

NORTH ATLANTIC TREATY ORGANISATION



RESEARCH AND TECHNOLOGY ORGANISATION

SYMPOSIUM

Advanced Sensor Payloads for UAV

Les charges utiles représentées par les capteurs avancés des UAV

SET-092RSY-018

organized by the

Sensors Electronics Technology Panel

to be held in

LISBON, PORTUGAL

Monday 2 May 2005 - Tuesday 3 May 2005

THE UNCLASSIFIED SESSIONS of this Symposium (Sessions 2 - 4) will be open to NATO NATIONS & to PARTNERSHIP FOR PEACE NATIONS (PfP) ONLY.

Session 1 (Mon 2 May until noon) will be CLASSIFIED UP TO "NATO SECRET" – Clearance Form Required (attached)

Latest Enrolment Dates

NATO Nations **Monday 11 April 2005**

PfP Nations **Friday 1 April 2005**

Citizens from NATO Nations and from Partnership-for-Peace (PfP) Nations may enrol for this Symposium via the attachment Enrolment Form. It should be noted that PfP Nationals wishing to attend the symposium will be required to send their enrolment application to the RTA SET Panel Executive, Lt. Colonel G. Fiamingo

All presentations and discussions will be held in either English or French, the official NATO languages. Simultaneous interpretation between the two languages will be provided

The SET Panel wishes to express its thanks to the Portuguese RTB Members for hosting this Symposium and for providing the facilities and personnel which make this meeting possible.

Background

Theme

Unmanned Air Vehicle (UAV) Systems are providing a new capability for military forces to conduct missions in a high threat or heavily defended areas where loss of high value or manned systems is likely or, where real time information provided by sensors is required. Additionally, UAV systems are becoming a cost-effective way to perform surveillance over broad maritime areas and assist in maintaining a Recognized Maritime Picture. At the operational level UAV provide, inter alia, Over-the-Horizon-Targeting, Battle Damage Assessment, ISTAR that may significantly reduce a Commander's level of uncertainty. The UAV system can be deployed to support Peacekeeping forces assisting in maintaining situational awareness of protagonist's forces.

The military are now looking beyond the requirement to detect, recognize, identify and strike targets. New payloads that can give a war-fighting advantage in areas such as electronic warfare, Mine Detection, NBC detection are being urgently considered in order to frame future UAV capability requirements.

Extensive technical development and availability of lightweight material for small airborne platforms combined with advanced Electro-Optics and other advanced sensor/sensors systems are enabling the appearance of micro and mini UAV which are beginning to become potentially important elements for many military NATO applications, especially in urban operations. In this class of UAV the issue of low cost expandable sensors is increasingly important.

This symposium will focus on advanced and innovative sensor technology and associated elements applicable to UAV's payloads which can respond to emerging concepts and new requirements within the NATO community, such as broad area maritime surveillance. Whilst the symposium will cover a broad class of UAVs, a particular focus will be micro and mini UAVs (with payloads up to 10 kg). Concerning the latter, miniature, low cost expendable payloads are of specific interest.

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SET-092 Symposium on "Advanced Sensor Payloads for UAV"

Programme

Monday 02 May 2005

Chair - Prof. L.M. Braga Costa Campos

07:30 Registration

08:10 Opening Ceremony
Prof. L.M. Braga Costa Campos, Cdr C. Ferreira Leite and Dr. Y. Jones KING

SESSION 1 - NATO CLASSIFIED UAV Operations and Applications

Chair - Prof. Costa Campos and Dr. F. Milton

08:30 1 UAV User Overview - a US Perspective
Mr. Dyke Weatherington

08:55 2 Application of Small Unmanned Air Vehicles in Network Centric Warfare
Mr. Richard Wright, Mr Gene Klager, Mr Frank Herbst

09:20 3 Be F-16 MLU & B-Hunter as Complementary Tactical Air Reconnaissance Assets
Lt. Col. R. Marchal, Lt L. Binet

09:45 BREAK

10:10 4 Sensor Integration and Context Detection in Intelligent Systems
Mr. Anton Vitko, Mr. Michal Savel, Mr. Ladislav Jurisica

10:35 5 Integrating Advanced Unmanned Air Vehicles Payloads with Multi-Sensor, Self, Healing Ground Based Networked Arrays
Mr. George Match, Mr. Steve Mander, Mr. Gerry Walsh

11:00 6 Optical Wireless for Intra UAV Communications
Dr Héctor Guerrero, Mr. Ignacio Arruego, Mr. Santiago Rodriguez, Mr Remo Tamayo, Mr. José Torres

11:25 7 DARPA Golden Eye Program Overview
LTC Brad Tousley

11:50 LUNCH AND REGISTRATION

SESSION 2 - NATO P1P UNCLASSIFIED NPU Multiple Utility Sensing

Chair - Mr. B. Brown and Eng. J. Cabrita Freitas

13:00 NATO SET Overview
Lt. Col. G. Fiamingo

13:15 8 Survey of Sensor Payloads for Small UAVs
Mr. R. Hintz

13:40 9 A Comparative Study of All-Accelerometer Strapdowns for UAV INS
Mr. Philippe Cardou, Prof. Jorge Angeles

14:05 10 Bus Communication for Multi Sensor Operations
Mr. George Mahalu, Mr Adrian Graur, Mr. Radu Pentiu, Mrs Carmen Mahalu

14:30 11 Image Processing for Tactical UAV
Mr. Michel Broekaert, Mr. Daniel Duclos, Mr Michel Sirieix

14:55 12 Data and Image Fusion for Multi Sensor UAV Payload
Mr. Paul Echard, Mr. Hervé Lamarre, Mr. Patrick Gosselin

