Please check our wiki for help on navigating the form.

Horizon 2020

Call: H2020-ICT-2018-2020

(Information and Communication Technologies)

Topic: ICT-11-2018-2019

Type of action: IA

Proposal number: 856572

Proposal acronym: DALIE

Deadline Id: H2020-ICT-2018-3

Table of contents

How to fill in the forms

The administrative forms must be filled in for each proposal using the templates available in the submission system. Some data fields in the administrative forms are pre-filled based on the steps in the submission wizard.

1 - General information

Topic	ICT-11-2018-2019	Type of Action	IA
Call Identifier	H2020-ICT-2018-2020	Deadline Id	H2020-ICT-2018-3

Acronym	DALIE
Proposal title	Digital Accelerator for Large Industrial Ecosystems

Note that for technical reasons, the following characters are not accepted in the Proposal Title and will be removed: < > " &

Duration in months	*36*
Fixed keyword 1	Big data
Fixed keyword 2	New industrial value chains
Fixed keyword 3	Internet of Things
Fixed keyword 4	Field trial
Fixed keyword 5	Piloting
Free keywords	*Digitalization of European Industry, Smart Mobility, Smart Manufacturing, Smart Cities, Smart Finance*

Abstract

Digitalization is a game changer to address transversal challenges and bridge heterogeneous skills and markets. It enables the increase of the productivity through optimization over the entire supply chain and the emergence of new services through the convergence of different applications domains.
Overall target of DALIE (Digital Accelerator for Large Industrial Ecosystems) is to accelerate the digitalization of key industrial sectors within Europe. The project relies on two pillars: the uptake of digital economy in key industrial sectors through industrial large scale test-beds, and the development of an open and tailorable digitalization framework encompassing the entire ecosystem. More especially, DALIE's four main objectives are
> Obj.1: Set-up of 5 relevant industrial pilot test-beds in different key applications domains (smart -mobility, -manufacturing, -cities, -finance), all driven by major industry partners, and providing very large number of distributed sources involving in-field IoT data and remote data storage and processing locations.
> Obj.2: Provide support for data-driven business generation integrating data-driven business model innovation, and data privacy (GDPR)
> Obj.3: Tailoring of the IIOT and Big Data technology frameworks for traditional industries, relying on mature environments such as Fiware or OneM2M
> Obj.4: Boosting the ecosystem, especially SMEs, through smart education solutions, by financial support to third party (FSTP) through a dedicated open call, and by market places for improved collaboration along the value chain
The DALIE consortium regroups 10 countries, 27 partners (7 BDVA members), and through the three car manufacturers is accounting for 35% of the worldwide vehicle production. Furthermore, DALIE has already received the support of 5 regional and European institutions, illustrating the integration to the smart specialisation priorities at regional / national level especially around the industrial pilot test-beds.

Remaining characters 2

Has this proposal (or a very similar one) been submitted in the past 2 years in response to a call for proposals under Horizon 2020 or any other EU programme(s)? ○ Yes ◉ No

Please give the proposal reference or contract number.	
xxxxxx-x	

Declarations

1) The coordinator declares to have the explicit consent of all applicants on their participation and on the content of this proposal.	☒
2) The information contained in this proposal is correct and complete.	☒
3) This proposal complies with ethical principles (including the highest standards of research integrity — as set out, for instance, in the European Code of Conduct for Research Integrity — and including, in particular, avoiding fabrication, falsification, plagiarism or other research misconduct).	☒

4) The coordinator confirms:

- to have carried out the self-check of the financial capacity of the organisation on http://ec.europa.eu/research/participants/portal/desktop/en/organisations/lfv.html or to be covered by a financial viability check in an EU project for the last closed financial year. Where the result was "weak" or "insufficient", the coordinator confirms being aware of the measures that may be imposed in accordance with the H2020 Grants Manual (Chapter on Financial capacity check); or	◉
- is exempt from the financial capacity check being a public body including international organisations, higher or secondary education establishment or a legal entity, whose viability is guaranteed by a Member State or associated country, as defined in the H2020 Grants Manual (Chapter on Financial capacity check); or	○
- as sole participant in the proposal is exempt from the financial capacity check.	○

5) The coordinator hereby declares that each applicant has confirmed:

- they are fully eligible in accordance with the criteria set out in the specific call for proposals; and	☒
- they have the financial and operational capacity to carry out the proposed action.	☒

The coordinator is only responsible for the correctness of the information relating to his/her own organisation. Each applicant remains responsible for the correctness of the information related to him and declared above. Where the proposal to be retained for EU funding, the coordinator and each beneficiary applicant will be required to present a formal declaration in this respect.

According to Article 131 of the Financial Regulation of 25 October 2012 on the financial rules applicable to the general budget of the Union (Official Journal L 298 of 26.10.2012, p. 1) and Article 145 of its Rules of Application (Official Journal L 362, 31.12.2012, p.1) applicants found guilty of misrepresentation may be subject to administrative and financial penalties under certain conditions.

Personal data protection

The assessment of your grant application will involve the collection and processing of personal data (such as your name, address and CV), which will be performed pursuant to Regulation (EC) No 45/2001 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data. Unless indicated otherwise, your replies to the questions in this form and any personal data requested are required to assess your grant application in accordance with the specifications of the call for proposals and will be processed solely for that purpose. Details concerning the purposes and means of the processing of your personal data as well as information on how to exercise your rights are available in the privacy statement. Applicants may lodge a complaint about the processing of their personal data with the European Data Protection Supervisor at any time.

Your personal data may be registered in the Early Detection and Exclusion system of the European Commission (EDES), the new system established by the Commission to reinforce the protection of the Union's financial interests and to ensure sound financial management, in accordance with the provisions of articles 105a and 108 of the revised EU Financial Regulation (FR) (Regulation (EU, EURATOM) 2015/1929 of the European Parliament and of the Council of 28 October 2015 amending Regulation (EU, EURATOM) No 966/2012) and articles 143 - 144 of the corresponding Rules of Application (RAP) (COMMISSION DELEGATED REGULATION (EU) 2015/2462 of 30 October 2015 amending Delegated Regulation (EU) No 1268/2012) for more information see the Privacy statement for the EDES Database.

2 - Participants & contacts

#	Participant Legal Name	Country	Action
1	AVL LIST GMBH	AT	
2	COMAU SPA	Italy	
3	GM GLOBAL PROPULSION SYSTEMS - TORINO SRL	IT	
4	PIERBURG GMBH	DE	
5	MILES Learning GmbH	AT	
6	IDEAS & MOTION SRL	IT	
7	INTRASOFT INTERNATIONAL SA	LU	
8	AVL DiTEST GMBH	AT	
9	FACHHOCHSCHULE NORDWESTSCHWEIZ	CH	
10	KNOW-CENTER GMBH RESEARCH CENTER FOR DATA-DRIVEN BUSINESS & BIG DATA ANALYTICS	AT	
11	INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	EL	
12	NVISO SA	CH	
13	EASY GLOBAL MARKET SAS	FR	
14	POLITECNICO DI TORINO	IT	
15	BARCELONA SUPERCOMPUTING CENTER - CENTRO NACIONAL DE SUPERCOMPUTACION	ES	
16	CSP INNOVAZIONE NELLE ICT SCARL	IT	
17	SEAT SA	ES	
18	UNIVERSITAT POLITECNICA DE CATALUNYA	ES	
19	PANEPISTIMIO PATRON	EL	
20	CENTRO RICERCHE FIAT SCPA	IT	
21	FCA INFORMATION TECHNOLOGY, EXCELLENCE AND METHODS SPA	IT	

22	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR	
23	NOMMON SOLUTIONS AND TECHNOLOGIES SL	ES	
24	FACTUAL CONSULTING	ES	
25	Eurolife ERB A.E.G.A.	EL	
26	BUDAPESTI MUSZAKI ES GAZDASAGTUDOMANYI EGYETEM	HU	
27	VENAKA MEDIA LIMITED	UK	

2 - Administrative data of participating organisations

PIC	***Legal name***
999952243	*AVL LIST GMBH*

Short name: AVL

Address of the organisation

Street HANS-LIST-PLATZ 1

Town GRAZ

Postcode 8020

Country Austria

Webpage www.avl.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....31/12/2017 - no

SME self-assessment .....31/12/2017 - no

SME validation sme.....26/03/2010 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Research and Technology Development ☐ not applicable

☒ Same as proposing organisation's address

Street: HANS-LIST-PLATZ 1

Town: GRAZ

Postcode: 8020

Country: Austria

Dependencies with other proposal participants

Character of dependence	***Participant***	
Same Group	AVL DiTEST GMBH	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Eric** Last name: **Armengaud**

E-Mail: **eric.armengaud@avl.com**

Position in org.: Project Manager R&D

Department: Research and Technology Development ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: HANS-LIST-PLATZ 1

Town: GRAZ Post code: 8020

Country: Austria

Website: www.avl.com

Phone: +433167876945 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Nadine	KNOPPER	nadine.knopper@avl.com	*+433167875381*
Verena	Wagenhofer	verena.wagenhofer@avl.com	*+433167876160*

PIC	***Legal name***
998080143	*COMAU SPA*

Short name: COMAU

Address of the organisation

Street VIA RIVALTA 30

Town GRUGLIASCO

Postcode 10095

Country Italy

Webpage www.comau.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....05/12/2008 - no

SME self-assessment ..... unknown

SME validation sme.....05/12/2008 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Robotics an automation products ☐ not applicable

☒ Same as proposing organisation's address

Street: VIA RIVALTA 30

Town: GRUGLIASCO

Postcode: 10095

Country: Italy

Dependencies with other proposal participants

Character of dependence	***Participant***	
Same Group	CENTRO RICERCHE FIAT SCPA	
Same Group	FCA INFORMATION TECHNOLOGY, EXCELLENCE AND METHODS SPA	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **Alfio** Last name: **Minissale**

E-Mail: **alfio.minissale@comau.com**

Position in org.: Project manager

Department: Software Design, Product Development ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: VIA RIVALTA 30

Town: GRUGLIASCO Post code: 10095

Country: Italy

Website: www.comau.com

Phone: +39 3351635348 Phone 2: *+xxx xxxxxxxxx* Fax: *+xxx xxxxxxxxx*

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Ennio	Chiatante	ennio.chiatante@comau.com	*+xxx xxxxxxxxx*
Carem	Rosito Mercio	carem.rositomercio@comau.com	*+xxx xxxxxxxxx*

PIC	***Legal name***
987548077	*GM GLOBAL PROPULSION SYSTEMS - TORINO SRL*

Short name: GM

Address of the organisation

Street CORSO CASTELFIDARDO 36

Town TORINO

Postcode 10129

Country Italy

Webpage

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....25/02/2005 - no

SME self-assessment .....25/02/2005 - no

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Advanced Engineering ☐ not applicable

☒ Same as proposing organisation's address

Street: CORSO CASTELFIDARDO 36

Town: TORINO

Postcode: 10129

Country: Italy

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr.

Sex: (•) Male ( ) Female

First name: **Massimilano**

Last name: **MELIS**

E-Mail: **massimiliano.melis@gm.com**

Position in org.: Controls Business Process Manager

Department: Diesel Controls & Control Systems Europe

☐ Same as organisation name

☒ Same as proposing organisation's address

Street: CORSO CASTELFIDARDO 36

Town: TORINO

Post code: 10129

Country: Italy

Website: http://www.gmpowertrain.com

Phone: +393405662664

Phone 2: *+xxx xxxxxxxxx*

Fax: *+xxx xxxxxxxxx*

PIC	***Legal name***
940809306	*PIERBURG GMBH*

Short name: PIERBURG

Address of the organisation

Street Alfred-Pierburg-Strasse 1

Town Neuss

Postcode 41460

Country Germany

Webpage www.pierburg.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: M-CDV ☐ not applicable

☒ Same as proposing organisation's address

Street: Alfred-Pierburg-Strasse 1

Town: Neuss

Postcode: 41460

Country: Germany

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr.

Sex: (•) Male ( ) Female

First name: **Michael**

Last name: **Breuer**

E-Mail: **michael.breuer@de.rheinmetall.com**

Position in org.: Director Variable Valve Train Systems

Department: M-CDV ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: Alfred-Pierburg-Strasse 1

Town: Neuss Post code: 41460

Country: Germany

Website: www.rheinmetall-automotive.com

Phone: +49 2131 520 2469 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	*Last Name*	*E-mail*	*Phone*
Dirk	Hunkel	dirk.hunkel@de.rheinmetall.com	+xxx xxxxxxxxx

PIC	***Legal name***
913112314	*MILES Learning GmbH*

Short name: MILES

Address of the organisation

Street Krottendorferstrasse 9d

Town Graz

Postcode 8052

Country Austria

Webpage

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....unknown

Non-profit .....unknown

International organisation .....unknown

International organisation of European interest .....unknown

Secondary or Higher education establishment .....unknown

Research organisation .....unknown

Legal person .....yes

Industry (private for profit).....unknown

Enterprise Data

SME self-declared status.....29/11/2016 - yes

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Software- and Content-Development ☐ not applicable

☒ Same as proposing organisation's address

Street: Krottendorferstrasse 9d

Town: Graz

Postcode: 8052

Country: Austria

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr.

Sex: (•) Male ( ) Female

First name: **Thomas**

Last name: **Hötzl**

E-Mail: **thoetzl@miles-learning.com**

Position in org.: CEO

Department: Development

☐ Same as organisation name

☒ Same as proposing organisation's address

Street: Krottendorferstrasse 9d

Town: Graz

Post code: 8052

Country: Austria

Website: www.miles-learning.com

Phone: +436646199815

Phone 2: *+xxx xxxxxxxxx*

Fax: *+xxx xxxxxxxxx*

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Ingrid	Armengaud	ingrid.armengaud@miles-learning.com	*+xxx xxxxxxxxx*

PIC	***Legal name***
951805323	*IDEAS & MOTION SRL*

Short name: I&M

Address of the organisation

Street VIA SANTA MARGHERITA 8

Town ALBA

Postcode 12051

Country Italy

Webpage www.ideasandmotion.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....31/12/2015 - yes

SME self-assessment .....31/12/2015 - yes

SME validation sme.....08/11/2012 - yes

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Ideas & Motion S.r.l. ☐ not applicable

☐ Same as proposing organisation's address

Street: Via Moglia 19

Town: Cherasco

Postcode: 12062

Country: Italy

Department 2

Department name: Ideas & Motion S.r.l. ☐ not applicable

☐ Same as proposing organisation's address

Street: Corso Unione Sovietica 612/3/B

Town: Torino

Postcode: 10135

Country: Italy

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name **Riccardo** Last name **Groppo**

E-Mail **riccardo.groppo@ideasandmotion.com**

Position in org.: CEO

Department: IDEAS & MOTION SRL ☒ Same as organisation name

☐ Same as proposing organisation's address

Street: Via Moglia 19

Town: Cherasco Post code: 12062

Country: Italy

Website: www.ideasandmotion.com

Phone: +335 5610398 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Barbara	Almondo	barbara.almondo@ideasandmotion.com	+xxx xxxxxxxxx

PIC	***Legal name***
999702371	*INTRASOFT INTERNATIONAL SA*

Short name: INTRA

Address of the organisation

Street RUE NICOLAS BOVE 2B

Town LUXEMBOURG

Postcode 1253

Country Luxembourg

Webpage www.intrasoft-intl.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Research and Innovation Development ☐ not applicable

☒ Same as proposing organisation's address

Street: RUE NICOLAS BOVE 2B

Town: LUXEMBOURG

Postcode: 1253

Country: Luxembourg

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **Konstantinos** Last name: **Thivaios**

E-Mail: **ridlux@intrasoft-intl.com**

Position in org.: Director

Department: Research and Innovation Development ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: RUE NICOLAS BOVE 2B

Town: LUXEMBOURG Post code: 1253

Country: Luxembourg

Website: www.intrasoft-intl.com

Phone: +352 44 10122000 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	*Last Name*	*E-mail*	*Phone*
George	Dimitrakopoulos	george.dimitrakopoulos@intrasoft-intl.com	+xxx xxxxxxxxx

PIC	***Legal name***
904348655	*AVL DiTEST GMBH*

Short name: AVL DiTEST

Address of the organisation

Street Alte Poststrasse 156

Town Graz

Postcode 8020

Country Austria

Webpage www.avlditest.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Development ☐ not applicable

☒ Same as proposing organisation's address

Street: Alte Poststrasse 156

Town: Graz

Postcode: 8020

Country: Austria

Dependencies with other proposal participants

Character of dependence	***Participant***	
Same Group	AVL LIST GMBH	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name **Heiko** Last name **Scharke**

E-Mail **heiko.scharke@avl.com**

Position in org.: Product Management

Department: Product Management ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: Alte Poststrasse 156

Town: Graz Post code: 8020

Country: Austria

Website: www.avlditest.com

Phone: +43 316 787 2388 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Gerald	Holzmeister	gerald.holzmeister@avl.com	+xxx xxxxxxxxx

PIC	***Legal name***
999856310	*FACHHOCHSCHULE NORDWESTSCHWEIZ*

Short name: FHNW

Address of the organisation

Street BAHNHOFSTRASSE 6

Town WINDISCH

Postcode 5210

Country Switzerland

Webpage www.fhnw.ch

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....yes

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....18/11/2008 - no

SME self-assessment .....18/11/2008 - no

SME validation sme.....18/11/2008 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Institute for Interactive Technologies IIT ☐ not applicable

☒ Same as proposing organisation's address

Street: BAHNHOFSTRASSE 6

Town: WINDISCH

Postcode: 5210

Country: Switzerland

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof.

Sex: (•) Male ( ) Female

First name: **Samuel**

Last name: **Fricker**

E-Mail: **samuel.fricker@fhnw.ch**

Position in org.: Professor of Software Engineering

Department: Institute for Interactive Technologies IIT

☐ Same as organisation name

☒ Same as proposing organisation's address

Street: BAHNHOFSTRASSE 6

Town: WINDISCH

Post code: 5210

Country: Switzerland

Website: https://www.fhnw.ch

Phone: +41 79 196 9629

Phone 2: *+xxx xxxxxxxxx*

Fax: *+xxx xxxxxxxxx*

PIC	***Legal name***
997997111	*KNOW-CENTER GMBH RESEARCH CENTER FOR DATA-DRIVEN BUSINESS & BIG DATA ANALY*

Short name: KNOW

Address of the organisation

Street INFFELDGASSE 13/6

Town GRAZ

Postcode 8010

Country Austria

Webpage www.know-center.at

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....31/12/2016 - yes

SME self-assessment .....31/12/2016 - yes

SME validation sme.....12/11/2008 - yes

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Knowledge Discovery ☐ not applicable

☒ Same as proposing organisation's address

Street: INFFELDGASSE 13/6

Town: GRAZ

Postcode: 8010

Country: Austria

Department 2

Department name: Data-Driven Business ☐ not applicable

☒ Same as proposing organisation's address

Street: INFFELDGASSE 13/6

Town: GRAZ

Postcode: 8010

Country: Austria

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Ms

Sex: ○ Male ◉ Female

First name: **Noreen** Last name: **Berger**

E-Mail: **nberger@know-center.at**

Position in org.: Funding Manager

Department: Data Management ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: INFFELDGASSE 13/6

Town: GRAZ Post code: 8010

Country: Austria

Website: www.know-center.tugraz.at

Phone: +43 316 873 30835 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Roman	Kern	rkern@know-center.at	+xxx xxxxxxxxx
Viktoria	Pammer-Schindler	vpammer@know-center.at	+xxx xxxxxxxxx
Gert	Breitfuss	gbreitfuss@know-center.at	+xxx xxxxxxxxx

PIC	***Legal name***
999654356	*INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS*

Short name: ICCS

Address of the organisation

Street Patission Str. 42

Town ATHINA

Postcode 10682

Country Greece

Webpage www.iccs.gr

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....07/10/2008 - no

SME self-assessment ..... unknown

SME validation sme.....07/10/2008 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Internet Science Group ☐ not applicable

☒ Same as proposing organisation's address

Street: Patission Str. 42

Town: ATHINA

Postcode: 10682

Country: Greece

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof.

Sex: (•) Male ( ) Female

First name: **Emmanuel**

Last name: **Protonotarios**

E-Mail: **protonot@cs.ntua.gr**

Position in org.: Managing Director

Department: Internet Science Group

☐ Same as organisation name

☒ Same as proposing organisation's address

Street: Patission Str. 42

Town: ATHINA

Post code: 10682

Country: Greece

Website: www.iccs.gr

Phone: +302107724383

Phone 2: *+xxx xxxxxxxxx*

Fax: *+xxx xxxxxxxxx*

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Nikolaos	Bakalos	bakalosnik@mail.ntua.gr	*+xxx xxxxxxxxx*

PIC	***Legal name***
941251432	*NVISO SA*

Short name: NVISO

Address of the organisation

Street PARC SCIENTIFIQUE EPFL

Town LAUSANNE

Postcode 1015

Country Switzerland

Webpage www.nviso.ch

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....31/12/2016 - yes

SME self-assessment .....31/12/2016 - yes

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

No department involved

Department name: *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street: *Please enter street name and number.*

Town: *Please enter the name of the town.*

Postcode: *Area code.*

Country: *Please select a country*

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **Timothy** Last name: **Llewellynn**

E-Mail: **tim.llewellynn@nviso.ch**

Position in org.: Project Responsible

Department: NVISO SA ☒ Same as organisation name

☒ Same as proposing organisation's address

Street: PARC SCIENTIFIQUE EPFL

Town: LAUSANNE Post code: 1015

Country: Switzerland

Website: www.nviso.ai

Phone: +41 21 353 85 11 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Itsik	Arbel	itsika@gmail.com	+xxx xxxxxxxxx
Daria	Shirokova	daria.shirokova@nviso.ai	+xxx xxxxxxxxx

PIC	***Legal name***
972455847	*EASY GLOBAL MARKET SAS*

Short name: EGM

Address of the organisation

Street 444 ROUTE DES DOLINES

Town VALBONNE

Postcode 06560

Country France

Webpage www.eglobalmark.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....30/06/2013 - yes

SME self-assessment .....30/06/2013 - yes

SME validation sme.....28/07/2010 - yes

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

No department involved

Department name: *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street: *Please enter street name and number.*

Town: *Please enter the name of the town.*

Postcode: *Area code.*

Country: *Please select a country*

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Franck** Last name: **Le Gall**

E-Mail: **franck.le-gall@eglobalmark.com**

Position in org.: CTO

Department: EASY GLOBAL MARKET SAS ☒ Same as organisation name

☒ Same as proposing organisation's address

Street: 444 ROUTE DES DOLINES

Town: VALBONNE Post code: 06560

Country: France

Website: www.eglobalmark.com

Phone: +33620035420 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Philippe	Cousin	philippe.cousin@eglobalmark.com	+xxx xxxxxxxxx

PIC	***Legal name***
999977754	*POLITECNICO DI TORINO*

Short name: POLITO

Address of the organisation

Street CORSO DUCA DEGLI ABRUZZI 24

Town TORINO

Postcode 10129

Country Italy

Webpage www.polito.it

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....yes

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....05/07/2001 - no

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Dipartimento di Automatica e Informatica ☐ not applicable

☒ Same as proposing organisation's address

Street: CORSO DUCA DEGLI ABRUZZI 24

Town: TORINO

Postcode: 10129

Country: Italy

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof. Sex: ○ Male ◉ Female

First name: **Elena** Last name: **Baralis**

E-Mail: **elena.baralis@polito.it**

Position in org.: Full Professor

Department: Dipartimento di Automatica e Informatica ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: CORSO DUCA DEGLI ABRUZZI 24

Town: TORINO Post code: 10129

Country: Italy

Website: www.polito.it

Phone: +39 011 090 7075 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Daniele	Apiletti	daniele.apiletti@polito.it	+xxx xxxxxxxxx
Antonella	Falcone	antonella.falcone@polito.it	+xxx xxxxxxxxx
Dauin	Progetti	dauin.progetti@polito.it	+xxx xxxxxxxxx

PIC	***Legal name***
999655520	*BARCELONA SUPERCOMPUTING CENTER - CENTRO NACIONAL DE SUPERCOMPUTACION*

Short name: BSC

Address of the organisation

Street Calle Jordi Girona 31

Town BARCELONA

Postcode 08034

Country Spain

Webpage www.bsc.es

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....01/03/2005 - no

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Earth Science Department ☐ not applicable

☐ Same as proposing organisation's address

Street: Building NEXUS II, Jordi Girona 29

Town: Barcelona

Postcode: 08034

Country: Spain

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Albert** Last name: **Soret**

E-Mail: **albert.soret@bsc.es**

Position in org.: Earth System Services Group Coordinator

Department: Earth Science Department ☐ Same as organisation name

☐ Same as proposing organisation's address

Street: Building NEXUS II, Jordi Girona 29

Town: Barcelona Post code: 08034

Country: Spain

Website: https://www.bsc.es/

Phone: +34 934134076 Phone 2: *+xxx xxxxxxxxx* Fax: *+xxx xxxxxxxxx*

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Mar	Rodriguez	mar.rodriguez@bsc.es	*+34934137566*

PIC	***Legal name***
999456282	*CSP INNOVAZIONE NELLE ICT SCARL*

Short name: CSP

Address of the organisation

Street STRADA DEL LIONETTO 6

Town TORINO

Postcode 10146

Country Italy

Webpage WWW.CSP.IT

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....02/03/1989 - no

SME self-assessment ..... unknown

SME validation sme.....02/03/1989 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Ricerca e attività produttive ☐ not applicable

☐ Same as proposing organisation's address

Street: Via Pier Carlo Boggio, 59

Town: Torino

Postcode: 10138

Country: Italy

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr.

Sex: (•) Male ( ) Female

First name: **Ferdinando**

Last name: **Ricchiuti**

E-Mail: **ferdinando.ricchiuti@csp.it**

Position in org.: Head of Architectures and Applications area

Department: Ricerca e attività produttive

☐ Same as organisation name

☐ Same as proposing organisation's address

Street: Via Pier Carlo Boggio, 59

Town: Torino

Post code: 10138

Country: Italy

Website: www.csp.it

Phone: 011 4815141

Phone 2: +xxx xxxxxxxxx

Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Roberto	Borri	roberto.borri@csp.it	+xxx xxxxxxxxx

PIC	***Legal name***
964510480	*SEAT SA*

Short name: SEAT

Address of the organisation

Street AUTOVIA A-2 KM 585

Town MARTORELL

Postcode 08760

Country Spain

Webpage www.seat.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: VX - Customer Journey ☐ not applicable

☒ Same as proposing organisation's address

Street: AUTOVIA A-2 KM 585

Town: MARTORELL

Postcode: 08760

Country: Spain

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Diego** Last name: **Villuendas Pellicero**

E-Mail: **diego.villuendas@seat.es**

Position in org.: Head of VX3 – Data Management and Analytics unit

Department: VX – Customer Journey ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: AUTOVIA A-2 KM 585

Town: MARTORELL Post code: 08760

Country: Spain

Website: www.seat.com

Phone: +620 789 986 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Erwan	Guillotel	erwan.guillotel@seat.es	+xxx xxxxxxxxx

PIC	***Legal name***
999976202	*UNIVERSITAT POLITECNICA DE CATALUNYA*

Short name: UPC

Address of the organisation

Street CALLE JORDI GIRONA 31

Town BARCELONA

Postcode 08034

Country Spain

Webpage www.upc.edu

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....yes

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....05/03/2014 - no

SME self-assessment .....05/03/2014 - no

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: inLab FIB ☐ not applicable

☐ Same as proposing organisation's address

Street: Jordi Girona, 1-3

Town: Barcelona

Postcode: 08034

Country: Spain

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Jose** Last name: **Casanovas García**

E-Mail: **josep.casanovas@upc.edu**

Position in org.: inLab FIB Director

Department: inLab FIB ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: CALLE JORDI GIRONA 31

Town: BARCELONA Post code: 08034

Country: Spain

Website: https://www.upc.edu

Phone: +34934016941 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
MªPaz	Linares Herreros	mari.paz.linares@upc.edu	+xxx xxxxxxxxx

PIC	***Legal name***
999894528	*PANEPISTIMIO PATRON*

Short name: LMS

Address of the organisation

Street UNIVERSITY CAMPUS RIO PATRAS

Town RIO PATRAS

Postcode 265 04

Country Greece

Webpage www.upatras.gr

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....yes

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....05/06/2013 - no

SME self-assessment .....05/06/2013 - no

SME validation sme.....05/06/2013 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Laboratory for Manufacturing Systems & Automation (LMS) ☐ not applicable

☒ Same as proposing organisation's address

Street: UNIVERSITY CAMPUS RIO PATRAS

Town: RIO PATRAS

Postcode: 265 04

Country: Greece

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof.

Sex: (•) Male ( ) Female

First name: **George**

Last name: **Chryssolouris**

E-Mail: **xrisol@lms.mech.upatras.gr**

Position in org.: Scientific responsible

Department: Laboratory for Manufacturing Systems & Automation (LMS)

☐ Same as organisation name

☒ Same as proposing organisation's address

Street: UNIVERSITY CAMPUS RIO PATRAS

Town: RIO PATRAS

Post code: 265 04

Country: Greece

Website: http://lms.mech.upatras.gr/

Phone: +30 2610 910160

Phone 2: *+xxx xxxxxxxxx*

Fax: *+xxx xxxxxxxxx*

PIC	***Legal name***
999992886	*CENTRO RICERCHE FIAT SCPA*

Short name: CRF

Address of the organisation

Street STRADA TORINO 50

Town ORBASSANO

Postcode 10043

Country Italy

Webpage www.crf.it

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....27/10/2008 - no

SME self-assessment ..... unknown

SME validation sme.....27/10/2008 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: WCM Research and Innovation ☐ not applicable

☒ Same as proposing organisation's address

Street: STRADA TORINO 50

Town: ORBASSANO

Postcode: 10043

Country: Italy

Dependencies with other proposal participants

Character of dependence	***Participant***
Same Group	COMAU SPA
Same Group	FCA INFORMATION TECHNOLOGY, EXCELLENCE AND METHODS SPA

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Alessandro** Last name: **ZANELLA**

E-Mail: **alessandro.zanella@crf.it**

Position in org.: Senior Researcher

Department: CENTRO RICERCHE FIAT SCPA ☒ Same as organisation name

☒ Same as proposing organisation's address

Street: STRADA TORINO 50

Town: ORBASSANO Post code: 10043

Country: Italy

Website: www.crf.it

Phone: +390119083336 Phone 2: +xxx xxxxxxxxx Fax: +390119083666

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Alessandra	Bugaudi	alessandra.bugaudi@crf.it	*+390119083263*
Antonello	Saraniti	antonello.saraniti@crf.it	*+390119083091*
Giulio	Vivo	giulio.vivo@crf.it	*+390119083074*

PIC	***Legal name***
933681358	*FCA INFORMATION TECHNOLOGY, EXCELLENCE AND METHODS SPA*

Short name: FCA ITEM

Address of the organisation

Street VIA PLAVA 86

Town TORINO

Postcode 10135

Country Italy

Webpage

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....15/01/2015 - no

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: ICT INDUSTRIAL APPLICATIONS & SERVICES ☐ not applicable

☐ Same as proposing organisation's address

Street: via ex Aeroporto s.n.

Town: Pomigliano d'Arco

Postcode: 80038

Country: Italy

Dependencies with other proposal participants

Character of dependence	***Participant***	
Same Group	CENTRO RICERCHE FIAT SCPA	
Same Group	COMAU SPA	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr.

Sex: (•) Male ( ) Female

First name: **Antonino** Last name: **Santagata**

E-Mail: **antonino.santagata@fcagroup.com**

Position in org.: ICT Industrial Applications & Services

Department: ICT INDUSTRIAL APPLICATIONS & SERVICES ☐ Same as organisation name

☐ Same as proposing organisation's address

Street: via ex Aeroporto s.n.

Town: Pomigliano d'Arco Post code: 80078

Country: Italy

Website:

Phone: +39 81 196- 95335 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
giacomo	fecondo	giacomo.fecondo@fcagroup.com	*+39 081 19695347*
vincenzo	fontana	vincenzo.fontana@fcagroup.com	*+39 081 19695367*

PIC	***Legal name***
999992401	*COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES*

Short name: CEA

Address of the organisation

Street RUE LEBLANC 25

Town PARIS 15

Postcode 75015

Country France

Webpage www.cea.fr

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....01/10/2008 - no

SME self-assessment ..... unknown

SME validation sme.....01/10/2008 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: CEA/DRT/Leti ☐ not applicable

☐ Same as proposing organisation's address

Street: 17 rue des Martyrs

Town: GRENOBLE

Postcode: 38054

Country: France

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mrs

Sex: ○ Male ◉ Female

First name: **Isabelle**

Last name: **Dor**

E-Mail: **isabelle.dor@cea.fr**

Position in org.: Research engineer

Department: CEA/DRT/Leti/DACLE ☐ Same as organisation name

☐ Same as proposing organisation's address

Street: 17 rue des Martyrs

Town: GRENOBLE Post code: 38054

Country: France

Website: http://www.cea.fr

Phone: +33 4 38 78 59 70 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

PIC	***Legal name***
953371194	*NOMMON SOLUTIONS AND TECHNOLOGIES SL*

Short name: NOMMON

Address of the organisation

Street CALLE CLAUDIO COELLO 124 - PLANTA 4A T

Town MADRID

Postcode 28006

Country Spain

Webpage www.nommon.es

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....31/12/2014 - yes

SME self-assessment .....31/12/2014 - yes

SME validation sme.....18/04/2012 - yes

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Research and Development ☐ not applicable

☐ Same as proposing organisation's address

Street: Claudio Coello 124, 4º Derecha

Town: Madrid

Postcode: 28006

Country: Spain

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Oliva** Last name: **Garcia Cantu Ros**

E-Mail: **oliva.garcia-cantu@nommon.es**

Position in org.: Responsible of the Research and Development area

Department: Research and Development ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: CALLE CLAUDIO COELLO 124 - PLANTA 4A TRASERA

Town: MADRID Post code: 28006

Country: Spain

Website: www.nommon.es/

Phone: +34 910726265 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	*Last Name*	*E-mail*	*Phone*
Ricardo	Herranz	ricardo.herranz@nommon.es	+xxx xxxxxxxxx

PIC	***Legal name***
906285454	*FACTUAL CONSULTING*

Short name: FACTUAL

Address of the organisation

Street Josep Valls 13, 2on A

Town Sant Cugat del Vallès

Postcode 08195

Country Spain

Webpage www.factual-consulting.com

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

No department involved

Department name: *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street: *Please enter street name and number.*

Town: *Please enter the name of the town.*

Postcode: *Area code.*

Country: *Please select a country*

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr.

Sex: (•) Male ( ) Female

First name: **Martí**

Last name: **Jofre**

E-Mail: **marti@factual-consulting.com**

Position in org.: CEO

Department: FACTUAL CONSULTING ☒ Same as organisation name

☒ Same as proposing organisation's address

Street: Josep Valls 13, 2on A

Town: Sant Cugat del Vallès

Post code: 08195

Country: Spain

Website: www.factual-consulting.com

Phone: +34 675 32 47 47

Phone 2: *+xxx xxxxxxxxx*

Fax: *+xxx xxxxxxxxx*

PIC	***Legal name***
905405179	*Eurolife ERB A.E.G.A.*

Short name: Eurolife

Address of the organisation

Street 33-35, El. Venizelou (Panepistimiou) & Korai Str

Town Athens

Postcode 105 64

Country Greece

Webpage www.eurolife.gr

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....unknown

Non-profit .....unknown

International organisation .....unknown

International organisation of European interest .....unknown

Secondary or Higher education establishment .....unknown

Research organisation .....unknown

Legal person .....yes

Industry (private for profit).....unknown

Enterprise Data

SME self-declared status..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Technology and Growth, IT ☐ not applicable

☒ Same as proposing organisation's address

Street: 33-35, El. Venizelou (Panepistimiou) & K

Town: Athens

Postcode: 105 64

Country: Greece

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Mr. Sex: (•) Male ( ) Female

First name: **Anastasis** Last name: **Dimas**

E-Mail: **adimas@eurolife.gr**

Position in org.: Software Engineer

Department: Technology and Growth ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: 33-35, El. Venizelou (Panepistimiou) & Korai Str.

Town: Athens Post code: 105 64

Country: Greece

Website: www.eurolife.gr

Phone: +306945762056 Phone 2: *+xxx xxxxxxxxx* Fax: *+xxx xxxxxxxxx*

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Yannis	Sotiropoulos	ysotiropoulos@eurolife.gr	*+xxx xxxxxxxxx*

PIC	***Legal name***
999904228	*BUDAPESTI MUSZAKI ES GAZDASAGTUDOMANYI EGYETEM*

Short name: BME

Address of the organisation

Street MUEGYETEM RAKPART 3

Town BUDAPEST

Postcode 1111

Country Hungary

Webpage www.bme.hu

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....yes

Research organisation .....yes

Legal person .....yes

Industry (private for profit).....no

Enterprise Data

SME self-declared status.....06/01/2009 - no

SME self-assessment ..... unknown

SME validation sme.....06/01/2009 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

Department 1

Department name: Electron Devices ☐ not applicable

☒ Same as proposing organisation's address

Street: MUEGYETEM RAKPART 3

Town: BUDAPEST

Postcode: 1111

Country: Hungary

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Prof.

Sex: ○ Male ◉ Female

First name: **Marta**

Last name: **Rencz Kerecsen**

E-Mail: **rencz@eet.bme.hu**

Position in org.: Professor

Department: Electron Devices ☐ Same as organisation name

☒ Same as proposing organisation's address

Street: MUEGYETEM RAKPART 3

Town: BUDAPEST Post code: 1111

Country: Hungary

Website: http://www.eet.bme.hu

Phone: +3614632727 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	***Last Name***	***E-mail***	***Phone***
Andras	Poppe	poppe@eet.bme.hu	+xxx xxxxxxxxx

PIC	***Legal name***
954748303	*VENAKA MEDIA LIMITED*

Short name: VML

Address of the organisation

Street GLEBE MEWS 2

Town SIDCUP LONDON

Postcode DA15 8GU

Country United Kingdom

Webpage venaka.co.uk

Legal Status of your organisation

Research and Innovation legal statuses

Public body .....no

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

Legal person .....yes

Industry (private for profit).....yes

Enterprise Data

SME self-declared status.....31/03/2016 - yes

SME self-assessment .....31/03/2016 - yes

SME validation sme.....07/02/2011 - yes

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.

Department(s) carrying out the proposed work

No department involved

Department name: *Name of the department/institute carrying out the work.* ☒ not applicable

☐ Same as proposing organisation's address

Street: *Please enter street name and number.*

Town: *Please enter the name of the town.*

Postcode: *Area code.*

Country: *Please select a country*

Dependencies with other proposal participants

Character of dependence	***Participant***	

Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title: Dr. Sex: (•) Male ( ) Female

First name: **Krishna** Last name: **Chandramouli**

E-Mail: **k.chandramouli@venaka.co.uk**

Position in org.: Chief Technology Officer

Department: VENAKA MEDIA LIMITED ☒ Same as organisation name

☒ Same as proposing organisation's address

Street: GLEBE MEWS 2

Town: SIDCUP LONDON Post code: DA15 8GU

Country: United Kingdom

Website: http://www.venaka.co.uk

Phone: +447903093122 Phone 2: +xxx xxxxxxxxx Fax: +xxx xxxxxxxxx

Other contact persons

First Name	*Last Name*	*E-mail*	*Phone*
Sofia	Trujillo	sofia.trujillo@venaka.co.uk	+xxx xxxxxxxxx

3 - Budget

No	Participant	Country	(A) Direct personnel costs/€	(B) Other direct costs/€	(C) Direct costs of sub-contracting/€	(D) Direct costs of providing financial support to third parties/€	(E) Costs of inkind contributions not used on the beneficiary's premises/€	(F) Indirect Costs / € (=0.25(A+B-E))	(G) Special unit costs covering direct & indirect costs / €	(H) Total estimated eligible costs / € (=A+B+C+D+F+G) BENEFICIARY	(I) Reimburse-ment rate (%) BENEFICIARY	(J) Max.EU Contribution / € (=H*I) BENEFICIARY	(K) Costs of third parties linked to participant THIRD PARTIES	(L) Max.EU Contribution / € THIRD PARTIES	(M) Total Costs for BENEFICIARY & THIRD PARTIES (=H+K)	(N) Max.EU Contribution / € BENEFICIARY & THIRD PARTIES (=J+L)	(O) Requested EU Contribution / € BENEFICIARY & THIRD PARTIES
1	Avl	AT	697480	36000	0	0	0	183370,00	0	916850,00	70	641795,00	0	0	916850,00	641795,00	641795,00
2	Comau	IT	357500	40000	0	0	0	99375,00	0	496875,00	70	347812,50	0	0	496875,00	347812,50	347812,50
3	Gm	IT	941625	27000	0	0	0	242156,25	0	1210781,25	70	847546,88	0	0	1210781,25	847546,88	847546,88
4	Pierburg	DE	333300	192000	0	0	0	131325,00	0	656625,00	70	459637,50	0	0	656625,00	459637,50	459637,50
5	Miles	AT	355600	26500	0	0	0	95525,00	0	477625,00	70	334337,50	0	0	477625,00	334337,50	334337,50

6	I&m	IT	432000	40200	0	0	0	118050,00	0	590250,00	70	413175,00	0	0	590250,00	413175,00	413175,00
7	Intra	LU	768000	45000	0	0	0	203250,00	0	1016250,00	70	711375,00	0	0	1016250,00	711375,00	711375,00
8	Avl Ditest	AT	486920	490400	0	0	0	244330,00	0	1221650,00	70	855155,00	0	0	1221650,00	855155,00	855155,00
9	Fhnw	CH	448000	24000	0	0	0	118000,00	0	590000,00	100	590000,00	0	0	590000,00	590000,00	590000,00
10	Know	AT	577500	45000	0	0	0	155625,00	0	778125,00	100	778125,00	0	0	778125,00	778125,00	778125,00
11	Iccs	EL	390000	40000	0	0	0	107500,00	0	537500,00	100	537500,00	0	0	537500,00	537500,00	537500,00
12	Nviso	CH	484500	24000	35000	0	0	127125,00	0	670625,00	70	469437,50	0	0	670625,00	469437,50	469437,50
13	Egm	FR	224796	24000	0	0	0	62199,00	0	310995,00	70	217696,50	0	0	310995,00	217696,50	217696,50
14	Polito	IT	675000	25000	0	0	0	175000,00	0	875000,00	100	875000,00	0	0	875000,00	875000,00	875000,00
15	Bsc	ES	810000	114000	0	0	0	231000,00	0	1155000,00	100	1155000,00	0	0	1155000,00	1155000,00	1155000,00

16	Csp	IT	210000	12000	0	0	0	55500,00	0	277500,00	100	277500,00	0	0	277500,00	277500,00	277500,00
17	Seat	ES	264000	133280	0	0	0	99320,00	0	496600,00	70	347620,00	0	0	496600,00	347620,00	347620,00
18	Upc	ES	580000	70000	0	0	0	162500,00	0	812500,00	100	812500,00	0	0	812500,00	812500,00	812500,00
19	Lms	EL	682500	62000	0	0	0	186125,00	0	930625,00	100	930625,00	0	0	930625,00	930625,00	930625,00
20	Crf	IT	426600	60000	0	0	0	121650,00	0	608250,00	100	608250,00	0	0	608250,00	608250,00	608250,00
21	Fca Item	IT	518400	14000	0	0	0	133100,00	0	665500,00	70	465850,00	0	0	665500,00	465850,00	465850,00
22	Cea	FR	102850	30000	500000	0	0	33212,50	0	666062,50	100	666062,50	0	0	666062,50	666062,50	666062,50
23	Nommon	ES	120000	12000	0	0	0	33000,00	0	165000,00	70	115500,00	0	0	165000,00	115500,00	115500,00
24	Factual	ES	864000	48000	0	0	0	228000,00	0	1140000,00	70	798000,00	0	0	1140000,00	798000,00	798000,00
25	Eurolife	EL	444000	165000	0	0	0	152250,00	0	761250,00	70	532875,00	0	0	761250,00	532875,00	532875,00

26	Bme	HU	211200	68000	0	0	0	69800,00	0	349000,00	100	349000,00	0	0	349000,00	349000,00	349000,00
27	Vml	UK	334800	54000	0	0	0	97200,00	0	486000,00	70	340200,00	0	0	486000,00	340200,00	340200,00
	Total		12740571	1921380	535000	0	0	3665487,75	0	18862438,75		15477575,88	0,00	0,00	18862438,75	15477575,88	15477575,88

4 - Ethics

1. HUMAN EMBRYOS/FOETUSES		Page
Does your research involve Human Embryonic Stem Cells (hESCs)?	○ Yes ◉ No	
Does your research involve the use of human embryos?	○ Yes ◉ No	
Does your research involve the use of human foetal tissues / cells?	○ Yes ◉ No	
2. HUMANS		**Page**
Does your research involve human participants?	○ Yes ◉ No	
Does your research involve physical interventions on the study participants?	○ Yes ◉ No	
3. HUMAN CELLS / TISSUES		**Page**
Does your research involve human cells or tissues (other than from Human Embryos/ Foetuses, i.e. section 1)?	○ Yes ◉ No	
4. PERSONAL DATA		**Page**
Does your research involve personal data collection and/or processing?	○ Yes ◉ No	
5. ANIMALS		**Page**
Does your research involve animals?	○ Yes ◉ No	
6. THIRD COUNTRIES		**Page**
In case non-EU countries are involved, do the research related activities undertaken in these countries raise potential ethics issues?	○ Yes ◉ No	
Do you plan to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?	○ Yes ◉ No	
Do you plan to import any material - including personal data - from non-EU countries into the EU?	○ Yes ◉ No	
Do you plan to export any material - including personal data - from the EU to non-EU countries?	○ Yes ◉ No	
In case your research involves low and/or lower middle income countries, are any benefits-sharing actions planned?	○ Yes ◉ No	
Could the situation in the country put the individuals taking part in the research at risk?	○ Yes ◉ No	
7. ENVIRONMENT & HEALTH and SAFETY		**Page**

Does your research involve the use of elements that may cause harm to the environment, to animals or plants?	◯ Yes ◉ No	
Does your research deal with endangered fauna and/or flora and/or protected areas?	◯ Yes ◉ No	
Does your research involve the use of elements that may cause harm to humans, including research staff?	◯ Yes ◉ No	
8. DUAL USE		Page
Does your research involve dual-use items in the sense of Regulation 428/2009, or other items for which an authorisation is required?	◯ Yes ◉ No	
9. EXCLUSIVE FOCUS ON CIVIL APPLICATIONS		Page
Could your research raise concerns regarding the exclusive focus on civil applications?	◯ Yes ◉ No	
10. MISUSE		Page
Does your research have the potential for misuse of research results?	◯ Yes ◉ No	
11. OTHER ETHICS ISSUES		Page
Are there any other ethics issues that should be taken into consideration? Please specify	◯ Yes ◉ No	

I confirm that I have taken into account all ethics issues described above and that, if any ethics issues apply, I will complete the ethics self-assessment and attach the required documents. ☒

How to Complete your Ethics Self-Assessment

5 - Call-specific questions

Extended Open Research Data Pilot in Horizon 2020

If selected, applicants will by default participate in the Pilot on Open Research Data in Horizon 2020[1] , which aims to improve and maximise access to and re-use of research data generated by actions.

However, participation in the Pilot is flexible in the sense that it does not mean that all research data needs to be open. After the action has started, participants will formulate a Data Management Plan (DMP), which should address the relevant aspects of making data FAIR – findable, accessible, interoperable and re-usable, including what data the project will generate, whether and how it will be made accessible for verification and re-use, and how it will be curated and preserved. Through this DMP projects can define certain datasets to remain closed according to the principle "as open as possible, as closed as necessary". A Data Management Plan does not have to be submitted at the proposal stage.

Furthermore, applicants also have the possibility to opt out of this Pilot completely at any stage (before or after the grant signature). In this case, applicants must indicate a reason for this choice (see options below).

Please note that participation in this Pilot does not constitute part of the evaluation process. Proposals will not be penalised for opting out.

We wish to opt out of the Pilot on Open Research Data in Horizon 2020.	○ Yes	◉ No

Further guidance on open access and research data management is available on the participant portal: http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-dissemination_en.htm and in general annex L of the Work Programme.

[1] *According to article 43.2 of Regulation (EU) No 1290/2013 of the European Parliament and of the Council, of 11 December 2013, laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" and repealing Regulation (EC) No 1906/2006.*

DALIE: "Digital Accelerator for Large Industrial Ecosystems"

Call: ICT-11-2018-2019: 'HPC and Big Data enabled Large-scale Test-beds and Applications'
Type of funding scheme: Innovation Action (IA)
Submission date: November 14th, 2018
Project duration: 36 months
Coordinating person: Dr. Eric Armengaud, MBA

No	Organisation Name	Beneficiary short name	Organization type	Country
01	AVL List GmbH	AVL	IND	AT
02	COMAU S.p.A.	COMAU	IND	IT
03	GM global propulsion systems	GM	IND	IT
04	Pierburg GmbH	PIE	IND	GE
05	Miles Learning GmbH	ML	SME	AT
06	Ideas & Motion S.r.l.	I&M	SME	IT
07	Intrasoft International SA	INTRA*	IND	LU
08	AVL DiTEST GmbH	DIT	IND	AT
09	University of Applied Sciences and Arts Northwestern Switzerland	FHNW	RTO	CHE
10	KnowCenter GmbH	KNOW*	RTO	AT
11	National Technical University of Athens (ICCS)	ICCS*	RTO	GR
12	NVISO S.A.	NVISO	SME	CHE
13	Easy Global Market	EGM*	SME	FR
14	Politecnico di Torino	POLITO**	RTO	IT
15	Barcelona Supercomputing center-Centro Nacional de Supercomputación	BSC*	RTO	ES
16	CSP innovazione nelle ICT s.c.a r.l.	CSP	RTO	IT
17	SEAT S.A.	SEAT	IND	ES
18	Universitat Politècnica de Catalunya	UPC	RTO	ES
19	University of Patras, Laboratory for Manufacturing Systems (LMS)	LMS	RTO	GR
20	Centro Ricerche FIAT S.C.p.A	CRF	RTO	IT
21	FCA Information Technology, Excellence and Methods (FCA S.P.A.)	FCA	IND	IT
22	COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	CEA*	RTO	FR
23	Nommon Solutions and Technologies S.L.	NOM	SME	ES
24	Factual Consulting	FAC	SME	ES
25	Eurolife ERB A.E.G.A	EUR	IND	GR
26	Budapest University of Technology and Economics	BME	RTO	HU
27	Venaka Media Limited	VML	SME	UK

** BDVA members; ** BDVA member through the CINI consortium*

1. Excellence

1.1 Objectives

1.1.1 Motivation

Digitalization is a game changer to address transversal challenges and **bridge heterogeneous skills** and markets. It enables the increase of the productivity through optimization over the entire supply chain and the **emergence of new services** through the convergence of **different applications domains**. First, digitalization supports **the increase of productivity through optimization over the entire supply chain** by seamlessly connecting the various stages of the product lifecycle. This enables an earlier and more accurate prediction of the real behavior during a concept phase (frontloading), and faster and more tailored improvement of development and production processes taking into account real product's usage. Second, digitalization enables **the emergence of new services through the convergence of different applications domains**. A typical example is the emergence of mobility as a service, where several fairly closed markets become more and more integrated. This **service-orientation** on the one hand increases the efficiency of transportation (e.g., for example, reducing the door-to-door transportation time) and on the other hand serves to reduce global emissions.

Springing from the aforementioned motivation, the fundamental goal of **DALIE (*Digital Accelerator for Large Industrial Ecosystems*) is to accelerate the digitalization of key industrial sectors within Europe.** This is driven by three main trends within the diverse industrial domains. First, the cost of sensors and actuators has dropped dramatically over the last decade[i]. Second, storage for these huge amounts of sensor data has become much cheaper, making it feasible to store these data for analysis. Third, Moore's law has continued to increase the computational power of microcontrollers. Due to these three converging trends, it has become possible to analyze data and to **rely on data-driven rather than on opinion-based decisions** across the industrial product lifecycle.

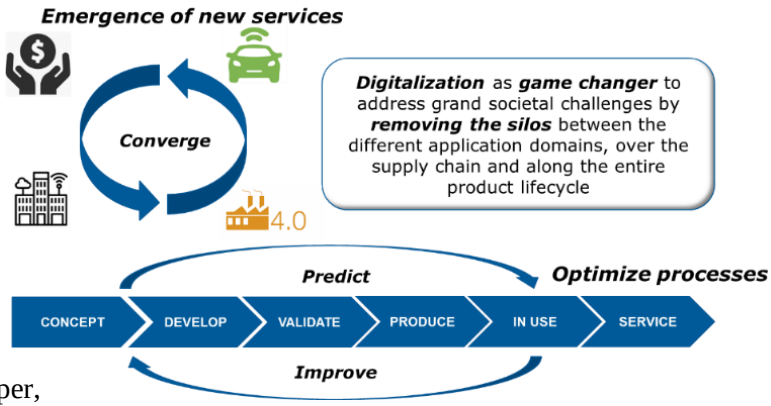


Figure 1: DALIE's vision – Digitalization as game changer by removing the silos

To achieve this goal, the project will rely on two main pillars (see Figure 1): (a) the uptake of digital economy for key industrial sectors and for the society through industrial large scale test-beds, and (b) the development of an open and tailorable digitalization framework encompassing the entire ecosystem supporting the uptake of digital economy.

1.1.2 Project objectives

DALIE's two main pillars are refined into the following four main objectives

- **Objective O1: Set-up of 5 relevant industrial pilot test-beds** in different, relevant applications domains while maintaining a relation to the overarching topic of smart transportation, all being driven by major industry partners. Target of these environments is to establish industrial relevant data flows from a very large number of distributed, heterogeneous sources, and to clearly demonstrate how digitalization generates innovation and large value creation from such data assets.
- **Objective O2: Provide support for data-driven business generation** by appropriate guidance, best practices and environments for business innovation related to data-driven business models, data-related market places, and for data privacy in the context of the General Data Protection Regulation (GDPR)[ii].
- **Objective O3: Tailoring of the IIOT and Big Data technology frameworks for traditional industries,** relying on mature environments such as FIWARE or oneM2M, to make the solutions faster converging to the industrial needs identified in the industrial test-beds.

- **Objective O4: Boosting the ecosystem** by extending the target audience of the DALIE outcomes by making use of appropriate education solutions, and by providing incentives to innovative SMEs to map to this initiative, complemented by supporting standardization activities.

The rest of this section aims at elaborating on the objectives, starting from the challenges, to which the objectives try to respond and continuing with distilling further the objectives.

Challenge 1: Demonstrate innovation and value creation by digitalization

Traditional large industries such as the automotive market – ranging from development up to recycling – are already well organized and have achieved high maturity over the decades. Nevertheless, traditional industrial markets are typically highly segmented and still dominated by non-ICT skills (e.g., mechanical engineering, production engineering). Digitalization provides a high potential to create data and information bridges over the product lifecycle, over the supply chain and with other application domains, thus leading to improved products and competitiveness increase. At the same time, the emergence of digitalization skills and digital solutions as complementarity to the traditional domains and existing solutions is required to achieve these targets. To answer this, Objective O1 has the target of setting-up 5 relevant **industrial pilot test-beds (IPTB)** to clearly demonstrate innovation and value creation by digitalization in selected segments.

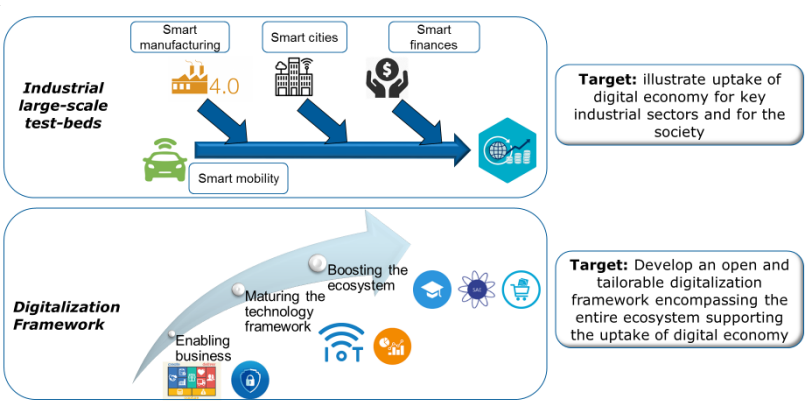


Figure 2: DALIE's mission: supporting digitalization uptake in traditional industries

Objective O1: Set-up of 5 relevant industrial pilot test-beds

- Objective O1.1*:* ***IPTB1 Smart mobility for fleet monitoring*** enabling productivity improvement along the entire vehicle product lifecycle
- Objective O1.2*:* ***IPTB2: Smart mobility for condition monitoring for emission regulation*** enabling productivity and performance improvement for core vehicle components
- Objective O1.3*:* ***IPTB3: Smart manufacturing for quality control*** targeting reduction of production waste and more efficient usage of the robots in the production line
- Objective O1.4*:* ***IPTB4: Smart cities for Air Quality & Mobility Strategies*** targeting reduction of emission peaks and traffic jams in large metropoles
- Objective O1.5*:* ***IPTB5: Smart finance for automotive insurance*** enabling higher customization of services

Challenge 2: Support the shift from traditional business models to data-driven business models

A key success factor for big data and digitalization in general is the capability to assess and later on monetize value creation, associated with a number of challenges. The first one is the capability to systematically analyze potential for value creation by digitalization and identify appropriate data-driven business models. The second challenge is to create an environment supporting demand and supply balancing (e.g., dedicated data market places), providing the appropriate services for enabling data-related businesses. To fully assess Europe's potential in the revolution of data-driven business, strong contributions to the European efforts on open data are important. Identifying standards for data-driven business approaches will help to foster the collaboration within the European data ecosystem. A third challenge is to properly understand the regulations and customer expectations in terms of confidentiality, data privacy, and ethical issues. There is a need to identify and evaluate positive externalities or 'value' of data market innovations that go beyond mere economic value. This work will make it easier to identify and promote the most trustworthy, ethical data market operations.

Objective O2: Provide support data-driven business generation

- Objective O2.1: Establishment of a **framework for data-driven business model development**, matching data value with market opportunities in terms of benefits, costs and risks in order to increase the competitiveness of the European industry partners.
- Objective O2.2: Significant contribution to the ongoing **European efforts on open data, while** adhering and promotion of standards for data-driven business approaches.
- Objective O2.3: Definition of **guidelines to address legal and ethical issues** in coherence with the European regulatory framework with emphasis on their practical applicability.

Challenge 3: Fill the technology gap between traditional industrial solutions and digitalization opportunities

The skills required for digitalization – ranging from cyber-physical systems for the digitalization of the physical behavior, to IoT for the connectivity between machines and the transmission of the information, up to big data for data structuring, data analytics and data visualization – need to be integrated in the traditional industrial skills portfolio (e.g., mechanical engineering, hydraulic, thermodynamics, etc.). This convergence is challenging since the different fields of expertise are highly heterogeneous and rely on long education as well as decades of experience. Consequently, the challenges are to find high skilled engineers as "technology translators" and to make the ICT technology more modular (e.g., as stand-alone technology bricks that can be easily integrated) in order to reduce the complexity and skill level required.

Objective O3: Tailoring of the IIOT and Big Data technology frameworks to traditional industries

- Objective O3.1 **Establishment of a baseline** based on existing frameworks and initiatives, including FIWARE and oneM2M.
- Objective O3.2: **Creation of an advanced framework for big data processing** integrating scalable big data management, automation of reusable big data ETL best practices, methods for automatic data enrichment and advanced machine learning algorithms, making use of existing, industrial domain expertise
- Objective O3.3: **Creation of a framework for interactive analysis in a (big-)data value chain**, relying on personalized visual analytics, multi-scale, visual interfaces for big-data processing methods, and collaborative visual workspace to enable collaboration and achieve a feedback loop with the big data processing pipeline.

Challenge 4: Lever value creation over the entire product lifecycle by boosting the entire supply chain

The opportunity of value creation through digitalization by mapping the different product lifecycles and by bridging different application domain is huge. In order to achieve such ambitious goal, a number of challenges need to be overcome. The first challenge addresses the aspect of education, with the need for emergence of digital skills in traditional work areas, necessary to optimize existing processes and to gain competitiveness. A second challenge is the capability to efficiently integrate the value creation chain, especially by integrating the SMEs as technology champions in this digitalization. Hence, especially the small structures lack internal resources to invest on new skills. A third and related challenge is the uptake and deployment of standards to support and accelerate industrialization of the innovation and secure the related invests.

Objective O4: Boosting the ecosystem

- Objective O4.1 Deployment of **smart education platform and related trainings** for IIoT and data analytics, enabling staff individualized and hybrid training for efficient deployment of ICT skill in traditional industrial environments.
- Objective O4.2: **Embedding SME community** to the industrial test-beds by means of **call for projects and appropriate cascade funding,** relying on the European' Smart Anything Everywhere (SAE) initiative.

- Objective O4.3: Establishment of a **dedicated data market place** for the efficient exchange and monetization of data, also integrating existing solutions by consortium partners and European initiatives
- Objective O4.4: Adherence to **established standardization and contribution to ongoing standardization efforts**, to ensure the developed solutions to scale beyond the industrial pilots and to achieve impact beyond the project's lifetime.

1.2 Relation to the work programme

DALIE is an Innovation Action, targeting the **topic ICT-11-2018, 'HPC and Big Data enabled Large-scale Test-beds and Applications'.** In the following we **address the specific challenges of the H2020 ICT-11-2018 call and the** corresponding **DALIE solutions proposed**, with indication of the respective objectives to be reached.

[ICT-11 Call] ***Development of large-scale IoT/Cloud-enabled industrial pilot test-beds for big data applications*** by combining and taking advantage of relevant technologies (Big Data, IoT, cloud and edge computing, etc.).

DALIE contribution: DALIE will demonstrate how Big Data and IoT can be used for significantly increasing the automation of industrial processes not only at local level (e.g., within a plant), but also end-to-end at global level. Hence, it will accelerate the pace of digitization and the innovation potential of I4.0 applications, through considering automation across the entire value chain. To do so, DALIE will set-up 5 relevant industrial pilot test-beds **(obj.O1)** in different applications domains while always relating to smart transportation, and all driven by major industry partners. Target of these environments is to provide industrial relevant data flows from a very large number of distributed sources, and to clearly demonstrate how digitalization will generate innovation and large value creation from such data assets. Furthermore, the results of those 5 test-beds will be used to promote and apply the digitalization technologies to aftersales market equipment systems for workshops and test organizations.

[ICT-11 Call] Development of industrial pilot test-beds ***addressing data flows from a very large number of distributed sources*** (such as sensors or IoT applications/infrastructures and/or involving remote data storage/processing locations).

DALIE contribution: DALIE is expected to enable the wave of Big Data applications that will comprise data streams from millions of internet-connected devices and smart objects, through the establishment of the 5 industrial test-beds. As part of these applications, DALIE will demonstrate how Big Data, IoT and AI can be used for controlling complex physical processes based on real-time decision making across the entire value chain and in a fully automated way, especially through achieving **obj. O1 and obj. O2**. The available datasets are described in Section 1.3.2 and refined in the Annex 2.

[ICT-11 Call] Demonstrate how to generate innovation and large value creation from such data.

DALIE contribution: DALIE firmly believes that a key success factor for big data and digitalization, in general, is the capability to assess and later on monetize value creation. To fully assess Europe's potential in the revolution of data-driven business, strong contributions to the European efforts on open data are important. Identifying standards for data-driven business approaches will help to foster the collaboration within the European data ecosystem. Moreover, there is a need to identify and evaluate positive externalities or 'value' of data market innovations that go beyond mere economic value. This work will make it easier to identify and promote the most trustworthy, ethical data market operations.

DALIE will contribute to the above through: a) creating a framework for data-driven business model development, matching data value with market opportunities in terms of benefit, cost and risk in order to increase the competitiveness of the industry partners (**obj. O2.1**), b) contributing to the European efforts on open data and interacting with standards for data-driven business approaches (**obj. O2.2**), c) defining guidelines to address legal and ethical issues in coherence with the European regulatory framework **(obj. O2.3)**

[ICT-11 Call] ***Addressing networking connectivity and large-scale data collection, management and interoperability issues*****.**

DALIE contribution: DALIE plans to contribute to this by working on pre-processing, validation and anonymization of big data, by the enrichment with additional information sources, as well as by deploying AI for pattern and condition detection and prediction.
In particular, through achieving (**obj. O3)**, DALIE will tailor the IIOT and Big Data technology frameworks for automotive applications, in particular targeting industrial IoT related to FiWare and OneM2M (**obj. O3.1**), creating a framework for big data processing integrating advancing Big Data management, automation of reusable Big Data ETL* best practices, methods for data enrichment and scalable machine learning algorithms **(obj.O3.2),** as well as creating a framework for interactive analysis in a big-data value chain, relying on personalized visual analytics, multi-scale, visual interfaces for big-data processing methods, and collaborative visual workspace (**obj.O3.3**).
The data assets available to the test-beds are also described in the proposal (Section 1.3.2 and refined in Annex 2).

[ICT-11 Call] ***Simple secure access and secure service*** provisioning of highly demanding data use cases for companies and ***especially SMEs***.

DALIE contribution: DALIE will contribute to this work programme expectation by leveraging on value creation over the entire product lifecycle by boosting the entire supply chain. This will be made possible especially through achieving **obj. O4**, by:

- Deploying a smart education platform and related trainings for IIoT and data analytics
- Embedding SME community to the industrial test-beds by means of call for projects and appropriate cascade funding, relying on the European SAE initiative community and support
- Deploying a dedicated data market place for the efficient exchange and monetization of data

The **synergies with relevant national / regional research and innovation programmes and initiatives** is implemented through the local industrial pilot test-beds and the **8 letters of support received already during proposal preparation phase**, See Annex 1. This encompasses especially **smart cities** (Bit Habitat Fundation, city of Turin), **regional competence centers** (MESAP, BigDataCoE), **companies** (ÖAMTC, IoMob), as well as **European initiatives** (EPoSS, POLIS).

Out of the 27 partners within the DALIE consortium, **7 are members of the BDVA**. KNOW is part of the board of directors and member of the partnership board with the commission, INTRA, ICCS, EGM, BSC, POLITO (through the CINI laboratory) and CEA are BDVA members. As the consortium is fully aware of the challenges in the fields of Big Data we address several topics of the Strategic Research and Innovation Agenda (SRIA 3.0).[iii] As depicted in Table 1, the DALIE project is covering technical and non-technical priorities, as well as supporting to overcome the identified weaknesses of the European market.

Table 1: Relation to SRIA 4.0

Technical Priorities	**DALIE Objective**
Data Management	O1.1-1.5, O2.2, O3.2
Data Processing Architectures	O1.1-1.5, O2.2, O3.2
Data Analytics	O1.1-1.5, O3.2
Data Protection	O1.1-1.5, O2.2, O2.3
Data Visualization and User Interaction	O3.3
Non-Technical Priorities	**DALIE Objective**
Skills development	O4.1
Business Models and Ecosystems	O2.1,
Policy, Regulation and Standardization	O2.1, O2.2, O2.3
Social perceptions and societal implication	O1.2-5, O2.2-3, O3.2
Weakness of the European Market *(mostly from SRIA V3.0)*	**DALIE Objective**
There are few large companies to lead the market, and many small sized companies that need nurturing	O1.1-1.5, O2.1, O2.2
There is no visibility of ecosystem service offerings.	O2.1, O2.2, O2.3
Lack of processable linked data, and of aggregated/combined data.	O2.2, O3.2,

Lack of seamless data access and inter-connectivity, and low levels of interoperability: data is often in silos and data sharing is difficult due to a lack of standards e.g. formats and semantics.	O1.1-1.5, O3.2
Migration of data between systems, versions or partners is challenging.	O1.1-1.5, O2.3
Public data in EU is not available to the extent it should be.	O2.3
The quality of data in open data portals is often very low.	O2.3
Structural data sources often lack precise semantics from ontologies.	O1.1-1.5, O2.2, O2.3
There is a lack of specialised education programs for data analysts.	O4.1
There are not enough skilled people to participate in training programmes.	O2.3, O4.1
Legislative restrictions on data sharing decrease availability across Europe and makes European-focused initiatives more difficult.	O2.2, O2.3
Providing Big Data (Value) for SME use.	O4.1, O4.2, O4.3

1.3 Concept and methodology

1.3.1 Overview of the approach

DALIE pursues a **comprehensive approach for business value creation with a technology stack that accounts for the fast-changing diversity of technologies, platforms, and tools for data-driven innovation**. Figure 3 provides an overview of the concept and methodology for building the DALIE test-beds (Obj. 1). The DALIE digital framework will offer a technology stack (Obj. 3) for value creation with novel digital services. These innovations evolve automotive business models (Obj. 2) with the potential to disrupt the automotive ecosystem (Obj. 4). The DALIE technology stack will offer the necessary ICT components and services for building and implementing end-to-end solutions with data-driven digital services. DALIE will put a strong focus on "data platforms & connectivity" and "applications" and achieve openness and flexibility in the "connected devices" layer with standards that allow services to rely on integrated sources for in-the-field information.

