Ministry of Defence

The Netherlands Defence Academy presents the

Faculty of Military Sciences in perspective

Education and Research report 2014

Table of contents

Coverphoto:
Officer-cadets look at the possibilities of cyber operations.
Article First Professor of Cyber Operations, page 21.

Preface

The art of changing the world without disturbing it

This title might sound like a contradiction in terms, but I would prefer to call it an oxymoron: an apparent contradiction. The word 'art' in the title refers to science in general, not to the specific research discipline – the basic principle is always the same. We try to observe a phenomenon, but at the same time avoid influencing the object(s) we are studying. The observations are subsequently recorded, analyzed and dissected. Based on the analysis it is common practice to theorize on the origin of the observed phenomenon and the parameters influencing it. Using the experience gained and the relevant theory we observe similar yet different phenomena and test our theory against the new observations, hoping the results will stand the test. Then it is time to publish our results in scientific journals, thus informing our peers about our findings and the theory behind them. This enables us to change the world or help others change it, since it is possible to adjust the boundaries of the various processes and thereby influence the outcome of a given similar, but new, situation. Hence, by observing the world without disturbing the situation, we can help change the world. Consequently, the title is only an apparent contradiction.

Scientists of the Faculty of Military Sciences of the Netherlands Defence Academy, as well as their colleagues at similar research institutes throughout the world, are very much aware of this difficult balance between observing without influencing the observed system too much, on the one hand, and trying to obtain enough scientific material to theorize about the process in a scientifically sound manner, on the other. Our researchers often partake in exercises or real-live conflict settings that give them the unique opportunity to study situations that rarely occur. These are often operations with many complicating factors carried out under high-risk conditions, which are not easily reproducible, yet very easily perturbed by external factors.

This annual report of the Faculty of Military Sciences contains reviews of a variety of scientific work, representing almost the whole scientific spectrum, with the obvious exception of medical sciences.

All the featured scientists have in common the close relation with the military world and the somewhat ambitious goal of changing the (military) world for the better. We hope you will appreciate their scientific efforts and be impressed with their dedication. If you have any questions relating to their work, please do not hesitate to contact them and ask for more details.

Prof Dr Henrik Rudolph
Dean of the Faculty of Military Sciences

About the Netherlands Defence Academy and Faculty of Military Sciences

The Netherlands Defence Academy (NLDA) provides initial officer training and education and career courses for officers at intermediate and senior level. By offering an integrated programme consisting of military training, personal development and academic education, the NLDA makes an important contribution to professional leadership.

Within the scope of the academic education for military personnel, the Faculty of Military Sciences (FMS) is primarily responsible for the academic degree programmes at Bachelor and Master level for aspirant-officers and officers of the Netherlands Armed Forces. In close cooperation with the Royal Naval Institute and the Royal Military Academy, the FMS aims to prepare midshipmen and officer-cadets, respectively, for their future jobs in the armed services.

Education

The FMS offers the following accredited Bachelor programmes at two locations:

- War Studies (WS), at Breda
- Military Management Studies (MMS), at Breda
- Military Systems & Technology (MS&T), at Den Helder.

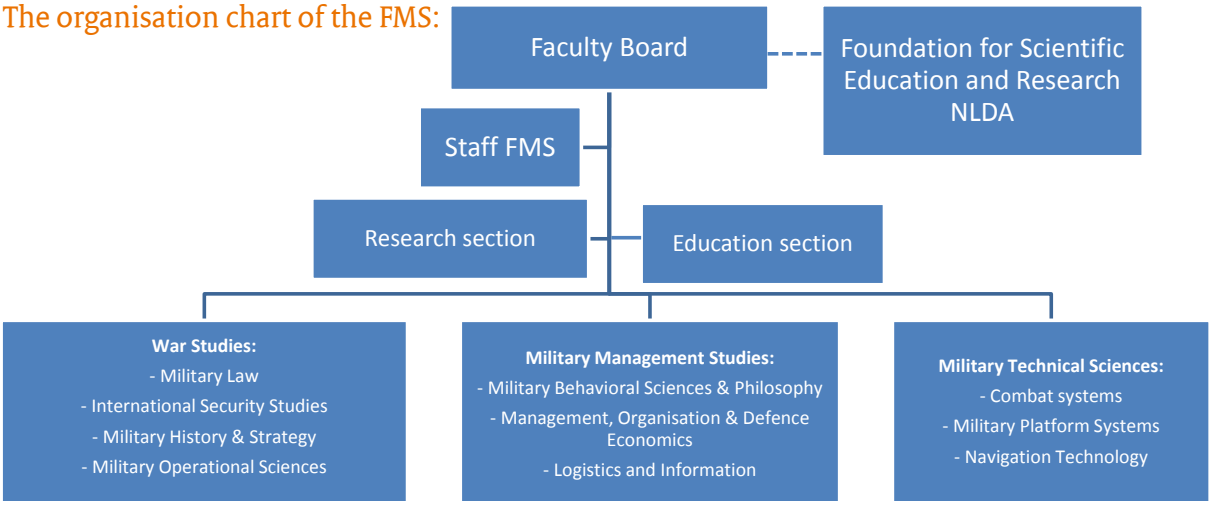
As of February 2013, the FMS also offers the academic Master's degree programme in Military Strategic Studies in Breda.

Research

Academic education is underpinned by independent academic research. Research at the FMS is relevant for the education it provides and for the Defence organisation as a whole, and contributes to improving military operations.

Research at the NLDA is mainly focused on military disciplines, such as strategy, command and control in military operations, leadership and ethics, defence economics, military law and history, military logistics as well as on technological domains, such as optimizing operational processes, navigation, maintenance, combat systems, C4I and military platforms. Much of this research is conducted in close collaboration with civil universities.

The organisation chart of the FMS:



Research at the Faculty is confined to military-relevant, multi-disciplinary areas, called Strategic Research Orientations (SROs):
1. Dynamics of War and Peacemaking;
2. Managing Military Coalitions;
3. Clustering Unmanned Military Systems;
4. Deployment and Deployability of Military Systems;
5. The Human(e) Factor in Present-day Military Practices;
6. Cyber Operations & Cyber Security.

Some facts and figures of 2015

Reference date is January 2015 (from the SWOON Annual Report 2014)

Scientific staff FMS

	War Studies	Military Management Studies	Military Technical Studies	Total
Scientific staff (lecturers and researchers)*	31,9 FTEs	31,8 FTEs	35,3 FTEs	99 FTEs

** the scientific staff of the FMS provides education (both regarding degree programs as well as in the field of Officer Training or Specialist Training Programs), contributes to advanced instruction and training and performs research and managerial tasks.*

Number of Bachelor students

	War Studies	Military Management Studies	Military Systems & Technology and Military Engineering	Total
Bachelor students	103	123	141	367

Number of Master students: 88

Number of Bachelor graduates

	War Studies	Military Management studies	Military Systems & Technology and Military Engineering	Total
Bachelor graduates	35	36	16	87

Number of publications by research staff:

Dissertations:	5
Books:	3
National and international articles	25
Conference papers	30
Book chapters	23
Reports	6

Number of research staff:

Total research capacity in FTEs (including doctoral researchers)	22,7
Doctoral researchers (TNO and FMW)	8
Doctoral researchers from operational commands	5

Innovative service logistics in the maritime sector

The maintenance of capital-intensive installations like naval vessels offers a complex challenge. Within the maritime and offshore sector a number of typical characteristics, e.g. geographical locations, various asset usage patterns and weather conditions, make the maintenance even more difficult. At the Faculty of Military Sciences Ph.D. student Sub-Lieutenant (N) Bianca Keers MSc works on a project that focuses on improving the maintenance and service logistics of maritime assets. Together with her mentor, Paul van Fenema, Professor of Military Logistics at the FMS, she explains what the research implies and how the Royal Dutch Navy can benefit from the research outcome.

Sub-Lieutenant (N) Bianca Keers MSc

Keers' research is part of an extensive project called Integrated Maintenance and Service Logistics Concepts for Maritime Assets (MaSeLMa). In order to understand the role of her research in this project it is necessary to know more about the motives and background of the project as a whole.

The MaSeLMa project

In the maritime sector service logistics support and maintenance of systems constitute a significant portion of the exploitation costs. On the one hand, this is due to the complexity and high capital value of the assets used in this sector and, on the other, due to the highly variable and mostly harsh conditions in which ships and their subsystems are operated. Moreover, since these assets are often operated at remote locations around the world, unplanned maintenance requires significant logistic efforts and is hence very costly. This reveals that an important cause of the high costs of service logistics in the maritime sector is the uncertainty of maintenance requirements.

The MaSeLMa project focuses on developing innovative concepts to improve the predictability of maintenance and the requirement for service logistics, on the one hand, and developing smart concepts of service logistics optimization, supply chain coordination and cooperation, on the other. The project's general objective is to reduce total costs of asset ownership and increase opportunities for new business by service innovation.

The Royal Dutch Navy and the Netherlands Defence Academy participate in the project together with 19 other parties; ship-owners like Fugro, Original Equipment Manufacturers like Pon Cat and system integrators like Thales.

NLDA participation

The research project is organized in three work packages. The first work package aims to increase the predictability of maintenance, decrease unexpected breakdowns and reduce unnecessary maintenance. The second work package focuses on optimal service logistics planning and support and the third on developing inter-organizational relationships.

