



UNITED NATIONS
Office for Outer Space Affairs

**United Nations/Philippines Workshop on
the Applications of Global Navigation Satellite Systems**

Organized jointly by

**The United Nations Office for Outer Space Affairs and
The National Mapping and Resource Information Authority**

Co-organized and co-sponsored by

**The International Committee on Global Navigation Satellite Systems and
The Philippine Space Agency**

Hosted by

The National Mapping and Resource Information Authority

Manila, the Philippines

22 - 26 April 2024

PROGRAMME

VENUE: SHERATON MANILA HOTEL

Grand Ballroom, 3rd Floor, 80 Andrews Avenue, Newport World Resorts, NCR Fourth District, Barangay 183, Pasay City, Metro Manila, Philippines, 1309

Monday, 22 April

08:30 – 09:30	<i>Registration</i>
09:30	Opening and Welcome Remarks
	<ul style="list-style-type: none"> - Usec. Peter N. TIANGCO, PhD <i>Administrator, National Mapping and Resource Information Authority (NAMRIA), the Philippines</i> - Dr. Joel Joseph S. MARCIANO, Jr. <i>Director General, Philippine Space Agency (PhilSA), the Philippines</i> - Ms. Sharafat GADIMOVA, <i>United Nations Office for Outer Space Affairs (UNOOSA)</i>
09:40	Keynote addresses: Setting the tone
	Hon. Maria Antonia YULO-LOYZAGA <i>Secretary, Department of Environment and Natural Resources, the Philippines</i>
10:00	Session 1: Current and planned global navigation satellite systems and satellite-based augmentation systems <i>Chairperson: Illa MAINALI, Austria</i> <i>Rapporteur: Acharaporn BUMRUNGKIT, Thailand</i>
10:00	<i>(virtual) Global Positioning System (GPS) Program Update, Jeffrey AUERBACH, United States of America</i>
10:30	International Committee on Global Navigation Satellite Systems (ICG), <i>Sharafat GADIMOVA, ICG Executive Secretariat</i>
11:00 – 11:30	<i>Coffee Break</i>
11:30	Session 1: Current and planned global navigation satellite systems and satellite-based augmentation systems (continued) <i>Chairperson: Noor Azawani WAHAP, Malaysia</i> <i>Rapporteur: Mohamed ELHAG, Saudi Arabia</i>
11:30	Global Navigation Satellite System (GLONASS) Status, <i>Sviatoslav ZHILENKO, Russian Federation</i>
12:00	BeiDou Navigation Satellite System (BDS) Update and Development, <i>Ke ZHANG, China</i>
12:30	Status Update on the Quasi-Zenith Satellite System (QZSS), <i>Yoko SAKAI, Japan</i>
13:00 – 14:30	<i>Lunch Break</i>
14:30	Session 1: Current and planned global navigation satellite systems and satellite-based augmentation systems (continued) <i>Chairperson: James Cesar REFRAN, the Philippines</i> <i>Rapporteur: Thayathip THONGTAN, Thailand</i>

14:30	<i>(virtual) European Satellite Navigation System (GALILEO) Programme Status, Dominic HAYES, European Commission</i>
15:00	Current status and assessment performance of Algerian Augmentation System AL-SBAS based on Alcomsat-1, <i>Hicham CHELLAL, Algeria</i>
15:30 – 16:00	<i>Coffee Break</i>
16:00	Session 2: GNSS Reference stations and applications <i>Chairperson: Czar Jakiri SARMIENTO, the Philippines</i> <i>Rapporteur: Teddy Modesto SURCO ESPEJO, United States of America</i>
16:00	ESTPOS as EUREF densification for Estonia, <i>Karin KOLLO, Estonia</i>
16:20	Geodetic network of Mongolia, <i>Undarmaa DASHBALBAR, Mongolia</i>
16:40	On the use of ERAS reanalysis data for precipitable water vapor estimation using Philippine GNSS CORS stations, <i>Christian David AQUINO, the Philippines</i>
17:00	Summary and Interactive Discussion
17:30	Adjourn
18:00 – 20:00	Reception Dinner at Sheraton Manila Hotel
Tuesday, 23 April	
09:00	Session 3: Space Weather - Ionospheric Monitoring with GNSS <i>Chairperson: Farah UZMA, Pakistan</i> <i>Rapporteur: Ferdaous CHAABANE, Tunisia</i>
09:00	Impact of St. Patrick's geomagnetic storm of 2015 on ionospheric total electron content using GPS over the Southeast Asian region, <i>Ernest MACALALAD, the Philippines</i>
09:20	Observation of electron density variations in the ionosphere associated by the Tongo volcano eruption in 2022 over the Philippines using GNSS, <i>Gella Mae FLORES, the Philippines</i>
09:40	Development of space weather forecast system in Thailand, <i>Acharaporn BUMRUNGKIT, Thailand</i>
10:20	Impacts of space weather on aviation, <i>Natalia KIM, Kyrgyzstan</i>
10:40	Summary and Interactive Discussion
11:00 – 11:30	<i>Coffee Break</i>
11:30	Session 3: Space Weather - Ionospheric Monitoring with GNSS (continued) <i>Chairperson: Natalia KIM, Kyrgyzstan</i> <i>Rapporteur: Lilia KIRAKOSYAN, Armenia</i>
11:30	Effects of major solar flares on ionospheric plasma density over Southeast Asian Region using GNSS, <i>Zane Nikia DOMINGO, the Philippines</i>
11:50	Estimation of Ionospheric Scintillation Index S ₄ from Rate of Change of Total Electron Content Index (ROTI) in Low Latitudes, <i>Teddy Modesto SURCO ESPEJO, United States</i>

