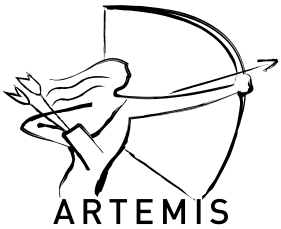
ARTEMIS Industry Association

WORKING GROUP

Metrics and success criteria for ARTEMIS



METRICS & SUCCESS CRITERIA FOR ARTEMIS

A BOTTOM-UP STUDY ON SUCCESS CRITERIA OF ARTEMIS PROJECTS

REPORT OF RESULTS

FROM THE 2013 QUESTIONNAIRE

MARCH 2013

Editors :

Patrick Pype

OPENING WORDS

ARTEMIS JU has provided the framework for the biggest R&D programs on software-based systems in Europe during recent years, stimulating significant new developments in nearly all domains relevant to societal life. Tens of millions of euros' worth of effort has been invested by partners from national R&D budgets, from European sources, and especially from industry and its partners in the research community. This concerted effort is aiming at clear progress in the domains considered to be critical for the competitiveness of European industry and for society as a whole. In 2010 ARTEMIS-IA decided to monitor its progress via dedicated Working Groups, also providing the foundation for continuous improvements. Despite all the difficulties in measuring the success of R&D projects in progress, the working group created a solid base for measurement of the achievements. Thanks to the dedicated engagement of many volunteers, many individuals and institutions affected by the ARTEMIS projects, their feedback and impressions provide a representative overview of the success achieved and prospects for improvement for the road ahead…

We would like to thank the Working Group for all their efforts and hope that you as reader of the report get a good impression of what was achieved.

Heinrich Daembkes and Jan Lohstroh
President and Secretary General
on behalf of the entire ARTEMIS Industry Association

INTRODUCTION

The Working Group (WG) 'Metrics and Success Criteria for ARTEMIS' was created in 2010 to define and monitor the achievements of the ARTEMIS JU Programme from a bottom-up perspective, more in particular to generate data on perceived project outcomes directly from the organisations involved in these projects. The goal is then to turn this operational data into a programme-level strategic component such that one can see how project results lead to a more competitive European Embedded Systems Industry.

In 2010 the first questionnaire was sent to a limited number of consortia only for two reasons :

> It could only be sent to projects of Call-1, which were two year into their term at the time of the questionnaire
> It was considered a test-case to improve the questionnaire and its relevance for a subsequent round of questions.

In 2012 we launched a second round of questions, broadened the scope and reduced the number of open questions in order to make it easier to fill out the questions and to have more relevant data available.

We can consider this second round a true success, as you will see in this report. The goal to measure the success of the ARTEMIS programme and to define steps on how to further improve and prioritise the programme can be considered achieved.

Patrick Pype,
Chairman WG Metrics

TABLE OF CONTENTS

METHODOLOGY

Whereas the 2010 questionnaire was sent to 7 project consortia and we had answers from 34 organisations, we have now sent it to more than 800 partners active in the ARTEMIS programme in call 1 and call 2 (so as to include the finalised projects or those more than two years into their term) and we have received answers from more than 150 partners.

The spanned 7 August till 5 September 2012 (one month).

We again focused on the three main sub-themes of the ARTEMIS programme :
> Theme 1 : Focusing on common R&D agendas more effectively
> Theme 2 : Providing significant economic and social benefits
> Theme 3 : Successful results in the market

In total we asked 50 questions : 44 multiple-choice and 6 open questions in order to have additional qualitative clarifications to other questions. This was done on the explicit request of the partners participating in 2010 questionnaire, in order to make it easier to fill out the questionnaire. This solved the limitations of the first questionnaire as documented in the previous report.
In addition, the advantage is that we now have answers from partners themselves whereas in the previous questionnaire we sometimes had answers from a consortium as a whole, the coordinator only or individual partners in a specific project. This made it more difficult to interpret certain data.

So we hope that this report provides an interesting read and if you have any questions related to it, please contact the office of the ARTEMIS Industry Association : info@artemis-ia.eu.

EXECUTIVE SUMMARY

This report is the second such report. In 2010 a first questionnaire was sent around to a limited number of participants in the ARTEMIS programme. In 2012 we had a much wider number of ARTEMIS participants to tap. We sent the questionnaire around to slightly more than 800 participants and received feedback from more than 150 participants.

The report is again divided into three sections, covering the following themes :

1 Focusing on common R&D agendas more efficiently
2 Providing significant economic & social benefits
3 Successful results in the market

The main results from the questionnaire on these themes are the following :

1 Collaboration within ARTEMIS remains very successful and has grown drastically compared to 2010. The creation of new partnerships has almost doubled. Also SME involvement has grown. The partnerships are mainly based on technology. The concept of CoIE has become much more known within the ARTEMIS community and has become an active instrument for success. However, it will be important that CoIEs continue along that path and ensure that there is an impact on the future Strategic Research Agenda. Alignment with other programmes is mainly with regional/national programmes, other ARTEMIS projects and FP7. The fact that ARTEMIS-IA is putting a specific requirement in the proposal evaluation criteria that gives added value to cooperation with other ARTEMIS projects is probably a factor that is helping in this. In the last calls this aspect is very well covered. ARTEMIS is growing and becoming a reference in Embedded Systems research and innovation in Europe. Alignment with ITEA has increased at steering board level, but has decreased at the operational level. The main motivator to work in ARTEMIS remains the industry-driven approach, including the scale and size of investment and impact. The possibility to work together within existing networks is a new element that has emerged. The impact on the R&D agenda is mainly on having increased knowledge and experience thanks to participating in ARTEMIS projects. The combination of scientific and industrial views is considered a key strength. An item deserving of attention remains the administrative complexity and alignment. Many stakeholders request concentration (“uniformity”) of all management within the JU office as this remove discrimination and efficiency gaps in administration entailed by different administrative procedures in different Member States. An important element is also the uncertainty about the availability of funding for all partners that has become a new key issue compared to 2010. Originally considered as teething troubles, this issue has not improved in recent calls and needs to be tackled.

2 ARTEMIS addresses a wide range of technology and application markets. From an application point of view, the automotive market is the biggest that is addessed. The impact on 20% to 40% market occurs mainly in a three to five-year period after the end of the project. This business impact largely concerns reduced development costs, reduced time-to-market and higher re-usability. All ARTEMIS AWP targets are addressed and the results are similar between 2010 and 2012, although target 4 has lost some attractiveness. Acquisition of know-how is mainly effected through in-house development, and has grown considerably from 2010 to 2012. In terms of societal challenges, the main

impact is on "security and safety" which is new for 2012. Other challenges are transport and mobility, energy efficiency, and health and well-being.

3 The development of prototypes and demonstrators remains a key activity in the ARTEMIS programme. The number of partners developing prototypes and demonstrators is growing, both from an application perspective as well as from a design tool perspective. Although a considerable number of respondents plans to contribute to the ARTEMIS tool platform, a majority of the respondents does yet know what this platform is, which is an item that needs attention. One of the issues to be looked into in order to make it a success is the ownership of this platform. The impact of the tools is mainly on reducing development time and improving product reliability. The contribution to standards has fallen with most emphasis on the extension of existing standards and participation in regular standardisation committees. Contributing to or creating Open-Source Communities, setting up public trials/field test and contributing to educational programmes (incl. to a large extent from an industrial perspective) are also important. There is an increase in the number of patents per partner. The first concrete figures have become available on dissemination. Publications of books, papers and brochures remain at the same level as 2010 while press releases have grown a lot since 2010. Participation in seminars and workshops have decreased relatively since 2010. We can imagine this has partly to do with the economic crisis and budget cuts in the industrial world.

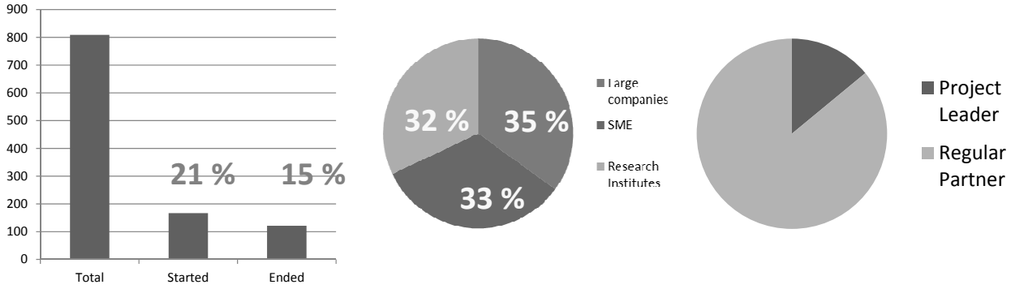
As an overall conclusion, we can state that ARTEMIS is alive and kicking ! The original aims have been achieved to a large extent and have led to successful results, in terms of technological developments, competitive advantages and market successes.

Overall the Embedded Systems community has found its place in Europe: people are getting to know each other better, a strong link between industry and education has become visible and the quality of the technology and dissemination results is clearly visible from the results of this questionnaire. Taking into account the evolution within Europe of bringing together ENIAC, ARTEMIS and EPOSS, one can state that ARTEMIS has definitely shown to be a complementary domain of expertise en between both ENIAC and EPOSS. Therefore, it is vita; to develop three interconnected Strategic Research Agendas in these domains.

Only some of the administrative burden remains an issue to be solved… Also the commitment of Member States towards the ARTEMIS programme remains an important asset to boost the Embedded Systems community impact in Europe.

SURVEY RESULTS

The questionnaire was sent to slightly more than 800 participants in Call 1 and 2 of the ARTEMIS programme: 21% has started the questionnaire and filled it out partly whereas 15% has completed all 50 questions. There is a balanced response from large companies, SMEs and research institutes. In total 68% of the answers came from industry.

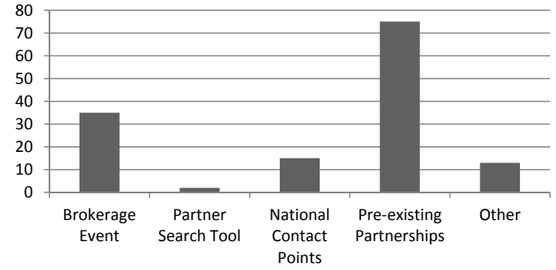


RESULTS FOR THEME 1
Focusing on common R&D agendas more effectively

CONSORTIA & PARTNERSHIPS

The consortia were mainly formed from pre-existing partnerships. 75 % of the partners that replied already had partnerships before the project was set up. This is approximately the same figure as in 2010 where 73 % of the partners already had partnerships.

The second point of contact is Brokerage events (>30%). National Contact Points and the Partner Search Tool are much lower (less than 15 %).



Concerning the way the consortia were formed, some more concrete answers were given :

> Approached by a large company
> Contacts through previous FP6 project
> "Colleagues of colleagues"
> ICT4EE brokerage event in Brussels[1]

Own network

> An existing European Research Network
> Through another project submission
> The project was the result of a merge of 2 projects after the evaluation phase
> Industrial contacts
> Destiny
> Randomly

[1] *Another study revealed a direct link of 1 in 3 projects to a brokerage event, although it was stated that it is difficult to determine an exact number because proposals change name, merge, re-configure, etc. Hence the connection is difficult to trace.*

In the latest questionnaire, each respondent formed an average of 4.3 new partnerships through participation in a project consortium. This is a strong growth compared to 2010 where only 2-3 new partnerships were formed per partner and per project.
In these new partnerships 2.2 involve an SME (50%), while the figure in 2010 was only 33%. So we also see a growth of SME involvement in the creation of new partnerships due to project participation.

PROJECT OUTCOME

72% of respondents want to define a continuation project after the project ends.

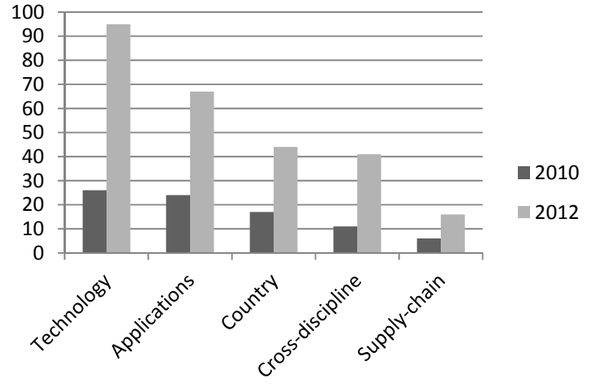
78% wants to continue the cooperation with an SME after the project. This is almost double the figure of 2010 (40%).

