Harmonised European Solutions for Testing Automated Road Transport

2nd Technical Workshop on new approaches for AVs certification

07/03/2019

The research leading to these results has received funding from the European Union

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Project in a nutshell

HEADSTART (Harmonised European Solutions for Testing Automated Road Transport):

- The European project funded under Horizon 2020 Framework Programme within the call **ART-01-2018** (the type: **Research and Innovation action**)
- Represented by the consortium of **17 partners** that are top automotive manufacturers, suppliers, test labs and researchers.

Call N°	H2020-DT-ART-2018-2019-2020
Grant Agreement N°	824309
Title	„HARMONISED EUROPEAN SOLUTIONS FOR TESTING AUTOMATED ROAD TRANSPORT “
Akronym	**HEADSTART**
Duration	36 months
Start Date	**01/01/2019**
Coordinator	IDIADA (IDI)
Beneficiaries	17 (BE, EL, DE, IT, SE, ES, FR, AT, NL, FR)
Third Parties	FKA (IKA), VEONEER (SAFER), RISE (SAFER), VOLVO (SAFER)
EU-Contribution	**5 999 028.75 €**

Project in a nutshell

HEADSTART will define **testing and validation procedures** of CAD functions including:

- its **key enabling technologies** (i.e. communication, cyber-security, positioning)
- by **cross-linking of all test instances** such as simulation, proving ground and real world field tests
- to validate safety and security performance according to **the needs of key user groups** (technology developers, consumer testing and type approval)

Call: ART-01-2018
Type: RIA
Budget: 6 M€

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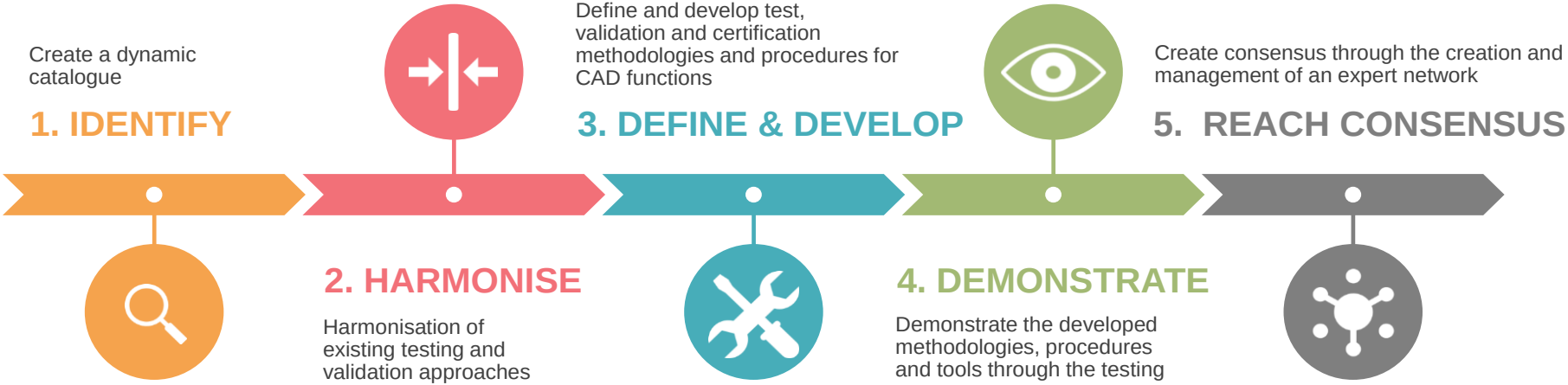
Objectives



HEADSTART has 3 ACTION PILLARS mapped with **end users of the project**:

1. Testing and validation (development): e.g. **OEMs**,
2. Assessment: Consumer testing: e.g. **Euro NCAP,**
3. Certification (type approval): e.g. **Type approval authorities & Technical services**

