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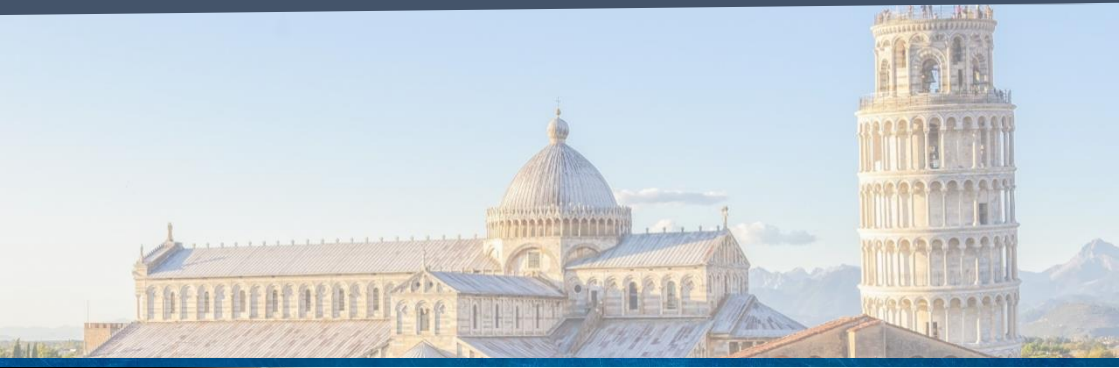
2020 IEEE INTERNATIONAL WORKSHOP ON

Metrology for AeroSpace

VIRTUAL CONFERENCE | 22-24 JUNE, 2020



Virtual Conference

WORKSHOP PROGRAM

JUNE 22-24, 2020

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IEEE MetroAeroSpace 2020 Welcome Message

On behalf of the Organizing Committee, we wish to welcome you to the 2020 IEEE International Workshopon Metrology for AeroSpace (MetroAeroSpace).

Since the first edition, MetroAeroSpace represents the international meeting place in the world of research in the field of measurement and instrumentation for aerospace involving institutions and academia in a discussion on the state-of-the-art concerning issues that require a joint approach by experts of measurement, instrumentation and industrial testing, typically professional engineers, and experts in innovation metrology, typically academics. The increasing number of scientists attending MetroAeroSpace and coming from fields, that can be very far from engineering, led to a positive hybridization of the workshop.

This 7th edition will keep pursuing the state of the art and practice started over the past years. Attention is paid, but not limited to, new technology for metrology-assisted production in the aerospace industry, aircraft component measurement, sensors and associated signal conditioning for aerospace, and calibration methods for electronic test and measurement for aerospace.

MetroAeroSpace organization was a challenging task due to the large and increasing interest of our research and application areas and for the COVID-19 emergency. Efforts from several members of the MetroAeroSpace community were required to shape the technical program and manage the operational aspects.

Besides, it has been challenging to set up the online platform to maintain live the presentation, and we wish that our pilot initiative could pave the way towards innovations in the organization of future scientific events. We would like to take this opportunity to thank all the colleagues that supported and cooperated with us. We also thank the public and private organizations that supported the meeting in different ways.

The MetroAeroSpace Technical Program consists of 24 oral sessions scheduled over two days. With the wide range of technical sessions covering the many fields of metrology for aerospace, we are happy to welcome you to the variety of technical presentations that await you this year. Thanks to all of the Technical Program Committee members and the reviewers who have contributed to make this outstanding program possible.

Despite the COVID-19 outbreak in conjunction with the deadline of the submission, we received 149 extended abstracts from all over the world. Due to the time limits of the workshop, only 120 papers have been selected after a painstaking activity of the program committee and additional reviewers. We like to thank all people who contributed to this process with opinions, comments, and suggestions to choose the best papers and even improve their quality.

Authors of all the above contributions are also welcome to submit an extended version to the Special Issues on *IEEE J-MASS - The Journal on Miniaturization for Air and Space Systems*, *Sensors* Journal by MDPI, and *Remote Sensing* Journal by MDPI.

The technical program encompasses several events and activities. The keynote speeches will be held by experts in the field of metrology for aerospace.

Domenico Accardo, University of Naples "Federico II", Italy, will speak about Aerospace on-board system architectures perspectives: embedded systems, sensor data fusion, and autonomy. Felix Opitz, Airbus Defence and Space GmbH, Germany, will present the Situation Awareness through Data Analytics and Machine Learning based on Trajectories

We are honored to have them as plenary speakers and thank them in advance for coming to our conference to share their knowledge and experiences with us.

This edition of the Workshop includes:

- "*Military Metrology for AeroSpace*", which is organized by AFCEA Naples Chapter, June 22nd, 2020.
- A half day of tutorials offering three subjects:
  - *Introduction to the "Conceptional design of space science imagers"*, Harald Michaelis, DLR, Institute of Planetary Research - Germany;
  - *"Bayesian Data Analysis applied to Plasma measurements in electric thrusters",* Manuel Martín Saravia, University of Pisa, Italy;
  - *"Infrared thermography in the aerospace sector"*, Carosena Meola, University of Naples "Federico II", Italy.

These events give more opportunities to contact Institutions and experts operating in different fields of Metrology for AeroSpace.

With the aim of providing a common ground for researches to share their findings on the metrology for aerospace, the Workshop was improved by adding a significant number of Special Sessions. This allows a spontaneous aggregation providing a forum of discussion close to the single research field. We wish to thank the organizers of these Special Sessions for their cooperation and support to the Workshop organization.

Several Awards offered by International Institution and Companies will be assigned, in particular to young researchers. The best contributions will be awarded, including the "*Best Conference Paper Award*", the "*Best Paper Presented by a Young Researcher*", the "*Best Paper Presented by a Woman*", and the "*Best Paper of the Special Session on Metrology for Radar Systems*".

We would like to conclude this message by sending to you all our virtual welcome to the historic and beautiful Pisa. Pisa's roots go back deeply to the past. Etruscans as well as ancient Romans were there and they left their archaeological remains. Pisa was a famous Sea Republic in the medieval age. It was the city of the mathematician Leonardo Fibonacci and, later, of Galileo Galilei who founded the experimental method. A citation attributed to Galileo reports: "*Measure what is measurable, and make measurable what is not so*". We believe you can join the spirit of this citation and move towards the new challenges and development of the Metrology for AeroSpace.

The 7th International Workshop on Metrology for AeroSpace is about to begin!

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Robert Rassa, *MetroAeroSpace General Chair*
Bernardo Tellini, *MetroAeroSpace General Chair*

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IEEE MetroAeroSpace 2020 Plenary Speakers

Plenary Tuesday, June 23, 2020

Aerospace on-board system architectures perspectives: embedded systems, sensor data fusion, and autonomy

Domenico Accardo
Department of Industrial Engineering - University of Naples 'Federico II', Italy

ABSTRACT

In-depth understanding of leading-edge technologies and safety requirements is requested in developing high-performance avionics solutions. The lecture will discuss the evolution of aircraft cockpit instrumentation to highlight main trends and technologies adopted. Solutions and system architectures for sensors and systems will be discussed considering several important features, such as avionics requirements, certification issues, operative constraints, and safety concerns.

The evolution of cockpit layout will be discussed starting from traditional "basic T" to current advanced configurations related to Integrated Modular Avionics. The impact of enabling technologies on the development of new functions and capabilities is discussed. In particular, the lecture will highlight the concept of complex systems realized by integrating several sub-systems, such as ADS-B, TCAS and GPWS.

The use of embedded electronic solutions will be discussed by presenting the different data bus solutions and architectures. Main issues related to hardware and software qualification process of embedded avionics systems will be examined. This is an important point to provide integration with components developed for different fields of application, such as ground and maritime transport or Internet of Things. Use of common solution will be useful to reduce costs and increase reliability due to scale testing.

Current avionics systems have a large number of data sources including sensors and systems. Proper data fusion techniques must be adopted to perform basic functions such as navigation, traffic and weather surveillance, and health monitoring. Data fusion is requested to increase accuracy, integrity and reliability. Some fundamentals solutions will be discussed including detailed examples.

The lecture will be completed by an overview of future trends in development of Avionics Systems. Autonomy is requested to improve performance and reliability of current systems. In particular, More Autonomous Aircraft and Unmanned Aircraft Systems are considered the most challenging configurations for developers. Several iconic autonomy solutions will be described to identify main features of future trends.

SPEAKER BIOGRAPHY

Domenico Accardo received the MSc degree in Aerospace Engineering with honors in the year 1997 from University of Naples "Federico II" (Italy) and the PhD degree in Aerospace Science and Technology in the year 2000 from Second University of Naples (Italy). He is Associate Professor of Avionics and ATM/ATC Systems for the MSc Course of Aerospace Engineering at University of Naples "Federico II" (Italy). He is also responsible for courses of On-Board Systems and Air Traffic Management and Control at Italian Air Force Academy. He is a member of PhD Council in Technology and Innovation Management at UNINA. His research activity deals with Unmanned Aircraft Systems, Integrated Navigation Systems, ATC/ATM, Electro-Optical Sensors for Satellite Attitude Measurement. He co-authored more than 100 papers for International Journals, International Congresses, and Textbook chapters, which collected more than 900 citations (source: Scopus Database by Elsevier) with h-index 17. He is the first author of an international patent (EP 2466568 B1) related to an original Aircraft Trajectory Prediction method. He has been Principal Investigator or Co-Investigator of several Research Projects funded by the European Union, Eurocontrol, the European Space Agency, the Italian Space Agency (ASI), the Italian Aerospace Research Center (CIRA), the Italian Ministry of University and Education (MIUR), and Italian aerospace enterprises, such as Finmeccanica, Carlo Gavazzi Space, and MBDA. He is AIAA senior member and IEEE member. He has been Chair of AIAA Sensor Systems and Information Fusion (SSIF) Technical Committee. He has been reviewer for several International Journals, such as IEEE Transactions on Aerospace and Electronic Systems, Progress in Aerospace Sciences, Aerospace Science and Technology, Acta Astronautica, Autonomous Robots, Pattern Recognition Letters and Sensors. He has been Track Session Chair and Session Chairman for several congresses organized by AIAA and IEEE, such as Infotech@Aerospace, Scitech, and Metroaerospace.

