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Project Acronym:

**SOCRADES**

Project Full Title:

**Service-Oriented Cross-layer infRAstructure for  
Distributed smart Embedded devices**

Proposal/Contract No: EU FP6 IST-5-034116 IP SOCRADES

# **Deliverable D10.1a**

## **SOCRADES Exploitation Plan**

### **(1<sup>st</sup> Release)**

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## Table of Contents:

<b>VERSION HISTORY:</b> .....	<b>2</b>
<b>1. INTRODUCTION</b> .....	<b>5</b>
<b>2. EXPLOITATION MANAGEMENT DESCRIPTION</b> .....	<b>6</b>
2.1. SOCRADES EXPLOITATION CHALLENGES AND TECHNOLOGICAL AREAS .....	6
2.2. EXPLOITATION PLANNING INSTRUMENTS .....	7
<b>3. INITIAL SURVEY FOR IDENTIFICATION OF EXPLOITATION PRIORITIES</b> .....	<b>9</b>
<b>4. CONSOLIDATED RESULTS OF INITIAL SURVEY</b> .....	<b>11</b>
4.1. QUESTION 1: WHAT ARE YOUR EXPECTATIONS REGARDING POTENTIAL OPPORTUNITIES BASED ON SOCRADES FEATURES AND TECHNOLOGIES?.....	11
4.1.1. <i>Results of Survey</i> .....	11
4.1.2. <i>Derived Priorities for Exploitation</i> .....	12
4.2. QUESTION 2: PLEASE RANK TOP 3 OF SOCRADES TECHNOLOGIES REGARDING YOUR EXPECTATIONS IN TERMS OF POTENTIAL IMPACT IN REVENUES (TURNOVER).....	12
4.2.1. <i>Results of Survey</i> .....	12
4.2.2. <i>Derived Priorities for Exploitation</i> .....	12
4.3. QUESTION 3: WHEN DO YOU THINK IT WILL BE READY TO BE WIDELY APPLIED IN YOUR INDUSTRY SECTORS WHERE YOUR COMPANY IS ACTIVE?.....	13
4.3.1. <i>Results of Survey</i> .....	13
4.3.2. <i>Derived Priorities for Exploitation</i> .....	13
4.4. QUESTION 4: WHAT WILL BE THE PERCENTAGE OF PRODUCTION LINES USING SIGNIFICANTLY SOCRADES TECHNOLOGIES IN YEAR 2015 AND 2020?.....	13
4.4.1. <i>Results of Survey</i> .....	13
4.4.2. <i>Derived Priorities for Exploitation</i> .....	14
4.5. QUESTION 5: WHAT TYPE OF PRODUCTS BEING SOCRADES TECHNOLOGY ENABLED IN YOUR PRODUCT PORTFOLIO DO YOU EXPECT TO BE INTRODUCED TO YOUR MARKET?.....	14
4.5.1. <i>Results of Survey</i> .....	14
4.5.2. <i>Derived Priorities for Exploitation</i> .....	15
4.6. QUESTION 6: WHAT IS THE SPECIFIC IMPORTANCE OF SOCRADES TECHNOLOGIES AT ENTERPRISE-LEVEL APPLICATION PLATFORMS? .....	15
4.6.1. <i>Results of Survey</i> .....	15
4.6.2. <i>Derived Priorities for Exploitation</i> .....	15
4.7. QUESTION 7: WHAT IS THE SPECIFIC IMPORTANCE OF SOCRADES TECHNOLOGIES AT ENTERPRISE-LEVEL MIDDLEWARE LEVEL? .....	15
4.7.1. <i>Results of Survey</i> .....	15
4.7.2. <i>Derived Priorities for Exploitation</i> .....	15
4.8. QUESTION 8: WHAT IS THE SPECIFIC IMPORTANCE OF SOCRADES TECHNOLOGIES AT DEVICE-LEVEL APPLICATION PLATFORMS LEVEL? .....	16
4.8.1. <i>Results of Survey</i> .....	16
4.8.2. <i>Derived Priorities for Exploitation</i> .....	16
4.9. QUESTION 9: WHAT IS THE SPECIFIC IMPORTANCE OF SOCRADES TECHNOLOGIES AT DEVICE-LEVEL MIDDLEWARE LEVEL? .....	16
4.9.1. <i>Results of Survey</i> .....	16
4.9.2. <i>Derived Priorities for Exploitation</i> .....	16
4.10. QUESTION 10: WHAT IS THE SPECIFIC IMPORTANCE OF SOCRADES TECHNOLOGIES AT DEVICE-CENTRIC INFRASTRUCTURE LEVEL?.....	16
4.10.1. <i>Results of Survey</i> .....	16
4.10.2. <i>Derived Priorities for Exploitation</i> .....	17
<b>5. EXPLOITATION PLAN</b> .....	<b>18</b>
5.1. IDENTIFIED PRIORITIES OF EXPLOITATION .....	18
5.2. SCHEDULE PLANNING FOR EXPLOITATION PHASES.....	19
5.3. OVERVIEW OF EXPLOITATION ACTIVITIES OF PARTNERS.....	20
<b>6. CONCLUSION</b> .....	<b>23</b>

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<b>REFERENCES .....</b>	<b>23</b>
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### **List of Figures:**

Figure 1: SOCRADES industrial component providers .....	6
Figure 2: Service-centric infrastructure levels.....	7
Figure 3: Application of SOCRADES technologies (mid- and long-term).....	13
Figure 4: Long-term expectations of usage .....	14
Figure 5: Schedule of SOCRADES exploitation activities .....	19

### **List of Tables:**

Table 1: List of expected priorities of SOCRADES technologies.....	11
Table 2: Expectation of SOCRADES-enabled products.....	14
Table 3: Importance of SOCRADES technologies at enterprise-level application platforms .....	15
Table 4: Importance of SOCRADES technologies at enterprise-middleware level .....	15
Table 5: Importance of SOCRADES technologies at device-level application platforms .....	16
Table 6: Importance of SOCRADES technologies at device-level middleware level .....	16
Table 7: Importance of SOCRADES technologies at device-centric infrastructure level .....	16

## 1. INTRODUCTION

Considering the technological and scientific SOCRADES vision of creating “a service-oriented ecosystem where intelligent networked systems are composed of wired/wireless smart embedded devices that interact with the physical environment and with the enterprise environment pursuing well-defined system goals” [1], the aim of this first initial release of the exploitation plan document is to determine and propose the most appropriate recommendations for commercialization, to describe the general exploitation management, the potential post-project activities according to the exploitation priorities derived from an initial survey of partners and the guidelines defined in the SOCRADES project proposal as well as to define finally a base for future business plan for SOCRADES considering the priorities and technological areas of the project.

