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EURON

European Robotics Research Network

Network of Excellence

Information Society Technologies Priority

DR 17.13

Periodic Activity Report—Year 3

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1 Overview

The key achievements in Year 3 are the continued success of:

- the summer schools (WP 7).
- the Springer Tracts in Advanced Robotics, which is largely driven by EURON members, and which is among the top series in engineering for Springer (WP 9)
- the extremely high quality of the Technology Transfer Award candidates (WP 15).

In addition, the following new successes have been realised:

- the revived form of the *Prospective Research Projects* finally seems to reach the community.
- the EURON website has got a dramatic overhaul both stylistically and with respect to content.
- the dialogue with the industrial robotics players in Europe has reached the critical level of intensity.

There are also some activities that have proven to be too difficult to realize, to attract too little interest from the community, or both, such as gender actions, interactions with international organisations, or the activities of the Education & Training key area.

From an organisational point of view, the transitions of (i) the Coordinatorship of EURON, and (ii) the Directorate General at the EC, have caused significant delays in execution of decisions and organisations.

2 Contribution to the research field

EURON is only indirectly influencing research outcome. Its most valuable contributions in this direction are:

- the above-mentioned increased interest in the *Prospective Research Projects*.
- the bridges that some active members in EURON have been able to build between *Cognitive Science* and *Robotics*. (Similar bridges with the controls and computer vision communities would be very welcome too!) This should lead in the medium term to better integrated and hence more valuable research results.
- the continuing advocacy for higher quality of the *experimental procedures*, including the need for *quantitative benchmarks*. The effects are yet very modestly visible, though.

3 Follow up of previous review

We think we have succeeded in implementing successful reactions to all major remarks of the previous review:

- The website has received tremendous attention, to improve the attractivity and the quality and quantity of the content.

- The *Prospective Research Projects* have been revived (both the scope, the submission procedure, and the review process), and we have received over a dozen submissions, with a high approval rate.
- The network has started the discussions about its future, after the end of the current EU funding.
- Benchmarking and good experimental practices have become a major theme in the discussion about preparing research roadmaps and improving the quality of robotics research papers.

4 Workpackage progress

4.1 WP 1: Research Roadmap

The objective of this work package was to outline the state of the art of robotics research, identify obstacles to its progress and develop a plan to address these obstacles.

Building on the results of the first two project phases, namely the first version of the roadmap, WP1 continued to update the roadmap and added new contents.

Several workshops and meeting, both formal and informal, were conducted together with EUROP representatives in order to harmonize the efforts of the EUROP SRA and the EURON roadmap.

The collaboration with the Benchmarking activity has been intensified and links from the roadmaps key areas to related benchmarks have been established in the roadmap document. This will help end users of the roadmap relate scientific questions addressed in the roadmap with real-world applications and benchmarking challenges.

In order to involve more EURON-members in the roadmapping process and to collect the newest ideas and improvements a survey was conducted using questionnaire. The questionnaire was distributed to the EURON-members using the EURON-mailing-list and physically during the Annual Meeting. The returned questionnaire sheets were analysed and the resulting material was incorporated into the roadmap document.

The results from the roadmapping process were collected and incorporated into the EURON research roadmap and presented at the Annual Meeting in March 2007.

Ongoing work will focus on:

- Further gathering of ideas and issues from the EURON members for input in the roadmap, in order to consolidate it.
- Involvement of the end users of the roadmap, like research planners, researchers, industries. (With participation into EUROP's CARE project as a major focus point.)
- Wide dissemination of the roadmapping results to the European and international research community with the goal of enforcing the use and reference of the roadmap by both academia and industries.

The corresponding Deliverables are: [DR.1.2 Revised Research Roadmap](#), and [DR.1.3 Research Roadmap with Measuarable Benchmarks](#).

4.2 WP 2: Research Benchmarks

The Milestones (M.2.4, M.2.5, M.2.6) have been reached. The objective of the work was:

- to consolidate current efforts on benchmarking.
- to promote the definition of new benchmarks in some selected areas, as suggested by the research roadmap.
- to promote good experimental and benchmarking practice.
- the dissemination in the community of existing benchmarks through discussions coordinated with international events, integrating experts in workshops and studies.
- to increase the awareness by organizing and participating in meetings, discussions, workshops to encourage experts in the fields to get involved in the process of benchmark definition and use.