Plenary Wednesday, June 24, 2020

Situation Awareness through Data Analytics and Machine Learning based on Trajectories

Felix Opitz
Airbus Defence and Space GmbH, Germany

ABSTRACT

Modern surveillance networks are able to provide trajectories of all kinds for aircrafts and vessels worldwide or at least in extended areas of the airspace or earth surface. Best known are Automatic Dependent Surveillance – Broadcast (ADS-B) and (Satellite-) Automatic Identification System (AIS) used in air and maritime surveillance. Both of them are cooperative systems. Besides these sources, sensors based on ground installations or mounted on airborne and space-based platforms deliver object trajectories independent of any transponders. This is done by advanced tracking and fusion algorithms generating trajectories out of sensor measurements.

Besides the trajectory generation, the challenge will be to place them into the right context and to provide situational awareness. This includes the estimation of the intents of the tracked objects, activity-based intelligence, and the determination of patterns of life. Otherwise, even modern surveillance systems are not able to take a real advantage of the gathered data.

Therefore, trajectories are further processed by data analytics and machine learning. Unsupervised machine learning offers techniques to cluster and to partition trajectories, extract highly frequented routes and points of interest, predict object movement and identify anomalous behaviour. On the other hand, transponder and broadcast systems provide additional attributes of the tracked trajectories. These labels pave the way for numerous supervised machine learning methods. The derived predictors realise the determination of object types and activities.

Finally, these new data analytic techniques have to be integrated in existing near real time surveillance systems. This requires specific system architectures as well as a completely new software and hardware landscape. In summary, trajectory-based data analytics and, machine learning is embedded on local or global clouds and uses dedicated mechanisms for distributed and parallel processing.

SPEAKER BIOGRAPHY

Dr. Felix Opitz was born in Frankfurt am Main/Germany. He studied mathematics and physics at the Johann Wolfgang Goethe University of Frankfurt and received a doctor degree in pure mathematics. He started as a system engineer at the former DaimlerChrysler Aerospace in Ulm. His current position at Airbus Space and Defence is that of a senior expert in the field of information fusion. His work includes signal processing, multi-object multi-source tracking, data fusion as well as machine learning and data analytics. His contributions are applied in numerous national and international projects in the field of aerospace as well as in maritime solutions.

IEEE MetroAeroSpace 2020 Tutorials

Introduction to the 'Conceptional design of space science imagers'

Harald Michaelis
DLR, Institute of Planetary Research - Germany

ABSTRACT

Imaging instruments play an important role in science and in scientific space missions. They are used for detection, characterization and study of remote objects e.g. planets, their moons, small bodies of our solar system and beyond.

However, many researchers and engineers have only a very limited understanding about the architecture, the key-parameters, design-options and their impact on performance and implementation. Therefore, this short tutorial will provide some insight into the basics of imaging systems with emphasis to VIS/NIR scientific cameras.

Topic relevance and novelty

NASA and ESA are conducting and planning scientific space missions to explore our space environment. The goal is to understand the formation of our own solar system as well as solar systems in general. We are exploring other planets, searching for pristine materials, organics, traces of life and planets around other stars. In this respect imaging instruments play an important role for the detection and scientific characterization. It is therefore needed that all involved scientists, engineers and managers have a good overview and understanding of the system architecture and parameters of an imaging system, their performance characteristics and drivers.

Speaker Biography

Dr. Harald Michaelis, is Head of the department Planetary Sensor Systems at the DLR Institute of Planetary Research and his involvement in space missions comprises instrument development as well as scientific investigations for the exploration of Mars (PHOBOS), CASSINI-HUYGENS-DISR, NASA Pathfinder, ESA Mars Express Mission, ESA ExoMars Mission), Venus (ESA Venus Express Mission), Comets (ESA Rosetta Mission), DAWN- Framing Camera (NASA- mission), Hayabuas-2 (MASCOT), BepiColombo-BELA and numerous space instrument technology studies (PlanetMicroCam, GAIA- Focal-Plate Demonstrator, ROKVISS-ISS, Smart-Panoramic Sensor, AsteroidFinder).

His main expertises are in scientific instrument design, instrument modeling and detector-science. He was working at ESA in 2004/2005 and he is recently working on JUICE-JANUS + GALA and the PLATO Fast-CCD electronics at DLR.

Infrared thermography in the aerospace sector

Carosena Meola
University of Naples 'Federico II', Italy

ABSTRACT

Infrared thermography, as a remote and non-contact measurement methodology, is extremely useful in all applications where temperature is an important parameter also for the purpose of understanding related phenomena. Often those who could reap the benefits do not know of its existence or are not adequately informed about its applications. Therefore, providing the basics (what is, for what it can be used, where it can be applied) can serve to convey, in the world of research and / or industry, the information necessary for a more suitable use of technology.

Topic relevance and novelty

Infrared thermography is a fully noncontact noninvasive methodology which can be usefully exploited in many different applications. It is an excellent condition monitoring tool to assist in the reduction of maintenance costs on mechanical equipment. In fact, it allows for monitoring of temperature and thermal patterns, on a wide variety of equipment (pumps, motors, bearings, pulleys, fans, drives, conveyors etc.), while the equipment is running under full load reducing stop costs. Mostly important, the inspection can be performed far away from any dangerous condition without any safety at work concern. The attention of the tutorial is particularly driven towards the use of infrared thermography with a twofold function of non-destructive technique and monitoring device. It is shown that infrared thermography can be used to detect either manufacturing defects, like fibres misalignment, voids, slag inclusions, or impact damage and/or degradation in service of composites but also for on-line monitoring of materials and structures under mechanical stresses (bending, impact). Considering as an example the monitoring of a material under impact, it is possible, through visualization of impact-induced thermal signatures, to get information which are useful for the material characterization, specifically for identifying initiation and propagation of the impact damage, to assess the extension of the impact damaged area, etc. for design purposes. This approach allows for rapid on-line appraisal avoiding the waste of time in back and forth testing attempts, which is common practice in industrial enterprise to assess the performance under impact of new materials.

Speaker Biography

Dr. Carosena Meola, aeronautical engineer, is senior research staff member at the Department of Industrial Engineering /Aerospace Division - University of Naples Federico II. Level III in infrared thermography and licensed instructor for personnel training and certification. Member of UNI, CEN and ISO Technical Committees. Member of the Editorial Board of many International Journals and of the Scientific Committee of International Conferences. Chair of Conference sessions, Editor of books and Guest Editor of Journal special issues. Author and co-author of about 200 papers in well recognized journals, books and proceedings. Referee of about 50 International Journals and of research projects.

Bayesian Data Analysis applied to Plasma measurements in electric thrusters

Manuel Martín Saravia
DICI-University of Pisa, Italy

ABSTRACT

The main goal of the tutorial is to present integrated data analysis methods based on Bayesian probability theory, together with an application to measurements of plasma properties in space electric thrusters.

- Introduce plasma diagnostic methods based on electrostatic probes, typically used in space electric propulsion research;
- Present an introduction to Bayesian methods of data analysis under uncertain conditions;
- Application of Bayesian methods to the case of a Triple Langmuir Probe.

Topic relevance and novelty

Integrated data analysis (IDA) methods first became widely used in the frame of nuclear fusion research, thanks to the capacity to combine data from different origins, together with expert knowledge, in order to perform optimal inferences in the presence of uncertainty.

In the last few years, as a result of the growth in available computational power, IDA methodologies spread to aerospace and other fields, where it has showed its praise in the study of complex phenomena.

The present tutorial will introduce the topic and show an application to measurements and inference in the frame of space electric propulsion research. It is important to note that the applications of the presented concepts are not limited to the study of plasma devices, as these methodologies can be extended to other areas of interest of the aerospace community, as has been occurring in the last few years, with applications in aerodynamics, structural damage analysis and multidisciplinary design, among others.

Speaker Biography

Aeronautical Engineer graduated at the Universidad Nacional de Córdoba, Argentina.

Pursued a PhD on Electric Propulsion at Università di Pisa, on the topic of Alternative propellants for Hall thrusters. Currently continues to work as a research scholar at the Università di Pisa in the area of plasma thrusters and alternative propellants.

Conference Awards

Best Conference Paper Award

Description: To recognize the most outstanding paper presented at the annual IEEE International Workshop on Metrology for AeroSpace.

The **Best Conference Paper Award** is sponsored by ***Sensors Journal***. The award will consist of a certificate and a **prize money** amounting to **500 CHF**.

Basis for Judging: Technical merit, originality, potential impact on the field, clarity of the written paper, and quality of the oral or other presentation.

Best Paper Presented by a Young Researcher

Description: An exclusive plaque will be given for the best paper authored and presented by a researcher younger than 35 years in age.

Basis for Judging: Technical merit, originality, potential impact on the field, clarity of the written paper, and quality of the oral or other presentation.

Best Paper Presented by a Woman

Description: An exclusive plaque will be given for the best paper authored and presented by a woman.

Basis for Judging: Technical merit, originality, potential impact on the field, clarity of the written paper, and quality of the oral or other presentation.

Best Paper of the Special Session on Metrology for Radar Systems

Description: To recognize the most outstanding paper presented at the IEEE MetroAeroSpace 2020 - Special Session on Metrology for Radar Systems.-

The Award is sponsored by ***Remote Sensing Journal***. The award will consist of a certificate and a **prize money amounting to 500 CHF**.

Basis for Judging: Technical merit, originality, potential impact on the field, clarity of the written paper, and quality of the presentation.

