AERONAUTICA Mmilitare

AFCEA NAPLES CHAPTER

2024 IEEE INTERNATIONAL WORKSHOP ON

# Technologies for Defense and Security

NAPOLI, ITALY / NOVEMBER 11-13, 2024

## [ FINAL PROGRAM ]

TECH DEFENSE

IEEE

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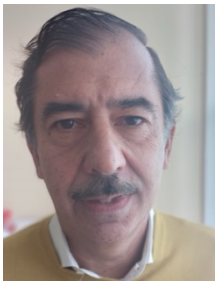
# IEEE TechDefense 2024 Keynote Speakers



## Plenary Session - Monday November 11 - H 09:45

## New Technologies for Future Radar

Filippo **de Stefani**
*LEONARDO*

## ABSTRACT

Leonardo is an international industrial group that creates multi-domain technological capabilities in the Aerospace, Defence & Security sectors. With over 51,000 employees worldwide, the company has a significant industrial presence in Italy, the United Kingdom, Poland, and the United States, and operates in 150 countries also through subsidiaries, joint ventures and shareholdings. A protagonist of the main international strategic programs, it is a technological and industrial partner of Governments, Defense Administrations, Institutions and companies. In 2022, it recorded consolidated revenues of € 14.7 billion and new orders of € 17.3 billion. Innovation, continuous research, digitization and sustainability are the pillars of its business around the world. Radar is one of the areas where Leonardo is active, offering advanced products. In this field, Leonardo remains at the forefront of technology with its AESA radar systems. A brief overview of some key products will be provided, and potential future developments will be explored, considering technological progress in various sectors.

## SPEAKER BIOGRAPHY

**Filippo de Stefani** carries out his activity at Leonardo where he is responsible for the Innovatio Hub within the Innovation group of the Electronics division. Previously he held the role of manager of the radar head processor (from A/D converter to track) with innovative projects and state-of-the-art processing architectures. He participated in the CNR "Information Systems and Parallel Computing" project. He was Project Leader in the ESPRIT TRACS (TRAffic Control Systems) project and held the role of Project Manager of the ECHOES project within the IV framework program of the European community. He was project manager of an internal project for the creation of an RHP (Radar Head Processor) to be used for the control of maritime traffic in ports.

In the academic year 91-92 he was a contract professor at the University of Pisa for the course "Introduction to computer systems" in the school for special purposes of technologies for environmental protection and safety. In the academic years 93-94, 94-95, 95-96 he was a contract professor at the University of Pisa for the "Fundamentals of Computer Science" course for the university diploma in mechanical, chemical and logistics engineering. He is the author of around 20 articles published in international journals.

## Plenary Session - Monday November 11 - H 10:15

# Emerging technologies and their effect on global security. The role of AFCEA

*Rear Adm.* Massimo **Esposito**
*AFCEA International's General Manager, AFCEA Europe*

## ABSTRACT

Over the past few years, the importance of technology in the preparation and conduct of military operations, as well as in terms of ability to influence the global security landscape is steadily increasing. As clearly stated in the 2022 NATO Strategic concept, Emerging and disruptive technologies (EDTs') are altering the character of conflict, acquiring greater strategic importance and becoming key arenas of global competition. Technological primacy increasingly influences success on the battlefield.

This changing nature of modern conflicts is characterized by the exploitation of new ways to fight (hybrid warfare) and by the insurgence of new confrontational domains (cyber, cognitive, information), alongside the traditional ones. In all of this, EDTs' are playing a significant role and could provide a new Revolution in Military Affairs.

The quest for technological superiority is becoming a major factor in the political agendas of the major powers. Consistent resources are allocated to achieve global technological leadership, which could boost the national economies and at the same time be a prerequisite for success in the future battlefield. Moreover, the increased accessibility and availability of those new technologies is reducing the technological gap between states and could bring an increased risk of confrontation, often below the threshold of war.

In this context, a continuous forum for networking and exchange of ideas and experiences between government/military, industry and academia is more important now than before. This is exactly the role of an international organization like AFCEA, that aims to connect, people, ideas and solutions globally, with a specific focus on C5ISTAR and new technologies.

## SPEAKER BIOGRAPHY

Italian navy Rear Adm. Massimo Esposito (Ret.) is AFCEA International's general manager, AFCEA Europe.

Esposito comes to AFCEA after serving for three years at the NATO headquarters in Brussels, focusing on new technologies and their effects on future warfare.

Esposito entered the Italian Naval Academy in 1983 and spent 15 years serving aboard warships as an antisubmarine warfare, operations and executive officer.
In addition to his command assignments, Esposito served in a variety of senior positions at single service, joint and international levels, including: Maritime Operations Center manager at NATO Naval headquarters, Naples, Italy; directing staff, teacher and senior researcher at the Italian Joint Staff College, Rome; executive and military assistant to the commanding officer of the Italian Naval Staff College, Venice, Italy; plans section head and military cooperation team leader at NATO Joint Forces Command, Brunssum, the Netherlands; director of the Centre for Maritime Studies at the Italian Naval Staff College, Venice, Italy; and branch head and military assistant at the Italian Military Delegation, NATO HQ, Brussels.
He earned a Master of Arts in defense studies from King's College in London and in international, strategic and military studies from LUISS Guido Carli University in Rome. He also holds a Bachelor of Science in physics from the University of Lecce in Italy, a Bachelor of Science in naval and maritime science from the University of Pisa in Italy and a Bachelor of Arts in political science from the University of Trieste in Italy. He has also successfully attended the Advanced Command and Staff Course at the Joint Services Command and Staff College in Shrivenham, U.K.

## Plenary Session - Wednesday November 13 - H 12:00

# Trends, Technologies, and Issues for Defense and Security - a Contractor's Perspective

C. Nils **Smith**
*Southwest Research Institute, US*

**ABSTRACT**

Southwest Research Institute is an Independent, Not-for-Profit Applied Engineering Research and Development organization. Over 60% of it's work is for the US Government, but a significant amount of it is for our international allies. That along with heavy involvement with IEEE and IEEE-USA as the Chair of the R&D Policy Committee gives Mr. Smith a unique perspective on issues affecting the international defense community.
In addition to shared adversaries, we also face shared challenges in availability of technologies (especially semiconductors), cybersecurity, pace of contracting, the modern technology update and fielding cycle, and the impacts of AI from defense against it to its responsible deployment. Mr. Smith will discuss these areas and their impact on our common defense. The best take away from this brief discuss is we continue to face many challenges but are in this together.

## SPEAKER BIOGRAPHY

**Mr. Smith** has accumulated significant experience in the design, development, and testing of shipboard, land-based, and airborne Electronic Support systems and in the management and development of related projects and programs. His work has concentrated on the MF, HF, VHF, and UHF bands and has involved Adaptive Doppler, Simple Loop, Spaced Loop, Dipole Adcock, Quadrupole Adcock, Phase Sampled Interferometer, Phase Mode, Wullenweber, Vector Matching, and Adaptive Antenna Array Superresolution direction finding techniques and radiolocation techniques.

Mr. Smith has had extensive experience with military, ragged commercial and commercial design requirements and in project, program, and administrative management. His main technical emphasis has been in the area of direction finding antennas, beam-forming networks, and RF system design and analysis. Mr. Smith has promoted, developed, and managed programs for U.S. and foreign governments as well as U.S. and foreign commercial organizations. His experience includes management of multi-million-dollar programs and acting as the Principal Investigator for SwRI- sponsored Internal Research projects. He has managed programs involving analysis, research, development, production, testing, consulting, training, and field services. He also led numerous QRC efforts. He is experienced with cost/schedule status control systems and other modern project management techniques involving technical performance, fiscal, schedule, personnel, documentation, logistics, reliability, maintainability, and security. Mr. Smith has also served as an instructor and course administrator for courses in Signal Exploitation and Geolocation, Radio Direction Finding, and RF Systems Engineering. He is also experienced with ISO-9001, AS9100, and CMMI for Development quality management systems and NIST 800-171 and CMMC compliance.