As part of the SOCRADES exploitation strategy the business plan will have to consider on the value creation to exploit business opportunities and value appropriation to define the specific ways how to attract customer’s attention while enabling revenue generation throughout the complete value chain.

It will provide a framework and guidelines to determine an exploitation strategy for the different research results in terms of technologies, products, knowledge, software etc. and which route of commercialization is the most promising (e.g. licensing potential models) to make the best use of the results of the project by placing the different stakeholders in a position to fully exploit the investment in the project.

For this reason three different activities in the area of exploitation (planning, standardization and roadmapping) have been combined and integrated in a single work package (WP10) resulting into 3 deliverables. Beside this first release of exploitation plan a deliverable D10.2 will specify the path of industrial standardization for SOCRADES and deliverable D10.4 that will focus on the roadmapping for adaptation of SOCRADES technologies will provided after the first 12 month of the project.

The stakeholders of the project are:

- Project partners of SOCRADES
- International industrial community and the market (the consumers) to which the task 10.2 and task 10.3 are addressed. The industrial community will take benefit from the standardization activity that will be initiated by the project.
- Customers who are part of the value-chain of the automation industry.

The exploitation activities within SOCRADES will be driven mainly by its industrial partners who will exploit the developed hardware / middleware /software in their devices / applications.

## 2. EXPLOITATION MANAGEMENT DESCRIPTION

This chapter describes the management of the definition, monitoring and animate the SOCRADES exploitation plan. Following items are defined to provide a framework for the exploitation management within the project:

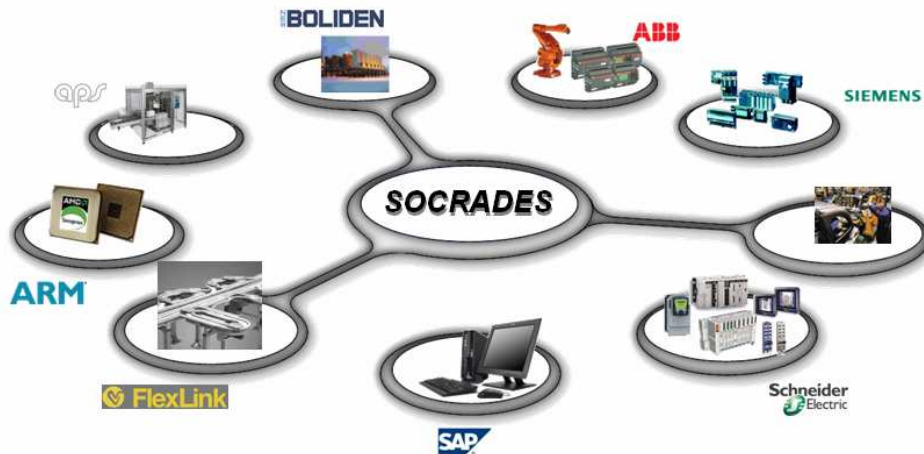
- Challenges of SOCRADES exploitation
- Technological areas to be exploit (priorities of exploitation actions)
- Exploitation planning instruments
- Process of definition of a exploitation strategy
- Management of project activities (project internal and external)
- Identification of exploitation priorities

Between all partners three basic “exploitation mantras” have been shared:

- Consortia will explore and develop new (today unknown) technologies to be promoted in future.
- Consortia have to meet expectations from European Commission in terms of future business with project results.
- Exploitation for SOCRADES means competition shares competitiveness.

### 2.1. SOCRADES Exploitation Challenges and Technological Areas

Due to the constitution of the SOCRADES consortia with its outstanding constellation of all major European ICT players in the industrial value chain and the high-level scientific expertise of the academic and scientific institutions across Europe, a wide range of commercialisation potentials of SOCRADES project results is feasible.



**Figure 1: SOCRADES industrial component providers**

Basically during the definition the most appropriate exploitation strategy the potential and most promising individual exploitation activities have to be identified while considering the partly competitive nature of market access of some SOCRADES partners.

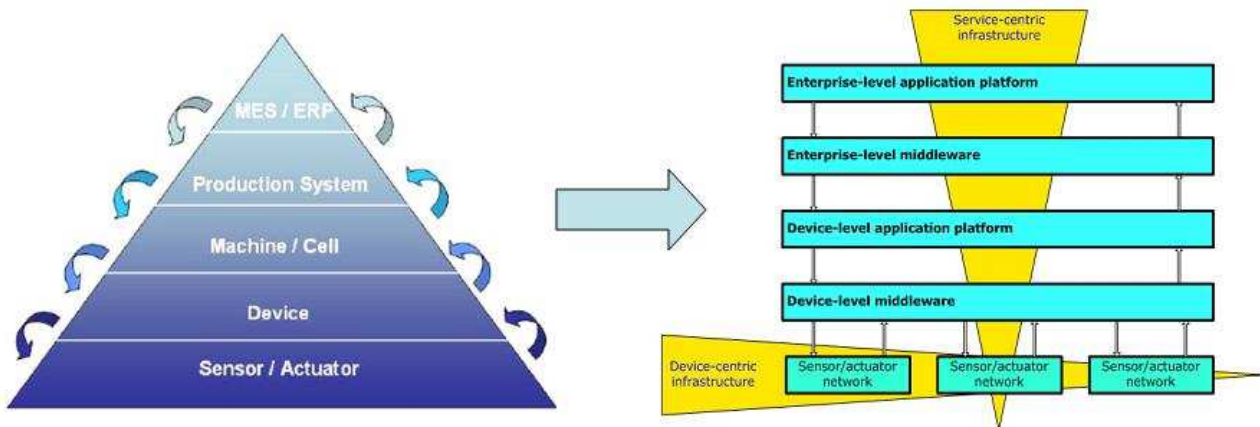
Therefore the dedicated work package (WP10) has been setup up to manage these challenges consistently.