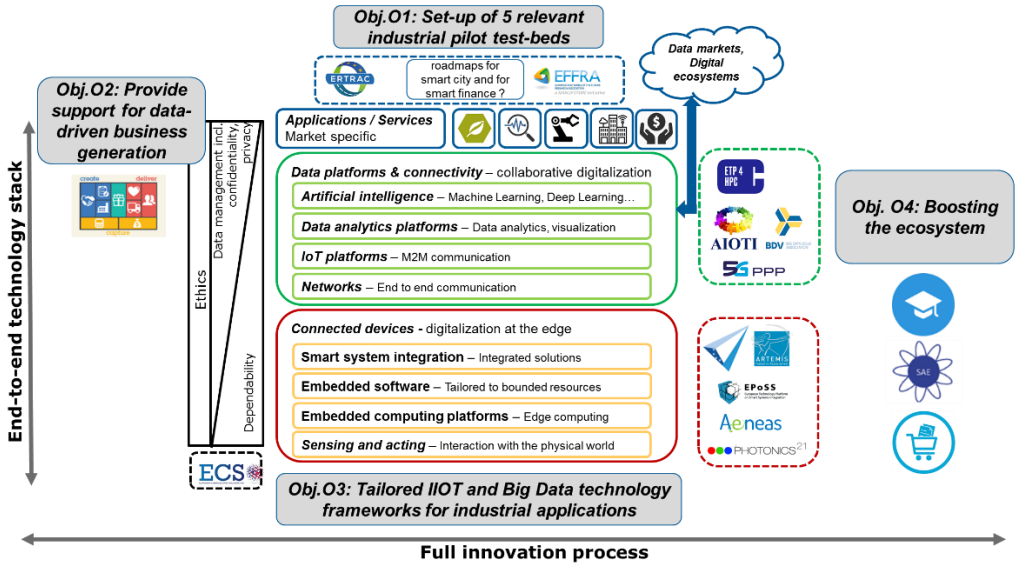


Figure 3: Overview of the DALIE's concept and methodology

Objective 1, *to set-up 5 relevant industrial pilot test-beds*, is achieved by taking advantage of relevant technologies (Big Data, IoT, cloud and edge computing) that offer data flows from a large number of distributed sensors to build **big data-based automotive and smart mobility applications**. The first two focus on **smart mobility** with **process optimization along the product lifecycle**. The other three demonstrate the **emergence of new services** that are enabled by the **convergence of different application domains**, namely smart production, smart cities, and smart insurances. The choice of these test-beds shows the broad opportunity for value creation in the key industrial sector of mobility.

Objective 2, *to provide support for data-driven business generation*, will support the shift from traditional business models to **data-driven business models**. The objective will be achieved by the creation of a framework for the development of business models that create large value from data assets.

Tools and methods will be developed to support the matching of data value with market opportunities. Furthermore, DALIE contributes to the **European efforts on open data** by fostering the collaboration within the European data ecosystems. Finally, DALIE aims to define guidelines to **address legal and ethical issues** in coherence with the European regulatory framework

Objective 3, *to tailor the IIoT and Big Data technology frameworks for traditional industries*, will be achieved with a comprehensive technology stack for data-driven automotive applications: a) the connected devices (or **cyber-physical systems** CPS), implementing digitalization at the edge, will be in charge to interact with the physical world in order to locally digitalize relevant information and act on the environment. They are typically specialized for a dedicated application and market. b) The **data platforms and analytics** will target the data gathering, organization processing, as well as communication management. These layers typically present a high degree of standardization to enable higher number of participants to collaborate. c) The **market-specific application**, on top, will provide the value creation for the customer while relying on the lower layers. This layer is typically tailored for a specific market need. d) The stack is further complemented by **data management**, including security (privacy, confidentiality) and ethics, as well as interfaces to interact with external **data markets and digital ecosystems.**

Objective 4, *to boost the ecosystem*, will be achieved by **integrating SMEs and technology providers in the value creation chain**. SMEs are facing numerous challenges in aligning data-driven solutions with customer needs, acquiring expertise of the domain application and data sciences, and enlarging cash flow flexibility to develop new assets, grow new competences, address new markets, and acquire customers. DALIE will address these challenges with a) **smart education**, b) **Financial Support to Third Party** (FSTP, also called cascade funding), and c) a **market place**. The FSTP will draw on the FED4SAE project, a part of the EC initiative Smart Anything Everywhere[iv], and bring support for small companies to increase their skills through collaboration with European big players (digital innovation hubs, research centers, RTO, and large industrial suppliers) and de-risking the SMEs' business plans thanks to dedicated innovation management support. The market place is relying on the marketplace for artificial intelligence of the H2020 Bonseyes project.

1.3.2 The industrial pilot test-beds (IPTB)

The following section provides an overview of the 5 industrial pilot test-beds (IPTB). Note that **more detailed information of the data sets and data sources** is provided in the annexes. Furthermore, the interactions between the digitalization framework and the IPTBs are described in Section 3.

1.3.2.1 IPTB1: Smart mobility for vehicle fleet monitoring

Main target: Leverage fleet connectivity to improve product quality and reliability introducing advanced prognostic features, simultaneously linking the data stream to engineering development for future products enhancement
Partners involved: GM, POLITO, KNOW, ICCS
Community addressed: Consumers (B2C), GM Engineering, Service and aftersales (B2B)
Main challenges addressed: products quality and reliability, downtime reduction
Input Data: engine and vehicle data coming from control units of selected vehicle subsystems
Output Data: prediction algorithms, fault prediction rate
Impact: Up to 50% waiting time reduction during service operation thanks to prediction and early warning. Reduction of 50% of no trouble found at service. Improvement of internal "bill of process" and "bill of design"

GM developed OnStar that is available in US since 19 years and in Europe since the end of 2015. The system is capable of acquiring and sending all the data that are available on the vehicle CAN BUS via 4G connection. The above-mentioned data are relevant for GM as they can be used to develop features to improve product quality, design practices, and customer user experience. In particular GM will

develop with Polito prognostic algorithms to evaluate how subsystems are performing in the field, avoiding fatal failures.

Leveraging the already available in the market proprietary OnStar architecture, GM will acquire field data coming from any vehicle control unit, particularly focusing on propulsion system features. As of today OnStar in Europe registered 9 million customer interactions and reached more than 1 billion interactions in the world. The project aims at selecting specific sophisticated propulsion subsystem to be monitored during life time to get data with the task to:

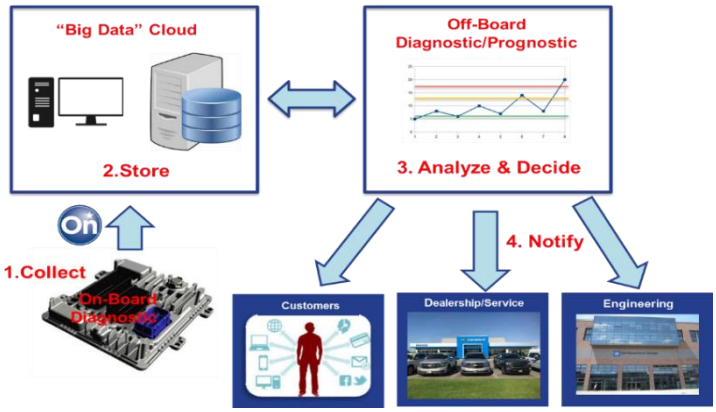


Figure 4: IPTB1: Smart mobility for Vehicle fleet monitoring

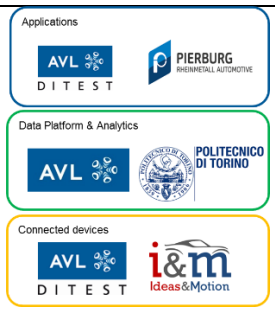
- Improve quality linking malfunction to production data
- Introduce prognostic early warning avoiding major failures
- Provides data insights to engineering

Such practice clearly pushes the vehicle monitoring to a new level of customer perception, improving the quality in real-time, dramatically improves the design process feeding it with field data that can be leveraged not to over design vehicle architecture.

Datasets Overview: Data comes from GM vehicle sub-systems and control units. The estimated potential consists of 1 M vehicles running in the field, providing 5TB/subsystem/day. There are already collected 0,5 TB on 300 raw attributes, from 10 different engine configurations and 500 number of cycles. Data rate goes up to 200GB/month for each vehicle. These figures are estimated for subsystems common to all vehicle product line.

1.3.2.2 IPTB2: Smart mobility for condition monitoring for emission regulation

Main target: Interconnect component development and aftersales services for traceable reduction of emissions for innovative powertrain
Partners involved: AVL, DIT, I&M, PIE, POLITO
Community addressed: Car manufacturers (B2B, Workshops (B2B)
Main challenges addressed: products quality and reliability, performance and emission regulation
Data description: (a) lab measurements of engine, (b) vehicle on-board-diagnostics and equipment information
Impact: Increase understanding of real component use / of component degradation model / of measurement equipment degradation model for more accurate and more effective compliance and monitoring of emission regulations



The ambitious target of DALIE project is also to combine the aftersales ecosystem with the powertrain ecosystem (see Figure 5): this will be accomplished through two different and well interconnected use cases. The proposed use cases, focusing respectively on aftersales and advanced powertrain technologies controlled by mechatronic control systems, will mutually benefit from networking and digitization of devices for the Internet of Things (IoT) as well as the big data approach.

The first use case, based on the proprietary Up-Valve technology developed at Pierburg and driven by an "in Line –Phaser", offers a very innovative approach which combines high precision and sophisticated mechanical engineering and smart control system supported by data science technology, for the development of safer, more reliable and longer life powertrain systems. The valve train actuation (VVA) is illustrated in the left part of the Figure. A brushless actuator (A) and a worm gear adjust the control shaft (T), which is equipped with needle bearings. The control shaft is fitted with a magnet for

position detection via Hall sensor (H). Sensor and actuator are linked to the valve control unit (VCU), which receives its control shaft position targets from the ECU and energizes the actuator accordingly.

The second use case is the application and promotion of digitalization technologies (e.g. digital twin, enabling infrastructure, cloud technology, AI analysis and visualization framework, data provider market place) to aftersales market equipment systems. Especially, aftersales equipment data sets include

- Basic data, such as device configuration, software version, licenses,
- Status data, such as position, device availability, working mode, state of health, issues and errors, individual components status, repair, certification and calibration status, consumables status,
- Usage data, e.g., executed functions, usage statistics, consumables consumption, aggregate runtime,
- Test data, selected vehicles, executed tests, test parameters, test results,
- Vehicle diagnostic data, Error Codes, live data, executed vehicle/battery diagnostic functions.

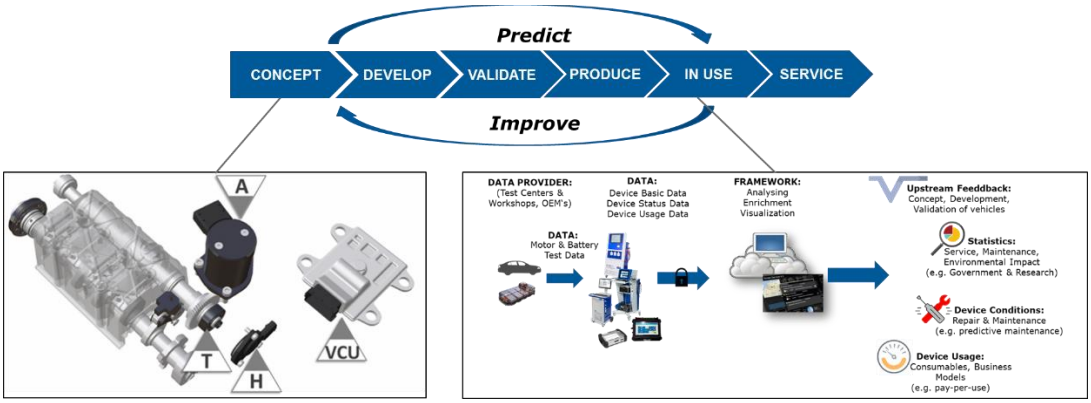


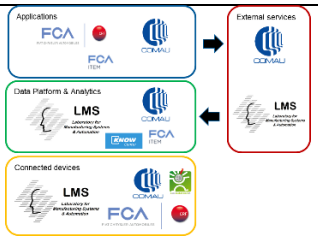
Figure 5: IPTB2: Smart mobility for condition monitoring for emission regulation

These data sets provide meaningful information on the usage and degradation of the components during field operation, which is an important knowledge while fed back to the component development. Hence the proposed use cases will jointly define the requirements of the data to be shared, the networking constraints and the way to process the data, both in real time and in the repair center. The two use cases will finally converge, once the prediction model and health monitoring related to the VVA technology have been validated in a realistic environment, towards the aftersales methodology and systems. As a result, the "digital twin" of the mechatronic system controlling the VVA will be seamlessly integrated into the comprehensive approach developed and provided by AVL DiTEST.

Worthy to note the proposed test bed correlates experiments run on dedicated test bench with the assembly lines at Pierburg, where automotive systems in large volumes are produced. In a first phase the data produced by healthy VVA systems under sound system conditions are deeply analyzed. This is the baseline to later on understand "abnormalities" of the system by correlating the system patterns and reactions. In a second step, the patterns for typical failure modes of the actuator itself are explored. In particular wearing, blocking issues, caused by the mechanical parts of the valve train and packaging/interconnection issues will be investigated. The identification and implementation of health monitoring and prediction algorithm will take place based on the comparison and analysis of the data previously collected. Then the prognostic model that, by using the real-time predictive model, monitors the behavior of the mechatronic systems and identifies and notifies promptly significant deviations with respect to the expected behavior. Finally, those details will be fed back to the assembly line to support corrective actions and improve the quality of the products.

Datasets Overview: Regarding the Up-Valve technology, the data generated is 14 GByte per day, taking into account three parameters (current for the actuator, vibration of the shaft, and temperature of the electrical motor). Regarding the after-sales use case, the amount of data to be transmitted is >30 Mbyte per day per device. Large test centers, such as Dekra and TUEV in Germany, with several hundreds of devices will easily generate several Gbytes of data per day.

1.3.2.3 IPTB3: Smart manufacturing for continuous quality control

Main target: Develop a smart manufacturing demonstrator that provide a continuous quality control and condition monitoring of its equipment.	
Partners involved: COMAU, CRF, LMS, FCA, EGM, KNOW	
Community addressed: Automotive sector manufacturers (B2B)	
Main challenges addressed: Business competitiveness	
Data description: Data coming from sensors, robots, logistics and purchase processes.	
Impact: Reduction of defected products by providing in-time alerts, and optimization of the repair activities.	

During the last years, automotive sector (which is key to the EU industry), is trying to adapt to the new technological and societal changes. Thus, digital innovations and high-tech solutions are more and more adapted to the core systems of the industry.

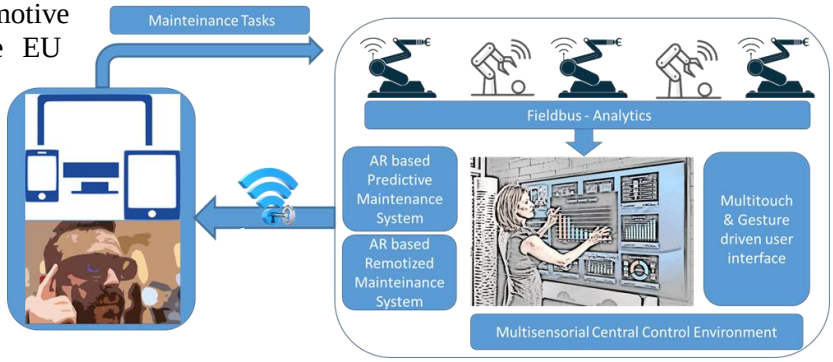


Figure 1: IPTB3: *Smart manufacturing for quality control*

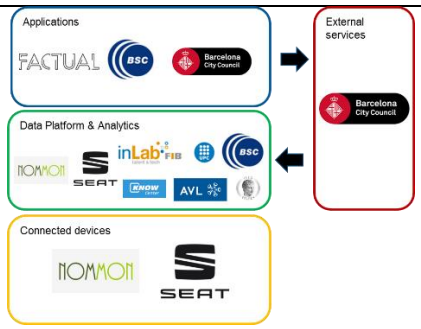
COMAU, CRF, LMS, FCA, EGM and KNOW will work together on an industrial automotive test-bed and more specifically focus will be given in the body shop and assembly stage of the vehicle. The use of Automated Guided Vehicles (AGVs) and collaborative robots is now a common phenomenon in today's automotive industry. However, the full-digitalization of this equipment has not been accomplished yet. The purpose behind this test-bed is to establish a robust, autonomous data gathering process from various equipment used during different stages of product's history such as purchasing, logistics, manufacturing and logistics. These equipment/tools have an important impact on the vehicle's quality. Thus, data from various sources may be proven useful in order to ensure the reduction of defected products, by providing in-time alerts and optimizing the repair activities using predictive maintenance models and concepts. The new technologies that will be adapted through the project's lifecycle, should be robust enough to avoid business interruption like unwanted waiting for the machine.

Quantifiable targets in terms of technical achievement: The technical achievements of the DALIE project are intended to be integrated in the smart manufacturing test-bed in order to provide beneficial results. The equipment used during the vehicle's production (robot, tools, AGVs, etc.), will be continuously monitored and evaluated through predictive maintenance models. Right now, the maintenance operations are planned during production stops in order to avoid downtime, therefore preventive maintenance is very conservative, and machines are over-maintained. An IoT server platform will be used for collecting, transferring and analyzing the process data. A real time computing on the edge side can be performed and data can be used on both premises as well as on cloud. The benefit of monitoring and analysis is the exploitation of all the component's life before the breakdown enabling the condition-based maintenance. This will also lead to a reduction of the maintenance costs. Finally, the healthy working condition of the equipment will lead to a decrease of the defected products.

Figure 6: IPTB3: Smart manufacturing for cont. quality control

Datasets Overview: Data will be collected from several sources: Sensors measuring environmental status, AGVs transporting the vehicles, equipment like robots and tools (e.g. welding guns): motors, internal sensor and components, purchasing and logistic processes (outbound, inbound, inplant). Accordingly, the data volume and velocity will be considerably high.

1.3.2.4 IPTB4: Smart cities for Air Quality & Mobility Strategies

Main target: to exploit large amount of mobility-related data to improve Air Quality models in large cities	
Partners involved: Factual, SEAT, Nommon, InLab FIB, BSC, AVL and supporting entities Barcelona City Council, Polis	
Community addressed: urban planners and citizens (B2Society)	
Main challenges addressed: city environment and quality of living	
Data description: Anonimised Call Detailed Records (CDRs) and xFCD from SEAT cars.	
Impact: better informed decisions on effectiveness of mobility plan measures to tackle Air Quality problems in cities, better information to City Authorities and citizens on exposure levels to air pollutants	

Barcelona use case will aggregate and exploit large amounts of mobility-related data sources to target one of the most pressing issues in the city (and in many other European cities): air quality and related health issues largely caused, among other factors, by inefficiently managed transport. The test-bed will leverage world-class High-Performance Computing (HPC) from the Barcelona Supercomputing Centre (BSC), combining and evolving detailed and customizable traffic, emissions and air quality models, co-developed together with the inLab FIB of the Universitat Politècnica de Catalunya (UPC). Novel industrial relevant data sources such as eXtended Floating Car Data (xFCD) and Floating Mobile Data (FMD) will be used to feed the corresponding models, complementing the conventional data inputs used until now, adding value to the existing tools. The outputs will consist of an air quality exposure decision-support tool, and a policy-assessment simulation instrument, based on high precision street-scale air quality forecast estimations.

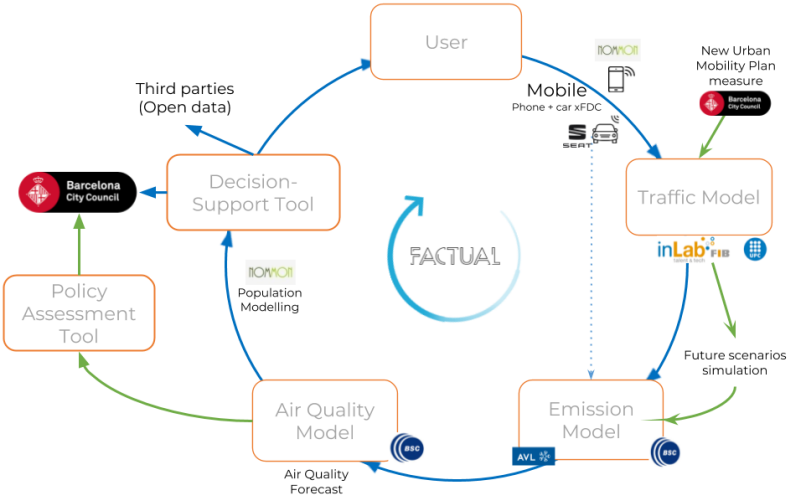


Figure 7: IPTB4: Smart cities for Air Quality & Mobility

This test-bed will bring together the experience and know-how of an outstanding group of partners, including one of the biggest Research and Innovation centres in Catalonia (UPC) and the national HPC centre (BSC), using data from the automotive industry leader in Spain (SEAT - VW Group) and mobility analytics from Nommon. The mobility-specialist Factual will lead and coordinate the activities of the stakeholders and will drive the project into achieving the sought impact by effectively measuring and disseminating it to the relevant audiences.

The concept: Figure 8 illustrates the main process, starting from the raw data generated by citizen's movements and driving

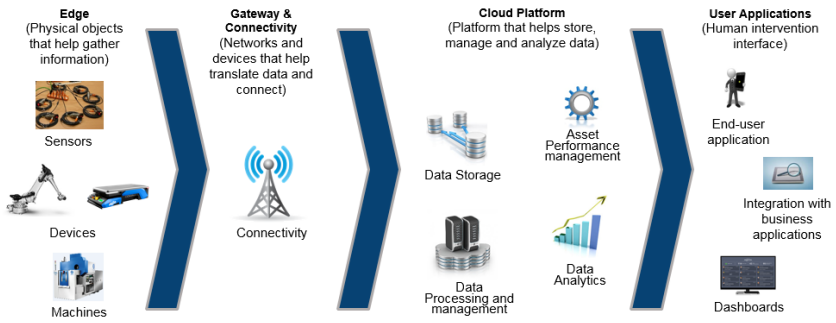


Figure 8: IoT overall architecture

behavior. SEAT will provide access to coveted connected car eXtended Floating Car Data (xFCD) not used in the BSC and UPC's InLab models to date (traffic congestion caused by cars is known to be a key contributor to air pollution in cities), and will set the required communication infrastructure. Nommon will provide Origin – Destination passenger data obtained from Floating Mobile Data (FMD) – i.e. from mobile phones. These datasets will feed and calibrate the UPC´s InLab Barcelona traffic model, which will be capable of emulating traffic behavior at street level. These inputs, along with additional data from SEAT, feed the BSC street-scale traffic emissions model, capable of estimating hourly traffic emissions (exhaust and non-exhaust). Lastly, this high precision characterisation of the mobility and emissions of the city, will be integrated into the current Air Quality model (CALIOPE), which in turn will deliver street-scale air quality forecast estimations.

Two main outputs will be generated based on the new CALIOPE model. First, street-level KPI's for air quality exposure within the city will be developed as a result of integrating population dynamics data into the Air Quality model. The result is a visually-aided Decision-Support-Tool (DST) providing street-scale air quality forecast estimations to the city council, the citizens and third parties via Open Data. On the other hand, the complex simulations performed by the macroscopic traffic model and its extensions, will favor the impact assessment of the environmental measures and policies that the city plans to deploy on both short term (measures on pollution episodes), and long term (major measures based on its Urban Mobility Plan (UMP)).

Datasets Overview: Two main datasets will feed the models on this test-bed:

1. Anonymized Call Detailed Records (CDRs) obtained from Orange Spain and processed by Nommon, that will provide origin – destination passenger data obtained from Floating Mobile Data (FMD). Volume is estimated on 1Tb per day (accounting for around 10 million registries). The data collection process belong to Orange Spain and none information about it is provided. CDRs are loaded to a working platform in batches every hour.
2. eXtended Floating Car Data (xFCD) from SEAT cars (other VW group brands still in negotiation). This data will complement the existing data to enhance the traffic, emissions and air quality models. It's estimated on 8-22 Tb of sensors data will be generated by connected cars. Data will be ingested in a pseudo-real time fashion but shared with BSC and UPC in batches.

Output data will consist on Georeferenced air quality and emission data in NetCDF format.

1.3.2.5 IPTB5: Smart finance for automotive insurance

<table>
<tr><td colspan="2">Main target: Exploit Historical Motor Insurance Big Data and Live Data from cars on the move to enhance road safety, encourage better driving behaviours, reduce the number and associated costs of insurance claims in car accidents.</td></tr>
<tr><td colspan="2">Partners involved: INTRASOFT International, Eurolife, Venaka Media Limited</td></tr>
<tr><td>Community addressed: Citizens and insurance companies (B2Society, B2C, B2B)</td><td rowspan="5"> 
</td></tr>
<tr><td>Main challenges addressed: Road safety, Enhanced Motor Insurance services with Real-time Data</td></tr>
<tr><td>Input Data: Anonymized data from car accidents and claims (incl. images on damages/env.), and real-time data from cars on the move</td></tr>
<tr><td>Output Data: geo-located recommendations, warnings, alerts on fraud, driving behavior, bonuses and insurance premiums, advanced visual analytics for decision support</td></tr>
<tr><td>Impact: Provide innovative domain-driven insurance services for both insurance stakeholders and insured citizens in a fair, trust-enabling, privacy-aware and transparent way enabling better driving behavior and cost reduction, enhance safety on roads and citizen awareness for dangerous situations on roads, decrease losses (due to fraud) of insurance companies</td></tr>
</table>

The need: Most car accidents on the road happen due to human error[v]. Thus, it is expected that greater automation in vehicles will help in reducing and preventing them, while at the same time cultivate better driving behaviours, and thus less claims during car accidents and thus less losses for both insured drivers and insurance companies.

The approach: The smart automotive insurance test-bed aims at enhanced safety on roads, fair settlement of claims in case of car accidents, offering incentives / bonuses for better driving behaviours and thus less costs for both insured drivers and insurance companies due to less car accidents, as well as fraud detection in car accident claims to minimize insurance companies' losses. For the needs of these, the exploitation of both existing historical big data pools in car accidents and claims data from insurance companies, as well as real-time data from cars on the move is vital to feed data analytics engines to extract the desired insights, and allow for informed decisions, recommendations, warnings and alerts to be forwarded to drivers and insurance companies, while at the same time provide enhanced situational awareness and promote better, more secure, trust-enabling and privacy-aware communication and collaboration among both user ends. A conceptual architecture of the automotive insurance test-bed is shown in Figure 9.

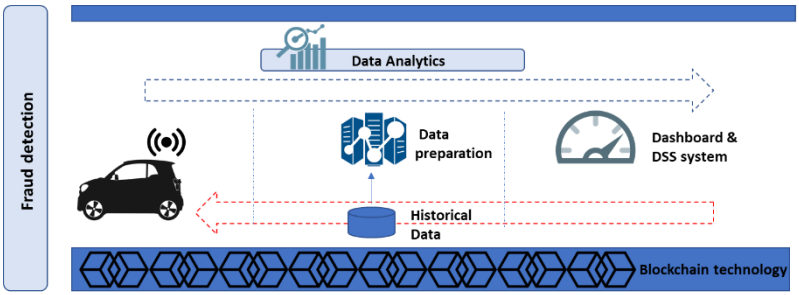


Figure 9: IPTB5: Smart finance for automotive insurance

In more detail, the smart automotive insurance test-bed will involve:

- Analysis of car accidents claims historical data (incl. accompanying images of damages/environment) from Eurolife's big data repository, that will be appropriately anonymized, to extract insights such as context and reasons of car accidents occurred in a town to identify and map high risk areas in a city and the reasons for this
- Driving behavior analysis using smart mobile applications for real-time data aggregation and analysis, such as location (GPS) and speed/acceleration over time, etc., to be used both for:
    - Enhanced situational awareness and geo-located recommendations, warnings and alerts to Drivers to prevent car accidents
    - Encouraging drivers for better driving behaviours by offering bonuses and better insurance premiums
- Analysis for better estimation of car damage when car accidents occur either on roads or within parking lots, analyzing car accident images in order to better assess the expenses/claims in costs from insurance companies
- Fraud detections in claims for reimbursement of expenses by analyzing and comparing data with historical data and initiating enhanced inspection processes.

The test-bed will be held in Athens city, involving 50+ drivers.

The datasets: Two main input and intermediate datasets will be exploited. First, anonymized data from car accidents and claims from Eurolife's big data repository (including image data), which includes automotive insurance contracts and claims on car accidents and damages. It consists of over 3.400.000 records of data for motor contracts in 1993-2018 period, over 150.000 records of data for motor claims in 1993-2018 period, and a 25GB production motor database (Motor basic tables in Oracle), excluding customer data. The second database holds real-time aggregated data from cars on the move - coming from mobile apps including location, speed, acceleration, temperature, etc., as well as images of car damages after car accidents and claims data.

The outputs will consist on recommendations for better driving behavior and adapted insurance premiums, warnings on nearing high-risk city areas, alerts on potential car accident or detected fraud in insurance claims, and geo-referenced high risk city areas (for safety on roads).

1.3.3 International and national research and innovation activities linked with DALIE

In the last few years **the DALIE participants have been part of several successful research projects** dealing with subjects strictly related to those of DALIE, as indicated in Table 2 (additional related projects listed in Section 4). This will significantly contribute to the DALIE effectiveness and outputs.

Table 2: Main international and national projects linked with DALIE

Project	*Relation to DALIE*	*Part.*
AFEL	Adaptive visualization of dynamic processes useful for the visual analytics tasks.	KNOW
AutoPilot	Bringing IoT into the automotive world to transform connected vehicles into highly and fully automated vehicles.	EGM
BIG IoT	Ignition of vibrant Internet of Things ecosystems bridging the current interoperability gap between the vertically integrated IoT platforms and by creating marketplaces for IoT services and applications, able to manage Big Data provided by different type of sources (connected car and mobile data).	SEAT, UPC, CSP
BONSEYES	A platform consisting of a Data Marketplace, Deep Learning Toolbox, and Developer Reference Platforms for organizations wanting to adopt Artificial Intelligence in IoT devices.	FHNW, NVISO
DEIS	Dependability engineering framework as support to deploy IoT devices and platforms in data-intensive environments.	AVL
EVOLVE	Experience on management of industrial test-beds and Big Data processing and technology stack.	AVL
FED4IoT	Analytic functions as edge-computing in IoT virtualization frameworks, including oneM2M, FIWARE and 5G ETSI MEC. Support for orchestration and programmability in optimized IoT deployments and Big Data processing platforms.	EGM
FED4SAE	Supporting the digitization of the European industry, experience on the provisioning of framework for cascade funding management.	AVL, CEA, BME
IMPAQT	Development of Big Data predictive functions on top of IoT gathered datasets.	EGM
MoreGrasp	Multimodal user interfaces and visual tools for collection and analysis of IoT-collected Big Data.	KNOW
OPL-APPs	Industrial IoT technological open platform to optimize manufacturing processes, methods and tools enabling the Digital Transformation and Industry 4.0.	FCA
Productive4.0	Platform across value chains and digitalized industries promoting the digital networking of manufacturing companies by efficiently designing and integrating IoT devices.	INTRA AVL
SERIOT	Security of IoT platforms and IoT systems management, in terms of threat analysis.	ICCS
TRANSFORMING TRANSPORT	Reusable Big Data solutions in the mobility and logistics markets through 13 pilots applied to transport processes, business models and services.	INTRA
WISE-IOT	Self-adapting context-aware system addressing the interoperability of industrial IoT systems at the semantic level exploiting the Fiware platform, useful for integrating the diverse use cases in DALIE.	FHNW, EGM

The proposed approach strongly relies on the lean interaction with successful European initiatives (e.g., Bonseyes, FED4SAE) in order to increase efficiency by reuse and tailoring of existing knowledge in order to support sustainability of successful European projects' outcomes in the long term.

1.3.4 Sex and/or gender analysis

Gender analysis in the context of DALIE is examined from a two-fold perspective:

Gender balance in the specific research and innovation domain. The R&D and innovation activities carried out in the context of DALIE can be considered gender and sex neutral. The domains tackled, both from the R&D (Big Data, IoT, cloud and edge computing) and from the industrial and business communities do not provide uneven opportunities, nor are they biased in any way. Nevertheless, to minimise the likelihood of gender or sex specific bias, the project will adopt the policy measures for benchmarking gender equality in science by the European Commission, but no such bias is anticipated.

Gender balance in the participating research teams: Overall, DALIE has a strong female representation among the executive members, as demonstrated in the partners profiles (see Section 4). DALIE is committed to promoting equal employment opportunities and aims to establish a program of actions to make the H2020 gender and equality policy fully effective. Finally, it will establish a system for monitoring gender equality in mobility schemes such as equality of access and participation, which causes subsequent impact on professional careers. DALIE will encourage balanced recruitment of female and male researchers, as well as of family-friendly policies, such as flexible working arrangements.

1.4 Ambition beyond state of the art

In the following section, the advance beyond state of the art for Objectives 2 – 4 will be described (ambition of the industrial pilot test bed was already presented in Section 1.3.2).

1.4.1 Data-driven business generation – Obj2

1.4.1.1 Framework for data-driven business development

Business models for big data are receiving increasing attention in academic literature. For instance, taxonomies have been developed for data-driven business models and patterns for such business models[vi]. Research[vii] and industrial practice also show that data and analytics can be leveraged to improve internal processes, enhance existing product and services, and provide new business models[viii]. Despite these early results, there is a lack of understanding of how data and analytics should be used to advance services[ix]. Further research is needed to design and evaluate tools and methods to balance the benefit, risk and costs of data[x]. Furthermore, existing work on data-driven business models does not consider business models in which multiple actors share data in marketplaces. Sharing data among multiple actors creates huge business model challenges, such as how to balance the gains and risks from sharing data, how to incentivize users, and how to balance privacy/confidentiality risks with business value. Tooling to support business model innovation (BMI) is becoming a specific area of scholarly interest. Such tools range from extensive ontologies and metamodels towards hands-on approaches such as the Business Model Canvas[xi], the STOF[xii] approach and the VISOR[xiii] framework. Although most tools are for (re)designing BMs, others are for testing and implementing BMs[xiv]. Some tools are based upon BMI patterns across industries. Platforms are emerging that prescribe what tool to use for which innovation phase (e.g. www.businessmakeover.eu).

Based on an in-depth analysis of patterns in data-driven business models, DALIE will design business models for the use cases in WP 5-9 considering 1) Data Assessment, 2) Value Proposition, and 3) Revenue Models/Pricing Strategies. Specific attention will be given to the multi-sided market and platform aspects in the project technologies. The business model tooling suite as developed in the H2020 project ENVISION will be applied for designing, analysing and testing the business models. These business models will then be generalized for the developed technologies such that they can be applied in different industries.

The project will apply state-of-the-art business model innovation tooling (i.e. those developed in H2020 ENVISION) and demonstrate their applicability on data-driven AI technologies, relying on the industrial test-beds. As a concrete outcome, the project will deliver tools and methods that facilitate the development of business models for data-driven technologies, which will ease the adoption of our technologies for data owners, service providers, aggregators and users.

Advances			
Analyze and categorization of at least **70 data-driven business model (DDBM) case studies**. Final catalog of at least **20 domains related and specified DDBM**.			
Relation to objective	O2.1	**TRL advance**	TRL4 --> TRL7

1.4.1.2 (Big) Data management and European effort on open data

A data management plan will be defined and implemented to ensure an elevated level of data quality and accessibility for final users and stakeholders, and to allow the application of data analytics techniques. To this aim, DALIE will address the compliance with the FAIR[xv] approach, to make the data **f**indable, **a**ccessible, **i**nteroperable and **r**e-usable. DALIE data management activities are crucial since the project deals with huge quantities of heterogeneous, mixed (open, public, privately shared, or highly confidential) Big Data. Hence, Big Data Management aims at collecting, storing, indexing, making accessible, and allow the processing of multiple types of data from different and heterogeneous sources leveraging the paradigms of Open, Linked and Big Data management.

Data management in DALIE will address the following main aspects:

- **Data format of both the collected and the delivered data**, describing the main characteristics of the data and their provenance.
- **Data protocols** used for data exchange within the DALIE platforms, and with the external world. International standards will be used.
- **Metadata content and format**: metadata are commonly used to describe data, both at dataset level and at record level.
- **Data sharing**, describing the policies used to share data among partners and non-partners of the project. Emphasis will be given to privacy issue for those data that cannot be delivered as open access data.
- **Data access efficiency:** accessing the right data in an efficient way is crucial in all the steps of the data-driven discovery process. Hence, in DALIE, the data management solutions will be targeted at efficiently storing and indexing the collected data.
- **Ethics and data privacy** to ensure data access and management according to the regulations

Advances			
Data management framework supporting multidimensional array data models, scalable storage engines, both relational and non-relational, and distributed indexing, to **match to the compelling context of industrial, data-intensive applications, and finally enable efficient data management**.			
Relation to objective	O2.2, O2.3	**TRL advance**	TRL5 --> TRL7

1.4.2 Industrial IOT and big data framework – Obj3

1.4.2.1 Establishment of a baseline for IIOT

DALIE has from its consortium strong relations and interactions capabilities with open -source initiatives to promote the use of open source technology as well as cloud-based environments and publish knowledge and related functions as open source to impacting open source communities.

Eclipse Foundation: The Eclipse Foundation, a non-profit organization, is established to help support and develop the large and growing Eclipse open source community. Eclipse is a global open source community with over 350 projects, more than 1400 committers, over 260-member organizations supporting the operation of the Foundation, and with an estimated 5 million active developers using Eclipse. Half of the Eclipse user community is located in Europe and half of the member companies are based in Europe. 30 projects are grouped under the "Internet of Things" working group where some DALIE open source results will be placed.

FIWARE Foundation (FF): The FF is the legal independent body providing shared resources to help achieving the FIWARE mission by promoting, augmenting, protecting, and validating the FIWARE technologies as well as the activities of the FIWARE community, empowering its members including end users, developers and rest of stakeholders in the entire ecosystem. The FIWARE Foundation is open organisation: anybody can join contributing to a transparent governance of FIWARE activities and rising through the ranks, based on merit FF is governing the open-source eco-system that is

maintaining the open reference implementations of FIWARE generic enablers. DALIE will contribute to the FIWARE OSS community by enhancing existing GEs as well as by providing new GEs.

Open Alliance for IoT Standard (OCEAN): is a global partnership based on open source and IoT standards, and aims to promote the development and commercialization of IoT platforms, products, and services by widespread adoption of IoT standards-compliant open source. OCEAN is responsible for releasing the source code for IoT standards (oneM2M) as open source and helping companies including SMEs collaborate each other and create new innovative IoT products and services under the global partnership, finally establishing a global IoT ecosystem. The oneM2M will be constantly updated on the newly-released oneM2M standards.

Advances			
DALIE builds upon on-going standardisation and more specifically intends to be the research project supporting the **AIOTI** activities on standardisation and policies (WG3 and WG4). DALIE extends the environment defined within the AIOTI activities (HLA and semantic interoperability white paper conclusion) and intends to further contribute with results from project investigation to add AI services within the AIOTI high level architecture.			
Relation to objective	O3.1	**TRL advance**	TRL3 --> TRL5

1.4.2.2 Big-Data pre-processing and ETL

With the advent of Big Data, Exploratory Data Analysis has become increasingly more complicated, impractical and tedious due to the necessary amount of manual intervention. Gandomi and Haider present a consolidated description of big data, and describe the analytics methods for Big Data, especially for unstructured data[xvi]. They highlight the need to develop appropriate and efficient analytical methods to leverage massive volumes of heterogeneous data in unstructured text, audio, and video formats. They also reinforce the need to devise new tools for predictive analytics for structured big data. As outlined by Famili, et al., real world data is inconsistent, incomplete and noisy[xvii]. This data cannot be injected onto data analysis stage without being first cleaned as it will lead to misleading results – a phenomenon often colloquially named "garbage in, garbage out".

Data cleaning is probably one of the most important preliminary steps of data analytics. The product of data cleaning, called tidy data, forms a crucial step in the data transformation process. The key aspects of tidy data are addressing the issues of missing data[xviii] extraction of noisy data and performing outlier analysis. Ramaswamy et al. give an overview of different algorithms for mining outliers from a large dataset[xix]. DALIE proposes to improve the pre-processing ETL pipeline to enhance the following Big Data analytics. Becher et al. discuss the importance of careful data pre-processing, including data cleansing, handling missing values, attribute representation and encoding, and generating derived attributes[xx]. They elaborate on the importance of the selection of the most appropriate subset of attributes to build an accurate and efficient model. They further propose an automated approach to the exploration, pre-processing, and selection of the optimal attribute subset whose goal is to simplify the KDD process and shorten the time to build a model. The proposed implementation finds inappropriate and suspicious attributes, performs target dependency analysis, determining optimal attribute encoding, generates new derived attributes, and provides a flexible approach to attribute selection. Scott, P., et al. propose an intelligent assistant, SNOUT, for exploratory data analysis of social science survey data that incorporates a range of data mining techniques[xxi]. In DALIE, the aim is to support data scientists by pushing forward unsupervised and exploratory algorithms, such as association rule mining, in the task of seeing what the data can tell us beyond the formal modelling or hypothesis testing procedures, hence greatly improving the ETL pipeline.

Having methods to deal with noisy and missing data, DALIE seeks to automate the ETL process. Although ETL process was established a long time ago, the methods to automate it have not been researched much. Most organizations these days follow ETL best practices and set up ETL pipelines, but human intervention is still expected from time to time. Many non-trivial ETL tasks tend to require multiple iterative steps until the data arrives in the desired state, for example in a series of transformations where data are iteratively lifted to a higher abstraction level. Many of the established best practices tend to overlook this issue. El Akkaoui, et al.[xxii] propose a framework for model-driven

development of ETL processes, to share and reuse methodologies and best practices among projects implemented with different technologies. Their goal is to harmonize the ETL process development by proposing a common and integrated development strategy. Once the model is developed, it can be automatically transformed into the required vendor specific code to execute the ETL process. But this framework covers the design and implementation phases of the ETL process development and not the whole ETL development life-cycle.

Advances			
DALIE will improve the ETL process by tackling the issues of heterogeneity, noise, and the massive size of structured industrial Big Data. DALIE will develop computationally efficient algorithms to avoid big data pitfalls. The proposed algorithm will lead to a **reduction of required human efforts** along the ETL process **by 50**%			
Relation to objective	O3.2	**TRL advance**	TRL4 --> TRL7

1.4.2.3 Transparent machine learning models

In recent years, machine learning techniques are achieving increasingly higher performance in different tasks, from anomaly detection to image recognition, from text and sound processing to predictive maintenance. The main idea behind machine learning models is to learn abstract representations of data under analysis. Specifically, deep learning architectures store these abstract patterns in the connections of their hidden layers[xxiii],[xxiv], [xxv]. Even though such models provide excellent results in many scenarios, some drawbacks prevent them from being fully exploited at industrial scale.

First, the knowledge hidden in the layers of deep neural networks is not easily accessible since it is encoded in the form of numerical parameters, i.e., the weights. Secondly, for particular input samples deep learning models could generate profoundly unexpected outcomes. Indeed, neural networks can produce misleading results for specific inputs, even if only few features have been slightly modified with respect to standard samples[xxvi]. Such adversarial perturbations have been addressed by recent research[xxvii], however the connection to quality attributes used in an industrial setting – such as reliability, safety or security - is subject to further investigation.

The study of semantics is a promising research direction in tackling the above-mentioned issues. Semantic information can be (i) derived directly from data, in order to construct interpretable abstract representations which model the nature of input patterns or (ii) learned from domain-expert knowledge. We will investigate applications of semantic anomaly detection to the DALIE use cases, in particular in the predictive maintenance context of large automotive stakeholders, by exploiting semantics to generate interpretable representations of normal-behavior data.

The demand for transparency also comes from public institutions. The European Union approved the GDPR, a regulation for ensuring personal data protection. It states that individuals have the right to receive "meaningful information about the logic involved" in case of automated decision-making[xxviii]. For some authors, this requirement legally mandates a "right to explanation"[xxix].

Since prediction models greatly impact both the society and large industrial environments, understanding how a classification model works or why a decision is made is of paramount importance. Algorithm results are expected to be understandable by domain experts and integrated with their business knowledge. The lack of interpretability becomes an obstacle for deep learning adoption in large-scale industrial settings. Our research activity is focused on the design and development of approaches to improve the interpretability of deep learning models. The idea is to use the original model to be explained as an oracle and observing how a prediction changes if parts of the input components are omitted. Some existing solutions that investigate the prediction change study only the omission of only one attribute value at the time[xxx,xxxi], whereas in DALIE we aim at overcoming such limitations.

The underlying data structures of the industrial pilots are time series, ubiquitous to many application scenarios involving sensory data. This data structure allows for dedicated algorithmic approaches. As such, we aim to improve state-of-the-art time series algorithms for the industrial pilots.

One of the latest developments in the theoretical treatment of early time series classification has been presented by Mori et al., (2016)[xxxii]. The authors employ a method called "Early classification framework for time series based on class discriminativeness and reliability of predictions", in short "ECDIRE", to classify bird songs early and also improve upon the results achieved by previous attempts. Early classification methods in literature so far did not consider the interpretability as an additional optimisation criterion, apart from reaching a high prediction accuracy.
We plan to extend existing approaches on early classification in two regards. At first, we plan to integrate contemporary deep learning techniques into the conceptual framework of early classification, with initial prototypes already showing encouraging results and provide promising outlook in selected industrial application areas. Secondly, we aim to integrate the objective of explainability into the developed methods, since in the area of early classification the human interpretation of the decisions of the machine learning algorithms are assumed to be of great help to correctly assess the phenomena under analysis.

Advances			
Machine learning models providing advancement with respect to the SoA in their ability to be transparent and semantically enriched, with the aim to provide **meaningful explanations of predictive maintenance results, smart manufacturing, and anomaly/fault detection**, and to guide the classification to **avoid semantically unwanted result**, thereby **improving the perceived understanding of algorithm output by 50%** and fostering business advantage of European companies.			
Relation to objective	O3.2	**TRL advance**	TRL4 --> TRL7

1.4.2.4 Interactive analysis and multi-scale visual interfaces

Providing decision makers with methods to navigate the information space and select the data regions to be connected is of paramount importance. Furnas et al.'s space-scale diagram portrays the conceptual framework of multi-scale exploration[xxxiii]. The use of navigation techniques with multi-scale interfaces has been extensively studied. Zooming is a commonly used technique. Some systems initiate zooming based on the selection of an object[xxxiv] or a region[xxxv] on the screen. Semantic zooming, which dynamically modifies the selection and structure of data to be displayed, is widely used in current online maps[xxxvi].

For very large information spaces, some zooming techniques automatically scale the content based on a user's interactions, such as the speed of panning[xxxvii], the distance to the scrollbar[xxxviii] or the degrees of interest of the information content[xxxix]. However, the views and data used depend on the information needs of the user, which vary widely for different stakeholders. To account for varying user needs and visualization preferences, DALIE extends KNOW's service for personalized visualizations and workflows[xl]. Conventional visual analytics techniques usually do more than just represent data, in that they also provide a view of the processes and parameters, so the analyst can interact with it. Conventional techniques differ largely from big-data analytics techniques and interactively changing parameters of some analytics step (e.g., a full ETL workflow) may involve costly, time-consuming computations.

Advances			
DALIE extends a suite of visualizations with methods to observe data at multiple scales supporting exploration from finest detail to at-a-glance overview of the entire digital supply chain. Further, it investigates personalized workflows for reusable analytics to eliminate manual steps associated with current approaches, and automatically deliver optimal representations, and leading to **reduction of human efforts during visual analytics on the data by 20% and improving of the perceived understanding of algorithm output by 50%**			
Relation to objective	O3.3	**TRL advance**	TRL4 --> TRL6

Often, people with diverse expert knowledge need to work together towards a meaningful interpretation of the associated results for new insight. Sensemaking is an iterative cognitive process that the human performs in order to build up a representation of an information space that is useful to achieve users' goal[xli]. So-called sensemaking tasks involve information gathering, representation of the information

in a schema that aids analysis, the development of insight through the manipulation of this representation, and the creation of some knowledge product or direct action based on the insight[xlii]. There is little knowledge of how sensemaking occurs in collaborative work. Qu and Hansen proposed a model which distinguishes between shared representation and shared understanding[xliii]. For successful collaboration to occur, users need to be aware of other users and the workspace.[xliv] Gutwin and Greenberg knowledge that is relevant to maintain awareness in a shared workspace for the purposes of successful collaboration[xlv].

Advances			
DALIE builds methods to share representations of data analytics and the knowledge associated to them to foster collaborative sensemaking. In this frame, DALIE proposes novel interfaces for transparency and control of advanced analytics methods, complementing and informing deep learning methods. Optimal combination of expert knowledge and state of the art algorithms will ensure the highest performance levels for the industrial pilots, **improving the perceived understanding of algorithm output by 50%**			
Relation to objective	O3.3	**TRL advance**	TRL4 --> TRL6

1.4.3 Boosting the ecosystem– Obj4

1.4.3.1 Smart education

Whether a digital economy can be successfully implemented across the entire supply chain, and even across the entire product lifecycle will depend on how well the integration of SMEs[xlvi], which make up around 99% of all companies in Europe, into the intended digitalization frameworks will succeed.

The project results will be presented in the form of structured learning units to facilitate the transfer of knowledge beyond the field of research, directly to the workplaces of companies (learning in the workplace[xlvii]). These contents will be delivered modularly and online through a dedicated content management system for public use. The CMS itself supports the structured creation of content by (multinational) teams of experts through integrated authoring. Delivered content can be easily and adaptively engineered to evolve dynamically as the project progresses. By means of various integrated assistance systems (usage analysis, tutoring, etc.), the platform also supports future consulting services and thus enables a use of content that goes far beyond the publication of project results.

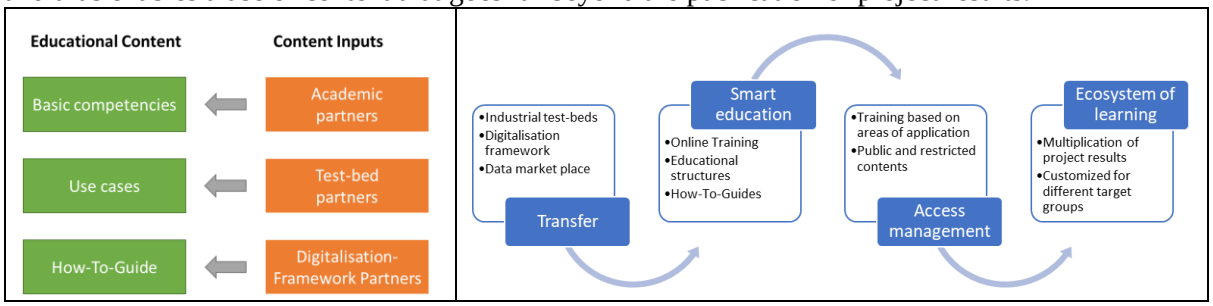


Figure 10: Smart education concept

The content of the project results will be focused on two main areas. The first one is the presentation of the industrial pilot test-beds to explain the rationales (market specifics) as well as technology decisions. The second aspect is to provide training on the digitization framework, in the form of a how-to guide internal and external partners. In addition, our content framework will describe required basic competencies for SMEs. They will serve as guidelines for the development of competence in the field of digital analytics and the subsequent implementation of a digital business fields.

Advances			
The smart education platform will be deployed both for internal trainings and for training of interested external experts. The target is to **prepare content for all objectives 1, 2, 3 related aspects**, to **reduce training efforts by 20%** and to **train a community of >100 people**			
Relation to objective	O4.1	**TRL advance**	TRL5 --> TRL7

1.4.3.2 Financial Support to Third party (tailoring of FED4SAE project[xlviii])

Boosting the ecosystem is the capability to embed the ecosystem, especially by integrating the SMEs as technology champions in this digitization. Hence, especially the small structures very often lack internal resources to invest on new skills and have difficulty to get in contact with big European technology suppliers, advanced technologies such as high maturity industrial large-scale test-beds. The "Smart Anything Everywhere" Initiative (SAE[xlix]) aims at catalyzing European Digitization and support European SMEs, start-ups and mid-caps to enhance their products and services through the inclusion of innovative digital technologies, in order to produce competitive products and therefore to help foster competitiveness on the one hand, and on the other hand to establish fully functional ecosystems of DIHs that can also provide services beyond technical advice such business consulting, innovation management support and training. In order to attract European SMEs, start-ups and mid-caps, e.g. more than 90% of small size enterprises, the SAE initiative has designed a dedicated tool, Financial Support to Third Party (FSTP, also commonly called cascade funding), tailored to bring support for small company to increase their skill through collaboration with European big players (research centre and RTO, industrial supplier) and de-risking their business plan thanks to dedicated innovation management support.Considering that, in Europe, the very large majority of European enterprises (more than 90%) counts less than 10 employees, it is of prime importance to propose a **tool simple to understand, easy to access, fast to response, in other words agile**, with a minimum of administrative tasks and reporting. From discussion with the small SMEs, people are quite reluctant to apply to EC program being afraid or having got already bad experience with the EC. The FSTP tool put into place in the frame of the SAE initiative offers such benefit for all the SMEs and it has successfully created a well-functioning ecosystem so far, having resulted created enormous economic and societal impact with 160 projects supported in the first years and success stories detailed in the SAE brochure[l].

Advances			
Within this project, the target is to replicate and tailor the one-stop-shop concept to **boost the DALIE ecosystem** by implementing a call for project **where >20 SMEs will submit a proposal** and **at least 10 projects will be granted**			
Relation to objective	O4.2	**TRL advance**	TRL6 --> TRL7

1.4.3.3 The market place to support exploitation of project results (tailoring of Bonseyes project[li])

Big tech companies like Google, IBM, and Baidu have taken an "artificial intelligence-as-a-service" approach to modularize the end-to-end development process[liiliii]. For example, with IBM Watson or the Google AI Cloud, companies can come, upload their data to the service provider's cloud, and benefit from a toolset that proposes to ease the AI development process. For the European industry, the use of these machine learning environments is problematic because they require the upload of data to third-party clouds. As a result, the control of the data is being handed over to the third-party provider, thus creating a lock-in with the service provider. Also, in most of the cases, the data is also handed over to the jurisdiction of non-European countries, e.g. the U.S.A. or China, making the data susceptible to the intelligence of the respective country or foreign espionage alliances[liv], e.g. through concerted interception by the respective intelligence agency[lvlvi].

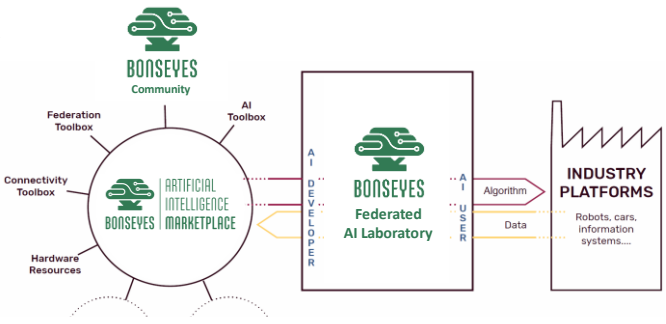


Figure 11: Community for collaborative development of industrial AI systems

The AI as-a-service platforms, advertised as free and open environments for industry and universities, also put the European industry in a disadvantage in the race for talent. Through their learned API expertise, the user data scientists are being accustomed to these platforms and become primary targets for scouting, screening, and eventual employment[lvii]. In comparison to the AI-as-a-service approach, Bonseyes offers decentralized collaboration with a peer-to-peer approach that does not require upload of data. Bonseyes consists of a marketplace, dynamically created federated laboratories, and a

community of users. The marketplace allows registration of storage and computational resources such as HPC, registration of AI artefacts like datasets and AI algorithms, tools for AI development, and users wanting to collaboratively solve AI challenges. This laboratory connects the selected resources to offer a protected environment for the exchange of AI artefacts and application of tools on these artefacts. With the Bonseyes approach, data can remain in the repositories of the data owners that are part of the laboratory instance.

Advances			
In the DALIE project, the consortium deploys Bonseyes in the industrial pilot test-beds a) as a **registry for data sources and storage and computational resources** and b) as an **environment for trusted, collaborative data-driven development of applications** for the industrial platforms and systems connected to the test-beds. Bonseyes will be extended with capabilities that are needed to **create and maintain trust among the users of the test-bed**. The consortium will develop tools that bring transparency into the quality and use of data and integrate these tools at the critical points in the data flows from the very large number of distributed sources.			
Relation to objective	O4.3	**TRL advance**	TRL4 --> TRL6

2. Impact

2.1 Expected impacts

Today, the automotive sector provides **direct and indirect jobs to 13.3 million Europeans** and make a vital contribution to the overall trade position of the EU[lviii]. The DALIE consortium regroups **key players from smart -mobility, -manufacturing, -cities, -finance** with the participation of three car manufacturers (FCA, SEAT / VW Group, and GM) accounting **for 35% of the worldwide vehicle production[lix],** two Tier1 / engineering partners (PIE and AVL) **totalizing a turnover > 4 Milliard Euro**, a robotic provider (COMAU) within the **top ten worldwide**, **one of the largest insurance provider from Greece** (EUR), and the **second largest city from Spain** (Barcelona). Complemented by **7 BDVA members,** DALIE brings together key industrial sectors with data-science and data-driven engineering thereby **facilitating the transformation of these large industrial ecosystems in Europe**.

2.1.1 Contribution to the expected impacts mentioned in the work programme

[ICT-11] Expected impact: *Demonstrated increase of innovation and productivity in the main target sector of the Large-Scale Pilot Action*
DALIE contribution: Traditional large industries such as the automotive market are already well organized and have achieved high maturity over the years. Nevertheless, they are typically highly segmented and still dominated by non-ICT skills (e.g., mechanical engineering, production engineering). ***DALIE*** will showcase that digitalization provides a high potential to create data and information bridges over the product lifecycle, over the supply chain and with other application domains, thus leading to improved products and competitiveness increase.
Measures / KPIs: High impact towards this direction will be ensured by achieving **obj. O1**, i.e. by setting-up 5 relevant industrial pilot test-beds to demonstrate innovation and value creation by digitalization in the selected transport segments:

- 50% waiting time reduction and 50% reduction of bugs and incidents in fleet monitoring (IPTB1)
- Increased compliance and improved accuracy in monitoring in emission regulations (ITB2)
- Increased product reliability (reduction of fault density, optimization of repair tasks) due to continuous quality control in smart manufacturing (ITB3)
- Reduction of air pollution in large cities due to data-driven (and thus evidence-based rather than opinion-based) decision making (ITB4)
- Design and preliminary development of automotive insurance services (ITB5)

In this respect, an increase in the productivity of the 4 transport related areas is expected to fluctuate around 30% for the ***DALIE*** industrial partners and beyond.

[ICT-11] Expected impact: *Increase of market share of Big Data technology providers if implemented commercially within the main target sector of the Large Scale Pilot Action.*
DALIE contribution: ***DALIE*** strongly believes that in order to increase the market share of Big Data technology providers, a key factor is the capability to assess and later on monetize value creation

through Big Data. Different challenges arise and will be covered by ***DALIE***. The first one is the capability to systematically analyse potential for value creation by digitalization and identify appropriate data-driven business models. The second challenge is to create an environment supporting demand and supply balancing (e.g., dedicated data market places), providing the appropriate services for enabling data-related businesses. A third challenge is to properly understand the regulations and customer expectations in terms of confidentiality and data privacy, and the deployment of appropriated technical solutions.

Measures / KPIs: ***DALIE*** will achieve high impact towards this dimension by achieving **obj. O2**, i.e. by supporting data-driven business generation, with the specific measures mentioned below:

- Creation of a catalogue for data-driven business models, matching them with business requirements from industrial partners, thus increasing competitiveness of industry to adapt their business accordingly (O2.1).
- Definition of guidelines to address legal and ethical issues in coherence with the European regulatory framework (O2.2, O2.3)
- Contribution to the European efforts on open data and interacting with standards for data-driven business approaches (O2.2, O2.3).

Based on the above, it is expected that the market share of Big Data technology providers within the transport sector will be increased by at least 20%.

[ICT-11] Expected impact: *Effective integration of HPC/BD/Cloud/IoT technologies in the main target sector(s) of the Large Scale Action, resulting into integrated value chains and efficient business processes of the participating organizations.*

DALIE contribution: ***DALIE*** will contribute to this impact dimension by filling the technology gap between traditional automotive solutions and digitalization. To do so, ***DALIE*** will work on providing engineers with the skills required for digitalization – ranging from cyber-physical systems for the digitalization of the physical behaviour, to IoT for the connectivity between machines and the transmission of the information, up to big data for data structuring, data analytics and data visualization.

Measures / KPIs: In order to contribute high impact towards this dimension, the following measures will be taken in the context of **obj. O3**:

- Creation of a framework for big data processing reducing the human effort along the ETL process by 50% (O3.2)
- Creation of a framework for interactive analysis in a (big-) data value chain reducing the effort when carrying out visual analytics on 20% (O3.3)

[ICT-11] Expected impact: *Widening the use of and facilitating the access to advanced HPC, big data and cloud infrastructures stimulating the emergence of the data economy in Europe;*

DALIE contribution: DALIE will contribute to this impact dimension by leveraging on value creation over the entire product lifecycle by boosting the entire supply chain. In particular, the opportunity of value creation through digitalization by mapping the different product lifecycles and by bridging different application domain is huge. At the same time, different challenges exist. First is education, with the need for emergence of digital skills in traditional work areas, in order to optimize existing processes and gain in competitiveness. A second challenge is the capability to embed the ecosystem, especially by integrating the SMEs as technology champions in this digitalization. Hence, especially the small structures lack internal resources to invest on new skills. A third and related challenge is the uptake and deployment of standards to support and accelerate industrialization of the innovation and secure the related invests.

Measures / KPIs: DALIE will take specific measures for contributing to this impact dimension, through achieving **obj. O4**, by:

- Deploying a smart education platform and related trainings for IIoT and data analytics. This will reduce training efforts by 20% and trainings for a community with more than 100 members will be deployed (O4.1)
- Embedding SME community to the industrial test-beds by means of call for projects and appropriate cascade funding, relying on the European's Smart Anything Everywhere initiative. We expect more than 20 SMEs to submit a proposal (O4.2)
- Deploying a dedicated data market place for the efficient exchange and monetization of data. Two industrial pilot test-beds will be available. (O4.3)

[ICT-11] Expected impact: *Stimulating additional private and public target investments in HPC and Big Data technologies from industry, Member States and Associated Countries, and other sources, as referred to in the contractual arrangements of the HPC and/or the Big Data Value Public Private Partnerships.*
DALIE contribution: In general, it is challenging to commit private actors and industrial partners to participate into a new initiative. To this effect, the logic pursued in ***DALIE*** is to establish the basis for successful performance, market uptake and deployment of the ***DALIE*** solutions and then efficiently promote and disseminate the preliminary outcomes so as to attract the ***DALIE*** target groups. ***DALIE*** will raise awareness of the pilots, and the benefits associated with data-driven mobility services, analytics, and associated data-services. The key to success is to promote the expected benefits as well as the sustainability of the proposed solutions.
Measures / KPIs: The measures that ***DALIE*** will take in order to stimulate additional private and public target investments rely on achieving all its objectives. Indicatively, at least

- 100 organizations will be participating actively in Big Data demonstrations: The business community enlargement is one of the primary channels to maximizing the impacts of DALIE. The project has already engaged 27 EU industry actors, including key players along the whole Data Value Chain, major EU knowledge providers and public bodies as members of the consortium.
- External actors will be engaged via dedicated actions, such as the dedicated calls for project(s), the Advisory Board and the organizations providing the LoIs will engage in dissemination and exploitation activities.

2.1.2 Additional substantial impacts

2.1.2.1 Enhancing innovation capacity

A closer look at R&D spending by both automotive OEMs and transport suppliers shows that around 40 percent of all investments go into innovations that never make it into the car or are never produced in sufficient numbers due to a lack of market acceptance. Of the remaining 60 percent, 20 percent is for necessary serial development. Another 20 percent is for innovations that fulfill legal requirements but do not add to a product's distinctiveness. Usually, these innovations do not pay off either. That leaves only a small remainder of 20 percent that represents profitable innovation investment. And more and more technologies are fiercely fighting over this sweet spot.

Only around ten percent of the automotive technologies under development at the moment have the potential to become blockbuster innovations. These technologies combine the two most relevant categories: The first category, market potential, consists of functional purpose, customer acceptance, regulation compliance and price level. The other category, a high degree of innovation, creates technological differentiation in the market, better intellectual property protection, high margins and a long harvest period. However, blockbuster technologies come at a high risk. The bigger the innovation step, the higher the development risks. And market potential is a moving target. Take the fuel cell. It certainly is highly innovative compared with existing power-train concepts. But it has a very low market potential at the moment, given its still questionable road capability, uncertain price position and dependence on special fuels. However, this situation could change with time and turn the fuel cell into a true blockbuster. Automotive companies must increasingly focus their innovation efforts on a very limited number of promising projects. In order not to place their bets blindly, they have to carefully assess the potential and risks of the technologies they want to explore and regularly reassess them.

Existing technologies, as well as technologies under development, always face the possibility of being pushed aside by alternative developments. In order to assess the technological and market potential of a given technology, its respective car module must be analyzed in terms of the key technologies being used, current trends and future innovations. The chances and risks of a given technology are also influenced by the different market structures, competitors and business models in each segment. Innovation cycles are constantly shortening while development costs are rising due to the higher complexity.

In "Car Innovation 2015," Oliver Wyman has examined a representative sample of 315 automotive innovations in terms of their innovativeness and their market potential. This analysis suggests that little more than half of all current innovation projects in the automotive industry have a high likelihood of

succeeding in the market. Besides producing a comprehensive industry innovation map and database, "Car Innovation 2015" has identified three technology trends through 2015:

Electrics and electronics will remain the most important enabler of automotive innovations and will grow by six percent annually. The sweet spots with a revenue growth of eight percent and more will be software, semiconductors, displays and power generation. Still, electronics will also face increasing cost-optimization pressures. Significant shifts will occur toward functional integration and carry-overs, and toward further standardization. As more and more automotive functions become interlinked, a noticeable move from single innovations to system innovations is taking place. Whereas one device used to have one single function in the past, more and more devices will be used for two and more purposes in the future. One example of this evolution is the Mercedes-Benz PRE-SAFE system. It links existing systems like crash sensors and ESP with seat controls, seatbelts and the sunroof, adding safety functions to existing components.

The single most important innovation focus of the industry lies in emissions / fuel efficiency / weight, with new power-train concepts and architectures evolving. Through 2015, the production of power trains that use the traditional fuel of gasoline will decline 0.3 percent annually from 48.5 million units in 2005 to 46.5 million. Diesel engines will experience annual growth of 2.1 percent, from 12.6 million to 15.8 million, while alternative-fuel vehicles (biofuel, natural gas) will grow up to 3.8 million units per year through 2015. The strongest growth will be in hybrid power trains, with a compound annual growth of 21.4 percent, reaching 11 percent of all power-train concepts through 2015 (micro 70 percent, full 24 percent, mild six percent). Fuel-cell power trains will reach significantly less than one percent of production.

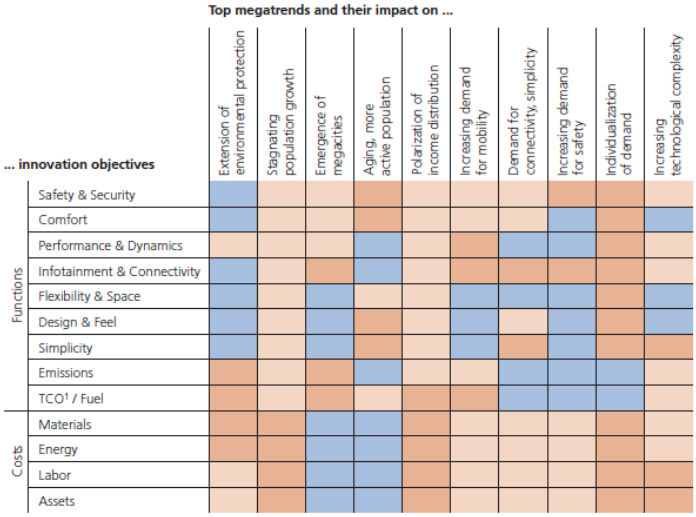


Figure 12: Top vehicular innovation enablers and trends

As understood by the figure below, DALIE will strive to achieve a very high impact in integrating new knowledge in numerous high impact areas, as it sees transport in a totally holistic manner, touching several aspects that affect it, incorporating Big Data and IoT. DALIE therefore is therefore well positioned to build capacity to create innovation in a number of functional domains (rows).

2.1.2.2 Increasing the competitiveness of the European industry and market and economy impact

One of the use cases of the project regards the evolution of machines into smart internet-connected objects with semi-autonomous behaviour, and the ability to predict and anticipate their End of Life (EOL), to identify and recommend the best possible time for their maintenance, while at the same time undertaking activities for implementing the maintenance activities (such as supply chain procurements and interaction). This use will open new horizons for manufacturers, by allowing them to leverage IoT and Big Data technologies and smart machines to improve their competitiveness and bottom lines. In particular, manufacturers will be able to depart from the current model of preventive maintenance which focuses on regular maintenance of machines, components and other infrastructure elements to prevent them from failing. This model is sub-optimal, as maintenance is performed earlier than needed, thus reducing the Overall Equipment Efficiency (OEE). The expected shift is towards prescriptive maintenance. According to ABI research, by 2019, 60% of all revenues of the maintenance analytics market will be produced based on advanced forms of maintenance (notably predictive and prescription based maintenance). The project will facilitate this shift by offering a collection of solutions that will allow manufacturers to use advanced predictive analytics and the implementation of automated smart

contracts in the scope of M2M/IoT interactions, with the following benefits: 1) Higher OEE, as predictive maintenance results in a smaller frequency of repairs; 2) Reduced labor and equipment costs; 3) Improved productivity for employees, who will replace the right component at the right time and 4) Increased safety, as timely avoidance of potential problems will provide safer work conditions.

2.1.2.3 Providing societal benefits

The integration of smart autonomous objects in larger systems, as enabled by ***DALIE*** technologies, can substantially increase the efficiency of monitoring and optimizing (via actuation and smart behaviour) the use of land, water, materials, as well as energy efficiency and the productivity of the food system.

A critical aspect of such systems is that they can support a change of the trajectory of the overall consumption of society. The integration capabilities of ***DALIE*** can help get more out of the products that we already have: products will to be designed to be continually and even autonomously improved, upgraded, and modernized rather than being made obsolete and replaced by the next generation.

