



17th Meeting of the International Committee on
Global Navigation Satellite Systems



International GNSS Monitoring and Assessment System—status and update

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CONTENTS

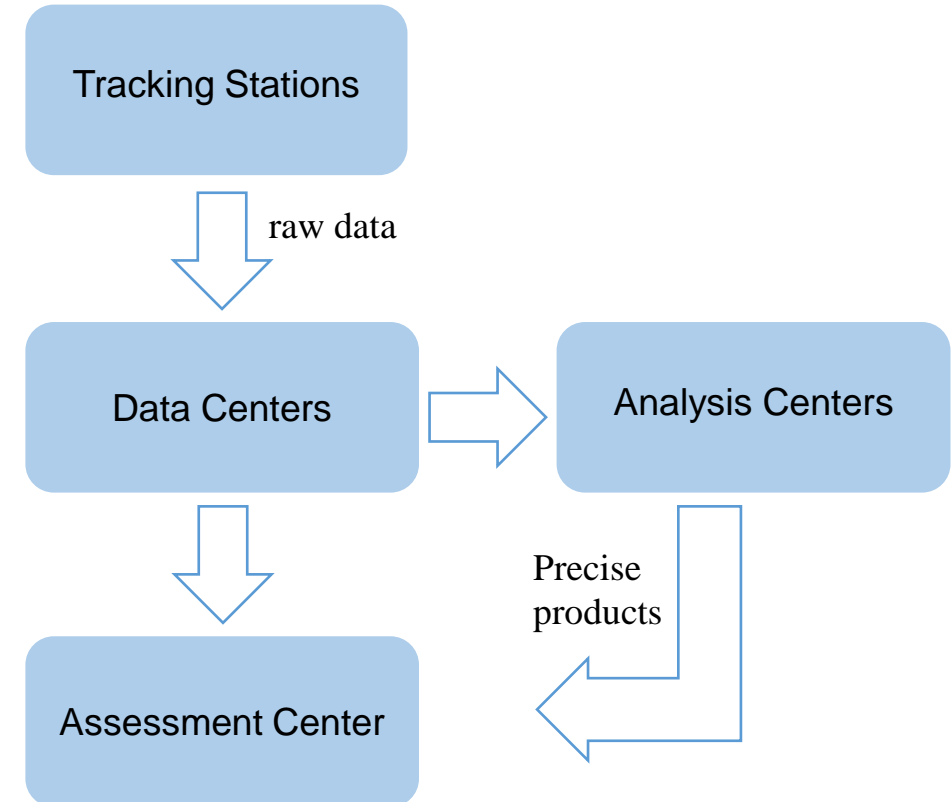
01 Daily
M&A
Results

02 New
Exploring
Work



Overview of iGMAS

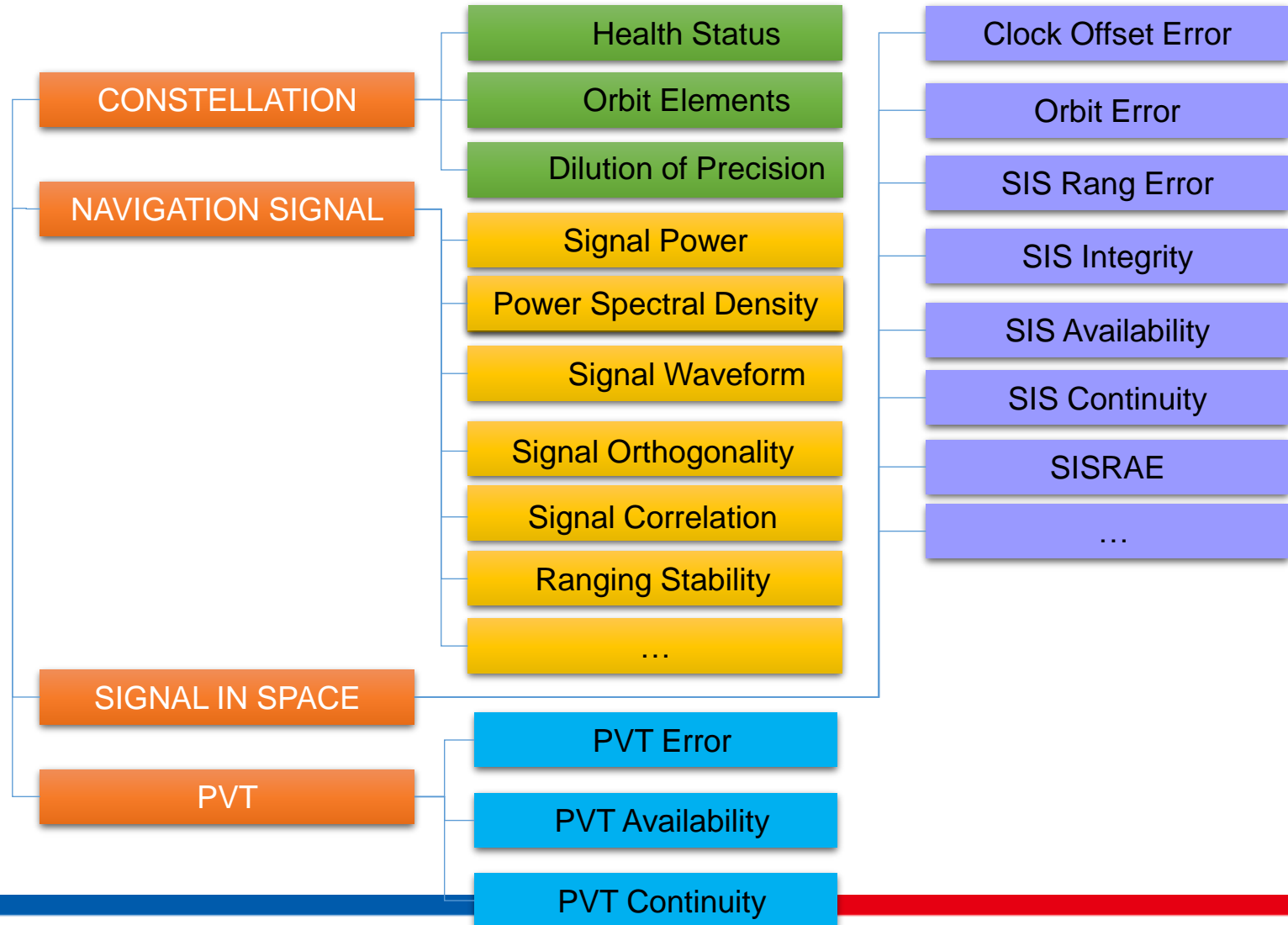
- Launched in 2012 following the ICG International GNSS Monitoring and Assessment (IGMA) initiative;
- Building multi-GNSS M&A infrastructure:
 - tracking network;
 - data centers;
 - analysis centers (for precise orbit&clock offset);
 - assessment center.
- Evaluate performance of multi-GNSS, aims to provide data service to GNSS providers and different users;



