



7 March 2013

**Science & Technology for Defence:
Luxury or Need?**

Colloquium

**Organised by the
Royal Higher Institute for Defence**

Conference Centre – Campus Renaissance
Rue Hobbema 8 – 1000 Brussels
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DEFENCE

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Programme

Abstracts

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Colloquium Programme

08.30 – 09.00: *Registration and coffee*

09.00 – 09.10: Welcome address

Colonel Corinne FAUT

Director-General of the Royal Higher Institute for Defence

09.10 – 09.30: **Keynote lecture: “On the use of Science & Technology for Society and Defence”**

Prof. dr. ir. Bart DE MOOR

Vice-Rector “International Policy” and “University and Society” at the Katholieke Universiteit Leuven

Session 1: Science and technology for Defence in an international context

09.30 – 09.50: **Science & Technology within NATO**

Major General Albert HUSNIAUX, MSc Eng

NATO Chief Scientist and Chairman of the Science &

Technology Board of the NATO Science and Technology Organization

09.50 – 10.10: **Science & Technology for Defence in a European context**

Major General Christian BREANT, PhD

Director of Research and Technology

European Defence Agency



Session 1: Science and technology for Defence in an international context

10.10 – 10.30: Science & Technology strategy within the Dutch Armed Forces

Mr Jelle KEUNING, MSc Eng
Director of Research and Development
Dutch Ministry of Defence

10.30 – 10.50: The “Direction générale de l’Armement” and its vision on Science & Technology for Defence

Colonel Gilles BRAULT, MSc Eng
Manager of International & Industrial Affairs
“Mission pour la recherche et l’innovation scientifique”,
“Direction générale de l’Armement”, French Ministry of
Defence

10.50 – 11.10: Panel Discussion on session 1

11.10 – 11.30: Coffee/Tea time

Session 2: Science and technology for the Belgian Ministry of Defence

11.30 – 11.50: Defence Science & Technology and the role of the Royal Military Academy

Prof. dr. ir. John VANTOMME
Chairman of the Scientific Commission at the Royal Military
Academy and Head of the Department of Construction and
Materials Engineering



11.50– 12.10: **The match between Science & Technology and the Defence off-the-shelf policy**
Major General Marc THYS, MSc Eng
Head of the Systems Division of the Directorate General
Material Resources

12.10 – 12.30: **On-going and future research in the chemical, biological, radiological & nuclear domain**
Colonel Jean-Luc GALA, MD, PhD
Director of the biology laboratory at the Defence
Laboratory Department
Director of the Centre for Applied Molecular Technologies
at the Université catholique de Louvain

12.30 – 12.50: *Panel Discussion on session 2*

12.50 – 13.00: Closing remarks
Colonel Richard MARCHAL, MSc Eng
Head of the Department Scientific and Technological
Research of Defence
Royal Higher Institute for Defence

13.00 – 14.00: *Reception*



Abstracts



Keynote lecture:

On the use of Science & Technology for Society and Defence

Prof. dr. ir. Bart DE MOOR

Vice-Rector "International Policy" and "University and Society" at the Katholieke Universiteit Leuven

Modern universities have a threefold mission: to excel in education, research and service to society. It is no coincidence that science and technology are increasingly an integral dimension of our modern day lives. The world we live in is sometimes described as a 'technotope', rather than a biotope, because science and technology not only have a drastic and recurring impact on our health, mobility, social interaction and the way we work, but also on our instruments and tools for warfare and defence.

Universities do not only teach about science and technology, increasingly they contribute to it, especially in those institutes that are research-driven. The KU Leuven is a research-intensive university, as illustrated by the fact that more than 50% of its annual turnover is in research expenditure. Its technology transfer office, founded in 1972, is one of the oldest on the continent and acts as an interface for researchers, in dealing with their inventions, patents, licenses, industrial contract research and spin-off creation.

How should we deal with 'sensitive areas' of research, such as nanotechnology, synthetic biology, cryptography, material science, signal processing, and many others, all of which are ingredients to so-called 'smart systems'? How should we cope with the notion of 'dual use', which is not a sharp line, but rather a continuum? How to deal with ethical issues and challenges, that originate in technological progress, where no longer the question is *how* to make something, but rather *what* to make and *why*, in a context where the integrity of individuals and communities can be at stake? What research funding is acceptable or not?

