Faculty of Military Sciences (FMS)

Netherlands Defence Academy (NLDA)

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Table of Contents

Faculty of Military Sciences of the NLDA

The Faculty of Military Sciences (FMS) of the Netherlands Defence Academy (NLDA) is divided into three domain clusters namely War Studies (WS), Military Management Studies (MMS) and Military Technical Sciences (MTS), each subdivided into a number of sections.

Cluster War Studies

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Cluster Military Technical Sciences

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Introduction

The Faculty of Military Sciences of the Netherlands Defence Academy (FMS-NLDA) presents the Annual Research Report 2013 (ARR2013). The FMS is divided into three knowledge domain clusters: War Studies, Military Management Sciences and Military Technical Sciences.

Research Focus Areas

The faculty focuses on a limited set of military relevant, multi-disciplinary research areas, called Strategic Research Orientations (SROs). These SRO's involve multiple groups and, in some cases, stretch across knowledge clusters. This focus should yield sufficient critical mass for our research and benefit from the unique character that distinguishes this faculty from other universities: a close grouping of many scientific domains in a single organisational unit. As of 1 January 2014 research is structured around six SROs: Dynamics of War and Peace Making, Managing Military Coalitions, Clustering Unmanned Military Systems, Deployment and Deployability of Military Systems, the Human(e) Factor in Present-day Military Practices and Cyber Operations & Cyber Security. The involvement of these multiple knowledge domain clusters is depicted in Figure 1.

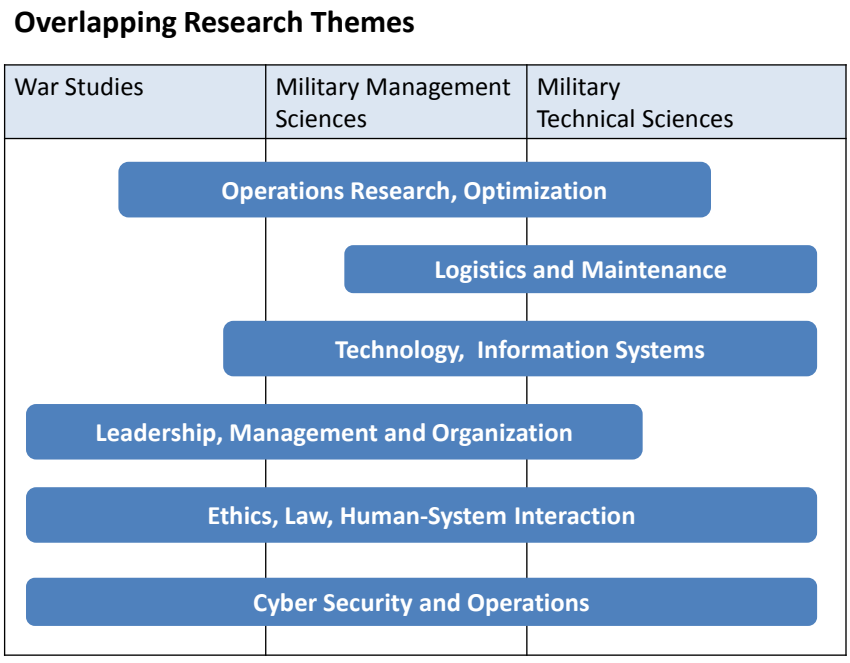

Fig. 1: Overlapping research themes between the three knowledge clusters in the FMS

Resources and Results

The total number of hours spent on research in 2013 was 52,235 (2012: 76,925), corresponding to 31.9 fte (2012: 41.4 fte). This number includes permanent scientific staff, PhD candidates and postdocs. It is significantly less than the previous year due to budget cuts, vacancies and the phasing out of internal FMS PhD candidates. The remaining PhDs are either financed from the TNO defence PhD budget or military staff.

An overview of the research output is shown in Figure 2. The category 'Military' includes *Militaire Spectator* and *Marineblad*. The publication of the NLARMS is counted as an international, reviewed book; this fact accounts for a significant number of book chapter contributions.

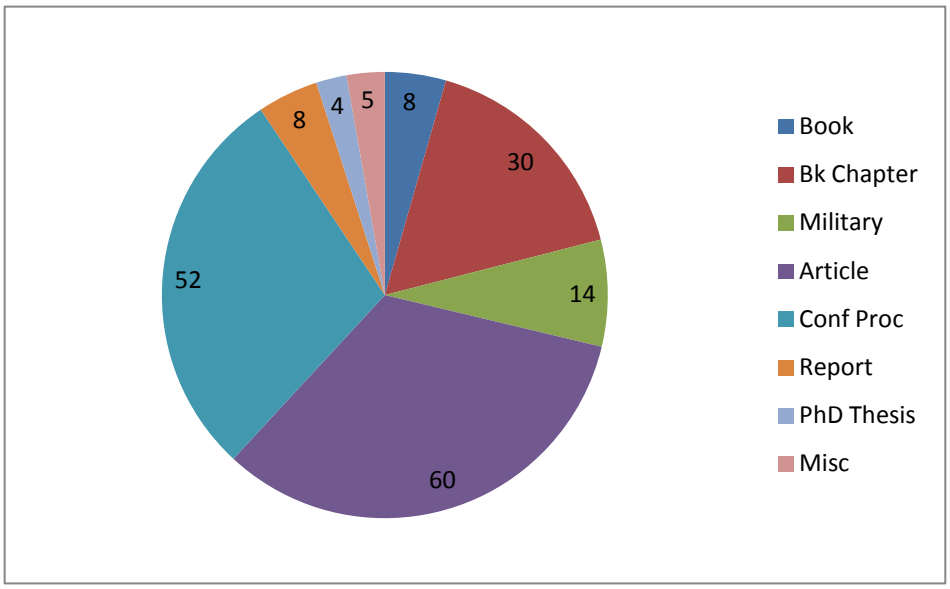

Fig. 2: Research output in 2013. Categories include books, scientific articles, conference proceedings, military journals, theses, reports and miscellaneous. The total number of publications in 2013 is 181 (2012: 208).

The output comparison between the years 2012 and 2013 is shown in Figure 3. Despite the considerable reduction in research hours and fte the decrease in scientific output turned out to be less significant than anticipated because of the lengthy process of publication. It is expected that the consequences of this reduction shall be more apparent in the output figures of 2014. Since scientific articles are valued more than conference proceedings, the shift in output of the two can be considered a positive development.

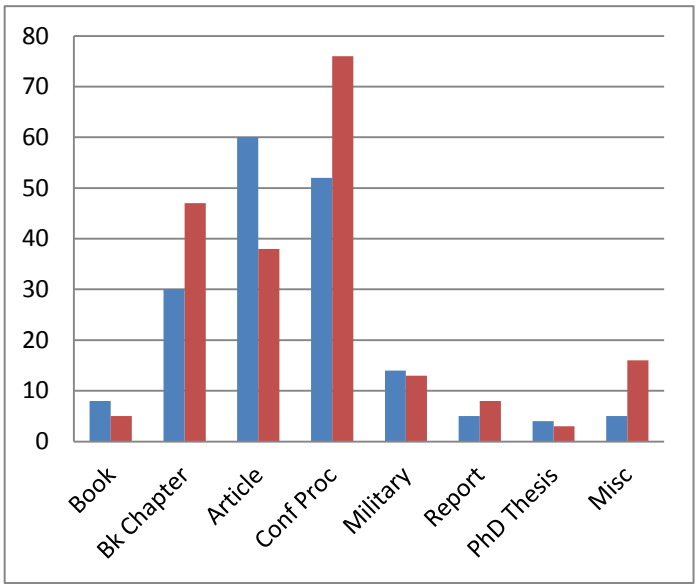

Fig. 3 Research output comparison between 2012 (red) ad 2013 (blue).

Other FMS expertise activities

In addition to the scientific publications other related (research) activities should be mentioned. FMS staff members participate in MoD Knowledge Networks, (inter)national expert groups and panels. They give presentations, write comments in national newspapers and magazines and appear on radio and television. In 2013 the FMS also provided a number of specialist courses, such as the Cyber Security Awareness Course, on behalf of the Taskforce Cyber, in collaboration with the Eindhoven University of Technology, the Navy Maintenance Establishment and various other MoD departments; the Ballistics and Guided Weapons Course for Dutch, Belgian and German officer students from the navy, the Train the Trainer Course on Military Ethics, the Airpower and Advanced Airpower Course, Crew Resource Management and the International Security Course for several African countries. On 9 and 10 December 2013 the research of the FMS was presented at Innovation in Defence (in collaboration with TNO and NLR). Last but not least there are the numerous guest lectures at universities, colleges and research institutes.

The following pages will report in detail about the progress of the scientific research at the NLDA-FMS. The report includes descriptions of the research activities in 2013, the resources allocated and lists the output.

SRO-1 Dynamics of War and Peacemaking (DWPM)

The common aim is to increase our understanding of the contemporary international security and military operational environment. To that end this SRO focuses on contemporary problems encountered by western governments and their armed forces in solving contemporary security issues. This certainly suggests a very broad scope. However, in light of the focus of the War Studies Bachelor program and the MA program in Military Strategic Studies, the available expertise of the War Studies department and the particular niche of the NLDA/FMS within the Netherlands academic environment, only a limited number of research topics has been selected that bear a particular relevance for the armed forces. All of them have a contemporary focus. This Strategic Research Orientation contains five themes:

1) Stabilisation (of conflict) and Reconstruction; 2) Engaging Violent Non-State Actors; 3) (Leadership) Targeting and Robotisation; 4) Virtual War and Strategic Communication (including elements of Cyber Warfare and Cyber Operations); 5) Adaptation and Transformation.

Results

DWPM-1 Stabilisation (of Conflict) and Reconstruction

Bartels, R. : *The Contemporary Classification of Armed Conflicts: Non-International Armed Conflict by Default?* Conference paper for the Irish Red Cross/ICRC Conference 'Contemporary Challenges in International Humanitarian Law', Dublin (Ireland), 17 October 2013 (international, reviewed, conference paper).

Bartels, R. : *Implementation of IHL: Qualification of Situations*. Presentation as part of Core Professional Training on Humanitarian Law and Policy, Dubai (United Arab Emirates), 17-18 March 2013 (international, not reviewed, training/presentation).

