



Cyber Physical Systems for Europe

D10.35 - Report on reaching SMEs v2

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1. Introduction

Embedded France is a non-profit association of French players in Embedded Software and System.

It has been created in 2013 - as recommended by Dominique Potier in its two reports for the French Ministry of Industry – with objective to gather and reinforce the eco-system, including Academics, SMEs and start-ups, to face issues of Cyber Physical Systems subsequent to connected embedded systems, and last but not least cross-feed medical with legacy industries (rail, aerospace and automotive).

Our missions:

- Federate industrial sectors
- Break down sectorial silos
- Develop international cooperation
- Ease hiring and training
- CPS advocacy and dissemination

The participation of Embedded France in the CPS4EU project is concentrated in dissemination efforts (W10.5 and W10.10).

The Embedded France Association brings together French players in the field of embedded software and systems. Its contribution to the CPS4EU project is spread in 5 actions:

- 1- Annual event “Assises de l’Embarqué », at the Ministry
- 2- Working groups
- 3- “Trophées de l’Embarqué”, awards at Assises de l’Embarqué
- 4- Attracting talents
- 5- Participating in trade fairs and key events in the sector

2. Dissemination Strategy

2.1. Communication and Dissemination Objectives

Objective is to evangelize and somehow demystify the Cyber Physical System domain within the whole eco-system, having a specific attention towards SMEs and start-ups as well as academics.

2.2. Guiding Principles

Guiding principles are:

- providing access to CPS documentation, expertise... for any of the Embedded France members, with special attention for the smallest entities
- enabling cross-feeding expertise between large groups and SMEs, via dedicated working-groups
- setting-up an annual event at the Ministry of Industries and Finance – Paris/Bercy – focused on a specific theme and supported by dedicated round tables mixing large industrial groups and SMEs offering products, technologies or services
- reinforcing and enlarging communication of SMEs willing to promote their products, technologies or expertise in the CPS domain

2.3. Responsibilities

Responsibilities are distributed to:

- a specific task-force in charge of the Assises de l'Embarqué organization
- the Déléguée Générale of Embedded France, who's in charge of the global organization of the association, the web site administration...
- nominated board members in charge of working-groups animation and administration
- nominated board members in charge of employment and training topic managed by a dedicated commission – CEF – (Commission Emploi Formation) welcoming large groups, SMEs and Academics

2.5. Target Audience

Target audiences are:

- the whole CPS eco-system, via information published on social media, website, etc...and free access (remote or in presence) to the annual Assises de l'Embarqué event
- Embedded France stakeholders, with specific attention on SMEs, regarding privileged and anticipated access to working group deliverables before publication in the website,
- Ministry of Finance and Industry

2.6. Logo and graphical Identity



2.8. Dissemination channels

- Embedded France website : <https://www.embedded-france.org/>
- the Assises de l'Embarqué website : <https://assises.embedded-france.org/>
- Youtube: https://www.youtube.com/channel/UCVlaewJFtCPFbeMT1_DMsWG
- LinkedIn: <https://www.linkedin.com/in/association-embedded-france-99a84616b/?originalSubdomain=fr>
- ...

2.9. Stakeholders

- Ministry of Finance and Industry
- Embedded France board
- Embedded France Members:
 - Large Industrial Groups,
 - Technology providers *
 - Service providers *
 - start-ups,

- academics
- * lot of SMEs

3. Communication and Dissemination Tools and Methods

3.1 Project Websites

Embedded France animates 2 websites:

- <https://www.embedded-france.org/> to present the association, its missions and its members, as well as its working groups, its Employment & education commission.
- <https://assises.embedded-france.org/> *Assises de l'Embarqué – Ministère de l'économie et des Finances et de la Relance / Bercy*

Every year, the organization organizes its annual Assises de l'Embarqué, which brings together around round tables and keynote speeches the ecosystem actors to promote formal and informal exchanges on the key issues of the sector. Since 2018, these round tables have been filmed, and shared on social networks.

Important: As early as 2018, prior to the launch of the CPS4EU project, the organizers of the Assises de l'embarqué have chosen to put CPS at the forefront of the scene. The choice of this theme was made on the grounds that CPS are both omnipresent in the sector and largely unknown. The aim of this conference was to show that CPSs are the future of the Embedded sector. A prospective reflection also focused on autonomous CPS, which not only interact with the environment, but also have a relative "intelligence".

3.1.1 Multi support dissemination

The basic principle is to use the website - and any communication channel - to share and push CPS related information towards our members, and in the other way provide extended communication to any CPS related information coming from our members (new offer or product, partnership, specific event, etc...).

3.1.1.1 OPIIEC Study

The 2014 OPIIEC database on CPS French footprint was planned to be updated in 2020, but deferred due to Covid19, Embedded France it has been postponed.

This study update is key to reinforce connections between Academics and Industry, and aligning training with employers expectations.

The Embedded professions, training in the Embedded sector. The Embedded France association actively participates in the OPIIEC study currently underway. Embedded France has been asked for the specifications of the study. The members of the association are also asked to respond to qualitative and quantitative studies on the subject.

The study will be completed in the summer of 2022 and the results will be presented at the 15th Assises de l'Embarqué in November 2022

3.1.1.2 Attracting Talents

As previous years, in spite of the Covid19 crisis, members of the CEF commission (“commission Emploi-Formation”) have continued to share within engineering schools awareness of the attractiveness of careers in embedded and cyberphysicals systems, highlighting the type of products and projects realized in order to encourage young students to embrace this path.

On-going CPS promotion action plan: throughout 2021, the ETC/ Employment and Education Commission (CEF/ Commission Competences, Emplois, Formation) has continued its work, closer than ever to Universities, Engineering schools and even High School to share with students on-the-field information on the CPS sector, its Industry stakeholders and its different markets, jobs and careers. The Commission is also the bearer of many projects, including support for inter-student challenges in robotics and electronics...

The Covid 2019 crisis has once again had a heavy impact on the activity of our members. The CEF has actively contributed to bringing academics and companies closer together in the context of this crisis, and continued to put the light on CPS fields, demonstrating how Open Source, Artificial Intelligence and CyberSecurity are becoming so critical.

