

2009



Annual Report on R&T Activities



1. FIVE YEARS OF EDA COLLABORATIVE DEFENCE R&T

ESTABLISHMENT OF EDA

When the European Defence Agency was established under the Council Joint Action of 12 July 2004, R&T was defined as one of its four main functions. The Chief Executive appointed Bertrand de Cordoue as the first EDA R&T Director in October 2004. The EDA work programme for 2005 assigned one flagship action

to the R&T Directorate: the preparation of a technology demonstration for Long Endurance Unmanned Aerial Vehicles (LE UAV). This project resulted in 2005 in the signature of the first R&T contract under the EDA budget: the study "digital LOS and BLOS datalinks for LE UAV".

DEFINING THE TASK

The first EDA R&T Steering Board took place on 22 April 2005. It defined the Operational Concept of the Directorate and established the 12 Capability Technology areas (CapTechs), each devoted to specific technology areas or clusters, within which co-operative activities would be developed. The CapTechs were activated progressively from July to December 2005, along with the recruitment of 12 CapTechs moderators from both Government and Industry. The CapTechs were grouped in three blocks corresponding to the three capability domains (IAP for Knowledge, GEM for Engagement, and ESM for Manoeuvre).

DEVELOPING THE TOOLS

Successful R&T cooperation requires a robust underpinning legal and financial framework. In Spring 2006, the General Conditions applicable to Ad Hoc Research & Technology Projects and Programmes of the European Defence Agency were approved. They remain the principal instrument for defence R&T cooperation in the EDA framework. The Agency also concluded in 2006 a formal arrangement with Norway, allowing that country to participate in EDA projects and programmes. By the end of August 2006, the EDA was fully responsible for the R&T projects previously running under the Western European Armaments Organization (WEAO). The documents establishing the first EDA ad hoc R&T project were signed on 6 June 2007.

A STEP CHANGE IN COOPERATION

The Agency has made significant strides forward into new forms of cooperation. The EDA Steering Board established in November 2006 the first Joint Investment Programme, in which 19 participating Member States (pMS) and Norway agreed to invest € 55 m for R&T in the field of Force Protection, a main challenge driven by operational needs. The second Joint Investment Programme on Innovative Concepts and Emerging Technologies was established in May 2008.

In parallel, the R&T Directorate and the pMS developed a European Defence R&T Strategy, endorsed by the Ministers of Defence in November 2008. The CapTechs configuration was revised in April 2008, making clear the system-oriented approach for some of the areas. Between 2007 and 2009, R&T cooperation between pMS under the EDA umbrella has increased by more than a factor two, rising from € 71 m to € 172 m.

THE EUROPEAN INTEGRATED DIMENSION

Defence R&T cooperation in Europe is not new, but the creation of the Agency, its linkage with the three other key dimensions for developing future capacities (harmonisation of capability requirements, armaments cooperation, industry & market), and the willingness of its pMS to work more and better together will now be enhanced by the coming into force of the Lisbon Treaty. The relationship with other key players in the field of R&T such as the European Commission and the European Space Agency, but also with key actors like NATO, will grow stronger and will allow European investments in R&T to be mobilised more effectively to improve the defence capabilities of the Union.

Christian Bréant, R&T Director

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2. CAPABILITY AND R&T CONNECTIVITY

The Capability Development Plan (CDP), developed by the pMS within the Capability Directorate, is “the driver” for the R&T community, as it defines the future military needs and priorities of European capability development. The CDP has identified twelve priority actions that need to be addressed by EDA pMS. Out of these priorities, four areas were selected for immediate attention in view of the need for R&T work to improve the related capabilities:

- Counter-Man Portable Air-Defence Systems (Counter-MANPADS),
- Chemical-Biological-Radiological-Nuclear protection (CBRN protection),
- Mine Counter-Measures in Littoral Sea Areas (MCM),
- Counter-Improvised Explosive Devices (Counter-IED).

The EDA R&T and Capabilities Directorates worked actively in 2009 to support pMS in these four work strands, and organised several combined workshops with CAP and ARM in these areas.

COUNTER-MANPADS

R&T work related to the CDP priority Counter-MANPADS focused on supporting the work of the Project Team (PT) “Counter-MANPADS” led by the Capabilities Directorate. In particular, the EDA organized on 16 and 17 June 2009 a successful workshop gathering not only pMS capability and R&T experts, but also representatives from other relevant organizations such as the European Commission and NATO. R&T experts also participated in the management of the EDA study “Protection of Air Assets from Low to Medium Altitude Ground Based Threats”, and the PT members were informed about Counter-MANPADS proposals under preparation in the CapTechs, especially in IAP3, GEM2 and ESM2. In addition, Italy supported actively the preparation of EDA projects by a Counter-MANPADS proposal at CapTech level, and by raising the topic at R&T Directors Steering Board.

CBRN-PROTECTION: THE BIO EDEP PROGRAMME

An ad hoc Category B programme on the preparation phase of a “Biological Detection Identification Monitoring Equipment Development and Enhancement Programme” (BIO EDEP) was formally endorsed at the EDA Steering Board Meeting in Ministers of Defence formation of 18 May 2009. Current planning foresees a 20 month preparation phase ending late 2010, followed by a 5 year demonstration phase, with a new generation of biological Detection, Identification and Monitoring (DIM) capability being fielded from 2015. The BIO EDEP programme comprises 8 projects which cover individual protection, non-specialist unit All-Arms CBRN defence protection, and specialist capabilities, as illustrated in Table 1.

The BIO EDEP programme is supported by EDA-funded studies, together with R&T Projects from the CapTech ESM4 “Human Factors and CBR protection”. In particular, ESM4 has launched an initiative on “Test and

Area	Project	Title
Individual Soldier Protection	1	Biological Aerosol Collector for Individual Biological Hazard Surveillance & Monitoring
Unit Protection (All Arms CBRN Defence)	2	Second generation rapid deployable Tactical Area Biological Surveillance & Monitoring System
	3	Future generation rapid deployable Mobile Operational Area Biological Surveillance & Monitoring System
CBRN Defence Specialist Capabilities	4	Rapid deployable Biological Field Reconnaissance Platform
	5	Second generation Armoured Biological Field Reconnaissance Platform
	6	Second generation deployable Tactical Field Analysis System
	7	Biological Residue Detection System for Decontamination Control
	8	Biological Reconnaissance Defence System Integration Project

Table 1 – Overview of the projects of the BIO EDEP programme

Evaluation of Bio Collection, Identification and Detection Equipment”. This project is intended to address the lack of joint standards for Test and Evaluation (T&E) regarding biological DIM capabilities. It will as such constitute the reference for the BIO EDEP programme by establishing a set of agreed T&E protocols which can be applied by the acquirers of equipment. It will aim to meet at least the demands expressed by the BIO EDEP programme in which BIO DIM T&E requirements need to be addressed.



Figure 1 – Vest Chemical Biological Sampling Kit from QS Molle

The project is structured in two phases. A first Information & Evaluation phase will be at minimal cost to contributing Members (cM), and is planned to be followed by a phase of experimentation. The first phase will aim at gathering a set of existing T&E experiences as diverse as possible from the cM. This includes the identification of the desired level of T&E criteria and standardization, the identification of the gaps between current and future T&E standard situations, and the definition of a roadmap to ensure that these elements meet the BIO EDEP requirements. Specific studies will be defined to bridge the identified gaps in the second phase.

EUROPEAN UNMANNED MARITIME SYSTEMS (UMS)

The programme “European Unmanned Maritime Systems for MCM and other naval applications” was approved in November 2009 by the Defence Ministers Steering Board as a Category A programme combined with a group of Category B projects. It is the first R&T programme to emerge out of the European Defence Research and Technology (EDRT) Strategy of November 2008, where “Uninhabited naval systems” was identified as one of the 22 R&T priorities. This priority was further substantiated through a number of workshops involving European naval experts and the inputs from EDA pMS and industry. These workshops revealed that the theme “Uninhabited naval systems” was strongly linked to Capability needs, and primarily to the CDP priority “Mine Counter-Measures in littoral sea area”.

Unmanned vehicles are soon expected to be an integral part of modern fleets. However, the European naval industry remains fragmented, and national industrial ambitions are still strong. Therefore the UMS programme aims at creating a European system of systems, based on various national systems, vehicles and components. It will address interoperability, standardization, modularity, inter-changeability of modules and best practices. The discussions on interfaces and standardization may in the long term pave the way for a single European Unmanned Underwater or Surface Vehicle.

The technical content is currently being substantiated by pMS experts, and is expected to include collaborative R&T projects from two pillars. The first pillar “Unmanned Systems” includes sensors, network enabled capabilities, communications, mission planning, signatures and regulations. The second pillar “Next generation MCM systems” covers, among other things, multi-influence and light-weight minesweeping, as well as buried and drifting MCM. Out of the two pillars, pMS experts have identified sixteen areas of collaboration, which are now being further elaborated into research technical proposals. The objective is to launch these projects under the UMS umbrella from 2011.

The large number of UMS R&T projects and their interconnections imply a strong need for coordination. For this reason, the UMS programme will be split into two levels. The lower level will include all the R&T projects launched within the UMS programme, but also any other relevant EDA R&T projects. The upper level will consist in a “System integration project”, which will focus on the technical coordination, recommendations on interfaces and the identification of future areas for R&T.

