Joining and Combining Forces to Face Future Challenges

May 15 - 17, 2017
Maritim Hotel Magdeburg
Otto-von-Guericke-Straße 87 | 39104 Magdeburg

www.dwt-sgw.de
Welcome Notes

Ladies and Gentlemen,

welcome to our international meeting here in Magdeburg!
The future security challenges of hybrid conflicts which are apparent even today are forcing us to gradually and holistically develop and optimise our military instruments so that we can continue to commit operationally ready forces.

For instance, the Very High Readiness Joint Task Force (VJTF) whose establishment is well under way as a rapidly deployable brigade-size intervention unit within the NATO Response Force, will be led by Germany from 2019; it is one of the key elements enabling us to meet the upcoming challenges and to fulfill our multinational commitments vis-à-vis our allies.

Supported by the German Army Concepts and Capabilities Development Centre as the essential driving force for the further development of land operation concepts, the German Association for Defence Technology’s Forum 2017 aims to demonstrate our land forces’ potential for capability development by focusing on the possibilities of both the defence industry and military entities.

Within the framework of the future operational environment, the Federal Ministry of Defence’s current White Paper provides the bedrock for the levels of ambition for future development such as the ‘Strategic Defence Planning Guideline’, Vision 2030+, ‘Guidelines for the Reorientation of the Bundeswehr’, and other political guidelines.

I wish you a pleasant and informative time here at our international Conference in Magdeburg!

LtCol (ret.) Wolf Rauchalles,
Managing Director of SGW Ltd

Programme on May 15th

12:30  Bus transfer from Main Entrance Maritim Hotel, Magdeburg, to Army Combat Training Centre
13:45  Arrival at Army Combat Training Centre, short break
14:00  Welcome address by Deputy Commander, Army Training Command and briefing by Director, Army Combat Training Centre
15:00  En route to Almark Kaserne
15:25  Visit of Schnöggersburg Urban Operations Training to Facility in 3 groups
17:30  En route to Maritim Hotel, Magdeburg
18:30  Ice-Breaker Reception at Maritim Hotel Magdeburg
21:00  End of Ice-Breaker-Reception
Programme on May 16th

07:00  Information desk opens
08:30  Opening of the conference
       General (ret.) Rainer Schuwirth,
       Chairman DWT e.V.
       Administrative details
       Lieutenant Colonel (ret.) Dipl.-Ing.(FH) Wolf
       Rauchalles, Managing Director, SGW Ltd
08:40  Introduction to the conference
       Major General Frank Leidenberger
       Commander,German Detachment, MNC/Basic
       Military Organisation
09:30  Networking training in a multinational setting -
       Where do we want to go from a capability manage-
       ment perspective?
       Rear Admiral Thomas Jugel,
       Director, Bundeswehr Office for Defence Planning
10:00  Army Combat Training Centre - already now the
       central land operations training facility for battal-
       ion-size units
       Brigadier General Hartmut Renk,
       Deputy Commander, Army Training Command
10:30  Future challenges of the Bundeswehr
       Brigadier General Gerald Funke,
       Planning
61:00  Coffee break, exhibition
11:30  A concept to integrate the Army Combat Training
       Centre into a multinational, multi-level, joint live
       exercise scenario
       Michael Kriewitz, Rheinmetall Defence Electronics
       Arnold Geisler, Raytheon Technical Services
12:00  Introductory briefing: Holistic Army development -
       focused on challenges and operational readiness
       Colonel, GS, Harvey Günther, Chief of Section I 1
       (1), Army Concepts and Capabilities Development
       Centre
12:15  Introductory briefing: Urban operations - German
       concepts and exercise facilities of allied forces
       Colonel, GS, Thomas Meuser, Chief of Branch V 1,
       Army Concepts and Capabilities Development
       Centre
12:30  Lunch break, exhibition
       Conference continues with Panel Sessions A / B
       Panel A 1: Salon München (1st Floor)
       Panel A 2: Plenum
       Panel B 1: Salon Stuttgart (1st Floor)
       Panel B 2: Saal Berlin (1st Floor)
17:45  Beer Call | Exhibition
18:15  Continuation of dialogue during Walking Dinner
       Buffet
21:45  End of first day

Programme on May 17th

07:30  Information desk opens
08:00  Opening of the exhibition | Welcome coffee
08:45  Introduction to the second conference day
       Major General Reinhard Wolski
09:00  Introductory briefing:
       Technology (standards) and equipment
       Klaus Müller-Peiter, Chief of Branch U1
       Federal Office of Bundeswehr Equipment,
       Information Technology and In-Service Support
09:15  Introductory briefing:
       Requirements and parameters for future oriented
       training in the German Army at the Army Combat
       Training Centre
       Colonel, GS, Andreas Reyer, Chief of Branch I 2,
       Army Concepts and Capabilities Development
       Centre
09:30  Train as you Fight
       Claes-Peter Cederlöf, Vice President,
       Saab BARRACUDA
10:00  Coffee break, exhibition
       Conference continues with Panel Sessions C / D
       Panel C 1: Salon Stuttgart (1st Floor)
       Panel C 2: Salon München (1st Floor)
       Panel C 3: Salon Dresden (1st Floor)
       Panel D 1: Saal Berlin (1st Floor)
       Panel D 2: Plenum
15:00  Coffee break, exhibition
15:30  The way ahead – focused on the future
       Major General Reinhard Wolski, Commander,
       Army Concepts and Capabilities Development
       Centre
16:00  Final remarks
       Major General (ret.) Wolfgang Döring,
       Managing Director, DWT e.V.
16:15  End of conference
Panel A 1
Future Challenges for the Land Forces
Room: “München”, 1st Floor
Panel Chair: Lieutenant Colonel, GS, Guido Altendorf

14:15 Introduction into the theme
Lieutenant Colonel, GS, Guido Altendorf, Div I, Army Concepts and Capabilities Development Centre

14:20 Future challenges - threat analysis - megatrends
Dr. Hajo Lippke, Div I 2, Bundeswehr Office for Defence Planning

14:45 Development of the comprehensive approach
Lieutenant Colonel, GS, Jörg Stenzel, Directorate-General for Security and Defence Policy II 1, MoD

15:10 CyberWarfare - Vulnerabilities of modern devices
Peter Weidenbach, Fraunhofer Institut FKIE

15:30 Coffee break, exhibition

16:30 IED-Threats within the limits of PSO?
Markus Lischka M.A., Div IV C-IED, Army Concepts and Capabilities Development Centre

16:55 Mobile monitoring systems also for UAS detection
Florian Bendel, Securiton company

17:20 Discussion

Panel A 2
Army Concepts and Capabilities Development Centre - Focused on Army Readiness
Room: Plenum, Ground Floor
Panel Chair: Lieutenant Colonel, GS, Andreas Christian

14:15 Management system of holistic Army development
Colonel, GS, Harald Einzinger, Div I 1, Army Concepts and Capabilities Development Centre

14:40 The integrated Army capabilities system
Lieutenant Colonel, GS, Maik Panster, Div I 4, Army Concepts and Capabilities Development Centre

15:05 Future Development in the German Army
Colonel, GS, Manfred Neuber, Div I 1 (3), Army Concepts and Capabilities Development Centre

15:30 Coffee break, exhibition

16:30 Capability management - meeting capability requirements up front
Lieutenant Colonel, GS, Jörg Schickor, Div I 1, Army Concepts and Capabilities Development Centre

16:55 From plans to reality - the Army today
Lieutenant Colonel, GS, Jürgen Hofmann, Div I 4, Army Concepts and Capabilities Development Centre

17:20 Discussion
Panel Sessions B1 / B2

Panel B 1
The Systems Approach - Key to Success
Room: “Stuttgart”, 1st Floor
Panel Chair: Lieutenant Colonel Herbert Rohde

14:15 Retaining the capabilities of the permanent structure – future challenges
Lieutenant Colonel Herbert Rohde, Div I 3, Army Concepts and Capabilities Development Centre

14:40 Looking across the border – Joint Multinational Readiness Centre (JMRC)
Major Clare Martinez, USA Army Liaison Officer

