NORTH ATLANTIC TREATY ORGANISATION

RESEARCH AND TECHNOLOGY ORGANISATION

SCI Symposium on

Intelligent Uninhabited Vehicle Guidance Systems

(Systèmes de guidage des véhicules intelligents sans pilote)

NATO/PfP UNCLASSIFIED

SCI - 202 / RSY - 022

organised by the

Systems Concept and Integration Panel

to be held in

München/Neubiberg, Germany

30 June – 2 July 2009

This Symposium is open to NATO/PfP Nations ONLY

Latest Enrolment Date

01 June 2009

Enrol Online at: http://www.rto.nato.int

Background

The mission of RTO is to conduct and promote co-operative research and information exchange. RTO consists of a three level organization: the Research and Technology Board (RTB), the Panels and the Technical teams. The Mission of the Systems Concepts and Integration Panel (SCI) is to further knowledge concerning advanced system concepts, integration, engineering techniques and technologies across the spectrum of platforms and operating environments to assure cost-effective mission-area capabilities.

Theme

Military Uninhabited Vehicles (UVs) generally must perform their missions under challenging conditions characterized by complexity, high dynamics, unpredictability, information uncertainty and so forth. Vehicle guidance, control and mission management systems operating in such scenarios must embody highly sophisticated functionalities to offer flexible and appropriate response options in coping with unforeseeable states and events. This symposium addresses technological issues and approaches on the various levels of UV guidance, ranging from operational aspect including networked scenarios, issues of human-automation integration and autonomy, trajectory generation and motion control as well as navigation, sensing and data processing systems. Finally, platform related issues of UV-systems will be addressed.

Enrolment

Citizens from NATO and PfP Nations must enroll for this Symposium via internet at http://www.rto.nato.int.
Once your enrolment is accepted you will receive a General Information Package with the latest information on travel, accommodation and local arrangements. Please note that participants are to make their own travel arrangements and hotel bookings.

Important date

Please respect the following date for enrolment:
1st June 2009.

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SCI-202 Symposium on "Intelligent Uninhabited Vehicle Guidance Systems"

Programme

Tuesday 30 June 2009

08:00 REGISTRATION

08:30 OPENING CEREMONY
Welcome by Prof. Dr. Merith Niehuss, President of the Universität der Bundeswehr Munich.
Welcome by SCI Panel
Welcome by Local Hosts

09:00 Keynote Speech
Future Directions in UAV Systems
J. Lockenour, Northrop Grumman Corporation, United States

09:30 Keynote Speech
UAV Systems - Perspectives in Europe
G. Bertolone, Alenia Aeronautica, Italy

10:00 Break

SESSION 1.1 - Operations, Requirements & Architectures I

Chair - A. Lief, Germany

10:30 **1** Integration of Unmanned Aircraft Systems in Joint Operations - Employment Principles and Considerations for Developments
J. Fehler, NATO Joint Air Power Competence Centre, Germany

10:55 **2** Technology Needs for Autonomous Multi-Vehicle UCAV Missions
M. Avalle, Alenia Aeronautica, Italy, F. Cunha, Instituto Superior Técnico, Portugal, J. Doornbos, ADSE Consulting and Engineering, The Netherlands, A. Jimenez, EADS CASA, Spain, G. Leonardi, Selex Galileo, Italy

11:20 **3** UAV - Coordinated-Autonomous Operation - ATM Interoperable UAV Management
D.W. Vos, Rockwell Collins Inc., O.F. Bleeker, Rockwell Collins, The Netherlands

11:45 **4** Vehicle Guidance Systems in NEC Context
J.S. Preden, R. Serg, A. Riid, L. Motus, R. Pahtma,Tallinn University of Technology, Estonia

11:55 Lunch

SESSION 1.2 - Operations, Requirements & Architectutes II

Chair - Prof. N. Alemdaroglu, Turkey

13:00 **5** Autonomous System Architectures Modelling and Integration
A. Brandstetter, EADS Military Air Systems, Germany

13:25 **6** Alfatroll, a New Knowledge Based Technology for UAS
T.O. Steine, Alfatroll A.S., Norway

13:50 **7** SIMAP: How intelligent Health Monitoring for UAS's Optimizes, Missions, OR (Operational Reliability) and Maintenance Costs
J. Borda Elejabarrieta, M. Insunza Arrien, SISTEPLANT S.L., Spain

14:15 **8** Design Considerations for Military Data Link Architecture in Enabling Integration of Intelligent Unmanned Air Vehicles (UAVs) With Navy Units
M. Dinc, Turkish Naval Research & Development Center, Turkey

14:40 Break

SESSION 2.1 - Autonomy & Human-Automation Integration I

Chair - J. Ramage, United States

15:10 **9** Development of Artificial Cognitive Units in UAV Guidance
C. Meitinger, G. Jarasch, A. Schulte, Universität der Bundeswehr München, Germany

15:35 **10** Adjustable Authority Without Levels
S. Mercier, C. Tessier, ONERA-DCSD, F. Dehais, ISAE-Supaero, France

16:00 **11** Manned-Unmanned Teaming: Artificial Cognition Applied to Multiple UAV Guidance
J. Uhrmann, Universität der Bundeswehr München, Germany