In general different potential post-project exploitation activities can be foreseen and will be defined during the project duration. Examples of such commercialization are:

- Identification of potential cooperation between companies
- Patents and licensing models
- Potential joint venture or spin-offs
- Coordination of individual exploitation activities (industrial events, fairs etc.)

In order to prepare the SOCRADES exploitation plan, the strategy will be based on the given technological exploitation areas, in particular their impact to the desired service-centric approach of SOCRADES (refer to figure 2), combined with the exploitation priorities that are identified in an initial survey [2], described in this document.

To generate high level of synergy in principle exploitation activities should be defined and coordinated where the partners are strong and where they have most interest. A regular monitoring of market trends and priorities (refer to chapter 2.2) will allow identifying and managing these.



**Figure 2: Service-centric infrastructure levels**

The major technological areas as defined by [1] are:

- Wireless sensors and actuator networking infrastructure
- Service-centric Infrastructure
- Ad-hoc networking services platform
- System engineering and management

They will event used in the other task to generate a consistent exploitation of results.

## 2.2. Exploitation Planning Instruments

To justify individual activities in the different SOCRADES technology areas as well as generating a good consistency to the project goals both project-internal and external activities are planned.

**Project-internal** exploitation planning activities:

- Regular survey of SOCRADES partners (yearly)

On yearly base the existing exploitation priorities will be monitored by a survey. The results of such survey will be analyzed, consolidated and distributed to all partners and can be used individually to adapt and justify the planned exploitation activities. Secondly it will provide an overview of potential areas of new activities as well as to identify gaps in the exploitation strategy. An initial survey has been done already to prepare the initial exploitation plan and its priorities (refer to chapter 3.2).

- Standardisation (task 10.2)

Activities planned in the area of standardisation such as definition of proposals for PAS (Publicly Available Standard) and planned work with or within standardization bodies like IEC will be synchronized in this dedicated task.

- Roadmapping (task 10.4)



The SOCRADES roadmap will be composed by 3 major phases: preliminary information as sort of prerequisite for the roadmap definition, roadmap definition and follow-up activities phase (refer to deliverable D10.4a).

Based on the definition of expected technological features, gaps between the current and future expected technological features have to be identified at long-term view. This will lead to specific trajectories how to fulfil these gaps.

Follow-up activities will be reviewed and validated by the consortia.

- Regular reviews during project management (PPC) and work package meetings

Since exploitation management activities are covered in work package 10 it is part of the periodic project review meetings. It will allow presenting and sharing the actual status of exploitation plan and activities, to solve potential issues and to agree on next steps in the area of exploitation on a regular base.

In addition any changes or new proposals of exploitation activities will be shared and reviewed by work package meetings.

**Project external** exploitation planning activities:

- Creation of or Joining an Industrial Mirror Group dealing with the major technology areas and their industrial deployment

This will allow to synchronize and justify activities planned exploitation and to identify or develop new potentials of commercialization of SOCRADES project results. During the following project phase a proposal will be defined and shared with the partners.

- Gather market- and technology specific information from Marketing and Research Institutes

Since many external market- and/or technology-specific surveys are made, the resulting information can be used to define and adapt exploitation activities and to identify additional key success factors. Trends seen by the project group can be justified.

- Synchronization with new research project proposals and other research projects

In close cooperation with work package 9 (Dissemination) sharing and synchronizing exploitation plan for SOCRADES to assess and maximize the scope and create consistency between different exploitation activities of other research projects as well as to generate good level of differentiation too.



### 3. INITIAL SURVEY FOR IDENTIFICATION OF EXPLOITATION PRIORITIES

The purpose of the questionnaire described in this chapter is to identify and collect information from SOCRADES partners and experts in a first initial step. Targeted audience of this document includes senior managers and senior experts in marketing, sales and R&D of the industrial partners within the SOCRADES consortium mainly.

It will allow checking the individual priorities of partners and the consortia in terms of exploitation and dissemination as well as to define and determine dedicated and consistent planning for dissemination and exploitation activities in order to generalize SOCRADES results and to define roadmaps even towards other markets and industries. Expected results are focused on a first consolidation of roadmaps and activities, to summarize the initial expectations of partners and their customers, to develop a description of SOCRADES business and customer perspectives and to identify impacts in current supply chain positioning while acting as either SOCRADES technology supplier, integrator, end user or even wholesaler.

The major sections defined within this document:

- Priorities in the scope of SOCRADES seen by the individual partner
- Application of SOCRADES technologies
- Potential individual activities in the area of dissemination and exploitation
- Individual profile of company/person interviewed

The answers are qualified by following levels (depending on nature of question):

- between 0 (no importance), 1 (very low importance) and 5 (very high importance),
- by time soon, mid-term (3-5 years) or long-term (10 years and more)
- by individual rating entered manually
- by Yes/No or
- by ranking of most important topics

Questions 11-14 will be used to gather global information and will not be detailed used for a prioritization.

**Question 1:** What are your expectations regarding potential opportunities based on SOCRADES features and technologies? - Priority given by 0 (none) until 5 (very high)

- Smart embedded intelligence and sensing and actuating capabilities
- New methodologies, technologies and tools for the modelling, design, engineering and operation (e.g. production real-time scheduling) in the area manufacturing
- Smart embedded system with co-operation of smart embedded devices that interact seamlessly and intensively over a network (wired/wireless).
- Middleware based on Service-Oriented Architecture (SoA)
- Interoperability at the semantic level to guarantee openness
- System intelligence by a large population of small and networked embedded devices at a high level of granularity
- Adaptability and easy reconfiguration of systems to meet short-term business demands
- Manage a vastly increased number of intelligent devices and its associated complexity, have very flexible real-time embedded devices (wired/wireless) that are fault-tolerant, reconfigurable, safe and secure.
- Individual Potential and their Priorities

**Question 2:** Please rank top 3 of SOCRADES technologies regarding your expectations in terms of potential impact in revenues (turnover). - Priority is given by ranking

- Smart embedded Intelligence
- New methodologies in manufacturing
- Seamless Networking of intelligent devices