15:05 Looking across the border – British Army Training Unit Suffield (BATUS) (CAN)
Lieutenant Colonel Andy Southby & Major Simon Everett, GBR Army, Field Army Training Branch

15:30 Coffee break, exhibition

16:30 Looking across the border – CENZUB at Sissone
Colonel Philippe Seigneur, FRA Army Liaison Officer

16:55 Discussion

Panel B 2
Urban Combat
Room: “Berlin”, 1st Floor
Panel Chair: Lieutenant Colonel, GS, Frank Lindstedt

14:15 Infantry forces in urban operations
Lieutenant Colonel Martin Lachner, Div II 2 (1), Army Concepts and Capabilities Development Centre

14:40 Armoured forces in urban operations
Lieutenant Colonel, GS, Volker Gruss, Div II 2 (1), Army Concepts and Capabilities Development Centre

15:05 Effectiveness for armoured forces in an urban environment
Oliver Dellschau, MBDA Deutschland Ltd

15:30 Coffee break, exhibition

16:30 Tactical communication with ear protection Comtac XPI and Comtac PTT, mounted and dismounted
Marco Melchers, 3M Deutschland Ltd

16:55 Exercise infrastructure - the entire capability spectrum
Lieutenant Colonel Peter Makowski, Army Combat Training Centre

17:20 Discussion
Panel Sessions C1 / C2 / C3

Panel C 1
NATO Standardisation Activities
Room: “Stuttgart”, 1st Floor
Panel Chair: TRDir Dietmar Breuer

11:00 Industrial standards as a prerequisite for carrying out multinational exercises
Armin Thinnes, Sect. U6.2, Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support

11:25 Interface architectures in the UCATT live simulation
Armin Thinnes, Sect. U6.2, Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support

11:50 The use of standards within live simulation in international exercises
Ernst Christians, RDE Ltd

12:15 Lunch break, exhibition

13:45 UCATT E8 – The LVC Interface for future live simulation exercises
Dr. Uwe Dobrindt, RDE Ltd

14:10 Geo-enabled future forces at the core of virtual interactive real-time reality
Michael Mundt, Esri Deutschland

14:35 Discussion

Panel C 2
Chances and Limitations of Different Simulation Modes
Room: “München”, 1st Floor
Panel Chair: Lieutenant Colonel Karl Roschei

11:00 Coupling of live/virtual/constructive simulation and C2
Klaus Kappen, IABG Ltd

11:25 Networked simulation – coupling the virtual with the real world
Andreas Schiel, ESG Ltd

11:50 Chances and limitations of the V-C world
Lieutenant Colonel Thomas Doll, Div I 1 (3), Army Concepts and Capabilities Development Centre

12:15 Lunch break, exhibition

13:45 3D terrain data for exercises and operations - today and in the future
Wolfgang Brettschneider, Div I 1 (4), Army Concepts and Capabilities Development Centre

14:10 Automated generation of geospecific 3D databases and their use in simulation
Dr. Joachim Schauß, KMW Ltd

14:35 Discussion

Panel C 3
Army Combat Training Centre Simulation Environment, Effectors
Room: “Dresden”, 1st Floor
Panel Chair: Lieutenant Colonel Peter Makowski

11:00 The future EXCON for multinational, multi-level, distributed live exercises
Patrick Galler, RDE Ltd

11:25 Integration of ECM jamming equipment
Jan Übersax, RUAG (Switzerland) Ltd

11:50 Potential of incorporating guided missiles in simulation systems and resulting requirements, exemplified by the Army Combat Training Centre
Oliver Dellschau, MBDA Deutschland

12:15 Lunch break, exhibition

13:45 Integration/simulation of airburst ammunition
Ernst Christians, RDE Ltd

14:10 Emerging challenges in Short Range Airspace
Alexander Burger, RAD Ltd

14:35 Discussion
Panel D 1

Integrating Combat Support and Combat Service Support Forces in the Training at the Army Combat Training Centre
Room: Berlin
Panel Chair: Major Jan Tröster

11:00 Combat and combat service support in hybrid conflicts - challenges, limitations and feasibility in training
   Major Jan Tröster, Div III 3 (1), Army Concepts and Capabilities Development Centre

11:25 NGVA-based mission systems for networked platforms on the future battlefield
   Dr. Thomas Weise, Rheinmetall Ltd

11:50 Integrating medical requirements in a medical training system (MTS) for the Army Combat Training Centre
   Major, Pharmacy Corps, Dr. Katja Lahm, Bundeswehr Medical Service Headquarters

12:15 Lunch break, exhibition

13:45 Engineer support in complex operational scenarios focusing on challenges in an urban environment
   Captain Tobias Hochmuth, Div III 3 (2), Army Concepts and Capabilities Development Centre

14:10 Integrating Joint Fire Support in complex operational scenarios in training at the Army Combat Training Centre
   Lieutenant Colonel Dirk Streitbürger, Div III 2 (1), Army Concepts and Capabilities Development Centre

14:20 Possibilities to train the Logistic Troops in ACTC
   Lieutenant Colonel Thomas Gorzelitz, Div III 4 (2), Army Concepts and Capabilities Development Centre

14:35 Discussion

Panel D 2

Future Extended Training and Exercise Opportunities at the Army Combat Training Centre
Room: Plenum
Panel Chair: Lieutenant Colonel, GS, Michael Felten

11:00 Weighing future training options of a multinational brigade at the Army Combat Training Centre
   Lieutenant Colonel, GS, Michael Felten, Div I 2 (1), Army Concepts and Capabilities Development Centre

11:25 Current and future training and exercises of GBR units at training facilities
   Colonel Alistair Rogers, GBR Army, Assistant Head, Capability Development, HQ Army Training Branch

11:50 Representing air manoeuvre of land forces at the Army Combat Training Centre
   Lieutenant Colonel Markus Lönnig, Div II 3 (1), Army Concepts and Capabilities Development Centre

12:15 Lunch break, exhibition

13:45 Future Army electronic warfare - challenges for realistic training and exercises
   Berthold Rehbein, Fraunhofer FKIE

14:10 Nammo’s training solutions – ammunition, concept, reduced range
    Hans-Georg Baum, Nammo Schönebeck Ltd

14:35 Discussion
Caterings

Ice-Breaker on May 15th


Magdeburger Schnippelsuppe

Gebratene Pouladenbrust auf Shiitake-Lauch | Welsfilet in Rieslingsauce mit körnigem Reis | Fleischspieß auf Bördegemüse | Vegetarisch gefüllte kleine Wirsingroulade | Buntes Gemüse, Gekräutertes Bördegold

Harzer Waldbeerengrütze mit Vanillesauce | Kaffeecreme „Röstfein“ | Apfelkuchlein

Luncheon on May 16th

Wildkräuter, Rucola und Feldsalat | mit Zitrone-Basilikum-Dressing und Orangen-Ingwer-Dressing | Hähnchensalat mit getrockneten Tomaten | Fruchtiger Shrimpsalat | Asiatischer Nudelsalat | Gurkensalat in Dillrahm | Tomatensalat mit Schnitlauch | Eingelegte Paprika und Champignons | Verschiedene Schinkensorten mit Melone

Spargelcremesuppe

Gegrilltes Lachsmedaillon mit Curcumasauce | Tofuklößchen im Kräutersud mit Gemüse | Schweinefilet auf kleinem Ratatouille | Brokkoli und Karotten, Kartoffelgratin, Fettucine

Harzer Beerengrütze mit Vanillesauce | Gezuckerte Erdbeeren mit Vanillesauce | Tiramisu

Dinner on May 16th

Knackige Blattsalate im Balsamico-Öl-Dressing mit Ziegen-Honig-Käse | Zitronenhälften mit Mozzarella, Basilikum, getrockneten Tomaten und Sardellen gefüllt | Kross gebratene Scheiben vom Schweinelachs in Chimichurri-Sauce auf Tomaten-Avocado-Brotsalat | Knusprige Bruschetta | Antipasti-Auswahl

