NATO - Lecture Series

- 10-11 Nov. 2014, Bucharest (ROU)
- 13-14 Nov. 2014, Paris (FRA)
- 17-18 Nov. 2014, Washington, DC (USA)
- 20-21 Nov. 2014, Vancouver, BC (CAN)

This Lecture Series is open to citizens from NATO and Partnership-for-Peace (PfP) Nations.

No registration fee!

SET-191

Radar and SAR systems for airborne and space-based surveillance and reconnaissance

Background

For NATO's military and peace-keeping operations radar and SAR systems for airborne and space-based surveillance, reconnaissance, and target acquisition (RSTA) are essential tools for a large number of missions. Its ability to function during day and night, relative immunity to weather, capability of localizing targets in range, long range operation, to generate highly accurate interferometric 3D-maps, detection and tracking of mobile targets, and classification of objects, make it the sensor of choice in many situations. New emerging concepts employ high-resolution multi-channel imaging radars, for instance, and/or multiply radar/SAR sensors distributed over the area of interest in a Network-centric environment to enhance the information quality gained by a single sensor. They offer multiply benefits, for instance boosting the potentialities to characterise the target by exploiting the multiple observation angles or using already available signals of opportunity.

Objectives

The objective of this Lecture Series is to present the cutting edge of SAR/MTI systems for airborne and space-based surveillance and reconnaissance applications and sophisticated modern data fusion and tracking techniques for these systems and thereby increases the awareness of their value to the NATO scientific and engineering communities. Lectures are given by leading experts in this area and discuss their pros & cons. These discourses will based on advanced applications in various fields relevant to NATO's mission, such as covert surveillance by airborne and space-based SAR/MTI systems, or security assistance systems for NATO DAT and their fusion products for producing better situation pictures in NATO's ISTAR systems, for instance. Moreover, the LS will review current developments in this area.

Topics to be covered:

The Lecture Series Team will present all relevant aspects of radar/SAR systems for airborne and space-based surveillance and reconnaissance.

Lecture topics includes:

- Sophisticated active and passive radar sensors
- Multistatic and MIMO radar systems
- High resolution Synthetic Aperture Radar (SAR)
- Multichannel SAR/MTI
- Multipass / multiview SAR and Interferometric SAR
- Tomography SAR
- Sensor data fusion
- Tracking and sensor management
- Context-assisted tracking and sensor data fusion
- Space-based moving target tracking

Context

Les systèmes SAR et radar de reconnaissance, surveillance, et acquisition d'objectif (RSTA) aéroportées et spatiales constituent des outils essentiels pour un grand nombre de missions lors des opérations militaires et de maintien de la paix de l'OTAN.
Capables de fonctionner de jour comme de nuit, relativement insensibles aux conditions météorologiques, efficaces pour localiser des objectifs à distance, disposant d'un long rayon d'action, pouvant générer des cartes 3D de haute précision par interférométrie, détecter et poursuivre des objectifs ainsi que classifier des objets, ces capteurs s'avèrent incontournables dans de nombreuses situations. Les nouveaux concepts émergents emploient des radars d'imagerie multicanaux haute-résolution, par exemple, et/ou de multiples capteurs radars/SAR distribués sur une zone d'intérêt dans un environnement en réseau afin d'améliorer la qualité des informations obtenues par un seul capteur. Ils offrent beaucoup d'avantages : par exemple, amplifier les possibilités de caractérisation d'un objectif en exploitant les différents angles d'observation ou en utilisant des signaux d'opportunité disponibles.

Objectifs

Cette série de conférences a pour objectif de présenter, d'une part, les tout derniers systèmes SAR/MTI pour des applications de surveillance et reconnaissance aéroportées et spatiales, et d'autre part, les techniques sophistiquées modernes de poursuite et fusion des données qu'ils utilisent, de sorte que les communautés techniques et scientifiques de l'OTAN soient mieux sensibilisés sur la valeur de ces systèmes. Des conférences présentées par des experts incontestés dans ce domaine traiteront de leurs avantages et inconvénients. Elles seront basées sur les applications avancées dans différents domaines pertinents à la mission de l'OTAN, comme la surveillance couverte par systèmes SAR/MTI aéroportés ou spatiaux, ou les systèmes d'assistance à la sécurité du programme DAT de l'OTAN et les produits de leur fusion visant à obtenir de meilleures représentation des situations pour les systèmes ISTAR de l'OTAN, par exemple. La série de conférences examinera les développements actuels en la matière.