The envisaged vehicle of collaboration for UMS is innovative, and identified through the acronym “JIP-Category B”. In practice, it is planned that pMS wishing to contribute will transfer funds to the EDA, as it is the case for the Joint Investment Programmes. However, pMS will decide individually to which R&T projects they shall take part. They

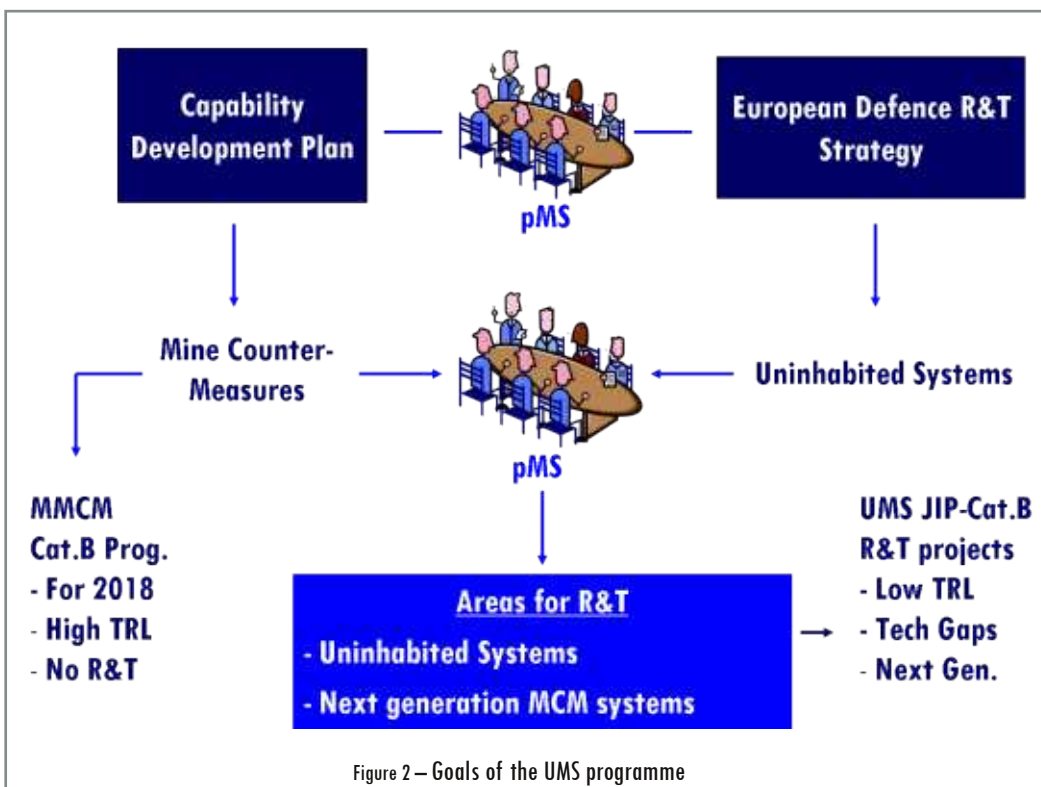


Figure 2 – Goals of the UMS programme

will retain control over their financial contributions, and their experts will define the technical content of the projects in cooperation with industry. A major advantage resides in the reduction of the administrative burden by using a single Programme Arrangement, covering all R&T Projects.

COUNTER-IED

Detection is the key for dismantling the IED. If you can detect an IED at a safe distance it will in the long run be rendered obsolete. EDA efforts in 2009 have focused on trying to identify what detection technologies can contribute to this capability in the short-, medium- and long term. TERIFIEC, an EDA funded study launched in January 2009, has provided insight into the pros- and cons of Terahertz technology, giving advice on how it can fit-in in the context of IED detection.

But Terahertz is not the only technology out there. There are many more and combining them we can make the difference. Adopting a scenario-based approach the EDA efforts have aimed at first defining the scenarios where we want to detect IEDs and for each assessing what systems of technologies can best deliver the capability needs. After all there is no technology that alone will save lives. It is a system of several technologies interconnected that will make the difference.

The combined Capability/R&T Workshop of July 2009 kick-started the scenario-based approach and paved the way for the launch of the C-IED Detection Expert Group, a Government-only group for the moment with representation from around ten pMS, which will by October 2010 provide thorough recommendations for where R&T is needed before bringing Industry onboard in order to translate the recommendations into the launch of projects (tentatively scheduled for 2011).

Exploitation, one of the six generic strands of C-IED (Prevent, Predict, Detect, Mitigate, Neutralise and Exploit), can provide valuable information that can not only help prevent IED incidents but also help develop for instance new detection and mitigation technologies. Forensics is in particular of interest and for this reason this was the theme of the parallel session to detection in the Workshop of July 2009. Activities penned for 2010 will aim at contributing to Level 1 and Level 2 capabilities, liaising closely with the civilian Forensics community.

3. THE CAPTECH STRATEGIC RESEARCH AGENDAS

OBJECTIVES

In the frame of the European Defence Research and Technology Strategy, the EDA Steering Board in R&T Directors formation of April 2009 instructed the CapTechs to produce their Strategic Research Agenda (SRA), and the corresponding technological roadmaps. The term "SRA" itself derives from the name used by the European Commission for the strategic documents which support the European Technology Platforms (ETP), in the frame of the EU Framework Programmes for Research and Technological Development. The Commission SRAs are publicly available, and often supplemented by Implementation Plans.

The objective of the CapTech SRAs is to build a shared vision among the governmental and non-governmental members of the CapTech on the most urgent technical challenges to study and solve in the coming 5 – 10 years. This vision should be simple enough to allow communication to non-members of the CapTech. The SRA also aims at producing an investment plan (a roadmap) for Defence R&T-investments for the CapTech.

The SRA should consist of three main sections. In its introduction, the SRA should survey the technical field treated by the CapTech, by putting



Figure 3 — Examples of Strategic Research Agendas

it in the context of the military capabilities requiring this technical base, the underpinning civil development trends and the evolution of the industrial capacity in Europe. The industrial assessment will include a global comparison. In a second section, the SRA should justify where military investment is necessary by stating the European technical shortfalls, which already exist, or which would result if military R&T-investments were too low. This forecast should extend at least 10 years ahead. Finally, a plan for cooperative investments to overcome the technical shortfalls should be developed.

Information, Acquisition & Processing	Guidance, Energy & Control	Environment, Simulation & Modelling
IAP1 Components	GEM1 Materials & Structures	ESM1 Naval Systems & their Environment
IAP2 RF Sensors & Signal Processing	GEM2 Energy, Missiles & Munitions	ESM2 Aerial Systems & their Environment
IAP3 Optical Sensor Syst. & Signal Processing	GEM3 Ground Systems & their Environment	ESM3 Systems of Syst., Space, Simulation & Experiment.
IAP4 CIS & Networks	GEM4 Guidance & Control	ESM4 Human Factors & CBR Protection
Delivery expected in 2009/2010	Delivery expected in 2011	Delivery expected after 2011

Figure 4 – Delivery Schedule of the CapTech Strategic Research Agendas

STATUS OF THE DIFFERENT CAPTECHS

The maturity of SRAs and the ways to produce them differ from CapTech to CapTech. Component CapTechs are perceived as more advanced than the system CapTechs created in 2008. Experts in some CapTech like IAP2 and GEM1 offered to produce a SRA from inherited strategic documents in the frame of special drafting sessions. In other CapTechs, the work may be supported by EDA-funded studies. Figure 4 is an indicative delivery schedule for the SRA of the different CapTechs.

THE DISCOTECH STUDY

The production of the SRA for the CapTech IAP1 “Components” was completed in July 2009 through the EDA-funded study “Disruptive COTS Technologies in the IT area” (DISCOTECH). This study was finalised after 17 months of work, including tight interaction between government experts and the consortium led by THALES. This consortium grouped the principal players in European Defence Electronics, covering industry and research facilities from nine pMS.

DISCOTECH performed a global analysis of commercial and military trends in the semiconductor area. This enabled to conclude where civil development is likely to supply the military user with a technical base to draw solutions from, and then to identify where European military R&T-investments would make most effect. These investment proposals were finally presented as roadmaps for cooperative projects. DISCOTECH was able to produce a full picture of the European Defence Technological and Industrial Base (EDTIB) in this critical area, and provided perspectives on how this EDTIB should be developed.

The main challenge here, however, is that to organise the necessary R&T investment on a European basis is a step forward, but it will not solve the problem of European non-dependency, let alone technical

superiority. The main issue is how to maintain a complete European supply chain, including the investments needed for production.

THE APPROACH TO SRA FOR A SYSTEM CAPTECH

Defining a Strategic Research Agenda in Systems CapTechs like ESM1 “Naval Systems” is not as straightforward as in CapTechs dealing with components. Even so, through the discussions that took place during the ESM1 second and third governmental meetings of 2009, an agreed procedure was identified for delivering a SRA, as illustrated in figure 5:

- 1) The end users within the Ministries of Defence were identified.
- 2) The required capabilities were listed, based on input from the EU Military Staff.
- 3) The capability gaps will be identified through a workshop early 2010, based on ESM1 expert knowledge and other available information.
- 4) Technologies to address these gaps will be identified, and linked to the ESM1 technology taxonomy, all related EDA-funded studies and ESM1 current or prospective projects.
- 5) Finally, technologies that may have a disruptive effect on Capabilities will also be identified.



Figure 5 – Methodology for delivering the Strategic Research Agenda for ESM1

The ESM1 SRA will be similar to the SRA of the Community of European Shipyards' Associations, to support synergies between the defence and the civil sectors.

4. IMPROVING THE EFFECTIVENESS OF R&T COLLABORATION

CAPTECH WAY OF WORKING

In response to the actions defined in the EDRT strategy “MEANS” action plan, the R&T Directorate launched a transversal work strand and involved the pMS in discussions for optimising the “CapTech Way of Working” (WoW). This term refers to “common practices” or “working routines” developed and adopted in the CapTechs as a means of implementation of collaborative R&T Projects. Defined and

