



Update on GNSS Issues at the United Nations

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Overview

- Report of the Scientific and Technical Subcommittee (COPUOS)
- Activities of the ICG-UN carried out in 2018 Reports on individual GNSS
- Promoting the use of GNSS technologies as tools for scientific applications
- Recently proposed GNSS work at CRECTEALC



Multi-GNSS – Report of the Scientific and Technical Subcommittee (STSC) of COPUOS - 2019

The STSC noted [Ref. A/AC.105/1202]

- a) [W]ith appreciation that, through ICG, all providers had agreed on the information presented in the publication “The Interoperable Global Navigation Satellite Systems Space Service Volume (ST/SPACE/75), and on a number of recommendations on continuing the development, support and expansion of the multi-GNSS space service volume concept.
- b) [W]ith satisfaction that the 13th meeting of ICG and the 21st meeting of the Providers’ Forum, was held in Xi’an, China, in November 2018; that the 14th meeting of ICG would be held in Bengaluru, India, from 9 to 13 December 2019; that UNOOSA will likely host the 15th meeting of ICG (2020), and the UAE the 16th meeting (2021)



Multi-GNSS – Report of the Scientific and Technical Subcommittee (STSC) of COPUOS - 2019

The STSC noted [Ref. A/AC.105/1202]

- c) [T]hat the launch of the 2 GLONASS-M navigation satellites into orbit in 2018 supported the space segment of the system and that 3 Glonass-M spacecraft will be launched, along with 1 Glonass-K and 1 Glonass-K2, in 2019. GLONASS-K2 satellites, will provide CDMA signals in the L1, L2 and L3 bands and the traditional signals with FDMA access. Full coverage in 2019?
- d) [T]hat the data and services provided by Galileo and EGNOS were available worldwide on an open basis and free of direct user charges. The four new Galileo satellites, launched in 2018, brought the number of satellites in orbit to 26. The full Galileo constellation would consist of 30 satellites and is expected to be completed by 2020.



Multi-GNSS – Report of the Scientific and Technical Subcommittee (STSC) of COPUOS - 2019

The STSC noted [Ref. A/AC.105/1202]

- e) [T]hat the BeiDou system had been developed in three stages named BDS-1, BDS-2 and BDS-3, respectively, and had progressed from a regional to a global service. The BDS-3 basic system with 18 satellites was completed at the end of 2018, and 10 more satellites would be launched in 2019. The system would provide global coverage by 2020.



Activities of the ICG-UN carried out in 2018 [A/AC.105/1192]

- The ICG, established under the auspices of the UN in 2005, seeks to establish a GNSS system of systems. The priorities of ICG include continued focus on spectrum protection, interference detection and mitigation, and transparent provision on interoperable civil services.
- According to the ICG workplan for 2018 and the recommendations contained therein,
UNOOSA, focused on: (a) disseminating information through the information centres hosted by the regional centres for space science and technology education, affiliated to the United Nations; (b) promoting the use of GNSS as tools for scientific applications; and (c) building the capacity of developing countries in using GNSS technology for sustainable development.



Activities of the ICG-UN carried out in 2018 [A/AC.105/1192]

UNOOSA organized intersessional meetings of ICG working groups

- An intersessional meeting of the interoperability and service provision subgroup of Working Group S was held in Vienna on 19 June 2018.
 - The progress made by the International Telecommunication Union in encouraging national regulators to use relevant protection criteria for GNSS was assessed.
 - The compatibility of search and rescue downlinks broadcast by GNSS in the L-band was added to the scope of the subgroup's work.



Activities of the ICG-UN carried out in 2018 [A/AC.105/1192]

UNOOSA organized intersessional meetings of ICG working groups

- Intersessional meeting of Working Group S was held in Noordwijk, the Netherlands, on 16 and 17 July 2018, to discuss:
 - Standards for interference detection and mitigation,
 - Signal compatibility and spectrum protection, and
 - Interoperability-related issues, such as timing, open-service standards, and multi-GNSS monitoring and assessment;
- A joint timing workshop of Working Group S and the working group on Reference Frames, Timing and Applications (Working Group D) was held in Vienna on 20 June 2018.



