EUROPEAN COMMISSION – HORIZON 2020

Deliverable D5.6

WP5

Second Intermediate Report on Dissemination & Exploitation Activities

Contract Number:	644090
Project Acronym:	EuroCPS
Project Title:	"European Network of competencies and platforms for Enabling SME from any sector building Innovative CPS products to sustain demand for European manufacturing"

Document Identifier:	Deliverable_EuroCPS_D5.6.doc
Status:	Final

Title of Document:	Deliverable D5.6
Dissemination Level:	Public (PU)

Author(s):	Davide Brunelli Ph.D, Simone Benatti Ph.D. (University of Bologna)
Reviewed by:	Olivier Thomas, Isabelle Dor

Created on:	January 3, 2017
Last update:	February 14, 2017

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 1 of 103

Abstract

This document describes the dissemination activities realized during the second year of the project, as well as the exploitation plans of all the EuroCPS partners. The consortium has continued to promote the EuroCPS initiatives by implementing strategies at both National and International level within the *Smart Anything Everywhere* initiative. To this purpose, the consortium leveraged multiple digital tools, such as an internet website and different social platforms, organized several events to promote the EuroCPS project, its objectives and its instruments, such as workshops, brokerage days, booths at conferences and fairs, etc.

Specific events to disseminate the results obtained by the funded experiments are organized and will continue to during the third year of the project. The document concludes with a short description of the strategies planned by the EuroCPS partners to exploit the results and the experience matured during the project to further strengthen the links between the research and the industrial worlds in the field of IoT and CPS at European level.

Table of Contents

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 3 of 103

Introduction

This document is organized as follows. In Chapter 1 some statistics about the project website are provided for Year 2, as well as the usage of press release and other social platform to disseminate the most important information about EuroCPS. Chapter 2 describes the events in which the EuroCPS project has been promoted during the second year. To this purpose, all networking partners organized and/or participated in forums, fairs, workshops and other events related to IoT and CPS technologies, organizing booths and presentations to promote the EuroCPS approach and the project objectives within the Smart Anything Everywhere (SAE) initiative. For all the participated initiatives a detailed description is provided. In the last Chapter of the document, the current exploitation plan for all the EuroCPS partners is reported, highlighting how the experience matured in the project, the creation of a European research-industry integrated network and the technical achievements of the project will be exploited by the consortium.

1. Dissemination Activities

1.1. Project Website

The EuroCPS website (https://www.eurocps.org/) has been designed and is operated by BME.

A responsive design has been selected, assuring easy reading and navigation on multiple devices: smart phones, tablets, notebooks and desktop PCs. The home page is the landing page, it contains the most important and up to date information in an easy to read format. The bottom part of the page gives a short description of the platforms and the design centers.

It has three functions:

(1) To inform SMEs, MidCaps about the EuroCPS project, the funding opportunities, the available CPS platforms and the coaching opportunities, the associated brokerage events.
(2) To facilitate the operation of the EuroCPS project and the collaboration between partners, to archive EuroCPS documents, by sharing project related restricted information among the partners,
(3) To enable the submission and evaluation of innovators projects of the Open Calls.

The website has become operational in the first month of the project, and it is continuously updated and upgraded to facilitate better dissemination, outreach and project operation. It includes a public part for public dissemination and a restricted part used only by the consortium partners.

The promotion of EuroCPS is enhanced by promoting the selected projects, their objectives and expected outcomes and their realization.

A cycling nature with peaks around the Open Call dates is observed showing the interest of SMEs. The project has reached the expected reach of 800 SME target number already in the first year as already in the month of May 2015 the number of unique visitors has reached 800. A the peak value was reached in the month of the 3rd open call: the number of visitors was around **2400**. Since then the number of visits has decreased to reach a steady 100 unique visitors weekly.

EuroCPS website visitors and visits weekly in 2016
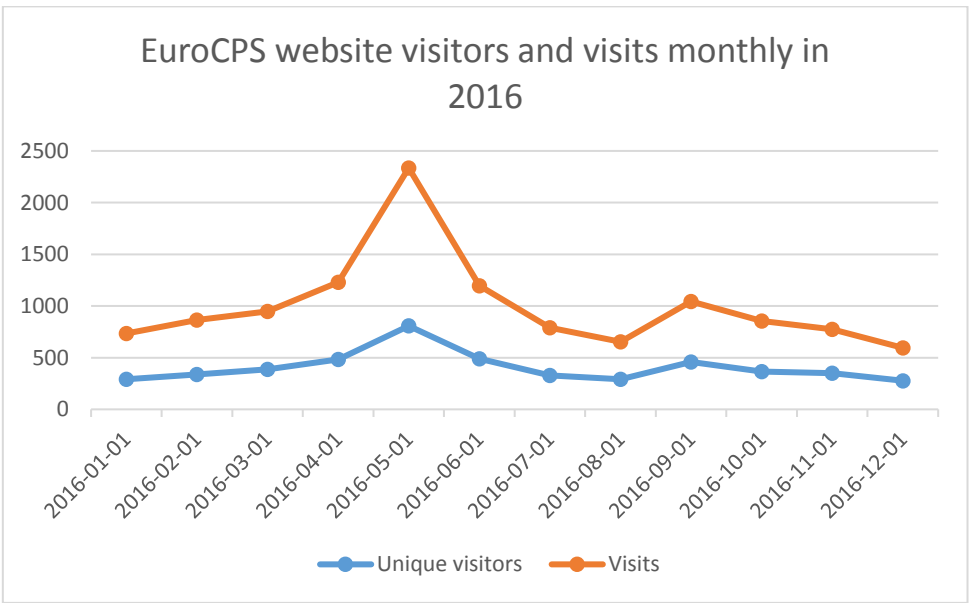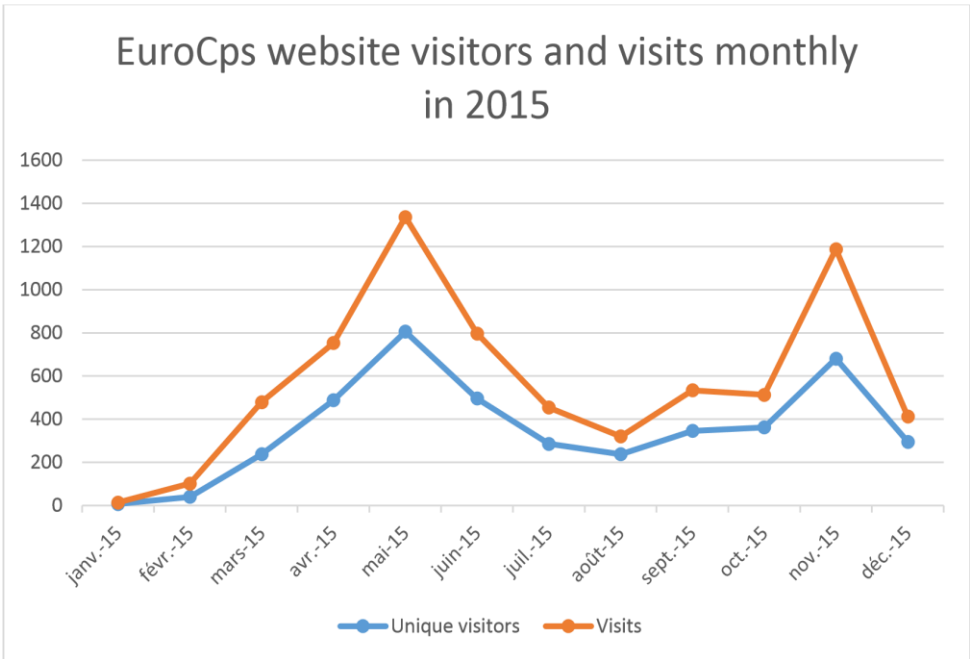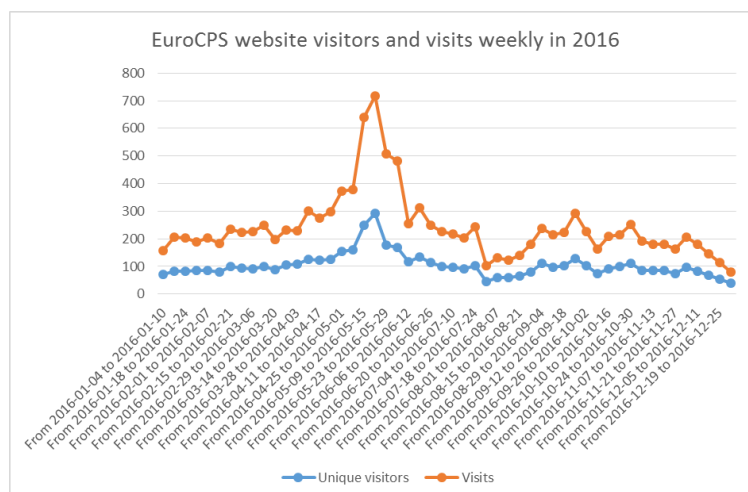
Further detailed numbers about the web visits are available upon request.

1.2. EuroCPS on Social Media

The Digital Catapult has used its EuroCPS landing page and blog post for promoting the EuroCPS project and the 3rd open call that has reached **300** page views in total. (http://www.digitalcatapultcentre.org.uk/project/eurocps/)

Furthermore, the Digital Catapult has been regularly promoting both the 3nd EuroCPS open call through LinkedIn, Facebook and Twitter posts reaching an audience of **3000+** followers/contacts as measured by table shown below.

3rd *Open Call promotion and reach*

EuroCPS Social Report (27/4/2016 - 1/6/2016)

	Page views	Unique page views				
Project page (27 Apr - 1 June)	76	73				
Open Call page (27 Apr - 1 June)	165	151				
Blog post (27 Apr - 1 June)	42	36				

Tweets	Date	Link	Impressions	RTs	Likes	
#SMEs can now take part in the 3rd #EuroCPS Open Call around Industrial Experiments - closes 1 June: http://bit.ly/1pJOGsu	28/4/2016	giCatapult/status/72	1318	2		0
3rd #EuroCPS Open Call for #SMEs is now live - apply by 1 June: http://bit.ly/1pJOGsu	29/4/2016	giCatapult/status/72	1801	2		1
Now is your chance to submit proposals for the next #EuroCPS Open Call: http://bit.ly/1pJOGsu	05/04/16	giCatapult/status/72	1888	4		1
#EuroCPS: Submit your proposals around Industrial Experiments before 1 June: http://bit.ly/1pJOGsu	05/06/16	giCatapult/status/72	1223	1		1
Exciting chance for your #SME to share ideas on #Industrial Experiments: http://bit.ly/EuroCPS #EuroCPS	05/09/16	giCatapult/status/72	1117	0		0
Submit your #Industrial Experiment proposals by 1 June! #EuroCPS http://bit.ly/1pJOGsu	05/12/16	giCatapult/status/73	1063	1		0
The 3rd #EuroCPS call is now open, #SMEs can apply for up to €150,000 #funding: http://bit.ly/27QPNJg #IoT	23/5/2016	giCatapult/status/73	1036	0		2
Find out more about the new #EuroCPS Open Call and how your #SME can take part. €150k available! http://bit.ly/27QPNJg	24/5/2016	giCatapult/status/73	1376	3		4
1 week left for #SMEs to apply for our #EuroCPS Open Call - sign up here: http://bit.ly/EuroCPS	26/5/2016	giCatapult/status/73	1150	1		0

LinkedIn	Date	Impressions	Clicks	Interactions	
new CPS-enabled products by 1 June: http://bit.ly/1pJOGsu	29/4/2016	2171	6	5	
1 week left for SMEs to apply for our EuroCPS Open Call - sign up here: http://bit.ly/EuroCPS	26/5/2016	1764	9	1	

Facebook Post	Date	Reach	Likes	Comments	Shares	
new CPS-enabled products by 1 June: http://bit.ly/1pJOGsu	29/4/2016	122	0	0		0
1 week left for SMEs to apply for our EuroCPS Open Call - sign up here: http://bit.ly/EuroCPS	26/5/2016	110	0	0		0

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 8 of 103

2. Event Participation & Organization

As for the first year, during the second year of the project, the EuroCPS partners participated in several events to promote the SAE initiative and the open calls for experiment proposals. Some events have also been organized by the consortium with the SMEs to showcase industrial experiment demonstrators and provide information about the project objectives and its approach, of consolidating the collaboration between competence centres, technology providers and SMEs across Europe.

The figure below shows the main events of 2016 (in orange) in which EuroCPS was participating.

In the following, the main events in which the EuroCPS initiative was promoted during year 2016 (second year of the project) are reported, including some details concerning their scope and target audience.

2.1. Workshop "Advanced Computing and Cyber-Physical Systems 2016" [CEA]

Conference & Exhibition	June 14, 2016	Brussels
Organizer:	EC with HiPEAC support	
EuroCPS participants:	CEA	
Number of participants:	~100	
Link:		

Description

This Collaboration workshop brought together the "Cyber-Physical Systems", "Advanced Computing" and the "Mixed Criticality Systems" project clusters financed by the European Commission under FP7 ICT Call 10 (2013), H2020 ICT Call 1 (2014) and Call 4 (2015).
The objectives were to discuss networking and synergies, assessment and best practices and future plans.

EUROCPS was presented at the "*Connection innovators across value chains*" session and it was presented in the collaboration workshop booklet. The workshop was the opportunity to meet other projects and to get a good overview of the on-going projects in the advanced computing and cyber-physical systems domain.

Collaboration workshop booklet / EuroCPS

2.2. SAE workshop "Smart Anything Everywhere 2016: Enhancing digital transformation in European SMEs" [CEA]

EC event	June 13, 2016	Brussels
Organizer:	EC with HiPEAC support	
EuroCPS participants:	CEA, BME, HTNL, FhG	
Number of participants:	~ 100	
Link:	https://ec.europa.eu/digital-single-market/en/news/smart-anything-everywhere-workshop-enhancing-digital-transformation-european-smes-presentations	

Description

The SAE workshop was organized to promote the work done so far by the innovation hubs actions and to present the next related call ICT-4-2016 (SAE) that will close in November later this year.

EUROCPS main features and achievement were presented and EUROCPS took part in the panel session "*Innovation Hubs best practices and lessons learnt*". The workshop gave us the opportunity to meet other projects not only SAE projects but also ongoing innovations projects on Advanced computing, CPS, SSI, etc...but also SMEs, RTOs and industries already involved or looking to be involved in further collaboration within the SAE ecosystem. It was also a very good place to exchange feedbacks and lessons learnt during the first year of EUROCPS with the SAE community.

Two EUROCPS success stories, *Biological sample management and tracking using CPS technologies* & *Smart streetlighting for less energy consumption and improved safety*, are presented in the SAE booklet 2016 "*Enhancing the digital transformation of the European industry*".

SAE booklet 2016 / EuroCPS success stories

2.3. Road2CPS "Smart Cyber-Physical Systems clustering and communication event" [CEA]

Workshop	April 14, 2016	Vienna
Organizer:	Road2CPS project, with the support of ARTEMIS	
EuroCPS participants:	Thales	
Number of participants:	➢ 100	

Description

Road2CPS is a 24-month coordination and support action, co-funded under the European Community's H2020 Research and Innovation Programme in the area of Smart Cyber-Physical Systems. It aims to carry out strategic action for future CPS through roadmaps, impact multiplications and constituency building. In order to share experiments and insights between the European Community.

EuroCPS was invited with the other SAE projects to participate and share its experience and feedbacks with the community.

2.4. IoT planet tradeshow [CEA]

Conference	October 25-27, 2016	Grenoble
Organizer:	IoT planet	
EuroCPS participants:	CEA, Digicat, Intel, BME, Infineon, HTNL, ST-I, ST-F, …,+ CPSLabs, Gateone, Smarter-SI participants + SAE Third parties and for EuroCPS: NquiringMind, Suricog, Ideas & Motions, EncoreLab, Winet	
Number of participants:	➢ 3000 visitors +110 exhibitors	
Link:	http://www.iot-planet.org/	

Description

The IoT Planet 2016 tradeshow co-located with SEMICON Europa 2016 is making a large scale High Tech Event at Grenoble for exploring the full Value Chain of Electronics from Silicon to Connected Object and networking High Tech people from OEM to Software Developers, from Professionals to Consumers.

EuroCPS took the opportunity of the IoT planet to organize a SAE event to showcase and disseminate on the most mature industrial experiments granted by the SAE 4 projects EUROCPS, CPSELab, Gateone, Smarter-SI in an international and challenging environment. At booth #117, 18 IEs were presenting demonstrators, 5 of them being funded by EuroCPS coming from France, Italy, England and Spain.

SAE IEs at the IoT planet

EUROCPS "booth"

SAE team   EUROCPS partners

Networking opportunities were offered for each SME to evaluate its project against competitors and to get feedbacks from potential customers.

Some IE's feedbacks

„**NquiringMind**s participated in the IoT Planet Trade Show (with an audience of 3,000 visitors and +110 exhibitors) as part of the EuroCPS booth together with other Anything Everywhere SMEs. NquiringMinds has provided the following feedback for their attendance to the show: In terms of outputs: meet and communicate with consortium partners, brand visibility, competitor research; regarding benefits: IE evaluation against competitors and feedback from potential customers. The main impact as identified by NquiringMinds will be follow up meetings with potential investors".*

„**Encore Lab** has been at IoT Planet 2016 fair, a reference event within Internet of Things. The fair took place in Grenoble (France) from 25 to 27 October, and had more than 3,000 visitors from 25 different countries.Leading companies such as ABB, Intel, Oracle or HP, among others, were also participating.Our engineers presented C-Node, a new model of Cesens® station in a smaller format, and oriented to roll-out higher resolution networks to monitor parameters related to risk and illnesses, that allows zoning parcels in a more detailed way. The system uses last generation SIGFOX and ST Microelectronics technology.C-Node is being developed within the framework of an EuroCPS project, with funds of the European Commission."*

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 15 of 103

2.5. Hannover Fair 2016 [CEA]

EC Event	April 25-29, 2016	Hannover
Organizer:	Deutsche Messe AG	
EuroCPS participants:	ExaInformatics	
Number of participants:	➢ 190 000	
Link:	http://www.hannovermesse.de	

Description

Hannover Messe is the world's leading trade fair for industrial technology. And "integrated Industries – Discover solutions" was the lead theme of the 2016 edition.

EuroCPS was invited to participate to the Group Pavilion of the European Commission (DG CNECT) at the German Hannover Messe. The objective was to show the strong ambition of the European Commission to help SMEs and Mid Caps digitizing their business and their products and to promote the European activities going on to achieve this.

The SME ExaInformatics, granted at the 1st EuroCPS open call, accepted with enthusiasm to be present and to promote their innovative project/showcase in an international and challenging environment.

ExaInformatics at Hannover messe

ExaInformatics feedbacks

"*Hannover Fair enabled us to both test our solution in large crowds (70000 probe requests captured in the first hour). It also allowed us to present our ideas to a diverse audience of*

---

visitors and vendors. We made contacts with telco providers who are facing challenges conforming with GDPR legislation with respect to how they handle sensed data".

2.6. TRA 2016 [CEA]

Forum & Exhibition	April 18-21, 2016	Warsaw
Organizer:	International committee with CEDR, ERTRAC, ERRAC, Waterbone, Alice, RBRI, Ministry of Infrastructure and construction, European Commission	
EuroCPS participants:	CEA, AVL	
Number of participants:	> 2200 professionals and researchers	
Link:	http://www.traconference.eu/	

Description

TRA, organized every two years, is the major European conference on transport, supported by major European actors in the domain of smart mobility. The conference topics address the main challenges in transport and mobility of people and goods with respect to energy, environment, safety and security as well as socio-economic issues. TRA aims at exploring the most advanced research and innovations, the latest technological and industrial developments and implementations, as well as innovative policies from Europe and beyond. The exhibition organized in conjunction with the conference offers a unique opportunity for Governmental and professional organisations, public and private research organisations and industrial companies to present their activities and meet the participants.

The EUROCPS booth was promoting the SAE initiative through the EUROCPS project, with dedicated emphasis on smart mobility applications.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 17 of 103

2.7. *Smart Anything Everywhere Workshop [DIGICAT]*

Event	September 13.2016	London (UK)
Organizer:	Digital Catapult	
EuroCPS participants:	CEA	
Number of participants:	45 registrants and speakers from Blumorpho (FR), CEA (FR), Newcastle University, Teesside University and the Catapult (Michele and Claire)	
Link:	https://www.digitalcatapultcentre.org.uk/event/smart-anything-everywhere-workshop/	

Description

The Digital Catapult has organized the Smart Anything Everywhere workshop looking to attract more participation from SMEs and other market stakeholders in the Cyber-Physcial Systems field. The event was hosted at the Digital Catapult premises in London.

This workshop provided a platform of engagement to four EU Projects that strive to involve more than 200 SMEs and midcaps in the field of Cyber-Physical Systems (CPS), Internet of Things (IoT) and Smart Systems Integration (SSI). These projects are looking to provide SMEs access to technologies developed at major European research and technology organisations.

During the Smart Anything Everywhere workshop, attendees had opportunity to connect to these four projects and learn how they have so far enabled European SMEs to digitize their products and enter new markets. The event also enabled participants to get first hand advice on how to get involved with experimentation or channeling further to market the solutions coming out of the Smart Anything Everywhere umbrella.

2.8. *EuroCPS-Italy workshop ORCONF2016 [UNIBO]*

Workshop	October 7-9, 2016	Bologna (IT)
Organizer:	Unibo	
EuroCPS participants:	Unibo	
Number of participants:	100 registrants and 20 speakers from Greenwaves, Unibo TUMinich and others	
Link:	http://orconf.org/2016/	

Description

ORCONF is an open source digital design and embedded systems conference, covering areas of electronics from the transistor level up to Linux user space and beyond. Expect presentations and discussion on free and open source IP projects, implementations on FPGA and in silicon, verification, EDA tools, licensing and embedded software, to name a few.

Begun as the annual OpenRISC developers and users conference, it has become a broad open source digital design-oriented event and is supported by FOSSi - the Free and Open Source Silicon Foundation.

2.9. eDIGIREGION conference [BME]

Workshop	2016 May	Bucharest
Organizer:	eDIGIREGION	
EuroCPS participants:	BME	
Number of participants:	about 80	
Link:	http://www.edigiregion.eu/	

Description

Workshop of the eDigiRegion project about issues of IoT. eDigiRegion consortium members, representatives of Hungarian SMEs, gvmtal innovation funding organizations, SME networking institutions

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 19 of 103

2.10.   PCIM conference [FINEPOWER]

EC event	10. – 12. May 2016	Nürnberg
Organizer:	Finepower booth	
EuroCPS participants:	FEAAM / enfas / Finepower	
Number of participants:	10	
Link:	**PCIM** EUROPE	

Description

At the PCIM conférence 2016 Finepower presented at its booth EuroCPS Project and had several meetings with potential SME´s but also alignment meetings with SME´s for submission of proposals for industrial experiments.