10 respondents are currently thinking about creating a new company based on the project results. They are currently investigating this in more detail. In total, each of them plans 1 or 2 spin-out companies (average 1.4).

31% of the respondents plan an interaction with a Centre of Innovation Excellence (CoIE). 9% is considering establishing a new CoIE. These figures are much higher than in 2010, when the CoIE concept was new and not yet known to the ARTEMIS community. As such, CoIE is becoming a real working instrument within the ARTEMIS Programme.

COOPERATION

The cooperation is mainly along the technology axis. The ranking is similar to 2010, but the importance of the technology axis compared to the applications axis has become more emphatic in 2012. The cooperation at country level also appears to be relatively high, about 45%. This is probably due to the administrative and funding specificities of the ARTEMIS programme, which encourage the formation of strong country consortiums already at the proposal phase with own use cases and demonstrators.



ALIGNMENT WITH OTHER PROGRAMMES

The top three alignment aspects are:

> Regional / National programmes
> Other ARTEMIS projects
> FP7

This is similar to 2010 with the exception of the alignment with ITEA, which became much less in 2012 compared to 2011. So, although at programme level, there is quite some effort spent on aligning the ARTEMIS and ITEA agendas, the operational alignment at project level has declined significantly.

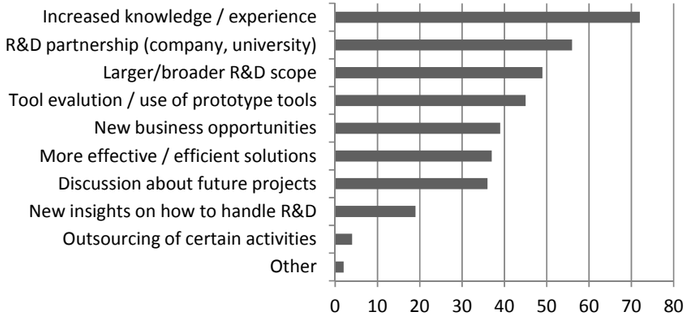
Some partners have given explicit reference to the Swedish Strategic Research Council, ESA, CELTIC and national programmes.

IMPACT ON INTERNAL R&D AGENDA

In 2010 this was an open question and these topics emerged without clear figures. Because of a multiple-choice question in 2012, it was possible to make a ranking.

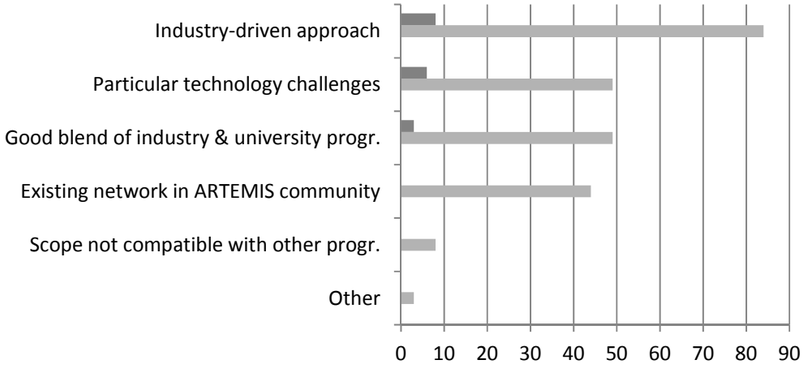
The top three consists mainly of increased R&D knowledge, experience, partnerships and scope. The fourth aspect position is the possibility to evaluate and/or use prototype tools developed in the different consortia. Fifth is the possibility to create new business opportunities – this is almost 30% of the respondents, which can be considered as a high figure.

Some examples that were given are "standards" and "development of important IP".



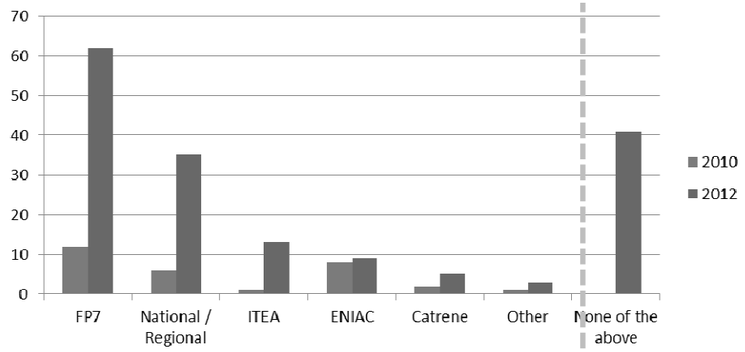
WHY ARTEMIS?

The reason for having an "industry-driven approach" in the ARTEMIS programme has become much more explicit compared to 2010. The "Existing Network in the ARTEMIS Community" is the main newcomer in the answers – but here we have to take into account that this was not yet so prevalent in 2010 given the recent incorporation of ARTEMIS at that time and the network consisted mainly of the founders and some of their partners.



Concerning alternative funding schemes, we can draw following conclusions :

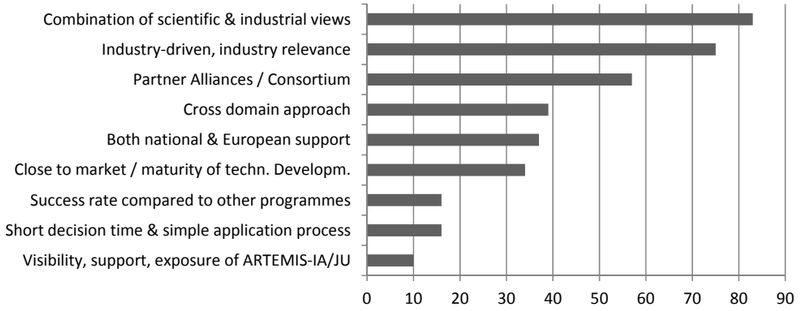
> FP7 remains the leading response
> National / Regional comes in at number 2 in 2012 (compared to number 3 in 2010)
> The top three is completed by the answer "None of the above", which was not asked for in 2010 and is as such a new given; so a large number of consortia does not consider alternative schemes
> ITEA has grown in absolute terms compared to 2010, but remains marginal in relative terms (less than 10%)
> ENIAC is at the same level as 2010, but because of the larger number of respondents in 2012, it can be concluded that it has become less popular in the ARTEMIS community as alternative funding scheme. It is also marginal with less than 10% of the respondents referring to it. One respondent explicitly mentioned ESA.



STRENGHTS AND WEAKNESSES OF ARTEMIS

In 2012, the item "Combination of scientific and industrial views" jumped to head the list with around 60% of the respondents providing this answer. Ranked 2 to 4 were the answers that had been ranked respectively 1 to 3 in the 2010 results :

> Industry-driven, industry relevance (55% of respondents)
> Partner alliances / consortium (40% of respondents)
> Cross-domain approach (30% of respondents)



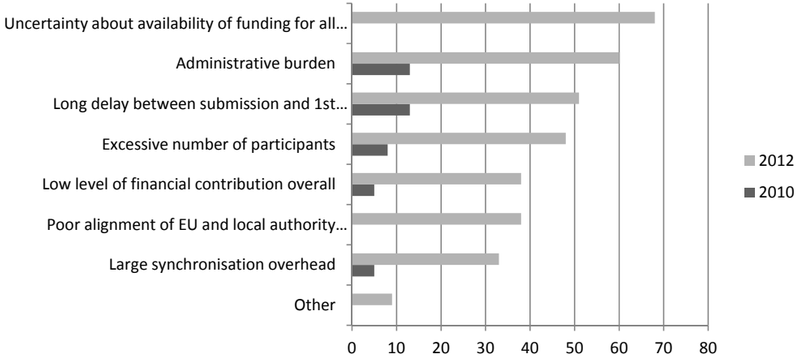
Concerning weaknesses, two new items have emerged in the statistics compared to 2010 :

> Uncertainty about availability of funding for all partners (50% of respondents – position 1)
> Poor alignment of EU and local authority administrative rules (30% of respondents – position 6)

For the other items, the ranking is the same as in 2010 with positions 2 and 3 for 2012 :

> Administrative burden (45% of respondents)
> Long delay between submission and 1st financial grant (35% of respondents)

So the main concerns about the programme have to do with administrative complexity and alignments.



An additional clarification, which was mentioned twice, was the lack of good communication/alignment between EU/Artemis and national authorities.

CONCLUSIONS OF THEME 1

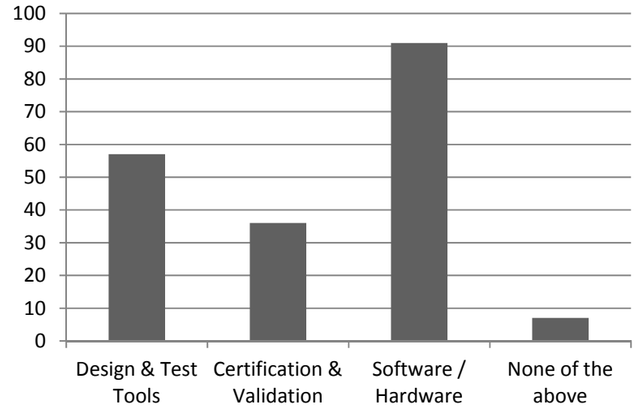
- Collaboration remains very successful and has grown drastically compared to 2010. The creation of new partnerships has almost doubled. Also SME involvement has grown from 33% to 50% in these new partnerships. The partnerships are mainly based on technology.
- The concept of CoIE has become much more known within the ARTEMIS community and more than 30% of the respondents plans to interact with an existing CoIE. 9% is planning to establish a new CoIE.
- Alignment with other programmes is mainly with regional/national programmes, other ARTEMIS projects and FP7. Alignment with ITEA has increased at steering board level, but has decreased at operational level. Results show that ITEA, ENIAC and Catrene may be an alternative funding mechanism for quite a minority of ARTEMIS consortia. The main motivator to work in ARTEMIS remains the industry-driven approach. The possibility to work together within existing networks is a new emergent element. The impact on the R&D agenda is mainly on having increased knowledge and experience thanks to participating in ARTEMIS projects. The combination of scientific and industrial views is considered as a key strength. An item for attention remains the administrative complexity and alignment. It is also important that the uncertainty about availability of funding for all partners has become a new key issue compared to 2010. This is actually scored as the most negative aspect of the ARTEMIS scheme, and it should be given more credence: the questionnaire shows that beneficiaries are criticising very specific elements in the way the programme is currently managed.

RESULTS FOR THEME 2
Providing significant economic and societal benefits

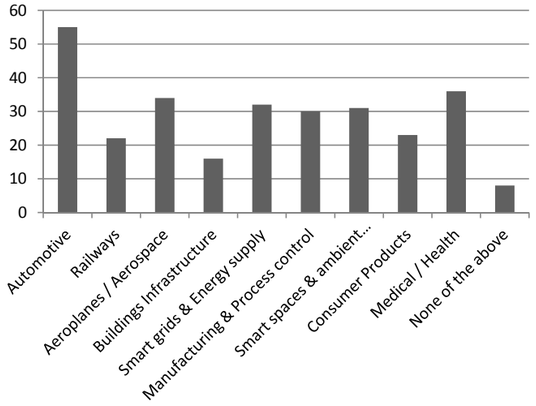
MARKET IMPACT

The markets addressed can be split in ''Technology Markets" and "Application Markets".

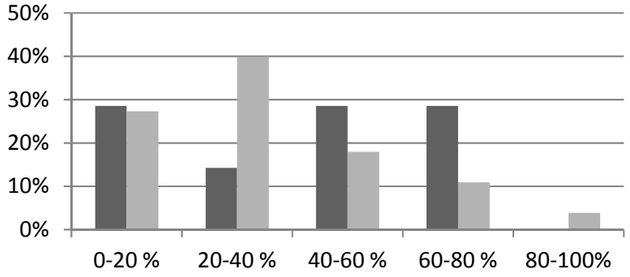
In terms of "Technology" the main market addressed is the hardware/software development (70% of the respondents).



