

EURON - EUROPEAN ROBOTICS NETWORK THE REAL INTEGRATION AND STRENGTHENING OF THE EUROPEAN RESEARCH AREA

Ognyan Manolov

e-mail: omanolov@bas.bg

*BG Representative and Managing Board member of European Robotics Network of Excellence – EURON
Laboratory of Mobile Robotics – LAMOR, ICSR-BAS, Sofia 1113, P.O. Box 79, Bulgaria*

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ABSTRACT

Robotics is expanding into a number of new application domains and it offers new opportunities to study human-robot augmentation (human-bionic system), advanced autonomy and user interfaces, and in addition human-robot augmentation (human-bionic system), advanced autonomy and user interfaces, and in addition integration of communities of “simple” robots opens new opportunities in terms of task achievement and flexibility.

I. INTRODUCTION

To enable a coherent approach to robotics in Europe there is a need to integrate regional research efforts with the activities within the “Beyond Robotics” program, and provide mechanisms for dissemination. This is particularly important in a European context, where there is a limited history of coordination. In both the USA and Japan, there is a long history of programmatic coordination of the research communities. In the USA, the DARPA agency has for more than 10 years run a programme on “Mobile Autonomous Robot Systems (MARS)”, and before that, the “Unmanned Vehicles Programme”, not to mention the NASA related programmes. The MARS programme has involved a significant degree of integration across institutions, with joint demonstrations, regular coordination workshops, etc. This has obviously generated significant common efforts across involved parties. In Japan, similar coordination efforts have taken place through the MITI agency, most recently as part of the “humanoid” initiative. There is thus a significant cohesion in the involved research communities, which also has led to a number of new research ventures in robotics such as the “search and rescue” effort in the USA and several robot entertainment initiatives in Japan.

During the last 3 years the EU has, as part of FP5, sponsored the network “European Robotics Research Network – EURON” to integrate the research community. This coordination has primarily focused on integration of national programmes, as there has been no explicit

European-funded robotics programme. As part of the FP5 programme there have been a number of robotics-related efforts, but they have been ad-hoc efforts or part of programmes where robotics was a secondary issue. The EURON network has been successful in the coordination of (relatively) diverse national programs. With the introduction of a European programme focused on robotics (the “Beyond Robotics” programme) there is a possibility for:

- European integration in robotics
- Coordination across the sponsored integrated projects in robotics.

Thus with a new programme on robotics there are rich opportunities to achieve significant integration. The network will also assist in dissemination, community efforts, and industrial transfer. At the same time, it must be recognized that the FP6 framework programme focuses on a smaller number of topics than FP5 and will involve a (relatively) limited number of research groups. The “Future and Emerging Technologies” (FET) action is also responsible for handling emerging ideas and approaches, as it was in FP5. As part of its mode of operation the EURON network will set up mechanisms for incorporation of such emerging ideas. Consequently EURON is an effort to set up a strong European community in robotics that integrates research within the FET initiative “Beyond Robotics”, provides the required mechanism for pick up of new ideas, for dissemination and industrial links, while at the same time creating links to nationally funded research programmes and to international activities. Thus, while the network will primarily focus on the topics identified as part of the “Beyond Robotics” initiative, it will also endeavor to provide integration of the wider European robotics scene.

II. WHAT EURON EXACTLY IS?

The present network of excellence EURON is addressed within the EU-IST-FET initiative on “Beyond Robotics” (BR) and provides the required resources to allow for community level integration of the disciplines involved in these BR initiatives. The network focuses on four primary

activities. As the CEC has launched a number of integrated projects (IPs) in BR there is naturally a need for coordination across these projects, and there is at the same time a need to provide a long-term roadmap for the initiative to consider its integration in the long-term goals of the commission (and the involved communities). Research coordination will provide the mechanisms for overall integration of the research within BR.

A number of emerging ideas originating from the IPs and the communities in general might warrant further consideration to determine their feasibility and potential integration into the general initiative. To ensure this the network has a joint research programme through which prospective research projects are sponsored. In addition topical studies across the initiative are sponsored to allow for close integration of the involved communities into the efforts within the IPs. For specialised studies of well defined topics the network setup "research ateliers" for single venue time limited studies..

