



REPORT ON ICG

Period: APRIL 2019 - APRIL 2020

The International Committee on Global Navigation Satellite Systems (ICG) promotes coordination among leading satellite operators and strives to maximize the benefits of global navigation satellite systems (GNSS) for sustainable development. It has been established on 2005 as a result of the GNSS ACTION TEAM of the United Nation COPUOS (Committee on the Peaceful Uses of Outer Space), formed by representatives of Member States of ONU.

ICG also serves as a platform for discussion and the exchange of information on general trends in user needs, applications and technology development.

The Office for Outer Space Affairs of the Secretariat, as the executive secretariat of ICG, works with Member States to enhance the compatibility and interoperability of constellations of GNSS so that positioning, navigation and timing technology remains equally accessible to all.

ICG divides its work among four working groups comprising representatives of the Members, Associate Members and Observers of ICG.

The working groups are: Working Group S, focused on systems, signals and services; Working Group B (formerly 2), focused on enhancement of GNSS performance, new services and capabilities; Working Group C, focused on information dissemination and capacity-building; Working Group D focused on reference frames, timing and applications.

The ICG Providers' Forum, consisting of those countries that operate global and regional navigation satellite systems or with plans to develop one, provides a venue for coordination and cooperation to improve overall service provision. The Forum also acts as a mechanism to continue discussions on important issues addressed by ICG that require inputs from system providers. The Forum meetings are held in conjunction with the annual meetings of ICG, or more often should the need arise.

My attendance to ICG, as representative of IAIN, has started in June 2018. My knowledge of ICG starts for the very beginning, having been co-chair of the GNSS ACTION TEAM, together with an US representative. Then I participated to ICG as Italy representative, since its foundation in 2005, up to April 2018 when I retired from my job with the Italian Space Agency.

At that time in 2018, IAIN was Observer of ICG. Considering the involvement of ICG in user needs, applications and technology development, I suggested that IAIN, as representative of Institutes of Navigations all over the world, could have been more active in GNSS user needs and applications. With the agreement of IAIN direction, a proposal was presented at the ICG-13 Meeting in China with the associated request by IAIN to change status from Observer to Associated Member. The request was accepted and since then IAIN is an Associated Member of ICG.

The detailed report on results of ICG-13 held in China can be read in my report : "REPORT on ICG13 in Xi'an from 5 to 9 November 2018", attached to this report(A-1).

Always as attachment, the Reports on ICG planning meetings, February and June 2019, can be found (A-2 and A-3). In 2019 the ICG-14 Meeting was held in Bangalore, India. Unfortunately, I could not attend that meeting, but the major results of this meeting are summarized in my Report of ICG planning meeting of February 2020, which is, as well, in attachment (A-4).

The ICG has foreseen another planning meeting in June 2020, which is, now, due to the coronavirus epidemics, improbable to be held. ICG-15 Meeting is planned to be held in Vienna on September 2020.



Some considerations regarding a possible contribution of IAIN to ICG on GNSS user needs and applications will follow.

Certainly IAIN will not represent all users of GNSS within ICG. IAIN could represent the transport users for all modalities of transport. For sure, civil aviation users are mainly represented by ICAO and maritime users have IMO as main regulatory entity. There is no intention to take over ICAO and IMO roles. But there are other transport modalities for which the Institutes of Navigation could be the collecting points of needs, such as road and rail transport, and, as well, general aviation and personal road transportation.

Certainly IAIN could cover also education & training for all navigation users aspects. IAIN could collaborate with WG-C on education & training, but in this sense there is the need to involve other persons (I'm not expert in this field).

IAIN could work with FIG, International Federation of Surveyors, which is an Associated Member of ICG, although survey is not the core topic of Institutes of Navigation.

The Institute of Navigations members of IAIN could collect in their own countries users needs, mainly in those less regulated transport modes.

WG-2, which is now called WG-B - Enhancement of GNSS Performance, New Services and Capabilities, doesn't directly focus its activities on user needs. The WG-B, as said by the sub-title, is focused to enhance GNSS performances, to new possible services and capabilities.