Mr. Smith was selected as the Engineering Manager of the Year by the Engineering Management Society of the Institute of Electrical and Electronic Engineers (IEEE) for 2006. He was also awarded the Dixie Crow Stanley B. Hall Executive Management Award in 2020 and Dixie Crow Anton D. “Tony” Brees Lifetime Service Award.

He earned Certificates in Executive Leadership, Managerial Leadership, Marketing, and Strategic Decision and Risk Management from the UT Austin McCombs School of Business.

Mr. Smith serves on Advisory Boards/Councils for Trinity University in Engineering Science and the UTSA in Electrical and Computer Engineering. He also serves on the BSA Alamo Area Council Executive Board, the Westside Family YMCA Board, SOSA Advisory Board, and the JBSA 5G Steering Committee. He is currently the Chair of the IEEE LSS TEMS Chapter and the IEEE-USA R&D Policy Committee and is the Past Chair of the IEEE Lone Star Section and Vice Chair of the IEEE LSS Government Relations Committee. Mr. Smith also serves as the Treasurer for the IEEE LSS Technology & Engineering Management Chapter and has been Technical Co-Chair multiple times for the IEEE/AIAA Digital Avionics Systems Conference.

# IEEE TechDefense 2024 Tutorial

## Tutorial Session - Tuesday November 12 - H 15:00

## Anti-Drone Systems Technologies: Innovations, Challenges, and Future Applications

Giuseppe **Albino**
*SAGREDO ENGINEERING*

### ABSTRACT

The increasing use of drones has led to the need to develop advanced anti-drone systems to protect critical infrastructures, public spaces, and restricted areas from potential security threats. This talk explores emerging and established technologies in the field of anti-drone systems, highlighting the main approaches used, including radar detection, radio frequency analysis, the use of electro-optical sensors, and other factors. It will address the technical challenges related to distinguishing between legitimate and hostile drones, the effectiveness of jamming systems, as well as the necessary evolution of regulations for managing these technologies. The talk will also analyze concrete use cases and examples and discuss future prospects, focusing on how artificial intelligence and machine learning can enhance detection and response capabilities. It will conclude with a discussion on implications of these technologies in the context of security and privacy.

### SPEAKER BIOGRAPHY

**Giuseppe Albino** is the General Manager of SAGREDO ENGINEERING. He received the degree in Electronic Engineering by the University of Naples Federico II, Italy in 2001. From 1996 to 2000 he was in the Italian Navy dealing with the Naval-Electronic domain. His professional interests include quality management and regulation, innovation technology, and security management. SAGREDO ENGINEERING is a leading company in the development of cutting-edge technologies for the creation of integrated Security Systems, specializing in anti-drone systems designed to protect critical infrastructures, airspaces, and sensitive locations. With over 15 years of experience in designing, developing, and integrating complex systems for the defense and protection of critical sites, SAGREDO ENGINEERING offers a comprehensive range of solutions, including radar detection, RF interference, and countermeasures for unauthorized drone activity. Thanks to a team of experts in robotics, artificial intelligence, and telecommunications, the company constantly innovates to provide state-of-the-art solutions that meet the strictest security requirements. SAGREDO ENGINEERING recently deployed its advanced anti-drone system at a large critical government site, following an increase in unauthorized drone

incursions near flight paths. The system integrates radar, RF detection, and real-time video analysis (optical and thermal) to identify and neutralize potential threats through GPS Spoofing Jammers within a 10-kilometer radius. Upon detecting an unauthorized drone, the system initiates an automated response, emitting RF jamming signals to disable the drone's control mechanisms, ensuring the safety of operations and airport activities without the need for physical intervention. The project has significantly reduced security risks, allowing uninterrupted operations while complying with aviation safety regulations.

# IEEE TechDefense 2024 Venue

**IEEE TechDefense 2024** will be held at the **Conference Center of the University of Naples Federico II**.

## ADDRESS

Via Partenope, 36
Napoli
**Use the QRCode to open the location on *Google Maps***

# IEEE TechDefense 2024 Social Events

## Welcome Party - Monday, November 11

The IEEE TechDefense **Welcome Party** will be held at "*Galleria Navarra*" on Monday, November 11 - 19:30.

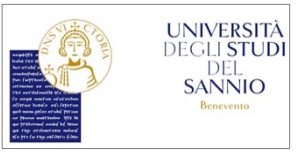
**ADDRESS**
Galleria Navarra Rossopomodoro
Piazza dei Martiri, 23 - Napoli

## Gala Dinner - Tuesday, November 12

The IEEE TechDefense **Gala Dinner** will be held at "*La Bersagliera 1919*" Restaurant on Tuesday, November 12 - 20:00.

**ADDRESS**
Ristorante La Bersagliera 1919
Borgo Marinari, 10/11 - Napoli

# IEEE TechDefense 2024 Patronages



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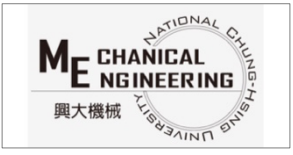
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# IEEE TechDefense 2024 Sponsors

# Program Schedule - Monday, November 11

| MONDAY - NOVEMBER 11, 2024 | | | |
|---|---|---|---|
| 09:00 - 09:30 | OPENING CEREMONY - Room A3 - Third Floor | | |
| 09:30 - 09:45 | Domenico Accardo, University of Naples Federico II, CESMA<br>TechDefense 2024 - A CESMA initiative | | |
| 09:45 - 10:15 | KEYNOTE SESSION - Filippo De Stefani, Leonardo<br>New technologies for future radar | | |
| 10:15 - 10:45 | KEYNOTE SESSION - Massimo Esposito, Italian Navy Rear Adm. (Ret.), AFCEA Europe<br>Emerging technologies and their effect on global security. The role of AFCEA | | |
| 10:45 - 11:00 | COFFEE BREAK | | |
| 11:00 - 12:15 | **Panel AFCEA** | | |
| | AKRON CYBER SHIELD - Quantum Resistant Hardware Mobile Encrypter Platform for Defense and Critical Applications<br>History and newest 2024 upgrades<br>Michele Cortese, CEO AKRON C4SEC - Antonio Corbo Esposito, Full Professor at University of Cassino | | |
| | Enhancing Business Intelligence with AI: Power BI and Copilot in Action<br>Marco Siciliano, SMS Engineering | | |
| | Multi purpose integrated Inspection System EvolutioN for mro Operation<br>Rosario Giordano, Consorzio MISENO | | |
| 12:15 - 13:15 | ROUND TABLE - Women in Engineering | | |
| 13:15 - 14:40 | LUNCH | | |
| | Room A3 - Third Floor | Room A - Ground Floor | Room B - Ground Floor |
| 14:40 - 16:20 | ROUND TABLE - Quantum Technology for Defence | Session 1.2 - Non-invasive monitoring of psychophysiological states of military personnel during operation and training | Session 1.3 - IEEE Women in Engineering with Focus in Cybersecurity and AI - PART I |
| 16:20 - 16:40 | COFFEE BREAK | | |
| | Room A3 - Third Floor | Room A - Ground Floor | Room B - Ground Floor |
| 16:40 - 18:20 | Session 2.1 - Novel Sensing for ISR and Radar EW | Session 2.2 - General Session - PART I | Session 2.3 - IEEE Women in Engineering with Focus in Cybersecurity and AI - PART II |
| | | | |
| 19:30 | WELCOME PARTY - GALLERIA NAVARRA | | |

