



1st Maritime Situational Awareness Workshop - MSAW 2019

Science and Technology meet operational needs

Villa Marigola, Lerici (La Spezia), Italy

8–10 October 2019



Tuesday 8 October

08:00	Registration & Welcome coffee	Main Hall
09:00	Welcome and Opening Talks	Main Conference Room
09:30	Keynote presentation Maritime surveillance: radar technologies and scenario characteristics Alfonso Farina ¹ , Sergio Gallone ¹ , Massimo C. Comparini ^{2,3} ¹ Leonardo SpA, ² e-GEOS, ³ Telespazio	
10:30	Coffee break	Garden
RADAR SYSTEMS		Main Conference Room
Chair: R. Streit		
11:00	RANGER: Radars and early warning technologies for long distance maritime surveillance L. Karagiannidis, D. Dres, E. Protopapadakis, F. Lamole, F. Jacquin, G. Rigal, E. Ouzounoglou, D. Katsaros, A. Karalis, L. Pierno, C. Mastroeni, M. Evangelista, V. Fontana, D. Gaglione, G. Soldi, P. Braca, S. Sarlio-Siintola, E. Sdongos, A. Amditis	
11:30	Fifteen years of HF-Surface-Wave radar for maritime surveillance J. Widera, T. Helzel, M. Kniephoff, L. Petersen	
11:50	Beyond the horizon: High frequency surface wave radar F. Lamole, F. Jacquin, G. Rigal	
12:10	A MIMO architecture for SaR application F. Prodi, L. Pierno, A. Farina	
12:30	Passive radar on moving platforms for maritime and coastal surveillance P. Wojacek, F. Colone, D. Cristallini, P. Lombardo, D. O'Hagan	
12:50	Lunch	Garden
13:50	Keynote presentation (remote) Re-examining fusion-sense-making-decision-making interdependencies again Jim Llinas, University at Buffalo	Main Conference Room
14:50	Break	
ARTIFICIAL INTELLIGENCE FOR MSA		Main Conference Room
Chair: J. Garcia Herrero		
15:00	A geospatial complex event processing engine for abnormal vessel behavior detection suitable for maritime surveillance M. Tsogas, P. Parthymos, M. Moutzouris, N. Patlakas, G. Karagiannis, A. Kostaridis, D. Diagourtas	
15:20	Detection of maritime anomalous behavior in a successful MARISA North Sea trial A. Mohamoud, J. van de Pol, E. den Breejen, K. Veltman, J. van der Velde, T. Mannucci, H. Hildmann	
15:40	Coffee break	Garden
16:10	Achieving maritime situational awareness using knowledge graphs: a study J. Everwyn, B. Zanuttini, A-I. Mouaddib, S. Gatepaille, S. Brunessaux	
16:30	Maritime Situation Awareness through data analytics, machine learning and risk assessment based on ship trajectories F. Opitz, C. Mohrdieck, K. Dästner	
16:50	IDCP as kernel element for force level recognized maritime picture generation J. Ziegler	
17:10	Poster Session & Demos	Gallery
18:00	Icebreaker	Garden