WG-D, which is mainly Reference Frames, Timing and Applications, includes in principle the applications. But it is mainly formed by experts on Reference Frames and Timing. There is no coverage of transport applications.

A possible cooperation for IAIN could be with RTCM, and specially the SC-134 group called "Integrity for High Accuracy GNSS-based applications". I was in touch with the Chairman of SC-134 and they are very willing to follow ICG activities.

Rome, 8 April 2020

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A-1

REPORT on ICG13 in Xi'an from 5 to 9 November 2018

The ICG, the International Committee on Satellite Navigation, had its 13th Meeting in Xi'an, during the week from 5 to 9 November 2018, chaired by China.

It has been an impressive organization done by our Chinese colleagues: the wonderful choice of the hotel, the directions panels to the hotel put outside, the giant plenary room and the Navigation exhibition showing the ancient Chinese capability to orientate and navigate, all these things contributed to feel the importance of the ICG initiative and made all the participants proud to participate.

Major conclusions of ICG13

The major conclusions of ICG, given in the third Plenary Session, which had place on the fifth day on Friday the 9, have been the followings:

- It was recognized that ICG also address GNSS technology and services in a range of applications related to meteorology, space exploration, smart phones, high-precision applications, intelligent transportation, emergency alert, monitoring and assessment, and smart cities.
- The request by Australia to join the ICG as Member was accepted.
 - o The request, which was recommended by the Providers' Forum, was based on the fact that Australia has started the development of a SBAS program in 2016. Firstly they funded the development of a test bed, based on an Inmarsat satellite (4F1) which provides coverage of Australia and New Zealand. In 2018 they started the development of a SBAS system, with the deployment of a national positioning infrastructure. The aim is to provide an open access PPP (10 cm accuracy). The public release is aimed at Q1 2019. The FOC (Full Operational Capability) is projected for 2024.
- The request by IAIN to change status from Observer to Associated Member was accepted.
 - o The request has been approved by ICG after a short speech by myself, recalling the content of my presentation of the First Plenary Session.
- The request by Nigeria to become a recognized Member of the Provider's Forum was acknowledged.
 - o The answer to this request has been postponed, due to the need to further analyze the Nigeria development program, NSAS, Nigeria Satellite Augmentation System, based on NigComSat-1R satellite launched in 2011. Further, Nigeria expressed the wish to host ICG in 2022.
- It was recalled that in 2019 the ICG14 meeting will be hosted in India. It will be host in Bangalore in December (exact dates to be better defined with tentative dates 8-13 december 2019).



- It was recalled that in 2020 the ICG15 will be hosted by UN OOSA in Vienna and in 2021, the ICG16 will be hosted by UAE (United Arab Emirates).
- The ICG TOR (terms of reference) will be amended accordingly to the decisions taken.
- The JOINT STATEMENT of ICG has been reviewed at the meeting, summarizing the achievements of the ICG13, and it will be distributed soon after the final setting up by UN OOSA.

The First Plenary Session of ICG started with the introduction of the Chair, Mr. Chengqi RAN, Director of the China Satellite Navigation Centre (CSNC) , who presented the various Chinese representatives. The official opening of the ICG13 started with an impressive video recalling the ancient Chinese navigation knowledge and highlighting the importance of international cooperation on satellite navigation: “Our dreams do not stop here” and “we will pursue our future without limitations”. A number of Chinese personalities had a welcome speech: Mr. Zhayao WANG, Cairman of the CSNC, Mr. Heping HU, government Secretary of Shaanxi Provincial Committee, who highlighted the importance of Xi’an in navigation and development of the entire China and Mr. Bin XIANGLI, Vice President of the Chinese Academy of Sciences.

The representative of United Nation, Mr, Luc ST-PIERRE, from OOSA office welcome the opening of ICG13.

Myself, Mr. Mario Caporale and the representative of USA, Mr. David Turner (in representation of Mr. Ken Hodgkins) did the welcome as Co-Chairs of the UN GNSS Action Team which, following a study period of 3 years, had proposed the establishment of ICG.