Although the societal impacts strongly depend on the applicability to a specific sector, ***DALIE*** advancements are expected to impact positively all areas and sectors of societies and economies in developed and emerging countries that rely on IoT, cloud and big data technologies. A new range of services and products of societal value will be enabled, supporting citizens' social wellbeing and social engagement, offering more efficient utility networks, traffic systems, health systems, security and financial services. The range of potential new services enabled by integration of smart objects, as well as actuation and autonomous behaviour, is limited only by the imagination.

While there may be initial concerns that automation and smart behaviour can have a negative effect on jobs and opportunity, the huge opportunities for innovation presented by smart objects and embedded intelligence, together with the extreme value of the data they produce, can be a net generator of economic growth. Instead of reducing human needs or the number of employees required to meet them, there will be new companies, new business models and roles (based on the evolution of product over time and the continuous relationship with the customer), new services derived. Existing staff can also work more productively, without struggling with system engineering, while being coached and guided far more easily by experts. Looking at the 2nd proposed use case (smart transportation), City expertise from ***DALIE*** is that proposed technologies will not only save costly replacement of primitive and dirty fast solutions but is also a main requirement for conserving trust and confidence of the customers and citizen and lay the platform for a continuing business.

Let it also be noted that the EU Integrated Urban Mobility Roadmap identifies how new and changing societal trends and patterns such as decarbonisation, city dynamics and digital society among others, will generate new urban mobility scenarios. This is a societal challenge that requires involvement and awareness of the industry, governments and the society and that calls for frameworks and enablers that have an impact on the way urban mobility is addressed, such as sustainable urban mobility plans, big data and modelling tools, regulation and business models, transferability and upscaling. In this sense, the smart city test bed provides modelling tools integrating a traffic model that makes use of big data (citizens' movements and driving behaviour), emissions and an air quality model into a Decision Support Tool (DST) directed to air quality managers and third parties interested in air quality forecasts. Although the test bed is developed for a particular city, it is transferable to other areas, given there is available information.

2.1.2.4 Tackling environmental issues

Issues related to the environment will also be tackled, as ***DALIE***, by contributing innately to the digitalisation of the transport sector, due to the ability to reduce the time-to-destination for each driver thus leading to emissions reduction. In detail, an accurate and real-time traffic information system is expected to increase road utilization by 20%, leading to a similar reduction to the estimated time-to-destination for each driver.

Since the number of people living in cities is projected to rise to 5 billion by 2030, efficient urban planning and management practices are key to contribute to the reduction of air pollution in cities. With this aim, the United Nations Environment Program claims for a better and more sustainable future for all though the implementation of the Sustainable Development Goals (SDGs). The test bed for smart

cities will make an important contribution for the achievement of the SDG 11- Sustainable cities and communities, which among other aspects, is directed to keep our cities air clean. Providing a tool to assess air quality, the test bed aligns with the European Union Environmental Action Programme that has the aim of reducing air, water and soil pollution, by safeguarding the EU citizens from environment-related pressures and risks to health and wellbeing.

Atmospheric pollution is one of the environmental factors with the greatest impact on human health throughout Europe, contributing in a non-negligible manner to the total burden of mortality in urban areas. The World Health Organization confirms that air pollution causes cancer. Besides that, effects on human health can produce eye and nose irritation, effects on the cardiovascular and respiratory system, and several studies relate air pollution with the rhythm of children's learning process. In this context, modelling techniques such as the proposed in the smart cities test bed become very useful to study the dynamics and transport of air pollutants and to forecast air quality concentrations that can have an impact on human health.

2.1.3 Barriers to Expected Impacts

Removing obstacles to change is central to garnering support for a reform process. With this belief, apart from the strategic impacts outlined by the call, ***DALIE*** aspires to bring significant impacts, which are achievable either within the project lifecycle or after full-scale adoption of the project outcomes by a wide range of stakeholders. The consortium is fully committed to mobilise all resources required in order to realise the envisaged impact while dissemination, stakeholder engagement and communication activities (as described in section 2.2) are expected to be instrumental for the multiplication of the envisaged ***DALIE*** impacts. Nevertheless, although the project impacts are tangible, there always exist certain external factors and barriers over which the project consortium has limited control and that may affect and possibly hinder the impacts' achievement. Such barriers are broader than the scientific, business, scientific and technical risks identified in section 3, and shall be appropriately tackled, since they will may significantly affect a core success factor like user acceptance. Such external assumptions and barriers can be found in the following table, in the form of a PEST analysis.

Table 3: DALIE PEST analysis

P – Political Factors	**E – Economic Factors**
• Unstable political environment • Digital transformation on the rise, affecting any industry in the EU • EC actions towards improving connectivity and digitalisation of the sectors considered (all with a transport flavor), as well as towards strengthening the EU Single Market • EU commitments on the environment and on natural resources (circular economy / green economy), as well as on climate change (mitigation and adaptation) • Data confidentiality, locality and protection / Potential restrictions in data usage and sharing across countries • Enforcement of the EU GDPR requiring changes in the mentality and design of any data platform	• Producing more and better from less • Being resilient in a volatile global market • Evolving, diverse and adaptive global value chains in any of the considered sectors, which are often imbalanced • Conducive market environment with a large and comparatively wealthy consumer base in Europe and expansion in foreign markets. • Higher costs for compliance with legislation compared to competitors. World market prices more favorable for producers in third countries, pushing for higher market shares • New data-driven business models built on shared value generation, but often lacking incentives for users to share data • Potential for cost reduction at the production level, thanks to digitalization in the considered sectors • Changing digital taxation in the EU, affecting taxation on data artefacts for business use
S – Social Factors	**T – Technological Factors**
• Lack of jobs and growth (underinvestment in connectivity and basic services) in any of the investigated sectors • Significant youth drain and ageing farm population in Europe • Uneven development throughout the EU with important structural constraints	• Disruptive technological advancements on big data processing • Speed of technology transfer • Lack of standardization and interoperability leading to inability to open up existing silos due to proprietary data formats and APIs • Higher consumer expectations enabled by technology

• Diverse land market, taxation and inheritance legislation across the member-states) • Lack of skills and awareness of the possibilities and benefits of digitalization	• Technology push solutions - Necessity to focus on actual users' needs in any of the sectors • Emergence of Digital Innovation Hubs (DIHs) contributing in the uptake of digital technologies in the transport-related sectors

Among the barriers and obstacles that are discovered in order to achieve the aforementioned impacts, the most significant are described below:

- **Diversity in terms of Standards**: The IoT & Big Data standards landscape is currently very broad and comprises many different standards. Therefore, there is a great fragmentation and diversity of standards, which has been already reflected in AIOTI's WG3 standards landscape deliverable. Even through ***DALIE*** will adhere to the most prominent architectures and many different platforms, it cannot address this diversity of standards in interfaces, connectivity frameworks, devices and data models. A future evolution of the standards towards different directions that those addressed by ***DALIE*** could have an adverse effect on the realization of the project's impact. To overcome this aspect, ***DALIE*** intends to contribute to on-going standardisation activities in relevant groups such as oneM2M Alliance, ETSI, ISG-CIM
- ***DALIE***'s **reliance on platforms and ecosystems**: ***DALIE*** will be developed and validated on certain IoT and Big data platforms and ecosystems. Hence, it will be to some extent bound to the wider adoption and use of these platforms, at least for an initial period prior to its adoption by additional platform providers and integrators. Therefore, the level of adoption and commercial success of these platforms will certainly affect the project's ability to realize the presented impacts.
- **Lack of established principles for data representation and acquisition** could result to limited utilization of ***DALIE***'s offerings. The goal to build upon semantic representation of the information as well as uptake and contribute to standardization bodies will minimize this obstacle.
- **Legal frameworks for data management hindering data-related processes** could become a barrier for the penetration and wide use of project outcomes. However, ***DALIE*** will allow users to set specific preferences that reflect legal aspects. In particular, impact of cross-border transfer of trained algorithms will be evaluate as data protection framework may require to remove part of a dataset used for a machine learning whereas such algorithms may be used at global scale.

2.2 Measures to maximise impact

2.2.1 Dissemination activities

2.2.1.1 Overview

Impact maximization relies heavily on knowledge diffusion, results demonstration and excellence spreading. Therefore, the dissemination activities of the project are carefully planned to ensure that the project's advancements are widely diffused to the intended targeted audiences with appropriate mechanisms in a timely manner, and that the key stakeholders for the project's exploitation and market uptake are early engaged and actively participating to the various project's implementation phases. Dissemination is instrumental to effectively promote the exploitation activities, while it is closely related to the communication activities and compatible with the protection of IPRs. ***DALIE*** will implement an intensive dissemination strategy that will lead all dissemination, communication and exploitation activities from the very early stages of the project.

2.2.1.2 Target groups

Considering the inter-relation between the diverse activities to maximize the project's impact, it is important to early identify the potential targeted audiences of ***DALIE*** along with their specific interest in the project. An initial list of such target groups for ***DALIE*** is depicted in the following table.

Table 4: DALIE identified target groups

Target Group	Interest in the Project

A – Big Data- and IoT-Driven Industry Stakeholders	*i)* Utilisation of project's results in everyday operations; *ii)* Strengthened innovation by blending with in-house artefacts; *iii)* Training on project's outcomes; *iv)* Participation in the project's events; *v)* Exploitation of project's open source results; *vi)* Inspiration for new ideas and applications
B - Researchers and Academia: Individuals engaged in research initiatives and/or working in research/academic institutes conducting core or application research on IoT, big data and cloud engineering	*i)* Further advancements on the IoT and Big Data research through extension / reuse of the project's outputs in the investigated and in other application domains; ii) Inspiration for future research initiatives based on the project's concept and results; *iii)* Participation in the project's events
C - Industry Associations & Technology Clusters: European initiatives and clusters Various EU and national unions, etc.; Major industry associations	*i)* Inclusion of project's results to collaborative research activities (roadmap, white papers, position papers); *ii)* Dissemination of project's results to their members; iii) Bilateral participation in events for knowledge exchange
D - Participants, project partners and relevant stakeholders active in the H2020 related to IoT and Big Data industry	i) Identification of common topics; ii) Synergies and collaborations for results promotion; *iii)* Enhancing innovation through results combination; *iv)* co-organisation of events; *v)* Research Agenda formulation
E - Policy-makers (at any level like EC Directorates and Units, Ministries and Governments, Regulatory Agencies), Standardisation Organisations (ETSI, etc.)	*i)* Evaluation of the project's Social-Technological-Economic-Environmental-Political (STEEP) aspects; *ii)* Definition of future research and innovation directions for the EC initiatives, considering the project's acquired knowledge and experience; *iii)* Inputs for standardization activities
F – General Public: Individuals who benefit from the project outcomes	Acquire new experiences and utilize the project results in scenarios that are addressed to the general public for gathering feedback

2.2.1.3 Dissemination objectives

Dissemination activities are expected to diffuse the scientific and technological knowledge generated in the context of the project, aiming to ensure both a mid– and long-term impact by informing the European target audiences A-G. The dissemination strategy to be applied is aligned to the **following objectives**:

- DISS. OBJ. I: Maximize ***DALIE*** outreach in the target audiences via appropriate key messages. (Target Audiences: A-G)
- DISS. OBJ. II: Diffuse the scientific and technological knowledge generated in the project within and beyond the project's consortium. (Target Audiences: A-F)
- DISS. OBJ. III: Establish liaisons with other projects and initiatives for knowledge and innovation transfer. (Target Audiences: D-E)
- DISS. OBJ. IV: Engage the targeted audiences to get feedback, validate and ensure broad applicability of the project's results. (Target Audiences: A, B, C, D, E, F)
- DISS. OBJ. V: Attract potential users / clients, foster the acceptance of the project's outcomes by new and current users and stimulate the appropriate market segments to support the project's exploitation strategy. (Target Audiences: A, C, E)
- DISS. OBJ. VI: Encourage the development of further outcomes in new initiatives. (Target Audiences: A, B, C, E)

The project's dissemination activities will be characterized by active, a priori awareness and validation by the targeted audiences and will be collectively performed by all partners, according to each partner's profile and expertise. The industrial partners will approach their relevant industry sectors, as well as

their distributors and client networks, while the academic and research partners will focus on disseminating the project results towards research institutes and universities across Europe.

2.2.1.4 Detailed activities planned

In the following Figure, an initial dissemination plan is provided which ensures that the suitable interactive and / or non-interactive dissemination activity is chosen based on the target audience, and presents different intensity depending on the phase and the evolution of the project. This plan will be confirmed at the very beginning of the project (M01 with D11.2) and will be updated and evaluated at the end of each phase (D11.3, D11.4). It needs to be noted, that this plan is complemented by another phase "Phase IV: Post-project Dissemination" which will be developed during the project and will cater for the further promotion and exploitation of project's results beyond the contractual implementation. In fact, the creation of a community of interested stakeholders and potential users is anticipated to ensure sustainability and transfer of data and knowledge beyond the project duration, ensuring in such a way the continuation of research and the increased take-up of results. For this reason, the project's dissemination activities will also include continuous monitoring of the achieved impact in order to increase the size of the community, along the project.

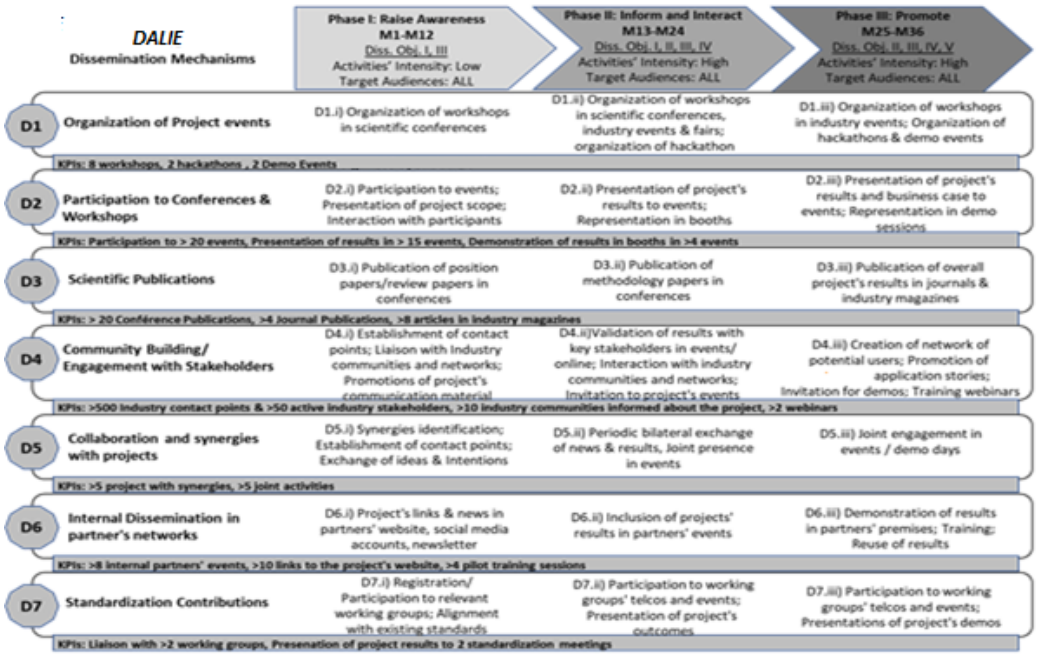


Figure 13: DALIE plan for dissemination activities

Research Community

- *Special Issues organization*: The consortium will organize at least 2 special issues in IEEE Transactions on Industrial Informatics, Elsevier Transportation Research part C or related journals. The high scientific profile of the participating academic and research institutes guarantees the success of these special issues, which will demonstrate the project's research achievements worldwide.
- *Workshops organization*: The consortium will organize workshops throughout the project's duration, where interested researchers and industry professionals can go and learn about ***DALIE*** concepts and how to implement them.
- *Contribution to international journals and conferences*: All the interesting and innovative research results of ***DALIE*** will be published in leading international journals in the field, as well as presented to international conferences. Indicative journals and conferences are presented in Table 5.

Table 5: Indicative Scientific Journals and Conferences

Conference & Events
IEEE Intelligent Vehicles Symposium (IV), IEEE Conference on ITS (ITSC), ITS World & European Congresses, IEEE Vehicular Technology Conference (VTC), EUCAR Reception &

Conference, TRB Annual Meeting, IEEE Vehicular Networking Conference (VNC), International Conference on Advances in Vehicular Systems, Technologies and Applications, IEEE International Conference on Communications (ICC), IEEE ICC Mobile and Wireless Networks Symposium, International Conference on Recent Advances on Signal Processing, Telecoms & Computing (SigTelCom), International Conference on Distributed Computing and Networking (ICDCN), IEEE/CIC International Conference on Communications, International Wireless Communications and Mobile Computing Conference, IEEE Conference on Communications & Network Security, International Conference on Internet of Things, Big Data and Security, International Symposium on Security and Privacy on Internet of Things (SPIoT-2017), AUVSI Automated Vehicle Symposium, European Conference on Connected and Automated Driving, International Conference on Connected Vehicles & Expo, IEEE International Conference on Robotics and Automation (ICRA), Automated Vehicles Summit
Journals
IEEE Transactions on Intelligent Transportation Systems journal, ET Intelligent Transport Systems Journal, Journal of Intelligent Transportation Systems: Technology, Planning, and Operations, International Journal of Vehicular Technology, International Journal of Intelligent Transportation Systems Research, Journal of Advanced Transportation, IEEE Communications Magazine, IEEE Transaction on Mobile Computing, IEEE Transactions on Wireless Communications, IET Communications, IEEE Transactions on Industrial Informatics, Elsevier Journal of Network and Computer Applications, IEEE Transactions on Big Data

It must be pointed out that all principal investigators from research and academia involved in ***DALIE*** comprise well-recognised experts in their field and they participate in wider associations in their fields of expertise, ensuring this way the successful dissemination of ***DALIE*** results and research findings. Achievable qualitative and quantitative targets will be set during the dissemination planning. Our initial targets include: **two related conferences** in which ***DALIE*** will be active, **one press release per year**, **6 publications in scientific conferences per year**, **4 publications in scientific journals per year**, **6 newsletters**, **four Master Thesis** and at least **two PhD Thesis**.

Contribution of Industrial and Business world

The ***DALIE*** has a group of industrial partners, SMEs and research institutes, with strong networking profiles, which will lead the dissemination of the project's outcomes to the industry. This will be achieved through direct dissemination activities such as e-marketing campaigns, news groups, mailing lists / e-Zines (electronic magazines), online press and on-site promotions. Furthermore, dissemination through partners' web sites, with their experiences of this solution and the high level of service provided by the ***DALIE*** platform will be sought. Exhibitions and participation in specialised events, forums and platforms, will guarantee wide dissemination of the results in EUs scientific and innovative business scenes. Finally, indirect dissemination will be accomplished via consortium partners' public relations, word of mouth, articles and assessment written by independent reviewers

2.2.2 Communication activities

2.2.2.1 Overview

All actions that contribute to the diffusion of the project's results beyond the consortium and the direct stakeholders are considered as Communication activities. In essence, the main objective of the communication activities is to maximize the project's innovation potential and to attract a wide range of stakeholders who are invited to embrace the project's results and benefit from the project's advancements. In this direction, ***DALIE*** will:

- Define concrete and measurable objectives for the communication activities and will link these objectives with the appropriate target groups.
- Implement a solid, modern and inclusive communication strategy, accompanied by a realistic plan to reach these objectives.
- Set up the different channels, tools and mechanisms that will be used to implement the communication plan and reach the targeted audiences.

- Define the guidelines for the implementation of communication and dissemination actions (e.g. project identity, messages to convey, internal reporting rules, etc.).
- Put into action an iterative communication and learning process, which shall measure the level of response per communication mechanism and interpret the corresponding insights.
- Closely monitor the impact of the communication activities in order to be able to apply corrective actions whenever necessary and identify opportunities that can maximize visibility.

2.2.2.2 Communication objectives

The communication strategy is driven by the following **communication objectives** which are directly linked with the different phases of the project and the corresponding targeted audiences:

- COMM.OBJ. I: To create awareness of the project among the full range of potential adopters / users in the general public. (Target Audiences: A-G)
- COMM.OBJ. II: To provide a clear view of the project's concept, goals and results by formulating adapted key messages, and preparing communication material. (Target Audiences: A-G)
- COMM.OBJ. III: To create an active community of potential users and collect feedback to be considered by the project's activities. (Target Audiences: A-G)
- COMM.OBJ. IV: To prepare the ground for the exploitation of project's results. (Target: A-G)
- COMM.OBJ. V: To support targeted dissemination of the project's results. (Target: A-G)

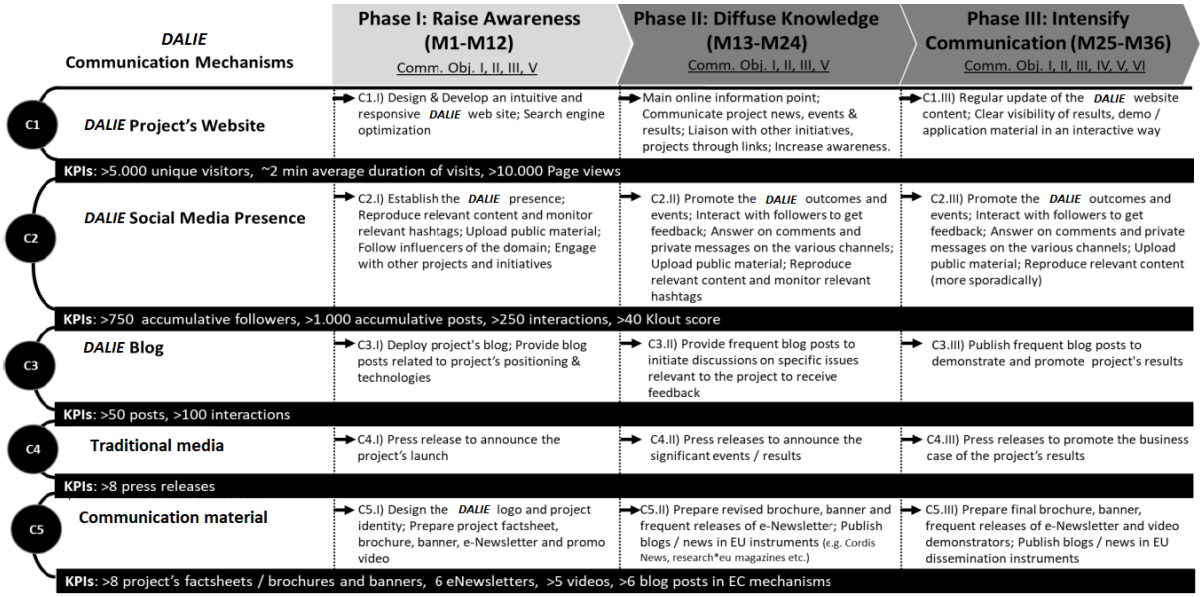


Figure 14: DALIE plan for communication activities

2.2.2.3 Detailed activities planned

To ensure the different communication objectives are addressed effectively and expectations of the target audience groups are met, specific attention will be paid to adapt the communication means, the measures and the content both to the needs and knowledge levels of these groups, as well as to the status/progress and needs of the project. An initial communication plan is depicted in the figure below. It needs to be noted that an additional phase, "Phase IV: Post-project Communication", is also envisaged to guarantee further promotion of project's results beyond its contractual implementation but is not depicted in that figure.

2.2.3 Dissemination and communication effectiveness measures

The aspect of assessing strategy efficacy is to monitor the impact of all communications where impact indicators and metrics will be examined and analysed to improve the cost effectiveness of the communication products and activities via a feedback loop. The different metrics may be monitored in different time cycles.

Example metrics include standard website metrics, user behaviour metrics, promotional metrics such as backlinks, SEO ranking etc., quantitative data measured via survey (suggested – under consideration), as well as outreach that covers indicators concerning press coverage, social media etc. To this end, we have devised an initial list of Key Performance Indicators (KPIs) for assessing the ***DALIE*** measures to maximize impact, corresponding mainly to dissemination and communication activities in the following table.

Table 6: KPIs for measuring impact related dissemination and communication activities

Channel	KPI	Method of measurement	Frequency	Threshold
DALIE portal (public site)	Number of visitors/ country	Google Analytics	Monthly	>=50 different visitors/ month for each country
	Number of site access with duration less than 30 seconds	Google Analytics	Daily	<= 20% of total access
	Number of site visitors per month	Google Analytics	Monthly	>= 50
DALIE portal (private site)	Number of authorised users	Admin tool	End of project	>=30
	Number of contributions and comments from authorised users	Admin tool	Monthly	>=30
Social Networks-Twitter (public)	Increase KLOUT punctuation per month	KLOUT	Monthly	>=2 points
	New follower per month	Twitter	Monthly	>=20
	Number of re-tweets per month	Twitter	Monthly	>=30
Social Networks LinkedIn (public)	New discussion per month	LinkedIn	Monthly	>=20
	View of ***DALIE*** profile	LinkedIn	Monthly	>=60
Social Networks You tube (private channel)	Number of new stakeholders viewing private videos about project per month	You Tube	Monthly	>=20
Mailing lists	Number of mailing lists	Report	End of project	>=6
	Number of authorised users in mailing lists per month	Admin tool	Monthly	>=30
Events – Up to 25 participants (***DALIE*** - organized events, international workshops, dissemination visits)	Number of events	Manually	End of project	>=15
	Number of audience contacts	Surveys	On schedule	At least 50% of the participants
	Number of participants Interested on ***DALIE*** project	Surveys	On schedule	At least 40% of the participants
Events – 25-100 participants (professional events with relevant end-users and authorities, international Scientific workshops)	Number of events	Manually	End of project	>=20
	Number of audience contacts	Surveys	On schedule	At least 30% of the participants
	Number of participants interested on ***DALIE*** project	Surveys	On schedule	At least 20% of the participants

Channel	KPI	Method of measurement	Frequency	Threshold
Events – more than 100 participants (Conferences – ***DALIE*** relevant)	Number of events	Manually	End of project	>=10
	Number of participants for ***DALIE*** section contacted	Surveys	On schedule	At least 50% of the participants
	Number of participants for ***DALIE*** section interested in the project	Surveys	On schedule	At least 40% of the participants
Journal publications	Number of journal publications by ***DALIE*** partners	Direct reporting	End of project	>=24
Presentations in International Conferences	Number of conference presentations by ***DALIE*** partners	Direct reporting	End of project	>=24

2.2.4 Exploitation activities

2.2.4.1 Joint exploitation strategy

Exploitation is recognized as the key enabler for the success of the ***DALIE*** project. Hence all partners within the project are aware of and committed to the exploitation of the project results, and the proposed project research and development focus strongly adheres to their research and business strategies. The Consortium Partners with their diverse and complementary Research and Business contexts and capabilities provide all potential exploitation modalities and routes to bring ***DALIE*** results to all targeted user communities.

The approach to exploitation followed within ***DALIE*** is described also in section 1.3.2. However, in general terms, the exploitation strategy depends on the actual exploitable assets. A list of exploitable assets will be refined in the course of the project duration, whereas at the proposal preparation time, there are already specific exploitable assets expected to be available within ***DALIE***, aligned with the main project objectives, listed in the table below.

Table 7: DALIE exploitable assets at proposal preparation stage

Exploitable asset	Description
A1	A1: IPTB1 Smart mobility for fleet monitoring enabling productivity improvement along the entire vehicle product lifecycle
A2	A2: IPTB2: Smart mobility for condition monitoring for emission regulation enabling productivity and performance improvement for core vehicle components
A3	A3: Smart manufacturing for quality control targeting reduction of production waste and more efficient usage of the robots in the production line
A4	A4: IPTB4: Smart cities for Air Quality & Mobility Strategies targeting reduction of emission peaks and traffic jams in large metropoles
A5	IPTB5: Smart finance for automotive insurance enabling higher customization of services
A6	Framework for big data processing integrating advancing Big Data management, automation of reusable Big Data ETL best practices, methods for data enrichment and scalable machine learning algorithms
A7	Framework for interactive analysis in a (big-)data value chain
A8	Smart education platform and related trainings for IIoT and data analytics
A9	Call for projects and appropriate cascade funding, relying on the European's Smart Anything Everywhere initiative
A10	Dedicated data market place for the efficient exchange and monetization of data

Key partners

The ***DALIE*** consortium is made of leading automotive companies, robotics manufacturers, cities operators, IoT, big data, traffic management experts, joining forces to build fully interoperative ecosystems to demonstrate in the real world the value of IoT and big data technologies applied to traditional key European industries. Five industrial test-beds are defined to validate how IOT and big data will support digitalization take-off in traditional large industries. Hence, this unique combination within this ecosystem strongly supports know-how transfer and identification of cross-domain, innovative solutions, and further shall illustrate the relevance and scalability of ***DALIE*** approach.

Key activities

- Set-up of 5 relevant industrial pilot test-beds in different applications domains while always relating to smart transportation, and all driven by major industry partners.
- Provide support for data-driven business generation by appropriate guidance, best practices and environments for business innovation related to data-driven business models, data-related market places, and for data privacy in the context of the General Data Protection Regulation (GDPR)
- Tailoring of the IIOT and Big Data technology frameworks for automotive applications, relying on mature environments such as Fiware or OneM2M
- Boosting the ecosystem by enlarging targeted audience of the DALIE outcomes by appropriate education solutions, by providing incentives to innovative SMEs to map to this initiative, and by supporting standardization activities

Key resources

- Qualified employees
- R&D innovation capabilities
- Access to industrial use cases (Pilots) and relevant data sets related to transport
- Appropriate labs and test environments for the development and validation of the proposed methods.
- Multiplier effect provided by the project content and the partners corporate strategies.

DALIE assets

- A1: IPTB1 Smart mobility for fleet monitoring enabling productivity improvement along the entire vehicle product lifecycle
- A2: IPTB2: Smart mobility for condition monitoring for emission regulation enabling productivity and performance improvement for core vehicle components
- A3: Smart manufacturing for quality control targeting reduction of production waste and more efficient usage of the robots in the production line
- A4: IPTB4: Smart cities for Air Quality & Mobility Strategies targeting reduction of emission peaks and traffic jams in large metropoles
- A5: IPTB5: Smart finance for automotive insurance enabling higher customization of services
- A6: Framework for big data processing integrating advancing Big Data management, automation of reusable Big Data ETL best practices, methods for data enrichment and scalable machine learning algorithms
- A7: Framework for interactive analysis in a (big-)data value chain
- A8: Smart education platform and related trainings for IIoT and data analytics
- A9: Call for projects and appropriate cascade funding, relying on the European's Smart Anything Everywhere initiative
- A10: Dedicated data market place for the efficient exchange and monetization of data

Customer relationships

- **Dedicated personal assistance / co-creation (A3, A4, A5, A6):** direct interactions with OEMs and tier-1, as well as tier-2 suppliers, so as to integrate the project findings in corporate manufacturing processes and products development.
- **Personal assistance (A2, A5):** assistance before and after sales to the customers, through covering the entire value chain.
- **Self-service (A1, A2):** creation of relationship between the DALIE partner and clientele via featuring of the industrial application use cases and the supply chains, to serve themselves efficiently.
- **Community-building (A7, A8 and A9):** creation of community building and enabling interactions at a pan-European level.

Channels

- C1. Partners and their respective distribution networks
- C2. DALIE dissemination and communication activities.
- C3. Participation in European transport related events and expert groups.
- C4. Projects (research / commercial) springing from DALIE.

Customer segments

- **Seg1** (A2)**: Worldwide Big Data and IoT enabled services market related to transportation**
- **Seg2** (A3,A4,A5,A6)**:** ***Complementary Tier 1/2 partners*** to support ***component industrialization*** as well as system integration within the transport domain seen from the various viewpoints
- **Seg3** (A2,A4,A5, A6): **OEMs and Tier 1** seeking for **engineering support** for the concept, deployment and validation of the exploitable assets
- **Seg4** (A2,A3,A7,A8,A9)**: European and worldwide transport market** expecting improved methods and key enabling technologies
- **Seg5** (A1, A6): **European community** targeting the exploitation of **cross-domain Big Data** related to transport as basis for **new value creation**

Cost structure

- ***Fixed costs*** such as personal (expertise), marketing, lab and material parts
- Variable costs: costs for the system components
- Note: co-investment provided by the companies to support technology development and support access to relevant labs

Revenue streams

- S/W components and IP sale (Seg.1, Seg.2, Seg.3, Seg.4, Seg.5): selling of rights to the customer
- Sell of software licenses (Seg.1, Seg.2, Seg.3, Seg.4, Seg.5): selling licenses to use the developed tools and methods
- Sell of engineering services (Seg.2, Seg.3, Seg.5): selling of respective engineering services

Figure 15: The DALIE business model canvas

DALIE's business model canvas, described in Figure 15 at project level, is a strategic management chat with elements describing the projects value proposition, infrastructure, customers, and finances (cost structures and revenue streams) in order to achieve the expected impact.

Moreover, the exploitation strategy of the ***DALIE*** project will follow a step wise approach and will be based on the combination of a bouquet of activities which will span throughout the project duration but will vary in intensity based on the amount of information that can be made available and the results that will be produced during the project lifetime. In addition, different exploitable assets may be exploited by different stakeholders based on the management of the IPRs as these are outlined in section 2.2.4.3.2.

The exploitation strategy of ***DALIE*** is based upon the "Innovation Management for Practitioners – How to Convert Research into Commercial Success Story" report, issued by the European Commission aiming to tackle the European Paradox, namely a strong science base yet weak innovation performance, and has been tailored to the specificities, needs and results of the project. Throughout the tailoring process, the consortium paid special attention in the identified impact factors for market-oriented exploitation, and integrated them in its overall strategy, from setting up the consortium to support future commercialization, to performing a preliminary market scan to identify the market targeted and the strength of the market demand. This can be summarized in the table below.

Table 8: Exploitation impact factors and actions taken by DALIE

Exploitation Impact Factor	**Actions taken by *DALIE* consortium**
Research field	***DALIE*** is engaged in a number of domains related to transport, which are currently being strongly digitalized based on IoT and Big Data technologies, which as such, hold the potential to be faster and more easily commercially exploited. ***DALIE*** also comprises of a highly motivated and highly skilled team, being committed in timely delivering the aspired results, with premium quality.
Cooperation	***DALIE*** consortium involves top OEMs, tier-1 and tier-2 manufacturers, as well as several industrial partners that offer technological solutions who hold significant commercial exploitation interest, thus aiming at increasing the potential of the market-oriented exploitation. Size-wise, the consortium also includes large enterprises with long-lasting experience in innovation aspects for the innovation management and business planning, which can make a difference in successful market-oriented exploitation since, as explained in section 4, the research outcomes are in line with their expectations from the project. ***DALIE*** also involves a significant number of smaller stakeholders including end-users throughout the requirements collection and validation processes, aspiring to better reflect the market needs and deliver a sound technological solution offering a high degree of usability.
Management & Organizational Change	***DALIE*** has put in place a solid project management strategy facilitated by a rigid – in terms of task allocations and execution - and flexible – in terms of bypassing bottlenecks such as partner substitutions - organizational structure which – as demonstrated in section 3.2 – holds the potential to fully support the project throughout its lifecycle. ***DALIE*** has also put in place, and will develop and constantly update, a risk management strategy, aiming not only at managing research, technical, financial, management, exploitation and other related risks as they appear, but mainly at proactively acting so as to avoid the appearance of these risks.
Market Knowledge, Awareness & Demand	The ***DALIE*** consortium will conduct a thorough market analysis which will aim at the identification of the highly automated vehicles market, towards which ***DALIE*** is targeted, its segmentation, the positioning of current competitors and all corresponding emerging trends. The consortium has already identified that a clear demand /market is already there awaiting for solutions and services it can consume, and thus the market pull rather than a specific technology push dominates the market in concern. ***DALIE*** will early on investigate the target market, investigate the performance and respective market conditions, and will define strategies to flexibly act upon during the exploitation phase.
Dissemination	Dissemination activities will deal mainly with the diffusion of scientific and technological knowledge generated within the context of the project, aiming to address the full range of potential users including the academic, research and industrial communities, along with all related stakeholders.
Standards & Regulations	***DALIE*** has identified a set of standardization bodies and EU directives that have to be closely monitored during the project lifetime, while in part of them, specific contributions are

	envisaged to be provided. These include Alliances such as AIOTI and standards maker (ETSI, oneM2M, ITU, GSMA, etc.). Specific interactions are foreseen with the ETSI ISG-CIM (Industry Specification Group on Context Information Management) which build upon GSMA IoT-Big data compliant architectures while expanding the FIWARE NGSI interface to make it "semantic enabled" through the use of graph-based models in its core and made accessible through NGSI-LD (linked data) interfaces.

Exploitation Activities: The project exploitation strategy will comprise of a bouquet of exploitation activities which include: 1) the identification of the innovative exploitable assets, whether these are technological components (e.g. big data platform), algorithms (e.g. IoT big data aggregation and processing), models or added value services (analytics, visualisations, reporting), which the project will deliver through its results to its target users, 2) the conduction of a thorough market analysis (which will comprise of an initial and a final analysis) which will aim at the identification of the (huge) market towards which ***DALIE*** is targeted, its segmentation, the positioning of current competitors and all corresponding emerging trends, 3) the documentation of an analytical IPR management strategy based on the principles outlined in the project CA which will guide the joint and individual exploitation capabilities of the project partners, 4) the analytical definition of a risk management strategy, aiming not only at managing research, technical, financial, management, exploitation and other related risks as they appear, but mainly at proactively acting so as to avoid the appearance of these risks, 5) the analytical definition of all possible commercial and non-commercial exploitation models, which have been preliminary identified and are outlined in the following paragraphs, 6) the analytical definition and evaluation of the sustainability and viability of possible business models and alternative solutions that may be followed for the provision of the project solution and services to the identified stakeholders, including licensing schemes, pricing, etc., and the corresponding tactical revisions as deemed necessary throughout the project lifecycle, 7) the establishment of tactical alliances with other industrial or research organisations that hold the potential of promoting the ***DALIE*** results, 8) the establishment of relationships of trust with customers early within the project, who can facilitate the quicker adoption of the solution and provide valuable feedback which can be used in the commercialization phase, 9) the identification of financial support from diversified funds (including for example business angels, institutional funds, as well as other private and/or public funds) that can be used to support direct and/or indirect commercial transformation, ranging from additional research activities to bug fixing and to technology integration in existing or future solutions, and 10) the validation of the aforementioned exploitation activities through the ***DALIE*** use cases / demonstrators.

Exploitation Models: The ***DALIE*** consortium recognizes three main exploitation models for the project results: 1) The commercial exploitation model, which implies the paid provision of the project results to the end users, complying with a licensing scheme which will be defined in the ***DALIE*** business plan, 2) The research exploitation model, which implies the re-utilisation of the research know-how acquired in future research activities, and 3) The technological exploitation model, which implies the re-utilisation of the technological know-how acquired for the development of innovative products and the provision of advanced services built on top of them. However, not all project partners and interested stakeholders may exploit all project results using the three models defined above. The exploitation models of the ***DALIE*** project results will be dependent upon three main parameters: a) the nature and interests of the project partners and stakeholders in general, b) the distribution model (commercial or non-commercial) of the project results and c) the distribution of the IPRs amongst the project partners. Based on these limitations, 1) the ***DALIE*** large industrial partners are mainly interested in commercially exploiting the project results, 2) the consortium (as well as external) academic and research organizations are mainly interested in adopting the research exploitation model for project results that will be provided as open source components, integrating them in their research and/or teaching activities and/or setting up future research projects further promoting the project results, and 3) smaller industrial partners are mainly interested in adopting the technological exploitation model for the project results that will be provided as open source components for know-how transfer in other products/services.

Exploitation Stakeholders: The ***DALIE*** consortium has already identified the different stakeholders that can take advantage of the ***DALIE*** results and services. In the following table, we summarise the stakeholders' categories based on their exploitation interest.

Table 9: Exploitation stakeholder in DALIE

Stakeholder Type	Description of interest
Education and Research organisations	Includes universities, engineering schools, public/private training providers, research centres, etc. They are mainly interested in the research exploitation model, aspiring re-utilisation of the research know-how acquired in future research activities. From a commercial exploitation model, they are interested in founding spin-offs and start-ups to commercially exploit the developed research results.

Industry / Companies	Includes all enterprises. In the case of ***DALIE***, the industrial partners of the consortium are mainly interested in the commercial exploitation model, providing the project results to the end users. They are also interested in the technological exploitation model, developing and delivering products and/or services built on top of the project open source results. Companies outside the consortium will mainly capitalize on the second model.
Investors	Includes angel investors, and other private and/or public funds. In the case of ***DALIE***, their exploitation interest is purely commercial and depends on the partnerships and revenue agreement. They could invest in the delivery of the innovation to the market and (commercially) capitalize on this once mature.
Policy-makers and governments	Includes national ministries, government, councils, etc.; In the case of ***DALIE***, they can capitalize on the project results and on the demonstrator outcomes and best practices identified so as to design national or regional policies.

Exploitation Intensity: The exploitation activities will vary in intensity based on the delivery of the project results and the acquisition of R&D know how. Towards this end, the exploitation activities will start mildly with the identification of the innovative exploitable assets of the project and the conduction of a preliminary market analysis identifying potential stakeholders and competitors, will intensify prior to the delivery of the intermediate project results with the more analytical definition of all possible commercial and non-commercial exploitation models and definition and evaluation of the sustainability and viability of possible business models and alternative solutions, and will peak prior to the delivery of the project final results, when the project dissemination activities will also be intense, attracting potential stakeholders and customers. Following the project end, the ***DALIE*** consortium will aim at creating appropriate business networks and at exploiting the project results.

Exploitation Objectives: The exploitation strategy of ***DALIE*** will follow three main stages of expansion with specific short-term, medium-term and long-term objectives:

1) Short-term objectives: This first stage corresponds to a period beginning with the start of the project activities and ends in parallel with the project. During this period, the main objective is to verify and validate through the industrial demonstrators, the quality and effectiveness of the ***DALIE*** results, concepts, models, tools and services.

2) Medium-term objectives: This second stage corresponds to a period beginning with the end of the project and ending after two or three years, depending on the maturity and completion of the project results. The main objective includes the commercialization of the "to date" results and developments of semi commercial products and services, while it further relates to potential fine-tuning, or expansion of the ***DALIE*** framework.

3) Long-term objectives: Corresponds to the commercialization of the ***DALIE*** framework products and services derived from the first and second stage.

2.2.4.2 Exploitation on a per industrial test-bed basis

IPTB1: Smart mobility for vehicle fleet monitoring: The market involves the whole GM portfolio, reaching globally around 9 million new sold vehicles each year. The technology will be implemented in all the carlines using the selected subsystems and will set a ground line to start implementing new features broadening the scope of such approach. The project is a key enabler to further expand the competences of the European site, who's responsible for the development of data analytics and prognostic algorithms for the global community developing propulsion system worldwide. The current capability can furtherly grow thanks to the cooperation with the consortium and in particular with Politecnico of Torino, enabling the GM team to acquire new competences in the big data analytics and prognostic features development area.

IPTB2: Smart mobility for condition monitoring for emission regulation: Transportation is possibly the only sector which has not managed until now to reduce its CO2 footprint in total. The CO2 contribution of transportation is even growing. On the other hand, it is understood that internal combustion engines (ICE) will stay one of the backbones of drive train technology for the next 20 years. Hence, further reducing the fuel consumption of ICE is mandatory. For the IPTB2 the route for exploitation relies on the improvement of the core assets for Pierburg and for AVL DiTEST through digitalization. Pierburg strongly believes that the market penetration of a complex technology like variable valve trains is enhanced by its predictive maintenance ability. With a wider penetration of variable valve trains the CO2 footprint of transportation will be lowered, which helps to achieve a sustainable environment. This innovation, which will impact performance, production costs and emissions of the powertrain, is expected to increase grow Pierburg's business opportunities, which accounts for employment in Europe. For AVL DITEST, the digitalization will open the door for a complementary business model relying on smart services – for more effective usage of workshop equipment, finally reducing downtime and increasing usage efficiency. This will provide a further competitive advantage, which will be developed in tight cooperation with a central customer (ÖAMTC, see letter of support) and by its deployment will further contribute to the monitoring of the emissions regulation.

IPTB3: Smart manufacturing for continuous quality control: Predictive maintenance models will be investigated in order to monitor the health status of the machines alongside with the quality of the vehicle through its lifecycle. There will be a specific study about the products positioning before the start of sales, that will take into consideration also other competitive solutions existing in the market and the differentiation of the smart manufacturing products from them. Also, the smart manufacturing test-bed will focus on the notification and advertising of the following added-value features: a) Modern production line using novel big data solutions, b) improving the traceability of the product through its lifecycle, c) decreasing of the defected products using prognostic maintenance services.

IPTB4: Smart cities for Air Quality & Mobility Strategies: As a result of DALIE, SEAT will prepare its IoT platform which will be able to collect relevant data from its vehicles, which could be of interest for municipalities and other potentially interested third parties. SEAT will consider incorporating some of the urban mobility policies being implemented in Barcelona in their connected cars – first compatible cars launched by late-2019 with a prevision of over 1M circulating units by end of project – (e.g. during an episode of environmental pollution some cars will not be allowed to enter the city, and this restriction will be shared with the navigation system of connected cars in the affected area). Nommon will develop new data fusion algorithms for the enriched OD matrices obtained from mobile phone records, with other data sources such as intelligent transport cards, GPS data form connected vehicles, etc. Nommon will integrate this outcome in the portfolio of solutions of its business unit Kineo (www.kineo-analytics.com) and will pursue its exploitation as part of its business strategy in the transport sector. The Decision-support tool (DST) resulting from WP8 will be the main exploitable asset for BSC, who will showcase the tool to present the results as Open Access. The DST will be used as a success story to promote the use of air quality forecasts in different sectors such as mobility planning or health. When more specific data is required by external clients, the possibility to sign an agreement for data sharing will be explored

IPTB5: Smart finance for automotive insurance: DALIE results will have an impact on Eurolife motor insurance portfolio consisting of over 100000 insured customers. The exploitation will focus on commercialization of the results targeting insured customers in order to provide them innovative insurance services. The knowledge gained from the project will initiate new business opportunities and will enable innovation change on the current operation of the organization. As a result, new products will be created and disseminated to existing and new customers proving better services including advanced situational awareness for car accident prevention and encouragement of drivers for better driving behavior providing better insurance premiums. Advanced claims assessment will enable better customer reimbursement and cost optimization for the insurance organization. Overall, big data, mobile applications and near real-time analytics technologies will be introduced to Eurolife platform giving a competitive advantage.

The market place – Sustainability: The Bonseyes Foundation will be instrumental for connecting the test-bed with the European AI community and test-beds within the automotive domain as well as other industry verticals, thus contributing to sustainability through growth and connectivity. The **Bonseyes Foundation is also having liaisons with the ongoing ISO standardization on artificial intelligence (ISO/IEC JTC 1/SC 42),** ensuring that lessons-learned and discovered stakeholder needs find their way into the relevant standardization activities.

2.2.4.3 Management of Knowledge and Intellectual Property Rights

Proper management of knowledge and of IPRs, will facilitate the creation of an environment that encourages and expedites the dissemination of discoveries, creations and new knowledge generated by ***DALIE*** partners (including industrial partners as well as researchers). It will ensure that the commercial results are distributed in a fair and equitable manner that recognizes the contributions of the inventors and the institution as well as those of other stakeholders, and will ensure that both IP and other products of research are made available to the public through an efficient and timely process of technology transfer. Last but not least, it will establish standards for determining the rights and obligations of the ***DALIE*** partners, the creators of intellectual property and their sponsors, with respect to inventions, discoveries and works created. Towards this end, the ***DALIE*** partners have even at this stage come to some preliminary agreements with regards to the management of knowledge and the management of IPRs, that are analysed below.

2.2.4.3.1 Management of Knowledge and contribution to Open Science

The consortium embraces the vision that large and unrestricted access to knowledge is essential not only for the central role of knowledge and innovation in generating growth but also as a fundamental human value of scientific knowledge progress and dissemination. In this respect, the ***DALIE*** consortium commits to open source policies. Nevertheless, while a plethora of components and modules (mainly coming from the academic institutions and research organisations) are provided open source, a set of the results are based upon proprietary / legacy components and modules that are not provided open source. Towards this end, the consortium will follow a multi-level approach towards managing the knowledge produced, the main idea being that 1) the ***DALIE*** solution will be copyright protected using a licensing scheme that will not violate the terms and conditions of the discrete components

comprising it, 2) the components that can be provided open source will be delivered under such a license (e.g. CC-BY), and 3) the respective knowledge producer holds the rights to the knowledge they have produced, while sharing the software implementation with the rest of the consortium. The consortium will examine the software licenses of all algorithms, components and modules to be used, and decide under which license (or combination of licenses) the ***DALIE*** framework will be released. From a preliminary evaluation of the licenses utilised within the context, the consortium partners are contemplating between the Apache Software License (ASL) license, which is also used by a wide array of successful OSS projects such as the Apache web server, and the LGPL software licenses. With regards to the components and modules that cannot be delivered open source, they will be copyright protected but of course will be freely available to consortium members to use for the production of foreground.

2.2.4.3.2 Management of IPR

Special emphasis within the project will be given to the management of knowledge and more importantly to the protection of IPRs, as well as to the management of ownership of the project results, following the main principles:

Ownership of Background Knowledge. The general scope is to grant to the consortium partners responsible for the production of foreground knowledge, all access rights to the background knowledge required both for the implementation of the project, and for the use of the foreground royalty-free. More specifically it is agreed that: 1) Access rights to the **background** knowledge (pre-existing know-how) necessary for the **implementation of the project** will be made available to the Consortium members **royalty-free**, 2) Access rights to the **background** knowledge for **dissemination, research and academic purposes,** shall be granted to the Consortium members **royalty-free**, 3) All IPRs of the **background** knowledge will be retained by the corresponding consortium partners after the completion of the project. Other consortium partners may not utilise background knowledge for exploitation and commercial purposes.

Ownership of Foreground Knowledge. All partners will be able to utilise it for future dissemination, research & academic purposes on a royalty-free basis, while the commercial exploitation of the platform will be regulated by the exploitation plan that will be developed during the project. It is agreed that: 1) IPR of the **foreground** knowledge produced by the consortium partners during the implementation of the project, will be retained by the corresponding partners and will be divided proportionally, according to the effort invested in the production of the knowledge (project results), 2) **Foreground** knowledge will be **made available** on a **royalty-free** basis to all project partners for **dissemination, research and academic purposes** only, both during as well as after the project conclusion, 3) All **consortium partners** will retain **exploitation rights** of all corresponding project results ("foreground") for their intended use and will be **granted access rights to utilise it on a royalty-free basis**.

Use of Foreground Knowledge. Unless limitations posed by the licenses of specific algorithms, modules or software components prohibit it, the consortium will promote the release of project results as **open-source components** and will be protected most probably under the ASL open source license, to facilitate their wider adoption by the industrial and the ICT communities.

Protection of Foreground Knowledge. Although the availability of legal protection for software has increased rapidly around the world over the past fifteen years, the scope and the feasibility of enforcement of that protection continues to vary significantly by country. In order to promote adequate and effective protection of intellectual property rights while ensuring that national laws enforcing such rights do not themselves become barriers to trade, protection of the foreground knowledge of the project will be based upon: 1) The **Council Directive 91/250/EEC** of 14 May 1991 on the legal protection of computer programs, 2) **Directive 2009/24/EC** of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs, 3) **Directive 96/9/EC** of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases, and 4) The **WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights** (TRIPS), taking into consideration all corresponding International Legal Protection for Software Policies.

2.2.4.3.3 Consortium Agreement

The ***DALIE*** Consortium Agreement will be signed before the project starts, will rely on the DESCA model[lx] for H2020, and will include: 1) Specific arrangements concerning intellectual property rights to be applied among the participants and their affiliates, in compliance with the general arrangements stipulated in the contract; 2) The internal organization of the consortium, its governance structure, decision-making processes and management arrangements; 3) Arrangements for the distribution of the Community contribution among participants and among activities; 4) Provisions for the settlement of disputes within the partnership; and 5) Other provisions deemed necessary to ensure a sound management of the project

3. Implementation

3.1 Work plan — Work packages, deliverables

DALIE project implementation is directly mapped to the main project's objectives (see Figure 16) and relies on the two main pillars of the proposal (see Figure 2). The work-packages in blue (WP2, WP3, WP4 and WP10) are related to the digitalization framework. They provide technical and business development related supports for digitalization uptake. Especially WP10 is related to community engagment and evaluation of the test-beds including support for replication. The work-packages in yellow (WP5, WP6, WP7, WP8, WP9) are directly linked to industrial pilot test beds and targets the integration and tailoring of the framework to showcase uptake of digital economy in their specific sectors. WP1 and WP11 are related to project management, communication and sustainability of the approach. Figure 17 shows the timing of work packages and tasks with the milestones planned, and Table 10 provides a list of the work-packages. Figure 18 provides a Pert Chart for the DALIE project, thus describing the dependencies both between the work-packages and between the deliverables, in the context of the six milestones (see Table 23).

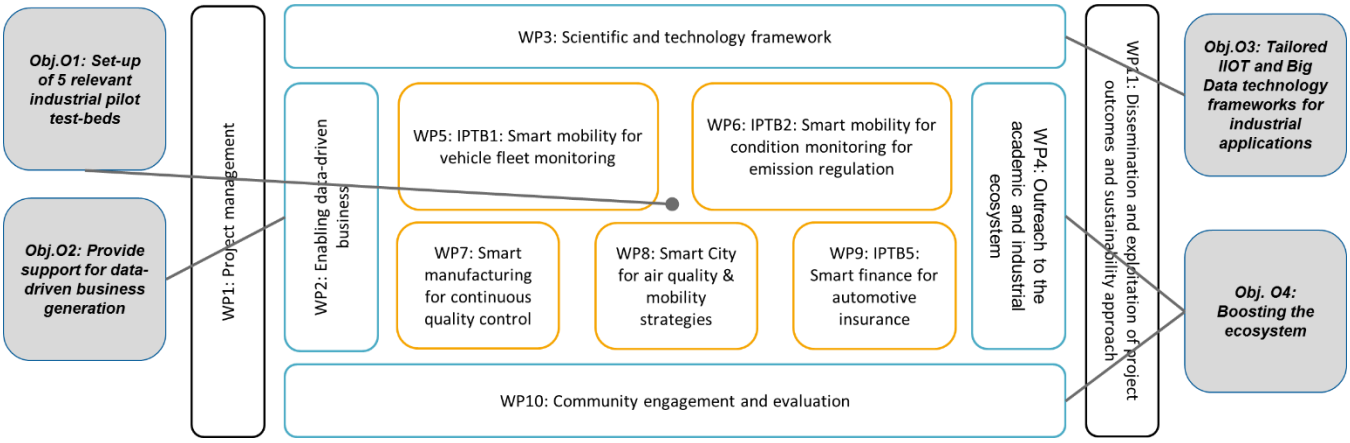


Figure 16: DALIE project structure

Table 10: List of Work Packages[lxi]

WP No	Work Package Title	Part. No	Lead Part.	Person-Months	Start Month	End month
1	Project Management	01	AVL	84,5	1	36
2	Enabling data-driven business	10	KNOW	136	1	36
3	Scientific and technology framework	07	INTRA	340,5	1	36
4	Outreach to the academic and industrial ecosystem	09	FHNW	188,5	1	36
5	IPTB1: Smart mobility for vehicle fleet monitoring	03	GM	164	1	36
6	IPTB2: Smart mobility for condition monitoring for emission regulation	04	PIE	162	1	36
7	IPTB3: Smart manufacturing for continuous quality control	02	COMAU	221	1	36
8	IPTB4: Smart City for air quality & mobility strategies	24	FAC	344	1	36
9	IPTB5: Smart finance for automotive insurance	25	EUR	115	1	36
10	Community engagement and evaluation	01	AVL	167	1	36
11	Dissemination and exploitation of project outcomes and sustainability approach	05	BSC	173	1	36
			Total months	2095,5		

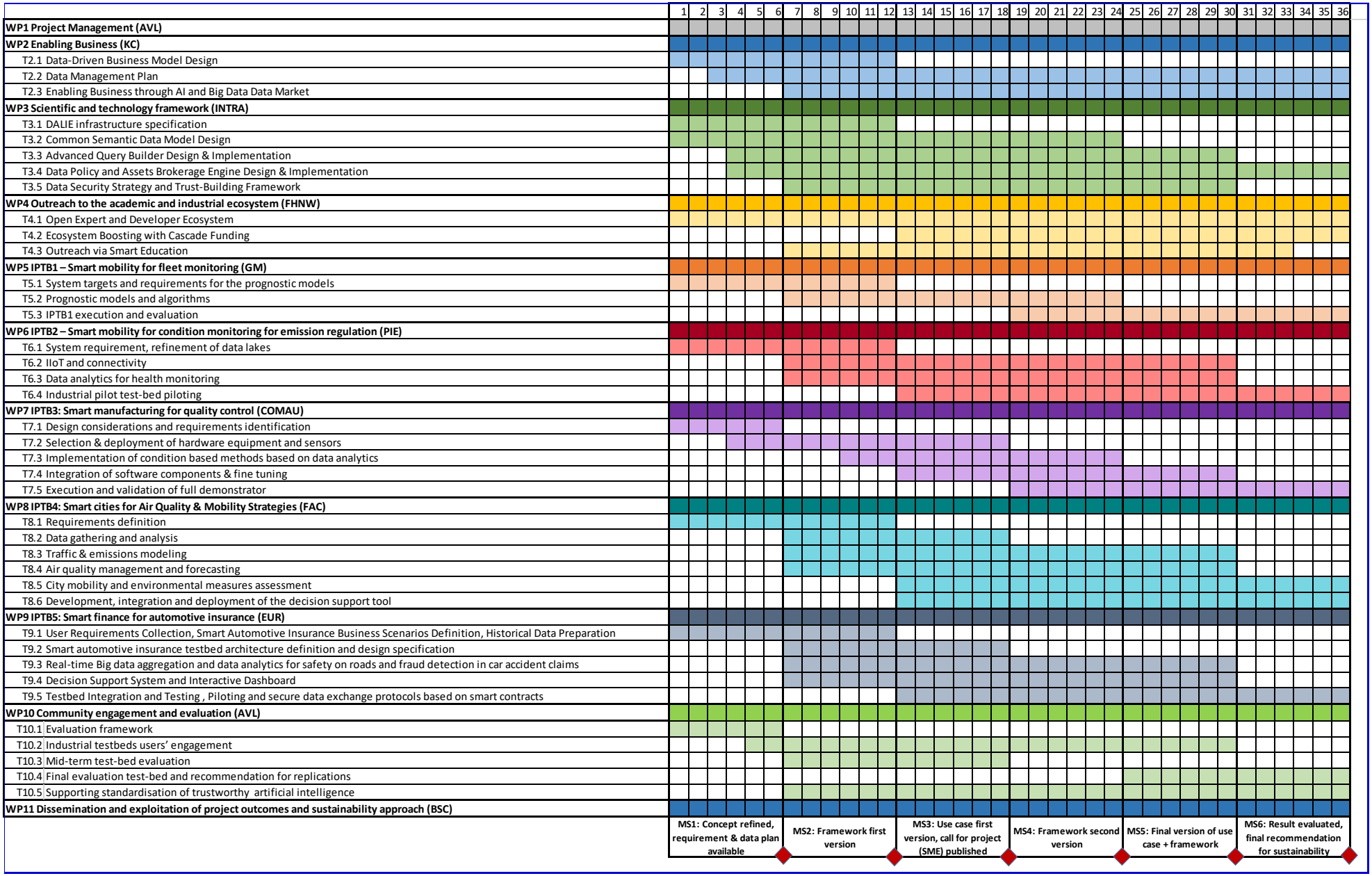


Figure 17: DALIE Project timeline

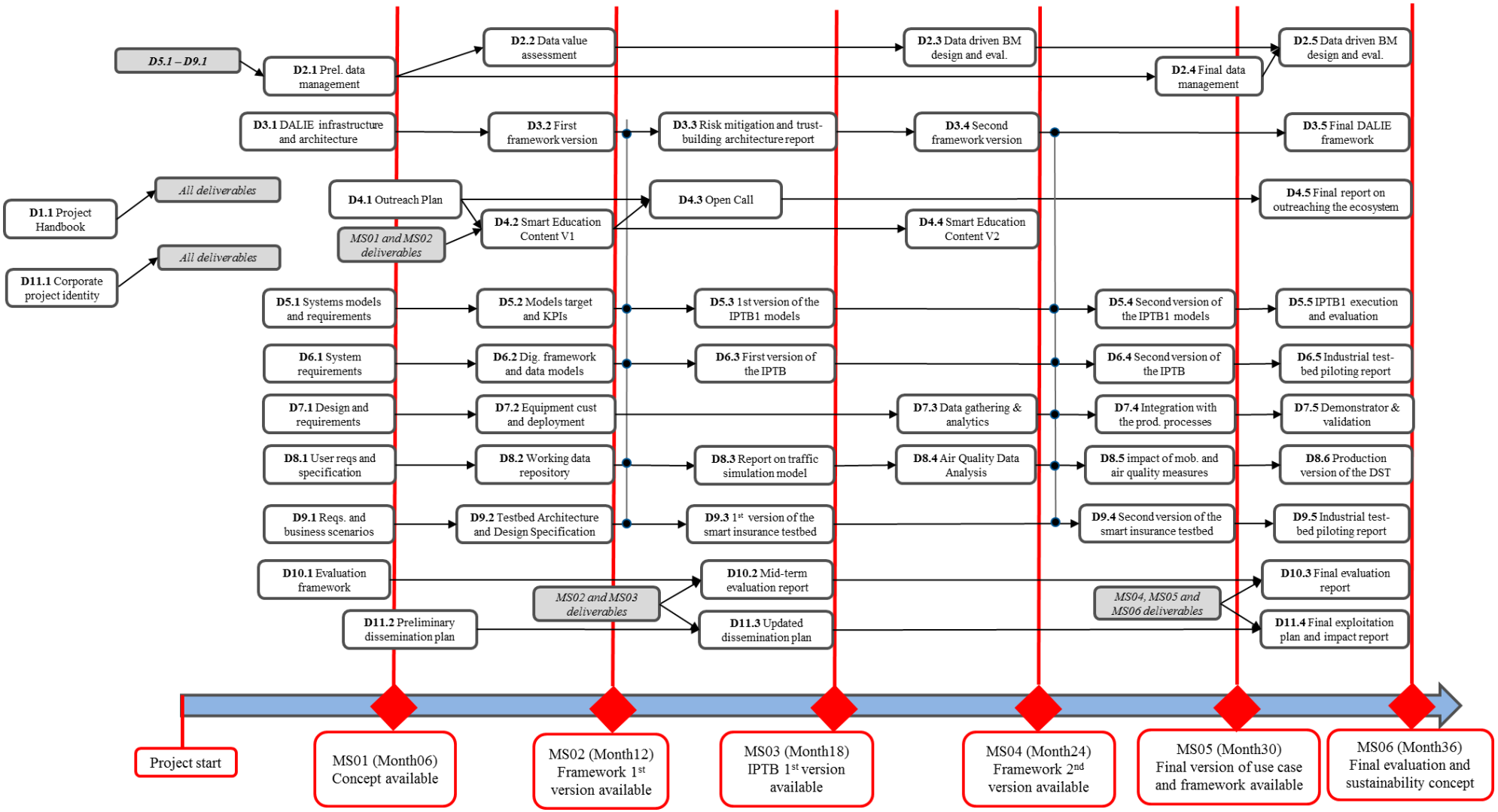


Figure 18: DALIE Pert Chart

Table 11: WP1 description

Work package number 1	**Lead beneficiary**													AVL
Work package title	Project Management													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	24	2	9	1	1,5	3	6	2	2	2	1	1	1	2
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	2	1	2	1	5	1	6	1	1	2	2	1	2	
Start month	1						End		36					

Objectives

The objective of this WP is to ensure that the project is delivered on time, according to the budget and to ensure that the overall project objectives are met. This includes technical project coordination, management of financial aspects, especially the project funding, legal issues and IPR management.

This work package will address the following aspects:

- Coordination of the technical activities of the project and linking together all project components.
- The overall legal, contractual, ethical, financial, and administrative management.
- Maintaining communication with European Commission & partners ensuring progress is reported effectively.
- Coordination of knowledge management & innovative activities regarding dissemination & exploitation.
- Establishing & maintaining conflict resolution procedures & management of strategic orientation of the project.

Task 1.1: Project Coordination (Lead: AVL, Part.: all)

The aim of the project management set up is to ensure **compliance of all project activities with the objectives set out in the Grant Agreement, the Consortium Agreement, and the relevant annexes**. To achieve this objective, the project management structure will maintain a continuous flow of communication and information to and between all partners and the European Commission. The project management is divided into 2 levels: **1) technical coordination** and **2) administrative project management**. The technical coordinator focuses on the technical execution of the work ensuring effective project planning, risk management and information flow within the consortium and alignment between work packages. The technical coordinator is supported by an administrative project leader on the aspects of financial, legal, and administrative project management. The technical coordinator and the administrative project leader (the project management team) will jointly work on managing the consortium, ensuring a smooth progress of the whole project, keeping track of the progress, costs, and budget situation, and providing the necessary reports to EC. All partners will report the necessary information to the project management team by means of **regular reporting and updates** (see Section 3.2). A defined communication cadence and decision-making structure will govern the consortium and is outlined in Section 3.

The project coordination also includes continuous assessment and monitoring of the project execution in **comparison to metrics set to achieve the project objectives**. This activity provides the basis for strategic decision-making in the Project Steering Board and ensures compliance of all project activities to the project objectives and gives indications for the exploitation of results. The project coordination is supported by a dedicated data manager (Task leader 2.2) and innovation manager (Task leader 11.3).

Task 1.2: Project Steering Board (Lead: AVL, Part.: all)

The Project Steering Board is **composed of one senior partner representative per partner organisation**. The Project Steering Board will be **chaired by the technical project coordinator**, its responsibilities include:

- Decisions on the **strategic orientation** of the project.
- Highest **decision-making body for topics not finding a resolution** in the WP Leader Board.
- Coordination of **risk management** (risk monitoring, final decision making), see Section 3.2.
- **Quality Management** (release of deliverables), see Section 3.2.

The Project Steering Board will meet on a regular basis **twice a year in a face-to-face meeting** with additional electronic meetings (WEBEX, Videoconferences) as requested during the project execution.

Task 1.3: Work Package Leader Board (Lead: AVL, Part.: all work package leaders)

The work package leader board consists of **all eleven work package leaders and is chaired by the technical coordinator**. It is the 1st level decision-making body. It is within the WP Leader Board's responsibility to:

- Ensure and monitor proper **cross-WP cooperation** including timing of deliverables and risk monitoring.
- Decide **technical matters** that affect more than one WP.
- Assure **quality of deliverables** by reviewing deliverables and project results.
- **Report to the Project Steering Board** on continuous basis.
- **Escalate to the Project Steering Board** when considered as necessary.
- Perform **continuous risk management** to track possible project risks throughout the whole project. Within this process, risks will be clearly identified and assessed, and the respective contingency plans will be available. The initial risk register identified in this bid (see Table 25) will be regularly updated and monitored by the technical project coordinator in cooperation with all work package leaders.

Each WP Leader will be responsible for the delivery of their respective work package and communication with partners inside the WP to ensure and monitor execution of tasks according to time and resource plan.

D1.1: DALIE Project Handbook (AVL, M02, CO) guidebook for all partners to clearly outline the management processes, and include timelines for requests (e.g., for dissemination requests) and reporting information.
The midterm & final reports are conducted via specific SyGMa sessions & are thus not listed as WP1 deliverables.

Table 12: WP2 description

Work package number 2	**Lead beneficiary**											KNOW		
Work package title	Enabling data-driven business													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	5	4	5	1	0	6	14	6	0	50	0	0	0	0
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	10	0	1	2	0	3	12	0	0	9	0	0	8	
Start month	1						End			36				

Objectives

WP2 is directly linked to objective 2 and targets the support for data-driven business model generation. Especially, following aspects are targeted:

- Creation of valuable and viable business models for data-driven use cases derived from WP5-WP8 that are sustainable beyond project end
- Data management taking into account legal and ethical issues
- Interaction with data market platforms

Task 2.1 Data-Driven Business Model Design (Lead: KNOW, Part.: AVL, COMAU, GM, PIE, I&M, INTRA, DIT, BSC, SEAT, CRF, FCA, FAC, VML)

During a first step, a data quality check will be performed to ensure an appropriate data quality in terms of data accuracy, data completeness, data consistency and legal perspectives (GDPR). By application of the "Data Value Check" procedure/toolset (developed by KNOW), the provided data from WP5-WP9 will be mapped on a "data map" structuring and analysing the aspects of benefit, cost, and risk. Relying on interactive workshops with the IPTBs owners, the developed use case ideas will be evaluated and re-ranked by subsequent value-benefit analysis and cost-effort analysis.

The second step will focus on business model designs/scenarios creation for all selected use cases with regard to WP5-WP9. This will be performed by applying state-of-the-art business model innovation tools developed in the H2020 project ENVISION or provided by KNOW research area "Data-Driven Business". While applying the tools, main attention will be given to data-enriched products/services and data enabled (stand-alone) services. These Business Models will make clear how the new data-driven value will look like (value proposition), which customer segments (groups) will be targeted and how the value will be captured (revenue model). This includes making explicit which resources, activities and partners are needed to implement the new data-driven services.

Finally, the last step targets the economic impact assessment through business model evaluation (BM Stress testing) and business model quantification (BM metrics). Two cycles of BM evaluation will be conducted, which each feed into the technology development of WP3 and WP4. In the first cycle, paper-based mockups will be evaluated. In the second cycle, available prototypes will be tested. Standardized survey scales will be used to measure customer and user acceptance. The findings from the experiment studies will be subsumed into overall economic impact evaluation for all use case.