Risotto Cacio e Pepe | Saltimbocca alla Romana an Rosmarinbratlingen | Knusprig gebackene Hähnchenschenkel in mediterranen Kräutern | Piccata Milanese an Petersilien-Kartoffelstampf und Waldpilzsaucen | „Live-Cooking-Station“: In Trüffelöl und Parmesan geschwenkte Spaghettini an Knoblauch und Peperoncini

Zitronensorbet | Panna Cotta mit fruchtiger Sauce | Kleine Käseauswahl

Luncheon on May 17th

Curryterrine mit Quinoa und Gemüse | Ziegenkäse mit Tomatenviertel und Rucola | Süßkartoffel-Shiitake Quiche | Mozzarella Rolls | Mini Hähnchenroulade | Auswahl verschiedener Blattsalate mit Dressingauswahl

Italienische Minestrone

Ravioli mit Tomaten und Mozzarella gefüllt an Kerbelschaum | Rinderröllchen an seiner Sauce | Zandermedaillon auf Dillgurken | Rahmwirsing, Spargelgemüse, Kartoffeln und Reismix

Vegane Vanillemousse auf Aprikosenragoût | Omas Rhabarberstreusel | Schokoladenmousse mit Kirschgrütze

Visitors from Authorities / Armed Forces are kindly asked to pay the Catering fee at the Conference Counter if Attending and not paid in Forefront.
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Future-oriented holistic Army development  
**Lieutenant General Frank Leidenberger**, Commander, German Detachment, MNC/Basic Military Organisation

+++ Abstract / Short Version was not available at editorial deadline +++

Networking training in a multinational setting - Where do we want to go from a capability management perspective?  
**Rear Admiral Thomas Jugel, Director**, Bundeswehr Office for Defence Planning

The NATO Strategic Concept demands the multinational interoperability on all levels of collaboration, e.g. training, education or exercises. Therefore Germany focusses on bi- and multilateral instruments, which are utilized coherently and are continuously enhanced. Consistently there is almost no connected neither national nor multinational training. It is obvious that a connected multinational training which is mission tailored will enhance the effectiveness in the theatre. For this we have to connect the German Army Combat Training Centre, representing the lower tactical level, with other national and more importantly multinational training entities. Bydgoszcz would act as the higher ranking HQ and Stavanger would portray the operational level. The Bundeswehr Office for Defence Planning ensures these requisitions by visioning the Future Development, managing necessary capabilities, examining resources and implementations. Furthermore all projects of the Office are considering the multinational aspect. Two of the current projects, the Virtual Tactical Training Platform and the Airmobile Simulation Network are selected to illustrate the work of the Bundeswehr Office for Defence Planning in line with the vision. It can be shown that a multinational connected training should be feasible, but there are still challenges in three areas: Technical, Conceptual and Multinational Capability Sharing. Facing and solving these challenges will lead to a connected multinational training. The German Army Combat Training Centre will be able to take the lead as the multinational tactical training site while connecting with the higher ranked tactical training center and the operational level. Despite the challenges, the connected multinational training can already be achieved on a smaller scheme. If we establish a communication linkage with the higher ranked tactical training center and the operational level, we will be able to forward military orders from the operational level all the way down to the tactical training level and vice versa. This would give us the chance to connect the different multinational sites today and is the first step to a connected multinational training.

Army Combat Training Centre - already now the central land operations training facility for battalion-size units  
**Brigadier General Hartmut Renk**, Deputy Commander, Army Training Command

+++ Abstract / Short Version was not available at editorial deadline +++

Future challenges of the Bundeswehr  
**Brigadier General Gerald Funke**, Planning Directorate I, MoD

+++ Abstract / Short Version was not available at editorial deadline +++

A concept to integrate the Army Combat Training Centre into a multinational, multi-level, joint live exercise scenario  
**Michael Kriewitz**, Rheinmetall Defence Electronics  
**Arnold Geisler**, Raytheon Technical Services

The procurement of Live Simulation equipment was initially driven by national requirements. In Europe first to close the gap for less expensive and safe gunnery training, in the US to allow for more objective tactical engagement evaluation in larger exercises. In both cases “interoperability” between different Live Simulation
systems has not been in the main focus of users and industry. The world has now changed significantly. To be successful, co-operation of multinational forces requires realistic training in a real environment with real constraints. While the different nations already train their soldiers in their own Combat Training Centers it is more complicated to do this with multinational forces having each their specific national Live Simulation equipment and different philosophies of conducting training. This joint lecture from Rheinmetall Defence Electronics, the system integrator and industrial service provider of the German Army Combat Training Center GUEZ, and Raytheon Technical Services, the operational support service provider of the US Army Joint Multinational Readines Center JMRC Hohenfels, will evaluate from industry perspective the possibility to connect both live Combat Training Centers in Germany, the German GUEZ and the JMRC to enhance training effectiveness in a multinational environment.

Holistic Army development - focused on challenges and operational readiness

Colonel, GS, Harvey Günther, Chief of Section I 1 (1), Army Concepts and Capabilities Development Centre

The Session presents a holistic army development and its current and future challenges at a glance (Session A) and dedicates to the subject of Urban Operations mainly referring to concepts and capabilities for training and exercise (Session B). The aim of the briefing is to give a brief overview of the road we came from, the challenges we face and how we envision to tackle them best. The briefing outlines first ideas to factors:
- Preparation of Forces
- Projecting of Forces
- Engagement in Future Conflicts
- Sustainability
- Command and Control
- Protect and Inform

and gives a first impression of the challenge finding an answer to the future questions in order to handle a future operational environment with capabilities we develop as of today.

German concepts and exercise facilities of allied forces

Colonel, GS, Thomas Meuser, Chief of Branch V 1, Army Concepts and Capabilities Development Centre

The introductory briefing to Session B will approach the subject of the two panels in a kind of a short historical overview. The Session chairman describes the way to Schnöggersburg chronologically and from a personal perspective.

Technology (standards) and equipment

Klaus Müller-Peiter, Chief of Branch U1, Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support

The session presents an overview about the UCATT (Urban Combat Advanced Training Technology) activities in NATO which is a focal point for live simulation and the related standardization issues. The Chances and Limitations of Different Simulation Modes as well as the Simulation Environment inclusive the aspect of Effectors will be presented. The briefings outline the following:
- Use and value of international Standards in and for Live Simulation
- The upcoming E8 standard
- Next steps of NATO’s automated information system from the perspectives of the “GIS” software provider “esri”.
- Comprehensive view of “Simulation-based training in the German Army”. Methodological and didactical principles of training and limits of the use of simulation technology.
- 3D geospecific databases for training and mission. Capabilities of the Bundeswehr Geoinformation Service and what kind of procedures and solutions have been developed.
Abstracts / Short Versions of the Main Programme Presentations (chronological)

- The future Exercise Control Center (EXCON) concept
- ECM Jamming equipment integration
- Potential of incorporating guided missiles in simulation systems
- Air Burst Ammunition types and their specific requirements for simulation
- Current trends in aerial threat analysis and Short Range Air Defence Developments

Requirements and parameters for future oriented training in the German Army at the Army Combat Training Centre

Colonel, GS, Andreas Reyer, Chief of Branch I 2, Army Concepts and Capabilities Development Centre

From the "school of the nation" to "information overload". Training in the armed forces in general and in the German Army in particular is subject to ever more rapidly changing parameters. The form of military service, demographic and societal developments, equipment, technology, multinationality and the appeal factor are key determinants shaping training. The purpose of military training will essentially remain unchanged: to prevail on operations! — however, in an equally changing operational environment encompassing national and collective defence, international crisis and risk prevention, humanitarian relief efforts and crisis management for German nationals abroad. At the same time, it is essential to adopt a modern and appealing design for the "German Army as an employer" to be able to compete and prevail on the labour market.

These future general and military capability requirements to be met by the individual, a team and a battle group may, almost ideally, be applied to the German Army Combat Training Centre as the central training facility of the German Army. The current and future developments of and considerations regarding the Combat Training Centre are in the focus of this introductory briefing and the related panels D1 and D2.

