



2023 IEEE INTERNATIONAL WORKSHOP ON

METROLOGY FOR AEROSPACE

POLITECNICO DI MILANO / JUNE 19-21, 2023

WORKSHOP PROGRAM

www.metroaerospace.org



TABLE OF CONTENTS

Welcome Message from the General Chairs	2
IEEE MetroAeroSpace 2023 Committee	5
IEEE MetroAeroSpace 2023 Keynote Speakers.....	8
Plenary Session - Monday June 19 - H 12:00	8
Plenary Session - Monday June 19 - H 14:20	9
Plenary Session - Tuesday June 20 - H 11:00	11
IEEE MetroAeroSpace 2023 Tutorials	13
Tutorial Session - Tuesday June 20 - H 14:30	13
Tutorial Session - Wednesday June 21 - H 12:20	14
IEEE MetroAeroSpace 2023 Venue	15
IEEE MetroAeroSpace 2023 Social Events	16
WELCOME PARTY Monday June 19 - H 19:00	16
GALA DINNER Tuesday June 20 - H 20:00.....	16
IEEE MetroAeroSpace 2023 Patronages	17
IEEE MetroAeroSpace 2023 Sponsors.....	19
Program Schedule - Monday, June 19	20
Program Schedule - Tuesday, June 20	21
Program Schedule - Wednesday, June 21.....	22
Technical Program - Monday, June 19.....	23
Technical Program - Tuesday, June 20.....	31
Technical Program - Wednesday, June 21	41

Welcome Message from the General Chairs

On behalf of the Organizing Committee, we welcome you to the 2023 IEEE International Workshop on Metrology for AeroSpace (MetroAeroSpace). We are proud to highlight that this edition marks the 10th anniversary of the conference. Year by year MetroAeroSpace gain the position of the leading scientific event into field of measurement and instrumentation for aerospace. This result was achieved thanks to the efforts of the organizers of the previous editions and the colleagues that joint year by year the conference increasing the attendee number and spread information about it.

This year *The Best Conference Paper Award* is dedicated to the memory of Prof. Stefano Debei, whose passion, enthusiasm, and commitment for science will be of inspiration for all the recipients of this prize. The award celebrates his role as founding father of IEEE MetroAeroSpace Conference and emphasizes his role as inspirational educator and mentor with an immense influence on the careers of many generations of young researchers.

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 10th edition is organized at the “Politecnico di Milano” - Bovisa Campus - Department of Mechanical Engineering, one of the primary scientific Italian research centers in aerospace.

As usual, this MetroAeroSpace 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. Efforts from many people were required to shape the technical program, arrange accommodation, manage the administrative aspects, and set up the social functions. We like to take this opportunity to thank all and each of them. We like also to thank the public and private organizations that supported the meeting in different ways. Special thanks goes to Athena Srl for their day by day collaboration and precious support in the many complex details of the conference.



The MetroAeroSpace Technical Program consists of three keynote speeches, 30 oral sessions scheduled over three days, 1 poster session, two tutorials and 4 parallel events. Among the oral sessions, we received the proposal of up to 19 Special Sessions and we wish to thank the organizers of these Special Sessions for their cooperation and support to the Workshop organization. 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.

We received 178 extended abstracts from all over the world. Due to the time limits of the workshop, only 130 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 *MDPI Remote Sensing*, *MDPI*, and *MDPI Sensors*.

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

- Maurizio Cheli, the second Italian astronaut, Italy, will present: *A future under the sign of continuity*.
- Wanda Peters, NASA, Deputy Associate Administrator for Programs in the Science Mission Directorate, *Technology, Instrumentation, and Measurements: The Cornerstone of NASA's Scientific Discovery*.
- Andrea Accomazzo, European Space Agency (ESA): *Orienteering in the Solar System: how not to get lost before reaching destination*.

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 also includes:

- the parallel event Military Metrology for AeroSpace, which is organized by AFCEA Naples Chapter and University of Sannio, June 19th, 2023, with a very rich program articulated on the full day.
- The panel *Sharing ideas with experienced and early-stage researchers*, organized by the Women in Engineering (WIE) IEEE Italy Section Affinity Group, June 20th, 2023.
- The Round Table *Health Scenarios and Key Technologies for enabling Human Exploration of Space*
- Panel GlueTech
- Two tutorials offering the subjects:

- *Distributed SLAM for a team of planetary robots: the ARCHES moon analogue demonstration mission, Riccardo Giubilato, German Aerospace Center, Germany*
- *Wind-tunnel testing, overview of state-of-the-art techniques with application to a real-case scenario, Andrea Colli, Politecnico di Milano, Italy*

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

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”, the “Best Poster Award”, “Best Paper of the Special Session on Metrology for Radar Systems”, and the “Best Paper Award for Aerospace and Electronic Systems”.

Enjoy the fellowship of colleagues and experts and spend some free time in the midst of natural and artistic beauty. We will appreciate your important feedback on the conference organization that represents for us the best way to improve the quality of the Workshop, and to achieve lasting excellence.

It is therefore with great honor and pride that we welcome you to Milan, Italy, and to the 10th International Workshop on Metrology for AeroSpace, 2023. We hope that you enjoy both your participation in the conference and your stay in Milan.

Pasquale Daponte, University of Sannio, Italy

Robert Rassa, Raytheon, US

Bortolino Saggin, Politecnico di Milano, Italy

IEEE MetroAeroSpace 2023 General Chairs



IEEE MetroAeroSpace 2023 Committee

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Mark Yeary, University of Oklahoma, US

David Zucconi, SAB Aerospace, Italy

IEEE MetroAeroSpace 2023 Keynote Speakers

Plenary Session - Monday June 19 - H 12:00



Orienteering in the Solar System: how not to get lost before reaching destination

Andrea Accomazzo

European Space Agency - ESA

ABSTRACT

Interplanetary flight is one of the most fascinating areas of spaceflight and it is a must for the exploration of our Solar System.

Since two decades the European Space Agency (ESA) has developed the techniques and the expertise required to navigate to planets, asteroids and comets.

Navigation is the discipline that allows mission operators not to get lost in space and be able to reach their destinations. It requires very accurate measurements of the limited set of observables for probes flying at distances from tens to hundreds of million km from the Earth and operating in proximity of celestial bodies.

The observables, either from radiometric or optical measurements, then need to be fed into the so-called "orbit determination" process, which allows precise reconstruction of the past status of the spacecraft and its projection into the future to be able to design next mission events.

The talk takes stock of some representative cases of ESA missions to give a feeling of the whole process.

SPEAKER BIOGRAPHY

Head of the Solar System and Exploration Missions Division in the Operations Department at the European Space Agency. Worked for the Rosetta, Venus Express, BepiColombo, and Solar Orbiter missions as Operations Manager and Flight Director. Focusing now on future missions like Exomars Rover, Juice, Hera, Mars Sample Return, and the Lunar exploration programme. Graduated at Politecnico di Milano in Aerospace Engineering. Completed basic pilot training at the Italian Air Force Academy. Likes football, mountain-biking, and skiing.

Plenary Session - Monday June 19 - H 14:20



A future under the sign of continuity

Maurizio Cheli

ABSTRACT

Italy is ready to play a preminent role in the European Space Agency, thanks to her know-how and to explore the new opportunities offered by the Space exploration heading towards the Moon and Mars.

In order to gain the target the Italian Space Agency needs continuity in the strategic vision, in the allocation of resources up to the industrial plan.

The Space and its related investments are strategic for our country but they need a careful monitoring and medium and long term programs.

Space activities are, by definition, experimental and if there is a detailed plan, an unexpected event can always occur and this is the reason why a strong commitment is absolutely necessary. The Italian Space Industry has an active role not only in the Space missions but also in the industrial technical research.

At the moment they are planning lunar modules for the Lunar Gateway, which will be part of the future human settlement on the Moon.

Our country has been active in this sector since the beginning and we possess skills and technology to keep on working in this field.

The speech will give an overview on these topics and some details about Italian Space exploration programme.

SPEAKER BIOGRAPHY

Maurizio Cheli was born in Modena, Italy, on May 4th 1959. In 1978 he entered the Accademia Aeronautica di Pozzuoli (Italian Air Force Academy) where he earned a degree in Aeronautical Sciences. In 1983 he was assigned to the well-known F-104G as an operational reconnaissance pilot, and in 1988 he graduated first at the Empire Test Pilot's School course in Boscombe Down, United Kingdom, hence becoming a test and experimental pilot of high-performance aircraft.

In 1996 he took part in the Space Shuttle Columbia STS-75 Tethered Satellite mission, in which he was assigned the role of Mission Specialist. In the same year, Alenia Aeronautica hired him and he was assigned as Chief Test Pilot for defence aircraft. He was the head of the operational development of the European fighter Eurofighter Typhoon as well.

In 2005 he established CFM Air, a start-up focused on the design of advanced light aircrafts, and in 2006 he founded DigiSky, a company specialized in the development of on-board electronics for sports aircrafts.

Maurizio Cheli earned a Master of Science Degree in Aerospace Engineering in 1994 from the University of Houston, US, a Degree in Political Sciences from the University of Turin, Italy, and a Master in Business Administration (MBA) from ESCP Europe in Paris in 2007.

On May 17th 2018 he summited Mount Everest, the highest mountain in the world.

Currently is a board member of ASI (Italian Space Agency) and member of the board of directors of CIRA (Italian Center for Aerospace Research).

"Tutto in un istante" (Everything in a moment) is the title of his first book.



Plenary Session - Tuesday June 20 - H 11:00



Technology, Instrumentation, and Measurements: The Cornerstone of NASA's Scientific Discovery

Wanda Peters

National Aeronautics and Space Administration - NASA

ABSTRACT

The National Aeronautics and Space Administration (NASA) uses the advancement of technology to enable and broaden scientific discovery. From mass spectroscopy to helicopters, NASA utilizes innovative technological developments, including commercial-off-the-shelf parts, to further scientific discovery on Earth, other planets, and in space. These technological advancements lead to better instrumentation and measurements that transform our ability to collect, process, and analyze data. These insights provide us with information about our planet and inform future NASA missions, while producing Spin-Offs that benefit society. Technology and instrumentation are indispensable tools for scientific discovery and highlight the potential for further advancements in the future.

SPEAKER BIOGRAPHY

Dr. Wanda Peters has over 35 years of scientific, engineering, and programmatic experience working for the federal government and private industry. She is a member of the Senior Executive Service of the United States of America. Presently, Dr. Peters serves as the Deputy Associate Administrator for Programs in the Science Mission Directorate (SMD), National Aeronautics and Space Administration (NASA) Headquarters. She is responsible for overseeing and assessing SMD's multi-billion dollar portfolio of over 125 missions. She started her career at NASA, Goddard Space Flight Center, in January 1990 as a support contractor and converted into the government in 2005. At NASA, Dr. Peters has worked in the areas of program, project and business management, institutional operations, mechanical systems engineering, space technology development, and safety and mission assurance.