Bartels, R. : *Regulating the Conduct of Hostilities: Targeting Individuals and Direct Participation in Hostilities*. Presentation as part of Core Professional Training on Humanitarian Law and Policy, Dubai (United Arab Emirates), 17-18 March 2013 (international, not reviewed, presentation/training).

Bosch, G. van den : 'Protection of civilians, praktijkervaringen van een militair jurist' in : *Militair Rechtelijk Tijdschrift* 106 (2013), 33-40 (national, peer reviewed, journal article).

Brinkel, T. & Noll, J. : 'Belfast flag issue' en de kwetsbare vrede in Noord-Ierland' in *Militaire Spectator*, 182(3), 112-124 (national, peer reviewed, journal article).

Douma, P. & Frerks, G. : *Fragility by Choice, a scoping study in Burundi, South Sudan and Uganda.* Synthesis report on research commissioned by the Dutch Consortium for Rehabilitation (DCR), 80 p. (international, reviewed, report).

Farrell, Th., Osinga, F. & Russell, J.A. (eds.), *Military Adaptation in Afghanistan*, Stanford University Press 2013, (international, peer reviewed, book).

Fink, M.D. & Holst, F.A : 'A legal view on NATO's campaign in Libya', in: Engelbrekt, K., Mohlin, M. & Wagnsson, C. (eds.), *The NATO intervention in Libya: lessons learned from the campaign*, Routledge, New York (USA), 63-99 (international, reviewed, book chapter).

Fink, M.D. & Voetelink, J.E.D. : 'De status van Militaire Vessel Protection Detachments', in: *Militair Rechtelijk Tijdschrift* 106 (2), 41-53 (national, peer reviewed, journal article).

Fink, M.D. : 'Maritime embargo operations: naval implementation of UN sanctions at sea under Articles 41 and 42 of the UN Charter' in: *Netherlands International Law Review* 60(1), 73-92 (international, reviewed, journal article).

Gill, T.D. : 'The Security Council and the Responsibility to Protect' in: Zyberi, G. & Mason, K. (eds.), *An Institutional Approach to the Responsibility to Protect* , Cambridge University Press (2013), 83-108 (international, reviewed, book chapter).

Hoek, B .van, Nijhof, J. & Voetelink, J.E.D. : 'The Scope of Jurisdiction Provisions in Status of Forces Agreements Related to Crisis Management Operations', in : *The Military Law and the Law of War Review* 51/3-4, 307-335 (international, reviewed, journal article).

Kitzen, M. & Molen, E. van der : 'Building a Community Oriented Police in Uruzgan, Afghanistan: the troubled Western view,' in: Amersfoort, H., Moelker, R., Soeters, S. & Verweij, D. (eds.), *Moral Responsibility and Military Effectiveness (NLARMS)*, The Hague: Asser Press, 171-191 (international, reviewed, book chapter).

Kitzen, M., Rietjens, S. & Osinga, F.: 'Soft Power the Hard Way: Adaptation by the Netherlands' Task Force Uruzgan', in: Farrell, Th., Osinga, F. & Russell, J.A. (eds.) *Military Adaptation in Afghanistan*, Stanford University Press, 2013, 159-192 (international, peer reviewed, book chapter).

Noll, J. & Rothman, M. : 'Power Denied? E.H. Carr and the Conduct of Post Cold War Intervention' in: Amersfoort, H., Moelker, R., Soeters, S. & Verweij, D.E.M. (eds.), *Moral Responsibility and Military Effectiveness (NLARMS)*, The Hague: Asser Press, 51-75 (international, reviewed, book chapter).

Osinga, F. & Russell, J. : 'Conclusion: Military Adaptation and the War in Afghanistan' in: Farrell, Th., Osinga, F. & Russell, J.A. (eds.) *Military Adaptation in Afghanistan*, Stanford University Press 2013, 288-329 (international, peer reviewed, book chapter).

Osinga, F., Geel, B. van & Koster, G. de: 'De Navo Tegen Gaddafi,' in: *Militaire Spectator*, 182(5), (national, peer reviewed, journal article).

Voetelink, J.E.D. : 'Status of Forces and Criminal Jurisdiction', in : *Netherlands International Law Review* 60 (2), 231-250 (international, reviewed, journal article).

Voetelink, J.E.D. : 'The Bilateral Security Agreement for Afghanistan', in : *Nederlands Juristenblad* 38, p. 2680-2683 (national, reviewed, journal article).

Voetelink, J.E.D. : *Militair Operationeel Recht*, Wolf Legal Publishers (The Netherlands), 388 pp. (national, reviewed, book).

Voetelink, J.E.D. : 'Lawfare' in : *Militair Rechtelijk Tijdschrift* 106 (3), 69-79 (national, peer reviewed, journal article).

Voetelink, J.E.D. : 'Evidence-Based Operations. How to remove the bad guys from the battlefield', in : *Militaire Spectator* 182(10), 434-444 (national, peer reviewed, journal article).

Voetelink, J.E.D. : 'EVBO: Evidence-Based Operations. How to Remove the Bad Guys from the Battlefield', in : *Humanitäres Völkerrecht – Informationsschriften/Journal of International Law of Peace and Armed Conflict* 4/2013, 194-201 (international, reviewed, journal article).

DWPM-2 Engaging Violent Non-State Actors

Bartels, R. : 'Dealing with the Principle of Proportionality in Armed Conflict in Retrospect: The Application of the Principle in International Criminal Trials' in: *Israel Law Review* 46(2), 271-315 (international, reviewed, journal article).

Bartels, R. : 'Discrepancies Between International Humanitarian Law on the Battlefield and in the Courtroom: The Challenges of Applying International Humanitarian Law During International Criminal Trials' in: Matthee, M., Toebes, B. & Brus, M. (eds.), *Armed Conflict and International Law: In Search of the Human Face*, Springer/Asser Press, 339-378 (international, peer reviewed, book chapter).

Gill, T.D. : 'Chivalry: A Principle of the Law of Armed Conflict?' in: Matthee, M., Toebes, B. & Brus, M. (eds.), *Armed Conflict and International Law: In Search of the Human Face,* Springer/Asser Press, 33-51 (international, peer reviewed, book chapter).

Gill, T.D. : Member of the Group of Authors within the Advisory Council on Issues of Public International Law (Commissie Advies Volkenrechtelijke Vraagstukken (CAVV)), *Advies inzake Bewapende Drones, Advies nr. 23* , juli 2013, 36 p. (national, reviewed, report).

Gill, T.D., Ducheine, P.A.L., Boddens Hosang, J.F.H. & Marchand, C. : 'Report on the The Role of Self-Defence in Multinational Operations', in: Horvat, S. & Benatar, M. (eds.), *Recueil International Society for Military Law and the Law of War, Congress Proceedings of the 19th International Congress on the Legal Interoperability and Ensuring Observance of the Law Applicable in Multinational Deployments* Brussels (Belgium), 121-171 (international, reviewed, conference proceedings).

Jong, H. de: 'Past as future: The South African War, Dutch observers and military memory' in: *Scientia Militaria. South African Journal of Military Studies* 41(1), 34-64 (international, reviewed, journal article).

Pouw, E.P. : *International Human Rights Law and the Law of Armed Conflict in the Context of Counterinsurgency with a Particular Focus on Targeting and Operational Detention*, Breda 2013 (national, peer reviewed, thesis).

DPWM-3 Targeting

Lindelauf, R., Alpern, S., Fokkink, R., Gasieniec, L., Subrahmanian, V.S. (eds.), *Search Theory: A Game Theoretic Perspective*, Springer (2013), 303 p. (international, peer reviewed, book).

Lindelauf, R., Husslage, B. & Hamers, H. : 'Cooperative game theoretic centrality analysis of terrorist networks: The cases of Jemaah Islamiyah and Al Qaeda' in: *European Journal of Operational Research* (229)1, Elsevier, 230-238 (international, reviewed, journal article).

Lindelauf, R. & Fokkink, R. : 'Netwerkanalyse Kraken,' in : *T.U. Delft: Rapport voor Nationale Politie*. (peer reviewed, national, report).

Orbons, S. : *Non-lethality in Reality – A Defence Technology Assessment of its Politicial and Military Potential,* Den Haag 2013 (national, peer reviewed, thesis).

Osinga, F., Geel, B. van & Koster, G. de : 'Operation Unified Protector,' in: *Militaire Spectator*, 182(5), 2013 237-248 (national, peer reviewed, journal article).

Osinga, F., 'Bounding the Debate on Drones: The Paradox of Postmodern Warfare' in: Amersfoort, H., Moelker, R., Soeters, S. & Verweij, D. (eds.), *Moral Responsibility and Military Effectiveness (NLARMS)*, The Hague: Asser Press, 243-279 (international, reviewed, book chapter).

Osinga, F. : *Airpower in Irregular War: The Afghan Model 3.0*. Conference paper at the International Air & Space Power Conference (ICAP), Istanbul (Turkey), 27-29 March 2013 (international, reviewed, conference paper).

DPWM-4 Virtual War and Strategic Communication

Much of the proposed research in this project has been moved to the new SRO Cyber Operations and Cyber Security or falls into both SRO's.

Dimitriu, G. : *Strategic Narratives, Counternarratives and Public Support for War. The Dutch government's explanation of the Uruzgan mission and its influence on the Dutch Public,* MA thesis, Leiden University, March 2013 (international, reviewed, thesis).

Gill, T. & Ducheine, P. 'Anticipatory Self-Defense in the Cyber Context' in: Schmitt, M. (ed.), *Cyber War and International Law, International Law Studies 2012*, 89 (2013), Newport: Naval War College Press, 438-471 (international, peer reviewed, journal article).

Gill, T. & Ducheine, P. : 'Anticipatory Self-Defense in the Cyber Context' in Dinstein, Y. & Domb, F. (eds.), *43 Israel Yearbook of Human Rights,* Martinus Nijhoff /Brill Academic Publishers, 81-110 (international, peer reviewed, journal article).

Gill, T. : 'Non-Intervention in the Cyber Context' in: Ziolkowski, K. (ed.), *Peacetime Regime for State Activities in Cyberspace. International Law, International Relations and Diplomacy.* Publication of NATO Cooperative Cyber Defence Centre of Excellence, Tallinn (Estland), 217-238 (international, reviewed, book chapter).