During his presentation, Professor De Moor will elaborate on how the university is deepening its code-of-conduct on all of these issues.



Session 1: Science and technology for Defence in an international context

Science & Technology within NATO

Major General Albert HUSNIAUX, MSc Eng

NATO Chief Scientist and Chairman of the Science & Technology Board (STB) of the NATO Science and Technology Organization

The NATO Science and Technology Organization (STO) aims at positioning the nations' and NATO's Science & Technology investments as a strategic enabler of the knowledge and technology advantage for the defence and security posture of NATO nations and partner nations. This is achieved not only by conducting and promoting Science & Technology activities but also by contributing to NATO's ability to enable and influence security and defence-related capability development and threat mitigation and by supporting decision-making in the NATO nations and NATO. By explaining the organisation's governance, its strategy and priorities, scope and stakeholders and by giving practical examples of collaborative Science & Technology efforts, it is shown how NATO S&T tries to make the difference in an increasingly interdependent and complex world.

Science & Technology for Defence in a European context

Major General Christian BREANT, PhD

Director of Research and Technology, European Defence Agency

One of the major objectives of the European Defence Agency (EDA) is to promote and develop cooperation between Member States in the area of Research and Technology, with the aim of preserving Europe's military effectiveness through a competitive European Defence industrial and technological base. Therefore, the EDA maintains a network of Technology Domain (CapTech) experts from across Europe. Together with the European Defence Research and Technology (EDRT) Strategy it forms the basis for the Agency's Research and Technology activities. The strategy sets out why and how governments should invest collectively in selected key technologies which must be preserved or developed in Europe, in particular in areas of critical technology non-dependence. Defence research at EU level is a factor in keeping the development of critical technologies for Defence in Europe and maintaining Defence assets and skilled competences and expertise in Europe.



Session 1: Science and technology for Defence in an international context

Science & Technology strategy within the Dutch Armed Forces

Mr Jelle KEUNING, MSc Eng

Director of Research and Development, Dutch Ministry of Defence

The Dutch Armed Forces have to be prepared to face both foreseen and unforeseen circumstances and changes in a fundamentally uncertain reality. A sound knowledgebase is vital in the strategic decision process leading to the most optimal choices in an ever changing and unpredictable environment. Therefore, there is a strong need to continually reinforce the capacity of innovation and adaptation. Not to forget that in times of budget austerity it is interesting to assess that innovation can also play a crucial role in cost reduction. It is clear that strategy, knowledge and innovation are closely linked. Knowing that Science and Technology is fueling the knowledgebase and thereby guiding strategic reflections and the deployment of innovation-based technologies, it is definitely not considered a luxury for the Dutch Defence.

The “Direction générale de l’Armement” and its vision on Science & Technology for Defence

Colonel Gilles BRAULT, MSc Eng

Manager of International & Industrial Affairs of the “Mission pour la recherche et l’innovation scientifique”, “Direction générale de l’Armement”, French Ministry of Defence

This lecture confirms the strategic role of research and innovation in the adaptation of the French Defence systems to the actual and future operational requirements and to medium and long-term threats, for the emergence of tomorrow’s breakthrough technologies or the sustainability of critical skills. It is explained how Science and Technology is managed within the French Armed Forces by the “Mission pour la recherche et l’innovation scientifique” (MRIS), which is a part of the “Direction générale de l’Armement”. The MRIS is responsible for the development of technologies and systems for tomorrow’s army. This goal is pursued by stimulating research activities in the lower Technology Readiness Levels (TRL), developing a long-term Defence research policy and finally by generating collaboration and exploring synergies with the world of academic and industrial research.