The Netherlands Defence Academy takes part in the first and third package. The second work package is conducted by the universities of Eindhoven and Twente. Prof Dr Ir Tiedo Tinga, Associate Professor of Maintenance lecturing at the FMS and part-time Professor of Maintenance at the University of Twente, leads the package, which is aimed at increasing the predictability of maintenance. Together with two Ph.D. students, who started their research in 2015, he develops predictive models for systems on board vessels, for example propulsion and radar systems. The main aim of this project is to determine when parts or complete systems fail, so that spare parts, personnel and facilities can be arranged in time.

Prof Dr Paul van Fenema

Professor van Fenema is responsible for the package on supply chain coordination. He supervises Sub-Lieutenant Keers' research, which is aimed at developing methods for collaboration between asset owners, Original Equipment Manufacturers and service suppliers.

In his inaugural speech held in April 2014 on multistakeholder innovation (available upon request), Professor Paul van Fenema elaborated on ways to make the supply of material and service more cost-efficient during military operations such as the current one in Mali. His chair revolves around two important issues: what determines the value of military logistics and how can innovation influence that value in a positive way? "That is why this work package fits perfectly into my research focus", explains Van Fenema.

Achievements in the third work package

Keers started her research in August 2013. She used the first six months to conduct baseline research and interviews within the organizations involved in the project. As there are 21 parties involved in this project her first challenge was to get a clear picture of their individual objectives for cooperation, the interrelation between potential partners and to understand the consequences for individual organizations in terms of changing their praxis.

The diversity of organizations, the low relational but high transactional form of partnerships and the traditional culture define the infrastructural characteristics within the maritime industry. "This made it a challenging setting for me to study inter-organizational relationships along with the emerging new focus on management innovation ", reflects Keers. Nevertheless, being motivated to develop business cooperation, organizations were able to lift the veil momentarily to enable the creation of new scientific insights into this matter.

She presented the preliminary findings in three articles and discussed the results during a number of scientific conferences. In addition, with the help of these conferences and during a series of business sessions organized by Gordian (an organization in service logistics and spare parts management), Keers and Van Fenema discussed further research requirements with international researchers within the same discipline and with business managers participating in the project.

source: World Class Maintenance

source: Thales

Keers: “Based on scientific and business requirements we formulated further research objectives to be studied successively with the help of MSc-students from Tilburg University and the Free University of Amsterdam.

Innovation model

In order to improve the success of collective innovation, the aim of Keers’ study is to design and validate a new, comprehensive and relevant innovation model by which service praxis between organizations participating in the MaSeLMa project can be improved. By means of contextual action research she is systematically studying case problems and (aided by theoretical considerations) applied intervention techniques in order to develop the ability of organizations to form intensive and long-lasting relationships.

Keers: “One of the latest aspects I identified to be of utter importance to the development of any collaborative initiative, is the intensity and dexterity with which actors fulfil their roles within the relationship. I consider it a privilege to be able to work on developing new knowledge and gaining new insights”.

Added value for the Royal Dutch Navy

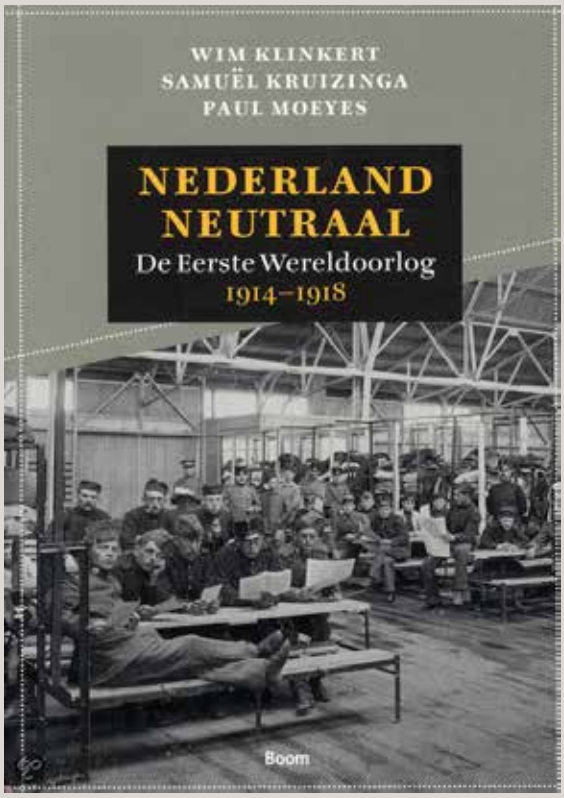
The MaSeLMa project offers the Royal Dutch Navy access to a broad range of newly developed methods to increase service logistics efficiency. With these methods, on the one hand, money can be saved (due to reduced supply and less unused spare parts) and, on the other, the availability and operational capability of naval vessels can be improved. Besides, the defence organization can learn a lot from other professional operators by collaboration in a number of ‘experimental gardens’ in the field of, for example, servicing propulsion and radar systems.
The added value for the NLDA is that the research results (like models, methods and insights) can be used as relevant case studies in both the Bachelor and Master programmes of the Faculty of Military Sciences. With these case studies lecturers can demonstrate how new maintenance and logistic insights can directly be applied in practice. Van Fenema adds: “We also give our students the opportunity to graduate at MaSeLMa organisations. Besides this the project offers more options; a midshipman studying at the Free University of Amsterdam currently graduates at the Defence Material Organisation on a MaSeLMa topic”.

Books

Last year saw a number of FMS publications on various scientific subjects, three of which feature below.

Nederland neutraal [The Neutral Netherlands]

Authors: Prof Dr Wim Klinkert, Dr Samuël Kruizinga and Dr Paul Moeyes



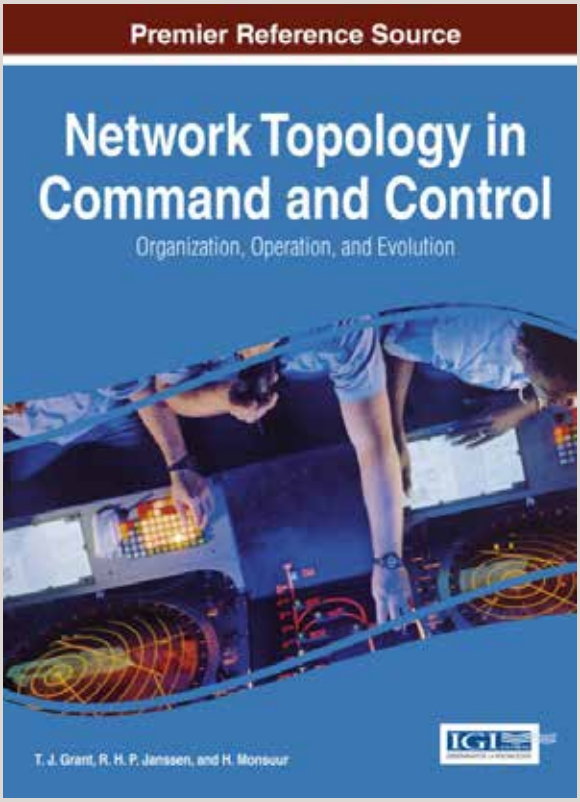
In his new book entitled *Nederland neutraal. De Eerste Wereldoorlog 1914-1918* [The Neutral Netherlands. The First World War 1914-1918] Professor Wim Klinkert describes three leading episodes of the turbulent years 1914-1918. The book presents a picture of how the Netherlands remained neutral during the First World War and how politicians, senior military, commercial entrepreneurs and journalists coped with the problems, opportunities and dangers of neutrality.

Klinkert portrays three officers, namely General C.J. Snijders, Commander-in-Chief naval and land forces, Prof L.A. van Royen, a 'gunner' who played a central role in the organization and modernization of Dutch weapons production, and cavalry Captain Fabius, who laid the foundation of the military intelligence service.

Besides these military figures, much is written in great detail about Queen Wilhelmina, who liked to refer to herself as the Soldiers' Queen. The other protagonists, discussed by Kruizinga and Moeyes, were active in the world of diplomacy and trade & industry.