Train as you Fight

Claes-Peter Cederlöf, Vice President, Saab BARRACUDA

Contents of the Presentation:
- The enemy of today
- Organization and Operational performance
- Train as you fight concept
- Survivability To Effect

The way ahead – focused on the future

Major General Reinhard Wolski, Commander, Army Concepts and Capabilities Development Centre

+++ Abstract / Short Version was not available at editorial deadline +++
Abstracts / Short Versions of Panel Session A1 (chronological)

Introduction into the theme
_Lieutenant Colonel, GS, Guido Altendorf_, Div I, Army Concepts and Capabilities
Development Centre

Aim of the short introduction is to set the scene for the following briefings.
It includes the formal introduction of the briefers and the presentation of the aim of the panel.
• How will future conflicts be handeled, and by whom?
• Will states be the the main players, or do we have to face other actors?
• What will be the role of traditional alliances (NATO, EU, OSCE)?
• How stable are modern societies? What are the vulnerabilities?
• What will be the reason for conflicts? Ressources, Religion, Money?
• Will regular forces be an instrument of Security Policy in the future?
• How easy can modern technology been accessed and used by terrorists or irregular forces?

Future challenges - threat analysis - megatrends
_Dr. Hajo Lippke_, Div I 2, Bundeswehr Office for Defence Planning

The Future Analysis Branch is a unique element in the Bundeswehr. Acting as a “headlight”, the future analysis is researching trends using methodical approaches which exceed military logical thinking. The aim is to early identify and analyse trends and build up future scenarios. This serves to identify potential future developments and help to build future robust armed forces. It’s necessary to mention, though, that the future analysis does NOT predict the future nor gives any probabilities about what exactly to expect.

Bundeswehr just recently released its own “Strategic Foresight 2040” paper, which will be one pillar of shaping the force for the future. In the presentation, future challenges will be shortly introduced:
- Social change (demographics, new forms of political participation, heterogeneous societies)
- Political landscape (multilateral system, regional changes, powershifts, polarity)
- Technology (Big Data, Artificial Intelligence and robotics, 3D-printing, nano-technology)
- Environment and ecology (climatic change, resource scarcities)

The current megatrends or, to be more precise, trend-cluster, which will have main implications on the military, are:
- Digitalization, automation, autonomous systems
- Individualization
- Urbanization
- Demographic change
- Transformation of energy systems

The threat analysis capacity of the Future Analysis Branch is limited, because we do not have the manpower – especially on the military side – to give in-depth recommendations. Among our expertise are various pictures of conflicts that help shaping an idea of future conflict. Thus we are able to develop a scenario setting that gives force planners a certain guidance of what to expect and how it will influence their field of planning.

Development of the comprehensive approach
_Lieutenant Colonel, GS, Jörg Stenzel_, Directorate-General for Security and Defence Policy II 1, MoD

The comprehensive approach is the guiding principle of the German government. Germany possesses a wide range of expertise and instruments that are used to tackle challenges at home and abroad. The White Paper 2016 names enhancing the comprehensive approach as a key area of national interest and one of the guiding principles for the Bundeswehr of the Future.

The Bundeswehr contributes to the German coordinated joint crisis management process in all phases of crises and conflicts. There are various forms of such contribution: enhancing and enabling security forces in a conflict affected region, conducting stabilization operations or providing post-crisis assistance.

The presentation will give elaborate on the current issues regarding cooperation between the Bundeswehr and state and non-state actors in both, a national and an international framework and the demands made on the Bundeswehr.
Abstracts / Short Versions of Panel Session A1 (chronological)

CyberWarfare - Vulnerabilities of modern devices
Peter Weidenbach, Fraunhofer Institut FKIE

In 2006 a blackout powered off large parts of Europe for several hours causing high economic damage. Even if the blackout of 2006 was an accident, it showed how fragile modern large power grids are. It also demonstrated that manipulating a few parts of the system can result in large and long lasting blackouts. These manipulations can be done on purpose by an attacker e.g. by manipulation of firmware of industrial control systems in power plants or several hundred smart-meters. Manipulating the firmware of a device is not as hard as one might think because many different devices share the same base system. For instance the radar system of the F-18 Super Hornet is powered by the same base system as several printers from Xerox or HP. Currently at least 29 vulnerabilities in this base system are publicly known and each one of these can potentially be used to compromise the whole system – from printers to jets. Furthermore many of these vulnerabilities are exploitable remotely, so that an attack can be launched without physical access to the device. This threat is not just theory as several leaks quote manipulating firmware is common practice of many intelligent agencies for years.

This talk shows how vulnerable modern devices (and our modern society) are and how civilians can damage military goods with “simple” cyber-attacks.

IED-Threats within the limits of PSO?
Markus Lischka M.A., Div IV C-IED, Army Concepts and Capabilities Development Centre

In the aftermath of the ISAF mission the IED threat to which coalition forces permanently were exposed, often was put into question. The rise of hybrid threats e.g. during the Crimea annexation and the Ukraine Crisis due to increasing Russian influence frequently led to the conclusion that current and future high intensity conflicts would no longer offer remarkable space for the use of IEDs.

Recent and current experiences in Mali and the findings in various Fagile State Evaluations indicate that the opposite is the case: IEDs are and will be an important tool in future crises, conflicts and war. High intensity conflicts will also leave space for asymmetric perpetrators and beyond various non-state entities even regular conventional forces will apply IEDs to attack logistics and supply lines behind the frontlines of combat. This highly likely will take place throughout the full spectrum of peace support operations within the framework of stabilization and reconstruction as well as within our system of Collective Defence including VJTF operations. Taking this into account we should notice that the countering efforts which we have developed mainly on our experiences of the ISAF and OEF mission currently have changed. We have learned from these experiences that AtN as the focal point of the C-IED approach did not meet the requirements of the overall C-IED approach.

Therefore C-IED institutions, concepts and doctrine underwent significant change throughout the recent years. C-IED has been turned into a wider CTN approach with HNAT as one of its major tools. Subsequently there is a good chance that future C-IED will turn into a more diversified “C-Improvised Threat” approach with numerous subsets of operational relevance and remarkable effects on preparation and training of forces.

This panel session seeks to explain the various interdependencies and to clarify the need for a “Next Generation C-IED”.

Mobile monitoring systems also for UAS detection
Florian Bendel, Securiton

The SecuriWall M3 mobile modular monitoring system is all about intelligent monitoring, wherever and whenever you need it. Quick to set up and put into operation, it provides your property or premises with professional protection with a minimum of personnel.

Ready for every assignment
SecuriWall M3 is designed with temporary surveillance and protection assignments in mind. The system consists of a network, cameras and sensors. With its modular design it adapts simply and precisely to the circumstances specific to each object or property and to every protection requirements. Its practical applications are virtually limitless. The system handles the security of camps, air bases, harbours etc.

Quickly up and running with Plug & Play
SecuriWall M3 can be commissioned in a flash based on the Plug & Play principle. The system automatically identifies all the components present. What is remarkable is that SecuriWall M3 is powered by one mains connection only and that the entire power and data transmission uses the unique and secure hybrid network (SCS Single Cable System).

Visual intelligence for seamless protection
SecuriWall M3 integrates the latest innovations in the area of video management. The IPS VideoManager system software delivers top-quality video transmission, intelligent alarm management, scalable video recordings and alarm checks as well as many other tasks. Plug-ins can also be used at any time to expand the functional scope of the basic software.

SecuriWall M3 – the benefits:
• Open, expandable and modular system
• Quick and easy to set up and dismantle on site
• Unrivalled operational readiness and maximum reliability
• Convenient commissioning using Plug & Play
• Easy operation
• Virtually limitless expansion and networking possibilities
• Ready for future developments and upgrades
• Minimum personnel requirements

Management system of holistic Army development
Colonel, GS, Harald Einzinger, Div I 1, Army Concepts and Capabilities Development Centre

At present armed forces are confronted with a wide variety of conflict forms, which require a versatile, flexible and robust force to encounter the challenges ahead. Concurrently army development is not only dealing with the issue of adapting the force for current tasks, but also with the question of capability development with regard to an ever faster changing future operational environment. The briefing gives a brief outline, how capability enhancement is managed by Army Development. Furthermore it accounts for the three guiding Army Development Principles. Finally the briefing outlines the Army Development Roadmap up to 2032.