Among actions, the creation of a trophy for students for the Assises de l'Embarqué was decided in 2020 and awarded to a project coming from one of our school partner of Embedded France. In 2021 Embedded France has decided to perpetuate these student trophies, various projects were submitted to the assises de l'embarqué, among which 3, were able to pitch in front of a panel of experts. Two of the selected projects had an ecological dimension (monitoring the health of a beehive, a project to clean up rivers) and an innovative health dimension (connected glasses for dyslexics)

3.1.1.3 Evangelization at school:

- Live presentation and discussions on Embedded Systems to the students of ESIEA (Engineering School), focusing on some CPS key techno drivers (Embedded AI, CyberSecurity, connectivity, data reduction, Trustworthy AI, 5G, Open Hardware,...), embracing the variety of usages (connected/ autonomous cars, EVTOLs and drones, smart manufacturing, ...) while illustrating how CPS may very positively impact ecological challenges (energy reduction, ...) as well as sovereignty (Open hardware, RISC 5, etc...). That event took place on the 5th of May 2021.
- Targeting College and not only Universities and Engineering schools: one CEF' member has been invited as a jury to the event “OSI – Olympiades des Systemes Embarqués/ Embedded Systems Olympics” that's final competition was held on June 3rd 2021.
- Embedded France has close ties with FIEEC, the main professional organization in France dealing with Electronics, that received massive support from the French Government, which considers lack of attractiveness of Electronics as critical issue. Several meetings – in fact every week – have been set up to coordinate the communication plan and manage the agency ‘la Manane’ selected to run it.

- Embedded France shared its views on recruitment challenges in Embedded Systems and proposed some of its members (Mathworks, Kalray, Catie) to be part of the working groups.
- Web site revamping: The CEF is having its own web page, that provides information on where Embedded Systems are taught (Engineering school vs Universities, Paris vs Regions) and which “major / dominant” are accessible. The page also provides a space for any Academic member to inform and share any specific message. But this page is quite static and does not fit with the type of communication students (and globally young people) are nowadays fan of (short and impacting videos, interviews, portraits, ...). So the Association Embedded France decided to vote a budget to rebuild the page accordingly, and several meetings have been set with the selected Communication Agency – Esteve Communications.

Information : update of the 2014 CPS French footprint study by OPIIEC

The 2014 OPIIEC database on CPS French footprint was planned to be updated in 2020, but deferred due to Covid19, Embedded France it has been postponed. This study update is key to reinforce connections between Academics and Industry, and aligning training with employers expectations.

The Embedded professions, training in the Embedded sector. The Embedded France association actively participates in the OPIIEC study currently underway. Embedded France has been asked for the specifications of the study. The members of the association are also asked to respond to qualitative and quantitative studies on the subject.

The study is now available in the OPIIEC website since 30/07/2022 (<https://www.opiiec.fr/etudes/136750>).

Its multiple information will definitively feed the new webpage “Compétences – Emploi-Formation” of the Embedded France website to reinforce the attractiveness of Embedded Systems and perfectly align with our strategy to attract talents as part of CPS4EU project.

As written above, EF will organize a specific session as part of the future Assises de l’Embarqué to reinforce the dissemination towards SMEs.

3.1.2 Working Groups

The Embedded France working Group are everything but static and disconnected from new challenges... That means EF working groups have to

- “surf the wave” of emerging CPS challenges,
- be dismantled when not anymore pertinent (e.g. *Formal Methods* quite well established now, or Safety of STRC systems when safety is not that isolated...),
- and be created when demand is perceived (e.g. *Embedded Artificial Intelligence*, created in 2020 or *Edge Computing that’s been settled in 2022...*).

This new Edge Computing working group, created in nov 2021, in partnership with *SYSTEMATIC* French competitiveness cluster, aims at promoting the EDGE concept which is still not well known since having multiple definitions. Edge represents a collection of “frontiers” that come between the intelligent devices that we see abound and the cloud.

The goal of EDGE COMPUTING: to bring capacity storage network infrastructure as close as possible to the key data processing.

Distributed intelligence (ie. Swarms) is the next generation of cyber-physical systems, which motivates to create the *Embedded-France Edge-WG* to follow the work undertaken within the

framework of the CPS4EU project and to support a stronger positioning for our industrial stakeholders. We want to contribute to the growth of this ecosystem, at first in France and then in Europe, in order to advance the software and hardware innovations that support EDGE. The CPS, the autonomous CPS are at the heart of the EDGE issue. The means: the participants in this WG will share the codes of use that we will have identified in everyday life, the projects on which we work, and then share the best practice experience because we are talking about still emerging technologies. So this sharing of expertise is fundamental. The ambition of the WG is to be the rallying point for the actors involved in the Edge in France and beyond in order to make the Edge ecosystem evolve. Co-piloted by the Eclipse Foundation in Canada, this WG will also have a global coordination dimension, in order to act for France for Europe while remaining in phase on a global scale.

3.2 Events

3.2.1 Assises de l'Embarqué 2019

In **2019**, the Assises were organized on November 19.

The theme was the **"intelligence" of embedded systems**. It has been developed through the convergence between safety and security, and the analysis of the possible assets/difficulties brought by Artificial Intelligence.

Every year, a keynote speaker comes at the Assises de l'Embarqué to share his thoughts and vision on the sector. In 2018, [Guillaume Devauchelle](#), VP Innovation and Technological Development of the Valeo Group, leader of the CPS4EU project, came to show that CPS has set a new paradigm in automotive manufacturing and is one of the key elements of the autonomous car of tomorrow.

In 2019, [Bertrand Tavernier](#), VP Software of the Thales group shared his analysis on safety and security, overturning, in passing, some preconceived ideas in Open HW markets for embedded products and CPS systems.

The Assises also hosted, organized by Embedded France, seconded by Arcure, the CEA and Valeo, **a stand specifically dedicated to the CPS4EU consortium** (visible in the youtube [best off](#)). Arcure took the opportunity of the Assises to speak on its news (impressive growth) due in part to its visibility thanks to the Assises, on its role in the CPS4EU project and exposed its video camera on the stand. Yumain, another SME partner of CPS4EU, was also nominated in 2019 for its sensor integrating embedded artificial intelligence (edge-computing), particularly suitable for securing an industrial environment.

The Working groups: Every year, the 7 WGs of the Embedded France association come to present the results of their work and their projects for the following year, some of them are particularly focused on CPS.