Task 2.2 Data Management Plan (Lead: INTRA, Part.: AVL, COMAU, GM, PIE, KNOW, DIT, BSC, FCA, FAC, VML)
Target of this task is the set-up of a data-management plan template as well as the set-up and maintenance of data management plan for the industrial pilot test-beds during the project duration. This task will be responsible for the pipeline of the data check-in processes in the ***DALIE*** data lake. The datasets that have been identified in task T2.1 follow a step-wise approach, including: ingestion, cleaning, curation, semantic annotation and harmonization (according to the procedures envisaged in T3.3), transformation and smart linking to other existing datasets. Data anonymization checks, as well as data quality checks will be instrumental in this task to ensure the integrity, privacy assurance and validity of the data while the data check-in process concludes with the data policy definition according to the framework defined in T3.4. Finally, this task will manage the lifecycle of the datasets collected and checked in in the ***DALIE*** platform to ensure their veracity and timeliness.

Task 2.3 Enabling Business through AI and Big Data Data Market Platforms (Lead: FNHW, Part.: KNOW, INTRA)
In this task, we will analyse and validate incentive models for the adoption of data market platforms for data providers including first insights into viable business models for such platforms. We will validate these models from a multi-actor perspective including, user perspective, service provider and main focus on privacy and security issues of data providing companies. To ensure that we will conduct an overarching analysis of already existing incentive models and data-market business models. Data will be collected from a set of already identified and to be identified sources through interviews, literature reviews, desk research and other means as deemed necessary. The results of the analysis will be integrated into a platform business model for the used data platform within the project in order to accelerate growth and value from data platforms

D2.1: Preliminary Data Management Plan (INTRA, M06, PU) Preliminary description of the datasets managed
D2.2: Report on Data Value Assessment- and Opportunity Analysis (KNOW, M12, CO) Identification of main business opportunities from the different industrial pilot test-beds
D2.3: Intermediate Report on Data-Driven Business Model Design and Evaluation (KNOW, M24, CO) Drafting of business models for the IPTBs and preliminary evaluation
D2.4: Final Data Management Plan (INTRA, M32, PU) Final version description of the datasets managed
D2.5 Final Report on Data-Driven Business Model Design and Evaluation (FHNW, M36, PU) Final impact evaluation of data-driven business models for the IPTBs, integrating impact through data market platforms

Table 13: WP3 description

Work package number 3	**Lead beneficiary**											INTRA		
Work package title	Scientific and technology framework													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	13	12	0	0	0	0	45	28	24	27	39	27	18	31
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	0	32	0,5	6	10	4	12	0	0	0	0	0	8	
Start month	1						End		36					

Objectives
WP3 is linked to objective 3 and responsible for establishing a trusted federated scientific and technological framework on top of service delivery infrastructures, industrial semantic models, context information management engines and cognitive models for big data and IoT enabled digital platforms. Its particular objectives are:

- The specification of the overall ***DALIE*** infrastructure and its architecture,
- the development of the ***DALIE*** Common Semantic Data Model, which will be used for semantically annotating raw and aggregated data of diverse types;
- the management (cleaning, curation, provenance) of the aggregated and semantically enriched datasets;
- the development of an Advanced Query Builder that will be responsible for allowing its users to explore, combine and express complex queries on ***DALIE*** data;
- the design of the ***DALIE*** Data Policy and the Assets Brokerage Frameworks facilitating proprietary data sharing and trading features to link data providers and data consumers;
- the design of the ***DALIE*** data integrity strategy safeguarding that proprietary data comprising actual business assets are not tampered with.

Task 3.1 *DALIE* infrastructure specification (Leader INTRA, Part.: KNOW, ICCS, FNHW, NVISO, EGM, AVL, DIT, CSP, LMS, UPC)
This task is responsible for specifying the architecture of the overall ***DALIE*** infrastructure. To do so, the ***DALIE*** Industrial Data Space (IDS) will be designed and implemented. The IDS will support the sharing of data and analytics within the (transport) industrial sector and will have **explicit links to BDVA/I-Spaces** and other relevant initiatives. This task will leverage and extend SotA assets from **FIWARE and other big data and IoT projects**, such as Boost4.0, Medilytics and Databio. The core component to realize the IDS will be the trusted IDS data connector, which connects to internal data sources inside a company and makes these data available in a standardized (RDF, Linked Data), secured, authenticated and controlled fashion to selected data value chain partners. The data space connector will be based on a Docker container and swarm infrastructure (respecting the BDE approach) for plugging-in of data mapping and transformation functionality include data cleaning, semantic matching (data/entity linking), search and querying.

Task 3.2 Common Semantic Data Model Design (Lead: NVISO, Part.: INTRA, KNOW, ICCS, FNHW, NVISO, EGM, AVL, DIT, CSP, LMS, VML)
T3.2 will develop the project's semantic model, which will be used for semantically annotating raw and aggregated data of diverse types including sensor data, satellite and aerial image data. The development of the model will follow a "meet-in-the-middle" approach where concepts come both in a bottom-up and top-down fashion. This means that the model will be based but also extend existing efforts. The output of this task will be both a conceptual model and its implementation expressed in a standardized ontology language e.g. RDF, OWL.
A second aspect of this task is data harmonization and enrichment, based on the created data model. Specifically, the role of this activity is twofold: (i) to semantically enrich raw and aggregated data of diverse types and (ii) to harmonize data already annotated using other semantic models. The output of this activity will be aligned data that come from a multitude of physically distributed data sources. These data can easily be processed and re-used by software tools and services. This harmonization target to minimize the risk of vendor lock-in.

Task 3.3 Advanced Query Builder Design & Implementation (Lead: POLITO, Part.: NVISO, INTRA, DIT, KNOW, ICCS, FNHW, NVISO, CSP, SEAT, UPC, CRF, FCA)
This task involves the design and development of the Advanced Query Builder that will be responsible for allowing its users to explore, combine and express complex queries on ***DALIE*** data. The user interface's ease of use will ensure that end users unfamiliar with formal query languages or the structure of the underlying data will still be able to describe complex queries on top of multiple datasets. The produced queries will then be used in order to retrieve raw data from ***DALIE*** Repository or passed onto other tools. The Advanced Query Builder will also ensure that the generated queries will be used to provide data without any violation of data access policies defined within the platform. The query builder will be enhanced with the design, development and optimization of machine learning models able to learn abstract, yet useful, representations of the DALIE datasets. Such models will exploit scalable data-mining algorithms, supervised, unsupervised or hybrid, such as classification and regression techniques, different clustering approaches, and exploratory data analysis like association rule extraction. The novelty introduced in DALIE is the research of semantically-enriched locally-explained deep learning approaches, able to overcome currently black-box drawbacks: semantics is a valuable addition that finds applications in many safety-critical environments, from smart manufacturing plants to fault detection and predictive maintenance, through smart city and smart mobility contexts. Model agnostic approaches could also be exploited in other research directions of interpretable machine learning, as interpretable feature extraction and selection algorithms applicable in predictive maintenance contexts and large-scale industrial test beds collecting many different heterogeneous data streams.

Task 3.4 Data Policy and Assets Brokerage Engine Design & Implementation (Lead: KNOW, Part.: NVISO, INTRA, FNHW, POLITO, LMS, COMAU, FCA, CRF)
T3.4 aims to deliver the ***DALIE*** Data Policy and the Assets Brokerage Engine that will be used to facilitate proprietary data sharing and trading features that can be offered by the ***DALIE*** platform to link data providers and

data consumers at all levels of the value chain while respecting their business-critical data IPR. Such an engine will thus boost the business impact and commercial exploitation potential both at consortium level, as well as at third party data provider level. The Data Policy framework will be based on data attribute description based on specific categories and predefined lists that will specify each dataset's IPRs, security, trust and quality features. It will be based on well-known dataset description schemas and will design tags to be applied on both the whole dataset as meta-information but also in their ingredients (e.g. data tuples) to have a holistic description of each data asset. The overall methodology regarding a Data Policy will be used as the basis for the definition of the Assets Brokerage Framework which will enable the display of each stakeholders' data and service offerings in a unified market place supporting the execution of semi-automatic negotiations between data/service owners and prospective "customers", leading to the generation of blockchain powered micro-contracts (which will not be translated to real money during the project's lifecycle), to facilitate the secure and trustworthy exchange of assets over the platform.

Task 3.5 Data Security Strategy and Trust-Building Framework (Lead: FHNW, Part.: NVISO, INTRA, KNOW, FNHW, POLITO)
T3.5 aims to provide enhanced information protection and secure data management over the entire data lifecycle ranging from data collection and storage to data search and deletion. Within all these data operations, ***DALIE*** integrates data security, user privacy and secure access control as holistic services to allow the trusted data movement between different entities and data infrastructures. Towards secure data storage, this task will implement all the necessary APIs and interfaces for orchestrating the employed data integrity and storage mechanisms employed by the various IoT service providers in order to provide a holistic secure data management platform. Furthermore, this task will explore the possibility of incorporating advanced policy-based blockchain structures for providing enhanced guarantees on the integrity of the above set of data operations.
A second aspect of this task is risk mitigation and trust building framework. The task contributes with a comprehensive approach to assessing this risk with quality and provenance information for data and algorithms and offering license specification and enforcement capabilities for building trust among the multiple parties that collaborate with the DALIE framework. The meta-data will be used to explain to anybody wanting to use a dataset, algorithm, or application the accumulated merits and limitations of such use. The task will put focus on the use cases' worries and will include compliance of purpose-bound data such as in GDPR and risk of novel applications and usage contexts for algorithms. To facilitate the communication of risk, the task will develop a scheme for licensing data and algorithm artefacts, allowing to specify permissions, conditions, and limitations of a data or algorithm artefact.

D3.1: DALIE infrastructure and architecture (INTRA, M06, PU) Description of the DALIE infrastructure
D3.2: First framework version (ICCS, M12, PU) Integrating common semantic data model and data exploration & brokerage services
D3.3: Risk mitigation and trust-building architecture report (FHNW, M18, PU) Enhancement of the framework toward generation, storage and exchange of relevant meta-information to increase trust
D3.4: Second framework version (CSP, M24, PU) Update of D3.2 for MS04
D3.5 Final DALIE framework (INTRA, M36, PU) Final version of the framework after integration of the lessons learnt during tailoring, deployment and evaluation at the IPTBs

Table 14: WP4 description

Work package number 4	**Lead beneficiary**											FHNW		
Work package title	Outreach to the academic and industrial ecosystem													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	0	2	4	0	50	4	3	2	13	3	6	19	1	2
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	3	0	1	8	5	5	3	6	0	9	3	32	4	
Start month	1						End		36					

Objectives

WP4 is responsible for achieving visibility among researchers and industrial developers and mobilizing their support for validating the DALIE framework, elicit feedback, and enable extension and take-up. Its particular objectives are:

- Validation of the DALIE technological framework with the external industrial developer community through third-party extensions to the technological framework and contributions to the DALIE use cases.
- Take-up of the DALIE framework and test-beds through enablement of new use cases with third-parties, bringing new big data and AI-related challenges into the DALIE ecosystem and offering solutions through data sets and data-driven development of big data analytics and AI algorithms.

Task 4.1: Open Expert and Developer Ecosystem (Lead: NVISO, Part.: FHNW, UPC, KNOW, ICCS, INTRA, EGM)
The objective of this task will be to mobilize the emerging European community of experts in artificial intelligence and big data analysis to offer solutions to the challenges exposed by the automotive test-bed participants. The task follows the community canvas[lxii] to build a sustainable ecosystem with a purposeful identity for the expert network, contents and rituals that encourage active participation in the test-bed projects, and structured interaction with the DALIE consortium. The task will draw on the European initiatives Bonseyes, AI4EU, and CLAIRE that together are supported by thousands of academics, professionals, and companies interested big data analysis. The task will validate the DALIE framework with the expert developer network to enable extension and take-up of the DALIE concept. The validation will evaluate the acceptance and impact of DALIE with a well-defined protocol for experimentation that will be applied in focus groups and in prolonged engagement of the external third-parties, e.g. within the cascade funding approach offered in Task 4.2. The extensions will be facilitated by exposing APIs and offer support, e.g. in events that focus on the use and extensions of the DALIE framework such as hackathons and connectathons.

Task 4.2: Ecosystem Boosting with Cascade Funding (Lead: CEA, Part.: BME, AVL, COMAU, DIT, GM, PIE, FAC, EUR, I&M, SEAT, LMS, CRF, FCA)
The objective of this task will be to enlarge the targeted audience of the DALIE outcomes with a structured community-building approach. The task follows the European Commission's "Smart Anything Everywhere" initiative (SAE) to address the challenge of SMEs of lacking internal resources to invest on new skills, having difficulties to get in contact with big European technology suppliers, and enhancing their products and services through the inclusion of innovative digital technologies. To attract participation of innovative European thirty-party SMEs, the task will provide financial support to build on DALIE (FSTP). At the core of the task will be the organization of an open call for cascade funding. During M15-M18, the call will be open. A simple and short proposal template will be filled out by each candidate third-party SME describing its project idea, how the digital technologies enable competitiveness of its offerings, to which IPTB the proposal will be linked to, how its business will be impacted, and what the benefit of the project results will be for society. The task will rank the proposals on excellence, quality, and impact and offer a notification about the funding decision in M20. In M22, a separate dedicated contract/agreement between the granted SME and the associated European partner is signed. The contract will rely on the DALIE CA and include a technical annex with dedicated information about the project, the workplan of 12 months maximum, deliverables, milestones, Gantt, budget, financial payment schedule, and intellectual property. More detailed information on the organization of the FSTP can be found in Annex 3.

Task 4.3: Outreach via Smart Education (Lead: ML, Part.: AVL, COMAU, DIT, GM, PIE, FAC, EUR, KNOW, FNHW, UPC, ICCS, INTRA, BSC, I&M, LMS, POLITO, SEAT, CRF, FCA, VML)
The objective of this task will be to transfer project results generated into online learning content outreaching to target groups beyond the project's direct environment. A selected set of project outcomes will be translated into learning content that will be tailored to three main target groups: (a) general managers and technical experts of the project's partner organizations, for internal dissemination/further education of project results, (b) SMEs intending to gain new perspectives and a guideline to step into this business (external dissemination), (c) the general public, to raise awareness about a data-driven business models. The contents will be provided online as structured learning units, providing individualized learning paths for each target group directly to the workplaces of companies (learning in the workplace). The structured learning units will be deployed on a content management system (CMS, see ML partner description in Section 4) to facilitate the transfer of knowledge beyond the field of research. The CMS will also support the structured creation of content through integrated authoring by expert teams. Thus, the content can be easily and adaptively engineered and evolve dynamically as the project progresses.

D4.1: Outreach Plan (NVISO, M9, PU) specifying the methodology, scope, and schedule of the outreach, including open call and smart education.
D4.2: Smart Education Content version 1 (ML, M12, PU) first content version focusing on the IPTBs
D4.3: Open Call (CEA, M15, PU) inviting third-parties to collaborate with DALIE through open call

D4.4: Smart Education Content version 2 (ML, M24, PU) second content version
D4.5: Final report on outreaching the ecosystem (FHNW, M36, PU) reporting on the impact achieved (a) with the open call, (b) with the smart education content, and (c) in relation to the open expert and developer ecosystem.

Table 15: WP5 description

Work package number 5	**Lead beneficiary**													GM
Work package title	IPTB1: Smart mobility for vehicle fleet monitoring													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	0	0	108	0	0	0	0	0	0	4	12	0	0	40
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	0	0	0	0	0	0	0	0	0	0	0	0	0	
Start month	1						End			36				

Objectives

Leveraging the proprietary OnStar architecture, GM has the ability to acquire field data coming from any vehicle control unit available in the market. The WP aims at selecting specific sophisticated propulsion subsystems to be monitored during the vehicle life time to get data with the aim of:

- Improving product quality by linking malfunctioning events to production data
- Introducing prognostic and early warning, hence avoiding major failures
- Providing data insights to engineering development thus creating valuable competitive advantage

In the WP, GM will select the subsystems to be monitored in the area of injection systems and aftertreatment, as these are key for emission compliance. GM will conduct problem specific experiments to produce data for the development of the prognostics features; for these activities data could come from engine test bench environment, data recorder installed on vehicles on OnStar, depending on the experiment and technical constraints. POLITO, KNOW and ICCS will support the work on the data analytics and machine learning to develop prognostic features in tight collaboration with the domain experts of GM. The result of the WP will be the **development of prognostic features embeddable in production vehicles to improve quality, reliability, and reduce downtime**.

Task 5.1 – System targets and requirements for the prognostic models (Lead: GM, Part.: POLITO, KNOW, ICCS)

An initial analysis will be performed by GM to define the exact subsystems to be monitored based on maintenance and downtime issues in order to select the higher-priority ones. A focus is to injection system and after-treatment since directly related to powertrain performances and emissions. A set of information and parameters already acquired and to be further investigated will be defined to feed the modelling of T5.3 and 5.4. POLITO will provide feedbacks about data requirements and volume. This task is directly related to T2.2 (data management plan).

Then, specific KPIs (Key Performance Indicators) will be defined by GM as targets to be achieved by the prognostic models. Based on Task 5.1, scalability, transparency and interpretability of data models will be defined based on the available variables and on the connectivity system capabilities (e.g. throughput, acquisition frequency, etc.). POLITO will provide inputs about data quality requirements. This task comprehends also the acquisition of additional data needed by the project. Data labelling will be performed and acceptance criteria will be defined by GM domain experts.

Task 5.2 - Prognostic models and algorithms (Lead: POLITO, Part.: GM)

This task follows the target of modelling, implementation and evaluation of advanced algorithms for (a) injection system health conditions, and (b) for health system modelling of the after-treatment conditions. GM domain experts and POLITO researchers and data engineers will cooperate to define the best modelling techniques to predict faults of the systems selected in Task 5.1, with the final aim of reducing customer maintenance costs and downtime. Several modelling methods will be evaluated (e.g. neural networks, decision trees, random forests, etc.) and will be compared in terms of prediction performance (precision, recall, AUROC, F-measure, etc.) and in terms of health status accuracy (e.g. neural networks, decision trees, random forests, etc.). The choice of the model will consider vehicle connectivity-system requirements to be sure that the data stream can be actually sustained in production systems. Partial data aggregation and edge computing onboard of the vehicle, prior to data sending to

the cloud, will be evaluated to improve data transmission efficiency (lower data size, to avoid data overflow risks). Data aggregation and edge computing impact on prediction model performance will be also evaluated.

Task 5.3 – IPTB1 execution and evaluation (Lead: GM, Part.: POLITO)
Target of this third task is the industrial pilot test-bed execution and evaluation. First aspect is related to full-scale deployment of the approach developed in T5.2 and the scalability of the proposed algorithms. Especially the migration of partial data aggregation onboard of the vehicle needs attention due to the related release processes. Second aspect is the integration to WP4 (cascade funding, smart education) to ensure appropriate know-how exchange and correct embedding of the community, finally leveraging the impact of the test-bed in the ecosystem. Third aspect is to develop a series of data-driven best practices for engine design to reduce polluting emissions of future engines. Based on T5.2, a set of best practices will be developed so that similar subsystems will not require the complete work to be re-executed. These will constitute a "Bill of Process" to be followed in the future by prognostic engineers to design the data architecture. Moreover, the learnings on fault prediction will be reflected in new component design, so that upcoming engines will not be affected by the same faults: this will be recorded in a "Bill of Design".

D5.1 System models and requirement (GM, M06, CO) Models & requirements on the digitalization framework
D5.2 Models target and KPIs (POLITO, M12, CO) Relevant KPIs to achieve the targets identified in D5.2
D5.3 1st version of the IPTB1 models (GM, M18, CO) 1st version of the injection and after-treatment model
D5.4 2nd version of the IPTB1 models (POLITO, M18, CO) updated version of D5.3
D5.5 IPTB1 execution and evaluation (GM, M36, CO) Evaluation of the IPTB1 integrating Bill of Process and Bill of Design guidelines

Table 16: WP6 description

Work package number 6	**Lead beneficiary**													PIE
Work package title	IPTB2: Smart mobility for condition monitoring for emission regulation													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	20	0	0	29	0	49	0	25	0	4	0	0	0	35
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	0	0	0	0	0	0	0	0	0	0	0	0	0	
Start month	1						End		36					

Objectives
This work-package combines the aftersales with the powertrain ecosystem: this will be accomplished through two different and well interconnected use cases, focused respectively on aftersales and advanced powertrain technologies controlled by mechatronic control systems. This WP combines the following objectives

- Development of use case for proprietary up-valve technology
- Development of use case for aftersales
- Convergence of both use cases into an industrial pilot test-bed illustrating the added value of digitalization through the entire product lifecycle

Task 6.1 – System requirement, refinement of data lakes (Lead: DIT, Part.: I&M, POLITO, AVL, PIE)
Target of this task is the refinement of the system models and the relevant data sets. This task is strongly related to WP2 to map the business opportunities with the technical requirements. This activity shall be performed first independently for each use case and then be converged toward a single industrial pilot test-bed covering the product lifecycle. Especially, for PIE, POLITO and I&M, an analysis and identification of the entire powertrain system (namely VVL), which includes the Up-Valve system driven by the "in-line phaser" and the mechatronic unit controlling such a VVL, will be performed. A set of information and parameters already acquired and to be further investigated will be defined to feed the modelling activities (Task 6.3). Parallel to this, DIT and AVL analysis will focus on the usage of aftersales equipment in terms of ecosystem and value chain including customer values, key partners, products, and digital services, internal and external processes, technologies and organizations, data assets for data market places and data sharing values. As a conclusion of this task, the component' expertise

from PIE will be concatenated with the vehicle & aftersales expertise from DIT for opportunity refinement in terms of relevant common data lakes.

Task 6.2 – IIoT and connectivity (Lead: I&M, Part.: I&M, POLITO, AVL, PIE, DIT)
Target of this task is the enhancement of the connected devices for data acquisition and processing at the edge. Especially, I&M will develop a real-time predictive model of the system behaviour. The aim is to develop through machine learning techniques, a low-cost model of the mechatronic system in terms of computing demand and execution time. Techniques such as Artificial Neural Networks (ANN) will be evaluated and trained using extensive training sets, which are produced using the accurate model defined in Task 6.3. Parallel to this, connectivity solutions for the aftersales equipment will be further enhanced and integrated to ease the deployment of connected instrumentation at customer location. A robust solution will be required to withstand workshop environment. Beside the connectivity solution, an IoT platform will be deployed to automatically gather and structure the data.

Task 6.3 – Data analytics for health monitoring (Lead: POLITO, Part.: I&M, AVL, PIE, DIT)
Parallel to T6.2, two distinct data analytics platforms will be deployed, and the models trained on real data. For that, relevant assets developed in WP3 should be identified and tailored. Based on these two tailored platforms, experts from different domains (i.e. powertrain, automotive, data science) will cooperate to define the best modelling techniques to predict faults of the system, in order to improve the reliability of the whole system.
PIE, I&M and POLITO will focus on the development of a detailed simulation model of the mechatronic system and its validation against a physical model of the mechatronic system. The goal of this step is to establish a reference model with high degree of accuracy with respect to an already existing system, thus allowing extensive simulation campaigns aimed at defining a predictive model compatible with real time behaviour and embedded computing limitations. Parallel to that, a similar activity by DIT and AVL combining vehicle information, workshop-related and environmental information will be performed, with the target to gain more insights in terms both of the system (vehicle) and the process (how the maintenance is performed at the workshop). Finally, the two activities will converge to analyze how the VVL can be effectively monitored once integrated into a vehicle.

Task 6.4 – Industrial pilot test-bed piloting (Lead: PIE, Part.: I&M, AVL, PIE, DIT, POLITO)
This task comprises several steps. The first one will be the system validation in realistic condition as well as the full-scale deployment. It should validate the correct operation between the connected devices and the data platforms, as well as the scalability to the full data amount. Then, and in parallel with WP10, user engagement (especially for DIT) as well as evaluation will be performed. The target being to ensure correctness of the data acquisition and processing, as well as creation of an added value (and related business) in relation to the invests performed. Furthermore, the identification of appropriate digitalization ecosystem (e.g., regarding billing services) will be an important aspect to consolidate value creation and refine ROI calculation.

D6.1 System requirements: Health monitoring for emission regulation (I&M, M6, CO): Elicitation of the requirements and identification of relevant data sets as well as networking constraints. Elicitation of ecosystem requirements addressing the value chain.
D6.2 Digitalization framework and data models (POLITO, M12, CO): mature concept and preliminary demonstrator for the IIoT and data analytics environment - major components such as the data management and machine learning framework, the models for predictive device and component maintenance, visualization aids
D6.3 First version of the IPTB (DIT, M18, CO): First version of end-to end solution including models, data and digitalization platform.
D6.4 Second version of the IPTB (AVL, M30, CO): Update of D6.3 incl. integration between both use case
D6.5 Industrial test-bed piloting report (PIE, M36, PU): Evaluation report covering the different aspects of the industrial pilot test-bed from technical, user engagement and business point of views

Table 17: WP7 description

Work package number 7	**Lead beneficiary**													COMAU
Work package title	IPTB3: Smart manufacturing for continuous quality control													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	0	42	0	0	0	0	0	0	0	4	0	0	3	0
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28

Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	0	0	0	0	60	42	70	0	0	0	0	0	0	
Start month	1						End		36					

Objectives

The main objective of WP7 is to validate and demonstrate the technical solutions that were developed during the DALIE project within a challenging and representative manufacturing test-bed. The aim of this smart manufacturing demonstrator can be recapped in the following points:

- Design of production and engineering end user applications, based on integration of analytics, modelling and semantic representation of production processes
- Continuous monitoring of the processes and equipment
- Data driven forecasting of potential failures
- Augmented and Virtual Reality tools enabling new operations and use cases through integrated knowledge management

Task 7.1: Design considerations and requirements identification (Lead: LMS, Part.: FCA, COMAU, CRF)

This task will focus on the design of the layout and architecture of the smart manufacturing test-bed. COMAU with the help of CRF, FCA and LMS will provide the design of the test-bed layout taking into consideration the different constraints and specifications of the industrial automotive environment. With reference to conditions set for utilization by final users both in plant and in process engineering, the design of a multisensorial central control environment (MCCE) will be defined, providing also real time awareness about equipment status. Multisensorial devices enable situational awareness about equipment and integrated process through communications to IIOT solutions. The design of MCCE will be primarily focused on User eXperience requirements and related technological devices and platforms allowing user's interaction as simple and efficient as possible (i.e. gestures, speech) with reference to production and engineering scenarios (monitoring, digital twinning, data mining, AR/VR solutions for maintenance tasks). Moreover, LMS will be responsible for the definition and structure of the requirements of the test-bed. For each industrial process, LMS will define the related KPIs and assess the validation criteria. The output of this task is reported in D7.1 on M6.

Task 7.2: Selection & deployment of hardware equipment and sensors (Lead: COMAU, Part.: FCA, LMS, CRF, EGM)

With respect to the test-bed scenario, various types of sensors will be considered and selected in order for the monitoring of the equipment and processes to be achieved. Responsible partner for the selections of such sensors will be COMAU with the help of LMS and EGM. COMAU and CRF will define and implement the hardware and software interfaces with the selected sensors. The hardware customization will include sensors measuring the environmental status like temperature, humidity, as well as intrinsic parameter of devices used in the production line as for example motors' current, welding gun voltage, etc. Furthermore, the several equipment like robots, AGVs, and tools (e.g. welding guns) will be enhanced with additional sensors like accelerometers, cameras, etc. in order to enhance the continuous control of the different stages of the vehicle. The outcome of this task will contribute in D7.2 and D7.4 on the first physical set up and individual hardware testing and the first integrated hardware testing respectively. Furthermore, in this task FCA and LMS will define the MCCE and AR/VR technologies in order to support local and remote equipment monitoring and maintenance activities as building blocks for the realization of demonstrative manufacturing end user applications.

Task 7.3: Implementation of condition-based methods based on data analytics (Lead: CRF, Part: LMS, FCA, COMAU, KNOW)

This task will deal with an extended data collection process from multiple sources through the vehicle's lifecycle. Data from processes (purchasing, logistics, operations, etc.) and equipment will be collected and maintained. The data will be pushed through a pre-processing stage in order to reduce the overhead of unwanted or unnecessary information. Also, this task will handle the implementation of the data driven methodology in terms of predictive maintenance in order to proactively predict a possible failure regarding the equipment (local analysis) and/or the impact of the decay of performances in terms of product quality and area/line efficiency (digital twin analysis). CRF will lead this data driven methodology while LMS, supported by KNOW, will deal with the digital twin analysis. Thus, the components' lifetime will be exploited in maximum before their breakdown leading to a decrease of maintenance costs. Combining and customizing different state-of-the-art data driven algorithms, this task will forecast the future evolution of the machine degradation using on line data collected from the factory level. Furthermore, COMAU with FCA will deal with the implementation of the data analytics techniques for product quality inspection. Exploring and analysing the production line data and their assessed quality, this task

will try to automatically discover emerging behaviours and identify possible causes for them and also characterize them in terms of frequency. The overall IIOT architecture will support also analytics approaches to predictive maintenance solutions for a continuous monitoring of equipment, based on the acquisition of large collections of data coming from the large set of equipment and tools deployed in production sites. Finally, an API enabling the integration between CBM and process modelling and simulation tools will be developed with the aim of increasing the meaningfulness of production planning applications.

Task 7.4: Integration of software components & fine tuning (Lead: COMAU, Part.: FCA, LMS, CRF)
This task will run in parallel with Task 7.3 in order for the software components to be customized and tested in the smart manufacturing test-bed setup. The main purpose of this task is to successfully integrate the different software components from Task 7.3 and from WP3 to the existing manufacturing processes. This will be achieved by interfacing with the production elements and systems and customizing the DALIE components to fit the needs of the smart manufacturing test-bed. Moreover, this task will handle the fine tuning stage which includes a continuous effort on managing possible changes in production's systems and infrastructure. Thus, the DALIE solutions will be in-line with the updates of the factory and the communication will remain smooth even after the project's lifecycle. The output will be not an isolated system but a manufacturing ecosystem that communicate, receive and manage data to provide a reconfigurable, flexible and efficient process accordingly with new industry 4.0 paradigm and technologies. In order to achieve this, the harmonized cooperation of all involved partners will be needed.

Task 7.5: Execution and validation of full demonstrator (Lead: FCA, Part.: COMAU, LMS, CRF, KNOW, EGM)
This task will undertake the execution of the smart manufacturing demonstrator. The basic functionalities of the DALIE project will be tested in two different stages. Firstly, LMS and COMAU will be responsible for an initial execution in an environment close to the industrial settings and secondly FCA and CRF will achieve the refinement and final execution in the real industrial premises will take place. KNOW and EGM will perform the testing and validation of the refined DALIE solution in the smart manufacturing test-bed. Also, an important aspect of this task is to assess the impact of DALIE in the real industrial scenario. With reference to Multisensorial Central Control Environment, FCA will address the test scenarios to User eXperience (management of equipment and process cognitive models through gestures, multi-touch, speech) and integration with IIoT solution, whereas for the AR/VR solutions will be focused on digital twinning analysis, maintenance uses cases and integration with MCCE. The final outcome of this task will be the demonstration of the smart manufacturing test-bed and the evaluation of the DALIE developments under this case which will be documented in D7.5.

D7.1 Design and requirements of the smart manufacturing test-bed (LMS, M6, PU) This deliverable will present the layout design of the test-bed alongside with the specification of the requirements.
D7.2 Equipment customization and deployment (COMAU, M12, PU) This deliverable will provide detailed information about the selection and installation of different sensor, devices and MCCE technologies.
D7.3 Data gathering & analytics (CRF, M24, CO) This deliverable will describe the methodologies and algorithms for data collection, prediction of failures, equipment and process simulations for digital twin.
D7.4: Integration with the production processes (COMAU, M30, CO) This deliverable will handle the communication between the DALIE solutions and the production units.
D7.5 Smart manufacturing test-bed – demonstrator & validation (FCA, M36, PU) This deliverable will demonstrate the project technologies to the smart manufacturing test-bed and asses their performance.

Table 18: WP8 description

Work package number 8	**Lead beneficiary**										FAC			
Work package title	IPTB4: Smart cities for Air Quality & Mobility Strategies													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	19	0	0	0	0	0	0	0	0	4	8	0	3	0
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	124	0	27	90	0	0	0	0	17	52	0	0	0	

Start month	1	End	36

Objectives

The objective of this work package is to demonstrate how mobility data can be exploited to improve air quality policy in cities, one of the big societal challenges in cities. More specifically, WP8 will:

- Provide city councils with relevant KPIs and air quality maps for informed sort-term decisions for mobility
- Inform citizens on level of exposure to air pollution in their city through different channels
- Assess the impact of city mobility & environmental measures on reducing emissions & improving air quality under consideration of the new Sustainable Urban Mobility Plan (SUMP)

Task 8.1 - Requirements definition (Lead: FAC Part.: BSC, UPC, NOM, SEAT)

This task includes activities for building foundation of the demonstration and to identify the specific requirements and objectives for the subsequent tasks of this WP. The activities are organized in two groups:

End-user requirements analysis (citizen communities, City Council): A series of participatory activities will be organized with relevant stakeholders: a workshop will be held with city council departments and external experts to define the measures and policies to be considered in the simulations and the KPIs to be analyzed. For the co-development of the decision-support tool (DST), a shared understanding of user needs will be obtained in interviews and a consolidating a focus group with key air quality managers.

General architecture and specification: The general architecture of the test-bed will be designed, identifying the components and interfaces involved in delivering the following outputs: (a) characteristics of the data analysis and format required for model development, (b) the frequency and channels for data provision as well as the architecture of a data repository, (c) novelties or evolutions to be implemented in the models, and (d) the methodology and workflows between the analysis, modelling and tools development.

Task 8.2 - Data gathering and analysis (Lead: NOM, Part. BSC, SEAT, FAC, KNOW, ICCS)

The work to be completed in this task entails two main components:

Data collection and harmonization. The data collected will be harmonized according to standardized formats and the specifications provided in task 8.1. Methodologies and workflows will be developed to deal with large-scale, heterogeneous, and noisy datasets and facilitate their processing by the data analysis algorithms. The data integration and harmonization tools will be developed to ensure the scalability of the system when dealing with big volumes of data in a timely and efficient manner.

Data analysis. Algorithms based on statistical analysis and machine learning techniques will be developed to merge information coming from the following sources: mobile phones, global navigation satellite systems (GPS and the European GALILEO), data from xFCD, traffic sensors, and travel surveys. The data analysis aims at reconstructing origin-destination matrices, possibly stratified by mode and route, and populations dynamics for the whole population of the city area of study (spatial and temporal distribution of people) and estimating the traffic matrix and the traffic speed and level of congestion. Combinations of the algorithms will be explored and applied to the data from the European environment information and observation network (EIONET) for the generation of the air quality forecast system inputs and to xFCD geolocated weather measurements. The results obtained with the developed algorithms will be validated with aggregated data coming from surveys and official statistics. The outputs of this task will be fed into the modelling and simulation developments of Tasks 8.3-8.5.

Task 8.3 - Traffic & emissions modeling (Lead: UPC, Part.: BSC, NOM, SEAT, AVL)

Calibrated traffic simulation model of Barcelona: UPC will develop a calibrated traffic simulation model for the city of Barcelona. In addition to the network construction for emulating private and public transport, the model will consider updated demand information and traffic mobility patterns in the form of origin destination matrices obtained from mobile phone data. The calibration process will consider not only data from existing sensors but also that provided by connected cars fleet (SEAT). The calibrated traffic model and its extensions will be capable of emulating traffic behavior at street level providing inputs for the street scale traffic emissions model.

Street scale traffic emissions model: The result from the traffic simulation model will be fed into the emissions' model HERMES. Together with the data coming from the xFCD, this approach will allow estimating emissions with high precision and developing a detailed bottom-up street scale traffic emissions model for the city of Barcelona. HERMES will be capable of estimating hourly traffic emissions (exhaust and non-exhaust) considering the following aspects at the link level: (i) vehicle fleet composition profiles obtained from the traffic camera system, (ii) traffic flow, speed, and level of congestion obtained from the traffic simulation model and xFCD, (iii) emission factors per vehicle category, technology, and fuel. The xFCD provided by SEAT allows to improve the traffic matrix in Spain, traffic speeds, and congestion levels. These xFCD will be compared and complemented with those provided by TomTom. For the estimation of the exhaust traffic emissions, a revision and adjustment of available traffic emission factors (i.e. COPERT and PHEM; a microscopic vehicle emission model) will be performed according to on-road circulation measurements reported by current literature.

Task 8.4 - Air quality management and forecasting (Lead: BSC, Part.: UPC)
The task enhances the CALIOPE air quality forecast system for the Iberian Peninsula, which today has a resolution of 4x4 km^2 with the new data obtained in task 8.3 and emissions data from anthropogenic (industry, energy, solvent use, residential combustion, waste management, and agriculture) and natural (biogenic and fire emissions) sources. The system will be adapted for Barcelona to simulate high spatial and temporal resolution (1km^2, 1h) air quality concentrations and completed with a near-road source urban dispersion model (R-Line) to provide air quality estimations at street level (10-20m). The coupling of mesoscale forecasting and urban-scale dispersion will result in an integrated urban air quality modelling tool able to estimate hourly concentration at the street level.

The forecasting system will be executed daily in the MareNostrum IV Supercomputer, hosted by BSC. The forecasted pollutants include: NO2, O3, CO, SO2, C6H6, PM10 and PM2.5 at the regional scale, and NO2 at the street scale for Barcelona. Georrefered air quality forecast and density population estimations from mobile phone data (T8.2) will be computed to estimate population exposition to air quality thresholds defined by the European Commission. A near-real time evaluation system will continuously evaluate the performance of the air quality forecast system with the local air quality monitoring network (EIONET, see task 8.2). Besides, the observational data of previous days to the forecast will also be used to apply a post-processing technique (Kalman filter) to correct the bias of the system and reduce its uncertainty in the simulated forecasts. The Kalman filter will be our benchmark and other methods based on machine learning and analogs will be explored too.

Task 8.5 - City mobility and environmental measures assessment (Lead: FAC, Part.: BSC, UPC, NOM)
Selection of the measures to be evaluated: The Barcelona City Council has defined the 2019-2024 Urban Mobility Plan (UMP) for governing urban mobility in the coming years. The administration (Ajuntament de Barcelona) and air quality, mobility, and traffic simulation experts (FAC, BSC and UPC) will select the measures from the UMP to be evaluated in the test-bed based on the following criteria: modeling feasibility, implementation viability, public perception, and the expected impact on air quality improvement.
Modelling assessment of the selected measures: The selected measures will be evaluated based on simulation of traffic and emission scenarios using the traffic and emission models of T8.3 and the integrated urban air quality tool of T8.4. To account for how the measures are related to the mobility policies to be evaluated, auxiliary modules and functions that customize and extend the traffic simulation model will be developed and tested.
Evaluation of the modelling assessment: The modelling assessment will quantify the impact of the measures on emission and air quality concentrations. The indicators will defined in T8.1 and T8.6 will be used to analyze the varying concentrations of regulated pollutants, the population exposed to bad air quality at the street level, and traffic emissions at the street and regional scale.

Task 8.6 - Development, integration, and deployment of the decision support tool (DST) (Lead: BSC, Part: FAC, NOM)
The DST will allow citizens to be informed about the level of exposure to air pollution in the city. CALIOPE will be enriched with the population density modelling and observational data from the remote servers defined in T8.2. A user-centered design approach based on testing a minimum viable product (MVP) in real conditions will be used to meet user expectations. FAC will organize the participatory activities with the City Council units interested in air quality and mobility planning and with public entities involved in decision making such as the Regional and State Administration. The final DST tool will be implemented by following lean development with incremental development cycles. The operational DST will be maintained until the end of the project.

D8.1 ITB4 - User Requirements and specification (FAC, M6, CO) Report that summarizes the results of user requirements analysis and system specification.
D8.2. Working data repository to feed Mobility and Air Quality prediction models (NOM, M12, CO) Report describing the architecture, implementation, and testing of the data repository for the models developed in T8.3.
D8.3 Report on traffic simulation model (UPC, M18, CO) Report of the implementation and calibration of the developed traffic simulation model and the auxiliary modules and functions to emulate the environmental measures related to the mobility policies to be evaluated.
D8.4 Methodologies and Algorithms for Air Quality Data Analysis (BSC, M24, PU) Report describing the data analysis algorithms developed by DALIE and the results of the validation experiments.
D8.5. Report of the impact of the mobility and air quality planning measures (FAC, M30, CO) Report describing the results of the T8.5 analysis.
D8.6. Production version of the DST (BSC, M36, PU) including developer's documentation

Table 19: WP9 description

Work package number 9	**Lead beneficiary**	EUR
Work package title	IPTB5: Smart finance for automotive insurance	

Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	0	0	0	0	0	0	36	0	0	4	0	0	0	0
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	0	0	0	0	0	0	0	0	0	0	45	0	30	
Start month	1						End		36					

Objectives

The target of WP9 is to design, develop, deploy, and pilot the smart automotive insurance industrial test-bed that capitalizes on the Insurance Big Data pools and on data collected from moving vehicles to promote safety on the road, encourage better driving behaviours, reduce the amount of claims and associated costs, and detect fraudulent claims for costs reimbursement of car accidents. With the test-bed, innovative insurance services will be delivered for citizens and stakeholders in a fair, trust-enabling, privacy-aware, and transparent way.

Task 9.1: User Requirements Collection, Smart Automotive Insurance Business Scenarios Definition, Historical Data Preparation (Lead: EUR, Part.: INTRA, VML, KNOW)

This task will define the business scenarios and stakeholder needs for automotive insurance, building on historical big data pools and real-time data aggregation to promote better driving behaviors, prevent accidents on roads, settle claims for damage costs, and detect fraudulent claims. The task will draw on the framework proposed in WP2 to co-design and specify business scenarios with the automotive insurance stakeholders. It will elicit requirements with a) targeted interviews and focus groups, b) a questionnaire made available through the project website, events, and email, and c) f2f meetings with peripheral stakeholders influencing the requirements. It will also select and pre-process historical insurance data from the Eurolife automotive insurance big data repository and identify the characteristics of the data sources for usage in the industrial test-bed. The pre-processing will include data cleaning as well as data anonymization or de-identification for GDPR compliance, including face and license plate blurring, while providing the needed data volume for big data analytics.

Task 9.2: Smart automotive insurance test-bed architecture definition and design specification (Lead: INTRA, Part.: EUR, VML)

This task will analyse the requirements and business scenarios from T9.1 to define the smart automotive insurance test-bed software use cases. It describes the software system's behavior as it responds to user requests. It details and prioritises functional/non-functional and technical/system requirements for the functional specification of the DALIE smart automotive insurance test-bed components and services. It specifies the interoperability of the test-bed with the core DALIE ecosystem and big data repositories/infrastructures. This task will also define the service-oriented smart automotive insurance test-bed architecture, relying on WP3 outcomes and targeting a tailoring of the relevant assets. The architecture will cover the integration logic and interfaces between the involved components and services, the upper layer application logic, and interoperability with existing tools. The task will be pursued in two iterations: 1) refinement of targeted stakeholder needs and requirements and 2) improve and extend the initially defined ones after feedback received from the initial conducted industrial test-bed pilots.

Task 9.3: Real-time Big data aggregation and data analytics for safety on roads and fraud detection in car accident claims (Lead: VML, Part.: INTRA, EUR)

This task will design and develop the drivers' mobile application for: i) collecting live context data from smart phones, such as location, speed, and acceleration, that are fed into the data analytics engine for supporting driving behaviour analysis, contextual understanding, and situational awareness for car accident analysis and fraud detection, ii) providing a driver dashboard with a) geo-localized dynamic information on high risk areas in the city for car accidents, b) notifications with recommendations, warning, and alerts, c) bonuses and insurance premiums for improved driving behaviour, and d) enhanced situational awareness for preventing accidents. The application will be interactive and offer customizable data sharing, security, and notification levels. This task includes analysis of historical data from Eurolife's big data pool on car accidents and claims, associated with involved drivers, to profile drivers as to the risk of being engaged in car accidents and thus devise strategies to promote better driving behaviours with adapted motor insurance premiums. In addition, live location, speed, and acceleration data coming from the driver mobile app will be analysed with spatio-temporal sequential and time-series algorithms to assess

driving behaviour. This task will also analyse historical and live data from car accidents and respective claims, including images/videos, to detect potential fraud and reduce losses of insurance companies by processing and correlating claims data over time. The task will devise both advanced sparse time series analysis algorithms as well as images analysis and understanding based on deep learning models for visual object detection and extraction, estimation of car damage extent, on top of big-data stack components of the DALIE ecosystem.

Task 9.4: Decision Support System and Interactive Dashboard (Lead: INTRA, Part.: VML, EUR)

The task analyses Eurolife's historical data on car accidents and past claims, incl. accompanied images of damages/environment, and live/operational data of car accidents on roads, as captured by driver's mobile apps and reported during the settlement process to extract insights such as context and reasons of the car accidents. These insights will be used to continuously geo-tag, map, and update high risk areas with contextual information on the risk reasons and provide live geo-localized warnings and recommendations to drivers' mobile apps when approaching the respective areas. The data analytics include statistical analysis, unstructured text analysis, and image processing for automated understanding of objects and context. In addition, the task will include the design and development of an interactive Decision Support Engine and Visualization medium (Dashboard) of the back-end system that gives insurance stakeholders the ability to operate and consult. Insights and results from the data analytics engine will be provided to the dashboard along with automated warnings, alerts, recommendations, notifications, and statistics. An event processing engine will be devised to accommodate decision support and automated warnings and recommendations to drivers with analytics for predicting potential car accidents.

Task 9.5: Test-bed Integration and Testing, Piloting and secure data exchange protocols based on smart contracts (Lead: INTRA Part.: EUR, VML)

This task unifies the outcomes of the previous tasks to release an integrated smart automotive insurance industrial test-bed for conducting customised pilots with real-life end users. An integration plan will be defined to guide the integration of the test-bed components and services. Guidelines for the continuous integration and deployment process, tools, and infrastructure will be provided. The collaborative workflow environment and tools to facilitate the integration process will be setup, including issue tracking, software repository, software build, testing, and verification. The test-bed will capitalize on blockchain technology and smart contracts for advanced secure exchange, confidentiality, and integrity of exchanged data between the backend and the vehicles/drivers on the move. INTRA will provide, customize and extend its SmartPACT relevant solution in order to secure, control, authenticate, and ensure the integrity of communicated and shared data with suitable data sharing policies/protocols. On this basis, the released components and services from DALIE and its ecosystem will be continuously integrated according to the interfaces and protocols defined in the architecture specification and realize innovative business process models. The interfaces will be developed following Web standards and specifications. The integration will result in releasing the industrial test-bed prototype for deployment. A continuous deployment approach will be followed for the needs of the envisioned pilot in cooperation with WP10 regarding community engagement. The preparation activities for conducting the pilot in the Athens city will be undertaken in this task, along with the training and support during the execution of the pilot.

D9.1 User Requirements and Business Scenarios Specification (EUR, M6, CO): Identification of user requirements and related business scenarios for IPTB5; preliminary dataset identification
D9.2 Test-bed Architecture and Design Specification (INTRA, M12, CO): Test-bed Architecture and Design Specification including report on historical insurance data preparation for GDPR-compliance and data analytics
D9.3 First version of the smart insurance test-bed (VML, M18, CO): First version of end-to end solution including models, data and digitalization platform.
D9.4 Second version of the smart insurance test-bed (INTRA, M30, CO): Update of D9.3 incl. smart contracts based secure data exchanges, data aggregation and data analytics Engine, and interactive dashboard; full-scale integration and deployment of the test-bed
D9.5 Industrial test-bed piloting report (EUR, M36, PU): Evaluation report covering the different aspects of the industrial pilot test-bed from technical, user engagement and business point of views; blockchain solution

Table 20: WP10 description

Work package number 10	**Lead beneficiary**										AVL			
Work package title	Community engagement and evaluation													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14

Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	20	1	5	1	1,5	0	12	8	8	0	7	2	6	15
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	5	0	0,5	5	15	15	3	3	0	18	12	4	4	
Start month	1						End		36					

Objectives

This work-package encompass community engagement for the IPTB as well as the evaluation and convergence of the industrial test-beds in order to evaluate the results achieved and pave the way for replication. Especially, the main objectives comprise

- Set-up of an evaluation framework for the test-beds comprising technical perspective (data sciences), data perspective (related to data management plan), market perspective (business opportunity in the respective application domain), ecosystem perspective (capability to identify and activate the respective ecosystem)
- Execution of the evaluation according to the different perspective identified
- Recommendations for replications
- Centralized communication channel toward standardization activities

Task 10.1: Evaluation framework (Lead: AVL, Part.: INTRA, POLITO, FAC, LMS, CRF, EUR, CEA, BME)
Target of this task is to set-up the evaluation framework and to identify the different perspectives under which the industrial test-beds should be evaluated. The following perspectives shall be taken into account

- Technical perspective with the capability to assess the performance and maturity of the technical bricks deployed from WP3
- Data perspective with an assessment of the data used and the maturity of the data management plan as prerequisite for business relying on data
- Market perspective with the evaluation of business opportunities in the respective application domain
- Ecosystem perspective with the assessment of the capability to identify and activate the respective ecosystems

Task 10.2: Industrial test-beds users' engagement (Lead: EUR, Participants: COMAU, LMS, GM, PIE, FAC, CEA, ML)
Objective of this task is to guarantee the participation of the critical mass of users and stakeholders in the industrial test-beds pilots to be conducted, who will also be requested to evaluate the test-beds. This task will strongly cooperate with the industrial test-beds to perform targeted communication toward the specific users (B2C for IPTBs 1,4,5, and B2B for IPTBs 1,2,3). For the industrial test-bed on smart automotive insurance, both drivers and insurance stakeholders will be engaged by organizing dedicated workshops and focus groups to ensure their participation and active contributions both during the early phase of requirements collection but also during the piloting and evaluation phase. It is foreseen that 50 drivers will be secured to actively participate to these tasks.

Task 10.3: Mid-term test-bed evaluation (Lead: CRF, Part.: GM, POLITO, COMAU, LMS, CRF, FCA, PIE, DIT, FAC, BSC, EUR, INTRA, ICCS, BSC, SEAT, UPC, VML)
During this task, the evaluation of the first version of the framework as well as the industrial test-beds will be performed. Main target of this evaluation is to implement a first iteration enabling a feedback for both framework WPs and industrial test-beds. Furthermore, this first evaluation will be completed while publishing the call for projects for SMEs, therefore providing important insights on opportunities for test-bed extensions.

Task 10.4: Final test-bed evaluation and recommendation for replications (Lead: FAC, Part.: GM, POLITO, COMAU, LMS; CRF, FCA, PIE, DIT, FAC, BSC, EUR, INTRA, ICCS, BSC, SEAT, UPC, VML)
Target of this task is the final evaluation of the proposed industrial test-beds. The results achieved by the five industrial test-beds in terms of technical achievements, data, market and ecosystems will be assessed. Further objective of this task is to identify the main success factors and lessons learnt for replications and upscaling of the proposed industrial test-beds.

Task 10.5: Supporting standardisation of trustworthy artificial intelligence (Lead: EGM, Part.: FHNW, NVISO, INTRA, POLITO)
The task 10.5 aims at sharing to developed knowledge on multi-party collaboration for digital data-driven application development with the wider developer community by contributing to standardization. The

standardization is intended to achieve compatibility, interoperability, and acceptance of the DALIE innovation in in related initiatives and future efforts. The task will answer CENELEC's call for standardization of trustworthy artificial intelligence[lxiii] by proposing DALIE's quality, provenance, and licensing approach for consensus-building and facilitate eventual certification of DALIE-based data and algorithms.

D10.1 Evaluation framework (AVL, M09, CO) This report describes the framework and identified criteria for the evaluation of the industrial test-beds

D10.2 Mid-term evaluation report (CRF, M18, CO) This document provides a first evaluation of the proposed digitalization framework and industrial test-beds at project mid-term for technology improvement, including planned user engagement and status on standardization activities

D10.3 Final evaluation report (FAC, M36, PU) This document provides the final evaluation of the proposed digitalization framework and industrial test-beds at project end**,** including user engagement, main factors and lessons learnt for replications and upscaling of the proposed industrial test-beds, as well as summary of standardization activities

Table 21: WP11 description

Work package number 11	**Lead beneficiary**											BSC		
Work package title	Dissemination and exploitation of project outcomes and sustainability approach													
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Short name of participant	AVL	COMAU	GM	PIE	ML	I&M	INTRA	DIT	FHNW	KNOW	ICCS	NVISO	EGM	POLITO
Person/months per participant:	5	2	4	1	10	6	12	3	3	3	5	2	1	10
Participant number	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Short name of participant	BSC	CSP	SEAT	UPC	LMS	CRF	FCA	CEA	NOM	FAC	EUR	BME	VML	
Person/months per participant:	36	2	1	4	10	9	2	1	2	18	12	7	2	
Start month	1						End		36					

Objectives

The overall aim of WP11 is to develop and implement a structured plan for disseminating and communicating the projects' results and to maximize impact of the DALIE project and its related outcomes through a comprehensive approach consisting of: 1) clustering activities (impact on R&D ecosystem), 2) dissemination and cross-fertilisation of results (impact on scientific community, communication to general public), and 3) exploitation (impact on market). In order to achieve this target, the necessary dissemination and communication activities will be planned and undertaken.

The impact and exploitation plans will be continuously evaluated to ensure continued relevance. A selection of relevant projects operating in the same field as DALIE will be approached to build a cluster targeting higher technical alignment and joint dissemination activities, therefore increasing the size of the ecosystem of the respective projects and finally their impact.

Task 11.1 – Project dissemination. (Lead: ML, Part.: all)

The objective of this task is to plan and report the dissemination activities for the project and to provide the necessary material and support to partners executing dissemination activities. This will include:

1) establishment of a "corporate" project identity with a project website and supporting dissemination material.

2) planning of targeted dissemination activities focusing on the identified target groups; including the tailoring of information to the specific needs of the target group.

The dissemination activities will consist of but will not limited to a press release at the beginning of the project, annual newsletters, to be disseminated across partner networks, participation in and co-organization of scientific conferences including special workshops, tutorials or industry days where feasible, a social media strategy primarily focusing on LinkedIn and Twitter and its execution, the production of promotional material to transfer the project findings to different target groups.

An initial dissemination plan is already provided in this document and will be updated at regular intervals during the course of the project. This plan clearly will identify the target stakeholder groups and the detailed activities that will be undertaken to disseminate the project's results. The activities will be specified in detail, including the

information to be disseminated, the relevance with regards to GDPR, the responsible partners, dates, and the dissemination method to be used.

Task 11.2 – Cross-fertilisation and synergies with European initiatives. (Lead: I&M, Part.: all)
The DALIE project benefits from a well-established European network. The vast majority of the consortium partners are actively involved in several European initiatives (e.g., EGVIA, ARTEMIS-IA, ECSEL, EPoSS, EUCAR and ERTRAC. Moreover, there is an active participation of the DALIE partners in large-scale European-funded projects, such as the ECSEL Lighthouse Mobility 4.0 initiative (i.e. AUTODRIVE) and CSAs promoting new solutions for the personal mobility in Europe. Joint activities will be co-organised between the DALIE consortium and the above-mentioned initiatives. This activity includes as well the identification of possible joint dissemination activities where possible. This alignment will result in a greater efficiency in the use of the European funding in order to avoid potential overlaps and design duplication, and ultimately improved impact of the respective projects in their communities.

Task 11.3 – Exploitation of project outcomes. (Lead: BSC, Part.: all)
This task will analyse the project outcomes with regard to their future exploitation potential according to three different types of exploitation paths: (a) **Transfer**: enhance good practice by spreading results, (b) **commercialisation**: creation of a new products, and (c) **Sustainability**: keep project results visible and available for access of target audience. In order to continuously focus on future exploitation opportunities and to ensure the plans are up to date and remain relevant, exploitation plans relying on the project assets (see Section 2.2.4) will be updated throughout the project duration. All partners are required to actively plan their exploitation with regards to future market take-up and feed back to the consortium. An impact analysis of the project results with regards to project and programme objectives, will be carried out as part of this task in line with the project's innovation management system (see Sec. 3.2).

D11.1: Corporate project identity (ML, M03, PU) At project begin, the initial dissemination material will be developed. This includes the Website, Logo and the templates following such a corporate project identity.
D11.2: Preliminary dissemination plan (ML, M09, CO) The dissemination plan (incl. social media strategy) will provide a planning and scheduling of activities to communicate the project and the planned outcomes.
D11.3: Updated dissemination plan and initial exploitation plan (BSC, M18, CO) This deliverable will outline the dissemination planning for the coming period of the project and will analyse the future evolution of the project outcomes and the partner's respective activities on the 3 levels of exploitation
D11.4: Final exploitation plan and sustainability / impact report (FAC, M36, CO) The exploitation plan will analyse the future evolution of the project outcomes and the partner's respective activities.

Table 22: List of Deliverables

Deliverable (number)	Deliverable name	WP No.	Short name of lead participant	Type	Diss. level	Delivery date (in months)
D1.1	DALIE Project Handbook	1	AVL	R	CO	M02
D2.1	Preliminary Data Management Plan	2	INTRA	R	PU	M06
D2.2	Report on Data Value Assessment- and Opportunity Analysis	2	KNOW	R	CO	M12
D2.3	Intermediate Report on Data-Driven Business Model Design and Evaluation	2	KNOW	R	CO	M24
D2.4	Final Data Management Plan	2	INTRA	R	PU	M32
D2.5	Final Report on Data-Driven Business Model Design and Evaluation	2	FHNW	R	PU	M36
D3.1	DALIE infrastructure and architecture	3	INTRA	R	PU	M06
D3.2	First framework version	3	ICCS	R	PU	M12
D3.3	Risk mitigation and trust-building architecture report	3	FHNW	R	PU	M18
D3.4	Second framework version	3	CSP	R	PU	M24
D3.5	Final DALIE framework	3	INTRA	R	PU	M36
D4.1	Outreach Plan	4	NVISO	R	PU	M09
D4.2	Smart Education Content version 1	4	ML	R	PU	M12
D4.3	Open Call	4	CEA	R	PU	M15

D4.4	Smart Education Content version 2	4	ML	R	PU	M24
D4.5	Final report on outreaching the ecosystem	4	FHNW	R	PU	M36
D5.1	System models and requirement	5	GM	R	CO	M06
D5.2	Models target and KPIs	5	POLITO	R	CO	M12
D5.3	1st version of the IPTB1 models	5	GM	R	CO	M18
D5.4	Second version of the IPTB1 models	5	POLITO	R	CO	M30
D5.5	IPTB1 execution and evaluation	5	GM	R	CO	M36
D6.1	System requirements: Health monitoring for emission regulation	6	I&M	R	CO	M06
D6.2	Digitalization framework and data models	6	POLITO	R	CO	M12
D6.3	First version of the IPTB	6	DIT	R	CO	M28
D6.4	Second version of the IPTB	6	AVL	R	CO	M30
D6.5	Industrial test-bed piloting report	6	PIE	R	PU	M36
D7.1	Design and requirements of the smart manufacturing test-bed	7	LMS	R	PU	M06
D7.2	Equipment customization and deployment	7	COMAU	R	PU	M12
D7.3	Data gathering & analytics	7	CRF	R	CO	M24
D7.4	Integration with the production processes	7	COMAU	R	CO	M30
D7.5	Smart manufacturing test-bed – demonstrator & validation	7	FCA	R	PU	M36
D8.1	User Requirements and specification	8	FAC	R	CO	M06
D8.2	Working data repository to feed Mobility and Air Quality prediction models	8	NOM	R	CO	M12
D8.3	Report on traffic simulation model	8	UPC	R	CO	M18
D8.4	Methodologies and Algorithms for Air Quality Data Analysis	8	BSC	R	PU	M24
D8.5	Report of the impact of the mobility and air quality planning measures	8	FAC	R	CO	M30
D8.6	Production version of the DST, including developer's documentation and user guides	8	BSC	R	PU	M36
D9.1	User Requirements and Business Scenarios Specification	9	EUR	R	CO	M06
D9.2	Test-bed Architecture and Design Specification	9	INTRA	R	CO	M12
D9.3	First version of the smart insurance test-bed	9	VML	R	CO	M18
D9.4	Second version of the smart insurance test-bed	9	INTRA	R	CO	M30
D9.5	Industrial test-bed piloting report	9	EUR	R	PU	M36
D10.1	Evaluation framework	10	AVL	R	CO	M09
D10.2	Mid-term evaluation report	10	CRF	R	CO	M18
D10.3	Final evaluation report	10	FAC	R	PU	M36
D11.1	Corporate project identity	11	ML	R	CO	M03
D11.2	Preliminary dissemination plan	11	ML	R	CO	M09
D11.3	Updated dissemination plan and initial exploitation plan	11	BSC	R	CO	M18
D11.4	Final exploitation plan and sustainability / impact report	11	FAC	R	CO	M36

All deliverables, regardless of the dissemination level, **will include an executive publishable summary**, which will be published on the project website as soon as it has been approved by the EC.

3.2 Management structure, milestones and procedures

3.2.1 Milestones

The project flow is organized around the following main milestones, see Table 23:

Table 23: List of milestones

Milestone number	Milestone name	Related WP(s)	Estimated date	Means of verification
1	Concept refined, requirement & data plan available	WP2, WP3, WP5-9	M06	D2.1, D3.1 D5.1, D6.1, D7.1, D8.1, D9.1, D10.1
2	Framework first version available	WP2, WP3, WP4	M12	D2.2, D3.2, D4.1, D4.2, D5.2, D6.2, D7.2, D8.2, D9.2, D11.2
3	IPTB first version available, call for project (SME) published	WP4, WP5-WP8	M18	D3.3, D4.3, D5.3, D6.3, D8.3, D9.3, D10.3, D11.3
4	Framework second version available	WP2, WP3, WP4	M24	D2.3, D3.4, D4.4, D7.3, D8.4
5	Final version of IPTB and framework available	All WPs	M30	D5.4, D6.4, D7.4, D8.5, D9.4
6	Result evaluated, final recommendation for sustainability available	All WPs	M36	D2.4, D2.3, D3.5, D4.5, D5.5, D6.5, D7.5, D8.6, D9.5, D10.3, D11.4

The first third of the project is dedicated to concept refinement, data governance (MS01) and deployment of ***DALIE*** framework (MS02). This targets the set-up of solid foundations for the industrial pilot test-bed. Then, two iterations are foreseen for industrial pilot test-bed integration, deployment and populating with industrial data, as well as update of the framework (MS03, MS04 and MS05). Finally, the final evaluation of the test-beds at real scale is performed (MS06). Figure 17 shows the timing of work packages and tasks with the milestones planned, while Figure 18 is illustrating the list of deliverables in DALIE as well as their inter-dependencies.

3.2.2 Organizational structure and decision making

The following section describes the organisational structure and the decision-making hierarchy to be employed in ***DALIE***. The management procedures will be fully outlined in the project consortium agreement to be signed by all partners covering all relevant issues necessary for the proper execution of the project. Relevant issues include the Steering Board, Project Coordinator, and individual partner responsibilities, liabilities, intellectual property rights (IPR), knowledge management, rules for publishing information, conflict resolution and financial management etc.

Project management: The Project Management Team is made up of the technical project coordinator and administrative project leader. The Coordinator will deal with the daily technical execution and synchronization within the consortium. The administrative project leader supports the coordinator in dealing with the legal, financial, and administrative aspects of the project coordination. The overall coordination is by done by AVL, by teaming Eric Armengaud (Project Manager R&D) as technical coordinator with Nadine Knopper (Expert European project) as administrative coordinator. The management structure presented in this section is appropriate for the size of the consortium and the 11 work packages and takes into consideration lessons learned in previous projects. The management structure is intentionally simple to ensure effective executive and clear communication in to enable the innovation process. To keep the travel costs low, project meetings will be conducting using a combination of virtual and face to face methods (e.g. Teleconferencing etc.).

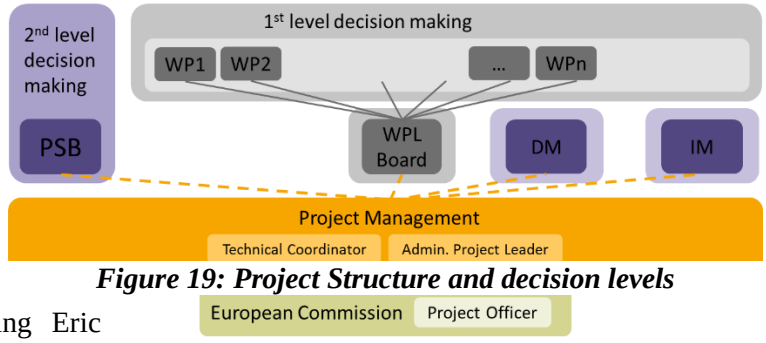


Figure 19: Project Structure and decision levels

The project will employ a management by exception principle where decisions are taken on the lowest level possible with first level decision taken inside the Work Packages. Where decision affect more than one work package the issue will be escalated to the Work Package Leader (WP Leader) Board. The Project Steering Board, composed of senior partner representatives, will take decision on escalation levels on issues not resolved at WP level or where strategic or directional input is required.

Work Packages and Work Package Leader Board (WPL board): The first level decision making is performed either (1) on WP level for topics affecting the execution of the Work Package where no interaction with other WPs is necessary or (2) on the WP Leader Board where decisions influencing the cooperation between Work Packages are taken. The WP Leader will be responsible for managing their WP as a self-contained entity. It is the WP Leader's responsibility to maintain communication with partners inside the WP including regular meetings by electronic means (Webex and Videoconferencing) and face-to-face where necessary, to ensure and monitor execution of tasks

inside the WP according to time and resource plan. A WP specific delivery plan will be drawn up to include division of responsibility and timings, and to report any deviations and risks identified inside the WP Leader Board

The WP Leader Board, headed by the technical coordinator, is the level of decision making for WP interactions. It is within the WP Leader Board's responsibility to ensure and monitor proper cross-WP cooperation including timing of deliverables and risk monitoring, to decide technical discussions that affect more than one WP, to assure quality of deliverables by reviewing deliverables and project results, to report to the Project Steering Board on continuous basis, and to escalate to the Project Steering Board when considered as necessary. The WP Leader Board will meet on at least monthly basis by electronic means (Webex, Videoconferences) and in a face-to-face meeting twice a year. Ad hoc meetings will be scheduled as required.

Project Steering Board (PSB): The Project Steering Board consists of senior partner representatives from each partner organization and is required to attend the Project Steering Board that is chaired by the technical project coordinator. The responsibilities of the Project Steering Board include to take decisions on the strategic orientation of the project including ensuring the cooperation with other related R&D initiatives, as second level decision making body for topics not finding a resolution on WP Leader Board, to validate proposals for changes to Annex I of the EC-GA to be agreed by the European Commission, for changes to the Consortium Plan (including the Consortium Budget), for changes with respect to the consortium agreement, for evolution of the Consortium (e.g. addition or withdrawal of partners). The Project Steering Board will meet twice a year in a face-to-face meeting with additional electronic meetings (Webex, Videoconferences) as required during the project lifetime.

Data Manager (DM): Target of the DM is to maintain the data management plan up to date and to advise the project team on data related issues. DM is the task leader of T2.2.

Innovation Manager (IM): Target of the IM is to ensure proper identification of exploitable assets, trace them during project execution, support the project partners for proper exploitation and ensure correct reporting – see Section 3.2.4 for more information. IM is the task leader of T11.3

A preliminary meeting schedule is provided

Table 24: Meeting Schedule

Meeting	Format	Date	Participants
Kick off meeting	Face to Face	Project start	All
Project Steering Board	Face to Face (virtual as required)	Every 6 months	All partners: PSB members
Work Package Leader Board	Virtual	Monthly Webex meeting	All WP Leaders
Work Package Leader Board	Face to Face (combined with PSB meetings)	Every 6 months	All WP Leaders
Work Package internal synchronization	Virtual (face 2 face upon request)	Every second week Webex meetings	WP participants

3.2.3 Execution and monitoring of the project

All documents relevant to the project will be shared over the ***DALIE*** SharePoint, an extranet platform with exclusive access for the project partners. The SharePoint site has already been used during the proposal preparation phase and allows central handling of all documents including version control. It is the responsibility of the participants to ensure their access data are not available to other individuals. The WP Leader Board will undertake technical Progress monitoring. In its regular meetings, the Work Package leaders are requested to provide information on the status of activities in the Work Package to ensure effective cooperation both inside the WP and in collaboration with other WPs. For each innovation cycle, clear technical expectations will be set, and corrective measures taken as required. On administrative level, the partners will provide status updates on efforts spent on each task to ensure spend remains in line with project progress. Each partner will nominate a representative as a main contact point for legal, administrative, and financial aspects. Financial data will be provided for each review period along with partner specific periodic reports. The accumulation of WP reports, status reports and the partner specific periodic reports will constitute the project periodic reports planned in months 09 and 18 and the final project report in month 36.

3.2.4 Innovation Management

Innovation management in ***DALIE*** strongly relies on the following pillars: (a) **Delivering the correct innovation to the correct market** – by the interconnection of technical innovation with business needs (see Section 2, business model canvas), (b) **Proper management of assets** to be created in the project, see Table 7 and WP11, (c) **Appropriate IPR and communication plan** to secure innovation and ensure that the dedicated audience is aware of the project outcomes.

With the innovation management as proposed in ***DALIE***, the project can count on the following advantages: increased visibility of project results and their impact, keeping track of results generated by the project and organize their evaluation, brings together solution providers and end users, support coordination and management of overall development effort, actively motivate and support communication and collaboration, ensure visibility and transparency for all partners, clear overview of solutions provided by the project and how they can be used/exploited, enable quick reaction on new input from different sources (project internal and external), ensure technical management and traceability to project goals

3.2.5 Critical Risks and Mitigation Measures

The continuous risk management of ***DALIE*** will be in the hands of project management team. They will be the first to identify, rate and provide mitigation strategies for risks coming up during project execution. Accordingly, risk management will be part of the monthly WP Leader Board synchronization. A first list of risks identified during the project preparation is shown in Table 25. The critical risks for the implementation of DALIE are identified as **6 potential technical risks (Tx), 2 potential Commercial risks (Cx)** that could endanger the timely and successful completion of the project and **2 risks** related **to the coordination and management (Mx)** of the consortium. These risks are explained below, and contingency plans are described to manage and mitigate the effect of the potential problems on the project outcomes. This list will be revised at project start and updated on a continuous basis.