Network Topology in Command and Control: Organization, Operation, and Evolution

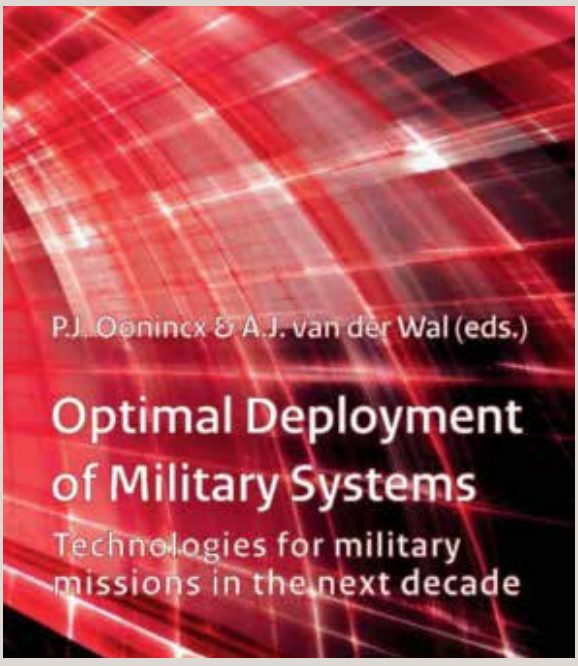
Authors: Dr Ir René Janssen, Dr Herman Monsuur and Prof Dr (retd) Tim Grant



The book gives a current overview of new insights into the field of Command and Control (C2) networks, like the systems that are used by the operational commands. That is what *Network Topology in Command and Control: Organization, Operation and Evolution*, written by two FMS lecturers, working in operational research and a former FMS professor in operational information and communication technology, offers.
Over the past decade, the C2 field has undergone a top-down transformation, directive command to Network Centric Operations (NCO); 'It takes a network to defeat a network'. Peer-to-peer networks (exchange of information between equals), self-synchronisation (adaptive acting) and flexibility play a key role here. This also includes the furtherance of the cooperation in different settings; either joint or combined and civil-military. The secondary C2 processes and C2 systems cannot be studied without using 'Network Science', that is the mathematics of networks. The book offers new insights into the field of C2 organisation structures, modeling of C2 structures, networks with their dependencies and evolution and C2 technologies.
Scientists from the Netherlands, Australia, Sweden, the UK and the USA contributed to the book. This publication is ideal for reference use by students, academics, and security professionals in the fields of C2 and network science.

Optimal Deployment of Military Systems

Editors: Prof Dr Ir P.J. Oonincx & Dr A.J. van der Wal



At the opening of each academic year, the Faculty of Military Sciences publishes the Annual Review of Military Studies (NL ARMS). In 2014 the 18th edition was issued.
In this volume entitled *Optimal Deployment of Military Systems*. Technologies for military missions in the next decade FMS scientists describe the result of the Faculty's research into technical means for future missions. State-of- the- art technologies, system integration and planning & life cycle management are the key themes of this book.
Technical means that develop rapidly are planning and conflict detection tools for Unmanned Aerial Vehicles, a simulation tool for anti-submarine warfare, and the use of chat in command & control for anti-piracy missions.
These means will play a pivotal role in modern warfare. From different angles FMS scientists describe the importance of fundamental research into the military application of these means. A short explanation of their Bachelor thesis on future energy supply for naval vessels by two naval officers concludes this volume. In order to receive a copy of the 18th edition of NL ARMS, please send an e-mail to imnm.v.kemenade@mindef.nl


UN

Column commandant of the Netherlands Defence Academy

Remember yesterday, dream about tomorrow, live today...

Today's world is dynamic, in which developments constantly accelerate and become more and more complex. The responsibilities put on the shoulders of our young, and sometimes not so young, officers increase by the day.

The biggest challenge of the Netherlands Defence Academy is to respond adequately to the dynamics of the military profession, and thereby preparing our students for the future. Hence the importance of retrospection, and the continuous search for improvements in education, training and character-building.

2014 was a busy year for the Faculty of Military Sciences. The impact of the reorganization (and reduction) had to be processed, which had consequences for each individual member of the faculty. Fewer people meant redesigning almost every process internally, which was a huge challenge.

In 2014 we started developing a Technical Master's Course, in close cooperation with the branches of the armed forces, which was hampered by limited personnel resources. This important development has not yet resulted in the actual mission to start such an education. The need for such a Master is widely acknowledged, but the struggle to attain the necessary resources is an indication of the huge challenges currently facing our defence organization.

In 2014 the NLDA received the results of a risk analysis on integrity. This important document suggested improvements in the work atmosphere and environment at the Royal Military Academy, the Royal Naval Institute and the Faculty of Military Sciences. Throughout 2014 we put great energy in developing the internal procedures, but more importantly, in harmonizing the implicit curricula of the three institutions. We will continue to do so for at least another two to four years.

This effort will result in strengthening the main selling point of the Netherlands Defence Academy: providing an excellent combination of scientific education, military training and character-building. All contributors have the same focus and provide opportunities for lifelong learning, just in time, just enough, and just for you....

Major General (A) Theo Vleugels,
Commandant of the Netherlands Defence Academy

Knowledge domain clusters

From January 2014 on the reorganised FMS has three domain clusters which are responsible for the academic education and research activities: War Studies, Military Management Studies and Military Technical Sciences. Within these clusters the Faculty focuses on a limited set of military relevant, multi-disciplinary research areas, called Strategic Research Orientations (SRO's). These SRO's involve multiple groups and, in some cases, stretch across knowledge clusters.

The chairmen of the domain clusters elucidate the important developments within their group and their added value for the defence organisation.

Prof Dr Ir Patrick Oonincx, chairman of the Military Technical Sciences (MTS) department
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The development and application of modern technology plays a pivotal role in modern warfare. Therefore it is evident, that projects on large material renewal and acquisition attract a lot of attention in both the military and the political scene. Introducing new technologies and novel military platforms leads to fundamentally re-thinking on their usage and of course on the budget involved. When it comes to the acquisition of novel technologies, we therefore expect exciting years ahead. The new Joint Support Ship Karel Doorman recently entered service, the F-16 fighter will be replaced with the new Joint Strike Fighter F-35, the MQ-9 Reaper is acquired as Medium Altitude Long Endurance (MALE) Unmanned Aerial Vehicle (UAV) and in the next decade the renewal of the Navy's mine-hunters and multipurpose frigates, as well as the possible update of the Dutch submarine fleet.

All of these projects will yield interesting research questions with respect to both technological developments and operational use, which are the two main topics of interest of the Department of Military Technical Sciences. In view of these developments the department presented in 2014 the Netherlands Annual Review of Military Studies on its research themes, discussing views on emerging new technologies and new operational challenges, created by these technologies.

Bachelor's programme

In her accredited Bachelor's programme the MTS department welcomed various Bachelor theses that were conducted in strong cooperation with MoD departments like the Defence Material Organisation (DMO). Some of them also won awards for best thesis in a certain field, like the Van Hengel-Spengler award for best thesis in the maritime field and the Rene Olthuis award in the field of Computer Science. Also the Bachelor programme introduced additional courses to host a new group of students from the Dutch army, namely the technical logistics department.

Ph.D. theses

Some of the research topics have also been addressed in Ph.D. theses, defended by the department's graduate students in 2014. In the field of maintenance research one thesis studied predictive maintenance for abrasive wear of military platforms operating in extreme conditions. Amongst others a case study on a Combat Vehicle (CV90) was analysed. Another thesis focused on monitoring corrosion processes based on identifying electrochemical. The latter project has also been presented during Innovation in Defence. In the field of navigation technology, a thesis on terrain referenced navigation was defended successfully. This technique can be used as a backup for GPS or by submarines during covert operations.

Research projects

In view of the emerging technologies the department also welcomed new projects in strong cooperation with the Ministry of Defence, the DMO and civil universities. A majority of projects were initiated with University of Twente on maintenance issues, where Life Cycle Management (LCM) becomes more and more a topic of interest. Two large projects in this area are Tools4LCM, considering quantitative tools for life cycle management, and MaSeLMA, which is a project funded by DinaLog on the integrated optimization of maintenance and service logistics for maritime assets. In the field of command and control (C2) and sensor management, cooperation with DMO led to the initiation of projects on platform and system integration, which will also be implemented with the renewal of the multipurpose frigates. : Together with TNO new projects on game theory, underwater navigation and communication were started.

Highlights of publications:

1. Homborg, A.M., *Electrochemical Noise: A Clear Corrosion Signature*, Ph.D. thesis, Delft University of Technology.
2. Oonincx, P.J. & Wal, A.J. van der: *Optimal Deployment of Military Systems. Technologies for military missions in the next decade*, the Annual Review of Military Studies (NL ARMS), Asser Press.
3. Grant, T.J., Janssen, R.H.P. & Monsuur, H. (eds.): *Network topology and military C2 systems: Design, operation and evolution*, IGI Global Publishers.
4. Theunissen, E., 'So you think you are safe' in *Coordinates*, Vol. X, Issue 9, 10-16.
5. Vermeulen, A.F. & Savelsberg, R.: 'Interception of an aerodynamically stable weaving re-entry vehicle' in *International Journal of Intelligent Defence Support Systems* 5 (2), 127-145.

Prof Dr Myriame Bollen, chairwoman of the Military Management Studies (MMS) department
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The department of MMS, on behalf of the MoD and the Dutch armed forces, delivers an accredited FMS scientific degree programme at Bachelor's level. Together with the department of War Studies, MMS takes part in the FMS Master's degree programme in Military Strategic Studies (MSS). In a European consortium initiated by the EU agency Frontex and in cooperation with the Royal Marechaussee, MMS has developed a scientific Master's degree programme in Strategic Border Management to be accredited shortly.

Besides the afore mentioned degree programmes, MMS staff provide courses, workshops and lectures in both degree and non-degree programmes regarding initial and advanced officers education, within and outside NLDA. Moreover, as applies to all FMS departments, MMS conducts research underpinning both the FMS degree programmes as well as the knowledge base of the MoD and the armed forces. In 2014, one Ph.D. research project, supervised by MSS staff, has been finalized. Last, at the request of the MoD and/or connected ministries MMS offers consultancy and advice based on its fields of expertise.