# Program Schedule - Tuesday, November 12

| TUESDAY - NOVEMBER 12, 2024 | | | |
|---|---|---|---|
| | Room A3 - Third Floor | Room A - Ground Floor | Room B - Ground Floor |
| 09:00 - 10:40 | Session 3.1 - Battlefield Operational Technology and Secure Internet of Battlefield Things | Session 3.2 - Enabling technologies for enhancing the resilience of power systems infrastructures | Session 3.3 - Young Researchers Activities in Technologies for Defense and Security |
| 10:40 - 11:00 | COFFEE BREAK | | |
| 11:00 - 12:00 | Session 4.1 - Non-contact measurement systems for defense and security | Session 4.2 - Instrumentation and Measurement Technology for Defense and Security | Session 4.3 - General Session - PART II |
| 12:00 - 13:40 | ROUND TABLE - Counter Drone System (C-UAS) | | |
| 13:40 - 15:00 | LUNCH | | |
| 15:00 - 15:45 | TUTORIAL - Anti-Drone Systems Technologies: Innovations, Challenges, and Future Application<br>Giuseppe Albino, SAGREDO ENGINEERING | | |
| 15:45 - 16:15 | COFFEE BREAK | | |
| 16:15 - 17:55 | Session 5.1 - Counter Unmanned Aerial Systems (C-UAS) Technologies | | |
| | | | |
| 20:00 | GALA DINNER - La Bersagliera | | |

# Program Schedule - Wednesday, November 13

| WEDNESDAY - NOVEMBER 13, 2024 | | | |
|---|---|---|---|
| | Aula Magna - First Floor | Room A - Ground Floor | Room B - Ground Floor |
| 09:00 - 10:40 | Session 6.1 - Ethics & Law of Technologies for Defense and Security | Session 6.2 - Applied Artificial Intelligence for Defense and Security Mechatronic Systems | Session 6.3 - Innovative Security Concepts and Applications in Aerospace Systems |
| 10:40 - 11:00 | COFFEE BREAK | | |
| 11:00 - 12:00 | ROUND TABLE - Autonomous Weapons and Human Responsibility: Legal, Ethical and Political Perspectives on Artificial Intelligence in Defense | Session 7.2 - General Session - PART III | Session 7.3 - Future Radar Technology PART I |
| 12:00 - 12:45 | KEYNOTE SESSION - C. Nils Smith<br>Trends, Technologies, and Issues for Defense and Security - a Contractor's Perspective | | |
| 12:45 - 14:10 | LUNCH | | |
| | Aula Magna - First Floor | Room A - Ground Floor | Room B - Ground Floor |
| 14:10 - 15:50 | Session 8.1 - Advanced Methods and Technologies for Flight Safety and Defense Systems Integration - PART I | Session 8.2 - Technology, application, and metrology of directed energy weapons | Session 8.3 - Future Radar Technology PART II |
| 15:50 - 16:10 | COFFEE BREAK | | |
| 16:00 - 17:50 | Session 9.1 - Advanced Methods and Technologies for Flight Safety and Defense Systems Integration - PART II | Session 9.2 - ISaCAGE: integration and coexistence of sensing and communication systems that share the same spatial and spectrum resources | |
| 17:50 - 18:30 | CLOSING AND AWARD CEREMONY | | |

# Technical Program - Monday, November 11

| | |
|---|---|
| *08:30 - 18:00* | *Congress Center University of Naples Federico II - Ground Floor*<br>**REGISTRATION** |

| | |
|---|---|
| *09:00 - 09:30* | *Room A3 - Third Floor*<br>**OPENING CEREMONY** |

| | |
|---|---|
| *09:30 - 09:45* | *Room A3 - Third Floor*<br>**INVITED TALK** |

**IEEE TechDefense 2024 - A CeSMA Initiative**

Domenico Accardo, *University of Naples Federico II, CeSMA*

| | |
|---|---|
| *09:45 - 10:15* | *Room A3 - Third Floor*<br>**PLENARY SESSION - KEYNOTE SPEAKER** |

**New Technologies for Future Radar**

Filippo De Stefani, *Leonardo*

| | |
|---|---|
| *10:15 - 10:45* | *Room A3 - Third Floor*<br>**PLENARY SESSION - KEYNOTE SPEAKER** |

**Emerging technologies and their effect on global security. The role of AFCEA**

Rear Adm. Massimo Esposito, *AFCEA International's General Manager, AFCEA Europe*

| | |
|---|---|
| *10:45 - 11:00* | *Third Floor*<br>**COFFEE BREAK** |

| | |
|---|---|
| *11:00 - 12:15* | *Room A3 - Third Floor*<br>**AFCEA - Chapter of Naples - PANEL SESSION** |

**AKRON CYBER SHIELD - Quantum Resistant Hardware Mobile Encrypter Platform for Defense and Critical Applications - History and newest 2024 upgrades**
Michele Cortese, *CEO AKRON C4SEC* - Antonio Corbo Esposito, *Full Professor at University of Cassino*

**Enhancing Business Intelligence with AI: Power BI and Copilot in Action**
Marco Siciliano, *SMS Engineering*

**Multi purpose integrated Inspection System EvolutioN for mro Operation**
Rosario Giordano, *Consorzio MISENO*

| | |
|---|---|
| *12:15 - 13:15* | *Room A3 - Third Floor*<br>**ROUND TABLE - Woman in Engineering** |

| | |
|---|---|
| *13:15 - 14:40* | *Third Floor*<br>**LUNCH** |

| | |
|---|---|
| *14:40 - 16:20* | *Room A3 - Third Floor*<br>**ROUND TABLE - Quantum Technology for Defence**<br>**MODERATOR:** Paolo De Natale, *Research Director, CNR-INO* |

Quantum technologies are set to revolutionize many sectors by enabling faster computation, more sensitive sensors, and highly secure communications. Quantum technologies will have a major impact on security and are expected to provide new opportunities for defence forces.

Quantum computing promises to significantly enhance data processing capabilities, improving, for instance, decision-making in real-time battle scenarios. Quantum sensors offer highly precise navigation and detection systems, allowing for better situational awareness in defence operations, even in GPS-denied environments. However, these technologies also present new challenges, as adversaries could exploit quantum capabilities to undermine current cryptographic systems and develop advanced surveillance techniques. Quantum Key Distribution (QKD) offers an innovative and future-proof method for securely protecting sensitive information.

To explore such advancements, the round table will delve into awareness of quantum technologies, their potential and deployment scenarios, especially for security and defence, and with a particular focus on different operational domains, including underwater. The session will also highlight the current state of QKD deployment and future challenges, especially its integration into emerging technologies like drones, unmanned vehicles, and others.

**PANELISTS**

Andrea Masini, *CEO, Flyhsight*

Antonella Sanguineti, *Head of PM Secure Cloud & Networking Solutions, Sparkle*

Patrizia Livreri, *Associate Professor, Department of Engineering, University of Palermo*

Tommaso Occhipinti, *CEO, QTI*

*14:40 - 16:20* *Room A - Ground Floor*

**Session 1.2 - Non-invasive monitoring of psychophysiological states of military personnel during operation and training**

**14:40** **Predicting Operator Situation Awareness From Psychophysiological Signals: Utility of Personalized and Universal Models**
Johnny Zhang, Neil Banerjee, Jacob R. Kintz, Torin K. Clark and Allison Hayman (University of Colorado Boulder, USA)

**15:00** **Evaluation of Drone Pilots' Sympathetic and Parasympathetic Nervous System Responses During Simulated Flight in Familiar and Unfamiliar Environments**
Przemyslaw Wojciechowski and Konrad Wojtowicz (Military University of Technology, Poland); Jan Błaszczyk (Calisia University, Poland); Jakub Djabin (Military University of Technology Warsaw, Poland); Jakub Kochan, Maciej Kurenda and Adam Marut (Military University of Technology, Poland)

**15:20** **Evaluating Startle in Aviation: A Focus on Instrumentation and Measurement Techniques**
Francesco Romano (University G. d'Annunzio of Chieti-Pescara, Italy); Michele Tritto (Next2U, Italy); Michele Giuseppe Di Cesare (University G. d'Annunzio of Chieti-Pescara, Italy); Sergio Nocco (Next2U, Italy); Daniela Cardone (University of Chieti-Pescara, Italy)