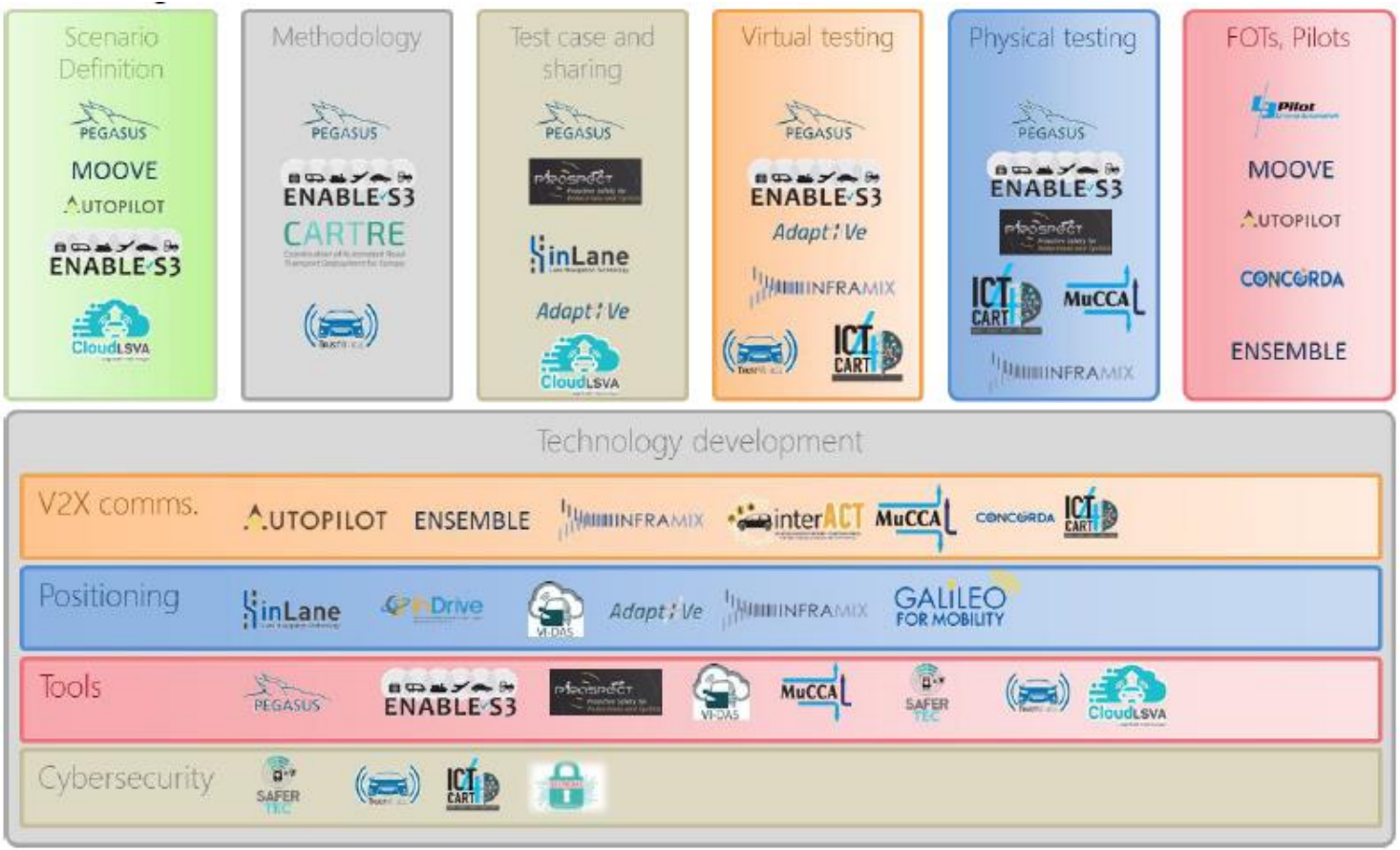
Objectives

OBJECTIVE 1: IDENTIFY	**Create a dynamic catalogue of existing methods, procedures and tools for testing, validation and certification considering multi-stakeholder requirements**
Create a catalogue of **existing databases (incl. scenario descriptions), methodologies, procedures and tools to identify gaps, overlaps, weaknesses and strengths.** This catalogue will identify requirements from different key user groups (OEMs, Tiers, NCAP and Type approval) through discussion and consensus building considering: 1) Suitability of the project results according to each target **user group need** 2) AD **functions** 3) Key Enabling Technologies (**KETs**) for CADs. The catalogue will be open and dynamic in order to include future and on-going initiatives as well as from other sectors.	
Success measures	• At least **30 EU, national and international activities** will be included. • Information will **be published in the project website** and updated on a yearly basis based on inputs from the identified stakeholders.