Gill, T.D. : Member of the Group of Experts which drew up and prepared at the invitation of the NATO CCD COE and under the chairmanship of Prof. M.N. Schmitt, the *Tallinn Manual on the Application of International Law to Cyber Warfare* , Cambridge University Press, ISBN 978-1-107-61377-5, 282 p. (international, peer reviewed, manual).

DPWM-5 Adaptation and Transformation

Mengelberg, S.N. : 'Wereldwijde partnerschappen voor de NAVO; keuze of noodzaak?' in *Atlantisch Perspectief,* juni 2013, 5 p. (national, not reviewed, journal article).

Noll, J. & Moelker, R. : 'Netherlands' in: Giegerich, B., Jonas, A. & Biehl, H. (eds.), *Strategic Cultures in Europe. Security and Defence Policies Across the Continent*, Springer 2013, 255-267 (international, reviewed, book chapter).

Osinga, F.P.B.: 'Getting A Discourse on Winning and Losing: A Primer on Boyd's Theory of Intellectual Evolution', in *Contemporary Security Policy*, 34(3), 603-624 (international, peer reviewed, journal article).

Osinga, F.P.B.: 'Airpower in de 21ste Eeuw,' in: *Militaire Spectator*, 182(1), (national, peer reviewed, journal article).

DPWM-6 Intelligence

Graaff, B. de, Vloten-Doting, L. van, Coutinho, R., Franken, H., Knottnerus, A., Lamberts, S. & Wilschut, J. : *Bouwen aan Biosecurity. Beoordelen van dual-use-onderzoek*, Koninklijke Nederlandse Akademie voor Wetensschappen, Amsterdam (The Netherlands), November 2013, 72 p. (international, peer reviewed, report).

Graaff, B. de : 'De onmogelijkheid van een mondiale strategie voor terrorismebestrijding' in *Magazine Nationale Veiligheid en Crisisbeheersing* 11(6), 24-26 (national, reviewed, journal article).

Graaff, B. de: 'De Grote Slachting. Derde Wereldoorlog of Apocalyps in Syrië' in *De Groene Amsterdammer*, 137 (49), 18-21 (national, not reviewed, article).

Graaff, B. de : 'Is de eeuwige oorlog uitgebroken?' in *Magazine Nationale Veiligheid en Crisisbeheersing*, 11(5), 30-31 (national, reviewed, journal article).

Graaff, B. de : 'Het begin van eeuwige oorlog' in *Militaire Spectator*, 182(9), 398-410 (national, peer reviewed, journal article).

Graaff, B. de : **'**Training Intelligence Producers and Consumers for the Future: The Dutch Approach' in *Journal of Strategic Security* 6(5), USF Libraries, 88-98 (international, reviewed, journal article).

Graaff, B. de & Wiebes, C. : 'Informanten zijn niet bang voor openbaarheid' in: Boink, G. (ed.), *Een kapitaal aan kennis. Liber Amicorum Sierk Plantinga*, Den Haag 2013, 112-116 (national, not reviewed, article).

Graaff, B. de : 'Why Kant Is Wrong: The World on its Way to Eternal War'in: Amersfoort, H., Moelker, R., Soeters, S. & Verweij, D. (eds.), *Moral Responsibility and Military Effectiveness (NLARMS)*, The Hague: Asser Press, 279-299 (reviewed, international, book chapter).

Graaff, B. de : 'De Nederlandse inlichtingen- en veiligheidsdiensten: nooit te oud om te leren' in *Historisch Tijdschrift Groniek* 193, 249-261 (national, reviewed, journal article).

DMH-1 A Military History of the Netherlands

This project (led by H. Amersfoort) will contribute to a multi-volume military history of the Netherlands, both in Europe and in the former colonial possessions. The project is a combined effort of the Section Military History & Strategy (MH&S) and the Netherlands Institute of Military History (NIMH). The contribution of the former to this project, as far as the research and writing is concerned, focuses on the 1900-1940 period. Besides that the section has a stake in the overall management (editorial board) of the series and respective volumes. It is expected that this series will stand out as the most prestigious and important publication in the field of Dutch military history in the next decade.

The project witnessed good progress in the year 2013. Volume I was published in 2013 and was widely acclaimed as a benchmark in the field of Dutch military history. The first draft of the manuscript of Volume II was discussed within the editorial board. The finalising, expanding and rewriting of the manuscript was planned and undertaken. The authors of Volume V rewrote and condensed their manuscript. Planning of Volume III was interrupted by other obligations of most of the authors.

The editorial board of the series, in which professor Amersfoort has a chair, continued the overall management of the project and the volumes that are in progress at this moment.

Professor Klinkert published an article and a book pertaining to his contribution to the project (Volume III, Dutch Army, 1870-1940). Both he and professor Amersfoort coached cadets and students, preparing Ba and Ma theses related to this research project.

DMH-2 The historical dimension of the operational conduct of the Netherlands' armed forces

The second research project derives historical research questions from current problems in the operational art. Given the limited resources of the section the project focuses for the time being on four sub-projects:

Clausewitz on the relation between political and military ends

After the tragic death of professor J.G. Siccama, Donker found a new promotor at Rotterdam University, agreed with him on the planned dissertation and started writing an article on an early work of Von Clausewitz, publication of which is planned for 2014.

Responding to a changing strategic environment: The Dutch armed forces in transformation 1944–1950

Progress of this project (dr. F. Baudet) was excellent. It was finished with the publication of a book.

Fault Line Year 1989: The End of the Cold War

In 2009 LTZ OC drs. R. de Ruiter was appointed as FMS-PhD. Most of his time since then was spent on research in the National Archives and collections within the Ministry of Defence (MoD). In 2012 the effort focused on writing the first draft of the PhD thesis, which was discussed with his supervisors in December 2012. The first draft was finalised in the first quarter of 2013 and will be reworked in 2014. De Ruiter returned to his career as a navy officer mid 2013.

A clash of military cultures: case-studies in irregular warfare in the southern African region 1870-1994

Drs. H. de Jong made good progress in 2012. He continued his participation in a network of researchers of the history of warfare in the South African region. Several manuscripts that were finalised in 2012, saw publication in 2013, as stated below. Other manuscripts were accepted for publication by the editors and will appear in 2014.

Results

Amersfoort, H., Moelker, R., Soeters, J. & Verweij, D. (eds.) *Moral responsibility and military effectiveness* The Hague: T.M.C. Asser Press 2013 (international, reviewed, book).

Amersfoort, H., Moelker, R. Soeters, J. & Verweij, D. : 'Editorial Introduction' in Amersfoort, H., Moelker, R., Soeters, J. & Verweij, D. (eds.) *Moral responsibility and military effectiveness,* The Hague: T.M.C. Asser Press, 1-8 (international, reviewed, book chapter).

Baudet, F.H. : *Het vierde wapen. Voorlichting, propaganda en volksweerbaarheid 1944-1953,* Amsterdam: Boom 2013 (national, reviewed, book).

Baudet, F.H. : `Zomaar een poster?' in: Kersten, A.E., Boink, G., Scheffers, A.A.J. & Velden, R. van, *Een kapitaal aan kennis. Liber amicorum Sierk Plantinga* (Voorburg 2013) 206-209 (national, reviewed, article).

Baudet, F.H. : `Some thoughts on the utility of the past to the military'/: `Quelques réflexions sur l'exploitation du passé dans les forces armées` in *Air and Space Power Journal – Africa and Francophonie* 4(4), 4-14 (international , peer reviewed, journal article).

Jong, H. de: 'Past as future: The South African War, Dutch observers and military memory' in: *Scientia Militaria. South African Journal of Military Studies* 41(1), 34-64 (international, reviewed, journal article).

Klinkert, W. : 'A Spy's Paradise' in *Journal for Intelligence History* 12(1), 12-35 (international, peer reviewed, journal article).

Klinkert, W. : *Defending neutrality. The Netherlands prepares for war, 1900-1925*, Leiden: Brill, 2013 (international, peer reviewed, book).

Ruiter, R.M. de : Abschied vom Kalten Krieg: Das Beispiel Niederlande; Das Paradigma des Kalten Krieges' ller, T. B., & Voß, K. (eds.), *Erbe des Kalten Krieges*, HIS Verlag Hamburg (Germany), 194-209 (international, peer reviewed, book chapter).

Maritime Security and Strategy

This study concerns the foundations of maritime strategy development. It relates maritime interests, risks and power to requirements concerning maritime strategy formulation.

A central organising concept is Seapower. Seapower is the capacity to influence the behaviour of other people or things by what one does at or from the sea, which includes the non-military aspects of sea-use (merchant shipping, fishing, marine insurance, shipbuilding and repair). Present research is set out to define maritime strategy, maritime vital interests and maritime threats. More detailed research concentrates on the specific position of the Netherlands as maritime power.

Woudstra, N.A. : 'Honderd jaar maritieme strategie en zeetactiek' in: *Militaire Spectator*, 182(11), 480-486 (national, peer reviewed, journal article).

Woudstra, N.A. :'Tussen poolijs en schaliegas' (1) in: *Marineblad*, 123(7) 2013, 4-7 (national, not reviewed, journal article).

Woudstra, N.A. :'Tussen poolijs en schaliegas' (2) in: *Marineblad,* 123(8) 2013, 4-7 (national, not reviewed, journal article).

The Law of Armed Conflict and Peace Operations

Bartels, R. : Six commentaries to articles of the ICTY/ICTR Statutes, the Rome Statute and the ICC Rules of Procedure and Evidence, in Hert, P. de, Flamme, J., Holvoet, M. & Struyven, O. (eds), *Code of International Criminal Law and Procedure – Annotated,* Larcier 2013, (international, peer reviewed, commentaries).

Fink, M.D. : 'Toute prise doit être jugée. Opmerkingen over het Nederlandse prijs(proces)recht' in *Militair Rechtelijk Tijdschrift*, 211-219 (national, peer reviewed, journal article).

SRO-2 Managing Military Coalitions

The Managing Military Coalitions SRO strives to provide insight in the working of military coalitions, contributing to the implementation of measures to improve the effectiveness and efficiency of collaborative relationships in a comprehensive environment.
Input for this particular SRO comes from two groups within the Capacity Group Military Business Sciences : Management, Organisation and Defense Economics (MODE) and Military Logistics & Information Management (MLIM). For practical reasons the output of both groups is presented separately.