Session 2: Science and technology for the Belgian Ministry of Defence

Defence Science & Technology and the role of the Royal Military Academy

Prof. dr. ir. John VANTOMME

Chairman of the Scientific Commission at the Royal Military Academy and Head of the Department of Construction and Materials Engineering

The Royal Military Academy (RMA) is a key player in the Research & Technology branch for the Belgian Defence Department. It is a university adhering to the Bologna declaration which stresses the link between education and research. This explains why research units are active in support of the mission statement of the RMA. The presence of the RMA on the academic level also offers major opportunities for the other Defence laboratories by providing the necessary academic entry to regional, national and European research projects and funding. Today, research in RMA is project-driven. This way of working has the advantage that innovation is guaranteed, but it has also a major drawback; it suggests the difficulty for the research units to assure continuity in the development of research capacity in critical domains, as well as to assure a sufficient critical mass. Therefore, RMA pleads for the creation of a statutory level for research directors and laboratory engineers; it is felt that such a measure could strongly enhance the research activities in RMA, not only in support for the education but also in support of the needs of the whole Defence Department

The match between Science & Technology and the Defence off-the-shelf policy

Major General Marc THYS, MSc Eng

Head of the Systems Division of the Directorate General Material Resources

One of the options for countries with a limited Defence industry is to favour the acquisition of systems, vehicles and equipment available on the military or even the commercial markets. This so called off-the-shelf policy is also integrated in the material resources management of the Belgian Armed Forces. The first part of this presentation will elaborate on the practical implementation of this policy within the Directorate General Material Resources. Subsequently, the accent will be put on clarifying the use and the importance of the in-house availability of knowledge and expertise based on and nourished by scientific and technological research performed within Defence.



Session 2: Science and technology for the Belgian Ministry of Defence

On-going and future research in the chemical, biological, radiological & nuclear domain

Colonel Jean-Luc GALA, MD, PhD

Director of the biology laboratory at the Defence Laboratory Department

Director of the Centre for Applied Molecular Technologies at Université catholique de Louvain

This presentation illustrates to what extent developing a cutting-edge bio-research within the Belgian Defence in the CBRN area can lead to major joint projects integrating the main European institutions (EDA, ESA and EC) as well as Belgian federal and regional institutions. Likewise, it will be pointed out how such projects, based on active European partnerships between civilian and military researchers, can also support European SMEs and industries active in the field of novel biotechnologies and, in turn, benefit from their innovative capability. Accordingly, concrete examples will be used to highlight in what way a military-driven research can promote enhanced military-civilian cooperation and generate reciprocal benefits in the field of global international security. But it will also be stressed how such biological military-driven research is fully compatible with the civilian academic counterpart and may even positively impact on it for mutual benefits (e.g. through critical mass of researchers, extended multidisciplinary expertise, improved technological watch, improved sustainability of research projects...). In short, this "Belgian model" of bio-research in the CBRN area intends to demonstrate why science and technology for Defence is not a luxury but a vital need, and how this need can perfectly meet current military financial constraints and prioritisation in times of austerity.

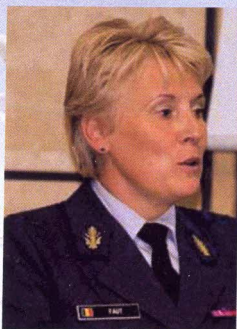


Curricula Vitae





Colonel Corinne FAUT



Originating from the Royal Military Academy in Brussels, she graduated as a Master of Military and Aerospace Sciences in 1982. The first steps in her professional life led her in January 1983 to the Technical School of Saffraenberg as a student squadron commander and then as a military assistant. After having been responsible for the personnel management in the Air Force Training & Support Headquarters for two years, Captain Corinne Faut joined the section Organisation & Education of the Air Force Staff in 1991. After having attended the Candidate Senior Officers Course, she moved to the “Audit” office in order to restructure the organisation charts.

After the Advanced Staff Course, Major Corinne Faut joined the Personnel Division of the General Staff in 1998 in order to coordinate the activities of different working groups regarding the future of the Belgian Defence and collaborated to achieve the strategic orientations of the Vision 2015 plan. In 2001, Lieutenant-Colonel Corinne Faut moved to Neder-Over-Heembeek as the synthesis officer in the Human Resources Department of the Defence Staff.

One year later she was appointed to the King’s Military Household. During this period Colonel Corinne Faut completed the High Studies for Security & Defence. After her six-month education as an auditor at the NATO Defence College, she was designated to lead the Task Force “Mixed Career Concept” at the Human Resources Department. In February 2009, she joined the Royal Higher Institute for Defence (RHID) as the director of the Centre for Security & Defence Studies before she became the director-general of the RHID in July of the same year.

During her career, Colonel Corinne Faut acted also as the representative of the female personnel of the Air Force as well at national as at NATO level. She was the Belgian delegate at the NATO Women Committee.