Prior to joining the NASA family, Dr. Peters worked at the Naval Research Laboratory as a research scientist. Dr. Peters is a mentor and advocates for diversity, equity, inclusion, and accessibility in the workplace. She is a graduate and Senior Executive Fellow of the Harvard Kennedy School of Government. Dr. Peters received both a Ph.D. in systems engineering and a

Master's in engineering management from George Washington University, a Bachelor of Science in engineering from the Catholic University of America, and a Bachelor of Science in biology from the University of Maryland, Eastern Shore. She is a native Washingtonian, is married and has two daughters.

IEEE MetroAeroSpace 2023 Tutorials

Tutorial Session - Tuesday June 20 - H 14:30



Distributed SLAM for a team of planetary robots: the ARCHES moon analogue demonstration mission

Riccardo Giubilato

German Aerospace Center, Germany

ABSTRACT

Simultaneous Localization and Mapping (SLAM) is a component of critical importance with respect to enabling a team of robotic agents to act autonomously in previously unseen environments. Differently from indoor applications, or in man-made environments, mobile robots operating in the field encounter several challenges when performing SLAM, such as unreliable data transmission channels between the agents, or the self-similarity of the environment, which has a significant impact in the possibility of recognizing previously seen places and reduce localization drift. At the DLR Institute of Robotics and Mechatronics we developed, over the years, a robust decentralized SLAM architecture for a heterogeneous team of robots, which is computationally feasible, thanks to a submap-based formulation, robust to connectivity losses, and capable of performing place recognition in absence of stable visual or structural features. This tutorial presents the experience and results obtained after the 2022 Helmholtz project "ARCHES", a large scale multi-partner (DLR, KIT, ESA) mission to demonstrate complex robotic behaviors, towards the development of a network of cooperating agents to act as a natural extension of astronauts during exploration of planetary environments. The 4-week long mission took place on the volcanic slopes of Mt. Etna, Sicily, at an altitude of 2600 meters, an environment designated as analogous to the Moon and Mars due to its peculiar geological and perceptual properties.

SPEAKER BIOGRAPHY

Riccardo Giubilato received a Ph.D. degree in Space Sciences, Technologies and Measurements in 2020 from the Centre of Studies and Activities for Space (CISAS) "G. Colombo," University of Padova. Since 2019, he is a Post-Doctoral researcher with the German Aerospace Center (DLR), Institute of Robotics and Mechatronics, Weßling, Germany.

His current research interests include collaborative multi-robot SLAM, sensor fusion for vision systems and range sensors, multimodal and learning-based place recognition in unstructured environments.

Tutorial Session - Wednesday June 21 - H 12:20



Wind-tunnel testing, overview of state-of-the-art techniques with application to a real-case scenario

Andrea Colli

Politecnico di Milano, Italy

ABSTRACT

Wind-tunnel testing has played a key role in the development of aerospace technologies and will continue to be a fundamental tool for research and industry as the demand for innovation is ever-growing.

The goal of this tutorial session is to give an overview of the capabilities of wind-tunnel testing, illustrating the wind tunnel itself with its main features, and dealing with the strategies and general recommendations on conducting a typical test campaign, but also the most common challenges it entails. A special focus will be given to the measurement techniques employed in wind tunnels, from more typical loads measurements to more complex and recent tools such as Particle Image Velocimetry, with an indication of some of the best practices in use nowadays. A series of experiments on a compound-configuration helicopter model, performed in the Large Wind Tunnel of Politecnico di Milano in 2022, will be taken as a practical example to better illustrate the topics.

SPEAKER BIOGRAPHY

Andrea Colli received a B.S. degree in Aerospace Engineering and a M.S. degree in Aeronautical Engineering from Politecnico di Milano in 2015 and 2018 respectively, and is now completing a Ph.D. in Aerospace Engineering at the same university. His field of interest is rotary-wing aerodynamics, in particular in blade-vortex interaction and rotor-wake interaction for next-generation aircraft. As part of his research he has conducted extensive wind-tunnel test campaigns, including Mach-scaled model rotor testing, employing a variety of measurement techniques ranging from Particle Image Velocimetry to unsteady pressure measurements.

IEEE MetroAeroSpace 2023 Venue

IEEE MetroAeroSpace 2023 will be held at the
Politecnico di Milano - Bovisa Campus, Building BL28 - Via Lambruschini, 4



ADDRESS

Via Lambruschini, 4
Milano

Use the QRCode to open the location on *Google Maps*

How to reach us

BY TAXI

If you decide to take a taxi, please specify to the driver the full address (via Lambruschini 4, Milano) because there are more than one Politecnico Campus in Milano.

BY PUBLIC TRANSPORTATION

The venue may be easily reached using public transportation. You may take trains of lines S1, S2, or S13 (the destinations of the "S" lines should be "Saronno" or "Bovisa" (S1), "Seveso" (S2), and "Bovisa" (S13)), or many trains from Milano Cadorna FNM station.

When you reach Bovisa Politecnico station, exit the station, turn right, go down the stairs, and then go straight to the building BL28 (5 minutes walking).

IEEE MetroAeroSpace 2023 Social Events

WELCOME PARTY

Monday June 19 - H 19:00

The Welcome Party will be held at the *Politecnico di Milano - Building BL28 - Via Lambruschini, 4* on **Monday, June 19 - 19.00.**



GALA DINNER

Tuesday June 20 - H 20:00

The Gala Dinner will be held at "*Osteria del Treno*" on **Tuesday, June 20 - 20.00.**

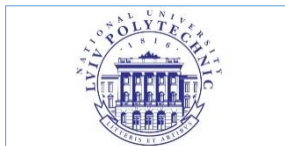
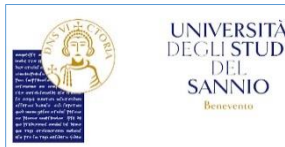


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Program Schedule - Monday, June 19

MONDAY, JUNE 19, 2023			
09:30 - 10:00	Opening Ceremony - Welcome Addresses		
	Carassa e Dadda Hall	Hall 1.1	Hall 1.2
10:00 - 11:40	Session 1.1 - Sensors and Solutions for Autonomous Aerospace Systems	Session 1.2 - General Session - Part 1	Session 1.3 - General Session - Part 2
11:40 - 12:00	COFFEE BREAK		
12:00 - 13:00	Keynote Speaker #1 - Andrea Accomazzo, <i>European Space Agency - ESA</i> Orienteering in the Solar System: how not to get lost before reaching destination		
13:00 - 14:20	LUNCH		
14:20 - 15:20	Keynote Speaker #2 - Maurizio Cheli A future under the sign of continuity		
	Carassa e Dadda Hall	Hall 1.1	Hall 1.2
15:20 - 16:40	Session 2.1 - Military Metrology for AeroSpace - Part 1	Session 2.2 - General Session - Part 3	Session 2.3 - General Session - Part 4
16:40 - 17:00	COFFEE BREAK		
17:00 - 18:40	Session 3.1 - Military Metrology for AeroSpace - Part 2	Session 3.2 - Round Table - Health Scenarios and Key Technologies for enabling Human Exploration of Space	Session 2.3 - General Session - Part 5
19:00 - 21:00	WELCOME PARTY		



Program Schedule - Tuesday, June 20

TUESDAY, JUNE 20, 2023			
	Carassa e Dadda Hall	Hall 1.1	Hall 1.2
09:00 - 10:40	Session 4.1 - Space To Space: Scientific and Technological Challenges for Human and Robotic Space Exploration - Part 1	Session 4.2 - Measurements in the Research of Aerodynamics and Control of Unmanned Aerial Vehicles	Session 4.3 - Manufacturing and Metrology in the Aerospace Industry - Part 1
10:40 - 11:00	COFFEE BREAK		
11:00 - 12:00	Keynote Speaker #3 - Wanda Peters, <i>National Aeronautics and Space Administration - NASA</i> Technology, Instrumentation, and Measurements: The Cornerstone of NASA's Scientific Discovery		
12:00 - 13:20	Session 5.1 - Space To Space: Scientific and Technological Challenges for Human and Robotic Space Exploration - Part 2	Session 5.2 - Measurement for Improving Quality, Reliability and Safety in Aerospace Applications	Session 5.3 - Manufacturing and Metrology in the Aerospace Industry - Part 2
13:20 - 14:30	LUNCH		
14:30 - 15:10	Tutorial Session #1 - Distributed SLAM for a team of planetary robots: the ARCHES moon analogue demonstration mission Riccardo Giubilato, German Aerospace Center, Germany		
	Carassa e Dadda Hall	Hall 1.1	Hall 1.2
15:10 - 16:30	Session 6.1 - Metrology and Instrumentation for Unmanned Aerial Vehicles - Part 1	Session 6.2 - Interplanetary exploration: Mars and Moon	Session 6.3 - IEEE WIE Panel
16:30 - 16:50	COFFEE BREAK		
16:50 - 18:10	Session 7.1 - Metrology and Instrumentation for Unmanned Aerial Vehicles - Part 2	Session 7.2 - Panel GlueTech	Session 7.3 - Complex Systems Operational Availability: Measurements, Methodologies and Requirements
20:00	SOCIAL DINNER		

Program Schedule - Wednesday, June 21

WEDNESDAY, JUNE 21, 2023			
	Room #1	Room #2	Room #3
09:30 - 11:30	Session 8.1 - Metrology for Radar Systems	Session 8.2 - Structural Health Monitoring and Nondestructive Testing for Aerospace - Part 1	Session 8.3 - Vision-based and LiDAR-based navigation systems for spacecraft and autonomous vehicles
11:30 - 12:20	POSTER SESSION + COFFEE BREAK		
12:20 - 13:00	Tutorial Session #2 - Wind-tunnel testing, overview of state-of-the-art techniques with application to a real-case scenario Andrea Colli, Politecnico di Milano, Italy		
13:00 - 14:00	LUNCH		
	Carassa e Dadda Hall	Hall 1.1	Hall 1.2
14:00 - 15:20	Session 9.1 - Optical and Innovative Sensors for Aerospace	Session 9.2 - Structural Health Monitoring and Nondestructive Testing for Aerospace - Part 2	Session 9.3 - University Satellites and Aerospace Research and Development
15:20 - 15:40	COFFEE BREAK		
15:40 - 17:00	Session 10.1 - Metrology for Maritime Transport, Ports and Shipping	Session 10.2 - General Session - Part 6	Session 3.3 - GNSS Space Synergies (GNS4): from GNSS space users to LEO-PNT and hybrid terminals
17:00 - 17:30	CLOSING AND AWARD CEREMONY		



Technical Program - Monday, June 19

09:00 - 17:00 *Politecnico di Milano - Building BL28*
REGISTRATIONS

09:30 - 10:00 *BL28 - Carassa e Dadda Hall*
OPENING CEREMONY - WELCOME ADDRESSES

10:00 - 11:40 *BL28 - Carassa e Dadda Hall*
Session 1.1 - Sensors and Solutions for Autonomous Aerospace Systems
Chairs: Domenico Accardo, *University of Naples Federico II, Italy*
Giorgio de Alteriis, *University of Naples Federico II, Italy*
Claudia Conte, *University of Naples Federico II, Italy*

10:00 Atmospheric Effects on Testing and Calibrating Star Tracking Algorithms
Louis Jannin, ISAE-SUPAERO, France
Leonard Felicetti, Cranfield University, United Kingdom