Table 25: Critical risks for implementation

Description of risk / Likelihood	WP(s) involved	Proposed risk-mitigation measures
C1 (Low): Major change in the IOT, Big data or automotive market lowering the expected impact of DALIE outcomes	All WPs	Risk management implemented within WP1 to identify external risks and adapt course of the project appropriately. Partners involved in respective expert groups (e.g., ERTRAC, BDVA, AIOTI) to monitor changes in technology and legislation.
C2 (Low): ***DALIE*** outcomes not achieving customer satisfaction, leading to risks for go-to-market	All WPs	Responsible DALIE partners – already implemented on the market – to monitor market change and adapt the direction of the project accordingly
T1 (Low): Results from the technical WPs are delayed	WPs 2, 3, 4	Isolate parts that can be completed and re-plan parts that can be delayed. Consider reallocating resources and building task forces.
T2 (Low): Technical results delivered do not meet industrial pilot test-bed expectations	WPs 2, 3, 4	Close cooperation between end users and technology providers right from the beginning of the project
T3 (Medium): Effort to deploy the proposed IOT and data analysis platforms is underestimated, leading to missing functionalities and / or delayed platform release	WP3	The long-standing experience of the partners in EU funded projects and activities related to the development/integration of IOT and data analysis platforms lowers this risk. The project will perform a careful requirements re-prioritization during project execution. Effort re-distribution will be evaluated
T4 (High): Requirements to the platforms being incomplete, not consistent, platform implementation cannot proceed	WP3	The requirements will be further investigated and the details level increased through multiple interactions with the use-cases providers. The project management will organize specific meetings involving also the involved partners.
T5 (High): Incompatibilities between components, components of the platform could not be released or integrated significantly delaying the pilot's implementation	WP3	Incompatibilities will be addressed. The implementation will be driven by specific convergence decisions on a case-by-case basis. To minimize the risk the involved WPs will perform a detailed analysis of all the interfaces and protocols needed during the initial phase of the project, before delivering the detailed design architecture. In general, ***DALIE*** strives for early integration of prototypes, close cooperation among partners and continuous risk monitoring by the project management.
T6 (Low): Deliverables do not meet sufficient quality standards.	All WPs	Project management to establish quality assurance process, by systematically reviewing deliverables sufficiently ahead in time to allow corrections or additional work to be performed.
M1 (Low): Partner not performing as expected in the technical annex	WP1	Regular synchronization and appropriate project monitoring and governance structure (See Section 3.2)
M2 (Low): Partner leaves consortium.	WP1	Project Management to setup regular conference calls and meetings to establish and motivate communication with partners.

3.2.6 Quality Management

To ensure the overall quality of the ***DALIE*** project, a Project Handbook (Deliverable 1.1) is available to all project participants. This document sets the guidelines for data exchange between partners on a dedicated project SharePoint (including naming conventions), the use of the ***DALIE*** corporate identity and communication to the public, the use of confidential information and IPR management, and the project quality management procedures. These procedures include a review process for deliverables, for publications and for dissemination material.

3.3 Consortium as a whole

The consortium is composed of 27 partners from 10 European countries, see Figure 20. When establishing the project consortium, the following parameters have been considered:

- Integration of relevant industrial partners to ensure industrial relevance and brand-independence of the solution to be developed
- Combination of partner expertise
- Exploitation potential by strong partners well implemented in their respective market
- Partner's trust in the project cooperation

Figure 20: Consortium as a whole

The DALIE consortium regroups **key players from smart -mobility, -manufacturing, -cities, -finance** with the participation of three car manufacturers (FCA, SEAT / VW Group, and GM) accounting **for 35% of the worldwide vehicle production**[lxiv]**,** two Tier1 / engineering partners (PIE and AVL) **totalizing a turnover > 4 Milliard Euro**, a robotic provider (COMAU) within the **top ten worldwide**, **one of the largest insurance provider from Greece** (EUR), and the **second largest city from Spain** (Barcelona). Complemented by **7 BDVA members** to support alignment with and correct strategy execution of the **BDVA SRIA,** DALIE brings together key industrial sectors with data-science and data-driven engineering thereby **facilitating the transformation of these large industrial ecosystems in Europe**.

Further, the mix of 9 large industrial partners, 7 SMEs, and 11 scientific partners provide a perfect balance (a) to **generate state-of-the-art concepts**, (b) to **industrialize the concepts towards innovation**, (c) to build fully **interoperative ecosystems to demonstrate in the real world the value of IOT and big data technologies** applied to traditional key European industries, and finally (d) to **pre-industrialization of the innovations** to products and solutions in a global market, thus increasing European competitiveness. An additional strength of the consortium is it tight integration in the European R&D ecosystems for industrial domains as well as ICT technology. **Five industrial test-beds are defined** to validate how IOT and big data will support digitalization take-off in traditional large industries. Hence, this unique combination within this ecosystem strongly supports know-how transfer and identification of cross-domain, innovative solutions, and further shall illustrate the relevance and scalability of ***DALIE's*** approach.

Finally, the strong integration in the ecosystem is highlighted by **8 letters of support** (see Annex 1). These organizations will be active followers and connectors to other European cities interested to be informed about the progress achieved by DALIE, the potential for solving common issues related to urban mobility, and ultimately contributing to spread the word, to promote best practices and disseminate success stories. The letter of support encompasses **smart cities** (Bit Habitat Fundation, city of Turin), **regional competence centers** (MESAP, BigDataCoE), **companies** (ÖAMTC, IoMob), as well as **European initiatives** (EPoSS, POLIS).

Contracts such as the Grant Agreement and the Consortium Agreement will lay out rules of cooperation across the consortium. They are the necessary framework around a cooperation that first needs to build on trust. It is the trust in each partner that the organization and the persons involved to have the right skills and needed commitment to fulfil the task they are dedicated for. Beyond the topics already addressed in the sections above, this trust was a further selection criterion. Although the consortium has never formally cooperated in exactly this configuration before, there is a strong trust in the cooperation. This trust is based on (1) the fact that individual partners have already cooperated in previous projects and (2) the cooperative spirit established during the proposal generation phase.

3.4 Resources to be committed

Table 26: Summary of staff effort

No.	Particip.	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	WP9	WP10	WP11	Total PM
1	**AVL**	24	5	13	0	0	20	0	19	0	20	5	**106**
2	**COMAU**	2	4	12	2	0	0	42	0	0	1	2	**65**
3	**GM**	9	5	0	4	108	0	0	0	0	5	4	**135**
4	**PIE**	1	1	0	0	0	29	0	0	0	1	1	**33**
5	**ML**	1,5	0	0	50,5	0	0	0	0	0	1,5	10	**63,5**
6	**I&M**	3	6	0	4	0	53	0	0	0	0	6	**72**
7	**INTRA**	6	14	45	3	0	0	0	0	36	12	12	**128**
8	**DIT**	2	6	28	2	0	25	0	0	0	8	3	**74**
9	**FHNW**	2	0	24	13	0	0	0	0	0	8	3	**50**
10	**KNOW**	2	50	27	3	4	4	4	4	4	0	3	**105**
11	**ICCS**	1	0	39	6	12	0	0	8	0	7	5	**78**
12	**NVISO**	1	0	27	19	0	0	0	0	0	2	2	**51**
13	**EGM**	1	0	18	1	0	0	3	3	0	6	1	**33**
14	**POLITO**	2	0	31	2	40	35	0	0	0	15	10	**135**
15	**BSC**	2	10	0	3	0	0	0	124	0	5	36	**180**
16	**CSP**	1	0	32	0	0	0	0	0	0	0	2	**35**
17	**SEAT**	2	1	0,5	1	0	0	0	27	0	0,5	1	**33**
18	**UPC**	1	2	6	8	0	0	0	90	0	5	4	**116**
19	**LMS**	5	0	10	5	0	0	60	0	0	15	10	**105**
20	**CRF**	1	3	4	5	0	0	42	0	0	15	9	**79**
21	**FCA**	6	12	12	3	0	0	70	0	0	3	2	**108**
22	**CEA**	1	0	0	6	0	0	0	0	0	3	1	**11**
23	**NOM**	1	0	0	0	0	0	0	17	0	0	2	**20**
24	**FAC**	2	9	0	9	0	0	0	52	0	18	18	**108**
25	**Eurolife**	2	0	0	3	0	0	0	0	45	12	12	**74**
26	**BME**	1	0	0	32	0	0	0	0	0	4	7	**44**
27	**VML**	2	8	8	4	0	0	0	0	30	4	2	**54**
	Total	**84**	**136**	**336**	**188**	**164**	**166**	**221**	**344**	**115**	**167**	**173**	**2095,5**

Table 27: 'Other direct cost' items

Partner	*Other Direct Costs (€)*	*Justification*
PIE	192,000	***Travel***: Travel to project meetings **(€ 7,000)** ***Equipment***: Hardware for 15 digitalized dynamometer prototypes to drive the control shaft and gather the data **(€12.000 each, € 180,000 in total)** ***Other goods and services:*** financial audit **(€ 5,000)**
DIT	490,400	***Travel***: Travel to project meetings and workshops **(€ 30,000)** ***Other goods and services:*** Conferences (2 per year, 2 persons, conference fee, project marketing) **(€ 30,000),** 3G for 1000 devices - 3 years **(€ 5,400), F**inancial audit **(€ 5,000),** Workshop Equipment Test devices: 30x ADS 130 (**4000€** per piece), 30xMDS450 **(7.000€** per piece) for development & test **(in total € 330,000),** 60 Connectivity Extensions Hardware for Workshop Equipment **(€ 18,000),** Billing solution Test, BearingPoint (solution pricing 2000 € / month) **(€ 72,000)**
SEAT	133,280	***Travel***: Attendance Steering Meetings (6 bi-annual + 2 review) **(€ 12,640),** Attendance to one project workshop and one dissemination event/year **(€ 10,640)** ***Other goods and services:*** Data transmission cost based on 1,65€/Gb and ca. 50b of data transmitted per second over a 12-month campaign including an average of 15,000 to 40,000 connected cars depending on participation of VW group's brands other than SEAT. **(€ 50,000),** 18-month access to AWS (EC, S3, ...) services for data handling and storage (estimated ca. 25Tb of data by the end of the campaign) **(€ 60.000)**
CEA	35,000	***Travel***: several travels required for project management, open call communication, connection with SAE community and beyond **(€ 20,000)** ***Other goods and services:*** Technical and business experts review task for the open call application evaluation if needed (750 € / day of expertise) **(€ 10,000),** Financial audit **(€ 5.000),** Management of SME's cascade funding budget for **10 projects each 50k€ funding (in total € 500,000)**

Eurolife	165,000	***Travel***: Participation to in total 6 Project Plenary Meetings and two Project reviews at M18 and M36, 2 persons - 2 days, total cost per person = 1000 Euros **(€ 16,000)** ***Other goods and services:*** Drivers community engagement costs (50 cars) **(€ 30,000),** Cloud infrastructure and processing nodes/VMs renting costs (12M*9000) **(€ 108,000),** Financial audit **(€ 5,000),** Misc. electronic equipment **(€ 6,000)**
BME	68,000	***Travel***: Travel to project meetings **(€ 30,000)**, Travel to dissemination activities **(€ 30,000)** ***Other goods and services:*** consumables and other small value goods **(€ 8,000)**
VML	54,000	***Travel***: DALIE meeting participation, GA, Hacathons, integration events and pilot deployment sites **(€ 25,000),** Travel to dissemination activities **(€ 10,000)** ***Equipment***: Depreciation cost for the infrastructure to be used for the development of overall project platform **(€ 5,000)** ***Other goods and services:*** Consumables **(€ 6,000),** Financial audit **(€ 5,000),** Registration cost - dissemination events, conferences and exploitation events **(€ 3,000)**

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[lx] [51] http://www.desca-2020.eu/
[lxi] If your action taking part in the Pilot on Open Research Data, you must include a data management plan as a distinct deliverable within the first 6 months of the project. This deliverable will evolve during the lifetime of the project in order to present the status of the project's reflections on data management. A template for such a plan is available on the Participant Portal (Guide on Data Management).
[lxii] https://community-canvas.org/
[lxiii] https://www.cencenelec.eu/News/Press_Releases/Pages/PR-2018-07.aspx
[lxiv] https://www.statista.com/statistics/198524/15-leading-passenger-car-manufacturers-worldwide/

DALIE Section 4-5

"Digital Accelerator for Large Industrial Ecosystems"

List of participants

No	Organisation Name	Beneficiary short name	Organization type	Country
01	AVL List GmbH	AVL	IND	AT
02	COMAU S.p.A.	COMAU	IND	IT
03	GM global propulsion systems	GM	IND	IT
04	Pierburg GmbH	PIE	IND	GE
05	Miles Learning GmbH	ML	SME	AT
06	Ideas & Motion S.r.l.	I&M	SME	IT
07	Intrasoft International SA	INTRA*	IND	LU
08	AVL DiTEST GmbH	DIT	IND	AT
09	University of Applied Sciences and Arts Northwestern Switzerland	FHNW	RTO	CHE
10	KnowCenter GmbH	KNOW*	RTO	AT
11	National Technical University of Athens (ICCS)	ICCS*	RTO	GR
12	NVISO S.A.	NVISO	SME	CHE
13	Easy Global Market	EGM*	SME	FR
14	Politecnico di Torino	POLITO**	RTO	IT
15	Barcelona Supercomputing center-Centro Nacional de Supercomputación	BSC*	RTO	ES
16	CSP innovazione nelle ICT s.c.a r.l.	CSP	RTO	IT
17	SEAT S.A.	SEAT	IND	ES
18	Universitat Politècnica de Catalunya	UPC	RTO	ES
19	University of Patras, Laboratory for Manufacturing Systems (LMS)	LMS	RTO	GR
20	Centro Ricerche FIAT S.C.p.A	CRF	RTO	IT
21	FCA Information Technology, Excellence and Methods (FCA ITEM S.P.A.)	FCA	IND	IT
22	COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	CEA*	RTO	FR
23	Nommon Solutions and Technologies S.L.	NOM	SME	ES
24	Factual Consulting	FAC	SME	ES
25	Eurolife ERB A.E.G.A	EUR	IND	GR
26	Budapest University of Technology and Economics	BME	RTO	HU
27	Venaka Media Limited	VML	SME	UK

** BDVA members ** BDVA member through the CINI laboratory*

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Section 4: Members of the consortium

4.1. Participants

Partner 1: AVL List GmbH	
Company Website: www.avl.com	

AVL List GmbH is the world's largest privately-owned company for development, simulation and testing technology of powertrains (hybrid, combustion engines, transmission, electric drive, batteries and software) for passenger cars, trucks and large engines. AVL has about 3850 employees in Graz (Austria), and a global network of 45 representations and affiliates resulting in more than 9500 employees worldwide. AVL´s Powertrain Engineering division activities are focused on the research, design and development of various powertrains in the view of low fuel consumption, low emission, low noise and improved drivability. The Advanced Simulation Technologies division develops and markets the simulation methods which are necessary for the powertrain development work. The Instrumentation and Test Systems division is an established manufacturer and provider of instruments and systems for powertrain and vehicle testing including combustion diagnostic sensors, optical systems as well as complete engine, powertrain and vehicle test beds. AVL supplies advanced development and testing solutions for conventional and hybrid vehicle components and systems like simulation platforms, development tools and system integration tools.

AVL will be the overall coordinator of this project. Besides this, AVL is involved in the framework development and in two industrial test-beds. As engineering partner of leading OEMs throughout the world, AVL is constantly seeking for new capabilities and their exploitation. AVL is continuously carrying out research and technical development in the field of data sciences to advance development and validation of innovate automotive powertrains including e-mobility. AVL is active in many European interest groups like ARTEMIS Joint Undertaking (member of the Steering Board), ERTRAC, EARPA, EGVI, European Green Cars Initiative, EUCAR etc. Since Framework Program 3 AVL has been participating in more than 140 European RTD projects as partner and coordinator.

CVs of involved key researchers / staff members

Eric Armengaud (male) received his M.Sc. from ESIEE Paris, in 2002, the PhD. degree from the TU Vienna, in 2008 and the MBA degree from IBSA, in 2016. He has more than 15 years of experience in automotive embedded systems in different positions. He is currently project manager R&D with the responsibility to identify, set-up and manage national and European R&D programs within the AVL PTE business unit. Eric Armengaud is author and co-author of more than 70 peer reviewed publications and patents, and is guest lecturer at the University of Applied Sciences FH Joanneum. Together with Nadine Knopper (in administrative lead) he was technical project coordinator of the FP7 project INCOBAT, and is technical coordinator from the ICT-01-2016 DEIS project.

Nadine Knopper (female) received her Master's degree in International Business from the University of Applied Sciences FH Joanneum in Graz in 2013. She joined AVL in 2012 and started working for the department of Research and Technology Development for Powertrain Engineering in 2014. She currently holds the position as specialist on EU project management, working in the project coordination of national and international funded projects. In this position, she is the administrative project coordinator for five H2020 projects as well as the administrative and legal contact for more than twenty H2020 projects.

Verena Wagenhofer (female) received her Master's degree in Applied Ethics from the University of Graz in 2017. She joined the department of Research Co-ordination at AVL in 2018 and holds the position of specialist in research funding, working in the coordination and administration of national and international R&D projects. Before starting her current position Verena worked in the fields of project management and international relations at the University of Technology in Graz for nine years. Verena will be supporting the DALIE consortium in all ethics aspects.

Stephen Jones (male) graduated from Cambridge University UK in 1996 with a PhD. in Natural Sciences. He began working at Ford, initially in Manufacturing, then in Gasoline Engine Calibration/OBD, & finally CAE. Afterwards he joined Prodrive as Lead Engineer Gasoline Calibration. In 2001 he started at LuK in Transmission Controls. He then moved to DE, where after a period as Technical Specialist for vibration damper development, & their electronic integration into powertrains, he became Leader Simulation Techniques where he automated/standardized simulation methods. During this time, he industrially supervised a PhD. in Controls at TU Karlsruhe. Later he worked in the UK at Scottish & Southern Energy, where he established a Condition Monitoring Centre for the generation fleet. Late in 2008 he moved to AVL in AT, initially Leading Production Controls, & later Hybrid & System Simulation. Currently he is Senior Product Manager Systems & Principal Engineer. He is a Chartered Mechanical Engineer & MIMechE. He is interested in the development of novel simulation methods to frontload the development of vehicles. He has acquired, worked in, & lead advanced & series production projects with many OEM & TIER1 worldwide. Since 2011, when he managed AVL's work in the FP7 OpEneR project, he has remained passionately involved in the development of predictive controls & ADAS, as well as the development of dampers for downsized/hybrid applications. He has published papers in ADAS, powertrain control, simulation, & thermodynamics. He holds various patents. He is a part-time tutor to MSc. students at IFP School in FR.

Michael Hammer (male) graduated in mechanical engineering at Graz University of Technology in 2007 and received a PhD degree from Graz University of Technology in the field of numerical mechanics in 2012. He worked in automotive powertrain development domain since 2013 at AVL List GmbH. Initially he was responsible for the area of component testing and tribology investigations. With the increasing focus on creation of physics of failure models he took over the team management for reliability engineering in 2015. Since 2016 he is also responsible for coordinating AVL's activities in data management, analysis and visualization for the service business – the so call "Big Data" team.

Gerhard Schagerl (male) received his MSc in 2003 in computer science at the Johannes Kepler University Linz, Austria. Gerhard is employed at AVL List GmbH since 2000. In the majority of this time he was in a team leading role for AVL's motorsport business. Beside other duties in this position he was responsible for the development of a vehicle lap time simulation tool and its implementation into cloud computing environment. From 2018 Gerhard joined AVL's Big Data efforts in the role as Product Manager for Big Data services. In this position he defines Big Data strategy and product portfolios, but also develops new data-driven business models. Gerhard has extensive experience in computer science and deep knowledge of the automotive industry as well as big data applications.

Relevant publications, and/or products, services or other achievements

- Armengaud, E., Sams, C., von Falck, G., List, G., Kreiner, C., & Riel, A. (2017). Industry 4.0 as digitalization over the entire product lifecycle: Opportunities in the automotive domain. in Systems, Software and Services Process Improvement - 24th European Conference, EuroSPI 2017, Proceedings (Band 748, S. 334-351). (Communications in Computer and Information Science; Band 748). Springer Verlag. DOI: 10.1007/978-3-319-64218-5_28
- AVL's nominated tool solutions for big data handling are based on AVL SANTORIN[1] MX 2™ and AVL CONCERTO[2] 4™. AVL SANTORIN MX 2™ is an ISO conform data management solution for engineers in the area of product validation and verification. AVL CONCERTO 4™ is a generic data processing platform that focuses on quick and intuitive signal analysis, validation, correlation and reporting. It synchronizes and compares measured and simulated data simultaneously - all acquired data within one standard tool. Both solutions are complementary and providing an important platform for the storage, structuring and processing of the large amount of information to be managed.
- The Integrated tool platforms complement the necessary skill set: AVL's Integrated and Open Development Platform[3] (IODP) enables a new way of model-based development. By combining and enhancing already established capabilities, simulation models, data storage or automation systems and

1 https://www.avl.com/-/avl-santorin-mx-2-
2 https://www.avl.com/-/avl-concerto-4-
3 https://www.avl.com/iodp

execution environments, early, open and consistent functional integration is made possible to master complexity and speed. Especially, AVL Model.CONNECT™4 empowers the implementation of model-based development, closing the gap between virtual and real worlds, resulting in cost benefits and efficiency increase across the entire development process. Applicable in a broad range of powertrain and vehicle applications, it creates prototypes, built with virtual and real components, available at every development step.

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
DEIS http://www.deis-project.eu/	ICT01, 2017-2019	The DEIS project addresses the challenge of assuring dependability of collaborative CPS by developing technologies that enable a science of dependable system integration	Dependability engineering framework as support to deploy dependable CPS and IOT
FED4SAE https://fed4sae.eu/	ICT04, 2017-2020	The overall ambition of the FED4SAE innovation action (IA) is to boost and sustain the digitization of the European industry by strengthening competitiveness in Cyber Physical Systems (CPS) and embedded system markets.	Framework for cascade funding management
EVOLVE	ICT11 2018 - 2021	EVOLVE aims to build a large-scale testbed by integrating technology from: • **The HPC world:** An advanced computing platform with HPC features and systems software. • **The Big Data world:** A versatile big-data processing stack for end-to-end workflows. • **The Cloud world:** Ease of deployment, access, and use in a shared manner, while addressing data protection.	Experience on management of industrial test-beds; big data processing stack

Description of significant infrastructure and major items of technical equipment relevant to the project

As an engineering service provider, AVL has the know-how, the tools and the equipment which is required within this project; no project related investment costs are necessary. Most of the test equipment and simulation tools is developed and manufactured by AVL, which enables a very high flexibility in case that new systems require updated test procedures.
Worldwide AVL holds a variety of 207 test beds (104 in the headquarters in Graz); including test beds especially equipped for gas engine and exhaust gas after treatment development.

4 https://www.avl.com/-/model-connect-

Partner 2: COMAU S.p.A.	
Company Website: www.comau.com	

Comau is a worldwide leader in manufacturing flexible, automatic systems and integrating products, processes and services that increase efficiency while lowering overall costs. Headquartered in Turin, Italy, with an international network that spans 17 countries that employ more than 9,000 employees, Comau uses the latest technology and processes to deliver advanced turnkey systems that consistently exceed the expectations of its customers. Comau specializes in body joining & assembly, powertrain machining & assembly, robotics and maintenance, as well as advanced production systems and environmental services for a wide range of industrial sectors. The continuous development of its products and services enables Comau to lead the automation industry in meeting the unique requirements of each customer, and through all phases of the project - from design, implementation and installation, to production start-up and maintenance services.

Comau will be responsible as technology provider with the development and use of new IoT platform that will enhance the flexibility and potentiality of the system permitting new functionalities as machine learning, predictive maintenance, big data analysis. Comau will support the smart manufacturing integration in WP6.

Comau has a long experience in funded R&D programs, which have been developed as European Projects (6th, 7th Framework Programme) and also national programs like Italian applied RTD innovation projects. COMAU will contribute with its laboratories and research facilities, where advanced solutions are developed and extensively tested.

CVs of involved key researchers / staff members

Mr. Alfio Minissale (male). Received his master degree in 2007 in Electronic engineering (automatic control), from the University of Catania. He joined COMAU group in 2008, working in application and process engineering for Robotics Business Unit. From 2012 he has been involved in many EU FP7 projects as Autorecon, SMErobotics, X-Act, Flexicast, Robopartner, Versatile, Esmera addressed transversally to several aspects of robotics field. From 2015 he is working in Product development department as a benchmarking specialist in validation test and benchmarking laboratory.

Mrs. Carem Rosito Mercio (female). Graduated in Electronics Engineer on 2010 at Politecnico di Torino. Has international profile having worked in several multinational companies in Brazil, Italy and France always on software departments. Joined COMAU Robotics in 2016 to manage the next generation robotics software platform project and guide innovative projects.

Mrs. Eliana Giovannitti (female). Received his master degree in Electronic Engineering, specializing in Robotics and Automation, from La Sapienza University of Rome. She had an internship in STMicroelectronics working on the control loops of a small mobile robot. She joined COMAU in 2014 as Control Engineer in Product Development Group and she is actually working on robot models identification and motion control.

Relevant publications, and/or products, services or other achievements

- Alfio Minissale, Industry 4.0: new challenges and opportunities, PLM2018 Conference, Turin 3 July 2018
- Sotiris Makris, Gian Paolo Gerio. Dual-arm robots for skilled manufacturing operation 2014 European Robotics Forum 2014 (EU Robotics), March 12-14, 2014

- Gian Paolo Gerio, Stefano Chiaverini. The Open Source Controller in COMAU Robotics. 2009 IEEE International Conference on Robotics and Automation (ICRA), Workshop on Open Source Software in Robotics, May 12-17, 2009

List of relevant previous projects or activities, connected to the subject of this proposal

X-act (www.xact-project.eu): Use of advanced cooperative robotic systems within European manufacturing and assembly facilities. COMAU's role and tasks have been: algorithms development and implementation, experience and best practice, comparative evaluation of trials.

ROBO-PARTNER (http://www.robo-partner.eu/): Development of seamless human-robot cooperation for intelligent, flexible and safe operations in the assembly factories of the future. COMAU's role and tasks have been: algorithms development and implementation, experience and best practice, comparative evaluation of trials.

SMErobotics (www.smerobotics.org): European Robotics Initiative for strengthening the competitiveness of SMEs in manufacturing by integrating aspects of cognitive systems. COMAU's role and tasks have been: robot application development and implementation, experience and best practice, comparative evaluation of trials.

Description of significant infrastructure and major items of technical equipment relevant to the project

Comau facilities include specific areas for processes testing, as well as a robotics laboratory with a wide range of innovative robot types, covering all payload categories and applications.

RoboLab: An INDUSTRIAL ROBOTICS LABORATORY where students and experts can work together on the development and testing of new products and applications in order to turn research results into exploitable products and services.

Joining & Assembly Lab: An INDUSTRIAL LABORATORY where COMAU engineers works on a variety of complex technical challenges in the field of Joining and Assembly Technologies to provide education and technical support for development of new assembly solutions.

Controls Engineering Lab: Development and testing of applications in order to turn research results into exploitable products and services. Up to 5 working places, with more than 5 PLCs connected, including Safety + Process components, multivendor equipment, one fixed HMI.

Partner 3: General Motors Global Propulsion System Torino SRL – GM GPS, Italy	
Company Website: http://www.gmpowertrain.com	

GM GPS Torino is part of the European branch of General Motors Co. worldwide leading manufacturer in automotive field. The company is in charge of developing and bringing to production Diesel engines and Diesel engine controls for GM worldwide. After developing the EU6 version of the 1.6 L4 turbo Diesel engine powering B/C segment platforms of Opel/Vauxhall, the engineering centre is currently preparing the new generation of Diesel engines and controls for GM worldwide.

GM GPS Torino is owner of product development process for Diesel engines and controls in General Motors and has in-house competences from advanced engineering (eg. R&D) to industrialization and SOP. Its mission is to develop new engines and controls to ensure the best efficiency and the lowest pollutant emissions to comply with the current and future regulations in Europe and in all markets where GM sells Diesel-powered vehicles. Beside the activity on engine, the centre has developed a strong competence in electronic controls, sensors and actuators. This competence is the building block on which the centre started the development activity on wellness applied to the passengers of motor vehicles. The implementation of this activity is supported through the existing research resources, including the labs of the centre and the availability of the labs of Politecnico di Torino in which campus our centre is located.

In the project GM GPS Torino will apply its expertise in embedded controls and big data analytics to develop prognostic features in cooperation with Politecnico aimed at preventing major failures. GM GPS will leverage the proprietary OnStar infrastructure to acquire data.

CVs of involved key researchers / staff members

Ing. Davide Tricarico (male): holds a Master Degree in Computer Engineering at Politecnico di Torino in 2010. He Joined GM in July 2010 as Algorithm Design and Development Engineer working in the Aftertreatment sensing area. In this position he gained experience in OBD related topics. From August 2017 he is part of the Advance Controls team as Technology System Engineer for OBD and Data driven methodologies development.
Ing. Alessia Tuninetti (female): holds a master degree in Electronics engineer at Polietecnico di Torino and a master degree in telecommunication engineer at Universitat Politecnica de Catalunya in 2003. She joined GM in 2005 as Controls Engineer working on different diagnostic topics for several subsystems (fuel system, DPF, SCR, sensors, etc..). From January 2017 she become Senior Technology Area Leader for diagnostic within Advance Controls team with the aim to define and support future diagnostic/prognostic development.
Ing. Maria Camuglia (female): holds a Degree in Mechatronics Engineering at the Politecnico di Torino in 2013. She joined GM in 2013 as Technology System Engineer in Advanced Engineering Diesel Controls and Engine Electrification team. She gained broad experience in New Generation Control techniques applied on aftertreatment systems and since 2017 she works on OBD topics.
Ing. Alessandra Neri (female): Alessandra Neri holds a Degree in Electronic Engineering at the Politecnico di Torino in 2006. She got a PhD in Metrology: Electronic Measurements at the Politecnico di Torino in 2009. She joined GM in 2012 as HW Electrical Architecture Development Engineer in Control team working as Detail Analysis Engineer on in-house diesel controllers. In 2015, she became Technology System Engineer working on OBD topics.
Ing. Massimiliano Melis (male): master of science in Mechanical engineering. Currently Controls Business manager. In Gm since 2007, covered several roles such engine technology area leader, advanced engineering project leader and injection system design responsible engineer.

Partner 4: Pierburg GmbH	
Company Website: www.rheinmetall-automotive.com	

Pierburg GmbH is a part of Rheinmetall Automotive AG, formerly KSPG AG. As a global tier-1 supplier to the automotive industry and thanks to its vast capabilities, Rheinmetall Automotive is successful in different segments: air management, emission control, pumps, pistons, engine blocks and plain bearings.

Product engineering and development are conducted in close liaison with leading OEMs. Low emissions, reduced fuel consumption, upgraded performance, reliability, quality and safety – these are forces that drive innovation at Rheinmetall Automotive. In line with its strategic missions, the Group has three divisions: Hardparts, Mechatronics and Aftermarket. Around 12,000 employees work in 40 different production locations in Europe, North and South America, Japan, India and China.

In its role as tier-1 supplier, Pierburg GmbH has traditionally been one of the closest partner to the automotive industry. Pierburg was founded in 1909 as a steel trader in Berlin; in 1928 Pierburg commenced with the production of carburetors and very soon graduated into sole supplier to all German automotive manufacturers and many international motor vehicle producers and engine manufacturers. In 1986, Pierburg was taken over by the Rheinmetall group and in 1998 merged with Kolbenschmidt to form Kolbenschmidt Pierburg AG. In 2016 Kolbenschmidt Pierburg AG had been renamed into Rheinmetall Automotive AG. Within the Rheinmetall Automotive Group, Pierburg belongs to the division mechatronics and is the specialist for emission control, actuators, solenoid valves, pumps and variable valve lift systems.

Decades of experience combined with comprehensive, innovative and globally acknowledge capabilities in every aspect of the engine are factors that have driven Pierburg in its mission to repeatedly develop and manufacture forward-looking components is driven by the challenge to meet fuel consumption targets, lower emissions, enhanced performance, comfort and safety. For these purposes, Pierburg offers high-technology solutions: on-demand controlled electric coolant pumps, DC-motor driven exhaust gas recirculation systems, variable valve train systems as well as the many different versions of dive modules. All these developments help to create an economically and ecologically balanced vehicle.

Main tasks:

- Design and integration of non-self-locking actuator (Phaser type)
- Modification of already existing variable valve train equipped cylinder head to accommodate the non-self-locking actuator
- Procurement and machining of the actuator parts assembly and build-up of 15 actuators
- Conception of an actuator test bench
- Data acquisition form sound actuators and from actuators put in an artificially failure mode.
- Data acquisition from sound actuators with “artificially” produced failures in the valve train hardware.
- Data acquisition from sound actuators and sound vale trains for the soft save strategy
- The data is used to develop and train a big data KI-algorithm to understand if one of the failure modes starts to occur. (work of Polito)
- Incorporation of the algorithms in the control electronics (work of (I&M)
- Testing of the actuators with the updated control electronics to validate the behaviour of the algorithms under practical conditions
- Testing of the actuators together with the valve train to validate the behaviour of the algorithms under practical conditions
- Testing of the soft safe strategy

CVs of involved key researchers / staff members

Dr.-rer. nat. Dirk Hunkel (male) is currently appointed as vice president Research and Technology in the Division Mechatronics (Pierburg GmbH), a division of Rheinmetall Automotive. He joint Pierburg in 1999 working for fuel cell developments, after multi roles in Engineering and Business development he got his recent assignment. He graduated at the University in Karlsruhe in Physics and made his PhD-Thesis in the Research Center in Jülich and RWTH –Aachen in semiconductor electrochemistry.

Dr.-Ing. Michael Breuer (male) is currently appointed as director in the business unit Variable Valve Train Systems inside the Division Mechatronics (Pierburg GmbH), a division of Rheinmetall Automotive. He joint Pierburg in 2005, working on air intake systems, EGR coolers and in the advanced engineering group. Before Pierburg he was employed at Ford Motor Company as an expert for emissions, combustions and performance. Graduated in mechanical engineering at RWTH Aachen, he started his career at FEV in different positions in gasoline engine engineering. In 2003 he submitted his PhD-Thesis on charge stratification in PFI gasoline engines.

Relevant publications, and/or products, services or other achievements

Schmitt, S.; Breuer, M.; Moormann, S.; Freeland, P.; Jones, G.:
Efficient Utilization of the Gas Exchange Advantages of an infinite variable mechanical Valve Train System

11. MTZ- Fachtagung Ladungswechsel und Emissionierung, Stuttgart 2018
Schloßhauer, A.; Fryjan, J.; Habermann, K.; Uhlmann, T.:
Multi-variable Gasoline Engine for Lowest CO2 Emissions
MTZ worldwide 79(2018)11, 2018

Breuer, M.; Bartsch, G.; Friedfeldt, R.; Heiter, U.; Kramer, U.; Lauterbach, M.; Schorn, T.; Siebrandt, S.:
3- Cylinder SI Engine with fully variable Valve Train UpValve on Intake and Exhaust Side

7. VDI- Fachtagung Ventiltrieb und Zylinderkopf, Würzburg 2017
Freeland, P.; Feasey, M.; Jones, G.; Chen, R.-S.; Huang L.-W.: *Gasoline Engine Technologies to Achieve Diesel-Like Fuel Consumption Levels*

7. Aachen Colloquium China, Beijing 2017
Breuer, M.; Grimm, K.; Schmitt, S., Hunkel, D.: *Development of a fully variable Valve Train to Production Readiness*
MTZ worldwide 78(2017)2, 2017

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
GASON	Horizon 2020	Set Up of an I3 SI engine dedicated for CNG to gain significant CO2 reductions	Engine is equipped with fully variable Valve Train UpValve on intake and exhaust side
VARIMOT	BMBF Germany	Highly variable I3 Gasoline Engine for lowest fuel consumption	Interaction of variable valve train, variable compression ratio and novel boost system

Description of significant infrastructure and major items of technical equipment relevant to the project

- Test rigs to drive valve trains of combustion engines and with fast acquisition of torques, valve lifts, signal processing etc.
- Test rigs for durability runs of engines, cylinder heads and/or valve train components
- Electronic shop to set up and test actuators and electronics
- Simulation department to calculate mechanical and electronical systems
- Prototype shop to set up and maintain mechanical systems

Figure Valve train actuation test bench and assembly lines at Pierburg

Partner 5: MILES Learning GmbH	MILES | learning
Company Website: www.miles-learning.com	

MILES Learning GmbH is a technology-spin-off from Austria's biggest private education provider (bit group GmbH) with over 30 years of experience in educating people for labour market needs. Founded as a start-up in 2016, MILES is developing and implementing innovative education and learning materials, focusing on smart education and learning with technologies.

Within the project, our focus is on "smart education". It is our aim to transfer project results into learning content that will be tailored to three main target groups. These will be

- General managers and technical experts of the project's partner organizations, for internal further education (internal dissemination of project results).
- SMEs in Europe with interest to (further) develop their data driven businesses, to receive an "overview" about new perspectives and a guideline to step into this business (external dissemination).
- The general public, to raise awareness about new opportunities in the field of digitalisation.

The contents will be provided online and modular at different technical levels via a modern CMS, providing didactical support for users (learners) and integrated authoring for continuous content improvement and enhancement. Contents reserved for (specific) project partners will thereby be protected through "private" content modules.
As these activities are closely linked to dissemination and sustainability, we will also take the lead in the work package 10, taking care of these aspects.

Although MILES is a start-up we can build on many years of experience in the field of training and learning concepts and the use of digital learning technology. Our key experts on the average have gained 15 years of profound expertise in development and implementation of training and further qualification measures for formal education, labour market services, public institutions and corporate clients. About the same time we have been engaging ourselves in the research, development and implementation of digital learning technologies. Our key experts have been regularly involved in international projects for clients such as the EC and Ministries of Education and have successfully implemented numerous international projects. For the ongoing development of our learning technologies we have established a close cooperation with several scientific partners: Technical University, Karl-Franzens-University, KnowCenter Gmbh and Joanneum Research GmbH (all Graz/AT).

CVs of involved key researchers / staff members

Thomas Hötzl, M.Sc. (male) is MILES co-founder, managing director and responsible for strategic- and project development. He gathered experience with the (automotive) industry already 25 years ago during the provision of consulting services on implementing digital PM solutions. Since 2001 he focused on the development of modular and flexible learning concepts for different labour market projects and services. Successively he was also responsible for their enrichment through modern learning technologies. Before founding MILES he decisively influenced the digital content development for one of the DACH market leaders for several years. In this capacity he was also responsible for their deployment within educational projects for numerous international clients. In DALIE Thomas will be responsible for the development of the content architecture and the coordination of the content preparation process with the project partners.

Mag. Michael Kvas, MPH (male) is MILES co-founder and MILES' chief learning strategist. He gained experience in a management consulting firm before he founded an NGO in the year 2008. Under his leadership the NGO mainly focused on the development and implementation of modern training concepts for adults. It was several times awarded for its innovative approaches. In 2013 he joined the bit group. Within one year he was appointed head of strategic- and organizational development and learning affairs for the business field labour market services. Already in 2015, he started to develop a concept for digital learning content that would be able to provide improved support for modern learning architectures and individualized forms of learning. This concept became the didactic basis for the technical developments of the MILES system. In DALIE

Michael will especially focus on Quality Management with special regard on Didactics and Methodological questions of the content development.

Mag. (FH) Ingrid Armengaud, **MSc (female)** has joined MILES by beginning of 2017. Since 2009, Ingrid has been working in the coordination, project management, dissemination and exploitation of various national and EU funded projects at AVL List GmbH. As an example, she was leading the dissemination and exploitation team in the ARTEMIS project CESAR and the FP7 project INCOBAT. In DALIE, she will lead the WP11 and will take care of the project management aspects on partner level.

Ms. Monika Hödl (female) is working as software developer since 1999. She is specialized in Java and has almost two decades of experience with different development frameworks and related data management systems. During numerous customer projects she has gained profound expertise in developing web-based applications, web services and mobile apps. For the last five years, she has specialized in the development of digital learning technologies, evolving a deep understanding about the requirements of modern learning architectures. In DALIE, she will be the responsible software architect for the implementation of required customized CMS features.

Relevant publications, and/or products, services or other achievements

Our team has been mainly responsible for the operation of one of Austria's biggest projects regarding learning with technology. For more than 10 years we are providing an open further education program for the local government of Upper Austria targeting on the reduction of skill-gaps of workforce for the labour market. Every year more than 1000 participants take part in individualized trainings in a variety of knowledge areas via a hybrid learning environment. The system MILES will replace the platform and content technology used in this project successively.

Description of significant infrastructure and major items of technical equipment relevant to the project

The Modular Interactive Learning and Empowerment System (MILES) is a modern CMS and integral part of all our digital learning contents. It manages content highly modular and cloud-based and allows the deployment of competence-based and hands-on learning materials, which foster individualized and scalable learning experiences.
MILES is based on highly-granular data bank architecture depicting dependencies and connections of learning units (content elements). Hereby content micro-entities can be individually configured and equipped with meta-information. All training contents, regardless of their scope, are based on these micro learning units. This consistent didactic substructure with learning objectives and competence architecture (EQR-equivalence) enables a flexible use of the learning contents in various learning architectures. Even very complex learning fields can thus be depicted in a transparent form.
Learning intensity, sequence and consolidations can be designed in a completely tailor-made way, while the focus is still on the actual goal, the superordinate acquisition of competence. The granular structure also allows the assessment of learning progress on a micro level (big data) and supports the control and development of learning processes as a strategic core momentum. From a usability perspective, our contents pursue the "mobile first approach" by means of full responsiveness regarding their usability on various devices.
With this system, MILES is primarily focusing on knowledge areas that are undergoing rapid change. Themes of this type can be addressed by formal education only with difficulty, education and training in this regard are increasingly occurring directly at the workplace. Due to our system's flexibility we can convey learning content also during unstructured learning processes, as they are common in work-based learning, in the complex overall context of e.g. new professional orientations. Furthermore, our system allows learning contents to be updated and amended during ongoing learning, without affecting the learning processes - an invaluable asset in rapidly evolving fields of knowledge.

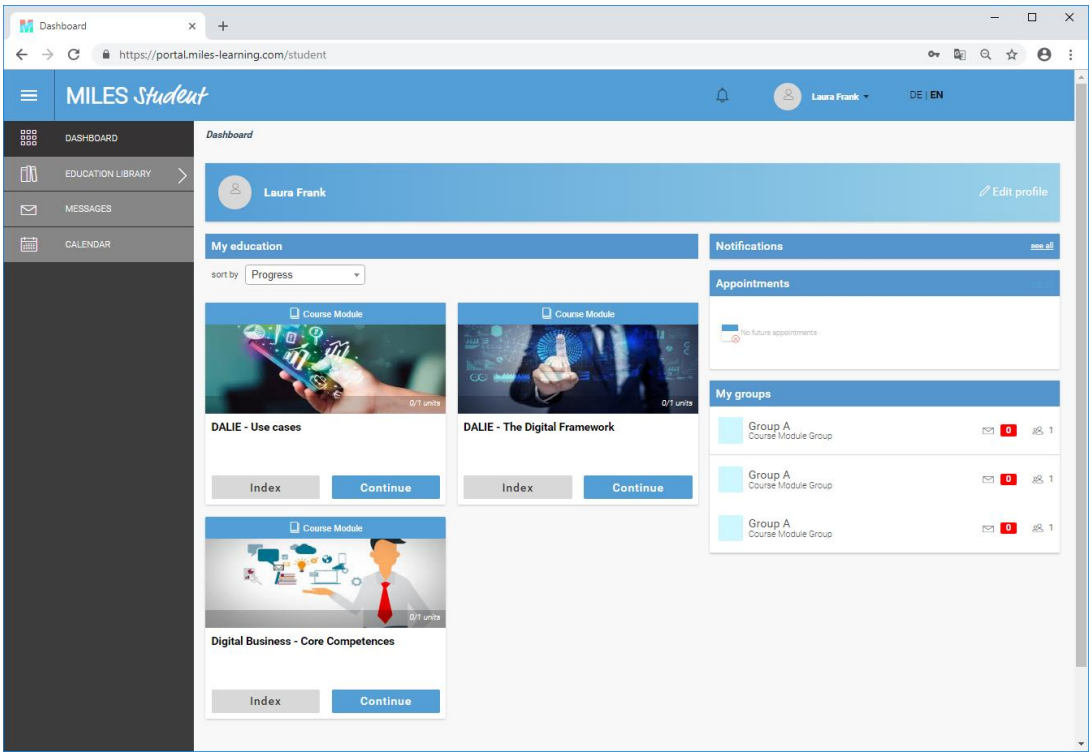


Figure 1: Miles learning's content management system

Partner 6: Ideas & Motion Srl	
Company Website: www.ideasandmotion.com	

Ideas & Motion S.r.l. (Italy), offers high-tech solutions in the field of automotive applications.
I&M has a well-recognized position of excellence on some key areas, stemming from more than 120 years of combined experience on innovative projects and related automotive products.
Its biggest technological background is in the design of semiconductor devices for the control of electro-actuators, and its integration in automotive powertrain applications.
I&M's core business is to provide HW/SW engineering services to OEM and Tier1 companies in the automotive industry, while also being active as a supplier of Electronic Control Units in niche applications with low volumes and high technological contents.

I&M will be involved in the design, realization, testing and integration of the mechatronic control unit for the Up Valve system driven by the in Line Phaser. I&M will bring the know-how on the design of innovative automotive systems (HW/SW) supported by the long-lasting relationship with major semiconductor suppliers. The mechatronic control unit will integrate the prediction model and health monitoring, developed in cooperation with Pierburg and PoliTO, for the whole VVL system. Additionally I&M will support to the networking and interaction with on-going EC initiative and EPoSS community and, more generally, the dissemination and exploitation of the results. Particular attention will be paid to the business development resulting from the project.

CVs of involved key researchers / staff members

Riccardo Groppo (male) took his MSc degree in Electronic Engineering at the Politecnico of Torino (Torino, Italy. He is the co-founder and CEO of Ideas & Motion, Member of the Board and Chairman of Transport Working Group within EPoSS (European Platform on Smart Systems Integration). He worked at Centro Ricerche FIAT (CRF) for more than 25 years, being the Head of the Automotive Electronics Design and Development Dept. at CRF (2002-2013). He holds more than 28 patents in the field of automotive electronics and embedded systems, most of which are currently in production on passenger cars.

Paolo Santero (male) took his MSc in Electronic Engineering in 1996 at the Politecnico of Torino (Torino, Italy). He is co-founder of I&M, where he is currently responsible for Automotive System HW Design. He worked at CRF for more than 15 years. He has a recognised experience in automotive electronics being involved in several industrial programs with the most relevant automotive and silicon suppliers worldwide. He holds more than 12 patents in the field of automotive electronics and embedded systems.

Marco Novaro (male) took his MSc degree in Electronic Engineering, focused in automation and control, at the Politecnico of Torino (Torino, Italy). He is co-founder of I&M, where he is currently responsible for SW Architecture and RT-OS. He worked at CRF and has more than 16 years of experience in the field embedded software development, and in particular in the design of multi-layered, highly scalable software architectures and basic software drivers.

Claudio Romano Novaro (male) took his MSc degree in Electronic Engineering, at the Politecnico of Torino (Torino, Italy). He is currently involved at I&M in the design and development of electric drives for automotive application with major automotive suppliers. He worked at CRF, being involved in the design of the first KERS for Ferrari F1 car, and has more than 10 years of experience in the field of HW design and e-motor control algorithms.

Relevant publications, and/or products, services or other achievements

- "Smart Actuator Control in Powertrain Systems" - R. Groppo (I&M), P. Santero (I&M) et al., SAE EVPT Sept. 2013, Detroit, USA
- "Improving HV Battery Efficiency By Smart Control Systems" - R.Groppo (I&M), E. Armengaud, G. Macher, AVL List GmbH, et al. March 2015, SSI 2015 Copenhagen

- "Smart Systems For Transport & Mobility" - R.Groppo March. 2013 – SSI 2013, Amsterdam
- "Understanding the SSI Ecosystem - Facts and Futures" - R.Groppo, March 2014, SSI 2014 Vienna
- "Smart Systems: Investing in a revolution" - R.Groppo, March 2015, SSI 2015 Copenhagen
- "A smart computing platform for dependable battery management systems" - R.Groppo (I&M), M. Novaro (I&M), E. Armengaud, G. Macher, AVL LIST GMBH, et al., June 2015, AMAA 2015, Berlin

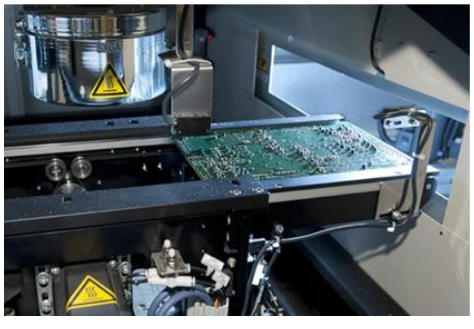
List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
DEIS	(H2020, GA 732242)	Digital Dependable Identity and CPS for automotive applications	Automotive control systems for physiological parameters analysis
AUTODRIVE	(ECSEL,GA 737469)	Technologies and components for the next generation of automated vehicles	Advanced control platform based on multi-processor architecture for safety critical application and improved vehicle dynamic control
STEVE	(H2020,GA 769944)	Experimental activities in real urban conditions of LEVs based on innovative automotive technologies	Advanced control platform based on multi-core processor implementing complex algorithms for vehicle control
SECREDAS	(ECSEL,GA 783174)	Next generation of switches base wide band gap technology for automotive applications	Development of power electronics based on wide band gap switches
PRYSTINE	(ECSEL,GA 783190)	Programmable Systems for Intelligence in Automobiles	Fault tolerant automotive sensor data fusion unit

Description of significant infrastructure and major items of technical equipment relevant to the project

I&M is fully equipped with modern CAD tool suite for electronic design. Most of all I&M has the full capability (see figures), through its industrial partner and minority-shareholder (MTM Group), to access a state-of-the-art electronic assembly factory (MTM- Electronic Division, Cherasco (CN), Italy) thus being able to develop their own products. A design methodology has been defined in order to guarantee a seamless design flow from the electronic design, made at I&M, down to the assembly and manufacturing of electronic systems at the factory. Moreover I&M relies on environmental test screening labs (e.g. humidity, temperature, vibration) and related reliability tests.






Partner 7: Intrasoft International S.A.	
Company Website: www.intrasoft-intl.com	

INTRASOFT International is a leading European IT Solutions and Services Group with strong international presence, offering innovative and added-value solutions of the highest quality to a wide range of international and national public and private organisations. The company employs more than 1,600 highly-skilled professionals, representing over 20 different nationalities and mastering more than 18 languages. With headquarters in Luxembourg, INTRASOFT International operates through its operational branches, subsidiaries and offices in 17 countries: Belgium, Bulgaria, Denmark, Cyprus, Greece, Jordan, Moldova, Morocco, Romania, Palestine, Philippines, Saudi Arabia, UK, UAE, USA and Yemen. More than 500 organizations in over 70 countries worldwide (Institutions and Agencies of the European Union, National Government Organizations, Public Agencies, Financial Institutions, Telecommunication Organizations, and Private Enterprises) have chosen the company's services and solutions to fulfil their business needs.

INTRASOFT International is a subsidiary of the ASE-listed INTRACOM Holdings, one of the largest multinational technology groups in SE Europe, with more than 35 years of experience and possesses a successful track record of delivering very large and complex IT systems, especially for the public sector. Through its continuous investment over the years it has earned a place among the primary IT services suppliers for EU institutions and bodies (Commission, EU Parliament, European Investment Bank etc.), but also among the public sectors of its global markets. Others markets sectors of INTRASOFT International include the banking sector, transportation, telecommunications, and the healthcare sectors.

INTRASOFT International has proven expertise in conceptual system architecture and system design, advanced application development and integration services, information portal management and communication services, and project management. INTRASOFT International's Software Engineers, Analysts and Programmers keep abreast of all major technology innovations and developments that can add value to our business activities. INTRASOFT has been awarded the following certifications: Quality Management of Products and Services (ISO 9001:2008); ISO/IEC 20000-1:2005 certification that underlines the quality of INTRASOFT's IT service management systems; ISO/IEC27001:2005 certification that recognises the strength of INTRASOFT's information security management procedures; CMMI Level 2 (Capability Maturity Model Integration) v1.2 for its Software Development activities; and since October 2012 has been successfully appraised at CMMI Level 3 for its software development projects in three locations (Luxembourg, Athens, Bucharest).

For more than 20 years, INTRASOFT International (Luxembourg) actively contributes to the development of innovative pre-industrial products and services through its participation in EU Research Programmes. We possess a successful track record in managing large and complex collaborative research projects, implementing innovative research prototypes, and effectively communicating research results in Europe and beyond. Serving this mission, the **Research and Innovation Development (RID)** Department contributes to the strategic policy objective of enabling Europe to master and shape future developments in ICT, while sustaining the company's leadership in ICT. Research is conducted by in-house and associate consultants, in conjunction with prestigious universities and research institutions, and acclaimed industrial partners that ensure the articulation of emerging ICT trends into innovative and exploitable research outcomes. As a result, INTRASOFT International offers an interdisciplinary centre of competence on the effects, use and applications of ICT in our targeted markets with a medium to long-term agenda.

The RID Department works in close collaboration with other INTRASOFT International (Luxembourg) teams, to bring technological and business innovation within the Group. The company continuously monitors new technological trends where RID is dealing with the development and assessment of innovative pre-industrial products and services. Starting in 2015, INTRASOFT International has taken a step further by investing even more in innovation and R&D both internally, but also through participation in venture capital funds and start-ups.

INTRASOFT International (Luxembourg) has extensive R&I activities related to Big Data, Data Analytics and AI. Indicatively, INTRASOFT participates with key roles in Big Data H2020 lighthouse projects in the areas of bioeconomy, manufacturing and transport. INTRASOFT International is heavily investing in Big Data. Currently, a Big Data virtual team has been created with representatives from business units across the company. The virtual team is responsible for exploring and developing opportunities related to Big Data

pertinent to all company activities. This approach aims to transform corporate culture in such a way that all decisions, both business and technical will ultimately become data driven.
In addition, INTRASOFT International is already active on blocKNOWhain technology and smart contracts, exploring the technical applicability of the technology and the potential efficiencies that it could release in various use-cases, such as Customs and Taxation trade facilitation, Insurance and Banking, among other. The company has developed blocKNOWhain technology solutions, for the customs and insurance sectors as a starter, having been awarded two projects from DG TAXUD, on the one hand, and business agreements with private Greek insurance companies on the other hand.

INTASOFT International will participate in various WPs within ***DALIE***. In particular, it will lead WP2 (Scientific and technology framework), providing the specifications for the overall DALIE testbed architecture and also being present in the development of the various components.
Moreover, INTRASOFT International (Luxembourg) will participate in the insurance use case (WP8), studying the impact of Big Data and IoT in the insurance domain and how it affects mobility.
Last, INTRASOFT International (Luxembourg) has also proven expertise in the area of the dissemination and exploitation of research project results, so it will significantly contribute in the corresponding WPs of the project.

Exploitation plans
INTRASOFT International (Luxembourg) aims at reinforcing its solutions portfolio through the offering of innovative and specialized applications and services in the evolving markets of agriculture, Big Data and IoT/cloud computing. Also, complement existing research activities in the areas considered in ***DALIE***, in order to extend its product portfolio into this important area where high growth is forecast in the next years due to the use of ICT technologies.
INTRASOFT's major activities in the project complement well INTRASOFT's business approach of offering turnkey solutions, utilizing its existing customer relations, business partnerships (existing, like SAP, and new coming through research and commercial projects) and its expertise in providing high quality integrated enterprise services. INTRASOFT will look to extend its portfolio to meet the special requirements of the Digital Single Market and the implied optimisation of the global supply chain through the use of ICT platform ecosystems.
Last, INTRASOFT will exploit ***DALIE*** through cooperating with the leading research institutes and software developers participating in the project, which may lead to strategic alliances in the field of commercialization and technology transfer of innovative aspects of technology. Hence, formation of synergies / collaboration with the partners in the context of another project is also being considered.

CVs of involved key researchers / staff members

Dr. George Dimitrakopoulos (male) has received his bachelor degree in Electrical and Computer Engineering in 2002 and his Ph.D. in 2007, from the National Technical University of Athens, and the University of Piraeus, respectively. Since November 2015 he is a senior consultant and project manager at Intrasoft International S.A. Since 2009 he is also with the Harokopio University of Athens (HUA), department of Informatics and Telematics, where he is now an assistant professor. From 2002 till 2009 he was an adjunct lecturer and senior research engineer at the University of Piraeus, department of Digital Systems. He is the author of more than 120 publications in international journals and conferences, whereas he has been involved in numerous internationally funded R&D projects. His research interests include the design and development of safety and emergency management algorithms for vehicular communication, as well as the design and development of strategies for the optimization of wireless networks based on cognitive networking principles.

Dr. Sofia Tsekeridou (**female**) is currently a Senior Research and Innovation Specialist/Manager at the Research and Innovation Development Dept. of INTRASOFT International, heading the Security and Safety Lab. She previously held the position of Associate Professor at Athens Information Technology (AIT) heading the Multimedia, Knowledge and Web Technologies research group. Dr. Tsekeridou has been involved, as senior researcher, project and/or technical coordinator as well as senior technical architect, in numerous national, industrial and EU-funded research projects in the areas of multimedia processing, e-learning, data analytics, information security, search engines, recommender systems and knowledge engineering in diverse application domains (public safety and security, e-health, learning, tourism, digital libraries, media,

entertainment, etc.). Research results in the area of big data analytics have led, among other, to two prototypes, the Dynamic Intrusion Patterns and Rules Discovery prototype for dynamic decision making of potential intrusions based on real-time and continuous multi-sensor feeds analysis results, and an Educational Resources Search Engine and Recommender System, mining social media to discover and recommend content of educational value. She has published many papers at international scientific journals and conferences and has contributed to the TV Anytime and W3C standardization bodies. She has served as a reviewer to many international scientific conferences and journals. Dr. Tsekeridou is a senior member of IEEE and a member of the Technical Chamber of Greece, and she is an active validated member of Europol's Data Protection Experts Network (https://www.europol.europa.eu/about-europol/data-protection-transparency).

Dr Raimund Bröchler (male) joined INTRASOFT Intl. in 2004, he has more than 15 years of experience in the Innovation, Consultancy, Research and Technology Transfer field. Because of his leadership skills, experience as coordinator and project manager, he runs strategic projects with volumes of +10 Mill€ and is Head of two INTRASOFT project labs; Innovation Services Lab and Factories of the Future Lab. Dr Bröchler joined INTRASOFT Intl. as Project Director running large network projects with +1000 network members, like IRC & IRE and managed larger technical assistance projects under the EuropeAid scheme. Since 2008 Dr Bröchler coordinates/supports three US projects like the USA-EU Technology-/ Business-Cooperation gateway EEN-US, works as expert in the BILAT-US and manages a study with RTI for NIST in Smart Manufacturing. Main focus since 2011 is the coordination and management of larger research or service projects that are designed as public private partnerships (PPPs). The projects of responsibility are in the "Innovation Services" and "Smart Manufacturing" sectors. The "Innovation Services" projects cover almost all innovation services from technology transfer over start-up support and ecosystem building to tailor made IT platforms to better support target groups with specific IT-enabled services. Dr Bröchler has been twice re-elected as Vice President of INSME (www.insme.org) ; a position he holds since 2007. He is also Member of the Board of TII (www.tii.org) since 2012 and -since 2014- he is Member of the Advisory Board of Japan-EU Partnership in Innovation, Science and Technology. He has two lectureships at the HTW, Saarbrucken (University of Applied Science and the Institute for Scientific professional training) and was awarded in 2014 as member of the Scientific Advisory Council of the HTW.

Mrs Akrivi Vivian Kiousi (female): joined INTRASOFT International S.A. in May 2001 and acts as a Senior Delivery Manager and Head of the Transport Lab of the Research & Innovation Development Department of the company. For eighteen years in research, Mrs. Kiousi during the last 18 years in research has gained experience in the field of Transport, e-Government, Human Computer Interaction, Internet based Technologies, Community Portals, Promotion and Dissemination Strategies. Mrs. Kiousi was and is currently involved in several relevant European and R&D Projects such as CIVITAS WIKI (Support action to CIVITAS initiative), OPTIMUM H2020, CORE IP H2020, IMAGINE IP, CASSANDRA IP, ETIS AGENT, in various positions including Project Coordination, Project Management, Dissemination and Communications management. She is a PhD candidate on behavioural and economical frameworks for multimodal and mobility as a service (MaaS) transportation schemes. She holds two masters (MSc), in Cognitive Science and Telecommunications Computing and Human Centred Systems awarded by the school of Computing and the Electronic and Electrical School of Engineering respectively at the University of Birmingham. In addition, Mrs. Kiousi holds a BSc Degree in Psychology and History of Art (double major). She has been trained in several management, communication methodologies and social media strategies and she is CMMI-DEV 1.3 ML3 Appraisal Team Member and ATM. Personal interests are research topics on energy efficiency, urban mobility, logistics, gender equality and mobility.

Dr. Marios Logothetis (male) is currently a Senior Research and Innovation Manager at INTRASOFT International. Before joining INTRASOFT, Marios has worked more than 10 years as a senior solution architect, project and technical manager for organisations including academia and industry, in several international and national research projects as well as bilateral projects with private telecommunication sector. From 2007 to 2013 he was working as a Lab Instructor and Scientific partner in the Piraeus University of Applied Science and from 2006 to 2015 as a research engineer and Lab Instructor in the University of Piraeus, Digital System department. His current research interests include the design, management, benchmarking and performance evaluation of wireless and mobile networks, Big Data analytics, Internet of things (IoT) and BlocKNOWhain and distributed ledger technologies. He has numerous publications in international journals and refereed conferences in these areas. Marios holds a BSc in Digital Systems, a MSc in Digital

Communications and Networks and a PhD in Telecommunications and Digital Systems, from the University of Piraeus. Finally, Marios is the founder of SmartPACT solution, the runner up of INTRASOFT's Internal Innovation Competition 2017, which has started as an internal commercial project and respective solution in the insurance domain. SmartPACT is an on-demand insurance coverage solution based on BlocKNOWhain's Smart Contracts, for health and life insurance services, covering short-term activities and experiences. A pay-as-you-go insurance service, by combining multiple insurance coverages (health, life, equipment, etc.) into a single seamless shield of protection.

Relevant publications, and/or products, services or other achievements

G. Dimitrakopoulos, "Current Technologies in Vehicular Communication", ISBN 978-3-319-47244-7, Springer, New York, USA, 2017.
Panagiotopoulos I., Dimitrakopoulos G.: "An empirical investigation on consumers' intentions towards autonomous driving", *Elsevier Transportation Research Part C: Emerging Technologies*, to appear.
G. Dimitrakopoulos, "Sustainable Mobility Leveraging on 5G Mobile Communication Infrastructures in the Context of Smart City Operations", *Springer Evolving Systems*, 8(2), 157-166, 10.1007/s12530-016-9166-4, 2017.
G. Dimitrakopoulos, V. Chatzigiannakis and L. Tsitouras, "A Knowledge-Based Integrated Framework for Increasing Social Management Intelligence", *International Journal of Big Data Intelligence*, (http://www.inderscience.com/info/ingeneral/forthcoming.php?jcode=ijbdi), 2016.
G. Dimitrakopoulos, P. Demestichas, V. Koutra, "Intelligent Management Functionality for Improving Transportation Efficiency by means of the Car Pooling Concept", *IEEE Transactions on Intelligent Transportation Systems*, vol 13, issue 2, pp. 424-436, June 2012.

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S. Tsekeridou, G. Leventakis, G. Kokkinis, E. Charalambous, S. Anson and G. Sargsyan, "A Crowd-Sourced Intelligent Information Management and Decision Support System enabling Diverse E-Government G2C2G", International Congress on Information and Communication Technology (ICICT 2018), 2018.

S. Tsekeridou, H. Benhadda, "Data Mining Techniques Empowering Automated Early Warning System for Critical Infrastructure Protection – the ARGOS case", Proceedings of the Proactive Workshop on: "Models and architectures for emergency management", Rome, Italy, 19-20 Feb. 2015

I.T. Christou, M. Bakopoulos, S. Tsekeridou, E. Amolochotis, C. Dimitriadis, "Detecting Fraud in Online Games of Chance and Lotteries", Elsevier Int. Journal on Experts Systems with Applications, 2011.

T. Perperis, T. Giannakopoulos, A. Makris, D. Kosmopoulos, S. Tsekeridou, S. Perantonis, S. Theodoridis, "Multimodal and Ontology-based Fusion Approaches of Audio and Visual Processing for Violence Detection in Movies", Elsevier Int. Journal on Experts Systems with Applications, October 2011.

List of relevant previous projects or activities, connected to the subject of this proposal

DATABIO (H2020-ICT-15-2016) focuses on the production of best possible raw materials from agriculture, forestry and fishery for the bioeconomy industry to produce food, energy and biomaterials taking into account responsibility and sustainability. DataBio proposes to deploy a state of the art, interoperable big data platform "on top of the existing partners' infrastructure. This DataBio platform will enable users with different profiles (agriculture, fishery, forest practitioners, insurance, banks, public bodies and decision makers) to fully benefit from the underlying High Processing capacities to explore new methods, build new innovative services and to interconnect to other user communities. Infrastructure will open new possibilities for ICT sector, including SMEs to develop new Bioeconomy 4.0 and will also open new possibilities for companies from the. Earth Observation sector

TRANSFORMINGTRANSPORT (H2020-ICT-15-2016) will demonstrate, in a realistic, measurable, and replicable way the transformative effects that Big Data will have to the mobility and logistics market. To this end, Transforming Transport will (1) perform large-scale piloting in 13 pilots to demonstrate the technical and economic viability of Big Data to reshape transport processes and services, (2) show Big Data value in

terms of operational efficiency improvements by at least 15% (10% efficiency improvement will lead to EU cost savings of 100 B€), (3) deliver reusable Big Data solutions for the whole mobility and logistics sector and related sectors, (4) ensure scalability for future scale of data at least at the level of year 2022 data size and velocity, (5) engage over 100 key European industry actors, (6) transfer knowledge and technology to double use of Big Data technology from currently 19% to at least 38%, (7) strengthen the position of EU Big Data providers and sector fostering a market share of up to 12% (8) pursue a strong plan for sustainability by incubating at least 15 post-project replication sites, (9) mobilize additional sector investments of at least 6 times the EC contribution.

Productive4.0 (H2020 ECSEL 2016) is an ambitious holistic innovation project, meant to open the doors to the potentials of Digital Industry and to maintain a leadership position of the industries in Europe. Its aim is to create a user platform across value chains and industries, thus promoting the digital networking of manufacturing companies, production machines and products. All partners involved are working on creating the capability to efficiently design and integrate hardware and software of Internet of Things (IoT) devices. Linking the real with the digital world takes more than just adding software to the hardware.

BOOST 4.0: Big Data Value Spaces for COmpetitiveness of European COnnected Smart FacTories 4.0. H2020-ICT lighthouse project, IA. www.boost40.eu

iTRACK - Integrated system for real-time TRACKing and collective intelligence in civilian humanitarian missions (H2020-BES-2015, 700510) develops human-centred technologies that take into account actual real-world practices of humanitarian aid workers, and provide policies for better protection and a more effective and efficient response. The project is based on the principles of Privacy by Design and will build the iTRACK system, an integrated intelligent real-time tracking and threat identification system to improve protection of responders and assets, and provide information management and logistics services such as real-time information updates and analyses as well as navigation, routing and scheduling. INTRASOFT leads the system design, integration and testing Workpackage, as well as the Exploitation Workpackage (www.itrack-project.eu , ongoing).

Track&Know - Data for Mobility Tracking Knowledge Extraction in Urban Areas (H2020-ICT-2016-2017) will research, develop and exploit a new software framework that aims at increasing the efficiency of Big Data applications in the transport, mobility, motor insurance and health sectors. Stemming from industrial cases, Track&Know will develop user friendly toolboxes that will be readily applicable in the addressed markets, and will be also investigated in additional domains through liaison activities with running ICT-15 Lighthouse projects. Track&Know integrates multidisciplinary research teams from Mobility Data management, Complex Event Recognition, Geospatial Modelling, Complex Network Analysis, Transportation Engineering and Visual Analytics to develop new models and applications. The Track&Know Toolboxes will be demonstrated in three real-world Pilots using datasets from niche market scenarios to validate efficiency improvements. (https://trackandknowproject.eu/ , ongoing).
PaaSword - A Holistic Data Privacy and Security by Design Platform-as-a-Service Framework (H2020) will introduce a holistic data privacy and security by design framework enhanced by sophisticated context-aware policy access models and robust policy access, decision, enforcement and governance mechanisms, which will enable the implementation of secure and transparent Cloud-based applications and services that will maintain a fully distributed and totally encrypted data persistence layer, and, thus, will foster customers' data protection, integrity and confidentiality, even in the case wherein there is no control over the underlying third-party Cloud resources utilized. INTRASOFT leads system design and integration tasks. (www.paasword.eu, finished).