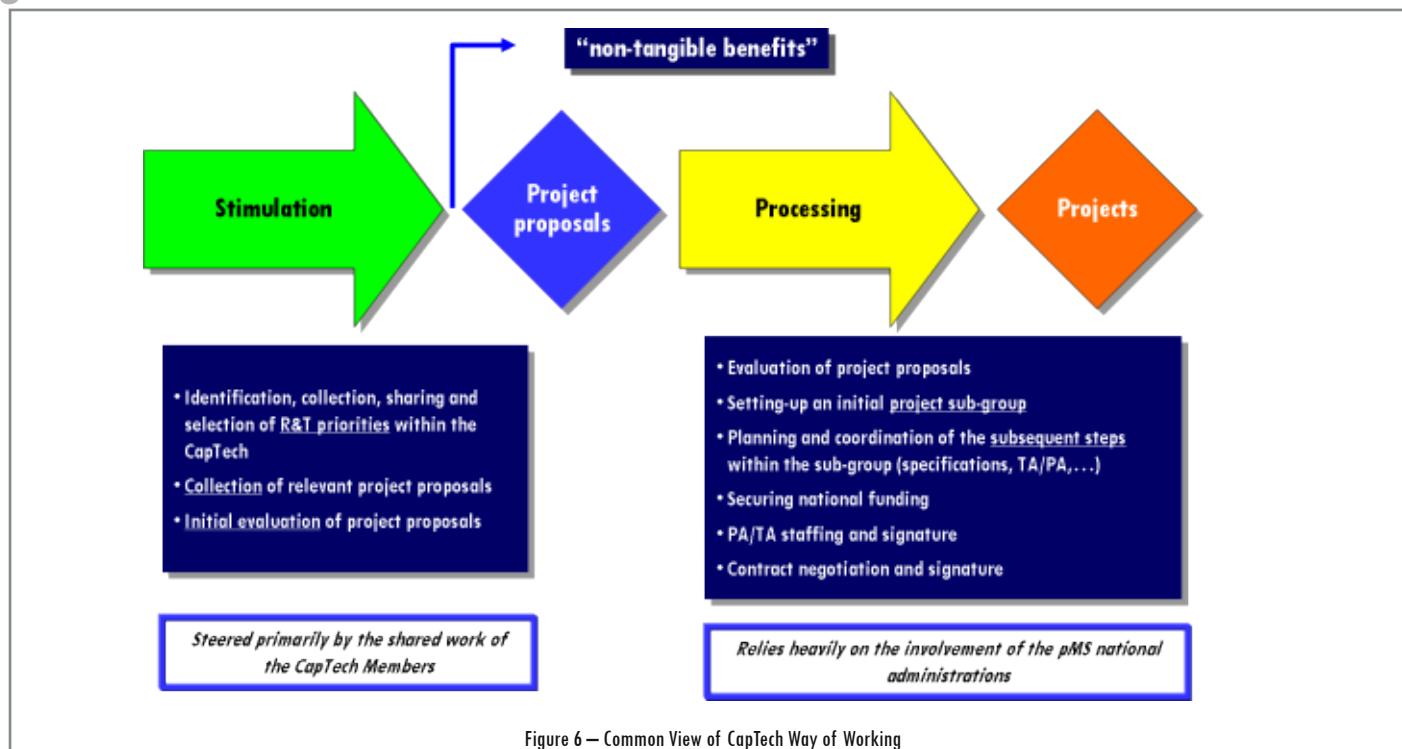


Figure 6 – Common View of CapTech Way of Working

documented at the CapTech level, the CapTech WoW reflect the requirements, expectations and preferences formulated by the CapTech members, where the CapTech National Coordinators – as the representatives of the pMS – play the leading role.

Building on the outcome of previous discussions and on a recent review of CapTech activities, the purpose of this transversal work strand is to:

- facilitate and encourage the exchange of information on CapTech WoW with all CapTech members, particularly after CapTech reorganisations that took place in 2008,
- provide guidelines and support to new CapTech Members and new CapTech Moderators, taking into account pMS representatives replacements and regular staff changes at EDA,
- highlight and recommend the approaches successfully implemented in some CapTechs so as to allow all CapTechs to assess their applicability and, if found relevant and useful, to adopt them,
- identify the issues common to all CapTechs and consolidate the efforts, to be undertaken by EDA and by the pMS, aiming at finding and agreeing adequate and acceptable solutions.

The orientations for optimising the CapTech WoW, drawn on the basis of the review and supported by a thorough analysis, refer to the following aspects of CapTechs operation:

1. Refining and communicating on the structured organisation of the CapTech WoW,
2. Improving the discussion on the R&T priorities for collaborative projects,

3. Stimulating the pMS participation,
4. Focusing on the role of the R&T PoCs as the coordinators on the national level,
5. Improving the integration of the CapTech non Government Experts in the CapTechs.

The conclusions and recommendations were compiled by the R&T Directorate and put forward for consideration of the interested stakeholders. They should be considered as inputs to the discussion leading to specific decisions, commitments and actions and implemented during 2010 with the aim to “improve the effectiveness of R&T collaboration”.

A SUCCESSFUL WAY OF WORKING: THE IAP4 CAPTECH

The CapTech IAP4 “CIS and networks” introduced in 2007 an annual cycle, which was successful in producing relevant R&T project proposals. During a first meeting early in 2009, the CapTech National Coordinators updated and specified their R&T priorities. The priorities were the basis for setting the agenda of the 2009-edition of the “Workshop on R&T International Cooperation Opportunities in IAP4”. This workshop took place in June and was attended by more than 40 participants from governments and industry. 12 new project proposals were presented and submitted to the pMS evaluation with the intention to identify new areas of cooperation.

The current annual cycle has shown its merits in launching new innovative R&T projects. In 2009, IAP4 focused on better integration of the non-governmental members of the CapTech and, particularly on encouraging the innovative contribution of the Small and Medium Enterprises (SME) and “non-industrial” organisations. The agenda of the 2009-edition of the “Workshop on R&T International Cooperation Opportunities in IAP4” included a half-day session, attended by the concerned members, dedicated to the discussion on the opportunities that can be created to stimulate such participation. The survey conducted among the participants of the event allowed to set the first list of possible improvements that will be integrated in the 2010-edition of the Workshop.

THE WORKSHOP “R&T ALL ON BOARD”

Preparation

On 29 and 30 October 2009, the EDA R&T Directorate organized the workshop “R&T All On Board” in Malta. The reason for the workshop was the necessity to reduce discrepancies between the defence R&T investments of the different pMS: 19 Member States invest less than 2% of the overall defence R&T budget in Europe. The workshop aimed at providing fundamental information about EDA, its R&T activities, procedures and instruments indispensable to participate successfully in EDA R&T activities, programmes and projects. The emphasis was

Attendees	Proportion
R&T Ministry of Defence or government	30%
Non R&T MoD or government	10%
Industry	32%
Universities, laboratories, ASD	22%
EDA staff	6%

Table 2 — Breakdown of attendees to the workshop “R&T All on Board”

directed to the exchange of practical knowledge and skills between the pMS and their industries. Another goal was to elaborate specific tools to promote the participation of less involved pMS in EDA R&T programmes and projects.

Programme

The workshop programme was based on proposals made by the Baltic States and Luxembourg, in close cooperation with the pMS R&T



Figure 7 — Opening session of the workshop “R&T All On Board”

representatives. The first day “Setting the Scene” allowed presenting R&T cooperative instruments, and included separate sessions for each of the CapTech clusters (IAP, GEM, ESM). The second day “Working together: Way ahead” proposed new ways on how to collaborate and how to enhance participation of less involved pMS. 101 participants attended the workshop, including 60% from the less involved pMS. The breakdown of attendees is registered in Table 2.

Outcome

Following the workshop, attendees were surveyed by EDA through a satisfaction questionnaire. 58% reported that they were “mostly satisfied”, and 35% “very satisfied”. Attendees appreciated the programme especially the sharing of experience. The presentation of new collaborative R&T mechanisms, such as the Innovative Technology Partnership SIMCLAIRS and the European Framework Cooperation, were also found of great value. Outcomes of the workshop have opened the door to identifying priorities and specific actions for promoting investments in the Member States less involved in the European defence R&T collaboration.

Member States have agreed to plan short-term actions:

- Better information for the less involved Member States, Small and Medium Enterprises (SMEs), laboratories and academia,
- Development of new tools for collaborative R&T projects,
- Development of specific tools for the less involved Member States,
- A new extranet forum dedicated to the new initiative “R&T All on Board”,

and proposed mid-term priorities:

- To launch a Joint Investment Programme more dedicated to the specificities of less involved Member States,
- To promote emerging technologies in collaborative R&T projects,

- To extend the European Defence Research Centres (EDRC) initiative to SMEs and academia in the less involved Member States.

Concerning long-term needs, further and extensive measures are required to:

- Develop new industrial competences in the less involved Member States,
- Manage technology demonstrators by EDA or OCCAR.

The workshop has created a new discussion and information forum, and brought people concerned in the European defence R&T collaboration closer together. It gave the opportunity to reveal real problems of the less involved Member States, on both the governmental and non-governmental side, and promoted a better understanding between them and the more experienced Members States.

5. CAPTECH HIGHLIGHTS

ESM2 - AERIAL SYSTEMS

The CapTech ESM2 “Aerial Systems & their Environment” held 3 formal meetings in 2009, in January, May and September. The format of the last two meetings was extended by the participation of industry and by the introduction of a dedicated workshop on helicopters, following the outcomes of the EDA annual conference of 10 March 2009 entitled “Helicopters-Key to mobility”. A typical ESM2 CapTech meeting takes place over two days, with two government-only sessions, and one or two topical workshops with industry. The first government session is dedicated to the review of the cooperative projects in preparation, and allows the proposition of new projects by pMS. The second session, highly appreciated by participants, is a presentation to pMS of the projects and activities linked to aerospace that are led within the Agency. Currently, nine pMS send official representatives to CapTech meetings (Belgium, Germany, Spain, Finland, France, Italy, the Netherlands, Poland, and Sweden).

Several projects are under review or preparation, with the support of industry which organizes workshops between regular CapTech meetings. Many are dealing with helicopter technologies, like health monitoring or the evaluation of ballistic damage to the driver shaft of the helicopter tail rotor. Other projects propose to study structural elements for a large helicopter, or to improve sensors for navigation and obstacle detection. UAV technologies are also considered with a study proposal on a persistent UCAV.

The CapTech work is fully integrated with all other EDA Directorates. There is a strong link with the Industry & Market (I&M) Directorate for the coordination of the I&M Future Air System work strand with the European Technology Acquisition Programme (ETAP). The CapTech contributes also to I&M projects on traceability, a future study on industrial dependencies, and the definition of a roadmap for Unmanned Air Systems. ESM2 is also directly involved in several projects led by EDA Armaments Directorate, like Unmanned Air Systems, the Future Transport Helicopter, MIDCAS, and the forum of Military Airworthiness Authorities. With regards to EDA Capabilities Directorate, the CapTech moderator is involved in the “Pooling & Sharing” project, and is planning to organize a workshop on capabilities involving the ETAP community.

IAP1 - COMPONENTS

Some pertinent examples of achievements of the CapTech IAP1 “Components” during 2009 will be given below. The CapTech met at three occasions, with typically 12 CNCs/CGEs present and another 25 CnGEs at the joint government-industry meetings. In addition, there were dedicated meetings to enable the interaction between the governmental and non-governmental side necessary for the completion of the DISCOTECH project.

Two R&T projects were finalised in IAP1 during the year 2009. The first one, KORRIGAN, was the biggest project ever contracted with a budget of € 40 m and seven pMS engaged. KORRIGAN proved that a European supply chain for SiC/GaN components is possible, and that the quality of the output can match what hitherto had to be purchased from the USA. KORRIGAN is nothing less than a major achievement in European defence R&T-cooperation. The second project, STAMP (Surface Mount

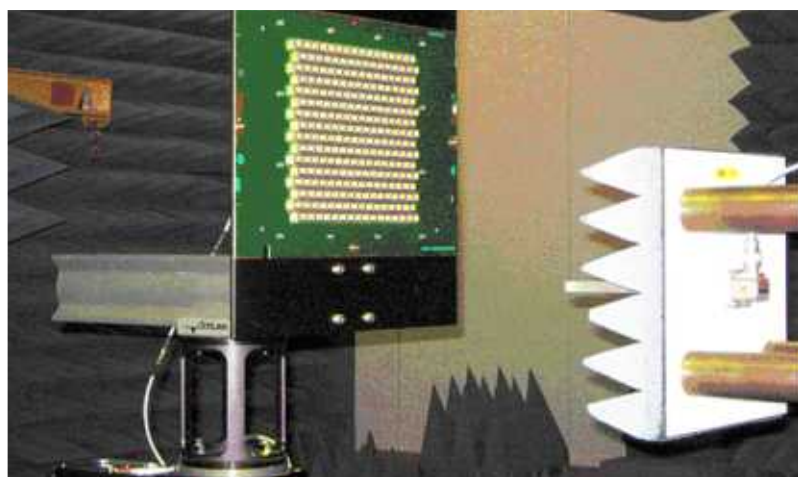


Figure 8 — Antenna demonstration in the STAMP project

Technologies for Active Modules Production), was a bilateral between Sweden and the Netherlands. It was smaller in volume than KORRIGAN, but it leaves nevertheless an important contribution to the European Defence Technological and Industrial Base, for the realisation of reasonably priced Active Electronically Scanned Antennas.