10:20 Autonomous Shape Memory Hinge for Space Applications Powered via Solar Energy
Arvind Gurusekaran, Free University of Bozen-Bolzano, Italy
Hugo De Souza Oliveira, Free University of Bozen-Bolzano, Italy
Vittoria Benedetti, Free University of Bozen-Bolzano, Italy
Marco Baratieri, Free University of Bozen-Bolzano, Italy
Niko Münzenrieder, Free University of Bozen-Bolzano, Italy
Manuela Ciocca, Free University of Bozen-Bolzano, Italy
Paolo Lugli, Free University of Bozen-Bolzano, Italy
Luisa Petti, Free University of Bozen-Bolzano, Italy

10:40 On the Scalability of Experimentally Determined Aerodynamic Model for Model-Based Navigation on a Delta-Wing UAV
Pasquale Longobardi, EPFL-CRYOS, Switzerland
J. Skaloud, EPFL-CRYOS, Switzerland

11:00 Autonomous Drones in GNSS-Denied Environments: Results From the Leonardo Drone Contest

Simone Godio, Politecnico di Torino, Italy
 Francesco Marino, Politecnico di Torino, Italy
 Alessandro Minervini, Politecnico di Torino, Italy
 Stefano Primatesta, Politecnico di Torino, Italy
 Marcello Chiaberge, Politecnico di Torino, Italy
 Giorgio Guglieri, Politecnico di Torino, Italy

11:20 Innovative Airspeed Sensing Based on a Micromachined Sensor

Vittoria Di Fiore, University of Naples Federico II, Italy
 Claudia Conte, University of Naples Federico II, Italy
 Verdiana Bottino, University of Naples Federico II, Italy
 Domenico Accardo, University of Naples Federico II, Italy
 Giancarlo Rufino, University of Naples Federico II, Italy
 Giorgio de Alteriis, University of Naples Federico II, Italy
 Fabio Passaniti, STMicroelectronics, Italy
 Davide Patti, STMicroelectronics, Italy
 Delfo Sanfilippo, STMicroelectronics, Italy

10:00 - 11:40

BL28 - Hall 1.1

Session 1.2 - General Session - Part I

Chair: David Martín Gómez, *Carlos III University of Madrid, Spain*

10:00 Real-Time Battery SOC Estimation Under Hybrid Power Conditions Using Fast-OCV Curve With Unscented Kalman Filters

Zhuoyao He, Shanghai Jiao Tong University, China
 David Martin Gomez, Universidad Carlos III de Madrid, Spain
 Arturo de la Escalera Hueso, Universidad Carlos III de Madrid, Spain
 Pablo Flores Pena, Drone Hopper, Spain
 Xingcai Lu, Shanghai Jiao Tong University, China
 José María Armingol Moreno, Universidad Carlos III de Madrid, Spain

10:20 Neural Network Calibration of Airborne Magnetometers

Nathan Laoué, Directorate General of Armament, France
 Arnaud Lepers, Directorate General of Armament, France
 Laure Deletraz, Directorate General of Armament, France
 Charly Faure, Directorate General of Armament, France

10:40 Strain Gauge Thermal Compensation: Approaches and New Improvements

Andrea Cazzani, Leonardo Company, Italy)
 Aniello Menichino, Italian Aerospace Research Centre - CIRA, Italy
 Michele Inverno, Italian Aerospace Research Centre - CIRA, Italy
 Marika Belardo, Italian Aerospace Research Centre - CIRA, Italy

11:00 Satellite TT&C Over M2M/IoT: The New Frontier of the Space Network Applications

Aziza Sabrina Wahib, Thales Alenia Space Italia, Italy
 Lorenza Di Domenico, Thales Alenia Space Italia, Italy



Maria Raissa Teodori, Thales Alenia Space Italia, Italy
Vincenzo Schena, Thales Alenia Space Italia, Italy
Raimondo Fortezza, Telespazio S.p.A., Italy
Fabrizio Piergentili, Sapienza University of Rome, Italy
Lorenzo Frezza, Sapienza University of Rome, Italy

11:20 Assessment of the Measurement Uncertainty for Amplitude-Dependent Single Optical Particle Counters

Marco Giovanni Corti, Politecnico di Milano, Italy
Bortolino Saggin, Politecnico di Milano, Italy
Francesca Esposito, INAF, Italy
Fabio Cozzolino, INAF, Italy
Gabriele Franzese, INAF, Italy
Diego Scaccabarozzi, Politecnico di Milano, Italy

10:00 - 11:20

BL28 - Hall 1.2

Session 1.3 - General Session - Part II

Chair: Andrea Delfini, *Sapienza University of Rome, Italy*

10:00 Performance Comparisons of Flexible Time Triggered Ethernet and TTEthernet Technologies for Space Launcher Networks

Vincenzo Eramo, Sapienza University of Rome, Italy
Tiziana Fiori, Sapienza University of Rome, Italy
Francesco Giacinto Lavacca, Sapienza University of Rome, Italy
Francesco Valente, Sapienza University of Rome, Italy
Marta Albano, Agenzia Spaziale Italiana, Italy
Simone Ciabuschi, Agenzia Spaziale Italiana, Italy
Enrico Cavallini, Agenzia Spaziale Italiana, Italy

10:20 The Influence of Humidity on the Electromagnetic Wave Propagation Parameters in Moon Soil Surface Used for Future Habitats

Andrea Delfini, Sapienza University of Rome, Italy
Roberto Pastore, Sapienza University of Rome, Italy
Davide Micheli, Telecom Italia - TILAB, Italy
Michele Lustrino, Sapienza University of Rome, Italy
Fabrizio Piergentili, Sapienza University of Rome, Italy
Mario Marchetti, Italian Association of Aeronautics and Astronautics, Italy
Marco Costanzi, TiFast srl, Italy

10:40 A Real-Time Simulation Framework for Powerline Communications in More-Electric Aircraft and Spacecraft

Vittorio Ugo Castrillo, CIRA - Italian Aerospace Research Centre, Italy
Ivan Iudice, CIRA - Italian Aerospace Research Centre, Italy
Domenico Pascarella, CIRA - Italian Aerospace Research Centre, Italy
Gianpaolo Pigliasco, CIRA - Italian Aerospace Research Centre, Italy
Angela Vozella, CIRA - Italian Aerospace Research Centre, Italy

11:00 An LSTM-Based Maneuver Detection Algorithm From Satellites Pattern of Life

Riccardo Cipollone, Politecnico di Milano, Italy
Italo Leonzio, Politecnico di Milano, Italy
Gaetano Calabrò, Politecnico di Milano, Italy
Pierluigi Di Lizia, Politecnico di Milano, Italy

11:40 - 12:00 *Politecnico di Milano - Building BL28*
COFFEE BREAK

12:00 - 13:00 *BL28 - Carassa e Dadda Hall*
PLENARY SESSION - KEYNOTE SPEAKER
Chair: Bortolino Saggin, *Politecnico di Milano, Italy*

**Orienteering in the Solar System:
how not to get lost before reaching destination**

Andrea Accomazzo, *European Space Agency - ESA*

13:00 - 14:20 *Politecnico di Milano - Building BL28*
LUNCH

14:20 - 15:20 *BL28 - Carassa e Dadda Hall*
PLENARY SESSION - KEYNOTE SPEAKER
Chair: Giovanni Savoldelli Pedrocchi, *AFCEA Chapter Naples*

A future under the sign of continuity

Maurizio Cheli

15:20 - 16:45 *BL28 - Carassa e Dadda Hall*
Session 2.1 - Military Metrology for AeroSpace - Part I
Chair: B.Gen. Giovanni Savoldelli Pedrocchi, *AFCEA Chapter Naples*

15:20 Welcome Addresses

Organizing Committee - B.Gen. Giovanni Savoldelli Pedrocchi, President, AFCEA Chapter Naples



- 15:25 Advanced Air Mobility - The ANN evolutive hybrid electric long range eVSTOL air platform**
Eng. Lucas Marchesini CEO MANTA Aircraft
- 15:45 Criptaliae Spacesport: The Italian Spaceport of Grottaglie**
Col. Luigi Riggio - Italian Government – Presidency of the Council Of Ministers - Office for space and aerospace policies
- 16:05 Advanced Air Mobility, Milano Cortina 2026 Olympic Games**
Eng. Claudia Carrà: SEAMilano
- 15:25 Spaceports as assets for providing wide range opportunities and operating services to commercial space activities**
Eng. Francesco Santoro

15:20 - 16:40

BL28 - Hall 1.1

Session 2.2 - General Session - Part III

Chair: Giuseppe Piccioni, *INAF, Italy*

- 15:20 Investigation of Optical Error Budget for the DORA Telescope**
Igor Di Varano, INAF-IAPS, Italy
Fabrizio Capaccioni, INAF-IAPS, Italy
Gianrico Filacchione, INAF-IAPS, Italy
Giovanna Rinaldi, INAF-IAPS, Italy
Giancarlo Bellucci, INAF-IAPS, Italy
Alfredo Morbidini, INAF-IAPS, Italy
Bortolino Saggin, Politecnico di Milano, Italy
- 15:40 Design and Optimization of the TMA Telescope Components for the RIIFS Spectrometer**
Andrea Appiani, Politecnico di Milano, Italy
Bortolino Saggin, Politecnico di Milano, Italy
Ignacio Amui, Politecnico di Milano, Italy
Youssef Beik, Politecnico di Milano, Italy
Giancarlo Bellucci, Politecnico di Milano, Italy
Diego Scaccabarozzi, Politecnico di Milano, Italy
- 16:00 DORA Telescope Breadboard Experimental Verification**
Pietro Valnegri, Politecnico di Milano, Italy
Diego Scaccabarozzi, Politecnico di Milano, Italy
Fabrizio Capaccioni, INAF, Italy
Giancarlo Bellucci, INAF, Italy
Giovanna Rinaldi, INAF, Italy
Bortolino Saggin, Politecnico di Milano, Italy
- 16:20 Structural optimization of supporting structures for the DORA telescope**
Pietro Valnegri, Politecnico di Milano, Italy
Diego Scaccabarozzi, Politecnico di Milano, Italy
Fabrizio Capaccioni, INAF, Italy

Giovanna Rinaldi, INAF, Italy
Giancarlo Bellucci, INAF, Italy
Bortolino Saggin, Politecnico di Milano, Italy

