

Status Report

Technology Platform Sustainable Electromagnetic Environments (EMC, including EMF)

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Overall Context

Platform Rationale and Objectives

Electromagnetic Compatibility (EMC) underpins almost all engineering activities and influences our daily life more than ever at a time that the number of EMC problems is rapidly increasing.

In the coming years the electromagnetic environment will drastically change. A high-speed digital lifestyle and an explosion of (wireless) devices will, without well timed and properly informed action, result in an increase of interference problems in homes, vehicles, hospitals, factories, planes, etc. In addition to this 'natural' environment, intentional electromagnetic threats are also emerging now to which unprotected systems will be vulnerable. Without a coordinated development program in which all stakeholders are involved, this increasingly complex electromagnetic environment cannot be controlled anymore and will lead to more and more interference problems and safety hazards, possibly aggravated by intentional malicious aggressions.

Europe's goal to achieve sustainable growth and competitiveness and homeland security can only be achieved through a better quality and cooperation of the entire EMC research and innovation community. This does not only include the capacity to create new EMC knowledge, but also an understanding of how the EMC knowledge might be used, applied and implemented by industry. Competitive advantage will also come from the existence of an effective know-how transfer from science to useful application in industry. In addition to that, the public fear of electromagnetic fields introduces often non-technical issues where a collaborative approach between researchers from different areas, including medical and psychological experts, is needed.

However, because EMC is distributed everywhere, in any product and environment, research and engineering activities are fragmented. This fragmentation poses a big disadvantage, that is EMC research and innovation does not receive sufficiently coherent attention to establish a determined push towards lower costs and higher social and economic benefits.

In our view, long-term fundamental work of strategic nature in EMC is required now to support emerging technologies and prevent new threats.

Technology Platform Sustainable Electromagnetic Environments

The objectives of the Technology Platform Sustainable Electromagnetic Environments (EMC including EMF) are:

- establish a clear strategic vision on EMC
- strengthen EMC innovation
- enhance international cooperation
- improve cooperation between industry and research institutes
- alleviate fragmentation in research

In short: To facilitate, co-ordinate and accelerate the development and acceptance of technologies that will create in the future an electromagnetic friendly and secure society.

Stage 1: Stakeholders getting together

Platform setup and launching

The scattered and unstructured EMC research activities have been discussed during meetings in spring of 2004, between Profs. Christopoulos, Degauque, Feliziani, Leferink. It was concluded that there is a need for strategic support and combined support via and by industry.

During the European EMC Symposium, September 2004, a first meeting was organised with industry experts and academics (EADS, Philips, PSA Peugeot Citroën, Siemens, Stork, Thales, Universities of Nottingham, La Sapienza, L'Aquila, Twente etc), total appr. 25 attendees. It was decided to establish an Industry Forum on EMC, in order to include EMC as a strategic technology domain in the technology programs of the EU. The core team included Frank Leferink (Thales), Amaury Soubeyran (EADS), Marcel van Doorn (Philips), Marco Leone (Siemens AG), Marco Klinger (PSA-Citroen), and Christos Christopoulos (University of Nottingham). Many e-mail discussions and side-meetings (November 2004 Hamburg) resulted in a draft Vision Paper and a preliminary draft Strategic Research Agenda. The number of stakeholders grew from 25 to over 40.

During the Zurich EMC Symposium in February 2005 the second large meeting was held. The meeting concluded to change from 'Industry Forum' towards a Technology Platform Sustainable Electromagnetic Environments (EMC including EMF). The Vision Paper, accompanied by a letter, was published, resulting in more than 135 stakeholders in May 2005.

A letter on the Technology Platform was sent to the European Commission in May 2005, along with over 20 signatories from leading European industry managers and organisations. The letter also included some suggestions to upgrade the FP7 program.

Stakeholder profiles

Core team: Audi, EADS, Philips, Siemens, Thales, University of Nottingham

Industrial stakeholders (not complete!): Airbus, Fiat, BAe, MBDA, STMicroelectronics, Renault, Selenia, KPN Mobile, Stork, Siemens-VDO, ATMEL, Exendis, SEAT, Galileo Avionica, etc.

Research Institutes (not complete!): NPL, TNO, Qinetiq, Fraunhofer, ARC, ONERA and many universities

Other (not complete!): Department of Defence Procurement (France), MOD (United Kingdom), Royal Navy (Netherlands), CISPR, URSI, MEDEA +

Organisations in 16 European countries, including Austria, Belgium, Croatia, Denmark, England, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Slovenia, Slovakia, Spain, Sweden and Switzerland.

Structure and Governance

Every year alternately the Euro EMC and Zurich EMC conferences will be accompanied by a summit of the ETP-SEE bringing together all stakeholders. The purpose of this summit is to discuss the strategic orientations and the implementation of the Strategic Research Agenda.