Furthermore there have been talks with 5 potential experts which have been technical representatives of their companies or work as professors in the field of communication, IoT or CPS.

As an result two proposals have been submitted and finally one expert was selected as an expert for the 3rd call.

Additionals :

Information of EuroCPS for participating for the 3rd call have been submitted or discussed with following organisations : ECPE (european center of power electronics – Nürnberg), TNA (Technologie Netzwerk Allgäu), Comment IT and BWCON.

2.11.   IoT Ignition Lab [INTEL]

Workshop	June 2016	Leixlip
Organizer:	IoT Ignition Lab Ireland	
EuroCPS participants:	Intel	
Number of participants:	200	
Link: http://www.challengeup.eu/	At the ChallengeUp Event, Intel presented the EuroCPS Programme to Cisco, Deutsche Telecom and the participants and highlighted the range of platforms and opportuities.	

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 20 of 103

https://newsroom.intel.ie/news-releases/intels-challenge-up-program-for-iot-startups-open-for-pre-registration/

In addition to this, the EuroCPS Programme has been dissemetated to all of the IOT Ignition Labs and Intel's EMEA Sales and Marketing team who are engaging directly with SMEs and they would have made SME aware of and encouraged them to apply for funding directly throught the EuroCPS website..

Description

The Challenge Up program unites the startup world with the resources and knowhow of three leading Companies, Intel, Cisco and Deutsche Telekom. It is designed for early-stage start-ups creating solutions for the Internet of Things/Everything (IoT/IoE) and related areas, including connected and smart solutions (smart home, smart city, smart energy, connected cars, wearables, Industry 4.0), information security, big data, analytics, connectivity and cloud computing.

Each of the companies supporting the program bring specific expertise to support the startups with Intel providing smart connected solutions for the IoT from devices to data centers including software and hardware architecture and engineering, data analytics and security.

The program gives startups access to one of the best global mentoring networks offering industry know-how and advice in all stages of the IoT value chain. The startups can also accelerate the go-to-market readiness by leveraging the combined customer bases, sales channels and technology assets of Cisco, Intel and Deutsche Telekom.

As part of the annual process, the successful startups visit the Ireland IoT Ignition lab for 2-3 days where they receive coaching and mentoring to refine their pitch, to gain technical or business assistance from the representatives of the mentoring organisations. The process continues with further intense workshops in Berlin and Poland until the startups are finally ready to pitch for funding from a panel of VC organisation at an annual event in London.

2.12.   H2020 Infoday [BME]

Event	April 2016	Budapest
Organizer:	NKFI	
EuroCPS participants:	BME	
Number of participants:	120	
Link:		

Description

NKFI organizes regularly info-days to increase the participation of Hungarian institutions and particularly SMEs in H2020 programs. BME was invited already for the 3rd time to present the

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 21 of 103

EuroCPS project and give information about the opportunities of project funding for SMEs. The presentation created high interest; several companies came to us for further details, and some of them came to us even for advice in using EuroCPS platforms later on.

2.13. HIPEAC conference[Thales]

Event	January 18-20, 2016	Prague (Czech Rep.)
Organizer:	HIPEAC NOE (Thales for industrial part)	
EuroCPS participants:	Thales, CEA	
Number of participants:	651 participants	
Link:	https://www.hipeac.net/conference/	

Description

3 days event organised by the HIPEAC NOE, including conference, workshops, industrial session, posters, and industrial booths.

As industrial chair, Thales organised the industrial session. Thales made a presentation including presentation of the EuroPCS project.

As a sponsor of the event, Thales setup a booth with a poster presenting EuroCPS platforms.

3. Project liaisons

In response to new challenges arising from the increased integration of digital components and smart functionality in products and services of everyday life, the European Commission proposed the creation of a "Smart Anything Everywhere (SAE)" Initiative. The core of the initiative is the networks of competence centers which cluster a wide spectrum of technical and application knowledge to support innovation and industrial technology platform which provide technology technical support and manufacturing solutions.

A first group of four Innovation Actions, GateOne, Smarter-SI, CPSE Labs, and EuroCPS are combining efforts under the SAE initiative to support experiments with the aim of involving SMEs and midcaps in the field of Cyber-Physical Systems (CPS), Internet of Things (IoT) and Smart Systems Integration (SSI). The foreseen activities of the four projects to liaise and cooperate together have been defined in the deliverable D5.1 "Smart Anything Everywhere collaboration plan". In order to perceive high quality of the service of SAE, it was decided to share links to innovation networks established by the projects, to cross-project processes to guide external stakeholders to services provided by individual projects and to exchange best practices in quality management between the projects.

The activities launched during the first year of collaboration to promote the "SAE brand" are detailed in the deliverable D5.5 "First intermediate report on dissemination and exploitation activities" and are recalled herafter:

- Development of a common web-portal (https://smartanythingeverywhere.eu/) for SAE, operated by BME from EuroCPS
- SAE launch event organized by EuroCP (March 27, 2015) in Grenoble, France
- Joint participation to the brokerage events EPoSS event organized by the EC (October 12, 2015 – Leuven, Belgium), Co Summit event organized by ARTEMIS/ITEA (March 9-11, 2015 – Berlin, Germany)
- Etc.

In 2016, the promotion activity was increased.

- The four SAE projects have commonly participated to the SAE workshop "*Smart Anything Everywhere 2016: Enhancing digital transformation in European SMEs*" exchanging feedbacks, best practices and lessons learnt during the first year of the project, building and consolidating the SAE community (see §2.2).
- EUROCPS and CPSELabs took both part to the Collaboration workshop "*Advanced Computing and Cyber-Physical Systems 2016*", presenting their project at the "*Connection innovators across value chains*" session (see §2.1).
- EUROCPS and Gateone have participated actively to the SAE everywhere workshop organized by the Digital Catapult at their premises in London. The workshop aimed at promoting the SAE community, in particular to attract more participation from the SMEs and other market stakeholders in the cyber-physical systems domain. The workshop provided the attendees an overview of the four projects and advices on how to get involved with experimentations and to get to know more about the SAE umbrella. More details in §2.7

- Following the EUROCPS proposal, the four SAE projects have participated to the IoT planet event in Grenoble sharing a SAE booth (booth#117), close to the start-up corner. The four sides of the booth enable each project to promote selected IEs. 18 IEs were presented, among them 5 SMEs involved in the EUROCPS project: demonstrators were presented and the IoT event offered a unique opportunity for each SME to evaluate their project against the competition, to meet and get feedbacks from potential customers and to enrich their network, more details in §2.4. To consolidate the SAE booth organization, phone call meetings have been organized regularly between the 4 projects: practical organization of the booth, information needed to prepare the visuals for each project, IoT planet website update, etc.

For the last year of the project, together with the three other projects, it is planned to have joint participation to brokerage events, to continue sharing feedbacks and return of experience, to foster the participation to working groups, e.g. strategic coaching, business modelling, platforms and tool chain, etc.

4. Exploitation Plan

4.1. Overall Project Objectives

One of the central objectives of EuroCPS is to build on existing structures and links provided by partners, an European core of competence on Embedded systems and Cyber Physical Systems, for fostering innovation through SMEs. This will be achieved through tight integration between the partners and the SME's which will be selected during the timeframe of the project with the Cascade Funding scheme. .

EuroCPS grows a wide array of Industrial and SME partners with strong and high-level industry participation. This impact will be more visible during the project. Exploitation plans for the EuroCPS consortium are measured considering the number of international events organized and the capability to reach more third parties and to extend the ecosystem of SMEs which are excellent in embedded systems and CPS.

In the second part of the project, also the number and the quality of the strategic alliances, between SMEs and the EuroCPS core will be considered. Then, an expected number of technology providers will be contacted to create a valuable technology portfolio for SMEs.

4.2. Individual Exploitation Strategy

4.2.1. COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES [CEA]

The CEA is the French Atomic Energy Commission (Commissariat à l'énergie atomique et aux énergies alternatives). The CEA is active in three main fields: energy, information and health technologies, defense 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. Within the CEA Technological Research Division, institutes lead research in order to increase the industrial competitiveness through technological innovation and transfers. The two institutes, CEA-Leti and CEA-List involved in EuroCPS project are focusing on many different applied research domains (RF, digital and SoC design for image processing, design environment and embedded software, wireless communication measurement, test and design…), developing advanced leading edge hardware and software technology solutions in particular for Cyber Physical Systems (CPS) and Internet of Things (IoT) systems.

EuroCPS goal for CEA is to support its mission to transfer its expertise and technologies to innovators to help them to prototype, test and grow their CPS ideas. Thus it is expected that EuroCPS will promote CEA expertise from silicon to system level and will increase SME engagement through collaboration programs such as joint laboratory. Also it is expected to evaluate the next technology R&D to engage for future market applications.

Seven industrial experiments involving CEA-Leti and CEA-List were granted by EuroCPS:

- GOSPEL, NEUROCPS and uLPGPS are 3 industrial experiments focusing on the development of new components using the 28nm FD-SOI STMicroelectronics technology platform. Having just started, the exploitation and dissemination of these industrial experiments will be reported in the next deliverable. Nevertheless, it shows the attractiveness of such collaboration and funding model for integrated circuit design. For CEA-Leti, it provides the opportunity to transfer 10 years of experience and expertise to third parties to efficiently design new IC components in FD-SOI. On the other hand, SMEs can investigate the benefit of such technology for their future product, while de-risking their development and make the right decision versus very costly developments. For STMicroelectronics, it enables to attract new SMEs for manufacturing their product.

- MGIoT industrial experiment allowed *Greenwaves Technologies* to reach a major breakthrough in their technology maturity gain. It enabled to validate their GreenOFDM algorithm in a radio communication environment. It also enabled to build a hardware platform used to prototype connected device application using the proposed modulation. Indeed, thanks to a production cost less than 200 €, the achieved prototype enables a diffusion of the Greenwaves technology to the prospects willing to assess the capacity of the technology at a reasonable cost. In addition and foreseen as next step in their industrialisation plan, the industrial experiment allows Greenwaves Technologies to select an architecture for the integrated circuit that will embed this algorithm. The integrated circuit architecture provides a breakthrough in terms of energy efficiency, with a 10x improvement versus the state-of-the-art. The integrated circuit will be manufactured by a semiconductor foundry. This development is already partially supported by the H2020 SME Instrument phase 2 grant. The company is in the process of raising a seed round of 2M€. From customer aspects, the industry players that will select GreenOFDM are LPWAN solution providers and IoT operators. Greenwaves Technologies is engaged in discussion with several of those players. In terms of dissemination, Greenwaves Technologies has produced white papers on the technology, video tutorials, and attend industry trade fairs. CEA-Leti is making a video of this demonstrator that will be shown on the 23rd of March at the Digital day as part of the official celebration of the 60th anniversary of the signature of the Treaty of Rome. For STMicroelectronics, this experiments enlarged the number of users of the Nucleo platform thanks to the diffusion of the technology to the Greenwaves prospects. For CEA-Leti it enables to get a better understanding of the LoRA protocol and OFDM technology optimisation.

- CNODE industrial experiment allowed *Encore Lab* to develop a simple low-cost, low-power sensing nodes based on the STM32 industrial platform and using only a few sensors to control the most changeable parameters: air temperature, humidity and soil moisture at three different depths. These nodes send data directly to the server using Sigfox communications. Encore Lab came to CEA-Leti to get the expertise on low-power system design and SigFox usage. CEA-Leti provided state-of-the-art and advanced technical solutions (TRL4-5) to help Encore Lab to evaluate the possible design opportunities and solutions for their product development. In addition, CEA-Leti developed a demonstrator relying on CEA Foxy device (a low-power SigFox

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 26 of 103

transceiver) in order to reduce the energy consumed by the radio module of each sensor node. This collaborative work was helpful for Encore Lab to get an early access to the performances of an advanced radio system. The demonstrator was valorized at the ISSCC conference (Feb. 2017). CEA-Leti and Encore Lab had fruitful exchanges about technology use cases. CEA-Leti had the opportunity to evaluate the interest of its most advanced solutions (ex: Wake-up radio) versus industrial needs.

- WOA industrial experiment has opened to *Terabee* the route for low-cost and reliable solutions for indoor localization and mapping by combining Terabee Teraranger modules with industry standard Inertial Motion Unit (IMU). Based on the results of WOA, Terabee is going to develop an updated HW-SW solution and then market the solution to its customers. In this framework, Terabee plans to set up the manufacturing supply and manufacturing chain to serve its markets. Beside, Terabee intends to continue working with CEA-Leti to further develop and enrich its technology in particular towards 3D map. For the selected IMU platform it opens a new market access. Feedbacks on the I-NEMO platform should help ST-I to improve the drift of their sensors.

- WEETSY2 industrial experiment is allowing *SuriCog* to develop a head mounted prototype as an add-on module to the existing SuriCog eye-tracking glasses. The 3D printed prototype combines both an embedded camera with a ST iNEMO IMU for fast tracking. The processing is based on a head localization software pipeline developed by the CEA-List. Currently the head localization software is executable through a PC. Once the industrial experiment is completed, it will enable SuriCog to validate the concept. More details will be disclosed into the next deliverable on exploitation. For the exploitation towards customers the software has to be embedded. Future collaboration between SuriCog and CEA-List includes a RAPID project and a joint lab. This collaboration aim at embedding all processing on the glasses to further reduce the bulkiness and power consumption of the prototype, thus enabling further portability.

In a global manner, the industrial experiments show a win-win situation where the SMEs, the CEA and the industrial platform provider can generate new business conjointly. SMEs are the best indicator regarding the evolution of the market and the future technology needs. It allows the CEA to track promising ideas, technologies and market trends in order to develop the technologies of tomorrow. On the other hand, SMEs can develop and validate innovative technology solutions thanks to the CEA expertise and industrial partner leading edge technologies, including silicon capabilities. For technology platform providers, it opens the door for new product to manufacture.

4.2.2. STMICROELECTRONICS GRENOBLE 2 SAS [ST-F]

Currently ST is one of the world leader for both standard and secure MCU's, supplying IoT market with both MCU as well as solid ecosystem for easy application development.

ST has a role in the project and in the setup of this IoT eco-system.
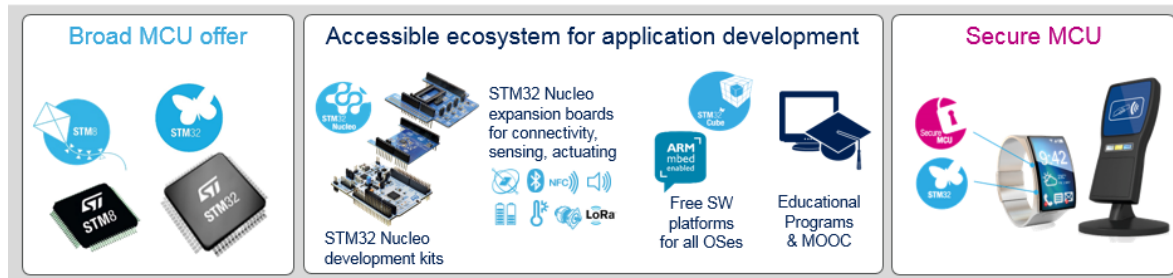
Thanks to this project ST expects to expand its activity in the IoT market with its family of micro-processors, sensors and connectivity solutions, which can be used to assemble Intelligent Connected Devices. ST will further enlarge the IoT business in Europe by giving access to an IoT development environment enabling end-customers to reduce time-to-market for the development of secured, low-power, low-cost Intelligent Connected Devices.

This should put Europe in a leading position in the IoT race, by having Intelligent Connected Devices built with European semi-conductor technologies and building blocks. The creation of a strong ecosystem will benefit to ST in expanding its capacity and R&D through new contributors in the various Smart X domains.

Beneficiary	Exploitable new item(new product/service short description)	Competitive context		Exploitation plan			
		Identified competitors	Added value of exploitable item	How? (routes for exploitation)	When	By whom? Potential users	Where? (in EU and/or other countries)
STMicrolectronics	Deployment of a new STM32 community platform	Renesas,NXP, Microchip,..	Increase visibility of STM32 platforms and facilitate easy cooperation between STM32 users	Develop a new web platform more modern and in line with completion offer.	Nov 2016??	Target all the users and potential users of STM32	worldwide

4.2.3. THALES SA [THALES]

Target markets of Thales

Thales is a global technology leader for the Defense, Security, Aerospace and Transportation markets. The company provides products covering a large panel of software, middleware and/or hardware solutions for these markets. In order to improve its competitiveness, the intention of the company is to push the adoption of safe & secure innovative solutions towards its six Global Business Units, and exploit the results internally. The potential impact of the EuroCPS experiments in the embedded system domain is high. Globally the embedded-software market is worth about 160 billion Euros, with an annual growth rate of 9 percent [Ebert and Jones. Embedded Software: Facts, Figures, and Future. Computer (2009) vol. 42 (4) pp.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 28 of 103

42- 52.]. Overall, the European region is expected to generate more revenues in comparison to any other region because of its early technological acceptance and government regulations.

From a design and implementation perspective, the use of hypervisors and real-time QoS management addressed in EuroCPS industrial experiments is of interest for all business units of Thales even if the main impact of the EUROCPS for Thales is expected in its avionics and space business units. The space and aerospace application domains have very high safety requirements. So, the use of solutions to deal with space and time segregation is of high interest.

The European aerospace industry is a key sector for Europe with a contribution to the EU GNP estimated to about EUR 500 billion [ECORYS, "Competitiveness of the EU Aerospace Industry with focus on: Aeronautics Industry", 2009]. In this context, the avionics market is of special importance since in avionics domain Europe cannot depend from other regions. Avionics systems now represent 11% of aircraft value in average [Clearwater corporate finance llp, Aerospace Global Report 2011, 2010]. The avionics market is estimated at $8~9 billion per year and is expected to grow at a rate of 4.8% through 2019 [Avascent Analytics , "Avascent Analytics Projects $21B Commercial Avionics Market to grow 4.8% through 2019", September 2014. Available at: https://www.avascent.com/blog/2014/09/04/avascent-analytics-projects-21b-commercial-avionics-market-grow-4-8-2019/]. The figure below represents the market forecast by product [Aviation Week & Space Technology, "Global Commercial Avionics Market Forecast by Product". Source: Avascent Analytics. Available at: http://aviationweek.com/%5Bprimary-term%5D/global-commercial-avionics-market-forecast-product].
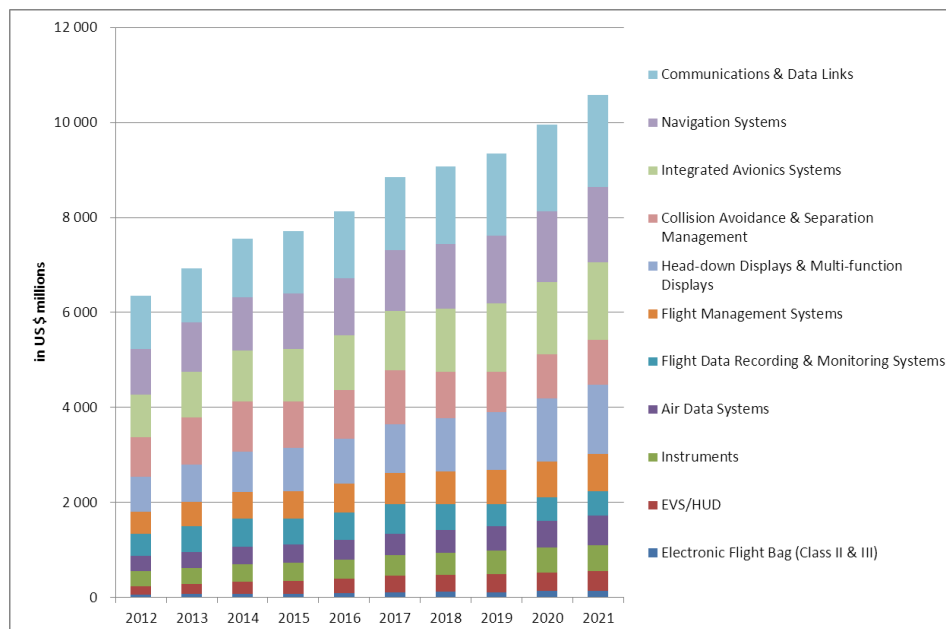
Global commercial avionics market forecast by product [Aviation Week & Space Technology, "Global Commercial Avionics Market Forecast by Product". Source: Avascent Analytics]

Today, in the avionic business, Thales, Rockwell Collins and Honeywell control 80 percent of the forward-fit market. In this portion, Thales' market share continues to rise [G2 Solutions, Commercial Avionics Market Analysis and Forecast, Air Transport Markets, 2007]. The figure below shows the position of Thales in the avionics market.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 29 of 103
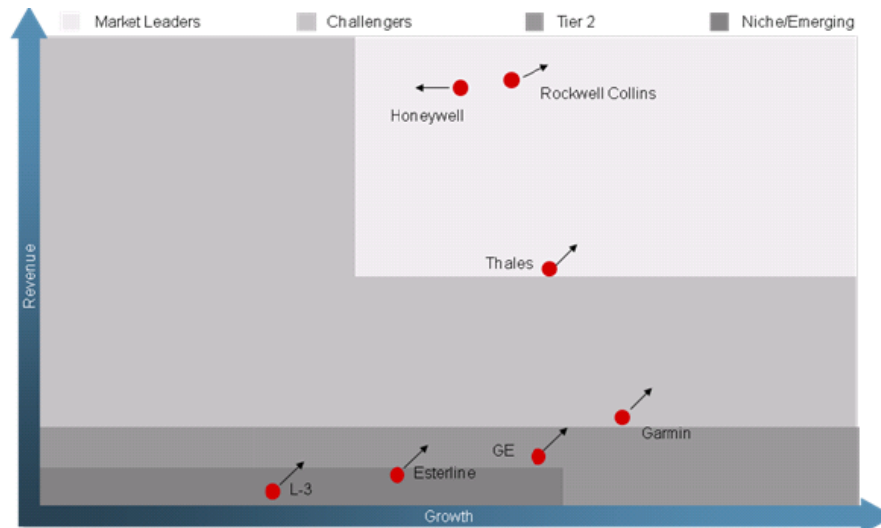
Global avionics competitive landscape
[Frost & Sullivan, "Growth Prospects in Commercial Avionics Markets", May 2011]

The space industry is also a strategic sector for Europe. Over the last decade, 80 satellites were launched on average per year while 100 satellites were launched in 2011 for the first time in 25 years [Euroconsult, Satellites to be Built & Launched by 2021: World Market Survey 15th Edition]. The figure above shows the growth of the satellite market between 2008 and 2013. The market should continue to grow and a total of 1075 launched satellites should be reached over 2012-2021. The derived revenues should grow by 36% in the decade, and reach $198 billion over the period [Euroconsult, Satellites to be Built & Launched by 2021: World Market Survey 15th Edition].