Major themes

At its core, the department of MMS, both in education and research is concerned with three major themes:

1. Psychosocial dynamics of expeditionary operations focus on 1) the triangle constituted by the individual, group and task in 2) the system (defence organization) in 3) changing contexts (before, during and after operations as well as in differing cultural settings). We ask ourselves: "What happens to the people in the triangle, during specific –unfavorable situations- before, during and after operations"? We also study the effects of being confronted with violence, both at an individual and at group level. We ask ourselves in what way such confrontations impact on the organization as a whole and how, in such dire situations, leaders fulfill their roles. Basically, we are concerned with studying how to best equip leaders to perform assignments as effectively and accountably as possible to prevent irresponsible behavior and its detrimental effects at all levels.

2. In Organising for Military Deployment (OMD), both from a generic- and military management perspective, we study structures, processes, systems and resources enabling military deployment in peace as well as operational situations. We presume both types of situations to interact and to be conditional to one another. Besides, frequent deployments on operations by (a part of) the military increase the need for continuous interaction, change and innovation. In OMD we focus on organizational questions derived from the armed forces' unique combination of characteristics, i.e. a politically driven organization, tasked with controlling- and exerting violence within structures, enabling high levels of mobility, flexibility and project-based working.

3. Deployability, Sustainability and Performance (DSP) focuses on the creation of added military value by applying insights from specific logistical and economic processes, systems and resources to military practice, albeit on operations out of area or in the Netherlands. To this end, we base DSP in domains, such as management, IT and (defence) economics that are being applied to concepts relevant for the MoD and The Netherlands armed forces. A Ph.D.-study on the MoD's Enterprise Resource Planning implementation will be completed in the beginning of 2015. A Ph.D.-study on networked cooperation for national operations is being started. Other research projects deal with organizational adaptation at the Defense Materiel Organization, maritime service logistics supply chains and organizational innovations such as logistical-operational analytics.

Highlights of publications:

1. Kleinreesink, L.H.E. : *On Military Memoirs. Soldier-authors, publishers, plots and motives*, NLDA Breda, 412.
2. Soeters, J., Shields, P.M. & Rietjens, S. (eds.): *The Routledge Handbook of Research Methods in Military Studies*, Abingdon/New York: Routledge, 336.
3. Beeres, R., Fenema, van, P.C., Bollen, M.T.I.B, & Dado, E.: 'The Strategic Value of Life-Cycle Costing' in *Optimal Deployment of Military Systems. Technologies for military missions in the next decade, the Annual Review of Military Studies (NL ARMS)*, NLDA Breda, 259-290.
4. Broesder, W.A., Op den Buijs, T.P., Vogelaar A.L.W. & Euwema, M.C.: 'Can soldiers combine swords and ploughshares? The construction of the Warrior - Peacekeeper Role Identity Survey (WPRIS)' in *Armed Forces and Society*, 40 (3).
5. Moorkamp, M., Kramer, E.H., Gulijk, C. van & Abe, B.: 'Safety management theory and the expeditionary organization: A critical theoretical reflection' in *Safety Science*, 69 (November) 71-81.

Commodore (AF) Prof Dr Frans Osinga, chairman of the War Studies department (WS)
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The War Studies Department continued its research on two broad themes: Dynamics of War and Peacemaking (DWPM), and Cyberwarfare. The SRO 'Dynamics of War and Peace Making' attempts to provide insight in the dynamics of interventions. The aim is to increase our understanding of the contemporary international security and military operational environment. To that end it focuses on contemporary problems encountered by western governments and their armed forces in solving security issues. It focuses on five topics: (1) Stabilization and Reconstruction; (2) Engaging Violent Non-State Actors; (3) Leadership Targeting and Robotization; (4) Virtual War and Strategic Communication; (5) Adaptation and Transformation. In addition to this SRO, the department also conducts research on cyber warfare. That SRO has a particular focus on the strategic, legal and policy aspects of cyber operations.

Bachelor and Master programmes

Both research programmes directly support Bachelor and Master level programmes run by the department. Those programmes were enriched by two new Master courses, one pertaining to the narratives various political and religious schools of thought employ to justify the use of force, and one on the dynamics of military innovation. Both were informed by ongoing research within the SRO. In the Bachelor program the courses on contemporary military operations were strengthened in coherence by re-clustering lectures into four thematic courses, each dealing with a specific strategic context: interstate warfare, irregular warfare, stabilization and reconstruction, and finally, national operations.

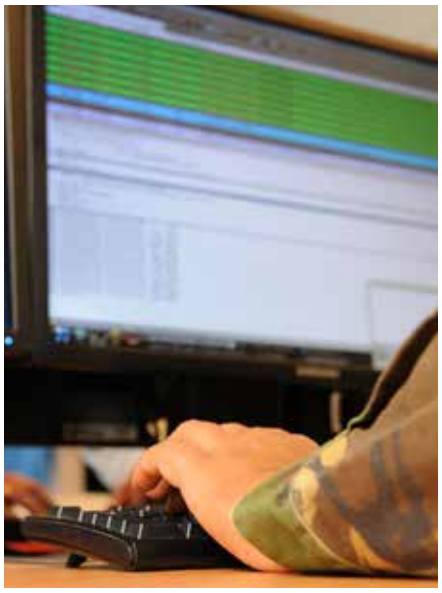
Apart from a steady stream of national and international publications, guest lectures and key note presentations in the Netherlands and abroad, War Studies department has been engaged in official policy development on topics such as defence policy, drone warfare and cyber operations. In addition several members have been invited to share their perspective on such topics with the Parliamentary Committee on Defence Policy. Finally, faculty members have been active in doctrine development supporting both national and NATO doctrine fora and warfare centers. Another highlight was the successful international congress 'War in the History of Ideas', which took place on October 14, at the Castle of Breda in cooperation with the British Society for the History of Philosophy and the Erasmus Universiteit Rotterdam.

Highlights of publications:

1. Graaff, B. de: '"There's a good reason they are called al-Qaeda in Iraq. They are al-Qaeda … in … Iraq." The impossibility of a global counter-terrorism strategy, or the end of the nation state' in Jarvis, L. & Lister, M. (eds), *Critical Perspectives on Counter-Terrorism*, London/ New York, 11-40.
2. Ducheine, P. & Haaster, J. van: 'Cyber Operations & Military Power', in: Brangetti, P., Maybaum, M.,Stinissen, J. (eds.), *Proceedings of the 6th International Conference on Cyber Conflict*, Tallinn: CCDCOE, 303-328.
3. Lindelauf, R.H.A.: 'Power Grid Defense Against Malicious Cascading Failure', (with Paulo Shakarian, Hansheng Lei), *13th International Conference of Autonomous Agents and Multiagent Systems (AAMAS-14)*.
4. Bartels, R.: 'From Jus In Bello to Jus Post Bellum: When do Non-International Armed Conflicts End?' in Carsten Stahn et al., *Jus Post Bellum: Mapping the Normative Foundations (Oxford University Press)*, 297-314.
5. Gill, T.D.: 'Some Thoughts on the Relationship between International Humanitarian Law and International Human Rights Law: A Plea for Mutual Respect and a Common Sense Approach' in Haek, Y, McGonigle Leyh, B. et al. (eds.) *The Realisation of Human Rights: When Theory Meets Practice*, Intersentia Publishers, Cambridge, 335-350.

First Professor of Cyber Operations

In future warfare the armed forces will operate both in the physical and non-physical, or digital, battle space. Brigadier-General (A) Paul Ducheine PhD LL.M. MSc will prepare the Armed Forces for this, as the Netherlands' first professor in cyber operations. In November 2014 Ducheine already held a named professorship of Military Law of Cyber Warfare at the Faculty of Law in the University of Amsterdam (UvA). Besides this civil academic chair he will also hold its military counterpart of cyber operations at the FMS from February 2015 on. "Some people think that we can execute cyber operations indiscriminately, but legal verification of these operations is indispensable", according to Ducheine.



Cyberspace, freely translated as the virtual world of information and communication, is a potential battlefield and, after water, land, air and space, the fifth dimension of military conduct. Ducheine: "All in all cyberspace enables digital access to information, which offers huge opportunities to manoeuvre". The weather, terrain conditions and the presence of enemy forces can, for example, negate the deployment of ground troops, artillery and air assets. But it is not necessary to attack military forces; in order to reach one's goal sources of information can also be disturbed and information can be made inaccessible or distorted.

Cyber Command

Professor Ducheine, a former combat engineer, has taught officer-cadets and midshipmen at the FMS on the subject of cyber warfare since 2012 as an Associate Professor of Cyber Operations and Cyber Security. Furthermore, he has studied the military-legal aspects of cyber operations and cyber security, acting in close cooperation with the latest addition to the Ministry of Defence; the Defensie Cyber Commando [Defence Cyber Command (DCC)] consisting of a staff of about 50 people.

Cyber warfare

Warfare is complicated as it is; cyber warfare is worse, more different, and therefore even more complex. Sitting behind one's computer one also needs to have accurate situational awareness in order to be able to exactly assess what opponents and other actors are up to, and be thoroughly documented before giving the order to intervene with cyber power, because the consequences can be huge.
Ducheine thinks it is a fascinating field of expertise, which deals with facts, their legal implications, political decision-making, and the subsequent actions public services such as the Police and Armed Forces may take. Ducheine: "I want to get that correlation across to the student-officers we train".