**15:40** **Evaluating the Cognitive Load of Pilots: A Review of Workload Assessment Tools and Data Analysis Methods**
Michele Giuseppe Di Cesare (University G. d'Annunzio of Chieti-Pescara, Italy); Michele Tritto (Next2U, Italy); Francesco Romano (University G. d'Annunzio of Chieti-Pescara, Italy); Alessandro Tiberio (Next2U srl, Italy); Daniela Cardone (University of Chieti-Pescara, Italy)

**16:00** **AeroStim: A NASA MATB-II Evolution**
Michele Giuseppe Di Cesare and Sergio Nocco (Next2U, Italy); Manish Chinthakindi, Alessandro Tiberio and Michele Merla (Next2U srl, Italy); Michele Tritto (Next2U, Italy); Arcangelo Merla (University G. d'Annunzio of Chieti-Pescara, Italy)

| *14:40 - 16:00* | *Room B - Ground Floor*<br>**Session 1.3 - IEEE Women in Engineering with Focus in Cybersecurity and AI - PART I** |
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**14:40** **Impact of Cyberattacks on Human's Health**
Vassil Guliashki (Institute of Information and Communication Technologies - BAS, Bulgaria); Galia Marinova (Technical University of Sofia, Bulgaria & Technical University-Sofia, Bulgaria)

**15:00** **Bridging the Gender Gap: Women in Georgia's Cybersecurity Future**
Ketevani Grdzelidze (Caucasus University, Georgia & Scientific Cyber Security Association, Georgia)

**15:20** **Cyber Social Security in Multi-Domain Operations**
Vita Santa Barletta (University of Bari, Italy); Miriana Calvano and Annita Sciacovelli (University of Bari Aldo Moro, Italy)

**15:40** **Cybercity: a Practical Approach to Teach and Learn Cybersecurity in Smart Cities**
Luca De Vito (University of Sannio, Italy); Salvatore Bramante and Mauro D'Angelo (Perlatecnica, Italy); Galia Marinova (Technical University of Sofia, Bulgaria & Technical University-Sofia, Bulgaria); Javier Orozco-Messana (Technical University of Valencia, Spain)

| *16:20 - 16:40* | *Third Floor*<br>**COFFEE BREAK** |
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| *16:40 - 18:20* | *Room A3 - Third Floor*<br>**Session 2.1 - Novel Sensing for ISR and Radar EW** |
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**16:40** **Practical Approach for Processing and Fusion of Multimodal Data for Reconnaissance**
Refiz Duro (AIT Austrian Institute of Technology GmbH, Austria); Axel Weißenfeld (AIT Austrian Institute of Technology Gmbh, Austria); Christoph Singewald (Syncpoint GmbH, Austria); Medina Andresel (AIT Austrian Institute of Technology GmbH, Austria); Dražen Ignjatović and Veronika Siska (AIT Austrian Institute of Technology Gmbh, Austria)

**17:00** **Scale Invariant Coherent Change Detection to Locate Micro-Motion in Single Pass SAR Images**
Finlay Rollo, Aleksanteri Vattulainen and Christos V. Ilioudis (University of Strathclyde, United Kingdom (Great Britain)); Pietro Milillo (University of Houston, USA); Carmine Clemente (University of Strathclyde, United Kingdom (Great Britain))

**17:20** **Rapid Radio Frequency Propagation Modelling Using a Generative Adversarial Network**
Aled Catherall and Josip Rozman (Plextek, United Kingdom (Great Britain))

**17:40** **On Cognitive Radar Jamming for Countering Cognitive Electromagnetic Protection Systems**
Hemanga Banerjee, Christos V. Ilioudis and Carmine Clemente (University of Strathclyde, United Kingdom (Great Britain)); Christopher Williams (DSTL, United Kingdom (Great Britain))

**18:00** **A Cognitive-Based ISAR System for Spectral Compatibility Applications**
Massimo Rosamilia (University of Naples Federico II, Italy); Augusto Aubry (Universita degli studi di Napoli, Italy); Alessio Balleri (Cranfield University, United Kingdom (Great Britain)); Antonio De Maio (University of Naples "Federico II", Italy); Marco Martorella (University of Birmingham, United Kingdom (Great Britain))

*16:40 - 18:20* *Room A - Ground Floor*
**Session 2.2 - General Session - PART I**

**16:40** **Feasibility of Deploying a Vertical Chain of Multicopter Drones Along a Shared Tether to Provide a Stratospheric High Altitude Platform Station**
Paul Cuffe and Barry McNicholl (University College Dublin, Ireland)

**16:56** **An Analysis of the Feasibility of Providing On-Demand Ground Level Illumination From a Loitering Unmanned Aerial Vehicle**
Ethan Cunningham (University College Dublin, Ireland); John Healy (University Collage Dublin, Ireland); Paul Cuffe (University College Dublin, Ireland)

**17:13** **Addressing Ionospheric Impairments in the Azimuth Ground Displacements Retrieved by Using SAOCOM-1 L-Band SAR Data**
Marianna Franzese (IREA-CNR & University of Naples Federico II, Italy); Antonio De Maio (University of Naples "Federico II", Italy); Riccardo Lanari (IREA-CNR, Italy); Augusto Aubry (Universita degli studi di Napoli, Italy); Paquale Noli, Giovanni Onorato, Yenni Lorena Belen Roa, Pasquale Striano and Claudio De Luca (IREA-CNR, Italy)

**17:30** **5G Mobile Network With Blockchain, IoT and Drones Integration for Military Applications**
Petrica Ciotirnae (Military Technical Academy Ferdinand I, Romania)

**17:46** **Integrating Byzantine Fault Tolerance Into Hyperledger Fabric: Implementation and Performance Analysis of the BDLS Protocol**
Ahmed Al Salih (University of North Carolina at Charlotte, USA & AholdDelhaize, USA)

**18:03** **Cuffless Blood Pressure Stratification and Hypertension Recognition Using Wearable PPG Sensor for Continuous Soldier Health Monitoring**
Yalagala Sivanjaneyulu (Indian Institute of Technology Bhubaneswar, India); M Sabarimalai Manikandan (Indian Institute of Technology Palakkad, India); Srinvas

Boppu (Indian Institute of Technology Bhubaneswar, India); Linga Reddy Cenkeramaddi, Sr (University of Agder, Norway)

| *16:40 - 18:00* | *Room B - Ground Floor*<br>**Session 2.3 - IEEE Women in Engineering with Focus in Cybersecurity and AI - PART II** |
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**16:40** **Identification Hardware Attacks of Integrated Circuit Design Data and Intellectual Property**
Eriselda Malaj (Aleksander Moisiu University - Durres, Albania); Galia Marinova (Technical University of Sofia, Bulgaria & Technical University-Sofia, Bulgaria)

**17:00** **AI as a Tool of Disinformation in the International Arena**
Ketevani Grdzelidze (Caucasus University, Georgia & Scientific Cyber Security Association, Georgia)

**17:20** **Analysis of Artificial Intelligence Subject Results by Gender**
Gabor Kiss (Obuda University, Hungary); Susana Moreira Bastos (Polytechnic of Porto, Portugal)

**17:40** **A Comparative Scoping Study of Local and Regional Museum Storage Solutions**
László Lőrincz, Gabor Kiss and Arnold Őszi (Obuda University, Hungary)

| *19:30* | *Galleria Navarra - Piazza dei Martiri, 23 - Napoli*<br>**WELCOME PARTY** |
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# Technical Program - Tuesday, November 12

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| *08:30 - 18:00* | *Congress Center University of Naples Federico II - Ground Floor*<br>**REGISTRATION** |

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| *09:00 - 10:40* | *Room A3 - Third Floor*<br>**Session 3.1 - Battlefield Operational Technology and Secure Internet of Battlefield Things** |