Activities of the ICG-UN carried out in 2018 [A/AC.105/1192]

UNOOSA organized intersessional meetings of ICG working groups

- The interim meeting of Working Group B was held in Vienna on 21 and 22 June 2018. The meeting reviewed the progress in the implementation of the recommendations made at the twelfth meeting of ICG, in 2017, and discussed additional recommendations for further consideration by ICG;
- An intersessional meeting of Working Group D was held, in conjunction with the Multi-GNSS Asia Conference, in Melbourne on 24 and 25 October, to discuss interoperability of GNSS precise positioning services.



Promoting the use of GNSS technologies as tools for scientific applications [A/AC.105/1192]

- 1) A workshop on space weather effects on GNSS operations at low latitudes, Trieste, Italy, from 23 April to 4 May 2018, in cooperation with ICTP, the Institute for Scientific Research (ISR) of Boston College and ICG. The workshop provided theoretical and practical training on the physics of space weather and its main effects on GNSS operations. Experts from 29 countries participated in the workshop. Funding was provided by the U. S. and the EC.
- 2) The ISWI school on space weather and GNSS was held in Baku in October 2018, to promote the topics of space weather and GNSS. The school was organized by the Azerbaijan National Academy of Sciences, ISR, the Scientific Committee on Solar-Terrestrial Physics and ICG. Experts from 24 countries participated in the school. Funds were provided by the U. S., the EC and the SCSTP .



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Promoting the use of GNSS technologies as tools for scientific applications [A/AC.105/1192]

- 3) An expert seminar on natural and artificial threats to GNSS, Politecnico di Torino, Italy, May 2018. The seminar was organized by the Politecnico di Torino, the Istituto Superiore Mario Boella and ICG. Experts from 12 countries participated in the seminar. Funds were provided by the EC through ICG to cover the costs of air travel for three experts.
- 4) A training course on GNSS, Bangkok, Jan. 2018 to raise awareness on GNSS and its applications in Asia and the Pacific. The course was organized by the Geoinformatics Centre, Asian Institute of Technology and the Centre for Spatial Information Science at the U. of Tokyo, with the support of ICG. Participants learned signal processing, precise point positioning and post-processing or real-time kinematics for high-accuracy. Experts from 15 countries. Funding was provided by the U. S. through ICG to defray the travel costs for 16 experts.



Promoting the use of GNSS technologies as tools for scientific applications [A/AC.105/1192]

- 5) Technical seminars recognizing a number of ongoing projects and initiatives to establish regional reference frame networks that meet needs of precise GNSS-positioning applications, organized by Commission on Positioning and Measurement of FIG and IAG, in cooperation with ICG, to raise awareness on the benefits of geospatial information for sustainable development.
- 6) A technical seminar, Istanbul, Turkey, May, 2018. Organized and sponsored by the Chamber of Survey and Cadastre Engineers of Turkey, Leica Geosystems and Trimble Inc. The focus of the seminar was reference frames in general, kinematics and dynamic datums that reflect geodetic priorities for all regions that are vulnerable to earthquakes. 36 experts from 18 countries participated in the seminar. Funds provided by the U. S. through ICG



Promoting the use of GNSS technologies as tools for scientific applications [A/AC.105/1192]

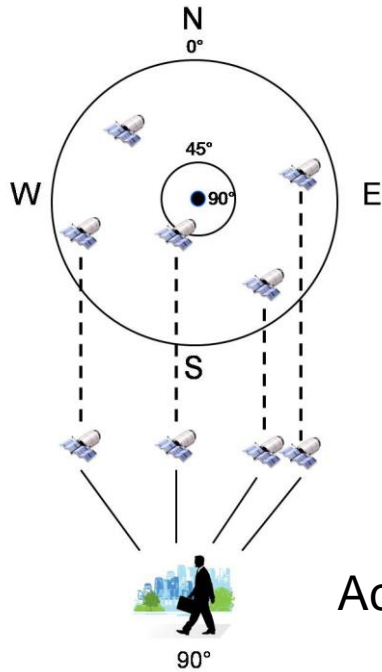
- 7) The 13th scientific workshop of AfricaArray, June 2018 at the U. of the Witwatersrand in South Africa. The workshop brought together researchers who utilize seismic and Global Positioning System data. The presentations covered: the structure, tectonics and resources of Africa; geodesy and space science; seismic monitoring and hazard assessment; and mining-related seismicity. Funds provided by the U. S. to cover air travel for 13 experts.
- 8) The UN/Argentina workshop on applications of GNSS was organized by the UNOOSA in cooperation with CONAE in March 2018. It was co-sponsored by the EC and the U.S. through ICG and ESA. **A one-and-a-half-day seminar on GNSS spectrum protection and Interference Detection and Mitigation,** organized by the ICG working group on Systems, Signals and Services (Working Group S), was held during the Workshop. The purpose was to highlight the importance of GNSS spectrum protection at the national level.