In 2009, the project arrangement for the Project MANGA (MANufacturable GALLium Nitride) was signed. This project engages five pMS (Germany, France, Italy, Sweden and the United Kingdom) under German lead. The budget is significant, almost € 15 m. MANGA will consolidate the SiC/GaN supply chain that was established in KORRIGAN.

GEM3 - GROUND SYSTEMS

In 2009, the CapTech GEM3 "Ground Systems & their Environment" underwent a strong development, following its first months of operation in 2008. Three additional CapTech National Coordinators were appointed, and took part to CapTech meetings for the first time in 2009. The CNCs reviewed the list of government experts inherited from the former GEM03 "Lethality and Protection", and appointed 14 new CGEs. 11 industry representatives registered to the CapTech in 2009. In February 2009, the CapTech held a 2 day workshop to define the list of Key Technologies for the five priorities defined in the frame of the EDRT strategy.

The CapTech kicked-off in 2009 its first two R&T category B projects. The project "Unmanned Tactical Ground Vehicle" (UGTV) gathers the efforts of Finland, France, Germany, Greece, Italy, Poland and Portugal to study the potentialities for a system for the automatic control of a ground vehicle, based on a production platform, providing a comprehensive analysis of performances, risks and benefits. This 9 month study was launched in September 2009. The project "Semi-Autonomous Small Ground Vehicle System" (SAM-UGV) joins French and German efforts to develop an autonomous technology demonstrator based on a mobile land system platform. It will run for three years, from May 2009, and will include platform testing.

The CapTech contracted its first two EDA-funded studies. The goal of the study "Essential Technical & Industrial Capabilities Expiry — Mapping the 2025 Firepower Technology Supply Chain (ETICE)" was to identify the critical skills and industrial capabilities which may expire in the supply chain of large calibre gun systems in Europe. This study was awarded to a consortium gathering significant actors involved in large calibre guns (BAE Systems Bofors, Cockerill Maintenance & Ingénierie, TNO, Qinetiq, Nexter Systems, Oto Melara, Rheinmetall) under the lead of the French-German Research Institute of Saint Louis



Figure 9 — Multifunctional Gun Demonstrator in indirect firing mode in study ETICE

ISL. The study was launched in June, and finished in December. A special workshop was held in September to define operational requirements, with the support of the pMS capabilities experts.

The study "Electric Armour for Armoured Vehicles" (ELAV) was a follow-up of the European Workshop on Electric Armour held at ISL on 13 March 2009, with the support of the Swedish Defence Research Institute FOI. Following a call for tenders of three months in late June, the study was awarded to the British company BMT Defence Limited, with a kick-off meeting in December.

ESM4 - HUMAN FACTORS & CBR PROTECTION

The CapTech ESM4 was restructured in late 2008, adding CBRN defence technologies to its existing portfolio of Human Factors and Medicine. This restructuring required a re-organisation of the CapTech way of working and the recruitment of a number of CBRN specialists to the network of experts. The CBRN field was very active, with the completion and reporting early 2009 of 3 Category B projects:

- "Fluorescence Applied to Biological Agents Detection" (FABIOLA), a project for improving bio-detection and early warning using Laser Induced Fluorescence,
- "NBC Modelling and Simulation", dedicated to the improvement of the modelling of CBRN terrorist incidents,
- "NBC Counter Terror", to examine and compare the preparedness of Member States in the event of a C or B terrorist attack.

Follow-on projects to "NBC Modelling and Simulation" and "NBC Counter Terror" are planned.

During 2009, work continued on the running project "Establishment and Management of a Common Database of B Agents", and Spain joined the group of pMS participating in this project. In the second half of 2009, planning began on a new group of ad hoc projects in the fields

of C&B detection: “Medical countermeasures to C&B agents”, “Modelling & Simulation of B&C incidents”, and “mapping bio-backgrounds”. pMS also decided to launch a significant initiative to improve and standardise the underlying tools and methodologies used in the test & evaluation of procedures and equipment for biological Detection, Identification and Monitoring.

In the area of Human Factors, phase 1 of the project “Social and Cultural Modelling of Headquarters and Operations” (SOCUMOD) was successfully completed. Planning began for the launch of Phase 2, which is due to begin in 2010. A new ad hoc project on “Fatigue and

Overload Detection and Advising Interface” (FODAI) was initiated. The CapTech also launched a major initiative to study the potential effects of demographic change among European population on recruitment to and retention in the Armed forces, and on future systems design.

6. R&T CATEGORY B PROJECTS

The main activity of the EDA R&T Directorate is the preparation of R&T Category B projects. These projects are funded and managed by a various number of contributing Members (cM). Discussions for most projects are held within the CapTechs. Three projects (MIDCAS, FICAPS,

Table 3 - R&T Category B projects for which the arrangement was signed in 2009

Acronym/ CapTech	Title	cM Leader	TA/PA signature date	Contract signature date	Project Value k€ (incl. VAT and co-funding)
COMARMS IAP2	EW Common Modular Architecture for Mission Simulation	SE, ES	02/02/09	National contracts	300
HDR-RF IAP4	High Data Rate Technology for HF Communications	DE, BE, FR	26/02/09	02/04/09	5,410
SOCUMOD ESM4	Social & Cultural Modelling of Headquarters and Operations	SE, BE, DE, FR, NL	31/03/09	N/A IEX and Scoping Study	0
IMA GEM2	Insensitive Munitions and Ageing	FR, CZ, FI, DE, NL, SE, UK	31/03/09	National contracts	4,050
SAM-UGV GEM3	Semi-Autonomous Small Ground Vehicle System Demonstrator	DE, FR	21/04/09	19/05/09	4,008
QPP ESM1	Quiescent Period Prediction	ES, FI, FR, IT	24/04/09	National contracts	1,534
BaToLUS GEM1	Battle Damage Tolerance for Lightweight UAV Structures	DE, FR, SE, UK	19/05/09	26/10/09	4,495
UGTV GEM3	Unmanned Ground Tactical Vehicle	IT, DE, EL, FI, FR, PL, PT	26/05/09	03/08/09	1,227
MIDCAS ARM	MidAir Collision Avoidance System	SE, DE, ES, FR, IT	17/06/09	17/06/09	60,359
APSS ARM	Active Protection System Study	DE, FI, NL, PL	19/06/09	Not signed yet	800
ECOCOAT GEM1	Environmentally Compliant Coatings in Aeronautics	FR, DE, IT, FI	30/09/09	09/12/09	3,375
CAPRICORN ESM3	CIMIC and Planning Research in Complex Operational Realistic Network	IT, FR	13/11/09	18/12/09	2,516
ACWS GEM1	Information Exchange on Antifouling Coatings for War Ships	FR, UK, NL	23/11/09	N/A Information Exchange	0
TELLUS IAP2	Technology Enablers for Light & Low cost Urban RF Systems	SE, NL, FI, IT, ES	26/11/09	04/12/09	9,030
FICAPS ARM	Future Interoperability of Camp Protection Systems	DE, FR	10/12/09	11/12/09	8,017
MANGA IAP1	Manufacturable GaN: SiC substrates and GaN epiwafers supply chain	DE, FR, IT, SE, UK	16/12/09	Not signed yet	17,123
CEDS GEM1	Information Exchange on Combat Equipment for Dismounted Soldier	FR, AT, ES, DE, FI, IT, PT, RO, SE	18/12/09	N/A Information Exchange	0
DUCAS IAP3	Detection in Urban scenarios using Combined Airborne imaging Sensos	SE, BE, DE, FR, IT, NL, NO, SE	18/12/09	National contracts	6,496
ERM GEM2	Environmentally Responsible Munitions	UK, FR, NL, NO, RO	22/12/09	National contracts	2,210



TOTAL: 130,952

APSS) are actually managed by the Armaments Directorate using R&T legal instruments, to better prepare the following phases of potential armament programmes. There are three main kinds of EDA projects (refer for Table 3 for details on individual projects):

- 1) Some projects (such as ACWS and CEDS) consist of simple Information EXchange (IEX), and are supported by a Technical or Project Arrangement (TA or PA), without the support of any contract. Some IEX PA like SOCUMOD can be more detailed and may determine that the project management group itself will carry out a study.
- 2) Most projects involve a non-Government contribution to the work and are defined by a PA or TA which determines that the EDA will act as the contracting agency.
- 3) Some projects like DUCAS are defined by a PA or TA which foresees that each cM will place a national contract on its own national contractors.

TA/PA SIGNED IN 2009

In 2009, Member States signed 19 TAs and PAs for R&T Category B projects, worth in total over € 130 m (including VAT and industrial co-funding). This led to the placement of nine EDA contracts by the EDA in 2009, with two more contracts to be signed in the first semester of

2010. five projects are implemented through national contracts, and three exchanges of information do not require any contract. Table 3 lists the projects along with their cM, significant dates and figures. More details can be found on the EDA website. 2009 was a special year for Romania, as it formally signed its first two arrangements for EDA R&T Category B projects.

PROJECTS COMPLETED IN 2009

In 2009, 8 R&T Category B projects were completed: they are listed in Table 4. Seven of them were transferred from the Research Cell of the Western European Armament Organization (WEAO). For each completed project, an executive summary is published on the EDA website.

PORTFOLIO OF CAT.B R&T CONTRACTS

Figure 10 summarizes the portfolio and the flux of R&T Category B contracts placed by the EDA in 2009. Please note that the figures differ from the table related to PAs and TAs, because not all EDA projects are implemented through EDA contracts, and because contracts are usually signed a few months after the signature of the PA/TA.