An important part of the Beyond Robotics initiative is the dissemination of results and excellence beyond the IPs. An effective mechanism for community setup and dissemination of knowledge is through summer schools, standardised educational efforts and new platforms for teaching. Consequently the network organise a wide variety of educational efforts to provide the required human resources.

In addition to education there is also a need to build strong ties to existing and new industries to ensure a long-term pick up of the results from the initiative. This is ensured through a concerted effort related to establishing an industrial club for industries that may utilize the generated knowledge.

Finally, an effort is also related to wider dissemination of results. This effort is divided into general dissemination to the society at large and scientific dissemination to the involved disciplines. A special press and media effort ensure that knowledge is disseminated in a form suitable for the general society. For the scientific dissemination a web facility is used and a new book series will report the results achieved within the initiative.

III. OBJECTIVE OF NETWORK

The overall objective of the network is to ensure that adequate resources and mechanisms are available to enable Europe to become the leading area in robotics. Particular emphasis is placed on the integration of the various efforts within the Beyond Robotics effort. The means to achieve this objective are fivefold:

1. Research Coordination: To provide the required mechanisms for coordination of EU research on robotics, with particular emphasis on the activities within the "Beyond Robotics" initiative. The coordination will both be in terms of development of a roadmap for the initiative

and through mechanisms that facilitate inter-project cooperation.

2. Joint Programme of Research: To provide the resources needed to enable pick-up and evaluation of emerging ideas in the field of robotics. The research programme involves sponsorship of prospective research projects, topical research studies and research ateliers.

3. Education & Training: To provide the required training and education efforts to ensure that there is access to the intellectual capital necessary for the execution of the programme and for subsequent industrial exploitation. This part forms an important component of the effort to spread excellence across the community.

4. Industrial Links: To ensure adequate integration with those European industries likely to exploit the results from the "Beyond Robotics" programme. The set up of links to industry is both in terms of maintenance of close ties to existing industries and more importantly exploration of links to new industrial areas in which robotics might play a role in the future. Consequently, links to SMEs are of major importance.

5. Dissemination: To provide the necessary mechanisms for dissemination of information about robotics in Europe and results emanating from the "Beyond Robotics" initiative. The dissemination effort is in terms of scientific reporting of results from the initiative, and a general press and media service to make the society at large aware of the results originating "Beyond Robotics".

IV. LIST OF CONTRACTORS

- 1 Kungl Tekniska Hogskolan KTH Sweden
- 2 Universitaet Karlsruhe UNIKARL Germany
- 3 Jaume-I University Jaume Spain
- 4 Technical University of Catalonia UPC Spain
- 5 Ecole Polytechnique Federal de Lausanne EPFL Switzerland
- 6 Universita di Napoli Federico II UNINA Italy
- 7 University of Amsterdam UvA Netherlands
- 8 Fraunhofer Gesellschaft Zur Foerderung der Angewandten Forschung E.V. FHG Germany
- 9 Gesellschaft fuer Produktionssysteme GPS Germany
- 10 Vienna University of Technology TUV Austria
- 11 Katholieke Universitaet Leuven KUL Belgium
- 12 LAMOR, Institute of Control and Systems Research – Bulgarian Academy of Science ICSR Bulgaria
- 13 Czech Technical University in Prague CTU Czech Rep
- 14 Universidad Carlos III de Madrid UC3M Spain
- 15 Tallinn Technical University TTU Estonia
- 16 University of Southern Denmark SDU Denmark
- 17 Centre national de la Recherche Scientifique Delegation Midi-Pyrenees CNRS France
- 18 National Technical University of Athens NTUA Greece
- 19 Mta Szamitastechnikai es Automatizalasi Kutato IntezeteMta-Sztaki Hungary
- 20 University of Ulster Ulster Ireland
- 21 Tel Aviv University TAU Israel

22 Politechnika Warszawska WUT Poland
23 Instituto de Systemas e Robotica ISR Portugal
24 Jozef Stefan Institute JSI Slovenia
25 University of Oulu Finland
26 University of Plymouth United Kingdom

