



Multi-GNSS Space Service Volume Activities

WG-B—Enhancement of GNSS Performance, New Services & Capabilities

ICG 13 - Xi'An, China November 4-9. 2018



International Committee on
Global Navigation Satellite Systems

Overview

- Interoperable Multi GNSS SSV Booklet
- Outreach Activities
- SSV Video
- Space Applications Subgroup
- Terms of Reference for Space Applications Subgroup

Interoperable Multi GNSS SSV Booklet

- Booklet was published on 01 Nov 2018
- Identifier: ST/SPACE/75
- Electronically available at:
 - <http://www.unoosa.org/oosa/en/ourwork/icg/documents/publications.html>
 - http://www.unoosa.org/res/oosadoc/data/documents/2018/stspace/stspace75_0_html/st_space_75E.pdf
- Hard copies will be provided to UNHQ (New York) for public sales.

**Congratulations and many, many thanks to the ICG and
WG-B for this achievement**

Interoperable Multi GNSS SSV Booklet

- Revisions and comments to the Booklet should be submitted to the SSV Taskforce or the WG-B chairs.
 - Submissions can be done at any time
 - Discussion will occur at SSV Taskforce and WG-B meetings
 - Final adoption of Booklet revisions will occur at annual ICG meetings and submitted to ICG for document updates
 - First revision cycle of Booklet is intended to be finalized at ICG-14
- Larger additions (new simulations, analyses, additional data, etc.) should be coordinated through the SSV Taskforce.

Recent Outreach Activities

- Public outreach activities
 - 24–28 Sep 2018: **ION GNSS+**, Miami, FL, USA [2 papers]
 - Paper 1: Development of Multi-GNSS SSV
 - Paper 2: Technical Results of Multi-GNSS SSV Analysis
 - Session: The Navigation of Satellites
 - Final proceedings are published at:
<https://www.ion.org/publications/browse.cfm?year=2018>
 - 1–5 Oct 2018: **IAC 2018**, Bremen, Germany
 - Paper: The Multi-GNSS SSV
 - Session: Space-Based Navigation Systems and Services
 - Final proceedings provided to attendees
- All final papers/presentations are posted to SSV FTP site and are available upon request.

Recent Outreach Activities

- Common questions and feedback:
 - When will the GNSS SSV Booklet be available?
 - What is specification status of SSV performance characteristics?
 - What is the feasibility of GNSS navigation at lunar distance?
 - Should GNSS signals in the SSV be augmented to improve performance or resiliency?
- Next step:
 - Journal publication

SSV Video – Status Update

- Recap of video takeaway and audience
- Changes in video planning and content, based on NASA Public Relations and Video Producer comments
 - Maximum length of video
 - Script changes
- Status on international video clips
- Video production status & tentative schedule for roll-out

SSV Video – Tentative Schedule

- **Finalize script and action plan: ICG-13**
- **Final video clips due from all parties:
November 21, 2018**
- **Production version draft: Early December**
- **Final Production copy for review: Late
December**
- **External release: Spring 2019**

Space Applications Subgroup

- **Current structure:**
 - “SSV Taskforce” made up of representatives from WG-B
 - Biweekly meetings by teleconference
 - Main activities:
 - SSV papers for ION/IAC
 - Finalizing SSV Booklet
 - SSV Video
- **Current Status:**
 - Attendance needs improvement: mainly US and ESA, but we need all Providers on-board
 - Informal structure; not part of WG-B Terms of Reference
 - Narrow focus on GNSS SSV
 - SSV issues take up majority of WG-B time
- **Proposal:**
 - Creation of WG-B dedicated Space User Subgroup as formal part of WG-B
 - Similar to existing Applications Subgroup

Space Applications Subgroup – ICG Recommendation

Background/Brief Description of the Issue:

WG-B has an extensive work plan, including many facets such as performance enhancements, ionospheric modeling, new service concepts and augmentations, and the SSV. The Multi-GNSS SSV project, and other similar projects, benefit from a highly active and focused team, which may not be appropriate for the WG-B as a whole, and may in fact detract from its ability to focus on other activities within its work plan.

Discussion/Analyses:

The formation of a formal subgroup on Space Applications would allow for independent action by its voluntary membership and leadership. Its focus would be the Multi-GNSS SSV and other aspects specific to the space user community.

Recommendation of Committee Action:

WG-B will create a Space Applications Subgroup, whose scope will include opportunities, issues, and challenges related to space applications of GNSS, as defined by the Subgroup terms of reference. For these purposes, the subgroup will interact with the space user community and the service providers. The terms of reference will be adopted by WG-B and the need for modification will be reviewed annually.

ToR for Space Applications Subgroup

1. Scope of the Space Applications Subgroup

- This Terms of Reference (ToR) defines the “Space Applications Subgroup” of ICG WG-B and its associated activities.

2. Objectives of Space Applications Subgroup

- Lead evolution of the Interoperable Multi-GNSS Space Service Volume including the use of GNSS for missions beyond the existing SSV (e.g. lunar)
- Encourage developments of space-based user equipment and emerging user community
- Encourage coordination with Interagency Operations Advisory Group (IOAG) and International Space Exploration Coordination Group (ISECG)
- Encourage development of new services and augmentations beneficial to space users.
- Promote space user community needs within ICG.

ToR for Space Applications Subgroup

1. Participants

- List of Participants

• Regulatory Framework

- This ToR is applicable to all related documents under the Space Applications Subgroup of WG-B.

• Milestones

- Draft ToR for the **Space Applications Subgroup**
- Submission of the ToR for the Space Applications Subgroup to **ICG**
- Launch of activities for **Space Applications Subgroup**

• Annexes



Space Applications Subgroup Participants

- To be successful, the Subgroup needs active participation from all service providers.
- Provider POCs for ongoing participation in Subgroup meetings: (List below needs to be confirmed)
 - US: Joel Parker/NASA joel.j.k.parker@nasa.gov
 - EU: Werner Enderle/ESA werner.enderle@esa.int
 - Russia: Ivan Revnivykh revnivykh.is@roscosmos.ru
 - China: Xinuo Chang chang_xinuo@foxmail.com
 - Japan: Satoshi Kogure [TBC] satoshi.kogure.e7f@cao.go.jp
 - India: R. Ramasubramanian subra@isac.gov.in