Management, Organisation and Defense Economics (MODE)

MMC-1 Deciding: Mission Goals and Legitimacy

Decision-making on whether or not Dutch military forces will participate in a coalition takes place at the political-military interface. While ultimate responsibility always rests in the hands of the government and parliament, the military will be involved in assessing the feasibility of the goals as well as the needed resources. This process is all about developing and applying organisational strategies in an environment of multiple (inter)national stakeholders, including public opinion and media. Convincing the latter two actors of the mission's legitimacy must be looked upon as a sine qua non for success, inseparable from the mission's effectiveness. Research in this context focuses on the politics of legitimising the goals and means as well as the costs and sacrifices that missions bring with them.

Grandia-Mantas, M. : *The Use of Military Means for Stabilisation Purposes. A comparative case study between the Netherlands and the United Kingdom* (PhD research). Due for completion in 2014.

Heeren-Bogers, J.J.D. : *Money, people, hardware. The soft-side of management control* (PhD research). Due for completion in 2014.

MMC-2 Preparing: Training and Organising

The military personnel, the organisation and the resources should be allocated to and prepared for the mission. With which partners does the military have to cooperate, in what kind of coalition and how? What problems concerning cooperation can be expected? How do military professionals prepare themselves for this cooperation? Ongoing research includes organisational, supporting and sourcing aspects.

MMC-3 Performing: Military and Civilian Partners

During the mission the military cooperate with all kinds of partners: other services (joint operations), armed forces from other countries (combined operations), aid organisations as well as other civil organisations (interagency cooperation), local armed forces and the police. These coalitions can be considered as multiteam systems that have to cooperate to reach the goals they are aiming for. Furthermore, leadership plays an important part in their success. Coalitions can be built on hierarchical relations or on peer-to-peer or network relations where no partner formally has the

lead. Personnel aspects fit in as well, especially ethical and cultural competencies, cultural diversity, negotiation skills and well-being. Of special importance is the cooperation of military and civilian actors in the context of (humanitarian) missions in complex and violent circumstances.

MMC-4 Evaluating: aftermath and learning

After the mission the organisation as well as individuals need time to recover and to draw lessons. The organisation evaluates what has been accomplished, which best practices have worked well and how successful the performance has been. Individual soldiers have to make sense of their experiences. Several issues are relevant here: assessing military and coalition performance; organisational lessons: after-action review, lessons learned processes; effectiveness and efficiency of cooperation with specific partners, procedures, systems; education and training: lessons with respect to the (lack of) competences of soldiers, NCOs and officers; conclusions about educational and training programs; coping, stress, healthcare, well-being and role-ambiguity; the position of veterans.

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Military Logistics & Information Management (MLIM)

The Military Logistics & Information Management group of the capacity group Military Business Sciences focuses on the development and application of new concepts for assets, logistics and innovation management. The group cooperates with researchers from SRO-4 *Deployment and Deployability of Military Systems* on maintenance and asset management concepts. For instance, the Dinalog/Maselma project combines maintenance, control tower and interorganisational cooperation to enhance value creation and sustainment from the perspective of the Ministry of Defence and suppliers. Esmaralda Kleinreesink joined the L&I group as of 1 January 2014. Her results for 2013 have been included.

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SRO-3 CLUSTERING OF UNMANNED MILITARY SYSTEMS (UMS)

The control of unmanned and autonomous military platforms requires a careful match between sensor technology and navigational tasks.

UMS-1 Sensor Data

An automatic surveillance system, based on AIS data, has been developed. A ship equipped with an AIS transponder sends data about his position, speed, heading and identification at a set interval. The developed surveillance system was able to track ships and to detect abnormal or prohibited behaviour. Ships violating speed limits or other traffic rules, entering forbidden areas such as harbours and surroundings of oil platforms were automatically detected and an alert was send to the Coast Guard.

In a second project an automatic surveillance system using smart cameras was developed for the NLDA area in Den Helder. The cameras were able to detect and track objects such as cars and persons. All the cameras were connected to each other in a network and every camera was modeled as an agent. Probabilistic reasoning was used to detect unwanted behaviour on the basis of the tracks of objects in combination with a database of historical data.

The project on 'smart dust' uses simulation to study the challenges and possibilities in the realisation of large sensor networks (10^2-10^4 nodes). Focus of this project has shifted from localising algorithms in anchor free networks to practical issues in the realisation of intruder detection networks.

In a new project a set of experiments has been conducted to study interaction between superconducting and regular coils. A tabletop setup for magnetic detection has been developed. Advances in magnetic sensors technology necessitate the development of more precise degaussing in ships and other platforms. It has been suggested that this may suitably be realised with the help of superconduction.

Phd student Iulia Lefter finished her research in the framework of surveillance systems. She will defend her thesis on March 12th 2014 at Delft University of Technology.

Prof. Rothkrantz left NLDA in November 2013, which marks the end of the surveillance projects.

UMS-2 Command & Control Systems for UMS using iTasks

The use of unmanned military systems in modern military missions requires new C2 concepts that enable complex cooperation between joint and combined partners in distributed settings using these systems. New C2 concepts are needed for networking and for unmanned systems; C2 of unmanned systems requires increasing automation of the C2 process itself. Clustering implies self-synchronisation. The dynamic workflow mechanism is well-suited for this. Therefore the iTasks formalism and the task-oriented programming paradigm appear to be promising techniques for developing prototype implementations of C2 systems for unmanned military systems. The iTasks formalism implements the task-oriented programming paradigm, which is a new way to model processes that involve several collaborators in a distributed setting with highly interdependent activities.

In 2013 Bas Lijnse finished and defended his PhD research on Task Oriented Programming (TOP) with iTasks. His research continues in a SENECA project funded by the Ministry of Defense for a period of 1,5 year. In this project a realistic prototype of an incident coordination system for the coastguard is built. The first version of the prototype was delivered in August 2013 and demonstrated in a workshop.

In collaboration with TNO Jurriën Stutterheim started his PhD research. He focuses on visualisation of both static and running iTasks applications. This should give domain experts better understanding of the structure and the coherence of (running) iTasks applications. As a spin-off of our activities TNO has started to use TOP and iTasks for other projects as well. There are plans to make even more use of TOP in forthcoming research programs.

In September the workshop *Incidone* was organised with more than 30 attendees from within the Ministry of Defence.

UMS-3 Weapon Systems

Western military forces do not have a monopoly on the use of systems such as UxVs. Highly maneuvering UxVs or micro-UxVs pose a threat against which existing air defence systems may not offer an adequate or affordable defense. It may be advantageous to develop methods of employing multiple fairly basic missiles against UAVs rather than a single high-tech weapon. Laser weapons may find their niche in use against such targets. An assessment of the vulnerability of friendly UAVs as well as methods to defend against enemy UAVs requires understanding of the effect that weapon systems have on their targets (terminal ballistics) and of countermeasures that can be employed.

In collaboration with the Netherlands Forensic Institute experimental research into projectile ricochets on wood has been presented at a conference. With the Royal Military Academy (Belgium) experimental research has been carried out on non-lethal weapons, which has lead to another international conference contribution.

We are steadily expanding the types of missile defense problems that we can simulate. A paper on North Korea's missile program has been published, after a short delay necessary to incorporate the latest data on the December 2012 North Korean satellite launch. A second paper, on weaving ballistic missile re-entry vehicles, has been accepted for publication. Initial results of a related modeling effort, aimed at simulating the flight of Maneuverable Re-entry vehicles has been presented at an international conference. A new collaboration with the US Naval War College on how missile defense technology and politics are interconnected has resulted in a joint publication on missile defense on a popular defense webpage.

UMS-4 Operational Aspects of Unmanned Navigation & Mission Management

Although current collision avoidance systems have proven to work well for commercial aircraft, comparable functions for UAVs require more autonomy, better integration and use of actual performance constraints. A goal is to develop and evaluate an (autonomous) integrated conflict prevention/resolution system that, if needed, can both predict and safely utilise the maximum possible vehicle 3D maneuver capability.

The main research focus of this theme will be the transition of the expertise built up in the past in the field of UAVs towards UxVs, in particular USVs (sea surface platforms). Research leading to this expertise was the main contribution to NLDA's work package in the joint national project C-Shield (Thales NL, NLR, NLDA, De Vries Lentsch, TP Marine) and the forthcoming joint NLDA-TNO project on underwater navigation.

A one-day symposium was organised on results of the C-Shield project. It was also presented on the occasion of the Navy's 525th anniversary and the "Innovation in Defence" event.

A student conducted research on a systematic approach to the realisation of required reference scenarios for the evaluation of future conflict prevention systems (consisting of conflict prediction and resolution functions). Another project deals with today's method to deploy LBL beacons at the right positions. This method takes time and may unnecessarily expose men or equipment to danger. Within this project we aim to perform a survey into alternative methods for deployment (e.g. using unmanned platforms). Finally, we expect to provide an overview of potential alternatives with a rationale in terms of expected performance, technical requirements, possibilities and limitations. The preliminary results have been presented at the 32nd Digital Avionics Systems Conference in a prize-winning paper (Best of Session Award).

UMS-5 GNSS and Terrestrial Backup Systems

This theme explores the opportunities of Terrestrial Navigation Systems to be used as back-up systems for a vulnerable GNSS (GPS/GLONASS/Galileo) or as stand-alone navigation tool for unmanned missions. In the field of Terrain Reference Navigation (TRN) digital signal processing techniques are used for new navigation algorithms, comparable to existing methods used for GPS. The goal of the research is to contribute to the creation of a design framework which can be used to match technology and processing concepts to a particular set of navigation system performance requirements.

PhD student D. Vaman performed a simulation-based verification of the new adaptive TRN tracking algorithm using radar altimeter measurements provided by Ohio University (USA). This marked the end of her PhD research. The thesis will be defended in June 2014 at Delft University of Technology. The research on the use of eLoran as a back-up system for GPS in an artillery setting was published by the *Journal of Navigation*.

Furthermore, a formula has been derived to estimate the standard deviation in eLoran measurements using the signal-to-noise ratio (SNR). To evaluate this formula eLoran signals from far away were used, that turned out to be rather useless, because of possible multiple propagation paths (ground, ionosphere). To verify this assumption and to find out whether SNR can be used to detect ionospheric waves, more data from senders afar have been used. Results of this study will be presented in 2014.