Technology Platform Sustainable Electromagnetic Environments

A Steering Board will define, oversee and update the implementation of the Strategic Research Agenda. This Board involves decision makers from leading stakeholders both from the private and public sectors. Stakeholders present at the conference elect the members of the Steering Board, with a target of one third new members every year. The majority shall be from industry (at least half + 1). The others members shall be from academia and research institutes, as well as the presidents of the Euro EMC and Zurich EMC conference, the COST and URSI chairman.

A Chairman of the Steering Board is elected by the Steering Board every 3 year for 3 years. The Steering Board will be supported by a Secretariat that provides secretarial, operational and public relations support for TP-SEE.

Working groups are set-up for specific pre-defined tasks, either permanent or on an ad-hoc basis will be established. The creation of Working Groups is the responsibility of the Steering Board, and mandated by the stakeholders present at the yearly summit.

Stage 2: Stakeholders define a Strategic Research Agenda

Methodology

A preliminary draft Strategic Research Agenda has been discussed in February 2005. The next draft version will be published in July 2005.

Current status

The draft SRA will be the subject of a summit that has been scheduled parallel to the EMC Euro Workshop on 'EMC of Wireless Systems', Rome, 19-21 September 2005. The main theme is dedicated to emerging technologies and their impact on EMI. Research is usually undertaken as a part of projects that are focused on particular products or technologies with a large emphasis on re-active measures that attempt to resolve an unforeseen EMC problem. But problems are increasing and new technologies cannot be used in their intended environment thus resulting in a slow down in innovation and progress. Pro-active projects are needed to investigate methods of dealing with potential EMC problems anticipate and resolve them early in the design process. The following main topics will form the initial thrust of the work: transport systems, including general modelling and simulation techniques for EMC in large systems, human safety, smarter use of the frequency spectrum, intentional EMI (EM terrorism), standardization in the evolving world. Semiconductor technology, information and communication technology as well as multimedia systems and modern power electronic technology will be taken into account. Specific working groups will be appointed for the further development of the SRA as needed.

Summary content and structure

The emphasis is on producing a SRA that reflects a common industrial and research strategy rather than be limited to a description of (emerging) technologies and technical challenges. Once the SRA is produced a key issue will be to decide the most relevant sources and modalities for financing each of the actions.

- Vision and Scope
- Emerging technologies and their impact on EMI
- EMC Research in the future: Identification of European Industry needs
- Benefits resulting from EMC R&D
- Implementation of the programme/Roadmap for EMC R&D in Europe
 - Role of partners: Industry
 - Small and medium size enterprises (SMEs)
 - Institutes and universities
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Communication Strategy

All material is available on our (temporary) website: www.emc-esd.nl.

Public dissemination and consensus building will be promoted via the annual conferences, the website and publications in journals.

Education and Training

Most of the universities with an EMC research group are stakeholders. Via the ETP-SEE, feedback can be given such that they are encouraged to provide the appropriate type of education and training to develop the skills needed by new generations of knowledge workers. The aim is to create the cross-disciplinary skills required, which demands fundamental changes in engineering education and to the organisation of academic research. It also requires new models of cooperative industry-university system-oriented research. The Marie-Curie program can be very useful in strengthening the European dimension.

Stage 3: Implementation of the Strategic Research Agenda

Operational focus and concrete projects

The goal of the ETP-SEE is to create common understanding, to identify top priority research topics and to include them in the EU framework programme for research, other European initiatives (e.g. EUREKA, ESA...) and national and regional programmes. The overarching theme is primarily a coherent approach, which results in useful research for social and economic benefit in Europe.

Industrial orientation

The economic impact of electromagnetic compatibility is huge: EMC related costs count for 1 – 5% of the sales price of electrical and electronic goods. With a European sales volume in electronics around 530 Billion euro (Source: EC Report NACE Rev. 1) the EMC financial impact is in the range of 5 to 25 Billion euro a year. Delay in product introduction or withdrawal of products are further substantial unaccountable costs. There is then an urgent need to support innovative EMC technologies, control costs effectively, and coherently manage the technical as well as organisational emerging challenges of EMC assurance all along the industrial supply chain.

This is the reason that many large industrial parties initiated and support the ETP-SEE, to facilitate, co-ordinate and accelerate the development and acceptance of technologies that will create in the future an electromagnetic friendly and secure society.

Commitment of stakeholders

Stakeholder commitment is first and foremost demonstrated by the significant resources that all parties are investing in this area. There is also strong evidence of stakeholder commitment by the person-days that have been already invested in attending meetings and in the preparation of the vision document, the letters, and the draft SRA. The secretariat has thus far been provided by the Dutch EMC-ESD Society.

Outlook towards building a long-term public-private partnership

Benefits will emerge from synergy between various research and technological development programmes and from new modes of co-operation between industry, academic research and public programs. It is of course clear that the process will need time and will rely on the sustained commitment from all involved parties. The ETP-SEE intends to foster leadership in this area.