

PUBLIC RELEASE



SCIENCE AND TECHNOLOGY ORGANIZATION
APPLIED VEHICLE TECHNOLOGY PANEL



NATO Science & Technology Organization (STO)
Collaboration Support Office (CSO)
Applied Vehicle Technology Panel (AVT)

Preliminary Meeting Announcement and

Call for Papers

AVT-304-Research Specialist's Meeting (RSM)

on

Graphene technologies and applications for defence

organized by the Members of the
Applied Vehicle Technology Panel
AVT-304 Programme Committee
to be held in Trondheim, Norway
10 – 11 October 2019

Contributions and participation are invited from NATO Nations
plus AUS, FIN and SWE

Note: Final date for submission of abstracts is 21 January 2019



AVT-304 Specialists' Meeting on Graphene technologies and applications for defence

Framework of the Meeting

The Applied Vehicle Technology (AVT) Panel of the NATO Science and Technology Organization (STO) is organizing, under Technical Committee Mechanical Systems, Structures and Materials (TC MSM), a Specialists' Meeting on the subject of **“Graphene technologies and applications for defence”**.

The meeting is open to NATO Nations plus the three “Enhanced Opportunity Partner” nations Australia, Sweden and Finland, and is classified as “NATO UNCLASSIFIED OPEN TO AUSTRALIA, FINLAND AND SWEDEN”. The Meeting is to be held during the Fall 2019 PBM in Trondheim, Norway, 10 – 11 October 2019.

A Specialists' Meeting is a medium-sized two-day event with up to 100 participants that aims at promoting exchange of state-of-the-art knowledge among an audience of experts and specialists on an important scientific or applied topic. The Programme Committee is responsible for selecting and inviting the Speakers. Observers, who present no paper, can also participate. Specialists' Meetings result in a STO Report (Meeting Proceedings) which will be published on the STO website.

General Scope and Meeting Objectives

The AVT-304 Technical Team aims to assess the potential use of graphene technologies in military applications. In order to perform the assessment, this RSM will bring together experts in the field to present and discuss the state of the art of graphene technologies in the light of their potential to enhance defense capabilities. The objective is to evaluate where and how graphene technologies may contribute to existing and new defense applications in all environments and situations.

This RSM will increase confidence in any future use and performance of graphene in military applications, leading to increased exploitation of emerging graphene-improved materials and the adoption of common approaches between Government and Industry and between different NATO nations.



RSM Topics

Major topics include:

- Structural applications for land, sea, air and space platforms
- Damage tolerant fiber-reinforced composite materials
- Lightweight, high performance ballistic protection
- Multifunctional coatings for corrosion- and wear-resistance, icephobic, microwave transparent
- Signature management and camouflage
- Energetic materials
- Fibers and textiles e.g. reinforced with or coated with graphene
- Sensors including electro-optical and radar, and other electronic applications
- Modelling and simulation of graphene-modified materials and structures
- Manufacturing and scalability

Other topics including, but not limited to, adhesives, elastomers, foams, ceramics, energy generation and storage may be included where synergies with the major topics are envisaged.

Posters, applications and materials exhibition

As part of the conference a small exhibition of graphene products, related applications and posters will be held. Anyone wishing to submit an exhibit is invited to contact the co-chairs. Anyone wishing to submit a poster is invited to do this using the abstract submission form (Annex 1) and indicating that a poster presentation is preferred.

Background and Justification - Relevance to NATO

Since 2004 numerous reports of the extraordinary properties of graphene have been published. These include extreme mechanical strength and elasticity; extreme electrical & thermal conductivity; extreme electronic properties; broadband optical absorption; excellent chemical stability and low friction.

There are widespread expectations that graphene will enable a large number of new and improved technologies in the fields of lightweight and impact-resistant composites



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for aerospace and transport, in protective coatings and energy and in multifunctional materials. Very large investments by public organizations and industry are rapidly scaling up graphene production, and hundreds of examples of applications in composites, structures, energy, electronics and sensors have been demonstrated. Consumer products are reaching the market.

There is a large interest for graphene technology. A workshop was organized by the European Defence Agency in 2014, and an additional study is ongoing and will conclude in December 2018. The Horizon 2020 Graphene flagship project started in 2010 and will continue until 2020. Earlier related AVT activities are AVT-122 and AVT-138. AVT-ET-161 considered the military potential of graphene (within the AVT community). Moreover, an AVT TechWatch document on graphene technologies has recently been published, and a similar document has been established by the SET Panel.

Despite the many basic R&T and industrial R&D activities there is a widespread lack of knowledge among defense organizations as to the potential impact of graphene technologies on defense capabilities. This Specialists' Meeting will provide a forum to (i) present, (ii) discuss, (iii) evaluate and (iv) disseminate available knowledge to NATO and partner nations.