Results

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SRO-4 Deployment and Deployability of Military Systems (DDMS)

The objectives of this program are (*i*) to provide optimal solutions to military, operational problems, by using various modeling, simulation and optimisation techniques like meta-heuristics, game-theory, decision-theory, stochastic modeling, network theories, logistics, artificial intelligence; (*ii*) to optimise the availability of military systems in a cost-effective manner, by developing innovative predictive maintenance strategies and advanced data-analysis methods. The distinguishing perspective of the present program, both scientifically and in terms of practical yields, is the integral quantitative approach of deployment and deployability. Where traditionally these two fields are optimised separately, incorporation of the interactions between deployment and deployability provides a more realistic and better solution.

DDMS-1 Optimal Deployment of Military Systems

Network Science and C2

The relation between networks and C2 is studied using stochastic actor-based simulations, network theories and game-theory. Findings of this research can be used to provide analytic and conceptual support for implementation and evaluation of doctrines and tactics related to Network Enabled Capabilities (NEC). It also may make possible the quantification of the relation between an agents network topology, type of agents and system performance or completion of a mission. Another application of the research is cyber warfare. Our findings of actor-based simulations on networks may be used for risk analysis of the vulnerability of (C2) networks. In 2013, we have worked on an edited book by prof. T. Grant, dr. ir. R. Janssen and dr. H. Monsuur. *Network Topology and Military C2 Systems: Organization, operation and evolution* will be published in May 2014.

Decision and planning tools for use in complex and uncertain operational environments

The aim is to design, test and implement robust and agile planning methods that can cope with changing operational circumstances and provide good solutions for a variety of operational circumstances. The PhD student of this project, Lanah Evers, has defended her thesis on agile and robust planning in November 2013. She developed several planning tools that can adequately take uncertainty into account. Several papers have been published and/or submitted. The work in this topic is strongly related to and also interacts with topic 3 of DDMS-2.
Another development in this project is the input through our research and expertise centre Military Operations Research, where we coach officers to apply Operations Research methods to relevant military operational problems. A first project, by TLT ir. A. Schuitmaker is on spare parts management for NH90 helicopters. A second project by LTZ2 ir. T. Stuivenberg concerns the development of a decision support planning tool for transit of submarines.

Design of optimal search and detection strategies

The current focus is on the design (using modeling, simulation and optimisation) of optimal convoying against piracy: what is the optimal position of a frigate in a convoy so that the convoy is optimally protected against piracy? LTZ1 Ir. R. Jutte is developing strategies for the interception of enemy submarines that try to target high value units (cooperation with Maritime Warfare Center).

Game Theoretic Risk Analysis of Security Threats

This research focuses on the development of models and methods that provide insights and strategies regarding the optimal *deployment* of *scarce security forces* in an efficient and effective way given *multiple (intelligent and) responsive threats*. To cope with these threats, we will have to develop new methods, that address the deployment of security measures in complex and dynamic environments, taking into consideration new technological developments (like the use of UAVs) and adaptive and multi-facet threats. It will be the focus of new PhD research.

DDMS-2 Optimizing Military System Deployability

In this research theme concepts, methods and tools are developed aiming at realisation of the required availability at minimal life cycle costs. This is achieved by research on three topics.

Improving the predictability of failures and the required maintenance

By understanding the physical failure mechanisms and the associated loads, monitoring of the usage and/or condition of the systems enables the prediction of component failures. This enhances the predictability of required maintenance activities.

In the PhD project by M. Woldman experiments are performed and a numerical model is developed to predict wear rates of military systems at different operating conditions. In this final year of the project, the focus has been on the development of a numerical model and the application of the work in a predictive maintenance setting. A finite element model was developed this year, incorporating the insights obtained from the experiments. The model will enable to quantify wear rates for a much wider range of particle shape and size than would be feasible in an experimental program. Moreover, the developed methods have been applied in a case study of the CV-90 infantry vehicle, where the effect of different usage profiles and environmental conditions on the wear of the sprocket wheel has been calculated. The method can be applied in a predictive maintenance policy. The results have been published in three new journal papers (all under review). Woldman shall defend his thesis on 23 April 2014.

In the PhD project of LTZ2OC A. Homborg the aim is to relate data obtained from electrochemical noise (EN) measurements to different corrosion mechanisms with the ultimate goal to develop condition monitoring sensors. In 2013 he continued the work on the development and application of advanced signal processing techniques. A new extension of the previously proposed methods to analyse transients in the EN signal has been published. Moreover, the methods have been applied to characterise the corrosion inhibition process caused by the presence of Ce in the solution. The work resulted in two new journal papers. The PhD thesis is due for completion in 2015.

Two military students at TU Delft (Oskam and Smeding) conducted their Master thesis research on condition monitoring related topics, i.e. gas turbine gas path analysis and diesel engine cylinder pressure measurements.

The research project Maintenance and Service Logistics for Maritime Assets (MaSeLMA) started, in cooperation with the Navy, University of Twente, TU Eindhoven and a consortium of maritime

industrial partners (Thales, Imtech, Damen). Two Master students performed their thesis work in the NLDA led work package on predictive maintenance and a PhD student will start in 2014.

Performing intelligent data analysis

Large amounts of data on the system usage, failures, parts supply and maintenance costs are collected within the Ministry of Defence (and industries). The research on this topic focuses on the development of innovative data analysis methods that translate the collected raw data into useful maintenance information.

In the PhD-project of B. de Jonge (mathematical) methods to analyse data on usage, failures, logistic supplies and costs are developed. The research focuses on the effect of uncertainty in failure rates on the decision for the optimal maintenance policy. Also the effect of clustering maintenance activities is studied. The results have been presented at international conferences and one journal paper has been submitted.

The research project Tools4LCM (MoD funded National Technology Project) started this year. The two-year project in which NLDA cooperates with the National Aerospace Laboratory (NLR) aims to develop quantitative tools to improve the life cycle management process. Using data from different sources, i.e. failure, logistics, maintenance, usage, condition and financial data, methods are developed to assess the maintenance performance. A team of representatives (~ 12 persons) from CLAS, CLSK and CZSK has been formed to work on relevant case studies (CV-90, Cougar, F-16, LCF) and provides useful input. In addition, FMS researcher Rijsdijk analyses the data and develops the new methods. A PhD student (Tiddens) will start in this project in March 2014. At the end of 2013, a report describing the literature study and preliminary method (WP1) was delivered.

A cooperation with Nedtrain (maintenance of trains) was started in the joint development of data analysis methods. A Nedtrain employee (Geertman) has been working at the NLDA for several months on this topic.

FMS student Oosterhoff did her Bachelor thesis work in this field. At the Marinebedrijf, a framework to analyse structural performance deviations was developed, assisting in finding the root cause of these problems.

Optimising maintenance and logistic processes

The concept of dynamic maintenance, where intervals are not fixed, but depend on the actual usage of the system, is developed. Moreover, maintenance modeling and optimisation techniques are applied to improve maintenance and logistic processes. The work in this topic is strongly related to and also interacts with topic 2 of DDMS-1.

A previously developed numerical model to optimise the LC frigate maintenance process, using input on the variations in usage profiles and subsystem failure behaviour, has been extended. This work has been published in a journal paper. Using the simulation model a comparison could be made between several maintenance policies. This work has been presented at an international conference.

The research project by Wubben on dynamic maintenance shifted from scientific applied. Several Bachelor students from both NLDA and Groningen University performed thesis projects on this topic. One journal paper will be written on this topic, for which the framework has been finished.

A military student at Eindhoven University (Dijkstra) was supervised in a project on optimising maintenance of weapon systems under different loads and at different maintenance locations.

Building Innovation in Military Engineering

The MESC research project is about the ways in which building and construction (BC) related groups or departments within the defence organisation (including the Army Corps of Engineers and Infrastructure Agency Group) can benefit from BC innovations, which originate from the civil BC practices and research efforts.

MES-1 Technical Innovation - Risk Management in Military Engineering

The objective of this research theme is that the Dutch military forces are better protected against the effects of both accidental and intentional explosions. This research will focus on developing models for predicting and simulating the impact of explosions on humans, materials and constructions.

Shock wave prediction model and shock tube blast testing facility (PhD project)

This project involves the generation of a model for predicting the blast wave parameters of a planar wave. The model will be verified with simulations using AUTODYN. In the objected tunnel test facility detonating wire will be applied to generate the blast, because existing tubes are not suitable for simulating a high explosive (IED or mortar). Detonating wire also has a low environmental impact, both in sound as well as in chemical products. With the blast wave parameter model, this new - still to be developed - shock-tube can produce required blast loads to test structural elements. In 2013, the theoretical framework has been further elaborated and a number of computational simulations was performed. It is expected that J. Borgers will finish his thesis in 2014.

MES-2 Process and System Innovation

The objective of this research topic is to increase the efficiency, effectiveness and quality of the current design and asset management processes for military building and construction. In order to reach this objective, solutions provided by the 'civil' BC practice and research will be made applicable for the military organisation by adapting and modifying these solutions to the specific needs and characteristics of the military BC processes.

Military engineering multi-team systems: the role of organizational identity (PhD project)

This PhD project is conducted by J. Wijnmaalen. The majority of the long-term project team alliances within the field of construction engineering fall under a category of teams which social psychologists call multi-team systems (MTSs). The partnership is formed between several different teams from various organisations each with their own culture, goals, language and interests. Leaders of such MTSs need to manage more than just the formal command and control mechanisms. They also need to be aware of the cognitive-cultural aspects within these complicated project teams. The research of

Wijnmaalen focuses on one of the possible barriers to effective cooperation in such complicated teams: namely organisational identity. To what extent and how does organisational and MTS identity influence MTS teamwork processes. The research builds on four case studies: three Dutch military engineering teams in Afghanistan and one civil engineering team in the Unites States. The aim of the research is to understand the processes that take place in MTSs and to develop tools for leaders of MTSs that help them lead these collectives in the most effective manner. It is expected that J. Wijnmaalen will finish her thesis in 2014.

MES-3 The development of a quantitative toolbox for analysing intelligence data

This PhD project is conducted by O. Goldbach, part-time PhD and employed at DIVI. The main objective is to develop quantitative data-driven analysing methods that support intelligence processes. Such methods are not available in the current (Dutch) intelligence service practice (and education). In order to determine the potential application areas of such quantitative methods within the current intelligence processes a thorough analysis of the current intelligence processes will be part of this research. In addition an analysis of the state of the art of quantitative methods in other or related disciplines (both national and international) will be performed and matched with the specific needs of the (Dutch) intelligence service

In 2012 a detailed analysis of the current intelligence processes has been performed. It gave insights in the specific 'information' problems within these processes. In 2013, the focus has been on how the type of education (quantitative versus qualitative methods) can influence decision-making processes. It is expected that O. Goldbach will finish his thesis in 2016.