Activities of the ICG-UN carried out in 2018 [A/AC.105/1192]

- The ICG publication: “The Interoperable Global Navigation Satellite Systems Space Service Volume” was sent by UNOOSA to the regional centres, both for training purposes and to disseminate information on multi-GNSS space service volume.
- The publication is a single resource with a concise overview on the characteristics of every GNSS provider as their contribution to the interoperable GNSS space service volume.

Recently Proposed



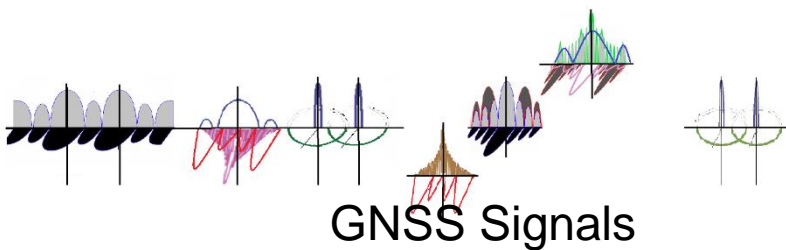
Actual GNSS

Actual GNSS	Future GNSS TCP/IP
Interoperability	Need of IoT Positioning
Rescue Missions	Availability of Positioning Services
Communication Protocols <i>ad hoc</i>	TCP/IP in mobile networks
Outdoor uses	Indoor Improvement
Dedicated radio links	WWW and VSAT
Data in Master Frames	Data in packets

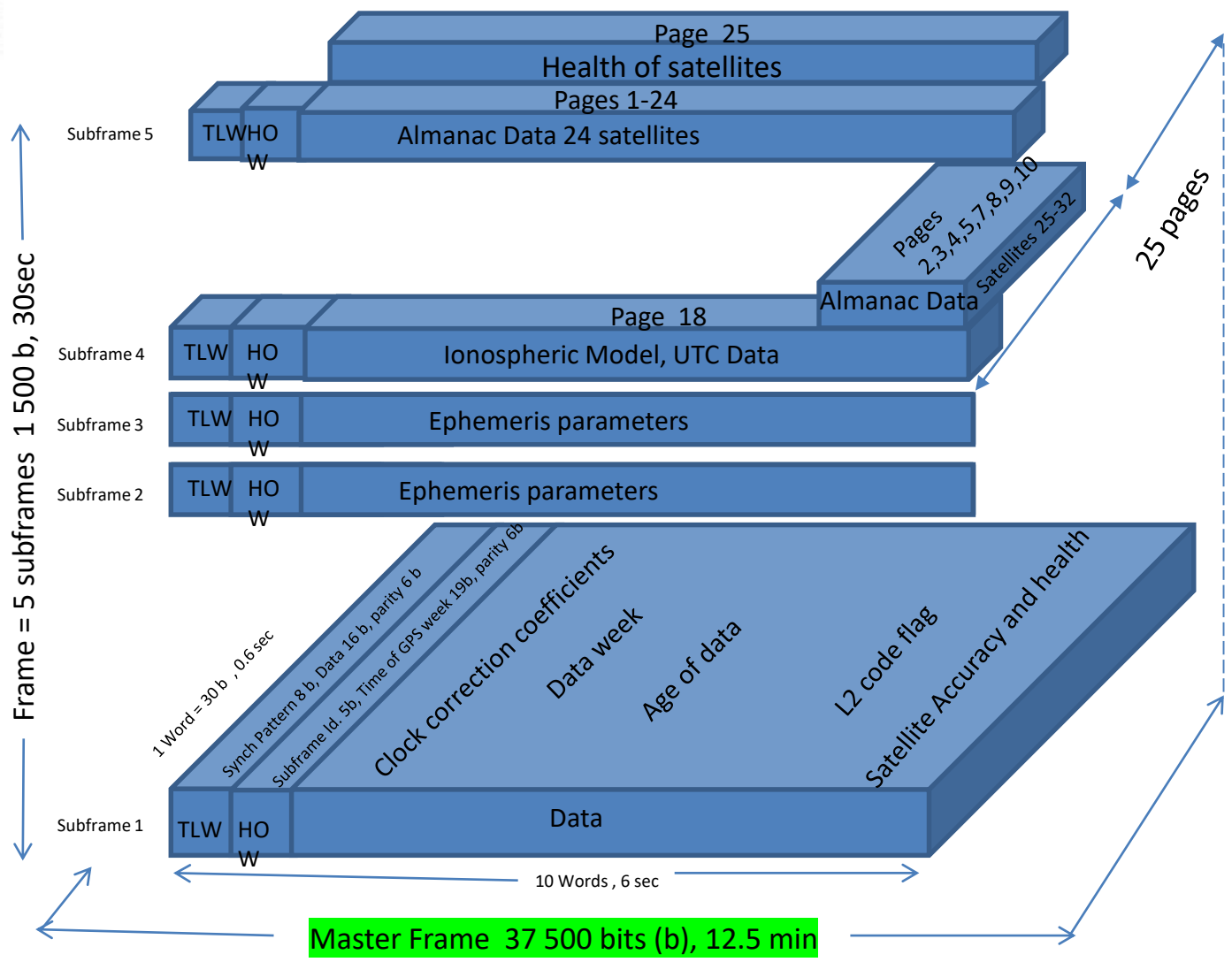
TCP: Transfer Control Protocol, provides Control and messaging for internet packets