Table 4 - R&T Category B projects completed in 2009

Acronym/CapTech	Title	cMS	Last invoice date	Project Value k€ (incl. VAT and co-funding)
TEMPO IAP1	Technologies for the Miniaturisation and the Packaging of True Time Delay Modules	IT, FI	22/01/09	3,720
MEMS2 IAP1	MEMS for Microwave Military Systems	IT, FR	28/01/09	5,088
TRAM GEM1	Development of new Transparent Materials for armour Applications	CZ, IT, NL	26/05/09	4,568
RAPTORS GEM1	Radar Absorbing Paint to Reduce Signature	IT, CZ	11/06/09	2,411
SCOOBIDOO ESM3	Satel. Chain for Op. Oceanography Based on Imagery and Radar Data over Oceans	FR, NO	15/10/09	4,263
MORSE IAP1	Multifunctional Optical Reconfigurable Scalable Equipment	IT, SE, UK	18/11/09	4,596
KORRIGAN IAP1	Key Organisation for Research on Integrated Circuits in GaN Technology	FR, DE, ES, IT, NL, SE, UK	25/11/09	47,423
OSEMINTI IAP4	Operational Semantic Intelligence Infrastructure	FR, ES, UK	03/12/09	6,409
				TOTAL: 78,476

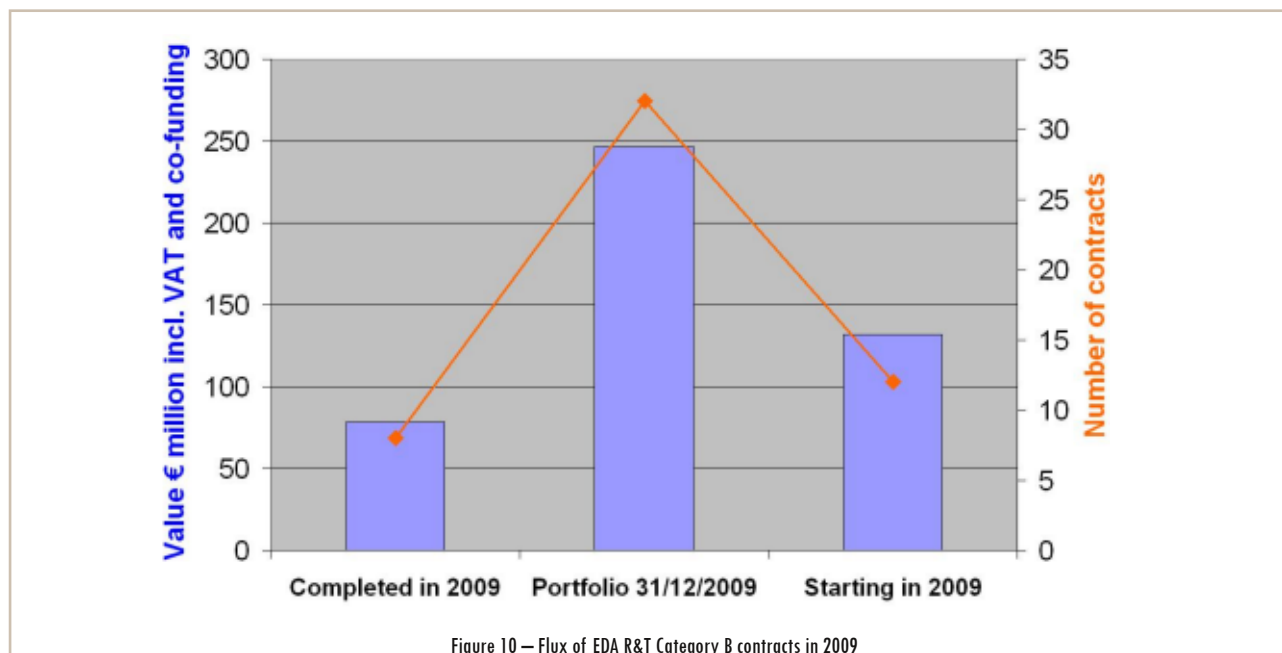


Figure 10 — Flux of EDA R&T Category B contracts in 2009

7. THE TWO JOINT INVESTMENT PROGRAMMES

FORCE PROTECTION

2009 was the third year of operation for the R&T Joint Investment Programme on Force Protection. This programme launched in 2007, and worth € 55 m, gathers together efforts on force protection of 20 European governments (Austria, Belgium, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden). The first two calls for proposals, issued in 2007, covered the topics "Collective Survivability", "Wireless Communication" and "Individual Protection Technology Forecasting". They led to the signature of 8 R&T contracts for a total of € 36.87 m in 2007-2008. Each contract is supervised by an Executive Management Group appointed by contributing Members, which reports to the Management Committee in charge of the whole programme.

The third call launched in 2008 on "Data Analysis and Data Fusion" led to the signature in 2009 of five contracts, chosen among 14 proposals. In 2009, the EDA issued on behalf on the contributing Members the fourth and last call, covering the topics "Mission Planning/Training in an asymmetric environment" and "Secured tactical wireless communications". The proposals were assessed from 11 to 15 May 2009 by experts from contributing Members assisted by EDA staff on five criteria: capability improvement, R&T excellence, management, value for money, cooperation.

The call encouraged the submission of proposals from Estonia, Norway, Poland and Slovakia by explicitly awarding bonus points to tenders

including entities from these contributing Members, in order to improve their industrial return over the whole programme. Interestingly, the incentive effect was sufficient by itself: the bonus points did not affect the outcomes of the assessment. As a result, the mean difference between the financial contribution of a cM to the programme and its return in terms of contracts is 22%. The assessment of 15 proposals led to the selection of five contracts, which will kick-off early 2010. The financial oversubscription for this fourth call was 2.4. Overall, 10 new contracts worth € 37.13 m were placed in 2009 for the JIP-FP programme, as shown in Table 5.

As the last JIP-FP contracts were signed in 2009, the emphasis in 2010 will be put on their implementation. To facilitate the dissemination of the results, the EDA granted IT access rights for members of the Management Committee to deliverables approved by the Executive Management Groups. It is also foreseen to invite more largely government experts to final meetings or workshops held in the frame of the contracts.

Due to the originality of the JIP-FP programme, it was deemed important to develop an efficient "lessons learned" process for future programmes. The EDA circulated in March 2009 a questionnaire to R&T directors, consortia, and members of the management committee and of the different management groups. Results were presented to the Steering Board R&T in Directors formation in May 2009. They show that contributing Members appreciate the JIP-FP networking effect and the possibility to better know the European Defence Technological and Industrial Base.

Table 5 — JIP-FP contracts signed in 2009

Call	Acronym	Title	Prime contractor	Contract signature date	Project Value k€ (incl. VAT and co-funding)
3	MEDUSA	Multi Sensor Data Fusion Grid for Urban Situational Awareness	Vitrociset	28/04/09	5,615
3	SUM	Surveillance in an Urban environment using Mobile sensors	GMV	29/04/09	2,687
3	DAFNE	Distributed and Adaptive multisensory Fusion Engine	Ingegneria des sistemi	06/05/09	3,825
3	D-FUSE	Data Fusion in Urban Sensor Networks	Thales NL	18/06/09	5,202
3	AUDIS	Acoustic Urban Threat Detector for Improved Surveillance Capabilities	D'Appolonia	18/06/09	2,308
4	SIMS	Smart Information for Mission Success	Thales-Raytheon Systems	08/12/09	3,683
4	ICAR	Intelligent Control of Adversary Radio Communications	Thales Comm. FR	14/12/09	4,268
4	CARDINAL	Cap. study to investigate essential man-machine Relationship for improved decision making in urban mil. environment	TNO NL	14/12/09	2,733
4	ATHENA	Asymmetric Threat Environment Analysis	TNO NL	14/12/09	3,577
4	EUSAS	European Urban Simulation for Asymmetric Scenarios	EADS D&S Systems FR	14/12/09	3,230

INNOVATIVE CONCEPTS AND EMERGING TECHNOLOGIES (ICET)

The Joint Investment Programme on Innovative Concepts and Emerging Technologies (JIP-ICET) has 15 contributing Members (Cyprus, Germany, Greece, Spain, France, Italy, Hungary, Norway, Slovenia, Slovakia and Poland) with a total contribution of € 15.6 m.

The first call of proposals ended in February 2009 and covered the following R&T goals: non-linear control design, integrated navigation architecture, nano-technologies for soldier protection and sustain, and structural health monitoring. cM experts evaluated 22 eligible proposals in April 2009 using the following criteria: R&T innovation, management, value for money, and cooperation. The

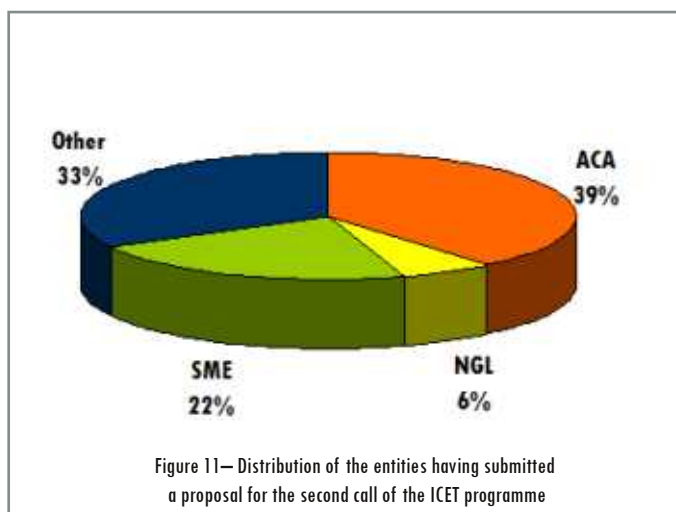
following month the management committee selected for contracting 4 proposals that had received the highest total scores in the evaluation. Their total value is around € 8.3 m, as listed in Table 6.

The second and final call for proposals closed in October 2009, and it covered the remaining ICET R&T goals: remote detection of hidden items, nanostructures electro-optical and others, radar technologies, and nanotechnologies for soldier protection and sustain. The Agency received 34 eligible proposals, with an overall financial oversubscription rate of about 4.7. The proposals were evaluated early December 2009, and the Management Committee selected six proposals which will be contracted in the first semester of 2010.