Mr. James Miller (NASA) and Mr. Werner Enderle (ESA) presented the booklet produced by ICG on the interoperable global navigation satellite systems Space Service Volume, as a significant result of international cooperation promoted by ICG .

Following the WELCOME session, it started the “Providers’ System and Service Update” Session where the major global and regional satellite navigation systems were presented. BDS (Beidou System, China), GPS (USA), GLONASS (Russia), Galileo (Europe), NAViC (India) and QZSS (Japan) were presented their current status.

In the afternoon, other Members, Associated Members and Observers did their presentation. There were presentation by EUREF on their activities, by EU on Galileo System performances, ESA on high fidelity 3D ionospheric models for PPP, ESA on GNSS navigation for cis-lunar missions, EU for Genesis project toward a Space Service Volume, ITU on the role of ITU in GNSS, FIG on GNSS PPP from the users’ perspective, FAI on the adoption of GNSS for UAV, ASI on the GNSS activities in Italy and, finally, IAIN proposing the new contribution to ICG and the request for change of status from Observer to Associated Member.

Then, there was the Seminar on “GNSS+ Applications and Experts”. A number of 10 presentations were given on different subjects such as: GNSS based Meteo Applications, Exploring the Moon with GNSS, Testing GNSS dual frequency with smartphones, High precision positioning and timing provision, Multi-GNSS Software Radiowave form development for the Space Station, Training and



Outreach with Galileo App competition for smartphones, BDS/GNSS apps for intelligent transportation, eCall – EU emergency alert system, APSCO IGMA project, Application of BDS in Phongsaly Safe city Project.

The second day, the 6 of November, the Working Groups started their parallel meetings. I have followed the works of the major WG, the WG-S (Systems, Services and Signals). WG-S met again on the 7th of November and the morning of the 8.

Then, in the afternoon of the 8th of November there was the Second Plenary Session of ICG, in which all the WGs presented their work and their proposed final actions and ICG drafted the final presentation for the Third Plenary Session.

Later in the Afternoon the Providers' Forum had their meeting, which I could not attend. The result of their meeting was presented at the Third Plenary Session.

WG-S , Systems, Services and Signals

The meeting started with questions & answers about the presentations of GNSS systems given during the First Plenary Session.

The “GNSS compatibility & spectrum” topic was discussed. It was presented by USA a set of interesting reports about problems experienced by the public on the use of GPS. Reports are available at the address:

<https://navcen.uscg.gov/?DO=GPSReportStatus> . From their statistics it appeared that 49% were due to unknown interference and 35% due to the user equipment. Lower percentages were given to mapping issue, GPS testing, ICD violation and SVN unusable despite that NANU was released. It was remarked that similar information should come from the other systems (Glonass, Galileo, Beidou, etc.).

There was also an interesting presentation by CHINA on GNSS interferences monitored in airports. They reported that general spectrum detection devices are not suitable to detect all the GNSS interferences. There is the need for special devices. Their Centre for data process & analysis work on receiver / constellation / RFI problems first. An approximated position of the interfering source can be derived from the intersection of LAT, LONG, HEIGHT and TIME info of ADS-B.

Representatives of the US Coast Guard presented an Assessment of electromagnetic environment in the GNSS frequency bands. The Compatibility & Spectrum protection sub-group, co-chaired by representatives of Japan (MITOME) and EU (HAYES) expressed some considerations on the WRC-23 (the World Radio Conference) Agenda items. Among the others, the Agenda should include also protection of the space weather monitoring stations in RNSS spectrum. And, the WRC-19 (which will be in oct-nov 2019) at the agenda item 7, issue A will include the definition of bringing into use of non-GSO satellites. Further, representative of China highlighted the need for out of band interference definition as far as GNSS systems are concerned.



An analysis of the SAR/GPS III and SAR/Glonass MEOSAR downlink interference was presented by a representative of NASA. It was highlighted that lesson learnt from SAR/BDS and SAR/Galileo L-band interference could provide potential solution.

