

10th International Colloquium on Scientific and Fundamental Aspects of GNSS

7 – 9 October 2026 | École de Technologie Supérieure (ETS), Montréal, Canada



FINAL PROGRAMME

Day 1 – Wednesday, 7 October 2026

08:00	Registration
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PLENARY SESSION - Room A

09:00 – 09:30	Welcome and Introduction <i>Paride Testani (European Space Agency, ESTEC) and Prof. René Jr. Landry (ETS)</i>
09:30 – 10:00	Keynote 1 – The Future of PNT: ESA is Shaping the Future of Navigation <i>Jose Angel Avila Rodriguez (European Space Agency, ESTEC)</i>
10:00 – 10:30	Keynote 2 – Constellations of Change: How GNSS Has Transformed Our Understanding of the Earth <i>Prof. Richard B. Langley (University of New Brunswick)</i>
10:30 – 11:00	Morning Coffee Break

PARALLEL SESSIONS

	Room A	Room B
11:00 – 12:40	Scientific Aspects of Positioning and Navigation Applications – I (Integrity & Spoofing Detection) <i>Chair: Jose Angel Avila Rodriguez</i>	Scientific Opportunities enabled by GNSS and PNT Systems – I <i>Dr. Ahmad Esmaeilkhah</i>
11:00	Physics-Consistency Validation for GNSS Spoofing Detection <i>Amna Adnan – University of Calgary</i> [STUDENT PRESENTATION]	Ghost Aircraft, Real Threats: Detection and Analysis of GNSS Spoofing and Jamming Using Crowdsourced ADS-B Data <i>Mohamed Malek Mokaddem – ETS-LASSEN</i> [STUDENT PRESENTATION]
11:20	Enhanced RAIM-Based Spoofing Detection Using GPS/SBAS L1 Measurements <i>Yashar Balazadegan Sarvood – ETS</i>	A novel approach for integrity monitoring of GNSS broadcast ephemeris using IGS ultra-rapid precise products <i>Mohammad Ali Goudarzi – ETS</i>
11:40	Robust Code-Carrier Divergence Monitoring for GNSS Receiver Integrity and Spoofing-Related Coherence Fault Detection <i>Yashar Balazadegan Sarvood – ETS</i>	AI-Based Multi-Source GNSS TEC Analysis for Detecting Pre-Seismic Ionospheric Disturbances and Enhancing Earthquake Forecasting <i>Layachi Abdelkebir – ENSGTS</i>
12:00	Adaptive Signal Power-Based GNSS Spoofing and Interference Detection and Classification Using a Self-Calibrating Statistical Technique <i>Ali Pirsiavash – ÉTS</i>	Modified stochastic model for GNSS positioning during ionospheric scintillation at high latitudes <i>Sophie Legresley - University of New Brunswick</i> [STUDENT PRESENTATION]
12:20	GNSS Space Spoofing: The Good, The Bad and The Ugly <i>Rene Jr Landry – ETS</i>	The ESA GNSS Science Support Centre: improving GNSS data usage by the scientific community <i>Natalia Castrillo – European Space Agency</i>
12:40 – 14:00	Lunch Break	