M&A Parameters Template

Continuously tracking and evaluating performance of multi-GNSS:

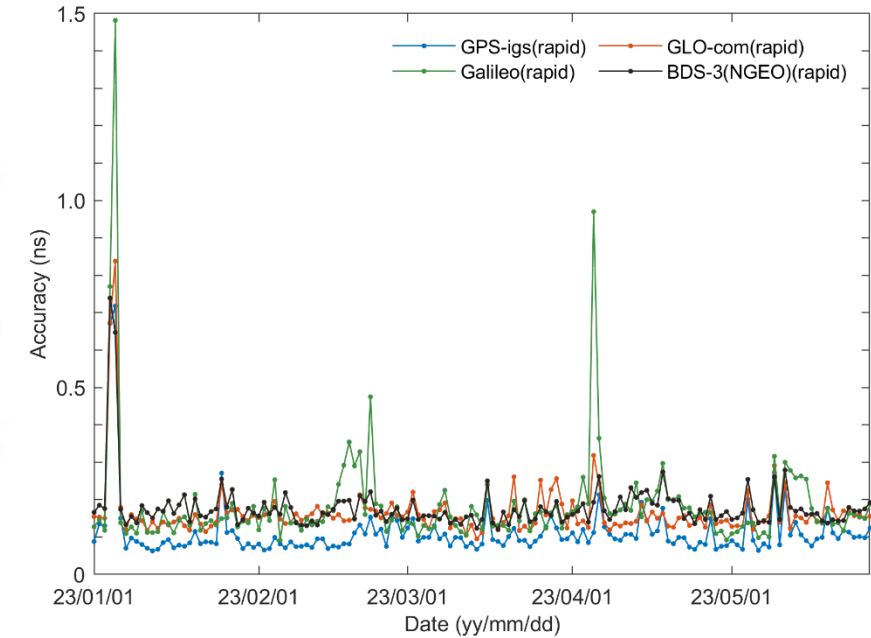
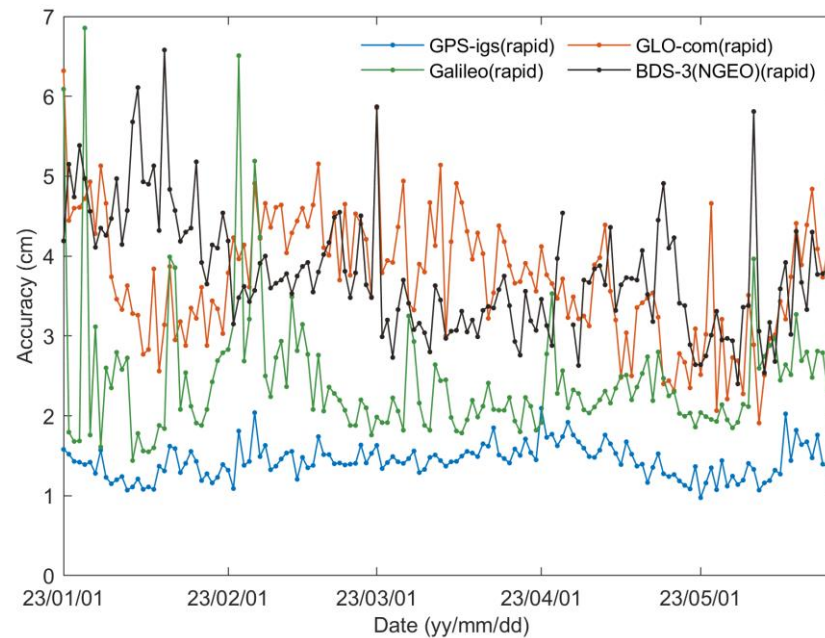
- Signal-in-space range error
- Signal-in-space continuity
- Signal-in-space availability
- UTCOE
- Positioning accuracy (Single/Dual frequency Standard Positioning using pseudorange)
- ...



