UNITED NATIONS
Office for Outer Space Affairs

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

Organized jointly by the United Nations Office for Outer Space Affairs
and the Survey Department of the Ministry of Land Reform and Management of Nepal

Co-organized and Co-sponsored by the
International Committee on Global Navigation Satellite Systems and
GfRmbH Galileo Control Centre, German Space Agency

Kathmandu, Nepal
12 - 16 December 2016

PROGRAMME

Monday, 12 December 2016

Venue: Nepa-Dhuku Hall, Hotel Radisson

08:30 - 09:30	*Registration of participants*
09:30 - 11:00	**Inaugural Session**
09:30 - 09:40	Formal Opening Session chaired by Krishna RAJ B.C., *Director General, Survey Department and Chair of Steering Committee, United Nations/Nepal Workshop, Nepal*
09:40 - 09:45	National Anthem (upon arrival of the Chief Guest)
09:45 - 09:55	Welcome Speech: Niraj MANANDHAR, *Co-ordinator, Organizing Committee, United Nations/Nepal Workshop , Survey Department, Nepal*
09:55 - 10:00	Inauguration: Chief Guest, Honourable Minister Bikram PANDEY, *Ministry of Land Reform and Management, Nepal*
10:00 - 10:25	*Keynote presentation:* International Cooperation in Promoting a Global Navigation Satellite System of Systems, *Sharafat GADIMOVA, ICG Executive Secretariat, United Nations Office for Outer Space Affairs, Austria*
10:25 - 10:30	Remarks: Dinesh MANANDHAR, *University of Tokyo, Japan*
10:30 - 10:35	Remarks: Sharafat GADIMOVA, *United Nations Office for Outer Space Affairs, Austria*
10:35 - 10:40	Remarks: Special Guest, Mohan Krishna SAPKOTA, *Secretary, Ministry of Land Reform and Management, Nepal*
10:40 - 10:45	Remarks: Special Guest, Honourable Vice-Chairman Dr. Min Bahadur SHRESTHA, *National Planning Commission, Nepal*
10:4 - 10:50	Remarks: Chief Guest, Honourable Minister Bikram PANDEY, *Ministry of Land Reform and Management, Nepal*

10:50 - 11:00	Vote of Thanks and Closing of Inaugural Session: Krishna RAJ B.C., *Director General, Survey Department and Chair of Steering Committee, United Nations/Nepal Workshop, Nepal*
11:00 – 11:30	*Coffee Break and Group Photo*
11:30 – 12:30	**Session 1 - Overview of Global Navigation Satellite Systems**
	Chairperson: Renato FILJAR, Croatia *Rapporteur: Maria MEHMOOD, Pakistan*
11:30 - 11:45	Global Positioning System (GPS): Status and Development**,** *Jeffrey AUERBACH, Department of State, United States of America*
11:45 - 12:00	Global Navigation Satellite System (GLONASS): Status and Development, *Tatiyana MIRGORODSKAYA, Roscosmos, Russian Federation*
12:00 - 12:15	BeiDou Navigation Satellite System (BDS): Status and Development, *Changdou MA, China Satellite Navigation Office, China*
12:15 - 12:30	GALILEO: Status and Development, *Dominic HAYES, European Commission, Brussels*
12:30 – 13:30	*Lunch Break*
13:30 – 15:00	**Session 2 – GNSS Applications and Technology Development**
	Chairperson: Christian ARBINGER, GfRmbH Galileo Control Centre, DLR *Rapporteur: Antonio BERTACHINI DEL ALMEIDA PRADO, Brazil*
13:30 - 13:45	Technology Transfer and Capacity Building in GNSS for Airspace Modernization in Nepal, *Narayan DHITAL, GfRmbH Galileo Control Centre, DLR,, Germany*
13:45 - 14:00	Utilization of GPS/GNSS Big Data from Probe Vehicle for Traffic Management in the context of Nepal, *Saurav RANJIT, University of Tokyo, Japan*
14:00 - 14:15	Utility of Sensor Fusion GPS and Motion Sensors in Android Devices in GPS Deprived Environment, *Suresh SHRESTHA, Amrit KARMACHARYA, Dipesh SUWAL, Nepal*
14:15 - 14:30	Initial Results of IRNSS Standalone and Hybrid Operations, *Anindya BOSE, University of Burdwan, India*
14:30 - 14:45	Multi-GNSS: Experience and the Benefits from India in GPS-GLONASS Hybrid Operation Mode, *Shreya SARKAR, University of Burdwan, India*
14:45 - 15:00	Location-based Image Acquisition and Management for Sabo Facility Inspection, *Masafumi NAKAGAWA, Shibaura Institute of Technology, Japan*
15:00 – 15:15	*Coffee Break*
15:15 – 17:00	**Session 3 – Environmental Monitoring and Management using GNSS**
	Chairperson: Keith GROVES, United States of America *Rapporteur: Sharafat GADIMOVA, United Nations Office for Outer Space Affairs*
15:15 - 15:30	Developing Sustainable Collaboration Model for Implementing Integrated Space-based/Geospatial Disaster Management Infrastructure to Strengthen the Resilience in ASEAN Community, *Hiroyuki MIYAZAKI, University of Tokyo, Japan*