V. POTENTIAL IMPACT

Both the USA and Japan are considered leaders in robotics; while the same cannot be said about Europe. However, Europe is the de-facto leader in (industrial) robotics. This has significantly influenced R&D spending in Europe. It is not unusual for EU companies to invest in research at MIT and Stanford, entirely on the basis of reputation, yet a review of R&D results clearly demonstrates that EU researchers are equally innovative. For emerging areas such as service robotics it is also characteristic that some of the initial products, such as autonomous vacuum cleaners, came from European companies. There is a need to consider how R&D in Europe can be utilized for the foundation of a new generation of robotics-related companies, and how such efforts can be coordinated with activities to generate new economic growth. In doing this, the general competence of the European robotics community must be made more evident so that eventually it will be recognized as on a par with or beyond efforts elsewhere. Furthermore, there is a need to ensure that the relatively limited investment by the EU in "Beyond Robotics" can be integrated with national efforts so as to ensure a synergistic multiplier effect.

Finally, EURON will ensure that novel ideas, that might generate major innovations, are picked up. The impact is thus expected to be:

- Making EU the leading R&D region on robotics
- Building the required infrastructure to support the emergence of a new industrial sector (human augmentation and service robotics)
- Providing the best human resources for commercial exploitation and continued development of European robotics research.

5.1 Contribution to standards

As part of its effort, EURON will develop research benchmarks that can be used for comparative studies. For companies entering into robotics it is crucial to get access to comparative studies to truly assess the value of new methods. In addition, the Industrial Links area will actively work to establish "gold standards" in robotics to allow classification of new methods and thereby assist in the component-based integration of systems. The role of system integrators has often been neglected in automation and for this type of company it is crucial to have access to standard models for new methods. Consequently EURON will work with SMEs and systems integrators to establish standards for systems and components.

5.2 Contributions to policy development

EURON will work actively to develop and maintain a roadmap for robotics research. The roadmap will not only outline how robotics can be used by the established industry, but also explore how robotics can be applied in new business sectors of particular relevance to "Beyond Robotics", including robotic prosthetics, service robotics and large scale integration of system communities. As part of this activity, a number of issues in terms of human-robot co-existence and cooperation will need to be considered and policies will have to be developed to allow use of such systems. EURON will attempt to play a central role in this policy development.

In addition, EURON will endeavour to develop standard curricula for teaching of robotics (from an integrated point of view). Here it is anticipated that a standard model curriculum can be developed, and the question of how such a model can be integrated into the established educational system will be considered.

5.3 Risk assessment and communication strategy

The EURON effort carries a minimum of risk as the focus of the network is broad brush. It will attempt to integrate a broad community. The risk might of course be a lack of focus. The tight coupling to the three integrated projects sponsored by the CEC in the area of "Beyond Robotics" does, however, give a clear direction to the many diverse activities in EURON. Furthermore, there is already a strong interest from the community to become involved. Consequently risk is considered minimum. For communication EURON will use a number of mechanisms – from an active WWW site, to regular communication in the most widely distributed magazine within the community. In addition, workshops on specific topics will be organized. For the involvement of young researchers, a number of summer schools will be organised each year. Experience from the FP5 NOE has demonstrated that these are effective mechanisms for reaching a wide community beyond the normal robotics institutions. In addition to the scientific dissemination the network will setup a press / media service from the entire initiative of "Beyond Robotics" to make the general society aware of the results.

VI. DEGREE OF INTEGRATION/JOINT PROGRAMME OF ACTIVITIES

VI.1 Integration Activities

For the integration of research within "beyond robotics" two mechanisms will be used:

1. Road mapping and benchmarking: definition of a roadmap for the area of "Beyond Robotics" and development of a number of benchmarks that allow comparative research.
2. Inter project cooperation: Set of mechanisms to allow cooperation across the projects involved in the "Beyond Robotics" initiative.