Precise Products Accuracy

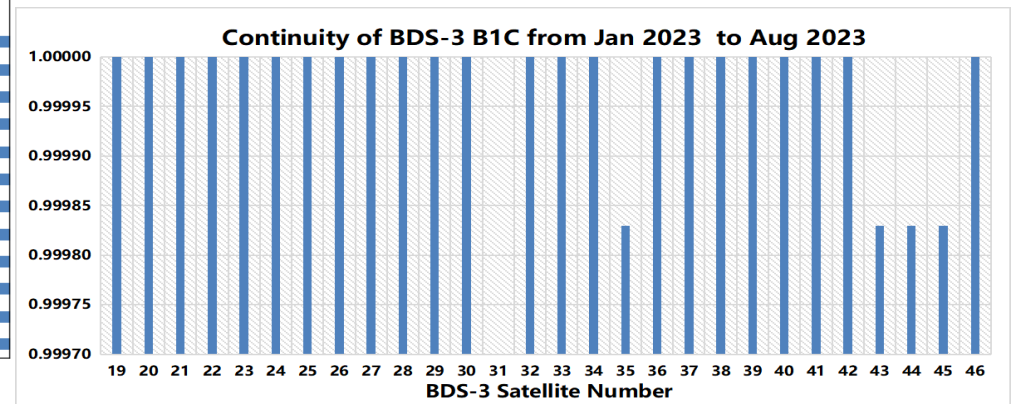
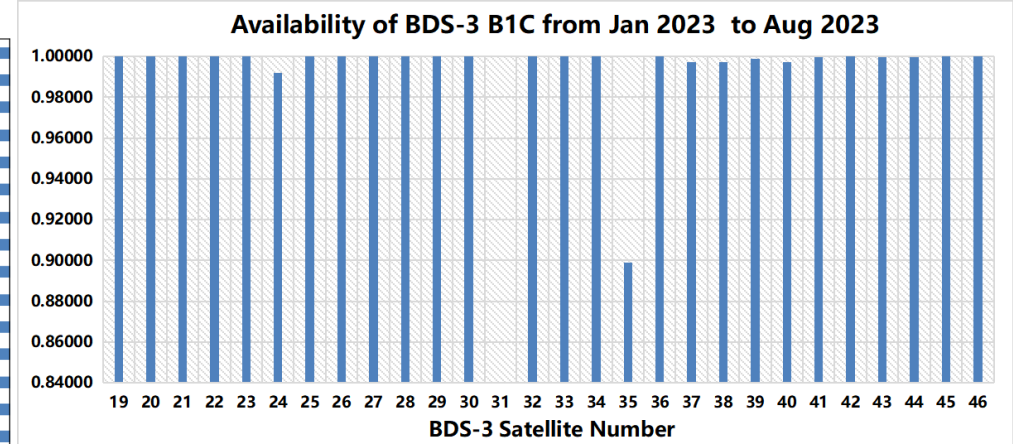
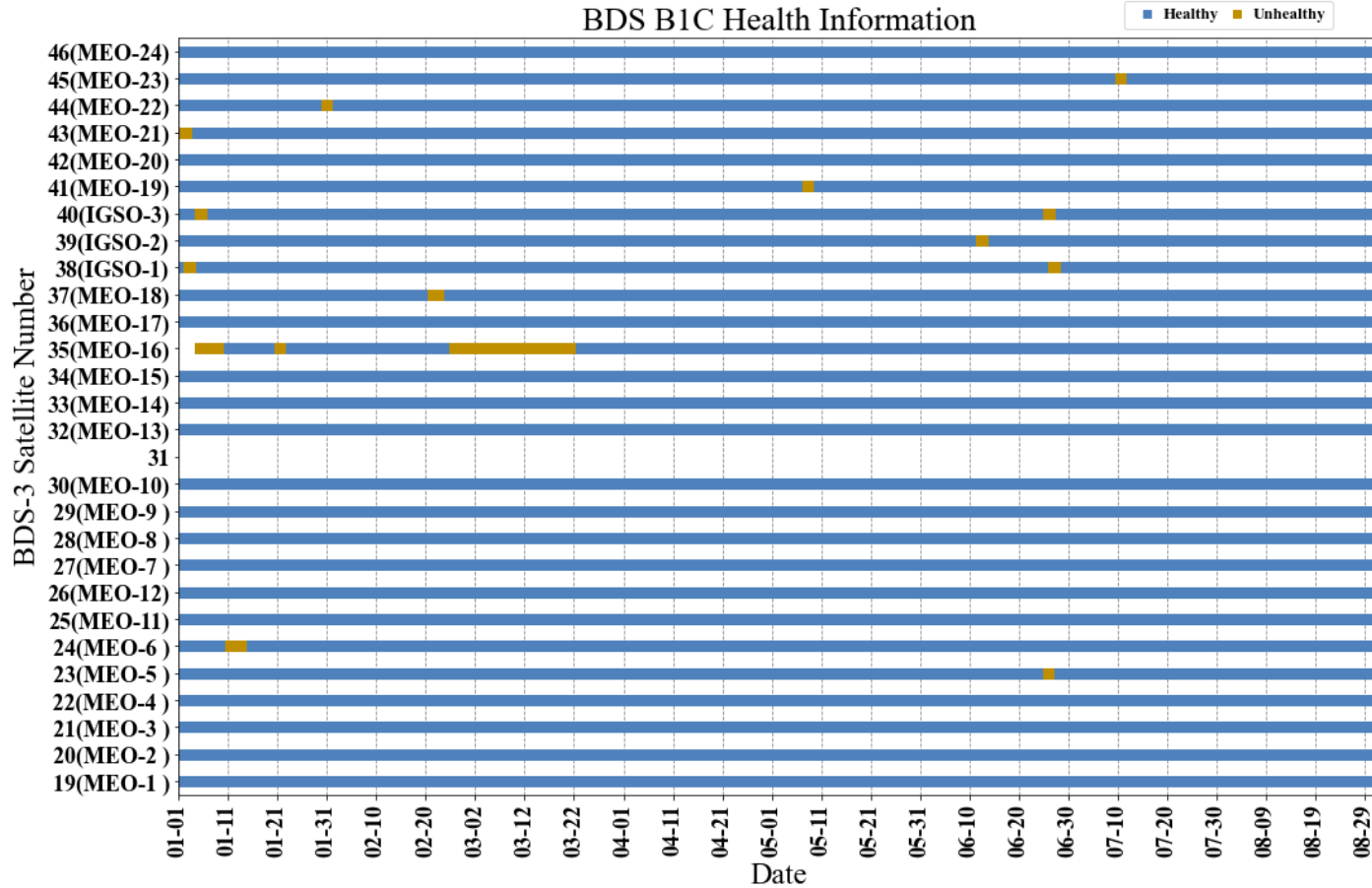
In the year 2023, accuracy of precise orbit and clock offset is compared with IGS products:

- precise orbit is in accuracy of about 5cm compared with IGS products;
- precise clock offset is about 0.2 ns.





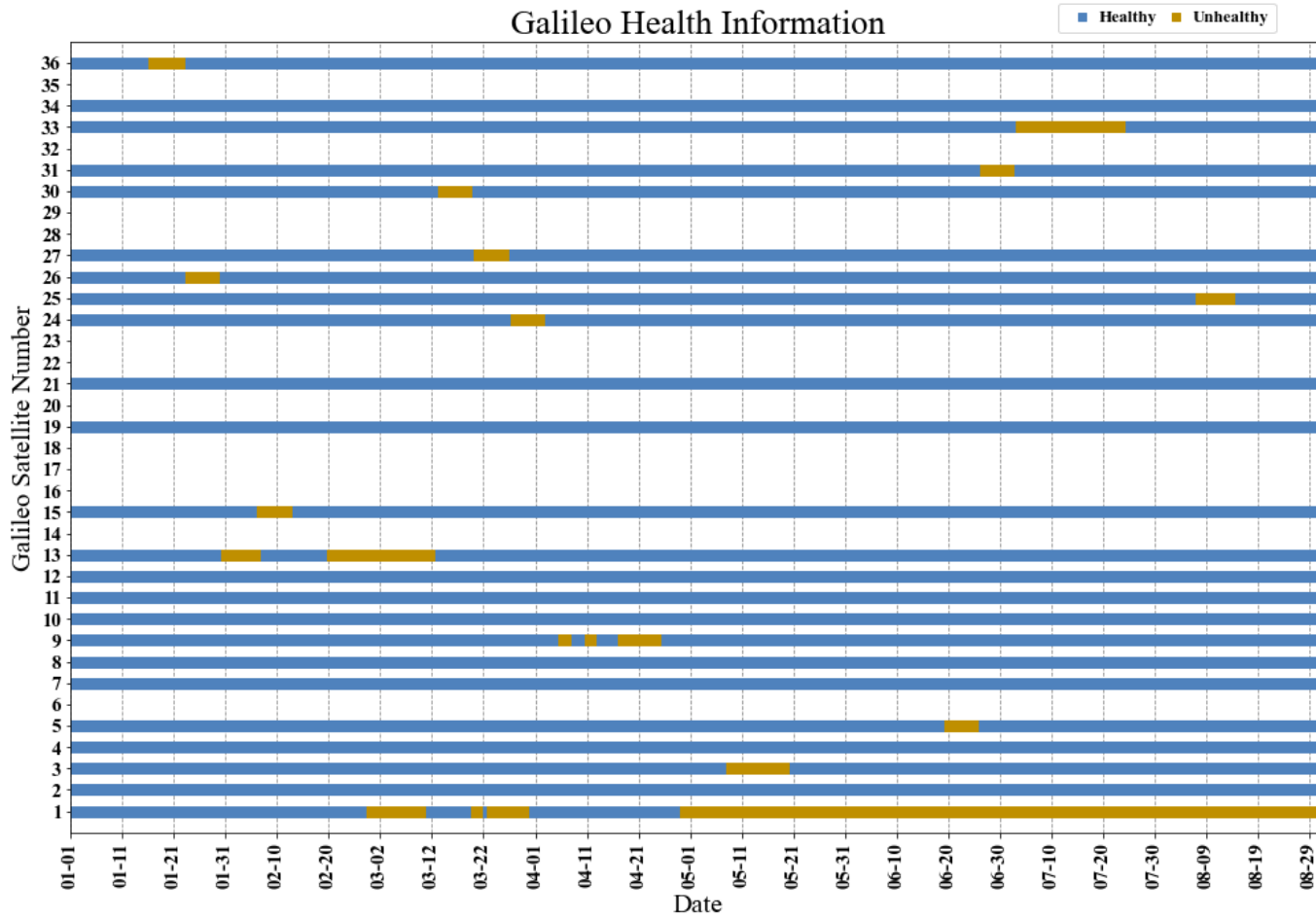
Per Slot Availability & Continuity -- BDS