- ViPE WG (Virtualization of Electronic Platforms). Led by Reda Nouacer of the CEA, ViPE has particularly been highlighted and gave an exhaustive presentation of its work.
- NSL WG (Normes pour la sûreté de fonctionnement Logiciel et système) Emmanuel Ledinot of Thales leads this working group dedicated to standards for safe critical systems (including of course CPS).

- LOIC WG (Logiciels pour Objets Intelligents et Connectés). Led by Jean-Philippe Malicet, Director of Captronic, [WG LOIC](#) presented its restructuring plans for the coming years during the last *Assises de l'Embarqué* event, November 2019. Focused on the Internet of Things, this working group has worked on the creation of multi-industry platforms covering all levels of safety and security, giving rise to the S3P (Smart - Safe and Secure Platform) project. After completion of S3P project, this working group decided to redirect its thinking towards CPS, **in conjunction with the CPS4EU partners** (and especially SMEs).

Trophées: Highlighting innovative projects, six trophies are awarded each year to projects in fields as varied as critical embedded systems, health, IoT industry and services, embedded technologies and IoT for the general customer applications. In this context, [Arcure](#), one of the 38 members of CPS4EU consortium, was awarded the IoT industry and services trophy in 2018 for its Blaxtair intelligent camera. One year later, at the 2019 *Assises de l'Embarqué* session, Sabri Bayoud came back to show how important it is for a company like Arcure to receive a trophy, and thus be recognized by her peers for the technological value of her innovation.

Attracting talents: Another mission devoted to Embedded France association is to tackle the recruitment issues that all the Embedded Systems stakeholders are currently facing. Over the last few years, the association has developed privileged links with the academic world (ENSTA, ESIEE, ESIEA, TelecomParis, PolyTech Paris Sud, Jules Verne University ...). Through meetings with students, it seeks to promote the embedded sector (and introducing the new concepts like CPS, OpenHardware...), its professions, and attract talent to these sectors. Such a presentation was performed for example for the ESIEA school in the premises of the Atos company on November 13 2019.

3.2.2 Assises de l'Embarqué 2020

In 2020 due to the Covid19 crisis, the Assises have been postponed to January 19 2021.

Due to the sanitary crisis, for the first time the organization had to organize a virtual day with real time transmission on Youtube and Tweeter. The second half of 2020 has been devoted to the preparation of these 13th Assises. This required a lot of preparation (including plan B and C depending on the sanitary constraints evolutions).

The event was a great success, with 432 registered attendees - 180 simultaneous connections at a minimum on the whole day – 1400 views/ average 35 minutes on the replay. 80 of those attendees were from SMEs and 57 from start-ups.

The theme for the 2020 Assises de l'Embarqué was « L'embarqué au cœur des chaînes de valeur industrielles. Comment garder la maîtrise de technologies clefs : IA embarquée, CPS , 5G, Edge, Openhardware, ... » or in other words Embedded Systems at the heart of industrial systems value chain: how to keep mastering of key technologies (Artificial Intelligence, CPS, 5G, EDGE , Open Source Hardware ...)

A dedicated Round Table has been set to share different visions on « CPS and embedded AI challenge”, which technologies and key toolchains have to be managed, as independently as possible:

- micro-electronic vision – by Kalray – on how to have EU sovereign manycore chips capable to run AI algorithms as close as possible to the sensor level (car, train, ...)

- technology transfer vision, by CEA, on how to generate spin-offs on niche CPS applications
- at software toolchain level, by ANSYS and Mathworks, that shared CPS insights and roadmaps, despite their position as market competitors...
- Renault, as vehicle OEM representative, having key position in the value chain, close to the final usage, and interfacing with the cyber dimension.

Ensuring seamless exchanges in real time and enabling all stakeholders to pass their messages requested a couple of meetings prior to the D Day.

As every year, the association awarded 5 trophies, to companies developing particularly innovative projects, the jury, (meeting on December 10, 2020) selected 10 companies, within the candidates (Axibio, Expemb, Cartesiam, Hionos, Ioterop, Outsight, Renault Software factory, Unseenlabs, Wisebatt, Yumain (member of CPS4EU). See the press release issued on the 18th of December : [2020-12-18-cp-nomines-trophees-embarque-def.pdf \(embedded-france.org\)](#).

On the 19th of January, YUMAIN, a member of the CPS4EU consortium, received the Embedded IoT for Industry and Services award. It was presented by the CEA, sponsor of the conference and another member of the consortium. [See the press release.](#)

Created in 2020, the Embedded AI WG worked jointly with the similar working group designated by the electronics sector (filière électronique. Embedded France is a founder of the “filière”). In order to ensure digital continuity between a sensor and the cyber universe housing IT technologies, while optimizing data privacy, performance and energy consumption applicable to many use cases, it is essential to define the means to ensure artificial intelligence processing to be applied close to the sensors and if possible in sovereign hardware and software environments.

The purpose of this WG is also to share in the ecosystem the roadmaps, the difficulties encountered, and the solutions imagined. The ultimate objective being a convergence on the challenges of CPS and the way in which embedded AI responds to them by satisfying all the different players in the ecosystem.

The on-board GT IA was put in the spotlight during the last Assises de l’Embarqué.

The diversity of teams from the Embedded France association, CPS4EU working groups, AIF working groups and those from the electronics industry, makes it possible to disseminate common benchmarks and accelerate convergence.

Edge Computing is a very interesting domain, having as many definitions as active stakeholders, from cloud hyperscalers, Network Service Providers (NSPs), Telco Operators, Telco Equipment providers, addressing a large variety of use cases (intelligent manufacturing, connected cars, Industrial IoT, ...) all of them perfectly framed under CPS architecture... Embedded France has therefore been solicited by Systematic, one of the main R&D cluster settled by the French Government, to envisage the creation of a joint Working Group. Several meetings (4) have already been set to share visions and key members have already been identified (Nokia, CEA, Renault,...) for Systematic, Kalray as a WG leader for Embedded France.

3.2.3 Assises de l'Embarqué 2021

By End of April, Embedded France started to work on the Assises de l'Embarqué 2021, that shall be organized – as usual – at the French Ministry of Economy/ Bercy, on the 2nd of December 2021. But due to calendar conflicts, the event has been settled on 2022, January the 12th.

After having set several meetings with its members, it has been decided to focus on interactions between Embedded Systems and ecological issues, encapsulated by the theme of the year « **Tech for green et green Tech : les systèmes embarqués au cœur de la transition écologique/ embedded systems at the core of ecological transition** ».