**09:00** **Black-Box Adversarial ML Attacks on IDS and Multi-Domain Impact Analysis for Threat Intelligence in Automotive Scenarios**
Vita Santa Barletta (University of Bari, Italy); Danilo Caivano (Università di Bari, Italy); Christian Catalano and Samuele del Vescovo (University of Bari Aldo Moro, Italy)

**09:20** **Measuring the Risk of Evasion and Poisoning Attacks on a Traffic Sign Recognition System**
Vita Santa Barletta (University of Bari, Italy); Christian Catalano, Mattia Colucci and Mirko De Vincentiis (University of Bari Aldo Moro, Italy); Antonio Piccinno (University of Bari, Italy)

**09:40** **Energy Efficiency for Tactical Cloud, Edge and IoT Continuum: Helping the Military Dominate the Battlespace**
Antonio Caruso (University of Salento, Italy)

**10:00** **The Impact of 3D Printing on the Defense Industry**
Mohamed zied Chaari (Qatar University, Qatar)

**10:20** **Not Sure Your Car Withstands Cyberwarfare**
Giampaolo Bella, Gianpietro Castiglione and Sergio Esposito (Università degli Studi di Catania, Italy); Mario Raciti (IMT School for Advanced Studies Lucca, Italy); Salvatore Riccobene (University of Catania, Italy)

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| *09:00 - 10:40* | *Room A - Ground Floor*<br>**Session 3.2 - Enabling technologies for enhancing the resilience of power systems infrastructures** |

**09:00** **Toward a Security Operation Center for Operational Technology in Industrial Networks**
Giovanni Battista Gaggero (Università Degli Studi di Genova, Italy); Roberto Caviglia (University of Genova, Italy); Paola Girdinio and Mario Marchese (University of Genoa, Italy)

**09:20** **Advanced Monitoring With Enhanced Security in Critical Infrastructures: The DOSSIER Framework**
Carmelo Mineo (National Research Council (CNR), Italy); Roberto Nardone (University of Naples Parthenope, Italy); Michele Paoletti and Giovanni Paragliola (National Research Council (CNR), Italy); Alfredo Petruolo (University of Naples Parthenope, Italy)

**09:40** **Multiple Approaches for Studying Energy Systems Cybersecurity Issues**
Giovanna Adinolfi (ENEA & University of Salerno, Italy); Roberto Ciavarella, Giorgio Graditi and Maria Valenti (ENEA, Italy); Alioscia Hamma (University of Naples Federico II Napoli, Italy); Lorenzo Campos Venuti (University of Naples, Italy)

**10:00** **Artificial Intelligence Solutions for Cybersecurity in Energy Systems**
Olga Degtiareva (Odessa National Economic University, Ukraine); Natalia Shyriaieva (Rhine-Waal University of Applied Sciences, Germany & National Technical University Kharkiv Polytechnic Institute, Ukraine); Tetiana Kuklinova (Odessa National Economic University, Ukraine)

**10:20** **A Comparison of Microgrids Design Tools: An Area of Development for New Decision Support Systems**
Nafisul Musfiq and Bharath Kumar Sugumar (Università di Pavia, Italy); Norma Anglani (University of Pavia, Italy)

*09:00 - 10:20* *Room B - Ground Floor*
**Session 3.3 - Young Researchers Activities in Technologies for Defense and Security**

**09:00** **Deep Learning Based Persistent Scatterers Detection: First Results**
Weili Tang (University of Napoli Parthenope, Italy & IREA-CNR, Italy); Simona Verde (CNR-IREA, Italy); Sergio Vitale (University of Naples Parthenope, Italy); Giampaolo Ferraioli, Gilda Schirinzi and Vito Pascazio (Università di Napoli Parthenope, Italy); Gianfranco Fornaro (CNR-IREA, Italy)

**09:20** **Open Innovation Model in Military Environments: A Preliminary Case of Aerospace Challenges**
Alexandra Zabala-López (Colombian Air Force, Colombia); Mario Linares-Vásquez and Yezid E. Donoso (Universidad de los Andes, Colombia)

**09:40** **Boosting Resolution of VHR Remote Sensing Images Using CNN**
Matteo Ciotola (University of Naples Federico II, Italy); Giovanni Poggi (Università Federico II di Napoli, Italy); Giuseppe Scarpa (University of Naples Parthenope, Italy)

**10:00** **Machine Learning-Based Design of Meta-Covers for Linear Antenna Beam-Shaping**
Michela Longhi and Stefano Vellucci (Niccolò Cusano University, Italy); Mirko Barbuto, Alessio Monti, Filiberto Bilotti and Alessandro Toscano (Roma Tre University, Italy)

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| *10:40 - 11:00* | *Third Floor*<br>**COFFEE BREAK** |

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| *11:00 - 12:00* | *Room A3 - Third Floor*<br>**Session 4.1 - Non-contact measurement systems for defense and security** |

**11:00** **Enhanced GSR Detection by Multispectral Illumination for Forensic Shooting Distance Analysis**
Vittoria Medici (Università Politecnica Delle Marche, Italy); Milena Martarelli, Paolo Castellini, Giuseppe Pandarese and Nicola Paone (Università Politecnica delle Marche, Italy); Vito Alessandro Spinelli, Gaetano Rizza, Giuseppe Riccio and Massimiliano Olivieri (Gabinetto Interregionale Polizia Scientifica per le Marche e L'Abruzzo, Italy); Rita Padovani (Gabinetto Interregionale Polizia Scientifica per le Marche e l Abruzzo, Italy)

**11:20** **A Lens-Based Graded-Index Dielectric Ring for Multibeam Radiation**
Marco Simone and Gino Sorbello (University of Catania, Italy)

**11:40** **Preventive and Predictive Maintenance of Medium Complexity Autonomous Vehicles**
Enrico Petritoli (Università degli Studi "Roma Tre", Italy); Ettore De Francesco and Ruggero De Francesco (SeTeL, Italy); Eduardo De Francesco (SETEL, Italy); Fabio Leccese ("Roma Tre" University, Italy)

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| *11:00 - 12:00* | *Room A - Ground Floor*<br>**Session 4.2 - Instrumentation and Measurement Technology for Defense and Security** |

**11:00** **Measurements and Instrumentation for the Security of Networking Cables**
Pasquale Daponte, Luca De Vito, Francesco Picariello, Sergio Rapuano and Ioan Tudosa (University of Sannio, Italy)

**11:20** **UAV Test-Bench Platform for Propeller Diagnostics Using Machine Learning**
Pasquale Daponte, Luca De Vito, Francesco Picariello and Ioan Tudosa (University of Sannio, Italy)

**11:40** **Experimental Methodology to Validate Tracked Vehicle Dynamics Models**
Enrico Galvagno, Antonio Tota, Mauro Velardocchia (Politecnico di Torino), Pierpaolo Dotoli, Paola Tiberi, Lorenzo Lamberti, Giacomo Mannino (CEPOLISPE), Giuseppe Pepe (Politecnico di Torino)

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| *11:00 - 12:00* | *Room B - Ground Floor*<br>**Session 4.3 - General Session - PART II** |

**11:00** **Exploiting LLMs for E-Learning: A Cybersecurity Perspective on AI-Generated Tools in Education**
Danilo Greco (Politecnico di Milano, Italy); Luca Chianese (Università degli Studi di Genova, Italy)

**11:10** **Scattering Center Extraction for ISAR Images Using U-Net Based Semantic Segmentation**
Dal-Jae Yun, Junhyeong Park, Haewon Jung, Hoon Kang, Ha-Rim Lee and In-Yong Park (Korea Research Institute of Standards and Science, Korea (South))

**11:20** **Trajectory Backtracking Guidance Control for Head-On Interception of High-Speed Ballistic Targets**
Erhan Bülbül and Aydin Cetin (Gazi University, Turkey)

**11:30** **UAV Security Logs Processing Using Machine Learning Algorithms**
Cristian Bucur (Polytechnique Montreal, Canada); Gabriella Nicolescu (Ecole Polytechnique de Montreal, Canada)