AVT-304 Technical Programme Committee

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Deadlines and Preliminary Schedule

- July 2018** **Distribution of Call for Papers**
To solicit abstracts from NATO nations and Australia, Finland and Sweden
After: authors to send their abstracts to the Programme Committee
- 21 Jan 2019** **Abstract Submission Deadline**
After: Programme Committee to select abstracts and to create the Meeting Programme from selected abstracts. **US authors please note annex 3. This applies to you!**
- 22 Feb 2019** **Authors Informed of Selection Decision**
Programme Committee to inform selected as well as rejected authors
AVT to dispatch authors' information package to selected authors
After: selected authors to prepare their papers, presentation and clearances
- 12 March 2019** **Final Agenda Approved by the Programme Committee**
Programme Committee to finalize the Programme
After: AVT to prepare and publish the official Meeting Announcement
- 1 July 2019** **Submission of Advance Copy of US Papers to US National Coordinator**
Deadline for US authors to submit their copy of their advance paper to the US National Coordinator (special instructions to be issued with authors' information package)
- 15 July 2019** **Electronic Advance Copy of Paper due at AVT**
Deadline for all other authors to send an advance copy of their full scientific Paper to AVT
After: Technical Evaluator to review all submitted papers
- 9 Sept 2019** **Submission of Final Version of all Papers to AVT**
Deadline for all authors to send final cleared papers to AVT
After: AVT to pre-release all papers on the STO website making them accessible to all registered participants of the Specialists' Meeting (RSM)
- 10-11 Oct 2019** **Specialists' Meeting to be held in Trondheim, Norway**
Deadline for all papers to be included in the Meeting Proceedings
- 11 Nov 2019** **Submission of Corrected Manuscripts**
Deadline for all papers to be included in the Meeting Proceedings
After: AVT to edit, prepare, produce Meeting Proceedings, which will be made accessible through the STO website



Procedures

Invitation and Abstract Submission

The initial abstract should describe in 1000-1500 words the aim, results and conclusions of the work. Inclusion of 1 to 2 figures and/or photographs to support the abstract is recommended. Authors' names, complete email addresses and other pertinent information must be included with the abstracts. For this purpose, please use the Abstract Submittal Form (Annex 1) and keep the size of files less than 2 MB.

The full scientific paper (recommended limit of 12 pages) will be requested once the Programme Committee has selected the authors and developed the final agenda for the Meeting.

Please submit your abstract along with the Abstract Submittal Form by no later than 21 January 2019 via email to the Programme Committee Co-Chairs:

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Security Level, Clearance and Paper Preparation

This Specialists' Meeting (RSM) is classified as NATO Unclassified open to Australia, Finland and Sweden. For details please consult the attached section on NATO and Partner Nations Overview (Annex 2). It is the responsibility of each contributor to fulfil the publication release and clearance requirements of his/her organization/company/affiliation and country to obtain clearance of abstracts and papers as needed. An official clearance is mandatory in the US (see ANNEX 3) and there may also be a requirement in other countries. If in doubt, authors should contact a Programme Committee Member.



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Authors of papers selected for presentation and publication will be notified by the Programme Committee by no later than 22 February 2019. The AVT Executive Office will then send an Authors' Information Package containing templates, detailed instructions concerning the preparation of manuscripts, as well as, information about the clearance process to each lead author.

Travel and Logistics

Authors of contributions selected for presentation will not be financially supported by NATO. Authors are responsible for their own hotel and travel reservations based on suggestions given in the General Information Package which will be provided typically 4 months ahead of time. Expenses for travel and per diem costs are the responsibility of each author's organisation and nation.

Contact Information

Any questions about the technical aspects of the scientific programme or the contents of papers should be addressed to the Programme Committee Co-Chairs listed above.

Questions on the administrative aspects of this Specialists' Meeting (RSM) or requests for further information about STO activities should be addressed to:

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*Thank you for your contributions
which are very much appreciated by the NATO community.*



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The NATO Science & Technology Organization

The NATO Science & Technology Organization promotes and conducts co-operative scientific research and exchange of technical information amongst NATO nations and NATO partners. Being the largest such collaborative body in the world, the STO encompasses over 5000 scientists and engineers addressing the complete scope of defence technologies and operational domains. This effort is supported by the Collaboration Support Office, which facilitates the collaboration by organising a wide range of studies, workshops, symposia, and other fora in which researchers can meet and exchange knowledge.

For further information, please consult the STO web site: www.sto.nato.int

The STO website provides a wide variety of information and on-line services ranging from overview information on the organization's mission to news regarding upcoming events. You will find on-line access to more than 1800 scientific publications, as well as, information about current activities.

Applied Vehicle Technology

The Applied Vehicle Technology Panel, comprising more than 1000 scientists and engineers, strives to improve the performance, reliability, affordability, and safety of vehicles through advancement of appropriate technologies. The Panel addresses platform technologies for vehicles operating in all domains (land, sea, air, and space), for both new and ageing systems.