Key sub-messages have been identified:

- special attention on having women on stage
- strong links with CPS, notably embedded AI
- embracing “special” markets (agriculture, eco-buildings, ..)
- interactions with sovereignty
- enlarge the Trophy for students to any Academic in France, being a member of Embedded France or not...

The detailed agenda is still, beginning of July, under construction, but the key moments have been defined:

- Introduction par Matthieu Weill/ Ministry : to get the official position of the French Government
- Context and definition, introduced by 2 women: Véronique Torner (Syntec/Numeum)/ TBC and Carolynn Bernier (CEA)
- Round table 1 « Tech for Green » : message : embedded systems can be a lever for the development of a green economy and for the ecological transition
- Round table 2 « Green Tech »: Can we consider Embedded Systems as clean technologies?
- The Keynote speaker is not identified at the moment

As previous years, in spite of the Covid19 crisis, members of the CEF commission (“commission Emploi-Formation”) have continued to share within engineering schools awareness of the attractiveness of careers in embedded systems, cyberphysicals systems, the type of products and projects realized in order to encourage young students to embrace this path.

Among actions, the creation of a **trophy for students** for the Assises de l'Embarqué was decided and awarded to a project coming from one of our school partner of Embedded France.

In 2021 due to an agenda conflict with the Ministry of the Economy which hosts the annual conference, the Assises have been postponed to January 12, 2022.

Due to the sanitary crisis, the organization has been prepared as a virtual day with real time broadcast on Youtube and Tweeter, and interaction (questions, comments, reactions, ...) when dealing with Round Tables. About 50-60 participants were physically present, the other guests have followed the event on social networks. The first participation figures indicate an audience of 880 people. The replay of the conference is currently visible on the website of the Embedded-France association (and on our YouTube channel at <https://youtu.be/AfKmSidQOaw>, with about 1700 views).

The theme for the 2021 Assises de l'Embarqué was « *Green Tech Tech for Green, L'Embarqué, un levier pour le développement d'une économie verte et pour la transition écologique ?, ...* » (translated into English: "can Embedded systems be considered as a lever to develop a green economy and support ecological transition ?").

A specific slot was dedicated to the CPS4EU program. Our keynote speaker - Philippe Gougeon from Valeo – communicated on CPS4EU status and achievements. He reminded context and objective of the project and highlighted its innovative dimensions (modular architectures, generic and easy-customized bricks, pre-developed/ pre-integrated blocks which will compose the next generation of CPS), and shared its first achievements. A call was launched for the participants of the *Assises de l'Embarqué* to join the project ecosystem, namely to the industrials so that they can seize the results of CPS4EU.

The CPS4EU Eco-system

The CPS4EU Project

- ❑ Managed by ECSEL JU
- ❑ **36** Partners from **5** European Countries
- ❑ **53 M.** Euro budget
- ❑ **16** use cases in Automotive, Industry, Energy and for SMEs
- ❑ 7/2019 to 6/2022

Web site:
www.cps4eu.eu

LinkedIn group:
www.linkedin.com/groups/12372370/

Pre-Integrated Architectures for sustainable complex Cyber-Physical Systems

- Solutions to reduce R&D Efforts for complex CPS developments
- Practical approach for current and upcoming challenges
- Fit well to networked eco-systems
- Meet expectations of large companies, SMEs and tool providers

Contacts

- Contact our project partners for more information:
<https://cps4eu.eu/wp-content/uploads/2020/11/CPS4EU-presentation-Summary.pdf>
- Or contact by email philippe.gougeon@valeo.com et etienne.hamelin@cea.fr

16 Use cases using at least 1 PIARCH (TRL 6-7) – Small & Medium Enterprises

The slide displays four SME use cases, a central architecture diagram, and a photo of a speaker. The use cases are:

- SME use case (Arcure):** Pedestrian detection on off-road construction trucks.
- SME use case (ACOEM):** Monitoring network for environment quality and threat detection.
- SME use case (M3S):** Open loop test bench for GNSS positioning.
- SME use case (Airline):** SaaS for intelligent motor control application on handheld tools.

The central diagram illustrates the CPS4EU architecture, showing the flow of data between various components like 'New data', 'AI signal', and 'Data processing'. The photo on the right shows a man speaking at a podium with the text 'Les assises de l'embarqué'.

A first round table was specifically dedicated to embedded technologies as a key enabler of "green" digital continuity and while making it more eco-responsible. This round table particularly highlighted the importance of Edge computing for effective CPS, thanks to its capacities to ensure efficient data management – including security and privacy – as well as real-time performance, while optimizing Telco bandwidth, computing capabilities as well as energy consumption. Edge computing is addressed by CPS4EU through its use-cases (smart-grid, autonomous vehicles, smart manufacturing, robotics).

Key stakeholders (STM, Greenspector, Silicon Mobility, Soitec, Ansys) illustrated how Embedded Technologies are frugal by nature and represent available and complementary solutions for next generation of CPS.

The second round table highlighted projects in different sectors of the economy (agriculture, transport, electrical networks, aerospace, etc.) in which embedded technologies can cross-feed to optimize consumption, reduce losses and increase performances. Preintegrated architectures developed in CPS4EU are enablers to reinforce European industrial leadership in these sectors. As for the first round table, it's important to notice that participants (Schneider Electric, EDF, The Mathworks, Flying Whales and University of Bordeaux) were coming from different playgrounds, from start-up to large Group and SME to Universities.

As every year, the Embedded France association is awarding 5 trophies to companies developing particularly innovative projects.

The 2021 jury met on December 10, 2021 and nominated 10 projects from Capgemini Engineering, Chronolife, Finheart, StatInf, Intento Design, Secure IC, Koovea, Wattson elements and Wandercraft - see [press release](#) issued on the 7th of December – while 6 were awarded a trophy on January 12 ([Press release attached](#)).

For the last three years, the members of the CPS4EU consortium have been asked by the CEA to apply for the Embedded Trophies. Two of them have been awarded trophies, [Yumain](#), last year and [Arcure](#), two years ago.