LEOSAR need to be part of the frequency coordination. The C/S T.014 - COSPAS-SARSAT Frequency Management need to be updated. Coordination between NTIA and ITU are needed. There are differences in signal polarization between Galileo, BDS and LEOSAR. So, the analysis need to be finalized, a joint paper need to be presented to COSPAS-SARSAT, an update of C/S T.14 document is needed.

The “Interoperability-Time” topic was discussed. The outcome of the Time workshop held on 20 June 2018 were reported. There is the need to continue the alignment of the various system times to UTC. A number of Time Interoperability Actions were proposed, among them, MGET (Multi GNSS Time offset : xGTO) proposed by ESA which suggest to broadcast corrections relative to xGTO, as already done between GPS and GALILEO. MGET could be appropriate for demanding users.

BIPM had proposed that each provider calculate and distribute a time offset with respect to each of the other providers, on the basis of a standardized geodetic reference, common to all the systems.

The “Open service information sharing and service performance monitoring” topic was discussed. The Performance Standards Team, headed by Mr. John Lavrakas, US, has developed a Performance Standard Document and a draft of Guidelines which should be finalized and approved.

The EU has presented for discussion a proposal for ICG documents management process.

A project for Interoperability 2030 was presented by Russia, Mr. Sergey Silin, which is aimed at development of standards for receiver model, geodetic class and digital receiver, capable to use simulated and real signals.

A survey of the status of various ICDs (Interface Control Document) of various systems was presented by Mr. Jeff Auerbach, USA, including draft performance standard Guidelines and definitions and calculations. A Performance Standards Workshop is foreseen for June 2019 in Vienna.

Orbital Debris mitigation was another topic of a number of presentations. Mr. J. Hahn, ESA has presented the application of IADC (Interagency Space Debris Coordination Committee) guidelines to Galileo system. Mr. Jing Zhou, China, presented a comprehensive analysis of Disposal status and Operational Safety of various GNSS systems. As a result of the various presentation it was highlighted a recommendation to ask the Interagency Space Debris Coordination Committee (IADC) to conduct a study on Medium Earth Orbit and Inclined Geostationary Orbit (IGSO) in coordination with system providers.

A joint session on PPP (Precise Point Positioning) services was conducted among WG-S, WG-D and WG-B. It was recognized that it is too early to make recommendation on specific issues on PPP services. It was proposed a Workshop in 2019 to explore issues and develop a comprehensive



description of the various services proposed for PPP, and to develop more concrete proposals to ICG14. It was proposed to establish a Task Force on “Interoperability of GNSS PPP services”.

The compatibility and spectrum protection subgroup, has conducted a third Spectrum Protection Seminar in conjunction with a United Nations/Argentina Workshop on the applications of GNSS held in Falda Del Carmen, 19 – 23 March 2018. This seminar was followed by the 7th GNSS Interference Detection and Mitigation (IDM) Workshop, organized and conducted under the auspices of the subgroup, which was held for a second time in conjunction with the annual Baska GNSS Conference in May 2018.

At the workshop, participants continued to investigate methods of implementing IDM capabilities through permanent network-based solutions and through crowdsourcing techniques. The subgroup exhorted national regulators to use relevant ITU protection criteria for GNSS. Compatibility of search and rescue downlinks broadcast by GNSS in the L-band was added to the scope of the subgroup’s work, envisaging cooperation with the COSPAS/SARSAT Programme and taking into account the role of the ITU and national administrations.

The interoperability and service standards subgroup held two workshops during the intersessional period. The first was focused on open service performance standards and international GNSS monitoring and assessment (IGMA). A document defining guidelines for developing Open Service Performance Standards, has been underway since 2012. The working group recommended that this guideline be formally adopted by the ICG. The subgroup has organized a second workshop focused on GNSS system time as recommended at ICG-12 and held the workshop in Vienna in June 2018 in conjunction with ICG Working Group D.

The Working Group also plans to join Working Groups B and D in conducting a workshop focused on Precise Point Positioning Services in 2019.