16:25 End of Day 1

19:00 Reception hosted by EADS Military Air Systems

Wednesday 01 July 2009

SESSION 2.2 - Autonomy & Human-Automation Integration II

Chair - Prof. F. Quagliotti, Italy

08:30 **12** Rule Engine as Support System in Generic Ground Control Station
S. Leuchter, Fraunhofer-Institut für Informations- und Datenverarbeitung IITB, Germany

08:55 **13** Cognitive Task Analysis: A crucial Step to Improve the usability of a Ground Control Station for Unmanned Air Systems (UAS) Mission
S. Langevin, B. N´Kaoua, Université Bordeaux 2, B. Joseph, Thales Airborne System, O. Amram, Magellium, France

09:20 **14** Decisional Autonomy for the HUGIN Autonomous Underwater Vehicle
M. Wiig, Norwegian Defense Research Establishment (FFI), Norway

10:00 Break

SESSION 3.1 - Trajectory Generation & Motion Control I

Chair - J. Ramage, United States

10:15 **15** Coordinated Path Following for Time-Critical Missions of Multiple UAVs Using L1 adaptation
I. Kaminer, V. Dobrokhodv, Naval Postgraduate School, E. Xargay, N. Hovakimyan, University of Illinois, United States, A. Pascoal, Instituto Superior Técnico, Portugal

10:40 **16** Guidance Systems for Motion Control of Unmanned Surface Vehicles
M. Breivik, Centre for Ships and Ocean Structures, V.E. Hovstein, Maritime Robotics, Norway

11:05 **17** Local control approach to wheeled mobile agents convoy
G. Klancar, D. Matko, S. Blazic, University of Ljubljana, Slovenia

11:30 **18** Approach and Landing Monitoring for UAVs
W. Lex, M. Schuster, Munich University of Applied Science, J. Beck, A. Knoll, European Aeronautic Defence and Space Company (EADS), Germany

11:55 Lunch

SESSION 3.2 - Trajectory Generation & Motion Control II

Chair - Prof. L. Motus, Estonia

13:00 **19** Autonomous Aggressive Landing at Unusual Attitudes with Helicopter UAV
S.Bayraktar, Baykar Makina San, Turkey

13:25 **20** NRC UAS Sense and Avoid Research Project: Trajectory Planning Algorithm Flight Test
K. Ellis, A. Gubbels, National Research Council of Canada, Canada

13:50 **21** Risk-free UAV Autopilot Tuning Using a HIL Simulator
T. Tomazic, D. Matko, University of Ljubljana, Slovenia

14:15 Break

SESSION 4.1 - Autonomous Navigation, Sensing & Data Processing I

Chair - S. Grinaker, Norway

14:45 **22** Dual Approach to Image Based Navigation
B. Sivalingam, Ø.T. Hoelsæter, L.H. Bakstad, Norwegian Defence Research Establishment (FFI), Norway

15:10 **23** Closing the Loop: Integrating Active Vision with Discrete Decision-Making for UAV Control
P. Hubbard, Defence R&D, Canada

15:35 **24** Towards Robust Navigation for UAVs
O.K. Hagen, K. Gade, Ø.T. Hoelsæter, Norwegian Defence Research Establishment (FFI), Norway

16:00 **25** Interactive Maps for Knowledge Based Guidance of UAV
M. Meriste, University of Tartu, Estonia

16:25 End of Day 2

20:00 Dinner

Thursday 02 July 2009

SESSION 4.2 - Autonomous Navigation, Sensing & Data Processing II

Chair - Prof. P. Stütz, Germany

08:30 **26** Laser Landing Systems
G.A. Kaloshin, Zuev Institute of Atmospheric Optics SB RAS, Russia

08:55 **27** Applications of Neural Networks for Intelligent Data Interpretation in UAVs: Health monitoring and Target Recognition
P. Knappe, R. Seitz, C. Stahl, C. Baisl, T. Koban, European Aeronautic Defence and Space Company (EADS), Germany

09:20 **28** Autonomous Sense and Avoid (SAA) for Unmanned Air System (UAS)
W.-Z. Chen, Northrop Grumman Corporation, United States

09:45 Break

SESSION 5.1 - Uninhabited Vehicle Systems Development I

Chair - Prof. N. Alemdaroglu, Turkey

10:15 **29** A Family of Unmanned Aerial Systems
R. Ludwig, Northrop Grumman Corporation, United States

10:40 **30** Configuration of an Optionally Piloted Vehicle as Flying Laboratory for Aeronautical REsearch
S. Palazzo, A. Rispoli, F. Valenza, Italian Aerospace Research Centre, Italy

11:05 **31** A Design Configuration and Optimization for a Multi Rotor UAV
E. Capello, G. Guaglieri, F. Quagliotti, Politecnico di Torino, Italy

11:30 Lunch

SESSION 5.2 - Uninhabited Vehicle Systems Development II

Chair - Prof. F. Quagliotti, Italy

12:30 **32** Teleoperated Control System of an Unmanned Ground Vehicle
A. Typiak, Military University of Technology, Poland

12:55 **33** Mobile Ground Station for the Unmanned Elettra-Twin-Flyer Airship
M. Battipede, P. Gili, M. Vazzola, Politecnico di Torino, Italy

13:20 **34** Simulation of Motion and Control of An Underwater Vehicle
F. Geridönmez, TÜBITAK-SAGE, Turkey

13:45 Closing Ceremony

14:00 End of Symposium

For more information,
Please visit the following web sites:

http://www.nato.int

http://www.rto.nato.int

Reference:
SCI-202 Symposium
Acknowledgement
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which make this meeting possible.