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POSTERS

1. Acoustic clutter removal, Hong Kong ship channel

W. Jobst, L. Whited, D. Smith

2. Underwater sound speed Netcdf calculator

P. Bitsikokos, I. Bitsikokos

3. Risk sensitive shifted Rayleigh filter for underwater bearings-only target tracking problems

N. Sharma, R.K. Tiwari, S. Bhaumik

4. Maritime anomaly detection

E. D’Afflisio, L.M. Millefiori, P. Braca

5. AIS-based learning of maritime traffic patterns for long-term prediction and anomaly detection

N. Forti, L.M. Millefiori, P. Braca

6. Heterogeneous information fusion for multitarget tracking using the sum-product algorithm

G. Soldi, D. Gaglione, F. Meyer, F. Hlawatsch, P. Braca, A. Farina and M. Z. Win

7. Enabling situational awareness in millimeter wave massive MIMO systems

R. Mendrzik, F. Meyer, G. Bauch, M. Z. Win

8. Arms smuggling investigation: contextual reasoning and uncertain information fusion with evidential networks

P. Kowalski, A-L. Joussetme

9. Automatic object classification for low-frequency active sonar using convolutional neural networks

G. De Magistris, P. Stinco, J. R. Bates, J. M. Topple, G. Canepa, G. Ferri, A. Tesei, K. Le Page

10. Cooperative beam tracking by multi-sensor data fusion in V2X networks

M. Brambilla, L. Combi, A. Matera, D. Tagliaferri, M. Nicoli, U. Spagnolini

11. Combining data from unmanned underwater vehicles and satellites for covert marine rapid environmental assessment

I. Borriore, P. Oddo, A. Russo and E. Coelho

12. AIS support to reduce collision risk for glider operations in high traffic areas

G. Pennucci, M. Oddone, D. Cecchi, B. Garau, L.M. Millefiori, G. Arcieri, P. Braca, A-L. Joussetme

DEMO BOOTHS

FFI

www.ffi.no

MARINETRAFFIC

www.marinetraffic.com

NODAL POINT

www.nodalpoint.com

STUDIOMAPP

www.studiomapp.com

EC MARISA project

www.marisaproject.eu

EC RANGER project

www.ranger-project.eu



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Wednesday 9 October

08:30 **Registration & Welcome coffee** **Main Hall**

09:00 Keynote presentation **Main Conference Room**

Push and pull in digitalization: Technology drivers for sensor data fusion

Felix Govaers, Fraunhofer FKIE

10:00 *Coffee break* Garden

RADAR SIGNAL PROCESSING **Main Conference Room**

Chair: A. Farina

10:30 **Synthesis of constant modulus radar signals in spectrally crowded scenarios**

A. Aubry, A. De Maio, M.A. Govoni, L. Pallotta

10:50 **Data fusion engine based on belief propagation in the RANGER experiment**

D. Gaglione, G. Soldi, P. Braca

11:10 **A constrained least squares approach for 2D PBR localization**

A. Aubry, V. Carotenuto, A. De Maio, L. Pallotta

11:30 *Break*

11:40 **Photonics applied to coherent radar networks for border security**

S. Maresca, G. Serafino, F. Scotti, L. Lembo, P. Ghelfi, A. Bogoni

12:00 **A marine radar dataset for multiple extended target tracking**

J.S. Fowdur, M. Baum, F. Heymann

12:20 **Ship length estimation using common radar field entries**

E. Protopapadakis, M. Bimpas, D. Dres

12:40 *Lunch* Garden

13:40 NITEC Challenge Winner **Main Conference Room**

Dual-use of AIS data, combining AIS tracking with

social network analysis for increased maritime network awareness

Dagfinn Vatne, FFI, introduced by F. Marziani, NATO NCIA

14:10 *Break*

ANOMALY DETECTION & BEHAVIOURAL ANALYSIS **Main Conference Room**

Chair: S. Horn

14:20 **Traffic density measures for mapping maritime patterns of life**

K. Landmark, M. Aronsen

14:40 **A data driven approach to maritime anomaly detection**

D. Zissis, K. Chatzikokoladis, M. Vodas, G. Spiliopoulos, K. Bereta

15:00 **Verification of sensor data in a maritime multi-sensor network**

M. Broetje, G. Battistello, M. Ulmke

15:20 **Aggregated risk assessment from multi-source data fusion**

F.C. Daffinà, T. Stahl, D. Quattrociochi, M. Zavagli, S. Chesworth, R. Migliorini, G. Sear

15:40 **EC project presentation: MARISA** **Main Conference Room**

Maritime Integrated Surveillance Awareness

Valeria Fontana

16:00 *Coffee break* Garden

16:30 **Behavioral analysis for maritime safety** **Main Conference Room**

E. Messel, M.G. Bjørndal

16:50 **Context-enhanced maritime surveillance optimization**

S. Horn

17:10 **Context information analysis from IMM filtered data classification**

D. Sanchez Pedroche, D. Amigo Herrero, J. Garcia Herrero, J.M. Molina Lopez

19:30 Bus pick-up / drop-off **La Spezia, Piazza Europa & Lerici, Piazza Bacigalupi**