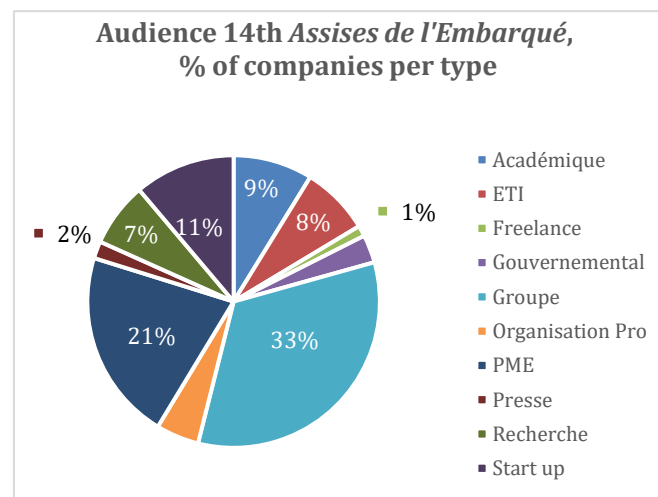
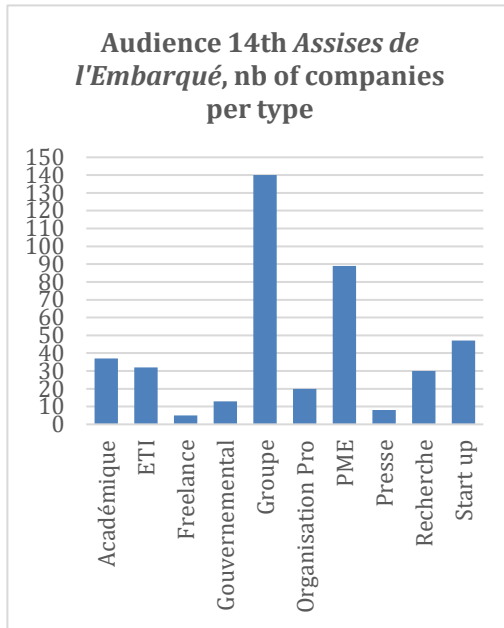
Important: to reinforce the dissemination within Academics, Embedded France nominated 3 projects carried out by students and awarded "Dysglass", as a promising solution for dyslexia.

As a conclusion, the *Assises de l'Embarqué* event is a key tool to disseminate knowledge, experiences and stakeholders in such a broad and innovative domain as CPS.

Moreover, the audience is composed of a large variety of companies, start-ups, SMEs (up to 250 employees), ETI (for *Entreprise de Taille Intermédiaire* – mid-size companies – with less than 5000 employees) up to Large Groups...

Some KPIs from the *Assises de l'Embarqué* held on 2022, January the 12th:

- audience: 425 individuals registered representing 268 companies
- 1687 post-events views with an average of 36 minutes



3.2.4 Assises de l'Embarqué 2022

Since May 2022, Embedded France is preparing its 15th *Assises de l'Embarqué*, originally planned on December 2022 the 12th, they will take place on January the 17th 2023.

The theme is to be : “*Edge Computing challenges and opportunities : how to associate sovereignty, security and sustainability*”.

Key parts of the program:

- Introduction by Ministry of Economy, Finance and Industrial and digital sovereignty,
- French Electronics cluster presentation, by key stakeholder representative (ST, Schneider Electric, ...)
- Embedded Systems study by OPIIEC on Competence, education and training, by Kyu and Numeum
- Opening: The promises of Edge Computing, overview of technological and economic challenges at European level » Eliane Fourgeau (Quantyss), Jean Pierre Delesse (Cabinet Decision)

IMPORTANT: Embedded France is participating, along with Cabinet Decision, to this key analysis requested by EU Commission/ DG Connect ((<https://www.h-cloud.eu/news/call-for-tenders-study-the-economic-potential-of-edge-far-edge-computing-in-smart-iot/>)). A workshop dedicated to the automotive sector, has been organized on Octobre the 6th. This is a key opportunity for Embedded France to establish a strong link with the CPS.

- Round table # 1: Transforming markets thanks to Edge Computing! For today or for tomorrow?
- Round table #2: Transforming markets thanks to Edge Computing! For today or for tomorrow?
- Keynotes speakers:
 - Open Innovation at the service of intelligent, secure, sustainable and sovereign mobility, by the Software Republic.
 - How will embedded software transform tomorrow's mobility? », by Thierry Cammal/ Renault and TBC/ Stellantis

3.2.5 Trade fairs, conferences & key CPS events

As a Partner of the PLANET TECH CARE initiative, launched by NUMEUM, Embedded France was present at the first GREEN TECH FORUM held in Paris on the 1st and 2nd of December 2021, a key opportunity for the association to highlight the ecological dimension of Embedded technologies, in which CPS are preponderant.

We're currently preparing the next Green Tech Forum session, planned in Paris on December the 1st and 2nd.

In line with our dissemination actions, next spring we will organize a Board of Directors with the Cluster "Images et reseaux" (Pôle de compétitivité) to strengthen our anchoring in the world of telecommunications, revolutionized by 5G and its major impact in the world of CPS.

Following Philippe Gougeon's intervention, we plan to produce, with the help of the CEA, a summary document on the importance of CPS4EU for SMEs. This document will be produced during the first semester of 2022 and will be distributed both to our members and to our wider ecosystem.

We have been asked by the organizers of the MtoM/ Embedded Systems annual event, which took place on 29th and 30th of June 2022 in Paris, to present key CPS topics. Thus we organized several presentations to reinforce CPS4EU dissemination : Etienne Hamelin on CPS4EU project, Eliane Fourgeaux on Edge Computing, Luc Chabaudie on Competence, Education and Jobs, Carolynn Bernier and Frédéric Debouck on "Green Tech and Tech for green") <https://www.salon-iot-mtom.com>.

In line with our dissemination actions on CPS, we organized a meeting on 27/07/ 2022 with Aerospace Valley management team that raised lot of interest and objective to move on together on 3 dimensions: working groups, notably embedded AI and Safety/ Security, CPS attractivity and cross industries dissemination.

We will continue our various dissemination actions, both within the working groups and the CEF, and will participate as much as possible in the various exhibitions and events that are important for the CPS ecosystem.

In parallel with the agriculture sector, to which Embedded France is currently opening up, we are getting closer to the MEDICEN cluster, which brings together players in the health sector. Today, these actors are undergoing a major transformation, with the development of connected medical devices over the last 10 years. Many of the players are startups or SMEs. The use of the bricks already pre-built via the CPS4EU project can be an important asset for these actors.