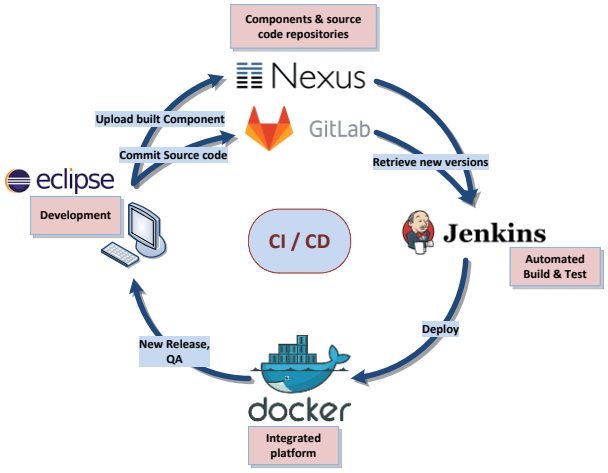
List of relevant products/services
1. SmartPACT – BlocKNOWhain and smart contracts for the insurance sector (https://www.intrasoft-intl.com/news/smartpact-demand-health-insurance-services-based-blocKNOWhains-smart-contracts)
INTRASOFT International has started an internal commercial project and respective solution in the insurance domain, **SmartPACT**, that has resulted as one of the winning proposals from the internal INTRASOFT International Innovation Competition in 2017, won by a member of the RID Dept. **SmartPACT** is positioned within the insurance industry and more specifically within the area of the exploitation of modern ICT in insurance (often called InsurTech), covering the gap that arises from the lack of on-demand insurance

coverage plans, which is currently at an embryonic level. **SmartPACT** is an on-demand insurance coverage solution based on BlocKNOWhain's Smart Contracts, for health and life insurance services, covering short-term activities and experiences. A pay-as-you-go insurance service, by combining multiple insurance coverages (health, life, equipment, etc.) into a single seamless shield of protection. **SmartPACT** will utilize a platform business model, i.e. it will facilitate the exchange between consumers (Insured) and producer (Insurance Company). It will allow users to request and select an insurance coverage, provided by Insurance company, (mainly health but also life insurance or other insurance related to the activity) for a specific occasion, meeting the exact user's needs. This might be a 2-hour health insurance coverage offered to skydivers, a 10-days health and life insurance offered for skiing holidays, or even a three-hour life insurance offered to a concert attendant **SmartPACT** is based on 3 main technological axes, which reflect also the main technical innovations i) BlocKNOWhain technology, ii) Smart Contracts and iii) Data analytics like Machine learning techniques. Currently, the project is in a proof of concept phase with key players of the insurance market.

2. Continuous Integration / Continuous Deployment Environment and Tools

As INTRA will be the system integrator at the envisioned Smart Automotive Insurance testbed, to support integration and system testing activities, INTRA will capitalize on its CI/CD tools and environment, to be hosted on the cloud, for easy access by all other technical partners. The CI/CD tools and environment consist of:

- GitLab for source control, acting as code repository and allowing code versioning
- Jenkins for automated build and testing
- Docker for containerization of services and components
- Eclipse IDE (as one exemplary case) for software development and debugging



3. INTRASOFT Big data platform is a fully featured industrial grade solution: *i)* which is capable to scale out and accommodate various and from different locations data streams, interoperating with all modern data storage technologies as well as other persistence approaches and *ii)* can support all important Big Data languages including Python, Java, R and Scala as well as other traditional programming approaches and *iii)* can interoperate with IoT architectures building an end-to-end IoT integration with the platform. This next-generation data sharing platform provides a unified, high-throughput, low-latency platform for handling real-time data feeds with the use of sophisticated technologies from the Big data ecosystem such as Apache kafka, Hadoop, Spark, etc.

The Big data platform consists of:

a. **Data sources and Data store components**, which represent data streams and data sources, both in a structured or unstructured format that can be made available and potentially be connected to the Big data platform.

b. **Connectors together with the Communication platform**, that connect external data sources and make them available to the Big Data platform. External data sources are connected and made available by employing the "Stream Connectors" and "Data Source Connectors". The Communication Platform represents a distributed streaming platform which is an Apache Kafka cluster.

c. **Underlying Infrastructure**. The underlying infrastructure spans multiple VMs and provides all the necessary technologies and components that enable the storage and analysis of the data involved and further allowing the usage of any technology agnostic algorithms, by providing a distributed computing environment

Description of significant infrastructure and major items of technical equipment relevant to the project

- INTRASOFT International maintains interconnected data centres across Europe that provide a computational cloud for the development and business needs of the organisation. ICT facilities and applications include the following:
- Jira used as tracking tool
- 165 UNIX-like systems including AIX on P5 and P7 systems, HPUX, SUN SPARC Enterprise M3000 and M4000 as well as Linux (primarily RHEL) hosted on VMware ESXi. All systems are spread across two data-centres.
- 200 WINTEL based servers (including physical and virtual machines) spread across four data-centres as well as 15 VMware ESXi hosts and 10 MS Hyper-V hosts
- Over 200 network, security and remote access appliances, providing the means of access, interoperability, security and high availability for a wide variety of hosting services.
- High-speed inter-site communications links, allowing for the establishment of enterprise cloud architecture.
- Document repositories (alfresco, redmine)
- For the purpose of the development phase of the project, INTRASOFT International will capitalise upon its internal infrastructure for development purposes and cater for external hosting and SLA for the project duration.

Partner 8: AVL DiTEST GmbH	
Company Website: www.avlditest.com	

AVL DITEST, founded in 1999, is a company of the AVL Group, the world's largest privately-owned enterprise engaged in the development of engines, measurement and testing systems that can draw on automotive engineering know-how from more than 50 years of development work. AVL DITEST equips garages and motor vehicle inspection centres with upmarket test systems and diagnostic equipment. Our corporate philosophy is based on our claim for technological and quality leadership, perfect service and global presence. The success of our products in over 50 countries is proof of the consistent implementation of our philosophy. With the Headquarter in Graz, Austria, and its subsidiaries in Germany and China we employ currently more than 220 employees. Internally, AVL DiTEST is characterized by flat organization and agile processes, which is an essential pillar of our success in the market, and for continuous increase in sales.
Our FIELDS OF BUSINESS are: a) ECU diagnostic tools and platforms for motorcycles, passenger cars, trucks and trailers, b) Exhaust gas analyzers for diesel and gasoline engines, c) Automotive measurement engineering including high-voltage measurement technology, d) Air conditioning services. We offer expertise, products and services along the entire diagnostic process chain from the vehicle diagnostic design stage up to complete hardware and software solutions for the diagnostic service tool, diagnostic data-authoring and -management. In particular, we count on our core competencies like the conceptual design, the complete or modular system development and different hardware solutions for aftersales workshops. Our technology allows the usage as developed by AVL DiTEST and the implementation of modular or framework components to be adapted to the specific requirements and optimal tailored solution for our clients. In current OEM projects, we develop and research in diagnostic telematics and cloud solutions for autonomous driving and predictive maintenance. Field data analysis based on analytics and big data is one of the main technology to solve the future challenges.

Within WP5 of DALIE project, AVL DiTEST Smart Services technology enables large digitalization test beds in aftersales market equipment systems. The technology allows integration of various workshop equipment devices into open and standardized DALIE framework to generate a constant data stream of connected devices. AVL DiTEST will identify and provide relevant data from various workshop equipment installations at customers and partners. In the WP5 of the project, AVL DiTEST will a) host secure data backend, b) pre-process raw data, c) enrich the equipment data with additional knowledge. In WP3 Framework developments, AVL DiTEST will a) develop and store digital twin data, b) develop and implement automotive specific analytics and life cycle models, c) grant access to the data and d) develop and implement common front-end data visualizations and e) integrate state-of-the-art billing solutions.
Furthermore, in WP2 data driven use cases and business models along the entire value chain need to be analyzed in order to identify digital services tailored for upstream & downstream market, to enable new business and to boost the digitalization of the entire aftersales ecosystem. AVL DiTEST will strongly cooperate with WP2 partners in order to identify requirements, use cases and business cases to evaluate successful business models.
Last but not least, AVL DiTEST will also contribute to WP1 project management, WP9 evaluation and lessons learned and WP10 dissemination of project.

CVs of involved key researchers / staff members

BSc Gerald Holzmeister (male) received his Engineer degree in 1993 in Control and regulation technology. He spent 10 years in a large Austrian telecommunication company and switched into Software development in 2001. There he deals with billing and building cross-company ecosystems with large companies all over the world. Since 2017 Mr. Holzmeister is part of the R&D team and responsible for the development of Smart Service solutions within AVL DiTEST. His fields of interest include Internet of Things, Telecommunications, Networks, Big Data Analytics and building cross-company Ecosystems.

BSc Thomas Leitgeb (male) received his engineering degree in industrial engineering and business informatics in 2008. He worked as a full stack developer for business intelligence software until 2015. His work includes technologies for desktop and web development and database design, database development and

software architecture in general. Since 2016, he has been part of AVL DiTEST's research and development team for smart service solutions in the area of frontend and backend web development, as well as IoT and Big Data.

BSc Sascha Ziesig (male) received his engineering degree in information technology in 2011. He is a Senior Solutions Architect for Data Intelligence and Diagnostics Analytics. He started as software engineer for diagnostic design and implementation, has continued to develop further as Scrum Master and Agile Coach before he started his career as Solutions Architect for Data Intelligence and Diagnostics Analytics. He conducted various projects with different Original Equipment Manufacturer in cloud computing, with Jaguar Land Rover in the field of Diagnostics Analytics and with AVL in the domain of Data Intelligence and SecDevOps.

Dr. Heiko Scharke (male) received his Engineer degree in 1995 in Automation and Control technology and received his doctor degree in 2001 for research in information, production and automation technology. He spent three years as a researcher and lecturer at Brandenburg Technical University in Cottbus, Germany, working on different algorithms for optimization of production and logistic. Since 2001, Mr. Scharke worked for different semiconductors and automotive companies in the field of communication technology, e.g. WiFi, RFID, and machine/vehicle diagnostics.

Relevant publications, and/or products, services or other achievements

The AVL DiTEST has 18 years of experience in case of diagnostic design, diagnostic data and workshop equipment. AVL DiTEST offers intelligent and innovative diagnostics products and services for workshops. Comprehensive workshop diagnostic integrates smooth interaction of all diagnostic areas: ECU diagnostic, measurement technology, PTI emission measurement, vehicle air condition service, intelligent troubleshooting systems, information systems, and training.

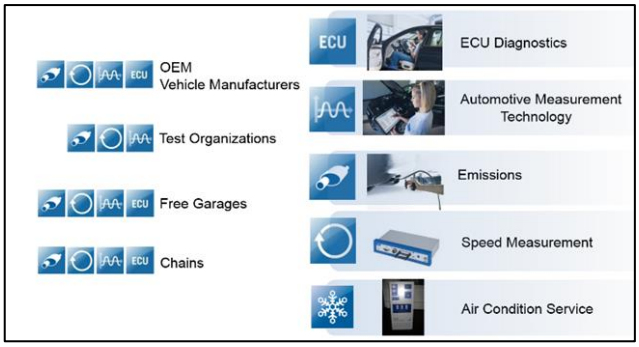


Figure: AVL DiTEST Key Business Areas

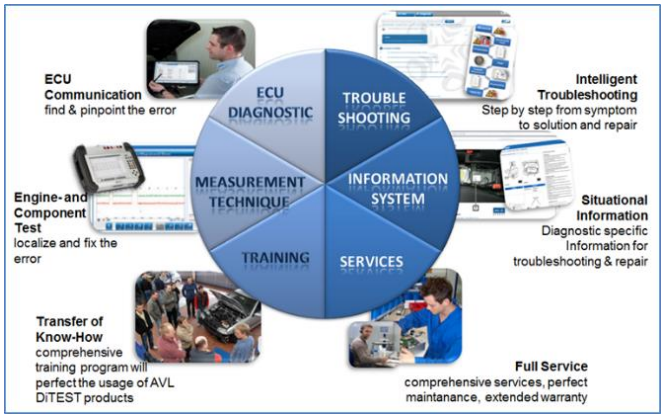


Figure: AVL DiTEST Products & Services Portfolio

AVL DiTEST works together with OEMs (e.g. BMW, VW or JLR), test organizations (e.g. DEKRA, TÜV) and break down providers (e.g. ÖAMTC Austria) to expand the experience for the service technician, to reduce the repair time and to improve the experience for the customer.

AVL DiTEST workshop equipment installed base counts more than 100.000 devices in EU. Within the project, AVL DiTEST will use the workshop equipment installations of customers and partner to constantly stream relevant data into a central data lake.

Furthermore, AVL DiTEST has developed a Smart Service Hub technology in order to connect the workshop equipment devices to any existing communication infrastructure. The Smart Hub enables a secure connection (either via Ethernet, WLAN, 3G) via the internet.

Figure: AVL DiTEST Smart Hub

The AVL DiTEST Smart Service hub solution opens up new possibilities for data-driven business models. It is already designed for future applications and allows for easy expansion, such as data-driven predictions of customer behaviour, device utilization peaks, maintenance vulnerability, new full-service rental or pay-per-use offerings, or AR / VR supported remote repair services.
In addition, AVL offers various services in the area of digitalization, digital twin, framework and cloud technology. A strong team of data scientists and domain experts researching on data intelligence throughout the complete vehicle development and aftersales process. To AVL offerings and main expertise count, among others, data management and meta data handling, AI systems for anomaly detection and pattern recognition, physical modelling and monitoring of digital twins, visualization technology for dashboards and reports and system modelling for quality and predictive maintenance.

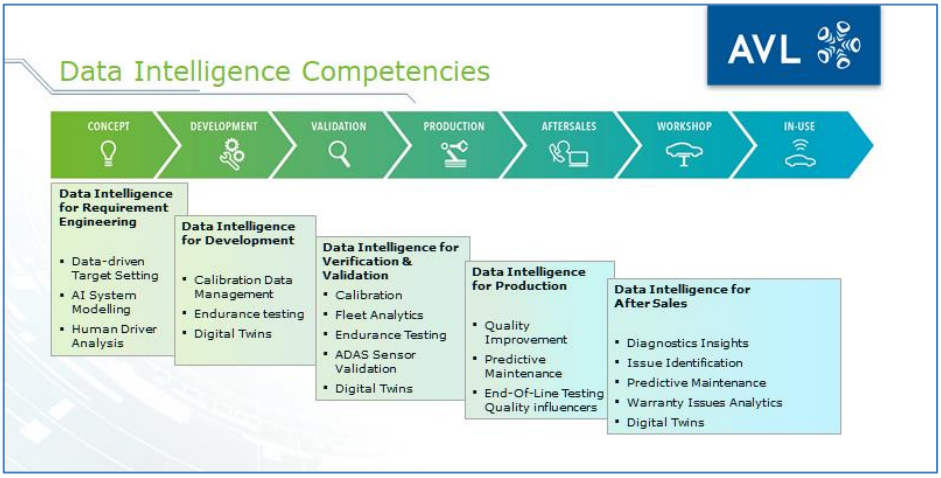


Figure: AVL Competencies – Data Intelligence

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
eMISSION	Austrian Research Promotion Agency (FFG), 2016-2018	Research on particle number and nitric oxide (NOx) measurement equipment for the periodical technical inspection (PTI) for in use vehicles. Further on the investigation of service relevant equipment data and ways to collect, share and evaluate this data.	The evaluation of product life cycle and device service relevant data is becoming more and more important. Especially for highly accurate measurement equipment, which is used for official purposes, it is crucial to know the physical and metrological state. Since in most countries the PTI is not centralized, it is important to find solutions for sending and collecting relevant data. Furthermore, the data will be used to evaluate vehicle emission and human health related parameters.

Description of significant infrastructure and major items of technical equipment relevant to the project

AVL DiTEST Plug & Play Smart Service Solution
The AVL together with AVL DiTEST has developed a Smart Service plug & play solution (AVL DiTEST Smart Hub hardware) which enables any development and workshop equipment the transmission of data to a central location. The solution has been developed with enhanced privacy and security aspects. It is based on a future-proof architecture with zero configuration. This makes the solution completely IT-compatible and robust against hacker risks.
AVL DiTEST is equipping leading customers and partners with this infrastructure technology in order to realize the large test bed data.

Smart Service Billing Solution provided by BearingPoint
In order to fully demonstrate the data driven business model and business cases, AVL DiTEST will implement an off-the-shelf billing solution for the test bed demonstration. AVL DiTEST will sub-contract the billing solution which is provided by BearingPoint.

Partner 9: Fachhochschule Nordwestschweiz	Fachhochschule Nordwestschweiz
Company Website: https://www.fhnw.ch	

The University of Applied Sciences and Arts Northwestern Switzerland (Fachhochschule Nordwestschweiz, FHNW) is a major public higher education institution in the corresponding area of the country. It has over 12,000 students and 2,500 staff members. It is one of 7 Universities of Applied Sciences accredited by the Swiss government and is run jointly by four states (cantons). The School of Engineering at FHNW focuses on education and research on applied topics in computer science, mechanical engineering, and electrical engineering. All research is performed in 12 independent institutes.
The Institute of Interactive Technologies, or IIT, will host the project. The institute works on topics related to socio-technological alignment. It develops methods to align technologies with stakeholder needs and approaches to help stakeholders evaluate, adopt, and exploit such solutions. Contexts in which the methods have been applied include software engineering, cybersecurity, IoT, and artificial intelligence applied for small and medium-sized enterprises as well as the verticals automotive, healthcare, consumers, smart cities, tourism, and financial services. IIT has a strong track of EU projects, including SMESEC (H2020 DS-02-2016), BONSEYES (H2020 ICT-01-2016), WISE-IOT (H2020 EUK-02-2016), and SUPERSEDE (H2020 ICT-09-2014).

Prof. Dr. Samuel Fricker (IIT) will lead the FHNW contributions to the project. He is supported by Mr Marcel Würsch. Further contributions will come from Prof. Dr. André Csillaghy (Institute for Data Science, I4DS). Together they lead interdisciplinary and international teams of about 70 experts, including data scientists, software engineers, computer scientists, and UX designers.
FHNW as an institute of applied sciences will cooperate with the DALIE partners for enabling the resolution of AI challenges in the DALIE testbed environments with the Marketplace for Artificial Intelligence (AI) resulting from the H2020 ICT-01-2016 Bonseyes effort. Bonseyes FHNW has extensive experience in the development of infrastructures for data-science is the leading developer for the Bonseyes AI Marketplace.
FHNW will specify and implement the interoperability between the Bonseyes marketplace and complementary IIOT and Big Data technology frameworks deployed in the DALIE testbeds. It will adapt Bonseyes to support data-driven business generation through automating the cycle of deploying up-to-date AI in runtime environments and ingesting data for AI development. It will enable trusted AI through audit capabilities for capturing the provenance of data within these cycles.
FHNW will further mobilize the Bonseyes community with more than 450 members today, offering the DALIE testbed environments with access to skilled AI developers. The community will fuel the testbeds with competent development capacity to solve real-world digitalization challenges with an open approach to development, thus contributing to boosting the DALIE ecosystem.

CVs of involved key researchers / staff members

Prof. Dr. Samuel Fricker (male) is a Professor at the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) and deputy head of the Institute for Interactive Technologies (IIT). He received his Ph.D. degree in 2009 from University of Zurich, Switzerland, his M.Sc. in Software Engineering in 2001 from the Royal Institute of Technology in Stockholm, Sweden, in 2001, and his Diploma in Informatics in 2001 from the Swiss Federal Institute of Technology in Lausanne, Switzerland. Dr. Fricker spent his career in both industry and academia. Important industry stays were with Ericsson, ABB, and Zuehlke. In academia, he had a position as Assistant Professor at Blekinge Institute of Technology (BTH). He advises theses at the bachelor, master, and PhD levels. His applied research focuses on socio-technological alignment of software, networked systems, and platforms for ecosystems. Dr. Fricker is leading FHNW in several H2020-projects, including BONSEYES, where his WP leader for the AI Marketplace development.

Prof. Dr. André Csillaghy (male) is the head of the Institute for Data Science (I4DS) at FHNW, a research institution with a work force of ~40 staff members, mostly in computer science. He holds a PhD in Computer Science from ETH Zurich. He has been involved in data handling and data analytics software development for big scientific data, especially astronomy data, since he was at graduate school. As a professor of Computer Science, Dr. Csillaghy teaches courses at all levels, including algorithms & data structures, database systems,

data warehouses & data mining, and information retrieval. He advises theses at the bachelor, master and PhD levels. He is the Swiss delegate for the International Space Weather Initiative ISWI, member of the Science Advisory Board of The Astronomy and Computing Journal, associate editor of the Earth Science Informatics Journal, member of the scientific committee of the IVOA-affiliated French Virtual Observatory, and member of the users committee of the French MEDOC Data Centre.

Relevant publications, and/or products, services or other achievements

- S. Fricker, Y. Maksimov (2017). "Pricing of Data Products in Data Marketplaces", International Conference on Software Business (ICSOB 2017), Essen, Germany.
- S. Marcin, A. Csillaghy (2017). "Accelerating Scientific Algorithms in Array Databases with GPUs", IEEE International Conference on Big Data, Boston, MA, USA.
- T. Llewellynn, M. Milagro, O. Deniz, S. Fricker, A. Storkey, N. Pazos, G. Velikic, R. Dahyot, S. Koller, G. Goumas, P. Leitner, G. Dasika, L. Wang, K. Tutschku (2017). "BONSEYES: Platform for Open Development of Systems of Artificial Intelligence", invited paper for ACM International Conference on Computing Frontiers, Siena, Italy.
- C. Dabin, M. Poncet, K. Noddle, M. Holliman, M. Melchior, R. Williams, A. Belikov, J. Hoar (2016): "Euclid: Orchestrating the Software Development and the Scientific Data Production in a Map Reduce Paradigm", Conference on Big Data from Space, Santa Cruz de Tenerife, Spain.
- Würsch, M., Ingold, R., & Liwicki, M. (2016). DivaServices—A RESTful web service for Document Image Analysis methods. Digital Scholarship in the Humanities, 32(suppl_1), i150–i156.

List of relevant previous projects or activities, connected to the subject of this proposal

Prof. Dr. Samuel Fricker and his team are members of the currently running BONSEYES project (H2020 ICT-01-2016). In BONSEYES, he is responsible for the development and open validation of the AI Marketplace. Prof. Fricker and his team were also members of the WISE-IOT project (H2020 EUK-02-2016), where he built a recommender that evolves and self-adapts to user needs and context with the help of IoT data. Prof. Dr. André Csillaghy worked already in FP5 on creating a platform for sharing data and algorithms in the context of the European Grid of Solar Observations EGSO (FP5-IST), Heliophysics Virtual Observatory HELIO (FP7 Research Infrastructure Program), and High-Energy Solar Physics in Europe HESPE (FP7 Space Program). Other projects are solar flares prediction in FLARECAST (H2020-industrial leadership) and the Spectrometer Telescope for Imaging X-rays, STIX, for the ESA Solar Orbiter Mission.

Description of significant infrastructure and major items of technical equipment relevant to the project

FHNW brings a development and cloud environment that has been used in European and global innovation projects.

FHNW has been establishing communication channels as part of the leadership for the development and open validation of BONSEYES. These channels are offered to the project.

Partner 10: KNOW-Center GmbH Research center for data-driven business & big data analytics	
Company Website: www.know-center.tugraz.at	

The Know-Center is Austria's competence centre for data-driven business and big data analytics, founded in 2001. As a connecting link between science and industry, the Know-Center conducts application-oriented research in cooperation with other academic institutions and with companies. The Center had an excellent 14 years track record, 60 researchers, annual industry assignments of about 150k€ and significant business development, products, services or subsidiaries. Today, the Center has over 100 researchers, 37 industry partners, over 700k€ annual industry assignments, a dedicated business development cooperating with major players and offers data-driven services to hundreds of users and has spun off three companies. The Know-Center fulfils its mission by empowering Austria's industry for data-driven business. The partner consortium includes 7 of the top 15 Styrian companies. We conducted more than 80 Big Data consulting projects for customers including 4 of the top 10 Austrian companies, the Austrian Parliament and the Austrian Court of Accounting. Our Big Data Lab offers science and industry a space for experimentation: It features latest technologies, cooperates with major players like Oracle, SAS, Microsoft and IBM, and supports the Smart Factory at TU Graz. Together with TU Graz we provide excellent qualification programs for data science: We won an endowed Professorship for Data Management at TU Graz, established the first Austrian Data Science Master's program and developed professional training offers. The Center provides tools and services for Data Science and Open Science: Our med360 service provides personalized information for medical researchers and our Open Source contributions provide algorithms to the community. The Know-Center founded the **European Network of National Big Data Centers of Excellence** and was awarded the iSpace label in Silver as one of the leading Big Data Research Centers in Europe by the Big Data Value Association (BDVA). From 2015 to 2017, Know-Center published 38 journal articles 140 conference articles in international peer-reviewed media.

Data-Driven Business (DB) represents the business perspective. The goal of the area is to embed data-driven technologies from the other areas into organisations in support of decision making, compliance, knowledge management and learning, thereby ultimately impacting how organisations do business at the level of work practice, business process and business model. The area provides competences in Knowledge Management, Technology Enhanced Learning, and Data-driven Business Models.

Knowledge Discovery (KD) represents the data analytics perspective. The purpose of this area is to research and develop algorithms and models for domain agnostic, data-driven analytics using a variety of data types, ranging from textual data to time series data. Our goal is to extract a maximum of value out of data with an appropriate (minimal) amount of human input. The area provides competences in Machine Learning, Information Retrieval, and Natural Language Processing.

CVs of involved key researchers / staff members

Dr Roman Kern (male) is the head of the Knowledge Discovery division at the Know-Center, where he works on machine learning and information retrieval. In addition, he has a strong background in natural language processing. He obtained his Master's degree (DI) in Telematics and his PhD in Informatics at the Technical University of Graz. After his studies he worked at a start-up company in the UK as a Marie Curie research fellow and as software architect in the industry. He participates in a number of EU research projects, where he served as coordinator and work package leader. He manages a number of large research and development projects in cooperation with the industry. He also gives lectures at the Technical University of Graz, serves as supervisor for Bachelor, Master and PhD students. He published over 70 peer-reviewed publications and achieved top rank results in international scientific challenges like CLEF and SemEval.

Dr Viktoria Pammer-Schindler (female) is area manager at the Know-Center and assistant professor at the Institute of Interactive Systems and Data Science at Graz University of Technology. Viktoria's research

centers around designing innovative technology for working and learning. One particular focus is the interlinking of learning at individual and organisational level, thus linking skill development, process guidance, process improvement and adaptation, and knowledge management. Viktoria has published over 60 scientific papers (of which 7 journal papers and 5 book chapters) to date.

Breitfuss, Gert, Mag. Ing. (male) is a senior researcher at Know-Center embedded in the research group Data-Driven Business with his main research focus on data-driven Business Models. Previously he led the research area Open Innovation at Evolaris, a research center for digital assistance systems. At this time Gert was involved in various national and EU funded projects, such as the Horizon 2020 project ENVISION (Empowering European SME business model Innovation). From 2009 to 2012 he taught and researched as a full-time lecturer at the degree program Innovation Management at University of Applied Science CAMPUS 02 in Graz.

Relevant publications, and/or products, services or other achievements

- **T. Santos, R. Kern**: A Literature Survey of Early Time Series Classification and Deep Learning. In R. Kern, G. Reiner, & O. Bluder (Eds.), International Workshop on Science, Application and Methods in Industry 4.0, pp. 31-38, 2016
- **H. Gursch, R. Kern**: Internet of Things meets Big Data: An Infrastructure to Collect, Connect, and Analyse Sensor Data. In VDE Kongress, Internet der Dinge, 2016
- **V. Rexha, M. Kröll, M. Dragoni, and R. Kern**: Exploiting propositions for opinion mining. In Semantic Web Evaluation Challenge, pp. 121-125, 2016
- **C. Horn, R. Kern**: Deriving Public Transportation Timetables with Large-Scale Cell Phone Data. In Proc. Computer Science, 2015
- de Reuver, Mark; Tarkus Astrid; **Breitfuss, Gert**; Haaker, Timber; Roelfsma Melissa; Kosman, Ruud; Heikkilä, Marikka (2017): Designing an ICT tooling platform to support SME business model innovation, 2nd International Conference on New Business Models, Graz
- Stabauer, Petra; **Breitfuss, Gert**; Lassnig, Markus; (2017): Changing business models arising from digital transformation, 2nd International Conference on New Business Models, Graz
- Stern, Hermann; Dennerlein, Sebastian; Pammer-Schindler, Viktoria; Ginthör, Robert; **Breitfuss, Gert** (2017): Bringing Big Data to Adolescence – Specifying Business Models by Practice, 2nd International Conference on New Business Models, Graz
- **Breitfuss, Gert**; Narzt, Wolfgang (2016): Designing of Digital Business Models for Barrier-Free Travel Assistance Services; 28th International Conference on Testing Software and Systems, Graz, Austria

List of relevant previous projects or activities, connected to the subject of this proposal

- **SemI40** (http://www.semi40.eu/): H2020 project, work package leader, €62 million, 36 participants, 2016 - 2020. SemI40 is an innovation action in the area of semiconductor manufacturing. The Know-Center is leader of the work package "Machine Learning and Automated Decision Making". Here the Know-Center also contributes the current state-of-the-art in the field of Machine Learning, for example Deep Learning algorithms.
- **Data Market Austria** (https://datamarket.at/): National lighthouse project, work package leader, €2.5 million, 17 participants, 2016 - 2019. Data Market Austria aims at providing an ecosystem to make use of data and to provide solutions for data services. Partners providing data and partners who are capable to create value out of the data, e.g. Data Science start-up companies. The Know-Center thereby provides methods to optimise the matching of the data providers and the data consumers.
- **AFEL** (http://afel-project.eu/)**:** H2020 EU project, 5 participants, 2015 - 2018. The project develops methods for understanding processes surfacing in informal learning environments. Know-Center leads the Visual Analytics work package, which focuses on adaptive visualization of dynamic processes related to learning activities.
- **MoreGrasp** (http://www.moregrasp.eu/): H2020 EU Project, 6 participants, 2015 - 2018. The project develops non-invasive, multimodal user interface including a brain-computer interface (BCI) for intuitive control of a semi-autonomous motor and sensory grasp neuroprosthesis. Know-Center develops visual

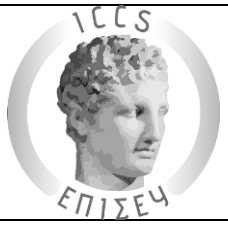
tools for collection and analysis of collected data, and is involved in the design of the multi-modal user interface.

- **RESys**: National funded projects, 848936 FFG, €1 million, 7 participants, 2015 - 2018. The RESys project aims at combining simulations and observations in order to optimise the energy management at a manufacturing site. Here the simulations comprise electrical and thermal models. In this project, Know-Center develops innovative methods for the analysis of big data, generated by a multitude of sensor data.

Description of significant infrastructure and major items of technical equipment relevant to the project

The Know-Center has an Interaction Lab and a Big Data Lab available, which enables us to carry out research on innovative interaction technologies, and to analyse big data on contemporary hardware (GPU cluster, Hadoop cluster).

The Know-Center uniquely combines research excellence, a long track record of collaboration with industry in terms of analyzing industrial data and working together with different stakeholders in an organization, innovative (e.g., data analytics) technology development and methodological know-how on embedding technology into practice.

Partner 11: Institute of Communication and Computer Systems	
Company Website: www.iccs.gr	

Institute Of Communication And Computer Systems is the ranking research institute on communications and computers in Greece. ICCS is affiliated with National Technical University of Athens (NTUA). In FP7 ICCS ranked in position 19 with respect to funding among all European research establishments companies and universities. Together with NTUA it ranked in position 12. ICCS is a non-profit Academic Research Body established in 1989 by the Ministry of Education in order to carry research and development activities in the fields of all diverse aspects of telecommunications , computer systems and techniques and their application in a variety of areas such as transceivers, radar and generally electromagnetic sensors, satellite and wireless communications, electromagnetic phenomena modelling, neural networks, systems, software and hardware engineering, Telematics and multimedia applications, Transport applications, Control systems, Robotics, Biomedical engineering, Electric power Renewable Energy Sources and Distributed Generation and management systems. The personnel of ICCS consists of a number of Research scientists and more than 500 Associate scientists (including PhD students). The research carried out in ICCS is substantially supported by SECE University Professors. There are many research units and laboratories presently active in ICCS. ICCS is very active in European co-funded research activities and has been the project manager of many EU projects in various programs (e.g. EC, ISIS, RACE II, ESPRIT, IES, ACTS, INFOSEC, BRITE-EURAM, STRIDE, MIP-Informatics, Telematic Applications, IST, GROWTH, QoL, JOULE, ENERGIE, 6th FW etc) in all of the above mentioned research areas.

The team that participates in this project's activities is the Internet Science Group. The Internet Science Group led by Professor Emmanuel N. Protonotarios, a very experienced leader in Greece with background in Telecommunications Smart Cities, Big Data Analytics and ICT optimisation solutions in high mobility environments. The group has great experience in completing successfully of more than 60 research projects the last 15 years supported by the European Commission and Greek National Funds such as: SARACEN, My eDirector, ISISEMD, MAGNET Beyond, MAGNET, MUSE I, II: Multi Service Access Everywhere, WINNER: Wireless Word Initiative New Radio, WINNER++, NOBEL I,II: Next Generation Optical Networks for Broadband European Leadership, OLYMPIC: Olympics Multimedia Personalised for the Internet Community, GIANT: GigaPON Access Network, CAUTION: Capacity Utilisation in Cellular Networks of Present and Future Generations, CAUTION++, WINMAN: WDM + IP Network Management, etc. Background and experience in Big Data Analytics, Statistics, Mathematical Modeling, Internet Sociology, Operational Research, Analysis of Time Series, Pattern Recognition, Neural Networks, Game Theory. The team has a number of highly expertised researchers both from the ICT and the SSH fields including Nikolaos Bakalos, Alexandros Manolakis, Thaleia Samantha Protonotariou, Athanasios Floudas, George Vlachodimitropoulos, and Spilios Evmorfos.

CVs of involved key researchers / staff members

Emmanuel Protonotarios (male) has had a long and interesting career both in the USA and Greece, as a professor of Electrical Engineering. In the USA where he got his PhD. degree, he worked first as a member of the technical stuff at Bell Laboratories in New Jersey and later as a professor at Columbia University in New York, until 1973. In Greece he served as a professor of telecommunications at the National Technical University of Athens and was the director of the corresponding laboratory for more than 30 years. He also served as Vice Rector for Academic Affairs at NTUA for three years. As the Dean of the School of Electrical and Computer Engineering he renovated the whole program of studies. He inaugurated the MBA Program Engineering Economic Systems which he directed for ten years. He also plays an active part in the rapid development of research in NTUA and was a founding member of the ICCS group. He is the author or co-author of 200 journal papers, published mostly in the IEEE Journals and International Conferences on Telecommunications and Circuit Theory, some of which he organised and chaired. He has also been the Executive Director of the National Research Council in Greece. He has been awarded many prizes, rewards

and distinctions for academic achievements. In his life, he considers as his biggest achievement helping young talented people to achieve eminence and recognition. He has supervised more than 80 Ph.D. theses and more than 600 Diploma and MSc theses. He now serves as a Research Consultant and Project Manager in ICCS. He participated and led hundreds of Telecommunications and Electrical Engineering Research Projects. Lately, he has been interested in networked media research area and advanced Internet applications, including: Future Networks that support the convergence and interoperability of heterogeneous mobile, wired and wireless broadband network technologies, including novel Internet architectures, network management and operation frameworks, wireless and broadband systems; Cloud computing, Internet of Services and Advanced Software Engineering that emphasise technologies for content handling; Architecture and technological foundations for Internet-connected sensors, actuators and other smart devices and objects, enabling person/object and object/object communications; Networked media and search systems, including digital media delivery platforms, end-to-end immersive and interactive media technologies, and multimedia search technologies; Security in networked service and computing environments; trust, privacy and claims management infrastructures; and data policy, governance and socio-economic aspects of trustworthy ICT.

Nikolaos Doulamis (male) has received the Diploma degree in Electrical and Computer Engineering from the National Technical University of Athens (NTUA) in 1995 with the highest honor and the PhD degree in electrical and computer engineering from NTUA in 2000. He joined the Image, Video and Multimedia Lab of NTUA in 1996 as research assistant. He is author of more than 180 articles in the area of multimedia and computer vision. More than 50 of them are journal papers of impact. Dr. Nikolaos Doulamis is currently involved in many European projects like eVacuate IP, Robinpect, ZoneSec, Vimsen, Inarchus and the national projects Viopolis, Pericles, Endecon. He was also involved in many other European research projects, such as SOCIOS, OLYMPIC, e-Director, Saracen, GRIA, GRIBLAD, AKOGRIMO in the area of multimedia processing. His main field of expertise in the digestion of heterogeneous data, data intensive applications, and machine learning.

Ersi Zevgoli (female) is a researcher in ICCS. She has collaborated in a number of R&D projects, in fields including Digital Signal and Image Processing, Machine Learning, Internet of Things, Telecommunications, Structural Health Monitoring, Inverse Problems, Web platforms, Big Data Analytics, Mathematical Modelling and Statistics and Security.

George Vlachodimitropoulos (male) is a researcher in ICCS. He has received the Diploma degree in Electrical and Computer Engineering from the National Technical University of Athens (NTUA) in 2018. During his Studies he has worked in Nokia Greece for 3 months in 2017 as a software engineer. He has collaborated in a number of R&D projects, in fields including Digital Signal and Image Processing, Machine Learning, Internet of Things, Telecommunications, Big Data Analytics, Mathematical Modelling and Statistics and Security.

Spilios Evmorfos (male) is a researcher in ICCS. He has received the Diploma degree in Electrical and Computer Engineering from the National Technical University of Athens (NTUA) in 2018. During his studies has participated in different R&D projects with focus on robotics and machine learning. His fields of interest include Machine Learning, Control Systems, Robotics, Internet of Things, Telecommunications, Big Data Analytics

Relevant publications, and/or products, services or other achievements

- Anastasios Doulamis, **Nikolaos D. Doulamis**, Marco Bertini, Jordi Gonzàlez, Thomas B. Moeslund: Guest Editorial: Analysis and Retrieval of Events/Actions and Workflows in Video Streams. Multimedia Tools Appl. 75(22): 14985-14990 (2016);
- Klimis S. Ntalianis, **Nikolaos D. Doulamis**: An automatic event-complementing human life summarization scheme based on a social computing method over social media content. Multimedia Tools Appl. 75(22): 15123-15149 (2016);
- Konstantinos Makantasis, Anastasios D. Doulamis, **Nikolaos Doulamis**, Konstantinos Psychas: Deep learning based human behavior recognition in industrial workflows. ICIP 2016: 1609-1613;

- P. Delias, A. D. Doulamis, **N. D. Doulamis**, N. F. Matsatsinis: Optimizing Resource Conflicts in Workflow Management Systems. IEEE Trans. Knowl. Data Eng. 23(3): 417-432 (2011).
- Papadakis E. Nikolaos, Koukoulas Nikolaos, Costicoglou Socrates, Bakalos Nikolaos, **Protonotarios N. Emmanuel**, Papadakis K. Nikolaos: Theft Detection using IoT participatory sensing concepts, European Conference on Networks and Communications (2016).

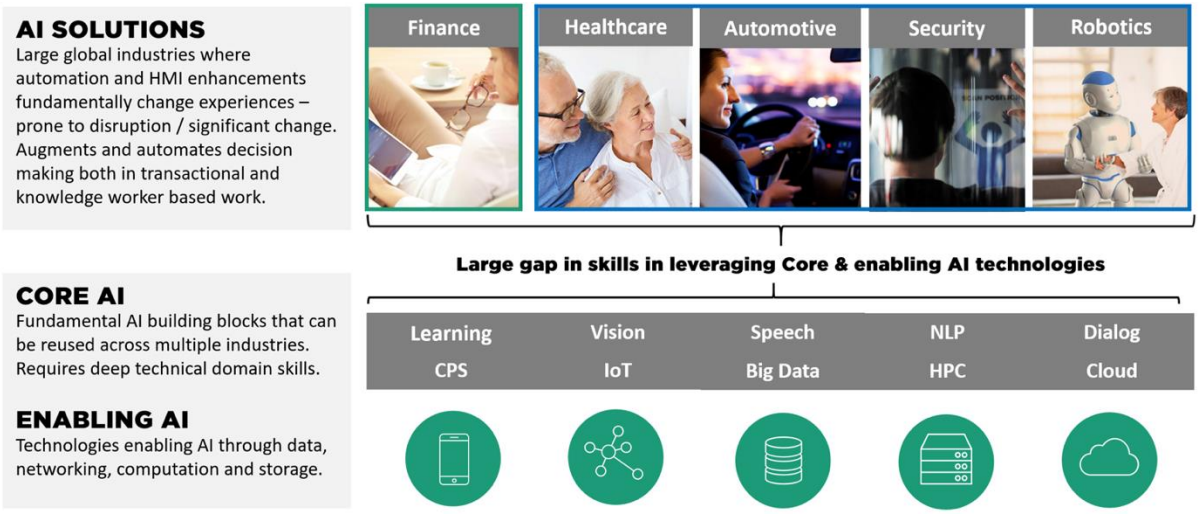
List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
SERIOT	EU-H2020, 2018-2021	The SerIoT project will develop, implement and test a generic IoT framework based on an adaptive smart Software Defined Network with verified software, secure routers, advanced analytics, and user friendly visual analytics. SerIoT will optimize the information security in IoT platforms and networks in a holistic, cross-layered manner (i.e. IoT platforms & devices, honeypots, SDN routers and operator's controller) that will be based both on dynamic and distributed processing of variable complexity by single network components (i.e. IoT platforms, devices and honeypots will perform lightweighted processes while SDN routers will be shouldered with more heavy processes), as well as on a centrally located server/controller that will have the main control of the network and will collect, aggregate and fuse the relevant information	In Seriot project, a lot of work has been done on analyzing the existing IoT platforms and describing and comparing their security features. This analysis will provide useful material for ***DALIE*** project. In addition, SERIOT will contribute to ***DALIE*** in terms of IoT systems management. The threat analysis and the integration of honeypots in SERIOT architecture will provide useful results to the IoT security that will be needed in ***DALIE***.
City.Risks	EU-H2020, 2015-2018	The main objective of the City.Risks project is to increase the perception of security of citizens in cities by activating in a more transparent and sustainable way their participation in communities, through which information and interventions can be provided both to proactively protect citizens from falling victims to criminal activities as well as to reactively provide more timely and effective response and assistance.	City.Risks is concerned about data safety of information. The methods that have been used as well as the results of this project are really important if we also consider the new GDPR rules and will help ***DALIE*** project in order to be GDPR compliant. It will also contribute in terms of IoT security.
SAFE STRIP	EU-H2020, 2017-2020	SAFE STRIP aims to introduce a disruptive technology that will embed C-ITS applications into existing road infrastructure, including I2V and V2I	SAFE STRIP project is really concerned about intelligent transport systems. In this case it can contribute a lot in terms of IoT systems and sensors in cars.

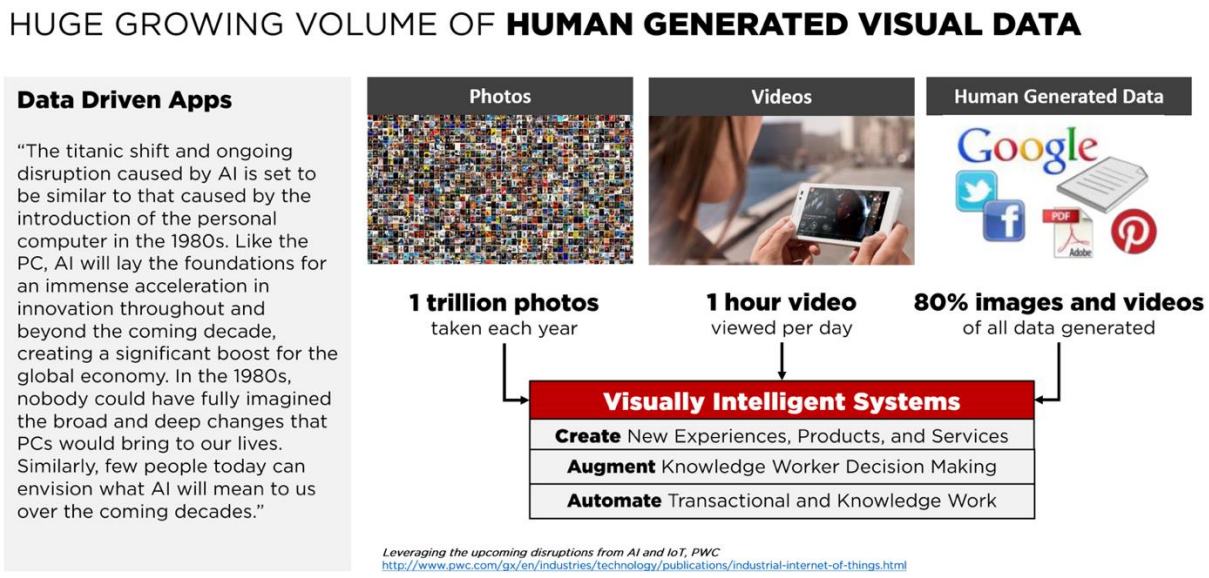
		communications as well as VMS/VSL functions into low-cost, integrated strip markers on the road. These strips will support intelligent transport systems (ITS) services and apps as they provide personalized in-vehicle messages for all road users (trucks, cars and vulnerable road users, such as PTWs riders) and all vehicle generations (non-equipped, C-ITS equipped, autonomous), at a reduced maintenance cost, fully recyclability and containing added-value services, as well as supporting real-time predictive road maintenance functions.	
SLALOM	EU-H2020, 2015-2016	SLALOM is an action tackling the complexity of cloud computing SLAs and contracts through standardisation of the SLA and contract terms and a reference model for SLA management, that lead to the development of easy to understand and quantifiable machine readable SLAs. In doing so it will support the adoption of future telecommunication, cloud and IoT technologies (SLA complexity is an identified barrier to adoption) and support the exploitation of results from the cloud and SLA research communities, effectively by factoring in advances from the research sector into the SLALOM legal and technical models and producing a set of metrics that maps the needed QoS and manages the provided resources in an efficient automatic way.	SLALOM project analysis about mapping the QoS can be really useful. In SLALOM, technologies such as cloud computing and IoT has been used which are very relevant with the needs of ***DALIE*** project

Partner 12: NVISO SA	NVISO ADVANCING HUMAN POTENTIAL
Company Website: www.nviso.ai	

NVISO are leading experts in applying Artificial Intelligence and Deep Learning to accurately detect and predict human emotions and behaviours across a range of industries including Finance, Automotive, Healthcare, and Media and Entertainment. It is a data-driven software development company head-quartered at the Innovation Park of the École Polytechnique Fédérale de Lausanne (EPFL) in Switzerland and its scientific roots are grounded in a long standing research project that researched machine learning methods and data science techniques for the development of natural multimodal interfaces for human-computer interaction funded by the Swiss National Science Foundation. It has R&D offices located in Switzerland and Sales Offices in Europe, North America, and Japan.



NVISO is defining the future of emotionally intelligent systems by integrating real-time emotional insights and analytics to improve safety, security, and personalization in next generation human-machine interfaces. Using its proprietary deep learning algorithms and artificial intelligence based on theoretical work by Dr. Paul Ekman (which demonstrates that emotions can be precisely recognized by minor changes in micro-expressions in the face) it delivers emotional insights in real-time via cloud API capabilities and in real-time on mobile devices to application developers around the world. It develops innovate solutions tailored for vertical market needs in areas such as Finance, Automotive, Healthcare, Media and Entertainment, and Robotics.



NVISO are experts in big data curation and analysis as well as in machine learning for building systems of artificial intelligence. NVISO has been working together with the automotive sector for developing virtual intelligent assistants that are deployed in automotive vehicles (cars). NVISO will make its competences available to the partners and help showcasing how start-ups and SME can contribute to the successful use of automotive testbeds.
NVISO is a coordinator of the H2020-ICT-01-2016 project Bonseyes which aims at developing a marketplace for artificial intelligence and has specialised on the setup, hosting, and support of virtual laboratories for machine learning. NVISO will facilitate the use of the marketplace in the here proposed project and adapt the laboratories for use within the project's testbeds for automotive use cases.

CVs of involved key researchers / staff members

Tim Llewellynn – CEO and Co-founder (male)

Tim Llewellyn is CEO and Co-founder of NVISO SA. Tim has 15 years' experience in high-tech start-ups and corporate R&D in data-driven software development in cloud, mobile, and embedded applications including successfully bringing to market advanced audio, image, and video processing technology across intelligent DSP cameras, smart watches and wearables, ultra-low power mobile audio devices, mobile digital TV and artificial intelligence enabled analytics. At NVISO, he is pioneering visually intelligent systems to transform user experiences in finance, automotive, and healthcare. Tim received his B.E. and M.E. (Hons) degrees in Electrical Engineering from the University of Canterbury, New Zealand in 1999 and 2001 respectively.

Matteo Sorci – CTO and Co-founder (male)

Matteo Sorci is CTO and Co-founder of NVISO SA. He is a leading expert in the field of applying artificial intelligence and behavioural modelling to the complex task of teaching a computer to understand human emotional response. Matteo received his B.S. and M.S. degrees from the Faculty of Telecommunication Engineering, University of Siena, Italy in 2001, and his PhD in 2009 under the guidance of Jean-Philippe Thiran, professor at the Signal Processing Laboratory of the EPFL, Switzerland. Under the auspices of the Interactive Multimodal Information Management (IM2) program where Professor Jean-Philippe Thiran and his team are developing technologies capable of detecting expressions and eye movement. These are data processing models developed with the help of facial databases. By means of a camera, they can recognize different parts of a face, track changes in time and space, and relate them to specific facial expressions. Since inception in 2001, the IM2 NCCR has received over $38.5M in funding for the study of multimodal interactions.

Relevant publications, and/or products, services or other achievements

1) Llewellynn, T., Fernández- Carrobles, M. M., Deniz, O., Fricker, S., et al. (2017) BONSEYES: Platform for Open Development of Systems of Artificial Intelligence. Proceedings of the Computing Frontiers Conference 299–304 (ACM, 2017). Doi: 10.1145/3075 564.3076259.

2) Eyes of Things, O. Deniz, N. Vallez, T. Llewellynn, et al. Sensors (Basel). 2017 May 21;17(5). pii: E1173. doi: 10.3390/s17051173.

3) Improved Local Binary Pattern Based Action Unit Detection Using Morphological and Bilateral Filters. A. Yuce, M. Sorci, J.P. Thiran. Presented at: 10th IEEE International Conference on Automatic Face and Gesture Recognition, Shanghai, China. Publication date: 2013

4) M. Sorci, T. Robin, J. Cruz, M. Bierlaire, J.P. Thiran, G. Antonini (2010) Capturing Human Perception of Facial Expressions by Discrete Choice Modelling. In Choice Modelling: The State-of-the-Art and the State-of-Practice, Emerald Group Publishing Limited, 2010.

5) Sorci, M., Antonini, G., Cruz, J., Robin, T., Bierlaire, M. and Thiran, J.-P. (2010) Modelling human perception of static facial expressions. Image and Vision Computing, 28(5) pp. 790-806.

Other Relevant Achievements:

IBM Beacon Award Winner for 2013 for Smarter Computing: NVISO was named the winner of a 2013 IBM Beacon Award for Smarter Computing: SmartCloud - Cloud Application Provider. This honor is awarded each year in recognition of a select number of IBM Business Partners who have delivered not only innovative solutions but have set the standards for business excellence, ingenuity, and creation of an exceptional client experience.

List of relevant previous projects or activities, connected to the subject of this proposal

1.H2020 Project: Bonseyes Artificial Intelligence Marketplace (www.bonseyes.com**):** The Bonseyes project aims to develop a platform consisting of a Data Marketplace, Deep Learning Toolbox, and Developer Reference Platforms for organizations wanting to adopt Artificial Intelligence in low power IoT devices ("edge computing"), embedded computing systems, or data center servers ("cloud computing"). It will bring about orders of magnitude improvements in efficiency, performance, reliability, security, and productivity in the design and programming of Systems of Artificial Intelligence that incorporate Smart Cyber Physical Systems while solving a chicken-egg problem for organizations who lack access to Data and Models. Its open software architecture will facilitate adoption of the whole concept on a wider scale.

2. H2020 Project: CAPTAIN (http://www.captain-eu.org/): CAPTAIN proposes a "transparent" technology designed to turn the home of the older adult into a ubiquitous assistant specifically designed to compensate for their physical and memory impairments during their daily living. To do so, it leverages state of the art technologies, projected augmented reality, real-time 3D sensing technologies, speech analysis, and non-invasive physiological and emotional data analysis from facial micro-expressions and human body pose thanks to scalable, robust, and accurate deep learning and artificial intelligence.

3. H2020 Project : Eyes of Things (www.eyesofthings.eu) aims at developing a ground-breaking computer vision platform that combines a) need for more intelligence in future embedded systems, b) computer vision moving rapidly beyond academic research and factory automation, and c) the phenomenal technological advances in mobile processing power.

4. H2020 Project : FANCI (www.fanci-project.eu) is a near-market Innovation Action will focus on intelligent user sensing methods, including face analysis, eye tracking, emotion, intention & authentication; hand gesture recognition; voice tone analysis; and head gesture & pose analysis. It will complement those with smart user intention or distraction estimation and system reaction methods, supplying visual (HUD, etc.), voice and haptic feedback as well as autonomous system actions.

5. Predictive Analytics in Health Care: Swiss Commission for Technology and Innovation (CTI) funded project to provide new levels of predictive analytics in health care applications that will improve the accuracy of patient evaluations. The project, valued at 750,000 USD, ran for 18 months and initially focused on leveraging NVISO's artificial intelligence-based face imaging capabilities to develop an automatic prediction process that will more accurately categorize patients who require tracheal intubation for surgeries involving general anesthesia, thus reducing costs and risks for this type of procedure.

Description of significant infrastructure and major items of technical equipment relevant to the project

NVISO has built one of the largest facial databases in the world of natural human emotions captured using ordinary low-cost CMOS sensors via webcams in natural environments outside of the laboratory comprising over 5 Million images. This database is fundamental to train high accuracy algorithms suitable for embedded system with low power consumption. Such as database necessary for both training and validating facial analysis.
NVISO is also located at the EPFL campus in Switzerland. It has strong relationships with world leading laboratories at the University in the fields of image processing and computer vision, robotics, artificial intelligence, and machine learning with cutting-edge equipment for computer vision and image processing including clusters for Grid computing and GPU-based supercomputers.

Partner 13: Easy Global Market	
Company Website: www.eglobalmark.com	

Easy Global Market SAS is a French SME, providing solutions and services to develop market confidence in technologies making the global market "easy" for companies looking for globalisation. EGM has a dual offer. Being specialised in validation, interoperability and integration Certification and label programmes, EGM is working with state of the art tools and validation approaches such as V&V, MBT (Model Based Testing) techniques using experience gained by EGM' Directors working in +30 FP projects and designing +10 worldwide label or certification programmes.
Second, EGM provides scientific and engineering services for IoT market from sensors to data analytics using experience from about 10 international research projects as well as standardisation involvement in IoT since 2010. This extended knowledge in IoT value chain is completed by other international projects applied to vertical fields, such as in Smart cities, Intelligent transport systems (ITS), Smart water Monitoring
EGM is currently involved in 9 H2020 projects including IoT, Cyber-Physical systems, distributed and parallel systems, IoT virtualisation. EGM has been coordinating the WISE-IoT http://wise-iot.eu EU-Korea project on worldwide interoperability for semantics IoT.
EGM (ETSI Member) is strongly involved within the standardisation area and is making key contributions to the oneM2M initiative. It recently co-founded the Industry Specification Group on Context Information Management (ISG CIM).
EGM is a member of the Alliance for IoT Innovation (AIOTI) as well as the Big Data Value Association (BDVA).
The first Innovation Radar Report reviewing the innovation potential of ICT projects funded under 7th Framework Programme and the Competitiveness and Innovation Framework Programme, to demonstrate the economic impact of EU grant funding identified EGM as being the 7th EU most innovative SME (http://www.sciencebusiness.net/news/77125/EU-Commission-releases-list-of-top-10-most-innovative-SMEs-in-ICT).

CVs of involved key researchers / staff members

Dr Franck Le Gall (male) is driving company development of advanced testing technologies as well as integration of IoT and data platforms. He involves himself in standardisation area including oneM2M and FIWARE. Previously, he has participated in large R&D projects within the big industry (Orange, Alcatel, Thomson) and spent 9 years as Director within an innovation management company. He directed more than 10 large scale projects and studies related to the evaluation and monitoring of innovation and technical programs as well as research projects. He is now participating in several EU funded projects including technical management in PROTEUS (advanced sensors for water monitoring), FIESTA (IoT semantic interoperability), FESTIVAL (EU-JP cooperation on IoT), U-Test (including uncertainties in cyber physical system testing), PHANTOM (model based testing of heterogeneous distributed systems).

Franck le Gall is the coordinator of the EU-Korea Wise-IoT project

Philippe COUSIN (male), Président, Working for France Telecom R&D (Orange Labs) for 17 years with many years in research for validation. EC Project Officer for 5 years on CTS programmes (Conformance Testing Services). World Test House Managing Director for 4 years. Created and managed for 9 years the ETSI (European Telecommunications Standards Institute) interoperability activities called Plugtests. Involved in +20 ICT research projects since 5th EU research programme (FP5) where he has managed few ones. He is actually coordinating IERC (Internet of Things Research Cluster) Activity Chain 4 on Interoperability (technical and semantics). He is chair of WG on IoT Forum and lead an important WP in new H2020 IoT–FIRE project called FIESTA to develop tests, tool and certification programme for semantic interoperability. He was leading key activities within IERC (IoT European Research Cluster) and the support project Smart Action on IoT Dissemination and international cooperation.

Hamza BAQA, (male) PhD student at Easy Global Market in collaboration with Mines-Telecom, France. He has a master degree in computer sciences from INPT and Mines-Telecom Saint Etienne. He also holds a master's degree in "Security and information system management". He is also certified web master in Bridge Value and IBM SPPS Modler tool (Data Mining). With a strong knowledge of software and semantics he has been active in Fiesta H2020 EU project where his research interests include Internet of things (IoT), Semantic web and Big data. He is now involved in the EU-KR WISE-IoT project, contributing to Quality of Information evaluation.

Dr Mengxuan ZHAO (female) has a PhD in computer science from University of Grenoble. Her thesis topic is "Discrete control for the Internet of things and smart environment via a shared infrastructure" where she brought the classical discrete control theory to the new application domain which the IoT using semantic techniques. With a strong background and research interest in the IoT domain and the semantic technologies, she joint Easy Global Market in June 2015 after 3 years of work of thesis preparation in Orange Labs in Grenoble. She mainly works on European research projects including Fiesta-IoT (semantic interoperability of testbeds), Festival (EU-JP, interoperability and federation of ICT services and testbeds), 5GinFIRE (5G testbed federation), 5GTANGO (DevOps applied on 5G environment). She also participates and contributes to standardization works.

Dr Wenbin LI (male), currently a Research Engineer, received his PhD degree of Computer Science from National Institute of Applied Science Lyon with a special focus on the computing paradigm to develop SOA-based applications by composing Web services and other system components in dynamic environments. Before joining Eglobalmark, he worked as a R&D engineer in Orange Labs and contributed in European project FIWARE and Orange project LiveObject to improve semantic interoperability for IoT infrastructures. In his early studies, he also participated the Chinese national 863 project “Security Reverse Analysis and Trustworthy Control for Operating System”, and for years he was dedicated to the robot soccer R&D programs. His R&D fields cover IoT, Cloud Computing, Semantic Web, Big Data and Information Security.standardization works. Wenbin Li is actively working in the Wise IoT project

Relevant publications, and/or products, services or other achievements

- Ernö Kovacs, Martin Bauer, Jaeho Kim, Jaeseok Yun, Franck Le Gall and Mengxuan Zhao, Standards-based Worldwide Semantic Interoperability For IoT, IEEE Communications Magazine – Communication Standards Supplement, ISSN 0163-6804, December 2016, pp. 40-46, DOI 10.1109/MCOM.2016.1600460CM
- Abbas Ahmad, Fabrice Bouquet, Elizabeta Fourneret, Franck Le Gall and Bruno Legeard, Model-Based Testing as a service for IoT Platforms, ISoLA 2016 – 7th International Symposium On Leveraging Applications of Formal Methods, Verification and Validation, Corfu, October 2016
- Franck Le Gall, Sophie Vallet Chevillard, Alex Gluhak, Nils Walravens, Zhang Xueli and Hend Ben Hadji, “Benchmarking Internet of Things Deployment: Frameworks, Best Practices and Experiences” in “Modeling and Processing for Next-Generation Big-Data Technologies”, Springer series, ISBN 978-3-319-06262-4, April 2014.
- IERC : Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems (Book River Publishers' Series in Information Science and Technology) May 2013, ISBN-13: 978-8792982735 Chapter 3 “Internet of Things Strategic Research and Innovation Agenda” Ovidiu Vermesan, Peter Friess, Patrick Guillemin, Harald Sundmaeker, Markus Eisenhauer, Klaus Moessner, Franck Le Gall, and Philippe Cousin; Chapter 8 “ Simpler IoT Word(s)of Tomorrow, More Interoperability Challenges to Cope Today” Payam Barnaghi ,Philippe Cousin, Pedro Maló, Martin Serrano ,and Cesar Viho.
- Congduc Pham, Abdur Rahim, Philippe Cousin, Low-cost, Long-range Open IoT for smarter rural African villages, in proceedings of the ISC2 2016, IEEE International Smart Cities Conference, pp. 512-517, September 12-15, 2016, Trento

More papers at http://www.eglobalmark.com/publications-awards/

List of relevant previous projects or activities, connected to the subject of this proposal

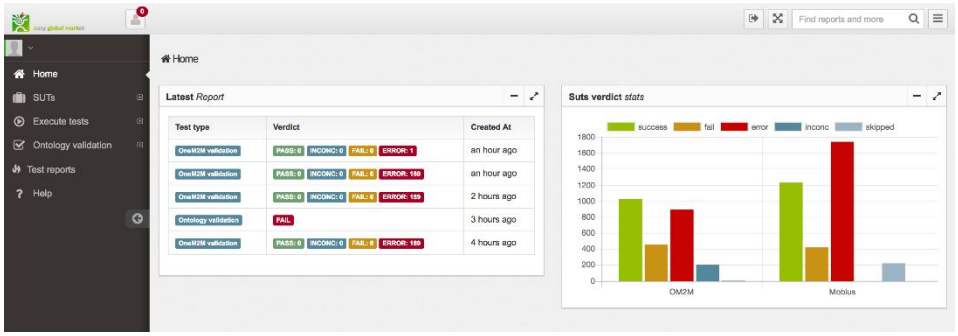
Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
AutoPilot	H2020, 2017-2020	AUTOPILOT brings IoT into the automotive world to transform connected vehicles into highly and fully automated vehicle. It develops new services on top of IoT to involve autonomous driving vehicles, like autonomous car sharing, automated parking, or enhanced digital dynamic maps to allow fully autonomous driving.	Knowledge of autonomous driving in a V2X environment
PHANTOM	H2020, 2015-2020	The overall objective of the PHANTOM project is to deliver an integrated cross-layer (hardware and system software/programming environment), multi-objective and cross-application approach that will enable next generation heterogeneous, parallel and low-power computing systems, while hiding the complexity of computing hardware from the programmer, thus fostering productivity in programming.	Testing and validation of distributed/parallel systems
Wise-IoT	H2020, 2016-2018	Wise-IoT is a collaboration project between Europe and Korea. It aims to build up federated and interoperable platforms ensuring end-to-end security and trust for reliable business environments with a multiplicity of IoT applications. Building synergies with national and international initiatives in both Europe and Korea, the project acts on the field of standardisation, fostering IoT development and interoperability.	Interoperability of IoT systems at the semantic level and connection to analytic systems through context management platforms (fiware)
IMPAQT	H2020, 2018-2020	The IMPAQT H2020 project develops and validates in-situ a multi-purpose (inland, coastal and offshore productions), multi-sensing (heterogeneous sensors and new/emerging technologies) and multi-functional (advanced monitoring, modelling, data analytics and decision making) management platform for sustainable Integrated Multi-Trophic Aquaculture (IMTA) production.	Development of predictive functions on top of IoT gathered data
FED4IoT	H2020, 2018-2021	The goal of the project is to introduce novel IoT virtualization technologies and is pursued as: 1) select/integrate/improve existing	Test and deploy analytic functions to the edge.

		IoT and cloud platforms, including oneM2M, FIWARE and 5G ETSI MEC 2) use such reference solution to build up a pool of federated IoT and fog/edge/cloud resources; 3) design novel device-level IoT virtualization technologies to create "IoT slices" formed by virtual IoT devices and computing resources; 4) support orchestration and programmability for optimal IoT virtual function deployment and Big Data processing; 5) integrate information coming from different IoT domains and other city sources; 6) integrate the system components.	

Description of significant infrastructure and major items of technical equipment relevant to the project

Software development

- 2 HP Proliant serveurs with VMWare virtualisation layers and dockerised development environment
- 15+ computers (processeur Intel core-i7, 8G RAM minimum)
- Data platform built on open-source components : NGINX (reverse proxy), Elasticsearch-Kibana, Graylog (syslog), Broker : Orion (FIWARE), Nagios (monitoring), Mosquito (MQTT), RabbitMQ (AMQP) , oneM2M (OM2M et Mobius Ocean), Odoo (ERP) ; Network server LoRaWAN
- EGM software solutions: Test as a Service platform (oneM2M compliance and semantic ontology validation)



- Other licences
  - office : MSOffice (>2013)
  - TTCN-3 compilation and execution : Elvior + TITAN (open-source)
  - Model based tests generation : SmartTesting certifyIT, Yest and

Conception mécanique-électronique

- 3D CAD workstation
- Electronic design and prototyping station
- Set of DIY boards (Raspberry PI, Arduino, Edison, etc.) and sensors for rapid prototyping, PoC implementation and interoperability validation

LoRaWAN Network

- LoRaWAN serveur
- Kerlink (IBTS & Wirnet) & Multitech gateways deployed over the territory

Partner 14: Politecnico di Torino	
Company Website: www.polito.it	

Politecnico di Torino (http://www.polito.it/) is a public university offering degrees in Engineering and Architecture, with an outstanding international reputation in technical and scientific teaching and research. It is a research university interested in the balanced development of both theoretical and applied research. Thanks to the participation in many international projects, Politecnico di Torino exhibits a significant experience in both scientific and administrative project management. Within the 6th Framework Programme, Politecnico di Torino was involved in 95 European research projects, while under the 7th Framework Programme 220 projects have been funded, with a total EU contribution of 61 million Euros. Moreover, in the first year of H2020, 33 projects have been approved. Politecnico di Torino is also participating in the EIT ICT Labs - which is one of the first Knowledge and Innovation Communities set up by the European Institute of Innovation- and it is the only Italian Partner involved in both projects of the FET flagship initiatives Graphene (http://graphene-flagship.eu/) and The Human Brain Project (https://www.humanbrainproject.eu/). POLITO hosts 5 ERC grant winners.

POLITO will contribute to the project by providing core contributions to **WP3**, in particular on data analytics and scalable Big Data mining algorithms; and by contributing to the tailoring of such algorithms and models to different use cases in WP5 and WP6, cooperating with industrial partners such as GM, I&M, Pierburg. Finally, POLITO, as a research university, will contribute to **WP10** with academic dissemination activities in the scientific community.

POLITO participates to the project through the research groups “Database and Data Mining Group” (DBDMG) and Electronic CAD & Reliability group within the Automation and Computer Engineering Department.

The Database and Data Mining Group (DBDMG), led by Elena Baralis, carries out its research activity in various areas within the field of data mining, machine learning, artificial intelligence, databases, and data-warehouses. The research activity of DBDMG focuses on the study of algorithms for diverse data mining tasks on Big Data, including

- association rule mining, to automatically discover complex correlations among data, at different abstraction levels (granularity and aggregation);
- the extraction of knowledge for performing predictions, such as classification and regression tasks, by means of supervised techniques;
- grouping of similar data, by means of unsupervised clustering techniques.

DBDMG has participated in several European and national projects, such as in the ONTIC (Online Network TraffIc Characterization) European project (http://ict-ontic.eu), in the mPlane European FP7 project (https://www.ict-mplane.eu/), and currently in the H20202 i-React project (http://www.i-react.eu/).
DBDMG has a strong track of industrial collaborations with large enterprises of different sectors, from financing to media, from oil extraction to energy services. Specifically, DBDMG has an established collaboration with GM (General Motors), addressing the application of machine learning techniques to industrial data from vehicles on the field, with specific focus on ANN (Artificial Neural Networks) exploitation, together with more transparent classification and prediction techniques, often coupled with other data mining approaches, e.g., clustering and association rule mining, with the aim to develop an AI system able to address industrial challenges.

In the past 10 years CAD Group participated to a number of H2020 and ECSEL projects, such as STEVE (http://www.steve-project.eu/index.php/en/), AUTODRIVE (https://autodrive-project.eu), PRYSTINE (https://www.ecsel.eu/projects/prystine), and HiPerform (https://www.ecsel.eu/projects/hiperform). Moreover, the group cooperated and still cooperates with many leading-edge companies/agencies such as

General Motors Global Propulsion Systems, FCA, IVECO, Magneti Marelli, ITT Motion Technologies, Ideas & Motion, Leonardo Finmeccanica, European Space Agency, Thales, EADS, Boeing Satellite Systems.

CVs of involved key researchers / staff members

Elena Maria Baralis (female), head of the Database and Data Mining Group (DBDMG), has been full professor in the Computer Science Department (DAUIN) of the Politecnico di Torino since January 2005. Her current research interests are in the field of database systems and data mining, more specifically on mining algorithms for Big Databases and sensor/stream data analysis. She has published over 80 papers in international journals (IEEE TKDE, ACM TODS, ACM TOIS) and conference proceedings (IEEE ICDE, IEEE ICDM, VLDB). She visited IBM Almaden Research Labs (California) and Stanford Computer Science Department. She has participated to several national and European research projects.