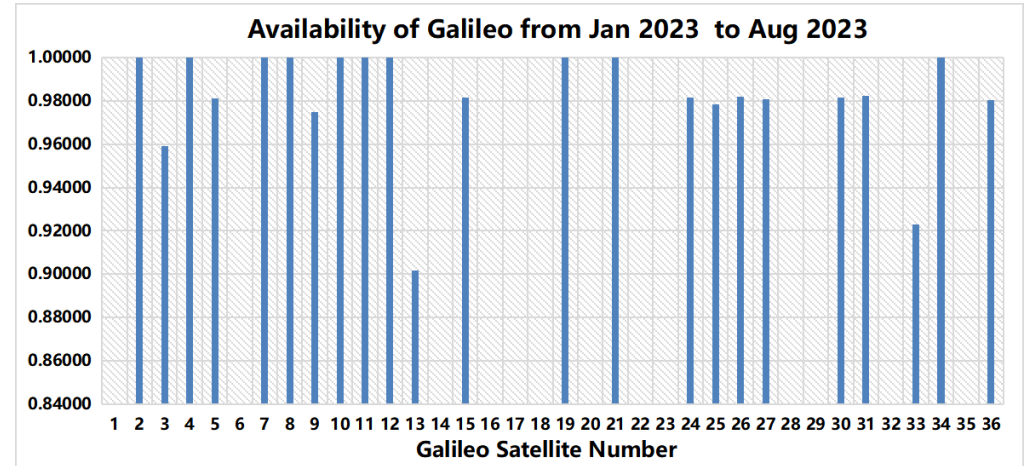


Per Slot Availability & Continuity -- Galileo

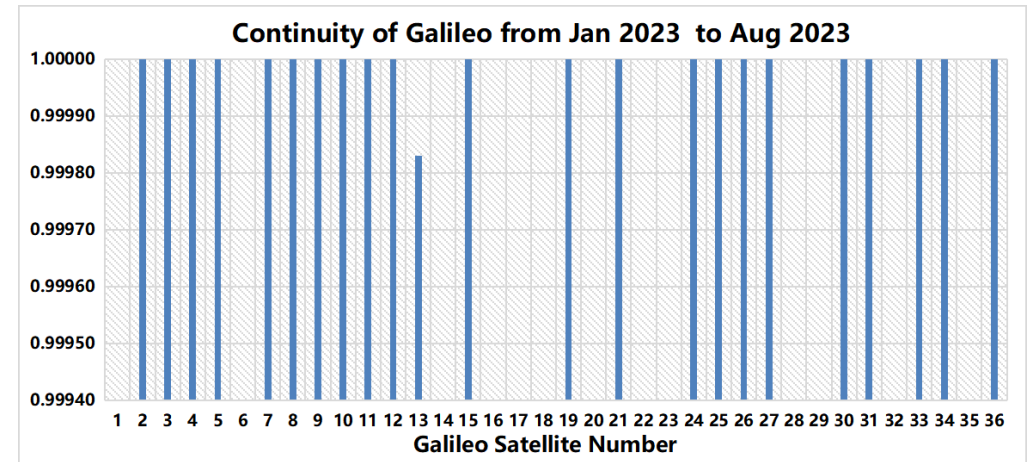
Galileo Health Information



