

15th IAA Symposium on Small Satellites for Earth System Observation

Program

May 04-08, 2025
Berlin, Germany



Scientific Program Committee

Honorary Chair

Rainer Sandau
IAA Technical Director
Satellites and Space Applications, France

Chairmen

Enrico Stoll
Chairholder of Space Technology
Technische Universität Berlin, Germany

Chantal Cappelletti
Aerospace Engineering University of Nottingham,
GB

René Laufer
Head of Space Systems
Luleå University of Technology, Sweden

Anke Pagels-Kerp
Divisional Board Member for Space German
Aerospace Center (DLR), Germany

Members

J.-N. Bricout (CNES, France)
J.-M. Contant (IAA, France)
L. Gratton (Provincia de Salta, Argentina)
S. Hardhienata (LAPAN, Indonesia)
W. Halle (DLR, Germany)
P. Lier (CNES, France)
Y.-A. Liou (CSRSR, Taiwan)
L. Maresi (ESA/ESTEC)
S. Mostert (SCSH, South Africa)
S. Nakasuka (Univ. of Tokyo, Japan)
R. Navalgund (ISRO, India)
S. Neeck (NASA/HQ ret., USA)
F. Ongaro (ESA/ESTEC)
M. Ovchinnikov (KIAM, Russia)
P. Patterson (USU/SDL, USA)
L. Paxton (JHU/APL, USA)
M. Saandar (MSPRS, Mongolia)
Sir Martin Sweeting (SSTL, UK)
Y. Zhu (CAST, Beijing, China)

Program Committee

J. Bartholomäus (TU Berlin, Germany)
S. Grau (EnduroSat, Germany)
E. Klioner (TU Berlin, Germany)
A. Preci (DLR, Germany)
S. Roemer (OHB, Germany)
S. Speretta (TU Delft, Netherlands)
T. Segert (BST, Germany)
A. da Silva Curiel (SSTL, UK)

Symposium Schedule

Sunday, May 4, 2025

18:00-20:00 **Opening of registration on site & exhibition SSEO15
with snacks & beverages**

Monday, May 5, 2025

| | |
|-------------|---|
| 08:00-18:00 | Registration |
| 09:00-09:45 | Conference Opening |
| 09:45-10:30 | Session – Programmatic |
| 10:30-10:45 | Coffee Break |
| 10:45-12:30 | Session 1 – Mission 1 Chairs: <i>N.N., N.N.</i> dlr-iaa2025-33 High Resolution Thermal Imaging on a Small Satellite dlr-iaa2025-43 Future Earth-Moon Navigation Based on Quantum Inertial Sensor Systems dlr-iaa2025-156 Mission and System Design of the SmallSat Lunar Science Exploration Mission SER3NE dlr-iaa2025-163 InnoCube – LEOP Experiences of the fully Wireless Data-Bus |
| 12:30-13:30 | Lunch Break |
| 13:30-15:00 | Session 2 – Instruments Chairs: <i>N.N.</i> dlr-iaa2025-58 S3LA - the single-photon counting laser altimeter for the SER3NE mission to the Moon dlr-iaa2025-60 A compact laser ranging interferometer for the SENSORIS mission dlr-iaa2025-80 CNN-Based System for Change Detection Onboard Earth Observation Small Satellites: Design Approach to FPGA Hardware Implementation dlr-iaa2025-114 Enhancing Small Earth Observation Satellites with Space Grade Commercial-Of-The-Shelf (SCOTS) Telescope Payloads |
| 15:00-15:20 | Coffee Break |
| 15:20-16:40 | Session 3 – Data Processing Chairs: <i>N.N., N.N.</i> dlr-iaa2025-47 Leveraging uniaxial vibration data to improve a satellite's finite element model dlr-iaa2025-49 A Distributed Compute Architecture for Real-Time Earth Observation from Small Satellites dlr-iaa2025-53 Mass Memory Module for Earth Observation applications in Small Satellites dlr-iaa2025-57 Ionospheric mapping with single-frequency GNSS measurements from commercial nanosatellite constellations |
| 16:40-17:40 | Panel Discussion on Cybersecurity |
| 18:00 | welcome reception for registered attendees |