The integrated Army capabilities system
Lieutenant Colonel, GS, Maik Panster, Div I 4, Army Concepts and Capabilities Development Centre

Throughout the era of mechanised warfare the principle of Combined Arms has been the key for operational success. The Brigade level is the lowest tactical echelon to experience Combined Arms Operations. The briefing conveys the basic ideas that made the German Army choose the Brigade as a core for capability development and the chosen roadmap and rational to improve the capabilities on these level.

Future Development in the German Army
Colonel, GS, Manfred Neuber, Div I 1 (3), Army Concepts and Capabilities Development Centre

Commonly the future battlefield seems to be a mere visionary product, when it comes to determining the framework of operations starting from 2030 onwards. The briefing gives insights into the methodology on how the ACCDC manages to create a solid vision of the future operational framework and its implicit challenges for the armed forces.
Capability management - meeting capability requirements up front
Lieutenant Colonel, GS, Jörg Schickor, Div I 1, Army Concepts and Capabilities Development Centre

Combining modern capabilities in a responsive and assertive force is an imperative for nowadays forces. A holistic approach to army development hinges on the balance of resources to allocated tasks. Consequently a sound management of capabilities within the due years is paramount to both operational effectiveness and efficiency. The briefing depicts the pattern by which ACCDC identifies overlapping capabilities and gaps in order to alleviate shortfalls or diminish redundancies.

From plans to reality - the Army today
Lieutenant Colonel, GS, Jürgen Hofmann, Div I 4, Army Concepts and Capabilities Development Centre

Viewed from the procedural standpoint resource implementation is the necessary step to achieve capabilities in praxis. In other words ACCDC accompanies the evolution of a product from the cradle to the grave and consequently considers all the ingredients needed to forge capabilities. It is ACCDC’s responsibility to monitor projects and their project elements actively. The briefing delivers an insight into resources and implementation and imparts a notion of how capabilities are finally set up.

Retaining the capabilities of the permanent structure – future challenges
Lieutenant Colonel Herbert Rohde, Div I 3, Army Concepts and Capabilities Development Centre
+++ Abstract / Short Version was not available at editorial deadline +++

Looking across the border – Joint Multinational Readiness Centre
Major Claire Martinez, USA Army Liaison Officer
+++ Abstract / Short Version was not available at editorial deadline +++

Looking across the border – British Army Training Unit Suffield (BATUS) (CAN)
Lieutenant Colonel Andy Southby & Major Simon Everett GBR Army, Field Army Training Branch
+++ Abstract / Short Version was not available at editorial deadline +++

Looking across the border – CENZUB at Sissone
Colonel Philippe Seigneur, FRA Army Liaison Officer

French Training centers: CENZUB-CENTAC
CENTAC (1997): Centre d’entraînement au combat
CENZUB (2006): Centre d’entraînement aux opérations en Zone Urbaine
Both centers are part of the Pole Champagne, in North Western France.
Beyond its mission as a manoeuvre training center, CENTAC also trains the JTACs of deployed units in a realistic framework, as well as the HQ of units deployed in military assistance to civil authorities missions.
CENZUB is more recent, and was developed on the former training area of Sissonne Camp in 2005.
The small « combat village Beauséjour » was improved, but reached its limit, and based on lessons learned from recent conflicts; the city of Beauséjour was built in 2010. It’s a small town with modern buildings and infrastructure, with houses equipped to follow the action inside.
A live-fire urban shooting range, CT ZUB, was added in 2011.
Both centers are using laser and GPS based systems, but will have to evolve with the introduction of a new generation of fighting systems.
CERBERE is a major program designed to field a totally instrumented simulation system within the program SCORPION framework.
Infantry forces in urban operations

Lieutenant Colonel Martin Lachner, Div II 2 (1), Army Concepts and Capabilities Development Centre

The infantry has to face increasing complex operations in the urban environment and thus meet ever-increasing demands on man, material and tactics. The control and the knowledge about potential dangers in the different dimensions of the urban environment are an elementary part of successful mission accomplishment. The intention of the briefing is to present the conceptual foundations as well as the training facilities available in Germany for the conduct of urban operations in order to demonstrate the increased demands on the infantry, especially in cooperation with the armoured branch and Army aviation. An overview of realized and future further developments of the material equipment is provided which underlines the need for continuous research and development.

Armoured forces in urban operations

Lieutenant Colonel, GS, Volker Gruss, Div II 2 (1), Army Concepts and Capabilities Development Centre

The presentation starts with general considerations about armoured forces in urban operations. It shows a video about tanks and mechanized infantry in Syria. The advantages and disadvantages of armour in urban operations are considered as well as the different levels of structures in urban terrain. Offensive and defensive operations of armoured troops can be conducted in different ways but have essential tasks in common. The essential tasks must be trained at the tactical level in a practical way in order to learn the peculiarities of the terrain and the different arms and services. The force mix must be suited to the terrain and the intended operational advance. The forces included in urban operations will not necessarily be different from open terrain operations but will have distinct emphasis due to intensive combat in constrained terrain. The armoured forces have not been tailored for urban operations yet, so they lack some of capabilities to meet the challenges in urban terrain. The urban training facilities must be suited for armour and combined arms operations at all levels. Training of combined Arms forces in urban terrain is the key to successful missions.

Effectiveness for armoured forces in an urban environment

Oliver Dellschau, MBDA Deutschland Ltd

Requirements, restrictions and the specific character of UrbOps are well known to military experts and most part of public nowadays. This presentation recalls most of these constraints, restraints and requirements to the audience and thus shows what “Armor Corps” needs in built up area to be successful. An overview of lethal and non-lethal weapons, direct, indirect and omnidirectional approach of targets, as well as scalable and electromagnetic warheads - respectively weapons - will be given. Furthermore different ways of delivering a warhead and totally different types of warheads will be explained. The author will show possible features of caliber ammo in direct fire as well as what is achievable with Joined Fires (JF) based weapons. What can be done in the field of intelligent ammo and laser plus missile systems will be the final chapter of this presentation. A forecast to future urban battlefield will be given.

Tactical communication with ear protection, Comtac XPI and Comtac PTT, mounted and dismounted

Marco Melchers, 3M Deutschland Ltd

The presentation starts with short product information and our customized solution for a variety of German Armed Forces needs. To focus on the essentials, we will only step into details with our 3M Peltor ComTac XPI hearing protector headset in combination with our special ComTac PTT and its unique features, advantages and positive side effects.
Situational background: A huge number of soldiers are endangered or already affected by hearing loss, which harm the operational readiness, the trust in their equipment and their leaders, the attractiveness of the job and nevertheless the fighting power at all,. Especially soldiers in training or combat situations in urban terrain must have the best equipment to protect, maintain and improve their natural senses during the whole mission (mounted/dismounted).

The integration of hearing protection into the lines of communication, a safe and improved situational awareness and a comfortable & reliable personal equipment will reduce stress, increase accuracy, expand the power of endurance during their mission.

Key message: to improve the fighting power we have to protect our soldiers’ irreparable and unique capabilities with the best equipment at all. A strong commitment at all costs to their health in tough missions will create more trust and effectiveness than anything else.

Exercise infrastructure - the entire capability spectrum

**Lieutenant Colonel Peter Makowski**, Army Combat Training Centre

Focusing of the existing training infrastructure in GACTC the presentation will first point out the capabilities to train at battalion plus level in all non urban operations.

The training currently has at its disposal small urban towns so that the CTC is able to train only at company level. However this infrastructure does not yet meet the requirements of an urban terrain that ensures realistic training at battalion level in urban operations.

Traditionally military leaders tried to avoid urban terrain. Actual deployments in former Yugoslavia and in Afghanistan showed us, that Military Operations in Urban Terrain, (MOUT), is increasing in importance.

To prepare our troops, especially for this new task, CTC identified an area in the northern part of the training area. With mobilization of the training infrastructure SCHNÖGGERSBURG, the CTC will close these gaps. The presentation shows the key milestones on this journey required for urban warfare training.