3.3 Publications and Presentations

The NSL WG (Software and System Dependability Standards working group) of Embedded France, led by Emmanuel Ledinot of Thales, worked on the topic "**Towards CPS certification reformation: call for effective foundations**".

The authorization to publish the article in the journal LITES has been delayed from August 2020 (https://ojs.dagstuhl.de/public/journals/1/LITES-CfP-Special-Issue_Embedded-Systems-Security_2020.pdf) to beginning of 2021, and has consequently been published in the website and directly forwarded to all the association members at this time and communicated on the social medias.

CPS market study:

Starting in 2019, Embedded France co-financed with the French DGE an exclusive study on the CPS sector in France. This study, carried out by the company Katalyse, was scheduled to be unveiled at the 2019 session of the Assises de l'Embarqué. The final version of the study was finally released during the last semester of 2020. Embedded France had an exclusivity for its members during October 2020. A dedicated virtual detailed presentation has been organized on October 26th : a day of exchanges enabling technological partners to share their views on the current situation and market trends. The report is available on the association website and on the Ministry of Economic Affairs:

<https://www.entreprises.gouv.fr/fr/etudes-et-statistiques/dossiers-de-la-dge/cartographie-des-systemes-cyberphysiques>

- Article for ERTS 2020 (see annex) Keywords :

Embedded Systems, Embedded Software, CPS (Cyber-Physical Systems), Intelligent Connected Systems, Strategic Council of The Electronic Sector, S3P (Smart Safe and Secure Platform), Real Time Software, Manycore, Critical Real Time Systems, Dependability And "Certification", Security of Autonomous Systems, Embedded Artificial Intelligence, Association.

4. Communication and Dissemination Analysis

4.1 Websites

Both websites, respectively dedicated to Embedded France association and to the Assises de l'Embarqué event, have been revamped in 2018, are quite active and well managed.

For 2021, objective is to rebuild the Embedded France webpage dedicated to Employment and Education, that's not attractive enough to share and pass our messages on CPS attractiveness to population of students who are used to use short and impacting videos, dealing with testimonies, events snapshots (e.g. robocup,...) and message driven...

4.2 Social Media

The Assises de l'Embarqué 2020, hold on January 2021 because of Covid19 impacts, have been representing a great challenge for Embedded France since quite no public in presence, and real-time broadcast on Utube... We plan to address the two dimensions – remote and in presence- for the 2021 event planned on the 2nd of December.

4.3 KPIs

- **SME Attendance (23%) at the Assises de l'Embarqué 2020, hold on the 12th of January**

2022:

- Large Groups: 133
- **SMEs: 88**
- Freelance/ Startups: 56
- Academic (Universities/ engineering schools): 41
- Research centres: 22
- Professional organizations: 20
- Ministry of Finance and Industry: 6
- Press: 5
- Misc: 12

- **SME representation as part of Working Groups: SME vs total**

- ISEC: **2/15**
- Embedded AI: **0/7**
- NSL: **1/12**
- ViPE: **6/15**
- Manycore certifiable: **1/1**
- LOIC: **10/15**

- **CPS related events in 2022:**

- **ANSYS –Race to net zero e-book. Janvier 2022**
- **KALRAY- Arcapix - Janvier 2022- /**
- **CATIE- Hydrozest de 6Tron- mars 2022**
- **Embedded SEC – mars 2022**
- **Numeum - Le pitch des candidats – Mars 2022**
- **Vector : les rendez-vous de l'e-mobilité (mars 2022)**
- **Minalogic Business meetings (mai 2022)**
- **ERTS-Toulouse- juin 2022**
- **SIDO - (Paris et Lyon) Automne 2022**
- **MtoM Embedded – juin 2022**
- **Ateliers Planet Tech care- 2021-2022**
- **EFFECS-Amsterdam- Novembre 2022**

- **CPS related events published in 2021:**

- **ESIEA - OpenLab- Octobre 2021**
- **IRT St Exupery et Kronosafe (Projet Archeos)- Juin 2021**
- **KALRAY- Lauréat appel à projet résilience mai 2021**
- **Mathworks – Climate R&D with MATLAB and Simulink**
- **Mathworks. MatLab expo, Mai 2021**
- **THALES-Gap analysis et les perspectives des CPS. Mai 2021**
- **Numeum : Fusion Syntec-Tech in France –Juin 2021**
- **COMPSAC 2021 (International Workshop on Software Engineering for Industrial Cyber-Physical Systems – Juillet 2021**
- **THALES – Robot Persévérance- Septembre 2021**
- **Systematic, Webinaire Open source pour l'embarqué – Octobre 2021**
- **Viv Heath Tech. Octobre 2021**

- **EuroMicro DSD Palerme, septembre 2021**
- **NAIA-R Bordeaux- déc. 2021**
- **EuroMicro DSD Palerme, septembre 2021**
- **Green Tech Forum Dec 2021**

- CPS related events published in 2020:

- **Embedded SEC** - Janvier 2020
- **ERTS** - Janvier 2020
- **AeroSpace Valley** - Janv-fev 2020
- **MWC Barcelone** - Février 2020 (annulé)
- **Global Industrie** - Mars 2020 (annulé)
- **Soutien aux PME et ETI** par la Commission Européenne- Mai 2020
- **Semaine de l'électronique de puissance** - Septembre 2020
- **MtoM Embedded** - Septembre 2020
- **Rapport CPS (DGE-EF)** - Octobre 2020
- **SIDO** - Novembre 2020
- **HealthTech Bordeaux** - Novembre 2020
- **Rendez-vous Carnot Lyon** - Novembre 2020
- **Projet REACH** pour l'Europe - Décembre 2020



- CPS related events published in 2019:

- **IOT Solutions World Congress** : Barcelona, du 29 au 31 octobre 2019
- **SIAE** : Le Bourget, du 17 au 23 juin 2019
- **ECSEL** : Bucarest, le 17 et 18 juin 2019
- **ACSEL / Forum de l'IoT** : Paris, le 24 octobre 2019
- **Smart Cities – Smart Grid** : Paris, du 2 au 3 octobre 2019
- **Embedded Linux Conference** : Lyon, du 28 au 30 octobre 2019
- **Vivatech** : Paris, du 16 au 18 mai 2019
- **FIC Lille 2019** : Lille, du 22 au 23 janvier 2019
- **SIDO** : Lyon, le 10 et 11 avril 2019
- **Urbagora 2019** : Paris, du 4 au 5 avril 2019
- **Salon ENOVA** : Nantes, du 3 au 4 avril 2019.
- **#DIGIHALLDAY à Nano-INNOV** : Paris Saclay, le 28 mars 2019.
- **E-Health** : Monaco, 26 et 27 mars 2019
- **Salon MtoM-Embedded Systems** : Paris, le 20 et 21 mars 2019



5. Conclusions

Embedded France is the association gathering the most prominent French players in Embedded Software and Systems, in all domains. This non-profit organization is dedicated to strengthen this ecosystem. Embedded France will carry on its mission by trying to bring more and more value to its members but also to the whole ecosystem. The new roadmap being drafted will make us more agile, more efficient and better meet the expectations of the ecosystem.