Global satellite industry revenues in US $ billions
[Satellite Industry Association, "State of the Satellite Industry Report", September 2014]

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 30 of 103

A major part of the launched satellites is for telecommunication applications where Thales gets a significant share of the market. Thales Alenia Space is the global leader in telecommunications satellite constellations in low and medium Earth orbit.

Satellites launched by function in 2013 Satellite Industry Association "State of the Satellite Industry Report", September 2014
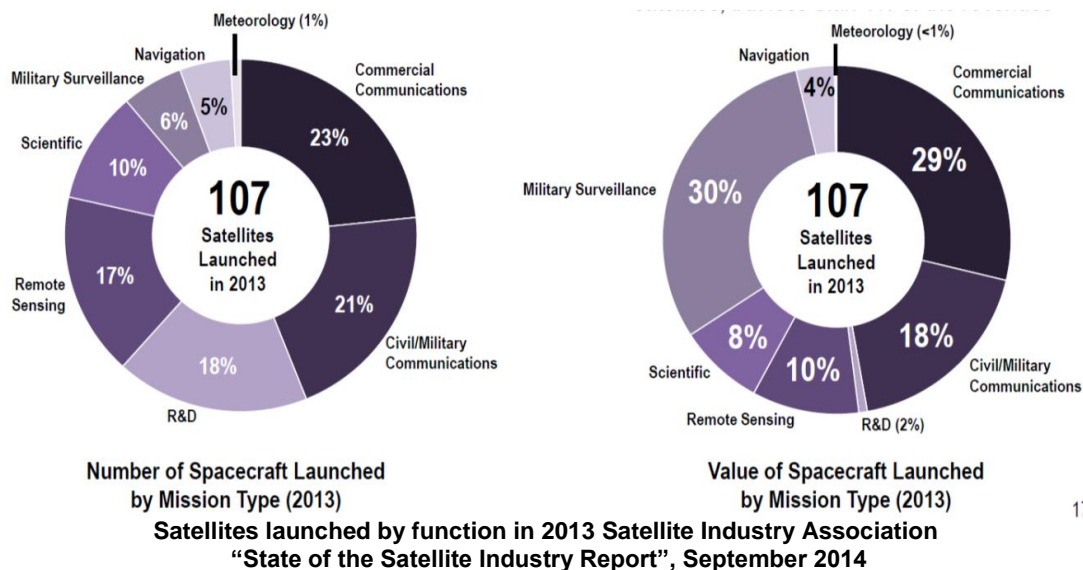
The Figure below shows the position of the different actors in the space sector.
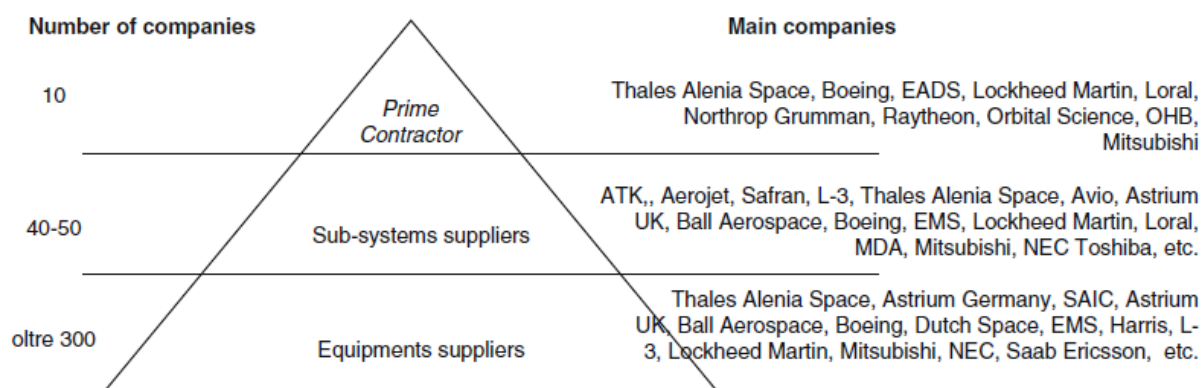
The industrial pyramid in the space manufacturing sector [M. Spagnulo, R. Fleeter, M. Balduccini, F. Nasini, "Space Activities: A Peculiar Economical, Political, and Industrial Sector", in Space Program Management, Springer New York, 2013, pp. 1-58]

Beside the aerospace and space markets, Thales targets also others market segments. The railway management system market, in which Thales is present, is notably estimated to grow

from $19.58 billion in 2014 to $35.99 billion in 2019, at a Compound Annual Growth Rate of 12.9% during the forecast period of 2014-2019 [MarketsandMarkets, "Railway Management System Market (Operations Management, Intelligent Signaling, Traffic Analytics, Asset Management, Control Systems, Maintenance Management, System Integration, Cloud Hosting) - Worldwide Market Forecasts and Analysis (2014-2019)", April 2014]. Thales is a global leader in the supply of rail control systems and services including signaling, communications, supervision and fare collection systems. Thales's transport activity generates €1.5 billion in revenue.

Challenges and opportunities

Today, many industrial fields in the area of information technology are facing the problem of increasing data-handling volumes and software complexity. This is a major concern in particular for the complex real time systems deployed in the space and avionics sectors (e.g., navigation systems). In the case of avionics, for example, each generation of embedded systems is implemented with an increased software size and a higher amount of software code to be certified, e.g., increased from 12 Mbytes in A340 to 80 Mbytes in A380. Figures below show that the size of the software has also increased exponentially in space missions during the last decades.
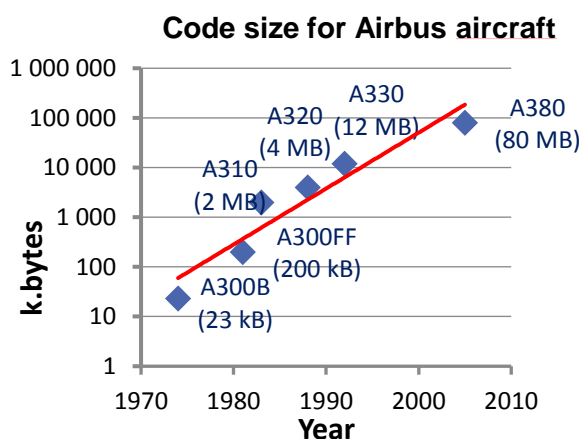
Figure 1: Increasing trend of software code in Airbus aircrafts [G. Edelin. Embedded Systems at THALES: the Artemis challenges for an industrial group. In ARTIST Summer School in Europe, 2009]
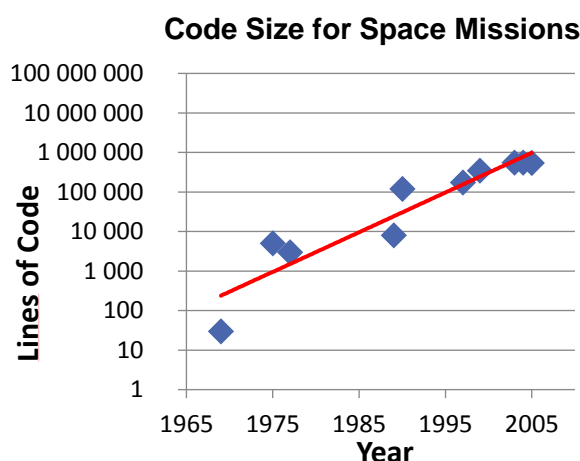
Figure 2: Estimated growth of on-board code size in space mission [NASA, "NASA Study on Flight Software Complexity", March 2009]

This increasing complexity is fuelled by the increasing computing power of processors and the continuous technology scaling. To address the safety challenge, the EUROCPS Industrial Experiments are very important for Thales and will enable the development of higher performance safety critical embedded systems.

The set of complementary solutions to address safety issues at control software levels (hypervisors, run-time QoS management) is a strong element to raise the interest of business units, especially in the avionic domain. It will open new perspectives in Thales for the development of innovative products with added value for the aerospace, space and railways sectors.

Impacts on the avionics sector

Aviation innovation in Europe is driven by a global strategy defined at the European level [European Commission, "Flightpath 2050 Europe's Vision for Aviation - Report of the High Level Group on Aviation Research", 2011] promoting a safe and energy efficient aviation. Among the disruptive technologies required to master the environmental footprint of the air transport, innovative avionics systems will play a key role. For instance, the evolution to advanced Air Traffic Management systems based on exchange of flight intent information, real-time flight data, weather and other information between ground and airborne computers will enable to optimize aircraft trajectories and to avoid air traffic system overloads [European Organisation For The Safety of Air Navigation, "Study Report On Avionics Systems For The Time Frame 2007, 2011 AND 2020", November 2004.]. But future generation of navigation systems in aircrafts, new cockpit generations that are safer, simpler [A. Doyle, "Thales outlines thinking on single-crew cockpits", Flightglobal, July 2010], or collision avoidance systems are all systems that will demand high computing power.

Disruptive technologies are necessary to integrate such features in aircrafts given their stringent environmental constraints. The current trend of avionics systems is to integrate different avionics functions in a common Integrated Modular Avionics (IMA) platform composed of a reduced number of computing units. The integration of decentralized systems into integrated modular avionics is thus a very important step in the reduction of weight due to reduction of different separate computing modules into less often centralized computing bays. In the context of environmental footprint reduction, each even very small weight reduction can lead to significant fuel savings over the lifetime of an aircraft and increase the competitiveness of this aircraft compared to international competitors. Such integration is also an effective way to reduce the number of computing unit types and so to improve the maintainability and serviceability of the equipment.

In this context, Thales is investigating next generations of IMA platforms. To this end, the solutions that are developed in EuroCPS Industrial Experiments will be key technologies to drive the design of such systems that will provide higher performance under the constraints of safety requirements.

Impacts on the space sector

Satellites are used for diverse applications like telecoms, TV Broadcasting, digital radio, navigation and localization, meteorology or earth observation (e.g., to study the environment and climate change). In the space domain, the need for higher communication satellite capacity as well as high-end onboard radar processing also pushes towards higher on-board processing power. Therefore segregation techniques and run-time QoS management solutions permit to take advantage of multicore performances together with safety constraints.

Roadmap toward exploitation of foreground

The exploitation plan of Thales is based on internal dissemination to promote the results of the Industrial Experiments and a phase of technology transfer to Thales business units. Internal dissemination activities have already been initiated but they will be pursued throughout all the duration of the project and after to present the progress of the project and the final results. The main actions regarding the exploitation of EuroCPS results aim for increasing the acceptance of these techniques in an industrial context for development teams. It involves to manage and reduce the risks related to the use of the tools for a commercial products, and to integrate the tools into the different design flows of the different business units.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 33 of 103

From Thales perspective, considering the application domain that requires very strict safety norms, it is evaluated and expected that solutions delivered by the project will not be mature enough for internal use. Therefore a phase of maturation will be required before these technologies can reach the market. This will result in complementary critical actions, not only scientific and technical. The figure below shows the roadmap to increase the TRL. The planned process will allow Thales to manage the risks related to the use of new solutions and improve their acceptance by integrating them into already existing designs.
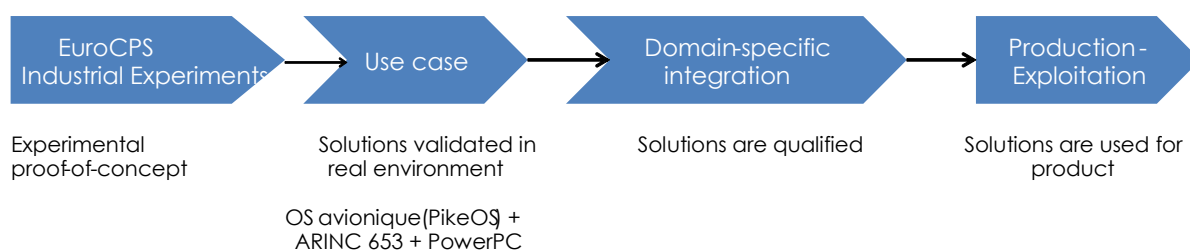
The exploitation in the different units of Thales will follow the exploitation process of the Thales group and be organized around:

- the TRT (Thales Research & Technology) research centers

- the R&D governance (Thales Technical Directorate, Key Technology Domains)

- the Competence Centers in Global Business Units

- the business lines (in Global Business Units)

The strategy of Thales for the exploitation of EuroCPS is based on the initial introduction of the project foreground in the application domains with the higher requirements, namely the avionics and the space domains. If the use of project solutions for aerospace and space applications is validated and approved, the proof-of-evidence obtained with a space and avionic use cases could support the introduction of these techniques in application domains with less stringent reliability requirements. The following figure shows the estimated timeline for the exploitation of results with a sequential introduction of results in the different business units (to limit required technology transfer efforts and according to the importance of the results for the different business units). In order to move forward on the basis of the results, several maturation threads will be followed with the objective to deliver several outcomes to the Thales business units without excessive delay.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 34 of 103
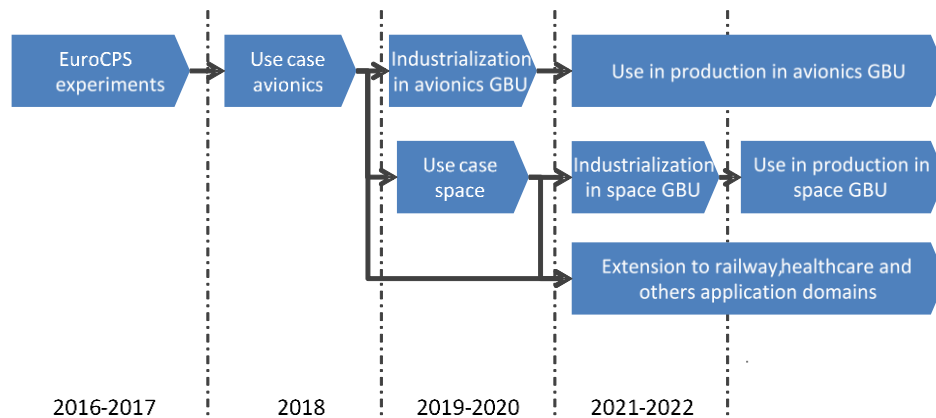
EuroCPS exploitation timeline

The industrialization phases in Thales business units will depend on the availability of an ecosystem around EuroCPS results. Different exploitation scenarios can be considered and will depend on the availability of results as a commercial product. The strategy of Thales is supported by the concrete intention to push the adoption of the results, based on its estimation of the improvement in competitiveness in its avionics and space business units.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 35 of 103

Beneficiary	Exploitable new item (new product/service) short description	Competitive context		Exploitation plan			
		Identified Competitors	Added value of exploitable item	How? (Routes for Exploitation)	When?	By Whom? Potential users	Where? (in EU and/or other countries)
Thales	Safety critical computing platform	Honeywell, Lockeed Martin, etc	Highly integrated, highly dependable, mixed-criticality ready	Updated version of computing platform (avionics platform, space platform, or railway) maybe especially space	Updated platform development, then certification in relevant cases : 1 to 3 years from now, potentially later	Thales computing platforms used in various systems (avionics, space, railway) for instance Airbus, RATP, SCNF, Eutelsat, etc	Mainly EU, US
Thales	Time and space segregation solution	Many RTOS and hypervisor providers, with various qualification levels	Brings guarantees for safety constraints	Within computing platforms	Same as above	Within computing platforms provided by Thales	Mainly EU, US
Thales	Run-time guaranteed QoS solution	Still unmature solutions	Brings safety guarantees together with performance	Within computing platforms	Will require more maturation steps	Within computing platforms provided by Thales	Mainly EU, US

4.2.4. AVL LIST GMBH [AVL]

AVL LIST GmbH is the world's largest privately owned and independent company for the development of powertrain systems as well as simulation, instrumentation and test systems. As innovation partner, one core competency of AVL is the capability to identify, create and industrialize innovative ideas toward innovative products and services. While already relying on a company structure combining on high skilled experts tightly connected to the world-wide customers, it is important for AVL to keep the door and mind open for promising ideas, technologies and markets. The possibility to present the Integrated and Open Development Platform as EuroCPS platform is for AVL the possibility to strengthen the discussion and cooperation with innovative companies, and finally to conjointly enhance the respective portfolio and generate new business (**EuroCPS as innovation multiplicator**). Hence, innovative companies are expert for new technologies and targeting different businesses,

which are good complement to existing AVL technology and market, therefore leading to a win-win situation where both institutions can generate new business conjointly.

The automotive market is currently evolving very fast according to different key enabling technologies and evolution of legislation

- EU directive and respective (worldwide) legislations regarding limitation of pollutant emissions, leading to incentive for higher degree of electrification
- EU directive regarding diminution of road accident
- Introduction of autonomous driving and impact on the automotive market (from passenger car as a product to mobility as a service)
- Introduction of autonomous driving and convergence between smart transportation and other domains such that smart health, smart home
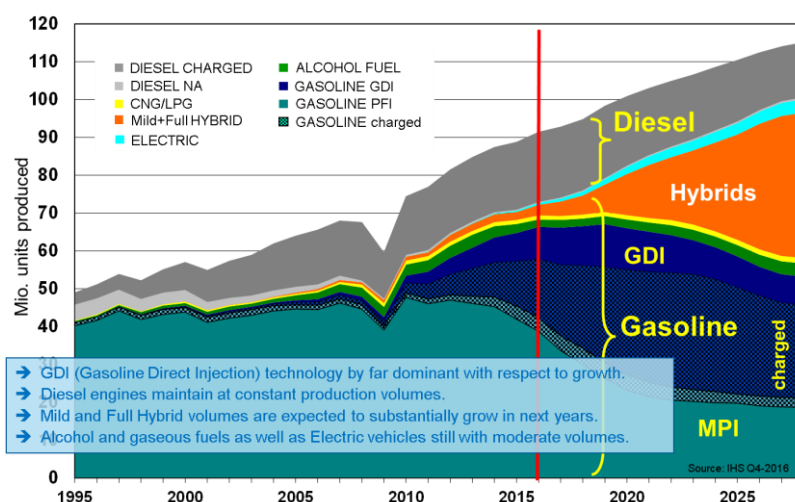
Global vehicle production by propulsion technology until 2028 (source: IHS Q4-2016[1])

As a result, market expectations regarding powertrain foresee a strong increase of electrification (grouping both hybrid and pure electric), with a downscaling of gasoline engine as a results of higher optimization and hybridization, see the figure above. Parallel to that, autonomous driving functions – already present on the market for Level 1 and 2 – is expected to have a fast and high market penetration.

---

[1] https://www.ihs.com/industry/automotive.html

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 37 of 103
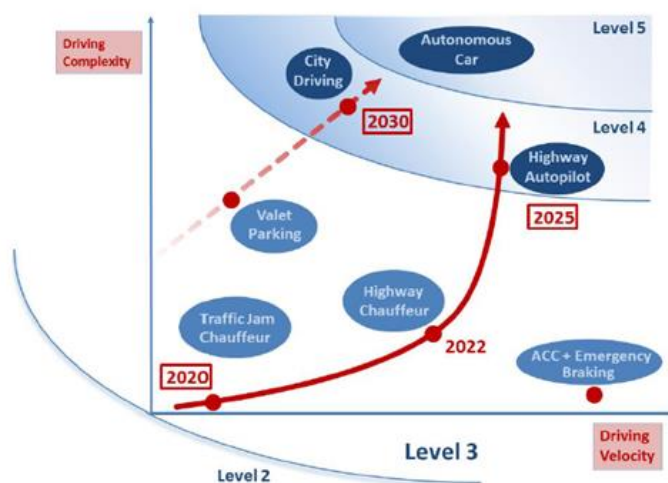
European Roadmap Smart Systems for Automated Driving, V1.2, EPoSS

The selected EuroCPS Industrial Experiments are fully in line with the main market trends identified

DATVS (call 1): "*Development and Automatic Test and Verification System*" supports the integration of this collected "real field" data into the simulation model generation. This IE supports the testing and validation of special and off road vehicles and tractors with implements. The proposed HIL system addresses in particular the market for autonomous driving which is furthermore necessary to cope with the challenges for precision farming.

HiLWaste (call 2): Design and development of a HiL battery waste heat simulator based on thermoelectric a heating polymer to be used as thermal battery simulator in virtual and real environments. This IE is targeting the electrification market and is relevant both for pure electric vehicles as well as for hybrid powertrains

MACH65 (call 2): The specific objective of the project is the development of an advanced development platform, namely MACH65, based on the new generation of high-performance multi-core processor in 65 nm technology and ultra smart driver concepts. This project is targeting the 3 cylinders engine market as one of the most promising architectures for the next years (engine downsizing, hybridization).

Hyper-SDF (call 3): The specific objective of the project is the development of an open powerful automotive development platform, namely HYPER_SDF, based on the proper combination of diverse high-performance multi-core processors providing outstanding processing capabilities while featuring a state-of-the-art safety architecture. This project targets the Advanced Driver Assistance System (ADAS) market, which is primarily driven by legislations pertaining to vehicle safety, changing preferences of customers, and increased demand for premium passenger cars as well as a progressive diffusion across the different vehicle's segments

Target: Strengthening B2B network

Main efforts: EuroCPS Year 1 – 2

Target: Creating innovation by running the industrial experiments

Main efforts: EuroCPS Year 2 – 3

Target: Creating business based on outcomes of the industrial experiments

Main timeline: EuroCPS Year 3, 1-3 years after end of project

Preliminary exploitation process for AVL

Following the preliminary exploitation process for AVL, see the figure above, following status can be reported:

➢ **Strengthening of AVL B2B network** to stimulate cooperation between AVL (large company) and innovative SMEs. Besides the strengthening of the technology expertise, we expect an **easier entry and increase of market share for new and innovative markets**.

➢ **Creation of new technical assets** targeting the main automotive trends. This co-creation with technology champions provides an agile method to move fast on a highly dynamic market while relying on well implemented technology (IODP) and well-established market presence from AVL

Focus of Year 3 will be to continue developing technical assets (especially for IEs from calls 2 and 3) and support the transfer of the technical outcomes toward business, in cooperation with the IE owners.

4.2.5. INFINEON TECHNOLOGIES AUSTRIA AG [INFINEON]

➢ **Expected results:** Competence partners enabled to make efficient use of the IFAT platform. Better understanding of SME interests for further business increase.

➢ **Exploitation strategy:** Infineon's division Power Management and Multimarket (PMM) has a strong interest to understand the needs of SMEs because more than 50% (estimation based on business via distribution) of the European turnover is SME-business. To further increase this share it's necessary to understand SME needs even better. Asking for feedback, also from our competence partner Finepower, we learned that increasing development speed by offering evaluation kits is very attractive for SMEs.