- Middleware based on SoA
- Interoperability and Openness
- System intelligence by small and networked embedded devices
- Adaptation / Reconfiguration features
- Wireless
- Others
- Manage distributed intelligent devices

**Question 3:** When do you think it will be ready to be widely applied in your industry sectors where your company is active? - Selection by time frame (soon, 3-5 years and more than 10 years)

- Ad-hoc networking services platform
- Wireless sensor/actuator networking infrastructure
- Service-centric infrastructure
- System engineering & management

**Question 4:** What will be the percentage of production lines using significantly SOCRADES technologies in year 2015 and 2020? - Ranking to be entered by individual numbers for each item

- Ad-hoc networking services platform
- Wireless sensor/actuator networking infrastructure
- Service-centric infrastructure
- System engineering & management

**Question 5:** What type of products being SOCRADES technology enabled in your product portfolio do you expect to be introduced to your market? - Priority given by 0 (none) until 5 (very high)

- MES / ERP software
- Machinery / assembly lines / production systems (incl. hard-and software)
- Communication infrastructure devices (incl. gateways)
- PLC and intelligent devices (incl. hard- and software)
- Data acquisition and visualization (incl. hard- and software)
- Sensors and Actuators (incl. hard- and software)

**Q6 – Q10:** What is the specific importance of SOCRADES technologies according to different information levels? - Priority given by 0 (none) until 5 (very high)

- Ad-hoc networking services platform
- Wireless sensor/actuator networking infrastructure
- Service-centric infrastructure
- System engineering & management

**Q6:** Enterprise level

**Q7:** Middleware level

**Q8:** Device-level application platform level

**Q9:** Device-level middleware level

**Q10:** Device-level-Infrastructure level

**Question 11:** Please specify potential activities you or your company would propose in the area of dissemination and exploitation – Individual text to be entered

**Question 12:** Company/individual profile of person interviewed

- Your main type of function/work
- Scope of your position within your company
- Company is categorised (NACE codes) by

- Turnover of your company Mio EUR
- Company is part of a group
- Number of employees
- Please estimate the number of employees with university degree (bachelor) or higher degree working in manufacturing/production
- What is your company's position within the supply-chain
- What is a typical delivery of the company

**Question 13:** I would like to receive further information about SOCRADES. – to be checked and email address to be entered






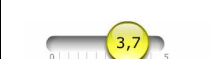


**Question 14:** I'm interested in an industrial mirror group for SOCRADES and its related technologies. – to be checked

## 4. CONSOLIDATED RESULTS OF INITIAL SURVEY

### 4.1. Question 1: What are your expectations regarding potential opportunities based on SOCRADES features and technologies?

#### 4.1.1. Results of Survey

The expectations of partners for the SOCRADES features and technologies as defined in the SOCRADES proposal are consolidated as following table shows.

SOCRADES features and technology area	Priority (average)
Smart embedded intelligence and sensing and actuating capabilities	
New methodologies, technologies and tools for the modelling, design, engineering and operation (e.g. production real-time scheduling) in the area manufacturing	
Smart embedded system with co-operation of smart embedded devices that interact seamlessly and intensively over a network (wired/wireless).	
Middleware based on Service-Oriented Architecture (SoA)	
Interoperability at the semantic level to guarantee openness	
System intelligence by a large population of small and networked embedded devices at a high level of granularity	
Adaptability and easy reconfiguration of systems to meet short-term business demands	
Manage a vastly increased number of intelligent devices and its associated complexity, have very flexible real-time embedded devices (wired/wireless) that are	

**Table 1: List of expected priorities of SOCRADES technologies**

#### **4.1.2. Derived Priorities for Exploitation**

All partners confirm the high or very high level of expectations therefore it should be common activity to promote these technologies focused on the individual priorities. Based on individual priorities gathered in this survey a review of actions within next year should be done to track the potential evolutions. All partners strongly consider SOCRADES technology as high-potential opportunity. Exploitation activities should consider following areas:

- Overview of SOCRADES technologies in general
- Promote features as customer benefits for using these technologies
- Validate the priorities by project-external survey
- Build network of partners who have most interest in the dedicated area of technology

#### **4.2. Question 2: Please rank top 3 of SOCRADES technologies regarding your expectations in terms of potential impact in revenues (turnover)**

##### **4.2.1. Results of Survey**

Based on the question on what are the top 3 priorities are seen by the partners results into following ranking:

1. Seamless Networking of intelligent devices
2. Adaptation / Reconfiguration features
3. Interoperability and Openness
4. Middleware based on Service-oriented Architectures
5. Smart embedded Intelligence
6. Wireless
7. Manage distributed intelligent devices
8. System intelligence by small and networked embedded devices
9. New methodologies in manufacturing

The specific ranking of the different topics is calculated in order to consider the times where the entry is mentioned either as first, second or third priority. The sum of the dedicated priority multiplied with a certain weight given to each level of priority (first = weight 3, second=weight 2 and third = weight 1) has led to this ranking.

##### **4.2.2. Derived Priorities for Exploitation**

Due to the initial character of the survey this first result in terms of ranking and priorities has to be confirmed and proven by project-external view in fact. A survey should be done in the next project phase. Once the ranking can be confirmed or is justified accordingly the exploitation planning and its schedule should reflect this ranking in order to satisfy most-required needs.

This implies the need for promotion of the SOCRADES results and its vision in the dedicated area, the creation of common industrial exploitation activities considering the individual partner priorities. The business plan to be proposed is strongly related to the potential of the commercialization of most-promising SOCRADES technologies as well it has to consider the (existing or not existing) acceptance on the markets for each of the topics mentioned.

**4.3. Question 3: When do you think it will be ready to be widely applied in your industry sectors where your company is active?**

**4.3.1. Results of Survey**

The expectations of SOCRADES partners are collected in this part to identify and derive the potential schedule priorities of actions among the application of SOCRADES technology areas. Figure 3 shows the consolidated result about this.



Figure 3: Application of SOCRADES technologies (mid- and long-term)

**4.3.2. Derived Priorities for Exploitation**

Since the resulting timeline with 2 major segments of application timing (less than 3-5 years and mid-term) is forcing a 2 step approach for exploitation. Nevertheless all partners consider that application of the technologies is seen in less the 10 years.