The work performed consisted of:

- keeping an up-to-date inventory and analysis of existing benchmarks and other relevant efforts such as FIRA, RoboCup, PERMIS, RADISH, RAWSEEDS, etc.
- promoting the definition of possible benchmark scenarios in particular domains by experts in these domains by means of many discussions.
- setting up working groups to continue a process of convergence towards consensus in order to ensure community wide acceptance of the benchmarks in the long term.
- a world-wide and a European workshop were held, and a second world-wide workshop is being organized:
 - Workshop on “Benchmarks in Robotics Research” held in Beijing in October 2006 in conjunction with IROS’06.
 - EURON Workshop on “Experimental Practices and Benchmarking” held in Chania (Greece) in March 2007.
 - Proposal submitted for the organization of a workshop on “Performance Evaluation and Benchmarking for Intelligent Robots and Systems” in conjunction with IROS’07 in October.

The main overall result is a considerable increase in the awareness of the importance of benchmarking in the European Robotics Community, resulting in an increasing number of initiatives for defining benchmarking scenarios. The web site (<http://www.euron.org/activities/benchmarks/index.html>) covers the issues of the report plus links to extended descriptions of the material in order to make it available to the community at large, as well as links to on-going initiatives for benchmark proposals.

The corresponding Deliverables are: [DR.2.4 IROS’06 Workshop on benchmarks](#), [DR.2.5 Second EURON Workshop on benchmarks](#), [DR.2.6 Documentation of research benchmarks V3](#). The latter is a document of over 100 pages comprising:

- Up-to-date exhaustive state of the art and analysis about benchmarking in non-industrial robotics, with particular attention to existing benchmarks and those resulting from other relevant efforts such as FIRA, RoboCup, PERMIS, RADISH, RAWSEEDS, etc.
- Reports on experimental benchmarking—including possible scenarios—from working groups on some selected topics resulting from on-going work, discussions and meetings, as suggested by the research roadmap.

4.3 WP 3: Inter-project cooperation

The Milestone (M.3.4, Advisory meeting) has not been reached, because of a lack of interest of the people involved in the Integrated Projects.

Hence, the corresponding Deliverable [DR.3.4 Minutes of meeting with IP leaders at Annual Meeting](#) is void.

4.4 WP 4: Joint Research

The Milestone (M.4.4) has been reached by the launch of *Call 3* for *Prospective Research Projects* (and Special Interest Groups). The reaction of the community has been much better than our previous trials, both in the number of submissions as in their quality.

The corresponding Deliverable is [DR.4.4 Result of research proposals year 3](#).

4.5 WP 5: Teaching Material

The Milestone (M.5.3) was reached by making the first version of the [teaching material database](#) available to the general public.

The corresponding Deliverable is [DR.5.3 First version of the Teaching Material Database](#).

4.6 WP 6: Robotics Curricula

The Milestone (DR.6.5) was reached by releasing the second version of the [course database](#).

The corresponding Deliverables are [M.6.4 Model curriculum for an European Master in Robotics](#), and [M.6.5 Second version of course database](#).

4.7 WP 7: Summer Schools

The Milestones (M.7.4, M.7.5) have been reached: as in previous years, it has been no problem to find organizers for summer and winter schools of a high academic quality, and with a high appeal to PhD students.

The corresponding Deliverable is [DR.7.4 Summer Schools organised Year 3](#).

4.8 WP 8: PhD Award

The Milestone (M.8.3) has been reached by the announcement of the third round of PhD award winners, at the Annual Meeting in Chania. As almost every year before, twelve submissions were received. This year, the jury of the event has been renewed, in order to relieve the previous jury from its intense efforts during the previous years.

The corresponding Deliverable is [DR.8.3 Announcement of winners \(Yr 3\)](#).

4.9 WP 9: Book series

The Milestone (M.9.3) has been reached: during the last year, the following new volumes of the STAR book series have been realized:

- 4 volumes published (2 monographs and 2 edited collections)

- 4 volumes in production (3 monographs and 1 edited collection)
- 2 volumes accepted (1 monographs and 1 edited collection)

The corresponding Deliverable is [DR.9.3 Summary of Yr 3 STAR volumes](#).