So IFAT decided to increase the number of CPS-applications where evaluation kits are available. This will help SMEs also beyond EuroCPS

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 39 of 103

Benefits: Increase of semiconductor component demand by European third parties

4.2.6. FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V [FhG]

Beneficiary	Exploitable new item (new product/service) short description	Competitive context		Exploitation plan			
		Identified Competitors	Added value of exploitable item	How? (Routes for Exploitation)	When?	By Whom? Potential users	Where? (in EU and/or other countries)
Fraunhofer	Displaying of information, health & environment application for sensor platform	Other RTOs, various engineering offices	Highly integrated, flexible solution	New product form third party, strengthened or new collaborations with third parties, feedback on third parties needs to improve the supplied technology and to develop required technology bricks in the future	Starts right now	STM platforms used for maritime application and sensor application	Mainly EU

4.2.7. The Connected Digital Economy Catapult Limited [DIGICAT]

Digital Catapult is a market leading technology innovation and research centre aimed at scaling up young companies and helping traditional businesses make better use of digital technology. The company's goal is to make the UK economy more digital – and therefore more productive, faster growing and more globally competitive. The Digital Catapult collaborates with digital champions across academia, industry and the creative SME communities to unlock IoT specific challenges. The Digital Catapult expects that the project will support its mission to enable large-scale "real world" demonstrators to help innovators prototype, test and grow their

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 40 of 103

IoT ideas. EuroCPS will increase SME engagement through our innovation centre and regional nodes and fuel Digital Catapult collaboration programmes such as the Pitstops.

Below we are summarizing the work we have done in relation to the ongoing EuroCPS experiments:

- Cardio IE:

We have closely worked with Spark Works to better define their product through: support in privacy-preserving, GDPR compliant architecture design with inclusion of tools for user managed access control and consent to personal data; sharper definition of their value proposition, and working on the business model to identify additional routes to market. Spark Works has been participating to expert's events such as Pitstops, through their participation as an expert company at the PwC Pitstop (https://www.digitalcatapultcentre.org.uk/event/pwc-pit-stop/) they had a captive audience of over 40 companies and experts looking at elderly case solutions, a growing market, and of course access to a corporate in need of new propositions for its clients.

- IBT3 IE:

Exa Informatics has been introduced to Heathrow airport off the back of the Visa Retail Pit Stop that took place on the 6th/7th October). Consent receipts project pioneered by the Digital Catapult could be insight to the personal data and trust issues IBT3 is facing. Exa Informatics has become a member of the Digital Catapult contributors program and has been participating to expert's events such as Pitstops, this provides them with a platform for organizing their reach to future users.

- AgriSense:

NquiringMinds hace been working closely with the Digital Catapult throughout the experimenton the definition of their value proposition and in recognition of that they have been selected as an expert company on the DSTL Pit Stop Event (https://www.digitalcatapultcentre.org.uk/event/dstl-pit-stop/) where they exchanged with over 40 companies that have developed innovative solutions for smart transport and the use of transport-based data, including solutions working with sensors, edge computing, big data, automation, predictive analytics, and more.

4.2.8. **ALMA MATER STUDIORUM-UNIVERSITA DI BOLOGNA [UNIBO]**

As an academic partner, UNIBO will not directly exploit the results of the project from a commercial point of view. As a consequence, the exploitation plan by UNIBO can be summarized as follows:

- Support to SMEs and creation of new collaboration links with the industrial world at regional, National and European level

- Further applied research in the field of IoT and CPS, leading to dissemination in international conferences and workshops, publication of books and journal articles, as well as IPR protection of the most promising ideas, in collaboration with the other EuroCPS partners and the supported SMEs

- Training of PhD students
- Industrial training courses and tutorials given at IEEE conferences

From this point of view, UNIBO represents an important socio-economic and cultural driving force for the territory it operates in: it is the primary research partner for the Emilia-Romagna region and for the regional branch of "Confindustria", the Confederation of Italian industry. The exploitation plans by UNIBO include the involvement of the Regional High Technology Network as well as the dissemination channels of UNIBO to promote the results and achievement of the project at the regional, National and international level. In addition, UNIBO will also leverage its participation to the KIC EIT ICT Labs to increase the visibility of the industrial experiments at the EU level, and to contribute and participate to training activities organized in the context of the ICT labs

4.2.9. LULEA TEKNISKA UNIVERSITET [LTU]

Luleå University of Technology (LTU) has three main tasks: Reasearch, education, and interaction with the surrounding societey. Thus, exploitation of results stemming from research projects is not performed directly by the University, but LTU is to support the exploitation whne being done by participating SMEs or spin-off companies. With this purpose, LTU has formed the company LTU Business AB (http://www.ltu.se/org/LTU-Holding/LTU-Business?l=en). LTU Business focuses on commissioned education, business development for small and medium-sized companies and the commercialization of research from Luleå University. The company is also commissioned to take business decisions about the intellectual rights that the company LTU License AB can buy from researchers at the University.

Thus, the SMEs working together with LTU within the EuroCPS project will be connected to LTU Business, in order to maximize the possibility for successful exploitation for the SME.

The results generated in the industrial experiments is also expected to generate academic publications under 2017.

4.2.10. BUDAPESTI MUSZAKI ES GAZDASAGTUDOMANYI EGYETEM [BME]

BME has extended the operation of the EuroCPS design laboratory towards SMEs who do not have financial support from the EuroCPS Project. The goal is to achieve self-sustainability in 2-3 years. So far, as the EuroCPS project pays the salaries of the coaches working in the EuroCPS design Laboratory, the coaching is free for the SMEs, but the goal is that the service will be continued as paid service after the end of the EuroCPS project.

4.2.11. VERENIGING HIGH TECH NL [HTNL]

As a pure network partner (cluster organization), HTNL will not directly exploit the results of the project from a commercial point of view. The exploitation for HTNL will be as follows:

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 42 of 103

- Support to SMEs and creation of new collaboration links with the industrial world at regional, national and European level. A stronger community on CPS based systems will actively support and fuel the Dutch "Smart Industry" initiatives;

- Using the experiments granted in the Netherlands as working example HTNL does have a much stronger position to promote CPS development in the Netherlands in possible collaboration with the EuroCPS platform providers. This route has been initiated and will continue after completion of the EuroCPS project.

- As the SME companies addressed do not necessarily belong to the cluster organization of HTNL as formal member, the EuroCPS project will provide HTNL with the opportunity to actively scout for new member companies active in the CPS world. As such this will enlarge the association and provide more capacity for innovation activities for and with member companies also along axes using IoT/CPS.

4.2.12. Finepower GmbH [FPG]

Beneficiary	Exploitable new item (new product/service) short description	Competitive context		Exploitation plan			
		Identified Competitors	Added value of exploitable item	How? (Routes for Exploitation)	qWhen?	By Whom? Potential users	Where? (in EU and/or other countries)
Finepower	Transmission of data via LoRa In IE LoRa Transmitter and Receivers are controlled via the XMC Platfomr	Sofar no storageconverter is equipped with LoRa . Potential competition are comming from big PV – inverter companies	FP can offer new connectivity between power electronic	Offering the LoRa connectivity as part of the power engineering serviced	Q3 / 2017	Companies asking for home storage systems	EU
Finepower	Extending onboard charger to low volt chargers	Engineering companies for industrial chargers	No highpower chargers with low volt available	In conjunction with IE a watercooled charger will be developed	Q4 / 2017	Automotive OEM and Tier 1	EU

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 43 of 103

Finepower	Expanding power engineering services to product services Production of stroage systems in relation with SME with knowlege of battery management systems	Battery storage makers SMA, Varta..	Installation by enduser and Addition targeting consumer market	Founding of now company related to production	2017	consumer	EU

Role in the project: Acting as a competence partner

Expected results: Expand know how from power engineering to power CPS engineering

update: beside the extension of the power engineering services Finepower plan in addition to become power electronics manufacturer in order to generate more sustainable business for the engineering department inside Finepower

Exploitation strategy: Extended technology product portfolio with higher complexity grade

1) extend connectivity portfolio with LoRa connectivity in cowork together with SME- Alitec.

2) extend product portfolio in terms of OnBoardCharger – for Low-Voltage-Vehicles in cowork with SME- FEAAM. After the IE FEAAM and Finepower will cooperate further on power electronics. A next project concerning DCDC converter to low voltage rail is currently in planning.

3) go into new business opportunity: Finepower as manufacturer of Power electronics in cowork with SME- enfas (sofar Finepower is only engineering service provider).

Enfas and Finepower are planning cooperation in production of storage systems where Finepower will act as provider for power converter devices.

Benefits: New technology will result in new employment

update: 1) – 2) for the new technologies Finepower is currently actively search for new R&D engineer

      3) for Power electronics manufacturer Finepower plans new employees for Qualification, Certification and after-sales service

Timescale: Short medium and long term.

update:1) extend by LoRa   End 2017

      2)extend OBC Low Volt: End 2017

      3) manufacturer of electronics :   Mid 2018

4.2.13. STMICROELECTRONICS SRL [ST-I]

STMicroelectronics, offering one of the industry's broadest product portfolios, serves customers across the spectrum of electronics applications with innovative semiconductor solutions that make a positive contribution to people's lives.

Due to the fragmented nature of the Internet of Things, the markets we serve span our entire customer base – from our largest customers to the tens of thousands of smaller and equally important customers who we serve through our distribution partners and mass-market initiatives.

ST-I, supporting EuroCPS activities on SMEs' Industrial Experiment, intends to foster the SMEs' innovative ideas and recognize the possible constrains, obstacles and limitations on adoption of our solutions for the development of new functionalities and capability required for new CPS applications market.

Technology innovations have to be placed inside the final products-services to reach the market.
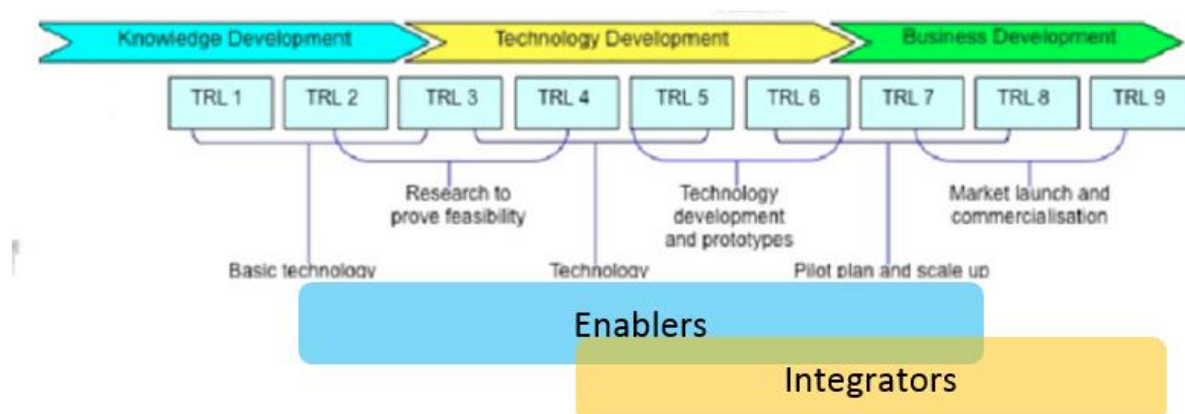
Previous figure reports the area of activity that we typically recognize for technology enablers and technology integrators in the product value chain.

This, on the Integrator side, requires the capability to develop final marketable products and, on Enablers side, to lower possible barriers and shortage allowing to better catch the technological potentiality and a higher grade of achievable innovations by means of the use of advanced and sophisticated electronic devices.

Only for example, it is estimated that 80% of all innovations in the automotive industry, today, are directly or indirectly enabled by electronics, which means a constant increase in the semiconductor content per car year after year.

For different domains, that already are characterized by a large adoption of semiconductor content, this generally means a pervasive introduction of specific wireless and wired communications, a constant improvement on elaborations and storage capabilities, and ever more "integrated" functionalities and higher speed on system clock, pursing a deeper and larger digitalization of the context.

Dissemination level: restricted within EuroCPS (CO)

Availability of advanced technological solutions is at the base of enhancing of goods and services, but this is possible only providing adequate support, especially for SMEs that for their nature generally have a niche focus and/or limited resources.

The activity developed in EuroCPS allows us to reinforce our propositions on mass market, better addressing the needs of new integrators so to facilitate the development of customer loyalty, also.

Another advantage due to the EuroCPS project is related to gather the SMEs' innovation skills and the incoming trend on requirements and expected characteristics for electronic devices for CPS applications, overcoming the large distance between ST, as silicon solutions provider/enabler, and final market goods developers.

This is in line to keep our technology edge that, further an unwavering commitment to R&D, requires to provide the adequate accessibility to our solutions to support their larger adoption.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 46 of 103

5. Conclusion

This deliverable reports all networking events, Dissemination plans and Exploitation Activities organized and achieved by EuroCPS partners.

A list of forums, fairs, workshops and other events related to IoT and CPS technologies, are described in this deliverable. Focus on the current exploitation plans are reported in the final part of the document.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 47 of 103

Annex 1:   Exploitation of the SME´s

The second reporting period in EuroCPS related to the exploitation is characterized as follows:

All three call have been executed. This means that all SME´s have started their word on their industrial experiments. Assuming an average duration of the IE´s most of the projects started in the first call are going to finalize their projects. The IE´s of the second call are mostly in the middle of their projects where the IE´s out of the third call are in a first period.

For the exploitation results related to the current reporting milestone the most valuable feedback is given by the SME´s who finalize their projects or who are in the final state of their projects. The business plan of this companies are becoming more clear and a comparison could be done between their targets shown in the initial proposal and the current state of their exploitation.

An alignment meeting of the EuroCPS members was executed on October 28th 2016 in Grenoble related to dissemination and exploitation purposes. Concerning the exploitation of the SME´s a template was created and aligned where the SME´s have been asked for the updated business plans, the market context and their go to market strategy. We took also the opportunity to ask the SME´s during this survey about satisfaction with EuroCPS, cowork with platform and competence partner and others. The results of this survey are listed in the individual SME exploitation feedback.

In the following a consolidation is done out of the data of the SME feedback for projects which are going to be finalized or which have a significant runtime.

Initial business plan out of 8 SME´s with a significant runtime of their experiments:

intial busines plan									
revenue based on IE / T Eur					employment based on IE				
2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
350	4.750	15.164	35.259	46.652	22	46	73	100	127
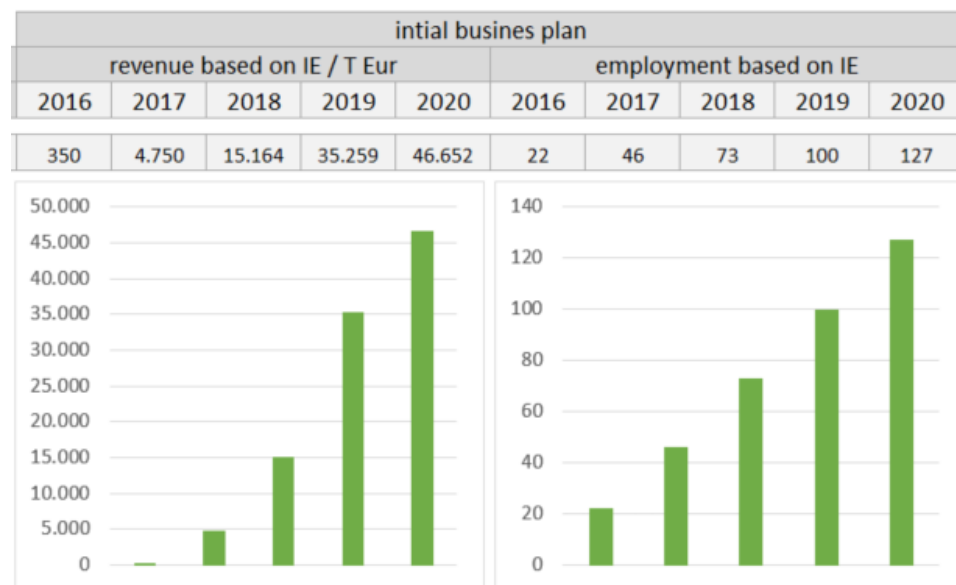
In average the SME´s forecasted to start their business in 2017 where the upper graphs significantly start to rise. In order to prepare the product or service launch some initial staff should be hired in 2016 and increase steadily over the next years.

updated business data:

updated busines plan									
revenue based on IE / T Eur					employment based on IE				
2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
50	386	6.361	20.486	40.774	16	41	63	77	98
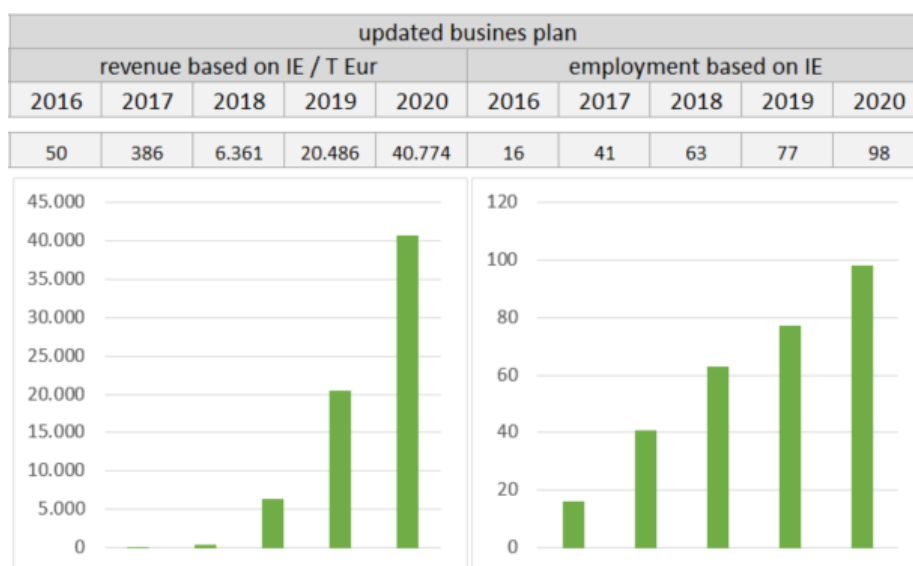
In the updated business plan data, the start of significant revenues is shifted to a certain extend into 2018. This means start of business will have a certain delay.

One reason for this delay is often the realistic assessment of product launch processes. Startup companies have highly technical innovative processes but the industrialization of products or services is often underestimated. Certification- or qualification processes are often work packages which take longer than expected.

In contrast to this delay most of the SME´s keep nearly their target for new employment. When looking into the most concrete figures of employment for 2016 and 2017, this is slightly below the original forecasted values.

This could be interpreted as the necessity of work for bringing the business. Even when the business plan will have some delay the work for industrialization still need more man power which results in new employment.

The following graph shows the development of the selected 8 SME which have a total employment of 107 people in 2016 and expect 157 employees in 2017. The total revenues were 2.8 Mio EUR in 2016 and a revenue of 6.96 Mio is expected for this year. For some SME´s the data have not been consistent for 2015 therefore this values are not taken into account for analysis.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 49 of 103

total company revenue / T Eur						total company employment					
2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
200	2.840	6.950	15.123	29.823	56.076	51	107	157	193	246	292
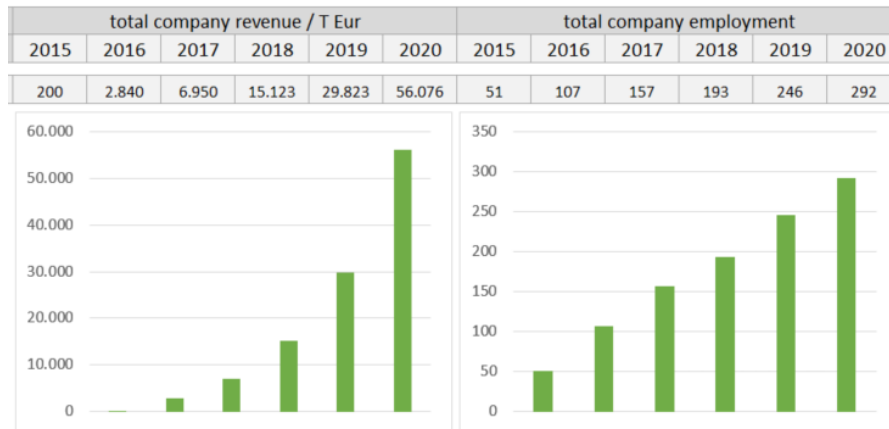
Generating an average of the data a typical SME which is participation in EuroCPS has 13 employees in 2016 and the forecast for this year will be 20 people. The average revenue would be 355k EUR for 2016 and 869k EUR for 2017.

average company revenue / T Eur						average company employment					
2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
25	355	869	1.890	3.728	7.010	6	13	20	24	31	37
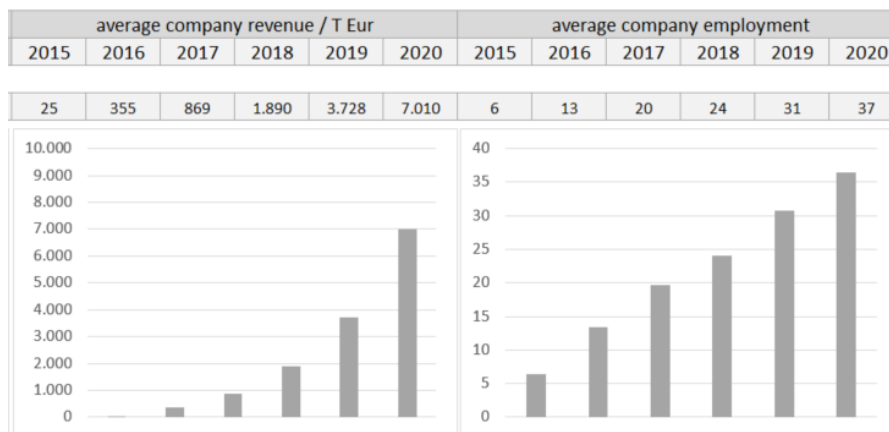
Result:

- 50% increase of employment from 2016 to 2017 is expected in average
- double the revenue from 2016 to 2017

The extrapolation for the coming years do not show abnormal expectation and seem to be feasible.

At the end of the EuroCPS project in 2018 more concrete figures will be available from the SME´s where the forecast analysis can be bases on more real figures.