Availability of Galileo from Jan 2023 to Aug 2023



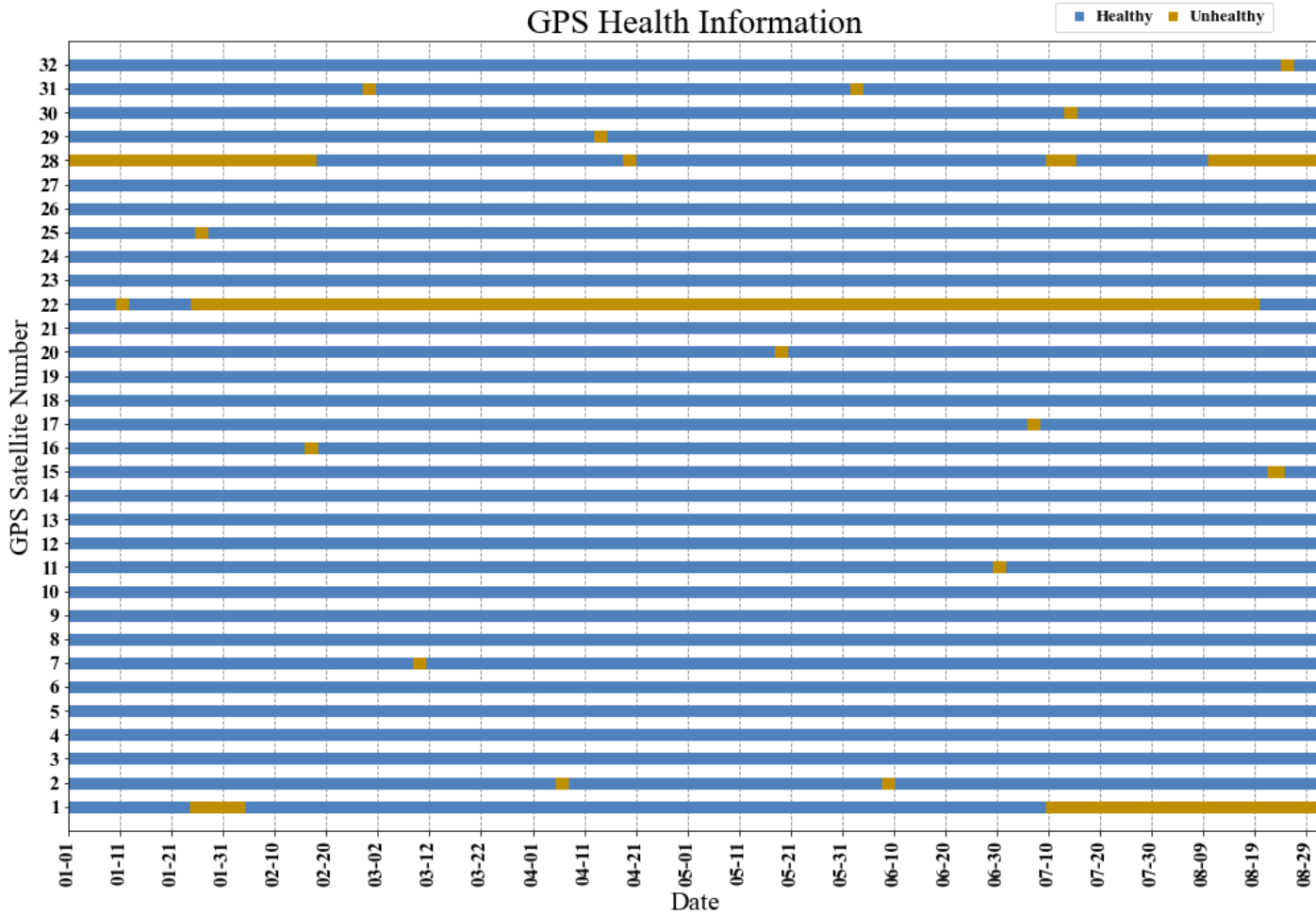
Continuity of Galileo from Jan 2023 to Aug 2023