Prof. dr. ir. Bart DE MOOR

Bart De Moor was born on 12 July 1960 in Halle, Belgium. He is married and has three children. In 1983, he obtained his Master Degree in Electrical Engineering at the KU Leuven, Belgium, and a PhD in Engineering at the same university in 1988. He spent two years as a Visiting Research Associate at Stanford University (1988-1990) at the departments of Electrical Engineering (ISL, Prof. Kailath) and Computer Science (Prof. Golub). Currently, he is a full professor at the Department of Electrical Engineering of the KU Leuven in the research group SCD and vice-rector for International Policy of the KU Leuven.

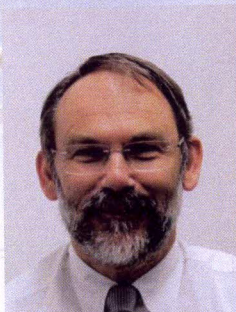
His research interests are in numerical linear algebra and optimisation, system theory and system identification, quantum information theory, control theory, data-mining, information retrieval and bio-informatics. He is or has been the coordinator of numerous research projects and networks funded by regional, federal and European funding agencies. He is the managing director of the Future Health department of iMinds.

Currently, he is leading a research group of ten PhD students and four postdocs and in the recent past, about 70 PhDs were obtained under his guidance. He has been teaching at several universities in Europe and the US. He is a member of several scientific and professional organisations, jury member of several scientific and industrial awards, and chairman or member of international educational and scientific review and selection committees. He is an associate editor and reviewer for several scientific journals. His work has won him several scientific awards (Leybold-Heraeus Prize (1986), Leslie Fox Prize (1989), Guillemin-Cauer best paper Award of the IEEE Transactions on Circuits and Systems (1990), Laureate of the Belgian Royal Academy of Sciences (1992), bi-annual Siemens Award (1994), best paper award of Automatica (IFAC, 1996), IEEE Signal Processing Society Best Paper Award (1999)). In November 2010, he received the 5-annual FWO Excellence Award out of the hands of King Albert II of Belgium. Since 2004, he is a fellow of the IEEE.

From 1991-1999 he was the head of cabinet and/or main advisor on Science and Technology of several ministers of the Belgian Federal Government (Demeester, Martens) and the Flanders Regional Governments (Demeester, Van den Brande). From December 2005 to July 2007, he was the head of cabinet on socio-economic policy of the minister-president of Flanders, Yves Leterme, capacity in which he was the coordinator of a new socio-economic business plan for the Flemish region.

He was and/or is in the board of six spin-offs, which he co-founded, of the Flemish Interuniversity Institute for Biotechnology, the Study Centre for Nuclear Energy, the Institute for Broad Band Technology, the Flemish Children Science Centre Technopolis, the Alamire Foundation and several other scientific and cultural organisations. He is the chairman of the Industrial Research Fund of the KU Leuven and the Hercules Foundation. As a vice-rector for International Policy, he is a member of the Executive Committee and the Academic Council of the KU Leuven and of the Board of Directors of the Association KU Leuven. He is also the chairman of the Committee on Internationalisation and Development Cooperation of the VLUHR.

He made regular television appearances in the Science Show 'Hoe?Zo!' on national television in Belgium, has a regular science talk on Radio 2 and patrons the 'Flemish Youth Technology Olympiade'.



Major General Albert HUSNIAUX, MSc Eng

Major General (Air Force) Albert Husniaux was born in Genk (Belgium) on 7 July 1957. He is a Master of Science in Engineering, specialised in Mechanics, Ballistics, Aeronautics and Astronautics.

Major General Husniaux is currently the NATO chief scientist. He chairs the Board of the Science and Technology Organisation, NATO's premier forum for Science and Technology co-operation among its member nations, comprising a network of more than 3000 scientists and the Centre for Maritime Research and Experimentation. He is also the senior scientific advisor of NATO.

Major General Husniaux is an experienced executive manager of Science and Technology, having served his nation from 1997 to 2009 and NATO since 2009. During his three-year tenure as the RTA Director, Major General Husniaux has been heavily involved in the NATO Agencies Reform, contributing significantly to the definition and the implementation of NATO's Science and Technology Reform. On 1 July 2012, he started his tenure as the first chief scientist of NATO, having been appointed by the North Atlantic Council (NAC) on 9 January 2012.