3. Results

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Tinga, T. : *Principles of loads and failure mechanisms. Applications in maintenance reliability and design,* Springer 2013, 302 p. (international, reviewed, book).

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SRO- 5 The Human(e) Factor in Present-day Military Practices

This research program focuses on the crucial role of the human(e) factor. The cluster of values, both voiced within and with regard to military practice, not only implies that there is, by definition, a unique and complex connection between ethics and violence in this practice (the humane factor), but it also points to the crucial role of the human factor. In other words, it also emphasizes the importance of the focus on the soldier as an individual agent, as a member and leader of a team or ad hoc (whether or not flexible) structures, and as a member, leader and manager in and of a governmental organisation that is entrusted with the monopoly of violence. Emphasized as well is that the actions of this human(e) factor are inherently enabled and constrained by the broader context of the socio-technological system in which he or she operates. The complex combination of tasks and goals of the military generates many ethical, political, personnel, organisational and cultural questions. It has become painfully clear that these questions may have unwanted and tragic consequences for protégées as well as protectors of human(e) security, on an individual level as well as on an organisational and (inter)national political level.

The strength of the research program lies in the unique interdisciplinary and transdisciplinary approach of its object: the human(e) factor in present-day military practices. The subjects in this program are studied from five different disciplines: psychology, philosophy/ethics, organisation sciences, sociology and political sciences.

Research Theme 1: Military Ethics and Leadership

Given the complexity and the moral/ethical challenges of present-day military practice, reflection on the values, norms and related interests of this practice, is highly relevant. In providing and stimulating this reflection military ethics has established itself as a form of applied ethics with a focus on the individual level, organisational and political level. The connection between ethics and leadership, which is underlined in both academic and business context, is especially relevant in a military setting.

Project 1a): Moral professionalism and moral injury in military practices

In May 2014 a research project on veterans will be launched in cooperation with Stichting WEP, Police Academy, Veterans Institute and the FMS. Several articles are under review.

Project 1b) Moral education and moral formation in (the preparation for) violent contexts

This research project focuses specifically on the preconditions for ethics education and on the role that virtue ethics, the Socratic dialogue and the process of ‘living learning’ can play in this context. In order to realise this objective a case study, a ‘train the trainer’ course in military ethics, will play a crucial role. The focus will be on the discrepancy between working on strengthening moral competence and the work context of the participants.

In the context of her PhD research in which she focuses on the effects of military ethics training, Eva van Baarle started a collaboration with the Free University of Amsterdam.

Project 1c) Military Virtues

Most of today's militaries put their money on character building in trying to make their soldiers virtuous. Although there is a great deal to say in favor of virtue ethics, there are a few practical concerns. For instance, it appears that the traditional military virtues are mainly beneficial to the organisation, not so much to the local population of the countries military personnel are deployed to. Especially in today's missions it can be expected that the proper virtues are not necessarily solely the more martial ones. Finally, it should be noted that virtue ethics in the military is more about the soldiers themselves, the maintaining of their morals, their self-image and their ability to 'look at themselves in the mirror' than about those who suffer the consequences. The aim of the program is not only to shed some light on different aspects of some of the more prominent military virtues and the role they can have in today's missions, but also to delve somewhat deeper into the above-mentioned concerns.

Project 1d) 'Building' leaders; leadership and moral formation in Military Education

Future leaders need to be able to fulfill different kinds of roles in evolving networks and need to be able to cooperate with a variety of people and organisations. Given their future challenges, leadership education and training exceeds preparation of leaders at a mere cognitive level. They also need to have social, moral and mental competencies to adaptively handle the challenges they are confronted with. The broader educational philosophy connected to these competencies can be called 'Bildung'. The German concept 'Bildung' affects not only the cognitive, but also the emotional, moral and volitional development of an individual. This research project focuses on the education of military leaders in contemporary western armies; on the educational philosophy behind the education of military leaders, and specifically the way 'Bildung' can be applied. A second focus in this project lies on military socialisation effects on leadership and moral behaviour. In co-operation with TNO a PhD project on leadership and moral formation in military forces will start in May 2014.

Project 1e) Mass violence, military ethics and the politics of law

This project will explore how soldiers deal with present-day demands of politics, ethics and law in violent conflicts and peace enforcement. Collaboration is sought with researchers in the area of International Criminology and International Politics and Law.

Research Theme 2: Psychosocial Dynamics of Expeditionary Organising

Missions today can range from small-scale events in the context of national tasks towards large-scale combat missions conducted globally. To deal with this diversity, teams or even whole units are often constituted in an ad hoc manner with the expertise that is depicted by the expedition to be accomplished. A result of all this is that up to the individual soldier the military is confronted with a diversity of tasks, environments, rules and regulations and political landscapes. Such flexible or expeditionary organising can pose a burden of psychosocial dynamics on the organisation in general and on the individual specifically.

Project 2a): Military Intervention and Reconstruction: new dilemma's in a new millennium

In present-day military practice the combination of combat tasks and tasks with regard to political, social and economic reconstruction is not easy and often creates dilemmas that cannot be countered

with simple solutions. Conflict resolution and political, social and economic reconstruction, and thus the road to 'human security', can only be realised by a comprehensive strategy. In one trajectory of this research project, in cooperation with the Centre of International Conflict Analysis and Management (CICAM) of the RU Nijmegen, the focus lies on an evaluative analysis of the concepts of comprehensive approach; human security; Just War and more specifically ius post bellum and their contribution to the questions that are generated in attempts to restore conflict and reconstruct political, social and economic infrastructures.

In a second trajectory research is carried out on the importance of civil-military relations (CMR) in humanitarian crisis. In this context a profound analysis and understanding of the roles and perceptions of the military, humanitarian organisations and local population is needed, given the widely acknowledged tensions between all different actors in CMR. A third trajectory reflects on inherent dilemmas of state building in reconstruction activities.

Project 2b): Gender, Integrity and the moral dimension of Leadership (PhD project)

Military organisations are characterised by hierarchy, uniformity, masculinity and an emphasis on group cohesion, leadership, structure and planning. This research project focuses on the influence of these contextual characteristics on co-operation processes, group dynamics, power processes, integrity and leadership. There are three trajectories: the critical analysis of the gendered character of the military organisation, integrity and the moral dimension of leadership. Jolanda Bosch plans to finish her dissertation in 2014.

Project 2c): Demographic change, recruitment and retention

In this project research is conducted to give insight in the possible impact demographic and strategic changes and changes in ICT possibilities on recruitment and retention in the Dutch military now and in the future. Comparisons will be made to similar research projects in Europe to draw conclusions for (strategies for) recruitment and retention on the higher European level. In 2013 an EDA working group started. Representatives of Sweden, The Netherlands, Norway, Canada and Belgium met to exchange the state of affairs in each country and to make arrangements to cooperate in international research. Dr. R. Richardson was the Dutch representative. In 2014 the working group will construct a measurement for international research on Recruitment and Retention in the Armed Forces.

Project 2d): Moral and cultural critical situations in the interaction with the local population during deployments (PhD project)

This research describes how soldiers act in morally and culturally critical situations. Furthermore, the goal is to describe which factors influence the way soldiers cope with these situations. At last, the local (Afghan) perspective on these situations and the soldier's behavior is investigated.

In 2013 Michelle Schut analysed the data of her PhD study. Furthermore, she published the first results in a book chapter. In 2014 Michelle intends to write and publish several articles. Her thesis is due for the end of 2014.

Project 2e): Psychosocial issues during and consequences of a deployment

In this project, psychosocial issues of Dutch soldiers during and after deployments are studied and compared internationally in order to contribute to a better preparation of military officers on military deployments. With the Veteran Institute a preresearch was conducted on the demographic features of Dutch veterans in cooperation with three cadets of the Faculty of Military Science.

Project 2f): The effects of stress and adaptability on (mental) health, well-being and performance of soldiers

This project will give insight in the impact of the demanding context of military missions by analysing the psychosocial aspects and their effects on the (mental) health, well-being and performance of soldiers.

Project 2g): The Warrior Peacekeeper Role Identity Project: validation of the Warrior Peacekeeper Identity Scale (WPRIS) and international comparisons of military role identity

The Warrior Peacekeeper Role Identity Scale (WPRIS) measures warrior and peacekeeper role identities as two separate constructs. The psychometric qualities of this Dutch scale are promising. In this project research is conducted using the WPRIS for three aims: 1. for comparing role identities and (background) variables between different countries (Canada, Belgium and Estonia), 2. for further improving the psychometric qualities of the WPRIS and developing norm scores, 3. for exploring correlations between role identities and other work-related variables. In its final validated form, the WPRIS can be used in military practice (e.g. in training) and as such it can identify deficits or biases in training programs. Finally, it can be used for preparation for deployment and identification and prevention of role strain during deployments.

Research Theme 3: Safety in high-risk socio-technological military systems and environments

Project 3a) Organisational fragility and the hermeneutics of safety

This research project focuses specifically on safety practices by means of critical analysis of accidents and safety practices and methodologies in the military. Also, the goal is to theoretically and empirically develop the organisational fragility perspective.

Project 3a1) Developing an organised theoretical perspective on safety management

This PhD project focuses on safety management for expeditionary organizations It redefines safety management by developing a theory which focuses on aspects of organisational design that facilitate local adaptive processes. Applying such a theory may eventually enhance the organisation's ability to deal with variation, may diminish fragility and improve safety.
In the year 2013 Moorkamp focused on three issues in his PhD research: finishing the empirical work for the case study on safety of operating with UAV's in Task Force Uruzgan (TFU), writing and resubmitting two research papers and writing a case study analysis booklet. The empirical work, which was conducted by means of interviews, was finished in April. Also, in April a research paper was prepared that served as a first exploration of the TFU-case. This paper was presented at the ESREL safety conference on the 29th of September and published in the book *Safety, Reliability and Risk Analysis: Beyond the Horizon*. During the summer a revision for a submitted paper was written

and resubmitted to the journal *Safety Science*. A second review procedure resulted in minor comments. The paper will, most likely, be accepted after these minor comments are included in the final version of the paper. During the second half of 2013 the TFU-case booklet (approx. 120 pages, six chapters) was written and will be finished during the first months of 2014.