In terms of application of SOCRADES technologies the area of system engineering and management technologies are considered as first to be widely used. Secondly in a second step SoA-oriented infrastructure, wireless sensor/actuator and ad-hoc networking services exploitation activities may be planned since they're expected to be applied in mid-term range within 3-5 years or later. In particular activities to raise awareness about these mid-term SOCRADES features have to be defined in order to reduce resulting the time for application of the second step while creating a common understanding on the market.

This current view must be validated in the next project phase in fact.

**4.4. Question 4: What will be the percentage of production lines using significantly SOCRADES technologies in year 2015 and 2020?**

**4.4.1. Results of Survey**

There's a strong expectation to have a high level of usage of SOCRADES technologies. As figure 4 shows the level of usage within production systems until 2020 will be between 25% and 43% in average (individually views are expecting levels until 80%).

The usage is forecasted to rise between 2015 and 2020 in average by 63%.

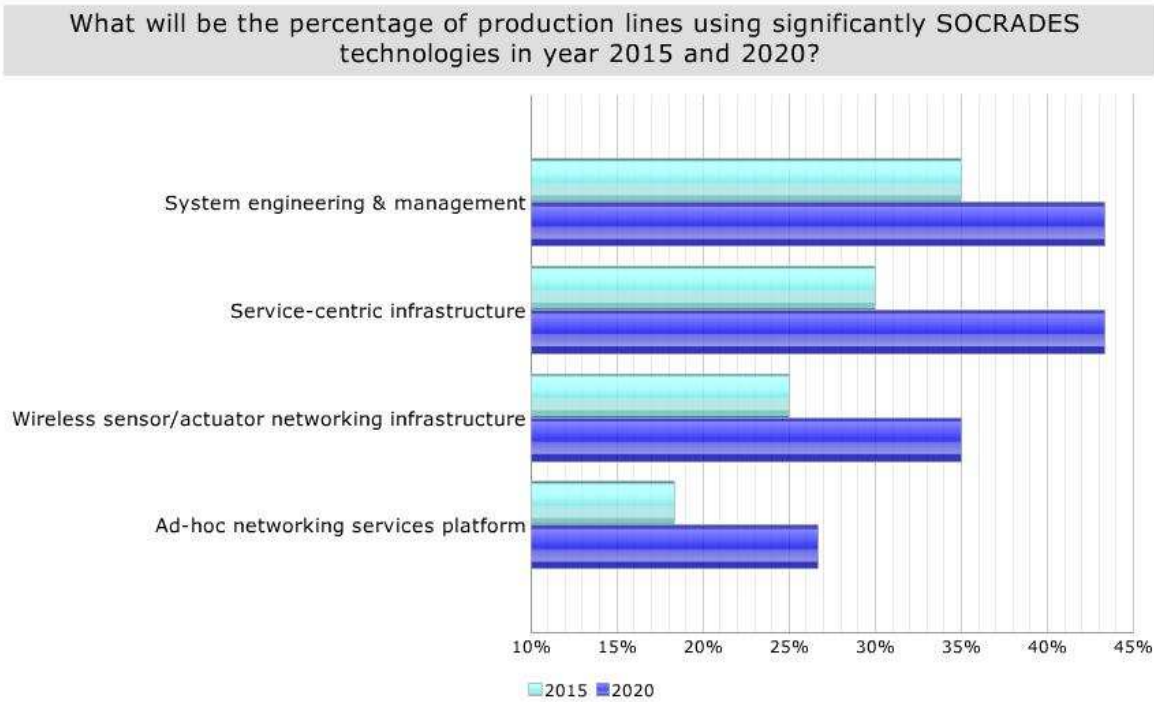


Figure 4: Long-term expectations of usage

#### 4.4.2. Derived Priorities for Exploitation

As the result of question 3 already implies the application of first system engineering and management technologies are seen as most likely until 2015. Even if all major technology areas are forecasted to increase strongly until 2015 the highest growth in terms of usage between 2015 and 2020 is expected by SoA-oriented infrastructures. Both system engineering and management and service-centric infrastructures are seen as mature technologies by 2020.

Since usage of wireless sensor/actuator networking infrastructure and ad-hoc networking services are considered as less growing until 2020 but R&D investments in both technologies are already significant today this result is strongly recommended to be validated in the upcoming project phase.

For planning the exploitation activities derived from this intermediate result and to enforce the usage of SOCRADES results within production environments the benefits for customers in particular in regard to the life cycle will have to be considered.

#### 4.5. Question 5: What type of products being SOCRADES technology enabled in your product portfolio do you expect to be introduced to your market?

##### 4.5.1. Results of Survey

	MES/ERP software	Machinery / assembly lines / production systems (incl. hard-and software)	Communication infrastructure devices (incl. gateways)	PLC and intelligent devices (incl. hard- and software)	Data acquisition and visualization (incl. hard- and software)	Sensors and Actuators (incl. hard- and software)
Min	0	0	0	0	3	0
Max	5	5	5	5	5	5
<b>Average</b>	<b>2,5</b>	<b>3</b>	<b>3,3</b>	<b>3,8</b>	<b>3,7</b>	<b>3,5</b>

Table 2: Expectation of SOCRADES-enabled products



#### 4.5.2. Derived Priorities for Exploitation

It can be assumed that there's a good level of consistency in terms of expecting a delivery of SOCRADES-enabled products. At all levels, from service-centric towards device-centric infrastructure, products are seen as feasible. This view will be validated during the next project phase to define a potential product roadmap covering the SOCRADES technologies. The variance between minimum and maximum level of expectations is demonstrating a different level of partner priorities (and capabilities) in the specific domain and will be considered in the planning of actions.

#### 4.6. Question 6: What is the specific importance of SOCRADES technologies at enterprise-level application platforms?