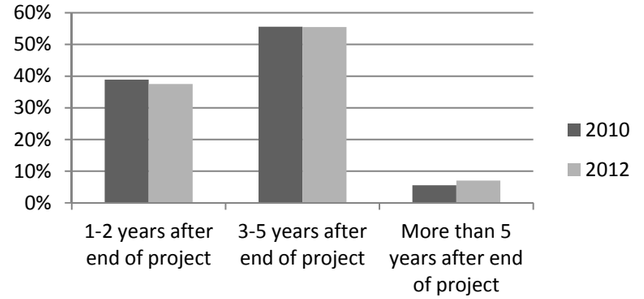
In terms of "Applications", the Automotive domain is the most represented (40% of the respondents). Other application domains are equally spread. The areas "Building/Infrastructures", "Railways" and "Consumer Products" are slightly lower than all other application markets.



In terms of market impact, most of the respondents indicate that their project will have an impact on 20% - 40% of the application market they are addressing. The comparison with the 2010 figures is visible in the figure below. Impact was estimated to be higher in 2010, but as the number of respondents was much lower, and the projects were not yet finalised, the figure in 2010 is probably less faithful.



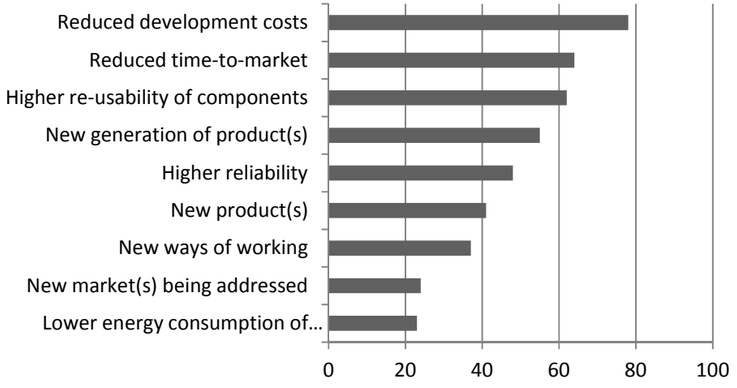
In terms of timeframe when project results will become available, the majority is 3-5 years after the end of the project. Here the results in 2010 and 2012 are very similar. Yet a significant share is for 1-2 years, which is quite uncommon for FP7-like projects.



BUSINESS IMPACT

In terms of business impact, the top 3 answers are :

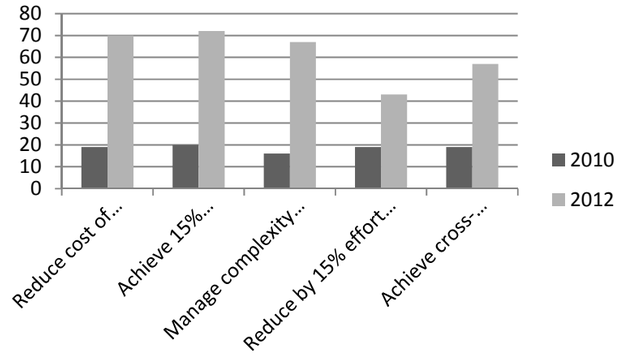
> Reduced development costs (60% of respondents)
> Reduced time-to-market (50% of respondents)
> Higher re-usability of components (50% of respondents)



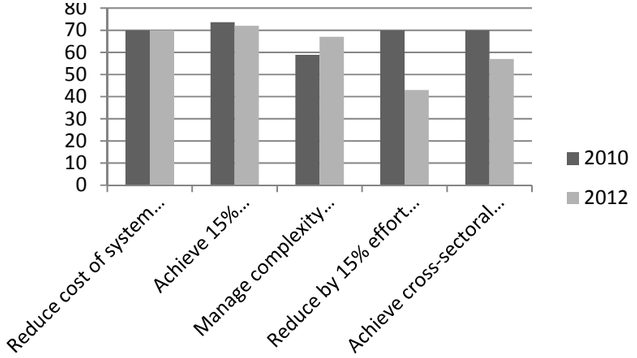
CONTRIBUTION TO ARTEMIS AWP TARGETS

In the statistics with absolute figures (number of respondents) and relative figures (comparative analysis between 2010 and 2012 figures compared to total number of respondents) below, the results of 2010 and 2012 are comparable, with the exception of target 4 "Reduce by 15% effort & time…", the impact of which in 2012 is much less compared to 2010.

Absolute figures :



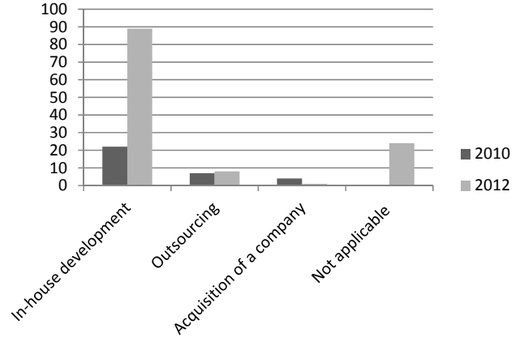
Relative figures :



Some more detailed clarification is given in Annex 2 (answers to an open question requesting more details on contribution to ARTEMIS AWP Targets) and Annex 3 (most important innovation).

KNOW-HOW ACQUISITION

In terms of strategy on know-how acquisition, the "in-house development" has grown considerably compared to 2010 and clearly has the biggest impact. "Outsourcing" is almost equal, but taking into account the number of respondents, this means a relative decrease from 2010 to 2012. "Acquisition of a company" has fallen considerably, from both an absolute and a relative point of view.

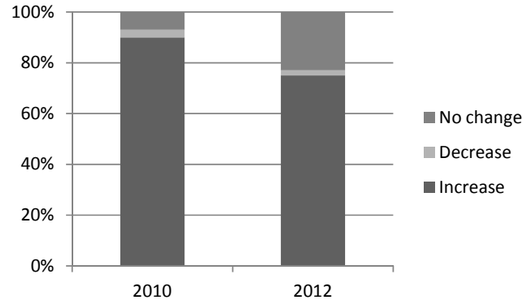


We also asked for the impact on know-how acquisition in 3 different domains :

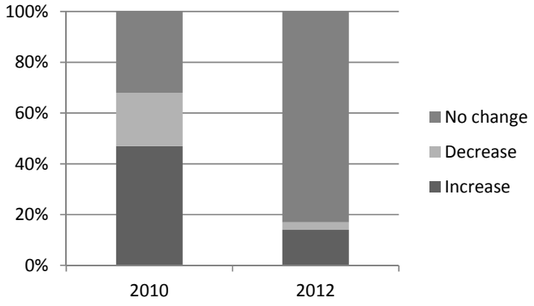
> in-house innovation
> licensing from third parties
> outsourcing of innovative activities

The goal was to see if participation in the ARTEMIS programme leads to an increase, a decrease or no change in behaviour in these three areas. In general, the answer "no change" has increased relatively, especially in the last two domains. However, there is still an increase in these two areas for 15% - 20% of the respondents. In terms of in-house innovation, the "increase" is visible for 75% of the respondents.

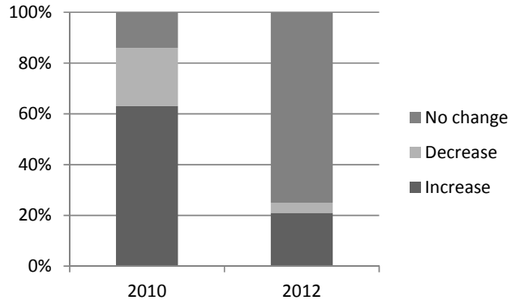
Impact on in-house innovation :



Impact on licensing from third parties :



Impact on outsourcing of innovative activities :

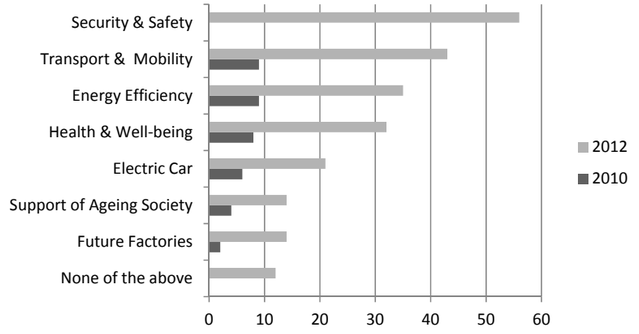


IMPACT ON SOCIETAL CHALLENGES

The ranking is the same for 2012 and 2010 with the exception of the area "Security & Safety", which is a newcomer and has jumped to position 1.

The top 4 consists of :

> Security & Safety (45% of the respondents)
> Transport & Mobility (35% of the respondents)
> Energy Efficiency (30% of the respondents)
> Health & Well-being (25% of the respondents)



CONCLUSIONS OF THEME 2

- ARTEMIS addresses a wide range of technology and application markets. From an application point of view, automotive is the main market addressed. The market impact mainly concerns a period of three to five years after the end of the project (with a remarkable and uncommon rate for 1-2 years) with the impact ranging from 20% to 40% of the market. Business impact is mainly on reduced development costs, reduced time-to-market and higher re-usability.
- All ARTEMIS AWP targets are addressed and results are similar between 2010 and 2012, although target 4 has lost some attractiveness.
- Acquisition of know-how is mainly through in-house development, and has grown considerably from 2010 to 2012.
- In terms of societal challenges, the main impact is on "security and safety" and is new compared to 2010. Other areas are transport and mobility, energy efficiency, and health and well-being. However, an important remark needs to be made here. The term "security and safety" has a different meaning in ARTEMIS that in the overall EU policy documents. The term "security and safety" as EU policy is much more related to global (cross-border) monitoring, prevention of terrorism and privacy of personal data. There are some aspects in ARTEMIS that hook in to this policy, such as data protection (security privacy and dependability – see ASP6), but this is limited to the embedded systems used mostly in the transport sector (e.g. rail signalling systems). As for safety, there is a risk of confusing "safety-critical applications" (in ARTEMIS SRA) and the safety of citizens, which is the EU policy. In ARTEMIS "security and safety" is mostly done in the sub-domain of the ASP1 (transport safety-critical applications, etc.) so, as such, one could state that it would more clearly contribute to the societal challenge "transport and mobility".

RESULTS FOR THEME 3
Successful results in the market

PROTOTYPES & DEMONSTRATORS

More than 70% of the respondents indicated that they will build application prototypes. The average number of prototypes built by respondents is 1.9.

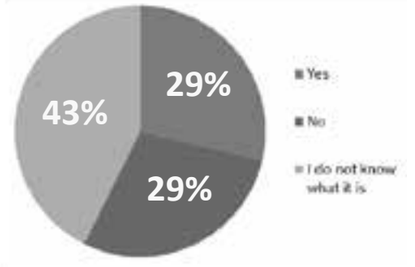
More details on examples of application prototypes and demonstrators are given in Annex 4.

More than 60% of the respondents indicated that they will build design tool prototypes. The average number here is 1.8.

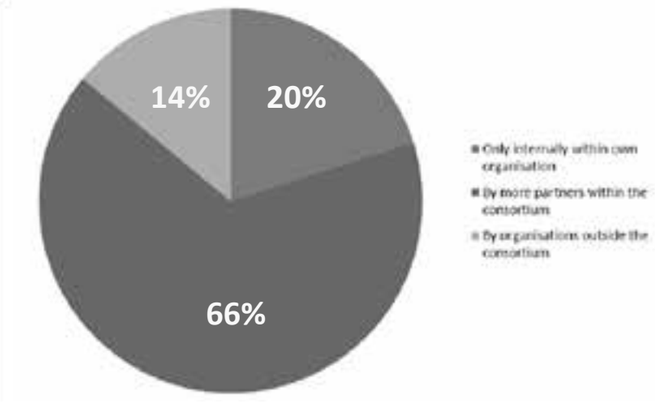
More details on examples of tool prototypes and demonstrators are given in Annex 5.

Compared to 2010, more respondents will build prototypes, both applications and design tool prototypes. In terms of the average number of prototypes built, the number of tool prototypes remains the same in 2012 compared to 2010, while the number of application prototypes has decreased.

In terms of the dissemination of design tool prototypes, around 40 respondents (about a third of the total number of respondents) plans to distribute an average of 1.9 tools to an Open-Source Community. Almost 30% of the respondents plan to contribute to the ARTEMIS Tool Platform. However, an item requiring attention is that 43% of the respondents do not know what the ARTEMIS Tool Platform consists of. However, one has to take into account that about less than half of the ARTEMIS projects aims to build/contribute to a reference tool platform –reference design architectures in the programme. The others aim at more focused objectives such as better WSN, middleware, HMI, etc. In those cases contributions to the ARTEMIS tool platform are neither requested, needed or relevant.