From September 2005 to July 2009, he was a member of the NATO Research & Technology Board (RTB) for Belgium; prior to that, from October 1997 to September 2005, he served as the Belgian national coordinator to the Research & Technology Organization (RTO). He also represented Belgium in the R&T Board of the European Defence Agency (EDA). From December 2006 to July 2009, he managed the research activities of the Belgian Armed Forces in the fields of technology and security and defence, as the first director-general of the Royal High Institute for Defence, also a "think tank" within the Belgian Ministry of Defence.

Major General Husniaux is a Belgian flag officer with a career in a very wide array of domains: integrated logistic support (including acquisition) of aircraft, helicopters, rocket launchers (Ariane) and weaponry, teaching and education, strategic affairs, human resources and Research & Technology.

During his career, Major General Husniaux mostly served as an aircraft and weapon systems logistic support manager. He was actively involved at unit, staff and industry level in the logistic support and the acquisition of the training aircraft, the transport aircraft and the combat aircraft of the Belgian Air Force, both in national and multinational frameworks.

Teaching activities, as a technology teacher to the engineers of the Belgian Air Force and as an assistant professor in physics to the Royal Military School's students (Bachelor and Master degree), were part of his early career.

Activities in the Strategic Affairs domain, as the branch chief, common capabilities planning, at the Strategy Department of the Defence Staff and in the Human Resources domain, in charge of preparing promotion boards of senior Air Force officers and as the project officer of the single career concept for all Belgian military, complete his portfolio.

Major General Husniaux is a member of the Technology and Society Class of the "Académie royale de Belgique" (Royal Academy for Sciences, Humanities and Arts).



Major General Christian BREANT, PhD

Christian Bréant has been first appointed by J. Solana in May 2008, EDA Director for Research & Technology, and for a second mandate by C. Ashton in November 2011.

From February 2005, he was deputy director for “technology strategy” at the Directorate for Force System and Strategies for Industry, Technology and Cooperation, and Research and Technology director for Defence and Security of the “Délégation générale pour l’Armement”.

Aged 57, he is a graduate from the Ecole polytechnique (1976) and PhD scientist in Laser Physics from Paris University. He was postdoc at JILA, Boulder, University of Colorado, USA.

In 1985, he was assigned to the Directorate for Research and Technology (DRET) of the “Délégation générale pour l’Armement” (DGA). Initially in charge of R&T studies in the field of laser sources and systems, he became manager of the optronics and laser department in 1989.

In 1993, he was appointed to the office of the National Armament Director (NAD), in charge of the development of the Defence Scientific Campus in Palaiseau.

In 1994, he became deputy head of the Directorate for Research and Technology and assistant to the NAD’s chief scientist adviser.

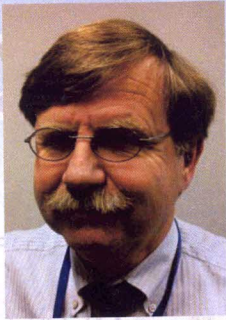
In 1997, he joined the Directorate for Cooperation and Industrial affairs (DCI) in Paris as deputy director in charge of industrial and economic analyses.

In addition to his work, he was an auditor at the Centre for Advanced Studies in Armament (CHEAr, Paris, 1995-1996), the Centre for Advanced Military Studies (CHEM) and the Institute for Advanced Studies in National Defence (IHEDN, Paris, 1999-2000). In 2000, he was appointed managing director of the Defence Analysis Centre (CAD) in charge of operational analysis and simulation for the preparation of the future defence systems.

In 2004, he became director of the common technologies department and in charge of technological prospective and preparation of the technical policies for DGA.

In March 2005 Christian Bréant was elected a member of the French Academy of Technologies. In 2006-2007, he was a member of the European Security Research Advisory Board (ESRAB) of the European Commission and presently member of ESRIF. He is also a member of the “Conseil économique de la défense”, France.

He has been awarded the distinctions of “Officier de la Légion d’honneur” and “Officier de l’Ordre national du mérite”.



Mr Jelle KEUNING, MSc Eng

Jelle Keuning completed his MSc in naval architecture at the Technical University Delft in 1976. From 1976 until 1977 he fulfilled his compulsory service as naval officer at the Materiel Directorate of the Royal Netherlands Navy.