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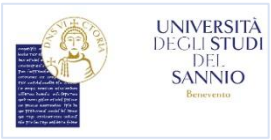
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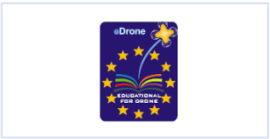
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Program Schedule - June 22, 2020

MONDAY, JUNE 22	
09:30 - 12:40 CET	**MILITARY METROLOGY FOR AEROSPACE**
09:30 - 09:40 CET	**WELCOME ADDRESSES** B. Gen. (res) Dario NICOLELLA, *President of AFCEA Chapter of Naples, Italy*
09:40 - 10:10 CET	**Opening remarks: ITAF strategies in Aerospace** Col. Luigi Riggio, *ITAF General Office for Space - Deputy chief*
10:10 - 10:40 CET	**Capabilities and potential of RPAS System in an industrial environment** B.Gen. (res) Giovanni Savoldelli Pedrocchi
10:40 - 11:10 CET	**Photonics for sensors for aerospace and industry** Prof. Antonello Cutolo, *University of Naples 'Federico II' Italy*
11:10 - 11:30 CET	**BREAK**
11:30 - 12:00 CET	**From reliability to mission reliability - the role of edge processing** Eng. Eduardo DE FRANCESCO, *FederLazio Aerospazio e Difesa*
12:00 - 12:30 CET	**Italian SST Operations Center (ISOC) - The use of military tracking radar in Space Surveillance & Tracking** S.Ten. Moreno Peroni, *ITAF Flight Test Center*
12:30 - 12:40 CET	**CLOSING SESSION**

MONDAY, JUNE 22	
15:30 - 18:00 CET	**TUTORIALS**
15:30 - 16:20 CET	**Introduction to the 'Conceptional design of space science imagers'** Harald Michaelis, *DLR, Institute of Planetary Research - Germany*
16:20 - 17:10 CET	**Bayesian Data Analysis applied to Plasma measurements in electric thrusters** Manuel Martín Saravia, *University of Pisa, Italy*
17:10 - 18:00 CET	**Infrared thermography in the aerospace sector** Carosena Meola, *University of Naples 'Federico II', Italy*

Program Schedule - June 23, 2020

TUESDAY, JUNE 23			
09:15 - 09:30 CET	**OPENING CEREMONY - WELCOME ADDRESSES**		
09:30 - 10:30 CET	**PLENARY SESSION** **Aerospace on-board system architectures perspectives: embedded systems, sensor data fusion, and autonomy** Domenico Accardo, *University of Naples 'Federico II', Italy*		
	Virtual Room #1	**Virtual Room #2**	**Virtual Room #3**
10:40 - 12:40 CET	**SESSION 1.1** METROLOGY FOR RADAR SYSTEMS PART 1	**SESSION 2.1** GENERAL SESSION - PART 1	**SESSION 3.1** MEASUREMENT FOR IMPROVING QUALITY, RELIABILITY AND SAFETY IN AEROSPACE APPLICATIONS - PART 1
12:40 - 13:40 CET	**SESSION 1.2** UAV AND LIGHT AIRCRAFT GROUND DIAGNOSTIC, CAX METHODS FOCUSED FOR DESIGN, MANUFACTURING AND MAINTENANCE OF ULTRALIGHT AIRCRAFTS	**SESSION 2.2** AEROSPACE EDUCATION	**SESSION 3.2** GENERAL SESSION - PART 2
14:20 - 16:00 CET	**SESSION 1.3** METROLOGY FOR RADAR SYSTEMS PART 2	**SESSION 2.3** SENSORS AND DATA FUSION TECHNIQUES, VIRTUAL AND SYNTHETIC SENSORS, ANALYTICAL REDUNDANCY AND STATE OBSERVERS FOR AVIONICS	**SESSION 3.3** MEASUREMENT FOR IMPROVING QUALITY, RELIABILITY AND SAFETY IN AEROSPACE APPLICATIONS - PART 2
16:00 - 18:20 CET	**SESSION 1.4** MANUFACTURING AND METROLOGY IN THE AEROSPACE INDUSTRY	**SESSION 2.4** METROLOGY IN THE THERMO-FLUID DYNAMICS AEROSPACE APPLICATIONS	**SESSION 3.4** METROLOGY AND INSTRUMENTATION FOR UNMANNED AERIAL VEHICLES

Program Schedule - June 24, 2020

WEDNESDAY, JUNE 24			
09:00 - 10:00 CET	**PLENARY SESSION** **Situation Awareness through Data Analytics and Machine Learning based on Trajectories** Felix Opitz, *Airbus Defence and Space GmbH, Germany*		
	Virtual Room #1	**Virtual Room #2**	**Virtual Room #3**
10:10 - 11:30 CET	**SESSION 1.5** ADVANCES ON MULTIMODAL IMAGING BASED INTELLIGENT SYSTEMS IN AEROSPACE METROLOGY - PART 1	**SESSION 2.5** GENERAL SESSION - PART 3	**SESSION 3.5** SENSORS AND SOLUTIONS FOR AUTONOMOUS AEROSPACE SYSTEMS PART 1
11:30 - 13:10 CET	**SESSION 1.6** ADVANCES ON MULTIMODAL IMAGING BASED INTELLIGENT SYSTEMS IN AEROSPACE METROLOGY - PART 2	**SESSION 2.6** GARFIELD - GENERAL AVIATION RESEARCH AND DEVELOPMENT. METROLOGY, METHODS AND INSTRUMENTATION	**SESSION 3.6** SENSORS AND SOLUTIONS FOR AUTONOMOUS AEROSPACE SYSTEMS PART 2
14:20 - 16:20 CET	**SESSION 1.7** STRUCTURAL HEALTH MONITORING AND NONDESTRUCTIVE TESTING FOR AEROSPACE	**SESSION 2.7** COMPLEX SYSTEMS OPERATIONAL AVAILABILITY: MEASUREMENTS, METHODOLOGIES AND REQUIREMENTS	**SESSION 3.7** SENSORS AND SOLUTIONS FOR AUTONOMOUS AEROSPACE SYSTEMS PART 3
16:20 - 18:00 CET	**SESSION 1.8** TERRESTRIAL AND IN-FLIGHT VERIFICATION OF THE GNC SYSTEMS FOR AEROSPACE VEHICLES	**SESSION 2.8** GENERAL SESSION - PART 4	**SESSION 3.8** METROLOGY IN THE RESEARCH OF THE HELICOPTERS AND DRONES
18:00 - 18:15 CET	**CLOSING AND AWARD CEREMONY**		

Technical Sessions - Monday, June 22

09:30 - 12:40 CET
MILITARY METROLOGY FOR AEROSPACE
Room: *Virtual Room #1*

Military Metrology for AeroSpace is organized by **AFCEA Naples Chapter** and **University of Sannio**. Military Metrology for AeroSpace is a parallel event of the 7th IEEE International Workshop on Metrology for AeroSpace.

PROGRAM

09:30 **WELCOME ADDRESSES**
B. Gen. (a) Dario NICOLELLA, *President of AFCEA Chapter of Naples, Italy*

09:40 **Opening remarks: ITAF strategies in Aerospace**
Col. Luigi RIGGIO, *ITAF General Office for Space - Deputy chief*

10:10 **Capabilities and potential of RPAS System in an industrial environment**
B.Gen. (res) Giovanni SAVOLDELLI PEDROCCHI

10:40 **Photonics for sensors for aerospace and industry**
Prof. Antonello CUTOLO, *University of Naples 'Federico II', Italy*

11:10 **BREAK**

11:30 **From reliability to mission reliability - the role of edge processing**
Eng. Eduardo DE FRANCESCO, *FederLazio Aerospazio e Difesa*

12:00 **Italian SST Operations Center (ISOC) - The use of military tracking radar in Space Surveillance & Tracking**
S.Ten. Moreno PERONI, *ITAF Flight Test Center*

12:30 **CLOSING SESSION**

15:30 - 18:00 CET
TUTORIALS
Room: *Virtual Room #1*
Chair: Stephen Dyer, *Kansas State University, US*
Co-Chair: Gianluca Caposciutti, *University of Pisa, Italy*

15:30 - 16:20 **Introduction to the 'Conceptional design of space science imagers'**
Harald Michaelis
DLR, Institute of Planetary Research - Germany
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17:10 - 18:00 **Infrared thermography in the aerospace sector**
Carosena Meola
University of Naples 'Federico II', Italy
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Technical Sessions - Tuesday, June 23

09:15 - 09:30 CET
OPENING SESSION - WELCOME ADDRESSES
Room: *Virtual Room #1*

09:30 - 10:30 CET
PLENARY SESSION
Room: *Virtual Room #1*
Chair: Antonio Plaza, *University of Extramadura, Spain*

Aerospace on-board system architectures perspectives: embedded systems, sensor data fusion, and autonomy

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

10:40 - 12:40 CET
SESSION 1.1 - METROLOGY FOR RADAR SYSTEMS - PART 1
Room: *Virtual Room #1*
Chairs: Alfonso Farina, *Selex ES, Italy*
Silvia Liberata Ullo, *University of Sannio, Italy*

10:40 Spaceborne Radar Functional Architecture for Debris Bayesian Inference
Marco Maffei, University of Napoli 'Federico II', Italy
Augusto Aubry, University of Napoli 'Federico II', Italy
Antonio De Maio, University of Napoli 'Federico II', Italy
Alfonso Farina, Selex ES, Italy

11:00 Measuring the Isolation of a Continuous Emission Radar by Support of the Doppler Effect
Christoph Wasserzier, Fraunhofer FHR, Germany
Gaspare Galati, Tor Vergata University of Rome, Italy

11:20 Out-off-Focus Phased-Array Feed for Communication System Parabolic Reflector Antenna
Siarhei V. Liashkevich, Belarusian State University, Belarus
Vladimir A. Saetchnikov, Belarusian State University, Belarus

11:40 Design of GLR-Based Detectors for FDA-MIMO radar
Lan Lan, National Key Laboratory of Radar Signal Processing, China University of Naples 'Federico II', Italy
Angela Marino, University of Naples 'Federico II', Italy
Augusto Aubry, University of Naples 'Federico II', Italy
Antonio De Maio, University of Naples 'Federico II', Italy
Guisheng Liao, National Key Laboratory of Radar Signal Processing, China
Jingwei Xu, National Key Laboratory of Radar Signal Processing, China

12:00 Robust Transmit-Receive Optimization Design for Extended Target Detection
Yu Yao, East China Jiaotong University, China
Alfonso Farina, SELEX Sistemi-Integrati, Italy
Yanjie Li, East China Jiaotong University, China

12:20 Constant Modulus Discrete Phase Radar Waveforms Design Subject to Multi-Spectral Constraint
Jing Yang, University of Electronic Science and Technology of China, China
Augusto Aubry, University of Napoli 'Federico II', Italy
Antonio De Maio, University of Napoli 'Federico II', Italy
Xianxiang Yu, University of Electronic Science and Technology of China, China
Guolong Cui, University of Electronic Science and Technology of China, China
Salvatore Iommelli, Maxwell, Italy