In terms of "tool usage" by other partners inside or outside the existing project consortium, the answers are given in the pie chart below.

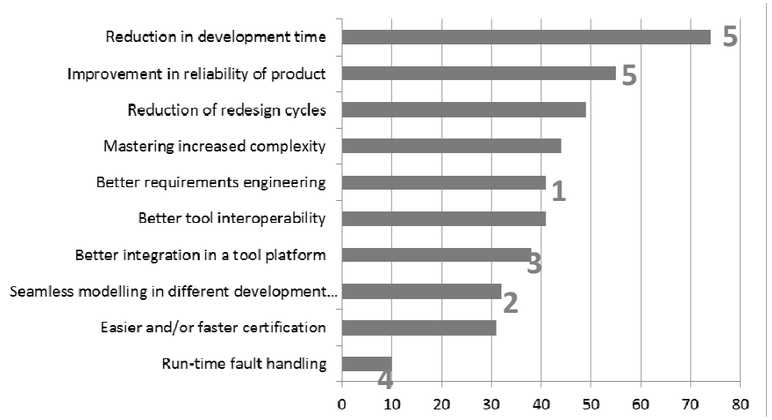


Concerning the expected improvements through the use of new tools, the outcome in 2012 is completely different to 2010.

The top 3 in 2010 was :
Better requirements engineering (position 5 in 2012)
Seamless modelling in different development phases (position 8 in 2012)
Better integration in a tool platform (position 7 in 2012)

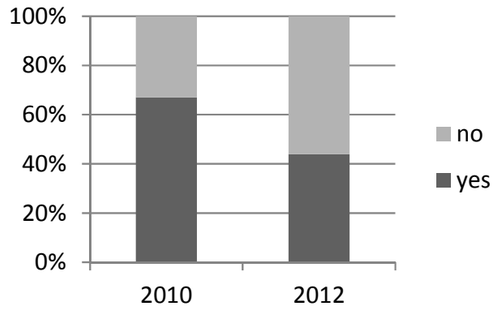
The top 3 in 2012 is :
> Reduction in development time (position 5 in 2010)
> Improvement in reliability of product (position 5 in 2010)
> Reduction of redesign cycles (newcomer)

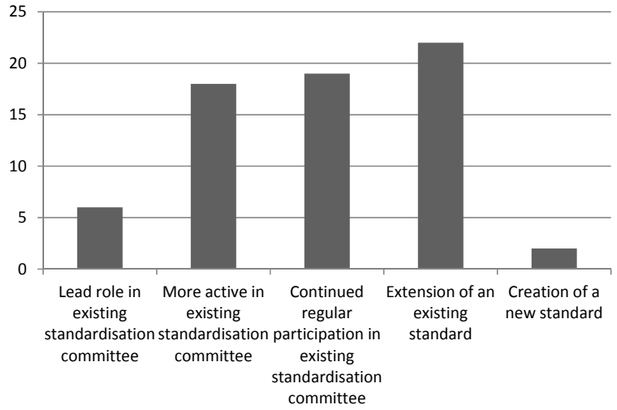
Full details are in the bar chart below. The red numbers indicate the position in 2010.
It may show a "maturation process" in ARTEMIS: in 2010 the main objective was to put people of different domains together and get them develop a common body language (better requirement engineering). Now that this has been achieved to some extent (e.g. the CESAR-project), attention focuses on concrete business objectives. This is quite encouraging!



STANDARDS

The contribution to standards fell from 66% in 2010 to 42% in 2012. Most of the contribution is on the extension of existing standards and through the participation in regular standardisation committees (around 20 of the respondents). Two respondents indicated that they had created a new standard.

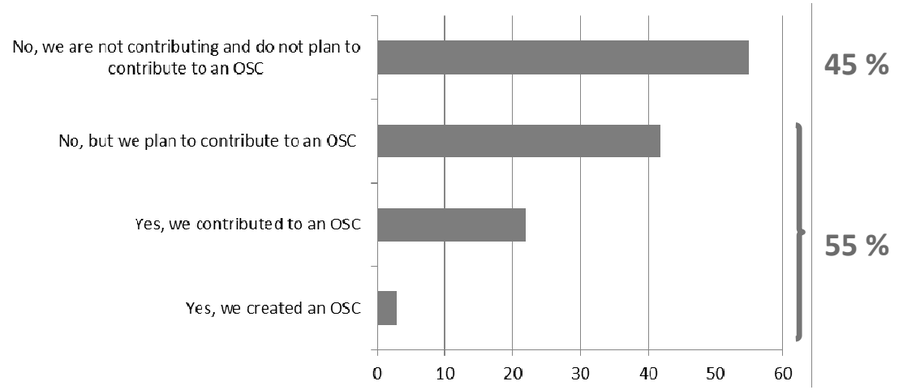




OPEN-SOURCE COMMUNITIES (OSC)

> 55% of the respondents indicated that they planned to contribute to, were contributing to or had created an OSC.

> 45% indicated that they were not contributing and did not plan to contribute at all.

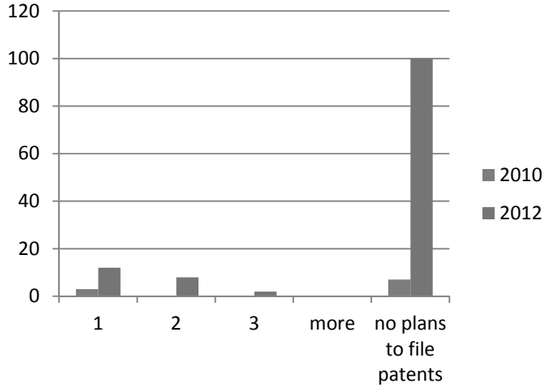


PATENTS

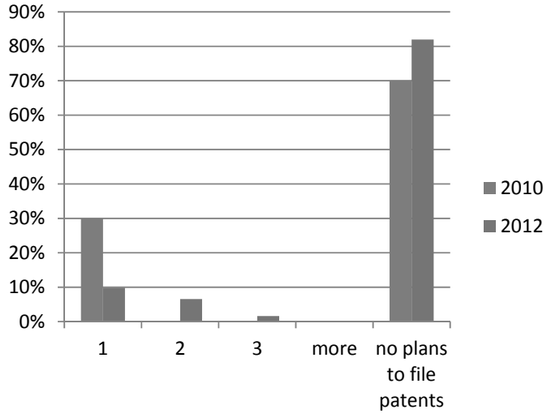
Although the relevance of data in 2010 might be questionable (only 10 answers to this question), we can see that the relative amount of "no plans to file patents" remains in the same order of magnitude (70%-80%), while there is an increase of the number of patents per partner. In 2010 only one patent per partner was planned, while now some partners plan 2 or 3 patents to file.

The figures below reveal the number patents filed/planned to file (horizontal axis) for the number of respondents (vertical axis), in both an absolute way (total number of respondents) and a relative way (total number of respondents in a % scale). This should be examined in more detail, as one would expect this to be an important asset for industry – which is not visible in the figures. However, one can also see that patents are expensive, time-consuming to make and that the process often takes longer than the project duration. In addition, the value of a patent as a figure of merit for this kind of market-facing research could be overestimated. Patents actually licensed is a better indicator, but is more difficult to measure and mostly happens much later than when the project is finalised.

Absolute figures :

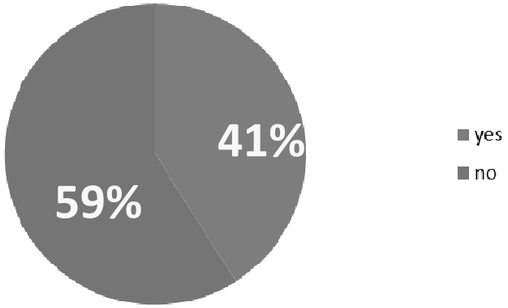


Relative figures :



PUBLIC TRIALS / FIELD TESTS

More than 40% of the total number of respondents plan a public trial or field test.

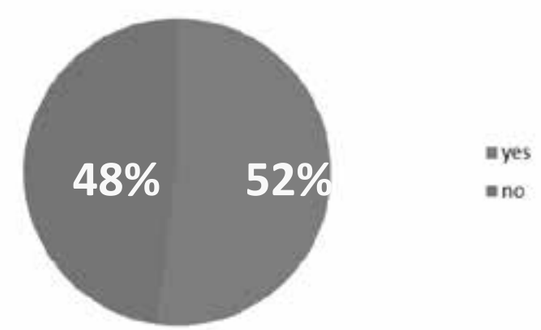


CONTRIBUTION TO EDUCATIONAL PROGRAMMES

More than 52% of the respondents plan to contribute to educational programmes. As the total number of research institutes in this questionnaire is 32%, this means that there will also be a considerable amount of industrial partners contributing to educational programmes. This is a positive evolution: it proves the need to create the "ES engineer" to better serve ES industry innovation.

Some more details and qualitative results on contributions to educational programmes are given in Annex 6.

It is hard to compare 2010 and 2012 figures. In 2010, 34% of the answers was yes (compared to 52% in 2012), while 14% was no (compared to 59% in 2012). In 2010, there were 52% with "not applicable" or "no answer".



DISSEMINATION

The table below shows the number of respondents on the different types of publications and participations in seminars and workshops (the figures in black are 2012, while the figures in red are 2010). In the last column, one can see the average number per respondent.

Although it is hard to draw conclusions (because in 2010 there were many fewer answers), one can see a drastic increase in "press releases" and a slight decrease in "workshops" in 2012.

Also, with a remarkable increase in books and papers, an increase of overall quality in the dissemination activities is evident: books and a large number of papers are realised through peer-reviewed processes, which tend to require higher quality standards.

Finally, there is a lot to be said for each type of dissemination but, in the end, it is the sum of the parts that counts… ARTEMIS conferences and publications have also delivered a clear focal point for dissemination of ARTEMIS results and should perhaps be even more focused and marketed in a larger way.

	Number of Respondents	Average number per respondent
# books published	7 (2)	1.0
# papers published	28 (15)	4.9
# commercial brochures	16 (6)	2.0
# press releases	19 (3)	2.3
# press coverage (# articles in magazines / newspapers)	14	4.2
# seminars / workshops organized	22 (24)	3.8
# presentations with project results during conferences / workshops	22	5.3

Some more details and qualitative results on publications, press releases and citations are given in Annex 7. This is not a complete list, but contains some examples that were given by the respondents.

CONCLUSIONS OF THEME 3

- The development of prototypes and demonstrators remains a key activity in the ARTEMIS programme. The number of partners developing prototypes and demonstrators is growing, both from an application perspective (more than 70% of the respondents) as well as from a design tool perspective (more than 60% of the respondents). Tool usage is 86% within the consortium and 14% outside the own consortium. 29% plans to contribute to the ARTEMIS tool platform, but 43% does not yet know what this Platform is – this is an item for attention. The impact of the tools is mainly on reduction in development time and improvement in product reliability (rising from position 5 in 2010 to positions 1&2 in 2012).
- The contribution to standards fell from 67% in 2010 to 47% in 2012. Most emphasis is on the extension of existing standards and participation in regular standardisation committees.
- 55% of the respondents plan to contribute to an Open-Source Community (including the creation of a new OSC). 30% plans to distribute an average of 1.9 tools to an OSC.
- 41% of the respondents plan to set up public trials or field tests. The AIPPs can provide the scope and means in order to realise this on a larger and more professional scale.
- 52% of the respondents plan to contribute to educational programmes – this includes a large part of the industrial partners in the programme.
- There is an increase in the number of patents per partner. However, the overall amount of patents is decreasing and requires attention.
- First concrete figures have become available on dissemination. Publications of books, papers and press releases have grown since 2010. Participation in seminars and workshops was relatively less since 2010.

FINAL CONCLUSIONS

Analysis of the results show that ARTEMIS has been gaining momentum since 2010. Networks have been established and are fully operational. The industry-driven approach and the combination of scientific and industrial views are considered key strengths and motivators for the programme.