15:30 - 15:45	Coupling GNSS with the Web APIs and Remote Sensing Algorithms for Disaster Management: use case for flood, *Shuman BARAL and Janak PARAJULI, Nepal*
15:45 - 16:00	Developing a Semi-Dynlic Datum for Nepal April 25 Gorka Earthquake, *Christopher PEARSON, University of Otago, New Zealand*
16:00 - 16:15	On the Spot Identification of Flood Inundation Depth from Gridded Data using GPS enabled Smartphone Application, *Shahidul ISLAM, University of Dhaka, Bangladesh*
16:15 - 16:30	Disasters Management System using GNSS, *Ashok DAHAL, Tribhuvan University, Nepal*
16:30 - 16:45	Application of Space Technology, including the GNSS, in the Healthcare Model of Nepal, *Saroj DHITAL, Center for Rural Healthcare & Telemedicine, Nepal*
16:45 - 17:00	Habitat Suitability Analysis of Tigers in Chitwan District, *Bipul NEUPANE, Nepal*
17:00 - 18:30	*Adjourn*
18:30 – 20:00	***Welcome Reception at Begnas Hall, Hotel Radisson***

Tuesday, 13 December 2016

08:30 – 10:30	**Session 4 – Seminar on Space Weather and its effects on GNSS**
08:30 - 08:40	Introductory Remarks: *Patricia DOHERTY, Boston College, United States of America*
08:40 - 09:00	The United States Space Weather Strategy Plan, *Jeffrey AUERBACH, United States of America*
09:00 - 09:20	The Origins of Space Weather (Events on the Sun), *Christine AMORY, LPP, France*
09:20 - 09:40	Space Weather Effects on GNSS, *Keith GROVES, Boston College, United States of America*
09:40 - 10:00	Space Weather Effects on GNSS Applications, *Patricia DOHERTY, Boston College, United States of America*
10:00 - 10:30	Discussions and Q&A Session
10:30 - 10:45	*Coffee Break*
10:45 – 17:00	**Session 5 –Seminar on GNSS Spectrum Protection and Interference Detection and Mitigation**
	I. Overview
10:45 - 11:00	Course Introduction, *Jeffrey AUERBACH, United States of America*
11:00 - 11:30	Participant Introductions: Country, Meeting Participants, GNSS Use Within Country, *Frank CLARK, United States of America, Dominic HAYES, European Commission, Takahiro MITOME, Japan*
	II. Introduction to GNSS
11:30 - 11:50	History, *Frank CLARK, United States of America*
11:50 - 12:10	How GNSS Works and Applications, *Dominic HAYES, European Commission*

12:10 - 12:30	GNSS Signals, Spectra, and Receiver Fundamentals, *David CHOI, United States of America*
12:30 - 12:50	Why GNSS is so Weak vs Terrestrial Signals: Why it is Vulnerable, *Dominic HAYES, European Commission*
12:50 - 13:10	Three Ways Interference Affects GNSS, *David CHOI, United States of America*
13:10 – 14:00	*Lunch Break*
	III. Spectrum Management
14:00 - 14:15	What is Spectrum Management and Why Do It, *Dominic HAYES, European Commission*
14:15 - 14:30	Introduction to ITU, *Takahiro MITOME, Japan on behalf of Attila MATAS, ITU*
14:30 - 15:00	Introduction to National Spectrum Agencies and National Applications, *Dominic HAYES, European Commission, David CHOI, United States of America, Takahiro MITOME, Japan*
15:00 - 15:20	Possible Emissions in GNSS Frequency Bands Other than GNSS Signals, *Takahiro MITOME, Japan*
15:20 - 15:35	Proliferation of GNSS Jammer Devices, *Frank CLARK, United States of America*
15:35 - 15:50	Adjacent Band Interference Concerns, *Dominic HAYES, European Commission*
15:50 – 16:05	*Coffee Break*
16:05 - 16:35	Q&A Session
16:35 - 17:00	Conclusion: Summary and Take-Away, *David CHOI, United States of America*
17:00	*Adjourn*