These could be anything from buildings, to structures, from parts of critical infrastructure, but also important parts of the social, economic, political, population and other systems. Identifying key terrain is vital in urban combat as in any other operation. UE (Urban Environment) can have operational and even strategic significance. Parts of the infrastructure will be related to special scenarios of urban warfare.

Schnöggersburg will cover typical elements of urban infrastructure where we can train and practice our Tactics, Techniques and Procedures (TTPs) in first class surroundings.

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**Industrial standards as a prerequisite for carrying out multinational exercises**

**Interface architectures in the UCATT live simulation**

**Armin Thinnen**, Sect. U6.2, Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support

Today’s political situation, the reduction of military personnel and material as well as focussing on certain capabilities drives the needs for multinational collaboration and cooperation in theatre.

As depicted in NATO studies from the early 2000, urban areas are continuously increasing in size and number and have become the focal point for unrest and conflict.

Training is vital for successful operations. Live instrumented training in urban areas is one of the most complex training environments imaginable.

As operations are multinational, so has to be training. Multinationalism in Live instrumented training in urban areas in terms of complexity could be considered the „icing on the cake“, as it adds the flavour of interoperability to the scenario! NATO with the Task-Group UCATT is tackling this problem since years. From analysing use cases, a generic functional architecture has been developed and constantly revised.

Derived from that architecture, all interoperability-relevant potential external interfaces have been identified and described. In a staged approach, using SISO’s organisation and procedures, the UCATT group (MSG-140 UCATT LSS) is developing a family of industry-standards for these identified interfaces. The first industry-standard for the LASER engagement interface has been officially put in place beginning of 2016.
Following a user requirement driven prioritization, the group now step by step approaches each and every interface implementation and either develops new standards or tries to use and/or enhance existing standards. The use of those standards in marketed products from industry will enable the required international interoperability in live training. UCATT is the focal point for live simulation and the related standardization issues.

**The use of standards within live simulation in international exercises**

*Ernst Christians*, RDE Ltd

Due to the history starting in the early 1970th the procurement of Live Simulation equipment was driven by national requirements. In Europe first to close the gap for less expensive and safe gunnery training, in the US to allow for more objective tactical engagement evaluation in larger exercises. In both cases “interoperability” between different Live Simulation systems has focused on the intra-national view only in those years.

With the progress of the European Union and the change from national to a European view of shared Defence efforts the need to operate and fight together has significantly increased. This is true for operational equipment as well as for procedures and interactions of multinational troops. To be successful the cooperation of multinational forces requires realistic training in a real environment with real constraints. While the different nations already train their soldiers in their own Combat Training Centers it is more complicated to do this with multinational forces having each their specific national Live Simulation equipment.

This lecture is based on a presentation prepared and provided by Captain Sander Cruiming, NL Army, who will not be able to attend the forum due to other duties. It highlights requirements, possibilities and constraints for multinational training exercises experienced during the course of the international exercise Noble Ledger 2014 and leads to conclusions regarding the use and value of International Standards in and for Live Simulation.

**UCATT E8 – The LVC Interface for future live simulation exercises**

*Dr. Uwe Dobrindt*, RDE Ltd

The overall mission of the NATO MSG-140 UCATT-LSS is the standardization of interfaces by SISO (Simulation Interoperability Standards Organization) which will enable interoperability of different systems for Live Training. Today, 11 external interfaces have been identified as candidates for standardization. The so-called E1/I2 Laser Engagement Interface is already a standard. Further interfaces are prioritized for standardization. One of the prioritized interfaces UCATT is working on actually is E8. E8 will enable the exchange of data between systems, which can influence the course of the training session and generally has a dynamic, time critical character. Examples of data exchange are updates of player status and events generated in System A, which will published into a federation. From the point of view of live simulation systems E8 regards the interconnection of a live simulation EXCON (Exercise Control Centre) with EXCON capabilities of other live simulation systems (L2L) and as well with virtual an constructive simulations (LVC). Therefor the HLA standard will be used for the protocol layer. The upcoming E8 standard will be realized in the German CTC GÜZ together with the functional upgrade of the GÜZ for the training in urban areas (Schnöggersburg). This LVC interface will enable new options for multi-national distributed exercise on brigade-level.

**Geo-enabled future forces at the core of virtual interactive real-time reality**

*Michael Mundt*, Esri Deutschland

NATO has decided to overcome stovepipes of today towards modular and interoperable services in the future. ‘GIS’ plays a significant role in this approach. ‘GIS’ wins to provide an unmistakable space and time aware fundament. Over and above ‘GIS’ incorporates all different tasks in a mission, no matter if they are driven by army, navy or air force. ‘GIS’ streamlines technology and enhances information exchange.

To join and combine forces means to overcome barricades. ‘GIS’ is the key technology to comply. This presentation points out the next mandatory steps of NATO’s automated information systems from the perspective of the ‘GIS’ software provider ‘esri’. Mr. Michael Mundt is presenting to you.
Abstracts / Short Versions of Panel Session C2 (chronological)

**Coupling of live/virtual/constructive simulation and C2**  
*Klaus Kappen*, IABG Ltd  

+++ Abstract / Short Version was not available at editorial deadline +++

**Networked simulation – coupling the virtual with the real world**  
*Andreas Schiel*, ESG Ltd  

+++ Abstract / Short Version was not available at editorial deadline +++

**Chances and limitations of the V-C world**  
*Lieutenant Colonel Thomas Doll, Div I 1 (3)*, Army Concepts and Capabilities Development Centre  

The presentation will provide a comprehensive view of "Simulation-based training in the German Army". Key questions are:  
- Where do we stand today?  
- What activities with regard to the development and modernisation of simulation systems for training and exercise are already being planned?  
- How should the Army simulation environment be designed in the medium and long term?  
Taking into account the questions above, answers will be given concerning the development of simulation systems with respect to the different simulation categories (live, virtual, serious games, constructive), the options for the use and application of AR and VR, coupling issues, the joint and multinational possibilities for cooperation, and the use of artificial intelligence, to name but a few. The presentation considers both the methodological and didactical principles of training and the limits to the use of simulation technology.

**3D terrain data for exercises and operations - today and in the future**  
*Wolfgang Brettschneider*, Div I 1 (4), Army Concepts and Capabilities Development Centre  

With the change of delivering digital instead of analog information, the requests for detailed models of the “real world” were undergoing a process of big increase. The way ahead and next step to 3D-visualization instead of 2D-visualization makes a remarkable difference and is now growing rapidly. Tactical needs of the army do exist actually in the following three areas:  
- Education and Training  
- Operational Planning and Support of Operations  
- Improvement of common use of target-data  
Provider for those Geoinfo-Data and Simulation-Data for the environment is the Bundeswehr Geoinformation Service (BGIS). The Center of Simulation of the Battlefield in the Future is constructing and building up the Training-City “Schnögersburg”. In parallel by the SMEs of the BGIS a 3D-Visualization is created and a base of simulation data (VBS3) for Schnögersburg is under development. The briefing will show which capabilities are available in the BGIS and what kind of procedures and solutions have been developed so far. An outlook will give some insight how 3D-Terrain-data will be generated to support future operations.

**Automated generation of geospecific 3D databases and their use in simulation**  
*Dr. Joachim Schauß*, KMW Ltd  

The German Aerospace Center (DLR) and the Krauss-Maffei Wegmann GmbH & Co. KG (KMW) have jointly developed procedures to create highly accurate geospecific 3D data bases in a short time. In the high-precision elevation model, buildings, vegetation and surface structures are fully automatically recognized and then automatically reconstructed as 3D objects with their actual surface and side textures and positioned at their exact locations. The geospecific 3D data bases can be used for simulation and training purposes, but also for mission preparation.
A geospecific 3D data base, which is suitable for simulation applications with dynamic effects, is created from aerial pictures with a terrain resolution of 5 cm. Accordingly, the geospecific 3D data base of the terrain can be directly used in the simulation. In addition to the representation in the KMW’s own simulation environment, the integration of the KMW renderer into VBS3 makes it possible to display data bases in this precision in VBS3 with only little loss of quality.