The Lecture Series Team

- Prof. Murat Efe, Ankara University (TUR), efe@eng.ankara.edu.tr
- Dr. Gianfranco Fornaro, CNR-IREA (ITA), fornaro.g@irea.cnr.it
- Dr. Wolfgang Koch, Fraunhofer FKIE (DEU), wolfgang.koch@fkie.fraunhofer.de
- Dr. Hélène Oriot, ONERA (FRA), helene.oriot@onera.fr
- Dr. Matthias Weiß, Fraunhofer FHR (DEU), matthias.weiss@fhr.fraunhofer.de

Day One

08:30		Registration	
09:00		Opening Ceremony & STO/CSO overview	National Authorities
09:15		Introduction and Overview	M. Weiß
09:30	1	Distributed Sensor Systems	M. Weiß
10:30		COFFEE BREAK	
11:00	2	Lecture I	H. Oriot
12:00		LUNCH BREAK	
13:00	3	Multipass/multiview and Interferometric SAR	G. Fornaro
14:00	4	Tracking Algorithms for Ground Situational Awareness	W. Koch
15:00		COFFEE BREAK	
15:30	5	Tracking and Fusion in Multistatic Sensor Networks I	M. Efe
16:30		End of first day	

Day Two

09:00	6	Compressive Sensing for Multi Sensor Systems	M. Weiß
10:00		COFFEE BREAK	
10:30	7	Lecture II	H. Oriot
11:30	8	Tomographic SAR	G. Fornaro
12:30		LUNCH BREAK	
13:30	9	Data Fusion for Ground Situational Awareness	W. Koch
14:30		COFFEE BREAK	
15:00	10	Tracking and Fusion in Multistatic Sensor Networks II	M. Efe
16:00			
16:10		Round Table Discussion	All
16:20		Closing Remarks End of Lecture Series	M. Weiß

Lecture Series Director

Dr. Matthias Weiß, GERMANY
Fraunhofer FHR
matthias.weiss@fhr.fraunhofer.de

Local Coordinators

ROMANIA, Bucharest:

Dr. Anca Poppescu
University Politehnica
Faculty of Electronics, Telecommunications and Information technology
Bd. Iuliu Maniu 1-3, Sector 6
Bucuresti, CP 060042 / Romania
Tel: +4021 402-4623
apopescu@ceospacetech.pub.ro

FRANCE, Paris:

Dr. Hélène Oriot
ONERA-DEMR
Chemin de la Hunière
91123 Palaiseau / France
Tel: +33 (0)1 80 38 62 31
helene.oriot@onera.fr

USA, Washington, DC:

Dr. Thomas L. Ainsworth
Naval Research Laboratory
Remote Sensing Division
Washington, DC 20375 / USA
Tel: +1 (202) 404-6369
ainsworth@nrl.navy.mil

CANADA, Vancouver, BC:

Ms. Josie Igglesden
MDA Systems Ltd.
13800 Commerce Parkway
Vancouver/Richmond, BC V6V 2J3 / Canada
Tel. +1 (604) 231-2102
josie@mdacorporation.com

STO Contact/Enrolment Coordinator

Science & Technology Organization / Collaboration Support Office / Anne Reboul
BP 25 - 92201 Neuilly-sur-Seine Cedex - France
Tel: +33 (0)1 5561 2267 | Fax: +33 (0)1 5561 9628
anne.reboul@cso.nato.int

Maj. IT Army Mauro Roddi
Executive, NATO STO-SET Panel
Tel: +33 (0)1 5561 2268 | Fax: +33 (0)1 5561 9615
Mauro.Roddi@cso.nato.int or
ewelina.glinska-lewis@cso.nato.int

APPLICATION TO ENROLL

Lecture Series SET-191

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Enrolment must be made via internet only at http://www.cso.nato.int

Note: if you enrolled for other RTO-STO activities in the past, please use the same e-mail address as previously. If your e-mail address has changed, please inform the STO-CSO contact before enrolling.

Once your enrolment has been validated, 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.

If you are unable to enrol via the internet, please contact the STO-CSO enrolment coordinator:
Anne Reboul - anne.reboul@cso.nato.int

Please respect the following dates for enrolment.

Latest Enrolment Dates

NATO Nations: **2 week prior LS-date**

PfP-Nations: **3 weeks prior LS-date**