##### 4.6.1. Results of Survey

	Ad-hoc networking services platform	Wireless sensor/actuator networking infrastructure	Service-centric infrastructure	System engineering & management
Min	2	0	2	1
Max	4	4	5	5
<b>Average</b>	<b>3,1</b>	<b>2,1</b>	<b>4,1</b>	<b>3,6</b>

Table 3: Importance of SOCRADES technologies at enterprise-level application platforms

#### 4.6.2. Derived Priorities for Exploitation

Most important for exploitation seen in this domain are system engineering and management and the service-centric infrastructure. Dedicated activities should be planned in the next project phase to answer this view seen by the partners. In addition this prioritization will be validated in next project phase too.

#### 4.7. Question 7: What is the specific importance of SOCRADES technologies at enterprise-level middleware level?

##### 4.7.1. Results of Survey

	Ad-hoc networking services platform	Wireless sensor/actuator networking infrastructure	Service-centric infrastructure	System engineering & management
Min	1	0	2	1
Max	4	5	5	5
<b>Average</b>	<b>3,1</b>	<b>2,3</b>	<b>4,0</b>	<b>3,7</b>

Table 4: Importance of SOCRADES technologies at enterprise-middleware level

#### 4.7.2. Derived Priorities for Exploitation

As expected the importance of service-centric infrastructure and system-engineering & management is still high. Activities of exploitation will have focus on the most-important domains to elaborate the planning in terms of effective and synchronized exploitation.



#### 4.8. Question 8: What is the specific importance of SOCRADES technologies at device-level application platforms level?

##### 4.8.1. Results of Survey

	Ad-hoc networking services platform	Wireless sensor/actuator networking infrastructure	Service-centric infrastructure	System engineering & management
Min	0	0	0	0
Max	5	4	5	5
<b>Average</b>	<b>3,1</b>	<b>2,3</b>	<b>3,4</b>	<b>3,4</b>

Table 5: Importance of SOCRADES technologies at device-level application platforms

##### 4.8.2. Derived Priorities for Exploitation

Nearly all domains of SOCRADES technologies have a similar importance as seen by the partners. That leads to a wider scope of exploitation activities as in the previous level that will have to be validated by next project phase too.

#### 4.9. Question 9: What is the specific importance of SOCRADES technologies at device-level middleware level?

##### 4.9.1. Results of Survey

	Ad-hoc networking services platform	Wireless sensor/actuator networking infrastructure	Service-centric infrastructure	System engineering & management
Min	0	0	0	0
Max	5	5	5	5
<b>Average</b>	<b>2,7</b>	<b>3,1</b>	<b>3,1</b>	<b>3,0</b>

Table 6: Importance of SOCRADES technologies at device-level middleware level

##### 4.9.2. Derived Priorities for Exploitation

The importance of wireless sensor/actuator networking infrastructure is considered as increasing while system engineering and management as well as service-centric infrastructure are stable in their level of importance. In general all domains of technologies are seen at similar value. Therefore the planning of exploitation must be composed by actions related to all 4 domains.

#### 4.10. Question 10: What is the specific importance of SOCRADES technologies at device-centric infrastructure level?

##### 4.10.1. Results of Survey

	Ad-hoc networking services platform	Wireless sensor/actuator networking infrastructure	Service-centric infrastructure	System engineering & management
Min	0	0	0	0
Max	5	5	4	4
<b>Average</b>	<b>2,7</b>	<b>3,7</b>	<b>2,9</b>	<b>2,6</b>

Table 7: Importance of SOCRADES technologies at device-centric infrastructure level

#### ***4.10.2. Derived Priorities for Exploitation***

At the lowest level of infrastructure levels the basic importance is strongly related to the networking capabilities. Nevertheless the importance of service-centric infrastructure is still seen important while for system engineering is decreased.

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## 5. EXPLOITATION PLAN

### 5.1. Identified Priorities of Exploitation

Activities and priorities in the area of SOCRADES technologies as they have been identified in the previous sections this chapter will describe a consolidated view of the exploitation plan. All activities to be planned and synchronized are based on the individual feedback during the initial survey and individual planning of the partners (refer to next chapter 5.2). A project-external survey will be defined within next project phase to proof and validate the findings as well as a project-internal update to confirm the priorities or to justify them.

While the SOCRADES technology domains of system engineering and management and service-centric infrastructure are continuously mentioned as important (refer to previous chapter) at all levels while ad-hoc networking and wireless sensor/actuator networking services have more dedicated importance according to the specific integration levels.

The combination of priorities seen by partners, their expectations of business potentials, the general view on mid-term and long-term usage of SOCRADES technologies as well as the feasibility of having products adapted to SOCRADES lead to following stepwise exploitation approach, that will be precised and reviewed in the next period of the project.

As one preliminary conclusion regarding the definition of SOCRADES exploitation actions the usage of demonstrators that will be developed within the project can be considered as important and vital element in the overall exploitation and dissemination too. Therefore a “story board” to illustrate the link between customer benefits and the potential business opportunities based on the SOCRADES results will be developed.