14:00 – 15:20	Scientific Aspects of Positioning and Navigation Applications – II (Positioning Algorithms & Multi-GNSS) <i>Chair: Dr. Ali Pirsiavash</i>	Scientific Opportunities enabled by GNSS and PNT Systems – II <i>Chair: Prof. Dr. Kyle O'Keefe</i>
14:00	A Closed-Form Recursive Least Squares Estimator with Explicit Full Covariance Modeling <i>Mohammad Mahdi Kariminejad – Laval Université</i> <i>[STUDENT PRESENTATION]</i>	Review of wide band GNSS signals for accurate positioning and scientific applications <i>Jean-luc Issler – CNES</i> <i>[REMOTE INVITED TALK]</i>
14:20	Impact of PCO/PCV Calibration Models on Precise Positioning with Low-Cost GNSS Receivers <i>Maciej Lackowski – Wrocław University</i> <i>[STUDENT PRESENTATION]</i>	Statistical study of the ionospheric GNSS TEC response to Pc3–6 ULF geomagnetic pulsations <i>Chris Watson – University of New Brunswick</i>
14:40	Extended Coherent Integration for GNSS Signal Acquisition Under Unknown Sign Transitions via Recursive Gray-Code Multi-Hypothesis <i>Jérôme Leclère – Xona</i>	A Comprehensive Framework for Autonomous LEO Signal Acquisition: Fusing Physics-Aware AI for Short-Horizon Orbital Correction with Kinematic Target Clustering for Resilient PNT <i>Saif Sinan – LASSENA-ETS</i> <i>[STUDENT PRESENTATION]</i>
15:00	Receiver-Assisted Analog Null-Forming for GNSS Anti-Jamming and Anti-Spoofing <i>Mohamed Emara – Calian GNSS</i>	Code-independent Satellite Identification Method using Zero Doppler Crossing Metric <i>Ahmad Esmaeilkhah – ETS Montréal</i>
15:20 – 15:50	Afternoon Coffee Break	
	Day 1 - Poster Session	
15:50 – 17:30	Scientific Aspects of Positioning and Navigation Applications – III (LEO, INS & Signals of Opportunity) <i>Chair: Dr. Mohammad Ali Goudarzi</i>	Geodesy, Geophysics and Earth Sciences <i>Chair: Prof. Urs Hugentobler</i>
15:50	GPU-Accelerated Dynamic LEO SoOP Positioning <i>Ahmad Esmaeilkhah – ETS Montréal</i>	Genesis: ESA's Satellite Mission for Geodetic Science at the Foundation of Navigation <i>Sara Gidlund – ESA</i>
16:10	Beyond GNSS: Passive Doppler Geolocation Using Iridium NEXT Signals of Opportunity for Resilient LEO-Based PNT <i>Wissem Jallouli – ETS/LASSENA</i> <i>[STUDENT PRESENTATION]</i>	Towards Combining Multi-Technique Estimates of Geocenter Motion and Low-Degree Gravity Field Coefficients <i>Tomasz Kur – Wrocław University</i>
16:30	Doppler-Based Differential Positioning with LEO: Smart Approach for Residual Estimation and Compensation <i>Hamam Salem – Queen's University</i> <i>[STUDENT PRESENTATION]</i>	ESA's Contribution to the Global Geodesy Supply Chain: Safeguarding European Space Operations and Enabling Future PNT <i>Sara Gidlund – ESA</i>
16:50	Exploiting Starlink Downlink Signal for Positioning <i>Ahmad Esmaeilkhah – ETS Montréal</i>	VarioPy: A Real-Time Multi-Parameter GNSS Variometric Framework for Earth System Monitoring <i>Augusto Mazzoni – Sapienza Università di Roma</i>
17:10	Observability-Contract GNSS/INS/LEO Integration for Resilient PNT in GNSS-Denied Environments <i>Samir Zemam – École de Technologie Supérieure (ÉTS)</i> <i>[STUDENT PRESENTATION]</i>	Study of spatial geodetic data and in situ geophysical measurements to constrain the Earth's elastic and viscoelastic responses <i>Alicia Tafflet – CNAM</i> <i>[STUDENT PRESENTATION]</i>

PLENARY SESSION – PANEL

17:30 – 18:30	Panel: National PNT Strategies and GNSS Capabilities in Canada and Northern Regions <i>Aaron Conde, Senior Project Manager, Engineering (Transport Canada)</i> <i>Kevin Thomson, Director of Research and Development (National Research Council)</i> <i>Catherine Robin, Director & Chief Geodesist (Natural Resources Canada)</i> <i>Haris Shaid, PNT Engineer (Canadian Coast Guard)</i> <i>Michel Clénet, Section Head, Navigation and Communications EW (Defence Research and Development Canada)</i> <i>Jennifer Wharram, Director, Canadian PNT Office / Director, ICT Resilience (ISED) (Positioning, Navigation and Timing Office)</i> <i>Moderator: Jean-Marc Gagné</i>
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Day 2 – Thursday, 8 October 2026