Due to the georeferenced 3D data base, exercises can be prepared intensively and the decision-making process can be supported as best as possible. Because of the very high recognition value, the familiar terrain can already be used in advance in the simulation. This makes it possible to carry out simulation exercises which are aligned with the actual realities of a current or future mission or training area and maximize the reference to reality. Among other things, various options for action can be trained in the simulation and evaluated in detail in order to select the most promising option for the training/mission. The methods for the creation of a georeferenced 3D data base and their use in the simulation are demonstrated on a current example of a German terrain section in order to show directly all advantages for the use in the simulation.

The future EXCON for multinational, multi-level, distributed live exercises

Patrick Galler, RDE Ltd

Regarding the diversity of present and future missions they all have some common significant characteristics: They are multi-national and multi-level mission. And often the troops dislocated at several localities in wide-spread area of operations. The aspect “train as you fight” is also valid for live simulation exercises. At the German combat training center GÜZ multi-national exercises are well-known for quite some time. During the upcoming years the Exercise Control Center (EXCON) of the GÜZ will be upgraded for urban operations (Schnöggersburg). Further steps for the GÜZ will be the representation of higher command for brigade-level exercise with training troops dislocated on more than one combat training area. An integration of constructive simulation (e.g. for a synthetic wrap of the combat training areas) and virtual simulators (e.g. UAVs) will be supposable.

Therefor the future EXCON has to provide capabilities for planning, execution, monitoring, after action review and evaluation to handle this upcoming tasks. One aspect could be a distributed concept for EXCON including fixed, mobile and portable elements.

Integration of ECM jamming equipment

Jan Übersax, RUAG (Switzerland) Ltd

+++ Abstract / Short Version was not available at editorial deadline +++

Potential of incorporating guided missiles in simulation systems and resulting requirements, exemplified by the Army Combat Training Centre

Oliver Dellschau, MBDA Deutschland

+++ Abstract / Short Version was not available at editorial deadline +++

Integration/simulation of airburst ammunition

Ernst Christians, RDE Ltd

One of the new features of weapon systems like the AFV PUMA is the capability to engage targets via Air Burst Ammunition. Furthermore in-service tanks may be upgraded to take advantage of the possibility to affect targets behind obstacles and in trenches. The training of these engagements requires technical approaches that are not or only partially introduced in many Combat Training Centers up to now. This lecture will start with an introduction into standard Live Simulation principles for the simulation of Direct Fire, Indirect Fire Weapons and other weapon effects as they are already used in the German Combat Trai-
Emerging challenges in Short Range Airspace

Alexander Burger, RAD Ltd

Following various incidents in the recent past, greater attention is given to Low-Slow-Small (LSS) threats. Rheinmetall AG and its Air Defence Group is responding to these threat scenarios in such a way that suitable overall solutions, created from a variety of capabilities and products ('toolbox') can be made available with the following characteristics:
- scalable, with regard to complexity and effect,
- situational, with regard to the respective locations and conditions,
- user-appropriate, with regard to the type of operator.

The experience and problem-solving abilities utilised in this domain come from Rheinmetall Air Defence AG’s nearly one hundred years of service to customers around the world. Here, the aforementioned ‘toolbox’ of capabilities and products combines German and Swiss specialisations in the fields of:
- airspace management
- air surveillance
- sensor solutions (e.g. optronic, electronic, radar-based)
- sensor data fusion
- target discrimination
- (target) tracking and verification
- identification
- effectors

It could be the Gefechtübungszentrum’s Key Role in implementing this joint capabilities – Mobile Short Range Air Defence (SHORAD) together with Counter-UAS/LSS – facing emerging threat scenarios.

The Speaker presents current trends in aerial threat analysis and Short Range Air Defence Developments. Main focus will be put on Rheinmetall’s answers to latest threats and customer requirements. At the end the speaker will ask some questions emphasizing the benefits of integrating SHORAD into simulation based joint training scenarios.

Combat and combat service support in hybrid conflicts - challenges, limitations and feasibility in training

Major Jan Tröster, Div III 3 (1), Army Concepts and Capabilities Development Centre

Since 2008 Russia continuously developed a hybrid power projection onto neighboring states involving military and mostly non-military means such as propaganda, disinformation, espionage and influencing minorities and also offensive and kinetic actions by militias and para-military forces all paralleled by the intimidation by the Russian Armed Forces. The crises on the Crimean and in the Western-Ukraine have so far been the peak of hybrid conflicts led by Russia. As for now we can observe first elements of hybrid tactics in the Baltics. In the NATO framework of assurance and deterrence we as German Army already have troops deployed in that region and – if a conflict becomes more likely – will deploy more forces there.

As our forces are mainly trained for fighting battles they do not exactly fit the requirements of acting in an environment where they are focused by hybrid tactics.

The presentation will outline the characteristics of a hybrid conflict and the Russians strategy of “New Generation Warfare”. After having a look on strategic and tactical approaches to encounter these conflict types it will be outlines, what specific challenges combat support and combat service support forces might have to
face being deployed in a hybrid conflict environment. At the end the necessary training needs and limitations will sketch an outlook of what we have to accomplish in the future to create the best possible preparation of our troops.

**NGVA-based mission systems for networked platforms on the future battlefield**  
*Dr. Thomas Weise*, Rheinmetall Ltd

Future vehicle emission systems are characterized by semiautomatic function and effect chains for target detection, target tracking, weapon infeed / tracking. The realizations of such function and effect chains will be based on a new standard with open IP-based system architectures, the so-called “Nato Generic Vehicle Architecture NGVA”. In the framework of the technology work, Rheinmetall is making an important contribution to the development of the cross-sectional capability of the entire task spectrum of the infantry operations against unarmored, light / irregular forces in the urban environment and the difficult terrain, as well as against mechanized / armored forces - Active Infantry (Puma - Boxer - IdZ-ES) with emphasis MOUT. The rigorous implementation of the “Nato Generic Vehicle Architecture NGVA” at Rheinmetall is commissioned by the BAAINBw in various demonstrator vehicles and is implemented in a systemic technology demonstrator SENeca (Sensor Efector Network Enhanced Combat Applications). The experimental work is accompanied by the consistent use of virtual combat field simulations in the Rheinmetall NECLab, in which the networked SENeca combat constellation is depicted and investigated with all individual technology solutions for the analysis and evaluation of the capability development.

**Integrating medical requirements in a medical training system (MTS) for the Army Combat Training Centre**  
*Major, Pharmacy Corps, Dr. Katja Lahm*, Bundeswehr Medical Service Headquarters

The current project, introducing a medical training system into the combat training system aims at widening the possibilities to simulate casualties to any desirable extent and providing the supervising team with more powerful tools for control and evaluation. Nevertheless the mission of medical training remains focused the same way, as before. Not in terms of medical planning process itself, supposedly ignoring current efforts on refocusing, a brief view over well-established fundamentals of medical supply should facilitate a common understanding the main focus of live simulation training, as intended here. Further prerequisite of a beneficial training is a sound conception on how different simulation techniques may interact. The most commonly applied in medical training will be shortly introduced either. Regarding AGDUS, as in use up to now, it will be evident, that a newly developed MTS would not start from zero. Based on the VEMAG database AGDUS yet indeed comprises a mighty library of differentiated injuries. Their highly abstracted presentation at the moment however imposes great effort on the supervising team to create appropriate intuitive scenarios. The MTS should mitigate this drawback. The development of the MTS is confined to a bundle of well-established transmission standards. Hence, this issue will be subject to some serious critical design reviews. Admittedly this does not necessarily have to be addressed as critical restriction. Indeed, too much of simulation might, in some situations, lead to adverse effects.