15:20 - 16:40

BL28 - Hall 1.2

Session 2.3 - General Session - Part IV

Chair: Marco Giovanni Corti, *Politecnico di Milano, Italy*

- 15:20 Development of a Two-Phase Flow Cooling System for Space Systems: Design and Ground Research Activity of Baridi-Sana Project**
Andrea Delfini, Sapienza University of Rome, Italy
Luca Gugliermetti, ENEA, Italy
Riccardo Restivo Alessi, Sapienza University of Rome, Italy
Luca Saraceno, ENEA, Italy
Giuseppe Zummo, ENEA, Italy
Paolo Marzioli, Sapienza University of Rome, Italy
Fabrizio Piergentili, Sapienza University of Rome, Italy
Fabio Santoni, Sapienza University of Rome, Italy
Giancarlo Santilli, Italian Space Agency, Italy
Munzer Jahjah, Italian Space Agency, Italy
- 15:40 Finite Element Modelling of Thermoelastic Behavior for High-Temperature Quartz Crystal Microbalance**
Chiara Martina, Politecnico di Milano, Italy
Bortolino Saggin, Politecnico di Milano, Italy
Ernesto Palomba/INAF-IAPS, Italy
Emiliano Zampetti, National Research Council, Italy
Maria Aurora Mancuso, National Research Council, Italy
Diego Scaccabarozzi, Politecnico di Milano, Italy
- 16:00 Earth Orbiting Resident Space Objects Characterization Based on Astrometric Data**
Nicola Cimmino, University of Naples Federico II, Italy
Giorgio Isoletta, University of Naples Federico II, Italy
Roberto Opromolla, University of Naples Federico II, Italy
Giancarmine Fasano, University of Naples Federico II, Italy
Marco Rigamonti, Flight Test Wing of the Italian Air Force, Italy
Moreno Peroni, Flight Test Wing of the Italian Air Force, Italy
Alessandro Panico, Flight Test Wing of the Italian Air Force, Italy
Andrea Cecchini, Flight Test Wing of the Italian Air Force, Italy
Aniello Basile, Leonardo S.p.A., Italy
Ottavio Pesacane, Leonardo S.p.A., Italy
Antonio Romano, Leonardo S.p.A., Italy
- 16:20 Research on Calibration Technology of Weapon Equipment Transfer Alignment System**
Yongchao Zhang, Beijing Aerospace Institute for Metrology and Measurement Technology, China



Xiaoxu Liu, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Yongyao Xu, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Xiaoqiang Gao, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Yulu Wang, Beijing Aerospace Institute for Metrology and Measurement Technology, China
Zongjun Wang, Beijing Aerospace Institute for Metrology and Measurement Technology, China

16:40 - 17:00 *Politecnico di Milano - Building BL28*
COFFEE BREAK

17:00 - 18:30 *BL28 - Carassa e Dadda Hall*
Session 3.1 - Military Metrology for AeroSpace - Part II
Chair: B.Gen. Giovanni Savoldelli Pedrocchi, *AFCEA Chapter Naples*

17:00 Leonardo Compact Electro-Optical Payloads for Remote Sensing

Eng. Franco Boldrini (Divisional Space Business)
Eng. Carlo Simoncelli (IPT Leader Imagers)

17:20 Skygate, Test Program for Emergent Airborne Technologies: Ellena de-icing and Telops hyperspectral sensor qualification

Eng. Davide Cagnoni – Digisky R&D Unit

17:40 Test configurations for performance and robustness evaluation of GNSS receivers

Capt Panico - Platforms and Space Mobility Section Leader

18:00 Sensor Data Fusion for Space Domain (SDA) Purposes

GMV Aerospace and Defence - Eng. Lorenzo Porcelli SST/SSA Engineer
GMV Aerospace and Defence - ENG. Angel Gallego Military SSA/SDA Programs Coordinator

18:20 Closing Remarks

B.Gen. Giovanni Savoldelli Pedrocchi

17:00 - 18:20 *BL28 - Hall 1.1*
Session 3.2 - Round Table

Health Scenarios and Key Technologies for enabling Human Exploration of Space

Welcome Addresses

Pasquale Daponte, Bortolino Saggin, *IEEE MetroAeroSpace 2023 General Chairs*

Opening and Introduction

Vittorio Ancona, *Thales Alenia Space*, Pietro Ferraro, *National Research Council - ISASI*, Paolo Maggiore, Piero Messidoro, *Politecnico di Torino*

Panelists

Maurizio Cheli, *Astronaut*

Matteo Cerri, *University of Bologna*
 Ilaria Locatore, *Thales Alenia Space*
 Marta Del Bianco, *Agenzia Spaziale Italiana, ASI*
 Wanda Peters, *NASA*

17:00 - 18:40

BL28 - Hall 1.2

Session 3.3 - General Session - Part V

Chair: Konrad Wojtowicz, *Military University of Technology, Poland*

17:00 Analysis of CubeSat Thermal Performance Using Various PV Panel Configurations

Narimane Blanchete, Mohammed V University, Morocco
 Amina Daghouri, Mohammed V University, Morocco
 Abdellah Bah, Mohammed V University, Morocco
 Soumia El Hani, Mohammed V University, Morocco

17:20 biLSCCS: Modular Dynamical On-Road Objects Trajectory Prediction Approach

Ivan Saetchnikov, Belarusian State University, Belarus
 Victor Skakun, Belarusian State University, Belarus
 Elina Tcherniavskaia, Belarusian State University, Belarus

17:40 A New Data Processing Method for Space-Borne Fourier Transform Spectrometers

Andrea Appiani, Politecnico di Milano, Italy
 Diego Scaccabarozzi, Politecnico di Milano, Italy
 Bortolino Saggin, Politecnico di Milano, Italy

18:00 A Custom Radiosonde Design for Environmental Measurements Over Maritime Areas

Antonio Turi, University of Pisa, Italy
 Matteo Gemignani, University of Pisa, Italy
 Salvo Marcuccio, University of Pisa, Italy

18:20 Reducing static linearity testing for ADCs

Grazia Iadarola, Università Politecnica delle Marche, Italy
 Pasquale Daponte, University of Sannio, Italy
 Luca De Vito, University of Sannio, Italy
 Sergio Rapuano, University of Sannio, Italy
 Susanna Spinsante, Università Politecnica delle Marche, Italy

19:00

WELCOME PARTY

Politecnico di Milano - Building BL28



Technical Program - Tuesday, June 20

09:00 - 17:00 *Politecnico di Milano - Building BL28*

REGISTRATIONS

9:00 - 10:45 *BL28 - Carassa e Dadda Hall*

Session 4.1 - Space To Space: Scientific and Technological Challenges for Human and Robotic Space Exploration - Part I

Chair: Pietro Ferraro, *National Research Council - ISASI*

09:00 Thin Film and Functionalized Micro-Structures for Health Monitoring

Sara Coppola, National Research Council - ISASI, Italy
Concetta Di Natale, University of Naples Federico II, Italy
Fabiana Graziano, National Research Council - ISASI, Italy
Veronica Vespini, National Research Council - ISASI, Italy
Zhe Wang, University of Naples Federico II, Italy
Vincenzo Ferraro, University of Naples Federico II, Italy
Ciro Tortora, National Research Council - ISASI, Italy
Simonetta Grilli, National Research Council - ISASI, Italy
Francesca Ferranti, Italian Space Agency, Italy
Silvia Mari, Italian Space Agency, Italy
Pier Luca Maffettone, University of Naples Federico II, Italy

09:15 Diagnosis of Space-Induced Effects on Blood Components by Label-Free Optical Technique and Microfluidics

Jaromir Behal, University of Naples Federico II, Italy
Zhe Wang, University of Naples Federico II, Italy
Lisa Miccio, National Research Council - ISASI, Italy
Martina Mugnano, University of Naples Federico II, Italy
Pasquale Memmolo, National Research Council - ISASI, Italy
Daniele Pirone, National Research Council - ISASI, Italy
Vittorio Bianco, National Research Council - ISASI, Italy
Giuseppe La Verde, University of Naples Federico II, Italy
Ivana Kurelac, University of Bologna, Italy
Massimiliano Villone, University of Naples Federico II, Italy
MariaGabriella Pugliese, University of Naples Federico II, Italy
Cecilia Arrichiello, Istituto Nazionale Tumori IRCCS Fondazione G. Pascale, Italy
Paolo Muto, Istituto Nazionale Tumori IRCCS Fondazione G. Pascale, Italy
Francesca Ferranti, Italian Space Agency, Italy
Pier Luca Maffettone, University of Naples Federico II, Italy
Silvia Mari, Italian Space Agency, Italy

- 09:30 Development of an Innovative Biosensor for Testing Picogram Level of the Tau Protein Involved in Microgravity Associated Neurodegeneration**
Concetta Di Natale, University of Naples Federico II, ISASI-CNR, Italy
Sara Coppola, National Research Council - ISASI, Italy
Veronica Vespini, National Research Council - ISASI, Italy
Volodymyr Tkachenko, National Research Council - ISASI, Italy
Giuseppina Luciani, University of Naples Federico II, Italy
Giuseppe Vitiello, University of Naples Federico II, Italy
Pier Luca Maffettone, University of Naples Federico II, Italy
Simonetta Grilli, National Research Council - ISASI, Italy
Silvia Mari, Italian Space Agency, Italy
Francesca Ferranti, Italian Space Agency, Italy
- 09:45 Experimental Characterization of a Linear Aerospike Nozzle Flow**
Gaetano Maria Di Cicca, Politecnico di Torino, Italy
Jehangir Hassan, Politecnico di Torino, Italy
Emanuele Resta, Politecnico di Torino, Italy
Roberto Marsilio, Politecnico di Torino, Italy
Michele Ferlauto, Politecnico di Torino, Italy
- 10:00 Human-Robot Interface for Teleoperated Robotized Planetary Sample Collection and Assembly**
Lorenzo Pagliara, University of Salerno, Italy
Vincenzo Petrone, University of Salerno, Italy
Enrico Ferrentino, University of Salerno, Italy
Pasquale Chiacchio, University of Salerno, Italy
- 10:15 CFD Prediction of Bioaerosol Dynamics in a Concept Air Sanitiser for Space Applications**
Giuseppe Mongelluzzo, INAF, Italy
Matteo Lombini, INAF, Italy
Laura Schreiber, INAF, Italy
Giovanni Pareschi, INAF, Italy
Andrea Bianco, INAF, Italy
Emiliano Diolaiti, INAF, Italy
Fausto Cortecchia, INAF, Italy
Giuseppe Malaguti, INAF, Italy
Luigi Lessio, INAF, Italy
Maria G. Pelizzo, University of Padua, Italy
Mauro Fiorini, INAF, Italy
Enrico Cascone, INAF, Italy
Vincenzo De Caprio, INAF, Italy
- 10:30 Developments for Crew Life Support Beyond LEO**
Ilaria Locantore, Thales Alenia Space



9:00 - 10:20

BL28 - Hall 1.1

Session 4.2 - Measurements in the Research of Aerodynamics and Control of Unmanned Aerial Vehicles

Chair: Zbigniew Czyż, *Polish Air Force Academy, Poland*

09:00 Design Features of Additively-Manufactured Multi-Hole Probes

Pawel Ruchala, Lukaszewicz Research Network - Institute of Aviation, Poland
Marta Witt, Lukaszewicz Research Network - Institute of Aviation, Poland
Katarzyna Surmacz, Lukaszewicz Research Network - Institute of Aviation, Poland

09:20 Design and Manufacturing of a Small Sized UAV Wing

Mihai Cosmin Parparita, Technical University of Cluj Napoca, Romania
Paul Bere, Technical University of Cluj Napoca, Romania
Jerzy Józwick, Lublin University of Technology, Poland
Katarzyna Biruk-Urban, Lublin University of Technology, Poland

09:40 Evaluation of Potential Flow Capabilities for Ground Effect Predictions of a Single Propeller