Key strengths and improvements compared to 2010 are the following :

1 New partnerships and involvement of SMEs
2 Growth of awareness of and interaction with CoIEs
3 Business impact on reduced development costs, reduced time-to-market and higher re-usability
4 ARTEMIS AWP targets are a living instrument
5 Societal challenges are addressed properly – "security and safety" being number 1. However, taking into account the security and safety focal area of in ARTEMIS (in comparison with the EU Policy), one can state that overall "Transport and Mobility" (including the security and safety aspects) remains the key focal area of ARTEMIS.
6 Attention for prototypes and demonstrators is growing, including public trials and field tests
7 More attention has been paid to press releases and press coverage. The publication of books and papers leads to higher quality dissemination (e.g. book on the Cesar project, to be published by Springer Verlag).

A number of items for attention still remain:

8 Uncertainty about availability of funding for all partners and the administrative burden
9 The ARTEMIS Tool Platform is not yet known by 43% of the ARTEMIS Community
10 The contribution to Standards has decreased in 2012 compared to 2010 and it is not clear why this is the case.

ANNEX 1:
Questionnaire as it was distributed

1. *Please indicate what type of partner you are:*
   - A. Large company
   - B. SME
   - C. University or Research Institute

2. *Are you the project leader of the consortium?*
   - yes
   - no

3. *SUB THEME 1 - How was the consortium formed?*
   (please select one or more options)
   - A. Through contacts in the brokerage event
   - B. Through the partners search tool of ARTEMISIA
   - C. Through the national contact points
   - D. Through pre-existing partnerships
   - E. Other (please specify)

4. *Did your organisation have partnerships with other consortium partners before the ARTEMIS project was proposed?*
   - yes
   - no

5. *How many new partnerships have been created or planned between you and other consortium members?*
   - yes
   - no

6. *If you have partnerships with other consortium partners before the ARTEMIS project was proposed. How many of these new partnerships are with an SME?*

7. *Is there an intention to apply for a continuation project within either ARTEMIS or any other initiative?*
   - yes
   - no

8. *Do you interact or plan to interact with an existing ARTEMIS CoIE?*
   - yes
   - no

9. *Are you planning to establish an ARTEMIS CoIE?*
   - yes
   - no

10. *Is there any plan or intention to create one or more new companies (spin-off's, start-up's), based on the project results?*
    - yes
    - no

11. *How many?*

12. *Is there an intention to continue the cooperation with the SME s in the consortium after the project has finished?*
    - yes
    - no

13. *Along which axis is the cooperation in the project being organised (multiple answers allowed)?*
    - A. Cooperation mainly at countrylevel
    - B. Cooperation mainly around the technology axis
    - C. Cross-discipline cooperation
    - D. Cooperation around certain application(s)
    - E. Supply-chain based cooperation

14. *Is the project aligned with other initiatives? (please select one or more)*
    - A. Regional/National programme/projects
    - B. Other ARTEMIS projects
    - C. ITEA programme/projects
    - D. ENIAC programme/projects
    - E. CATRENE programme/projects
    - F. FP7 programme/projects
    - G. Other programme/projects
    - H. Not aligned with other initiatives

15. *Which of the following best describes the impact of the project on the internal R&D agenda of your organisation? Please select one or more options.*
    - A. Larger/broader R&D scope
    - B. Tool evaluation & use of prototype tools
    - C. Discussion about future projects
    - D. Research or development partnership with other company or university
    - E. New business opportunities
    - F. More efficient/effective solutions or design methods
    - G. Outsourcing of certain activities
    - H. Increase of knowledge and/or experiences
    - I. New insights on how to handle certain R&D work
    - J. R&D partnerships with other companies & universities
    - K. Other

16. *Why did you select ARTEMIS as a programme to submit the project?*
    - A. Industry-driven approach
    - B. Particular technology challenges
    - C. Good blend of industrial and university programmes
    - D. Scope was not compatible with other programmes like ENIAC, Catrene, Itea,…
    - E. Existing network of companies/universities in the ARTEMIS community
    - F. Other

17. *What alternative programmes did you consider to submit this project?*
    - A. ENIAC
    - B. Catrene
    - C. Itea
    - D. FP7
    - E. National / Regional
    - F. Other
    - G. None of the above

18. *What are the key strengths of participating in the ARTEMIS programme from a project perspective? Please select max. 3 answers.*
    - A. Partner alliances/Consortium
    - B. Cross-domain approach
    - C. Industry-driven, industry relevance
    - D. Combination of scientific and industrial views
    - E. Visibility, support, dissemination & exposure of ARTEMIS-IA and ARTEMIS JU
    - F. Close to market / maturity of technological developments
    - G. Short decision time & simplified application process
    - H. Both national and European support
    - I. Success rate compared to other programmes

19. *What are the weaknesses of participating in an ARTEMIS project? Please select max. 3 answers.*
    - A. Long delay between submission and 1st financial grant
    - B. Administrative burden
    - C. Excessive number of participants
    - D. Poor alignment of EU and local authority administrative rules
    - E. Uncertainty about the availability of funding for all consortium members
    - F. Low level of financial contribution overall
    - G. Large synchronisation overhead
    - H. Other

20. *SUB THEME 2 - MARKET - What is the focal market of your project activities on A. Embedded System (ES) Technology Market? (multiple answers possible)*
    - A. ES Design and Test Tools
    - B. ES certification and validation
    - C. ES Software/Hardware
    - D. None of the above

21. *What is the focal market of your project activities on B. ES Application Market? (multiple answers possible)*
    - A. Automotive
    - B. Railways
    - C. Aeroplanes/Aerospace
    - D. Buildings infrastructure
    - E. Smart grids and energy supply
    - F. Manufacturing and process control
    - G. Smart spaces and ambient intelligence
    - H. Consumer products
    - I. Medical or health
    - J. None of the above

20. E*stimate the proportion (%) of the application market on which the project has an influence*
    - A. 0-20%
    - B. 20-40%
    - C. 40-60%
    - D. 60-80%
    - E. 80-100%

23. *In what timeframe will the project have a specific market impact?*
    - A. 1-2 years after the end of the project
    - B. 3-5 years after the end of the project
    - C. More than 5 years after the end of the project

24. *What will be the expected business impact? (multiple answers are possible)*
    - A. Reduced development costs
    - B. Reduced time-to-market
    - C. Higher reliability
    - D. Higher re-usability of components
    - E. New ways of working
    - F. New product(s)
    - G. New generations of product (s)
    - H. New market(s) being addressed
    - I. Lower energy consumption of products

25. *ARTEMIS TARGETS - Please indicate the ARTEMIS AWP target(s) to which your project contributes (multiple answers are possible)*
    - A. 15% reduction in the cost of system design within next 3 years
    - B. 15% reduction in development cycles (esp. in sectors requiring qualification/certification)
    - C. Manage complexity increase of 25% with 10% reduction in effort in next 3 years
    - D. 15% reduction in the effort and time required for re-validation and re-certification of systems after making changes within
    - E. Achieve cross-sectoral re-usability of ES devices (e.g. interoperable components for different sectors/ applications)

26. *Please give examples / explanations of the ARTEMIS AWP target(s) to which your project contributes*

27. *RESULTS - What does your organisation consider to be the most important innovation of the project? (please make elevator pitch description of max. 500 characters).*

28. *STRATEGY - Do you increase or decrease in-house innovation by participating in ARTEMIS?*
- A. Increase
- B. Decrease
- C. No change

29. *Do you increase or decrease licensing technologies from third parties by participating in ARTEMIS?*
- A. Increase
- B. Decrease
- C. No change

30. *Do you increase or decrease outsourcing of innovative activities by participating in ARTEMIS?*
- A. Increase
- B. Decrease
- C. No change

31. *What is the (expected) impact of the project on the size of the R&D teams in Europe in your organisation?*
- A. Bigger team within the organisation
- B. Bigger team due to R&D partnerships with other industrial domains (cross-domain)
- C. Bigger team due to more cooperation with research institutes and/or universities
- D. Possibility to acquire more PhD students
- E. Smaller team (e.g. due to more efficient working, cooperation, outsourcing,…)
- F. No impact

32. *What is the overall strategy of your organisation on acquiring ES know-how/technologies?*
- A. In-house development
- B. Outsourcing
- C. Acquisition of a company specialising in ES
- D. Not applicable

33. *In which field has the project contributed to solving the -Societal Challenges- or in contributing to sustainability?*
- A. Electric Car
- B. Health & Well-being
- C. Support of Ageing Society
- D. Future Factories
- E. Energy Efficiency
- F. Transport & Mobility
- G. Security and safety
- H. None of the above

34. *SUB THEME 3 - APPLICATION PROTOTYPES/DEMONSTRATORS - How many application prototypes/demonstrators did you contribute to in this project?*

35. *Can you please give some examples of application prototypes/ demonstrators*

36. *TOOL PROTOTYPES/DEMONSTRATORS - How many tool prototypes / demonstrators did your organisation contribute within the scope of the project?*

37. *How many tool prototypes / demonstrators were distributed in an open-source manner?*

38. *Can you please give some examples of tool prototypes/demonstrators:*

39. *Does your project contribute to an -ARTEMIS Tool Platform-?*
- A. Yes
- B. No
- C. I do not know what it is

40. *How will the tool prototypes or demonstrators be used?*
- A. Only internally within your organisation
- B. By more partners within the consortium
- C. By organisations outside the consortium

41. *What improvements are expected through the use of the new tool(s)?*
- A. Better requirements engineering
- B. Better integration in a tool platform
- C. Seamless modelling of the product in the different development phases
- D. Better tool interoperability
- E. Run-time fault handling
- F. Reduction in development time –
- G. Improvement in reliability of product
- H. Reduction of redesign cycles
- I. Easier and/or faster certification
- J. Mastering increased complexity

42. Is *there any contribution to standards?*
- yes
- no

43. *If yes, what is the contribution?*
- A. Lead role in existing standardisation committee
- B. More active in existing standardisation committee
- C. Continued regular participation in existing standardisation committee
- D. Extension of an existing standard
- E. Creation of a new standard

44. *Did you contribute to -Open Source Communities-?*
- A. Yes, we created an Open Source Community
- B. Yes, we contributed to an existing Open Source Community
- C. No, but we plan to contribute to an Open Source Community in the future
- D. No, we are not contributing and we do not plan to contribute to any Open Source Community

45. *How many patents have you filed or do you plan to file*
- A. 1
- B. 2
- C. 3
- D. more
- E. We do not plan to file any patents

46. *Has your organisation performed or does it plan to perform public trials or field tests?*
- yes
- no

47. *Is there any contribution to educational programmes? (e.g. university courses)*
- yes
- no

48. If yes, please specify

49. *Dissemination of all project results*
(to be answered by project leaders ONLY)

- A. Number of books published:
- B. Number of papers published:
- C. Number of commercial brochures:
- D. Number of press releases:
- E. Press coverage – how many articles in magazines/ newspapers:
- F. Number of seminars/workshops organised:
- G. Number of presentations with project results during conferences/workshops:

50. *Please indicate key publications/press coverage / citations give reference*

ANNEX 2 :
More details on contribution to ARTEMIS AWP Targets

Standardisation in the field of medical signal treatment
Reduce development cost of software development for process control systems Increase reliability of airplane flight control equipment Introduce technological breakthrough in large scale wireless sensor networks
We are developing a new hypervisor for ARM-based system. The ARTEMIS projects allow us to test this as a new potential project and evaluate it from both a technology and market perspective. This will reduce both time to market and product risks if we finally decide to go for a new product.
see Demanes proposal
Larger, more complex software product on reduced hardware
Improved design efficiency
Reduction of development cycles through systematic testing and validation procedures Development of reusable robotics core components
Better performance analysis technologies allowing system optimisation in shorter times
A new life cycle for component-based development A new tool for component-based development
The project targets ASP8, Human-centric design of embedded systems. It takes a human-centric approach to managing the complexity of interconnected embedded devices. The extension of model-based design approaches to the design and analysis of human-machine interaction. The development of cross-domain reusable technology to synthesise "intelligent" multi-modal HMI. Technologies for intelligent multi-modal interactive systems especially addressing the user's interworking with adaptive context-aware systems.
The project will reduce the cost of the system design regarding the security aspects to be taken into account. Similarly, the management of the complexity increase will require less effort.
Being able to produce medical monitors with less different kinds of components and less working capital. We aim to achieve this with an improved platform approach => which should reduce the design cycle (including testing) as well.
RTOS support for next generation multicore architectures
Improved tool integration; improved process support; component-based design; certification of systems composed of certified components

The project will provide methodologies to facilitate testing and verification of safety-critical systems. This will reduce costs and time-to-market, increase re-usability of components across products and across sectors (e.g., automotive, avionics, railway), etc.
One of our main targets was to minimise power consumption of a given IC by 20% with no negative impact on other parameters and functionality of the IC
From the mobile Internet towards the Internet of embedded systems (sensors, things) - measureable security
Wireless technology with interoperability offers retrofit capability for existing building and reduced installation time, effort and cost for new buildings, also reconfigurable and future-proof. Energy savings of up to 30% are possible.
Greater potential for reuse. Support for iterative and incremental development (including qualification and certification).
New firmware templates for safety-intensive applications, in demanding environments.
Re-certifiable components in multicore architecture, mixed-criticality systems, using time and space partitioning technologies.
Reduce the cost of new WSN nodes and expand their functionality. Reduce power consumption of video-capable WSN nodes
Reusable components will cut the cost of recertification.
Reduction of development time
A new system for telemonitoring the health status at home will reduce hospitalisation. The system will have flexibility so it can be re-used for new diseases.
Hide parallel aspects for the user and efficiently exploit parallel machines.
Use of common hardware platforms across a broad range of new products and portability of modular firmware.
Mainly in Smart Spaces with multiple areas of applicability
Embedded systems in smart environments
Co-simulation
Increase reliability and conformity.
Creation of an open platform where information originated by multisource devices / subsystem can be integrated and interoperate; standardisation efforts; “clinical validity” (accuracy) of multi-sensorial wearable subsystems; innovation in visualisation systems for medical applications.
Distributed controls
Developed system architecture for use horizontally in several domains and markets, thus reducing development and deployment cycles for customers.
Increased performance of multicore applications.