4.10 WP 10: WWW site

The Milestone (M.10.3, Single login and tikiwiki infrastructure fully operational) has not been reached, because so much work has been put in reworking the website (according to the last Review comments) and adding content. (The amount of new content has grown tremendously!).

The corresponding Deliverable is [DR.10.3 Statistics on the web usage and its structure](#).

4.11 WP 11: Information about EURON and the Beyond Robotics initiative

The Milestones (M.11.5, M.11.6) have been reached:

- IEEE Robotics and Automation Magazine: 4 columns published:
 1. EUROS-06
 2. EUROP Technology Platform
 3. Interview with Herman Bruyninckx (new coordinator)
 4. 2007 EURON Annual General Meeting
- Press club
 1. 17 articles in printed and internet media with coverage of EURON and Annual General Meeting (March 2007)

The corresponding Deliverables are [DR.11.7 Updated information package about EURON & Beyond Robotics](#) and [DR.11.8 Yr 3 collection of IEEE RAM columns](#).

4.12 WP 12: Liaison with Organisations

Interaction with professional organisations was successfully continued in the third year of EURON:

- At **EUnited Robotics** meeting EURON activities were reported to the member industries (for a listing of EUnited Robotics members: <http://www.eu-nited-robotics.net/members>). As the year before, EUnited Robotics agreed on sponsoring the TechTransfer Award (see WP15). A Memorandum of Understanding (MoU) was settled with EURON and EUnited Robotics.
- Interaction with the **International Federation of Robotics** (IFR), which is also based on a MoU, comprises mainly the regular preparation of the service robotics statistics which is published by the IFR Statistical Department (<http://www.worldrobotics-online.org>). The statistics (including service robotics technology reports, case studies and market forecasts) have become an important component of the World Robotics Yearbook and meanwhile serves a reference to the robotics community, business journalists and government bodies. The service robotics chapter

was submitted in summer 2006 and presented to the press in October 2006. The material has been distributed among the EURON web for use to the EURON community, <http://www.euron.org/resources/statistics.html>. The statistical scheme has been modified for this years census and the mailing to all service robot manufacturers has been sent out recently.

- Interaction with the **EUROP European Technology Platform** has been lively in the last period as the EUROP strategic research agenda (SRA) has been launched (in June 2006). The scope and actions of EUROP platform have been intensely communicated in the EURON community. EURON representatives are member of the Steering Board (making up to 20% of the votes) which defines and updates the Strategic Agenda and oversee its implementation, see <http://www.robotics-platform.eu.com> for more details on the EUROP governance.

The corresponding Deliverable is [DR.12.5: Contribution to Statistics/Forecasts/Foresights in Annual Publications such as World Robotics 2006](#).

4.13 WP 13: Sectorial White Papers

Some EURON Members are also partners in the EUROP platforms supporting Coordination Action, CARE. Interactions between both projects have been defined in the last EURON description of work as is described in the following table:

EUROP Activities (CARE DoW)		EURON activities in the Y3 DoW	
WP1.1	Define a method to achieve the sectorial SRAs and to lead towards a common SRA addressing cross sectional challenges towards: <ul style="list-style-type: none"> • Modularity • Common integration architectures and middlewares • Engineering practices, • Methods 	WP14	EURON intends to contribute to the sectorial SRAs with regard to mid-to long-term research trends and challenges. Experts from EURON will point out current activities, trends and challenges in modularity (HW/SW), integration architectures and middleware, engineering and benchmarking methods for cost effective robot development. Results are part of consolidated sectorial SRAs and as cross sectional shemes of a common SRA.
WP1.7	Develop a dissemination and exploitation strategy of the SRA to develop robotic activity and business in Europe. This activity investigates among others strengthening of technology transfer, and spin-off creation.	WP13	In a new workpackage information about commercialization routes of robotics research will be developed and success stories will be presented and communicated. This activity plans to include experts from entrepreneurial studies and consultants

In a two-day workshop with the industrial robotics companies held in Stuttgart, March 9th 2007, the former Industrial Robotics White Paper was reviewed and its new edition has been elaborated very recently. Activities will intensify regarding the industry workshops as the CARE-initiative has been redefined towards a highly visible and endorsed European robotics roadmap.