Wednesday, 14 December 2016

08:30 – 12:05	**Session 5– Seminar on GNSS Spectrum Protection and Interference Detection and Mitigation (continues)**
08:30 - 08:40	Introduction, *Jeffrey AUERBACH, United States of America*
08:40 - 09:10	Interactive Discussion: What Was Learned; What Is Needed, *David CHOI, United States of America*
	IV. Spectrum Protection
09:10 - 09:30	What is Meant by Spectrum "Protection", *Dominic HAYES, European Commission*
09:30 - 09:45	ITU Role in Interference Enforcement, *Dominic HAYES, European Commission on behalf of Attila MATAS of ITU*
09:45 - 10:00	ICG Activities and its Role in Spectrum Protection and Interference Detection and Mitigation, *Jeffrey AUERBACH, United States of America*
10:00 - 10:30	The Ultra-Wide Band Example and a Place to Start, *David CHOI, United States of America*
10:30 – 10:45	*Coffee Break*

	V. Interference Detection and Mitigation
10:45 - 11:05	Interference Detection Concepts, *Takahiro MITOME, Japan*
11:05 - 11:25	Interference Detection and Mitigation and GNSS Jammers, *Jeffrey AUERBACH, United States of America*
11:25 - 11:40	Canadian and Australian Legal Sanctions, *Jeffrey AUERBACH, United States of America*
	VI. Summary/Interactive discussions
11:40 - 12:05	Summary and Q&A Session, *All Workshop Participants*
12:05 – 13:00	*Lunch Break*
13:00 – 15:00	**Session 6 - RTKLIB DEMO Session**
13:00 – 13:15	Quasi-Zenith Satellite Systems (QZSS) Introduction, *Dinesh MANANDHAR, University of Tokyo, Japan*
13:15 – 13:30	Location Spoofing – A Dangerous Vulnerability for GNSS, *Dinesh MANANDHAR, University of Tokyo, Japan*
13:30 - 14:00	Tomoki HIGUCHI, *Tokyo University of Marine Science and Technology, Japan*
14:00 - 15:00	Evaluation of Low Cost RTK GNSS System, *Akhilesh Kumar KARNA, SoftWel (P) Ltd., Nepal*
15:00 – 15:15	*Coffee Break*
15:15 – 17:00	**Session 7– Space Weather**
	Chairperson: Patricia DOHERTY, United States of America *Rapporteur: Esraa HASSAN, Egypt*
15:1 - 15:30	Space Weather at Low-Latitudes and Possibility of its Forecasting, *Narayan CHAPAGAIN, Nepal*
15:30 - 15:45	The Variations of Equatorial Plasma Bubble with Solar and Geomagnetic Activities in Malaysia from 2008-2013, *SuhailaBinti MBUHARI, University of Technology of Malaysia, Malaysia*
15:45 - 16:00	Development of the New Ionospheric Disturbance Index for GNSS User, *Buldan MUSLIM, Indonesian National Institute of Aeronautics and Space (LAPAN), Indonesia*
16:00 - 16:15	Impacts of Solar Storms on Energy and Communications Technologies, *S. GAUTAM, Tribhuvan University, Prithvi Narayan, Campus, Pokhara, Nepal*
16:15 - 17:00	Discussion and Q&A Session
17:00	*Adjourn*

Thursday, 15 December 2016

09:00 – 11:00	**Session 8 – GNSS Reference Frames and Reference Station Networks**
	Chairperson: Christopher PEARSON, New Zealand *Rapporteur: Mourad BOUZIANI, Morocco*
09:00 - 09:15	The Asia Pacific Reference Frame (APREF), *Andrick LAL, Fiji on behalf of John Dawson of Geoscience Australia*
09:15 - 09:30	Analysing the Performance of Permanent GNSS Stations, *Maria MEHMOOD, Space and Upper Atmosphere research Commission (SUPARCO), Pakistan*
09:30 - 09:45	Modification of the Reference frame of Uzbekistan Topographic Maps, *Erkin MIRMAKHMUDOV, Uzbekistan*
09:45 - 10:00	Data Analysis of Permanent GPS Networks, *Erdenezul DANZANSAN, Institute of Astronomy and Geophysics, Mongolia*
10:00 - 10:15	PGM2016: A New Geoid Model for the Philippines, *Ronaldo GATCHALIAN, The Philippines*
10:15 - 10:30	Potential Use of QZSS Monitoring Station for Future Research, *Kavinda HETTIARACHCHIGE, Asian Institute of Technology, Thailand*
10:30 - 10:45	A Pilot GNSS Timing Station in Thailand Geodetic Network, *Thayathip THONGTAN, National Institute of Metrology Thailand, Thailand*
10:45 - 11:00	Q&A Session
11:00 – 11:20	*Coffee Break*
11:20 – 13:00	**Session 8 – GNSS Reference Frames and Reference Station Networks (continues)**
	Chairperson: Christopher PEARSON, New Zealand *Rapporteur: Karin KOLLO, Estonia*
11:20 - 11:35	Egyptian Permanent GPS Network (EPGN) and Geodynamic Studies using the Global Positioning System Data: A case study of Stationary Network in Egypt, *Esraa HASSAN, Egypt*
11:35 - 11:50	Survey Department towards CORS, *Sushmita TIMILSINA, Nepal*
11:50 - 12:05	Positioning in Pacific Islands, *Andrick LAL, Fiji*
12:05 - 12:20	Summary of the Reference Frames in Practice Workshops, *Christopher PEARSON, University of Otago, New Zealand*
12:20 – 13:00	Discussion and Q&A Session
13:00 – 14:00	*Lunch Break*
14:00 – 17:00	**Technical Tour/Cultural Tour**
17:00	*Adjourn*