Increase efficiency in energy use
Cross-optimisation of security and safety analyses of embedded systems leading to a better understanding of the interactions, better management of the risks and potential cost reductions due to combination of safety and security systems.
Requirements engineering
Develop adaptation of the methods for recognition in railway domain which requires adjustment of parameters of the optical detecting layout, data acquisition electronic circuits and processing algorithms to new conditions, resulting in a completely new type of device and a laboratory prototype of snow sensor for switch-point heating controls through testing in work conditions and optimisation of algorithms.
Safety issues on e-drive system and battery management system in line with ISO262626
Establish an overall system approach for healthcare based on an integrated system concept of seamless integration of interoperable components
This project will contribute to SAFEVIEW at home delivery products interacting with digital TV
Ambient Assisted Living
Reconfigurable architectures that will allow reuse of embedded systems. Enhanced security in communications and protection against external attacks.
They contribute to building an advanced software systems framework to enhance reliability and costs for real-time embedded systems.
Methods and processes for safety-relevant embedded systems, embedded systems in smart environments
Reduction of development time for experimental set-ups for video processing (similar to the product in collaborating companies). Access to wider results of evaluation of image and video processing algorithms in embedded environments.
Methods, techniques and tools for the design of driving support systems, including the human user state from the beginning of the process (system functionality is thus improved and, for example, the HMI design does not need to be modified each time).
Project objectives are 20% improvement in time to market, development costs and costs of poor quality. Approach is to improve the way design tools are used in the development of ES.
The cost of the certification of software components in critical systems will be reduced. We are focusing on the railway and health domains. Reusability of software components will be an important key.
Achieve 15% reduction in development cycles, especially in sectors requiring qualification or certification, on 2011 levels: development of methodologies to reduce time and effort for the verification of safety-relevant systems within the automotive domain. Reduce the effort and time required for revalidation and recertification of systems by 15% compared with 2011 levels: automation of verification steps will also contribute to a more efficient revalidation and recertification.

ANNEX 3:
Most important innovations

Highly integrated and secure tools to monitor cardiac patients at home.
The project develops an integrated approach to consider the influences between safety and security.
The creation of a tool chain that can support the design of the embedded systems development cycle from requirements engineering to the verification, validation of detailed embedded system design.
The Platform
A set of new technologies (both software and hardware) for making more secure and/or more reliable embedded systems.
Roll-out of adaptive networks that enable the monitoring and control of large and complex environments
The possibility of having critical and non-critical applications on one unique micro controller (so reduced hardware) due to the results of the project guaranteeing the non-interference of one with another.
General availability of modelling methodologies facilitated by the Open Source approach, where all tools are made available free of charge. In order to disseminate the modelling methodologies and tools to a wider group of SMEs the project has established a wiki based entry to tools, models, libraries and tutorials guiding new users through modelling exercises. Provision of four SystemC based Models of Computation (MoC): the Untimed MoC, the Discrete time MoC, the Continuous time MoC and the Synchronuous MoC. These MoCs have been carefully selected in order to be able to model the application domains of the SMEs within the project. Other languages (C, VHDL, Matlab/Simulink) are integrated into the system model using SystemC wrappers. Tutorials help the SMEs to get started with the MoC libraries.
Reconfiguration techniques for power constrained sensor and mesh networks
Emerging cooperation and mutual understanding between robotics and V&V communities. Highly relevant for emerging service robotics market.
Improved performance analysis technologies
A new component-based approach, X-MAN, to system design, together with a new development life cycle, the W model, that is more complete than the current standard V model. X-MAN enables hierarchical construction and compositional V&V, which combats scale and complexity whilst the W model enables increased component re-use by defining separate life cycles for component and system development.
Our company currently provides services to patients that focus on supporting these patients in certain healthcare related behaviour, for example, medication use. These services are currently single dimensional coaching. With the technology developed in the project, we can introduce multidimensional coaching. This is multidimensional because it combines input from multiple sources, and it is multidimensional because it interacts with the patient on multiple platforms. This technology will enable us to implement context dependent feedback that takes a multitude of input data into consideration and that selects the device to deliver this feedback based on the current situation of the patient.
Having a set of engineering design rules that result in a sound platform approach for product development.
Too early to say. Hardware support for resource based scheduling, QoS, fault tolerance.
Company-specific Instantiation of the Reference Technology Platform
An implementation of the methods/tools to verify and test systems against the ISO26262 standard, and a way to certify components out-of-context.
Success in achieving power savings
New development-supportive tools, patentable products already emerging from interim results
The approach of measuring security parameters through quantifiable numbers. “What does security mean?”
Open source middleware platform with energy/context awareness enables high degree of interoperability amongst heterogeneous devices and systems. Energy savings of up to 30% possible. Also develops next generation of wireless gas meters.
Multicore support
Component based design (CBD) enables higher levels of abstraction for reduced implementation complexity. The integration of CBD with model-driven development creates a potent combination especially capable of mastering complexity, increasing reuse potential, guaranteeing robustness and quality, easing maintenance, while also reducing costs and risks of development and deployment via support for iterative and incremental development. That very combination also creates important challenges for the development of high-integrity software. The CHESS project (ARTEMIS-2008-1-100022) has made landmark contributions in the above directions, in methodology as well as in technology.
--
Adaptation of reference Linux distribution on the new, targeted research HW.
Use of run-time tracing technologies for analysis and verification of embedded software.
Interoperability and legacy support.
Guidelines for certifying mixed-criticality systems on multi-core platforms.
Apply the research performed within the organisation in order to produce a marketable product
Get experience with certification and check possibilities to ease this job
New design strategies for HW/SW systems, early estimates of the design costs
Enabling decision support via the design and implementation of embedded intelligence supporting context-aware and pro-active decision processes in complex data and information-intensive situations.
Integration of state-of-the-art HW/SW elements for telemonitoring and diagnosis with systems at hospitals in order to provide a complete and compact tool for physicians
Obtain the best performance from any parallel architecture (mostly GPU) based on an hidden iterative process
New development paradigm and tools in technologies related to the Internet of Things

New FMI Standard for co-simulation reshaping the industry. Very large adoption from tool vendors and industrial companies.
Miniaturisation of hardware platform by incorporation of algorithms
Validation of a new technological framework for a modelling tool.
Implementation of standardised communication protocols for smart grid based application integration
Security framework for multiple scenarios based on ES.
Novel and cost saving safety approaches
Optimised and improved microgrid management together with an effective control of loads by means of embedded systems to successfully cope with demand energy peaks, thus minimising the probability of sporadic blackouts.
We consider it comes from two different perspectives: the development and validation of a new system and components (smart gas advanced metering infrastructure) and the integration of this new system with a energy optimisation middleware.
1.Learning multicore usage 2.New way of working 3.New tools for design, implementation and testing
1. Processing of the ECG signals for feature extraction including non-invasive evaluation of serum potassium concentration in the blood; 2. High dynamic range displays for medical images and innovative calibration solutions; 3. Innovative solutions for Computer Aided Detection in medical images. 4. Overall system architecture for a "continuum of care"
The application of innovative ideas into a sound application framework. At least at the national level, it is always difficult to have strict relationship between research institutions and industries. The ARTEMIS framework and the project aims at bridging this gap but the dimension of the ARTEMIS projects is a clear obstacle to this goal. However, it is difficult to be optimal: small projects have more control but narrower scope whereas large projects are ambitious, still very cumbersome to manage and drive efficiently towards success.
Embedded technology
Developed an integrated framework of technologies which enable large scale Wireless Sensor Networks solution for real-time, continuous and reliable monitoring of environment and natural parameters (in an unprecedented way).
Development of power-consumption measurement devices and processing of measurement results by energy-management algorithms.
Tool-chain for parallelizing legacy code.
Application of the final product to a business case
A suite of systems analyses tools
Combination of boilerplate and ontologies to improve requirements
The HMI methods and techniques. The task analysis approach in the HMI development phase. Human-centred architecture
Capability in wireless sensor networks. Proving scalability is possible.

RE-certification time reduction, i.e. time-to-market reduction
Reduced cost for e.g. electronics for safety, especially in battery management system
Composable safety argumentation, making it easier to develop components with partial argumentation that fits into a system context where the system with additional argumentation is being certified to a safety standard
Facilitating reuse of existing certified components
More information extractable from MRI images
Creating a BUSINESS CASE at HOME. FTHH an OpenNetwork is main strategic line in the coming years; to provide advanced services over this network will be a critical issue for success. SAFEVIEW plans to integrate SIMPLE MIDDLEWARE in SetTopbox to provide domesctic services (current business case) integrated with the PUNTO AZUL interactive solution. The following scenario could apply: Mr X consumes milk, SIMPLE MIDDLEWARE detects the last pack, then PUNTO AZUL sends a banner to TV with milk. Mr.X select the banner and he gets a discount coupon for milk in a shop near him. We also plan to integrate SIMPLE middleware capabilities, integrating wireless medical sensors, wireless positioning bracelets and RFID tags in keys, wallets and other personal objects, and integrate them with backend systems for health management, providing advanced services for dependent or elder people.
Ease the life of multicore programmers. Low power consumption
A solution able to manage and control a microgrid
Better understanding of the applicable algorithms
A new approach to WSNs that allows reusability through dynamic reconfiguration and enhanced security in the communications and the devices for specific applications
Investigation of software design methods, processes and tools. Applicability of those frameworks to development of operational projects.
Development of new generation of products, new processes, which will enable the growth of new technology - e.g. electromotive industry
Reduction of certification and recertification times. Development of new safety methods for multicore processors
As a research organisation, we value the publication results and (journals/conferences) and also better integration in the European research community. However, technological output is also important, such as hardware accelerated object recognition in FPGA, protection of I/O in embedded systems, etc.
Advanced driver models (including personalisation and state classification)
Provide the ability to substitute tools to prevent vendor lock-in and increase competition between tool vendors.
New reusable process model and component model for different industrial domains. Also new or extended tools that will help in this new process model
As an academic partner we aim to make academic methods also applicable to case studies from industry. Key issues for this are handling the complexity of real application scenarios, customisation of available academic methods for the provided case studies in the project, and improvement of the research methods.