	Room A	Room B
09:00 – 10:40	Scientific Aspects of Positioning and Navigation Applications – IV (Urban & Machine Learning) <i>Chair: René Jr. Landry</i>	Navigation for Lunar and for Space Applications – I <i>Chair: Dr Tomasz Kur</i>
09:00	Bridging 2D and 3D: A 2.5D Deterministic Approach to Urban GNSS Propagation Modeling <i>Hossein Hadidian – ETS</i> [STUDENT PRESENTATION]	Lunar Pathfinder GNSS Receiver In-Orbit Experiment <i>Floor Thomas Melman – European Space Agency</i> [REMOTE INVITED TALK]
09:20	Transforming a City into a GNSS Laboratory: Montréal's Real-Time Network and Geodetic Modernization for Next-Generation Scientific and Urban Positioning <i>Youssef Smadi – Ville de Montréal</i>	NOVAMOON: Establishing a High-Precision Lunar Surface Differential PNT, Timing and Selenodetic Reference Station <i>Richard Swinden – ESA</i>
09:40	A Deep Learning Framework for Smartphone GNSS Scene Recognition <i>Lingmin Tan – York University</i> [STUDENT PRESENTATION]	Orbit determination of the Moonlight satellites with single-beam interferometry to a lunar lander <i>Luciano Iess – Sapienza University of Rome</i>
10:00	Demonstrating the Benefits of Tightly Coupled INS and LEO Satellites for GNSS Outages in Urban Environments <i>Monique Rivard – Queen's University</i> [STUDENT PRESENTATION]	A Lunar VLBI Transmitter in the NovaMoon Framework: Synergies with LLR and GNSS <i>Ozgur Karatekin – Royal Observatory of Belgium</i>
10:20 – 11:00	Morning Coffee Break	
11:00 – 12:20	Fundamental Physics · Optical & Quantum Technologies for PNT <i>Chair: Marek Ziebart</i>	Navigation for Lunar and for Space Applications – II <i>Chair: Richard Swinden</i>
11:00	In-orbit demonstration of optical links for next-generation GNSS: the OpSTAR mission <i>Grzegorz Michalak – DLR</i>	Laser Retroreflectors for NovaMoon: Enabling Millimeter-Level Lunar Laser Ranging from the Lunar South Pole <i>Roberto Campagnola – INFN LNF</i>
11:20	Probing gravitational waves using GNSS constellations <i>Bruno Bertrand – Royal Observatory of Belgium</i>	Simulations of the Positioning Performance in the LunaNet Framework <i>Krzysztof Sośnica – Wrocław University</i>
11:40	The Galileo for Science (G4S_2.0) Project: Topological Domain Wall Dark Matter and Galileo GNSS Atomic Clocks <i>Alessandro Di Marco – INAF-IAPS</i>	GNSS Radio Occultation Experiment from the Moon: An Experiment of Earth atmospheric remote sensing from a Celestial Body! <i>Francesco Vespe – Agenzia Spaziale Italiana</i>
12:00	Testing Local Position Invariance with Galileo Satellites: an independent validation and a new pipeline for Fundamental Physics <i>Feliciano Sapia – INAF-IAPS</i>	Results and lessons learnt from the Lunar GNSS Receiver Experiment – LuGRE <i>Fabio Dosis – Politecnico di Torino</i>
12:20 – 14:00	Lunch Break	
14:00 – 15:20	Time and Frequency Principles and Novel Clock Technologies – I <i>Chair: Paride Testani</i>	Navigation for Lunar and for Space Applications – III <i>Chair: Prof. Fabio Dosis</i>
14:00	Robust GNSS Timing Under Radio Frequency Interference Using a Low-Power, Dual-Band Controlled Reception Pattern Antenna <i>Benjamin Adu – York University</i> [STUDENT PRESENTATION]	Position, Navigation, and Timing Performance for Mars Surface and Entry Users <i>Tomasz Kur – Wrocław University</i>
14:20	Resilient GNSS-Disciplined Timing Board for Autonomous PNT Holdover in GNSS-Denied Environments <i>Saif Sinan – LASSENA-ETS</i> [STUDENT PRESENTATION]	Assessing GNSS based Lunar Time Transfer Precision Using the Navimoon Receiver <i>Yoann Audet – ESA</i>

