SCIENCE AND TECHNOLOGY ORGANIZATION

APPLIED VEHICLE TECHNOLOGY PANEL

Science & Technology Organization
Collaboration Support Office
Applied Vehicle Technology Panel

AVT-394 Research Specialists' Meeting on

Water sampling, monitoring and control/remediation for live-fire military ranges

Koblenz, Germany

14 - 16 October 2024

This Research Specialists' Meeting is open to NATO Nations, Enhanced Opportunity Partner (EOP) and Partnership for Peace (PfP) Nations

Theme and Topics

This Research Specialists' Meeting will be held in conjunction with the 54th AVT Panel Business Meeting (PBM) with the objective to promote military live-fire range sustainability. Many NATO countries have documented soil contamination from munition constituents (heavy metals, explosive residues, propellants) migrating to surface water and groundwater in their respective training range areas. It is therefore high priority to understand how contaminants migrate through the environment to minimize any adverse effects, and to avoid potential range closures.

A RSM will bring together experts in the field of water sampling and monitoring strategies and also specialists with experience in remediation or control techniques. This meeting will allow the transfer of information gained from AVT-362 to the broader defence community i.e., implementing innovative monitoring, mitigation, and water remediation technologies on current ranges and incorporating new criteria into future range designs leading to more sustainable ranges for all countries. The primary objective of the RSM will be to exchange information and discuss current practices and research on the topics of water sampling, monitoring and remediation techniques concerning munition's constituents. Additionally, cold region challenges and climate resiliency, in the context of range contamination, will be discussed.

The relevant scientific topics addressed in this Research Specialists' Meeting are located in the following research domains:

- Water sampling and monitoring techniques
- Surface water treatment and management
- Groundwater and active source zone remediation and management
- Hydraulic control measures to avoid off-site migration of contaminants
- Emerging munitions constituents as contaminants in water
- Cold region challenges and climate resiliency for range contamination

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Programme

DAY 1

Monday, 14 October 2024, 10:00 – 17:30

Registration

10:00		Registration
14:00		Welcome (Co-chairs Richard Martel and Reija Pihkala)
14:10	KN	***KEYNOTE 1: TBD 40 min*** **LTC Hanjo Neue**, Ammunition Safety International Relation Office, MoD Germany

Session 1 Water monitoring strategy

Chairs**: Richard Martel** (National Institute of Scientific Research (INRS)) and **Reija Pihkala** (Defence Properties Finland)

15:00	1	Combining Technical Innovation with a Standardized Monitoring Framework for Munition Constituents in CAF Range and Training Areas **Dean Morrow**, Royal Military College of Canada
15:30		COFFEE BREAK
16:00	2	Background levels and environmental quality assessment of surface and groundwater in the Valcartier and Farnham ranges and training areas **Alexandre Montcalm**, Department of National Defence Canada
16:30	3	General planning of surface water management in the Finnish Defence Forces' training areas **Teemu Pasanen**, Finnish Defence Forces
17:00	4	Metal contamination in water – sampling and preparation techniques **Ida Vaa Johnsen**, Norwegian Defence Research Establishment (FFI)
17:30		End of Day 1

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Tuesday, 15 October 2024, 09:00 – 17:30

Session 2 Water sampling and environmental assessment

Chairs**: Kari Koponen** (Defence Properties Finland) and **Anna Wagner** (US Army Corps of Engineers, Cold Regions Research and Engineering Laboratory)

9:00	KN	***KEYNOTE 2:*** Research objectives and decision making based on range and training area hydrogeology **Sonia Thiboutot**, Defence Research and Development Canada
9:30	5	Water and sediment sampling at Borris Shooting Range **Philip de Lasson**, Danish Defence Estates Agency
10:00	6	Environmental assessment of the use of small arms in the Canadian Arctic **Marie-Claude Lapointe**, Defense Research and Development Canada
10:30		COFFEE BREAK

Session 3 Underwater munition sites

Chairs: **Gary Larsen** (US Army Corps of Engineers, Cold Regions Research and Engineering Laboratory) and **Marie-Claude Lapointe** (Defense Research and Development Canada)