Tuesday, May 6, 2025

| | |
|-------------|--|
| 9:00-10:30 | Session 4 – Mission 2 Chairs: <i>N.N., N.N.</i> dlr-iaa2025-34 SOVA-S SMALL SATELLITE MISSION – INNOVATIVE APPROACH FOR OBSERVING EARTH'S ATMOSPHERIC MECHANISMS dlr-iaa2025-52 CENSSAT-1 Mission Concept: A CubeSat for Space Weather Monitoring dlr-iaa2025-98 Development of a Space Demonstrator of an optical Rubidium Two-Photon Atomic Clock dlr-iaa2025-154 System Design for Autonomous Down-to-Earth Optical Link Acquisition from LEO (ADEOLA) |
| 10:30-10:50 | Coffee Break |
| 10:50-12:10 | Session 5 – Formations and Constellations 1 Chairs: <i>N.N., N.N.</i> dlr-iaa2025-54 Addressing challenges for magnetic attitude control of New Space earth observation missions dlr-iaa2025-100 Formation Flight with CubeSats: Flight Experience of the NanoFF Mission dlr-iaa2025-112 Possible applications of spinning tethered systems for Earth and Moon observation: an overview dlr-iaa2025-124 Using formation-flying to estimate bias-free drag coefficients for improved satellite orbit predictions |
| 12:10-13:30 | Lunch Break |
| 13:30-15:00 | Session 6 – Data Applications Chairs: <i>N.N., N.N.</i> dlr-iaa2025-92 Enhancing Aerosol Monitoring: Sensitivity Experiments for PolSAC design in G20 Framework dlr-iaa2025-122 Scheduling of Agile Earth Observation Satellite Using a Refined Genetic Algorithm dlr-iaa2025-152 Leveraging GNSS-Reflectometry Onboard ISRO's EOS-08 MicroSat-2C for Global Monitoring of Hydrological Variables dlr-iaa2025-164 GNSS remote sensing of the PRETTY CubeSat mission: a demonstration to validate models of ionospheric electron density |
| 15:00-15:20 | Coffee Break |
| 15:20-16:30 | Session 7 – Subsystems Chairs: <i>N.N., N.N.</i> dlr-iaa2025-39 Breaking Boundaries in Reaction Wheel Control: Flight- Proven Zero-crossing Design for small satellite dlr-iaa2025-147 SOS Star Tracker Algorithm: Static Open-Source Star Tracker for Agile Attitude Determination dlr-iaa2025-148 Configuration and AIT challenges of SPADEX Spacecraft India's first Docking Mission dlr-iaa2025-150 Expanding the Capabilities of SmallSats through Deployable Antennas |
| 16:40-18:00 | Poster Session I |
| 16:30-18:00 | Workshop 1 and 2 upon registration |
| 19:00 | IAA Dinner at Rotisserie Please note that this is a ticketed event - you must register and pay for the dinner event. |