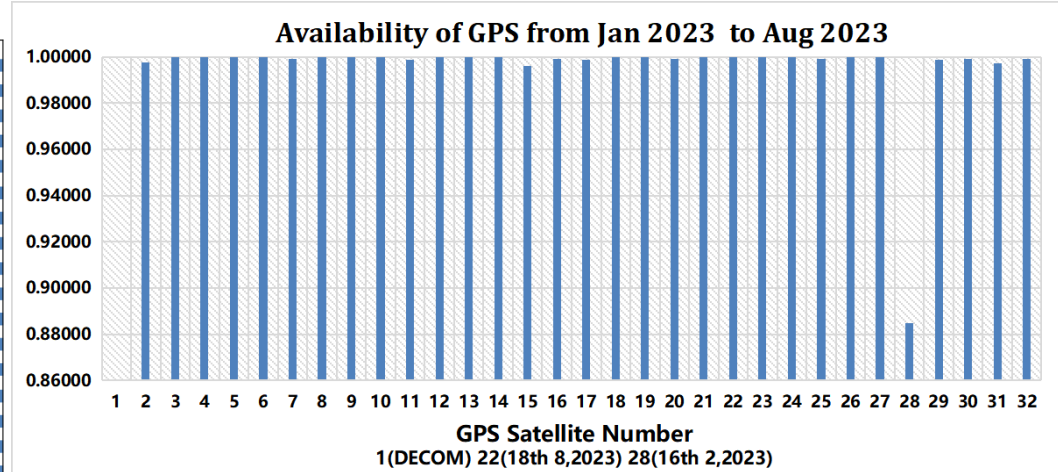


Per Slot Availability & Continuity -- GPS

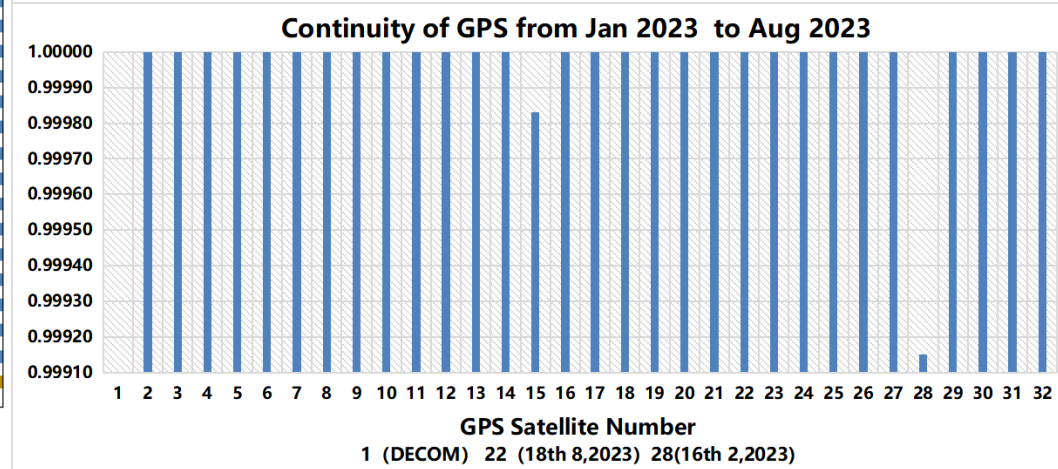
GPS Health Information



Availability of GPS from Jan 2023 to Aug 2023