The Working Group WG-S has recommended that the ICG ask the Interagency Space Debris Coordination Committee (IADC) to conduct a study on Medium Earth Orbit and Inclined Geostationary Orbit (IGSO) in coordination with system providers.

WG-B, Working Group on the Enhancement of GNSS Performance, New Services and Capabilities

Within the WG-B, Working Group on the Enhancement of GNSS Performance, New Services and Capabilities China, Europe and the United States presented results on Lunar GNSS analyses and architectural studies performed by each region. NASA has informed WG-B about the benefits of combined communications and navigation capabilities for space users.

A major milestone has been accomplished by successfully completing the work on the GNSS SSV Booklet as ‘The Reference’ for the space user community. A new Space Applications subgroup was created by WG-B to focus on these issues. The Space Applications Sub-Group will be co-chaired by Interim co-chairs from US, ESA and China.



Acknowledging the importance of Space Weather Information for GNSS and space users of GNSS, WG-B encourages the open exchange of space weather data. The working group was briefed by China on the space weather payloads of BDS-2 and BDS-3. China, Japan and India presented the status of space weather and ionospheric research. WG-B agrees that dedicated mechanisms should be investigated to share space weather data among the international community, and additionally to disseminate it to potential users in all regimes (Next Generation Broadcasting Service being one potential mechanism).

China provided information on the planned BDS Return Link Service (RLS) and NASA provided overview on the RLS discussions within Cospas-Sarsat. There was interest in pushing for interoperability of the SAR RLS. It was also highlighted the need for undertaking discussion of the RLS and an overall Concept of Operations with Cospas-Sarsat.

EU and Japan jointly presented the Common Emergency Warning Services. The WG-B members share the need to further discuss the emergency warning service within the ICG WG-B. For this purpose, a correspondence group on EWS common format will be set up.

The Application Sub-group working activities and achievements were reported. China introduced BDS applications on civil transport aircraft, indicating that the BDS short message function provides a new technological approach of real-time flight surveillance, tracking and emergency communication. India introduced NavIC messaging services and novel applications. Japan updated on the QZSS IGSO satellites' advantages for offering a seamless and robust navigation integrity monitoring service. The standardization activities for Dual-Frequency Multi-Constellation SBAS, which includes consideration of the benefits that can be provided by the use of IGSO, are ongoing.

The WG-C, Working Group on Information Dissemination and Capacity-building

The WG-C, Working Group on Information Dissemination and Capacity-building considered educational programmes and activities carried out by FIG, ISMB/LINKS, the Beihang University, BeiDou International Exchange and Training Centre, CGSIC, the University of Tokyo, Tokyo University of Marine Science and Technology, the Russian Federation, the European Commission and the United Nations-affiliated Regional Centres for Space Science and Technology Education located in India, China, Morocco and Nigeria, in promoting the use of GNSS capabilities, particularly in developing countries. The working group emphasized that ICG should strengthen cooperation with industry, government, academia, and other relevant institutions to improve GNSS education, training and capacity building. This would be accomplished through continued outreach to policy and decision makers, supporting the exchange of experts and educational resources, and increased engagement of women and young professionals.

The working group took note that the education capacity building index proposed by the Regional Centre for Space Science Technology and Education in Asia and the Pacific (China) will require further evaluation at the United Nations-affiliated Regional Centres to improve global facilitation of GNSS education development and capacity building.



WG-D, Working Group on Reference Frames, Timing and Applications

The WG-D, Working Group on Reference Frames, Timing and Applications noted specific progress on: (1) the refinement of the alignments of GNSS reference frames to the ITRF, and (2) the information on the GNSS timing references and the inter-comparisons of GNSS time offsets. WG-D noted that the templates on geodetic and timing references should be updated by the GNSS Providers to reflect the changes.

With respect to education and capacity building in less developed countries, WG-D members also participated in education and outreach projects, in partnership with WG-C, on “Reference Frames in Practice” workshops. Two such workshops were held, in May 2018 at FIG Congress in Istanbul, and September 2018 in Fiji.