Massimo Violante (male) received the MS (1996) and PhD (2001) from Politecnico di Torino, Torino, Italy. Since 2001 he is with the Dept. of Control and Computer Engineering at Politecnico di Torino where he is now Associate Professor. Massimo Violante research activities focus on the design and evaluation of mission-critical systems, with particularly emphasis on the development of tools and techniques for enabling the use of commercial-off-the-shelf (COTS) components in space. Massimo Violante leads a team within Politecnico di Torino, which is involved in a number of projects with several companies/agencies in both automotive and aerospace industries. Massimo Violante authored one book on Software-Implemented Hardware Fault Tolerance, one on Reprogrammable FPGAs for critical applications, and more than 130 papers on international journals and proceedings of international conferences.

Relevant publications, and/or products, services or other achievements

- Apiletti, Daniele; Baralis, Elena; Cerquitelli, Tania; Garza, Paolo; Pulvirenti, Fabio; Venturini, Luca, “Frequent Itemsets Mining for Big Data: A Comparative Analysis” In: BIG DATA RESEARCH. - ISSN 2214-5796 (2017), pp. 67-83.
- Apiletti, Daniele; Baralis, Elena; Cerquitelli, Tania; Garza, Paolo; Giordano, Danilo; Mellia, Marco; Venturini, Luca. “SeLINA: a Self-Learning Insightful Network Analyzer” - In: IEEE TRANSACTIONS ON NETWORK AND SERVICE MANAGEMENT. - ISSN 1932-4537 - 13:3(2016), pp. 696-710.
- Baralis E.; Cagliero L.; Garza P., “EnBay: A Novel Pattern-Based Bayesian Classifier”. In: IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING. - ISSN 1041-4347. - 25:12(2013), pp. 2780-2795.
- S. Esposito, M. Violante, M. Sozzi, M. Terrone, M. Traversone, A Novel Method for Online Detection of Faults Affecting Execution-Time in Multicore-Based Systems, To appear on ACM Transactions on Embedded Computing Systems
- Stefano Esposito; Massimo Violante (2016), Mitigating Soft Errors in Processors Cores Embedded in System-on Programmable-Chips. In: FPGAs and Parallel Architectures for Aerospace Applications. Springer, pp. 219-238. ISBN 978331914

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
ONTIC	EU, FP7, 2014-2017	Design, develop and experimentally evaluate a Big Data framework for the Online Network Traffic Characterization	The ONTIC project lead to the design and development of algorithms for analysing large volume of big-data, both in cardinality and dimensionality. Such algorithms will allow to build upon new and improved techniques addressing the challenge.
mPlane	EU, FP7, 2013-2016	"mPlane - an Intelligent Measurement Plane for Future Network and Application Management" consists of a distributed measurement infrastructure based on big data architectures to perform active, passive and hybrid measurements in the Internet, with applications to traffic management; It leverages machine learning approaches to design automatic algorithms and methodologies to identify anomalies, outliers, and find the root cause of a problem.	The experience built in the mPlane project is fundamental to define complex, large scale, distributed architectures to collect, store, and process data. While the objectives and application scenarios of the project are different, the big data approach is similar, and most of the lessons learned in mPlane can be applied in the project.
PRYSTINE	ECSEL	Programmable Systems for Intelligence in Automobiles	The experience gathered in this project contributes to the know-how in the topic of design and validation of embedded processing systems for automotive applications.

Description of significant infrastructure and major items of technical equipment relevant to the project

At the Politecnico di Torino, Elena Baralis co-founded the university-wide SmartData Lab, a 500-node Hadoop-based cluster, with 1 Petabyte of disk, and 1 Terabyte of RAM, based on DELL servers, and attracting both academic, teaching, and industrial interests. The SmartData Lab facilities, both in hardware and in software, together with the skills of the researcher working at the Lab, will be provided as an asset to the project.
http://smartdata.polito.it/

Partner 15: Barcelona Supercomputing Center – Centro Nacional de Supercomputación	
Company Website: https://www.bsc.es/	

The Barcelona Supercomputing Center – Centro Nacional de Supercomputación (short named as BSC), created in 2005, is the leading supercomputing centre in Spain. It specializes in High Performance Computing and its mission is twofold: to offer supercomputing facilities and services to Spanish and European scientists, and to create knowledge and technology to be transferred to society. At the BSC, more than 500 people from 40 different countries perform and facilitate research into Computer Sciences, Life Sciences, Earth Sciences and Computational Applications in Science and Engineering. This multi-disciplinary approach and the combination of world-leading researchers and experts in HPC (High-Performing Computing) with state-of-the-art supercomputing resources make BSC unique. The BSC is one of the first eight Spanish 'Severo Ochoa Centre of Excellence" awarded by the Spanish Government, it is managing the Spanish Supercomputing Network, as well as one of the four hosting members of the European PRACE Research Infrastructure. The BSC hosts MareNostrum supercomputer, a Tier-0 PRACE system currently ranked as the #3 most powerful supercomputer in Europe (#13 in the world) with 13.7Pflop/s capacity. In addition, the BSC hosts other High-Performance Computing (HPC) resources, among which it is worth mentioning Minotauro, one of the most efficient supercomputers in the world (#35 in the last ranking of the top500 green list). The Earth Sciences Department at BSC (ES-BSC) has developed into a reference institution in Europe in the field of air quality, climate predictions and atmospheric composition modelling. The main aim of the Department is to perform research on and develop methods for environmental forecasting, with a particular focus on the atmosphere-ocean-biosphere system. This includes managing and transferring technology to support the main societal challenges through models and data applications in HPC and big data solutions. Within the ES-BSC, two different groups will work on this project. The Earth System Services group facilitates the interpretation and application of research coming from the BSC-ES through tailored services. Applied research is carried out to demonstrate the ongoing value of these services to advance sustainable development in key sectors of society and economy such as urban planning, health or renewable energy. An interdisciplinary team including air quality and climate scientists, science communicators, environmental economists, UX designer and user-engagement specialists collaborates to ensure that users remain at the centre of the research process and the outcomes are both useful to and usable by them. The Computational Earth Sciences group aims to identify and explore computational options for the strengthening of innovation on Earth System Models. This framework takes advantage of the unique environment the BSC offers not only for using the latest developments in supercomputing, but also in big and open data applications, ranging from data governance and management, advanced descriptive analytics of large data volumes to novel explorative methods including deep learning and cognitive algorithms for pattern recognition in large and variate data sets.
BSC contribution in the DALIE project will be the development of a decision support tool for air quality management. Firstly, we will gather and fusion different data sources that allow a high precision characterization of mobility and emissions of a city. This information will be integrated in the HERMES emission model to estimate emission. The resulting emissions will be used within the CALIOPE air quality system to predict air quality episodes. In parallel, the CALIOPE system will be used to assess the impact of different mobility plans defined by the Barcelona city council and implemented by UPC in the mobility model. The final output of this work will be the development, integration and deployment of the decision support tool.

CVs of involved key researchers / staff members

Dr. Albert Soret (**male**) holds a PhD in Environmental Engineering from the Polytechnic University of Catalonia (Barcelona). He is head of the Services group at the Earth Sciences Department of the BSC. The group host 24 engineers, physicists, social scientists, economists, communication experts and other air quality and climate researchers who try to bring the latest developments in earth sciences to the society. He is a postdoc researcher with 10 years of experience in the areas of Air Quality and Climate. His main expertise includes emission modelling, meteorological modelling, air quality modelling and climate services. He is the principal investigator of the S2S4E project (EC-H2020). Work Package leader within Clim4Energy (Copernicus), VISCA (H2020) and MAGIC (Copernicus). He coordinated the development of the Spanish air quality-related CALIOPE for the Spanish Ministry. His work has resulted in 11 peer-reviewed publications,

5 chapters in books, proceedings and reports, more than 50 contributions to conferences/workshops/seminars. He is supervisor of several postdocs and three PhD students.

Msc. Kim Serradell (**male**) is currently managing the Computational Earth Sciences group in the Earth Sciences department at Barcelona Supercomputing Center (BSC-CNS). In the last years, he has been in charge for the system administration of all the computational resources of the department and he was also responsible of supervising the operational runs of the NMMB/BSC-CTM model and CALIOPE Air Quality System at BSC. In that sense, he was also involved in the analysis of the models to improve their performance and developed strong skills of compilation and scripting. Furthermore, he's focused in deploying different earth system models (dust transport, climate or weather forecast) required by the department in a wide range of HPC architectures. He succeeds porting different these models in next HPC architectures like Montblanc cluster (ARM Based). He applied with success these skills in projects like IS-ENES2, ESiWACE or ESiWACE2.

Dr. Marta Terrado (**female**) has a Master's degree in Geographical Information Systems from the Polytechnic University of Catalunya and a PhD in Earth Sciences from the University of Barcelona. She has six years post-doctoral experience in water management and ecosystem services research, and has been involved in various national and EU funded projects on water scarcity and adaptation to climate change. As a science communication specialist in the Earth System Services group at BSC, she facilitates knowledge and technology transfer on air quailty services to users. She is currently involved in EU funded projects embracing communication and dissemination actions, user-engagement and interaction with stakeholders. She had worked on various R&D projects with the main goal of investigating how users interact with web based user interfaces in order to improve their User Experience (UX).

Dr. Mario Acosta (**male**) is a postdoctoral researcher and the leader of the Performance Team in the Computational Earth Sciences group. He obtained his PhD from University of Granada (Spain) in 2015, on High Performance Computing applied to Earth System Modeling. This expertise includes wide knowledge in numerical models (governing equations, numerical algorithms and computational implementation) and how to adapt them efficiently to actual and new High Performance Computing resources.

Dr. María Gonçalves Agueitos (**female**) is Chemical Engineer by the University of Santiago de Compostela (2004) and holds a PhD in Environmental Engineering by the Technical University of Catalonia -UPC- (2009). She currently works as a tenure-track 2 lecturer at the Engineering Projects and Construction Department (DEPC) of the UPC, and as associate researcher at the Earth Sciences Department of the BSC-CNS. Her research interests lie on the atmospheric modelling field. By means of numerical models and thanks to High Performance Computing environments, she explores atmospheric processes and with a focus on atmospheric chemistry and aerosols. As such, she has collaborated in a range of national and international projects and initiatives focusing on atmospheric models development and evaluation (e.g. CALIOPE) and more recently Earth System Modelling (e.g. EC-Earth, AerChemMIP).

Relevant publications, and/or products, services or other achievements

- Lawrence, B. N., Rezny, M., Budich, R., Bauer, P., Behrens, J., Carter, M., Deconinck, W., Ford, R., Maynard, C., Mullerworth, S., Osuna, C., Porter, A., Serradell, K., Valcke, S., Wedi, N., and Wilson, S. (2018). Crossing the chasm: how to develop weather and climate models for next generation computers?, Geosci. Model Dev., 11, 1799-1821, https://doi.org/10.5194/gmd-11-1799-2018, 2018.
- Pérez, J., Gutierrez-Torre, A., Berral, J., Carrera, D. (2018). A resilient and distributed near real-time traffic forecasting application for Fog computing environments. Future Generation Computer Systems, 87, 198-212, doi.org/10.1016/j.future.2018.05.013.
- Tintó, O., Castrillo M., Acosta, M., Mula-Valls O., Sanchez A., Serradell K., Cortés A., Doblas-Reyes, F.J. (2018). Finding, analyzing and solving MPI communication bottlenecks in Earth System models. Journal of Computational Science, doi.org/10.1016/j.jocs.2018.04.015.
- Guevara, M., C. Tena, A. Soret, K. Serradell, D. Guzmán, A. Retama, P. Camacho, M. Jaimes-Palomera and A. Mediavilla (2017). An emission processing system for air quality modelling in the Mexico City metropolitan area: Evaluation and comparison of the MOBILE6.2-Mexico and MOVES-Mexico traffic emissions. Science of The Total Environment, 584-585, 882-900, doi:10.1016/j.scitotenv.2017.01.135.

- Soret, A., M. Guevara and J.M. Baldasano (2014). The potential impacts of electric vehicles on air quality in the urban areas of Barcelona and Madrid (Spain). Atmospheric Environment, 99, 51-63. doi:10.1016/j.atmosenv.2014.09.048.

For a complete list of publications of the Earth Sciences Department at BSC: https://earth.bsc.es/wiki/doku.php?id=publications:publications

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
ESiWACE	H2020 (2015-19)	ESiWACE stands for Centre of Excellence in Simulation of Weather and Climate in Europe. The main goal of ESiWACE is to substantially improve efficiency and productivity of numerical weather and climate simulation on high-performance computing platforms.	• Development of Big Data and HPC capacities for air quality forecast systems. Improve efficiency and productivity of weather and air quality systems on high-performance computing platforms.
ESCAPE-2	H2020 (2018-2021)	ESCAPE-2 will develop world-class, extreme-scale computing capabilities for European operational numerical weather and climate prediction, and provide the key components for representative benchmarks to be deployed on extreme-scale demonstrators and beyond.	• Implement data structures and tools supporting parallel computation of dynamics and physics on multiple scales and multiple levels. Achieve at the same time: performance, resilience, accuracy and portability in different HPC architectures.
CALIOPE Spain and CALIOPE Mexico	Spanish Ministry and Mexico City's Secretary of the Environment (2007-12/2015-2018)	CALIOPE air quality forecast system (http://www.bsc.es/caliope/?language=en/ www.aire.cdmx.gob.mx/pronostico-aire/), an operational system at high spatial and temporal resolutions	• Development of air quality forecasting tools and planning. • Development of the HERMES emission model. • Development of an emission processing system for Mexico. Co-development of a decision support tool.
RESILIENCE	Joint effort: FP7, H2020, COPERNICUS	Decision support tool for wind energy purposes: Seasonal Wind Predictions for the Energy Sector http://resilience.bsc.es/map.html	• Development, integration and deployment of the decision support tool User engagememnt, User eXperience techniques and co-development.
WMO Dust Centers	WMO contract (2007-…)	BSC (jointly to the Spanish Meteorological Agency, AEMET) is managing the Sand and Dust Warning Advisory and Assessment System (SDS-WAS; https://sds-was.aemet.es/) Regional Center	• Provision of user tailored forecast products • Big data management: gathering different forecasts and observations, quality check and postprocessing

Description of significant infrastructure and major items of technical equipment relevant to the project

The high-performance capabilities of BSC (e.g. MareNostrum IV) and the close collaboration with the HPC experts allow gather and fusion different data sources that allow a high precision characterization of the input data for air quality planning and optimization of the modelling workflow. All together will help to increase

the spatial and temporal resolution of atmospheric modelling systems, in order to improve our knowledge on dynamic patterns of air pollutants in complex terrains and interactions and feedbacks of physico-chemical processes occurring in the atmosphere.

Partner 16: CSP INNOVAZIONE NELLE ICT scarl	
Company Website: www.csp.it	

Founded in 1998 and based in Torino, CSP is a research center, working on ICT applied research and industrial development. CSP is non-profit and has public and private shareholders, including the Politecnico di Torino. It is acknowledged as Research Laboratory by MIUR (Italian Ministry of Research and University). The mission is applying the scientific and technological research to develop local innovation potential. CSP has been performing, in the last 16 years, the technology transfer of the R&D outputs to local communities, enterprises, local PAs, schools and educational player. CSP works in cooperation with academia and SMEs in collaborative research projects and with user communities in Living Labs.
CSP will be mainly involved in WP3 to design and implement open source data analytics, machine learning and visualization applications by using the services, interfaces and data that will be available on DAILE platform. CSP will also provide a link to the outcomings of BigIoT project, in particular the API that has been designed to address interoperability between IoT platforms. CSP will be also involved in WP1 and WP11 activities.
CSP has developed skills and experience in all different layers composing the Internet of Things architecture: device implementation (sensors), transmission protocols (boardband and narrowband technologies), data validation (using statistics and ML techniques), data lake implementation. CSP is also working on technologies which can enable Fog computing models. In particular we are working on Nvidia TX2 and TensorFlow, to implement a classifier of objects inside real-time images captured by IP Cameras on the edge of the infrastructure.

CVs of involved key researchers / staff members

Ferdinando Ricchiuti (male) holds a degree (M.Sc.) in Computer Engineering from the Politecnico di Torino. He is currently head Architectures and Applications area in CSP. Initially he has been involved in research activities about Digital Signature and Identity Management and has worked in different projects related to Network and Systems Security. Currently he is working in projects covering different topics, such as Cloud/Fog computing, IoT/IIoT platforms, mobile applications and security.

Roberto Politi (**male)** is an application architect at CSP. During the last 15 years he has been involved as software architect and developer in several projects covering different research areas, including: full stack web development, multitouch and immersive interfaces, UI and UX, mobile applications, high performance computing and distributed software architecture design and implementation.

Relevant publications, and/or products, services or other achievements

Marcellin, Lara, Politi, Roberto (2009): Tag vision: social knowledge for collaborative search. In: Proceedings of the 20th ACM Conference on Hypertext and Hypermedia, 2009, pp. 325-326. http://doi.acm.org/10.1145/1557914.1557970

Awareness and Learning in Participatory Noise Sensing. Becker, Martin; Caminiti, Saverio; Fiorella, Donato; Francis, Louise; Gravino, Pietro; Haklay, Mordechai (Muki); Hotho, Andreas; Loreto, Vittorio; Mueller, Juergen; Ricchiuti, Ferdinando; Servedio, Vito D. P.; Sîrbu, Alina; Tria, Francesca in PLoS ONE (2013). 8(12) e81638.

Data collection and visualization apps:
WideNoisePlus (a game to engage users in collecting and tagging noise information), https://itunes.apple.com/it/app/widenoise-plus/id657693514?mt=8

TemporAlert (an application able to use ARPA Piemonte radars raw data to forecast approaching storms): https://play.google.com/store/apps/details?id=it.csp.temporalert

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
BIGIoT-Bridging the Interoperability Gap on the Internet of Things	H2020-LEIT-ICT/2016-2018	The objective of BIGIoT is to ignite really vibrant Internet of Things ecosystems bridging the current interoperability gap between the vertically integrated IoT platforms and by creating marketplaces for IoT services and applications	One of most related outcomes of BigIoT project is the API, designed to provide interoperability between different IoT platforms.

Partner 17: SEAT S.A.	
Company Website: www.seat.com	

Sociedad Española de Automóviles de Turismo (SEAT) is a Spanish car manufacturer, a subsidiary of the German Volkswagen Group, with its headquarters and main manufacturing facilities located in Martorell (Barcelona), Catalonia, Spain. In terms of production, SEAT's Martorell plant is the most important car factory in Spain, recognized with the Lean & Green Management Award, which confirms it as the most efficient factory in the European automotive industry, and a special mention to quality in the Factory of the Year awards for excellence in its manufacturing process. To face the challenges of Industry 4.0 and build one of the smartest, most digitized and coordinated factories in the sector, SEAT has created a new Smart Factory and Innovation department composed of top experts in key paradigms and technologies, such as Internet of Things (IoT), Big Data and Analytics, and Advanced Robotics, among others. This department works closely with Production and Quality areas in new agile labs built to design and test prototypes and to develop pilots. In the project, SEAT will provide its know-how linked to the connected car, what parameters can be extracted from the various embedded sensors, what information is provided and in which format, and how to access them. The resulting data will be passed on to the HPC experts to feed air quality prediction models.

SEAT will provide a key contribution to WP7 ("Digital economy impacting smart city" test-bed). It is the owner of the connected car fleet's data. SEAT will identify the sensors which data will be collected for the purpose of feeding the prediction models developed by UPC and BSC. It will program the data collection campaign, supervise its good functioning and take counter actions if need be to correct possible emission/reception issues. Given that the data will transit via a backend owned by Volkswagen AG (VW) this company will enter as a Linked Third Party of SEAT since both companies are subsidiaries of VW group. VW will be in charge of the development, maintenance and support of the backend required for the data extraction. SEAT will also coordinate the interactions with VW to ensure a correct access to the raw data. Finally, SEAT will set a cloud solution to pre-process the data (data cleaning), store it and grant access to UPC and BSC partners to feed their traffic and emission models.

CVs of involved key researchers / staff members

Dr Diego Villuendas Pellicero (male) is the Head of Market Intelligence unit within the VX – Customer Journey department where he coordinates the activities of data science and data analytics. He also acts as SEAT's representative for data science and business intelligence in several VW group committees in charge of defining the group strategies linked to the generation, use and licensing of data. Additionally, he is a member of the organizing team of DataBeersBCN, a local initiative aiming at converting Barcelona in a world reference hub for data science and big data. Previously, he worked as Assistant Professor at the University of Barcelona where he was in charge of several computer-related courses at graduate and master levels. Dr Villuendas received a B.Sc., a M.Sc. and a Ph.D. in Physics from the University of Barcelona in 2007, 2008 and 2015 respectively and attended in 2015 the postgraduate course on Data Science and Big Data from the same university.

Dr Erwan Guillotel (male) is currently a Data Scientist within the VX – Customer Journey department, in charge of on-demand requests for data generated by SEAT's Connected Cars. He is responsible for programming data retrieval campaigns and the subsequent preparation and analysis of the data, as well as the definition of requirements for next versions of the Connected Car. He received a B.Sc. and a M.Sc. in physics from Uni. Paris 11, France as well as a Ph.D. in Physics from Uni. Paris 7, France and a M.Sc. in Data Science from Uni. Barcelona, Spain, in 2005, 2006, 2010 and 2017 respectively. Dr Guillotel brings a wealth of project management experience from funded research projects. In FP7, he has successfully served as project manager of coordinated European projects MERGING (GA no. 309150); NANO - TEC (GA no. 257954) and the Spanish CONSOLIDER project nanoTHERM (GA no. CSD2010 - 00044). He has also been involved as a partner in numerous projects, such as NANO - RF (GA no. 318352) and NANOTHERM (GA no. 318117). In H2020 he has coordinated SPIRE - 8 project IbD (GA no. 680565). He is very familiar with all the modalities of EC research projects.

Anna Hernández Castellà (female) is a Business Analyst Manager within the VX – Customer Journey department where she deals with advanced statistical analysis of data generated on SEAT's various platforms. Previously, she worked as Commercial Business Analyst at Spanair, then as Database Manager at vLex.com where she gained a handful experience in data analysis, database management and business intelligence. Ms. Hernández received a B.Sc. in Statistics from University of Barcelona in 2002.

Relevant publications, and/or products, services or other achievements

SEAT currently produces 7 car models (Mii, Ibiza, León, Toledo, Arona, Ateca, and Alhambra) under its SEAT brand and 2 more car models (e-Racer and CUPRA Ateca) under its new CUPRA Sports brand. The production of SEAT cars is distributed among SEAT factories located in Barcelona, Spain, and other Volkswagen Group factories located in Czech Republic, Portugal and Slovakia. SEAT exports 80% of its cars and is present in more than 80 countries through a network of 1.700 dealerships. In 2017, SEAT sold almost 470.000 cars. SEAT also offers car sharing services through its recently acquired start-up company called Respiro and e-mobility services (Justmoove, Shazam, etc.) through its recently created subsidiary company called XMoba.

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
BIG IoT	H2020-ICT-2015/H2020-ICT-2015 Jan. 2016 – Dec. 2018	The objective of BIG IoT is to ignite really vibrant Internet of Things ecosystems bridging the current interoperability gap between the vertically integrated IoT platforms and by creating marketplaces for IoT services and applications.	The establishment of a marketplace where platform, application, and service providers can monetize their assets could benefit from the IIOT and Big Data technology framework developed in ***DALIE*** for automotive applications.

Description of significant infrastructure and major items of technical equipment relevant to the project

SEAT will provide its agile labs and other facilities to integrate, test, and validate the proposed solutions coming out from the project in real-life environments. More specifically, the Thinking Lab (**Fehler! Verweisquelle konnte nicht gefunden werden.**) and the Tech Lab (Figure 2) are open spaces for innovation to carry out research activities such as challenge exploration, solution ideation, solution feasibility (concept and prototype design, test and validation), and solution pilot development. The Metropolis Lab (Figure 3) is a digital laboratory that aims to analyze and seek out intelligent solutions of the challenges facing future mobility. It is composed of top professionals with significant experience in different areas, with special focus on Big Data and Analytics. SEAT will access data stored in a tailor-made infrastructure with petabytes capabilities called ACDC and property of Audi AG. The ACDC is the infrastructure that the VW group decided to use as a repository for the data generated by the connected cars of all the brands of the group.

Figure 1: SEAT Production team organizing an innovation workshop in the Thinking Lab.

Figure 2: The SEAT Smart Factory team working in the TechLab.

Figure 3: SEAT experts in Big Data and Analytics working in the Metropolis Lab.

Partner 18: Universitat Politècnica de Catalunya	
Company Website: https://www.upc.edu/en http://inlab.fib.upc.edu/en	

The Universitat Politècnica de Catalunya (UPC) is a public institution that offers higher education in a wide range of technical, artistic and humanistic fields. Its participation in this proposal will be through the inLab FIB, the Barcelona School of Informatics innovation and research lab. In particular, the Smart Mobility research group, specialized in using traffic simulation modelling, will developed a model of the studied area to evaluate different mobility policies.
UPC (inLab FIB) will lead the WP7 Task 3.1 Calibrated traffic simulation model related to the development of a traffic simulation model of the selected area of study: Barcelona. This development consists in the construction of the network (including all the needed details to emulate the private and public transport), the demand analysis (using origin-destination matrices built from mobile data) and the calibration process (including speed data from floating car data). UPC also will contribute in WP7, in particular in task 5 City mobility and environmental measures assessment with the emulation of the proposed traffic policies using the model developed in Task 3.1.

UPC is currently involved in the Barcelona Virtual Mobility Lab Project where the first multimodal model of the Barcelona Metropolitan Area has been developed (2017/2018). In the DALIE project, UPC will take advantage of the possibility to start from this Barcelona model by improving and extending it with more details and incorporating recent changes in the network. This will allow assess the impact of the Barcelona mobility policies with respect to air quality indicators.

Some references where the work has been presented:

- Smart City Expo World Congress (Nov 2017)
  http://www.carnetbarcelona.com/index.php/2017/12/20/virtual-mobility-lab-modelling-transport-in-the-first-ring-of-the-barcelona-metropolitan-area/

- The 9th International Conference on Cloud Computing, GRIDs, and Virtualization (Feb 2018)
  http://www.iaria.org/conferences2018/ProgramCLOUDCOMPUTING18.html

- IX Jornadas sobre ITS en Cataluña (Feb 2018)
  https://cdn.website-editor.net/2d40cc63851f4d94b11848ff5435fcc3/files/uploaded/Programa%20ITS%20Catalunya.pdf

- XVIII Congreso Español sobre Sistemas Inteligentes de Transporte (April 2018)

CVs of involved key researchers / staff members

Dr. MªPaz Linares (female) (PhD in Statistics and Operation Research, Msc in Logistics, Transport and Mobility, Degree in Mathematics). She is a researcher at inLab FIB and assistant professor at the department of Statistics and Operation Research at UPC. She completed her PhD in 2014 with a thesis dedicated to Dynamic Traffic Assignment using mesoscopic simulation which was awarded with the XII Premio Abertis and finalist of the IV International Award on Transport Infrastructure Management Research. Since 2005, she works on projects specialized on the application of optimization and simulation techniques to transportation problems. She has recently been involved in several CARNET research projects, as the Barcelona Virtual Mobility Lab project, and is currently working on the H2020 BIG IoT project.

Dr. Lídia Montero, **(female)** (PhD in Computer Science). She is an associate professor (tenure position) of the department of Statistics and Operations Research at UPC and specializes in the application of statistics and data mining to transportation planning, demand modeling, traffic management, traffic simulation and other related transportation problems. She has been involved in many development projects with public administrations and companies. She has presented her research work in more than 60 international congresses

and conferences. She is currently leading the simulation of projects related with future urban mobility simulation in CARNET.

Prof. Josep Casanovas (male) (PhD in Computer Science, Industrial Engineer, MSc in Economics). Director of in LabFIB at Barcelona School of Informatics. He's full professor of the Statistics and Operations Research Department at UPC. He has been Vice-rector for University Policy of Universitat Politècnica de Catalunya (UPC) (2006-2011) with responsibilities in new strategic projects like the definition of new university governance models. His main research areas are modelling and simulation, agent based modelling and HPC. He is the author of research articles and other publications and he has collaborated in many projects for the EU and different companies and institutions.

Juan Salmerón (male) (Degree in Computer Science)- He is a researcher at inLab FIB UPC in the Smart Mobility group, collaborating in European H2020 projects (BIG IoT project). He is also been involved in several CARNET projects (CitEffects, Barcelona Virtual Mobility Lab) and in private projects for large and SME companies. He has focused his career towards the use of the information and communication technologies in the smart cities and mobility area. He has participated in several R+D projects focused in traffic data analytics, routing algorithms and traffic simulation UPC.

Relevant publications, and/or products, services or other achievements

- L. Montero, M. P. Linares, J. Casanovas, E. Codina (2018). Impact of Networks Performance of Probe Vehicle Data Usage: An Experimental Design for Simulation Assessment. Journal of Advanced Transportation, Vol. 2018, 1-12.

- M. P. Linares, L. Montero, E. Lorente, J. Salmeron, J. Casanovas (2017). Analytics tool for assessing mobility concepts, vehicles and city policies (CitScale). 5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems. 2017, Italy.

- L. Montero, M.P. Linares, O. Serch, J. Casanovas (2017). A visualization tool based on traffic simulator for the analysis and evaluation of smart city policies, innovative vehicles and mobility concepts. In Proceedings: Winter Simulation Conference 2017, December 3-6, 2017, Las Vegas.

- M. P. Linares, J. Barceló, C. Carmona, L. Montero (2016). Analysis and operational challenges of dynamic ride sharing demand responsive transportation models. Transportation Research Procedia, Vol. 21, 110-129. Elsevier, 2016.

- MP. Linares, L. Montero J. Barceló and C. Carmona (2016) A Simulation Framework For Real-Time Assessment Of Dynamic Ride Sharing Demand Responsive Transportation Models. Proceedings of the 2016 Winter Simulation Conference. December 11~14, Washington D.C

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
BIG IoT	H2020-ICT-2015-688038 (2016-2018)	UPC is leading the piloting work package, coordinating the Barcelona pilot and its use cases related with traffic monitoring, parking and bus monitoring. In Barcelona, the project team is using infrastructure based traffic detectors to measure speed, car count and related parameters. (http://www.big-iot.eu)	In the DALIE project, UPC will used the acquired knowledge with respect to the management of big data provided by different type of sources (connected car and mobile data).

Barcelona Virtual Mobility Lab	CARNET (Cooperative Automotive Research Network)project funded by PTV. (2017-2018)	UPC is involved in the Barcelona Virtual Mobility Lab Project where the first detailed multimodal model of the Barcelona Metropolitan Area (1st Crown) has been developed in the 1st phase (2017). **(**https://inlab.fib.upc.edu/en/barcelona-virtual-mobility-lab)	In the ***DALIE*** project, UPC will take advantage of the possibility to start from this BCN model that will allow assess the impact of the Barcelona air quality measures and mobility policies.
Connected Car Barcelona Simulative Evaluation Project	CARNET (Cooperative Automotive Research Network) project funded by Volkswagen Research. (2014–2016)	In this project, 10.000 equipped vehicles were emulated, acting as mobile traffic sensors that coexisted with the rest of the city's vehicles. The simulation allowed the team to assess the quality of the information collected by this type of vehicle, in order to estimate the state of the city's traffic, opening the door to future lines of research. (http://inlab.fib.upc.edu/en/simulating-future-urban-mobility)	In the ***DALIE*** project, UPC will deal with real connected car data in the calibration procedure. Thus, the acquired knowledge during this previous project will be critical in order to succeed.
Simulative evaluation of a cooperative urban mobility concept	Funded by Volkswagen Research (2014– 2015)	This project focused on the analysis and evaluation of the impact of a system consisting of a fleet of vehicles shared between multiple users, exploiting in an efficient, flexible and profitable way the fact that their routes coincide totally or partially. (http://inlab.fib.upc.edu/en/simulating-future-urban-mobility)	In the ***DALIE*** project, UPC will deal with the evaluation of different mobility policies. Thus, the acquired knowledge during this previous project will be very useful in order to know how they could be emulated in the simulation tool.
Advanced Information System on the Mobility of Persons and Vehicles (In4Mo).	Funded by: Subprogram Avanza Competitividad I+D+I, 2010-2012. Reference: TSI-020100-2010-690. (2010-2012)	Severaldata collection/filtering/completion/fusion techniques and methodologies have been developed by ICT & Transports group at inLab FIB to elaborate information from traffic data coming from different ICT sources as a result of the research done in these projects of the Spanish R+D National Programs. The data filtering and fusion techniques have were specifically tuned, calibrated and configured for Bluetooth and loop detectors in Barcelona local urban environment. Prediction and state estimation methodologies have also been explored.	In the ***DALIE*** project, UPC will deal with different data sources, thus, the knowledge of the research group with respect to analytics techniques (in particular, data fusion) could be crucial for the calibration phase.

Description of significant infrastructure and major items of technical equipment relevant to the project

UPC will use technical equipment of the Simulation laboratory and software tools related to traffic management system, including CitScale environment (http://inlab.fib.upc.edu/en/tools/citscale): Analytics Tools and Services for the Assessment of Innovative Mobility Concepts, Vehicles and City Policies. It has been designed to facilitate the analysis of impacts of innovative mobility concepts and vehicles considering different levels of penetration. It consists of a data analysis and visualization tool and a simulation lab engine, which can be extended with customized modules to evaluate new mobility and vehicle concepts.

Partner Name: Laboratory for Manufacturing Systems & Automation (LMS)	
Company Website: http://lms.mech.upatras.gr/	

Participant profile

Laboratory for Manufacturing Systems & Automation (LMS) is oriented on research and development in cutting edge scientific and technological fields. LMS is involved in a number of research projects funded by the EU and European industrial partners. Particular emphasis is given to the co-operation with the European industry as well as with a number of "hi-tech" firms. LMS is under the direction and technical coordination of Professor George Chryssolouris. It currently employs approximately 70 researchers organized in three different groups: Innovative Manufacturing Processes, Advanced Human-Centered Design Techniques, including Virtual Reality, and Production Systems Planning, Control and Networking.

LMS will participate in multiple work packages during the DALIE project. Regarding the WP3, LMS will be involved in the design and development of the framework within the automotive sector in order to enhance the interaction with the shop-floor level. As far as the WP4, the role of LMS will be supportive and more focused on organizing events in order to promote the ecosystem. Moreover, in WP6, LMS will be highly involved and work closely with the other involved partners in order to enhance the smart manufacturing testbed and support its digitalization in terms of predictive maintenance, equipment condition monitoring, quality control, etc. Also, during WP9, LMS will contribute to the integration of the scientific and technology framework with the smart manufacturing testbed and support the technical validation of the project activities in the industrial area. Finally, in WP10, LMS will participate in the dissemination activities and will be willing to support the documentation of the dissemination report.

LMS experience comes from its participation in a number of industrial related projects. More specific, LMS has been participating with a leading role in FP6 IPs MyCar project. MyCar‘s approach included the identification, the monitoring and the interpretation of the necessary maintenance parameters, fostered the maintenance-relevant information flow by preventing the failures and facilitated the management of resources and maintenance task execution. Accordingly, LMS have already developed predictive maintenance and condition monitoring techniques which will be further improved during the DALIE project.

CVs of involved key researchers / staff members

Prof. George Chryssolouris (male) is Professor (1993-) of the Department of Mechanical Engineering and Aeronautics of which he was Chairman between 2003 and 2007. He was, for 2006-2007, the President of CIRP, the Paris based International Academy for Production Engineering. He is the Director of the Laboratory for Manufacturing Systems and Automation (LMS). LMS researchers work on a variety of research subjects including production systems planning and control, software development for industrial networking, innovative manufacturing processes, virtual reality engineering applications, and quality control and metrology. Professor Chryssolouris was Chief Executive Officer of OTE, the national Greek telecom operator, and member of its board of directors (1996-1999). Under his leadership OTE, the largest company of Greece with 20000 employees and annual revenue of ca. $3 billion, became the first Greek company to be listed in the NYSE (New York Stock Exchange). Professor Chryssolouris was also advisor to the Prime Minister of Greece on education and technology (1996-1998). Professor Chryssolouris worked at MIT (Massachusetts Institute of Technology) in the USA between 1980 and 1993. He led a research group for the development of information systems and automation for industrial applications. He taught at MIT undergraduate and graduate level subjects related to manufacturing, systems, design and automation. Between 1980 and 1993 he served also as Vice-President, responsible for the US operation, of a German engineering company specialised in industrial automation. In 1988 he established, with help from venture capital, a company for software products developed by his research group at MIT. He worked (1976-1980) as Research Associate in the Institute of Manufacturing Technology and Machine Tools at the University of Hannover, Germany. Professor Chryssolouris has more than 400 publications in international scientific journals and refereed conferences. He is the author of two books published by Springer Verlag. He holds a US Patent for a laser machine design. He was granted the Frederick W. Taylor Research Medal by SME (2001) for his outstanding contributions to manufacturing research. He was also the recipient of SME's Young Outstanding Manufacturing Engineer

Award (1986). He received a Ph.D. (Dr.-Ing.) in Engineering from the University of Hannover, Germany (1979) and a Diploma (M.S.) in Mechanical / Electrical Engineering from the National Technical University of Athens, Greece (1975).

Dr. Sotiris Makris (male) is a Project manager (2000-) at the Laboratory for Manufacturing Systems and Automation-LMS. He owns a Diploma (Degree Master of Science) in Mechanical Engineering and Aeronautics from the University of Patras, Greece and a PhD in Engineering of the Department of Mechanical Engineering and Aeronautics, University of Patras. He worked as a Research Associate for the Laboratory for Manufacturing Systems and Automation, in the Department of Mechanical Engineering and Aeronautics from April 2010 to present. His main research interests are focused on the field of Robots, Automation and Virtual reality in Manufacturing. He speaks fluently English. He is an Associate Member of the International Academy for Production Research (CIRP) (http://www.cirp.net), a member of the European Manufacturing and Innovation Research Association (http://www.emiracle.eu/) and a member of the Technical Chamber of Greece and of the Technical Chamber of Mechanical and Electrical Engineers. He has been serving as the Vice-chair of the CIRP Research affiliates from 2008 to 2011. He has been involved in more than fifteen (15) RTD projects funded by the EC, acting as Senior Researcher, Project and Technical Manager contributing to the research and technological advancement of the Laboratory for Manufacturing Systems and Automation. Major EC funded projects that he managed are the following: MyCar, Intermar, AUTORECON, X-act, Sense&React, ROBO-PARTNER, MARVIN, Syrios, e-Custom. He has been a reviewer for four (4) International Journals, in large number of International Conferences and guest editor in two (2) International Scientific Journals. He has organized the Second CIRP Web Conference. He has been leading researcher teams towards accomplishing outstanding technical engineering achievements in manufacturing mainly by investigating new technology in manufacturing environments. Such achievements include the Development of data models for the electronic operation of production networks with an application in the automotive and maritime industry, Development of web based models and software tool for dynamic job rotation with multiple criteria, Web-services oriented workflow management system for integrated digital production engineering utilizing the AutomationML format, Virtual Commissioning of assembly cells with cooperating robots, Industrial Applications with Cooperating Robots for the Flexible Assembly, utilizing industrial robots and artificial intelligence methods for multi robot systems cognition, RFID technology in robotic assembly for random mix manufacturing for sensing and control of assembly processes. He has given several scientific presentations and invited talks in International Workshops organized by the EC. He has given a number of technical presentations in CIRP General Assembly Meetings, to the Scientific Technical Committees of Assembly and Design.
He has been advising twenty eight (28) Student and Diploma Thesis in the Faculty of Mechanical Engineering and Aeronautics of the University of Patras, mostly in cooperation with industry and in topics relevant to the intelligent automation of manufacturing systems. He has more than 60 publications (Twenty two (22) publications in international refereed scientific journals, three (3) publications in Greek refereed scientific journals, three (3) chapters in books, thirty two (32) publications in conference proceedings with review in the full paper and eight (8) submitted publications in international refereed scientific journals - currently under review).

Mr. Apostolis Papavasileiou (male) is an Electrical & Computer Engineer and he has graduated from the University of Patras. He has been involved in several R&D projects and scientific publications. Major EU funded projects that he participated are the following: SERENA, EUROC, ROBO-PARTNER, X-Act). He is currently employed as a researcher in Laboratory of Manufacturing Systems and Automation since 2014. His main fields of interests are: development of robotic applications for the industrial sector, applications for the enhancement of the human-robot interaction, speech recognition algorithms, motion planning methodologies, mobile development & UX design.

Niki Kousi MSc. (female) is a Mechanical and Aeronautics Engineer from University of Patras. She works as a research engineer at LMS focusing on HRI and HR task planning area. She has been involved in a number of EU funded projects (AUTORECON, ROBO-PARTNER, SYMBIOTIC, THOMAS). Human Robot Interaction, HR task planning and execution, performance assessment of production systems using stationary/mobile robots, HR cell setup and design based on the development of decision making frameworks etc. are some of the main research topics that she has worked on as a research engineer.

Relevant publications, and/or products, services or other achievements

- D. Mourtzis et al, “Industrial Big Data as a result of IoT adoption in Manufacturing”, Procedia CIRP 55 (2016), 290-295
- G. Chryssolouris, N. Papakostas, D. Mourtzis, S. Makris, "Knowledge Management in Manufacturing Process Modeling - Case Studies in Selected Manufacturing Processes", Methods and Tools for Effective Knowledge Life-Cycle-Management, A. Bernard, S. Tichkiewitch (eds.), Part 3, pp. 507-520, Springer (2008)
- K. Efthymiou, N. Papakostas, D. Mourtzis, G. Chryssolouris, On a Predictive Maintenance Platform for Production Systems, 45th CIRP Conference on Manufacturing Systems (2012) 221–226
- G. Michalos et al "ROBO-PARTNER: Seamless Human-Robot Cooperation for Intelligent, Flexible and Safe Operations in the Assembly Factories of the Future", (CATS 2014), 5th CIPR Conference on Assembly Technologies and Systems, 13-14 November, Dresden, Germany, pp. 71-76 (2014)
- D. Mourtzis et al "An Internet of Things-Based Monitoring System for Shop-Floor Control", ASME-Journal of Computing and Information Science in Engineering, (JCISE-17-1207) , (2018)

List of 5 relevant previous projects or activities connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to the project
MyCar	FP6	Improving flexibility in assembly plants and vehicle customization, while improving plant efficiency	Correlating different processes and parameters with the quality of the product will be beneficial for the testbeds inside the project
COMET	FP7	Investigating the accuracy of robotic structures using Finite Elements modeling in order to analyze the tolerance chain and develop techniques for its compensation	Modelling of industrial equipment will be further used to enhance the predictive maintenance techniques
ROBO-PARTNER	FP7	Leading the modeling and development of methods and tools for planning of human robot collaborative tasks, Augmented Reality for supporting human operators, Advanced Human Robot interaction through multi modal interfaces	Transfer the knowledge regarding the extending use of wearable devices in the industrial environments
CAPP-4-SMEs	FP7	Focusing on the adoption of IoT alongside with cloud and service-oriented computing approaches in manufacturing	The know-how regarding the use of IoT in manufacturing will be useful during the DALIE project, in order to go beyond the state of the art.
ICP4Life	H2020	An integrated collaborative platform for managing the product-service engineering lifecycle	Large industrial testbeds inside the DALIE project will deal with the monitoring of their products during their lifecycle.

Description of significant infrastructure and major items of technical equipment relevant to the project

LMS is running the robotic group activities in a fully equipped Machine shop, where the following robotics cells are installed and used for research.
Flexible cell with two heavy duty industrial robots (COMAU NJ130 and NJ370) equipped with fixture, gripper, welding gun, RFID sensors (Figure 1)
Dual arm robot cell equipped with PILZ Safety eye and Human robot interaction sensors, Schunk grippers (Figure 2).
Cooperating robots cell for small payload assembly operations equipped with two COMAU Smart 6 (6kg payload robots), conveyor, grippers and camera system (Figure 3).
Human-Robot cooperative cell. This cell enables the cooperation of a Human with a high payload robot (COMAU NJ130). The Cell is equipped with state of the art 3D scanner (Safety eye) and the latest Robot safe move functionality. The cell offers to the operator wearables devices and infrastructure for a Safe and intuitive interaction of the Human with the Robot. (Figure 4)
UR10 robot cell for Human Robot Collaboration, equipped with a customized gripper for pick and place tasks (Figure 5)
Cooperating robots cell for sealing operations equipped with two COMAU Racer (7kg payload robots), conveyor and camera system (Figure 6)


Figure 1


Figure 2


Figure 3

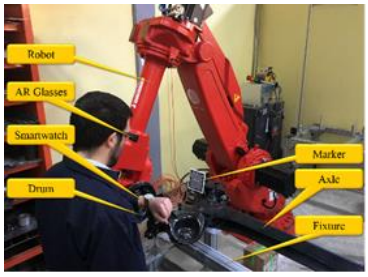


Figure 4

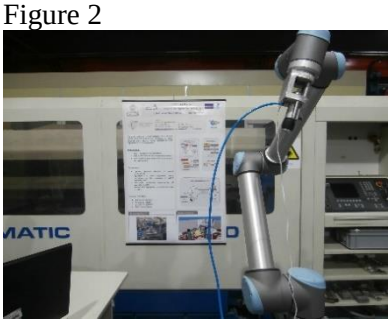


Figure 5


Figure 6

In terms of software tools, tools used in industry are available in LMS, such as Product development (Pro/Engineer, CATIA), for process planning and simulation (DELMIA, Process Simulate, IMPACT, WITNESS. ROBCAD, Invision, WinMod), for integration/communication and visualization Vitrools and a Virtual and Augmented Reality Room.

Partner 20: Centro Ricerche FIAT S.c.p.A.	
Company Website: www.crf.it/EN	

CRF (Centro Ricerche Fiat), headquartered in Orbassano (Turin) with other branch sites in Italy, was established in 1978. As a focal point for research activities of FCA (Fiat Chrysler Automobiles), CRF has the mission to:

- develop and transfer innovative powertrains, vehicle systems and features, materials, processes and methodologies together with innovation expertise in order to improve the competitiveness of FCA products;
- represent FCA in European collaborative research programs, joining pre-competitive projects and promoting networking actions;
- support FCA in the protection and enhancement of intellectual property.

Also, through the cooperation with a pan-European network from industry and academia, CRF conducts collaborative research initiatives at the national and international levels in partnership with all the key public and private stakeholders concerned with sustainable mobility, targeting specifically the industrial exploitation of research.
CRF develops research and innovation along the three principal axes of sustainability: Environmental Sustainability, which encompasses all aspects relating to energy efficiency as well as to the reduction of the impact on the environment over the entire lifecycle of the vehicle; Social Sustainability, focusing on the safety of transportation systems through the development of active, passive, preventive and cooperative solutions while addressing the mobility of all users irrespective of their specific needs; Economically sustainable competitiveness, oriented towards viable innovation, i.e., improving the performance and functionality of new vehicles in a cost-effective manner while reducing the time-to-market of research results.
The CRF research activities imply strategic competences not only in the field of automotive engineering, but also in the fields of manufacturing, advanced materials, ICT and electronics, as well as a wide range of state-of-the-art laboratories and extensive test facilities, including advanced engine & vehicle testing facilities, EMC chambers and a dynamic driving simulator with immersive virtual reality.

CRF participates with a leading role in the European “Green Vehicle Initiative” and “Factories of the Future”, the Public Private Partnerships conceived by the European Commission in 2009 to focus public and private research on issues of direct and significant relevance to the Europe with regard to the competitiveness of industry and employment. Within this context, CRF is actively involved in key European Technology Platforms: ERTRAC (road transport), EPOSS (smart systems), EUMAT (materials), MANUFU-TURE (manufacturing) and NANOfutures (nanotechnologies). CRF is also supporting the Joint Technology Initiative ECSEL (Electronic Components and Systems for European Leadership). CRF joins the Human Factors and Ergonomics Society Europe Chapter, nonprofit organization promoting the understanding of human factors and the application of that knowledge to the project and the use of tools, vehicles, systems and environments. CRF is associated to EIT ICT Labs (Knowledge and Information Community on ICT), EUCAR (European Council for Automotive R&D) and other associations of European relevancy.
At national level CRF participates in the Cluster Trasporti Italia 2020, an association of enterprises, universities, research institutions and other entities fostering the innovation of surface mobility system.
The Intellectual Property developed by CRF includes a total of 2,173 granted patents, protecting 527 inventions. Over recent years the technology-driver role of CRF has enabled the industrialization and commercialization of a significant number of distinctive and highly innovative products for FCA including, in the powertrains area: the Diesel Common Rail system (UNIJET and MultiJet), the MULTIAIR system with the TwinAir engine, the CNG (Compressed Natural Gas) and the DDCT (Dual Dry Clutch Transmission) technologies; and in the vehicles area: energy saving air-conditioning systems, the Blue&MeTM connectivity product, Driving Advisor and Magic Parking driver-assistance systems and the ECODriveTM eco-navigation solutions.
CRF is in the project with the World Class Manufacturing Research & Innovation (WCM R&I) area, which specifically deals with innovation in Manufacturing
The WCM method is a structured, rigorous and integrated production methodology that involves the organization as a whole. WCM's primary objective is to continuously improve production performance to ensure quality. Among the most important issues are the safety and the involvement of people. The WCM

program also aims at the excellence of the plants and of the supplier park through the dissemination of the innovative concepts developed and the use of the principles and methodologies of WCM. The role of the WCM R&I area inside the FCA WCM group ensures a wide auditory for internal dissemination and exploitation actions.
WCM R&I area is in the project mainly with the “Factory Innovation” department. The main activity of the department is the research and innovation in relation to the factory and the manufacturing process in the fields of flexibility and productivity, innovative robotics, Man-Robot collaboration, quality monitoring, ergonomics and logistics.

CRF’s role in the project is mainly as end-user; CRF will participate in the smart manufacturing application (WP6). As such CRF will provide requirements and know-how for functionality, safety, system requirements, factory data availability and structure and so on. CRF, as partner and part of the FCA (Fiat Chrysler Automobiles) group will give support and contribution to the exploitation of the project through proper internal dissemination and concept diffusion.

CVs of involved key researchers / staff members

Alessandro Zanella (male) graduated with a degree in "Physics" at the University of Turin. He works in CRF since 1998. His main activities have always been targeted to the development of smart, flexible and adaptive products. Initially he worked in the operative group of Mechatronics developing new actuators, sensors and control systems for advanced functionalities (front lighting adaptive headlamps, sensors for the detection and classification of front pedestrian crash, smart material based innovative actuators and so on). Afterwards the experience developed on smart systems has been applied in the field of factory automation. Since 2010 he is Senior Specialist in the field of factory flexibility and adaptability. Since 2010 he is Senior Specialist in the field of factory flexibility and adaptability. The main research fields are, end-effectors and actuators for adaptive and flexible manufacturing, architectures and systems for enhanced flexible manufacturing in the shop-floor and in the logistics and applications of Human-Robot Cooperation. He participated in many national and European projects both as CRF manager or project coordinator. He has filed more than 30 patents regarding smart devices, their control and application in many fields (automotive, white industry, manufacturing). He participates in the the definition of global FCA manufacturing research innovation Roadmaps in the field of factory innovation, adaptability and flexibility, logistics, robotic tools for ergonomics and exploitation of Human Robot Collaboration. He participates in the definition of I4.0 FCA centralized activities in particular for the HRC cluster.

Julien Mascolo (male) is a senior researcher and project manager in the Factory Innovation department of CRF. His areas of work in FCA regard the optimization of industrial processes (Manufacturing and Logistics). He is involved in internal projects within FCA in the area of design and operations of supply chains and manufacturing processes. In particular in the last years he has coordinated internal projects related to the reengineering and optimization of the manufacturing processes in several plants in FCA and several others elated to Automotive Assembly, Painting and BiW. He has also coordinated two European research projects and was involved in many others in the area of Supply Chain and Production Management, such as IMAGINE (optimization of Dynamic Manufacturing Networks), PREMANUS (Optimization of Remanufacturing processes), PROMISE (Product Lifecycle Management and Information Tracking using Smart Embedded Systems), Dynamite (Predictive Maintenance of Manufacturing equipment), Smart Products (Optimization of Shop-floor processes) and e-CUSTOM.

Giulio Vivo (male) is a senior researcher of Centro Ricerche FIAT. He graduated in Information Science in 1986 and joined CRF in 1987. From 1986-1989 he worked at Tecnopolis (Bari) dealing with innovative computer vision, inspection, robot guidance, knowledge based vision systems, 2D and 3D pattern recognition applications for the FIAT group plants. He has participated in various EU RTD programs, starting with EUREKA-Prometheus. Lately he has worked in the domain of the preventive safety and the cooperative ITS systems, contributing to a significant number of projects on these subjects, the SAFESPOT EU integrated project among the others. Dr. Vivo is currently involved in advanced robotics, automation and flexible manufacturing activities in the Process Research business line of CRF.

Relevant publications, and/or products, services or other achievements

- The future of manufacturing for the automotive industry, Julien Mascolo, EIT Digital workshop on CPS,2015
- "E-Maintenance", K.Holmberg, A.Adgar, A.Arnaiz, E.Jantunen, J.Mascolo, S.Mekid, Springer, 2010

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
Know4Car	FP7, FOF-ICT 2011-2015	knowledge management and collaboration, throughout the process lifecycle, http://www.know4car.eu/	Data knowledge on the shop floor
I-BiDaaS	H2020 2017-2020	Development of tools to empower users to easily utilize and interact with big data technologies, by designing, building, and demonstrating, a unified solution.	Tools for Big Data approach for the manufacturing
HII OEDIPUS	EIT Digital 2016-2018	a sensing platform and open architecture for realtime monitoring of Automotive welding process using Big Data.	Big Data approach for the manufacturing toward quality improvements
BOOST	H2020 2018-2021	a Big Data platform for the management of a fleet of AGVs in a stamping cell.	Big Data approach for the manufacturing toward logistics improvements

Description of significant infrastructure and major items of technical equipment relevant to the project

CRF will provide the existing technical infrastructure available in the CRF-FCA laboratories;

- Flexible adaptive systems Lab: Universal Robot UR10 CB2 and CB3 collaborative robots, KUKA LWR IIWA and its components (grippers, safety eye systems ...), and ergonomics and work analysis labs
- Quality process and monitoring control Lab: product quality and process control systems, vision systems; HMI for HRC development and characterization systems.
- Modeling Lab: augmented reality, semi-immersive virtual reality, numerical analysis and simulation of production processes
- Ergonomics: analysis, evaluation and design of workstations

Partner 21: FCA Information Technology, Excellence & Methods (FCA ITEM S.P.A.)	
Company Website:	

FCA Information Technology, Excellence and Methods SpA, was formed in 2009; it aims to provide ICT methodologies and services to companies of Fiat Chrysler Group Automobiles (FCA) and CNH-Industrial, with particular focus on:

- Innovation, project activities and services in Engineering, Manufacturing and other industrial processes
- Delivery of basic services in infrastructure, network and information security
- Governance of ICT services

FCA ITEM ICT Industrial Applications & Services BU, based in Pomigliano d'Arco (Napoli), operates with the mission to ensure the Innovation, the project activities and services in the ICT applied to Engineering and other industrial processes, for Group companies.

FCA ITEM currently has around 200 employees including 50 in B.U. Technology - ICT Industrial Applications & Services, dedicated to Research and Innovation in ICT.

The main activities are:

- Projects, Solutions and Methods in the Product and Process lifecycle management
- Applications of Virtual & Augmented Reality in operational contexts of PD, Quality, Manufacturing
- Embedded SW
- Define, coordinate and develop initiatives for research and innovation in ICT for FCA

FCA ITEM is a company of FCA Group. FCA, the seventh largest automaker in the world, designs, engineers, manufactures and sell passengers cars, flight commercial vehicles, components and production systems worldwide. The group's automotive brand are Abarth, Alfa Romeo, Chrysler, Dodge, Fiat, Fiat professional, Jeep, Lancia, Maserati, SRT and Mopar, the parts and service brand. The Group's businesses also includes Comau (production systems) and Teksid (iron and castings).

FCA operates through companies in approximately 40 countries and has commercial relationship with customers in more than 150 countries.

The Group's research concentrates on the following main areas:

- reduction of environmental footprint: with a focus on reducing environmental impacts over the entire vehicle life cycle – from raw materials to end-of-life recycling. The objective is to reduce noise, carbon and other polluting emissions, while improving vehicle energy efficiency
- safety and connected vehicles: with a focus on all aspects of safety (active, passive and preventive) and development of efficient infomobility systems
- increasing product competitiveness: with a focus on new vehicle architectures, performance, comfort and perceived quality, and the use of innovative technologies in production processes, while ensuring affordability and economic sustainability

The FCA ITEM company profile matches the tasks of the proposal. In particular, the business unit designs and deploys advanced IT solutions for production plants with reference to Industry 4.0 scenarios, enabling processes improvement. In such context FCA ITEM expertise in VR/AR will enable new approaches to continuous monitoring of processes and equipment with objective to increase global performance and create new value combining and taking advantage of technologies in order to provide the information required to solve issues and forecast potential failures

CVs of involved key researchers / staff members

Giacomo Fecondo (male): Graduated in Computer Science in 1987, begins his experience in telecommunications networks for the Italtel Telecommunications Division for the Defense as a software designer of packet-switched networks (X.25/ X.75, X .400 protocols) with applications in routing and security. Works in FCA group (Elasis, Fiat ITEM, FCA ITEM) since 1990 and devises and implements learning

solutions based on information technologies. As a project manager, coordinates numerous enterprise software projects: Interactive Electronic Technical Manual, Software Analysis for FMEA (Failure Mode Effect Analysis), Design and Development of software platforms, web based, for the Powertrain Testing Facilities management. Coordinates funded research Information technology projects. Among the most significant "Methods and solutions for e-learning and Knowledge Management" (S594 P/01 2002-2004), a project with the aim of redesigning processes and job roles, in business education. With the project "Models and service-oriented architecture for logistics and sharing of knowledge and information in product development in the automotive sector" (MIUR 4452, 2005-2007), defines, in collaboration with industrial and academic partners, methodological approaches and technological solutions for the implementation of an architecture, grid based, service-oriented for a supply chain of the automotive world. As project manager leads the public funded project "Automotive Enterprise 2.0" (PON_01_00990 2012-2015. The project defines new methodologies, techniques and enabling technologies to manage knowledge and competencies distributed in the enterprises social networks facing the new challenges deriving from Security 2.0. In 2018 contributes to preparation of ICT-H2020 proposals (Musketeer, Dispel). Supports FCA ICT Headquarters and ICT of Engine & Transmission plants in Quality Audit concerning UNI ISO/TS16949. His research interests are mainly focused on Industy 4.0.

Alessandro Milite (male): Graduated in Electronic Engineering, Alessandro begins his experience in FIAT group in 1999 (Elasis, Fiat ITEM, FCA ITEM) as project manager for the first virtual reality center and for the design of Motion Capturing room dedicated to the product process ergonomics of Elasis. As project manager leads other virtual reality center design projects for CNH USA (Burr Ridge) and, on behalf of the CRP, for Electrolux in Porcia (Italy). He has collaborated with University of Calabria in several research initiatives on Digital Mockup defining serviceability methods using Virtual Reality techniques and technologies, University of Campania, department of psychology, working about Gap&Flush and interior lightning evaluation using KANSEI methods with Virtual Reality technique and technologies. Most relevant current interest in which is involved his department, Virtual, Augmented and Mixed Reality applied to product engineering (Ergonomic and Serviceability), Style, Manufacturing (Product ergonomic, training, mainteinance), and Perceived Quality (Gap&Flush and Interior lightning evaluation). Digital Marketing (creation of VR/AR contents for commercial launch of vehicle on the market). Currently he is responsible of Virtual and Augmented Reality Competence Center in FCA ITEM.

Angjela Shiroka (female): Angjela Shiroka obtained her Master Degree in Management Engineering at University of Naples "Federico II". In 2015 she also earned PhD in Computer and Control Engineering (S.S.D. Operations Research) at University of Naples "Federico II" - Department of Electrical Engineering and Information Technology (DIETI).
In 2016 Angjela started working at FCA ITEM in the Manufacturing Methods, Applications & Tools Department as ICT Application Specialist, position that she currently holds.
Her activities are focused mainly on supporting the introduction of digital/virtual solutions in FCA plants through simulation and modeling activities. In particular, she works on the development of digital models for processes and logistics systems using DES software in order to explore system's characteristics, optimize systems performances and evaluate related benefits. She also runs experiments and create what-if manufacturing scenarios for flow material optimization, resource allocation and warehouse management systems, within the digital twinning context.
Recently she participated to the definition of proposals for innovation projects/initiatives requiring process optimization through mathematical models and methods in machine learning. In particular, she participated to PoCs related to Condition Based Maintenance implementation and to a predictive model targeted to improve efficiency in highly automated areas of production plants.

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities
OPL-APPs	National Operative Plan 2014-2020	The main objective is an Industrial IoT technological open platform and realize on it innovative applications and services to optimize Manufacturing process of FCA. The scenario is the adoption of methods and tools enabling the Digital Transformation and Industry 4.0

Description of significant infrastructure and major items of technical equipment relevant to the project

FCA ITEM is in possession of leading technologies and commercial off the shelf solutions to carry out project activities.
For the SW development of custom solutions, FCA ITEM has access to all technologies, traditional and innovative, included those cloud (IaaS and PaaS) based.
In relation to technologies more directly connected to Augmented and Virtual Reality, the laboratory is continuously enriched with state of the art solutions and devices. Regarding the SW, besides open source platforms, some commercial framework and tools are:

- 3DEXCITE DELTAGEN
- Siemens PLM solutions for engineering (CAD/CAM/CAE) modelling, simulation and visualition
- Vicon technologies for high precision motion capture and tracking
- Autodesk Maya
- Chaos Group VRAY
- Unity

Partner 22: Commissariat à l'énergie atomique et aux énergies alternatives	
Company Website: http://www.cea.fr/english	

The CEA is a public body established in October 1945. The CEA is very active in three main fields: Energy, Information and Health technologies, Defence and National security. In each of these fields, the CEA maintains a cross-disciplinary culture of engineers and researchers, building on the synergies between fundamental and technological research. The CEA has a workforce of around 15 000 employees. Within the CEA Technological Research Division (CEA DRT), institutes lead research in order to increase the industrial competitiveness through technological innovation and transfers. The institute CEA-Leti, within CEA-DRT, will contribute to DALIE. CEA-Leti gathers more than 1500 people focusing on many different applied research domains like RF, digital and SoC design for image processing, design environment and embedded software, etc. with the strong project-centred culture of its researchers, engineers and technicians, CEA-Leti is able to perform research work in partnership with the major industrial players in the nuclear, automotive aeronautical, defence and medical fields, and thus investigate and develop innovative solutions corresponding to their requirements. CEA teams have worked as partners with numerous university laboratories, engineering schools and other research establishments on collaborative projects.

CEA-Leti aims at boosting the ecosystem by embedding the SME community to the industrial test-beds thanks to open call set-up in order to attract innovative projects and propose appropriate cascade funding, to support the SME digitalization phase and skills developments. CEA-Leti will make DALI benefit of its implication in the SAE community, in particular SAE connection and networking. It will rely on its experience to set an agile open call tool, a fair and transparent evaluation process and a tailored strategy to monitor the DALI awarded projects.

Since the year 2015 when the European Commission launched the Smart Anything Everywhere Initiative, CEa-leti has been very much involved being the coordinator of one the first granted innovation Action, project EuroCPS, and experimenting the Financial Support of Third Party (FSTP, also called Cascade Funding), putting into place open call strategy, FSTP process. CEA-Leti experience was recognized and reinforced with the coordination of a second phase SAE Innovation Action, FED4SAE, and the participation to the associated CSA project, Smart4Europe. CEA-Leti is well implemented in the SAE community, with a solid experience for boosting the SAE ecosystem thanks to open call and cascade funding opportunity.

CVs of involved key researchers / staff members

Isabelle Dor (female) received her Engineer degree in 1987 in Solid Mechanics then she spent 2 years at the Von Karman Institute of fluids Dynamics (Brussels) for a master degree and then holding an advanced research orientation position. She joined CEA Nuclear Energy Division in 1989 and held several position in the CATHARE code team where she was involved in various FP6 and FP7 STREP projects. She joined CEA-Leti in 2014 on European project coordination. She has managed the EuroCPS project, she currently coordinates FED4SAE project and she is WP leader in Smart4Europe project.

Caroline Arnaud (female) received her Ph.D. degree in microelectronics from the University of Limoges (France) in 2001. Her thesis work was focused on load-pull test characterization technics, mainly dedicated to power amplifier optimization for front-end modules in telecommunication applications. After completing her Ph.D., she joined STMicroelectronics R&D division (Crolles, France) where she worked first as RF engineer, then as manager of an RF and analog test team. Her work was focused on characterization and validation of advanced integrated circuits for different domains of application, mainly telecommunication and automotive. End of 2014, Caroline joined the CEA-LETI in Grenoble where she is currently in charge of the Design Center and Platform team in the Architecture, IC Design and Embedded Software division. One of the main mission of her team is to enable and manage tools for IC design support, from emulation to test.

Relevant publications, and/or products, services or other achievements

- Participation to the SAE booklet (2016 and 2018 edition) with 4 success stories (2018 edition: https://smartanythingeverywhere.eu/wp-content/uploads/2018/03/SAE_BROCHURE_2018b.pdf)
- EuroCPS bootcamp video (https://www.youtube.com/watch?v=cqVpHpbVAwk)
- EuroCPS article "*EuroCPS project helps over 30 SMEs build new cyber-physical products for the CPS market, creating more than 100 jobs and 10 M€ additional revenues." (2018-09-14)*, published by Cordis.
- Contribution to SAE website (https://smartanythingeverywhere.eu/)

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
EuroCPS	H2020, 2015-2018)	The goal of EuroCPS project is to create synergies between emerging and established organizations operating CPS sectors in order to boost the ecosystem and ease access for SMEs, start-ups and mid-caps to technologies of established players and capacity to accelerate technology transfers	1st phase SAE IA, European industry digitization, 1st set-up of the cascade funding tool, issuing lessons learnt and recommendations to the EC for wider use. The cascade funding tool was deployed through: - Open call organization - Evaluation process set-up - Coaching/monitoring strategyCascade funding payment This 1st experience to manage the FSTP was enhance with FED4SAE projects and will be directly integrated in ***DALIE***.
FED4SAE	H2020 (2018-2020)	The overall ambition o FED4SAE is to boost and sustain the digitization of the European industry by strengthening competitiveness in CPS and embedded system market.	2nd phase SAE IA, European Industry digitization, giving access to leading technology sources, competence and industrial platforms and innovation management through the cascade funding tool, based on the experience acquired during EuroCPS. The lessons learnt with the SAE IAs will be part of the savoir-faire that will serve ***DALIE*** to implement and manage the open call and boost the SME ecosystem around the 5 test-beds.
Smart4Europe	H2020 (2018-2019)	CSA project under the SAE initiative, coordination and support action for all the SAE Innovation Actions and link with other communities such as I4MS but also ARTEMIS, HiPEAC, etc.	Smart4Europe acts as a catalyst for European Digitization and its strategic objectives are 1) connecting with the community and enhancing SAE growth by bringing on board SMEs and mid-caps, 2) multiplying and creating SAE ecosystem and achieving growth through collaboration, 3) enabling the next generation of SAE growth in new sectors., with

			a WP dedicated to supporting the ecosystem growth, the community building and sharing best practices and lessons learnt. The SAE ecosystem and the strong connection with the I4MS initiative, among other European programmes, will support ***DALIE*** project and its ecosystem.

Partner 23: Nommon Solutions and Technologies S.L.	
Company Website: www.nommon.es/	

Nommon is a research-intensive SME created in 2012 and based in Madrid, Spain, which provides decision support tools and consulting services for the transportation industry. Nommon's commercial operations are organised into three business units:

- Transport & Mobility, which provides specialised transport consultancy services, with particular focus on the use of non-conventional data sources in transport modelling projects and on new, emerging mobility concepts and technologies, such as MaaS and CAVs.
- Aviation, which provides products and services for the planning and management of airports, airlines and air traffic management systems.
- Kineo Mobility Analytics (www.kineo-analytics.com), which analyses anonymised geolocation data from mobile devices (e.g., mobile phone records) and blends them with more traditional data (e.g., census data, traffic counts) to provide mobility and travel demand information. Kineo was born in 2015 as a spin-off of Nommon, and became a business unit of Nommon in 2018, after the merger of the two companies.

R&D activities are extremely important for Nommon as a source of knowledge, understanding of market needs and opportunities, and new ideas for innovative products and services. Nommon's research agenda encompasses three main threads:

- big data and geospatial data analysis,
- complex systems modelling and data-driven simulation,
- information visualisation and visual analytics.

Since its creation in 2012, Nommon has been particularly active in European collaborative research projects, playing a coordination role in projects such as EUNOIA (FP7, www.eunoia-project.eu), INSIGHT (FP7, www.insight-fp7.eu), INTUIT (H2020, www.intuit-sesar.eu), BigData4ATM (H2020, www.bigdata4atm.eu) and BAMBOO (Eurostars, https://www.eurostars-eureka.eu/project/id/12063).

CVs of involved key researchers / staff members

Oliva García-Cantú (female), Principal Researcher at Nommon, graduated in Physics from the Universidad Nacional Autónoma de México and holds a Master in Advanced Mathematics from the University of Cambridge and a PhD in Theoretical Physics from Imperial College London. She has worked as a postdoctoral researcher in several areas of theoretical physics at Universidad Complutense de Madrid (UCM) and Universidad Carlos III (UC3M). As Principal Researcher at Nommon, she has participated in several European research and innovation projects, such as EUNOIA, INSIGHT, BigData4ATM and BAMBOO, focusing on the application of complex systems science and artificial intelligence to the study of travel behaviour.