Wednesday, May 7, 2025

| | |
|-------------|---|
| 09:00-10:00 | Session 8 – Sustainability and Space Situational Awareness Chairs: <i>N.N., N.N.</i> dlr-iaa2025-45 Optimizing Mission Planning for Multi-Debris Rendezvous Using Reinforcement Learning with Refueling and Adaptive Collision Avoidance dlr-iaa2025-63 Design and Analysis of an Event Camera Payload for Space-Based Object Detection on the EventSat 6U CubeSat Mission dlr-iaa2025-141 Sustainable Satellite Development in Thailand Through the School Satellite Project |
| 10:00-10:15 | Coffee Break |
| 10:15-11:45 | Session 9 – Between Automatization and Digitalization: Satellite Production Technologies Chairs: <i>N.N., N.N.</i> dlr-iaa2025-46 Automated production of Digital Sensors, the next step in satellite production optimisation dlr-iaa2025-55 Multi-Index Remote Sensing GPU Framework for Environmental Monitoring: Tangier - Strait of Gibraltar dlr-iaa2025-64 Securing Satellite Command Systems: An Offline Voice Recognition Approach with Authentication dlr-iaa2025-143 Towards Cost-Effective and Efficient Production and Testing of NewSpace Technologies: Advancing Standardization, Digitalization and Automation in Satellite Development |
| 11:50-12:50 | Panel Discussion: Between Automatization and Digitalization: Satellite Production Technologies |
| 12:50-13:30 | Lunch Break |
| 13:30-15:00 | Session 10 – Lessons Learned Chairs: <i>N.N., N.N.</i> dlr-iaa2025-31 Operational Learnings of Ground Track Control for Missions in Low Earth Orbit dlr-iaa2025-48 A practical approach to do notching on the load specifications at an early design stage of satellites dlr-iaa2025-73 Lessons from Foresail-1(p): Enhancing CubeSat Platforms for Space Science dlr-iaa2025-158 Multi-organization Effort within an IAA Event, to Promote Concurrent Design for the Latin American Region |
| 15:00-15:20 | Coffee Break |
| 15:20-16:30 | Session 11 – Special Aspects Chairs: <i>N.N., N.N.</i> dlr-iaa2025-36 Liliium CubeSats: Towards Agile and Responsive Space dlr-iaa2025-38 AquaWatch-AUK – A Bilateral Programme for Integrated Water Quality Monitoring dlr-iaa2025-145 Disrupting the Monitoring of Environment over Tropics with Small/Very Small Satellites: The “Equatorial Sentinels” Concept |
| 16:40-18:00 | Poster Session II |
| 16:30-18:00 | Workshop 3 and 4 upon registration |

Thursday, May 8, 2025

- 09:00-10:30 **Session 12 – Student Competition**
Chairs: *N.N., N.N.*
dlr-iaa2025-125 RADIANT – Radar-based Awareness with Distributed Illuminator Networks
dlr-iaa2025-151 The Sapling CubeSat Mission: Stanford University's First Fully Student Developed Satellites
dlr-iaa2025-159 QUANTUM COMPUTING FOR OPTIMIZED SPACE TRAFFIC AND SATELLITE COLLISION AVOIDANCE
dlr-iaa2025-162 Developing a Modular Platform for Reduced Gravity Research on Sounding Rockets
dlr-iaa2025-165 Observation of Cosmic Dust in High Elliptical Earth Orbits Using Micro Satellites
dlr-iaa2025-170 Mission Analysis and Optimized Concept of Operations for In-Orbit Demonstration of Autonomous Optical Link Acquisition for a SmallSat in LEO
-
- 10:30-10:50 **Coffee Break**
-
- 10:50-12:10 **Session 13 – Missions 3**
Chairs: *N.N., N.N.*
dlr-iaa2025-102 Czech Ambitious Missions covering high demands of today's Earth Observations and Astrophysics
dlr-iaa2025-108 Overview of mission concepts enabled by the modular LEOS-100 small satellite platform
dlr-iaa2025-129 Mission concept design for a high resolution deployable infrared telescope hosted on a small satellite
-
- 12:10-13:30 **Lunch Break**
-
- 13:30-15:00 **Session 14 – Below and Beyond LEO**
Chairs: *N.N., N.N.*
dlr-iaa2025-78 Mission Analysis and Platform Design for the EarthNext CubeSat VLEO Mission
dlr-iaa2025-93 Fully Passive Thermal Control Design and On-Orbit Validation for ISRO Nano Satellite (INS)
dlr-iaa2025-127 Moonraker: Mapping the Moon with High-Resolution LiDAR
dlr-iaa2025-139 Hybrid Navigation Techniques for Beyond LEO CubeSat Missions
-
- 15:00-15:20 **Coffee Break**
-
- 15:20-16:30 **Session 15 – Formations and Constellations 2**
Chairs: *N.N., N.N.*
dlr-iaa2025-66 NOAA's Thinking Small: a Disaggregated Approach Low Earth Orbit Earth Observations
dlr-iaa2025-83 CubeSats swarm mission for Studying Escaping Radio waves (CSER)
dlr-iaa2025-109 Beyond VIBES Pioneer: What is Next for the Consumer Electronics Revolution in Space?
dlr-iaa2025-117 Challenges of Implementing a Pushbroom Imaging Spectrometer on Small Satellites
-
- 16:40-17:40 **Symposium Summary**
Chairs: *N.N.*
Awards Best Paper Presentations and Best Poster Presentations