Angelo Lerro, Politecnico di Torino, Italy

10:00 Autogyro Main Rotor Blade Strength Tests

Zbigniew Czyż, Polish Air Force Academy, Poland
Piotr Podolak, Lublin University of Technology, Poland
Krzysztof Skiba, Lublin University of Technology, Poland
Patrik Jakubczak, Lublin University of Technology, Poland
Paweł Karpiński, Lublin University of Technology, Poland
Patrik Różyło, Lublin University of Technology, Poland
Magda Drożdździel-Jurkiewicz, Lublin University of Technology, Poland

9:00 - 10:40

BL28 - Hall 1.2

Session 4.3 - Manufacturing and Metrology in the Aerospace Industry - Part I

Chair: Magdalena Zawada-Michałowska, *Lublin University of Technology*

09:00 Possibilities of Software Automation of Optical Measurements of Aeronautical Elements Produced Additively in the Structure Industry 4.0

Grzegorz Budzik, Rzeszów University of Technology, Poland
Tomasz Dziubek, Rzeszów University of Technology, Poland
Andrzej Paszkiewicz, Rzeszów University of Technology, Poland
Łukasz Przesłowski, Rzeszów University of Technology, Poland
Marek Bolanowski, Rzeszów University of Technology, Poland
Jerzy Józwick, Lublin University of Technology, Poland

09:20 The Influence of Terrain Obstacle Geometry on Aircraft Suspension System Dynamics

Jerzy Józwick, Lublin University of Technology, Poland
Jaroslaw Pytka, Lublin University of Technology, Poland

Ernest Gnapowski, University College of Enterprise and Administration, Poland
 Adrian Stelmachowicz, University College of Applied Science in Chelm, Poland
 Grzegorz Budzik, Rzeszów University of Technology, Poland

09:40 Analysis and Prediction of Hardness Change at High Temperature Based on BP Neural Network

Chen Shilin, Changcheng Institute of Metrology & Measurement, China
 Shi Wei, Changcheng Institute of Metrology and Measurement, China

10:00 A Short Review on Measurement Methods in Machining of Aerospace Materials

Mehmet Erdi Korkmaz, Karabük University, Turkey
 Munish Kumar Gupta, Opole University of Technology, Poland
 Jolanta Beata Krolczyk, Opole University of Technology, Poland
 Grzegorz Mikołaj Krolczyk, Opole University of Technology, Poland
 Zhixiong Li, Opole University of Technology, Poland
 Nimel Sworna Ross, Saveetha School of Engineering, India

10:20 Analysis of the Fatigue Strength of Models Produced by the DMLS Method for Applications in the Aerospace Industry

Mariusz Cygnar, Academy of Applied Sciences in New Sacz, Poland
 Piotr Bąk, Yasa Motors Poland, Poland
 Grzegorz Budzik, Rzeszów University of Technology, Poland
 Tomasz Kądziołka, Academy of Applied Sciences in New Sacz, Poland
 Małgorzata Zaborniak, Rzeszów University of Technology, Poland
 Tomasz Dziubek, Rzeszów University of Technology, Poland

10:40 - 11:00 *Politecnico di Milano - Building BL28*
COFFEE BREAK

11:00 - 12:00 *BL28 - Carassa e Dadda Hall*
PLENARY SESSION - KEYNOTE SPEAKER
Chair: Pietro Ferraro, *National Research Council - ISASI, Italy*

**Technology, Instrumentation, and Measurements:
 The Cornerstone of NASA's Scientific Discovery**

Wanda Peters, *National Aeronautics and Space Administration - NASA*



12:00 - 13:20

BL28 - Carassa e Dadda Hall

Session 5.1 - Space To Space: Scientific and Technological Challenges for Human and Robotic Space Exploration - Part II

Chair: Vittorio Ancona, *Thales Alenia Space*

12:00 The Adaptive Vertical Farm as an Efficient Tool for the Cultivation of Multiple Crops in Space

Patrizia Bagnerini, University of Genoa, Italy
Mauro Gaggero, National Research Council of Italy, Italy
Marco Ghio, Space V, Italy
Franco Malerba, Space V, Italy

12:16 Additive Manufacturing Demonstration Technology Mission for Lunar Application

Francesca Giacomini, NewRoboticArm, Italy
Giovanni Giordano, NewRoboticArm, Italy

12:32 Analysis of the Thermal Environment in the LuNaDrone Exploration Mission of Lunar Lava Tubes

Stefano Pescaglia, Politecnico di Torino, Italy
Riccardo Barbieri, Politecnico di Torino, Italy
Giuseppe Bortolato, Politecnico di Torino, Italy
Paolo Maggiore, Politecnico di Torino, Italy
Piero Messidoro, Politecnico di Torino, Italy
Roberto Vittori, ESA Astronaut and ITAF General

12:48 REV1 From Space Transportation to In-Orbit Manufacturing

Carmine Di Lauro, Thales Alenia Space
Achim Schwarzwalder, Space Cargo Unlimited
Ferdinand Haag, Space Cargo Unlimited

13:04 Satellite Data Management and Privacy Law

Lucilla Gatt, University Suor Orsola Benincasa, Italy
Ilaria A. Caggiano, University Suor Orsola Benincasa, Italy
Luigi Izzo, University Suor Orsola Benincasa, Italy
Alessandra Fabrocini, Sapienza University of Rome, University Suor Orsola Benincasa, Italy
Anna Anita Mollo, University of Naples Federico II, University Suor Orsola Benincasa, Italy

12:00 - 13:20

BL28 - Hall 1.1

Session 5.2 - Measurement for Improving Quality, Reliability and Safety in Aerospace Applications

Chair: Lorenzo Ciani, *University of Florence, Italy*

12:00 A Heuristic Algorithm for Aircraft Landing Scheduling Problem

Vassil Guliashki, Institute of Information Technologies - BAS, Bulgaria
Gasper Music, University of Ljubljana, Slovenia
Galia Marinova, Technical University of Sofia, Bulgaria

12:20 Analysis of Noise Contributions in Low-Cost IMUs Through Allan's Variance

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

12:40 Optimized Design and Experimental Analysis of Mechanical Structure of Torsional Pendulum Thrust Frame

Qing Qing Wang, Beijing Orient Institute of Measurement and Test, China
 Jun-Wei Jia, Beijing Orient Institute of Measurement and Test, China
 Xue-Chao Liu, Beijing Orient Institute of Measurement and Test, China
 Yu-Jing Wu, Beijing Orient Institute of Measurement and Test, China
 Meng Chang, Beijing Orient Institute of Measurement and Test, China
 Tie-Li Li, Beijing Orient Institute of Measurement and Test, China
 Hao Lang, Beijing Orient Institute of Measurement and Test, China
 Xue-Jiang Dong, Beijing Orient Institute of Measurement and Test, China
 Ren Zhang, Beijing Orient Institute of Measurement and Test, China

13:00 Heuristic Estimation of Temperature-Dependant Model Parameters of Li-Po Batteries for UAV Applications

Aleksander Suti, University of Pisa, Italy
 Gianpietro Di Rito, University of Pisa, Italy
 Giuseppe Mattei, Sky Eye Systems srl, Italy

12:00 - 13:20

BL28 - Hall 1.2

Session 5.3 - Manufacturing and Metrology in the Aerospace Industry - Part II

Chair: Magdalena Zawada-Michałowska, *Lublin University of Technology*

12:00 Influence of Different Technological Parameters on Cutting Force in Drilling GFRP Composites

Katarzyna Biruk-Urban, Lublin University of Technology, Poland
 Jerzy Józwick, Lublin University of Technology, Poland
 Paul Bere, Technical University of Cluj Napoca, Romania
 Mihai Parparita, Technical University of Cluj Napoca, Romania

12:20 Influence of Thermal Deformations on Accuracy Measurement With an Inspection Probe

Paweł Pieśko, Lublin University of Technology, Poland
 Magdalena Zawada-Michałowska, Lublin University of Technology, Poland
 Jerzy Józwick, Lublin University of Technology, Poland



12:40 The Use of Computed Tomography for Verifying the Correct Assembly of a Snap-Fit Joint in a Thin-Walled Aerospace Structure

Magdalena Zawada-Michałowska, Lublin University of Technology, Poland
Paweł Pieśko, Lublin University of Technology, Poland

13:00 Dimensional and Shape Analysis of Conformal Channels on the Example of an Aircraft Engine Blade Casting Mold

Łukasz Przesłowski, Rzeszów University of Technology, Poland
Jerzy Józwiak, Lublin University of Technology, Poland
Piotr Niesłony, Opole University of Technology, Poland
Grzegorz Budzik, Rzeszów University of Technology, Poland
Maciej Michna, Borg Warner, Poland
Łukasz Kochmański, Rzeszów University of Technology, Poland

13:20 - 14:30 *Politecnico di Milano - Building BL28*
LUNCH

14:30 - 15:10 *BL28 - Carassa e Dadda Hall*
PLENARY SESSION - TUTORIAL
Chair: Marco Pertile, *University of Padova, Italy*

Distributed SLAM for a team of planetary robots: the ARCHES moon analogue demonstration mission

Riccardo Giubilato, *German Aerospace Center, Germany*

15:10 - 16:30 *BL28 - Carassa e Dadda Hall*
Session 6.1 - Metrology and Instrumentation for Unmanned Aerial Vehicles - Part I
Chair: Konrad Wojtowicz, *Military University of Technology, Poland*

15:10 Radar-On-Chip Laboratory Characterization for UAM Applications

Aniello Menichino, Italian Aerospace Research Centre - CIRA, Italy
Vittorio Di Vito, Italian Aerospace Research Centre - CIRA, Italy
Gennaro Ariante, University of Naples Parthenope, Italy
Giuseppe Del Core, University of Naples Parthenope, Italy

15:30 Survey of GNC Sensors Suitable for Hybrid Stratospheric Platform Applications

Luca de Pasquale, Politecnico di Torino, Italy
Piero Gili, Politecnico di Torino, Italy

15:50 Visual-Based Landing System of a Multirotor UAV in GNSS Denied Environment

Adam Marut, Military University of Technology, Poland
 Przemyslaw Wojciechowski, Military University of Technology, Poland
 Konrad Wojtowicz, Military University of Technology, Poland
 Krzysztof Falkowski, Military University of Technology, Poland

16:10 Impact characterization on RC airplane model in operation using machine learning

Francesco Nicassio, University of Salento, Italy
 Flavio Dipietrangelo, University of Salento, Italy
 Gennaro Scarselli, University of Salento, Italy

15:10 - 16:30

BL28 - Hall 1.1

Session 6.2 - Interplanetary exploration: Mars and Moon

Chair: Claudio Sacchi, *University of Trento, Italy*

**15:10 The COP Software for Development and Testing of the ExoMars Instrument
 MicroMED**

Gabriele Franzese, INAF, Italy
 Carmen PortoINAF, Italy
 Marco Giovanni Corti, Politecnico di Milano, Italy
 Giuseppe MongelluzzoINAF, Italy
 Francesca EspositoINAF, Italy
 Fabio CozzolinoINAF, Italy
 Diego Scaccabarozzi, Politecnico di Milano, Italy
 Nuria Andrés Santiuste, Instituto Nacional de Técnica Aeroespacial, Spain
 Alberto Martín-Ortega, Instituto Nacional de Técnica Aeroespacial, Spain
 Ignacio Arruego, Instituto Nacional de Técnica Aeroespacial, Spain
 Joaquín Rivas, Instituto Nacional de Técnica Aeroespacial, Spain
 José Ramon De Mingo, Instituto Nacional de Técnica Aeroespacial, Spain
 Fausto Cortecchia, INAF, Italy
 Ciprian Popa, INAF, Italy
 Simone Silvestro, INAF, Italy
 Alan Cosimo Ruggeri, INAF, Italy