10:40 - 12:40 CET
SESSION 2.1 - GENERAL SESSION - PART 1
Room: *Virtual Room #2*
Chair: Mirko Marracci, *University of Pisa, Italy*

10:40 Evaluation of 3D CNN Semantic Mapping for Rover Navigation
Sebastiano Chiodini, University of Padova, Italy
Luca Torresin, University of Padova, Italy
Marco Pertile, University of Padova, Italy
Stefano Debei, University of Padova, Italy

11:00 Marine Targets Recognition Through Micro-Motion Estimation from SAR data
Davide Armenise, University of Naples, Italy
Filippo Biondi, University of L'Aquila, Italy
Pia Addabbo, Università Giustino Fortunato, Italy
Carmine Clemente, University of Strathclyde, Scotland
Danilo Orlando, Università Degli Studi Niccolò Cusano, Italy

11:20 Tethered Satellite controlled re-entry dynamics from the International Space Station
Alice Brunello, (CISAS) "Giuseppe Colombo" University of Padova, Italy
Andrea Valmorbida, (CISAS) "Giuseppe Colombo" University of Padova, Italy
Enrico C. Lorenzini, University of Padova, Italy
Alberto Fedele, Italian Aerospace Research Centre (CIRA), Italy
Mario De Stefano Fumo, Italian Aerospace Research Centre (CIRA), Italy
Raffaele Votta, Italian Aerospace Research Centre (CIRA), Italy

11:40 Emission Pollution Reduction by EFB Implemented Trajectory Optimizer
Gabriella Serafino, LEONARDO, Italy
Piercesare Bernabò, CNIT - RaSS, Italy
Fabrizio Cuccoli, CNIT - RaSS, Italy
Alberto Lupidi, CNIT - RaSS, Italy

12:00 Thermal hysteresis in inertial sensors
Jacek Pieniazek, Rzeszow University of Technology, Poland
Piotr Ciecinski, Rzeszow University of Technology, Poland

12:20 Intelligent Counter Guidance Regulated by Deep Reinforced Learning
Runle Du, National Key Laboratory of Science and Technology on Test, China
Jiaqi Liu, National Key Laboratory of Science and Technology on Test, China
Li Zhang, National Key Laboratory of Science and Technology on Test, China
Jianhua Li, National Key Laboratory of Science and Technology on Test, China

10:40 - 12:40 CET
SESSION 3.1 - MEASUREMENT FOR IMPROVING QUALITY, RELIABILITY AND SAFETY IN AEROSPACE APPLICATIONS - PART 1
Room: *Virtual Room #3*
Chairs: Lorenzo Ciani, *University of Florence, Italy*
Marcantonio Catelani, *Universtiy of Florence, Italy*

10:40 Space Debris Observation activities at S5Lab: from telescope measurements to orbit and attitude determination
Lorenzo Mariani, DIMA Sapienza University of Rome, Italy
Gaetano Zarcone, DIMA Sapienza University of Rome, Italy
Andrea Delfini, DIAEE Sapienza University of Rome, Italy
Marco Acernese, DIMA Sapienza University of Rome, Italy
Shariar Hadji Hossein, DIMA Sapienza University of Rome, Italy
Leonardo Parisi, CNR, UOS Sapienza, Italy
Federico Curianò, DIAEE Sapienza University of Rome, Italy
Fabio Santoni, DIAEE Sapienza University of Rome, Italy
Fabrizio Piergentili, DIMA Sapienza University of Rome, Italy

11:00 Analysis of SoH for Lithium Battery Cells operating under Vibration Stress

Gianluca Caposciutti, University of Pisa, Italy
Gabriele Bandini, University of Pisa, Italy
Mirko Marracci, University of Pisa, Italy
Alice Buffi, University of Pisa, Italy
Bernardo Tellini, University of Pisa, Italy

11:20 UVS in Monitoring of Environmental Factors

Veaceslav Sprincean, Office for Education for Drones and ePhysMCS Lab, Moldova State University, Republic of Moldova
Adrian Paladi, Office for Education for Drones and ePhysMCS Lab, Moldova State University, Republic of Moldova
Tatiana Bulimaga, Moldova State University, Republic of Moldova
Florentin Paladi, Moldova State University, Republic of Moldova

11:40 Health-monitoring of a jamming-tolerant electromechanical actuator with differential ball screws

Gianpietro Di Rito, Università di Pisa, Italy
Benedetto Luciano, AESIS srl, Italy
Nicola Borgarelli, Umbra Group spa, Italy
Marco Nardeschi, Umbra Group spa, Italy

12:00 Design of a miniature time-of-flight mass spectrometer for space application

Zhengyi Ren, Lanzhou Institute of Physics Lanzhou, China
Meiru Guo, Lanzhou Institute of Physics Lanzhou, China
Yongjun Cheng, Lanzhou Institute of Physics Lanzhou, China

12:20 A New Mass Properties Measurement System for the Assembly of Rocket Cabins

Wenhao Dong, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Yachen Liu, Beijing Aerospace Institute for Metrology and Measurement Technology, China

Mingrong Tian, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Chunxi Wang, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Xinlei Zhang, Beijing Aerospace Institute for Metrology and Measurement Technology, China

12:40 - 13:40 CET

SESSION 1.2 - UAV AND LIGHT AIRCRAFT GROUND DIAGNOSTIC, CAX METHODS FOCUSED FOR DESIGN, MANUFACTURING AND MAINTENANCE OF ULTRALIGHT AIRCRAFTS

Room: *Virtual Room #1*

Chairs: Andrzej Łukaszewicz, *Bialystok University of Technology, Poland*
Jerzy Józwik, *Lublin University of Technology, Poland*
Krzysztof Szafran, *Institute of Aviation, Poland*

12:40 CAx Techniques Used in UAV Design Process
Andrzej Łukaszewicz, Bialystok University of Technology, Poland
Krzysztof Szafran, Institute of Aviation, Poland
Jerzy Józwik, Lublin University of Technology, Poland

13:00 Flight safety - some aspects of the impact of the human factor in the process of landing on the basis of a subjective analysis
Krzysztof Stanisław Szafran, Institute of Aviation, Poland
Andrzej Łukaszewicz, Bialystok University of Technology, Poland

13:20 Two TEU Container Aircraft as a Complementation of Intermodal Fast Sea Transport
Łukasz Jeziorek, Research Network Łukasiewicz Institute of Aviation, Poland

12:40 - 13:40 CET
SESSION 2.2 - AEROSPACE EDUCATION
Room: *Virtual Room #2*
Chair: Vladimir Saetchnikov, *Belarusian State University, Belarus*

12:40 BSUSat-1 - Research/Educational Lab - One Year in Orbit
Vladimir Saetchnikov, Belarusian State University, Belarus
Sergey Semenovich, Belarusian State University, Belarus
Alexander Spiridonov, Belarusian State University, Belarus
Elina Tcherniavskaia, Belarusian State University, Belarus
Vladimir Cherny, Belarusian State University, Belarus
Igor Stetsko, Belarusian State University, Belarus
Sergey Vasilenko, Belarusian State University, Belarus
Dmitry Buchinsky, Belarusian State University, Belarus

13:00 Small Satellite Orbit Determination Using The University Ground Station
Alexander Spiridonov, Belarusian State University, Belarus
Vladimir Saetchnikov, Belarusian State University, Belarus
Dmitrii Ushakov, Belarusian State University, Belarus
Vladimir Cherny, Belarusian State University, Belarus
Alexey Kezik, Belarusian State University, Belarus

13:20 Hands-on education through nano-satellites development: past, current and future projects at Sapienza S5Lab
Paolo Marzioli, Sapienza University of Rome, Italy
Lorenzo Frezza, Sapienza University of Rome, Italy
Diego Amadio, Sapienza University of Rome, Italy
Shariar Hadji Hossein, Sapienza University of Rome, Italy
Maria Giulia Pancalli, Sapienza University of Rome, Italy
Niccolò Picci, Sapienza University of Rome, Italy
Eleonora Vestito, Sapienza University of Rome, Italy
Fabrizio Piergentili, Sapienza University of Rome, Italy
Paola Celesti, Sapienza University of Rome, Italy
Federico Curianò, Sapienza University of Rome, Italy
Luca Gugliermetti, Sapienza University of Rome, Italy
Fabio Santoni, Sapienza University of Rome, Italy

12:40 - 13:40 CET

SESSION 3.2 - GENERAL SESSION - PART 2

Room: *Virtual Room #3*

Chairs: Andrea Delfini, *DIMA, Sapienza Università di Roma, Italy*
Mario Marchetti, *DIAEE, Sapienza Università di Roma, Italy*

12:40 Ground Simulation of the Effects of the Space Environment on Ceramic nano-coated panels for Space Environment Protection

Andrea Delfini, DIMA, Sapienza Università di Roma, Italy
Roberto Pastore, DIAEE, Sapienza Università di Roma, Italy
Fabio Santoni, DIAEE, Sapienza Università di Roma, Italy
Fabrizio Piergentili, DIMA, Sapienza Università di Roma, Italy
Mario Marchetti, DIAEE, Sapienza Università di Roma, Italy

13:00 GreenCube: microgreens cultivation and growth monitoring on-board a 3U CubeSat

Fabio Santoni, Sapienza University of Rome, Italy
Luca Gugliermetti, Sapienza University of Rome, Italy
Giuseppe Piras, Sapienza University of Rome, Italy
Stefania De Pascale, University of Naples 'Federico II', Italy
Antonio Pannico, University of Naples 'Federico II', Italy
Fabrizio Piergentili, Sapienza University of Rome, Italy
Paolo Marzioli, Sapienza University of Rome, Italy
Lorenzo Frezza, Sapienza University of Rome, Italy
Diego Amadio, Sapienza University of Rome, Italy
Andrea Gianfermo, Sapienza University of Rome, Italy
Federico Curianò, Sapienza University of Rome, Italy
Shariar Hadji Hossein, Sapienza University of Rome, Italy
Luca Nardi, ENEA, Italy
Eugenio Benvenuto, ENEA, Italy
Giulio Metelli, ENEA, Italy
Marco Garegnani, ENEA, Italy
Gabriele Mascetti, Italian Space Agency, Italy
Silvia Mari, Italian Space Agency, Italy
Marta Del Bianco, Italian Space Agency, Italy