Friday, 16 December 2016

08:30 – 10:30	**Session 9 – Real Time Kinematic: Technology and Applications**
	Chairperson: Andrick LAL, Fiji *Rapporteur: Erkin MIRMAKHMUDOV, Uzbekistan*
08:30 - 08:45	Comparative Analysis of GNSS Real Time Kinematic Methods for Navigation, *Mourad BOUZIANI, Morocco*
08:45 - 09:00	LatPos System for Ionosphere Monitoring and RTK Applications, *Didzis DOBELIS, Latvia*
09:00 - 09:15	Indonesian Low Cost GPS Receiver, *Budi PARJANTO, Geospatial Information Agency, Indonesia*
09:15 - 09:30	Use of GPS in survey data error control and management, *N. KHANAL, BCIPN, NSET, Nepal*
09:30 - 09:45	Verification of GNSS Data in Estonia, *Karin KOLLO, Estonian Land Board, Estonia*
09:45 - 10:00	Augmenting GNSS Precise Point Positioning (PPP) for Improved Performance, *Sue Lynn CHOY, RMIT University, Australia*
10:00 - 10:15	Software-defined GNSS Receiver as A Framework for GNSS-related Research and Education, *Renato FILJAR, University of Rijeka, Croatia*
10:15 - 10:30	Opportunities of Studies in Master and Doctoral Levels in the Field of GNSS at INPE, *Antonio BERTACHINI DEL ALMEIDA PRADO, National Institute for Space Research, Brazil*
10:30 – 10:50	*Coffee Break*
10:50 – 12:35	**Session 10 – GNSS implementation and uses: Case Studies**
	Chairperson: Anindya BOSE, University of Budwan, India *Rapporteur: Shahidul ISLAM, University of Dhaka, Bangladesh*
11:50 - 11:05	Accident Monitoring System using GNSS, *Pratichhya SHARMA, Tribhuvan University, Nepal*
11:05 - 11:20	Space Technology Information Applications in Lao PDR, *Sengchanh PHASAYASENG, Ministry of Science and Technology, Lao PDR*
11:20 - 11:35	Positioning and Timing and Navigation System in Ukraine: European Cooperation Aspects, *Sergii CHERNOLEVSKYI, National Space Facilities Control and Test Center (NSFCTC), Ukraine*
11:35 - 12:20	Discussions and Q&A Session
12:20 – 12:25	*(The setting of the closing session)*
12:25 – 12:45	**Plenary Closing Session**
12:25 - 12:45	Recommendations consolidated at the discussion sessions
12:45 – 13:30	**Closing Remarks**

12:45 - 12:50	Sharafat GADIMOVA, *United Nations Office for Outer Space Affairs*
12:50 - 12:55	Dinesh MANANDHAR, *University of Tokyo, Japan*
12:55 - 13:05	Niraj MANANDHAR, *Co-ordinator, Organizing Committee, United Nations/Nepal Workshop, Survey Department, Nepal*
13:05 - 13:10	Ms. Liza CHOEGYAL, *New Zealand Honorary Consul to Nepal*
13:10 - 13:20	Special Guest, Honourable Vice-Chairman Dr. Min Bahadur SHRESTHA, *National Planning Commission, Nepal*
13:20 - 13:30	Chief Guest, Honourable Minister Bikram PANDEY, *Ministry of Land Reform and Management, Nepal*
13:30 - 13:40	Closing Remarks, Krishna RAJ B.C., *Director General, Survey Department and Chair of Steering Committee, UN/Nepal Workshop, Nepal*
13:40 - 14:40	*Lunch Break*
14:30	*Adjourn*