15:30 Exploiting Differential Correction in the Future Lunar Satellite Navigation System

Gheorghe Sirbu, University of Rome Tor Vergata, Italy
 Mauro Leonardi, University of Rome Tor Vergata, Italy
 Mattia Carosi, Thales Alenia Space Italia, Italy
 Carmine Di Lauro, Thales Alenia Space Italia, Italy
 Cosimo Stallo, Thales Alenia Space Italia, Italy

15:50 Spacecraft Accelerometry with Parametric Nanoamplifiers Pumped by Radiation-Induced Dispersion Force Modulation

Fabrizio Pinto, Izmir University of Economics, Turkey

16:10 Multicarrier Waveforms for Moon-To-Earth RF Transmission

Talha Faizur Rahman, Mississippi State University, USA
 Vuk Marojevic, Mississippi State University, USA
 Claudio Sacchi, University of Trento, Italy



15:10 - 16:30 *BL28 - Hall 1.2*
Session 6.3 - Panel WIE IEEE Italy Section Affinity Group

**IEEE Women in Engineering Affinity Group Panel for MetroAeroSpace:
"Sharing idea with experienced and early-stage researchers"**

16:30 - 16:50 *Politecnico di Milano - Building BL28*
COFFEE BREAK

16:50 - 17:50 *BL28 - Carassa e Dadda Hall*
**Session 7.1 - Metrology and Instrumentation for Unmanned Aerial
Vehicles - Part II**
Chairs: Konrad Wojtowicz, *Military University of Technology, Poland*

16:50 Detection of Critical Infrastructure Elements Damage With Drones

Przemyslaw Wojciechowski, *Military University of Technology, Poland*
Konrad Wojtowicz, *Military University of Technology, Poland*

17:10 Atmospheric Effects on Rotary LiDAR-Based Systems for UAS Missions

Gennaro Ariante, *University of Naples Parthenope, Italy*
Salvatore Ponte, *University of Campania "L. Vanvitelli", Italy*
Giuseppe Del Core, *University of Naples Parthenope, Italy*

17:30 Optical Multi-Camera UAV Positioning System via ArUco Fiducial Markers

Luca De Vito, *University of Sannio, Italy*
Francesco Picariello, *University of Sannio, Italy*
Konrad Wojtowicz, *Military University of Technology, Poland*
Adam Marut, *Military University of Technology, Poland*
Przemyslaw Wojciechowski, *Military University of Technology, Poland*

16:50 - 18:10 *BL28 - Hall 1.1*
Session 7.2 - Panel GlueTech

16:50 - 18:30

BL28 - Hall 1.2

Session 7.3 - Complex Systems Operational Availability: Measurements, Methodologies and Requirements

Chairs: Fabio Leccese, *Roma Tre University of Rome, Italy*
Manuel Greco, *Roma Tre University of Rome, Italy*

16:50 Nitride Semiconductors Realizing Sustainable Society

Takashi Matsuoka, New Industry Creation Hatchery Center, Tohoku University, Japan
Tetsuya Suemitsu, New Industry Creation Hatchery Center, Tohoku University, Japan

17:30 Low Cost and Label Free Raman Sensors Based on Ag-Coated ZnO Nanorods for Monitoring Astronaut's Health

Francesco Maita, National Research Council - IMM, Italy
Luca Maiolo, National Research Council - IMM, Italy
Ivano Lucarini, National Research Council - IMM, Italy
Jose Ignacio Del Rio De Vicente, National Research Council - IMM, Italy
Elena Palmieri, National Research Council - IMM, Italy
Eleonora Fiorentini, National Research Council - IMM, Italy
Valentina Mussi, National Research Council - IMM, Italy

17:50 Simulation and Detection of Structural Damage on Polymeric Materials Using a Terahertz Imaging System

Manuel Greco, "Roma Tre" University, Italy
Emilio Giovenale, ENEA, Italy
Fabio Leccese, "Roma Tre" University, Italy
Andrea Doria, ENEA, Italy

18:10 Characterization of Innovative Capacitive Oil Level Sensors for Aerospace Applications

Gregorio Andria, Polytechnic University of Bari, Italy
Filippo Attivissimo, Polytechnic University of Bari, Italy
Francesco Adamo, Polytechnic University of Bari, Italy
Attilio Di Nisio, Polytechnic University of Bari, Italy
Luisa De Palma, Polytechnic University of Bari, Italy
Daniel Lotano, Polytechnic University of Bari, Italy

20:00

GALA DINNER

Osteria del Treno - Via San Gregorio, 46 - Milano



Technical Program - Wednesday, June 21

09:00 - 14:00 *Politecnico di Milano – Building BL28*
REGISTRATIONS

9:30 - 11:50 *BL28 - Carassa e Dadda Hall*
Session 8.1 - Metrology for Radar Systems
Chairs: Alfonso Farina, *Selex-ES (retired), Rome, Italy*
Silvia Ullo, *University of Sannio, Italy*

09:30 Sensor Failure Detection for TDOA-Based Localization Systems

Gaetano Giunta, University of Roma Tre, Italy
Danilo Orlando, Università degli Studi Niccolò Cusano, Italy
Luca Pallotta, University of Basilicata, Italy

09:50 A Comparative Analysis of ML-Based DOA Estimators

Danilo Orlando, Università degli Studi Niccolò Cusano, Italy
Giuseppe Ricci, Università del Salento, Italy

10:10 Experimental Evaluation of Radar Waveforms for Spectral Coexistence Using the PARSAX Radar

Vincenzo Carotenuto, University of Naples Federico II, Italy
Augusto Aubry, University of Naples Federico II, Italy
Antonio De Maio, University of Naples Federico II, Italy
Francesco Fioranelli, TU Delft, The Netherlands
Oleg Krasnov, TU Delft, The Netherlands
Alexander Yarovoy, TU Delft, The Netherlands
Fred van der Zwan, TU Delft, The Netherlands

10:30 Radar-Camera Fusion for Ground-Based Perception of Small UAV in Urban Air Mobility

Cheng Huang, Cranfield University, United Kingdom
Ivan Petrunin, Cranfield University, United Kingdom
Antonios Tsourdos, Cranfield University, United Kingdom

10:50 Exploring Homogeneity and Covariance Matrix Structure of Multistatic/Polarimetric Sea-Clutter Data

Vincenzo Carotenuto, University of Naples Federico II, Italy
Augusto Aubry, University of Naples Federico II, Italy
Antonio De Maio, University of Naples Federico II, Italy
Francesco Fioranelli, TU Delft, The Netherlands

11:10 Orbital Angular Momentum (OAM) Waves for Microwave Remote Sensing: Potentialities and Applications

Salvatore Ponte, University of Campania "L. Vanvitelli", Italy
 Alfonso Farina, Leonardo Company Consultant, Italy
 Luca Timmoneri, Leonardo Spa, Italy

11:30 Application of Active Optical System for Estimation of the Wide-Aperture Antenna Profile

Vasilina Baranova, Belarusian State University, Belarus
 Siarhei Liashkevich, Belarusian State University, Belarus
 Vladimir Saetchnikov, Belarusian State University, Belarus

9:30 - 11:30

BL28 - Hall 1.1

Session 8.2 - Structural Health Monitoring and Nondestructive Testing for Aerospace - Part I

Chairs: Vittorio Memmolo, *Goethe University Frankfurt, Germany*
 University of Naples Federico II, *Italy*
 Marco Laracca, *Sapienza University of Rome, Italy*

09:30 Impact Detection on Thin Structures via Machine Learning Approaches

Flavio Dipietrangelo, University of Salento, Italy
 Francesco Nicassio, University of Salento, Italy
 Gennaro Scarselli, University of Salento, Italy

09:50 Concept of Autonomous Self-Sensing Metamaterial Structures for Future Aircraft

Jan Bajer, Brno University of Technology, Czech Republic
 Filip Ksica, Brno University of Technology, Czech Republic
 Petr Marcián, Brno University of Technology, Czech Republic
 Miroslav Hrstka, Brno University of Technology, Czech Republic
 Jan Navrátil, Brno University of Technology, Czech Republic
 Zdenek Hadas, Brno University of Technology, Czech Republic

10:10 Assessing Bonded Area Quality of Carbon Fiber Lenticular Ribs With Lock-In Thermography

Francesca Di Carolo, Diagnostic Engineering Solutions S. r. l., Italy
 Francesco Ancona, Diagnostic Engineering Solutions S. r. l., Italy
 Giovanni Santonicola, Diagnostic Engineering Solutions S. r. l., Italy
 Joao Silva, Oxford Space System Ltd, United Kingdom
 Kensei Kitsu Iglesias, Oxford Space System Ltd, United Kingdom
 Amool Raina, Oxford Space System Ltd, United Kingdom

10:30 Composite Materials Characterization Based on a Computed Tomography Scan Optimization Approach

Alessio Trolli, Università Politecnica delle Marche, Italy
 Sara Casaccia, Università Politecnica delle Marche, Italy
 Giuseppe Pandarese, Università Politecnica delle Marche, Italy



Vincenzo Castorani, HP Composites S.p.A., Italy
Gian Marco Revel, Università Politecnica delle Marche, Italy

10:50 Metrological Characterization of an ECT Method for Thickness Estimation Based on Dimensional Analysis

Alessandro Sardellitti, University of Cassino and Southern Lazio, Italy
Filippo Milano, University of Cassino and Southern Lazio, Italy
Antonio Nocella, University of Cassino and Southern Lazio, Italy
Giulia Di Capua, University of Cassino and Southern Lazio, Italy
Luigi Ferrigno, University of Cassino and Southern Lazio, Italy
Antonello Tamburrino, University of Cassino and Southern Lazio, Italy
Marco Laracca, Sapienza University of Rome, Italy

11:10 Design of Multi-Level Structural Health Monitoring for Data Fusion in Real Scale Aerostructures

Vittorio Memmolo, Goethe University Frankfurt, Germany, University of Naples Federico II, Italy
Fulvio Romano, Italian Aerospace Research Center, Italy
Monica Ciminello, Italian Aerospace Research Center, Italy
Assunta Sorrentino, Italian Aerospace Research Center, Italy
Ernesto Monaco, University of Naples Federico II, Italy
Leandro Maio, University of Naples Federico II, Italy
Fabrizio Ricci, University of Naples Federico II, Italy

9:30 - 11:30

BL28 - Hall 1.2

Session 8.3 - Vision-based and LiDAR-based navigation systems for spacecraft and autonomous vehicles