12:10	Compact, Low-Cost GNSS Hardware: Potentials in Precise Positioning, Ionospheric Probing, Time Transfer and Application Development, <i>Anindya BOSE, India</i>
12:30 – 14:00	<i>Lunch Break</i>
14:00	Session 4: Precise Point Positioning (PPP) Service <i>Chairperson: Nenad SIKIRICA, Croatia</i> <i>Rapporteur: Xaiyakone XAIBOUNHEUANG, Lao People's Democratic Republic</i>
14:00	Pilot experiment of MADOCA-PPP for base point installation in a remote island of the Philippines, <i>Tadashi SASAKAWA, Japan</i>
14:20	Accuracy Assessment of High-End and Low-Cost GNSS Receivers using MADOCA PPP, <i>Garrin Alif NANDITHO, Indonesia</i>
14:40	Performance evaluation of low-cost GNSS receiver using MADOCA corrections with PPP mode in Thailand, <i>Teetat CHAROENKALUNYUTA, Thailand</i>
15:00 – 15:30	<i>Coffee Break</i>
15:30 – 17:00	Discussion Session: Use and Implementation of GNSS Technologies <i>Moderators: Sharafat GADIMOVA, the Office for Outer Space Affairs and Charisma Victoria CAYAPAN, the Philippines</i> <i>Rapporteur: Ranya ELAGOOZ, Egypt</i>
	<ul style="list-style-type: none"> ▪ Discuss plans, framework for a mechanism of regional cooperation; follow-up projects and initiatives
17:00	Adjourn
Wednesday, 24 April	
09:00	Session 5: Applications of GNSS: Case studies <i>Chairperson: Sharafat GADIMOVA, the Office for Outer Space Affairs</i> <i>Rapporteur: Teetat CHAROENKALUNYUTA, Thailand</i>
09:00	Open Platform for Enhancing Public Transport Quality of Service (QoS) Through Congestion Pricing Strategies and Insurance Telematics, <i>Noriel Christopher TIGLAO, the Philippines</i>
09:20	Exploring Cadaster mapping by GNSS technology to control time and costs, the possibility of sustainable development in Land Management, <i>Md Nurul Amin SHIKDER, Bangladesh</i>
09:40	Designing, Implementing and Testing a Low-Power GPS Rx Subsystem for LEO Satellites, <i>Ranya ELAGOOZ, Egypt</i>
10:00	A Comprehensive Analysis of Android Smartphones GNSS Positioning and Signal Strength in Indoor and Outdoor Environments, <i>Devadas KUNA, India</i>
10:20	Global Navigation Satellite System (GNSS) Co-located Tide Stations: Purpose and Prospects in the Philippines, <i>Dennis BRINGAS, the Philippines</i>
10:40	Development of Sustainable Cities using Pak-SBAS, <i>Farah UZMA, Pakistan</i>
11:00 – 11:30	<i>Coffee Break</i>