Interaction between the chairs

Ducheine's multidisciplinary chair at the FMS comprises the legal, technological and military aspects of military cyber operations, as well as the governance of cyber security at national level. Focusing his education and research at UvA mainly on the legal aspects, Professor Ducheine holds a chair that offers other opportunities in the sense that it can bestow doctorates. Researchers at the FMS, supervised by Ducheine, can obtain their doctorate at the UvA and may later on use their acquired knowledge while working within the Armed Forces. "You will have access to research experience, knowledge and a large network. After all you do not carry out research in isolation", adds Ducheine. He also feels the advantages of the mix of military and civil students himself. Ducheine: "Sometimes they ask questions I never thought of".

Background information

After completing officer-training at the Royal Netherlands Military Academy Ducheine joined the Engineer Corps as a junior officer. He went on to study Public Administration at Amsterdam Free University and read law at Utrecht University. He has worked as a legal advisor in the Netherlands, Germany and Bosnia-Herzegovina.

Research

As a military legal advisor, Paul Ducheine's research involves military law aspects of cyber operations and cyber security, his main focus being on cyber warfare and, more specifically, on the legal basis for military cyber operations (the ius ad bellum – 'right to go to war') and legal regimes during such operations (the ius in bello – 'conduct in war'). Ducheine also studies the theories that have developed around the concepts of (ICT) protection, law enforcement and intelligence in connection with cyber security, focusing on the legitimacy of military and other governmental cyber activities.

Positions at UvA

From 2003 to 2007 he held an associate chair in Military Law as a researcher, taking his Ph.D. entitled 'Armed Forces, Use of Force & Counter-Terrorism' at UvA in March 2008. Ducheine has been a lecturer in Armed Forces and Constitutional Law at the UvA since 2004, and is also a guest lecturer on International Humanitarian Law. Furthermore, he is a senior researcher in the Research Forum on Law of Armed Conflict and Peace Operations at the UvA's Amsterdam Centre of International Law. He has published on topics including military law, laws of war, ius ad bellum, use of force, drones and targeting.

Ancillary positions

Ducheine holds a number of ancillary positions, including that of member of expertise groups of the International Law Association and Cyber Conference Programming Committee member at NATO's Cooperative Cyber Defence Centre of Excellence. He is co-editor of the military quarterly Militaire Spectator, board member of the Military Law Association of the Netherlands, and a member of the advisory editorial board of the Yearbook of International Humanitarian Law.

Brief news

Civil Accreditation University Teaching Qualification programme

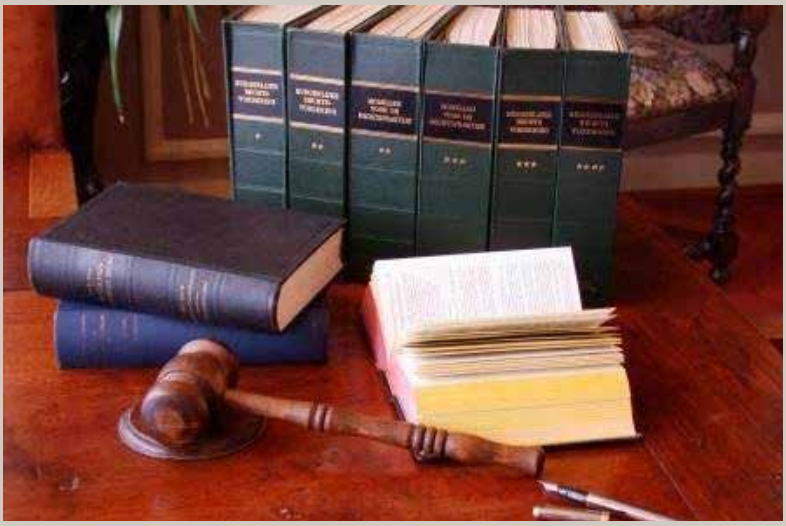
A commission of external experts, of the association of cooperative Dutch universities (VSNU), has authorized the Netherlands Defence College and Faculty of Military Sciences of the Netherlands Defence Academy the right to issue the Basis Kwalificatie Onderwijs (BKO) [University Teaching Qualification] to its academic staff. Prior to the accreditation the NLDA underwent a process of investigation of its professional programme and an assessment procedure.

The BKO is a hallmark of the didactic qualities of academic staff. The Dutch universities together acknowledge the qualifications awarded to the members of their teaching personnel. This means that BKO-qualified lecturers are recognized by all participating institutions for scientific education, such as the Netherlands Defence Academy.

The BKO course consists of a professionalization phase and an assessment phase. During the professionalization teachers attend a basic course in didactics and several supplementary modules. In the assessment phase the developments of the BKO participants are assessed on the basis of the contents of their portfolios.

International law in peace operations

In 2013 The International Society for Military Law and the Law of War initiated a high profile project aimed at producing a Manual of International Law in Peace Operations. The Manual, the first of its kind and due to be published in 2016, is intended to provide an authoritative exposé and critical assessment of the law that applies to the planning and conduct of peace operations. FMS Professor Terry Gill is one of the senior academic advisors that lead this project.



This Peace Operations Manual project is intended for both academic reflection and practitioners. It will consist of black letter rules (the well-established technical legal rules that are no longer subject to reasonable dispute) and accompanying commentary, offering a detailed guide for relevant areas of international law.

The project is inspired by the 1994 San Remo Manual on International Law Applicable to Armed Conflict at Sea, the 2006 San Remo Manual on the Law of Non-International Armed Conflict, and the 2010 HPCR Manual on International Law Applicable to Air and Missile Warfare.

Academic leaders

Besides Gill, the overall academic leadership of the project is entrusted to two other senior academic advisors; Dr Dieter Fleck and Dr William H. Boothby. At the outset they were closely involved in determining the scope of the project, the intended audience and level of abstraction and what the purpose of the manual would be in relation to other literature and policy documents on the topic. In addition, they were also involved in selecting the members of the expert group contributing to the Manual. All three advisors are contributors of one or more chapters to the manual and they will serve as editors in the drafting and the final phase.

Additional expert group

In addition to the group of experts, the project is enriched by the participation of observers from the UN Department of Peacekeeping Operations, The European Union, the African Union, the International Committee of the Red Cross and NATO. Their role is to comment on the drafts from the perspectives of their respective organizations and provide advice. They do not directly participate in drafting material, but will offer comments during the working meetings.

Relation with FMS research programme

The project fits well into the FMS research programme 'Dynamics of War and Peacemaking' and is also part of the Research Programme 'The Role of Law in Armed Conflict and Peace Operations' of the Amsterdam Centre for International Law (University of Amsterdam) with which the NLDA and FMS have a close relationship laid down in a cooperation agreement. It will serve as a research tool for Master and post-graduate students at both institutions, in particular in the 'International Law of Military Operations' course in the context of the Master in Military Strategic Studies. It is hoped it will also prove a useful guide for policy makers at the Ministry of Defence in planning and conducting peace operations, such as the current mission of the Netherlands Armed Forces in Mali.

Study of the atmospheric influence on radar propagation

The Royal Netherlands Navy is very interested in the extent to which weather conditions influence the propagation of radar waves, because these weather conditions affect the ranges at which crews of naval vessels can detect targets at sea, while simultaneously avoiding detection by the enemy. To get a good insight into the effects of weather conditions on the propagation of radar waves, Royal Netherlands Navy Captain (E) Dr Fok Bolderheij MSc, FMS associate professor of Navigation, in cooperation with American scientists and Dr Vincent van Leijen of DMO Joint IT Command, performed radar experiments off the coast of Den Helder. The radar was used to track vessels at sea while, at the same time, weather balloons were launched to measure atmospheric parameters. These experiments showed that the path followed by the radar waves was, to a larger extent than expected, influenced by weather conditions.

This influence is brought about by changes in the air pressure, humidity and/or temperature, that consequently result in a changing refractive index (light breaking index), which causes the electromagnetic (EM) waves to deviate from a straight path and follow a curved path instead.

Software package

There are various software packages available to predict this influence, one of the most advanced being the Advanced Refractive Effects Prediction System (AREPS) of the Space and Naval Warfare Systems Command (SPAWAR), a major department of navy acquisition commands. To monitor changes in the refractive index weather balloons are used, equipped with a probe that measures the environmental variables including their GPS position and the precise moment that these measurements were taken.

This allows the calculation of the course of the refractive index as a function of altitude and, subsequently, the derivation of the curve of the path made by the EM wave.

The change of the refractive index is, however, also position dependant. If the geography (e.g. land or water) or the meteorological conditions (a cold front) change, the weather balloon will measure different refractive profiles at different positions. A sound prediction of the propagation of EM waves, therefore, requires the launch of weather balloons at multiple locations. Also, the propagation prediction model has to be able to cope with a position dependant refractive profile. The AREPS software package has this capability.

Weather prediction model

Launching weather balloons is expensive and cumbersome. Good launch positions may be unavailable and therefore the simultaneous launch of a number of balloons is difficult. The Dutch and American research group examined whether the data from the weather prediction model HARMONIE of the Royal Netherlands Meteorological Institute is suitable to feed AREPS with a position-dependant refractive profile. The outcome was positive and in collaboration with SPAWAR measurements were then carried out at the Dutch coast to validate the results of the model.