20:00 No-host dinner **Restaurant Ca' Borghese
Via Arena, 1, 19031 Ameglia SP**



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Wednesday 9 October

DEEP LEARNING AND CLASSIFICATION

Small Conference Room

Chair: D. Zissis

- 10:30 **Vessel identification using convolutional neural networks**
A. Reche Martinez, A. Baldacci
- 10:50 **Operationalizing ship detection using deep learning**
T. Brenn, L-P. Gjøvik, G. Rasmussen, T. Bauna, M. Kampffmeyer, R. Jenssen, S. Anfinsen
- 11:10 **Monitoring marine protected areas using data fusion and AI techniques**
K. Bereta, A. Millios, K. Chatzikokolakis, D. Zissis
- 11:30 *Break*
- 11:40 **Custom state-of-the-art CNN algorithm for ship detection and segmentation**
G. Bottini, M. Corsi, F.C. Daffinà, S. Tilia, T. Stahl, D. Quattrociocchi
- 12:00 **Industry is the key for R&D transition to operational end-users - An innovative MSA project example powered by AI, led by CS**
M. Degache, L. Gardenal, J-C. Charles, V. Marié, B. Soloch, O. Tran
- 12:20 **Automatic recognition of underwater acoustic signature for naval purposes**
E. Artusi, F. Chaillan

BIG DATA ARCHITECTURES & SYSTEMS

Small Conference Room

Chair: C. Ray

- 14:20 **LIDARs usage in maritime operations and ECO – Autonomous shipping, for protection, safety and navigation for NATO allies awareness**
A. Pantazis
- 14:40 **Big data infrastructure for heterogeneous sources and data fusion services applied to maritime surveillance**
G. Vella, G. Barone, V. Latino, D. Messina, V. Morreale
- 15:00 **A cloud architecture for big data analytics and real-time anomaly detection in global maritime applications**
M.A. Biscardi, M. Cinque, M. Corsi, F.C. Daffinà, R. Della Corte, A. Di Martino, C. Perrotta, S. Recano, D. Quattrociocchi
- 15:20 **Development and Integration of coastal surveillance radar system over four seas**
A-A. Mert, S. Üzümcü, F. Atay

MARITIME SITUATIONAL AWARENESS AND ETHICS

Small Conference Room

Chair: F. de Rosa

- 16:30 **Redefining situation awareness for the maritime information warfare domain**
A-L. S. Lapinski
- 16:50 **Collaborative Space-based Maritime Situational Awareness (CSMSA)**
G. Thomas
- 17:10 **An ethical framework for maritime surveillance technology projects**
S. Sarlio-Siintola, T. Tammilehto, S. Siintola



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Thursday 10 October

08:30	Registration & Welcome coffee	Main Hall
09:00	Keynote presentation Ocean of Things John Waterston, DARPA	Main Conference Room
10:00	Coffee break	Garden
MARITIME UNMANNED SYSTEMS		Main Conference Room
Chair: R. Been		
10:30	Maritime cyber situational awareness elaboration for unmanned vehicles O. Jacq, P. Merino Laso, D. Brosset, J. Simonin, Y. Kermarrec, M-A. Giraud	
10:50	Smoothing optimal RRT* trajectories for recovery of an AUV by a moving surface vessel S. Williams, X. Wang, D. Angeley, C. Gilliam, B. Moran, T. Jackson, R. Ellem, A. Bessell	
11:10	How to measure distance between the elements of an underwater robotic swarm by power LEDs in unknown sea water conditions R. dell'Erba	
11:30	Copter currents high resolution surface current fields measured by a small UAV J. Horstmann, R. Carrasco, M. Streßer	
11:50	EC project presentation: COMPASS2020 Coordination of Maritime Assets for Persistent and Systematic Surveillance Nexhat Kapidani	Main Conference Room
12:10	Lunch	Garden
PERSISTENT SURVEILLANCE		Main Conference Room
Chair: G. Soldi		
13:10	Spire / ICEYE – Arctic maritime awareness platform F. Guillaume, Q. Gollier, C. Winquist, S. Andersson	
13:30	BalSAR: A stratospheric balloon-borne SAR system and its use for maritime surveillance M. Martorella, E. Aboutanios	
13:50	Persistent maritime surveillance against underwater contacts using a wave gliders: Fleet composition and effectiveness R. Kessel, C. Hamm, M. Taillefer	
14:10	EC project presentation (remote): ARCSAR Arctic and North Atlantic Security and Preparedness Network Bent-Ove Jamtli	Main Conference Room
14:30	CMRE presentation	Main Conference Room
15:20	Coffee break	Garden
15:50	Panel & Closure	Main Conference Room
17:00		

Legend

Keynote and plenary presentation
Regular sessions
Poster, demo and panel sessions
EC project presentations
Social events



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