13:20 Modeling and Calibration of Wide Range of Motion Biaxial Inclinometers for Celestial Navigation
Ilija Jovanovic, Ryerson University, Canada
John Enright, Ryerson University, Canada

14:20 - 16:20 CET
SESSION 1.3 - METROLOGY FOR RADAR SYSTEMS - PART 2
Room: *Virtual Room #1*
Chairs: Alfonso Farina, *Selex ES, Italy*
Silvia Liberata Ullo, *University of Sannio, Italy*

14:20 The use of FlyTrack µP device to determine the angular and range resolution of modern radars.
Mariusz Pakowski, Air Force Institute of Technology, Poland
Marek Brzozowski, Air Force Institute of Technology, Poland
Mirosław Myszka, Air Force Institute of Technology, Poland
Mirosław Michalczewski, Air Force Institute of Technology, Poland

14:40 Water Level measurement using COSMO-SkyMed Synthetic Aperture Radar
Filippo Biondi, University of L'Aquila, Italy
Angelica Tarpanelli, Consiglio Nazionale delle Ricerche, Italy
Pia Addabbo, Università degli studi "Giustino Fortunato", Italy
Carmine Clemente, University of Strathclyde, Scotland
Danilo Orlando, Università degli Studi "Niccolò Cusano", Italy

15:00 Continuous – Emission Noise Radar: Design Criteria and Waveforms
Gaspare Galati, National Inter-University Consortium for Telecommunications, Tor Vergata University, Italy
Gabriele Pavan, National Inter-University Consortium for Telecommunications, Tor Vergata University, Italy
Christoph Wasserzier, Fraunhofer Institute, Germany

15:20 Performance Evaluation of Vibrational Measurements Through mmWave Radars

Gianluca Ciattaglia, Università Politecnica delle Marche, Italy
Adelmo De Santis, Università Politecnica delle Marche, Italy
Deivis Disha, Università Politecnica delle Marche, Italy
Susanna Spinsante, Università Politecnica delle Marche, Italy
Paolo Castellini, Università Politecnica delle Marche, Italy
Ennio Gambi, Università Politecnica delle Marche, Italy

15:40 A Two-Step Process for a Cognitive Radar Waveform Design with Multipath Exploitation

Seden Hazal Gulen Yilmaz, Advanced Tech. Research Inst., TUBITAK Bilgem Iltaren, Turkey
Chiara Zarro, University of Sannio, Italy
Harun Taha Hayvaci, American Univ. of the Middle East, Kuwait
Silvia Liberata Ullo, University of Sannio, Italy

16:00 Gait Recognition using FMCW Radar and Temporal Convolutional Deep Neural Networks

Pia Addabbo, "Giustino Fortunato" University, Italy
Mario Luca Bernardi, University of Sannio, Italy
Filippo Biondi, University of L'Aquila, Italy
Marta Cimitile, Unitelma Sapienza University, Italy
Carmine Clemente, University of Strathclyde, Scotland
Danilo Orlando, "Niccolò Cusano" University, Italy

14:20 - 16:00 CET
SESSION 2.3 - SENSORS AND DATA FUSION TECHNIQUES, VIRTUAL AND SYNTHETIC SENSORS, ANALYTICAL REDUNDANCY AND STATE OBSERVERS FOR AVIONICS
Room: *Virtual Room #2*
Chair: Angelo Lerro, *Politecnico di Torino, Italy*

14:20 Estimating the performance of a Passive Multi-static Doppler-only Radar Network

Miika Tolonen, Lappeenranta-Lahti University of Technology, Finland
Tuomo Kauranne, Adaptia Solutions Oy, Finland
Juha Hartikka, Adaptia Solutions Oy, Finland
Mauno Ritola, Adaptia Solutions Oy, Finland
Matti Korhonen, Adaptia Solutions Oy, Finland

14:40 Effects of the Wind Field on the Synthetic Measurement of the Aerodynamic Angles of an Aerial Vehicle

Alberto Brandl, Politecnico di Torino, Italy
Manuela Battipede, Politecnico di Torino, Italy

15:00 Preliminary Definition of Metrological Guidelines for Synthetic Sensor Verification

Angelo Lerro, Politecnico di Torino, Italy
Chiara Musacchio, Politecnico di Torino, Italy

15:20 Safety Assessment for Certified Air Data Systems based on Synthetic Sensors

Angelo Lerro, Politecnico di Torino, Italy
Manuela Battipede, Politecnico di Torino, Italy
Giovanni Sangaletti, SELT Aerospace & Defence, Italy
Daniele Barbera, SELT Aerospace & Defence, Italy
Samuele Antinori, SELT Aerospace & Defence, Italy

15:40 Sensitivity Analysis of a Certifiable Synthetic Sensor for Aerodynamic Angle Estimation

Alberto Brandl, Politecnico di Torino, Italy
Graziano Coppa, INRiM, Italy
Piero Gili, Politecnico di Torino, Italy

14:20 - 16:00 CET

SESSION 3.3 - MEASUREMENT FOR IMPROVING QUALITY, RELIABILITY AND SAFETY IN AEROSPACE APPLICATIONS - PART 2

Room: *Virtual Room #3*

Chairs: Lorenzo Ciani, *University of Florence, Italy*
Marcantonio Catelani, *Universtiy of Florence, Italy*

14:20 The Challenges For Electromagnetic Diagnosis And Control of Power Devices using Wide-Band Gap Semi-conductors

Jean-Marie Larbaig, Université Pau Pays de l'Adour, France
Jean-marc Dienot, Université de Toulouse-III, France
Robert Ruscassie, Université Pau Pays de l'Adour, France
Ioav Ramos-Chavez, Novatem S. A., France

14:40 Heterogeneous sensor network for micro-satellite anomaly detection and event recording

Girolamo Di Francia, ENEA, Italy
Saverio De Vito, ENEA, Italy
Fabrizio Formisano, ENEA, Italy
Antonio Del Giudice, ENEA, Italy
Renato Aurigemma, Euro.Soft s.r.l., Italy
Raimondo Fortezza, Telespazio, Italy
Raffaele Savino, University of Naples 'Federico II', Italy
Salvatore Schiano Lo Moriello, Euro.Soft s.r.l., Italy

15:00 Design and Experimental analysis of temperature tests for Inertial Measurement Units in Avionic applications

Marcantonio Catelani, University of Florence, Italy
Lorenzo Ciani, University of Florence, Italy
Gabriele Patrizi, University of Florence, Italy
Domenico Capriglione, University of Salerno, Italy
Marco Carratù, University of Salerno, Italy
Paolo Sommella, University of Salerno, Italy
Antonio Pietrosanto, University of Salerno, Italy

15:20 The Scatter Correct Technology on GE Phoenix V|Tome|x CT System
Nicola Tognetti, Pontlab S.r.l., Italy

15:40 Examination and evaluation of training jet aircraft maintainability
Karol Kawka, Military University of Technology, Poland
Konrad Wojtowicz, Military University of Technology, Poland
Mariusz Zieja, Air Force Institute of Technology, Poland

16:00 - 18:20 CET
SESSION 1.4 - MANUFACTURING AND METROLOGY IN THE AEROSPACE INDUSTRY
Room: *Virtual Room #1*
Chair: Jerzy Józwik, *Lublin University of Technology, Poland*

16:00 Research on Trustworthiness Evaluation Technology of Aircraft Intelligent Navigation System
Jing Sun, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Xiujian Zhang, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Pengcheng Zhang, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Yongchao Zhang, Beijing Aerospace Institute for Metrology and Measurement Technology, China

16:20 ICA-Based Single Channel Source Separation With Time-Frequency Decomposition
Dariusz Mika, The State School of Higher Education Chełm, Poland
Grzegorz Budzik, Rzeszow University of Technology, Poland
Jerzy Józwik, Lublin University of Technology, Poland

16:40 SpaceART SpaceWire and SpaceFibre Analyser Real-Time
Antonino Marino, University of Pisa, Italy
Alessandro Leoni, University of Pisa, Italy
Luca Dello Sterpaio, University of Pisa, Italy

Pietro Nannipieri, University of Pisa, Italy
Gianmarco Dinelli, University of Pisa, Italy
Gionata Benelli, IngeniArs s.r.l., Italy
Daniele Davalle, IngeniArs s.r.l., Italy
Luca Fanucci, University of Pisa, Italy

17:00 The assessment of electromagnetic field in commonly used training aircrafts

Joanna Michalowska, The State School of Higher Education in Chelm, Poland
Jaroslaw Pytka, Lublin University of Technology, Poland
Arkadiusz Tofil, The State School of Higher Education in Chelm, Poland
Jerzy Jozwik, The State School of Higher Education in Chelm, Poland
Lukasz Puzio, The State School of Higher Education in Chelm, Poland
Piotr Krupski, Lublin University of Technology, Poland

17:20 Artificial Neural Network models for tool wear prediction during Aluminium Matrix Composite milling

Martyna Wiciak-Pikuła, Poznan University of Technology, Poland
Agata Felusiak, Poznan University of Technology, Poland
Paweł Twardowski, Poznan University of Technology, Poland

17:40 Surface roughness and forces prediction of milling Inconel 718 with neural network

Martyna Wiciak-Pikuła, Poznan University of Technology, Poland
Agata Felusiak, Poznan University of Technology, Poland
Tadeusz Chwalczuk, Poznan University of Technology, Poland
Paweł Twardowski, Poznan University of Technology, Poland

18:00 Analysis of Wear of the Polymer Mold in the Production of Wax Casting Models of Aircraft Engine Blades

Grzegorz Budzik, Rzeszow University of Technology, Poland
Paweł Turek, Rzeszow University of Technology, Poland
Jerzy Józwik, Lublin University of Technology, Poland
Mariusz Oleksy, Rzeszow University of Technology, Poland
Andrzej Paszkiewicz, Rzeszow University of Technology, Poland
Żelechowski Damian, PROSOLUTIONS Majewscy Sp. J., Poland
Joanna Woźniak, Rzeszow University of Technology, Poland

16:00 - 18:20 CET

SESSION 2.4 - METROLOGY IN THE THERMO-FLUID DYNAMICS AEROSPACE APPLICATIONS

Room: *Virtual Room #2*

Chairs: Adolfo Martucci, *CIRA, Italy*
Giovanni Cerasuolo, *CIRA, Italy*
Orsola Petrella, *CIRA, Italy*