After this he worked from 1978 until 1979 at the Ministry of Transport and Public Works as project engineer at the department for maritime transport, involved in nautical studies.

Work included management of research programmes on navigational hazards regarding LNG transport and criteria for allowable seastates for very large crude oil carriers (VLCC's) to Rotterdam harbour.

In 1979 he joined the Delft Hydraulics Research Institute, as a project scientist at the department for maritime structures. His main activities included hydrodynamic research on the floating materiel and the development of computer prediction tools for motions in seaway of moored vessels and cutter suction dredgers. As such he was project leader for the advisory work of the institute related to operations of the floating materiel used for the construction of the Eastern Scheldt Storm Surge Barrier in The Netherlands.

In 1986 he returned to the Ministry of Defence. From 1986 until 1999 he worked at the Department for Naval Construction, starting as head of the section for naval construction and survivability, ending as assistant director for naval platform technologies. His responsibilities laid in the fields of ship hydrodynamics, ship propulsion, structures, survivability and ship signatures, both for advisory work to the design office as for the management of the research projects at the research institutes.

During this period he was also national project manager for international research and technology projects. He was also during that time chairman of the NATO Ship Survivability Group and national delegate at the NATO Group NNAG/ NG/6 on Ship Design.

In 2000 he moved to the position of deputy director for research and development of the Ministry of Defence.

In 2003 he was appointed as director for research and development of the Ministry of Defence. In this position he is responsible for the R&T policy, planning and oversight of all the research activities of the Ministry of Defence. He is the principal national representative in the NATO Research and Technology Board and in the R&T Steering Board of the European Defence Agency.



Colonel Gilles BRAULT, MSc Eng

Colonel in the Corps of Armaments, Gilles Brault is currently Manager of Industrial and International Affairs of the "Mission pour la recherche et l'innovation scientifique" within the "Direction générale de l'Armement" of the French Ministry of Defence.

Aged 57, he is a graduate from the "Ecole universitaire des ingénieurs de Lille" with a specialisation in Materials Science.

From October 2004 to July 2009 he was the programme manager of the COBRA counter-battery radar system and the Multiple Launch Rocket Systems (MLRS) for the Operational Directorate within the "Direction générale de l'Armement".

In August 1999 he became the research programme manager of the "Structural Materials" Domain of the Technical Service.

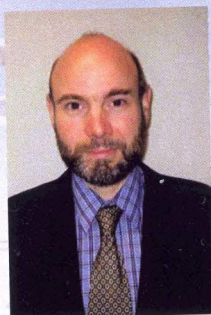
From September 1989 to July 1999 Colonel Brault was subsequently assigned to the functions of deputy head of the "Structural Materials" Domain and head of the "Armours & Warheads" Division in the Research Directorate within the "Direction générale de l'Armement".

In 1981 he became the head of the "X Ray Diffraction & Micro-Probes Analysis" Research Laboratory of the "Etablissement technique central de l'armement"

He has been awarded the distinction of "Officier de l'Ordre national du mérite"



Prof. dr. ir. John VANTOMME



John Vantomme obtained his Master degree of civil engineering of the Polytechnical Faculty of the Royal Military Academy (RMA) with the 130th promotion in 1980 and the Master degree in civil engineering – orientation building problems at the Vrije Universiteit Brussel (VUB) in 1987.

He got his PhD degree in engineering sciences at the VUB in 1992 with a dissertation on material damping in fibre reinforced plastics.

Currently he is head of the Civil and Materials Engineering Department of the Royal Military Academy (RMA) in Brussels and is part time professor at the VUB.

His teaching and research is situated in the domain of mechanics of materials and constructions, with emphasis on concrete and composite systems. Particular topics are the analysis of effects of explosions on constructions and physical security of personnel and infrastructure.

He is also member of the scientific committee of the Royal Higher Institute for Defence and is chair of the committee for the cluster Mobility, Systems and Protection (MSP) in the research programme for Defence.

He is chairman of the Scientific Commission of the RMA and member of the Board of the RMA-Patrimony.



Major General Marc THYS, MSc Eng

Major General Marc Thys graduated in 1985 as Master in Engineering Sciences at the Royal Military School in Brussels. He is an armoured cavalry officer who served as platoon commander and commanding officer in the 1st Mounted Rifles Regiment/Guides.