**11:40** **Deep Learning Based Soldier Face Detection and Counting Method for Military Tactical Operations and Artificial Intelligence Powered Weapons**
Sivaranjini P N and M Sabarimalai Manikandan (Indian Institute of Technology Palakkad, India); Linga Reddy Cenkeramaddi, Sr (University of Agder, Norway)

**11:50** **Quality-Aware Rhythm-Aware Heart Rate Variability Analysis for Soldier Health and Wellness Monitoring Using Wearable ECG Sensing Devices**
M Sabarimalai Manikandan and Jomole Varghese V (Indian Institute of Technology Palakkad, India); Linga Reddy Cenkeramaddi, Sr (University of Agder, Norway)

*12:00 - 13:40* *Room A3 - Third Floor*
**ROUND TABLE - Counter Drone System (C-UAS)**

The increasing number of drones in the skies and their safe and settled integration into the airspace represents the core challenge to implement the market.
Over recent years, in Europe as well as in the rest of the world the number of incidents involving drones has increased significantly. In most cases unauthorised drones, called malicious drones, have been identified inside and around the airports. All the EU members are expected to collaborate in order to minimise the threats that unidentified UAS and drones can represent paying particular attention to terroristic attacks.
Drones are currently and commonly deployed to smuggle goods across the borders or into the prisons, to disrupt critical infrastructure and threatens common people.
The use of weaponised drones which is increasing in conflict zones in Europe represents further inspiration for terrorists.
Italy and EU member states are designing Counter Drone Systems (C-UAS) solution to intercept and neutralize mini/micro UAV in several scenario and environments around areas at risk.
The employment of a Counter Drone system (C-UAS) involves a complex multi step process; the aim of the round table is to envolve all state agencies and industries to identify common lines of action to ensure broad protection against the hostile use of drones.

**AGENDA**

**The criminal use of drones in prisons: analysis of the Italian context and research of the most suitable C-uas technological solutions**
Dr Antimo Cicala - *Dipartimento Amministrazione Giustizia*

**Counter Drone Systems: from military to civil applications**
Eng. Antonio Manna - *Elettronica SpA*

**The threat posed by drone and the C-UAS technologies**
Lt. Col. Alessio Alfonso Iozzino - *Chief Innovation Department, Italian Army - Centro di Eccellenza Counter Mini e Micro APR*

**Leonardo technology providing C-UAS capabilities in the emerging scenarios: on going developments and future evolutions**
Eng. Domenico Vigilante - *Leonardo*

**ITAF C-UAS systems**
Col. Mario D'agostino - *Capo Ufficio Forze di Protezione e Speciali - Italian Air Force, Comando Squadra Aerea*

**Drones and threats X Milan Airports challenges**
Eng. Pierpaolo De Lazzari - *Sea Milano*

**Drone detection in airport environments: Current status, emerging challenges, and the ENAC perspective**
Eng. Mario Salipante - *ENAC - Italian Civil Aviation Authority*

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| *13:40 - 15:00* | *Third Floor*<br>**LUNCH** |

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| *15:00 - 15:45* | *Room A3 - Third Floor*<br>**TUTORIAL SESSION** |

## Anti-Drone Systems Technologies: Innovations, Challenges, and Future Application

Giuseppe Albino, *SAGREDO ENGINEERING*

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| *15:45 - 16:15* | *Third Floor*<br>**COFFEE BREAK** |

*16:15 - 17:55* *Room A3 - Third Floor*
**Session 5.1 - Counter Unmanned Aerial Systems (C-UAS) Technologies**

**16:15** **RCS of a F-35 Stealth Aircraft: Statistical Analyses of a POFACETS Model**
Fausta Mattei (University of Study of Naples Federico II & University of Bergamo, Italy); Luca Pallotta (University of Basilicata, Italy); Domenico Accardo (Università degli Studi di Napoli FEDERICO II, Italy); Antonio De Maio (University of Naples "Federico II", Italy)

**16:35** **Exploring the RCS of In-Flight UAVs**
Fausta Mattei (University of Study of Naples Federico II & University of Bergamo, Italy); Vincenzo Carotenuto, Claudia Conte and Giancarlo Rufino (University of Naples Federico II, Italy); Domenico Accardo (Università degli Studi di Napoli FEDERICO II, Italy); Alessandro Di Vincenzo (Università Degli Studi di Napoli Parthenope & Istituto per Il Rilevamento Elettromagnetico dell'Ambiente IREA-CNR, Italy); Carmen Esposito (Istituto per il Rilevamento Elettromagnetico dell Ambiente IREA-CNR, Italy); Antonio Natale (Istituto per il Rilevamento Elettromagnetico dell'Ambiente IREA-CNR, Italy); Paolo Berardino (Istituto per il Rilevamento Elettromagnetico dell Ambiente IREA-CNR, Italy); Gianfranco Palmese (CORISTA, Italy); Stefano Perna (Università degi Studi di Napoli Parthenope, Italy); Riccardo Lanari (IREA-CNR, Italy); Antonio De Maio (University of Naples "Federico II", Italy)

**16:55** **Detection of Flying Nano-Drone Signatures With a K-Band FMCW Radar**
Alessio Balleri (Cranfield University, United Kingdom (Great Britain))

**17:15** **Mini-Micro UAV - Counter Drone Technologies and Solutions for Naval Vessels**
Paolo Camuso, Italian Navy

**17:35** **Enabling Technologies for Autonomous Flight in Challenging Environments**
Claudia Conte (University of Naples Federico II, Italy); Domenico Accardo (Università degli Studi di Napoli FEDERICO II, Italy)

*20:00* *La Bersagliera 1919 Restaurant - Borgo Marinari, 10/11 - Napoli*
**GALA DINNER**

# Technical Program - Wednesday, November 13

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| *08:30 - 16:00* | *Congress Center University of Naples Federico II - Ground Floor*<br>**REGISTRATION** |

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| *09:00 - 10:40* | *Aula Magna - First Floor*<br>**Session 6.1 - Ethics & Law of Technologies for Defense and Security** |

**09:00** **Hic Sunt Drones: Warfare in the Digital Age**
Stefano De Luca (University of Naples Suor Orsola Benincas, Italy)

**09:20** **A Growing Integration of Weaponized Commercial Drones in Battlefield Operations**
Mohamed zied Chaari (Qatar University, Qatar)

**09:40** **The Militarisation of Space and the Involvement of Civil Assets: Possible Evolutions and Legal Questions**
Ilaria Amelia Caggiano and Lucilla Gatt (Università Degli Studi Suor Orsola Benincasa, Italy); Anita Mollo (UNISOB, Italy); Luigi Izzo (University of Naples Suor Orsola Benincasa, Italy)

**10:00** **Autonomous Weapons Systems: A Need for New IHL Rules**
Giulia Marcucci (Italian Red Cross, Italy)

**10:20** **Blockchain and AI Ethics: Implications for Defence and Security**
Christian Esposito (University of Salerno, Italy); Gianluca Attademo (Università degli Studi di Salerno, Italy); Francesco Miano (Università degli Studi di Napoli Federico II, Italy)

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| *09:00 - 10:40* | *Room A - Ground Floor*<br>**Session 6.2 - Applied Artificial Intelligence for Defense and Security Mechatronic Systems** |

**09:00** **An Approach to Synthesize Thermal Infrared Ship Images**
Huy Quoc Nguyen (Vettel Aerospace Institute Vietnam, Vietnam); Thinh Doan Vo, Duc Anh Phan, Thao Nhu Nguyen, Luu Phong Nguyen, Huong Ninh, Hai Tran and Tu Anh Nguyen (Viettel Aerospace Institute Vietnam, Vietnam)

**09:16** **Machine-Learning-Enhanced Military Maintenance Management Systems**
Łukasz Stosio, Konrad Wojtowicz and Stanislaw Kachel (Military University of Technology, Poland)