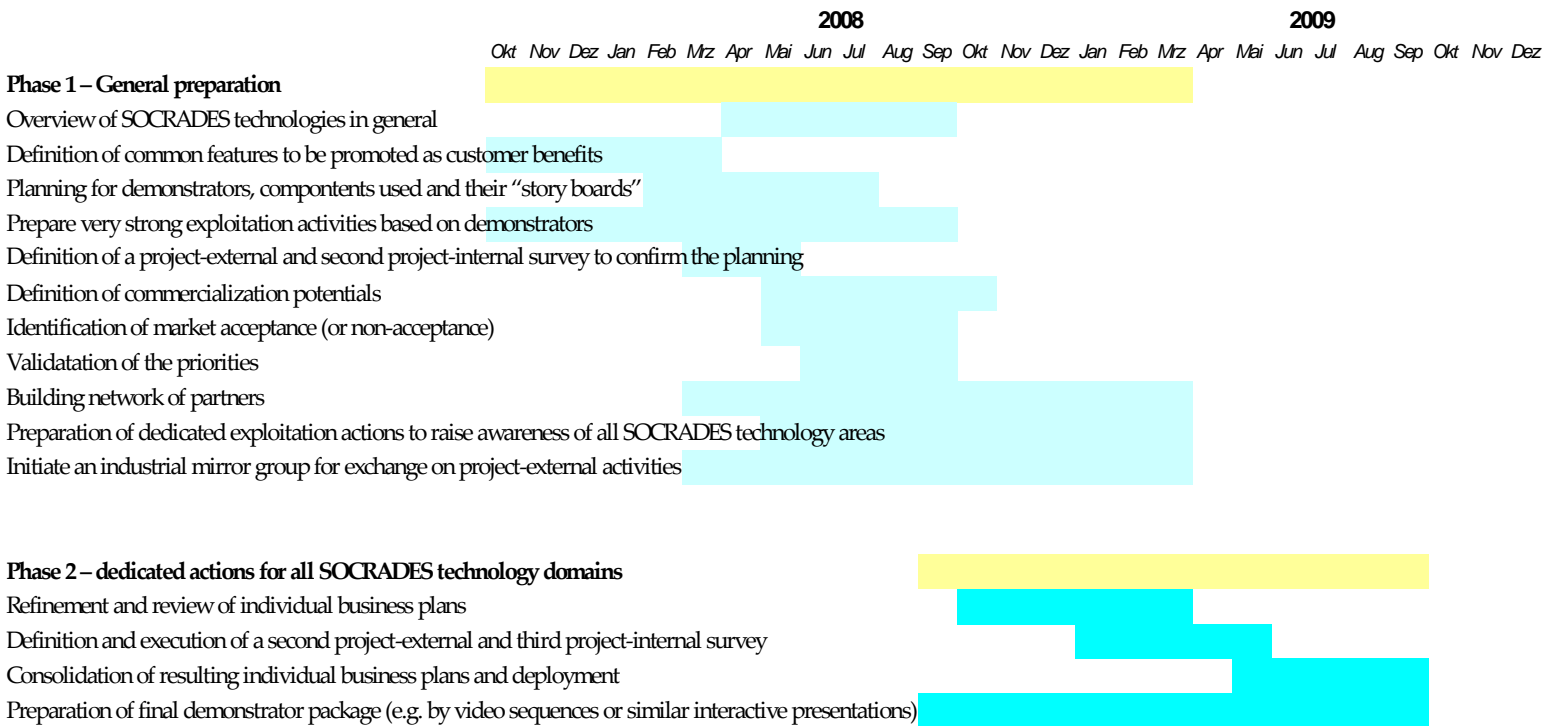
#### Phase 1 – General preparation

- Overview of SOCRADES technologies in general
- Definition of common features to be promoted as customer benefits
- Synchronize planning for demonstrators, components used and their “story boards”
- Prepare very strong exploitation activities based on demonstrators
- Definition of a project-external and second project-internal survey to confirm the planning
- Definition of commercialization potentials of most-promising SOCRADES technologies
- Identification of market acceptance (or non-acceptance)
- Validation of the priorities defined by this initial survey and, if necessary, their justification
- Building network of partners who have most interest, priorities and capabilities in the dedicated area of technology
- Preparation of dedicated exploitation actions to raise awareness of all SOCRADES technology areas
- Initiate an industrial mirror group for exchange on project-external activities

#### Phase 2 – dedicated actions for all SOCRADES technology domains

- Refinement and review of individual business plans
- Definition and execution of a second project-external and third project-internal survey
- Consolidation of resulting individual business plans and deployment
- Preparation of final demonstrator package (e.g. by video sequences or similar interactive presentations)

**5.2. Schedule Planning for Exploitation Phases**



**Figure 5: Schedule of SOCRADES exploitation activities**

### 5.3. Overview of Exploitation Activities of Partners

**ABB** plans to exploit the results of SOCRADES including:

- the creation of synergies with related RTD projects
- transferring relevant results to ABB business units for commercialisation, if successfully evaluated from a business and technology perspective
- the extension of technical and technological knowledge and know-how for follow-up research projects in the field of advanced process automation and wireless networking

**APS** plans to exploit the results SOCRADES with special focus on:

- the extension of technical and technological knowledge and know-how for follow-up research projects in the field of advanced manufacturing automation, collaborative control, embedded intelligence and wireless networking;
- the creation of synergies with related RTD projects;
- the transfer of SOCRADES technologies into industrial application;
- the training and education of mechatronics students;
- the set-up of a SOCRADES Trial Site for testing, feasibility studies, training, and demonstration.

Synergies with the Eureka RoboTOOL project may also be exploited to further support the SOCRADES dissemination effort.

While **ARM** is pervasive in embedded devices, SOCRADES offers new application domains for ARM: advanced manufacturing automation, embedded intelligence and ad-hoc networking. The intention is therefore to gather requirements and perform feasibility for a new generation of ARM systems, which can be developed to meet the criteria of these new application domains. If successful, it will enable ARM to penetrate new application domains and design novel intellectual property for these domains. It will contribute towards ARM's goal of being at the heart of the digital revolution and provide continued growth of the ARM architecture.

In its exploitation of the SOCRADES results, **Boliden** will particularly focus on:

- the creation of synergies with related projects at Boliden or in ProcessIT projects.
- propose transfer of SOCRADES technologies into new industrial products and services
- industries in the ProcessIT Innovations network.

Boliden will also take a lead for the project in the ProcessIT Innovations network and to disseminating the result and knowledge to other industries. In the ProcessIT Innovations centre, "Fault tolerant network embedded systems is a prioritised area. The process industries in ProcessIT are committed to support the centre financially in time and in other resources.

For this area, several industries are interested to contribute in requirements and scenario analysis and to follow and evaluate the results of the demonstration. Through the ProcessIT Innovations organisation, the following industries will participate in the work mentioned: LKAB (Mining), Smurfit Kappa (Pulp and Paper), SSAB (Swedish Steel), SCA (Pulp and Paper). Several supplying industries like ABB and IT-SMEs are also committed to ProcessIT. It is expected that results from SOCRADES will also strengthen regional SMEs in terms of new products and services for an international market. Boliden, also committed to ProcessIT, will take a leading role for the ProcessIT network as a full project partner, providing demonstrator facilities and support but also as the disseminator of the SOCRADES results to the industries in ProcessIT. The main part of this is already financed by the partners of ProcessIT Innovations.

**Flexlink** will validate project results to identify if it can be exploited to their Dynamic Assembly System (DAS) concept and adopted for key customers. Feedback from the market is key issue for the exploitation and how FlexLink can merchandise the innovations of the project results.