The corresponding Deliverable is [DR.13.4 Update of the SRA in Industrial Automation](#).

4.14 WP 14: Fostering Technology Transfer and Entrepreneurship in EURON

This is a new WP, without a Milestone in the current reporting period. But the activities have already started, as planned but with some start-up delays.

The corresponding Deliverable is [DR.14.3 Workshop\(s\) on SME Issues](#).

4.15 WP 15: Technology Transfer Award

The Milestone (M.15.3, erroneously denoted M.15.2 in the “Description of Work”) has been reached. The Award is carried out as a joint activity by EURON and EUnited Robotics and has become in its fourth round a highlight of EURON annual meeting. The costs of the Award (cash money for the winners, trophies, distribution of a press release) is split between EURON and EUnited Robotics. Again from 12 submissions of remarkably high quality which have been received early February 2007, five have been selected as finalists for a special session at the EURON annual meeting in March 2007. Two first prizes and two third prizes have been determined by a jury consisting of members from industry and academia. Applications for the Fifth Tech-Transfer Award will be solicited in 2007. A English press release was formulated and distributed. The Award winners were as follows:

Presenter	Affiliation	Application-Short-Title	Rank
Ulrich Hagn, Tobias Ortmaier, R. Wohlgemuth	DLR, Brainlab, KUKA	KineMedic	1
Matthias Haag; Carsten Weiss Heinz Wrn	Schunk/Uni Karlsruhe(TH), Weiss Robotics	The Schunk Dextrous Hand	3
Jocelyne Troccaz; Sandrine Voros	TIMC-IMAG	The Light Endoscope Holder Robot	3
Vincent Nabat, Matt Bjork, François Pierrot	LIRMM/CNRS, Fatronik	Quattro—A New High-Speed Parallel Robot	5
Hong Liu, Peter Meusel, Gerd Hirzinger	DLR	From the DLR/HIT Hand to the SAH Hand	1

The corresponding Deliverable is [DR.15.3 Technology Award ceremony & press release](#). (The “Description of Work” of EURON erroneously gives an incomplete list of Deliverables. . .)

4.16 WP 17: Management

All Milestones (M.17.5, M.17.6) were reached. The status of the management is more than satisfactory, from the point of view of the administrative and legal support.

The corresponding Deliverables are: [DR.17.12 Minutes of fifth board meeting](#), [DR.17.13 Periodic activity report 3](#), [DR.17.14 Annual report on EURON–Yr 3](#), [DR.17.15 Minutes of sixth board meeting](#).

4.17 WP 18: Annual Meeting

This Milestone (M.18.2) has been reached: the meeting took place as planned, with all traditional components: formal and informal meetings of working groups, key notes, Technology Transfer Award, PhD Award, etc.

The corresponding Deliverable is [DR.18.2 Proceedings from EURON Annual Meeting—Yr 3](#).

4.18 WP 19: European Robotics Symposium

No real activity planned in this reporting period (and no Milestone planned). But the venue for EUROS 2008 has already been fixed (Prague) as well as the local organizer (Libor Preucil). Reservations for the event have been made.

4.19 WP 20: International Cooperation

The Milestone (M.20.1) has not been (fully) reached, because of the lack of international interest; no similar organisation such as EURON exist in other continents! EURON does have *Memorandums of Understanding* with organisations such as IFR, IARP, . . . , but these documents have very little practical influence. For example, the Coordinator had a meeting with IARP representatives at the 2007 IEEE International Conference on Robotics and Automation in Rome, but the results of such meeting are poor.

The corresponding Deliverable is [DR.20.2 Minutes of the Second International Robotics Research Coordination Meeting](#).

4.20 WP 21: Gender Action

This WP has reached its Milestones (M.21.2, M.21.3, M.21.4): it organised a workshop on the Annual Meeting 2007, and some of its members also participated to a similar workshop at the IEEE International Conference on Robotics and Automation, April 2007, Rome. The Milestone M.21.4 was given a new meaning, because of the internationally emerged initiative about *Women in Robotics towards Human Science, Technology and Society*, (<http://women.ws100h.net/>).