VI.1.1 Research Coordination

Research Roadmap The Research Coordination effort is responsible for the EU-wide generation of roadmaps for R&D in robotics. The effort is expected to comprise studies that:

- Document the state-of-the-art
- Identify major economic and societal driving forces
- Recognize major bottlenecks to progress
- Describe major emerging trends and opportunities
- Identify relevant technological driving forces
- Develop a roadmap to ensure continued progress

The roadmap provides the required background for deciding on potential future programmes in robotics and places the on-going IPs in a broader context. The roadmap will be updated at least every 18 months. Research Benchmarks Based on core problems identified by the research roadmap, the Research Benchmarks effort develops problem sets, qualitative and quantitative measures, and documentation standards to be used for comparing research results and critically assessing the quality of solutions. For major open problems, the definition of scientific competitions has proven quick to attract substantial research efforts and rapid to produce high-quality solutions. In areas of particular interest, actual performance of benchmarking can be enabled by small, targeted actions. Industrial participation in the process of developing benchmarks will be solicited. Methodological know-how on benchmarking will be disseminated via summer schools and a benchmarking web site. Systematic benchmarking will: foster the overall quality of research results; improve publication opportunities for EU-based research, thereby increasing international visibility of European research; and lead to rapid adoption of new research results by application developers and the robotics industry.

VI.1.2 Inter-project Cooperation Activities

The EU will, initially, launch 3 integrated projects as part of the “Beyond Robotics” initiative. There may be a certain degree of overlap between these projects, while some of the objectives identified in the work programme of the initiative might not be addressed by any of these IPs. National programmes may also have funded projects dealing with some of the objectives of the initiative. To facilitate community-wide inter-project cooperation a “Strategic Advisory Committee” will be established to discuss and implement mechanisms for inter-project cooperation among the projects of the initiative, but possibly also between the initiative and nationally funded programmes.

In addition the Strategic Advisory Committee will also be consulted before joint research initiatives are approved by the Network Board. The Strategic Advisory Committee comprises project leaders for the sponsored projects and a number of others who are invited to participate depending on the topic of a meeting. The Strategic Advisory

Committee is expected to meet twice per year. For the meeting concurrent with the IP Annual Reviews, the emphasis will be on the status of the initiative. Other meetings will be directed at linkage and cooperation with national programmes, international issues, and outreaches. The Strategic Advisory Committee will be composed of the following permanent members:

- Paolo Dario, SSSA
- Raja Chatila, LAAS
- Hans Wörn, UNIKARL
- Henrik I. Christensen, KTH
- An EU Officer, CEC
- 2 prominent international researchers
- A representative for SMEs
- A representative for the community at large.

The external representatives will be appointed after consultations with the CEC. At the annual review meetings the project reviewers will be invited to participate to provide feedback to the Commission and IP consortia on how the initiative is faring and to discuss of proposed actions. At the non-review meetings other relevant persons will be invited to attend.

VI.2 Programme of Joint Research EURON

To establish its research programme the network will use three mechanisms:

1. Prospective Research Projects,
2. Research ateliers, and
3. Topical Studies

In the Programme of Joint Research there will be other participating entities (third parties) who will be contributing to the execution of the programme in compliance with Art. 17 of the Rules for Participation of the 6th Framework Programme.

VI.2.1 Prospective Research Projects

To ensure that emerging trends and new ideas are adequately addressed the network will issue two calls per year for “Prospective Research Projects”. A Prospective Research Project is a focussed effort to investigate a well-defined problem. Projects are expected to provide support to research within the subject area of the Beyond Robotics initiative and be of an exploratory nature, or test rapidly the credibility of new research ideas and concepts. They complement the research undertaken by the integrated projects, bridge the gaps, consolidating the initiative and its position at the forefront of research. A successful project will generate critical input to one of the on-going IP projects in the area of “Beyond Robotics”. It may also be followed by a submission of a proposal for a regular EU project (STREP). The project proposals will be evaluated through a peer-review process, supervised by the “Network Board”. It is anticipated that at most 2–3 Prospective Research Projects can be sponsored each year at an average level of funding of 100 K Euro per project and with a typical maximum duration of one year. Prospective Research Projects must have a clear value to

the “Beyond Robotics” programme and, as such, address one of the focal areas of:

- Hybrid bionic systems
- Cognitive Companion
- Robot ecologies

The proposed research can be related directly to one of the focal areas, be cross-cutting, or related to entirely new ideas – related to “Beyond Robotics”.