WG-D continues to contribute to the IGMA initiative, in particular through involvement in the IGMA-IGS Joint Trial Project. Laser tracking of GNSS satellites is an important means of independently determining the precise GNSS ephemerides, and hence evaluating the quality of GNSS satellite orbits computed by the GNSS Providers and third parties using GNSS measurements and models. The IGS made recommendations to the ILRS on guidelines for the selection of GNSS satellites to be tracked by the ILRS, and for which periods and intervals. WG-D approved the IGS recommendation as the basis for future GNSS tracking.

Satellite physical and geometrical properties related to the shape, mass, optical properties, dimensions and locations of radiating antennas permit improved orbit modelling, which in turn increases the accuracy of ephemerides and satellite clock correction determination.

WG-D acknowledges that there has been some progress made in the provision of satellite properties by the GNSS Providers in accordance with the white paper titled “Satellite and Operations Information for Generation of Precise GNSS Orbit and Clock Products” released by the IGS. The IGS collects and makes available data on GNSS satellite properties to the user community. WG-D noted that some Providers are providing GNSS data from their tracking stations to the IGS. Working Group D will continue to monitor progress (in conjunction with IGMA), demonstrate the benefits and encourage all GNSS Providers to contribute.

WG-D, in collaboration with WG-S, held a second joint workshop on monitoring the offsets between GNSS times was held in Vienna in June 2018, and a common session was organized at ICG-13. Studies have been conducted by some GNSS Providers and within the timing community and the presented results allow characterization of the offsets and identify several methods to improve their determination. Additional work is necessary for the Providers to assess the accuracy goals in the determination of the GNSS time offsets, in order to specify a recommended method to determine and monitor them. The common session between WG-S and D concluded that a further focused workshop should address these questions in 2019.

WG-D held a joint meeting with WGs B and S to discuss “Interoperability of GNSS Precise Point Positioning (PPP) Services”. It was agreed that it is too early to decide whether this should become



a new work item of the ICG. However there was consensus that the topic is worthy of further exploration and that all 3 working groups should be involved. It was agreed that a useful way forward is to hold a dedicated workshop on PPP Services during the first half of 2019. There was considerable discussion on whether such a workshop should involve current commercial providers of PPP Services. It was agreed in the joint meeting that the issue needs further discussion. In the WG-D meeting, it was suggested that a possible approach could be to hold a workshop in 2019 including all relevant stakeholders, which would be immediately followed by a closed session amongst ICG members and associate members.



A-2

REPORT on ICG Planning meeting 18 February 2019 in Vienna

The meeting was chaired by China and India.

China started with a film summarizing the ICG13 event in Xi'an. China recalled verbally the activities done by the ICG working Groups which are described in details in the UN Report A/AC.105/1191 of 30 November 2018 and A/AC.105/1191 of 30 November 2018 (attached to this REPORT).

I wish to highlight points 30. To 33. of UN Report A/AC.105/1191, which refer to the nomination of IAIN as Associated Member of ICG.

A special emphasis was given to the recommendations proposed by WG-S (Systems, Signals and Services):
13 S.1 – Adoption of Guidelines for developing Performance Standards
13 S.2 – IADC to conduct a study for MEO orbits debris mitigation

Prominent post-ICG13 WG meetings were highlighted:

- IDM Workshop to be done in Croatia – Baska, 12-15 may 2019
- Performance Standards and IGMA Workshop – June 2019 Vienna
- Timing Workshop – ESTEC – April-May 2019
- WG-S Intersessional meeting – August(September) 2019 in JRC or ESRIN

A verbal summary of the Providers' Forum was given by China representative (see details in the UN Reports recalled above).

India representative gave a presentation on the preparation for ICG14 in Bangalore on 8-13 December 2019.

The Agenda follows the agreed standard Agenda for yearly ICG Meeting. A website for ICG14 will be hosted by mid may 2019. For VISA information the web address was given <https://www.indiavisaonline.gov.in/visa/>. The website will include detailed information for VISA. Venue has not been chosen yet. Possible venues could be the following hotels: Leel Palace, Shangri-La, ITC Gardenia, The Lalit Ashok.