Through its participation in European projects such as CPS4EU, Embedded France affirms its desire to promote its European dimension and to foster the emergence of a European Embedded Network making European industry more competitive to face the challenges of the future.

6. Annexes

Article presented at the ERTS 2020 conference

EMBEDDED FRANCE new Organization and Missions

Cendrine Barruyer (1), Cédric Demeure (2), Olivier Guetta (3), Jean-Luc Chabaudie (4)
(1) *Embedded France*, (2) *Thales*, (3) *Renault*, (4) *Altran*

Keywords

Embedded Systems, Embedded Software, CPS (Cyber-Physical Systems), Intelligent Connected Systems, Strategic Council of The Electronic Sector, S3P (Smart Safe and Secure Platform), Real Time Software, Manycore, Critical Real Time Systems, Dependability And "Certification", Security of Autonomous Systems, Embedded Artificial Intelligence, Association.

Summary

Embedded France is the association of French players in embedded software and systems. This non-profit organization acts as the armed wing of the French State (DGE) within the embedded ecosystem to promote "skills sharing" and cross fertilization, and brings together all stakeholders in the sector: researchers, training centers, industrialists.

It was created in 2013 with the main objectives of developing activities in the domain and contributing to the competitiveness of the French Industry. Embedded France is a unique association because of its transversality. It brings together players of all sizes, from major contractors and competitiveness clusters, to emerging startups, as well as universities and engineer schools.

This paper will first recall the main missions of this association, then, it will describe the new governance recently reshuffled to improve its attractiveness and the associated roadmap, and will at the end focus on the various ongoing Working Groups.

Embedded France main missions

The association has 5 main missions:

- **Federate the sector:** the strong growth and rapid changes in the ecosystem of intelligent connected systems and connected objects call for the existence of a unifying entity such as Embedded France.
- **Break down the sectoral "silos":** Embedded France aims to encourage communication, feedback and solution sharing between the diverse players -both users and providers of embedded software and systems- to remove barriers in this market and contribute to the sector's enhanced competitiveness.
- **Develop international cooperation:** Embedded France is eager to develop links with similar initiatives in other European countries.
- **Ease hiring and training:** Embedded France aims to help tackle the skill shortage in the embedded software and systems sectors.
- **Communicate** with the major players: investors, public authorities, research institutions etc., to increase the visibility and attractiveness of the sector.

As the main representative of the Embedded software ecosystem, Embedded France takes part in the Strategic Council of the Electronics Sector (“Conseil Stratégique de la Filière Electronique”). French minister Bruno Le Maire signed the Sector’s contract (“contrat de filière”) in March 2019. This allows Embedded France’s members to participate in the various Working Groups which will build the Electronic Branch roadmaps.

Embedded France activities and governance

Embedded France activities

The activities of Embedded France are distributed as follows:

- Operational Coordination and Coordination
- Animation of working groups (WG, see below)
- Taking part in European projects such as CPS4EU.
- Communication actions, including professional events related to embedded systems and connected objects...
- Organization of an annual meeting called the “Assises de l’Embarqué”
- Actions related to employment, training, jobs and skills directly concerned by embedded software and systems



In addition, Embedded France has privileged links with high level authorities, in particular the General Directorate of Enterprises (DGE). It carries out actions in collaboration with the French Public Authorities, (DGE), such as the market survey on the CPS sector.

Embedded France Governance

The Board of Directors meets every month in order to review all current topics: governance, ecosystem news, budget and membership, partnerships, Working Groups, communication, events and exhibitions.

To illustrate the association’s strong links with the French embedded systems ecosystem, the Board - originally composed of Founders, (*Syntec Numerique*, Cap’Tronic, and 4 Competitiveness Clusters - Aerospace Valley - Systematic - Image et réseaux - Minalogic) which represent many players of the ecosystem- (major main contractors as well as small companies) now welcomes Academics (ESIEA), a Research and Technology Organization (CEA) and SMEs (Viveris, Prove-and-Run).

A new roadmap has been defined and approved in 2019, along with board effectiveness reinforcement. To this end, key dimensions are now managed by specific commissions: Events sector, Ecosystem, Education and Employment, Working Groups. Each commission is entrusted with specific missions in these areas. This more agile organization will allow Embedded France to be more reactive and to reinforce each of its missions.

Major Embedded France historical steps

Nov. 2013: Creation of Embedded France.

2014	<ul style="list-style-type: none"> - Constitution and first working groups - Validation of the plans for the "New Industrial France" (NFI) by the Government and selection of Embedded France as the pilot structure of the "Software and Embedded Systems" plan.
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2015	<ul style="list-style-type: none"> - Implementation of the NFI (“Nouvelle France Industrielle”) Plan for Embedded Software and Systems as part of the "Digital Trust Solution". - Launch of the S3P (Smart, Safe and Secure Platform) project.
2016	<ul style="list-style-type: none"> - Positioning of Embedded France at the European level. - Launch of two new working groups and a commission dedicated to education (CEF, “Commission Emploi Formation”)
2017	<ul style="list-style-type: none"> - Presentation of the report on CPS (Cyber Physical Systems) on August 26, 2017 to Mr. Bruno Lemaire (French Minister of Economy) - Launch of two new working groups (Safety of STRC and Virtualization of electronic platforms) and discussions for the creation of a new group on the certification of autonomous vehicles carrying Artificial Intelligence).
2018	<ul style="list-style-type: none"> - Alliance S3P day (Neuilly, October 19, 2018) - Creation of a Strategic Sector Committee (“Comité Stratégique de Filière” (CSF)), Electronic Sector (May 2018) - Communication Plan. - Links with medical and academic sectors - 11èmes Assises de l’Embarqué: focus on Cyber-Physical Systems. (December 19th, 2018)
2019	<ul style="list-style-type: none"> - Update Roadmap, Governance and Working Group alignment on Embedded systems markets challenges (Security - Artificial intelligence) - Adaptation, for Embedded System, of a specific French Government funded mechanism for long term unemployed people (POE) - Co-funding, with French DGE, a CPS market analysis and propositions to increase French competitiveness (maturity, employments,...) - 12èmes Assises de l’Embarqué: focus on Safety and Cybersecurity of Embedded Systems. (November 19th, 2019)