Individual SME feedback from specific industrial experiments:

	Project:	SME:	Networking Partner:	Platform:
1)	CARDIO	SPARK WORKS	DIGITAL CATAPULT	INTEL
2)	AgriSense	nquiringminds	DIGITAL CATAPULT	STM
3)	IBT3	ExaInformatics	DIGITAL CATAPULT	INTEL
4)	SmartLAB	NEUMANN Diagn.	BME	INTEL / ST32
5)	MGIoT	GreenWaves	CEA	ST – Nucleo
6)	SelfCommNet	Wireless P2P Tech.	LTU	ST32
7)	D3DSM	CONEX	LTU	ST32
8)	ECESS	enfas	FPG	IFAT / ST32
9)	Charger Guard	IEB	FPG	IFAT
10)	ISCAD Charger	FEAAM	FPG	IFAT
11)	SolarSensNet	Alitec	FPG	IFAT
12)	MCS-MXSME:	FentISS	Thales	Thales
13)	NOFIST	AltreonicT	Thales	Thales TRT
14)	CNODE	Encore Lab	CEA	ST-I
15)	WOA	Terabee	CEA	ST-I

(other projects no further updated compared to initial proposal)

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 51 of 103

A1:

project acronym: CARDIO

SME: SPARK WORKS ITC LTD

networking partner: DIGITAL CATAPULT

competence partner: DIGITAL CATAPULT

platform provider: INTEL LABS/ Intel Curie Platform / Quark SoC

short project description:

SPARKS develops an innovative wearable CPS to provide safety, reassurance and quality of life to the post-PCI patient and patients with heart failure. The wearable device will provide real-time, high-definition electrocardiography using a diagnosis-grade ECG device, eliminating patient's fear of death, reducing unnecessary hospitalizations and ambulance calls, and minimizing response time in case of a critical event. The product is based on an innovative miniature sensor provided by SPARKS in combination with the Intel Curie platform. The innovation of the new product is related to the ability to process high-frequency signals within the wearable device thus delivering high-accuracy diagnosis on the basis of its low cost and accurate signal recording. This is achieved by leveraging the innovative pattern recognition engine provided by the Quark processor to increase the accuracy of the signal detection algorithms. This innovative product makes it possible to deliver reliable clinical services at any location, even in places where Internet cloud-based services are not reachable thus preventing unnecessary admissions and providing added value for the patient (e.g., emotional safety to the patient).

project start: 1/JUNE/2016

project end: 31/MAY/2017

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE	90.000	220.000	564.000	989.000	1.582.500
employment based on IE	6 persons	12 persons	24 persons	38 persons	54 persons

Market context:

Advancements in technology have opened up new areas in the medical equipment market. Remote home monitoring is becoming more common across the healthcare industry, with various medical conditions tracked when patients are away from the hospital. The monitoring of cardiac health problems is such an example and can be managed when patients are residing at home with the use of cardiac monitoring equipment. By 2020, heart disease and stroke are expected to be the leading cause of death and disability globally, with fatalities projected to rise to 20 million a year; and to 24 million by 2030. Approximately 1,1 million people in Europe die from a stroke, whilst 47% of all deaths in Europe are related to cardiovascular diseases. Portable ECG devices to provide reliable, accurate, real-time monitoring of the heart and that are able to detect sporadic events during doubtful sections of incidents would constitute an effective alternative. On the one hand, there are companies offering (i)

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 52 of 103

handheld ECGs with 1-3 leads electrocardiogram (ECG) monitors and associated apps, such AliveCor Heart Monitor, HearCheck Pen or the Omron HeartScan ECG Monitor. On the other hand, there are higher-end (ii) wearable ECG monitors, such as QardioCore and Equivital, both offering a more reliable and wireless ECG capability to share heart data with doctors. Finally, there are Holter devices, such as GE Healthcare Seer 1000 Holter Monitors or Welch Allyn Holter Monitors. The reliability of CARDIO as a trusted comprehensive homecare monitoring solution, combining the accurate and reliable data generated by the hospital-grade, 12-lead ECG device and the cloud-based IoT platform,delivers tangible direct benefits for 3 target groups: (1) for Patients, CARDIO provides health and economic advantages whilst decreasing anxiety, (2) for doctors, it increases the effectiveness and efficiency of their work, (3) for hospitals and Healthcare system.**updated business plan**:

	2015	2016	2017	2018	2019	2020
revenue based on IE	-		10.000	90.000	220.000	564.000
employment based on IE	-		1 person	6 persons	12 persons	24 persons
total company revenue		50.000	90.000	132.800	383.000	876.000
total employment	4 persons	6 persons	7 persons	12 person	24 persons	48 persons

Our future goals in order to convert the EuroCPS prototype in a commercial product are:

● Performance Analysis: Our goal is to validate the correct operation of the complete system as well of the individual components. Additionally we are interested in evaluating the operating parameters of each individual sub-system and of the end-to-end system.

● Access in the EU market: We also have to develop a strategy in which our product is recognized and bought by customers in a particular market getting the CE mark. The CE mark can be confusing, costly, complex, and can take up a lot of a company's precious time. That's why we have to invest time, effort and money in order to gain access in the EU market.

● Future developments: SPARKS has an extended R&D timetable to implement future innovation and improve its solution. The planned developments relate to functionality improvements (user interface, workflow fluidity, etc.). After penetrating the B2B market, the company aims at catering directly to consumers by extending its offering and enable the patient's relatives to monitor patients.

● Feasibility study: SPARKS is seeking funds to undertake a six-month feasibility study from January to June 2017. This feasibility study will include (1) a written report and (2) market outreach to demonstrate various aspects of the market that are critical for the success of the business.

Goto market strateg

SPARKS client acquisition strategy relies on two channels. First, it relies on Medical Device Sales Representatives (B2B2B), who have a wide network of clients and whose products are often complementary, to boost sales and evangelize our solution to larger general practices (GPs), clinics and hospitals (B2B). These entities have a reputation of being gre at accounts as they represent more important sales revenues. Our sales representatives will focus on developing a first contact in the aim of organising demonstrations and being referenced. SPARKS will organize regular workshops enabling our sales-team to engage with clients and show them a demonstration of our solutions live, to give the opportunity to ask questions to our pre-sales team. The relationship with our resellers will be contracted

and will specify the means we shall put forward to boost the sales but also the obligations they will be entitled to, such as putting our solution forward via a show-room, workshops. Second, SPARKS will create strategic partnerships with Adult Day Care Centre to target Patients or Doctors (B2B2C/B). Additionally, using the focused web media outlets we will try to increase our publicity and brand awareness. We believe that through publicity we will reach the system developers and product designers. We will use a strategy of continuously investing in social media campaigns, in banner ads of some popular technological web-based sites related with high-precision wearable devices for remote healthcare and monitoring at home. Taking part in technological exhibitions and medical conferences we are going to increase our publicity awareness about our product.

Impact of EuroCPS

EuroCPS provides imporant support so that our team delivers a next generation wearable device well ahead of existing state-of-the-art devices in terms of (a) capability to perform diagnosis on the spot without relying on cloud services thus significantly simplifying the overall operation of the device; (b) increased battery lifetime running for several days and in this sense extending the independence of the patients. EuroCPS provides support in term of (a) transferring know-how related to the technical aspects of the development, (b) extremely hard-to-find consulting related to privacy aspect and data confidentiality issues (which are very important for both wearable and medical domains) and (c) financial support for the personnel costs for the development of the product and the business aspects. In the meantime the overall administrative effort is very lightweight and limited during the verification of the project milestones.

Until now, the experience of the Intel technical team has provided support and guidance during the packaging design for the next level of experience prototypes and pre-production medical prototypes as well as the legal procedures to acquire approval to enter the market. Equally important was the support received from the Digital Catapult team towards identifying and tackling all the legal issues related to privacy and confidentiality of data collected and handled by our system. Lengthy consultation meetings have taken place to develop a goto market compliant with existing EU regulations and addressing the necessary insurance policies. During the project, the monthly meetings and the constant communication via emails and calls with Spark Works and Digital Catapult were valuable for our product progress in many ways: i) coaching on architecture and implementation of their use cases, ii) coaching on user interactions and formation of use cases as well as iii) further engagement with the business community holding events at the Digital Catapult premises such as Pit Stops.

How can help EuroCPS for further progress of Industrial experiment

We strongly believe that it will be beneficial for Spark Works to develop connections with other members of the EuroCPS consortium to reinforce our commercial and technical network. It will be also valuable to develop connections with the other companies and network institutions as the product becomes more substantial. Our thought is to use our partnership with Digital Catapult in order to find new innovative opportunities in the space of integrated health and social care network activities. In addition, if new challenges about health and wellbeing innovation should be sponsored by external partners and addressed as part of the Digital Catapult Innovation team, thus leading to commercial innovation events, we will engage Spark Works as technology provider and expert in relevant activities, thus allowing them to establish new business partners for their solution.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 54 of 103

A2:

project acronym: AgriSense

SME: nquiringminds

networking partner:

competence partner:

platform provider: STM

short project description:

AgriSense is part of a project that aims to develop a suite of agri-tech sensors and an IoT hub suitable to the harsh and difficult environments found in industrial agriculture. Enhanced by cloud or edge AI computing that can be used to direct or automate industrial processes. Specifically in this IE we are targeting the grain drying segment of the crop life cycle (sowing, growing, harvesting, drying, storage and delivery).

The problem we are addressing is: When the grain comes off the field it is too wet. It needs to be dried - fundamentally because above a certain moisture content (MC) it will rapidly spoil - but of immediate commercial concern to the UK farmer, they will be fined at point of sale if the grain is above a threshold MC. At the same time, the dryer wants to avoid over drying for three reasons. Wasted energy, opportunity cost from over deployment of equipment and human resources and finally profit loss, because as the grain is sold by weight, every percent of water removed unnecessarily is a percent less revenue per tonne. In between over and under drying, there is an optimum MC the dryer wants to target.

The IE solution is to move from using one or two expensive electromagnetic or capacitance moisture meters to an array of many cheap relative humidity sensors. By using the improved spatial granularity from many sensors and state of the art AI to compensate for reduced measurement accuracy, AgriSense aims to better control the drying process and greatly improve the ability to accurately dry the grain to the target MC; at a fraction of the cost of existing systems.

project start: 08/06/2016

project end: 27/01/2016

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE	0	0	0	0	0
employment based on IE	0	4	4	6	6

Market context:

The initial market focus prior to starting the IE was the UK industrial grain dryer market. During the IE we have explored the potential in other markets. For grain market size India and China are the largest. With the Indian agricultural sector the best placed to gain from the proposed technology. India produces about 263.3 million tons of food grains per year. Annual post production losses are 15

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 55 of 103

million tons of food grains. Enough to feed one third of India's poor. We are pivoting our product focus to align with this greater oportunity.

Our latest investigations still show that there are no competitors on the market for the proposed methodology.

While we still intend to explore the UK market through our contacts with BDC, (one of the major UK grain dryer distributers), we have secured funding and also formed a partnership with a number of the main customers in India, including the Indian Ministry for Food Processing. Through the IMFP who indrirectly are responsible for drying a large percentage of the grain and several other private large grain processesors in India, we intend to develop into the Indian market.

Discussions with Cicso are ongoing examining the Chinese market, in particular the rice drying market.

updated business plan:

	2015	2016	2017	2018	2019	2020
revenue based on IE	-	0	75,000	150,000	220,000	370,000
employment based on IE	-	2	3	4	4	5
total company revenue		500,000	700,000	950,000	1,100,000	1,350,000
total employment	10	12	18	18	24	24

From prototype to product

- 2016: conducted early stage field trials at one site
- 2016: learning and planning for two more years of trials and development, funded by Newton Fund
- 2016: early stage testing of ML
- 2016: UX development
- 2017: conducting further trials
- 2017: ML refinement
- 2017: UX refinement
- 2017: Hub specification and development
- 2017: Market exploration and partner building
- 2018: conducting further trials
- 2018: ML refinement
- 2018: UX refinement
- 2018: Exploration of hardware partners
- 2018: Exploitation of physical products; data assets and IP
- 2019: Exploitation of physical products; data assets and IP
- 2020: Exploitation of physical products; data assets and IP

Goto market strategy

In the UK our market strategy remains unchanged with two primary exploitation routes.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 56 of 103

1) Physical sensor sale and licensing of analytics: this a physical product that will be sold via identified resellers. BDC is our initial UK based reseller partner, with broad UK coverage. We will explore other partners for other regions on a nonexclusive basis as the product matures.

2) Licensed IP: this is a separate exploitation route. Instead of targeting grain drier service companies (such as BDC), this targets the actual manufacturers of grain drier equipment and control systems. In this scearnio we license protected IP which can be physical installed with new driers.

Most of our efforts will now focus on the India Market –

The core of the commercial offering is embodied in the hub: a standalone IOT connected hub hosting all analytics locally (but uploading to cloud when possible) The hub has a unit cost of £750 with a £425 per year, subscription cost on analytics. This represents a potential 1300% yearly ROI to mill owner. Sensor prototypes will be created as base designed and standard solutions developed at volume. It is anticipated however that agricultural consultants, grain dryer installers and grain dryer manufacturers will integrate their owns sensors (using our base design) adding value and revenue to their own product in the process.

To realise these opportunities we are conducting a two year development program with IMFP, TN Foodgrains Marketing Yard and Madurai. Alongside this we will continue our exploitation activites, leveraging the results of the IE, which have recently included our CEO accompanying the UK Prime Minister as part of her Trade Delegation to India as a recognised leader in IoT.

Impact of EuroCPS

- o Budget distribution [25% @ start,…., 5% @ IE closure]
- o This was fine for us as we do not have cash flow issues
- o Administrative effort:
  Medium, relative to total funding and the length of project
- o Founding project related to CPS / IoT:
- o platform (satisfaction with the PF, performance of PF, quality, development time…)
  The ST components used were well suited to the application
- o Cowork platform partner:
  Professional and responsive
- o Cowork competence partner
  Helpful, gives good clear guidance
- o

The EuroCPS project has been an extremely valuable investment for nquiringminds. Directly from the IE we have already secured funding for two more years development that will secure existing jobs and create high value jobs in the future (see above); as well as future revenue and being instrumental in forming valuable partnerships and market opportunities.

How can help EuroCPS for further progress of Industrial experiment

- o technically
- o Guidance partners to help with redesigning solution for scaled manufacture and distribution

others

Guidance on requirements for final report, marketing, future funding opportunities

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 57 of 103

A3:

project acronym: IBT3

SME: ExaInformatics

networking partner   DIGICAT

competence partner:

platform provider: INTEL

short project description:

  The project is developing the ability for identity to be shared between the Cloud and IoT devices. This secure sharing is enabled by the use of edge processing to filter data at the IoT level and apply policy before its transfer to the Cloud. The business goals of the project are to ensure that Smart City technology can be GDPR compliant and ensure any processing of data is done with the users consent.

  In order to achieve consented data processing identity has to be linked to data on collection. Traditional approaches collect all data and then sort for identity, our solution matches identity when the data is produced ignoring the other data objects.

  In terms of business model we are targeting owners of built infrastructure who are likely to implement Smart City services to improve the experience of users. Such improvements can include improved passage through the airport to better retail experiences. Using our base model we can provide such services in a user centric privacy protecting way which encourages users and service providers to build stronger relationships around data.

project start: Sept 2015

project end: Mar 2017

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE	50000	75000	150000	250000	400000
employment based on IE	0.75 FTE	1FTE	2 FTE	4 FTE	6 FTE

Market context:

        In this Industrial Experiment, we have developed a product called HelloData. This product uses emitted broadcast probe request signals from all Smart Phones. Specifically within the retail and transportation sectors these signals are increasingly being used by providers to track movements of crowds. The problem with using this technology "as is" is that the tracking is done without consent and it is a course and generalized way to gather data which can improve space optimization for retail or transport utilisation.

        Our offering is to not track the crowd but to engage with individuals to better understand the behavior and motivation of the crowd using the same technology. Our solution targets organisations who wish to optimize the way people interact with their transport or retail set of services. This is done the creation of a platform where a shopper or traveler agrees for his or her probe requests to be recorded.

Dissemination level: restricted within EuroCPS (CO)

Using this agreement we then present both the data and set of retailers / service providers who wish to use it to the shopper / traveler. As the data is of value we expect to incentivize this data sharing by offers / vouchers being presented by the retailer / service provider for data access. The use of these vouchers particularly in the case of retail is a way to change behavior. Within the transport sector information on travel disruption or passes for express check in could be incentives.

Thus, with the exchange of information and incentives between both parties at the center of our offering we are looking to target existing loyalty schemes at organization such as Heathrow to use our product. Also we feel this model can be developed in the transport sector, as in the UK budget cuts (£2Bn for Transport for London) are leading the organization to look for new ways to incentivize retailers in stations and also change traveler behavior to optimize the use of the network.

updated business plan:

	2015	2016	2017	2018	2019	2020
revenue based on IE	-	50,000	75,000	150,000	250,000	400,000
employment based on IE	-	1	2	2	4	6
total company revenue		100,000	150,000	250,000	400,000	550,000
total employment		2	4	4	6	8

From prototype to product

- o In terms of facilities we can use the existing process from Intel to mass produce customized devices based on our work on the Edison board. We expect that we will need 30-50 per average retail space.
- o To integrate and test this we will have to invest in a larger testbed than we currently have at ExaInformatics. This investment will include the procurement of more intel devices and also network infrastructure to support the testbed.
- o For all installations we will require investment in appropriate middleware to support the HelloData platform. Depending on the security constraints of the client this could either be in the Cloud or local machine room.
- o In terms of company strategy during the course of the project we have moved from a focus on data processing capabilities at the edge to the wider question of GDPR compliance and if this can translate to business value. We expect this to continue in the longer term but the shorter term goals have to focus more on the specific motivations in both the retail and transport sectors.
- o Beside the IE we have completed a project with the UK Ministry of Defence. This work developed a standalone data analytics platform. This could be applied to the HelloData framework if customer requirements for more automated data analytics as a service emerge.
- o After the project we aim to have in place at least one trial with a potential end user. This work will carry the IE further up the TRL scale. In terms of IP and patents, our platform generally uses open source software. Where we write standalone code to process probe request data we will license it to protect ownership.

- o   Investment in production / test equipment:
- o   The system uses for the most part installed wifi hotspots. To these some low cost processors (e.g. Intel Edison board) are added to perform the edge processing for the system. Otherwise the investment is in software. There not a great deal of capital investment required

- o   Company strategy / founding:
    The Company was founded as a spin out from STFC. Its business is in large data analytics. The technology that is being developed as part of this grant will be one of the revenue streams for the company and it is hoped that this will grow into a substantial business
- o   innovative work / features / research beside IE- work:
- o   Large data analytics and Data manipulation

- o   what happens next after EuroCPS (follow up projects etc.)
- o   the company is marketing the technology to paying customers and is hopeful that it will sell either a working system shortly or will be able to join in a technology development partnership with a large potential customer.

- o   Generated IP (patents) & ownership:]
    None. Protection is in software copyright

Go to market strategy

- We believe that this technology will enable location owners to increase revenue opportunities and, at the same time, enhance their users experience while in the equipped locations.
- Our current strategy is focused on engaging with customers through our existing networks. This in line with the current status of the Industrial Experiment. An initial software prototype has been developed and we are talking to organization to gather feedback on its potential use.
- Early findings from this work has helped us reposition our pitch to focus on the use of specific relations with individuals and the need to not collect any anonymous probe request data. The assurance that the product is entirely with consent is a key issue for potential customers. In terms of the use of GDPR concerns to unlock the market, we have found that potential customers tend to see issues around GDPR as being far enough on the horizon to warrant no pressing need to act.
- Therefore, our pitch is based on optimization of existing space and infrastructure using our technology to build better relations with key users of the space. We focus on how our system is unique in that it presents the user at the center of the relationship building in order to yield better data and ensure maximum trust.
- After the project we will have a more polished prototype and will aim to attend more trade shows and look to develop targeted advertising following up on the marker research we are currently conducting in the IE.
-

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 60 of 103

Impact of EuroCPS

- assessment of:

  o Founding rate fair: We are ok with this
  o Budget distribution [25% @ start,…., 5% @ IE closure] We are ok with this
  o Administrative effort: We are ok with this, although the audit of accounts places a heavy admin burden; particularly since it was only introduced to the project half way through the project
  o Founding project related to CPS / IoT: The project has enabled us to invest time to develop a product. This would have impossible without the funding
  o platform (satisfaction with the PF, performance of PF, quality, development time…) When compared to its rivals i.e. Raspberry Pi the Edison board is quite expensive and not as feature rich. Our focus on the experiment has led us not to experiment with other Intel IoT although we have read about emerging technologies from Intel and are interested. The partner is also very large and so the relevant activities within the partner have been difficult to access.
  o Cowork platform partner: Intel have provided good technical support and have helped drive our development toward a more commercial goal
  o Cowork competence partner DIGICAT have introduced us to some good networks of potential partners and customers. They have also helped us identify finer details of emerging legislation and its commercial potential. They have provided us feedback on design and also have facilitated us in terms of workspace when we have been in London to visit potential clients.
  o general improvement potential The guideline around the IE tend to differ between partners, the experiment is risky and the methodology to assess commercial success in terms of expectations from the SME should be made clearer. This would have enabled us to have clearer expectations between all partners and to structure our deliverables slightly differently.
  o others:]

How can help EuroCPS for further progress of Industrial experiment

  o technically :Joint workshops and free kit

  o business plan Joint workshops again and also pan European networking events.

  o others

Dissemination level: restricted within EuroCPS (CO)
THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 61 of 103

A4:

project acronym: **SmartLAB**
SME: **NEUMANN Diagnostics Ltd.**
networking partner: **BME**
competence partner: **BME**
platform providers:

    • **INTEL Ireland (**INTEL Edison)
    • **ST Microelectronics (**STM 32)

Short project description:
High throughput medical diagnostics laboratories and bio-banks have to face the growing amount of biomedical samples processed and stored locally. The continuous quality assurance of the even tens of thousands sample test tubes during processing, transportation and storage generates the need for comprehensive solutions. SmartLAB's innovative solution uses RFID (Radio Frequency Identification) tagged test tubes and sample holders. The touchless and highly flexible technology enables the reliable and secure identification of the test tubes in the entire laboratory ecosystem, reducing the risk of sample loss or misprocessing and shortening the time of providing results for the patients. NEUMANN and its predecessors have a decade long experience in high throughput in vitro laboratory diagnostics (IVD). SmartLAB's innovative solution reflects to the needs gained from the everyday issues of laboratory work.
The platforms offered by EuroCPS provided up to date solutions for the actual implementation of the system with the continuous assistance of BME as a system integrator. The SmartLAB system utilizes coordinator modules in laboratory and refrigerated sample storage areas operated by Intel's embedded Edison platform. Thanks to the platform's flexibility and off the shelf IoT solutions the integration of hardware subsystems and the Laboratory Information Management System (LIMS) was done with ease. Endpoint hardware units were realized using ST's microcontroller platform ST32 and wireless solutions.