Objectives

OBJECTIVE 2: HARMONISE	**Harmonisation of existing testing and validation approaches taking into account other industries and domains**
• **Build from existing initiatives** (1) to maximise consensus and (2) to maximise efficiency. • Harmonise these approaches and procedures between (overlapping) initiatives and…. • ….integrate those that are already covering specific use cases and/or technologies. • The project will also **cover cross-fertilization with other successful testing**, validation and certification approaches from other sectors i.e. on KETs for **cyber-security in the ICT** domain and for **positioning in aerospace.**	
Success measures	All the methodologies from the above catalogue will be examined. The liaison team will **organise a set of 9 workshops with the expert groups** to align the main priorities in CAD validation.

International cooperation



Objectives

OBJECTIVE 3: DEFINE & DEVELOP	**Define and develop test, validation and certification methodologies and procedures for CAD building upon existing initiatives.**
HEADSTART will develop testing, validation and certification methodologies and procedures for CAD by: closing existing **gaps** and developing methodologies, procedures and tools **beyond state-of-the-art**: • Define unambiguous, robust and interoperable **description of the necessary data** to optimise scenario creation. • Define trustworthy **selection criteria** of relevant scenarios, • To set up the **requirements of simulation testing** to maximise test track testing • Develop, adapt or improve the necessary procedures and tools for the robust and complete testing of CAD functions. • Extend the developments **to include KETs** (communications, positioning and cyber-security) in the testing pipeline together with AD functions. • Take advantage of successful approaches being used in **other sectors**.	
Success measures	HEADSTART will deliver **a CAD assessment methodology** and will apply it to a selection of use cases.

Objectives

OBJECTIVE 4: DEMONSTRATE	**Demonstrate the developed methodologies, procedures and tools through the testing of relevant CAD use cases.**
• Implement, validate and showcase the results of the project **in laboratory and test tracks** through its application in selected use cases ← **Up to 4 use cases** • **Test in several locations** (including Euro NCAP accredited laboratories) in order to demonstrate reliability, repeatability and robustness. • Validate in cooperation **with on-going projects**. • **Assess the test results** to demonstrate its suitability, scalability (to other functions, KETs and/or user groups) and time-cost effectiveness. The test case definition as well as its execution results will be made **publicly available** in an open format that helps its acceptance and sharing among stakeholders.	
Success measures	• All the methodologies, test procedures and tools will be validated via testing in different facilities for **4 Use Cases**. • The final results will assess the **repeatability, reliability and robustness**. • KPIs for each of these indicators will be defined to assess the success of the developed methods.

Use Cases

	Truck Platooning	Highway pilot	Rural road	Urban
				
Scenarios & Pilot data source	ENSEMBLE	PEGASUS & MOOVE	MOOVE	MOOVE
V2X comms.	✓ Main focus	✓ Main focus	✓	✓
Positioning	✓	✓	✓ Main focus	✓ Main focus
Cyber-security		✓	✓	✓

Use case selection criteria:

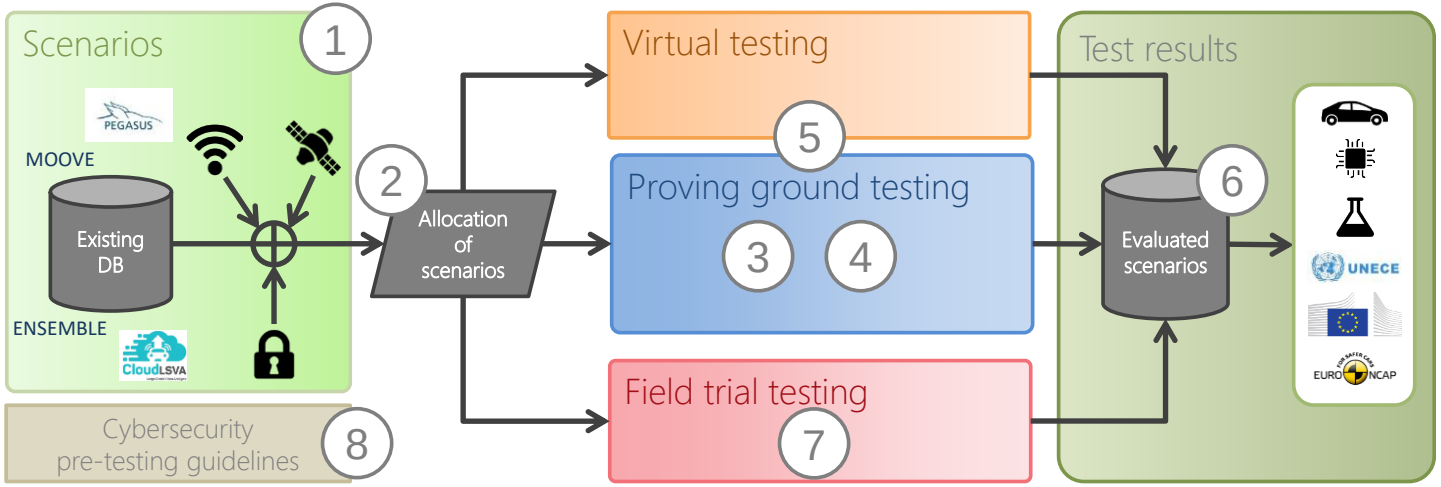
- Scenarios are available
- Technology is **mature and representative** enough
- Cooperation with other on-going initiatives
- Cover all **the KETs**
- Feasibility within the project scope and timeline

Objectives

OBJECTIVE 5: REACH CONSENSUS	**Reach consensus by creating and managing an expert network of CAD testing to promote adoption of the project results considering multi-stakeholder needs.**
• Engage, organize and support the creation of **an expert network on CAD testing** • Identify **requirements** from different stakeholders and user groups to steer the project • Identify **future research needs** that have to be addressed at European and/or international level. • Define commonly agreed European positions to support the EC driven harmonisation activities (i.e. **ART tri-lateral group**). • **Support policy makers and regulatory bodies** from a technical point of view. Organize international workshops to identify and support cooperation with key industry / research / policy makers (i.e. WP.29 ITS/AD groups). • **Cooperate with on-going Support Actions**, public tenders and dedicated groups providing the focus on testing of CAD and its enabling technologies (i.e. GSA, 5G Alliances, SDOs, etc.)	
Success measures	• Set up and establish **the experts platform**. This platform will organise up to 9 workshops. • Level of alignment/agreement with the project results > than 80%

Concept

HEADSTART concept



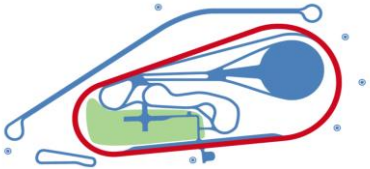
1. **Integration of KET:** positioning, communications and cyber-security in CAD test scenarios
2. Comprehensive procedure for **the allocation of** test cases per testing platform
3. **Selection criteria** and specification for **proving ground test** scenarios taking into account criticality
4. **PG testing and evaluation**
5. **Correlation** between simulation and proving ground results
6. Harmonised, open result compilation and **sharing**
7. **Field trial test** methodology description
8. **Cyber-security principles** and integration in the testing methodology

The Work-package structure

Testing resources

IDIADA

Aldenhoven



DITCM

Lelystadt

AstaZero

3 testing campaigns will be organised, in IDIADA PG (Spain), AstaZero (Sweden), Aldenhoven TC (Germany) and TNO facilities and RDW Lelystad TC (The Netherlands).