11:30	Session 6: Applications of GNSS: National Programmes <i>Chairperson: Karin KOLLO, Estonia</i> <i>Rapporteur: Krishna Prasad BHANDARI, Nepal</i>
11:30	GNSS Applications and Prospects in Indonesia: Academic Perspective, <i>Lin YOLA, Indonesia</i>
11:50	GNSS Application in Nepal, <i>Illa MAINALI, Austria</i>
12:10	GNSS Application based on citizen science in Mongolia, <i>Ochirkhuyag LKHAMJAV, Mongolia</i>
12:30 – 14:00	<i>Lunch Break</i>
14:00	<i>Technical Visit: The National Mapping and resource Information Authority</i>
Thursday, 25 April	
09:00	Session 7: GNSS Technology and applications <i>Chairperson: Anindya BOSE, India</i> <i>Rapporteur: Undarmaa DASHBALBAR, Mongolia</i>
09:00	GNSS Spoofing Attacks and Mitigation Methods, <i>Dinesh MANADHAR, Japan</i>
09:20	Probability-of-Occurrence model for GNSS PNT utilisation risk assessment facilitates GNSS application developments in the fields of aviation and maritime, <i>Nenad SIKIRICA, Croatia</i>
09:40	Application of BDS for Safety Communication and Search and Rescue, <i>xxx, China</i>
10:00	Land subsidence and groundwater storage change assessment using InSAR and grace in the arid environment of Saudi Arabia, <i>Mohamed ELHAG, Saudi Arabia</i>
10:20	GPS-based 2D Map Creation using Drones Swarm, <i>Lilia KIRAKOSYAN, Armenia</i>
10:40	Research Activities on GNSS Lab at Pashchimanchal Campus, Tribhuvan University, Pokhara, Nepal, <i>Krishna Prasad BHANDARI, Nepal</i>
11:00	Multi-Sensor Data Fusion improving Traffic Signs Recognition, <i>Ferdaous CHAABANE, Tunisia</i>
11:20	DEM of the Mountain Terrain based on the GNSS, <i>Mekhriban KAZAXBAYEVA, Uzbekistan</i>
11:40 – 12:00	<i>Coffee Break</i>
12:00	Working Group Sessions
12:00	Regional Centres for Space Science and Technology Education (affiliated to the United Nations), <i>Sharafat GADIMOVA, United Nations Office for Outer Space Affairs</i>
12:20	(virtually) Ambient-Aware and Applications-Aligned PNT, <i>Renato FILJAR, Croatia</i>

12:30	<i>(virtually) Contribution to the “Space2030” Agenda: EU Space - Supporting A World Of 8 Billion People, Jorge DEL RIO VERA, United Nations Office for Outer Space Affairs</i>
12:50	Working Group 1: Capacity Building and Institutional Strengthening <i>Moderator: Sharafat GADIMOVA, United Nations Office for Outer Space Affairs</i> <i>Rapporteurs: Md Nurul Amin SHIKDER, Bangladesh</i>
	Working Group 2: Specific GNSS Applications <i>Moderator: Lin YOLA, Indonesia</i> <i>Rapporteurs: Ochirkhuyag LKHAMJAV, Mongolia</i>
	<ul style="list-style-type: none"> ▪ <i>International/Regional collaboration opportunities that could be established in order to promote the use of GNSS technology, and the workshop follow-up projects/initiatives (if any);</i> ▪ <i>Requirements of implementing, mechanisms and resources for developing of partnerships and networks (regional/international);</i> ▪ <i>Type and level of training required for addressing GNSS and their applications;</i> <ul style="list-style-type: none"> ○ <i>monitoring, detecting, and mitigating GNSS interference for GNSS applications in various disciplines.</i> ▪ <i>Next steps (proposals for future workshops/training courses).</i>
13:00 – 14:00	<i>Lunch Break</i>
14:00	Working Group Sessions (continued)
15:00 – 15:20	<i>Coffee Break</i>
15:20	Session 8: Use and implementation of GNSS technologies <i>Chairperson: Devadas KUNA, India</i> <i>Rapporteur: Garrin Alif NANDITHO, Indonesia</i>
15:20	<i>Data Collection from Mobile Phones Using Open Data Kit (ODKCollect) for Field Validation of Satellite-Derived Data Products, Noel Jerome BORLONGAN, the Philippines</i>
15:40	<i>Enhancing Precision Navigation in Peninsular Malaysia: A Comparative Analysis of Satellite-Based DGPS and Commercial SBAS Services, Noor Azawani WAHAP, Malaysia</i>
16:00	<i>GNSS Motions Associated with Eight Recent Earthquakes in the Philippines, Teresito BACOLCOL, the Philippines</i>
16:20	<i>National Time Scale generation and distributions, Thayathip THONGTAN, Thailand</i>
16:40	<i>Satellite Communications in Lao PDR, Xaiyakone XAIBOUNHEUANG, Lao PDR</i>
17:00	<i>Adjourn</i>

Friday, 26 April	
09:00	Plenary Closing Session: Workshop views and recommendations <i>Moderators: Sharafat GADIMOVA, the Office for Outer Space Affairs and Charisma Victoria CAYAPAN, the Philippines</i>
	<ul style="list-style-type: none"> ▪ Summary reports of presentation sessions
	<ul style="list-style-type: none"> ▪ Summary report of the working groups discussion sessions: presentation of proposals and recommendations consolidated at the discussion sessions
<i>11:30 – 11:50</i>	<i>Coffee Break</i>
11:50	Concluding remarks
	<ul style="list-style-type: none"> ▪ <i>Workshop participants</i> ▪ <i>United Nations Office for Outer Space Affairs (UNOOSA)</i> ▪ <i>National Mapping and Resource Information Authority (NAMRIA), The Philippines</i>
12:30	Adjourn