Poster Sessions

Poster Session I - Tuesday

- dlr-iaa2025-14** Impact of the Pitch Axis Momentum Wheel Misalignment on the Attitude Performance Applied to Low Earth Orbit Microsatellite
- dlr-iaa2025-15** Development of an Error-Correcting IP Core for CubeSat Memory Protection
- dlr-iaa2025-16** Design and Validation of an Advanced Lithium-Ion Capacitor-Based Battery for Nano-Satellite Applications
- dlr-iaa2025-17** Enhancing the radiation-hardening capability of high-density memories through the implementation of robust error detection and correction codes
- dlr-iaa2025-18** IMPACT OF LTDN DRIFT ON RADIOMETRIC PERFORMANCE: INSIGHTS FROM THE IMAGING PAYLOAD OF ALSAT-1B SATELLITE
- dlr-iaa2025-21** Analysis of Thermal and Mechanical Loads on a Separation Mechanism for Microsatellites: A Finite Element Method Approach
- dlr-iaa2025-25** Monitoring the Earth's ionosphere with the Korean CubeSat fleet, SNIPE
- dlr-iaa2025-28** Hymove: versatile core avionics ranging from Satellites to launchers
- dlr-iaa2025-29** AI-Based Attitude Control for Restricted Reaction Wheels
- dlr-iaa2025-30** Bridging Gaps in Distributed Space Systems: A Digital Twin Solution
- dlr-iaa2025-35** Integrating Small Satellites into Disaster Management Frameworks: Bridging Gaps and Unlocking Potential
- dlr-iaa2025-40** A low cost, small satellite constellation approach to rapidly monitor Land Surface Temperature for Urban and Agricultural applications over UK and Europe, with optimized cross calibration to ESA and Copernicus missions.
- dlr-iaa2025-41** NIRCA MkII Front-End Electronics for Readout and Control of High-Performance Space Image Sensors
- dlr-iaa2025-56** A Model-Driven Approach for Enhancing Satellite Flight Software Development: A Case Study on the AOCS of Alsat-1B
- dlr-iaa2025-59** Exploring land use land cover changes and their effect on urban heat island and land surface temperature: The case of Lahore, Pakistan
- dlr-iaa2025-65** Indigenous ceramic PTFE composite substrate for microwave application in small satellites and other microwave applications
- dlr-iaa2025-67** Application of High-Precision Inertial-Grade MEMS Accelerometers in the SPADEX Space Docking Mission
- dlr-iaa2025-68** Quantity is a quality - Benefits of Distributed Satellite Systems and Constellations Against Anti-Satellite Weapons
- dlr-iaa2025-69** Quantum-Resilient Cybersecurity for Small Satellite Networks: Leveraging Post-Quantum Cryptography and Quantum Key Distribution (QKD)
- dlr-iaa2025-70** Data Handling and Storage Subsystem for INS-2 series of Nanosatellites
- dlr-iaa2025-71** Software-Defined Radio Ground Station for a Small Satellite Mission
- dlr-iaa2025-72** The development of the Seeing Imagers for New Space missions
- dlr-iaa2025-74** Ultra-Miniaturised Star Tracker for Nano-Satellites and Micro-Satellites: Performance evaluation on ground and onboard
- dlr-iaa2025-75** Realization of Next Generation Solid State Recorder for small satellites
- dlr-iaa2025-76** Evaluating the Stability of Optical Barrel Alignment in Orbital Thermal Conditions
- dlr-iaa2025-77** Wireless LiFi based UART for Earth Observation Sensors
- dlr-iaa2025-79** Active Spacecraft Potential Control for Small Satellites
- dlr-iaa2025-82** Enhancing SAR Satellite Operations by Reducing Battery Charging Duration with Satellite-to-Satellite Laser Power Beaming
- dlr-iaa2025-84** Tethered Satellite System for Cross-Track Formation Flying: Architecture and Performance Analysis
- dlr-iaa2025-85** Unsupervised Segmentation of High-Resolution Satellite Images Using SAM
- dlr-iaa2025-88** Monitoring and Study of Self-Isolated Tribes using CubeSat Imaging in LEO
- dlr-iaa2025-89** CubeSim: Simulation Framework for the Development of Small Satellites