project start: February 2016
project end: February 2017

business plan described in proposal for industrial experiment:

Business view: This project is seen as an excellent opportunity for Neumann Diagnostics to create new USPs, which strengthens their competitiveness in the IVD diagnostics place. These USPs include
• Complex sample taking, extraction devices with full traceability and full quality assurance (general NAAT IVD sampling system)
• Integrated robotized cervical molecular pathological IVD kits with full traceability and automated sample management (cervical biomarker panel and HPV testing)
Profit: As a result of the new products based on the concepts of this industrial experiment the profit margin of the new Neumann DX products is expected to increase. Current sales prices are about 2xCOTS price, which is expected to increase.
Turnover: At least 3 MEur is expected in 5 years after launching the first products based on the new concepts.
Employment: Cellcall will employ 2 full time engineers for running the project 2016 2017 2018 2019 2020
revenue based on IE 0 0 600 kEUR 600 kEUR 600 kEUR
employment based on IE +2 +4 +6 +6 +6

Market context:

Dissemination level: restricted within EuroCPS (CO)
THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 62 of 103

Market size: The progress in in-vitro diagnostics (IVD) has become a key economic driving force in the industrial countries and will create new mass markets not only in Europe but also in the newly industrialized countries like India or China. This is very competitive market there are new trends shaping and driving the global market and it is expected that emerging players significantly alter the market positioning of the current market leaders. It is estimated that the global laboratory analyzers market was valued at $.48 billion in 2012, and is forecast to grow at a compound annual growth rate (CAGR) of 7.8%
over the next five years, to reach $.73 billion by 2017.
Neumann DX released the MOLAB & LabAssistant System and Cellcall CONFIDENCE IVD products when the EuroCPS proposal was submitted. As a complex sample processing system based on NAAT technology, MOLAB is one of the potential application of the proposed sample management system. Other ongoing products like CONFIDENCE can be also seamlessly integrated with the proposed new technologies. MOLAB and Confidence compete in a market worth € 50 million today. HPV screening in Europe is expected to reach €500 million within 10 years. Current competitors of Neumann in this field are Roche Molecular, Qiagen and Genomica in Europe.

updated business plan:

2015 2016 2017 2018 2019 2020
revenue based on IE - - 100 kEUR 200 kEUR 400 kEUR 600 kEUR
employment based on IE - 4 5 5 6 6
total company revenue - 130 kEUR 200 kEUR 400 kEUR 600 kEUR 600 kEUR
total employment 6 10 11 15 20 20

From prototype to product

o **Investments in production facilities:** No further investments will be required as the production will be outsourced to manufacturing service providers.
o **Investment in production / test equipment:** The ergonomic shell and plastic body of the system components should be designed and investment will be needed for the production of manufacturing tools
o **Company strategy / funding:** Given features of SmartLAB will be integrated in the already off theshelf products of Neumann DX. Based on customer feedbacks and needs, further features will be implemented in the forthcoming Neumann systems and products. Also, the company will seek for project funding opportunities for the further development.
o **Generated IP (patents) & ownership:** The IP generated in this project is exclusively owned by Neumann DX.
Goto market strategy

As SmartLAB is intended to be a part of the already existing systems and products of Neumann DX, the marketization process is tightly integrated with the current marketing activity of the company. Customers are primarily reached in molecular biology trade shows and international conferences such as follows: International Papillomavirus Conference, EUROGIN International Multidisciplinary Congress, Interdisciplinar HPV Congerss, IUSTI-Europe ConferenceInternational Colposcopy and Cervical Pathology Conference, International Congress of Gynaecology and Obstetrics.

Impact of EuroCPS

o **Funding rate fair:** 75%
o **Budget distribution:** 25 % pre-financing, 18 % @ M1, 33 % @ M2, 24 % @ M3 (project end)

o **Market impact:** Neumann Diagnostics develops molecular tests for cancer prevention and related laboratory solutions. Using the high level of reliability and traceability of the samples processed under the supervision of SmartLAB system Neumann DX can provide highly automated workflows extended with quality controlled sample handling solutions for high throughput laboratories especially in the field of infectious diseases like STDs and HPV screening which involves millions of patients in the EU.

o **Economic impact:** The economic impacts of the project will include increases capabilities and know-how for Neumann and will also augment revenues as the company will be in the position to compete for supply contracts of high-throughput laboratories in the diagnostic field. The reagent market for HPV screening in Europe is expected to reach €500 million within 10 years. INTEL and STM will see higher sales for their components thanks to the sales of Neumann.

o **Development, platform providers:** In general, development time was longer than expected at the project start. It was found that the emerging development community behind the Intel platforms is sparse at the moment, therefore a number of problems, bugs and issues are waiting to be solved. We justified as a general limitation of the EuroCPS approach that the number of the proposed platforms is limited, although the platform providers may have more adequate solutions and products, which were not actually offered by the programme.

o **Competence partner:** Neumann DX experienced a seamless co-work with its competence partner, BME. The development teams meet regularly during the project with a good and steady progress performance in the past 10 Months.

o **General improvement potential for EuroCPS:** More flexible selection options of the platforms/products from the already existing platform providers.

How can help EuroCPS for further progress of Industrial experiment
The funding received from the EuroCPS project helped NEUMANN to add extra values to its existing products with CPS based sample tracking and quality control solutions. NEUMANN being an IVD company has limited capabilities for CPS based system development. EuroCPS enabled the cooperation with the design center BME and provided the direct access to Intel's and ST's up to date solutions. By the integration of the platform provider's solutions and by the application of the newest leading-edge academic knowledge of BME, EuroCPS makes the SmartLAB concept a competitive solution and gains market advantage for NEUMANN. At the current stage Neumann intends to continue its research and development cooperation with BME for the further development of the SmartLAB product line.

Dissemination level: restricted within EuroCPS (CO)
THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 64 of 103

A5:

project acronym: MGIoT

SME: GreenWaves Technologies

competence partner: CEA

platform provider: ST – Nucleo

short project description:

The objective of the project was the development of an optimized 2 frequency-bands (868 MHz, 915 MHz) Green-OFDM transceiver for high data rates & long ranges IoT services based on the STM32 F-Series Nucleo board. OFDM is the most used modulation for high data rate wireless communication. It presents one problem that is its high power consumption, which GreenOFDM, GreenWaves Technologies proprietary solution solves.

project start: Nov 2015

project end: Oct 2016

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE	0.21	1.08	3.1	10.4	20.2
employment based on IE	13	17	19	25	30

Market context:

GreenWaves Technologies focuses on the market of high-speed wireless connection solutions for Low Power Wide Area Networks (LPWANs). The exponential development of IoT has led to the emergence of many new cases of use that pre-existing standards can not satisfy. In particular, LPWANs have been invented to serve the need for infrequent, very low-speed connections, simple deployment via low-density, low-cost base station infrastructure, which can run years on a batterie. The current providers are in particular Sigfox, Semtech (with LoRa), Ingenu and NWave. Their market is made up of private networks deployed on private campuses (buildings, car parks, industrial campuses, ports, mines, agricultural fields, ...) and more recently of IoT telecom operators.

It is expected that a large part of the foreseen exponential growth IoT (several tens of billions in 2020) will mainly come from the connection of devices via LPWANs due to the very low cost, long range and scalability of these solutions.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 65 of 103

Early deployments of these LPWANs are showing the emerging demand for higher data rate to enable new richer use cases. However, the technologies used by LPWANs can not offer rates greater than a few Kb/s.

GreenWaves Technologies targets high data rate (1Mb/s) LPWANs.

The industry players that will select GreenOFDM (which are more relevant than our actual customers) are both the LPWAN technology suppliers and the IoT operators.

Competition at network level comes 3GPP LTE-Cat M. GreenOFDM is a technology that will help the LPWAN players to fend off this competition.

updated business plan:

	2015	2016	2017	2018	2019	2020
revenue based on IE	-	0	0.1	2.3	8.5	15.2
employment based on IE	-	9	21	27	29	31
total company revenue		0.1	2.3	8.5	15.2	28.5
total employment		9	21	27	29	31

From prototype to product

- The IE has enabled us, among other things, to validate our algorithm in a radio communication environment. We have in parallel selected an architecture for the integrated circuit that will embed this algorithm and are designing it.
    - o Investments in production facilities:
        - The integrated circuit will be manufactured by a semiconductor foundry.
    - o Investment in production / test equipment:
        - We are investing in test bench equipment. Production test will be subcontracted.
    - o Company strategy / funding:
        - The company is in the process of raising a seed round of 2M€.
    - o innovative work / features / research beside IE- work:
        - The architecture of our integrated circuit represent a breakthrough in term of energy efficiency, with a 10x improvement vs the state-of-the-art.
    - o what happens next after EuroCPS (follow up projects etc.)
        - We have in parallel selected an architecture for the integrated circuit that will embed this algorithm and are designing it. This development is supported in particular by an H2020 SME Instrument phase 2 grant.

    - o Generated IP (patents) & ownership:]

- The invention (GreenOFDM) took place prior to the IE.

Go market strategy

- *As mentioned above in this document, the industry players that will select GreenOFDM are LPWAN solution providers and IoT operators. They are the ones we are targeting from a business development perspective.*
- *We are engaged in discussion with several of those. Interestingly, our propuct can also support their current solutions. This would be an opportunity of shorter term business as well as a way to have an intimate early realtionsip with those.*
- *We have produced white papers on the technology, video tutorials, and we attend industry trade fairs.*

Impact of EuroCPS

- assessment of:

    o Funding rate fair:
        - OK
    o Budget distribution [25% @ start,…., 5% @ IE closure]
        - OK
    o Administrative effort:
        - OK
    o Funding project related to CPS / IoT:
        - OK
    o platform (satisfaction with the PF, performance of PF, quality, development time…)
        - NOK
    o Cowork platform partner:
        - NOK
    o Cowork competence partner
        - OK
    o general improvement potential
        - More care should be put in validating the motivation of the platform partner
    o others:]

How can help EuroCPS for further progress of Industrial experiment

    o technically / business plan
        - Being a start-up, our plans change relatively often as we learn from the market. EuroCPS has been useful to help us engaging with potential players. And … this has made us alter our plan relatively away – qualitatively - from the plan we had when we defined our IE. Nevertheless, what has been developed has proven and is proving to be useful in the new course of the company.

Dissemination level: restricted within EuroCPS (CO)

A6:

project acronym: *SelfCommNet*
SME: Wireless P2P Technologies AB

networking partner: LTU

competence partner: LTU

platform provider: STM32 Microcontroller Platform from STMicroelectronics

short project description:

The rapid expansion of the 3G and 4G networks has changed the way we communicate, but there are large uncovered areas in remote or undeveloped regions where advanced digital services are not available. In response to the demand for smartphone-like communication everywhere, Wireless P2P Technologies AB (WP2P) is developing affordable and license-free digital two-way radios for wideband long-distance communication in areas lacking cell-phone infrastructure. These handheld radios are not only transmitters – they are also routers and repeaters in self-formed mobile ad hoc networks (MANETs). VoIP, instant messaging, GPS and map sharing, and file sharing are supported in groups with hundreds of users. Compared to walkie-talkies, the state-of-the-art radio communication in uncovered areas for private users, the WP2P MANET two-way technology is a disruptive innovation.

In this project we will extend the communication range and improve the coverage in harsh environments by changing radio frequency from the 33-cm (900 MHz) to the 70-cm wavelength (430 MHz) band. Thereby the digital two-way radios will match the requirements for wildlife usage and, in particular, become the number one choice for hunting, fishing, and active tourism.

project start: 01.09.2016

project end: 01.09.2017

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE	0	20 KEUR	200 KEUR	350 KEUR	1 MEUR
employment based on IE	1	2	4	5	10

Market context:

There are wide remote areas with poor cell-phone coverage in northern Scandinavia. At the same time these areas serve as recreation areas for many hunters, fishermen, and wildlife tourists. These wildlife explorers constitute the major customer base for WP2P's primarily targeted market – private infrastructure-less radio communication in Scandinavia, where approximately 10 000 radio gadgets are sold annually in retail stores for leisure and outdoor team activities. Scandinavians are known to be early IT adopters and in some regions hunting is something like a national sport. There are as many as half a million registered hunters only in Norway, corresponding to almost 1 sold gadget annually per 100 registered hunters. From retailers we know that a Norwegian hunter typically spends 400 EUR

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 68 of 103

when buying a radio gadget, giving a total Norwegian hunting market potential of 200 million EUR. The market is scalable and in a global perspective the potential is enormous. In the US there are more than 20 million registered hunters, and worldwide we count on around 100 million.

User feedback points out the high communication quality (low noise, long distances, little radio shadowing) and the smartphone services (hunting safety with position maps) as major selling points of our solution. Our technology is compatible with most of the commercially available walkie-talkies ensuring a seamless customer acceptance of the new technology. Besides the geographical scalability the technology has potential to be 'tooled' to fulfill the needs of mission critical communication between the team members in professional rescue services, public safety, mining, construction or oil and gas industries. The second priority in our commercialization strategy is the Scandinavian license-free public sector with cost-efficient rescue services complementary to the TETRA system and cell-phones. The private and public markets are estimated to be of similar size but the latter will take longer to penetrate.

According to Persistence Market Research the global digital two-way radio market will reach ½ million units by 2021. The market can be divided in a low-price narrowband segment and a premium wideband segment with smartphone-like services. WP2P is currently the only wideband player in Scandinavia. Worldwide there are a few US developers (e.g. Persistent systems and WaveRelay) of costly MANET technology for advanced purposes, but WP2P is to the best of our knowledge the only supplier of affordable (~500 EUR) license-free MANET two-way radios.

updated business plan:

	2015	2016	2017	2018	2019	2020
revenue based on IE	-	0	200 KSEK	2 MSEK	3.5 MSEK	10 MSEK
employment based on IE	-	1	2	4	5	10
total company revenue	2.1 MSEK	1.3 MSEK	2.7 MSEK	3.5 MSEK	5 MSEK	15 MSEK
total employment	3	4	5	7	8	13

From prototype to product

The main purpose of the project is to design and verify via Partners updated version of our radiosystem targeting new frequency bands. We are investing into production of 10 prototypes currently. Regarding technology protection we have a mixed copy- and IPR based approach. Core technology features are hidden in software algorithms and are hard to copy, however, we will protect 'some' features to make it reasonably difficult for competitors to enter the field. This strategy may very well be reconsidered in a later stage when revenues become higher. In the present phase a fast track to market is more prioritized than water-tight protection of all technology features.

The competition in the radio communication field is strong, and the expansion of infrastructure-based technologies will continue. WP2P must be innovative to survive. In one future scenario third-party developers will make apps on the WP2P platform. Our business model can handle this opportunity. In another scenario WP2P will also develop and provide network 'bridges', and small MANET "base stations", for hooking on MANET networks to the Internet via cell-phone networks. Doing this would give many opportunities. Internet app development could

develop into a big business, and MANET infrastructure could, to some extent, become a substitute for cell-phone base stations in harsh terrain or in scenery landscapes.

Goto market strategy

Our market strategy is fully focused on the private Scandinavian market to rapidly build up a critical mass of wildlife users and demonstrate commercial feasibility in this key segment. To not lose momentum we intend to release the targeted UHF two-way radios for evaluation next year. The development is challenging and difficult to carry out without competence support, and the extensive development costs cannot be financed by WP2P alone. Currently the best option is public co-funding.

After the UHF prototype release we will switch focus and intensify the marketing activities to be able to pass the critical-mass-of-users barrier. In parallel the development towards the final product launch in 2017 will be performed per the business planning. Partnering will be necessary for the development of a rugged housing and for regulatory issues. We anticipate that this development phase can be funded partly by pre-orders, by consulting revenues, and by external investments or bank loans due to convincing results with the targeted UHF prototypes in this project.

When expanding the business towards the Scandinavian public sector the approach will be different. Based on proof-of-concept in the private sector we will try to attract interest from voluntary or public rescue organisations for larger contracts including training, support and service. Outside Scandinavia, in the later internationalization phase, the approach will be to use distributors or agents while keeping the core service and development functions in-house in Sweden.

WP2P is fully satisfied and confident while working with Project Partners from LTU. All necessary resources are available and communication / feedback is well established. The founding rate approved is acceptable, no significant changes needed.

How can help EuroCPS for further progress of Industrial experiment

Overall impression of EuroCPS program is very high. The program fully meets WP2P's expectations and requirements.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 70 of 103

A7:

project acronym: D3DSM

SME: CONEX

networking partner: LTU

competence partner: LTU

platform provider: STM32, Microcontroller and inertial

short project description: Developing prototype drone for 3D scanning of underground hard to reach areas

project start: Spring 2016

project end: Fall 2017

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE	0	0	Break even		
employment based on IE	1	1-2	2	2	2

Market context:

These exists about 100 potential underground mining sites in the EU, and reaching 2% of

these/year seems like a conservative estimate. Worldwide the potential is an order of magnitude larger (for example, in 2013 there was 719 active underground mining sites in the USA). Thus, even with our conservative estimation on the expected sale we see great potential to generate substantial profit for Conex.

During this project potential patent will be evaluated, the IP of the drone scannersystem is mostly software and can thus be protected using the memory protection features of the embedded MCU.

updated business plan:

	2015	2016	2017	2018	2019	2020
revenue based on IE	-	0	0	0.1M€	0.3M€	1M€
employment based on IE	-	0.5	1	2	2	2
total company revenue	0.2M€	0.5M€	1M€	1M€	1M€	1M€
total employment	21	35	40	50	60	70

From prototype to product

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 71 of 103

Investments in production facilities:
Will be outsourced

Investment in production / test equipment:
Invesment in laboratory facilities in ongoing

what happens next after EuroCPS (follow up projects etc.)
Identifying a pilot customer is ongoing, the company initially commited for this is not very active in this project at the moment. With the pilot customer finalize the product to reach market ready state.

Generated IP (patents) & ownership:
The ip generated in this project is software and is owned by Conex

Goto market strategy

Ongoing activities is reaching out to potential customers in the area, we have ongoing discussions with LKAB and BOLIDEN.

Other ongoing marketing activities is discussions with other companies that supplies drone systems.

Impact of EuroCPS

Founding rate fair: Yes
Budget distribution [25% @ start,…., 5% @ IE closure] Fair /
Administrative effort: Acceptable
Founding project related to CPS / IoT: ??
platform (satisfaction with the PF, performance of PF, quality, development time…)
    Good

Cowork platform partner: Has received some samples
Cowork competence partner   Excellent
general improvement potential
others:]

How can help EuroCPS for further progress of Industrial experiment

technically
Ok, no major obstacles so far

business plan
Small setback with commitment from pilot customer.
Identifying new customer is underway or hopefulle renew the interest from the initial contact.

others
        no.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 72 of 103

A8:

project acronym:	ECESS
SME:	enfas
networking partner:	Finepower
competence partner:	Finepwer
platform provider:	Infineon / ST

short project description:

At present, energy storage is the pivotal technology that will reshape the energy sector by enabling widespread adoption and grid-integration of solar and wind renewables. It will play also a major role on influencing our behaviour on how we will use energy in general.

An energy-storage market is growing exponentially and with reducing of its cost, it is now entering in the commercial, consumer and residential market, where applications are smaller but it requires simplicity, safety and scalability. In order to achieve such potential of the energy-storage systems, number of disruptive changes needs to be adapted in underlying basic cell-chemistry, requiring hardware, which needs to be integrated as well as software components as per their applications. A key component in this eco-system is a Battery-Management-Systems (BMS), which should inherently run the intelligent algorithms, which are adaptable to various underlying cells but also should allow scalability for integrating different hardware components using standard communication with not only to multiple battery-packs but also to other power-electronics devices.

This proposal will outline the development of a modular and scalable high capacity energy-storage system that will use EtherCAT as its main communication bus between the different modules. This will be the **first EtherCAT based energy-storage** in the market. In existing systems battery-packs are connected via SPI, CAN or similar real-time bus systems with limitation of number of nodes connected to it. EtherCAT is an Ethernet based real-time field bus which provides high speed communication with flexible network topologies, relative to other available bus systems. EtherCAT provides a significant increase in the number of nodes (eg. **up to 65535 battery packs**) that can be connected to the bus. In addition it allows a **widely spread** network of battery pack.

In this proposed experiment we explain the development of a complex EtherCAT slave controller as a targeted CPS product which expands the EtherCAT technology in energy storage and battery management systems. It also contains the description of the target product, necessary development efforts of hardware and software using euroCPS platforms, required work-packages and resources.

project start: 14.05.2016

project end: 13.05.2017

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE (M€)	-	3,3	10,5	22,5	22,5
employment based on IE		7	16	19	23

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 73 of 103

Market context:

Today's energy-storage are big, ugly black-boxes with limited deployment possibilities. Energy storage systems, available today in the market, have not the possibility to communicate in real time to each other, no real time data transmission is possible, with the impact of no high system efficiency and scalability. EtherCAT communication between the storage units will obviously change this. Proposed energy-storage solution opens up new possibilities for a very detail analyses of the sensor data from each storage and give the possibility to make the energy flow more efficiency. Efficiency means, for our environment a better use our natural resources and for our customer to save money.

In the **market today** there are a lot of battery producers, but they have **no compatibility** and they are **not scalable**, they have **no hot-swap**.

Our forecast of the Integration of EtherCAT in the enstorage series will be finished in Q1 2017 and lunch the marked integrated in enstorage systems in Q2 2017. With our customers discussed strategies we expect the following sales in 2017 until 2020. In 2021 the enfas SSB cells will launch the market and implemented in the enstorage, which are connected with EtherCAT.

updated business plan:

	2015	2016	2017	2018	2019	2020
revenue based on IE	-			3,3	10,5	22,5
employment based on IE	-	7	16	19	23	
total company revenue		1,2	4	11		
total employment	10	23	50			

From prototype to product

For Euor CPS the EtherCAT Interface will be realized like it was forecasted in the EuroCPS standard agreement. Concerning the total product enfas is faced with a delay caused by mechanics and thermal design of the housing where compromises must be found between outer cabinet design and function, especially the thermal transfer. This will basically cause a delay of the complete final product with production start in 2018

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 74 of 103

- o Investments in production facilities: contract for renting production building done
- o Investment in production / test equipment: automatic assembly machine bought
- o Company strategy / founding: a separate company for production already founded (enspring)
- o innovative work / features / research beside IE- work:

  enfas is parallel working on new solid substance storage elements which can be in future an alternative battery for the enfas storage. The main advantage will be high power possibility, high C charging and discharging but it will need a high voltage.