Chairs: Marco Pertile, *University of Padova, Italy*

Sebastiano Chiodini, *University of Padova, Italy*

Andrea Valmorbida, *University of Padova, Italy*

Riccardo Giubilato, *German Aerospace Center, Germany*

09:30 Experimental Campaign on the Sensor Package for a Smart Capture Tool

Martina Imperatrice, University of Padova, Italy
Alex Caon, University of Padova, Center of Studies and Activities for Space "G. Colombo", Italy
Mattia Peruffo, University of Padova, Center of Studies and Activities for Space "G. Colombo", Italy
Francesco Branz, University of Padova, Italy
Alessandro Francesconi, University of Padova, Italy

09:50 Mechatronic Design and Positioning Accuracy Characterisation of a Robotic Arm for Exploration Rovers

Giacomo Franchini, University of Padova, Italy
Sebastiano Chiodini, University of Padova, Italy
Marco Ghetti, University of Padova, Italy
Marco Pertile, University of Padova, Italy

10:10 Experimental Validation of a Convolutional Neural Network for Proximity Navigation Between Uncooperative Satellites

Andrea Valmorbida, University of Padova, Italy
 Fabio Favaretto, University of Padova, Italy
 Mattia Peruffo, University of Padova, Italy
 Francesco Branz, University of Padova, Italy
 Enrico Lorenzini, University of Padova, Italy

10:30 Experimental Assessment of a Visual-Laser Relative Navigation Module for CubeSats

Giuseppe Napolano, University of Naples Federico II, Italy
 Claudio Vela, University of Naples Federico II, Italy
 Alessia Nocerino, University of Naples Federico II, Italy
 Roberto Opromolla, University of Naples Federico II, Italy
 Michele Grassi, University of Naples Federico II, Italy
 Salvatore Amoruso, University of Naples Federico II, Italy
 Guido Di Donfrancesco, ALA Advanced Lidar Applications S.r.l., Italy

10:50 360-Deg FOV Scanning LiDAR Versus Non-Repetitive Scanning LiDAR: A Rover Navigation Experiment

Filippo Volpin, University of Padova, Italy
 Sebastiano Chiodini, University of Padova, Italy
 Simone Fortuna, University of Padova, Italy
 Andrea Valmorbida, University of Padova, Italy
 Marco Pertile, University of Padova, Italy

11:10 Thermal Testing of Bonded Joints for a Hyper Hemispheric Panoramic Camera

Marco Giovanni Corti, Politecnico di Milano, Italy
 Bortolino Saggin, Politecnico di Milano, Italy
 Claudio Pernechele, National Institute for Astrophysics, Italy
 Diego Scaccabarozzi, Politecnico di Milano, Italy

11:30 - 12:00 Politecnico di Milano - Building BL28
COFFEE BREAK

11:30 - 12:20 Politecnico di Milano - Building BL28
POSTER SESSION
Chair: Andrea Appiani, *Politecnico di Milano, Italy*

PS01 Experimental Study of Cold Atomic Vacuum Measurements in a Magneto-Optical Trap

Yongjun Cheng, Lanzhou Institute of Physics, China
 Meng Dong, Lanzhou Institute of Physics, China
 Xiangmin Wu, Lanzhou Institute of Physics, China
 Wenjun Sun, Lanzhou Institute of Physics, China



Yanpeng Li, Lanzhou Institute of Physics, China
Suzhao Zhang, Lanzhou Institute of Physics, China

PS02 Experimental Analysis of FBG Sensors Thermal Calibration Under Different Loading Conditions

Alessandro Aimasso, Politecnico di Torino, Italy
Giacomo Gallone, Politecnico di Torino, Italy
Matteo Davide Lorenzo Dalla Vedova, Politecnico di Torino, Italy
Paolo Maggiore, Politecnico di Torino, Italy

PS03 Inflatable Beam-Switching Dome Antenna: An Advanced Study

Enrico Petritoli, "Roma Tre" University, Italy
Fabio Leccese, "Roma Tre" University, Italy
Tonino Giagnacovo, LTG Elettronica, Italy

PS04 A System Demonstration of Optical Circuit Switching in a Space-Based WDM Optical Transport Network

Salvatore Durante, Thales Alenia Space Italia, Italy
Luca Rodio, Politecnico di Bari, Italy
Vincenzo Schena, Thales Alenia Space Italia, Italy
Giovanna Calò, Politecnico di Bari, Italy
Antonella D'Orazio, Politecnico di Bari, Italy
Vincenzo Ferrara, Sapienza University of Rome, Italy

PS05 Analysis of Technological Parameters of Hydroabrasive Cutting of Multilayer Aerospace Structures of Aluminum Alloy - Carbon Composite Type

Michał Leleń, Lublin University of Technology, Poland
Jerzy Józwick, Lublin University of Technology, Poland

PS06 A Non-Autonomous Doppler Navigation Method With Navigation Beacon

Yu Tao, China Academy of Management Science, China

PS07 Assessment of Uncertainty of Measurement With a Tool Probe on CNC Machine Tools

Daria Sałamacha, Lublin University of Technology, Poland
Jerzy Józwick, Lublin University of Technology, Poland

PS08 Local Correlation Degree of Laser Speckle for Vibration Analysis

Giuseppe Schirripa Spagnolo, "Roma Tre" University, Italy
Fabio Leccese, "Roma Tre" University, Italy

PS09 Simulation and Replacement of Experimental Test With Software Tools in Reliability Analysis

Gian Luca Mariotti, ItalConsul, Italy
Roberto Paggi, ItalConsul, Italy
Anna Paggi, ItalConsul, Italy
Fabio Leccese, "Roma Tre" University, Italy

PS10 A Neural Network Model Relating Extraction Current Characteristics With Optical Emission Spectra for Digital Twin of Miniaturized Ion Thrusters

Jun-Wei Jia, Beijing Orient Institute of Measurement and Test, China

Ren-Qiu Zou, Beijing Orient Institute of Measurement and Test, China
 Qi Luo, Beijing Orient Institute of Measurement and Test, China
 Xi-Ming Zhu, Beijing Orient Institute of Measurement and Test, China
 Yan-Fei Wang, Beijing Orient Institute of Measurement and Test, China
 Yu-Jing Wu, Beijing Orient Institute of Measurement and Test, China
 Hao Lang, Beijing Orient Institute of Measurement and Test, China
 Wen-Jie Zhang, Beijing Orient Institute of Measurement and Test, China
 Xue-Jiang Dong, Beijing Orient Institute of Measurement and Test, China

PS11 A Simple Digitizing Front-End for Plasma Diagnostic Probes

Sreehari Balachandran Nair, Indian Institute of Space Science and Technology, India
 Chandrika Sreekantan Anoop, Indian Institute of Space Science and Technology, India
 R. Sudharshan Kaarthik, Indian Institute of Space Science and Technology, India

PS12 Comparison Among Four Lock-In Algorithms in Transient Regime on CFRP

Tiziana Matarrese, Politecnico di Bari, Italy
 Davide Palumbo, Politecnico di Bari, Italy
 Giovanni Santonicola, Diagnostic Engineering Solutions SrL, Italy
 Francesco Ancona, Diagnostic Engineering Solutions SrL, Italy
 Umberto Galietti, Politecnico di Bari, Italy

PS13 Development of Precision Angle Position Indicator Based on Virtual Instruments

You Li, Beijing Orient Institute of Measurement and Test, Beihang University, China
 Wang Shuqiang, Beijing Orient Institute of Measurement and Test, China
 Hu Zhiyuan, Beijing Orient Institute of Measurement and Test, China
 Liu Biye, Beijing Orient Institute of Measurement and Test, China
 Li Xiating, Beijing Aerospace Science and Intelligent Strategy, China
 Wei Ran, Delian University of Technology

PS14 Latent Neural Network for Recognition of Anomalies in 3D-Print of a Scale Model for Wind Tunnel Measurements

Jarosław Pytka, Lublin University of Technology, Poland
 Paweł Tomiło, Lublin University of Technology, Poland
 Jerzy Józwick, Lublin University of Technology, Poland
 Ernest Gnapowski, University College of Enterprise and Administration, Poland
 Tomasz Marek Muszynski, University College of Applied Sciences, Poland
 Andrzej Łukaszewicz, Białystok University of Technology, Poland

PS15 Design and Performance Studies of a Simple Direct Digital Electronic Instrumentation System for Thermistor Interfacing

Sajeev R, Vikram Sarabhai Space Centre, India
 Sreehari Balachandran Nair, Indian Institute of Space Science & Technology, India
 Chandrika Sreekantan Anoop, Indian Institute of Space Science and Technology, India
 Roy Thankachan, ISRO, India

PS16 Influence of Annealing in Deposited Ti-Pt Thin Films Sensing Elements for Quartz Crystals Microbalances

Elimar Vieira Vaz Junior, Politecnico di Milano, Italy
 Chiara Martina, Politecnico di Milano, Italy
 Bortolino Saggin, Politecnico di Milano, Italy



Riccardo Gerosa, Politecnico di Milano, Italy
Emiliano Zampetti, IIA-CNR, Italy
Maria Aurora Mancuso, IIA-CNR, Italy
Andrea Longobardo, INAF-IAPS, Italy
Ernesto Palomba, INAF-IAPS, Italy
Fabrizio Dirri, INAF-IAPS, Italy
Chiara Gisellu, INAF-IAPS, Italy
Diego Scaccabarozzi, Politecnico di Milano, Italy

PS17 Aerodynamic Load Measurements on the Example of Diamond DA42 Model Aircraft

Jan Domino, Polish Air Force University, Poland
Zbigniew Czyż, Polish Air Force University, Poland
Robert Bąbel, Polish Air Force University, Poland

PS18 Performance Measurements System of Propellers for Electric Propulsion

Mateusz Sadowski, Polish Air Force University, Poland
Zbigniew Czyż, Polish Air Force University, Poland
Krzysztof Skiba, Polish Air Force University, Poland

PS19 Automatic Measurement System for Satellite Alignment

Zaihua Yang, Beijing Institute of Spacecraft Environment Engineering, China
Lichen Sun, Beijing Institute of Spacecraft Environment Engineering, China
Yue Zheng, Beijing Institute of Spacecraft Environment Engineering, China

12:20 - 13:00 *BL28 - Carassa e Dadda Hall*
PLENARY SESSION - TUTORIAL

Wind-tunnel testing, overview of state-of-the-art techniques with application to a real-case scenario

Andrea Colli, *Politecnico di Milano, Italy*

13:00 - 14:00 *Politecnico di Milano - Building BL28*
LUNCH

14:00 - 15:20 *BL28 - Carassa e Dadda Hall*
Session 9.1 - Optical and Innovative Sensors for Aerospace
Chairs: Alessandro Aimasso, *Politecnico di Torino, Italy*
Paolo Maggiore, *Politecnico di Torino, Italy*

14:00 Creation of a Support Software for the Development of a System for Sending and Visualizing FBG Sensor Data for Aerospace Application

Antonio Costantino Marceddu, Politecnico di Torino, Italy
 Alessandro Aimasso, Politecnico di Torino, Italy
 Antonio Scaldaferrri, Politecnico di Torino, Italy
 Paolo Maggiore, Politecnico di Torino, Italy
 Bartolomeo Montrucchio, Politecnico di Torino, Italy
 Matteo Davide Lorenzo Dalla Vedova, Politecnico di Torino, Italy

14:16 Influence of Adhesive and Application Method on FBG Temperature Sensors for Space Applications