Poster Session II - Wednesday

- dlr-iaa2025-90** High-Performance Ion Propulsion System for Small Satellites
- dlr-iaa2025-91** The START-1 and START-2 CubeSat Missions for In-Orbit Demonstration of Multiple Payloads
- dlr-iaa2025-94** Gas bearing reaction wheels: A breakthrough for high-performance pointing missions?
- dlr-iaa2025-95** Development of multifunctional structure for small satellite application
- dlr-iaa2025-96** Hardware in-the-loop ACS Testing and System End-to-End Tests in the ACS Test Facility for Nano to Small Satellites
- dlr-iaa2025-97** From Low-Resource Subsystems to EO Payload Computer: Enabling Flexible, Scalable CubeSat Software with an OS Abstraction Layer
- dlr-iaa2025-99** BO goes Space: Setting up research-oriented learning by establishing access to real-world space exploration at BO using PocketCubes
- dlr-iaa2025-104** A Novel Pulse Width Modulation strategy for rapid detumbling of Small Satellites
- dlr-iaa2025-105** A cost effective, compact and spectral efficient design of reconfigurable data transmitters with enhanced reliability for Nanosats
- dlr-iaa2025-106** Robust Optimisation for Uncertain Satellite Data Transmission Scheduling
- dlr-iaa2025-111** GLITCH (Gamma Light Interference In Technological Circuitry and Hardware)
- dlr-iaa2025-113** Deployable Thin-membrane Antenna Prototype for Small Microwave Earth Observation Satellites
- dlr-iaa2025-115** A CubeSat scaled mission for the in-orbit demonstration of a spinning tethered system for artificial gravity
- dlr-iaa2025-116** Development of an Advanced Micro-Propulsion System for Small Satellites
- dlr-iaa2025-118** Optimal manoeuvring of small Earth Observation platforms for frequent re-targeting
- dlr-iaa2025-123** An Exact Approach to Scheduling Agile Earth Observation Satellite in Multiple Time Periods
- dlr-iaa2025-126** A Swarm Architecture for Small Satellites Pointing towards Common Moving Targets
- dlr-iaa2025-130** Parametric Analysis on the Stability of Low-lunar Orbits in Pairs of Semi-major Axis and Eccentricity
- dlr-iaa2025-131** Multi-Mission Control Center - Innovation in Operations
- dlr-iaa2025-133** Overview of the CAM Payload of the APTAS Student CubeSat Project
- dlr-iaa2025-135** Testing Approach for the Foresail-1p CubeSat
- dlr-iaa2025-136** Power-Up - Upscaling the TUBiX20 Microsatellite Platform for QUEEN
- dlr-iaa2025-137** Autonomous formation flying in the traffic
- dlr-iaa2025-138** Advancing Lunar Ice Characterization with a Dual-Instrument CubeSat Constellation: Combining Neutron and Near-Infrared Spectroscopy
- dlr-iaa2025-140** Near Real-Time Satellite Operations Planning using Genetic Algorithms
- dlr-iaa2025-142** On the response of Low-altitude satellite orbits to atmospheric density variations in Ionosphere-Thermosphere System
- dlr-iaa2025-144** Control of robotic arm equipped with imaging camera as end-effector for power-efficient remote sensing using small satellites
- dlr-iaa2025-153** Robotic Arms based Docking Simulator for Removal of Earth Observation CubeSats
- dlr-iaa2025-155** Guidance and Control for aerodynamic-based nanosat multi-static SAR formation flying mission aimed at sub-millimeter space debris characterization
- dlr-iaa2025-157** Four IOD Missions supported by the Triton-X Platform for Smallsats
- dlr-iaa2025-165** Comparative Design Evaluation of Satellite-Analogue Robotic Arm End-Effectors
- dlr-iaa2025-164** The use of plasma generators for the reuse and recycling of spacecraft solar cells
- dlr-iaa2025-167** WOBBLE2
- dlr-iaa2025-169** 4 years of StudOps: Utilizing Retired Spacecraft for Novel Education and Research