The members of the AVT community exploit and focus their joint expertise in the following fields:

- Mechanical Systems, Structures, and Materials
- Performance, Stability and Control, Fluid Physics
- Propulsion and Power Systems

For further information please consult the [AVT web site](#).



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3. Author Title

Name

Nationality

Affiliation:

Full Mailing Address:

Telephone / Email address:

3. Author Title

Name

Nationality

Affiliation:

Full Mailing Address:

Telephone / Email address:

Please copy as required – recommended not more than 5 authors.

Note bene:

Authors should be listed in the order they will appear on the programme and in the final manuscript. Unless specified otherwise, the first listed author is presumed to be the lead author having the major responsibility regarding content of the paper.



Annex 2

NATO and Partner Nations Overview with Geographical Abbreviations

NATO NATIONS			
ALBANIA	ALB	LATVIA	LVA
BELGIUM	BEL	LITHUANIA	LTU
BULGARIA	BGR	LUXEMBOURG	LUX
CANADA	CAN	NORWAY	NOR
CROATIA	HRV	POLAND	POL
CZECH REPUBLIC	CZE	PORTUGAL	PRT
DENMARK	DNK	ROMANIA	ROU
ESTONIA	EST	SLOVAKIA	SVK
FRANCE	FRA	SLOVENIA	SVN
GERMANY	DEU	SPAIN	ESP
GREECE	GRC	THE NETHERLANDS	NLD
HUNGARY	HUN	TURKEY	TUR
ICELAND	ISL	UNITED KINGDOM	GBR
ITALY	ITA	UNITED STATES	USA

EAPC/PARTNERSHIP for PEACE NATION (PfP)			
ARMENIA	ARM	MALTA	MLT
AUSTRIA	AUT	MOLDOVA	MDA
AZERBAIJAN	AZE	MONTENEGRO	MNE
BELARUS	BLR	SERBIA	SRB
BOSNIA & HERZEGOVINA	BIH	SWEDEN*	SWE
FINLAND*	FIN	SWITZERLAND	CHE
FYROM (MACEDONIA)	FYR	TAJIKISTAN	TJK
GEORGIA	GEO	TURKMENISTAN	TKM
IRELAND	IRL	UKRAINE	UKR
KAZAKHSTAN	KAZ	UZBEKISTAN	UZB
KYRGYZSTAN	KGZ		

MEDITERRANEAN DIALOGUE NATION (MD)			
ALGERIA	DZA	MAURITANIA	MRT
EGYPT	EGY	MOROCCO	MAR
ISRAEL	ISR	TUNISIA	TUN
JORDAN	JOR		



ISTANBUL COOPERATION INITIATIVE (ICI) NATION LIST

BAHRAIN	BHR	SAUDI ARABIA	SAU
KUWAIT	KWT	UNITED ARAB EMIRATES	ARE
QATAR	QAT		

GLOBAL PARTNERS (GP)

AFGHANISTAN	AFG	KOREA (Republic Of)	KOR
AUSTRALIA*	AUS	NEW ZEALAND	NZL
IRAQ	IRQ	PAKISTAN	PAK
JAPAN	JPN		

OTHER NATIONS (including CONTACT COUNTRIES)

ARGENTINA	ARG	CHINA	CHN
BRAZIL	BRA	INDIA	IND
CHILE	CHL	SINGAPORE	SGP

* Australia, Finland and Sweden are usually referred to as “Enhanced Opportunity Partner” (EOP).



Annex 3

**Special Notice for U.S. Authors
and non U.S. Authors Affiliated with U.S. Organizations**

**Abstracts of Papers from the U.S. must be sent to the following P.O.C.
4 weeks prior to the regular abstract submission deadline:**

NATO S&T Organization U.S. National Coordinator
OASD(R&E)/International Technology Programs
4800 Mark Center Drive, Suite 17D08
Alexandria, VA 22350-3600
Tel: +1 571-372-6539 / 6538
E-mail: osd.pentagon.ousd-atl.mbx.usnatcor@mail.mil

In addition to their abstract, all U.S. Authors must provide:

1. Certification (can be signed by the author) that there are no proprietary or copyright limitations;
2. Internal documentation from their local public affairs or foreign disclosure office (or equivalent) that clearly shows:
 - Title of the paper or presentation
 - Level of clearance (i.e., Approved for Public Release)
 - Name, title, and organization of the approval authority
3. Full details of authors

Note that only complete packages (abstracts + items listed above) will be accepted by the U.S. PoC.

After review and approval, the U.S. PoC will forward all U.S. abstracts to the AVT Panel Office, who will send them to the Programme Committee.

U.S. authors are encouraged to address questions and concerns to the PoC as early as possible to the US Member of the Programme Committee. Delays in meeting deadlines will impact the timely submission of your abstract.