VI.2.2 Research Ateliers

Robotics R&D is performed in national programmes, in the IPs within “Beyond Robotics” and as part of a number of other community programmes (Neuro-IT, complex systems, etc.). There is consequently a need to consider how the wider community can be integrated with the “Beyond Robotics” effort and how inter-project exchange of ideas can be promoted. To this end the concept of a Research Atelier is defined. A Research Atelier is a focussed effort on a well-defined topic taking place at a single venue, with participation of researchers from a number of different institutions and companies over a limited period of time. The duration of an atelier can be from a few days to a month. The aim of an atelier is crossinstitution and/or cross-discipline integration. The result of an atelier can be a roadmap or a focussed study of a particular topic. EURON will sponsor calls for Research Ateliers, and it is in particular recommended that such studies are carried out in close cooperation with the launched integrated projects. At most 1–2 ateliers, sponsored at a level of 100 KEuro each, are expected per year.

VI.2.3 Topical Studies

In addition to the Prospective Research Projects and Research Ateliers, a number of Topical Research Studies may be initiated, providing a very reactive and flexible funding scheme to support the investigation of innovative ideas. The aim is to generate input to the research roadmap or explore research issues of relevance to the integrated projects or the community in general. Such studies are expected to be highly focussed, with well-defined deliverables, in emerging disciplines such as cooperative systems or human-robot interaction. An anticipated volume of 3–4 such studies per year with a budget of 30–70 KEuro is foreseen.

VI.2.4 Call and Evaluation of Research Projects and Topical Studies

Calls for Prospective Research Projects, Research Ateliers, and Topical Research Studies are issued twice per year (March and October, respectively). The objective is to deliver final decisions on received proposals within 6 weeks of the submission deadline. The call for projects and studies will be in the form of a “call for direct contracts with third parties” (according to article 17 of the rules for participation) to execute a small project or a special study under the auspices of EURON. The call will

be advertised at least three months before its closing date through:

- The EURON Web Site,
- The IEEE Robotics and Automation Magazine,
- The EURON mailing list.

The requirements concerning the format for proposals will be made available in conjunction with the announcement of the call. Inappropriately formatted or partial proposals will be disregarded. A proposal must (at least) contain:

1. Objective of study
2. A concise workplan for the effort
3. Measurable deliverables from the effort
4. A timetable for completion
5. A detailed budget for the effort

VI.2.5 Selection of Projects and Topical Studies

The Network Board is expected to meet 5 weeks after the deadline of the call to make a final decision on the received proposals. An EU officer will be invited to the meeting as an observer. In the selection of the proposals for support the Board will adhere to the guidelines for evaluation used by the CEC as applicable. For the discussion of each proposal, board members who have earlier notified a conflict of interest will be required to leave the room while the case is being discussed. Such members are not allowed to express any opinion about the proposal at any time during the meeting. Within one week of the board meeting, proposers receive a written decision regarding their proposal. The decision will include an evaluation decision and a summary of the evaluations received from the international evaluators. In addition, successful proposals will be advertised through the EURON WWW facility.

VI.2.6 Agreement

The EURON co-ordinator concludes a written agreement with the project consortium. This agreement determines the conditions for implementing the research activities and the respective rights and obligations of EURON and the project consortium. The agreement shall be in conformity with the EURON contract. The detailed agreement is specified as part of deliverable.

VI.2.7 Financial provisions and monitoring of the proposal

The financial support to the project is in a form of a fixed contribution (“lump sum”). The payments for an activity will always follow the plan outlined below.

1. A 40% advance of the budget will be paid at contract signature;
2. the last 60% is paid once the deliverables have been approved by the EURON Network Board (within 1 to 3 months of completion).

In their final report the project must show that the cost of participants eligible for funding has been at least as high as the financial contribution received from EURON. For the cost reporting the consortium shall adhere to the

standard CEC cost reporting procedures, cost eligibility and cost models.