16:00 A wind tunnel sensor network for a cost-effective evaluation of aircraft drag reduction from riblets
Antonio Pagano, Italian Aerospace Research Centre, CIRA, Italy
Carmelo Izzo, Italian Aerospace Research Centre, CIRA, Italy

16:20 Absorption-based Laser Mass Flow Meter for Iodine Feeding System for Electric Propulsion
Manuel M. Saravia, DICI - Università di Pisa, Italy
Alfio E. Vinci, DICI - Università di Pisa, Italy
Bruno Moriconi, DICI - Università di Pisa, Italy
Luca Bernazzani, DCCI - Università di Pisa, Italy
Alessio Ceccarini, DCCI - Università di Pisa, Italy
Fabrizio Paganucci, DICI - Università di Pisa, Italy

16:40 Superhydrophobic coatings for aeronautical applications.
Filomena Piscitelli, Italian Aerospace Research Centre (CIRA), Italy

17:00 Innovative calibration methodology for gardon gauge heat flux meter
Adolfo Martucci, CIRA Italian aerospace Research Center, Italy
Fabrizio De Gregorio, CIRA Italian aerospace Research Center, Italy
Marilena Musto, University of Naples 'Federico II', Italy
Orsola Petrella, CIRA Italian aerospace Research Center, Italy
Luigi Marciano, CIRA Italian aerospace Research Center, Italy
Giuseppe Rotondo, University of Naples 'Federico II', Italy
Eliana Gaudino, University of Naples 'Federico II', Italy

17:20 Flow control on a 2D back-facing ramp by Synthetic Jets
Giuseppe Ceglia, CIRA Italian aerospace Research Center, Italy
Marco Invigorito, CIRA Italian aerospace Research Center, Italy
Matteo Chiatto, University of Naples 'Federico II', Italy
Carlo Salvatore Greco, University of Naples 'Federico II', Italy
Gennaro Cardone, University of Naples 'Federico II', Italy
Luigi De Luca, University of Naples 'Federico II', Italy

17:40 Material Spectral Emissivity Evaluation by Dual-Colour Pyrometer
Carlo Purpura, CIRA-PWT Centro Italiano Ricerche Aerospaziali, Italy

18:00 Uncertainty propagation in field inversion for turbulence modelling in turbomachinery
Andrea Ferrero, Politecnico di Torino, Italy
Francesco Larocca, Politecnico di Torino, Italy
Francesca Romana Pennecchi, Istituto Nazionale di Ricerca Metrologica, Italy

16:00 - 17:40 CET
SESSION 3.4 - METROLOGY AND INSTRUMENTATION FOR UNMANNED AERIAL VEHICLES
Room: *Virtual Room #3*
Chair: Konrad Wojtowicz, *Military University of Technology, Poland*

16:00 A Cloud-based Vehicle Collision Avoidance Strategy for Unmanned Aircraft System Traffic Management (UTM) in Urban Areas
Stefano Primatesta, Politecnico di Torino, Italy
Matteo Scanavino, Politecnico di Torino, Italy
Andrea Lorenzini, Politecnico di Torino, Italy
Francesco Polia, Politecnico di Torino, Italy
Enrico Stabile, Politecnico di Torino, Italy
Giorgio Guglieri, Politecnico di Torino, Italy
Alessandro Rizzo, Politecnico di Torino, Italy

16:20 Velocity and attitude estimation of a small unmanned aircraft with micro Pitot tube and Inertial Measurement Unit (IMU)
Gennaro Ariante, Parthenope University of Naples, Italy
Umberto Papa, Parthenope University of Naples, Italy
Salvatore Ponte, University of Campania "L. Vanvitelli"
Giuseppe Del Core, Parthenope University of Naples, Italy

16:40 Avalanche Rescue with Autonomous Drones
Pietro Iob, University of Padova, Italy
Luca Frau, University of Padova, Italy
Piero Danieli, University of Padova, Italy
Lorenzo Olivieri, University of Padova, Italy
Carlo Bettanini, University of Padova, Italy

17:00 CREATEFORUAS: Developing Innovative Technologies for Autonomous UAS
Giancarmine Fasano, Università di Napoli "Federico II", Italy
Flavia Causa, Università di Napoli "Federico II", Italy
Roberto Opromolla, Università di Napoli "Federico II", Italy
Elisa Capello, Politecnico di Torino, Italy
Davide Carminati, Politecnico di Torino, Italy
Adriano Mancini, Università Politecnica delle Marche, Italy
Alessandro Galdelli, Università Politecnica delle Marche, Italy

17:20 Verification tests of total station usability for UAV position measurements
Agnieszka Hankus-Kubica, JSW Innowacje S.A., Poland
Bartosz Brzozowski, JSW Innowacje S.A., Poland
Karol Cheda, JSW Innowacje S.A., Poland
Maciej Kuliński, JSW Innowacje S.A., Poland
Piotr Wieczorek, JSW Innowacje S.A., Poland

Technical Sessions - Wednesday, June 24

09:00 - 10:00 CET
PLENARY SESSION
Room: *Virtual Room #1*
Chair: Luca De Vito, *University of Sannio, Italy*

Situation Awareness through Data Analytics and Machine Learning based on Trajectories

Felix Opitz, *Airbus Defence and Space GmbH, Germany*

10:10 - 11:30 CET
SESSION 1.5 - ADVANCES ON MULTIMODAL IMAGING BASED INTELLIGENT SYSTEMS IN AEROSPACE METROLOGY - PART 1
Room: *Virtual Room #1*
Chairs: Vito Pagliarulo, *CNR-ISASI, Italy*
Pietro Ferraro, *CNR-ISASI, Italy*
Ettore Stella, *CNR-STIIMA, Italy*
Nicola Gallo, *Leonardo SpA, Italy*

10:10 Pattern recognition on aerospace images using deep neural networks
Ivan Saetchnikov, Belarusian State University, Belarus
Victor Skakun, Belarusian State University, Belarus
Elina Tcherniavskaia, Belarusian State University, Belarus

10:30 Lock-in Thermography as a tool for the Detection of Damages in "Eco" Composite Materials

Massimo Rippa, ISASI - CNR, Italy
Pietro Russo, IPCB - CNR, Italy
Vito Pagliarulo, ISASI - CNR, Italy
Vittorio Bianco, ISASI - CNR, Italy
Pietro Ferraro, ISASI - CNR, Italy
Pasquale Mormile, ISASI - CNR, Italy

10:50 Damage evaluation on 3Dimensional Carbon Fibre laminates by speckle interferometry

Vito Pagliarulo, ISASI - CNR, Italy
Pietro Ferraro, ISASI - CNR, Italy
Maria Rosaria Ricciardi, CNR, IPCB, Italy
Vincenza Antonucci, CNR, IPCB, Italy
Ilaria Papa, University of Naples 'Federico II', Italy
Valentina Lopresto, University of Naples 'Federico II', Italy

11:10 External and internal quality inspection of aerospace components

Carlos Beltran-Gonzalez, Pattern Analysis and Computer Vision - Istituto Italiano di Tecnologia, Italy
Matteo Bustreo, Pattern Analysis and Computer Vision - Istituto Italiano di Tecnologia, Italy
Alessio Del Bue, Pattern Analysis and Computer Vision- Istituto Italiano di Tecnologia, Italy

10:10 - 11:30 CET
SESSION 2.5 - GENERAL SESSION - PART 3
Room: *Virtual Room #2*
Chair: Alice Buffi, *University of Pisa, Italy*

10:10 CFD analysis of the "MicroMED" Optical Particle Counter in various planetary environments

Giuseppe Mongelluzzo, INAF, University of Naples 'Federico II', Italy
Gabriele Franzese, INAF, Italy
Cesare Molfese, INAF, Italy
Francesca Esposito, INAF, Italy
Alan Cosimo Ruggeri, INAF, Italy
Fabio Cozzolino, INAF, Italy
Carmen Porto, INAF, Italy

10:30 Time Difference of Arrival for stratospheric balloon tracking: design and development of the STRAINS Experiment

Luigi di Palo, (DIMA) Sapienza University of Rome, Italy
Riccardo Garofalo, (DIMA) Sapienza University of Rome, Italy
Emanuele Bedetti, (DIMA) Sapienza University of Rome, Italy
Paola Celesti, (DIMA) Sapienza University of Rome, Italy
Francesco Iovanna, (DIMA) Sapienza University of Rome, Italy
Lorenzo Frezza, (DIMA) Sapienza University of Rome, Italy
Paolo Marzioli, (DIMA) Sapienza University of Rome, Italy
Fabrizio Piergentili, (DIMA) Sapienza University of Rome, Italy
Angela Volpe, Italian Space Agency, Italy
Federico Curianò, (DIAEE) Sapienza University of Rome, Italy
Fabio Santoni, (DIAEE) Sapienza University of Rome, Italy

10:50 Research on single frequency terahertz beam divergence Angle measurement

Xiaoqiang Gao, Beijing Aerospace Institute for Metrology and Measurement, China
Lin Liu, Beijing Aerospace Institute for Metrology and Measurement, China
Yang Xie, Beijing Aerospace Institute for Metrology and Measurement, China
Hao Liu, Beijing Aerospace Institute for Metrology and Measurement, China
Zongjun Wang, Beijing Aerospace Institute for Metrology and Measurement, China
Xiaoxu Liu, Beijing Aerospace Institute for Metrology and Measurement, China

11:10 Comb-calibrated Frequency-modulated Continuouswave Lidar
Yang Xie, Beijing Aerospace Institute for Metrology and Measurement, China
Tieli Zhang, Beijing Aerospace Institute for Metrology and Measurement, China
Zongjun Wang, Beijing Aerospace Institute for Metrology and Measurement, China
Lin Liu, Beijing Aerospace Institute for Metrology and Measurement, China
Hao Liu, Beijing Aerospace Institute for Metrology and Measurement, China
Xiaoqiang Gao, Beijing Aerospace Institute for Metrology and Measurement, China
Meng Ge, Beijing Aerospace Institute for Metrology and Measurement, China
Fumin Zhang, Tianjin University, China

10:10 - 11:30 CET
SESSION 3.5 - SENSORS AND SOLUTIONS FOR AUTONOMOUS AEROSPACE SYSTEMS - PART 1

Room: *Virtual Room #3*
Chairs: Domenico Accardo, *University of Naples Federico II, Italy*
Roberto Opromolla, *University of Naples Federico II, Italy*