15:20 BREAK

15:45 13 A Challenge for Micro and Mini UAV's: the sensor problem
Prof. Roland Decuypere, Dr. Dimitri Jerome, Dr. Davy Hermans

16:10 14 Acoustic Detection and Tracking of UAVs and from UAVs
Mr. Tien Pham, Mr. Nino Srour

16:35 15 Simulation and Experimental Elaboration of Acoustic Sensors for Mobile Robots
Prof Dr. Vladamir Evgen'evich Pavlovsky, Ms Tatyana S. Khashan

Tuesday 03 May 2005

SESSION 3 - NATO P1P UNCLASSIFIED NPU EO Sensing

Chair - Dr. J. Buss and Prof. E. Schweicher

08:30 16 Optic-Based Sensors for CBRN Reconnaissance System on UAV
Mr Alberto Aguilar, Dr Jesús Delgado, Dr Pedro Sanz-Aránguez, Dr Guillermo Orellana, Dr Maria C. Moreno-Bomdi

08:55 17 Step-Stare Image Gathering for High-Resolution Targeting (SIGHT)
Mr. Benoit Ricard, Ms Valérie Lavigne

09:20 18 Airborne Multi-Spectral Minefield Survey
Dr. Eric den Breejen

09:45 BREAK

10:10 19 Polarimetric Imaging Laser Radar
Mr. Richard Richmond, Mr. Bruno Evans

10:35 20 A 3.5 to 12 Micron "Dualband" Spectrometer for UAVs
Dr. Paul Levan

11:00 21 Imaging Sensor Analysis for UAV Applications
Mr. Ulrich Thoennesen, Mr. Karlheinz Bers

SESSION 4 - NATO P1P UNCLASSIFIED NPU RF Sensing

Chair - Dr. M. Weiss and Dr. W. Miceli

11:25 22 A Stepped Frequency CW SAR for Lightweight UAV Operation
Dr. Keith Morrison

11:50 LUNCH

13:15 23 Development of a Small Phased Array SAR-MTI System for Tactical UAV
Mr. B.C.B. Vermeulen, Mr. D. van Halsema, Mr. M.P.G. Otten, Mr. W.J. Vlothuizen

13:40 24 A UAV-Friendly Strategy for Moving Targets Processing Using SAR (unclassified)
Prof. Dr. Paulo Marques, Prof. Dr. José Dias

14:05 25 Ongoing research on UAV payloads at the Electromagnetism and Radar Department of ONERA
Mr. Hervé Jeuland, Mr. Dominique Medynski, Mr. Pierre Enert

14:30 26 FM-CW Based Miniature SAR Systems for Small UAV's
Prof. Peter Hoogetboom, Mr. Jacco de Wit, Mr Adriano Meta, Mr. Jordi Figueras

14:55 27 Multi Function & Wideband Radiating Structures
Mr. C. Renard, Mr. Bernard Perpère, Mr. Michel Soiron

15:20 BREAK

15:45 28 I-Master New Compact High Performance Surveillance Radar
Mr. Michael F. Attfield, Mr Michael Morris

16:00 29 Low Cost, Lightweight Multi Beam Antennas for UAV's
Dr. James C.G. Matthews, Dr. Christian Rieckmann, Mr. Rob A. Lewis

16:25 Summary Comments
Dr. Rudy Buser

19:00 Reception



APPLICATION TO ENROL



Symposium on "Advanced Sensor Payloads for UAV " (SET-092)

RTO Symposium - LISBON, PORTUGAL
Monday 2 May 2005 - Tuesday 3 May 2005

Title/Titre (Prof, Dr, Mr, Mrs etc.):

Family Name, Initials:

Position:

I am an employee of: Government/Industry/Academia/Other:

Office Address:

Tel: Fax:

E-Mail:

Nationality:

Passport No:

Passport Issued at (place): on (date):

Date of Birth: Place of Birth (inc Country):

Latest Enrolment Dates

NATO Nations: **Monday 11 April 2005**

PfP Nations: **Friday 1 April 2005**

THIS MUST BE COMPLETED

The member of RTO named below has endorsed my application to attend this Meeting

My role at the Meeting will be:

- | | | |
|--|--|--------------------------|
| <input type="checkbox"/> Panel Member | <input type="checkbox"/> Session Chair | Session Number(s): |
| <input type="checkbox"/> Author | <input type="checkbox"/> Co-Author | Paper Number(s): |
| <input type="checkbox"/> Other Participant | | |

For use of Enrolment Co-ordinator

I approve this application to enrol and have sent an information package

Signed: Date:

Please complete this form IN BLOCK LETTERS and send it to the Enrolment Co-ordinator (see reverse) for your nation who will, upon receipt of your application to enrol, forward a general information package which will include travel advice, recommended accommodation etc.



SECURITY CLEARANCE CERTIFICATE



Symposium on "Advanced Sensor Payloads for UAV " (SET-092)

RTO Symposium - LISBON, PORTUGAL
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Title/Titre (Prof, Dr, Mr, Mrs etc.):

Family Name, Initials:

Position:

I am an employee of: Government/Industry/Academia/Other:

Office Address:

Tel: Fax:

E-Mail:

Nationality:

Date of Birth: Place of Birth (inc Country):

Passport No:

Passport Issued at (place): on (date):

has been cleared for access to information classified up to and including:

NATO SECRET: Valid Until:

Certified by authorised National Security Officer (please include Official Stamp):

Signature:

Family Name, Initials:

Position:

Organisation:

Official Address:

Tel: Fax:

When Complete Send / Fax To:
RTA Security Officer, BP 25, 92201 Neuilly-sur-Seine Cedex, France.
Fax: 0033 1 55 61 9624 or scan form and email to: garrisonm@rta.nato.int



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