VI.3 Activities to Spread Excellence

Press and media coverage Making the general public (the community at large) aware of the initiative is naturally of major importance. To this end, a general media package that outlines the activities within “Beyond Robotics” will be prepared. The package will be updated annually to allow inclusion of research highlights. The package will be prepared in close cooperation with the sponsored IPs. In addition, press conferences will be organised at least in association with the EURON annual meeting. Finally press releases will be organised in connection with the release of major new results. The press and media coverage will attempt to represent the entire area of “Beyond Robotics” in terms of general information. For continual information about the diverse set of efforts within Beyond Robotics contact will be established with a number of science journalists. The network will sponsor journalists to generate general information about the initiative and promote a steady stream of information about the effort to public media. Experience from the EURON network under FP5 demonstrates that effective dissemination and training are best achieved through the use of four mechanisms:

- Graduate Education Activities
- Dissemination Effort
- Links to End-User Industries
- Topical Sessions

VI.3.1 Graduate Education Activities

Summer Schools Graduate education can best be achieved through the organization of focused activities such as one-week summer schools on well-defined topics. This model was adopted as part of FP5 EURON and the response from the graduate students was extremely positive. It is anticipated that such activities will be continued with 4–5 summer schools per year. A call for proposals will be issued twice per year (March and October). The proposals will be evaluated by the Educational Board in cooperation with the Coordinator. The evaluation will, as far as possible, follow the review guidelines for Topical Research Studies outline above. Special initiatives will also be undertaken to ensure that the material prepared for summer schools is made available to a wider audience, either through edited books or through topical WWW sites. Proposals for summer schools must clearly specify how the material will subsequently be made available to the community at large. Model curricula An effort will be undertaken to define a model curriculum in robotics and to define a standard package of courses. To accompany the model curriculum, a model set of educational material will be prepared by leading experts in the field. This will include text book material, standard lectures and example exercises. The material will be integrated into a WEB book that is accessible by anyone. The material will hopefully grow into an encyclopedia for robotics. As part

of this effort an ontology for robotics will be developed. The aim of the ontology is to provide a standard terminology for robotics and for its use in teaching of robotics. In addition the effort will also consider the setup of standardized platforms for teaching and the potential generation of open-source material to support such educational efforts.

PhD Award Every year, the best theses presented during the last two years will be honored with the “Best European PhD Thesis in Robotics” award (named, in honor of Georges Giralt, “The Georges Giralt PhD Award”). The best theses will be published in the STAR book series by Springer and thesis summaries and reviews will appear in special columns of major research journals, such as IEEE TRA or Elsevier RAS. The award and its associated publishing activities will increase international visibility of excellent European research in robotics. The Educational Board is responsible for the appointment of a jury to evaluate submitted theses. The final decision will be announced at the annual EURON meeting and subsequently published on the EURON web site.

VI.3.2 Information Dissemination

Book Series: As a result of EURON I, a new book series was established: Springer Tracts in Advanced Robotics (STAR) published by Springer-Verlag – http://www.springer.de/cgi/svcat/search_book.pl?series=5208 which is also available in electronic form under the LINK service at <http://link.springer.de/link/service/series/5208/index.htm>

The Series co-editors are: Bruno Siciliano, Univ. Naples, Italy, Oussama Khatib, Stanford Univ., USA, Frans Groen, Univ. Amsterdam, The Netherlands. The STAR series publishes new developments and advances in the fields of robotics research rapidly and informally but with high quality. The intent is to cover all the technical contents, applications, and multidisciplinary aspects of robotics – embedded in the fields of Mechanical Engineering, Computer Science, Electrical Engineering, Mechatronic, Control, and Life Sciences – as well as the methodologies behind them. Within the scope of the series are monographs, lecture notes, selected contributions from specialized conferences and workshops, as well as selected PhD theses. Eight volumes have already been published. The goal is to continue the series and establish it as a high quality reference series not only within Europe, but also world-wide. Another six volumes are soon to appear, and several contacts with potential authors will be pursued during EURON (II).

Contribution to web site on European Robotics: In cooperation with the Links to End-User Industries Key Area, a comprehensive web site on European Robotics will be set up and maintained for the duration of the programme. Statistics on the number of hits will be

collected. A regular news section will be updated on a monthly basis, and will provide an interactive forum for real exchange of information between EURON members. Visibility in the IEEE Robotics and Automation Society: The IEEE Robotics and Automation Society constitutes the largest scientific association in the field, counting more than 6,500 members. Many individuals involved in EURON are very active within the society; furthermore, Europe has attained leadership roles in the society – Paolo Dario is the current President, and Bruno Siciliano is the current Vice-President for Technical Activities, while several other European fellows cover strategic positions. The IEEE Robotics and Automation Magazine is an informative technical publication, with large circulation beyond the society and a high impact factor. Following the report in the March 2002 issue, edited by Henrik Christensen and Bruno Siciliano, the goal within EURON is to tighten liaison with RAS and publish a regular column in the Magazine, as well as in the web site of the Society: <http://www.ncsu.edu/IEEE-RAS/>