10:10 An Innovative Process-Based Mission Management System for Unmanned Vehicles
Claudia Conte, University of Naples 'Federico II', Italy
Giorgio de Alteriis, University of Naples 'Federico II', Italy
Giancarlo Rufino, University of Naples 'Federico II', Italy
Domenico Accardo, University of Naples 'Federico II', Italy

10:30 Graph of civil aircraft trajectory generation and selection for weather avoidance and emission redation
Gabriella Serafino, Leonardo company, Italy

10:50 Application of dispersed microresonator based sensor for aerospace-related tasks
Anton Saetchnikov, Ruhr University Bochum, Germany, Belarusian State University, Belarus
Elina Tcherniavskaia, Belarusian State University, Belarus
Vladimir Saetchnikov, Belarusian State University, Belarus
Andreas Ostendorf, Ruhr University Bochum, Germany

11:10 Hazard detection and landing site selection for planetary exploration using LIDAR

Davide Mango, University of Naples 'Federico II', Italy
Roberto Opromolla, University of Naples 'Federico II', Italy
Christoph Schmitt, Jena-Optronik GmbH, Germany

11:30 - 12:50 CET
SESSION 1.6 - ADVANCES ON MULTIMODAL IMAGING BASED INTELLIGENT SYSTEMS IN AEROSPACE METROLOGY - PART 2
Room: *Virtual Room #1*
Chairs: Vito Pagliarulo, *CNR-ISASI, Italy*
Pietro Ferraro, *CNR-ISASI, Italy*
Ettore Stella, *CNR-STIIMA, Italy*
Nicola Gallo, *Leonardo SpA, Italy*

11:30 Comparative analysis of multimodal feature-based 3D point cloud stitching techniques for aeronautic applications

Vito Renò, National Research Council of Italy, STIIMA, Italy
Massimiliano Nitti, National Research Council of Italy, STIIMA, Italy
Maria di Summa, National Research Council of Italy, STIIMA, Italy
Rosalia Maglietta, National Research Council of Italy, STIIMA, Italy
Ettore Stella, National Research Council of Italy, STIIMA, Italy

11:50 A RANSAC-based method for detecting postassembly defects in aircraft interiors

Nicola Mosca, National Research Council of Italy, STIIMA, Italy
Cosimo Patruno, National Research Council of Italy, STIIMA, Italy
Roberto Colella, National Research Council of Italy, STIIMA, Italy
Simone Pio Negri, National Research Council of Italy, STIIMA, Italy
Ettore Stella, National Research Council of Italy, STIIMA, Italy

12:10 Physics-based modelling and optimisation of shimming operations in the assembly process of aircraft skin panels
Pasquale Franciosa, University of Warwick, UK
Salvatore Gerbino, University of Campania "L. Vanvitelli", Italy
Nicola Gallo, Leonardo SpA, Italy
Massimo Martorelli, University of Naples "Federico II", Italy

12:30 Optical characterizations of airless radial tire
Massimo Martorelli, University of Naples 'Federico II', Italy
Domenico Speranza, University of Cassino and Southern Lazio, Italy
Pietro Ferraro, CNR National Research Council, Italy
Andrea Genovese, University of Naples 'Federico II', Italy
Antonio Gloria, IPCB, CNR National Research Council, Italy
Vito Pagliarulo, ISASI, CNR National Research Council, Italy

11:30 - 13:10 CET
SESSION 2.6 - GARFIELD - GENERAL AVIATION RESEARCH AND DEVELOPMENT. METROLOGY, METHODS AND INSTRUMENTATION
Room: *Virtual Room #2*
Chair: Jarosław Pytka, *Lublin University of Technology, Lublin, Poland*

11:30 Flight Testing of the PROPWING Airplane Propulsion Concept
Jarosław Pytka, Lublin University of Technology, Poland
Andrzej Rypulak, Military University of Aviation, Poland
Joanna Michałowska, The State School of Higher Education, Poland
Jan Pytka, Military University of Aviation, Poland
Dariusz Błażejczak, West University of Technology in Szczecin, Poland
Ernest Gnapowski, University College of Administration and Enterprise, Poland
Jan Laskowski, Lublin University of Technology, Poland

11:50 Wind Tunnel Testing of Mesh Electrodes Plasma Actuator
Ernest Gnapowski, University College of Enterprise and Administration, Poland
Jarosław Pytka, Lublin University of Technology, Poland
Jerzy Józwik, Lublin University of Technology, Poland
Joanna Michałowska, The State School of Higher Education, Poland

12:10 Special measurement standard of mass, mass center and inertia moment
Olga Dovydenko, TsAGI, Russia
Aleksander Samoylenko, TsAGI, Russia
Vasiliy Petronevich, TsAGI, Russia

12:30 Soil Cone Index impact on aircraft ground performance
Anna Zalewska-Tytłak, Lublin University of Technology, Poland
Tomasz Łyszczyk, Lublin University of Technology, Poland
Jarosław Pytka, Lublin University of Technology, Poland

12:50 Uncertainty Estimation of Measuring Circuit During Cutting Forces Measurement Using the Piezoelectric Dynamometer
Magdalena Zawada-Michałowska, Lublin University of Technology, Poland
Paweł Pieśko, Lublin University of Technology, Poland
Jerzy Józwik, Lublin University of Technology, Poland
Legutko Stanisław, Poznan University of Technology, Poland
Dariusz Mika, The State School of Higher Education, Poland
Jarosław Pytka, Lublin University of Technology, Poland

11:30 - 13:10 CET
SESSION 3.6 - SENSORS AND SOLUTIONS FOR AUTONOMOUS AEROSPACE SYSTEMS - PART 2
Room: *Virtual Room #3*
Chairs: Domenico Accardo, *University of Naples Federico II, Italy*
Giorgio de Alteriis*, University of Naples Federico II, University of Bergamo*

11:30 Analysis of LIDAR-based relative navigation performance during close-range rendezvous toward an uncooperative spacecraft
Alessia Nocerino, University of Naples 'Federico II', Italy
Roberto Opromolla, University of Naples 'Federico II', Italy
Giancarmine Fasano, University of Naples 'Federico II', Italy
Michele Grassi, University of Naples 'Federico II', Italy

11:50 AutoTaxi task analysis and HMI development forthe Introduction of RPAS in non-segregated airport

Gabriella Serafino, Leonardo company, Italy
Francesco Tesauri, RE: Lab Srl, Italy
Maurizio Goiak, Leonardo company, Italy
Enrico Lo greco, Leonardo company, Italy
Nicola Toniazzi, Leonardo company, Italy
Paolo Zerbo, Leonardo company, Italy

12:10 Use of piezoelectric actuators for thrust vectoring in ion engines: conceptual design and preliminary analysis

Naveen K. Doddahosahalli Nagarajaiah, University of Pisa, Italy
Guglielmo Neri, University of Pisa, Italy
Arjun Jayaprakash Chaliyath, University of Pisa, Italy
Mario Rosario Chiarelli, University of Pisa, Italy
Gianpietro Di Rito, University of Pisa, Italy

12:30 Flying Outfit for Control of Unsafe Seagulls

Domenico Accardo, University of Naples 'Federico II', Italy
Leopoldo Angrisani, University of Naples 'Federico II', Italy
Luca Borrelli, University of Naples 'Federico II', Italy
Mauro D'Arco, University of Naples 'Federico II', Italy
Egidio Di Benedetto, University of Naples 'Federico II', Italy
Ludovico Di Pineto, University of Naples 'Federico II', Italy
Giancarmine Fasano, University of Naples 'Federico II', Italy
Alessandro Fioretti, University of Naples 'Federico II', Italy
Giancarlo Rufino, University of Naples 'Federico II', Italy
Tamara Russo, University of Naples 'Federico II', Italy
Anna Elena Tirri, University of Naples 'Federico II', Italy

12:50 Design and test of autonomous scientific payloads for sounding balloons

C. Bettanini, University of Padova, Italy
P. Fiorentin, University of Padova, Italy
A. Dumitriu, University of Padova, Italy
E. Conte, University of Padova, Italy
F. Accatino, University of Padova, Italy

E. Cagnato, University of Padova, Italy
O. Kahol, University of Padova, Italy
M. Ghedin, University of Padova, Italy
D. Celadin, University of Padova, Italy
N. Magro, University of Padova, Italy
M. Bedendo, University of Padova, Italy
A. Aboudan, University of Padova, Italy
G. Colombatti, University of Padova, Italy

14:20 - 16:20 CET

SESSION 1.7 - STRUCTURAL HEALTH MONITORING AND NONDESTRUCTIVE TESTING FOR AEROSPACE

Room: *Virtual Room #1*

Chairs: Marco Laracca, *Univerity of Cassino, Italy*
Leandro Maio, *University of Naples 'Federico II', Italy*
Vittorio Memmolo, *University of Naples 'Federico II', Italy*

14:20 Digitization of X-ray films of aerospace products and defect detection based on convolutional neural network

Xing Wang, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Ke Liu, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Zengyu Sun, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Yue Gao, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Tong Wu, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Yuan Yuan, Beijing Aerospace Institute for Metrology and Measurement Technology, China

14:40 High Quality Process of Ultrasonic Nondestructive Testing of Adhesively Bonded Dissimilar Materials

Damira Smagulova, Kaunas University of Technology, Lithuania
Elena Jasiuniene, Kaunas University of Technology, Lithuania

15:00 Analysis of the accuracy in impact localization using piezoelectric sensors for Structural Health Monitoring with multichannel real-time electronics
Andrea Bulletti, University of Florence, Italy
Eugenio Marino Merlo, University of Florence, Italy
Lorenzo Capineri, University of Florence, Italy

15:20 Sensor integration within composite structures for continuous load monitoring
Vittorio Memmolo, University of Naples 'Federico II', Italy
Matthias Schmidt, Fraunhofer LBF, Germany
Leandro Maio, University of Naples 'Federico II', Italy
Fabrizio Ricci, University of Naples 'Federico II', Italy