This research also involved close collaboration with the Joint Information Technology Command, to which Dr Vincent van Leijen is attached, and the Defence Joint Meteo Group, supported by the Royal Netherlands Meteorological Institute. Part of this research is carried out by Sub-Lieutenant (E) Joris Derksen, an NLDA Master student at TU Delft.


F804

Column chairman of the Foundation for Scientific Education and Research NLDA

The Board of the Foundation for Scientific Education and Research NLDA (SWOON), responsible for maintaining the quality of both scientific education and research at the Faculty of Military Sciences, can look back on 2014 as being a busy and successful year. The Master's degree programme, which started in 2013, has proven to be a success amongst military as well as civilian students. The evaluation of the programme showed that the students are very content with the well- taught and well-structured lectures, the high level of the guest lectures and the interaction between students and academic staff.

2014 was the year in which the reorganization of the Faculty, following the defence budget cuts, took effect. The Board expresses its satisfaction with the way the Faculty staff has carried through this reorganization, without disrupting the education and research programmes. In order to prepare the evaluation of the research programme, due in 2017, several actions were taken and discussed at a widely-attended Research Day in Amsterdam, during which FMS researchers discussed topics, such as scientific integrity, the Ph.D. policy and bibliometrics (e.g. citation analysis).

Another achievement was the succesful audit of the NLDA's University Teaching Qualification (BKO), a quality mark of the didactic capability of academic staff, by a commission of external experts. The commission has granted the NLDA, under the auspices of SWOON, the right to issue the BKO qualification to its educational staff. Besides, important steps have been taken in the NLDA Council to devise a specific Military Technical Master's Degree programme in the near future, to be modelled on typically military requirements. Such a Master fits the recognition that our military forces are more and more dependent on knowledge and technology for military missions in the next decade.

Late 2014 a new five-year strategic road-map for the development of the Faculty was concluded by the SWOON Board and forwarded to the Chief of Defence for endorsement by the NLDA Council. The Board appreciates the valuable advice on many of the issues supplied by the Scientific Advisory Council [Wetenschappelijke Adviesraad, WAR] under the revered chairmanship of Prof mr A.H.A. (Fred) Soons. Looking ahead, the SWOON expects to enhance the Faculty's record on scientific research, as increasing numbers of officers are engaged in Ph.D. studies, providing them with a unique combination of military operational experience and scientific knowledge. In line with that ambition, the Faculty wishes to obtain the right to bestow doctorates for the benefit of both students and scientific staff. Measures have been taken to expand the Faculty's research capacity through (inter) national co-operation in project-based external funding.

The Board of SWOON sees 2015 as a year of consolidation after a period of budget-driven reorganization as well as a year of working towards new ambitions. The international security situation today – more than ever in the post-Cold War years – requires that the NLDA provides the Netherlands Armed Forces with leaders who have had the best mental preparation and scientific education.

Lieutenant-General RNLAF (retd.) Dr. Dirk Starink
Chairman of the Foundation for Scientific Education and Research NLDA

Positive assessment of European Joint Master's in Strategic Border Management

For more than two years academic staff of the Faculty of Military Sciences, together with colleagues of the Royal Netherlands Marechaussee (RNLM), have worked on an EU-wide project on the development of a joint Master's Course in Strategic Border Management. In December 2014 the programme of the Master's was assessed by an independent commission consisting of international experts, who concluded that the programme meets the terms of education at university level. The first group of students will start the accredited Master's in the academic year 2015-2016.

The European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union (Frontex) took the initiative for the development of the Master's course. From 2010, due to increasing unrest and instability in the Middle East and the expansion of the European Union towards the East, various EU countries have acknowledged the need for academic training in the field of border management.

With the Joint European Master's degree programme in strategic border management they aim to provide border officials throughout the EU with academic knowledge and skills to improve the management of the EU's external borders.

All EU countries have organised border management in accordance with their own principles and legislation. Also, regardless of the Bologna Agreements on the structure of academic degree programmes across Europe, the Ministries of Education of the EU member states are also bound by their own national legislation on higher education. Therefore, the preparation of the extensive detailed documentation for this assessment was a challenge for the different European academic partners and border guard organisations involved.

Positive judgement

During the assessment of the Master's the Commission was impressed by the extensive documentation provided by Frontex, but even more so by the intensive European collaboration that made this Master possible. Teaching and developing staff have met on a regular basis over the past two years, in for instance Spain, Estonia, the Netherlands and Romania. Although this was time-consuming, it was important to create widespread support in the participating countries. The Commission is somewhat worried about the study load for the students, but also about the work load for the teaching staff at the various institutions. For most teachers, the Frontex Master comes on top of their regular activities.

Contribution to modules

FMS will contribute to three modules of the Master's programme: Fundamental Rights and Ethics, Researching Management Practices and Researching Integrated Practices. Besides, together with the consortium partners, the Faculty of Military Sciences will take a fair share in supervising Master theses.

Fundamental Rights and Ethics

Fundamental rights and ethics are integral to every aspect of border guarding. Issues in this field will, therefore, be part of all modules. The aim of this particular module is to provide all students with the basics of fundamental rights and ethics, which is a prerequisite for being able to recognize such issues in the other modules. Although the emphasis is on fundamental rights and ethics in the working environment, more theoretical notions in law and ethics are not absent; they form the basis for every informed discussion on these topics.

Researching Management Practices

The aim of the module Researching Management Practices in Border Security is to prepare the students for conducting quantitative investigations (e.g. constructing a simple questionnaire and evaluating and interpreting the data obtained) within their own organisation culminating in the submission of a research report. Thereby they will be able to apply the research methods for analysing (complex) management problems in daily work situations.

Researching Integrated Practices

The emphasis in this module is on qualitative research techniques (e.g. interviews, case studies, observations) and scientific writing and presentation skills. This module provides the students with a basic introduction to qualitative methods and their qualities (validation, reliability, generalization, etcetera) relevant to conduct such a study of their own, leading to a case study research report.
In addition, the students will integrate the knowledge gained from previous topics covered in all the modules of the programme. Besides, during a field visit, they will learn from the specialists who are embedded in a border surveillance organization. Both methods modules provide the students with quantitative and qualitative knowledge and skills and prepare them for writing their final dissertations.

Opening Academic Year in the spirit of a troubled world

This year the opening of the academic year took place in a rather special military setting, namely in the Port of Den Helder on board the naval vessel Zr. Ms.(HMS) Johan de Witt. The Dutch representative to the European Union, His Excellency drs. Pieter de Gooijer, was the keynote speaker at the ceremony on 28 August. In his address he urged academic staff and students to contribute to a growing European cooperation.

More than military

According to De Gooijer, recent events in, for example, the Ukraine and Iraq beg the extension of Europe's military power, creating a broader scope for European collaboration, also in the field of education and research.

At the same time he noted that the distinction between soldier and diplomat, development assistant and trade developer, private and public sector, is becoming increasingly blurred. Therefore, the armed forces increasingly employ personnel that are more than military. The Dutch representative hopes that the NLDA will be able to contribute to that development.

Armed Forces Top Executives Course

In his speech the Commandant of the Netherlands Defence Academy, Major General Theo Vleugels, acknowledged the importance of partnerships, both national and international, for the Academy. He revealed his plans for a part-time course for armed forces' top executives (Top Defensie Vorming), which participants from other countries and departments also have the possibility to join. This is an investment in the future of armed forces' top management and meets the lifetime-learning philosophy of the NLDA.

Future

In his speech Professor Dr Henrik Rudolph, Dean of the FMS, challenged all the operational commands to think about the future field of activity of the officers and the academic competences that belong to that field. He presented the first copy of the 18th edition of the Netherlands Annual Review of Military Studies, entitled Optimal Deployment of Military Systems. Technologies for military missions in the next decade, to Admiral Mathieu Borsboom.

Thesis Award

Every year during the Opening Ceremony the FMS presents an award to the author of the best Bachelor thesis. The originator of the prize, Commander (rtd) Ir Hein Sabelis, former Dean of the FMS, awarded the prize himself. Midshipman Heleen Sikkes received the Hein Sabelis Thesis Award for her thesis with the title 'Dress with beard', a case-study into the cultural frames with regard to Muslims cadets of the initial officer training course of the Royal Netherlands Army. The thesis received the highest grade.

Researcher of the year

Every year the Permanent Committee for Scientific Research [Vaste Commissie voor Wetenschapsbeoefening] of the FMS nominates a 'Researcher of the Year'. On account of his extraordinary research achievements Dr Ir Bas Rietjens, Senior Lecturer of Management Information Services, received the title of Researcher of the Academic Year 2013-2014.


Ms JOHAN DE WITT


Z.E. drs. P. de Gooijer
Permanent Vertegenwoordiger
van Nederland bij de EU

Highlights of dissertations

At the Faculty of Military Sciences, both civil and military Ph.D. students work on their dissertations. Their research fits within one of the Strategic Research Orientations, which form the basis for the FMS research programme.

The FMS distinguishes four categories of Ph.D. students; so-called TNO* - Ph.D. students, funded by the armed forces' funding budget; military Ph.D. students earmarked by their operational commands to do research; Ph.D. students that are financed by external sources, and Ph.D. students funded from the FMS research budget. The latter group, consisting of three students, will phase out in 2015.