Acronym	Title	Prime contractor	Contract signature date	Project Value k€ (incl. VAT and co-funding)
HECTOR	Helicopter Fuselage Crack Monitoring and Prognosis Through On-board Sensor Network	Politecnico di Milano	30/11/09	2,227
SESAMO	Sensors for Structural Monitoring	MBDA Italia	21/12/09	1,591
SARINA	SAR-based Augmented Integrity Navigation	Ingegneria des sistemi	04/01/10	2,302
NICE	Nonlinear Innovative Control Designs and Evaluations	ONERA Toulouse	25/02/10	2,297

Table 6 — ICET contracts from the first call signed in 2009 and early 2010

A bonus point system was introduced in the second call to facilitate the achievement of global balance of the programme. The proposals were granted additional points for each per cent of project budget proposal allocated to cM with low industrial return after the first Call. The bonus point system seems to have succeeded in encouraging the participation of organisations from the cM with low industrial return but without distorting the ranking of proposals based on their technological merit.



One of the objectives of the ICET programme has been to encourage more Small and Medium Enterprises (SME), academic institutions (ACA) and Non-Governmental Laboratories (NGL) to participate in European defence research cooperation. This goal has been achieved as exemplified by Call 2 in which two thirds of consortium members belong to these groups (see Figure 11).

8. STUDIES FUNDED BY EDA OPERATIONAL BUDGET

STUDIES CONTRACTED AND COMPLETED

In 2009, 7 EDA-funded studies worth a total of € 1.42 million were lead by the R&T Directorate (see table 7). These figures are similar to 2008 (6 R&T studies worth a total of € 1.34 m). These studies support the activity of the CapTechs in strong coordination with the other EDA Directorates. They are ideally suited for technology watch, general architecture studies, and surveys of the 'state of the art'. In addition, on 15/12/2009 the EDA placed a contract amendment worth € 198 k to launch the second phase of the R&T study "Embarked Middleware".

As mentioned in Table 8, seven R&T studies finished in 2009: five of them were launched in 2008, one in 2007, and one in 2009. A project overview is available on the EDA website. Final reports have been distributed, and an electronic copy is archived in EDA activity database.

EVALUATION OF STUDIES

EDA-funded studies are generally awarded upon competition following an invitation to tender advertised on the EDA website and on the EU Official Journal. The successful tender is selected by an evaluation committee appointed by the EDA chief executive, generally among EDA staff members from different directorates. In 2009, the CapTech ESM1 "Naval Systems" introduced an innovation by proposing government experts to be appointed as members of the evaluation committee. The conditions are that they must be free from any conflict of interest and that they must keep the confidentiality of the tenders.

Table 7 — List of EDA-funded R&T studies contracted in 2009 and early 2010

Acronym CapTech	Contract title	Supplier	Signature date	Value k€
ETICE GEM3	Essential Technical & Industrial Capabilities Expiry — Mapping the 2025 firepower technology supply chain	ISL — French-German Research Institute	19/06/09	400
ELAV GEM3	Electric Armour for Armoured Vehicles	BMT Defence Services	23/10/09	200
SMUV0 GEM4	Reference Scenarios for Multiple Unmanned Vehicle Operations	BMT Defence Services	19/11/09	177
ERIT GEM4	Enhanced Radar Imaging Technology	MBDA Italy	11/12/09	400
ESUVV ESM1	Energy Supply for Unmanned Underwater Vehicles	ECA	19/01/10	90
CAFF ESM4	Cognitive Aspects of Friendly Fire	TNO	04/01/10	95
MUSV ESM1	Maritime Unmanned Surface Vehicles	BMT Defence Services	18/01/10	92
Amendment ESM3	Embarked Middleware	GMV	15/12/09	198

Table 8 — List of EDA-funded R&T studies completed in 2009

Acronym CapTech	Contract title	Supplier	Final Report	Value k€
C2T ESM4	Exploring the potential for a common casualty tracing and tracking tool for EU led military missions	Charles Lucas Associates	23/04/09	132
OPEE ESM1	Overall Platform Energy Efficiency	BMT Defence Services	15/05/09	120
EMSR ESM1	Electromagnetic signature reduction	BAE Systems UK	10/06/09	97
- ESM3	EU Core Technical Framework Study	SAAB Systems	04/07/09	445
DISCOTECH IAP1	Disruptive COTS Technologies in the IT area	Thales Communications	20/07/09	300
TERIFIEC GEM2	Technology Watch on Terahertz for the Identification of Explosive Chemicals	Qinetiq UK	11/11/09	150
ETICE GEM3	Essential Technical & Industrial Capabilities Expiry — Mapping the 2025 firepower technology supply chain	ISL — French-German Research Institute	15/12/09	400

DESCRIPTION OF THE C2T STUDY

In 2008, the EDA contracted under its operational budget within the CapTech ESM04 “Human Factors and CBR Protection” a “Study on the Potential for a Common Casualty Tracing and Tracking (C2T) Tool for EU led Military Operations”. This study was conducted in close collaboration with the experts of Project Team Medical and the European Union Military Staff, who were the main customers of the report. The contractor made an extensive survey of C2T tools, both existing and in development, in EU Member States, NATO and the US. The study made it clear that existing CT2 tools, either paper based or IT based, will not provide the complete solution, and will need a common tactical level operating framework, based on agreed EU wide operational staff processes. The contractor recommended that EDA pMS consider a staged approach to the development of CT2 for EU led military operations. The study was particularly appreciated for the completeness of the analysis, supported by a solid list of carefully chosen contributors.

DESCRIPTION OF THE SCORED STUDY

In 2005 the Defence Ministers decided to “support an Agency-led effort (...) to identify pMS requirements and to test the viability of a collective European approach to developing a next-generation SDR as a joint civil/military endeavour”. Responding to this assignment, during 2006 the Agency, in cooperation with the pMS represented in PT SDR, prepared the technical specification and initiated the procurement process for the project focusing on the “Military SDR Capabilities Including Applying Cognitive Radio Spectrum Management to the Security and Defence Domains”, also known as SCORED.

A comprehensive approach was the basis to prepare and launch the study involving the four EDA functional Directorates and the Corporate

Services in the different stages of specification, procurement and management of the project. In addition, a search for complementarity with the civil research in this area required putting in place coordination mechanisms to follow the progress of the corresponding project, run by the European Commission within the PASR programme, on “Wireless INTERoperability for SECurity”, also known as WINTSEC.

Considering the relevance and close relation between the topics of SDR (of considerable interest from the capability point of view) and Cognitive Radio (prospective technology evolving from SDR and explored by the R&T) the R&T and the Capability Directorates joined the assigned budgets to run one single project. It was performed by a Consortium composed of 20 European industries and research organisations: seven co-contractors (Selex Communications, Indra Sistemas S.A., Thales Communications S.A., Elektrobit Wireless Communications Ltd., Ericsson, TNO, Rohde & Schwarz) and 13 sub-contractors (GMV S.A., Amper Programas, Skysoft Portugal, FOI, RADMOR S.A., Itracom Defense Electronics, Prismtech, University of Karlsruhe, University of Oulu-CWC, University of Roma, WMC, EADS Defence Electronics, JRC). The objective was to gather the leading European industry players and get one consistent vision on the benefits, challenges and development perspectives of those promising technologies in Europe.

Some of the highlights on the outcome of the study are a) a vision of current SDR issues from military perspective, analyzing the added value of this new technology and providing the industrial view on its possible evolution at European level; b) the discussion on the main architectural and technological aspects of military SDR considering also the changes brought in by SDR capabilities and related technological basis with a long term horizon; c) the analysis, at a preliminary level, of the impact of the CR and FRSM functionalities; d) Considerations of business models relevant to WF portability aspects, and several

recommendations for a roadmap supporting the evolution of SDR and introduction of CR/FRSM together with a synthesis of proposed studies.

Based on the final report of the SCORED study, the Project Team SDR formulated the recommendations on the follow-up activities related to SDR and Cognitive Radio. In June 2009 the Project Team further evaluated the presented information and considered the possibility to, inter alia, focus activities on a) spectrum management, b) standardisation and certification, c) technical elements (security, reliability, performance, etc.).

Although there were no specific actions drawn by the PT SDR, it should be noted that the subject is already followed-up by the interested pMS through a number of R&T projects — on-going or under launch — such as:

- ESSOR: European Secured Software Defined Radio Referential (cat B)
- ETARE: Enabling Technology for Advanced Radio in Europe (cat B)
- HDR-HF: High Data Rate Technology for HF Communications (cat B)
- WOLF: Wireless Robust Link for Urban Force Operations (cat A)
- CORASMA: Cognitive Radio for Dynamic Spectrum Management (cat B, under launch).

The pMS contributing to those projects have confirmed the usefulness of the results produced by the SCORED study in the specification phase and in monitoring and evaluating of the projects progress.

9. TRANSVERSAL ACTIVITIES

CRITICAL SPACE TECHNOLOGIES FOR EUROPEAN NON-DEPENDENCE

In 2002, the European Space Agency (ESA) identified the dependence of the European space industry on critical non-EU technologies, mostly from the US and Japan. Although a large number of these technologies are mission critical, the absence of commercial prospects means that the resolution of the dependence requires public funding. The ESA efforts resulted in the document “Critical Space Technologies for European non-dependence”, issued in 2003. In September 2008, a workshop in Brussels addressed this issue with 100 stakeholders from 20 countries representing the European Commission (EC), ESA, EDA, their respective Member States, national agencies and the European space industry. A tripartite EC-ESA-EDA Joint Task Force was then established for coordination purposes, with monthly meetings. The Joint Task Force produced in May 2009 a report including a common methodology for a coherent Europe-wide approach, a first common list of technologies and an analysis of the potential implementation instruments. The Task Force also identified a list of urgent actions for 2009 and agreed to reach a European Non-dependence list by January 2010 to be reviewed and updated every 2 years.

On 10 September 2009, an EC-ESA-EDA Non-Dependence Mapping Meeting took place in Brussels, with participation of Member States’ delegates from the three institutions and industry. This meeting contributed to the drafting of a list of urgent actions for 2010/2011. The next EC-ESA-EDA Non-Dependence Roadmap Meeting, with the participation of ESA Member States’ representatives, took place on 9 December 2009 at the European Space Research and Technology Centre (ESTEC) in the Netherlands, to discuss the list and identify the role of the different organizations in the coming years. The updated list of actions is expected to be finalized in February 2010. The EDA expects to contribute to the Critical Space Technology process mainly through the implementation of R&T projects at components level (IAP1 CapTech).

DIALOGUE WITH ASD

EDA maintains a structured dialogue with the AeroSpace and Defence Industries Association of Europe (ASD). ASD has 28 member associations in 20 countries across Europe, and represents the aeronautics, space, defence and security industries in Europe with the objective of promoting and supporting the competitive development of the sector. EDA R&T Directorate regularly participate to the ASD Defence R&T committee, which is held every two months. Similarly, ASD is on a regular basis invited to EDA events, such as the “R&T all on board” workshop in October 2009 where it presented industry’s views on collaborative R&T and R&D. A representation from the ASD Defence R&T committee also joined working sessions with national R&T points of contact.