Embedded France “Assises de l’Embarqué”

Organized by Embedded France, in partnership with the General Directorate of Enterprises of the Ministry of Economy and Finance (DGE), the annual event, “Assises de l’Embarqué”, is held every year in November or December at the French Ministry of Economy, in Bercy. During a whole day, it combines round tables of experts, keynote speakers, pitches of companies nominated to “Trophées de l’Embarqué” and awards the “Trophées”. These awards make it possible to distinguish companies and startups carrying particularly innovative projects in the field of embedded technologies.

The 11th edition, in Dec. 2018, was focused on Cyber-Physical Systems (CPS). A market survey on the Cyber Physical Systems sector was announced (first results and recommendations will be presented on Nov. 2019 at the Assises).

The 12th edition (November 19, 2019) was devoted to the safety and security of embedded systems (“Safety-cybersecurity convergence in Embedded Systems: Myth or reality?). The focus was on the long term story of fusion between safety and Security, which both addresses the Embedded Systems nowadays connected, and the analysis of the Artificial Intelligence impact, potentially positive but negative too...This edition was also the opportunity for the chosen firm co-contracted by Embedded France and DGE to present its analysis on the CPS ecosystem in France, along with propositions to the Government and industrial stakeholders to improve competitiveness, attractiveness and global efficiency.

The 2019 “Assises de l’Embarqué” are therefore an opportunity for Embedded France to present to the public - in preview- the studies that it co-conducts with the DGE ! Next forum in 2020 should consider

the question of “embedded artificial intelligence”. These sessions are filmed and are made available for viewing on the “Assises de l'Embarqué” website.

Embedded France roadmap

The 2019-2022 roadmap consists of the following directions.

- **3 challenges** to generate value for our members
 - Cover the whole French territory, and not the main cities (especially not limited to Paris region)
 - Reinforce interactions between members (to generate an « effet de meute »)
 - Valorize interactions with French Administration, notably DGE (the on-going study on cyber-physical systems will help focus energy on identified promising topics).
- **4 axes to tackle those challenges**
 - Communication/ Events/ Networking
 - Focused Working Groups to cover technical / technological dimensions
 - Relationship with academics (education / training / employment). Here the signed EDEC contract (“Engagement de Développement Et de Compétences ») will help by providing the proper tools to analyze et evaluate the needs.
 - Establish a strategy for the Industrial ecosystem

Embedded France Working Groups

Our 7 Working Groups and the “Skills -Employment – Training” Commission (CEF) are at the heart of the association's mission and activities. Their development is a sign of the vitality of Embedded France.

The “Skills -Employment – Training” Commission (CEF) created three years ago, has in turn set up actions for higher education institutions. The participation of new members in the association (schools and universities) helps to strengthen this pole. The objective 2019-2020 is to update the cartography of training (schools, continuing education...) in the embedded domain, boost the relations between our industrial and academic members, get closer to the students of these training institutions for example by organizing a dedicated event (e.g. in the form of a Hackathon).

The seven Working Groups slightly changed in 2019 according to the table below:

WG1	Software for Smart and Connected Objects: initially dedicated to S3P project, will now concentrate on CPS
WG2	Regulation and Standards - Dependability and "Certification"
WG3 Closing November 2019	Formal Methods → closing end of 2019, remaining activities included in WG8 “Engineering of Safe and Critical Embedded Systems”
WG4 Name change in 2019	Security of Autonomous Systems → becomes Embedded Artificial Intelligence
WG5	Manycore
WG6 Closing November 2019	Safety of Critical real-time systems → closing end of 2019, remaining activities included in WG8 “Engineering of Safe and Critical Embedded Systems”
WG7	Virtualization of digital platforms
WG8 Creation November 2019	Engineering of Safe and Critical Embedded Systems

What are our Working Groups? : Forums for exchange, thinking and writing of deliverables, bringing together industrial contractors, technology providers and academic bodies around key issues of embedded systems.

What is their role? Without any spirit of competition, their members seek to collectively advance knowledge by combining the theoretical approach with feedback from industry players.

Be it to revise standards or to promote practices, to deploy new interoperable technologies, to demystify a subject, to build a state of the art, to contribute to state initiatives, Embedded France WG's rely on expertise and cross-sectoral positioning to adapt offers to needs and bring value to the French ecosystem of embedded systems.

What is their operating mode? Gathered around their "pilot" who is usually at the origin of the WG's creation, members meet regularly and publish deliverables. Each group determines the rhythm of its meetings and its publications. Any member of Embedded France can participate in the group(s) that interests him and can also put forward the creation of a WG if a transversal problem relating to the embedded sector seems to require a collective reflection. The publications are the property of the working group but are available to all the association's members.

These working groups, and all those who will emerge over time, are at the heart of Embedded France's mission: to federate skills, remove barriers and silos, promote the cross-fertilization of different sectors for greater benefit for all ecosystem stakeholders.

A more complete description of each of these groups, their constituent companies, mode of operation, activities, publications made to date, are available on the Embedded France Website (<https://www.embedded-france.org/>) and are regularly updated.

Conclusions

Embedded France is the association gathering the most prominent French players in Embedded Software and Systems, in all domains. This non-profit organization is dedicated to strengthen this ecosystem. Embedded France will carry on its mission by trying to bring more and more value to its members but also to the whole ecosystem. The new roadmap being drafted will make us more agile, more efficient, and better meet the expectations of the ecosystem. Through its participation in European projects such as CPS4EU, Embedded France affirms its desire to promote its European dimension and to foster the emergence of a European Embedded Network making European industry more competitive to face the challenges of the future.