- o what happens next after EuroCPS (follow up projects etc.)

  the complete strorage will put to production where the main investments are already don

- o Generated IP (patents) & ownership:

  basic patents eg. for hot swap have been registered which will secure unique features of the storage system

Goto market strategy

Enfas will enter the consumer market with storage products for residential and SME buildings and following in the industrial marked for grid storage systems with the possibility of the very high scalability. The consequences of this will be a shift of energy-storage's value-chain from vertical to horizontal business models. Such transformations will greatly accelerate the rate of innovation and opportunities to develop "killer-application" in energy sector. The commercial buildings market is the second most active market segment after bulk storage, reflecting demand for energy cost management solutions from commercial and industrial customers. These customers are willing to invest in intelligent distributed energy storage system, which will reduce cost and availability of steady and quality power for their operations.

Impact of EuroCPS

- - assessment of:
  - o Founding rate fair: yes based on the reasonable administrative efforts
  - o Budget distribution [25% @ start,...., 5% @ IE closure]   fair
  - o Administrative effort: reasonable
  - o Founding project related to CPS / IoT: perfect topic for founding projects
  - o platform (satisfaction with the PF, performance of PF, quality, development time…)

    there was already good know how available in use of the platforms

  - o Cowork platform partner:

    there was already good know how available in use of the platforms

  - o Cowork competence partner

    good help in order to realize the power electronic for this product.

    At enfas there is limited know how in power electronic. Finepower could help a

    lot in order to realize complete product

  - o general improvement potential

How can help EuroCPS for further progress of Industrial experiment

the product plane has a slight delay but there is no issue for bringing the storage to production.

No further help is requested (so far.)

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 75 of 103

A9:

project acronym: Charger Guard

SME: IEB (Industrie Elektronik Brilon)

networking partner: Finepower

competence partner: Finepower

platform provider: Infineon

short project description:

Target:

Development of a network connected sensing electronic (Charger Guard) which detects the battery-charging status of industrial battery chargers from competitive brands. This enables the integration of charger from competitors into IEB battery- supervising system.

Current situation:

Industrial battery chargers are often spatially combined in an industrial facility where batteries (eg. for forklifts) are put for recharging. A supervising system for the battery state of charge supports the worker to use the charged batteries in the right order (charged and cooled down battery = best battery). This system enables the maximum lifetime of the batteries or indicates when old batteries should be replaced.

The detection of the state of charge is done best by the charger electronic itself and therefore the supervising systems are working within a charger- network of one supplier brand (using the telemetry data of the charger). Selling IEB charger in an already existing charger- network of a competitive brand is linked to a battery supervising system where existing competitor charger can be integrated without access to the telemetry data.

New:

Within EuroCPS an electronic and software (charger guard) will be developed which shall directly be adapted to the poles of a battery, charged by a competitor battery charger. New software- algorithms of battery tracking voltage will allow detecting the state of charge. The Charger Guard is connected to the IEB charger network via a proprietary bus.

Prospect:

By integrating competitor chargers into IEB supervising system (via Charger Guard) the industrial customer can change from a proprietary charger network to a free scalable, enabling also an easy change from existing (competitor) battery chargers to IEB- systems. This results in new market possibilities for supervising systems and for battery charging infrastructure for IEB.

project start: 14.07.2016

project end: 13.07.2017

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE / TEur		20	40	60	130
employment based on IE		2	4	7	8

Market context:

The development of the Charger Guard will have following impacts:

- unique marketing feature
- free scalable charger network instead of existing proprietary networks
- additional sales of new I-Light system including charger guard
- easier replacement of existing charging environment (competitor replacement)
- increase sales of industrial charging facilities
- enter new market
- increase employment

Market perspective of Charger Guard:

IEB is focused on the European Market with industrial battery chargers. In Euorpe there are several competitors like Axima, GFS, Fronius, Benning, SBE, Mori (Battery Charger Industry) and Industrie-Automation, which are acting in the same business segment. In comparison to others, IEB is following the strategy of a modular charger approach where solutions can be easily realised from a few 100 W to 50 kW.

This strategy is already a unique marketing feature of IEB.

The I- Light system which indicates the "best battery- usage" is competing with similar concepts of Axima:(Take-This), Benning:(Next-Battery-Guard). The competitor concepts are working inside the charger family of one brand.

An internal market analysis of IEB has shown that Charger-Guard- Concept is not available in the targeted European market and not available by any competitor.

This results in a unique selling point of the Charger- Guard and can further clearly differentiate IEB within the competition of industrial charging in Europe.

"The customers of Charger Infrastructure can change with the Charger Guard to a free scalable network where they can flexibly integrate several brands. "

Competitor replacement:

Since the Battery- Guard Concept can integrate the industrial charger of the competitors, there is not anymore a burden to offer and install IEB Chargers to new customers. They do not need to completely change from one brand to IEB, which is normally a high cost factor. Furthermore they can integrate the existing chargers in the IEB charger network and take advantage of the of IEB system.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 77 of 103

Another unique selling point of IEB chargers will be the outstanding efficiency of more than 95% which will be introduced to the market next year.

New markets:

Industrial chargers can also be used in the booming market of E-Mobility. The new marketing feature support also the intention of IEB to expand in the industrial E-Mobility market.

In parallel IEB is currently certifying the new Chargers for the US market where the entrance is planned next year. Outstanding marketing features will enable an easier access to this market.

updated business plan:

so far there is no difference to the initial proposal

From prototype to product

Production target:

The Euro CPS project "Charger guard" will take one year where a functional Network with Charger guards and Control Unit is realised. Based on current promising simulations the targeted functionality is highly feasible.

After the realisation of the A- sample within EuroCPS project following tasks need to be further executed: qualification, certification and production transfer.

A duration of 9 month is expected for the industrialisation process, which results in a targeted production start by end of 2017.

Furthermore IEB has outstanding know how in charging of lead acid batteries with patents on charging processes which secure this know how.

Goto market strategy

> IEB is already well known in the industrial Market for battery charging systems an since years present as exhibitor at the relevant fairs. In parallel IEB will enter in addition the US market where products have already been presented at the industrial customers and the relevant certification are going to be finalized. The battery guard will help to increase the business in the already addressed market in Europe and strengthen the launch in the US market. The European and the US variants of the battery charger will be manufactured in Germany.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 78 of 103

Impact of EuroCPS

- assessment of:

  o Founding rate fair: yes
  o Budget distribution [25% @ start,…., 5% @ IE closure]: fair payment distribution realted to efforts
  o Administrative effort: fair related to reasonable funding
  o Founding project related to CPS / IoT: in general IoT is good topic for several funding projects
  o platform (satisfaction with the PF, performance of PF, quality, development time…)
  o Cowork platform partner: XMC and power platform issues are mostly covered by competence partner
  o Cowork competence partner: good cooperation in algorithm-, HW- and SW- design with Competencepartner
  o general improvement potential: funding projects related to renewable energy and E-Mobility (CO_2 reduction) would fit to IEB products best
  o others:]

How can help EuroCPS for further progress of Industrial experiment

currently the EuroCPS project is on track and exploitation and production plan is set up therefore no further help is requested.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 79 of 103

A10:

project acronym:	ISCAD Charger
SME:	FEAAM GmbH
networking partner:	Finepower GmbH - FPG
competence partner:	Finepower GmbH - FPG
platform provider:	Infineon Power Management - IFAT

short project description:

A three-phase power factor correction unit (PFC) using high-efficient power semiconductors out of the IFAT platform is to be designed for an innovative low-voltage traction system in electric vehicles. The traction system comprises a rated voltage of 48V which has several benefits in comparison to widely used high-voltage traction systems. The issue of thus very high current flowing in the system has been solved by an innovative multi-phase motor design as well as short-distance connections between traction battery and motor inverter. The lack of automotive on-board chargers being able to charge low-voltage systems in electric vehicles out of the public grid leads to a high effort which is required to build up a new high-power charging unit for low-voltage battery systems. The PFC to be investigated, designed and realized in this project is one part of the charging unit. The other part is represented by an isolated DC/DC-Converter which transforms the (rectified and smoothed by PFC) high grid voltage to the low battery voltage. Due to limited time and financial sources, only the PFC part of this charging unit is part of the EuroCPS-project.

Additionally, for controlling power factor, communication to grid and car electronics, a microcontroller device out of Infineons XMC family is to be used.

project start: 01.09.2016

project end: 31.07.2017

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE (k€)	-	50	500	2.500	45.000
employment based on IE	6	7,5	9	14	25

Market context:

There are already bilateral projects concerning ISCAD together with automotive Tier-1 suppliers and a company which is electrifying delivery vehicles and a market entry is aspired to through these customers. However, there is a tough competition considered, but a share of at least 5 % feasible.

updated business plan:

the business plan remains up to now the same like initial

From prototype to product

In parallel to the development of the LV onboard charger where the PFC develop during EuroCPS FEAAM is working on the DCDC- converter as well as on the development of the LV motor and it´s drive in order to realize a full concept car which is base for bringing the system finally to production

Goto market strategy

Up to now, there are no LV competitors on market serving the passenger car segment and a first-to-market strategy is focussed. Development of the system until production readiness is considered to take approximately 3 years. Especially the Chinese market allows easier entrance and can be used to enhance technical maturity for European and Northern American markets. Small series in end of 2017 will help to ramp up production until 2020. In 2018 and 2019 additional applications, e.g. delivery vehicles, are used to spread the technology, gain market access and improve the product.

Basic patents concerning the low voltage motor realization strengthen the launch of the technology to the market.

Impact of EuroCPS

- assessment of:

  o Founding rate fair: yes based on the reasonable administrative efforts
  o Budget distribution [25% @ start,...., 5% @ IE closure] fair
  o Administrative effort: so far reasonable for SME´s
  o Founding project related to CPS / IoT: good topic
  o platform (satisfaction with the PF, performance of PF, quality, development time…)
  o Cowork platform partner: XMC training and training in power components is highly welcome and will executed next.
  o Cowork competence partner: The expertise in high power application of the competence center helps a lot for choosing the right technology including the assistance in schematic and layout reviews
  o general improvement potential:

How can help EuroCPS for further progress of Industrial experiment

FEAAM is in contact with OEM´s and tier 1 for realization of the complete system. This means the product process in on going as expected therefore no further help is requested so fa.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 81 of 103

A11:

project acronym: SolarSensNet

SME: Alitec

networking partner: Finepower

competence partner: Finepwer

platform provider: Infineon (XMC Platform)

short project description:

The SolarSensNet project aims at setting up and experimenting a CPS able to provide fine grained information about solar irradiation for implementing an active optimization and fine-tuning of heating- and cooling-related energy consumption in large buildings.

In particular, our project has the objective of building a prototype demonstrator of a dependable sensor network capable of performing a distributed irradiation monitoring and to put it in relation to the amount of energy needed to air conditioning buildings' premises, in order to come up with useful data for active air conditioning management. This will enable optimized buildings' heating and cooling-related energy consumption while at the same time guaranteeing improved comfort to occupants.

The system will be built on top of highly innovative solar irradiation sensors developed and patented by Alitec in 2015, whose distinctive innovation lies in significantly lowering the cost of solar irradiation monitoring - which is currently very expensive and thus almost exclusively employed in the industrial and photovoltaic domain - and make it affordable at single building level. The sensors' network will be built using Infineon Platform.

The system will be experimented using as pilot building the premises of the Navacchio Technology Hub located in the surroundings of Pisa, Italy.

SolarSensNet's innovation objectives are the followings:

☐ Increase the Technology Readiness Level of the innovative irradiation sensing technology with respect to its application in the field of building energy management. Target TRL increase: 5 > 7

☐ Enable the CPS built on top of such sensors to face the sustainability challenge applied to the optimization of energy consumption in buildings

☐ Boost Alitec's profitability by combining innovative technologies into new solutions for the market of building energy management systems (BEMS)

project start: Aug. 2016

project end: Aug. 2017

business plan described in proposal for industrial experiment:

	2016	2017 (*)	2018 (**)	2019	2020
revenue based on IE	--	0	2.3 mln	7.8	10-15 Mio
employment based on IE	--	+4	+4	+9	+15

Market context:

Buildings are responsible for 40% of energy consumption and 36% of CO_2 emissions in the EU. Two-thirds of buildings in the EU were built when energy efficiency requirements were limited or non-existent and most of these will still be standing in 2050 (source: EU). Increasing the rate of energy efficiency in the building sector is essential to meet the European Union's energy targets for 2020 and 2030. The Energy Performance of Building Directive (EPBD) is currently under review and a proposal for a new Directive is expected in 2016. By improving the energy efficiency of buildings, a 5% reduction of EU energy consumption is esteemed, corresponding to a 6% decrease in CO_2 emissions. In terms of industrial relevance, the proposed experiment would enable Alitec to come up with a new product serving the market for building energy management systems (BEMS).

Building Energy Management Systems (or BEMS) are monitoring and control systems that help to manage, control and monitor building technical services (HVAC, lighting etc.) and the energy consumption of devices used by the building.

They provide building mangers information and tools to understand the energy usage of their buildings and to control and improve their buildings' energy performance.

Fig. 1 – Building control through BEMS

In fact, the proposed CPS system provides a set of critical information enabling an active thermal control systems for adjusting rooms' temperature. Indeed, our system is supposed to be integrated into a full monitoring and control solution and thus:

- **Industrial partners (businesses)** are system integrators and typically BEMS developers and manufacturers

- **End users** are building managers in charge of achieving energy efficiency performances

Potential impact of experiment: Our experiment's most important impact lies in the peculiarity of the solar irradiation sensors it is built on top of, and hence on the type of monitoring it enables. At present indeed, the solar irradiation monitoring technology commercially available consists of large and expensive SMSs almost exclusively employed in photovoltaic (PV) power plants. In this field, in

fact, the real time assessment of solar irradiation is critical in order to monitor the plant performance in terms of energy collected, and thus its profitability and ultimately its ROI. Thanks to the proposed experiment, the full potential of solar irradiation monitoring will be made available to the energy efficient buildings domain. ESA indeed dramatically reduces solar irradiation monitoring costs, and makes it affordable at single building level. This results in the opening of a new market segment which was cut off from accessing – and thus from using - this type of information for energy efficiency as well as for cost optimization purposes. In terms of impact, the proposed experiment would:
1) allow to achieve the following innovation objectives:
 increase the technology readiness level (TRL) of the ESA sensor with respect to its application in the field of smart buildings management.

In fact, ESA sensor score 7 in terms of Technology Readiness Level when its application is considered in the PV field, since it has already been successfully demonstrated in 4 test sites across Europe, but scales down to 5 if applied to the BEMS market segment, since no distributed monitoring system has built on top of if at building level yet, with the aim of optimizing energy efficiency. The proposed experiment would allow ESA and the whole CPS system built of top of them to reach TRL 7 also with reference to the smart buildings domain because ultimately we aim at demonstrating in operational environment its capability to provide in real time the parameters to be taken into account in order to optimize the energy management of the whole building. To this aim, the collaboration with the Navacchio Technology Hub as end-user of our CPS system represent the back spine of our experiment.
 enable the CPS system built on top of the ESA sensors to face the sustainability challenge applied to the active optimization of energy consumption, and thus reduction of costs, in large buildings.

2) widener Alitec's technology portfolio with a ready-to-integrate solution demonstrated in operational environment, hence viable for system integrators interested in further qualifying their BEM systems with solar irradiations data.
The underlying user-supplier relationships encompassed in the foreseen business model is a partnership whereby Alitec brings the technology solution for collecting relevant data and a system integrator – ideally a company in the BEMS market, for instance Schneider Electric, Siemens, Johnson Controls – integrates it in its final marketable product.

updated business plan:

	Actual		*Projection*			
	2015	2016	2017(*)	2018(**)	2019	2020
revenue based on IE	-	-	-	2.3 mln	7.8	10-15 Mio
employment based on IE	-	-	+4	+7	+9	+15
total company revenue	330'000	610'000 (***)	1.7 mln	3.2 mln	8.9 mln	20.6 mln
total employment	2	4	8	22	35	73

From prototype to product

Once the industrial prototype version will be ready (planned by early 2018), Alitec intends to handle industrial production through partnerships with supplier of components and of manufacturing and assembling lines. Hence by mid-2018 Alitec will focus on:

- implement agreements with suppliers of high-quality components and spare parts
- outsource manufacturing to suppliers of industrial assembling lines like Phoenix and Joer.

Both companies are Alitec's longstanding partners since years hence sound industrial relationships are already in place.

Goto market strategy

The first target market of the proposed product is going to be Italy. Italy accounts for total potential market of more than 12 million buildings (source: BPIE and Politecnico di Milano), with a very small percentage of them managed through smart BEM systems.
Alitec esteems to reach at least 0.5% of them during the first 3 years of operations.

Alitec's goto marked strategy is based implementation of **partnership agreements with industry players** developing and commercializing BEMS interested in further qualifying their commercial offer with solar irradiation data, whereby SolarSensNet will be provided as ready-to-integrate system.

To this aim, it is worth pointing out that direct contacts have already been established with Johnson Controls, and forecasts of provisional sales have been projected as for the first target market, i.e. Italy.

Fig. 2 – Main industry players in the BEMSs market segment

Further leads with key industry players will be generated through participation to trade shows and exhibitions. With this respect, preliminary analyses have been performed on the exhibitors' and participants to InterSolar, and in particular to the related Conference sessions focused on smart technologies for energy efficiency in buildings, like for instance the followings:

Smart Renewable Energy: Residential, Commercial and Industrial Buildings

This session explores the increasing role of smart technologies in residential, commercial and industrial buildings. Apps that control applications in real-time, wireless data transfer technologies using interfaces like TVs, PCs and smart phones interconnect and control PV systems, the inflow of electricity into buildings, heat pumps, ees systems, etc. This session investigates the market perspectives for smart technologies, identifies early movers, presents business models and reports on initial experiences.

Source: http://www.intersolar.de/en/conference/session/smart-renewable-energy-residential-commercial-and-industrial-buildings-1480.html

---

Dissemination level: restricted within EuroCPS (CO)
THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 85 of 103

<div style="border:1px solid">

Smart Renewable Energy: Buildings/Energy Management

Buildings are being transformed from energy consumers into energy producers, where any excess energy, heat and cooling generated is shared with the surrounding neighborhood. Through the use of storage devices, buildings are becoming active components which support the energy system. Smart building energy management systems go beyond considering the current and expected future demands of the building and the neighborhood. Smart home applications also increase comfort and energy efficiency in residential spaces and offices. The buildings of the future are characterized by modern plant technology and sustainable building designs, combined with intelligent and networked control over smart home applications, buildings and neighborhood energy systems.

Source: http://www.intersolar.de/en/conference/session/smart-renewable-energy-buildingsenergy-management-1481.html

</div>

Impact of EuroCPS

- assessment of:
    - Founding rate fair:
    Appropriate for carrying out the Experiment

    - Budget distribution [25% @ start,…., 5% @ IE closure]
    Appropriate

    - Administrative effort:
    So far (at the time Interim Milestone is being approached): Appropriate

    - Founding project related to CPS / IoT:
    … ? did not understand this

    - Platform (satisfaction with the PF, performance of PF, quality, development time…)
    Good

    - Cowork competence partner
    Good

    - general improvement potential
    (Nothing to point out)

    - others:]
    --

How can help EuroCPS for further progress of Industrial experiment

A present we are on track both as for technical and for business planning issues.

Once we will be approaching the market launch stage we would definitively benefit from extended contacts with potential customers and partners. In fact, while the development and experiment phases can be fully controlled within the company itself, approaching with the market presents aleatory variables than can be analysed and addressed but not fully controlled.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 86 of 103

A12:

project acronym: **MCS-MX**

SME: **FentISS**

networking partner: **Thales**

competence partner: **Thales**

platform provider: **Thales**

short project description:

The industrial experiment has as main goal to demonstrate the implementation of Mixed Criticality Systems using application representative of the avionic domain on multicore systems platforms based on the multicore XtratuM hypervisor. The approach is based on the Integrated Modular Avionics architecture using XtratuM multicore hypervisor as partitioning kernel and LithOS as ARINC-653 guest OS. XtratuM will provide full-virtualization techniques taking profit of the hardware virtualization support provided by the selected hardware platform and resource management techniques.

project start: February 2016

project end: February 2017

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE	**Not provided in the proposal**				
employment based on IE					

Market context:

FentISS is a research company in embedded systems. The company is positioning in hypervisors segment for the European market, mainly in aerospace sector. Our main customers are critical systems manufacturers or assemblers looking for technological solutions to do secure partitions in their applications. The users must have strong knowledge of ARINC-653 and other related standards, and experience in programming real-time applications. In aerospace sector the influencers opinion or decision, like the European Space Agency is very important. In other sectors, we must offer the solution and convince the system designers. So, the actors in our market are:

− Influencers. It's very important that they test our product. Their opinion will achieve market success.

− Recommended-users. They acquire our products influenced by an important agent.

− Isolated customers. They visit our website or have heard of our products and ask for them to test and check their features.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 87 of 103

Updated business plan:

	2017	2018	2019	2020
revenue based on IE	25.500	70.800	96.000	140.000
employment based on IE	1	1	-	-
total company revenue	510.000	590.000	640.000	700.000
total employment	11	12	13	13

The estimation of the IE impact on FentISS is based on the incorporation of the mechanisms in the following versions of XtratuM that include the necessary hardware mechanisms.

From prototype to product

- main activities on going or foreseen, to convert the EuroCPS prototype in a commercial product (investment in manufacturing, Product design, mass production preparation, …)
    o Investments in production facilities:
    No investments in production facilities are foreseen to implement the exploitation of the results

    o Investment in production / test equipment:
    No investments in test equipment. Test equipments and tools used for testing the platform has been reused from other projects.

    o Company strategy / founding:
    The strategy for the company is to support the exploitation by the company´s own resources. No external funding is scheduled at this point.

    o innovative work / features / research beside IE- work:
    Innovative work can be summarized in three main aspects:
    1. adaptation of XtratuM hypervisor to the processor/board
    2. Inclusion of the mechanism at hypervisor level to deal with the performance unit
    3. Definition and implementation of the event based controllers to handle critical applications jointly with non critical application in a multicore platform

    o what happens next after EuroCPS (follow up projects etc.):
    XtratuM has been deeply developed in R&D projects funded by the European Commission, which deal with TSP architectures. After the finalization of EuroCPS project, some other projects take advantages of the product evolution specially the mechanisms for core control.

- DREAMS. Distributed Real –Time Archtecture for Mixed Criticality Systems. The objective of the project is to develop a cross-domain architecture and design tools for networked complex systems where application subsystems of different criticality, executing on networked multi-core chips, are supported.

-SAFEPOWER. Is a project conceived and proposed by an outstanding consortium formed by European key players in the research and development activities related to mixed criticality systems and low power computing

o Generated IP (patents) & ownership:
The defined mechanisms in the EUROCPS can be considered as innovative approach to deal with the core control. Anyway, it is supported by specific hardware as the Performance Monitor Unit and can be difficult to generate patents. FentISS will maintain the IPRs of the solution.