Some of the main areas addressed through this dialogue in 2009 were the European Defence Research & Technology Strategy (EDRT), CapTech performance, the improvement of Industry/Government relations, Intellectual Property Rights and technology dependencies. The ASD Defence R&T committee helped to substantiate the EDRT Key Technologies and Skills, in parallel to the work carried out by government experts in the CapTechs. Aiming at contributing to the CapTech performance, ASD released a food for thought paper on European Future Air Power Systems in the 2035 perspective (dated June 2009), as well as with a position paper by the European Land Defence Industry Group (dated September 2009). Representatives from the ASD Defence R&T committee provide regular updates to both EDA and national R&T points of contact on their view of CapTech performance based on the way of working, the number of cooperative projects launched and the participation of industry. In addition, the ASD Defence R&T committee started a dialogue with the R&T and I&M Directorates for a detailed mapping on technology dependencies. Cooperation on current and new issues will continue in 2010.

ETAP – EUROPEAN TECHNOLOGY ACQUISITION PROGRAMME

The European Technology Acquisition Programme (ETAP) results from the will of the 6 Lol nations to join their efforts in fostering the development of technologies for post-2020 Future Combat Air Systems. The programme was set up in its present form on 26 November 2001 when the related MOU signed by France, Germany, Italy, Spain, Sweden and the United Kingdom entered into force. So far, ETAP has launched 15 Technology Development Programmes (TPDs) worth € 117 m. The TDPs are sorted into 8 technological domains to fulfil capability needs: avionics, airframe, integrated vehicle systems, low observables, mission guidance and control, weapons and weapons integration, support, and propulsion. The TDPs are linked by a study guiding the whole ETAP programme, the Global System Study (GSS), targeted at indicating the most cost-effective technologies to be developed in order to reach a given capability requirement. The scope of the Future Combat Air System is illustrated in Figure 12.

The contract for each TDP used to be placed by the lead nation, which sometimes led to lengthy multinational negotiations to adapt ETAP clauses to national regulations. As a result, ETAP nations have long been interested in using a single contracting entity. The EDA contracted in 2007 on behalf on the ETAP nations its first ETAP project, TDP 1.4C “high bandwidth communications datalink”. As the contracting process and the follow-up phase were considered successful, ETAP nations

agreed in 2009 to consider EDA as the reference contracting agency for future TDPs. Both organisations agreed upon their interest in coordinating their activities, in order to avoid duplication and to benefit mutually from their respective work strands. As a consequence, joint meetings are organized, and the EDA provides to the ETAP community extensive information about the development of CapTech ESM “Aerial System” and the Category B project “Future Air Systems”. In addition, the ETAP Steering Committee agreed in November 2009 to the principle of organizing a joint meeting with EDA capability requirement working group, mainly to share operational scenarios.

ESRIF – EUROPEAN SECURITY RESEARCH INNOVATION FORUM

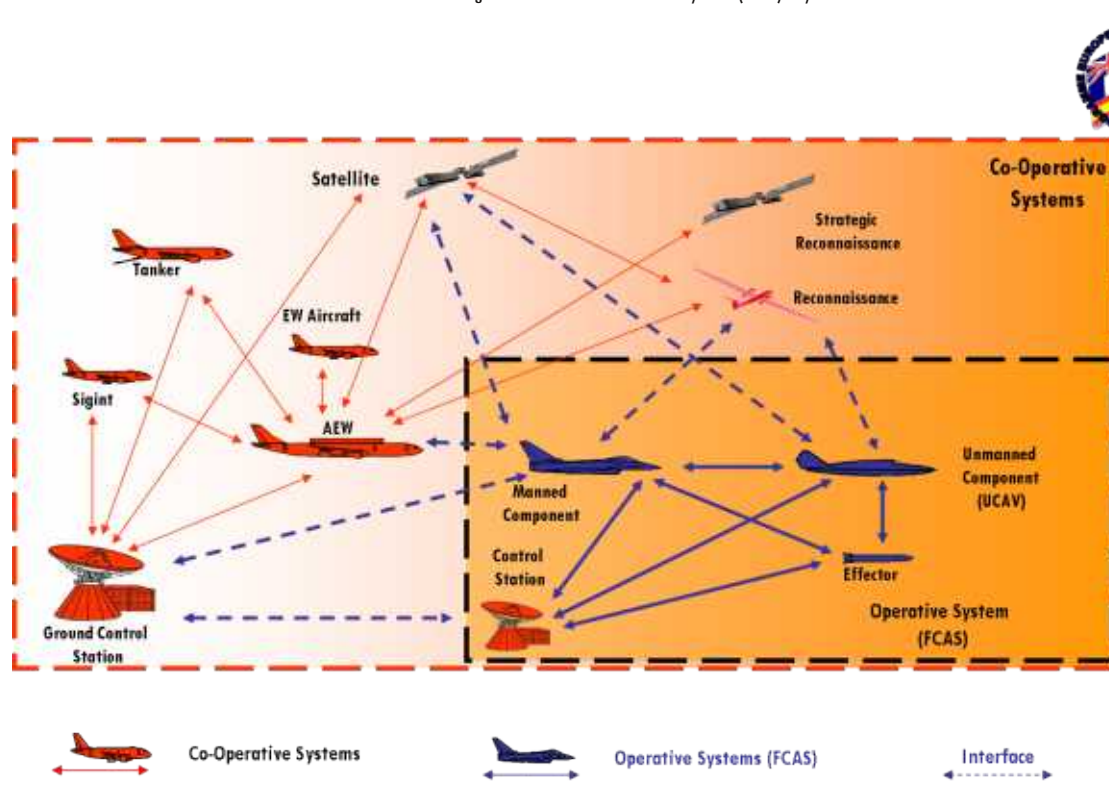
The future of security in Europe has to consider the internal and external dimensions of possible threats whilst taking into account the increasing convergence of civil and military capabilities. By promoting a public-private dialogue, with 64 members from 31 countries and assisted by more than 600 experts, ESRIF has spent the last two years analyzing the medium and long-term security challenges that Europe faces. Looking at scenarios with a 2030 time horizon it has scrutinised a range of risks coupling them throughout mission areas. For the first time the civil security component described the required research, technologies, equipment and services using a capability-driven approach. EDA was a member of ESRIF, along with other European

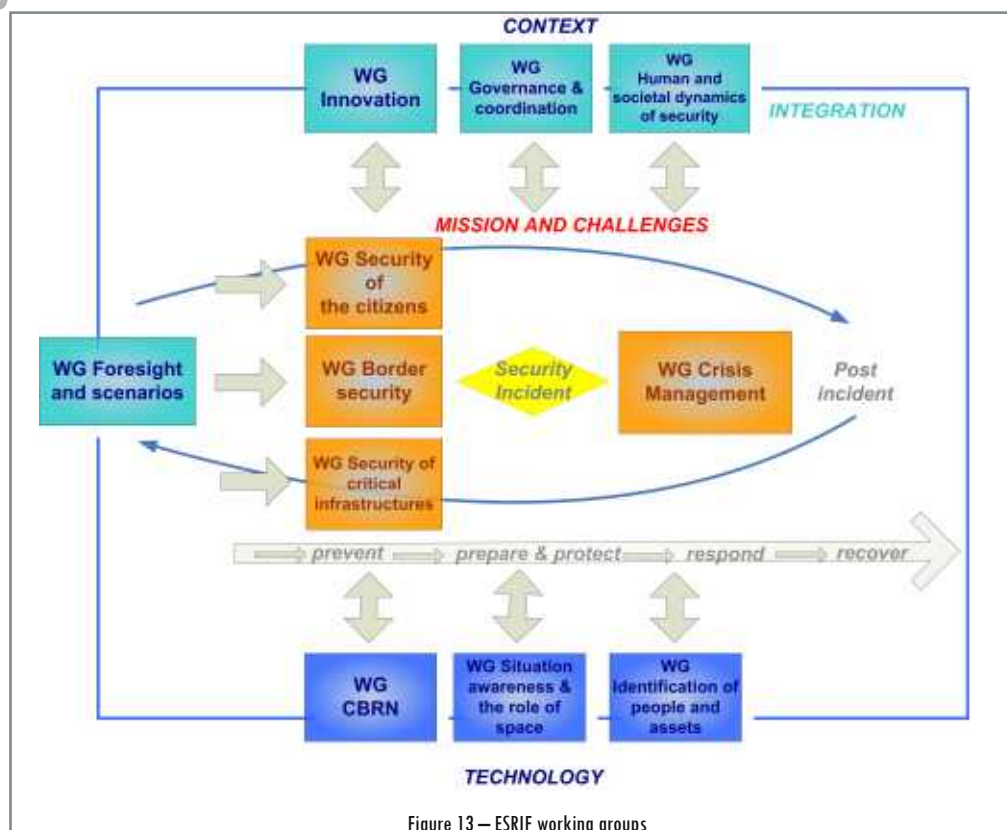
Institutions and Agencies, and the R&T Directorate played an important role by Chairing WG 7 on Situation Awareness and the role of Space.

ESRIF involved 11 thematic working groups: WG 1-4 focussed on security missions based on the guidance and long-term scenarios provided by WG 5; WG 6-8 dealt with specific challenges, while the other three covered transversal issues.

In its final report delivered in December 2009, ESRIF described its vision of security through nine key messages highlighting the

Figure 12 – Future Combat Air System (FCAS) - System view





need to preserve the European values, fundamental rights and freedoms while being innovative in addressing security threats. ESRIF work was the foundation for the elaboration of a European Security Research and Innovation Agenda (ESRIA), which is available on the ESRIF website at <http://www.esrif.eu>.

ESRIF made proposals for the effective implementation of the ESRIA, especially in terms of governance, priority to innovation, standardization, best practice, and funding through increased EU contributions. It also recommended establishing a permanent working structure for the implementation of the ESRIA. The outcomes of ESRIF were presented during the Fourth European Security Research Conference held in Stockholm on 29-30 September 2009.

EUROPEAN DEFENCE RESEARCH CENTRES (EDRC)

The EDRC initiative was launched in 2008 on the basis of a proposal from Germany and France. Member-States agreed to share their common interest to have a global picture of defence technology competences in Europe, and decided to develop a dedicated database for the purpose.

On April 2009, a pilot tool was launched and in September 2009, all pMS were invited to populate the database. The EDRC database is seen as a straightforward instrument to encourage the promotion of competences and cooperation among, initially, European government owned Defence

Research Centres, and later to other research providers. It will also be a useful mechanism for EDA when expertise is required for studies.