**Engineer support in complex operational scenarios focusing on challenges in an urban environment**  
*Captain Tobias Hochmuth*, Div III 3 (2), Army Concepts and Capabilities Development Centre

There is a worldwide change from rural to urban areas. One consequence is that there are more operations in urban environment. For centuries, engineers have been busy providing innovative solutions to fulfill diverse and complex tasks that operations in urban areas have always required. Engineers support operations in urban environment with a contribution to the operational picture, mobility support and counter-mobility. Therefore the engineer branch has a lot of different capabilities. Engineers have special skills and equipment to complement the maneuver commander’s intent to have freedom of movement. General support involves the provision of engineer advice, technical expertise, resources and work. In an urban environment are rest-
Abstracts / Short Versions of Panel Session D1 (chronological)

Restricted fields of vision and fire. The complexity and the drive of these operations complicate the mutual support and limit the possibilities for reinforcement and reorganization. The engineer coordinator has to plan the task organization of the engineer forces, that reorganization is not necessary.

**Integrating Joint Fire Support in complex operational scenarios in training at the Army Combat Training Centre**

*Lieutenant Colonel Dirk Streitbürger*, Div III 2 (1), Army Concepts and Capabilities Development Centre

The current conflict between Ukraine and Russia most prominently displays the threat potential of modern war for the land forces, both for army manoeuvre forces and indirect fire ground forces, as well as for JFS coordination elements. It provides deep insights into implementation and allows conclusions for future conflicts, too. The artillery is the primary means to inflict temporary or total losses on the adversary. The Russian artillery has a wide spectrum of ammunition with numerous weapon systems, which can be fired at long ranges. Today, Russia has the most sophisticated, largest and most densely networked air defence and antiaircraft defence system in the world. This enables it to control the airspace over the Baltic Sea, and it could also be effective against far-away regions in Germany. In addition, friendly forces can be threatened anywhere by electronic warfare, paramilitary and irregular forces. With composite land force operations, counterinsurgency (COIN), with the common concept of a networked “comprehensive approach” based on lessons learned from previous operations, the German Army’s effectiveness against future conflicts is, in principle, built on a good foundation. The command and control principles are suited to respond to these threats. The principle of mission command allows our units and formations to respond independently and rapidly to new situations. As for the ground-based indirect fire forces (mortar, artillery) and the JFS coordination elements, the doctrines applicable to the types of operation will not change fundamentally and can be applied to future missions. However, only with the individual functional elements acting in concert, Joint & Combined to be precise, will the JFS and Indirect Fire capabilities become effective and use their functionality in cooperation with the manoeuvre force. Therefore, depending on the intensity of operations/combat, JFS must in future have command of the entire mission spectrum of conventional, unconventional, regular and irregular fighting methods, also in urban environments. The joint and combined approach of past and ongoing operations will also apply to future missions. Having command of military skills, including action to be taken in the event of system failure, provides the prerequisite for being able to employ the weapon and reconnaissance systems even without technical support. Self-protection, against reconnaissance and irregular forces as well as against air threats and enemy artillery, becomes even more important. In the DEU Army Combat Training Centre, these capabilities have to be incorporated both at infrastructural and methodological level. JFS with the coordination elements JFST and JFSCT must become part of every exercise and be replicated at all levels. Since realistic conditions, particularly the representation of enemy artillery, cannot be displayed in training areas such as the DEU Army Combat Training Centre, this has to be simulated. The implementation of simulation is the key aspect and, at the same time, also the challenge of the future to make a significant step forward. This should be the focus of future development, because it is the only way to make JFS and artillery operations a hands-on experience.

**Possibilities to train the Logistic Troops in ACTC**

*Lieutenant Colonel Thomas Gorzelitz*, Div III 4 (2) Army Concepts and Capabilities Development Centre

Exercises conducted for logistic forces at the Army Combat Training Centre (ACTC) are not primarily geared to cover each and every aspect both of technical and general military training. Logistic forces must, however, be in a position to deliver adequate military response in situations of particular threat. Especially when interacting with manoeuvre forces, the Army Combat Training Centre is therefore beneficial for conducting exercises involving logistic forces. The presentation will provide an overview of possible exercise scenarios derived from the operational doctrine of the Army logistic forces and for which the Army Combat Training Centre provides particularly well-suited exercise conditions.
Weighing future training options of a multinational brigade at the Army Combat Training Centre

Lieutenant Colonel, GS, Michael Felten, Div I 2 (1), Army Concepts and Capabilities Development Centre

The Army Combat Training Centre is the central training facility where battalion-size units of the Army, of other major military organizational elements and of multinational partners are trained for employment in land operations.

The ongoing construction of the Schnögersburg urban operations training facility (planned IOC 2018/FOC 2021) will contribute to significantly improving training options for urban operations. Further optimisation efforts will be required to reflect the reorientation of the Army towards national and collective defence. For that purpose, a position paper titled "Army Combat Training Centre 2020+" was prepared at the Army Concepts and Capabilities Development Centre.

The measures described therein are aimed at facilitating training of multinational brigades at the Army Combat Training Centre. The briefing contains initial considerations with a view to achieving this objective in a holistic approach.

Current and future training and exercises of GBR units at training facilities

Colonel Alistair Rogers, GBR Army, Assistant Head, Capability Development, HQ Army Training Branch

+++ Abstract / Short Version was not available at editorial deadline +++

Representing air manoeuvre of land forces at the Army Combat Training Centre

Lieutenant Colonel Markus Lönnig, Div II 3 (1), Army Concepts and Capabilities Development Centre

Future Army electronic warfare - challenges for realistic training and exercises

Berthold Rehbein, Fraunhofer FKIE

Electronic Warfare (EW) is for the Army an integral part of any land-based operation and is conducted with a platform-based EW approach. This includes ensuring the capabilities of friendly weapon systems in the entire electromagnetic spectrum (EMS) and protecting persons, facilities and land and air based systems against direct and indirect threats from opposing forces, in all mission roles and possible military situations.

Due to the associated threats of the wide range of weapon systems using the EMS, the rapid development of existing technologies and the rapid procurement of new technologies, a wide range of protective measures in a networked environment is becoming increasingly important. These protective measures include the capability for platform camouflaging in a multispectral threat scenario.

EW resources can only be effectively utilized when a complete understanding of threats, counter-measures, effectors and secure control of EW equipment is conveyed through realistic training and exercises. To achieve this, simulations of a networked environment should be made available during training.

It is necessary to make the leadership and the troops aware of the threats in the EMS as well as to provide training so that they can maintain their effectiveness through protective measures and counter measures. Additionally, it is necessary to teach them how to use available EW resources actively and imaginatively against the weaknesses of the opponent.

The presentation will give an overview of protective measures and effectors that will be available in the future for both friendly as well as hostile forces and give details on the possibility to integrate EW resources in a simulation environment.
Nammo’s training solutions – ammunition, concept, reduced range

Hans-Georg Baum, Nammo Schönebeck Ltd

Founded in 1946, the company is a pioneer in thermoplastic products and processes. Bakelittfabrikken invented and was the first company to produce Plastic Blank Ammunition and Plastic Short Range Training Ammunition. Approx. 35 people are employed in Nammo Bakelittfabrikken AS, which became a part of the Nammo Group in 2005 and belongs to Nammo Raufoss AS, which is located 120 km north of Oslo in Norway. The production facilities at Raufoss were established in 1896 as Raufoss Ammunisjonsfabrikk (Ammunition Factory). Today Nammo Raufoss AS has about 650 employees and development and production activities

**Plastic Blank Ammunition:**
- Plastic Blank Ammunition is non-lethal ammunition designed to provide military forces and law enforcement communities realistic training and maximum safety at low cost. The safety range is 3 meter, and it cannot be mistaken as live ammo.

**Plastic Short Range Training Ammunition (P-SRTA), + Tracer (-T):**
- The P-SRTA are essential to the user’s safety and survivability in the field by providing the Army with training ammunition for use which offers a realistic training scenario even on restricted ranges. The P-SRTA is designed to give military forces and security forces cost effective training at a low cost.
- A Light weight Training Bolt (LWTb) is required for the assault rifles and a recoil amplifier for the Ca.50.
- The maximum safety range is for the Cal. 5.56x45 -200m effective training range is out to 70 meters, for the Cal.50 it’s 150 meters and the maximum safety range is 700meters.
- The tracer cartridge exhibits a visible trace up to 150 meters.
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