Project 3a2) Safety in socio-technological military systems

This research attempts to answer how the establishment of safety as a social process can add value to foresight and hindsight safety assessments and evaluations of large scale socio-technological military systems. It focuses specifically but not solely on Unmanned Aircraft Systems (UAS).

The research aims to deliver seven papers among which a literature review and a concluding paper. The other five papers will follow from several research projects:

- a quantitative study on how a classic risk management tool handles hierarchical differences in risk management with the Royal Netherlands Air Force
- a qualitative study on social redundancy in Apache helicopter crew behavior

The third project aims to deliver three papers centering around a specific large scale military socio-technological system, the unmanned aerial system (UAS). This project will build on three different studies:

  - a preliminary qualitative study on the social construction of UAS technology in concrete settings
  - a qualitative study after social dynamics in the integration of UAS in the (inter)national airspace
  - a qualitative study on socio-technological issues regarding either the use of autonomous UAS or the dual use engineering of UAS

Besides these conference papers work has been done on the literature review paper which is now ready in concept and will be submitted early 2014. For the study on the integration of military UAS in the (inter)national airspace structure a lot of background work has been performed in 2013. All interviews have been completed and transcribed. Data will be analysed and should result in a paper at the midst of 2014.

Project 3b) Organizational sensemaking & psychological fragility

Research into the experiences of military organisations and operators in dynamic environments has led to insights that can help to create a contribution to organisational sensemaking theory. On the one hand, sensemaking theory can clarify how operators develop ways to deal with complex environments by enactment and subsequent reflection. On the other hand, however, such environments can confront operators with feelings of anxiety and guilt which can eventually develop into severe psychological trauma. An ‘academic split’ exists between the fields that study these two aspects. This project aims to theoretically connect the two academic fields. Such a connection could develop into an academic contribution and should lead to a more balanced understanding of the

psychological pressures to which operators are exposed which could be the onset for further development in military training.

Project 3c) Innovative technology in socio-technological military systems

This project focuses on the use of military technology, its role regarding safety and its ethical and organisational consequences. The aim is to analyse and propose morally adequate standards and principles for the use of military technology. Also, the regulation of military technology is studied as well as the manner in which public perceptions and debates can play a role in regulation and how they should be accounted for in policy. The focus will be on new and emerging technologies such as autonomous robots, human enhancement, cyber and network centric warfare technology.
It has become clear that with robotics and other innovations an increased use of intelligence information specifically and cyberspace in general, and current societal debates on armed unmanned aircraft systems (UAS), research in the area of technological innovation and socio-technology from this particular angle is a necessity for the Dutch Armed Forces. First steps have been made with the JISTAR battalion to assess some research opportunities. So far, agreement has been established to focus on possible pitfalls in JISTAR's current socio-technological system regarding a) the current process of analysing intelligence data, b) the construction of the enemy and c) the distribution of this construction to others.

Results

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Rijsdijk, E. : *Forever connected: State narratives and the memory of Srebrenica*. Paper presented at VIEW research seminar, VU university, 11 October 2013, Amsterdam (The Netherlands), 23 pp. (national, reviewed, conference paper).

Schut, M. & Moelker, R. : 'Respect and Responsibility: Tensions between Cultural Effectivity and Moral Responsibility in Morally and Culturally Critical Situations' in Amersfoort, H., Moelker, R., Soeters, J. & Verweij, D. (eds.), *Moral Responsibility and Military Effectiveness,* The Hague : Asser Press, 191-216 (international, reviewed, book chapter).*

Verweij, D. : 'Responsibility as the 'ability to respond' adequately' in: Amersfoort, H., Moelker, R., Soeters, J. & Verweij, D. (eds.), *Moral Responsibility & Military Effectiveness*, The Hague : Asser Press, 11-32 (international, reviewed, book chapter).

Verweij, D. : *Responsibility as the cornerstone of reconciliation and reconstruction.* Conference paper presented at the 3rd annual conference of International Society for Military Ethics (Euro ISME), 2-3 May 2013, Amsterdam (The Netherlands) (international, reviewed, conference paper).

Verweij, D. : *Meer aandacht voor 'moral injury' in militaire missies*? Paper presented at conference Capita Selecta in de gezondheidszorg relevant voor de militaire zorgverlener, Schoorl (The Netherlands), 15 November 2013 (national, not reviewed, conference paper).

Verweij, D. : *Military Intervention: From 'Just War' to 'Responsibility to Protect'.* Paper presented at the conference 'The United Nations Security Council: Responses to Mass Atrocities', The Hague Institute for Global Justice, The Hague (The Netherlands), 18 April 2013 (national, reviewed, conference paper).

Verweij, D. : *Vrede en Verzoening*. Paper presented at the conference 'Vrede van Nijmegen' Rotaryclub Nijmegen Zuid en Radboud Universiteit Nijmegen, Berg en Dal (The Netherlands), 20 April 2013 (national, not reviewed, conference paper).

Verweij, D. : *Zijn 'Just Wars' niet uiteindelijk ook just wars? De mogelijkheden en onmogelijkheden van de traditie van de rechtvaardige oorlog.* Paper presented at conference 'De Nieuwe oorlog' organised by Vereniging van Ethici Nederland, Breda (The Netherlands), 24 Oktober 2013 (national, reviewed, conference paper).

NLDA Center of Excellence Human Factors and System Safety

Military activity is increasingly situated in complex and dynamic environments from which safety issues can emerge. One promising perspective that can help to tackle these safety issues is the perspective of human factors and system safety. Several researchers of the FMS are experts in this area. Their knowledge could potentially be applied outside the NLDA as well. They can contribute to issues of safe performance that practitioners in the armed forces typically are confronted with. The need for such valorization of knowledge has been formulated in the Strategic Knowledge and Innovation Agenda 2011-2015.

In the year 2013 guest lectures on human factors and system safety were provided in the Armed Forces Masterclass on Safety Management (Center of Expertise on Labour and Health (CEAG), the Air Force Course for Flight Safety Officers and the Navy Train the Trainer Course on Crew Resource Management (CRM). The topic of CRM has been picked up for further exploration. In January 2013 a

workshop was organised on the topic of CRM in which the Police Academy, the Fire Services and some members of the Regional Crisis Response Organisations participated. Two seminars will be organised in 2014, one for the higher management levels and one for a broader public. Also, a briefing has been given on the topic of CRM to the MT of the School for Crisis Response of the Police Academy as well as a workshop on their yearly Day for Professionals. Besides these activities connections with the Applied University of Amsterdam have been pursued as a possible partner for future programs on human factors and system safety as well as with the Knowledge Center in Risk Management of Twente University.

SRO-6 Cyber Operations & Cyber Security

The implementation of the Netherlands Cyber Security Strategy and the subsequent Defence Cyber Strategy resulted in the establishment of a small group within the FMS dedicated to Cyber Operations & Cyber Security. An associated professor was nominated in June 2012, a researcher and the chair (professor) will start in 2014. The cyber branch will be working alongside the Defence Cyber Expertise Centre (operational in 2014) and the Task Force Cyber.

The branch's mission is to widen and deepen knowledge (and skills) on cyber security (in general) and cyber operations (in particular). Five themes have been identified: operational (including doctrine and legal issues), strategy, governance and organisation, social and technological.

Initial research focuses on the development of doctrine and strategy, as well as the governance and organisation of cyber security. In collaboration with other branches of the War Studies Department, various publications have been delivered. The majority of the research however, will result in publications in 2014 and beyond. Hence, the return on this year's investment is still to come. This will involve research on governance of cyber security (contracted to Erasmus University), ungoverned spaces (in collaboration with professor Beatrice de Graaf), operationalising cyber operations in military power and the notion of cyber operations and cyber within the framework of non-kinetic targeting.

Of special note are the multidisciplinary (cyber)legal publications authored by professor T. Gill and/or Col P. Ducheine.

Three PhD researchers have been allocated: one by the Army (van Haaster) and two as a result of a joint program with TNO. Van Haaster's PhD will cover cyber warfare within military operations. The two additional TNO funded PhD-projects will focus on (a) the applicability of potential (offensive and defensive) cyber capabilities and corresponding institutional frameworks and (b) modelling effectiveness (and desired effects) and side effects (collateral damage) in order to validate the legitimacy of cyber attacks.

Output

Ducheine, P. : 'Legal Framework for Military Cyber Operations' in: *Militair Rechtelijk Tijdschrift,* 106(1), 9-19 (national, peer reviewed, journal article).

Ducheine, P. : 'Effectiviteit, legitimiteit en verantwoordelijkheid', in: Wagemaker, A. & Nijnatten, F. van: *Minuutschoten – Liber Amicorum voor Hans Bosch,* 25-28 (national, not reviewed, article).

Ducheine, P. & Haaster, J. van: 'Cyber-operaties en militair vermogen' in: *Militaire Spectator* 182(9), 368-387 (national, peer reviewed, journal article).

Gill, T.D., Ducheine, P.A.L., Boddens Hosang, J.F.H. & Marchand, C. : 'Report on the The Role of Self-Defence in Multinational Operations', in: Horvat, S. & Benatar, M. (eds.) *Recueil International Society for Military Law and the Law of War, Congress Proceedings of the 19th International Congress on the Legal Interoperability and Ensuring Observance of the Law Applicable in Multinational Deployments* Brussels (Belgium), 121-171 (international, reviewed, conference paper).

Gill, T. & Ducheine, P. : 'Anticipatory Self-Defense in the Cyber Context' in: Schmitt, M. (ed.), *Cyber War and International Law, International Law Studies 2012*, 89 (2013), Newport: Naval War College Press, 438-471 (international, peer reviewed, journal article).