11:00	7	Ammunition in Swiss lakes: a problem rising from the past? **Rolf Keiser**, Armasuisse Real Estate, SZ
11:30	8	The environmental relevance of characterizing the spatial distribution of contamination at underwater munitions aquatic sites **Guilherme Lotufo**, US Army Engineer Research and Development Center
12:00	9	Low and high order detonation: remedy or challenge? **Bhumika Sharma**, Cranfield University, UK
12:30		LUNCH

Session 4 Surface water treatment and groundwater remediation

Chairs: **Ida Vaa Johnsen** (Norwegian Defence Research Establishment (FFI)) and **Philip de Lasson** (Danish Defence Estates Agency)

14:00 10 Sampling and remediation of contaminated water with explosive residue from high and low order detonations
Sally Webb, Cranfield University, UK

14:30 11 Efficacy of Activated Carbons and Biochar for Underwater Remediation of TNT Contamination
Federica Persico, Cranfield University, UK

15:00 12 The use of activated carbon in remediation of TNT and RDX contaminated groundwater
Kari Koponen, Defence Properties Finland

15:30 COFFEE BREAK

Session 5 Active source zone remediation

Chairs: **Stefanie Goure** (Director Land Environment, Canadian Army) and **Rolf Keiser** (Armasuisse Real Estate, SZ)

16:00 13 Shotgun range remediation with willow and biochar
Reija Pihkala, Defence Properties Finland

16:30 14 Purification of shooting range run-off water using a novel 4D Scavenger technology
Ari Väisänen, University of Eastern Finland

17:00 15 Trials in developing mitigation devices to manage munitions constituents release into the environment on live fire ranges
François-David Cloutier, Department of National Defence Canada

17:30 General discussions and end of Day 2

Wednesday, 16 October 2024, 09:00 – 12:30

Session 6 Emerging munitions constituents as contaminants in water

Chairs**: Pia Bergamashi** (Armasuisse Real Estate, SZ) and **Tore Joranger** (Norwegian Defence Estates Agency)

09:00 16 Comprehensive Assessment of Environmental Impact: Disposal of Perchlorate Containing Munitions at the Canadian Munitions Logistical Disposal Site
Dana Pantea, National Defence Canada

09:30 17 Multiscale approach for the characterization and remediation of ammunition residues in soil and water of range training areas
Richard Martel, National Institute of Scientific Research (INRS)

10:00 18 Environmental Risk Associated with Hand Smoke Grenade Formulations and their Dye Ingredients
Fanny Monteil-Rivera, National Research Council Canada

10:30 COFFEE BREAK

Session 7 Effects of climate change

Chairs**: Richard Martel** (National Institute of Scientific Research (INRS)) and **Reija Pihkala** (Defence Properties Finland)

11:00 Panel discussion

12:00 Closing remarks and Best Paper Award

12:30 End of Day 3

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Science and Technology Organization in NATO

In NATO, Science & Technology (S&T) is defined as the selective and rigorous generation and application of state-of-the-art, validated knowledge for defence and security purposes. S&T activities embrace scientific research, technology development, transition, application and field-testing, experimentation and a range of related scientific activities that include systems engineering, operational research and analysis, synthesis, integration and validation of knowledge derived through the scientific method.

In NATO, S&T is addressed using different business models:

- The Collaborative business model where NATO provides a forum where NATO Nations and partner Nations elect to use their national resources to define, conduct and promote cooperative research and information exchange.
- The In-House delivery business model where S&T activities are conducted in a NATO dedicated executive body, having its own personnel, capabilities and infrastructure.

The Science and Technology Organization - STO

The mission of the NATO STO is to help position the Nations' and NATO's S&T investments as a strategic enabler of the knowledge and technology advantage for the defence and security posture of NATO Nations and partner Nations, by:

- Conducting and promoting S&T activities that augment and leverage the capabilities and programmes of the Alliance, of the NATO Nations and the partner Nations, in support of NATO's objectives;
- Contributing to NATO's ability to enable and influence security - and defence-related capability development and threat mitigation in NATO Nations and partner Nations, in accordance with NATO policies;
- Supporting decision-making in the NATO Nations and NATO.

AVT-394 Research Specialists' Meeting

Acknowledgement

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for the invitation to hold this meeting in Koblenz and for the facilities and personnel,

which make this meeting possible.