On several occasions EDA has promoted the EDRC database and at the 'All on Board' Workshop this was done to a broader audience of interested parties. Considering the aim of that workshop and the intention to include all defence research providers within EDRC, the possibility to identify SMEs in particular will be considered.

Other EDA Directorates together with some pMS are also considering the possibility of extending the use of EDRC database to other functions like the identification of Test Centres (Armaments Directorate). At the end

of 2009 the R&T POCs agreed to continue populating the EDRC database and to take a decision in March 2010 for its official launch on the EDA Portal. Currently the database can be viewed at the address <http://www.eda.europa.eu/edrcweb>.

INTELLECTUAL PROPERTY RIGHTS

The launch of new and more complex projects and programmes in the frame of EDA (such as the Joint Investment Programmes) introduced new ways of working not foreseen in the current General Conditions (GC), and focused attention in particular on Intellectual Property Rights (IPR) — where industry concerns especially about uses of Background Information are strong. In addition, there is today no instrument for R&T co-operation that can be used by all pMS. Therefore, an amendment of the GC was proposed to improve and update the IPR regimes available to R&T projects and programmes, and to restructure the current GC to make them usable by all pMS.

An IPR Working Group open to all pMS was set up in October 2008, and held ten meetings at the EDA until November 2009. It introduced the 'four models' which will form the default language available as a starting point for IPR regimes for individual projects and programmes:

- fully funded classic category B,
- jointly funded classic category B (the most frequent case),
- fully funded JIP,
- jointly funded JIP.

Definitions relevant to IPR have also been carefully considered, particularly the introduction of a new Security Purposes definition. To ensure that industry's concerns are fully understood, experts nominated by ASD have had two meetings with the IPR Working Group; at the second meeting the draft of the new IPR provisions was discussed jointly. In parallel to the restructuring work described above, the related PA Guide and Model Contract are being updated. The new "General Rules" and "General Provisions" replacing the GC were circulated to EDA pMS for national staffing on 1 December 2009, with the aim to adopt them at the EDA Steering Board in the first semester 2010.

10. BOOSTING TOGETHER THE EUROPEAN FRAMEWORK COOPERATION FOR RESEARCH

The Joint Action establishing the European Defence Agency (EDA) identifies promoting research aimed at leadership in strategic technologies for future defence and security capabilities as one key aim of the Agency. It tasks the Agency to identify appropriate areas of cooperation with the European Commission research activities in order to fulfil future defence and security capability requirements and to strengthen Europe's industrial and technological potential.

Likewise the European Commission (EC) is tasked by the Council Decision concerning the 7th Framework Programme's Specific Programme "Cooperation" to take into account relevant research activities carried out by Member States, European and international organisations. This decision recognises that there are areas of dual use technology relevant to both civilian and military applications, and that a suitable frame should be established to coordinate some activities between the FP7 and EDA.

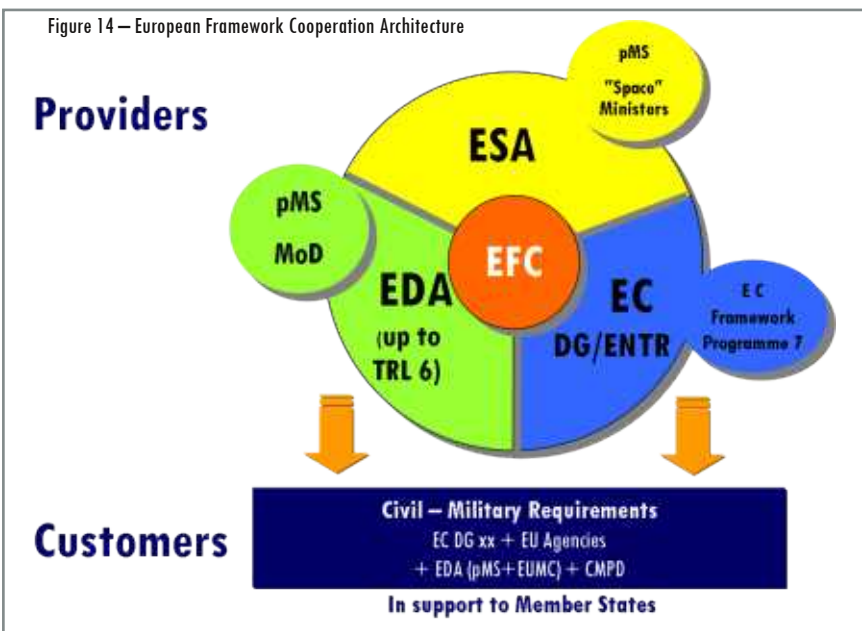
The cooperation between the EC and EDA varies in depth and shape, and increasingly encompasses taking into account work done within the frameworks of other organisations like the European Space Agency or Eurocontrol. This working together is not an objective on its own — the cooperation aims at building the capabilities that meet the needs of the defence and civilian security communities. Where comprehensive capabilities are addressed, where requirements converge, where duplication must be avoided, and where the compatibility of defence and security related technologies and systems is paramount, the European Commission's and the European Defence Agency's Frameworks need to synchronise the implementation of their programmes.

EDA and the Commission are already synergising their research in some specific projects, such as Software Defined Radio, the insertion of Unmanned Aerial Vehicles into regulated airspace, on critical technologies for space applications or on Maritime Surveillance.

European Ministers of Defence, meeting in EDA's Steering Board on 18 May 2009, have tasked the EDA to develop concrete proposals, working in close coordination with the Commission. The existing cooperation and liaison with the Commission will now be brought to a systematic and more intensive level drawing on the experience of the cooperation between Member States in the running Joint Investment Programmes.

"Situation Awareness" was first identified as a possible candidate for such a European Cooperation Programme. Most of the related technical challenges are as relevant in the civilian security domain as in the defence remit, and the European technological and industrial base is very much the same from sensing to command and control and information management of networked assets.

Figure 14 — European Framework Cooperation Architecture



The cooperation is expected to address research, technology development and demonstration activities ranging from the system of systems level down to the level of underpinning technologies.

Under this European Framework Cooperation (EFC) EDA invited Member States to a first coordination meeting where organisational and managerial aspects would be addressed together with a set of possible topics for R&T cooperation. Relevant stakeholders like the Commission (DG ENTR), the European Space Agency and the Council (Crisis Management and Planning Directorate) were also present.

It was recognised that regulations, procedures and membership differ in each of the organisations (EDA,

EC, ESA), similarly is the funding process. For that reason there will be no joint funding and the management responsibilities within each of the frameworks will remain unchanged. The aim will be to synchronise research and allow for mutual use of results, as technologies are increasingly of a dual-use nature for military and civilian end users.

First activities will start in 2010, and the last commitments would likely be made in 2014, bridging to the next framework programme.

Inter-institutional working groups to review and find a common ground to allow use and disclosure of information as well as reviewing the technical areas where cooperation may occur start gradually meeting. As for the topics to be covered, a selection of the most promising ones has been agreed to start with. CBRN and unmanned air systems (UAS) are recognised as priority but situation awareness (SA) will also be looked into by experts from the three frameworks even if it has been considered as a difficult subject.

The Agency will propose to Member States to support a concrete proposal on the methodology and technical coverage to be presented to the MoD SB on 26 April 2010.

11. FIGURES FOR 2009

EDA-FUNDED R&T STUDIES

€ 1.62 m committed for 7 new studies and one amendment

CATEGORY A R&T PROGRAMMES

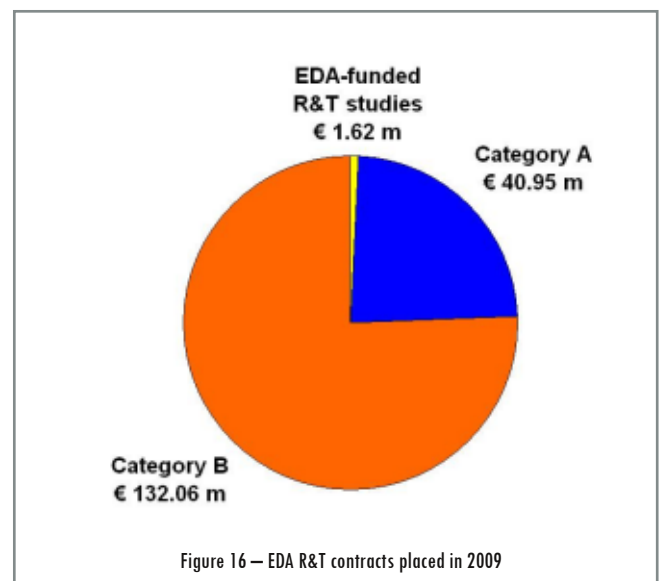
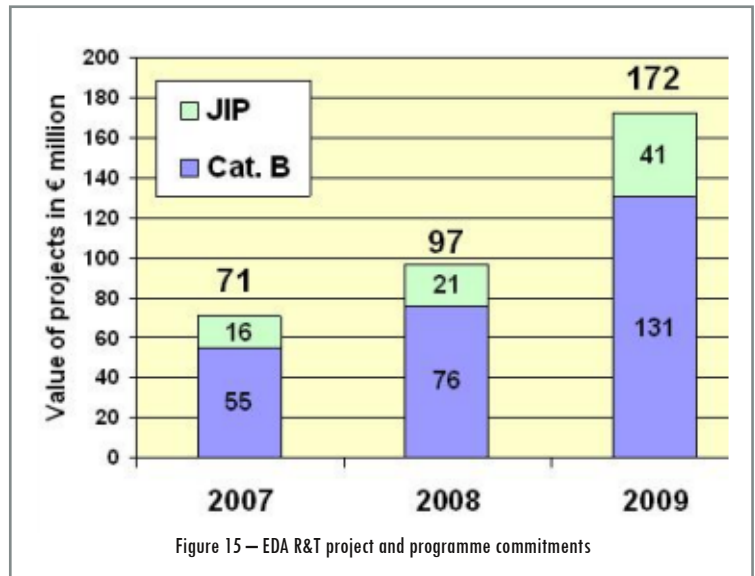
€ 40.95 m committed for 10 JIP-FP and 2 ICET contracts (incl. VAT and co-funding)

CATEGORY B R&T PROJECTS AND PROGRAMMES

€ 130.95 m committed for 19 new Project or Technical Arrangements (incl. VAT and co-funding)

TOTAL OF NEW CONTRACTS FOR EDA-FUNDED STUDIES, CATEGORY A AND B PROJECTS AND PROGRAMMES

€ 174.63 m committed for new contracts



This annual R&T Report is dedicated to the memory of our dear collaborator and friend **Magnus Levin**, who invested a lot of his expertise, energy and passion in R&T at EDA and who left us on 5 february 2010.