IP: Internet Protocol provides connectionless and routing for internet packets

VSAT: provides satellite communications for Internet



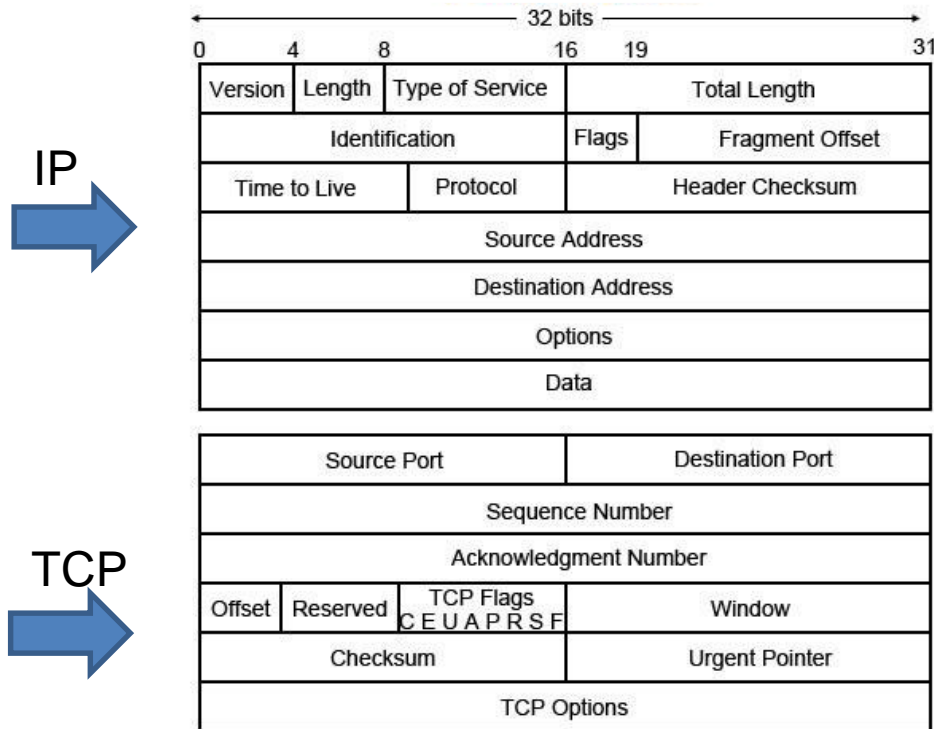
GNSS Signals





GNSS TCP/IP Information Data Blocks

Packet



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Thank you