The corresponding Deliverable is [DR.21.2 Report on Gender Action—Yr 3](#).

4.21 WP 22: Special Interest Groups

The Milestone (M.22.2) is reached, by means of the *Open Call* of February 2007. The response of the community is still rather low.

The corresponding deliverable is [DR.22.2 Special Interest Groups—Yr 3](#).

4.22 WP 22: Towards a Durable European Robotics Entity

This WP has been set up explicitly after the previous review, and has already produced a set of different scenarios for continuation of the EURON network after the EU funding will stop. This WP will be a core activity in the coming year.

The corresponding deliverable is [DR.23.1 Report on the mission and the size of the entity](#).

5 Status of deliverables and milestones

List of Deliverables for Year 3:

Deliverable	Title
DR.1.3	Research Roadmap with measurable benchmarks
DR.2.4	IROS'06 Workshop on benchmarks
DR.2.5	Second EURON Workshop on benchmarks
DR.2.6	Documentation of research benchmarks V3
DR.3.4	Minutes of meeting with IP leaders at Annual Meeting
DR.4.4	Result of research proposalsYr 3 + DR.22.2 Special Interest GroupsYr 3
DR.5.3	First version of the Teaching Material Database
DR.6.4	Model curriculum for an European Master in Robotics
DR.6.5	Second version of course database
DR.7.4	Summer Schools organised Year 3
DR.8.3	Announcement of winners (Yr 3)
DR.9.3	Summary of Yr 3 STAR volumes
DR.10.3	Statistics on web-usage and structure
DR.11.7	Updated information package about EURON & Beyond Robotics
DR.11.8	Yr 3 collection of IEEE RAM columns
DR.12.5	Contribution to statistics/forecasts/foresights
DR.13.4	Update of the SRA in Industrial Automation
DR.14.3	Workshop(s) on SME Issues
DR.15.3	Award ceremony and press release (Yr 3)
DR.17.12	Minutes of fifth board meeting
DR.17.13	Periodic activity report 3
DR.17.14	Annual report on EURON Yr 3
DR.17.15	Minutes of sixth board meeting
DR.18.3	Proceedings from EURON Annual MeetingYr 3
DR.20.2	Minutes of the Second International Robotics Research Coordination Meeting
DR.21.2	Report on Gender ActionYr 3
DR.22.2	Special Interest GroupsYr 3 + DR.4.4 Result of research proposalsYr 3
DR.23.1	Report on the mission and the size of the entity

List of Milestones. The *emphasized* Milestones have not been reached.

Milestone	Title
M.1.3	Publication of revised version of the roadmap
M.1.4	Publication of a extended version of the roadmap
M.2.4	IROS'06 Workshop on benchmarks
M.2.5	Second EURON Workshop on benchmarks
M.2.6	Third version of research benchmarks
M.3.4	<i>Advisory meeting</i> (Month 36)
M.4.4	Completion of second round of project calls
M.5.3	First version of Teaching Material Database made available to general public
M.6.5	Model curriculum for an European Master in Robotics
M.6.7	The second version of course database is made available
M.7.4	Fourth round of summer schools
M.7.5	Fifth round of summer schools
M.8.3	Announcement of third round of PhD award winner
M.9.3	At least 8 new volumes in the STAR series
M.10.3	<i>Single login and tikiwiki infrastructure fully operational</i>
M.11.5	Media coverage for EURON & Beyond Robotics
M.11.6	Publication of 4 issues during the second year
M.15.3	The fourth EURON/EUnited Robotics TechTransfer Award
M.17.5	Fifth EURON Board Meeting
M.17.6	Sixth EURON Board Meeting
M.18.2	Third EURON Annual Meeting
M.20.1	<i>Second International Robotics Research Coordination Meeting</i>
M.21.2	Appointment of the special working group C
M.21.3	First meeting of the working group at the Annual Meeting and making a plan for future actions
M.21.4	Organization of the database of female researchers
M.22.2	Organisation of a second collection of interest groups

6 Dissemination and use of the knowledge

EURON provides dissemination in the following ways:

- The *Springer Tracts on Advanced Robotics* (START) book series.
- A column in the *IEEE Robotics and Automation Magazine*
- The website <http://www.euron.org>.
- The Annual Meeting.
- The summer schools.