In 2014, five Ph.D. students obtained their doctorate. These are being discussed below, as well as three doctoral studies that are in progress.

** TNO is the Nederlandse Organisatie voor Toegepast natuurwetenschappelijk onderzoek [Dutch organisation for applied physical science research]*

Five completed dissertations

Electrochemical Noise:
A Clear Corrosion Signature
Author: Lieutenant (N) Dr Ir Axel Homborg

Corrosion, or rust, poses a recurring problem on Dutch naval vessels. Lieutenant (N) Dr Ir Axel Homborg, lecturer and researcher at the NLDA, rose to the challenge to find a solution for this problem. Thanks to the 'Homborg-method' the Dutch armed forces are better able to predict the infraction of metal constructions in vessels due to which maintenance costs will be lower and the safety of the vessels will increase.

In his research Homborg aimed at a new way of measuring corrosion, which is in fact a natural process that excites its own electrical signals. By recording these signals, he actually 'listens' to corrosion. That already has been a known fact for some time; the same goes for the application of noise measurement of corrosion. However, until now it has been difficult to give a sound interpretation of the information from the measurements.
With this method, that distinguishes varied noise signals, it is not only possible to identify the different forms of corrosion, but also to predict the condition of the material. In that way the navy can indeed better estimate when a vessel needs to be decommissioned. Likewise, it becomes possible to draw up a flexible and custom-made maintenance plan per vessel, enabling the navy to prevent unsafe situations from happening and save a lot of money in the long run.

Besides the NLDA, the technical university of Delft, Endures B.V. and the Materials Innovation Institute worked on this Ph.D. project.

A GPS inspired Terrain Referenced Navigation algorithm
Author: Dr Daniela Vaman

Satellite navigation systems like GPS and Galileo, which the armed forces use, are vulnerable because they can deliberately be disturbed by an opponent. Therefore, it is important that the armed forces have back-up systems at their disposal that can also assess the position of an object. Daniela Vaman, former researcher at the Netherlands Defence Academy, examined which technique offers a good alternative for vulnerable satellite navigation systems.

Vaman researched whether positioning on the basis of terrain-contour plotting (the so-called Terrain Referenced Navigation, or TRN) can gain from modern signal processing techniques. The technique that she developed, known as adaptive tracking loop, is based on small, deliberately applied disturbances in the control loop of the TRN system with which the system can estimate the actual measuring fault and compensate for it.
With the accuracy that can be accomplished with this TRN technique, for certain applications it offers a good alternative compared to the vulnerable GPS and Galileo systems and it can prevent hostile disruptions from fire-delivering systems and GPS controlled bombs.

The doctoral student developed a range of algorithms based on tailing GPS signals and suppressing disruptions from these signals, but now optimized for a signal which consists of a sequence of space measurements to the terrain. Positioning takes place by finding the hereby corresponding series in an existing database. She tested the algorithm by means of computer simulations using various terrain contour plots and altimetries with several types of sensors.

Daniela Vaman worked for the FMS until 2014. At the moment she works as a technical consultant in the Mobile and Payment Practice department of UL Transaction Security.

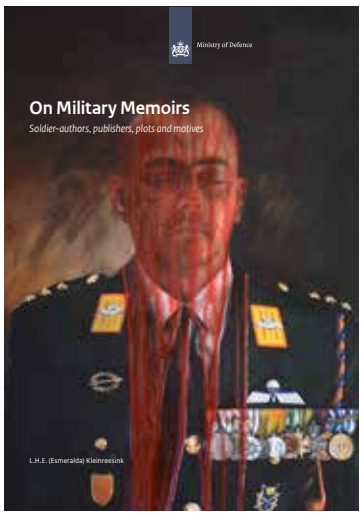
On Military Memoirs.
Soldier-authors, Publishers, Plots and Motives
Author: Lieutenant-Colonel (AF) Dr Esmeralda Kleinreesink

Memoirs of military personnel deployed to Afghanistan often have a positive tone. That a mere 39 percent of the autobiographies have a storyline characterized by disillusion appears from Esmeralda Kleinreesink's Ph.D. research into the Afghanistan-memoirs. Another conclusion from her research is that these books are not written because it helps the military writers cope with their experiences.

After any war military memoirs have been written. Lieutenant-Colonel Kleinreesink examined all 54 Afghanistan memoirs that were published between 2001 and 2010 in the Netherlands, Germany, the USA, the UK and Canada. She did not only examine the literary contents, but also the publication of the books.

Whether a military autobiography has a positive or negative storyline appears to be well predictable on the basis of the characteristics of the writer. Authors who still work for the Ministry of Defence when their book is published have a positive outlook, whereas combat soldiers usually write in a less positive vein, even when they are still armed forces' employees.

Kleinreesink finds it remarkable that almost half of the military authors were not part of a team when on mission.



They were deployed alone, for instance as a doctor or automation expert. They chose to publish their books by themselves rather than by an established publisher.

Finally, Kleinreesink dismisses the idea that the military authors primarily write down their experiences because this helps them in coping. This reason is only rarely referred to by the military writers and, when it is, only by individually deployed military. Gaining acknowledgement for their work in Afghanistan, helping others and bringing about positive change, like a better understanding in civilian society or within the armed forces, are uniformly mentioned as the main reasons for writing.

Lieutenant-Colonel Esmeralda Kleinreesink works as an academic lecturer at the Netherlands Defence Academy. She herself also wrote a military autobiography about Afghanistan: Officier in Afghanistan [Officer in Afghanistan] (Meulenhoff, 2012).

Multimodal surveillance.
Behaviour analysis for recognizing stress and aggression
Author: Dr Iulia Lefter

Security guards watch video images from camera systems installed on military and large public terrains looking for unwanted behavior and incidents 24/7. The attention of the staff can waver due to various causes. Some incidents, like gun-related and riotous behaviour, are hard to discover with only video images. Therefore, incidents can sometimes not be properly assessed and the video images are consulted afterwards.

Lefter's research prompts a solution in the shape of using an automatic surveillance system that alerts security staff at certain moments so as to keep an eye on what is happening in certain places. This reduces the number of missed incidents due to distraction and looking at preferred screens. The system recognizes, besides violence, also negative emotions and stress that can precede violence. By recognizing emotions at an early stage, it is possible to prevent violence.

With own scenarios and semi-professional actors the researcher built a dataset consisting of video images. To be able to recognize stress and aggression she filtered all kinds of characteristics from these video recordings. Lefter developed a method that can be used for making predictions about stress and aggression levels with new video recordings.
The developed system can be built into existing video surveillance systems. According to Lefter it is desirable to test the system in a military environment.

The research for multimodal video surveillance systems was a cooperation between the Netherlands Defence Academy, TNO and the technical university of Delft.

An experimental and theoretical investigation into three-body abrasive wear
Author: Dr Martijn Woldman

Dr Martijn Woldman has developed a maintenance concept whereby it is possible to predict the maintenance intervals and lifespan of engines that operate in sandy conditions. He used the infantry Combat Vehicle 90 (CV90) as subject of the case study in his Ph.D. research.

Woldman has researched the influence of the size and shape of the grains of sand on the wear of material. By means of a numeric model he reproduced the development of scratch as a result of the sliding movement of a molded grain of sand by a steel surface. By applying Woldman's research results to the maintenance concept the maintenance intervals and life span of, for example, the wheels of the CV90 can be better predicted.
When sand gets into a machine and gets stuck between components that are in sliding contact, for example, in cog wheel constructions and ball bearings, abrasive wear will occur on the contact areas.

Abrasion is the form of wear that is caused by a gliding movement of hard grains or roughness on a softer surface. A distinction is made by second-body abrasion and third-body abrasion. The former means that one of the contact areas causes wear and with the latter there is an 'alien' body between the contact areas, which causes wear. In Woldmans' research it is a matter of third-body abrasive wear, since the grains of sand activate the wear.

Dr Martijn Woldman carried out his research in cooperation with TNO, the University of Twente and the Netherlands Defence Academy.

Three doctoral studies in progress

The effects of military education at the Royal Netherlands Military Academy on the practices of military leadership
Ph.D. researcher: Marenne Jansen MA

Contemporary military and peacekeeping missions become more and more complex. Challenges include the ethical and operational complexities with which servicemen are confronted during operations. Military leaders need to develop social, moral and psychological competencies to handle the ambiguities and pressures of modern conflict. Therefore military leadership development is considered extremely important within the defence organization.

The aim of Ph.D. researcher Marenne Jansen, also related to the Radboud University and TNO, is to understand how the training mechanisms at the Royal Netherlands Military Academy (RNMLA) influence leadership performance, specifically with regard to their professional behaviour during operations. To understand the effects of military education on the practices of military leadership, Marenne will provide insights into the relationship between the nature of military education, and specifically socialization, on the one hand, and the manifestations of military leadership, on the other.

Ms. Jansen started her research at the Netherlands Defence Academy in August 2014. The first half year she spent on doing preliminary interviews with officers, a literature research and designing the research plan. The coming years she will collect data, both at the Netherlands Defence Academy, as well as in the field. The outcome of this dissertation will contribute to a better understanding of the mechanisms of military education, and its effects on the performance of military leadership.