Goto market strategy

- short term actions ongoing or foreseen to reach your customers (opportunities, Joint marketing, advertisement, Trade shows, Dissemination activities, …)]

FentISS is a technological company experienced in partitioned systems, for real-time and critical embedded applications.

Partitioned systems are the most promising technology to build dependable systems where some applications are executed in the same hardware platform. Avionic sector has a large experience and successful cases using IMA software architectures. Other sectors as Space and Automotive have promoted and adapt this approach. IMA-SP is the ESA program for partitioned systems that is considered the basic technology for the new generation of satellites. In automotive, AUTOSAR approach follows a similar approach. While current developments are based on mono-core architectures, the need of more computation and the processor evolution foresee that the future all the embedded systems will be multi-core. Currently, some relevant problems can be identified in the use of multi-core systems for critical applications (temporal isolation, limitation of resources and worst case execution time determination).

As result of this experiment some relevant results such as resource limitation techniques and full virtualization are aimed. This industrial experiment can facilitate the future use of XtratuM technologies in different sectors, which implies new bussines opportunities in a short time period in Avioncs, Space ans Automotive sector. Long term strategy will consist in introducing our key product in other sectors (Renewable Energy and Railway) where the developments achieved will remain valid.

A succesful exploitation of this technology requires a high level of manurity and certifiability, so a strong additional effort after the development and experimentation is required to achieve a certifiable product. FentISS is focused on the certification for space and avionics sectors. Not

---

only efforts in developments and further certification is being made, another efforts are being made in promoting the product, which is important to ensure business success.

Although these activities are important, the role of the influencers actors in our current space sector (ESA, CNES,etc) is crucial for us to promote our products.

Impact of EuroCPS

Assessment of:

- o Founding rate fair: **OK**
- o Budget distribution [25% @ start,…., 5% @ IE closure] : **OK**
- o Administrative effort: **good but some delays for the payment**
- o Founding project related to CPS / IoT:
- o platform (satisfaction with the PF, performance of PF, quality, development time…) : **no problem with the platform**
- o Cowork platform partner: **OK**
- o Cowork competence partner: **OK**

How can help EuroCPS for further progress of Industrial experiment

The support of Thales in promoting the results of the Industrial experiment can be really useful to achieve a successful dissemination strategy, which is an important part of our business plan.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 90 of 103

A13:

Project acronym:	**NOFIST**
SME:	**Altreonic**
Networking partner:	**Thales TRT**
Competence partner:	**Thales TRT**
Platform provider:	**Thales TRT**

Short project description:

The main objective of the project is to implement and to demonstrate using a Flight Management application a novel and advanced real-time programming environment available for complex multi-core platforms that must be able to meet very stringent safety as well as real-time requirements, in particular as mandated by DO-178C DAL-A whereby multiple applications are concurrently executing on the platform. The environment (VirtuosoNext Designer) allows transparent programming of ream-time applications across a multi/manycore target system while providing fine-gran space and time partitioning for safety and security.

In this project the programming environment will be implemented and demonstrated on an advanced multi-core platform (based on Freescale multicore PPC). The demonstration will validate the approach by implementing the Thales TRT Flight Management application. Later on, the same application can be implemented largely by recompiling the source code on other, eventually heterogeneous platform, e.g. using ARM Axx and ARM M3/4 in as far as the real-time constraints are reachable on this platform (using Rate Monotonic Analysis).

project start: **August 2016**

project end: **June 2017**

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE	**Not provided in the proposal**				
employment based on IE					

Market context:

The implementation of VirtuosoNext to an aviation domain platform and its verification by a flight management system constitutes an important step to validate the novel approach. It can serve as an example for many other domains:

o Automotive: vehicles are increasingly controlled by a networked, heterogeneous embedded system while being connected with each other and the infrastructure. VirtuosoNext allows protection on the lower-end processors (like ARM M3/4) by using the on-chip MPU as well on the higher end processors (like ARM Axx, PPC) by using on-chip MMU. The safety requirements for autonomous driving are even higher than for e.g. the aviation industry as the reaction times are much shorter.

o Medical: also in this domain, embedded electronic and networked systems play an increasingly greater role. While they increase the QoS, they also pose substantial safety risks.

o Railway: today's trains rely on networked control systems as well as wireless connections with side-track equipment to guarantee a safe operation.

o Mission critical infrastructure: examples are energy networks (e.g. smart grids) that being networked result in potentially serious consequences when failing. The challenge in such systems is security (malicious intrusions) as well as the avalanche effects of small failures.

o Security and surveillance systems: most of these systems are networked and when failing, they fail to meet their intended purpose.

Updated business plan:

	2016	2017 (est.)	2018(est.)	2019 (est.)	2020 (est.)
revenue (1000 Euro) based on IE	0	240	480	480	480
employment based on IE	1	2	3	3	3
total company revenue	300	525	4300	13200	16000
total employment	5	14	18	21	24

From prototype to product

o Investments in production facilities: VirtuosoNext Designer is integrated in Altreonic's KURT e-vehicle platform, designed to be remotely monitored and steered by software with a roadmap towards (semi)-autonomous driving.

o Investment in production / test equipment: limited to the acquisition of evaluation and demonstration boards and tools

o Company strategy / founding: Altreonic sells VirtuosoNext Designer mainly under an Open Technology License in conjunction with engineering services to adapt it to the specific hardware and application of its customers, mainly in safety critical sectors. For certification purposes, a Qualification Package can be developed by taking into account the target specific implementation layer.

o Innovative work / features / research beside IE- work: VirtuosoNext Designer is first of all a development modeling environment that relieves the programmer from a lot of

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 93 of 103

the tedious low level programming on the target. The higher level models are used with code generator to isolate the prgrammer from the SoC whereby the final application code is linked in with the real-time RTOS kernel. Hence, a large amount of work went into adapting the codegenerators tot the specific Frescale target SoC.

o What happens next after EuroCPS (follow up projects etc.): VirtuosoNext Designer has now been developed and ported on different targets (Freescale, TIC6678, ARM-A9, ARM-M3/4 and its variants). Altreonic will continue offering it under an Open Technology License, enhancing the product's support based of customer input.

o Generated IP (patents) & ownership: all IP remains property of Altreonic NV and is available under an Open Technology License scheme.

Goto market strategy

- short term actions ongoing or foreseen to reach customers (opportunities, Joint marketing, advertisement, Trade shows, Dissemination activities, …)]
- Altreonic is using different channels to communicate about the project:
  - o Website www.altreonic.com
  - o Email newsletter to its historical database (9000 addresses)
- Actions intended when the software is stable:
  - o Freescale specific press release
  - o Public workshop(s) in cooperation with Thales
  - o Internal presentations at Thales
  - o White paper showing the functionality and performance
  - o Papers to be submitted on international conferences.

Impact of EuroCPS

Assessment of:

o Founding rate fair: OK

o Budget distribution [25% @ start,…., 5% @ IE closure] : OK

o Administrative effort: OK but problem with large delays for the payment

o Founding project related to CPS / IoT:

o Platform (satisfaction with the PF, performance of PF, quality, development time…) :

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 94 of 103

The Freescale T2080 unlike the multi-core SoCs Altreonic used previously (Texas Instruments TMS320C6678, and early investigation on Freescale P4080) is a pure SMP (Symmetrical Multi Processor) Machine instead of an AMP (Asymmetric Multi Processor) Machine. This means that it is not designed to run multiple, fully independent Operating System Instances and that the physical memory is shared. This shortcoming can be overcome by either utilizing a resource intensive Hypervisor which also impacts on the real-time performance, which is not the aim of this project, or by adjusting the Operating System to cater for this environment. The latter is the solution implemented in the project.

One must also be aware that platforms like the T2080 SoC are complex and require a lot of (sometimes) incomplete information to digest in order to allow the low level programming. As such, the result is not fully generic but tied in with the selected platform.

The fact that code generators that take into account the SoC specific memory architecture and interrupt layer require also a significant effort that cannot be reused across other targets.

o Cowork platform partner: OK
o Cowork competence partner: OK
o General improvement potential: a more detailed understanding of the application needs could contribute to better support in the programming environment.

How can EuroCPS help for further progress of the Industrial Experiment

o Technically: while it was less of an issue with the Freescale target system, low level programming can benefit from direct support with the SoC vendor. This can seriously reduce the time lost on finding known answers.

o Business plan: Altreonic being a small SME does not have the means to execute a full scale marketing sales effort in a market that is increasingly very specialised and whereby historical choices have been made. Hence, Altreonic must rely on large customers to act as references. For this reason as well, Altreonic has decided to mainly market VirtuosoNext Designer via its Open Technology Licensing scheme in combination with customer specific engineering services as well as use the product internally as a competitive advantage for developing an advanced electric vehicle.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 95 of 103

A14:

project acronym: CNODE

SME: Encore Lab

networking partner: CEA

competence partner: CEA

platform provider: ST-I

STM32-L0

short project description:

The goal of Encore Lab for this EuroCPS project is to overcome current technological limitations by building a new kind of sensor nodes based on the low energy consumption STM32-L0 platform and Sigfox communication technologies.

The objective is to develop simple low-cost sensing nodes with minimal maintenance requirements and a long battery life (at least five years) with little or no power supply. These simple and reliable nodes will incorporate only a few sensors to control the most changeable parameters: air temperature, humidity and soil moisture at three different depths. All these nodes will send data directly to the server using Sigfox communications. This way, the system will be less exposed to problems arising from node synchronization and node breakdown.

The experiment will include the design, development and test of a new shield for STM32-L0 platform which will comprise the conditioning signal circuit of the sensor and communication socket for Sigfox module. The resulting nodes will be integrated into the current Cesens infrastructure.

project start: **01-03-2016**

project end: **28-02-2017**

business plan described in proposal for industrial experiment:

	2016	2017	2018	2019	2020
revenue based on IE		75K€	225K€	450K€	1125K€
employment based on IE		2	3	3	5

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 96 of 103

Market context:

The target market of the new product Cnode is agriculture, one of the pillars of economy worldwide. Decisions on crop management are frequently made ignoring important agro-climatic information or, at best, based on records by public stations. However, such information refers to very large areas, and agro-climatic conditions can vary in short distances. Thus, the information available gives only a vague (sometimes even incorrect) idea to agronomists when they have to make a decision for a specific plantation.

The ability to determine whether a plant needs water, fertilizers or pesticides, when and how much, is key to achieve sustainable agriculture. It is worth to mention that irrigation accounts for approximately **70% of world water consumption and up to 58% of the applied pesticide treatments are unnecessary.**

Market size is huge with **25% of the European land dedicated to agriculture and an annual output of 240 Billion euros**.

In this context, main clients of Cnode will be **medium size farmers or large agrofood companies** that want to improve the quality of their products reducing costs taking the best solutions. The product Cnode will be integrated in a more comprehensive solution: Cesens®.

There several competitors around Europe (Libelium, Bynse, etc). Regarding these solutions, Cesens® and Cnode main strong points will be:

- Affordable. Around **300 € / node** (Cnode estimated market price)
- Proprietary. We develop hardware & software.
- Autonomous. GPRS/GSM communications
- Proactive. Alerts and periodical reports

updated business plan:

	2015	2016	2017	2018	2019	2020
revenue based on IE	-		400K€	750K€	1.200K€	1.500K€
employment based on IE	-		6	3	3	3
total company revenue			400K€	1.150K€	2.350K€	3.850K€
total employment			6	9	12	15

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 97 of 103

From prototype to product

At the end of the industrial experiment it is envisaged to obtain a pre-commercial product. Despite of not being included in the initial scope of the IE, Encore aims to get a **Sigfox certification (readiness to market)**.

In order to reduce production costs Encore foresees to launch a crowdfunding campaign through **KickStarter** with the objective to produce a batch of **at least 1,000 units**. To produce batches of this size will reduce to the half the manufacturing costs. If the KickStarter campaign fails Encore will look for other funding sources.

Packaging, a smartphone app and product documentation will be finished during this time. Encore objective is to succeed in the funding rise and start selling the product by the summer of 2017.

There are not manufacturing or logistic investments planned. These activities will be outsourced, the added value activities that Encore Lab will carried out will be a continuous development of the product and, on the other hand, marketing and sales to reach the global market.

The strategy of the company will be to go on developing added value products in the field of smart agriculture approaching different subsectors from the commercial point of view.

Currently Encore is also working in **GateOne Project**. Inside the same big initiative of EuroCPS (SmartAnythingEverywhere https://smartanythingeverywhere.eu). This experiment tries to test the performance of very innovative chemical sensors of NH+ and P for agriculture purpuses. The project does not imply funding resources to Encore Lab, however further commercial agreements could arise from this project. CEA and two additional SMES are also involved in the project.

Additionally, Encore Lab plans to develop the following innovative projects in the field of smart agriculture during the period 2017-2018:

- Development of new irrigation system based on nodes using LORA or Sigfox protocols to achieve high accuracy in smart agriculture.

- Development of a smart system to reduce the use of pesticides based of sensor field networks.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 98 of 103

Goto market strategy

One of the most important features of Cnode is that it will be able to be sold through the Internet. That allows Encore Lab to reach the global market immediately. Sigfox connectivity deployment and the translation to other languages of Cesens Cloud will be the main limitations for this.

At the moment Encore Lab through its brand Cesens® www.cesens.com is very present in the wine sector in Spain with very important clients such as Pernod Ricard, Bodegas Ontañon, Bodegas Franco Españolas o Bodegas Ramón Bilbao. Our aim is to grow geographically in this sector (2017-2018 France and Portugal) and also to other crops (eg: fruits) where Encore Lab technologies have already some pilots experiences.

Small farmers, individual agronomist will be approach to marketing activities, advertisement in sector websites, linkedIn, etc. In these cases the sales channel will be our website.

Big and/or strategic clients will be approached directly with tailor made proposals and projects.

Impact of EuroCPS

EuroCPS Funding Rate is very good and difficult to obtain in regional or national programs at least in Spain.

Budget distribution, in our opinion a higher percentage of the total should be given at the beginning of the project. At least a 35%.

Administrative effort. We cannot asset that until the project is closed. So far, the administrative effort is what it is expected in a public grant procedure.

Platform SMT32-L0 works really good. We are thinking about changing other product from our portfolio to this technology.

Cowork platform partner: ST. The collaboration has been inexistent. We queried a couple of questions but we did not receive any solution. This did not stop the IE since the platform documentation is large and we could solve technical problem by ourselves.

Cowork competence partner: CEA. The collaboration has been excellent. All our queries were solved, CEA helped us with the design process and administrative issues. Also with the dissemination of the results. New opportunities have arisen from this collaboration: Gateone project, foxy transceivers testing, integration of Encore product in Sensinect platform.

Improvement potential: From our point of view the experiment should include a second phase for demonstration and market introduction. In this second phase marketing products, dissemination and pilot facilities would be supported.

How can help EuroCPS for further progress of Industrial experiment

Any help is always welcome in SMEs. From our point of view reviewing and supporting to deploy the business plan of the product will be very useful.

Additional financial support for dissemination, pilot projects in different countries or sectors or for the production of medium size batches will be really useful to speed up market introduction.

Dissemination level: restricted within EuroCPS (CO)

THIS DOCUMENT IS CONFIDENTIAL, AND WAS PRODUCED UNDER THE EUROCPS PROJECT (EC CONTRACT: 644090).

Page 99 of 103

A15:

project acronym: WOA

SME: Terabee

networking partner: CEA

competence partner: CEA

platform provider: ST-I

WOA project integrates only the iNemo platform from STMicoelectronics

short project description:

To diversify Terabee activities, the Industrial Experiment (IE) planed in this proposal aims to develop and **evaluate the Terabee distance sensors in the domain of wearable appliances**. Thanks to their very low power consumption and reduced size, it is feasible to integrate the sensors in a large variety of wearable outfits such as helmet, jacket, etc. The purpose of such integration is to assist the user in the task of detecting and avoiding obstacles in constrained environments where human vision is not enough. For instance, rescue workers, such as fire-fighters, who might be working in dark conditions or in buildings filled with smoke, cannot see their close environment. The walls or potentials obstacles which can occur at any time will be detected and warned by sensory helmet. Moreover, for the fire-fighter safety, this integration could help to guide them through unfamiliar environments. Target application domains also include construction sites, people rescue, etc.

A very effective theoretical framework for object detection and avoidance is the so-called Occupancy Grid (OG) scheme. It allows to model the output of multiple sensors as a probabilistic distribution over the space and it is very effective to support multi-sensor fusion*]*

project start: March 2016

project end: December 2016

	2016	2017	2018	2019	2020
revenue based on IE	0€	50K€	100k€	300k€	500k€
employment based on IE	1	0	0	0	0

Market context:

Market environment evolves quickly by a faster adoption of essential technologies for autonomous systems. Market like consumer drones, either personal or consumers or industrial robots and autonomous (or pseudo autonomous vehicules are also adopting multiple sensing solutions.

describe

2010-2021 Sensors for Drones & Robots revenue forecast (in $M) by sensor type

	Implem entation	2010	2011	2012	2013	2014	2015e	2016e	2017e	2018e	2019e	2020e	2021e	CAGR 2015-2021
■ Environment		0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,3	28%
■ Microwave		8	8	8	9	10	10	11	12	12	13	15	16	8%
■ Touch		0	2	2	3	3	3	3	4	4	5	5	6	9%
■ Position		26	32	34	38	47	52	57	63	69	76	85	95	11%
■ Optical		157	173	189	207	229	256	286	318	357	404	459	526	13%
■ Acoustic		16	19	20	24	28	33	38	44	50	57	64	73	14%

2012-2020 Automotive imaging system revenue forecast (in $M) by applications

	2012	2013	2014	2015	2016e	2017e	2018e	2019e	2020e	2021e	CAGR
■ Gesture recognition	0	0	0	0	0	1	1	1	2	2	43,7%
■ Driver monitoring	0	1	4	11	21	35	49	64	81	99	43,7%
■ Lidar	-	-	-	-	-	-	15	27	68	120	0,0%
■ Night vision	-	46	56	61	48	56	60	62	65	67	1,6%
■ Forward ADAS	81	198	426	876	1 486	2 140	2 649	3 089	3 422	3 737	27,3%
■ Side mirror replacement	-	-	-	-	-	11	23	41	59	88	66,9%
■ 360° suround	35	92	213	470	814	1 204	1 510	1 790	2 050	2 272	30,0%
■ Backup	84	166	286	470	673	824	854	838	794	727	7,6%
■ Dash camera	33	62	103	164	229	272	275	262	241	215	4,6%

Key customers are

Car manufacturers (all) and ODM (ala Bosch, Conti; Marelli;;;;) for autonomous vehicle market ; Drone companies like Parrot or DJI or Amazon and finally industrial companies (like Rockwell, Staubly, Datalogic

….

Key competitors for equivalent technologies.

Pmd Technologies; STMicroelectronics, Infineon Technologies; Heptagon microoptics (recently acquired by AMS)

updated business plan:

	2015	2016	2017	2018	2019	2020
revenue based on IE	-	0	50k€	100k€	300k€	500k€
employment based on IE	-	1	0	0	0	0
total company revenue		600k€	1500k€	3000k€	4000k€	5500K€
total employment	5	20	25	28	30	32

From prototype to product

- Euro CPS project has allowed Terabee to develop a very cheap and highly performant Hub solutions by combining Terabee Teraranger modules with industry standard Inertial Motion Unit (IMU) . From now Terabe will develop an updated HW+SW solution which will take into account all hints coming from the project, and then market the solution to its customers and will set up the manufacturing supply and manufacturing chain to serve its markets.
    o Investments in production facilities: Terabee targets a fabless type of business model subcontracting most of its production; There is no plan today to invest into a manufacturing facilities – The very first volumes will continue to manually manufacture and move quickly to low cost manufacturing specialized companies

    o Investment in production / test equipment/ Even if it does not target in house volume production Terabee has to be equipped with some test equipment capabilities to validate , industrialize and qualify its products. Test equipment investments will continue over the next year In addition Terabee might be addressing Automotive market a very demanding one in term of product quality and has to put in place the appropriate solutions to serve it.

    o Company strategy / founding: Terabee is experiencing a fast growth phase and has a good visibility of steady growth over the next years. Therefore Terabee will soon seek some major investments from the financial market

    o innovative work / features / research beside IE- work: EuroCPS project achievement is part of the making possible to create low cost localization and mapping solution (first is a known environment) Terabee will continue to improve its technology to have more reliable and precise solutions but also cheaper and more robust offer in all the application fields it is currently involved

    o what happens next after EuroCPS (follow up projects etc.) EuroCPS project has opened the route for low cost and reliable solutions for localization and mapping. More work is required on the algorithm and software side. Terabee intends to continue to work with its partner to further develop and enrich the technology on one side and will integrate inside its products the major components of IMU platform

o Generated IP (patents) & ownership:] EuroCPS project has not generated new patents but significantly increase Terabee ownership on low cost localization and mapping solutions. The future product developments combined with the continuous R&D effort should create the conditions to enrich the IP portofolio of Terabee in the coming years.

Goto market strategy

Once a product will be finalised and ready to market, Terabee will push this into its network of hundreds of customers, both actively (marketing emails, and request for re-sales/distribution) and passively (new products visibile on the website).

Impact of EuroCPS

-

o Founding rate fair: Fair founding fair – could be better if subcontractor rate could be larger (15% too low). SME don"t necessary masters all required technologies and having the possibility to increase the subcontractor rate will definitively help them in building innovative solutions
o Budget distribution [25% @ start,…., 5% @ IE closure] – Split along project duration is correct
o Administrative effort: Administrative effort is limited and should be kept at this level
o Founding project related to CPS / IoT: No specific comment
o platform (satisfaction with the PF, performance of PF, quality, development time…) good support from the platform provider. In addition the platform is very easy to use . Unfortunately the quality level of the output data from the platform was unusable.
o Cowork platform partner: Very limited interaction mainly because the easiness to use the platform and its not suitability for the final project
o Cowork competence partner. Very good exchange and contact
o general improvement potential –Process for project preparation and implementation is pretty lean which is very nice for SME; In case of success it should be nice if a mechanism was existing to ease the submission of   more rewardable project ala H2020 SME . Criteria could be difficult to define and monitor but such type of arrangement could boost susscessful companies/projects/technologies
o others:] The limit or 50K€ funding is pretty limited – may be morer rewardable to move the limit to 100k€

How can help EuroCPS for further progress of Industrial experiment

o technically Results are matching expectations, assuming that a final demo is provided
o business plan   Terabe Business projections will benefit from EuroCPS project outcomes
o others : Terabee could benefit of EuroCPS data base actors and would appreciate to be introduced to potential partners (technological or business) that are active in the same fields of applications to better leverage the works performed during the project and to promote Terabee overall technology platform and solutions.