ANNEX 4:
Application Prototypes / Demonstrators

Prototype chip-level hardware implementation of complex algorithms, system-level integration of a working demonstrator for field evaluation
Prototype of telemonitoring at home, middleware for clinical data treatment
Robust PLC modem with increased speed
AUTOSAR electric motor driver
A 400+ wireless sensor network for monitoring data centres, a tool chain of commercial and academic tools for the verification of embedded system design
We are developing a novel hypervisor, the basis of which is being done within the ARTEMIS financed project. We will integrate the new software layer into a couple of the project final prototype deliverables.
Test vehicle with new driver assistance system based on developed hardware platform.
Smart airport management, sense and response logistics, cooperating sensors at home
In-car platform as part of ecosystem of cooperating systems

> Device stabilisation system for stabilising movements and vibration is being modelled. The device alignment can be controlled with two motors. The main objective is to try out different models of computation and platform models. A high abstraction level model was designed and implemented using SystemC and the model was refined to use the system functionality framework and implemented by ForSyDe. > Impulse-Radio Ultra-Wideband Radar: A single-chip CMOS radio system based on Ultra Wideband Impulse Radio technology is modelled with the aim to increase the overall bandwidth in the system from 100 kb/s to 1 Mb/s and at the same time increase the maximum transmission range from 10m to 20m. This will open new markets like wireless ECG. The modelling enables the system parameters to be defined at an early stage in the design process and so far it indicates a 25% increase in the company's productivity. > Hearing aid calibration device: this case produces a behavioural model of an audio calibration device evaluated with design space exploration techniques and partial refinement of the model. It measures a time-domain signal, calculates a frequency-domain signal (FFT) and displays it on a monitor in "perceived" real time. The modelling has identified the systems bottleneck. Preliminary results show that the modelling work can be done in a work process which fits into the fast development and decision phases in AuditData. > Half-duplex UART-based protocol: the aim of this case study is to improve the performance of a protocol by increasing the communication baud rate from 1.5 to 24 Mbps. The first model is a high-level model with the basic functionality and contains a controller sending requests to a group of units sharing the same bus. It allows message and performance monitoring and will eventually estimate the performance of the system, especially concerning the bus traffic. The second model focuses on a behaviour similar to the real-life system, including the analog parts. > Radio System for Intelligent Transport Systems: the emerging market of intelligent transport systems is being addressed in this case, where the development of a new radio system has been selected as case study. The underlying radio standard in this application is derived from the well known IEEE802.11a into the new IEEE802.11p standard. Several technical challenges must be addressed when a radio optimised for 802.11a (WISPA) is redesigned to fulfil the 802.11p standard, e.g. architectural modifications must be implemented to address new use cases. Also performance must be improved, with a focus on software algorithms for handling of Doppler shift and multipath signal propagation as well as linearity in the signal path.
Domestic robot assistant
Low-cost plate identification, low-energy submarine vision system
LPV (avionics), Aircraft fuel management system (avionics), FADEC (avionics)
A runtime system was made consisting of several sensors (from different partners in the project) that were connected through a semantic data broker. This system, geared towards supporting diabetes patient, was complimented by user interfaces on android smartphones, i-phones and laptops. This system was tested with 5 diabetes patients, who each used the system for about one week. The feedback about their experiences and the result of the tests were used as input for further development of the concept.
The design of a new product will be done according the new development approach to prove the positive impact of the newly gained knowledge
smart energy ui
QoS scheduling for on-chip resources +> resilient embedded applications.
Avionics Equipment (= company use case in the project) developed with the company-specific instance of the reference technology platform
Micro-architectural software simulators of microcontrollers allowing fault injection and simulation of faults with more accurate results than those of purely functional simulators

IC RedQueen redesigned with respect to minimal power consumption
EFB devices complete task models cooperative flight deck
Integrating sensor system on a railway, connect to telecom machine-to-machine (M2M) platform and demonstrating interoperability of sensors systems.
Better energy control in industry
Energi Nord provides 2 demonstrators in the project. The demonstrators will be equipped with the devices there are developed in the project.
Automotive on-board electronics system
2 pilots showing interoperability of the hardware, business GUI & middleware platform with actuation capability, 1 on site in our university, 1 at one of our project partners.
Human Behaviour Estimator
A use case from an on-going satellite system development project funded by the European Space Agency. A use-case control system from a new-generation base station for a large telecom provider. A use case from a new-generation safety-related on-board system for railway applications.
Planned: prototype of a platform for safety-intensive IO-module
Automotive start-up testing
Activity recognition system, energy expenditure system, health risk assessment expert system
WSN node based on FPGA
Graphic demo showing different apps located on different cores
The project (starting in September) will result in HW demonstrators for automotive systems (i.e. driver assistance systems)
Smart embedded emergency dispatching system: a decentralised solution for emergency management
Automatic parallelisation of specific applications for embedded devices to be execute on specific parallel platforms
Cardiac image analysis
Wireless, highly-autonomous sensor node for healthcare applications
Demonstrate communication protocol implementation
Parallelising signal/image processing applications
Emergency systems for evacuations, new technologies to be applied on smart cities (including the communication between smart cars and smart cities) and smart buildings
Tracing tool

Prototype of novel safety approach for safe and deterministic communication in the railway sector.
The validation pilots in e- GOTHAM are for the residential, tertiary and industrial sectors that are located in Finland, Italy and Norway respectively. For example, the Norwegian/residential pilot project in e-GOTHAM will be a part of Demo Steinkjer, which is a large-scale living lab for smart grid activities. The area for this pilot will be in the community of Steinkjer, located about 120 km north of Trondheim. This pilot will cover 771 consumers and one hydropower plant.
Demonstrator of energy-efficiency technologies in Crossleigh House (Cork) - Smart Gas System pilots (2) in Italy - Iitegrated system demonstrator in Barcelona (to be delivered by the end of the project)
Small-scale escalator demonstrator and several demonstrators developed by other partners
High dynamic range display: a new system for “personalised and task-oriented calibration” of medical displays
Smart computer networks able to introduce stronger dependability and safety.
Embedded robot controls, embedded monitoring systems
Integrated System Prototype 1 -> Largest European R&D Wireless Sensor Network base system of +300 nodes for environmental monitoring in testbed environment in ISEP facility, Portugal Integrated System Prototype 2 -> Largest European R&D Wireless Sensor Network full system of +400 nodes for environmental monitoring in real-world environment in SANJOTEC facilities, Porto, Portugal
- Demonstrator of energy-management platform for domestic environments. - Demonstrator of energy-management platform for office environments.
Multicore for Space applications
Provided an application for multicore simulation tool for evaluating the impact of number of cores in application’s performance.
Energy-optimising system in tertiary context
Utilisation of the KB3 and VisualFigaro platforms (see http://sourceforge.net/projects/visualfigaro/) as a tool for joint optimisation of safety and security
GNLQ - Guided Natural Language requirements for Quality. Freeware on Sourceforge. the CESAR tool is DODT KROSA - Tool for Reuse of HazOp results Spinoff - a tool for semiautomatic security analysis
Avionic demonstrator, Ground Control System demonstrator, Automotive demonstrator, Agriculture demonstrator, Civil Application demonstrator, Cognitive monitor software prototype, Contactless video sensors prototype
ATE for on aerospace on broad communication networks
Defibrillator R750 => Task DRD
Laboratory prototype of snow sensor for switchpoint heating controls
e-Drive system
Better imaging chain for MR, better configurable software solutions for our imaging chain
Compilation chain for two application domains

We will implement three different prototypes where we will test the project results. In particular we will have three prototypes (three microgrids): industrial site, residential site and tertiary site.
A new WSN prototype system with high configurability features and enhanced security to be used in high security installations
Demostrator in the context of satellite applications.
Avionics platforms for safety developments based on multicore SOC.
Demonstrator - video and radar-enabled embedded system plus algorithms for its processing (along with collaborating SME).
Cooperative Lane-change Assistant functionality in Automotive domain
Radar digital receiver system
Railway domain demonstrator, the Traintic, and Health domain demonstrator, Osatu's demonstrator. In both of the demos, the objective is to demonstrate that the new process model, component model and the tools created in the project are good enough to reduce the cost of certification of SW components taking into account aspects like reusability.
Airbag system for cars
Country road assist with ES tool chain

ANNEX 5:
Tool prototypes / demonstrators

Web Service for standard clinical data transmission.
A combination of SysML, Matlab and UPPAAL software tools for defining, modelling and verifying embedded system designs
Our in-house developed hypervisor for creating secure execution environment in ARM-based embedded systems.
Test vehicle with new driver assistance function based on developed hardware platform
OpenEHR based Kernel where parts are open-sourced.
System Functionality Framework (SFF). Platform Architecture Framework (PAF). Four SystemC based Models of Computation (MoC): the Untimed MoC, the Discrete time MoC, the Continuous time MoC and the the Synchronous MoC.
Performance analysis technology
X-MAN
1/ design rules for a platform approach 2/ strategy for component reduction + practical implementation guide 3/ economic model to calculate trade-offs in design for supply chain decisions
Tools for performance analysis & modelling: interface from Cheddar to Rhapsody
Micro-architectural software simulators of microcontrollers for performance
Metrics for defining measurable security. Reasoning engines based on security knowledge.
System development tools
A graphical modeller with built-in support for design views. A suite of model-to-model transformations for model-based analysis with back propagation. A model-to-code generator engine based on a suite of library-level correct-by-construction archetypes.
Flagman - for verification of software sequences RapiTrace - for visualisation of embedded software execution
Wireless-based physiological sensors
Expert knowledge extraction questionnaire
Communication protocol
Configuration tool, AUTOSAR modules
HMI design support tooldeveloped within Protegé environment as an ontology allowing the capture and reasoning of HMI guidelines.

Not only the development platform and the architecture themselves but also some demonstrators like smartifiers, sensor actuators and so on...
PragmaDev Tracer
Smart gas meters, data concentrator provided, several middleware versions
Multi-sensorial, wearable platform high-dynamic range display, overall system for “continuum of care” (at home, mobile, in the hospital)
Methodologies and tools for energy-aware network node operation. Methodologies and tools for autonomic computational task distribution.
An embedded platform based on ZigBee technology for the integration of legacy devices into the energy-management demonstrators of the project.
Virtual environment to implement the context and the scenarios
Software/hardware solution of object detection in image/video (its “runtime”, not machine learning).
Driver’s state classifier - recognition and prediction of driver’s intentions
UML synthesis tool

ANNEX 6:
Contribution to Educational Programmes

Design Methodologies for Embedded Systems
Post-graduate involvement in research areas of the project produces results that will form the basis of further research
Part of the courses specifically dedicated to arguments of the project.
PhD course @tu Graz
Syllabus modification of Embedded Systems module to include new methodology and supporting tool chain foe ES design Assignment of new PhD work
Integration in lectures
Courses on modelling
> SystemC training course > Tutorial on Hardware/Software co-design > Seminar on modelling and design of heterogeneous embedded systems > System-level modelling tutorial > Seminar on system-level modelling with open-source tools
Inclusion of results in university courses
Lectures at university
Simulation and performance analysis in some Master courses
MSc course in component-based software development
We host graduate students for graduation projects that involve the technologies and applications that are part of this project. We provide guest lectures about these topics at several universities from time to time.
Vlerick Business School (most famous Belgian Business School) is involved in the project. Knowledge gained can be lectured in their innovation and supply chain courses.
Project manager of our ARTEMIS project also practises at the Electrrical Engineering Faculty conveying both theoretical and practical results of the project to students.
> Specified lectures at the University of Oslo (UiO) in this area. > Establish the information security research focus at UiO > Contribute with the prototype at the “Researchers Night”, an evening for schools to encourage natural & technology sciences

New modules in MSc courses
Through ECSI
All that relates to the use of model-based technologies and methodologies in the development of embedded real-time software.
Embedded Systems
Lectures, UX Certification Programme
Impact by TUT
Embedded Systems curriculum
MSc courses, presentations
Postgraduate courses are based on the research performed within the project
PhD on Computer Science and Electronic Engineering
Tool evaluations
The results will have an impact on the lectures here at Leibniz Universitaet, Hannover
Training on specific parallel platforms and usability to students and external companies organised through dedicated workshops
Several doctoral theses through the universities involved in the project
University Training Programme
Some of the educational partners propose new secure mechanisms for ES presented in workshops, journals, etc.
To be defined.
-
The topics of the research are introduced to regular classes at undergraduate and graduate level.
Dissemination of contents through participation in Master courses in local universities
Invited presentation to present EDF perspective on the importance to industrial security
Large part of our work in CESAR is included in the NTNU course TDT4242 - Requirements and Testing
New courses in sensor networking & diploma thesis
ENAV Academy: 19 September 2012 "Educazione Continua in Medicina (ECM)". http://www.aofs.org/wp-content/uploads/2012/07/121119-AAA-SAVE-THE-DATE2.jpg
PhD thesis
Guest lecturing
Lecture on multicore programming

Direct application of project results to MSc curricula
Master course in the program "Master on Industrial Electronics" at Universidad Politecnica de Madrid, in a course called "Advanced Processing Architectures" and partially in another called "Wireless Sensor Networks".
A new subject related to safety-critical systems for the IT degree
Exploitation of the project research results in courses (we are IT oriented faculty) and MSc and PhD work.
The participants that are universities have planned to organise events and also to design new material for the related courses using the results of the project. It is our case. As university our intention is to design new material for the Embedded Systems Master of the Mondragon University.
Integration of the ongoing research activities of the project into up-to-date courses.