Urban Security
Ph.D. researcher: Captain (A) Rick Krosenbrink MSc

Future wars will be fought in cities. To influence the possible outcomes of these future wars a thorough understanding of urban surroundings is indispensable, especially in preventing the escalation of a conflict. Currently the Dutch armed forces are conducting a broad variety of activities in preparing for urban operations. With his research Krosenbrink will contribute to the understanding of the 'organised complexity' of the city and the role of security in this environment. Thereby he aims to contribute to the armed forces' preparations for urban operations by creating a modern and solid theoretical basis for understanding urban security issues. These will be based on design analyses of communities in both Afghanistan and the Netherlands (and possibly Mali).

A city is a diverse mix of people and processes, with its own self-organizing dynamic. In the most abstract way the research of Rick Krosenbrink will contribute to the understanding of the 'organized complexity' of the city and the role of security in this environment. Krosenbrink will challenge the concept and construct of security by focusing on the relationship of security and (public) space.
The research is shaped around a broad central question: What is the influence of urban design on security? And in what way can the urban landscape be adjusted so that it contributes to human security, civil empowerment and community resilience? Before talking about urban warfare, the issue of understanding urban security should be addressed.
This research analyses security issues and carries out research on future-proof security concepts, in which openness is key instead of exclusion and fear. Rick is determined to find positive dynamics in the ongoing process of securitization.
In 2014 he wrote his research proposal and was accepted as a Ph.D. students at the Faculty of Architecture at Delft University of Technology. He presented his starting concept in several forums, including the International Society of Military Sciences at the Austrian National Defence Academy. This year he will publish two articles that will form the conceptual framework for his research. Besides his research he will be attending the Doctoral Education Programme of TU Delft.

Targeting
Ph.D. researcher: Lieutenant (MC) Mark Roorda LLM

During the last fifteen years the use of armed Unmanned Aerial Vehicles (UAV) for engaging ground targets has increased significantly. Unmanned weapon platforms have been used for regular combat missions in Afghanistan, Libya, Iraq and Syria, as well as for counter-terrorism operations in Pakistan, Somalia and Yemen. The practice of using targeting assets that are not inhibited by humans has provoked extensive debate on the morality and legality thereof; a debate that has gained importance since it appears that such technology is rapidly proliferating.

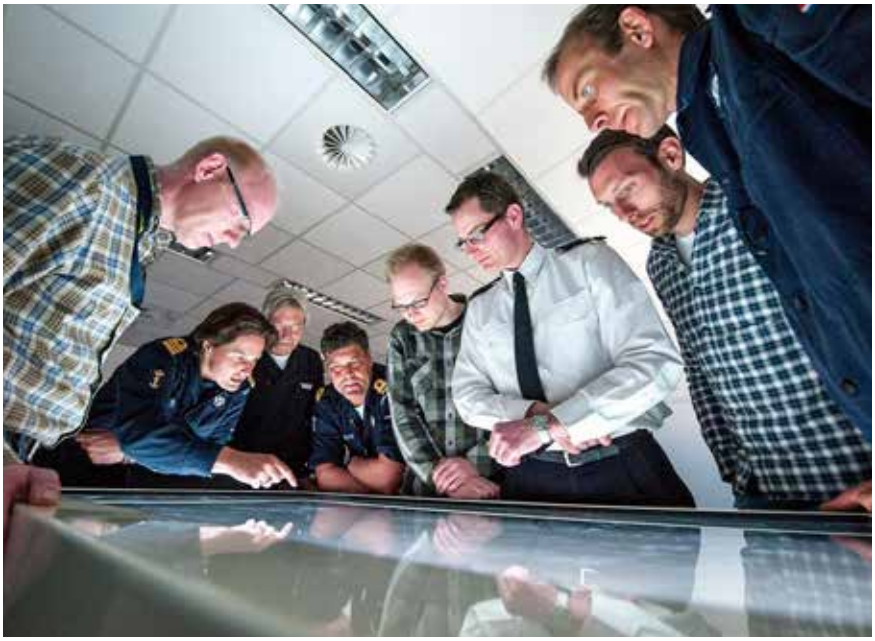
The aim of Roorda's Ph.D. research is to facilitate further debate on the legitimacy of the military use of remotely-operated weapon platforms by contributing to a common understanding of operational targeting procedure and how relevant legal norms are incorporated into such procedures.

Mark will analyse how military targeting has evolved over time, how states have adopted procedures aimed at effective and legitimate use of force, and whether the use of remotely-operated weapons is distinct from this development. In this sense, Roorda's research will investigate whether this new technology revolutionizes warfare or whether it is 'merely' a logical step in acquiring and using means that are necessary to face adapting opponents. Issues such as risk-free war, risk-transfer, play station mentality, signature strikes and leadership targeting will be scrutinized. This research will be unique in offering a balanced, multidisciplinary account of both military operational requirements and relevant regulating norms. One of Mark's hypotheses is that these two elements might not be so far apart as is often suggested.

The research results can be used to determine the extent to which remote weapon technologies can be incorporated into the Netherlands (and other) defence structures and whether there are concerns that must be addressed in effectively and legitimately using them for targeting purposes. It could, therefore, lead to recommendations for improving targeting procedures, particularly to facilitate transparency and accountability. Over the past year, Mark has formulated his research design and started collecting and analyzing data on the evolution of targeting, as well as on the procedures that states have adopted to perform targeting in armed conflict. These elements will serve as a basis for assessing the uniqueness of remotely-operated weapon platforms and identifying the main concerns about their use.

Civil-military working relationships

Defence organizations comprise both military and civil personnel working in partnership with each other. Although civil-military working relationships and work culture have largely remained unexplored so far, as evidenced by international requests for information, it is an important human resources issue in defence organizations. Together with eight other NATO countries, the Netherlands actively participate in a NATO task group that cultivates knowledge of the cooperation between military and civilian defence personnel. On behalf of the Faculty of Military Sciences of the Netherlands Defence Academy, Professor Dr Sjo Soeters and Dr Manon Andres, both researchers at the FMS, participate in this project.



Defence organizations are unique in that they comprise integrated military and civilian workforces that, although they often work closely together (e.g. at headquarters, on bases, on operations, at military educational institutions), are governed by very different personnel management systems and have very distinct cultures. These factors can affect the nature of the collaboration between these integrated workforces and influence both personnel outcomes and organizational effectiveness. There are significant gaps in the empirical research of this fundamental issue affecting military organizations.

Manon Andres, university lecturer of Organisation Science and Management, and Sjo Soeters, Professor of Military Organisational Science and Management, are representatives of the Netherlands in the NATO task group, which is aimed at extending our understanding of military and civilian work culture and relations.

Results so far

International comparisons still need to be made, but based on the research results so far Andres and Soeters can already conclude that there are differences in relations between military and civil staff within defence organisations which prompt research questions such as: what underlies these differences and are there also differences in work relations?

It is striking to note that amongst interviewed senior military commanders and policymakers the notion exists that there are no urgent issues concerning work relations between military and civilian personnel, but commanders and policymakers described clear differences that may give rise to issues in the future. Moreover, the research shows that mainly in the field of leadership and supervision there are important points of interest e.g. aspects of fairness and perceptions of fairness of service personnel and civilian employees.

Expected outcome

The results of the project, forthcoming in 2016, will be relevant for both military as well as civilian supervisors. The research group's objective is, amongst others, to develop, operationalize, and test a conceptual model for military and civilian work culture and relations, identifying challenges and enablers of effective civil-military interaction and collaboration in defence organizations. Besides, ' best practices' will be formulated with regard to personnel management.

List of abbreviations

A	Army, for example in Colonel (A)
AF	Air Force (AF), for example in Colonel (AF)
AREPS	Advanced Refractive Effects Prediction System
BKO	Basis Kwalificatie Onderwijs In translation: University Teaching Qualification
C2	Command and Control
CV90	Combat Vehicle 90
DMO	Defence Materiel Organisation
EM	Electromagnetic
FMS	Faculty of Military Sciences
Frontex	European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union
IDL	Instituut Defensie Leergangen In translation: Netherlands Defence College
KMA	Koninklijke Militaire Academie In translation: Royal Netherlands Military Academy
LCM	Life Cycle Management
M	Marechaussee, for example in Colonel (M)
MALE	Medium Altitude Long Endurance
MaSeLMa	Integrated Maintenance and Service Logistics Concepts for Maritime Assets
MC	Marine Corps
MMS	Military Management Studies
MoD	Ministry of Defence
MSS	Military Strategic Studies
MS&T	Military Systems and Technology
N	Navy, for example in Colonel (N)
NCO	Network Centric Operations
NLDA	Netherlands Defence Academy
RNLM	Royal Netherlands Marechaussee
RNMLA	Royal Netherlands Military Academy
SRO	Strategic Research Orientation
SWOON	Stichting Wetenschappelijk Onderwijs en Onderzoek NLDA In translation: Foundation for Education and Research NLDA
TNO	Nederlandse Organisatie voor Toegepast natuurwetenschappelijk onderzoek In translation: Dutch organisation for applied physical science research
TRN	Terrain Referenced Navigation
UAV	Unmanned Aerial Vehicle
VSNU	Vereniging van Samenwerkende Nederlandse Universiteiten In translation: the association of cooperative Dutch universities
VU	Vrije Universiteit In translation: Free University
WAR	Wetenschappelijke Adviesraad In translation: Scientific Advisory Board
WS	War Studies

Colophon

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