7 Other issues

The major new issues for EURON are the new directions that the EC asked the network to investigate:

- The integration of EURON’s *Roadmap* with EUROP’s *Strategic Research Agenda*. This activity has already started, via the EURON members that are also involved in the CARE project. Further actions have to be taken, though, because EURON had already a schedule for the extension of its own Roadmap; this schedule will most probably have to be adapted, because the EC wants to increase the pace of the work.
- The rationalization of the activities in EURON. See App. A for concrete suggestions, that have to be discussed at the Review Meeting.
- The drafting of a *Call for Proposals* for “European Robotics Research Platforms”. (See App. B for a concrete suggestion.) This ERRP could become a new Work Package for EURON, but the precise organisation should be discussed at the Review Meeting.

It is also our intention to ask for a six-month extension of the project, in order to be able to implement the above-mentioned issues, and to allow the Prospective Research Projects to end within the limits of the project.

A Suggested changes to Annex 1—Description of Work

This Appendix gives an outline of suggested changes with respect to the current Description of Work. These suggestions were discussed in the EURON Board, where they did not receive an unanimously positive response; a thorough discussion at the Review Meeting would be very welcome.

Work Packages to be **stopped**:

- WP4 Joint research: no PRPs are accepted anymore after the review; the call will be closed but all submitted proposals will be fairly evaluated. We have to close the Call anyway, since the duration of the Projects should not be longer than the duration of EURON.
- WP5 Teaching Material and WP6 Robotics Curricula, because there is too little community interest for these activities. The suggestion is to keep the started initiatives (web-accessible databases) operational, but not to start any new initiatives and to cancel the planned Milestones and Deliverables.
- WP19 European Robotics Symposium, because there are already enough conferences. (However, this event could be turned into a common “Annual Meeting” with EUROP, see below.)
- WP21 Gender Action.
- WP12 Liaison with Organisations, WP20 International Cooperation (because too little interest from other organisations).
- WP3 Inter-project cooperation (because IPs end, and because not much interest was noticeable here either).

Work Packages to be **more closely integrated** with EUROP:

- WP10 WWW site.
One suggestion is to re-use the domain name <http://robotics-in-europe.org> (which hosted the “Yellow pages” of WP 16, cancelled two years ago) as a **portal** for EURON, EUROP and EUnited, on which news feeds, announcements and columns of all three organisations can appear. For EURON, the news feeds could be for normal news, as well as for announcing drafts of research papers. Technically speaking, the infrastructure for news feeds is readily available; the way it would work is that each partner registers some webpages with the EURON server where that server can harvest the news on a daily basis. In the most ambitious version, this would require an *increase* the budget of the WWW package, part or all of which could be shared with EUROP. A more extended and dynamic website will also contribute tremendously to the long-term survival opportunities for EURON, because a portal could generate income to fund the network activities.
- Annual Meeting.
The suggestion is to keep the reservations that have been made already in Prague for the EUROS 2008 Conference and Annual Meeting, and to use them to drastically extend our Annual Meeting in the direction of EUROP and EUnited Robotics. In recent informal meetings between the EURON Coordinator and representatives from EUROP and EUnited (Rainer Bischoff, Thilo Brodtmann, and Stefan Sagert) the suggestion of doing more of these things together was well received. The Annual Meeting is a concrete example, where industrial and academic people (including PhDs!) could meet. In principle, this could even become *the* annual gathering of research robotics, as a complement to trade fairs such as Automatica etc.

- Dissemination.
The newsletter idea (that has occurred in EURON during the last year) could be more easily executed when working together with EUROP since the combination of academic and industrial news will most probably be more attractive for the target public.
- WP2 Benchmarking and WP1 Roadmapping.
EUROP would take the lead of this activity, via the CARE project.
- WP13 Sectorial White Papers and WP14 Mechanisms to improve TechTransfer and Spin-off Creation. These things are natural fits with industry anyway, and the EURON people involved are also EUROP members.