15:40 On the use of smart on-board systems for aircraft ice removal
Leandro Maio, University of Naples 'Federico II', Italy
Mena Piscitelli, Italian Aerospace Research Centre, Italy
Salvatore Ameduri, Italian Aerospace Research Centre, Italy
Angela Brindisi, Italian Aerospace Research Centre, Italy
Lorenzo Pellone, Italian Aerospace Research Centre, Italy
Vittorio Memmolo, University of Naples 'Federico II', Italy
Fabrizio Ricci, University of Naples 'Federico II', Italy
Concilio Antonio, Italian Aerospace Research Centre, Italy
Marco Laracca, University of Cassino and Southern Lazio, Italy

16:00 Preliminary results of FMCW radar measurements at 60GHz for ice build up detection on the surface of a composite panel
Leandro Maio, University of Naples 'Federico II', Italy
Jochen Moll, Goethe-University Frankfurt, Germany

14:20 - 16:20 CET
SESSION 2.7 - COMPLEX SYSTEMS OPERATIONAL AVAILABILITY: MEASUREMENTS, METHODOLOGIES AND REQUIREMENTS
Room: *Virtual Room #2*
Chair: Fabio Leccese, *Roma Tre University, Italy*

14:20 Inertial Navigation Systems (INS) for Drones: Position Errors Model
Enrico Petritoli, Università degli Studi "Roma Tre", Italy
Fabio Leccese, Università degli Studi "Roma Tre", Italy
Giuseppe Schirripa Spagnolo, Università degli Studi "Roma Tre", Italy

14:40 Post-annealing effects on stability of lasered nanostructured ZnO sensors for their usage in monitoring smart greenhouse
Luca Maiolo, IMM-CNR, Italy
Francesco Maita, IMM-CNR, Italy
Ivano Lucarini, IMM-CNR, Italy
Annalisa Convertino, IMM-CNR, Italy
Davide Polese, IMM-CNR, Italy

15:00 General Reliability Assessment via the Physics-Based Approach
Anna Paggi, ItalConsul s.r.l., Italy
Gian Luca Mariotti, ItalConsul s.r.l., Italy
Roberto Paggi, ItalConsul s.r.l., Italy
Fabio Leccese, Università degli Studi "Roma Tre", Italy

15:20 CO_2 Recycling into Methane and Water over Stable Selective Catalyst Ni/CeO_2-nanorods
Simonetta Tuti, "Roma Tre" University, Italy
Igor Luisetto, ENEA, Italy
Fabio Leccese, "Roma Tre" University, Italy
Eleonora Marconi, "Roma Tre" University, Italy
Sergio Lo Mastro, "Roma Tre" University, Italy
Elisabetta Di Bartolomeo, "Tor Vergata" University, Italy
Mariarita Santoro, "Tor Vergata" University, Italy

15:40 Simulation of a WSN Routing Protocol for Airport Runway Application
Marco Cagnetti, Università degli Studi "Roma Tre", Italy
Mariagrazia Leccisi, Università degli Studi "Roma Tre", Italy
Fabio Leccese, Università degli Studi "Roma Tre", Italy

16:00 A New Approach to define reproducibility of Additive Layers manufactured components

Sabino Giarnetti, SeTeL s.r.l., Italy
Eduardo De Francesco, SeTeL s.r.l., Italy
Ruggero De Francesco, SeTeL s.r.l., Italy
Francesca Nanni, "Tor Vergata" University, Italy
Marco Cagnetti, "Roma Tre" University, Italy
Fabio Leccese, "Roma Tre" University, Italy
Enrico Petritoli, "Roma Tre" University, Italy
Giuseppe Schirripa Spagnolo, "Roma Tre" University, Italy

14:20 - 16:00 CET
SESSION 3.7 - SENSORS AND SOLUTIONS FOR AUTONOMOUS AEROSPACE SYSTEMS - PART 3
Room: *Virtual Room #3*
Chairs: Domenico Accardo, *University of Naples Federico II, Italy*
Claudia Conte*, University of Naples Federico II, University of Bergamo*

14:20 Use of Consumer-Grade MEMS Inertial Sensors for Accurate Attitude Determination of Drones

Giorgio de Alteriis, University of Naples Federico II, University of Bergamo
Claudia Conte, University of Naples Federico II, University of Bergamo
Rosario Schiano Lo Moriello, University of Naples Federico II
Domenico Accardo, University of Naples Federico II

14:40 Adaptive Detection Tracking System for Autonomous UAV Maritime Patrolling

Alessandro Panico, Italian Air Force,Italy
Luca Zanotti Fragonara, Cranfield University, UK
Saba Al-Rubaye, Cranfield University, UK

15:00 Software and Sensor Issues for Autonomous Systems based on Machine Learning Solutions

Dario De Dominicis, Italian Airforce Academy, Italy
Domenico Accardo, University of Naples 'Federico II', Italy

15:20 Unmanned Aerial Vehicle platform based on low-power components and environmental sensors: technical description and data analysis on real-time monitoring of air pollutants

Giuseppe Caragnano, LINKS Foundation, Italy
Simone Ciccia, LINKS Foundation, Italy
Fabrizio Bertone, LINKS Foundation, Italy
Giuseppe Varavallo, LINKS Foundation, Italy
Olivier Terzo, LINKS Foundation, Italy
Davide Capello, Novasis Innovazione, Italy
Alberto Brajon, AISICO, Italy

16:20 - 18:00 CET
SESSION 1.8 - TERRESTRIAL AND IN-FLIGHT VERIFICATION OF THE GNC SYSTEMS FOR AEROSPACE VEHICLES
Room: *Virtual Room #1*
Chairs: Yevgeny Somov, *Samara State Technical University, Russia*
Paolo Castaldi, *University of Bologna, Italy*

16:20 Ground Facility for Validation of Proximity Operations: a Hardware-In-the-Loop Experiment

Alex Caon, University of Padova, Italy
Francesco Feltrin, University of Padova, Italy
Francesco Branz, University of Padova, Italy
Francesco Sansone, Stellar Project srl, Italy
Alessandro Francesconi, University of Padova, Italy

16:40 Interplanetary Spacecraft Control Methods and Algorithms for Large Cargo Delivery

Alexander Nebylov, State University of Aerospace Instrumentation (SUAI), Russia
Alexander Panferov, State University of Aerospace Instrumentation (SUAI), Russia
Sergey Brodsky, State University of Aerospace Instrumentation (SUAI), Russia
Boris Birjukov, State University of Aerospace Instrumentation (SUAI), Russia

17:00 Checking the Accuracy of Long-term Stabilizing a Spacecraft with a Large-size Asymmetric Elastic Structure in Geostationary Orbit
Yevgeny Somov, Samara State Technical University, Russia
Sergey Butyrin, Samara State Technical University, Russia
Sergey Somov, Samara State Technical University, Russia

17:20 Checking the Required Accuracy of Measuring the State of Elastic Aerospace Vehicle Structure
Alexander Panferov, State University of Aerospace Instrumentation (SUAI), Russia
Alexander Nebylov, State University of Aerospace Instrumentation (SUAI), Russia
Sergey Brodsky, State University of Aerospace Instrumentation (SUAI), Russia

17:40 Checking the Accuracy of a Space Robot Control System at Inspecting the State of Geostationary Satellite
Yevgeny Somov, Samara State Technical University, Russia
Sergey Butyrin, Samara State Technical University, Russia
Sergey Somov, Samara State Technical University, Russia

16:20 - 18:00 CET
SESSION 2.8 - GENERAL SESSION - PART 4
Room: *Virtual Room #2*
Chair: Ioan Tudosa, *University of Sannio, Italy*

16:20 RF emitters localization from compressed measurements exploiting MMV-OMP algorithm
Francesco Picariello, University of Sannio, Italy
Ioan Tudosa, University of Sannio, Italy
Eulalia Balestrieri, University of Sannio, Italy
Sergio Rapuano, University of Sannio, Italy
Luca De Vito, University of Sannio, Italy

16:40 Vehicle localization using laser scanner
Wieslaw Szaj, Rzeszow University of Technology, Poland
Jacek Pieniazek, Rzeszow University of Technology, Poland

17:00 Simulation Framework for Mobile Robots in Planetary-Like Environments
Riccardo Giubilato, CISAS, University of Padova, Italy, Institute of Robotics and Mechatronics, Germany
Andrea Masili, University of Padova, Italy
Sebastiano Chiodini, CISAS, University of Padova, Italy
Marco Pertile, CISAS, University of Padova, Italy
Stefano Debei, CISAS, University of Padova, Italy

17:20 A test-bench for battery-motor-propeller assemblies designed for multirotor vehicles
Giulio Avanzini, Università del Salento, Italy
Attilio Di Nisio, Politecnico di Bari, Italy
Anna Lanzolla, Politecnico di Bari, Italy
Donato Stigliano, Politecnico di Bari, Italy

17:40 Uncertainty evaluation for dynamic measurements
Claudio Fogaça Truyts, Institute Aeronautics and Space, Brazil
M. L. C. C., Reis, Institute Aeronautics and Space, Brazil

16:20 - 17:40 CET
SESSION 3.8 - METROLOGY IN THE RESEARCH OF THE HELICOPTERS AND DRONES
Room: *Virtual Room #3*
Chairs: Zbigniew Czyż, *Polish Air Force University, Poland*
Jerzy Józwik, *Lublin University of Technology, Poland*
Tomasz Łusiak, *Polish Air Force University, Poland*

16:20 Aerodynamic Measurement of the Rotor Blade for Aviation Application
Ksenia Siadkowska, Lublin University of Technology, Poland

16:40 Unmanned Autogyro for Advanced SAR Tasks: a Preliminary Assessment
Enrico Petritoli, Science Department, Università degli Studi "Roma Tre", Italy
Fabio Leccese, Science Department, Università degli Studi "Roma Tre", Italy

17:00 Research into a Fuel Supply System in the Aircraft Diesel Opposed Engine
Łukasz Grabowski, Lublin University of Technology, Poland
Rafał Sochaczewski, Lublin University of Technology, Poland
Grzegorz Barański, Lublin University of Technology, Poland
Michał Biały, Lublin University of Technology, Poland

17:20 Measurement of Air Flow Velocity around the Unmanned Rotorcraft
Zbigniew Czyż, Military University of Aviation, Poland
Ksenia Siadkowska, Lublin University of Technology, Poland

18:00 - 18:15 CET
CLOSING AND AWARD CEREMONY
Room: *Virtual Room #1*