This is to ensure wide dissemination of information about the network itself, as well as other initiatives promoted within EURON, such as Integrated Projects, Summer Schools and Focused Workshops, PhD Theses, Industrial Links, New Publications, etc. Visibility at Major Industrial Fairs: Dissemination Activities will also involve presence at major industrial fairs, as the result of a synergistic effort with the Links to End-User Industries Key Area to attract potential robot industry to new advanced and service robotics markets. Particular attention will be paid to the interests of SMEs.

VI.3.3 Links to End-User Industries

Robotics is increasingly seen as an enabler of future competitive manufacturing. Thus, it is necessary for robot manufacturers and systems integrators to take advantage of the latest technologies which aim at a new dimension in flexibility, productivity, cost-effectiveness and user-friendliness of robot automation. Besides the well-established industrial robot automation industry, service robots (SR) have spawned a wealth of new companies eager to take advantage of the product and service opportunities in this emerging market. Products may be as diverse as medical robots, automatic industrial cleaning machines, household companions, autonomous vacuum cleaners and even robots for entertainment and education. Service robots are seen as innovative, high added-value products with significant future market potential and thus constitute a unique opportunity for Europe to gain a competitive edge in a critical early phase. The goal of the EURON “Industrial Links” key area was to establish a dialog between robotics industry and research to reduce the discrepancy between the state-of-the-art in robotics research versus actual utilized technology. In order to pursue this goal five actions were defined, which underwent critical appraisal during the last EURON meeting in Lisbon. They are presented in the table below.

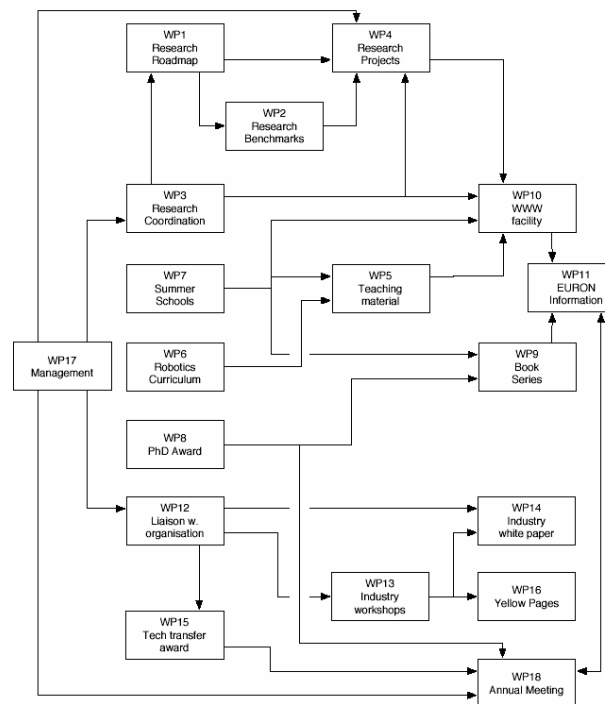


Figure 1: Pert chart of work package activities

VII. CONCLUSION

EURON does not have ethical issues as outlined in the work programme and the contract negotiation guide. However, some of the involved integrated projects do have ethical issues that must be carefully considered. To this end the EU might setup an ethical oversight committee for the entire “Beyond Robotics” effort. If such an effort is initiated by the EU the network will work closely with the ethical oversight committee to address the issues related to the overall initiative.

The network involves more than 100 institutions across Europe. For administrative and financial reasons, only a subset of those will directly become “contracting partners” in the sense specified in the FP6-IST work programme. Consequently, the network will be organized as a shallow hierarchy with a limited number of “contracting partners”. A majority of the involved institutions will be affiliated with the network through a membership contract with the coordinator. Furthermore, the network is considered an open entity. The network will allow inclusion of additional members as affiliates any time during its lifespan. Any institution or company with a required minimum of R&D activity in robotics will be eligible for membership. An application for membership, comprising the following information, can be submitted to the coordinator