Alessandro Aimasso, Politecnico di Torino, Italy
 Matteo Davide Lorenzo Dalla Vedova, Politecnico di Torino, Italy
 Davide Janner, Politecnico di Torino, Italy
 Paolo Maggiore, Politecnico di Torino, Italy
 Alberto Rovera, Politecnico di Torino, Italy

14:32 Proposal of a Standard Method to Define a Best Practice for Bonding FBG Sensors for Aerospace Use

Alessandro Aimasso, Politecnico di Torino, Italy
 Carlo Giovanni Ferro, Politecnico di Torino, Italy

14:48 Past, Present, and Futures Non Destructive Techniques

Ciro Tortora, National Research Council - ISASI, Italy
 Fabiana Graziano, National Research Council - ISASI, Italy
 Veronica Vespini, National Research Council - ISASI, Italy
 Sara Coppola, National Research Council - ISASI, Italy
 Simonetta Grilli, National Research Council - ISASI, Italy
 Pietro Ferraro, National Research Council - ISASI, Italy

15:04 Vibration Modal Assessment Using Acoustic Stimulation and Camera-Assisted Heterodyne Interferometry

Wen Xiao, Beihang University, China
 Zonghui Chen, Beihang University, China
 Peng Deng, Beihang University, China
 Xiyu Liu, Beihang University, China
 Lu Xin, Beihang University, China
 Yakun Liu, Beihang University, China
 Xiaosu Yi, Beihang University, China
 Feng Pan, Beihang University, China

14:00 - 15:20

BL28 - Hall 1.1

Session 9.2 - Structural Health Monitoring and Nondestructive Testing for Aerospace - Part II

Chairs: Vittorio Memmolo, *Goethe University Frankfurt, Germany*
 University of Naples Federico II, Italy
 Marco Laracca, *Sapienza University of Rome, Italy*

14:00 Thermographic Non-Destructive Techniques for Evaluating Surface Coating in Ceramic Matrix Composites ISIComp®: A Capability Study

Francesca Di Carolo, Politecnico di Bari, Italy
Giovanni Santonicola, Diagnostic Engineering Solutions S. r. l., Italy
Francesco Ancona, Diagnostic Engineering Solutions S. r. l., Italy
Davide Palumbo, Politecnico di Bari, Italy
Umberto Galietti, Politecnico di Bari, Italy
Cinzia Toscano, Italian Aerospace Research Centre, Italy
Mario De Stefano Fumo, Italian Aerospace Research Centre, Italy
Mario De Cesare, Italian Aerospace Research Centre, Italy

14:20 A Novel Multi-Excitation ECT Probe for Deep Defects With Any Orientation

Federico Carere, Sapienza University of Rome, Italy
Andrea Bernieri, University of Cassino, Italy
Luigi Ferrigno, University of Cassino, Italy
Marco Laracca, Sapienza University of Rome, Italy
Silvia Sangiovanni, Sapienza University of Rome, Italy

14:40 Laser Ultrasonic Non-Destructive Testing for Aerospace Applications

Giuseppe Del Prete, Leonardo S.p.A. - University of Naples Federico II, Italy
Fabrizio Leone, Leonardo S.p.A., Italy
Valerio Dentico, Leonardo S.p.A., Italy
Nicola Gallo, Leonardo S.p.A., Italy
Leandro Maio, University of Naples Federico II, Italy
Vittorio Memmolo, University of Naples Federico II, Italy
Veronica Vespini, National Research Council - ISASI, Italy
Sara Coppola, National Research Council - ISASI, Italy
Ettore Stella, National Research Council - STIIMA, Italy
Pietro Ferraro, National Research Council - ISASI, Italy

15:00 Non-Destructive Techniques for Quality Control of Composite Materials

Fabiana Graziano, National Research Council - ISASI, Italy
Ciro Tortora, National Research Council - ISASI, Italy
Veronica Vespini, National Research Council - ISASI, Italy
Massimo Rippa, National Research Council - ISASI, Italy
Valerio Dentico, Leonardo S.p.A., Italy
Fabrizio Leone, Leonardo S.p.A., Italy
Nicola Gallo, Leonardo S.p.A., Italy
Ettore Stella, National Research Council - STIIMA, Italy
Pietro Russo, National Research Council - IPCB, Italy
Sara Coppola, National Research Council - ISASI, Italy
Pietro Ferraro, National Research Council - ISASI, Italy

14:00 - 15:20

BL28 - Hall 1.2

Session 9.3 - University Satellites and Aerospace Research and Development

Chairs: Vladimir Saetchnikov, *Belarusian State University, Belarus*
Mario R. Chiarelli, *University of Pisa, Italy*

14:00 An Accurate and Efficient Numerical Tool for the Analysis and Design of Optical Feeder Links

Carla Cantore, Polytechnic University of Bari, Italy
 Davide Monopoli, Polytechnic University of Bari, Italy
 Angelo Altamura, European Space Agency, The Netherlands
 Alberto Mengali, European Space Agency, The Netherlands
 Marco Grande, Polytechnic University of Bari, Italy

14:20 Small Satellite Identification for Multi-Payload Launch Using Doppler Measurements

Alexander Spiridonov, Belarusian State University, Belarus
 Vasilina Baranova, Belarusian State University, Belarus
 Dmitrii Ushakov, Belarusian State University, Belarus
 Vladimir Saetchnikov, Belarusian State University, Belarus
 Vladimir Cherny, Belarusian State University, Belarus

14:40 Re-Entry Dynamics of the Reusable Stage of a Space Launcher: A First Level Model

Mario R. Chiarelli, University of Pisa, Italy
 Stefano Carbutti, University of Pisa, Italy
 Gianluca Mariani, University of Pisa, Italy
 Giuseppe Palaia, University of Pisa, Italy
 Karim Abu Salem, University of Pisa, Italy

15:00 Video Data Processing System for Ground-Based Space Optical Surveillance Application

Vasilina Baranova, Belarusian State University, Belarus
 Alexander Spiridonov, Belarusian State University, Belarus
 Siarhei Liashkevich, Belarusian State University, Belarus
 Vladimir Saetchnikov, Belarusian State University, Belarus

15:20 - 15:40 Politecnico di Milano - Building BL28
COFFEE BREAK

15:40 - 16:40 BL28 - Carassa e Dadda Hall
Session 10.1 - Metrology for Maritime Transport, Ports and Shipping
Chairs: Michele Fiorini, Leonardo S.p.A., Italy

15:40 Building an Autonomous Boat: A Multidisciplinary Design Engineering Approach

Alexandros Troupiotis-Kapeliaris, University of the Aegean, Greece
 Nikolas Gavalakis, University of the Aegean, Greece
 Konstantinos Koutis, University of the Aegean, Greece
 Dimitris Lamparas, University of the Aegean, Greece
 Giorgos Melissourgous, University of the Aegean, Greece
 George Nikolaidis, University of the Aegean, Greece
 Nikolaos Sapountzis, University of the Aegean, Greece



Loukas-Vasilios Skouras, University of the Aegean, Greece
Maria Stampoulou, University of the Aegean, Greece
Giorgos Voudimos, University of the Aegean, Greece
Thomas Kogias, University of the Aegean, Greece
Ilias Xidias, University of the Aegean, Greece
Dimitris Zissis, University of the Aegean, Greece

16:00 Free Cooling Data Centres for Smart Ports and Shipping: An Energy Efficiency Analysis

Michele Fiorini, Leonardo S.p.A., Italy
Francesco De Angelis, Leonardo S.p.A., Italy

16:20 Educational Approaches for Personnel in Vessel Traffic Services

Jillian Carson-Jackson, JCJ Consulting, Australia
Michele Fiorini, Leonardo S.p.A., Italy
Marco Galloro, Leonardo S.p.A., Italy

15:40 - 17:00

BL28 - Hall 1.1

Session 10.2 - General Session - Part VI

Chair: Sebastiano Chiodini, *University of Padova, Italy*

15:40 Navigation of Sounding Balloons With Deep Reinforcement Learning

Marco Gannetti, University of Pisa, Italy
Matteo Gemignani, University of Pisa, Italy
Salvo Marcuccio, University of Pisa, Italy

16:00 Investigating the Power Budget of a 3U Nanosatellite Designed for Earth Observation

Amina Daghouri, Mohammed V University in Rabat, Morocco
Youssef El Hachimi, Mohammed V University in Rabat, Morocco
Abdelaali Ouhammam, Mohammed V University in Rabat, Morocco
Mohammed Alae Chanoui, Mohammed V University in Rabat, Morocco
Soumia El Hani, Mohammed V University in Rabat, Morocco
Hassan Mahmoudi, Mohammed V University in Rabat, Morocco

16:20 Determination of the Accelerometer Metrological Characteristics on Board the METRIC Mission

Andrea Valmorbida, University of Padova, Italy
Giovanni Anese, University of Padova, Italy
Roberto Peron, Istituto Nazionale di Astrofisica, Italy
Enrico Lorenzini, University of Padova, Italy

16:40 Adaptive Equalization as Method for Satellite Communication Channel Characterization

Nico Corsinovi, University of Pisa, Ingeniars Srl, Italy
Roberto Ciardi, University of Pisa, Ingeniars Srl, Italy
Emanuele Pagani, University of Pisa, Ingeniars Srl, Italy

Matteo Bertolucci, Ingeniars Srl, Italy
Luca Fanucci, University of Pisa, Italy

15:40 - 17:00

BL28 - Hall 1.2

Session 10.3 - GNSS Space Synergies (GNS4): from GNSS space users to LEO-PNT and hybrid terminals

Chair: Francesco Menzione, *European Commission*

15:40 Navigating in Geostationary Orbit With a GNSS Receiver: A Further Analysis to In-Flight Results

Andrea Piccolo, Thales Alenia Space Italia, Italy
Alberto Zin, Thales Alenia Space Italia, Italy
Stefano Zago, Thales Alenia Space Italia, Italy
Lorenzo Badano, Thales Alenia Space Italia, Italy
Livio Marradi, Thales Alenia Space Italia, Italy

16:00 DGNSS Ranging for CubeSat Rendezvous and Docking Manoeuvres at LEO

Alex Minetto, Politecnico di Torino, Italy
Giorgio Ammirante, Politecnico di Torino, Italy
Fabrizio Stesina, Politecnico di Torino, Italy
Fabio Dovis, Politecnico di Torino, Italy
Sabrina Corpino, Politecnico di Torino, Italy

16:20 Configurable GNSS Based Orbit Determination for LEO PNT Non-Operative and Operative Phases

Francesco Menzione, European Commission Joint Research Center
Alfredo Renga, University of Naples Federico II, Italy
Gianmarco Santoro, University of Naples Federico II, Italy

16:40 Striking a Balance: Performance and Cost Optimization of LEO-PNT Constellation for Hybrid Users Using a Meta-Heuristic Approach

Lorenzo Marchionne, Thales Alenia Space Italia, Italy
Leandro Maria Gessato, Thales Alenia Space Italia, Italy
Fabrizio Toni, Thales Alenia Space Italia, Italy
Stefano La Barbera, Thales Alenia Space Italia, Italy

17:00 - 17:30

BL28 - Carassa e Dadda Hall

CLOSING AND AWARD CEREMONY