14:40	From Industrial Platform to Space System: Advancing a Rubidium Optical Clock for Cislunar Applications <i>Victor Helson – Rolex Quantum</i>	Differential corrections for Lunar Orbiters and Landers: Assessment of expected PVT performances <i>Yoann Audet – ESA</i>
15:00	Active Laser Retroreflector at high repetition rate for Positioning, Navigation and Timing <i>Axel Pillot – CNRS</i> [STUDENT PRESENTATION]	
15:20 – 15:50	Afternoon Coffee Break	
15:50 – 16:30	Time and Frequency Principles and Novel Clock Technologies – II <i>Chair: Paride Testani</i>	Business-to-Business (B2B) Meeting and Networking Opportunity
15:50	Dynamic Allan Deviation of Receiver Clocks for the Detection of GNSS Spoofing in Avionics <i>Antoine Parisé – ETS</i> [STUDENT PRESENTATION]	
16:10	Influence of Earth space environment on Galileo clocks <i>Bruno Bertrand - Royal Observatory of Belgium</i>	
16:30 – 17:30	Day 2 - Poster Session	
19:00 –	Gala Dinner	

Day 3 – Friday, 9 October 2026

	Room A	Room B
09:00 – 10:20	Reference Frames and Precise Orbit Determination – I <i>Chair: Sara Gidlund</i>	GNSS Remote Sensing, Reflectometry and Atmosphere Sounding I <i>Chair: Prof. Jens Wickert</i>
09:00	Benefits from Combining Different Space Geodetic Observation Types <i>Erik Schönemann – ESA/ESOC</i> [REMOTE INVITED TALK]	Performance assessment of ship-based GNSS meteorology through multi-source comparisons over the Mediterranean Sea <i>Andrea Antonini – LaMMA Consortium</i>
09:20	Predicted GNSS Orbit and Clock Products for Reduced Dependence on Continuous Real-Time PPP Correction Streams <i>Habib Rahman – GPS Data Ltd</i>	Simultaneous Tropospheric Refractivity Estimation Using Network-Based Precise Point Positioning (STEPPP) <i>Grzegorz Marut – Wrocław University</i>
09:40	Impact of thermal radiation pressure modelling of GNSS satellites on geodetic parameters <i>Urs Hugentobler – Technical University of Munich</i>	Assessment of UAV-Borne GNSS ZWD Estimates for Atmospheric Soundings <i>Sinéad McGetrick – ETH Zürich</i> [STUDENT PRESENTATION]
10:00	What Do Space Ties Deliver Today? A Real-Data Multi-Technique Assessment Using GNSS, DORIS and SLR <i>Patrick Schreiner – GFZ Helmholtz Centre</i>	An Encoder–Decoder Attention ConvLSTM Framework for Physics-Informed Spatiotemporal Forecasting of Ionospheric TEC <i>Taiwo Osanyin – York University</i>
10:20 – 10:50	Morning Coffee Break	
10:50 – 12:30	Reference Frames and Precise Orbit Determination – II <i>Chair: Prof. Krzysztof Sośnica</i>	GNSS Remote Sensing, Reflectometry and Atmosphere Sounding II <i>Chair: Dr. Sunil Bisnath</i>
10:50	On Cooperative Precise Orbit Determination: A Semi-Joint POD Approach <i>Marvin Bayram Stucke – University of Stuttgart</i> [STUDENT PRESENTATION]	GNSS Remote Sensing: Recent activities and novel developments at GFZ <i>Jens Wickert - GFZ</i>
11:10	Precise Orbit Determination and Clock Bias Estimation of the Galileo FOC Constellation: Ongoing Activities and Fundamental Physics Applications within the G4S_2.0 Project <i>Marco Cinelli – INAF/IAPS</i>	Simulations and hardware selection of a cross-link radio occultation instrument to observe the lunar ionosphere <i>Giacomo Radaelli – University of New Brunswick</i> [STUDENT PRESENTATION]