OOSA representative highlighted two future events in 2019: UN/Fiji Workshop on GNSS applications in Suva, Fiji, 24-28 June 2019 and International Space Weather Initiative in ICTP (Trieste) on 20-24 May 2019.

The EU representative gave a presentation on Emergency Warning Service (EWS) highlighting an intervention on this subject on next IAC in Washington on 21-25 October 2019. EU gave a second presentation on Galileo and Ionosphere prediction, based on a prototype to monitor and predict the ionosphere behavior, with short and long term forecasts.

The IAIN representative gave the presentation on the proposed IAIN ACTION PLAN to support ICG Activities.

A representative of the African Regional Centre ARCSSTE-E described the capacity building and dissemination information of this Centre.

Next ICG Planning meeting is foreseen on 12 June 2019 in Vienna.



A-3

REPORT on ICG Planning meeting 11 June 2019 in Vienna

The meeting was chaired by India and supported by the Executive Secretariat.

India representative summarized the activities done by ICG from ICG-13 on, reporting on the Meeting of Providers' Forum held in Vienna on 10 June 2019, highlighting the 3 presentations given:

Open Service Information Dissemination

- The BDS-3 SAR with RLS + EWS Services - Gang LI, China Satellite Navigation Project Centre, China
- Disposal Strategy and Collision Probability of BDS MEO Satellites - Jing ZHOU, Hui YANG, Beijing Institute of Spacecraft System Engineering, CAST, China

Other matters

- Autonomous Flight Termination System (AFTS) - Lisa VALENCIA, NASA KSC Project Manager, United States of America

Those presentations can be found at the address:

<http://www.unoosa.org/oosa/en/ourwork/icg/providers-forum/meetings/22-.html>

The activities for planning and preparing the ICG-14, dates 8-13 December 2019 in Bengaluru, India, were presented. The Agenda is a standard Agenda already agreed by ICG since years.

The venue will be the Hotel Conrad in Bengaluru (<https://conradhotels3.hilton.com>)

It was highlighted that the VISA application should be started at least 2 months in advance. (www.indianvisaonline.gov.in).

The ICG-14 website is www.icg14.org. Registration will be open from 1 July 2019.

The Executive Secretariat reported on a number of events post-ICG-13. Prominent ones were highlighted:

- IDM Workshop to be done in Croatia – Baska, 12-15 May 2019
- Timing Workshop – ESTEC – April-May 2019
- International Space Weather Initiative in ICTP (Trieste) on 20-24 May 2019

CGSIC representative highlighted that the annual CGSIC meeting will have place on 16-17 September 2019 joining the annual ION Meeting. He invited anyone who is interested to participate.

The Working Groups representatives shortly reported on their activities. In particular, WG-S (Systems, Signals and Services) gave a special emphasis to the recommendations proposed during ICG-13:

- 13 S.1 – Adoption of Guidelines for developing Performance Standards
- 13 S.2 – IADC to conduct a study for MEO orbits debris mitigation



ICG-15 will be in Vienna, hosted by UN, in VIC-C building, Wargraben Strasse, 5. There will be a tour on UNIS (The United Nation Information Services). The meeting will start on Monday (because on Sunday the UN offices are closed) and on Tuesday there will be the Opening Day. Dates have to be fixed.

ICG-16 will be hosted by UAE in Dubai.

Out of the meeting, I was asked by Sharafat Gadimova if IAIN would be interested in hosting ICG in 2022.

Obviously I answered that I will refer on it to IAIN and to my Institute. Right now it seems that there is an unofficial suggestion from Nigeria to host ICG in 2022 but no formal proposal. Any proposal should come to the ICG-14 event in December 2019.

We have to talk about it. As you probably know, ICG annual meeting has no fee, so there is no income to the host. ICG is mainly a meeting among governmental representatives, participated by international bodies, organizations and associations.

Usually the host will bear the costs of the event, which, in most of the cases, are strongly sustained by industrial sponsors. Italy, which is a founding Member of ICG, hosted the annual meeting in Turin in 2009, financially supported for the Gala Dinner by the European Commission, and for the rest by Turin city and by a number of industrial sponsors.



