SCIENCE AND TECHNOLOGY ORGANIZATION

APPLIED VEHICLE TECHNOLOGY PANEL

Science & Technology Organization
Collaboration Support Office
Applied Vehicle Technology Panel

AVT-400 Research Workshop on

Emerging Propulsion Technologies for NATO Land Vehicle Platform Systems

Ottawa, Canada

21-22 May 2024

This Research Workshop is open to NATO Nations, Australia, Japan, Switzerland and Austria

Theme and Topics

The relevant scientific topics addressed in this Research Workshop are located in the following research domains:

- Military automotive & power duty cycle definitions
- Advanced power dense engines and transmissions
- Alternative fuels
- Compact, low heat rejection powertrain architectures
- Electric machines (generators & motors)
- Power management, distribution, and energy storage solutions

Background

Commercial investments in propulsion technologies and powertrain architectures focus on high volume sales of cars, trucks, and off-road vehicles. One of the drivers for commercial investments is the evolving legislation in meeting climate change targets, which have led to drastic changes in propulsion technologies. These constantly changing technologies can adversely impact a military platform's ability to integrate and meet performance requirements in current and future NATO ground vehicles. Leveraging commercial investments while optimizing propulsion technologies to military environments can also provide significant capability benefits for improved efficiency and greater power density. Therefore, there is a requirement to assess emerging commercial drive train technologies against military requirements in order to support the exploitation of the most appropriate solutions in a timely way.

Registration

Online registration for this event AVT-400 is mandatory for all workshop delegates, programme committee members, authors, presenters and external guests. Participation is free of charge. Due to security restrictions only duly registered and re-confirmed AVT-400 participants will have access to the General Information Package (GIP) with detailed information on conference location and logistics.

For online registration please go to this website:

https://events.sto.nato.int/index.php/upcoming-events/event-list/event/18-ws/558-avt-400-rws-on-emerging-propulsion-technologies-for-nato-land-vehicle-platform-systems

Thank you for your cooperation.

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Programme

DAY 1

Tuesday, 21 May 2024, 08:45 - 17:30

08:45		AVT-400 Opening Remarks AVT-400 Co-chairs: O. Balling, Aarhus University, Denmark M. Hönlinger, KNDS, Germany J. Tasdemir, U.S. Army GVSC, United States

Session 1 Requirements of Future Military Propulsion Systems

09:00	KN	KEYNOTE 1 Defining Next Generation Military Vehicles Col R. Howell, U.S. Army NGCV CFT, United States
09:45	KN	KEYNOTE 2 Propulsion Trends for Civil and Commercial Vehicles Dr D. Tomazic, FEV, United States
10:30		COFFEE BREAK
11:00	KN	KEYNOTE 3 Translation of Military Operational Requirements into Mission Profiles H. Hodges, NATC, United States
11:45	4	PANEL & OPEN DISCUSSION Defining Future Vehicle Requirements Moderator: G. Hunter Panelists: Col R. Howell, Dr D. Tomazic and H. Hodges
12:30		LUNCH

Session 2 Emerging Propulsion System Architectures

14:00	5	Innovative Concept for Increasing the Mobility of a 5-ton Tracked Vehicle Dr U. J. Schael, IABG, Germany
14:30	6	Extended M113 Diesel Electric Research Platform for the Norwegian Defense Research Establishment H. Pål, FFI, Norway
15:00	7	Advanced Mobility Experimental Prototype (AMEP) J. Tasdemir, US Army GVSC, United States
15:30		COFFEE BREAK

Session 3 Power Generation, Conversion & Storage

16:00	8	Advanced Combat Engine – Opposed Piston Engine D. Doig, CUMMINS, United States
16:30	9	Advanced Hybrid Propulsion Technologies C. Wolf, RRPS/MTU, Germany
17:00	10	Hydrogen Storage and H^2 - Internal Combustion Engine Capt. B. Shurdha, CAF, Canada
17:30		ADJOURN for the DAY

DAY 2

Wednesday, 22 May 2024, 09:00 - 17:30

Session 4 Electrification of Military Vehicles

09:00	11	Development Trends for Electric Drives in the Automotive Industry Prof M. Jaensch, TUM, Germany
09:30	12	Energy Storage – High Voltage Batteries Dr L. Toomey, US Army GVSC, United States
10:00	13	Electric Propulsion Drive (E-X-Drive) V. Doherty, QinetiQ, United Kingdom
10:30		COFFEE BREAK

Session 5 Transmission Architectures

11:00	14	Hybridization of Tracked Vehicles – Opportunities and Implementation on Transmissions M. Fischer, RENK, Germany
11:30	15	Advanced Combat Transmissions. The Efficiency Regain I. García-Eizaga, SAPA, Spain
12:00	16	Future Military Drive and Steering Gears R. Boss, ZF, Germany
12:30		LUNCH

Session 6 Next Generation Propulsion System Integration

13:45	KN	KEYNOTE 4 Propulsion Analyses using NG-NRMM Prof O. Balling, Aarhus University, Denmark

14:30	18	Integration of Hybrid Electric Drive (HED) and High Voltage Systems – Considerations and Challenges I. Rife, BAE Systems, United States
15:00	19	Parallel Hybrid Powertrain Opportunities for Tracked Vehicles Dr R. Krishnamachari, General Dynamics Land Systems, United States
15:30		COFFEE BREAK
16:00	20	Integration of Alternative Propulsion Systems for Wheeled Vehicles B. Dayley, GM Defense, United States
16:30	21	PANEL & OPEN DISCUSSIONS Building Next Generation Military Vehicles Moderator: G. Hunter Panelists: I. Rife, Dr R. Krishnamachari and B. Dayley
17:15		Closing Remarks and Future Plans O. Balling, M. Hönlinger and J. Tasdemir
17:30		WORKSHOP ADJOURNS

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.

Acknowledgement

The Applied Vehicle Technology Panel expresses its thanks to Canada
for the invitation to hold this meeting in Ottawa and for the facilities and personnel,
which make this meeting possible.