Luis Willumsen (male) has over 35 years of experience as a consultant, transport planner and researcher with a distinguished academic career. He is an internationally recognised authority in transport and traffic modelling. Based in Britain since 1975, he has been a researcher and lecturer at Leeds University and at University College London. From 1989 to 2009, he was a Director of Steer Davies Gleave. He left the company to set up his independent practice in 2009. He has written over 50 technical papers, books and book chapters. He is co-author with Prof. Ortúzar of 'Modelling Transport', now in its fourth edition, and more recently has published 'Better Traffic and Revenue Forecasting', dealing with the issues of risk and uncertainty in demand projections for transport concessions. His experience covers transport modelling assignments and leadership of numerous traffic and revenue forecasting studies for toll roads, managed lanes, rail, metro, etc., undertaken either for the private sector, financial institutions or government sponsors. He has also experience in transport planning for large cities and regions. In 2015 he partnered with Nommon to create Kineo Mobility Analytics, which has recently been fully integrated into Nommon as a business unit. He serves at Nommon's Board of Directors, provides scientific advice for the development of new products and services, and leads Nommon's Transport & Mobility Business Unit.

Miguel Picornell (male), Technical Director of Nommon-Kineo, graduated as a Civil Engineer from the Universitat Politècnica de València (UPV). He holds a PhD in Transport Planning from UPV, a Master's

Degree in Planning and Management in Civil Engineering from UPV and a Master in Leadership in Civil Engineering from Universidad de Castilla la Mancha (UCLM). His doctoral research focuses on the analysis of geolocated data from mobile devices for the characterisation of urban mobility patterns. He started his professional career in 2008 working as a project manager in the construction industry. From September 2011 to September 2012 he worked as an Assistant Professor and Associate Researcher at the School of Civil Engineering of the UPV. In October 2012 he joined Nommon, where he has led numerous research and consulting projects dealing with spatio-temporal data analysis and transport and traffic modelling.

David Toribio (male), Head of Technologies and Software Engineering at Nommon, graduated in Computer Engineering from the Universidad Autónoma de Madrid and holds a Master in Innovation Management from La Salle International Graduate School. He started his professional career in 2006 working for Telefonica R&D and then for Indra Software Labs, where was coordinator, technical responsible, and lead developer for several national and European R&D projects. He joined Nommon in 2014, where he is in charge of leading the development of Nommon computing infrastructure and the implementation of systems and software engineering processes, and provides specialised IT support for the execution of research and consulting projects.

Relevant publications, and/or products, services or other achievements

Examples of relevant scientific publications are:

- Bassolas, A., J.J. Ramasco, R. Herranz and O. García- Cantú Ros (in press) "Mobile phone records to feed activity-based travel demand models: MATSim for studying a cordon toll policy in Barcelona", Transportation Research Part C: Policy and Practice.
- García, P., O. García-Cantú Ros, C. Ciruelos and R.Herranz (2017) "Understanding Door-to-Door Travel Times from Opportunistically Collected Mobile Phone Records: A Case Study of Spanish Airports", in D. Schaefer (Ed.) Proceedings of the SESAR Innovation Days 2017, EUROCONTROL.
- Willumsen, L.G. and M. Picornell (2016) "Transport Models and Big Data Fusion: Lessons from Experience", Proceedings of the European Transport Conference 2016.
- Picornell M., T. Ruiz, M. Lenormand, J.J. Ramasco, T. Dubernet and E. Frías-Martínez (2015) "Exploring the potential of phone call data to characterize the relationship between social network and travel behaviour", Transportation, Vol. 42, Iss. 4, pp. 647-668.
- Lenormand, M., T. Louail, O. Garcia Cantu, M. Picornell, R. Herranz, J. Murillo Arias, M. Barthelemy, M. San Miguel and J.J. Ramasco (2015) "Influence of sociodemographic characteristics on human mobility", Scientific Reports 5, 10075.
- Louail T., M. Lenormand, M. Picornell, O. García-Cantú Ros, R. Herranz, E. Frías-Martínez, J.J. Ramasco and M. Barthélémy (2014) "Uncovering the spatial structure of mobility networks", Nature Communications 6, 6007.
- Louail T., M. Lenormand, O. García-Cantú Ros, M. Picornell, R. Herranz, E. Frías-Martínez and M. Barthélémy (2014) "From mobile phone data to the spatial structure of cities", Scientific Reports 4, 5276.
- Lenormand M., M. Picornell, O. García-Cantú Ros, A. Tugores, T. Louail, R. Herranz, M. Barthélémy, E. Frías-Martínez and J.J. Ramasco (2014) "Cross-checking different sources of mobility information", PloS one 9 (8), e105184.
- Ortuzar, J. de D. and L.G. Willumsen (1990) "Modelling Transport", John Wiley and Sons, Chichester, UK.

Relevant products and services:

- Travel demand information commercialised through our brand Kineo (kineo-analytics.com).

Examples of relevant commercial projects in which non-conventional data sources, such as mobile phone records and public transport smart card data, have been used to analyse travel demand and build transport and traffic models:

- Analysis of Potential Demand of the Future Acciona Scooter-Sharing System in Madrid. Customer: Acciona. Year: 2018.

- Analysis of Travel Demand and Development of a Travel Demand Model of the Island of Tenerife. Customer: Cabildo de Tenerife (Tenerife Local Government). Year: 2018.
- Origin-Destination Matrices of the Barcelona Ring Roads. Customer: Barcelona City Government. Year: 2018.
- Origin-Destination Matrices of Barcelona Metropolitan Area for Barcelona Virtual Mobility Lab (https://inlab.fib.upc.edu/en/barcelona-virtual-mobility-lab). Customer: CARNET. Year: 2018.
- Study of Interurban Passenger Mobility based on Big Data technologies. Customer: Spanish Ministry of Transport. Year: 2018.
- Origin-Destination Matrices of the Region of Valencia for the Sustainable Urban Mobility Plan of the City of Valencia. Customer: IDOM. Year: 2017.
- Origin-Destination Matrices of the Málaga Metropolitan Area. Customer: EMT Málaga (Málaga Public Transport Municipal Company). Year: 2017.
- Origin-Destination Matrices and Study of Route Choice for a Toll Road in Santiago de Chile. Customer: Highway Concessionaire Company (confidential). Year: 2016.
- Estimation of Potential Demand for a Toll Road in Spain and Modelling of Revenue Optimisation Strategies. Customer: Ferrovial-Cintra. Year: 2016.
- Extraction of Origin-Destination Matrices from Mobile Phone Data for the Region of Madrid, 2015. Customer: Consorcio Regional de Transportes de Madrid, CRTM (Madrid Regional Public Transport Authority).
- Evaluation of the Potential of Mobile Phone Records for Obtaining Commuting Information for the Spanish Census. Customer: Instituto Nacional de Estadística, INE (Spanish National Statistical Office). Year: 2015.

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
BigData4ATM	H2020 - SESAR 2020 Exploratory Research, 2016-2018	The main objective of BingData4ATM (bigdata4atm.eu) was to investigate how new sources of passenger-centric data coming from smart personal devices can be analysed to extract relevant information about passengers' behaviour and inform air transport decision making processes	The data analysis and fusion techniques developed in BigData4ATM will be enhanced in ***DALIE*** by considering further and variety of data sources or the to allow the enrichment of trajectories mobility patterns extracted from geolocated passenger centric data sources to be used in the pilot case of Barcelona
INSIGHT	FP7, 2013-2016	INSIGHT (insight-fp7.eu) investigated how innovative data analysis and visualisation techniques can help improve planning and decision support systems for cities and regions. Case studies focused on the cities of Barcelona, London, Rotterdam and Madrid.	The visual analytics and data mining techniques developed in INSIGHT will be used in ***DALIE*** for data cleaning and bias identification for the data sources of the pilot case of Barcelona
EUNOIA	FP7, 2012-2015	The goal of EUNOIA (eunoia-project.eu) was to take advantage of the opportunities brought by new big data sources to develop, calibrate and validate urban transport simulation models. Case	The data sources identified in EUNOIA as well as the data fusion and analysis techniques developed in this project will be used in ***DALIE*** to extract mobility patterns from the fusion and analysis of traditional and non-

		studies focused on the cities of Barcelona, London and Zurich.	conventional data sources for the pilot case of Barcelona.
TripOD	H2020 SME Instrument Phase 1, 2014-2015	TripOD (Advanced Analytics for Trip Origin-Destination Matrices) conducted a feasibility study and developed a business plan for the products and services that would later be commercialised by Nommon-Kineo	The data analysis and fusion techniques developed in TripOD will be used in ***DALIE*** and enhanced for the extraction of mobility patterns from different geolocated passenger centric data sources for the pilot case of Barcelona
BAMBOO	Eurostars, 2018-2020	Eurostars, 2018-2020. The goal of BAMBOO (Big Data Analytics for Mobility Modelling) is to develop new methodologies and algorithms to extract travel demand information from anonymised mobile phone records and to integrate such information into state-of-the-art transport simulation systems and interactive visualisation tools	The improvements of the Kineo algorithms developed in this project will used in ***DALIE*** for the refinement of route and mode identification from alternative data sources from different geolocated passenger centric data sources for the pilot case of Barcelona

Description of significant infrastructure and major items of technical equipment relevant to the project

Big data infrastructures demand high processing/IOPS performance and very large storage capacity. To conduct the work proposed in DALIE, Nommon will make use of the storage infrastructure of the company implemented by means of RAID disk arrays offering low latency access and data redundancy to extensive data volumes. Computation nodes take advantage of optimised access to the datasets persisted on this infrastructure. These nodes are mainly equipped with quad-core Intel processors and a large amount of RAM memory. The infrastructure is surrounded by a network including the standard security measures, i.e. firewall, SPI intrusion detection, DoS protection, etc. When the computational needs of the project exceed the resources provided by Nommon's local infrastructure, supplementary resources.

Partner 24: Factual Consulting	FACTUAL
Company Website: www.factual-consulting.com	

Factual is a disruptive innovation and consultancy firm specialized in all things mobility. Factual builds on an extensive international network of highly skilled and experienced professionals, independent consultants, entrepreneurs, researchers who bring in their background and knowledge, adapting to our customers' requirements with a more flexible, sharp, and focused approach than more traditional consultancies. Factual believes in high performance individuals delivering passion, expertise, vision and commitment to fulfilling customers' goals, and always steer towards exceeding them: meeting a customer's goal is not a finish line for Factual; our mindset is already planning for the next frontier, identifying a new revenue stream, working to leverage an unmet opportunity.

Core role of Factual in DALIE will be leading and coordinating the overall activities of the test-bed stakeholders (DALIE actual partners and local urban mobility policy makers), aligning their individual needs, strategic and technical requirements, with the overall project activities and objectives, driving DALIE to achieving the sought impact, and effectively measuring and disseminating it to the relevant audiences, maximising the awareness of the activities implemented in the context of urban mobility in Barcelona as inspiration for other cities facing similar challenges, both within the project and beyond.

CVs of involved key researchers / staff members

Martí Jofre (male)
Martí Jofre is Factual founder, ITS (Intelligent Transportation Systems) Business Manager at Pildo Labs and Innovation Consultant for Fundació Creafutur. He holds a Master's Degree in Telecommunications, for both Telecom Paris and the Technical University of Catalonia (UPC), and a Master in Marketing Management for EADA Business School. He accumulates a wide experience in the definition, sale and management of R&D and innovation projects, mostly related to satellite navigation applications and urban mobility, obtained at companies such as European Space Agency (ESA), Centre de Tecnologia Aeroespacial (CTAE) and European GNSS Agency (GSA). He is the coordinator of the GSA-funded European project "Galileo for Mobility", aimed at fostering the adoption of Galileo location technologies for Mobility as a Service (MaaS) applications.

Camila Gonzalez Arango (female)
Camila holds an Electronic Engineering Degree by the Pontifical Javeriana University of Bogotá (Colombia) and a MSc in Sustainability by the Universitat Autònoma de Barcelona (UAB). She is Senior Project Manager at FACTUAL, where she is involved in research and projects from both the technological and socioenvironmental approaches. She is now leading Current Ecological, from where she develops urban initiatives that use innovation, human-centered strategies and research, to foster behaviour change towards urban sustainability. She also collaborates with different public and private organizations as a freelance consultant on project management. She has extensive experience in sales and product management in technology in Latin America. Based in Barcelona but originally from Bogotá, Camila participates in citizens initiatives in both cities and collaborates with local and international movements.
Online résumé: https://www.linkedin.com/in/camilagonzaleza/

Josep Laborda (male)
Josep Laborda is Intelligent Mobility Project Manager at RACC and advisor to Factual. He holds a Master's Degree in Telecommunications for the Technical University of Catalonia. He has a track record in defining business strategies as an analyst at Deloitte. At RACC, he has participated in numerous EC-funded R&D projects in the CASE – Connected, Autonomous, Shared & Service, and Electric – fields. In recent years, he has led the development and launch of the traffic and mobility information service at RACC, and is currently the technical coordinator of new MaaS services. He has served as member of ERTICO ITS Europe Strategy Committee. He is active in several national and international working groups and task forces, including the CARNET platform in Barcelona (Cooperative Automotive Research Network), the FIA task force on connected vehicles and the Mobility as a Service Alliance, where he leads a WG looking at identifying

business models and best practices being developed worldwide. He is a part-time lecturer and advisor at the UPC Postgraduate Course on "Smart Mobility: Intelligent Transportation Systems".

Relevant publications, and/or products, services or other achievements

- Jofre, M. "Citizens and the future of Mobility: the Barcelona case", POLIS Annual Conference 2017, Brussels (Belgium)
- Jofre, M., Ortuño, J., Soley, S. "Advanced positioning service for smart mobility applications". ITS World Congress 2015, Bordeaux (France)
- Portouli, E., Amditis, A., Lytrivis, P., Tzanidaki, J., Laborda, J., Rodrigues, N., van Waes, F., Liebermann, J., Dafonte, P. "Traffic Management of the future and Road Automation" (2016). 11th ITS European Congress, Glasgow (Scotland) (conference proceedings)
- Rehrl, K., Salanova, J., Laborda, J., Tzanidaki, J., van Waes, F. 'Traffic Management 2.0 - The Win-Win" (2016). 11th ITS European Congress, Glasgow (Scotland) (conference proceedings)
- Laborda, J. "Loop sensor and Floating Car Data fusion for traffic information in Spain" (2011). 8th ITS European Congress, Lyon (France) (conference proceedings).
- Laborda, J., Castells, X., Hesselbach, X. "Design and implementation of a J2EE platform to handle standardised telematics emergency calls originated from vehicles" (2004). 15th IEEE International Symposium on Personal, Indoor and Mobile Radio Communications, Barcelona (Spain) (conference proceedings).

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
smartCEM (smart Connected ElectroMobility)	European Commission, Competitiveness and Innovation Framework Programme (CIP), 2012-2015	Main goal of the project was to design and develop services tailored to Electric Vehicles and pilot them in different European cities (Barcelona, San Sebastian, Newcastle, Reggio Emilia) implementing various business scenarios. Mr Laborda was the coordinator of a pilot test in Barcelona of a novel one-way sharing mobility service with electric scooters, which was successfully launched after the project lifetime and currently expanding to other European cities. Mr Jofre was a central contributor to the business model of the service.	***DALIE*** will generate insights on the expected impact of innovative urban mobility strategies aimed at solving common issues facing cities today, such as air quality caused by mobility. Accumulated experience in successfully developing, launching and evaluating new urban mobility services (specifically based on EVs) will definitely contribute to the ***DALIE*** goal of supporting urban mobility policy makers in defining their strategies.
CARNET (Cooperative Automotive Research Network)	Public-Private Partnership, funded by partners	CARNET is a knowledge hub for automotive science and technology, focused on urban mobility, and based in Barcelona. http://www.carnetbarcelona.com	The Technical University of Catalonia (UPC) and SEAT are founding partners of CARNET; Factual is a regular contributor to its activities. CARNET network and links with the mobility industry, local universities and institutional partners will be very valuable for ***DALIE***, with the ultimate aim to leverage HPC to achieve true impact in Barcelona urban mobility strategies.

MaaS Alliance	Public-Private Partnership, funded by partners	The Mobility as a Service (MaaS) Alliance is a public-private partnership creating the foundations for a common approach to MaaS, unlocking the economies of scale needed for successful implementation and take-up of MaaS in Europe and beyond. The main goal is to facilitate a single, open market and full deployment of MaaS services. https://maas-alliance.eu	Mr. Laborda coordinates a Working Group in the Alliance devoted to assessing pioneer landmark MaaS implementations worldwide to understand best practices, lessons learned and levers towards successful implementation of MaaS. ***DALIE*** aims at making recommendations and contributing to the definition of urban mobility strategies (including MaaS) grounded on HPC support. Having the views from other cities having implemented MaaS will be a very valuable complement.
Galileo For Mobility	European Global Navigation Satellite Systems Agency, 2017 – 2020	Galileo For Mobility fosters the adoption of Galileo location technology to support and improve MaaS services. Mr Jofre is the coordinator of the project. http://www.galileo4mobility.eu	***DALIE*** will leverage technical inputs and advice from Galileo For Mobility, specifically when MaaS-like services are simulated and its expected impact evaluated contributing to the implementation of future urban mobility measures in European cities.
Citizens and the future of Mobility: the Barcelona case	Joint funding of 11 public and private entities from Barcelona mobility ecosystem	The project aimed at identifying the shift we might observe in the coming years on the attitudes and behaviour of Barcelona citizens related to daily mobility, looking at the impact that shared mobility or urban planning policy might have in modal share distribution. More specifically, the study performed a segmentation of citizens according to their attitudes towards mobility and other sociological aspects, and assess the potential for behavioural shift in each segment.	***DALIE*** impact will be assessed according to the citizen segments and behavioural change opportunities as identified in the study.

Partner 25: Eurolife ERB A.E.G.A	
Company Website: www.eurolife.gr	

Eurolife ERB Insurance Group Holdings S.A. is one of the largest insurance providers in Greece with c.12.2% m.s. in combined life and non-life insurance. Fairfax Financial Holdings Limited, an international investment group with extensive experience and expertise in the insurance sector, acquired jointly with OMERS Administration Corporation in 2016, an 80% equity stake in the Eurolife ERB Group.

Eurolife ERB Insurance designs, offers and promotes insurance products and services that cater to all the needs of modern living. EERB counts more than 15 years of successful operation. Inno-vative and flexible, the products that EERB designs have carved a new reality in insurance sales. EERB's sales network promotes our products via the Eurobank branch network and selected working partners/brokers throughout Greece.

Eurolife will act as an industrial testbed partner for this proposal, providing a large scale automotive insurance industrial testbed.

As part of the consortium, Eurolife will offer their historical data about motor insurance, including claims, accident reports and photos of accidents. Their main tasks will include data preparation (table analysis and optimization, GDPR, data cleansing, possible normalizations, etc.).

CVs of involved key researchers / staff members

Nick Giannakakis (male) is currently the CTO of Eurolife ERB Insurance SA. He is an experienced business director and information technology expert. He has lead business transformation, enabled cost savings to companies across the world and consulted on/commanded massive multi-million Euro change management. He has extensive experience as senior IT/Information System Business Leader in globally distinguished multinational companies including: British American Tobacco where he held the position of Global Head Centre of Excellence, Richemont where he held the position of Group Program Director and in Coca-Cola HBC where he held the position of Group BI Manager. He is an active alumni member of the Institute for Management Development (IMD), MIT Sloan School of Management, and London Business School.

Kostoglou John (male) is currently working as IT Manager of Eurolife ERB Insurance SA reporting to CEO. His main tasks include: Full responsibility and supervision of IT division, managing a team of 21 employees, IT strategic planning, IT budget management, Technical evaluations for hardware and software, Development and Maintaining of company IT systems software and databases, Recommending and implementing improvements and efficiencies, Project planning and Project management, Audit Reporting. He has extensive experience in insurance companies as he worked as Group Insurance Manager in the IT Division of Alpha Insurance Company and as New Development Manager in Generali Life SA. In addition, he has worked as manager and analyst in several companies including "TORRENT"-Emmanuel N Kazis SA and Johnson & Johnson Hellas SA. He holds a Bachelor of Science in Business Administration with specialty in Computer Information Systems from the American College of Greece – Deree College.

Yannis Sotiropoulos (male) received his Ph.D. from Athens University of Economics with specialization on stream analytics. He holds a B.Sc. from the Department of Digital Systems from University of Piraeus and a M.Sc. in Network-based Systems from University of Piraeus. His research interests are Data Streams, Business Intelligence and Data Analytics. He has participated on several Research and Information Technology projects as Research Officer and as Senior Business Intelligence Engineer and Management Information Systems Professional.

Anastasis Dimas (male) holds a B.Sc in Computer Science from University of Ioannina and currently working as a Software Engineer for financial institutes. His interests lie in Data Analytics and Artificial Intelligence.

Relevant publications, and/or products, services or other achievements

- ETL processes/procedures for handling data
- Motor Data Warehouse (SQL Server)
- Analysis Services OLAP Cubes (eg. PnL, ERB Statistics cube etc)
- PowerBI tabular models and Visualization
- Motor Antifraud services (FRISS) https://www.friss.com/news/eurolife-erb-chooses-friss-solution-underwriting-claims/

Description of significant infrastructure and major items of technical equipment relevant to the project

Eurolife Motor insurance market size:

- Over 100.000 in force motor contracts for September 2018
- 12x of this size per year (historical data)
- Over 18.300 new motor claims for year 2017
- Daily handling of 100+ new motor claims (on average including payments) for year 2017
- Eurolife Database/Historical data for Motor contracts/claims
- Over 3.400.000 records of data for motor contracts in 1993-2018 period
- Over 150.000 records of data for motor claims in 1993-2018 period
- 25G data in production motor database (Motor basic tables in Oracle), excluding customer data

Partner 26: Budapest University of Technology and Economics (Department of Electron Devices)	
Company Website: http://www.eet.bme.hu	

BME (Budapest University of Technology and Economics) is one of the leading technical universities of Central Europe. Its historical excellence is demonstrated with the numerous Nobel Prize holders of former graduates of BME. The Department of Electron Devices deals with all aspects of microelectronics and ICT, from semiconductor physics through device manufacturing to fully software-based system level design. The multi physics knowledge of the researchers is exploited by their work in a number of European projects, exploited also in recent H2020 projects such as EuroCPS or Delphi4LED. A special field of research is related to thermal issues of electronic systems and solid-state light sources, exploited in multiple dozens of European and national R&D projects (including the aforementioned ones). In the EuroCPS project BME acted as competence and design center to support local SMEs in their innovative CPS based development projects. In the FED4SAE H2020 project BME maintains this activity as a DIH, a digital innovation hub. Working with SMEs has a long tradition at BME which also manifested in launching several spin-off companies in the past 2 decades, e.g (MicReD Ltd – now part of Mentor, a Siemens business, specialized in thermal testing of packaged semiconductor devices; C3S Ltd. specialized in development of pico-satellites; and most recently, SpinSplit Ltd., specialized in microfluidic systems for biochemistry. BME exploits their knowledge gained in the R&D projects in their educational activities by launching new elective subjects for MSc and PhD students which also led to their participation in an Erasmus+ international MSc course on Smart Systems Integration (SSI).

CVs of involved key researchers / staff members

Márta Rencz (female) holds a full professorship at BME Department of Electron Devices (BME DED). Between 2005 and 2013 she served as the Head of DED. In 1997 she co-founded Micred as the spinoff of BME and served as the CEO of Micred until it was acquired in 2008 by Mentor Graphics. Since then, she holds also a research director position in the Micred unit of Mentor Graphics. She has been leading researcher in various international and national research projects, resulting in more than 300 research papers.

András Poppe (male) is an associate professor and the current Head of Department of BME's Department of Electron Devices (BME DED). He was co-founder of Micred. His major research field is the thermal and electro-thermal modelling and multi-domain testing in electronics. He is a worldwide known expert of LED characterization. He has published his research results in more than 200 papers.

András Timár (male) obtained his MSc degree in electrical engineering in 2006 at BME. After graduation he started PhD studies in the field of thermal aware design of ICs, especially electro- and logi-thermal simulation. He obtained his PhD in 2013. His expertise includes C/C++ software development, software development for mobile devices, web development. Currently he is a senior lecturer at BME DED and has been working on the development of an IoT-enabled smart lighting application. He is one of DED's experts on CPS/IoT platforms. He is senior staff member of the department's EDA laboratory.

Relevant publications, and/or products, services or other achievements

IoT/CPS design platforms in LED-based street-lighting luminaires", In: Dariusz Sawicki, Piotr Pracki (ed.), Proceedings of the VI. IEEE Lighting Conference LUMEN V4, Karpacz, Poland, 13/09/2016-16/09/2016. pp. 65-70. http://dx.doi.org/10.1109/LUMENV.2016.7745518

András Poppe, Márta Rencz, Robin Bornoff, Christophe Marty, Joan Yu, Genevieve Martin, "LED based application design in an "Industry 4.0" approach: implementation as proposed by the Delphi4LED project", In: Proceedings of the 16th International Symposium on the Science and Technology of Lighting (LS16), 17-22 June 2018, Sheffield, UK, http://www.eet.bme.hu/~poppe/MTMTDOCs/LS16_Poppe_et_al-FINAL.pdf

Péter Pálovics, Ferenc Ender, **Márta Rencz**, "Geometric optimization of microreactor chambers to increase the homogeneity of the velocity field", JOURNAL OF MICROMECHANICS AND MICROENGINEERING 28: Paper 064002. 11 p. (2018), http://dx.doi.org/10.1088/1361-6439/aab1c3

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
EUROCPS	H2020 ICT	Supporting SMEs in platform-based CPS design	We have created a web-based system for supporting application experiments of SMEs that is intended to be used also by the ***DALIE*** project
FED4SAE	H2020 ICT	Supporting SMEs in platform-based CPS design	Experience with our reliability test-bed
SMARTPOWER	H2020 ICT	Development of a reliability testbed for high power applications	Experience with our reliability test-bed

Description of significant infrastructure and major items of technical equipment relevant to the project

BME is supposed to host the website of the project. BME is experienced in this, as our expert team has developed already the website of several ICT projects and hosts them successfully. BME has developed a proposal submission system especially for cascade funding support of ICT projects. This has been used already successfully in the EUROCPS and the FED4SAE projects. If needed the CPS reliability test-bed of the department can also be offered for the project.

Partner 27: Venaka Media Limited	
Company Website: http://www.venaka.co.uk	

Venaka Media Limited (VML) is a SME specializing in the provision of software and services for multimedia processing and communications systems. By exploiting modern software and hardware technologies together with open middleware platforms, VML engineers have successfully delivered several commercial platforms that fulfil projects and customers' requirements. VML technology is a result of extensive R&D activities performed in cooperation with well-known academic research teams. The product-oriented core competencies of VML include cloud-oriented video coding, media analytic solutions for security services, multimedia data mining, and end-to-end multimedia communications.
The team members of VML have collectively more than 30 years of experience in identifying problems and engineering optimal solutions. VML has vast expertise across several technologies including media analysis, signal processing, feature indexing, Big data analytics and loosely coupled distributed system design. The product-oriented core competencies of VML include expertise in developing application across several platforms including desktop solutions, mobile applications along with complementary technologies that support front-end system design using HTML5, CSS3, jQuery and AngularJS for enhanced visualisation of large-scale information.
The innovation potential of VML involve the high-level abstraction of system functionalities that delivers simplified solutions to the customers and enables wide-range adoption of research outcomes. System design architects at VML have several years of experience in the creation and management of distributed network infrastructure across diversified deployments including stand-alone model as well as in a cloud environment such as Amazon EC2. VML personnel brings extensive research background and track record acquired through participation in UK and EU funded project, as well as, long standing co-operations with renowned industrial players as United Technologies, Motorola, Philips and Siemens. VML also actively participates in several standardisation activities including the participation in ISO/IEC/JCT 1/SC29/WG 11 (MPEG) group and Open Network Foundation (ONF) for SDN, TM Forum (TMF) Distributed Management Task Force (DMTF).

CVs of involved key researchers / staff members

Dr. Krishna Chandramouli (male) PhD, MIET, M. Tech, B. E, currently holds the position of CTO at VML. He received his PhD degree from University of London in 2009 with specialization in machine learning for visual pattern recognition using biologically inspired algorithms. He held the post of Postdoctoral Researcher offering consultancy in the field of knowledge and media analysis. He is a recognized expert in the use of video processing for semantic analysis of multimedia content. His expertise on Big Data Analytics, with experience in FI-Ware technologies (both generic enablers and specific enablers) has been gathered over many years of participation in several international benchmarking activities that are related to Media standardisation as MPEG. Dr. Chandramouli has executed several key projects in the domain of knowledge representation for geospatial content analysis, media transmission and forensic security for big-data platform. He has also been a key contributor for EU funded projects namely, FP6 NoE K-Space, FP7 IP MESH, FP7 STReP PAPYRUS, FP7 STReP RUSHES, FP7 NoE PetaMedia and FP7 NoE 3DLife. He has a collective experience of more than 15 years in research and industry. Dr. Chandramouli is also a member of MPEG ad-hoc group for Media Orchestration (MORE). He is also a recognised subject expert at British Standards international (BSI) for Systems and contributes towards standards development. Currently, he holds the post of a Research Assistant at MMV and conducts research in the semantic data modelling for large-scale linguistic models complemented with heterogeneous information modalities. He has published more than 50 papers in several conferences including several hosted by IEEE among others and book chapters. He is a member of IEEE, IEEE Computer Society, ACM and ONF. He has also organised special sessions in CBM'17, ICMR'18. His current research interests include machine learning, big data video analytics, media engineering, time series analysis, information science and knowledge modelling for surveillance applications.

Dr. Sergio A Velastin (male) is a recognized expert in the use of video processing for improved security and the feeling of security in public spaces. He has worked for a number of years on visual monitoring of crowds and the detection of incidents related to personal security. This includes funding under a number of UK grants, EU Framework IV, V, VI and VII (CROMATICA, ADVISOR, PRISMATICA (Technical Co-oordinator), CARETAKER and ProtectRail) in all of which he has worked closely with citizens groups, police, transport operators, research institutions and manufacturers. He has also led industrially-funded research such as "Getting the Best Use out of CCTV in the Railways (UK Railway Safety and Standards Board), "Intelligent Pedestrian Surveillance System for Public Transport in Rome" (Rome Public Transport Authority), Video-based Vehicle Classification (Transport for London) and Human Activity Recognition (Bosch). In 2003 he conceived and still organises and chairs an international conference on Imaging for Crime Detection and Prevention (ICDP) that attracts a range of security experts, including police forces. He has authored more than 100 publications on visual surveillance and until recently he was the director of the Digital Imaging Research Centre in Kingston University London. He is a Senior Member of the IEEE and regularly gives keynote talks on video analytics to scientific and commercial audiences.

Ms Sofia Trujillo (female) is a VML administrator and EU LEAR representative for the company. She has been actively involved in research projects on quality of experience analysis of surveillance content and prediction of event on the basis of human behaviour. She is responsible for the negotiation and management of the financial, commercial and technical aspects of all productions in VML.

Relevant publications, and/or products, services or other achievements

- M. Oskar van Deventer, Jean-Claude Dufourd, Sejin Oh, Seong Yong Lim, Youngkwon Lim, Krishna Chandramouli, Rob Koenen, "Media orchestration between streams and devices via new MPEG timed metadata", International Broadcasting Convention 2017 (IBC2017), doi: 10.1049/oap-ibc.2017.0322
- Several contributions to ISO/IEC 23001-13 Media Orchestration standard specification
- Professional consultancy on Open Networking Foundation (ONF) Certified SDN Associate (OCSA) training activities, 2017
- F. Sobhani, K. Chandramouli, Q. Zhang and E. Izquierdo, "Formal representation of events in a surveillance domain ontology," 2016 IEEE International Conference on Image Processing (ICIP), Phoenix, AZ, 2016, pp. 913-917.
- Galanopoulos D., Dojchinovski M., Chandramouli K., Kliegr T., Mezaris V. (2015) Multimodal Fusion: Combining Visual and Textual Cues for Concept Detection in Video. In: Baughman A., Gao J., Pan JY., Petrushin V. (eds) Multimedia Data Mining and Analytics. Springer, Cham

List of relevant previous projects or activities, connected to the subject of this proposal

Project acronym	Funding source/ period	Topic of the project / activities	Relevance and link to DALIE
MAGNETO	H2020	• Contribution to the big-data visual analytics. • Cross-domain evidence analysis • Sparse-time series data analytics • Semantic technologies for high-level knowledge reasoning Extraction of high-level events description from visual analytics	The outcome of the project will be leveraged in the contribution of WP3, WP5 and WP8. The development of the scientific products will enable product development for catering the needs of transportation and financial services sector.
DEFENDER	H2020	• Architecture design and development for ingesting large-scale heterogenous data sources • Real-time visual analytics for	The real-time streaming capability and object detection will be leveraged for the development of visual pattern analysis.

		object detection (drones, human, intrusion detection) Security by design for software component lifecycle management	
LASIE	FP7	• Large-scale integration of digital forensic information datasets • Development of Distinctive Region Or Pattern (DROP) detection module to enable data correlation among diversified media sources • Contribution to ISO/IEC 23001-13 Media Orchestration specification Time-series correlation for digital evidence	The time-series correlation analytics will be used to contribute for the event extraction within smart mobility and smart finance use-cases.
ADVISE	FP7	• Unification of distribution surveillance infrastructure • Data mining platform for multi-modal information analysis Large-scale database repository for metadata extraction	The semantic models for knowledge representation extracted from media processing algorithms will be exploited within the project.
Surveillance centric coding	Industrial funding	• Motion analysis-based encoding of surveillance videos	The technology transfer on dynamic profiling of media encoding standards (such as MPEG DASH) will be leveraged to support real-time media streaming.

Description of significant infrastructure and major items of technical equipment relevant to the project

Media data storage:

- 160TB CyberStore 316S 12GB/s Storage Server

Computing:

- A dedicated work station Overclocked Intel Core i7-7700k Quad Core (4.8GHz) with GPU 11GB Nvidia GeForce GTX 1080 Ti -
- A TITAN Gladius Overclocked SLI Pro PC Intel Core I5 7600K with Nvidia GPU Asus GeForce GTX 1070

Two Alienware Overclocked AMD Ryzen Threadripper 1950X (16-Core) wit ual GPU Nvidia GeForce GTX 1080 Ti

4.2 Third parties involved in the project (including use of third party resources)

BSC

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)?	No
Does the participant envisage that part of its work is performed by linked third parties?	No
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)?	Yes

Some activities carried out at the Barcelona Supercomputing Center – Centro Nacional de Supercomputación (BSC) will be contributed free of charge by a Third Party: Universitat Politècnica de Catalunya (UPC).

The BSC is a consortium that is composed of the following member institutions: Universitat Politècnica de Catalunya (UPC), Spanish Council for Scientific Research (CSIC), as well as the Spanish and the Catalan governments. The UPC contributes in kind by making human resources available to work on projects. The relationship between BSC and UPC is defined in an agreement with each institution that was established prior to the start of this project.

The Department involved in this proposal is the Department of Project and Construction Engineering (DEPC) of the Polytechnic University of Catalonia (UPC) that teaches and conducts research in the field of project engineering, environmental engineering, energy efficiency among others. The research activity of the DEPC is organized in several research groups. Its scientific production includes publications in high impact indexed journals and lectures at congresses of recognized international prestige derived from participation in numerous national and European competitive research projects.

This Department shares key resources with the BSC, including several key personnel that will be dedicated to this project. There is a signed Collaboration Agreement between the UPC and the BSC establishing the framework of the relationship between these two entities. According to this agreement, several professors of the UPC are made available to the BSC to work on projects. According to this situation, UPC will not carry out any part of the work and just lends resources to the beneficiary. The third party makes available resources (dedicated time of Dr María Gonçalves-Ageitos, who is employed by UPC) to the beneficiary BSC, which does not reimburse the cost to the third party, but which charges the costs of the third party as an eligible cost of the project. Its costs will be declared by the beneficiary in its Financial Statements but must be recorded in the accounts of the third party. The salary of Dr María Gonçalves-Ageitos is shared by both institutions.

UPC resources will be available for the whole duration of the project, mainly for RTD activities. Main activities are on WP7 with an involvement of the 8% respect to the total BSC efforts.

Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No

SEAT

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)?	No
Does the participant envisage that part of its work is performed by linked third parties?	Yes

The Linked Third Party associated to SEAT S.A. is Volkswagen AG. VW is linked to SEAT S.A. since both are subsidiary companies of Volkswagen group. The Linked Third Party will deal with the connected cars data extraction which will transit via a backend infrastructure that serves for all brands of the VW group (development and maintenance of the backend and delivery of raw data).	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)?	No
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No

CEA

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)?	No
CEA will provide financial support to third parties via cascade funding. Since the call does not mention this budget category in the work program, it is not possible to allocate budget of this kind in the proposal part A. We therefore opted to add the respective budget under "Subcontracting".	
Does the participant envisage that part of its work is performed by linked third parties?	No
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)?	No
Does the participant envisage that part of the work is performed by International Partners (Article 14a of the General Model Grant Agreement)?	No

Section 5: Ethics and Security

5.1 Ethics

Collecting, handling and transferring personal data will be done sensitively, transparently and only in the extent that is necessary for unobstructed progress in the project. Project partners will also comply with the applicable legislation concerning data protection in the European Union. Personal data will be anonymized and measures will be taken to prevent any backtracking from data sets to individuals. Persons whose individual personal data is used are informed and will have the possibility to withdraw their consent for the use of their data. Possible data purchases will be documented and traceable.
Ethical issues in project DALIE are discussed with applicable authorities to ensure the implementation of a security design for data collection, storage, access, sharing, protection, retention and destruction already in the design phase of the project but also during the work in the project.

Protection of personal data: compliance with National and EU Data Protection Laws
Both Nommon and SEAT (Air Quality and Mobility Strategies testbed) carry out personal data collection. While it involves tracking of participants, it doesn't collect or process any sensitive personal data such as health, sexuality, ethnicity, political opinion, religious or philosophical conviction, nor genetic information. It doesn't involve a secondary use of previously collected personal data.
According to Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, the principles of data protection should apply to any information concerning an identified or identifiable natural person. To determine whether a natural person is identifiable, account should be taken of all the means reasonably likely to be used, such as singling out, either by the controller or by another person to identify the natural person directly or indirectly. To ascertain whether means are reasonably likely to be used to identify the natural person, account should be taken of all objective factors, such as the costs of and the amount of time required for identification, taking into consideration the available technology at the time of the processing and technological developments. The principles of data protection should therefore not apply to anonymous information, namely information which does not relate to an identified or identifiable natural person or to personal data rendered anonymous in such a manner that the data subject is not or no longer identifiable. EU Regulation does not therefore concern the processing of such anonymous information, including for statistical or research purposes.
Data from call detail records to be collected and processed during the DALIE-BCN test case meet or could potentially meet the definition given in the EU regulation. This data will be previously anonymised by the data providers in such a way that the data subject is no longer identifiable. To ensure this, the relevant data sharing agreements will specify that the different datasets will not contain any Personally Identifiable Information. However, after anonymisation, some individual records of the datasets used in the project might contain information that, even if it does not allow individual identities to be distinguished, could potentially be combined with information from additional data sources in an attempt to re-identify individuals. Although this is very unlikely, to prevent any risk the project will explicitly disallow the combination of partial samples or complete datasets of disaggregated data with other datasets, i.e., the combination of data coming from different data sources will always be made using aggregated data. Additionally, it is important to bear in mind that:

- CDRs will be collected and stored by the data providers. The data will never leave the providers platform and will be processed in there only by the partners that own the agreements with them. Nommon has previous experience in the management of this type of data in scientific projects (e.g., in the FP7 EUNOIA and INSIGHT projects and in the H2020 BigData4ATM, where the proposed approach was approved by the EC after an exhaustive Ethics Audit). Additionally, Nommonhas conducted a number of consulting projects with this data. Only processed aggregated data will leave the providers' platform.

- The rest of partners will only work with post-processed, aggregated information (e.g., aggregated flows between A and B, segmented by the sociodemographic characteristics of the travelers), and therefore are not concerned by the protection of personal data (POPD) requirements.

5.2 Security[5]

Please indicate if your project will involve:

- activities or results raising security issues: (NO)
- 'EU-classified information' as background or results: (NO)

[5] Article 37.1 of Model Grant Agreement. *Before disclosing results of activities raising security issues to a third party (including affiliated entities), a beneficiary must inform the coordinator — which must request written approval from the Commission/Agency;* Article 37. *Activities related to 'classified deliverables' must comply with the 'security requirements' until they are declassified; Action tasks related to classified deliverables may not be subcontracted without prior explicit written approval from the Commission/Agency.; The beneficiaries must inform the coordinator — which must immediately inform the Commission/Agency — of any changes in the security context and — if necessary —request for Annex 1 to be amended (see Article 55)*

Annex 1 – Letter of Support for DALIE

A1.1 ÖAMTC, Austria

ÖAMTC | STEIERMARK

SEND TO:

AVL DiTEST GmbH
Attn.: Heiko Scharke
Alte Poststrasse 156
8020 Graz
Austria

19.10.2018

Letter of Intent

Call identifier: ICT-11b-2018
Project title: Digital Accelerator for Large Industrial Ecosystems
Project acronym: DALIE

I am pleased to confirm that OEAMTC expresses the interest in supporting in the project "**DALIE**", for which a proposal will be submitted to the **ICT-11b-2018** call under the coordination of AVL List GmbH, and agree to support the AVL DiTEST GmbH in the HPC project activities for aftersales test bed, such as extending the aftersales workshop equipment with digitalization technologies, allowing access to device stream, consulting framework implmentations and evaluating data driven business models.

The OEAMTC (www.oeamtc.at) is the largest mobility club in Austria and actively participates in a worldwide network of mobility clubs (www.arceuropegroup.com). Among other things , the OEAMTC supports its members with worldwide accident and breakdown services, incurance services, travel service, vehicle maintenance and repair services and periodical technical inspections. Aftersales workshop equipment with digitalization technologies will help us to optimize our member services, to make our internal processes more efficient and to make to sustainable contribution to the environment by monitoring vehicle A/C services and periodical vehicle emission tests.

Yours sincerely

STEIERMÄRKISCHER
AUTOMOBIL- UND MOTORSPORTKLUB
8020 GRAZ, Alte Poststrasse 161

NAME: Dr. Paul Fembach
POSITION: Direktor

Steiermärkischer Automobil- und Motorsportklub
Alte Poststraße 161
8020 Graz
Tel. (0316) 504
Fax DW 8850
graz@oeamtc.at
ZVR 180053275
DVR 0604666
UID ATU28663504

Nothilfe Tag & Nacht: Pannenhilfe und Abschleppung Tel. 120

Schutzbrief-Nothilfe: (01) 25 120 00

www.oeamtc.at

Bank: Bankhaus Krentschker & Co | IBAN: AT10 1952 0000 0002 2533, BIC: KREGAT2GXXX

Figure 2: Letter of Support - ÖAMTC Steiermark

A1.2 MESAP, Italy

CENTRO SERVIZI INDUSTRIE S.R.L.

mesap

Prot. n. 638/A

Turin, 31/10/2018

Attn. Dr. Eric Armengaud,
Project Manager R&D
AVL LIST GMBH
A-8020 Graz, Hans-List-Platz 1 - Austria

Subject: Letter of Endorsement to the DALIE Project

Dear dr. Armengaud,

I am pleased to provide a Letter of Endorsement to the DALIE proposal entitled *"Digital Accelerator for Large Industrial Ecosystems"* that will be submitted to the ICT-11-2018 Horizon 2020 Call addressing the topic "HPC and Big Data enabled Large-scale Test-beds and Applications". The project will be coordinated by AVL LIST GMBH (Austria) and with the direct involvement of several relevant companies and Universities from Piedmont as well as from other European countries.

This means a remarkable critical mass which will be in the position to accelerate the digitalization of key industrial sectors within Europe relying by leveraging on smart connected devices.

On the light of further strengthening the impact of such a proposal, we feel that an active involvement of the MESAP Innovation Cluster will provide mutual benefits.

We'll also connect this activity with the on-going CSA named "inSSIght" (In-depth support for innovation and exploitation in Smart Systems Integration) where MESAP has a strategic role related to the implementation of effective measures aimed at promoting the Smart System Integration technologies, as well as other activities running in Piemonte. This activity is also tightly linked to the wide adoption of the SSI Trademark.

Finally we are available and interested in organising together large events to increase the awareness about the digitalization of key industrial sectors in Europe.

Kind regards

Giuseppe Gherzi
MESAP Head

10128 TORINO – Via M. Fanti 17 – Telefono 011.5718.269 – Società Unipersonale, Soggetto ad Attività di Direzione e Coordinamento ex art. 2495
c.c. della Controllante Unione Industriale di Torino – Cap. Soc. €. 15.300,00 – Reg. Imp. 1857/74 – C.C.I.A.A. 486968 – C.F. e P.I. n. 01045950019

Figure 3: Letter of Support – METSAP

A1.3 EPoSS, EU

EPoSS
European Technology Platform on Smart Systems Integration

EPoSS e.V. · Steinplatz 1 · 10623 Berlin

Attn. Dr. Dr. Eric Armengaud, MBA
Project Manager R&D
AVL LIST GMBH
A-8020 Graz, Hans-List-Platz 1
AUSTRIA

Berlin, 08.11.2018

Letter of Support to the DALIE Project

Dear Dr. Armengaud,

The EPoSS Association is pleased to support the DALIE proposal entitled "*Digital Accelerator for Large Industrial Ecosystems*" that will be submitted to the ICT-11-2018 Horizon 2020 Call addressing the topic "HPC and Big Data enabled Large-scale Test-beds and Applications".

The project will be coordinated by AVL LIST GMBH (Austria) and, notably, with the direct involvement of relevant companies and Universities from eight European countries. This means a remarkable critical mass which will be in the position to accelerate the digitalization of key industrial sectors within Europe relying by leveraging on smart connected devices.

On the light of further strengthening the impact of such a proposal, we feel that an active involvement of the EPoSS Association will provide mutual benefits.

EPOSS is highly interested and committed to support the development and innovation on smart connected systems, which is a central brick in context of industrial data ecosystems (including e.g., IOT / data analytics).

The intended cooperation (to be further elaborated once the project is granted) will rely on conjoint dissemination activities and expert workshops, easing identification of relevant technologies for the SSI Trademark, dissemination of DALIE call for projects in the EPOSS community.

Yours sincerely,

Wolfgang GESSNER

(Head of Office)

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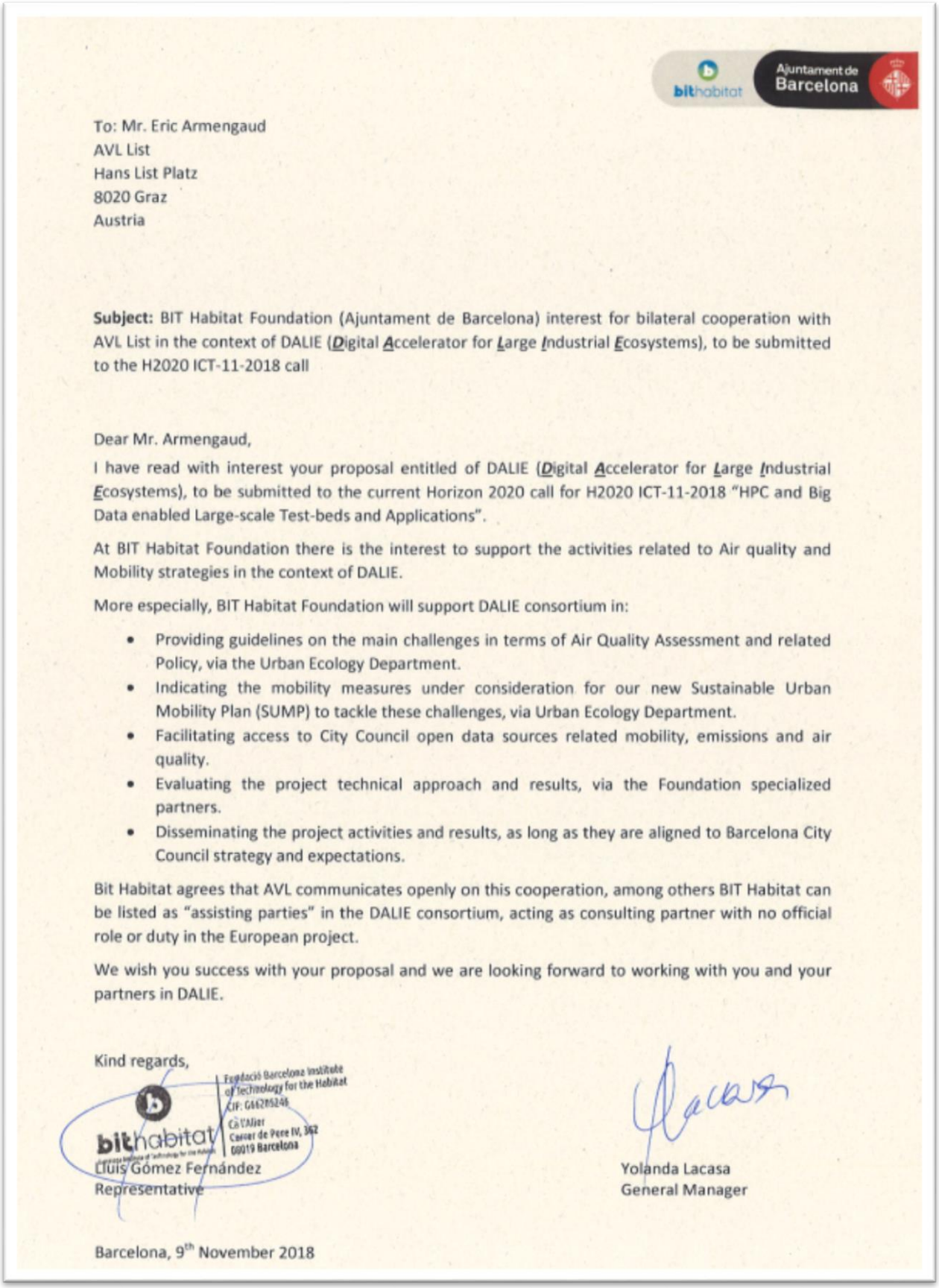
Amtsgericht Berlin-Charlottenburg

Chairman of the Board: Carmelo Papa
Vice Chairman: Karsten Hofmann
Vice Chairman: Renzo dal Molin

Figure 4: Letter of Support - EPOSS

A1.4 Bit Habitat Foundation, Spain



bithabitat | Ajuntament de Barcelona

To: Mr. Eric Armengaud
AVL List
Hans List Platz
8020 Graz
Austria

Subject: BIT Habitat Foundation (Ajuntament de Barcelona) interest for bilateral cooperation with AVL List in the context of DALIE (*D*igital *A*ccelerator for *L*arge *I*ndustrial *E*cosystems), to be submitted to the H2020 ICT-11-2018 call

Dear Mr. Armengaud,

I have read with interest your proposal entitled of DALIE (*D*igital *A*ccelerator for *L*arge *I*ndustrial *E*cosystems), to be submitted to the current Horizon 2020 call for H2020 ICT-11-2018 "HPC and Big Data enabled Large-scale Test-beds and Applications".

At BIT Habitat Foundation there is the interest to support the activities related to Air quality and Mobility strategies in the context of DALIE.

More especially, BIT Habitat Foundation will support DALIE consortium in:

- Providing guidelines on the main challenges in terms of Air Quality Assessment and related Policy, via the Urban Ecology Department.
- Indicating the mobility measures under consideration for our new Sustainable Urban Mobility Plan (SUMP) to tackle these challenges, via Urban Ecology Department.
- Facilitating access to City Council open data sources related mobility, emissions and air quality.
- Evaluating the project technical approach and results, via the Foundation specialized partners.
- Disseminating the project activities and results, as long as they are aligned to Barcelona City Council strategy and expectations.

Bit Habitat agrees that AVL communicates openly on this cooperation, among others BIT Habitat can be listed as "assisting parties" in the DALIE consortium, acting as consulting partner with no official role or duty in the European project.

We wish you success with your proposal and we are looking forward to working with you and your partners in DALIE.

Kind regards,

Fundació Barcelona Institute of Technology for the Habitat
CIF: G66285248
C/ d'Alí er
Carrer de Pere IV, 362
08019 Barcelona

Lluís Gómez Fernández
Representative

Yolanda Lacasa
General Manager

Barcelona, 9th November 2018

Figure 5: Letter of Support - bit habitat

A1.5 Città di Torino, Italy

CITTÀ DI TORINO

Progetto Speciale Innovazione, Fondi Europei - Smart City

Attn. Dr. Eric Armengaud,
Project Manager R&D
AVL LIST GMBH
A-8020 Graz, Hans-List-Platz 1
Austria

Subject: DALIE "Digital Accelerator for Large Industrial Ecocystems". City of Turin - Letter of Support

Dear Sir,

this letter confirms the interest of the City of Turin in the mentioned project: DALIE "Digital Accelerator for Large Industrial Ecocystems", submitted as a project proposal within the Call Horizon 2020 ICT-11-2018-2019 "HPC and Big Data enabled Large-scale Test-beds and Applications".

We would like to support the project submission and to be kept informed about the development of this project because we believe that it's in line with the goals of our municipality.

Turin is the capital of the Piedmont Region in North-West Italy. This area is characterised by a strong industrial activity and it also represents an important traffic and railway point, to and from Central Europe. Torino city itself is home to a population of 884.733 within an area of 130 km2, resulting in a population density of approximately 7.000 inhabitants per km^2.

In the last thirty years, Torino has been following a path that has transformed it from a mono-industrial city to a globally-oriented, innovative and diversified economy: a new pole of innovation, culture and improved quality of life. The City of Turin is strongly committed to become a "smarter city", fostering a sustainable, intelligent and inclusive urban growth.

We support the project aims to accelerate the digitalization of key industrial sectors within Europe, first of all through the uptake of digital economy for key industrial sectors and for the society through industrial large scale testbeds, and - also very meaningful - with the development of an open and tailorable digitalization framework encompassing the entire ecosystem supporting the uptake of digital economy.

Yours faithfully,

Dott. Gianfranco Presutti
Head of Directorate City of Turin

Progetto Speciale Innovazione, Fondi Europei - Smart City
Corso Ferrucci, 122 - 10141 Torino
torinocitylab@comune.torino.it

Figure 6: Letter of support – Città di Torino

A1.6 IoMob, Estonia

IoMob Technologies OU
Rännaku pst 12, Harju maakond
Tallinn, Nomme linnaosa, 10917
Estonia

To: Mr. Eric Armengaud
AVL List
Hans List Platz
8020 Graz
Austria

Subject: Iomob Technologies OU interest for bilateral cooperation with AVL List in the context of DALIE (*D*igital *A*ccelerator for *L*arge *I*ndustrial *E*cosystems), to be submitted to the H2020 ICT-11-2018 call

Dear Mr. Armengaud,

I have read with interest your proposal entitled of DALIE (*D*igital *A*ccelerator for *L*arge *I*ndustrial *E*cosystems), to be submitted to the current Horizon 2020 call for H2020 ICT-11-2018 "HPC and Big Data enabled Large-scale Test-beds and Applications".

At Iomob Technologies OU there is the interest to support bilaterally with AVL the activities related to leveraging HPC and Big Data technologies for actual use cases tackling urban mobility challenges in the context of DALIE.

More especially, the interest from IoMob Technologies OU relates to the techniques and testbeds for accurate simulation and analysis of what-if scenarios in the context of, in particular, the aggregation of urban shared mobility services in high-density areas. We are ready to contribute expert feedback and guidance.

IoMob Technologies OU agrees that AVL communicates openly on this cooperation, among others IoMob Technologies OU can be listed as "assisting parties" in the DALIE consortium, acting as consulting partner with no official role or duty in the European project.

We wish you success with your proposal and we are looking forward to working with you and your partners in DALIE

Kind regards,

Josep Sanjuas, PhD

Chief Technology Officer

Figure 7: Letter of support – IoMob

A1.7 BigDataCoE, Spain

To: Mr. Eric Armengaud
AVL List
Hans List Platz
8020 Graz
Austria

Subject: Big Data CoE Barcelona (Big Data Centre of Excellence) Interest for bilateral cooperation with AVL List in the context of DALIE (*D*igital *A*ccelerator for *L*arge *I*ndustrial *E*cosystems), to be submitted to the H2020 ICT-11-2019 call

Dear Mr. Armengaud,

I have read with interest your proposal entitled of DALIE (*D*igital *A*ccelerator for *L*arge *I*ndustrial *E*cosystems), to be submitted to the current Horizon 2020 call for H2020 ICT-11-2019 "HPC and Big Data enabled Large-scale Test-beds and Applications".

Our Centre of Excellence (CoE) for Big Data is driven by Eurecat Technology Centre, the Government of Catalonia, the Barcelona City Council and Oracle, and it builds, develops and provides tools, datasets and value-added Big Data capabilities enabling companies to define test and validate Big Data models before their final implementation.

At Big Data CoE Barcelona, there is the interest to support bilaterally with AVL the activities related to leveraging both HPC and Big Data capabilities into actual use cases tackling urban mobility challenges in the context of DALIE. More especially, the support from Big Data CoE Barcelona will consist of providing timely feedback, guidance and expert technical contributions when needed.

Big Data CoE Barcelona agrees that AVL communicates openly on this cooperation, among others Big Data CoE can be listed as "assisting parties" in the DALIE consortium, acting as consulting partner with no official role or duty in the European project.

We wish you success with your proposal and we are looking forward to working with you and your partners in DALIE.

Kind regards,

Marc Torrent
Director of the Big Data Centre of Excellence
Barcelona, Spain

Figure 8: Letter of support – BigDataCoE

A1.8 POLIS, EU

POLIS
CITIES AND REGIONS FOR TRANSPORT INNOVATION

To: Mr. Eric Armengaud
AVL List
Hans List Platz
8020 Graz
Austria

Subject: Polis (Promotion of Operational Links with Integrated Services) Interest for bilateral cooperation with AVL List in the context of DALIE (***D***igital ***A***ccelerator for ***L***arge ***I***ndustrial ***E***cosystems), to be submitted to the H2020 ICT-11-2018 call

Dear Mr. Armengaud,

I have read with interest your proposal entitled of DALIE (***D***igital ***A***ccelerator for ***L***arge ***I***ndustrial ***E***cosystems), to be submitted to the current Horizon 2020 call for H2020 ICT-11-2018 "HPC and Big Data enabled Large-scale Test-beds and Applications".

At Polis (Promotion of Operational Links with Integrated Services), there is the interest to support bilaterally with AVL the activities related to leveraging HPC and Big Data capabilities into actual use cases tackling urban mobility challenges in the context of DALIE.

More especially, the support from Polis (Promotion of Operational Links with Integrated Services) will consist of providing timely feedback and guidance.

Polis (Promotion of Operational Links with Integrated Services) agrees that AVL communicates openly on this cooperation, among others Polis (Promotion of Operational Links with Integrated Services) can be listed as "assisting parties" in the DALIE consortium, acting as consulting partner with no official role or duty in the European project.

We wish you success with your proposal and we are looking forward to working with you and your partners in DALIE

Kind regards,

Karen Vancluysen
Polis Secretary General

Cities and Regions for
Transport Innovation

Rue du Trône 98, B-1050 Brussels, Belgium
Tel +32 (0)2 500 56 70
VAT BE 0460400701
www.polisnetwork.eu

Figure 9: Letter of support – POLIS

Annex 2 – Detailed information on the data sets from the industrial pilot test-beds (IPTB)

A2.1 IPTB1: Smart mobility for vehicle fleet monitoring

Project data lake (inputs data and intermediate data generated within the project)	
Source of the data	GM vehicle sub-systems and control unit
Information content & planned usage	Propulsion subsystem data with the task to: ➢ Improve quality linking malfunction to production data ➢ Introduce prognostic early warning avoiding major failures ➢ Provides data insights to engineering
Volume / velocity / variety of data	**Field data potential:** ➢ 5 Mb/subsystem/day ➢ around 1 M vehicles running in the field ➢ 5 Tb/subsystem/day **Data already collected:** ➢ 0,5 TB ➢ on 10 different engine configurations ➢ 300 raw attributes ➢ 500 number of cycles ➢ Data rate: up to 200GB/month for each vehicle These figures are estimated for subsystems common to all vehicle product line. Specific subsystems used in certain application only (i.e. in case of Diesel vehicles) will decrease the amount of data accordingly, depending on the market share.
Ownership	General Motors
Confidentiality / privacy aspects	Fully owned and confidential to General Motors
Degree of openness (public availability, access right management…)	Private to General Motors

A2.2 IPTB2: Smart mobility for condition monitoring for emission regulation

Project data lake (inputs data and intermediate data generated within the project)	
Source of the data	Repair and maintenance equipment in vehicle workshops and vehicle test centers
Information content & planned usage	Equipment data on device parameter, status, usage and executed tests & results Usage of data for: * long term vehicle in-use data for upstream feedback for vehicle development * optimization and scheduling of device service and maintenance * automatization of device consumables delivery * common statistics for governments and research institutes
Volume / velocity / variety of data	> 30MB per device per day every 5 min different types of devices (emission, AC Service, motor and battery repair and test systems) and different types of data (basic, status, usage, tests)
Ownership	Workshop or test centre
Confidentiality / privacy aspects	Device data only, no person related data, anonymization is part of framework

Degree of openness (public availability, access right management…)	Access right management

A2.2 IPTB3: Smart manufacturing for continuous quality control

Project data lake (inputs data and intermediate data generated within the project)	
Source of the data	1. Sensors measuring environmental status 2. AGVs transporting the vehicle 3. Equipment like robots and tools (e.g. welding guns): motors, internal sensor and components. 4. Purchasing processes 5. Logistic processes (outbound, inbound, inplant)
Information content & planned usage	Data coming from environmental sensors, AGVs, equipment used, multiple processes like purchasing and logistics. Usage of data for: • Predictive maintenance analytics • Ensure quality of the product through its lifecycle – traceability of the vehicle • Reduce maintenance costs • Monitor the health status of the equipment
Volume / velocity / variety of data	Volume: High Velocity: High Variety: Medium
Ownership	Machine shop, assembly cell
Confidentiality / privacy aspects	Non-personalized data
Degree of openness (public availability, access right management…)	Access right management

A2.2 IPTB4: Smart cities for Air Quality & Mobility Strategies

Project data lake (inputs data and intermediate data generated within the project)	
Source of the data	1. Anonymized Call Detailed Records (CDRs) from Orange Spain 2. SEAT Connected cars in the city (other VW group brands still in negotiation)
Information content & plannedusage	Content: Origin – destination passenger data obtained from Floating Mobile Data (FMD), andeXtended Floating Car Data (xFCD) from SEAT cars. These datasets will complement the existing data on the models, which will be used for: • Emulating traffic behaviour at street level • Estimatinghourlytrafficemissions • Delivering street-scale air quality forecast estimations.
Volume / velocity / variety of data	1. 1Tb per day (accounting for around 10 million registries). The data collection process belong to Orange Spain and none information about it is provided. CDRs are loaded to a working platform in batches every hour.

	2. 8-22 Tb of sensors data will be generated by connected cars. Data will be ingested in a pseudo-real time fashion but shared with BSC and UPC in batches.
Ownership	1. CDRs are solely property of Orange Spain. Nommon is authorized for their exploitation for the DALIE project via a commercial agreement. 2. Data coming from connected cars are the sole property of SEAT, S.A.
Confidentiality / privacy aspects	1. Access to CDRs is only granted to Nommon via a commercial agreement with Orange Spain. CDRs data never leave the Orange working platform and should be processed in there. Access to OD matrices produced by Nommon will be granted to BSC and UPC under a specific license of use. 2. Data provided by SEAT, S.A. will be shared based on individual agreements.
Degree of openness (public availability, access right management…)	1. CDR data and OD information will not be open. 2. Data from SEAT, S.A. will not be open.

Output datasets (information to be made available to third parties)	
Output dataset	Georeferenced air quality and emission data in NetCDF format.
Informationcontent&potential use	Air quality and emission model outputs to provide forecast information and help to define air quality-mobility plans
Volume / velocity / variety of data	400 Gb per day taking into account model outputs (air quality, meteorology and emissions)
Ownership	BSC
Confidentiality / privacy aspects	Raw air quality forecast data will be shared based on individual agreements.
Degree of openness (public availability, access right management…)	Postprocessed data (figures, tables) will be open and public available through the decision support tool.

A2.2 IPTB5: Smart finance for automotive insurance

Project data lake (inputs data and intermediate data generated within the project)	
Source of the data	i) Anonymized data from car accidents and claims from Eurolife's big data repository, including image data ii) Real-time aggregated data from cars on the move
Informationcontent&plannedusage	i) Data coming from mobile apps including location, speed, acceleration, temperature, etc., as well as images of car damages after car accidents and claims data ii) Data coming from Eurolife's big data repository including automotive insurance contracts and claims on car accidents and damages
Volume / velocity / variety of data	i) Over 3.400.000records of data for motor contracts in 1993-2018 period ii) Over 150.000 records of data for motor claims in 1993-2018 period iii) 25G datain production motor database (Motor basic tables in Oracle), excluding customer data

Ownership	i) Historical Car Accidents and Claims data are the property of Eurolife. ii) Data coming from cars are the property of the drivers/ users to consent to take part in the pilot
Confidentiality / privacy aspects	i) Historical Data from Eurolife's database will be anonymized and de-identified before used for the needs of the testbed, as described in Task 9.1, in compliance with GDPR ii) Live personal data from cars on the move will be protected through anonymization, encryption, smart contracts to enforce data sharing policies, private, permissioned blocKNOWhain
Degree of openess (public availability, access right management…)	Eurolife's data as well as data coming from cars on the move will not be open

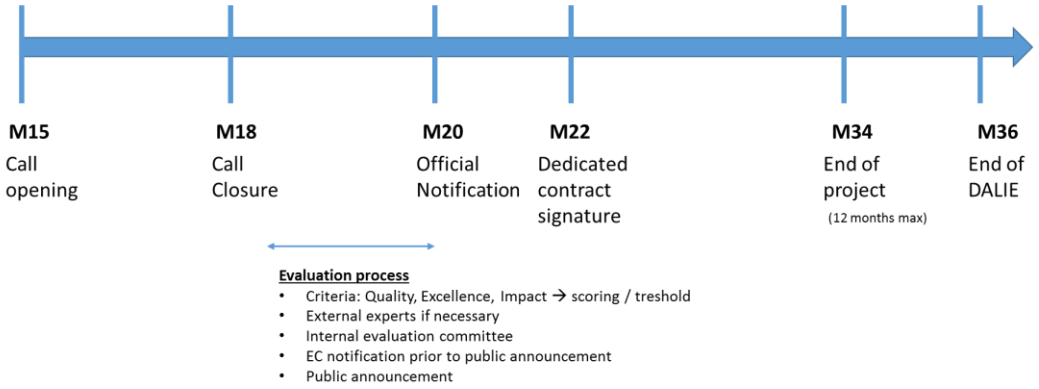
Output datasets (information to be made available to third parties)	
Output dataset	Recommendations for better driving behaviour and adapted insurance premiums, warnings on nearing high risk city areas, alerts on potential car accident or detected fraud in insurance claims, geo-referenced high risk city areas (for safety on roads)
Information content & potential use	See above, use by drivers while on the move to enhanced their safety and insurance companies to encourage better driving behaviour, reduce costs in car accident claims, reduce losses from fraud in claims
Volume / velocity / variety of data	n/a
Ownership	Eurolife
Confidentiality / privacy aspects	Requiring consent of end user (driver), encrypted, anonymized and shared in private permissioned blocKNOWhain networks, complying with adequately defined smart contracts dictating jointly agreed data sharing policies
Degree of openess (public availability, access right management…)	Proprietary

Annex 3 – Detailed information on the FSTP deployment within DALIE project

FSTP deployment within DALIE project will support the following headlines:

- To give access to both a wide panel of advanced technologies & competences and infrastructures to test digital innovation on the smart mobility supported by the DIH, e.g. the five industrial pilot large-scale test-beds.
- The financial support from the EC is directly provided to the SMEs (with a maximum of 50 k€), based on a 70% funding rate in order to have access to new skills and disruptive technical support. This direct funding to the SME is one pillar of the FSTP tool, this is completed by additional funding support to the technical partners (test-beds). The cascade funding being supported by DALIE cascade funding partner in charge of the overall FSTP deployment.
- Funding decisions are quick and official notifications are provided in less than 2 months, which make it possible to start the selected projects rapidly. This a key element as the time is a key factor of the digitization process, to define a project with pertinent choice in terms of disruptive technology and usage case, to build a pertinent business model, in other words not to be obsolete in terms of technology and/or not to be competitive regarding the usage case by the end of the selected AE. To bring the right support at the right time appears essential to remain in the course of Europe digitization and not to miss the target.
- SMEs have access to a lean and agile process as most of the time they do not have the means to deal with European program and are quite afraid to enter any European program. Thus to present a simple process helps to attract SMEs from various sectors and all over Europe. To promote the open call through DALIE website and getting the support of SAE and collaborative EC initiatives (I4MS, HiPEAC, ARTEMIS, etc.), give access to a very large ecosystem.
- Open call is organized through DALIE website, with pre-registration and submission on line:
    - Open call must be open for at least 12 weeks, with FAQs, recommendations and information hot line available to support the SMEs;
    - A simple and short proposal template (a dozen pages) must be filled out describing the project idea, how does the product/process/service become more competitive through the latest digital technologies, where does the competition stands, how does it fit in the SME's roadmap, what will be the impact in terms of employment, revenues growth, etc. and what will be the benefit for the society (improve health safety, decrease the use of pesticides, improve the protection of personal data, etc.).
    - The funding decision then directly depend on the proposal ranking (technical analysis of the project –excellence, quality, impact). The proposal evaluation will be performed by a small panel of experts, the criteria listed and detailed in the guidelines available on line. After the evaluation process is conducted, the EC will be informed of the granted proposals for information and validation before the official notifications. All the participants will receive a formal notification with evaluation feedbacks.
    - The innovative part of the process is that the granted SMEs will not join DALIE consortium but sign a separate dedicated contract/agreement with the associated DALIE partners (a dedicated small consortium is constituted). The dedicated contract will rely on DALIE CA and then includes a technical annexe with dedicated information about the project duration (12 months at max), the workplan and deliverables and milestones, the Gantt, the budget and the financial payment schedule, IPs, the associated partners, etc.

The following agenda is foreseen for the FSTP implementation within DALIE project:



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