**09:33** **Real-Time Control of Multiple Multirotor Platforms Interconnected in a Mesh Network**
Maciej Kurenda and Konrad Wojtowicz (Military University of Technology, Poland); Krzysztof Sibilski (Air Force Institute of Technology, Poland); Jakub Djabin (Military University of Technology Warsaw, Poland); Jakub Kochan, Przemyslaw Wojciechowski and Adam Marut (Military University of Technology, Poland)

**09:50** **Surveillance and Protection of Critical Infrastructure With Unmanned Aerial Vehicles**
Adam Marut, Przemyslaw Wojciechowski and Konrad Wojtowicz (Military University of Technology, Poland); Jakub Djabin (Military University of Technology Warsaw, Poland); Jakub Kochan and Maciej Kurenda (Military University of Technology, Poland)

**10:06** **Scalable Hardware in the Loop (HIL) System for Real-Time Swarm Drone Control Simulation**
Jakub Djabin (Military University of Technology Warsaw, Poland); Maciej Kurenda, Jakub Kochan, Konrad Wojtowicz, Przemyslaw Wojciechowski and Adam Marut (Military University of Technology, Poland)

**10:23** **Conceptual Design of the Deep-Learning-Driven Flight Management System**
Jakub Kochan (Military University of Technology, Poland); Jakub Djabin (Military University of Technology Warsaw, Poland); Maciej Kurenda, Konrad Wojtowicz, Przemyslaw Wojciechowski and Adam Marut (Military University of Technology, Poland)

*09:00 - 10:40* *Room B - Ground Floor*
**Session 6.3 - Innovative Security Concepts and Applications in Aerospace Systems**

**09:00** **Security Assessment of Drone Teams and Swarms Using an Extended SecRAM Methodology**
Gennaro Pio Rimoli and Massimo Ficco (University of Salerno, Italy); Domenico Pascarella (CIRA scpa, Italy); Vittorio U. Castrillo (CIRA - Italian Aerospace Research Centre, Italy)

**09:16** **Drone Intrusions in U-Space: Risk Analysis and Modeling of Cyber-Physical Attacks**
Pierre Bieber and Thomas Dubot (ONERA, France)

**09:33** **Preliminary Concept Design of an Ontology for the Security Risk Assessment of U-Space Solutions**
Raffaele Elia (University of Campania Luigi Vanvitelli, Italy & CIRA, Italy); Massimiliano Rak (University of Campania Luigi Vanvitelli, Italy); Domenico Pascarella (CIRA scpa, Italy)

**09:50** **Space Enabled Secure Quantum Communication**
Riccardo Lazzaro (Thales Alenia Space, Italy)

**10:06** **A Preliminary Concept for a Resilience Service to Manage Drone Cyber-Physical Attacks**
Domenico Pascarella (CIRA scpa, Italy); Gabriella Gigante and Angela Vozella (CIRA - Italian Aerospace Research Centre, Italy); Pierre Bieber and Thomas Dubot (ONERA, France); Albert Remiro Bellostas (INTA, Spain); Jaime Cabezas (Instituto Nacional de Técnica Aeroespacial, Spain)

**10:23** **Methodological Framework Design for Prediction of Swarm Movement**
Riccardo Esposito, Gabriella Gigante and Angelo Manco (CIRA - Italian Aerospace Research Centre, Italy)

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| *10:40 - 11:00* | *First Floor*<br>**COFFEE BREAK** |

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| *11:00 - 12:00* | *Aula Magna - First Floor*<br>**ROUND TABLE - Autonomous Weapons and Human Responsibility: Legal, Ethical and Political Perspectives on Artificial Intelligence in Defense**<br>**MODERATOR:** Stefano De Luca, *Suor Orsola Benincasa University of Naples* |

Autonomous weapon systems, capable of selecting and attacking targets without human intervention, raise pressing ethical, legal, and political issues. These warfare technologies could address the need to minimize casualties and losses in combat among military and civilians but implicitly encourage or legitimize the use of force as a means of conflict resolution. The deployment of such systems might even influence tendencies toward belligerent or hazardous attitudes, potentially altering both the concept and moral reality of war itself.
While these systems currently feature an operational framework requiring human operators for control, in the foreseeable future automated solutions may become fully autonomous, with the risk of failing to distinguish civilians or recognize intentions to surrender or participate in conflict.
In the face of these scenarios, binding positions from States are still lacking, with the exception of some recent declaratory UN documents (2023). Meanwhile, existing Conventions, such as the Geneva Convention and its Protocols, remain applicable, albeit within a context markedly different from that envisioned at the time of their adoption.
The roundtable aims to foster reflection on these issues through an interdisciplinary dialogue, beginning from the historical roots of international humanitarian law. It will address the potential subjectivity of autonomous weapon systems, the decision-making responsibility of humans, and the application of principles such as the proportionality of military actions, also from the perspectives of the relevant stakeholders, such as organizations operating in war zones.

**PANELISTS**

Fra' Nicolò **Custoza de' Cattani**, *Grand Prior, Grand Priory of Naples and Sicily, Sovereign Order of Malta*

Guglielmo **Tamburrini**, *Professor of Philosophy of Science and Technology, Department of Electrical and Information Technology Engineering, 'Federico II' University of Naples*

Giovanni **Sartor**, *Professor of Legal Informatics, Department of Legal Studies, University of Bologna*

Rita **Mazza**, *Professor of International Law, Department of Political Sciences, 'Federico II' University of Naples*

Giulia **Marcucci**, *Humanitarian Advocacy Officer, Italian Red Cross*

*11:00 - 12:00* *Room A - Ground Floor*
**Session 7.2 - General Session - PART III**

**11:00** **Technological Developments in the Underwater Dimension**
Fabio Casamassima, Italian Navy

**11:10** **Formant Based Direction of Voice for Smart Microphone Array**
Kaluri V Rangarao (University of Hyderabad, USA & Hyderabad, India); Atul Negi (University of Hyderabad, India)

**11:20** **Automation of Translating MITRE ATT&CK Pseudocode to Executable Scripts**
Raul Alexsander Castro Montoya, Hamza Hmiddouch El Byari, Andrea Villacis Vanegas, Ivan Quiñonero Martinez De Ojeda and Maria-Dolores Cano (Universidad Politécnica de Cartagena, Spain)

**11:30** **Enhancing Performance of Deep Learning Based Non-Profiled Side-Channel Attack Using Multi-Output and Transfer Learning**
Van-Phuc Hoang (Le Quy Don Technical University, Vietnam), Ngoc-Tuan Do and Huu Minh Nguyen (Le Quy Don Technical University, Vietnam)

**11:40** **Progressive Optimization of Deep Learning-Based Fight Detection Model**
Azamat Mukhamediya and Tilek Zhumabek (Nazarbayev University, Kazakhstan)

**11:50** **Ballistic Missile Threat Modeling and VHF Radar Detection Performance Analysis for Tactical-Level Air Defense Simulator**
Marta Walenczykowska, Witold Bużantowicz and Adam Kawalec (Military University of Technology, Poland)

*11:00 - 12:00* *Room B - Ground Floor*
**Session 7.3 - Future Radar Technology - PART I**

**11:00** **Multilinear Dynamical Systems (MLDS): Applications to Tensor Kalman Filter and Tensor LQG**
Alfonso Farina (Leonardo Company Consultant, Italy); Stefano Carletta (Sapienza University of Rome, Italy); Giovanni B. Palmerini and Francesco De Angelis (Sapienza Università di Roma, Italy)

**11:20** **Development and Evaluation of an OFDM-Based Bistatic S-Band SDR Breadboard System for Waveform Analysis and RADCOM Detection Processing**
Sonia Quattrociocchi (Rheinmetall Italia, Italy)