The ideas for exploitation activities of **ifak** as research and development institution comprise the following aspects:

- Publications with different topics,
- Reinforcement of research co-operations,
- Strengthen the integration of SOCRADES related topics into lectures,
- Establish research activities complementing the SOCRADES project results,
- Provide support regarding use of SOCRADES results.

The SOCRADES project is of major importance to **KTH**. It is planned to be continually used in other research projects and in education. Specifically, the results of SOCRADES will be disseminated through the European Network of Excellence HYCON and EURON as well as a number of national research projects on networked embedded control systems supported by the Swedish Research Council, the Swedish Strategic Research Foundation and the Swedish Agency for Innovation Systems. Many of the projects have strong industrial participation. SOCRADES will also be crucial for the undergraduate and graduate education, e.g., several PhD students will be involved in the SOCRADES research activities and a new undergraduate course has been developed closely related to the work in SOCRADES. These dissemination activities will be further explored.

**Loughborough University** will disseminate and exploit the results of the SOCRADES project via its research centres, i.e., feeding the results into new collaborative projects with industry. A major dissemination-related goal will be to highlight the potential of distributed embedded devices utilising SOCRADES technology to enable more efficient machine reconfigurability via a functionally modular, component-based approach to automation. Loughborough has a close working relationship with a wide range of automation vendors and users both in the UK and more widely across the rest of Europe. It will utilise these relationships to drive project exploitation. Other dissemination activities will include a well-targeted series of international publications and special conference sessions. The project results will additionally be used in lectures, seminars, and postgraduate research.

**LTU** plans to exploit the results SOCRADES with special focus on:

- the extension of technical and technological knowledge and know-how for follow-up research projects in the field of advanced measurement and control in process industry, collaborative control, embedded intelligence and wireless networking;
- the creation of synergies with related RTD projects;
- the transfer of SOCRADES technologies into industrial application mainly through the ProcessIT and EISLAB networks;
- the training and education of students at LTU.

**Politecnico di Milano**, being the leading Technical University in Italy has a strong relationship with the economical and industrial sectors of the country economy. The link with the industry is high with a fruitful and reciprocal exchange of knowledge and competence. SOCRADES results will therefore contribute to this asset. In particular:

- Update of the courses both at undergraduate and graduate level
- Ad-hoc seminar for industry
- Publication of the SOCRADES result in the economical and technical Italian journals and newspapers
- Special dissemination activities for the SMEs.

Being leader of WP9, **POLIMI** will also manage the entire dissemination plan. SOCRADES will particularly benefit from the international exposure of **POLIMI** in the major academic association such as **IFAC** and **IFIP**, and industrial such as **IMS**.

**SAP** expects to draw benefits from SOCRADES outcomes with regard to the integration of Smart technologies in **SAP's** new service oriented application framework and thus ensure a long-term exploitation of project results beyond the project duration. One of the aims of the SOCRADES project is to greatly

facilitate the integration of device-level networks with higher-level business process management systems. Therefore, SAP think there is an interesting opportunity to test the waters of such integration capabilities using SAP's application platform called SAP NetWeaver. SAP propose to pursue two thematic directions for exploiting the SOCRADES results:

- integration with business applications within identified scenarios (yet to be refined);
- linking SOCRADES to our current Smart Items related research activities.

**Schneider Electric** plans to exploit the results of SOCRADES including:

- The creation of synergies with related RTD projects
- Evaluation of relevant results for a potential commercialisation
- Transfer of results into the Schneider Electric offer portfolio
- The extension of technical and technological knowledge and know-how for follow-up research projects in the field of (Web-) service-oriented architectures and collaborative automation systems.

For dissemination purposes, **Siemens** mainly will make use of the main automation fairs in Europe as there are Hannover Messe Industrie and SPS/IPC/DRIVES. As already mentioned, the wireless sensor/actuator topic is still in its early infancy so that Siemens regards SOCRADES as a pre-development project which does not necessarily result in exploitation in final products, but serves as a technology platform which serves as basis for later concrete product developments. So, especially the infrastructure/architecture, which will be a result of WP2 and WP 3, will be a fundamental issue to build on for Siemens. Also interfaces as well to the wired world as to the single sensor should be defined within SOCRADES. As wireless technology is on its way down from the control level to the field level and finally might widely replace wired communication in industrial automation, SOCRADES might become a basic building block in Siemens' corresponding strategy.

**TUT** will disseminate the knowledge generated in methodologies and technologies within the SOCRADES project through scientific publications in international refereed journals (e.g. IEEE Transactions on Industrial Informatics, Prof. Lastra is Associate Editor) and international technical conferences (e.g. IEEE International Conference on Industrial Informatics, Prof. Lastra is Technical Co-chair). TUT will also use the results of SOCRADES to provide input to the IEEE Technical Committee on Industrial Agents (Prof. Lastra is chair of the Architecture track). The work done on SOCRADES will also be leveraged to produce Doctoral and M.Sc. theses.

**Jaguar** plans to evaluate and disseminate the benefits of an open control solution, which SOCRADES enables, e.g., plug-and-play connectivity and interoperability. Jaguar anticipate the utilisation of SOCRADES in prototype form on automation systems for engine assembly applications, with the potential for mainstream adoption of such technology in the longer term, in collaboration with vendors such as Schneider Electric, Siemens and ABB. Jaguar will actively disseminate the potential of the approach to its supply chain partners (machine builders and component and controls vendors) in the automotive sector.



## 6. CONCLUSION

Thanks to the first project-internal survey a first consolidation of the individual exploitation priorities and potential exploitation actions have been made. The result shows the strong commitment and motivation of all SOCRADES partners as well as their dedicated expectations.

This first release of exploitation plan confirms that the good level of exploitation capabilities and defines a stepwise exploitation approach among the project duration and beyond. Since all partners providing even complementary capabilities and potentials a brought area can be covered depending on the dedicated priorities of the technology domain, the availability of products and the acceptance of the customers that will have to be generated and satisfied by the SOCRADES consortia.

## References

- [1] IST-5-034116 SOCRADES Annex I: Description of Work
- [2] SOCRADES 1<sup>st</sup> Exploitation Plan Annex A: Initial Questionnaire Forms