ANNEX 7:
Publications

R. Gazzarata, F. Vergari, J-M. Verlinden, F. Morandi, S. Naso, V. Parodi, T. Salmon Cinotti, M. Giacomini "The Integration of e-health into the Clinical Workflow – Electronic Health Record and Standardization Efforts" ICOST 2012, LNCS 7251, M. Donnelly, C. Paggetti, C. Nugent, M. Mokhtari (Eds.), Springer-Verlag Berlin, Heidelberg 2012, pp. 107-115. R. Gazzarata, F. Vergari, V. Parodi, F. Morandi, S. Naso, T. Salmon Cinotti, M. Giacomini "A standardized middleware for remote and smart monitory of cardiac patientes within an European Project", in GNB2012, June 26th – 29th, Rome (Italy), 351-1/2.

Conference paper presentation at COMPENG 2012 in Aachen by Oliver Schwarz and Christian Gehrmann, "Securing DMA through Virtualization", June, 2012.

The press coverage included appearance in 12 European magazines, among them: ARTEMIS News, Elektronik & Data, ICES News, DocStoc, Weekly Business News. Publications:

1. Sanna Määttä, Leandro Soares Indrusiak, Luciano Ost, Leandro Möller, Manfred Glesner, Fernando Gehm Moraes, and Jari Nurmi, "Characterising Embedded Applications using a UML Profile," in Proc. International Symposium on System-on-Chip (SoC 2009), Tampere, Finland, October 6-7, 2009, pp. 172-175.
2. Leandro Soares Indrusiak, Luciano Ost, Fernando Moraes, Sanna Määttä, Jari Nurmi, Leandro Möller, and Manfred Glesner, "Evaluating the Impact of Communication Latency on Applications Running over On-Chip Multiprocessor Platforms: A Layered Approach," in Proc. 8th IEEE International Conference on Industrial Informatics (INDIN 2010) Osaka, Japan, July 13-16, 2010
3. Roberto Airoldi, Fabio Garzia, and Jari Nurmi, "FFT Algorithms Evaluation on a Homogeneous MP-SoC," in Proc. International Symposium on Multicore Systems-on-Chip (MCSoC 2010), San Diego, CA, USA, September 13-16, 2010.
4. Sanna Määttä, Leandro Soares Indrusiak, Luciano Ost, Leanrdo Möller, Manfred Glesner, Fernando Gehm Moraes, and Jari Nurmi, "A Case Study of Hierarchically Heterogeneous Application Modelling Using UML and Ptolemy II," in Proc. International Symposium on System-on-Chip (SoC 2010) Tampere Finland September 29-30, Tampere, Finland, September 29 30, 2010.
5. Luciano Ost, Leandro Soares Indrusiak, Sanna Määttä, Marcelo Mandelli, Jari Nurmi, and Fernando Moraes, "Model-based Design Flow for NoC-based MPSoCs," in Proc. IEEE International Conference on Electronics, Circuits, and Systems (ICECS 2010), Athens, Greece, December 12-15, 2010.
6. J. Zhu, I. Sander, and A. Jantsch, Pareto Efficient Design for Reconfigurable Streaming Applications on CPU/FPGAs, in /Proceedings of Design Automation and Test in Europe (DATE '10)/, Dresden, Germany,
7. J. Zhu, I. Sander, and A. Jantsch, Constrained Global Scheduling of Streaming Applications on MPSoCs, in /Proceedings of the conference on Asia South Pacific Design Automation (ASP-DAC '10)/, Taipei, Republic of China, 2010.
8. M. K. Jakobsen, J. Madsen, M. R. Hansen. DEHAR: a Distributed Energy Harvesting Aware Routing Algorithm for Ad-hoc Multi-hop Wireless Sensor Networks, in Proceedings of the 11th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM 2010), 2010
9. 2. J. Gan, F. Gruian, P. Pop, J. Madsen. Energy/Reliability Trade-offs in Fault-Tolerant Event-Triggered Distributed Embedded Systems, in Proceedings of the 16th Asian and South Pasific Design Automation Conference, pp. 731-736, 2011
10. Zhu, I. Sander, and A. Jantsch, HetMoC: heterogeneous modelling in SystemC, in /Proceedings of Forum for Design Languages (FDL '10)/, Southampton, UK, 2010.
11. Hansen, Michael Reichhardt; Jakobsen, Mikkel Koefoed; Madsen, Jan (2011): Modelling of Energy Harvesting Aware Wireless Sensor Networks. In: Tan,Yen Kheng (Ed.) Sustainable Energy Harvesting Technologies - Past, Present and Future Intech, pp. 3 - 24, 2011
12. K. Jakobsen, J. Madsen, S. H. A. Niaki, I. Sander, J. Hansen, "System level modelling with open source tools", to appear in proceedings of Embedded World 2012
13. J. Gan, P. Pop, F. Gurian, J. Madsen (2012): Robust and Flexible Mapping for Real-time Distributed Application during the Early Design Phases, to appear in Proceedings of DATE 2012.
14. S. H. Attarzadeh Niaki and I. Sander. Semi-formal refinement of heterogeneous embedded systems by foreign model integration. In Proceedings of Forum for Design Languages (FDL '11), Oldenburg, Germany, September 2011.
15. S. H. Attarzadeh Niaki and I. Sander. Co-simulation of embedded systems in a heterogeneous MoC-based modelling framework. In 2011 6th IEEE International Symposium on Industrial Embedded Systems (SIES), pages 238-247. IEEE, June 2011.

SEE 2011 ReConf 2010 & 2011 ERTS2 2012

all publications are available at: http://pshield.unik.no/wiki/PSHIELD_Dissemination including the list of 6 PhD theses working in the area

http://www.me3gas.eu/

Cavero, C., Rodríguez, J. M., Valle, R., Rugnone, A., Foresti, F., Tamburini, E., Paggetti, C., Gialelis, G., Chondros, P., Panagiotou, C., Ilardia, M., Eguia, I., Puddu, P. E., and Luštrek, M. (2012). Medical expert support tool (MEST): A person-centric approach for healthcare management. ICOST conference. Solar, H., Fernández, E., Tartarsico, G., Pioggia, G., Cvetković, B., Kozina, S., Luštrek, M., and Lampe, J. (2012). A non invasive, wearable sensor platform for multi-parametric remote monitoring in CHF patients. ICOST conference. Kaluža, B., Luštrek, M., Dovgan, E., and Gams, M. (2012). Context-aware MAS to support elderly people. AAMAS conference, demo. Luštrek, M., Cvetković, B., and Kozina, S. (2012). Energy expenditure estimation with wearable accelerometers. ISCAS conference.

1 E. Tsiporkova, T. Tourwé, N. González-Deleito and A. Hristoskova. Ontology-driven Multimodal Interface Design for an Emergency Response Application, In Proc. of the 9th International Conference on Information Systems for Crisis Response and Management, ISCRAM 2012 (Vancouver, Canada, April 22-25, 2012).
2 T. Tourwé, E. Tsiporkova, N. González-Deleito and A. Hristoskova. Ontology-driven Elicitation of Multimodal User Interface Design Recommendations. In: Proc. of The 23rd Benelux Conference on Artificial Intelligence, BNAIC 2011 (Ghent, Belgium, November 3-4, 2011), 231-238.
3 E. Tsiporkova, T. Tourwé and N. González-Deleito. Towards a Semantic Modelling Framework in Support of Multimodal User Interface Design. Lecture Notes in Computer Science "Human-Computer Interaction – INTERACT 2011", 6949 (2011), 636-639.

More than 300 publications (all of them have been detailed within the dissemination reports)

SDL Forum

pHealth Conference 2011-Proceedings ICOST Conference 2012-Proceedings ISCAS Conference 2012-Proceedings ARTEMIS Magazine

EMMON research results have been published and presented in top international events: 9th IEEE/IFIP International Conference on Embedded and Ubiquitous Computing (EUC 2011, http://anss.org.au/euc2011), October 24-26, 2011, Melbourne, Australia; 9th ACM Conference on Embedded Networked Sensor Systems (Sensys 2011, http://sensys.acm.org/2011) in Seattle, WA, USA; 14th ACM International Conference on Modelling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM 2011, http://mswimconf.com/2011/), Miami Beach, FL, USA; Embedded World Conference 2012 (www.embedded-world.de) in Germany 3rd International Workshop on Cooperating Objects (CONET 2012), collocated with the Cyber Physical Systems week in Beijing, China, April 2012;

Regularity and joint time-frequency analyses of non stationary heart rate variability in the assessment of mental effort induced by memory search task L.Y. Di Marco, R. Sottile, L. Chiari, Medical Engineering & Physics To appear The Institute of Physics and Engineering in Medicine London 2012 ESP2: A Platform for Experimental Design in Cognitive Ergonomics R. Sottile, L.Y. Di Marco, L. Chiari Advances in Understanding Human Performance: Neuroergonomics, Human Factors Design, and Special Populations Advances in Human Factors and Ergonomics Series, Ch. 14, Sec. II, 21 June 2010 CRC Press 2010 pp. 142 - 150 ISBN 978-1439835012 Time-Frequency Analysis of Cardio-Respiratory Response to Mental Task Execution L.Y. Di Marco, R. Sottile, L. Chiari Computing in Cardiology Vol. 37, 2010 IEEE Computer Society Long Beach 2010 pp. 753 - 756 ISSN 0276–6574 Cognitive adaptive man machine interfaces for the firefighter commander: design framework and research methodology M. de Graaf Lecture Notes in Computer Science Lecture Notes in Computer Science 6780. Springer Verlag.y Long Beach 2011 pp. 588-597 ISSN 0302-9743 ISBN 978-3-642-21851-4 Please refer to: http://www.cammi.eu/exploitation_and_dissemination
Automotive safety and security / Increasing reliability of single and multiore systems with SW rejuvenation and coded processing
International Journal of Security and Its Applications, vol. 5, no. 4, pp. 91--106, October, 2011 International Journal of Advanced Research in Computer Science , 2011 GSTF International Journal on Computing, 2011 OpenAccess Series in Informatics (OASIcs), 2011 IEEE Software, vol. 28, no. 3, pp. 41-48 , 2011 IEEE Transactions on Computers, 2011 Microprocessors and Microsystems, Volume 35, Issue 8, November 2011, Pages 668-682, ISSN 0141-9331, , 23 August 2011 Scalable Multi-core Architectures. Design Methodologies and Tools, D. D. S. a. A. Jantsch, Ed., Springer,, 2011 D. Soudris and A. Jantsch (Eds.), Scalable Multi-core Architectures: Design Methodologies and Tools. Springer, 2011
DASIA/2011 DATE/2012
Two publications on JCR journals
Journal and conference publications

ACKNOWLEGDEMENTS
Working Group Metrics and Success Criteria for ARTEMIS

I would like to thank the core team of the WG Metrics, which has helped to develop the questionnaire and analyse the answers, more in particular :

> Wim Codenie
> Alun Foster
> Petri Liuha
> Irene Lopez de Vallejo
> Yannis Papaefstathiou
> András Pataricza
> Ad ten Berg
> Elena Tsiporkova
> Antonio Vecchio
> Roberto Zafalon

CREDITS

GRAPHIC DESIGN AND LAYOUT
Studio Kraft - Veldhoven, the Netherlands
Lara Jonkers
Iris Hamelink

EDITING
CPLS – Goirle, the Netherlands

PRINTED AND BOUND IN THE NETHERLANDS
Verhagen Grafische media - Veldhoven, the Netherlands

First edition, March 2013.

www.artemis.eu