Expected results (project)

From Research -> Technology development –> Technology Demonstration

Advancement of TRL in the HEADSTART Project	Initial TRL	Final TRL
Scenario description to include KETs	3 - 4 depending on KETs	6
Cyber-security test methods and tools	3	5-6
V2X communications test methods and tools	4	6
Positioning test methods and tools	5	7
Target platforms for CAD testing	6	7
CAD Testing protocols	5	7-8

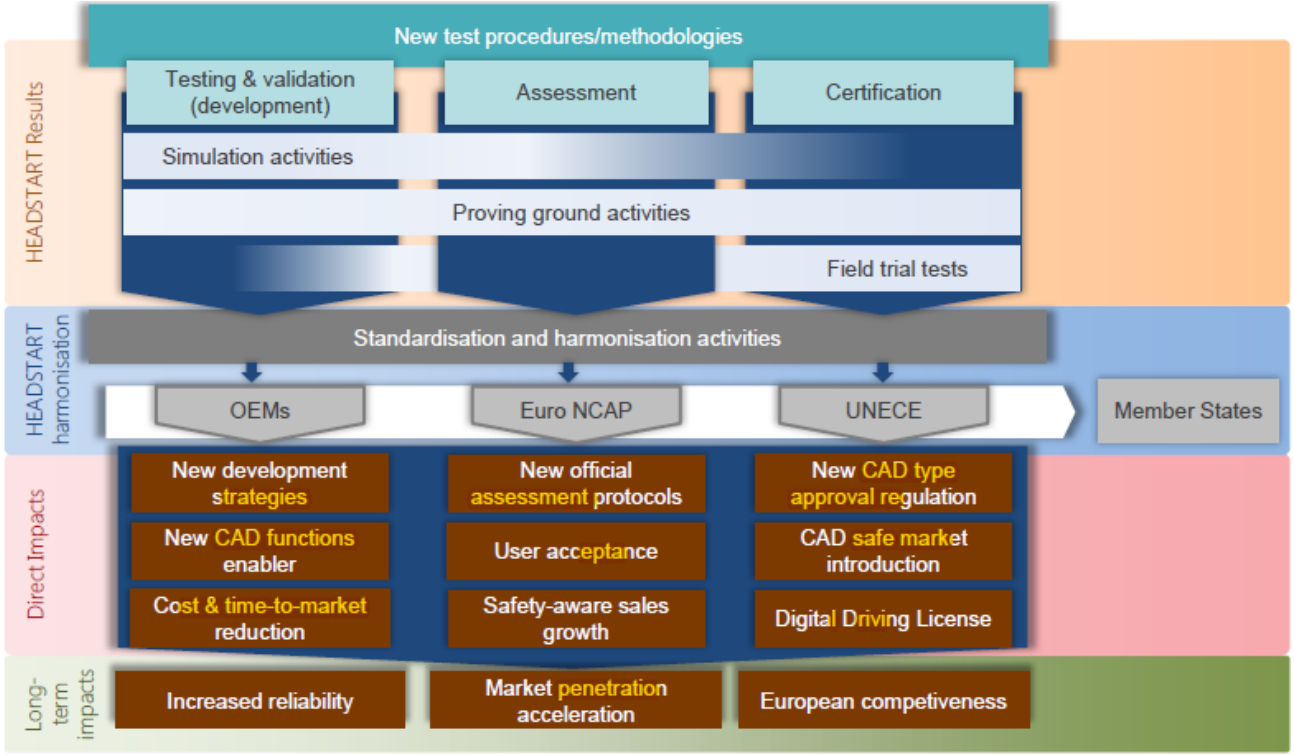
The first concepts & methods (e.g. PEGASUS, MOOVE) of level of maturity (TRL4 - TRL6) work towards the validation by the identification of representative scenarios of road scenes and critical scenarios in terms of safety.