Appendix 1: Research capacity

Personnel	Section	Cluster	SRO	Planned	Realised	Hours ext	Status
Absil, Prof. Dr. Ir. F.	COS	MTS	SRO-3	100	100		HL
Andres, Dr. M.	MODE	MMS	SRO-2	500	300		DOC
Amersfoort, Prof. Dr. H.	MH&S	WS	SRO-1	400	300		HL
Baarle, Drs. E.	IDL	MMS	DRP	400	400		UD
Baarda, Dr. T.A. van*	IDL	MMS	DRP	600	600		UHD
Bakx, Maj Drs. G.C.H.	MBSP	MMS	DRP	500	500		UD
Barros, Dr. A.I.	COS/OR	MTS	SRO-4			340	RES
Bartels LLM, R.C.	MIL	WS	SRO-1			30	RES
Baudet, Dr. F.H.	MH&S	WS	SRO-1	480	480		UHD
Beeres, Dr. R.J.M.	MODE	MMS	SRO-2	480	480		UHD
Bijlsma, Dr. T.	MODE	MMS	SRO-2	425	400		UD
Bogers, Drs. M.	MODE	MMS	SRO-2	350	300		DOC
Bolderheij, Col Dr. Ir. F.	COS	MTS	SRO-3	500	480		UHD
Bollen, Dr. M.T.I.B.	MODE	MMS	SRO-2	300	300		UHD
Bon, Drs. A.A.	ISS	WS	SRO-1	480	450		UD
Borgers, Ir. J.	CIT	MTS	DRP PhD	600	410		UD
Bos-Bakx, Lcol Drs. M.P.G.	MODE	MMS	SRO-2	300	0		UD
Bosch, Drs. J.	MBSP	MMS	DRP	200	200		DOC
Bosch, Lcol G.L.C. van den LL.M	MIL	WS	SRO-1	480	480		DOC
Bouwmeester, Col Drs. H.	MOAS	WS	SRO-1	-	250		UHD
Brinkel, Dr. Th.	ISS	WS	SRO-1	480	160		DOC
Broos, Dr. E.*	MBSP	MMS	DRP	200	150		UD
Brunsting, LtCol R. MASS	MOAS	WS	DRP	480	300		DOC
Buijs, Dr. T. op den	MBSP	MMS	SRO-2	450	450		UD
Dado, Dr. Ir. E.	CIT	MTS	DRP	450	490		UHD
Dalenberg, Lcol Drs. S.	MBSP	MMS	DRP	400	200		DOC
Donker, Drs. P.	MH&S	WS	SRO-1	480	480		UD
Ducheine, Col Dr. P.A.L.	CYB	WS	CYB	480	480		UHD
Evers, Drs. L.	COS	MTS	SRO-4 PhD	1640	1640		AIO
Faber, Ir. N.	L&I	MMS	DRP PhD	300	160		UHD
Fenema, Dr. P.C. van	L&I	MMS	SRO-2	500	500		UHD
Flink, LTZ1 N.D. LL.M	MIL	WS	DRP	480	480		UD
Frerks, Prof. dr. ir.	MOAS	WS	SRO-1	-	40		HL
Geel, Col B. van MASS*	MOAS	WS	DRP	480	100		UHD
Gill, Prof. Dr. T.D.	MIL	WS	SRO-1	100	100		HL
Goldbach, Capt Drs. O.	CIT	MST	DRP	400		400	OPCO
Graaff, Prof. Dr. B. de	MOAS	WS	SRO-1	240	240		HL
Grandia Mantas MA, Capt M.	MODE	MMS	SRO-2	1640		1640	OPCO
Groot MSc, C. de	NAV	MTS	SRO-3	170	0		UD
Haaster, LT Mr. J. van	CYB	WS	SRO-6	-		500	AIO
Heeren-Bogers, Drs. J.J.D.	MODE	MMS	SRO-2	350	350		UD
Hoencamp, MSc, Lt A.	MPS	MTS	DRP	600		600	OPCO

Personnel	Section	Cluster	SRO	Planned	Realised	Hours ext	Status
Hordijk, Ir. R.	COS	MTS	SRO-3	410	410		UD
Jansen. Dr. J. M.	COS	MTS	SRO-3	500	500		UHD
Janssen, Dr. Ir. R.H.P.	COS/OR	MTS	SRO-4	400	400		UD
Jong, Drs. H. de	MH&S	WS	SRO-1	480	450		UD
Jong, Dr. M.A.G. de	MH&S	WS	SRO-1	300	320		DOC
Jonge MSc, B. de	MPS	MTS	SRO-4	1640		1640	RES
Keers, B. LTZ1 MSc.	L&I	MBW	SRO-2	-		600	OPCO
Kitzen, Drs. M.	MOAS	WS	SRO-1	480	900		UD
Kleinreesink, LtCol Drs. L.H.E.	MODE	MMS	SRO-2	400	400		DOC
Klinkert, Prof. Dr. W.	MH&S	WS	SRO-1	480	500		UHD
Koene, Dr. L.	COS	MTS	SRO-3	410	410		UD
Knoll, Ir. H.	MPS	MTS	DRP	200	200		UD
Koster, LtCol A. de	MOAS	WS	SRO-1	480	480		DOC
Krabbenborg, D.	CiT	MTS	DRP	150	0		DOC
Kramer, Dr. F.J.	MBSP	MMS	DRP	400	400		UHD
Lefter MSc, L.	COS	MTS	SRO-3	1640		1640	AIO
Lijnse, Ir. B.	COS	MTS	SRO-3	1640		1640	POSTDOC
Lindelauf, Dr. R.	MOAS	WS	SRO-1	480	400		DOC
Lubberman-Schrotenboer, Capt I. *	MODE	MMS	SRO-2	480	250		DOC
Maas, Drs. J.B.	MODE	MMS	SRO-2	1640	1640		AIO
Mengelberg, Drs. S.	ISS	WS	SRO-1	250	250		UD
Meuldijk, Ir. D.W. *	MPS	MTS	DRP	200	100		UD
Meulen, Prof. Dr. J.S. van der	MODE	MMS	SRO-2	500	250		UHD
Moelker, Dr. R.	MODE	MMS	SRO-2	500	500		UHD
Molen, LCOL E. van der	MOAS	WS	SRO-1	120	120		UD
Monsuur, Dr. H.	COS/OR	MTS	SRO-4	500	500		UHD
Moorkamp, Drs. M.	MBSP	MMS	DRP	1640	1640		AIO
Noll, Dr. J.E.	ISS	WS	SRO-1	480	100		UHD
Notenboom, Dr. Ir. R.P.	MPS	MTS	DRP	320	200		UD
Olsthoorn, Dr. P.H.J.	MBSP	MMS	DRP	500	500		UD
Ooms MSC, Col (ret) D.M.	COS	MTS	SRO-3	200	200		DOC
Oonincx, Prof. Dr. Ir. P.	NAV	MTS	SRO-3	400	400		HL
Orbons, Ir. J.*	MOAS	WS	DRP	275	275		UD
Osinga, Cdre Prof. Dr. F.P.B.	MOAS	WS	SRO-1	480	230		HL
Lcol B.M.J. Pijpers LL.M.*	MOAS	WS	SRO-1	200	100		DOC
Popma, Ing. T.O.H.	MPS	MTS	SRO-4	50	50		DOC
Pouw, Maj Drs. E.H.	MIL	WS	SRO-1	800		800	OPCO
Raju Mandapalli MSc, P. *	CIT	MTS	DRP	1640		350	AIO
Richardson, Dr. R.A.L.	MBSP	MMS	SRO-2	250	250		UD
Rietjens, Dr. Ir. S.J.H.	MODE	MMS	SRO-2	600	500		UD
Royakkers LLM, Dr. L. *	MBSP	MMS	DRP	300	300		UHD
Ross, Dr. R. *	MPS	MTS	SRO-4	600	300		UHD
Rothkrantz, Prof. Dr. Drs. L.*	COS	MTS	SRO-3	300	300		HL
Rothman, Dr. M.G.D.	ISS	WS	SRO-1	480	400		UHD

Personnel	Section	Cluster	SRO	Planned	Realised	Hours ext	Status
Ruiter, LTZ2OC R. de*	MH&S	WS	SRO-1	250		250	OPCO
Rijsdijk, Dr. E.	MBSP	MMS	DRP	300	300		UD
Rijsdijk, Ir. Ch.	COS	MTS	SRO-3	1640		1640	AIO
Savelsberg, Dr. Ir. R.	COS	MTS	SRO-3	410	410		UD
Scheele Msc, C.	NAV	MTS	SRO-3	170	170		UD
Schmidt, Dr. W.	MBSP	MMS	SRO-2	100	100		UD
Schut MSc, M.	MBSP	MMS	SRO-2	1640	1640		AIO
Sinterniklaas, Maj Drs. R. *	MOAS	WS	SRO-1	1280	1280		DOC
Soeters, Prof. Dr. J.M.L.	MODE	MMS	SRO-2	500	500		HL
Somsen, Dr. O.	COS	MTS	SRO-3	500	500		UD
Stapersma, Prof. Ir. D.	MPS	MTS	SRO-4	600	300		HL
Theunissen, Prof. Dr. Ir. E.	NAV	MTS	SRO-3	300	300		HL
Tinga, Dr. Ir. T.	MPS	MTS	SRO-4	700	500		UHD
Vaman, Msc. D.	NAV	MTS	SRO-3	135	135		AIO
Veen MSc, M. van*	MODE	MMS	SRO-2	500	250		UD
Ven, Drs. M.P.A.	COS/OR	MTS	SRO-4	100	100		UD
Vermeulen, Dr. Ir. A. *	COS	MTS	SRO-3	500	500		UHD
Verweij, Prof. Dr. D.E.M.	MBSP	MMS	DRP/SRO-2	680	600		HL
Voetelink, LtCol Drs. J.E.D.	MIL	WS	SRO-1	480	80		UD
Vries, Dr. Ir. J. de	MPS	MTS	DRP	200	200		UD
Waard, Dr. E.J. de	MODE	MMS	SRO-2	425	425		UD
Wal, Dr. A. van der	COS	MTS	SRO-3	500	500		UHD
Woldman MSc, M.	MPS	MTS	SRO-4	1640		1640	AIO
Woudstra, Capt Drs. N.	MOAS	WS	SRO-1	480	200		UHD
Wubben, Ir. J.P.C.	I&L	MMS	SRO-4	450	200		UD
Wijnmalen, Drs. J.	CIT	MTS	DRP	1640	1475		AIO
Total				58100	38660	13710	

Hours in FTE			
AIO/POSTDOC/RES Uren		23280	
HL Uren		3410	
UHD Uren		9770	
UD Uren		11770	
DOC Uren		4140	
Totaal		52235	31.9 VTE
Staf FMW		38660	23.6 VTE

* has left the FMS in the course of 2013 or per 01-01-2014