His previous postings include project manager for the battlefield surveillance radar, ballistics and security officer in the department for studies of the Armour School, capability manager Land Combat at the Department for Strategy, J5 chief plans KFOR/national contingent commander KFOR and project manager "Future" for the procurement of the new families of Armoured Vehicles.

After his term as director Land Systems within the Directorate General Material Resources of the Defence Staff, he is now chief of the Systems Division within the same department. This division is responsible for the material management of all land, air, naval and support systems of the Belgian Defence.

Major General Thys is an alumnus of the Command and Staff Course at the Canadian Forces College in Toronto and the Higher Staff Course at the Royal Defence College in Brussels.



Colonel Jean-Luc GALA, MD, PhD

Jean-Luc Gala, MD, PhD, is colonel of the Belgian Armed Forces, and full professor at Université catholique de Louvain (UCL), where he teaches molecular genetics.

He is the founder and chairman of the mixed military-academic technological platform CTMA/DLD-Bio (Center of Applied Molecular Technologies-UCL/Defence Laboratories Department-Biological Threats – Belgian MOD), hosting common military, academic and industrial R&D projects.

His work focuses on developing and validating innovative new DNA-based diagnostic and prognostic tools for genetic-based diseases and infectious diseases (including Biological Warfare Agents).

His activity is integrated in several national and international military framework projects (European Defence Agency, NATO SIBCRA) and academic EU networks (COSTB28, Bio3R/PASR, FP7-CBRN-Map, FP7-PRACTICE, FP7-ARCHIMEDES, FP7-EDEN, FP-7MIRACLE, ESA/B-LiFE). He is acting as scientific and medical counsellor for the federal government in matters dealing with public and military health (bioterrorism, natural outbreaks...).

He is author or co-author of more than 100 publications in international "peer-review" journals. His research projects have led to the creation of the first Belgian light fieldable laboratory for DNA-based identification of life-threatening infections and the creation of several successful spin-off activities.



Colonel Richard MARCHAL, MSc Eng

Richard Marchal was born in Namur on 7 May 1960. In 1983 he graduated as a master of science in engineering (telecommunications and weapon systems-ballistics) from the Royal Military Academy (133rd promotion of the Polytechnic section).

He was then posted to the 35th anti-aircraft artillery battalion in Spich (Germany), where he served as technical officer of the GEPARD arm system. From 1987 to 1989, he completed his internship of "ingénieur du matériel militaire" (military equipment engineer) at the technical service of the land force in Peutie and obtained a Master's in Physics (optoelectronics and solid-state physics) from the University of Liège.

In 1989 he gained the degree of military equipment engineer and joined the arsenal of mechanical equipment and armament in Rocourt (Liège), where he led the optics-optronics service and the modernisation of the LEOPARD tank fire-control system, after which he headed all production services. During the same period, he gained further knowledge of optronic system and radar technologies as well as of software engineering, particularly at the "École supérieure d'optique" (higher school of optics; Orsay, France) and at the "École supérieure de l'aéronautique" (higher school of aeronautics; Toulouse, France).

In 1994 he temporarily left the Belgian Defence to serve as a R&D manager at OIP (Optronic Instruments and Products) in Oudenaarde. The following year he returned to the Rocourt arsenal to set up a new department dealing with weapon systems and then held the position of special chief of staff, responsible for quality, information technology, prevention, internal control and purchases. During this period he also earned a post-graduate degree in industrial management from the University of Liège.

In 1999 he joined the division "plans and programmes" of the Land Force Staff to take over the new project of B-HUNTER unmanned aerial vehicle (UAV), which he successfully completed within the General Directorate Equipment. During the same period, he also actively represented Belgium as regards UAV in different NATO groups (NAAG and NAFAG) and gave several conferences on the matter (France, United Kingdom, United States and Spain). He is also a member of UAV professional associations (Euro-UVS, AUVSI) and of SPIE (International Society for Optics and Photonics).

In 2006 he was appointed to the department Assessment, where he dealt with the harmonisation of the sectoral plans of the various departments and general directorates, after which he contributed to set up Defence's internal audit and internal control, in line with the new legislation of 2007.

In early 2012, he joined the Royal Higher Institute for Defence, to take over the function of director of the Department Scientific and Technological Research of Defence.