Expected results (1 year)

Del #	Deliverable Title	Lead beneficiary	Due Date
D1.1	State of innovation of existing initiatives and gap analysis	IKA	M6
D1.2	Stakeholders and user group needs	VEDECOM	M6
D1.3	Technical and functional requirements for KETs	SAFER	M9
D1.4	Functional requirements of selected use cases	SAFER	M9
D2.1	Common methodology for test, validation and certification	IKA	M12
D6.1	Website	ICCS	M3
D6.2	Dissemination and Communication strategy	ICCS	M6
D6.5	Dissemination material: First year	ICCS	M12
D7.1	Project management, quality and risk procedures	IDIADA	M2
D7.2	Innovation management plan	IKA	M3
D7.3	Data Management Plan	VICOMTECH	M6

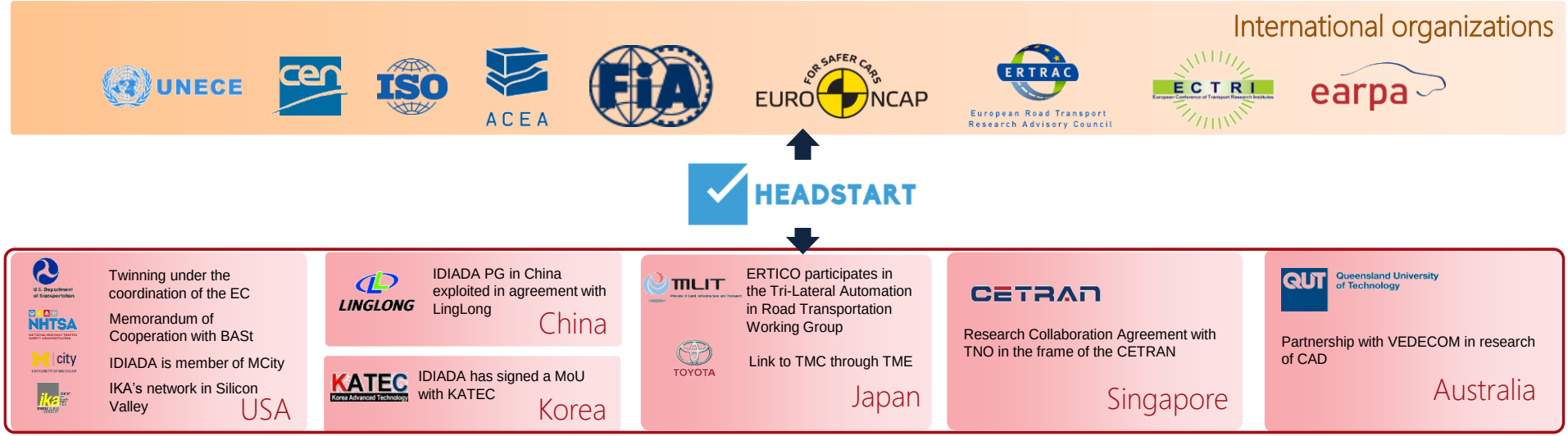
MS No.	Name	WP	Date	Lead	Due
MS1	Preliminary input to T1.2 to define online survey	1	M2	VED	1
MS2	Online survey released	1	M3	VED	3
MS3	Use cases defined	1	M9	VED	9
MS4	Overall methodology first draft	2	M8	IKA	8

Expected impact



- **Vehicle manufacturers / suppliers** will gain from the reduction of testing effort and reduction in the time-to-market.
- **Authorities** will benefit from a set of tests with broad consensus.
- **Research organisations / test organisations** will benefit from a common framework how to perform tests.

International cooperation



Main actors (today)

Consortium

Associated Partners (open)

An expert network

- Stakeholders from **the industry, the research arena and standardisation bodies** to gather its expertise regarding CAD testing and validation approaches (type approval and conformance issues for higher levels of automation).
- **Partnership agreement form** to be signed
- To provide feedback about the potential solutions through e.g. **interviews, online surveys, participation in demonstration events and workshops**
- The HEADSTART **Thematic Sub-groups** to ask for CAD expertise:
    - Cyber-security,
    - Communications,
    - Positioning,
    - Scenario selection,
    - Consumer testing,
    - Type approval

The dissemination actions

- The landing page www.headstart-project.eu
- The social media @HEADSTART_EU
- HEADSTART project on LI www.linkedin.com/groups/8732558/

Project Manager

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