11:30	On the Performance of Galileo HAS and IGS Real-Time Correction Services in Canada <i>Reza Ghoddousi-Fard – Natural Resources Canada</i>	Retro reflector clocking and its contribution to the satellite laser ranging data distribution of Galileo satellites <i>Michael Steindorfer – Space Research Institute, Austrian Academy of Sciences</i>
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PLENARY SESSION - *Room A*

12:00 – 12:30	Best Presentation Award & Closing Remarks
12:00 –	Farewell Lunch

Poster Presentations

The following abstracts are presented as posters displayed throughout the colloquium. Dedicated viewing periods are scheduled on Days 1 and 2

No.	Title	Author(s) – Organisation	Theme
1	Impact of severe geomagnetic storms on IGS multi-GNSS ultra-rapid orbit and clock products: a quantitative assessment	Luna Lenin - Bolivarian Agency For Space Activities (abae)	Reference Frames and Precise Orbit Determination
2	Multi-Layer Fault Detection and Exclusion for GNSS-Based LEO Precise Orbit Determination	Ghribi Adam - University of Stuttgart <i>[STUDENT POSTER]</i>	Reference Frames and Precise Orbit Determination
3	Investigation of L1/L5 GPS signals and comparison to L1/L2	Güldemeister Nicole - Gfz Helmholtz Centre For Geosciences	Geodesy, Geophysics and Earth Sciences
4	GNSS-based Low-Degree Gravity Field Recovery for Monitoring Seasonal Mass Redistribution and Polar Motion Excitation	Nowak Adrian - Wroctaw University of Environmental and Life Sciences	Geodesy, Geophysics and Earth Sciences
5	FROM EXPERIMENTAL TO OPERATIONAL: 7 YEARS OF SHIP BASED GNSS-METEOROLOGY WITH AN 8-VESSEL NETWORK IN THE THYRRENIAN SEA	Antonini Andrea - LaMMA Consortium	GNSS Remote Sensing, Reflectometry and Atmosphere Sounding
6	ACONS: Configurable User-Side Navigation Simulator for Lunar and Planetary Applications	Zajdel Radoslaw - Wroclaw University Of Environmental And Life Sciences	Navigation for Lunar and for Space Applications
7	International Lunar Reference Frame (ILuRF) as the first combined reference frame realization for the Moon	Sośnica Krzysztof - Wroclaw University Of Environmental And Life Sciences	Navigation for Lunar and for Space Applications
8	Comparative Evaluation of GNSS INS Post Processing Strategies in GNSS Limited Environments: A Case Study of the Hawaiian Islands	Dini Reza - Fugro	Scientific Aspects of Positioning and Navigation Applications
9	Improving GNSS Positioning Using External Hydrogen Maser Clocks	Mikoś Marcin - Wrocław University of Environmental and Life Sciences (UPWr)	Scientific Aspects of Positioning and Navigation Applications
10	Analysis of computational challenges of sphere decoders in GNSS ambiguity resolution	Pääkkönen Into - Septentrio NV	Scientific Aspects of Positioning and Navigation Applications
11	Validation of the reference frame realized by Galileo HAS corrections	Kazmierski Kamil - Wroclaw University of Environmental and Life Sciences	Scientific Aspects of Positioning and Navigation Applications
12	Performance Optimization of Kalman Filter–Aided LTE TDOA Positioning for Urban Environments in Support of GNSS Infrastructure	Drapeau François – Lassena <i>[STUDENT POSTER]</i>	Scientific Aspects of Positioning and Navigation Applications
13	Xona Pulsar in Orbit: Recent Progress and International Collaboration in LEO PNT	Reid Tyler - Xona	Optical and Quantum Principles and Technologies for PNT
14	Adaptive Machine-Learning Ensemble for Improving Ionospheric Estimates Obtained From Smartphone GNSS	Hayden Caitlyn - York University	Scientific Opportunities enabled by GNSS and PNT systems