**11:40** **Joint Estimation of Range and Velocity in FMCW Radar for Autonomous Driving**
Ruri Jiang (University of Science and Technology of China, Hefei, China); Junjie Weng (University of Science and Technology, Hefei, China); Jun Liu (University of Science and Technology of China, China); Weijian Liu (Wuhan Electronic Information Institute, China); Danilo Orlando (Unviersity of Pisa, Italy)

*12:00 - 12:45* *Aula Magna - First Floor*
**PLENARY SESSION - KEYNOTE SPEAKER**

## Trends, Technologies, and Issues for Defense and Security: A Contractor's Perspective

C. Nils Smith, *Southwest Research Institute, US*

*12:45 - 14:10* *First Floor*
**LUNCH**

*14:10 - 15:50* *Aula Magna - First Floor*
**Session 8.1 - Advanced Methods and Technologies for Flight Safety and Defense Systems Integration - PART I**

**14:10** **An Innovative Air Accident Investigation Method to Safety Differently**
Gian Luca Greco (Italian Air Force, Italy); Francesca Chiotti (Leonardo S.p.A. Aircraft Division Turin, Italy)

**14:30** **The Human Factors SHELL Model, the Automation and the Artificial Intelligence: A New Paradigm?**
Gian Luca Greco (Italian Air Force, Italy); Giuseppe Fauci (Italian Air Force Department, Italy)

**14:50** **Integrated Trajectory Planning and Fault Detection for a Skid-Steered Mobile Robot Deployed in Post-Disaster Scenarios**
Alessia Ferraro (Università Mediterranea di Reggio Calabria, Reggio Calabria, Italy); Claudio De Capua (University Meditteranea, Italy); Valerio Scordamaglia (University of Reggio Calabria, Italy)

**15:10** **A Model-Based Approach to Failure Mode and Effect Analysis of an Unmanned Quadrotor**
Salvatore Rosario Bassolillo (University of Naples Parthenope, Italy)

**15:30** **Potential and Challenges for a Certified Application of Model Reference Adaptive Control to Aerial Vehicles**
Mattia Gramuglia, Giri M. Kumar and Andrea L'Afflitto (Virginia Tech, USA)

*14:10 - 15:30* *Room A - Ground Floor*

**Session 8.2 - Technology, application, and metrology of directed energy weapons**

**14:10** **Artificial intelligence techniques for damage assessment in RF DEW systems**
Luca Morino, MBDA

**14:30** **Perspectives on Directed Energy Microwaves After the First 50 Years**
Edl Schamiloglu, University of New Mexico, USA

**14:50** **New trends in High Power Vacuum Technologies for Directed Energy Weapons**
Pietro Bia, ELTGroup

**15:10** **The Coming of Age of Directed Energy Weapons and the Red Sea Crisis**
Bonnie Johnson, Naval Postgraduate School, USA

*14:10 - 15:30* *Room B - Ground Floor*

**Session 8.3 - Future Radar Technology - PART II**

**14:10** **Conceptual, Functional and Operational Interactions of ATC Radars and Navigation Systems in the Framework of Future Airspace Management**
Salvatore Ponte (University of Campania "L. Vanvitelli", Italy); Alfonso Farina (Leonardo Company Consultant, Italy)

**14:30** **Multiple Target Detection in Radar Systems: A Hybrid Approach Combining EM Clustering and Sparsity-Based Reconstruction**
Jiarui Sun, Chengpeng Hao and Linjie Yan (Chinese Academy of Sciences, China); Danilo Orlando (Unviersity of Pisa, Italy)

**14:50** **Deceptive Jamming Against SAR via Range-Azimuth Two-Dimensional Modulation**
Liu Yangyang (National Key Lab of Radar Signal Processing, Xidian University, China); Lan Lan, Guisheng Liao and Jingwei Xu (Xidian University, China)

**15:10** **Non-Parametric Target Detection Based on Sparse Representation for Hyperspectral Images**
Wenhao Wang and Jun Liu (University of Science and Technology of China, China); Danilo Orlando (Unviersity of Pisa, Italy); Li Xiao (University of Science and Technology of China, China)

*15:50 - 16:10* *First Floor*

**COFFEE BREAK**

*16:10 - 17:50* *Aula Magna - First Floor*

**Session 9.1 - Advanced Methods and Technologies for Flight Safety and Defense Systems Integration - PART II**

**16:10** **A Trajectory Planning Algorithm for a MAV Patroller in Presence of Wind**
Vito Antonio Nardi (University Mediterranea of Reggio Calabria, Italy)

**16:30** **Time-Delay Approach to Coordinate Movements of Mobile Robots Subject to Uncertainties and External Disturbances**
Alessia Ferraro (University of Reggio Calabria, Italy); Giuseppe Martino (Università Mediterranea di Reggio Calabria, Italy)

**16:50** **A Multi Agent Simulator for Disaster Prevention and First Response Applications**
Gennaro Raspaolo (University of Campania Luigi Vanvitelli, Italy); Alessandro Puro (University of Naples Parthenope, Italy); Giuliano D'alterio (University of Campania Luigi Vanvitelli, Italy)

**17:10** **Task Priority Approach for Solving Coordination of Moving Mobile Robot in SAR Operations**
Michele Buonsanti (University of Reggio Calabria, Italy); Egidio D'Amato (University of Naples Parthenope, Italy); Alessia Ferraro (University of Reggio Calabria, Italy); Immacolata Notaro (University of Campania Luigi Vanvitelli, Italy); Valerio Scordamaglia (University of Reggio Calabria, Italy)

**17:30** **A Dynamic Weight Adjustment System for Aerial Video Object Recognition Using YOLOv8 With Night Vision Integration**
Federico Candela, Phd (University Mediterranea of Reggio Calabria, Italy); Claudio De Capua (University Mediterranea, Italy); Andrea Francesco Morabito and Francesco C Morabito (University Mediterranea of Reggio Calabria, Italy); Francesco Restuccia (Northeastern University, USA)

*16:10 - 17:50* *Room A - Ground Floor*

**Session 9.2 - ISaCAGE: integration and coexistence of sensing and communication systems that share the same spatial and spectrum resources**

**16:10** **Impact and Mitigation of Index Modulation on Radar Quality for a FMCW-Based Communication System**
Robert S. C. Winter (University College London, United Kingdom (Great Britain)); Aled Catherall (Plextek, United Kingdom (Great Britain)); Christos Masouros and Matthew Ritchie (University College London, United Kingdom (Great Britain))

**16:26** **Rule-Based Scheduling for MPARs Performing Sensing and Communications**
Augusto Aubry (Universita degli studi di Napoli, Italy); Antonio De Maio (University of Naples "Federico II", Italy); Luca Pallotta (University of Basilicata, Italy)

**16:43** **Preliminary Experimental Results for a Multi-Channel Forward Scatter Radar**
Abdollah Ajorloo and Yihua Qin (Sapienza University of Rome, Italy); Carlo Bongioanni (School of Advanced Defence Studies, Italy); Fabiola Colone (Sapienza University of Rome, Italy)

**17:00** **Experimental Validation of Supervised DPCA Reciprocal Filter in OFDM Radar on Moving Platforms**
Andrea Quirini (Sapienza University of Rome, Italy); Carlo Bongioanni (School of Advanced Defence Studies, Italy); Fabiola Colone (Sapienza University of Rome, Italy); Pierfrancesco Lombardo (University of Rome La Sapienza, Italy)

**17:16** **An Inverse Reconstruction Method in Presence of Multipath Induced by Point-Like Inhomogeneities**
Loreto Di Donato (University of Catania, Italy); Antonio Cuccaro (Università della Calabria, Italy); Maria Antonia Maisto and Raffaele Solimene (Università degli studi della Campania Luigi Vanvitelli, Italy)

**17:33** **COSMIC Waveforms for Integrated Communication and Imaging**
Marco Manzoni, Francesco Linsalata, Maurizio Magarini and Stefano Tebaldini (Politecnico di Milano, Italy)

*17:50 - 18:20* *Aula Magna - First Floor*
**CLOSING AND AWARD CEREMONY**