Budgetary speaking, the abovementioned actions would free more or less one million Euros, which would then become available for the following **new Work Package**:

- WP 24 European Robotics Research Platforms (ERRP), Call for Proposals. (See App. [B.](#))

B European Robotics Research Platforms

This Appendix presents a draft suggestion for a *Call for Proposals*. It covers only the technological aspects of such a Call, not the financial aspects. This draft has been discussed in the EURON Board, but no unanimity has been reached.

European Robotics Research Platforms Call for Proposals

Version June 1st 2007, Herman Bruyninckx

The motivations behind this Call are the following:

- Major steps forward in fundamental robotics research require the availability of ever more expensive and complex hardware and software platforms, as well as the integration of research results from ever more complementary disciplines.
- The investments in such platforms and in the human research power to make optimal use of them are too high for most individual institutes.
- Too few potentially good researchers have access to such platforms.
- The European manufacturers of advanced robotics platforms miss too many opportunities to profit from the best research brains in Europe.

Hence, the ERRPs should provide, both, the infrastructure and the stimulus, to bring the best European robotics hardware and the best European brains in robotics together, with the minimum of technical and/or logistic constraints, in order to achieve major scientific and technological breakthroughs that can maintain/improve/create a leading role for Europe in some selected robotics application domains.

The Call solicits consortia to submit a proposal for the creation of such a platform with the following characteristics:

- The consortium illustrates the appropriateness of its Proposal by a possible research roadmap for five years, which is in line with the European Strategic Research Agenda in robotics.
- The goal of the consortium Proposal must be eventual exploitation of the research performed on the ERRP in application domains that will give Europe a leading market position.
- The scope of the proposals should be at least five years.
- The consortium explains its strategy and management process to open up the ERRP to the whole research community in an efficient, fair, and cost-effective way. Researchers that apply for use of the platform are stimulated to link their research proposal to the European Strategic Research Agenda in robotics. Nevertheless, research proposal that deviate from the SRA can be accepted too.
- Two independent Review Boards are involved in the ERRPs: the first Review Board evaluates the proposals for the platform; the second Review Board evaluates the proposals of researchers that want to use the platform. The latter proposals are *not* part of this Call.

- The consortium makes a contract with the vendor(s) of a robotics platform in which the vendor provides open access to as many levels of the platform as required by its research roadmap. What “open access” means concretely is up to the consortium to specify. Anyway, these open interfaces should be described quantitatively in a contractual way with the EC, and available without costs or Non-Disclosure Agreements to interested researchers.
- The platforms are maintained by dedicated staff, and the provided hardware and software are sufficiently open and standardized in order to reduce the costs of customized interfacing (hardware and software) by the visiting researchers. All necessary care must be taken to avoid discrimination of research proposals on the basis of inside knowledge about the workings of the platform.
- If the ERRP platform consists of offerings by different vendors, these vendors should provide one single, standardized, and fully documented interface, which still allows the use of the hardware and software up to its technical performance limits.
- The consortium and the vendor(s) make a concrete proposal about where the platform will be hosted, what further hardware and software developments are required and/or appropriate, who will achieve these developments, what the maintenance of the platform will be, and how it will be organized.

Examples of further developments are: support for the benchmarking goals that the Strategic Research Agenda in robotics will require; standardization compliance in case of newly emerging robotics standards, approved by the platform Review Board.

The platform need not be hosted in one fixed location: it could be more efficient to let the platform travel, instead of the researchers.

- The consortium is only responsible for the creation of the platform and the logistics of running it, not for the research to be performed on it, nor for the travel and hosting costs of guest researchers.
- The consortium must define one or more “Grand Challenges” for its platform, that is, ambitious but realistic research goals that would mean a fundamental breakthrough in the domain(s) that are supported by the platform. The “Grand Challenge” must be accompanied by a quantifiable benchmark.
- The consortium optimizes the public availability of the fundamental research results. An open source license to software developed on the ERRP, or a freely accessible, completely documented repository of experimental data, are both valuable strategies, but alternative suggestions are welcomed. Case-specific Intellectual Property arrangements with individual researchers are possible, subject to approval by the Review Board that is responsible for the research projects on the platform.