A-4

REPORT on ICG Planning meeting 11 June 2019 in Vienna

The meeting was chaired by Mr. Manish Saxena, representing India Chair for ICG-14, and supported by the Executive Secretariat.

The United Nations document, which extensively reports on ICG-14, is A/AC.105/1217.

India representative summarized the activities done by ICG-14 IN Bangalore with a presentation.

A total of 258 participants of which, 109 from India, 55 from China, 19 from USA were present at the meeting. New Zealand is a new member of ICG, which was welcome in Bangalore.

Major outcomes of the ICG-14 are the two recommendations from WG- S, the WG on Systems, Signals and Services, that is:

- 14S-1 : produce a booklet on GNSS/RNSS Spectrum Protection by June 2020.
- 14S-2 : establish a Task Force on order to improve interoperability of PPP (Precise Point Positioning) services, probably in summer 2020.

Topics such as Timing Interoperability were addressed and the need to organize a workshop with focus on feedbacks from users and manufacturers. Also the Authentication of civil GNSS signals was addressed.

IGMA (International GNSS Monitoring and Assessment) and PPP Task Forces were contributed jointly by WG-S and WG-B.

WG-B (on Enhancement of GNSS Performance, New Services and Capabilities) representatives were not present at the planning meeting, therefore the only information which was given is that they plan to have a meeting in Vienna in June 2020.

For WG-C (WG on Information Dissemination and Capacity-building), Mrs. Sharafat Gadimova reported on Training Courses. A number of Workshops focused on dissemination and capacity-building will be organized in the first semester of 2020.

WG-D (WG on Reference Frames, Timing and Applications) representatives were not present at the planning meeting. Secretariat just gave the information that the WG will organize Reference Frames and Geodetic Capacity training courses in Amsterdam.

The Providers' Forum reported on their meetings in Bangalore during ICG-14. Updates on the International GNSS Monitoring and Assessment System and a preliminary assessment of multi-GNSS performance were given at ICG-14. The executive secretariat of ICG provided an overview of the established regional centres in each region covered by the regional economic commissions of the United Nations (for Africa, Asia and the Pacific, Latin America and the Caribbean and West Asia). New Zealand was invited to present details of their interest in membership to the Providers' Forum.



Next ICG-15 will be in Vienna on 14-18 September 2020, and Simonetta Di Pippo, Director of UN OOSA office, will chair it.

There will be a dedicated web site in the next months. There will be no registration online. Anyone will send participation via email to ICG Secretariat and will receive invitation.

The 31st of August 2020 will be the deadline for communicating the participation to ICG-15, but it is suggested to provide the participation info by end of July 2020.

Venue will be the Vienna International Center, VIC, building C, floor 2. Main room will be C1 (180 persons). The other rooms on 7th floor: C2, C3, C4, C5, C6 will be dedicated to WGs. All meetings will have to be finished by 18:00. There will be a Focus Tour on Wednesday 16 September 2020 afternoon about VIC Art Collection.

The ICG Executive Secretariat reported about their activities: there will be two major Workshops in 2020:

- A Mongolia Workshop on GNSS applications , on 13-17 April 2020
- An International Space Weather Initiative Workshop , in Kerala, India, on 2-6 November 2020.

India representative informed about the Multi-GNSS Asia Conference which will be held in Bangkok on 24-28 August 2020.

US representative, Mr. David Turner, gave a short presentation about their perspective on ICG Programmatic Improvements. There is a need for programmatic changes to improve efficiency of ICG activities: need for tracking ICG recommendations, need for standardize numbering format for ICG recommendations, need Next ICG meeting in June 2020 additional info will be presented.

ICG-16 in 2021 will be hosted by Arab Emirates in Dubai. ICG-17 in 2022 will be hosted by Europe in a capital to be decided.

Next ICG planning meeting will be on 15th June 2020 at 15:00 hrs and up to 18:00. COPUOS will be in the period 17-26 June 2020. Providers' Forum meeting will take place in the morning of 15 June.