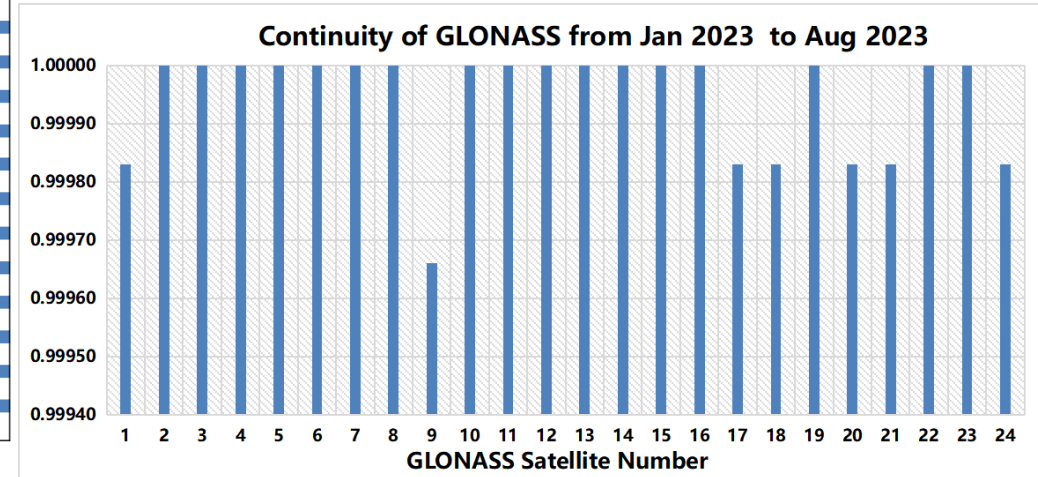
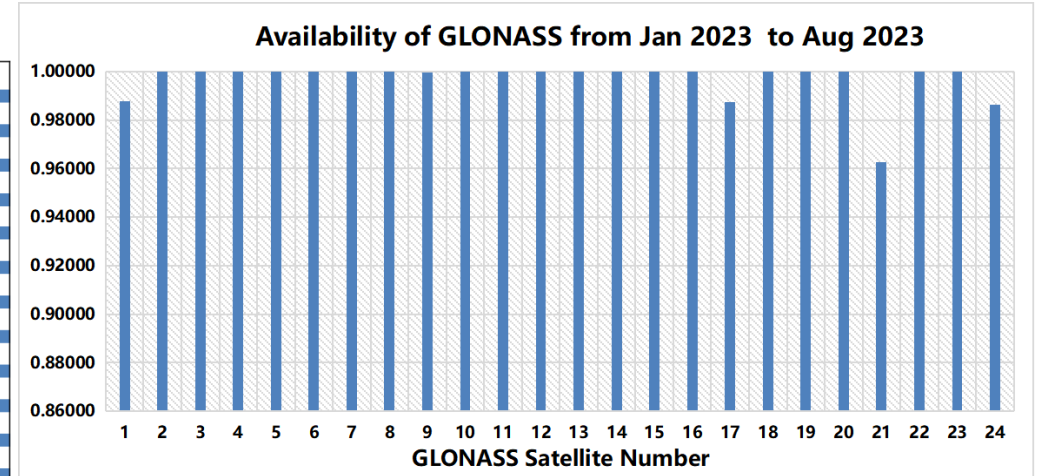
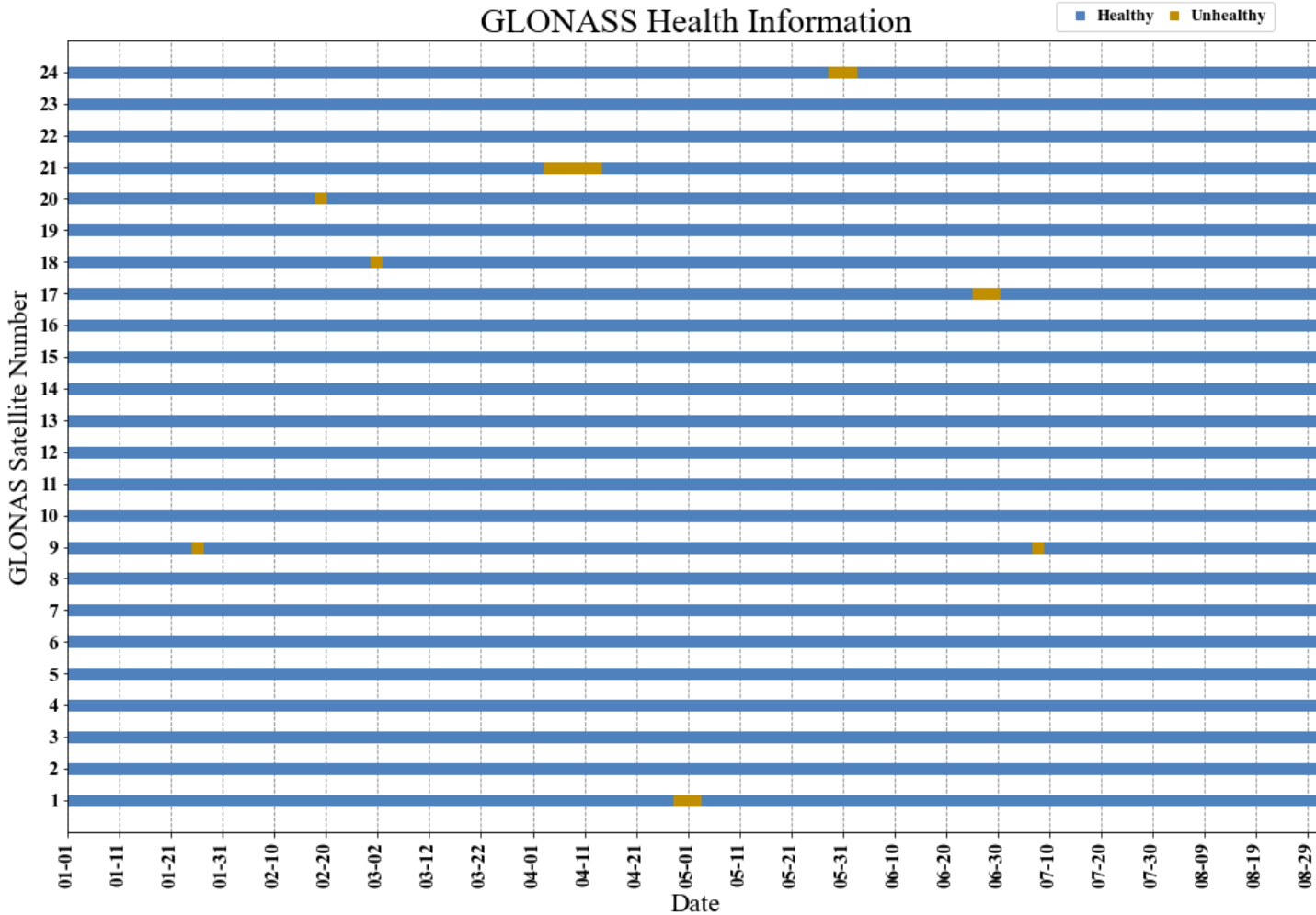


Continuity of GPS from Jan 2023 to Aug 2023

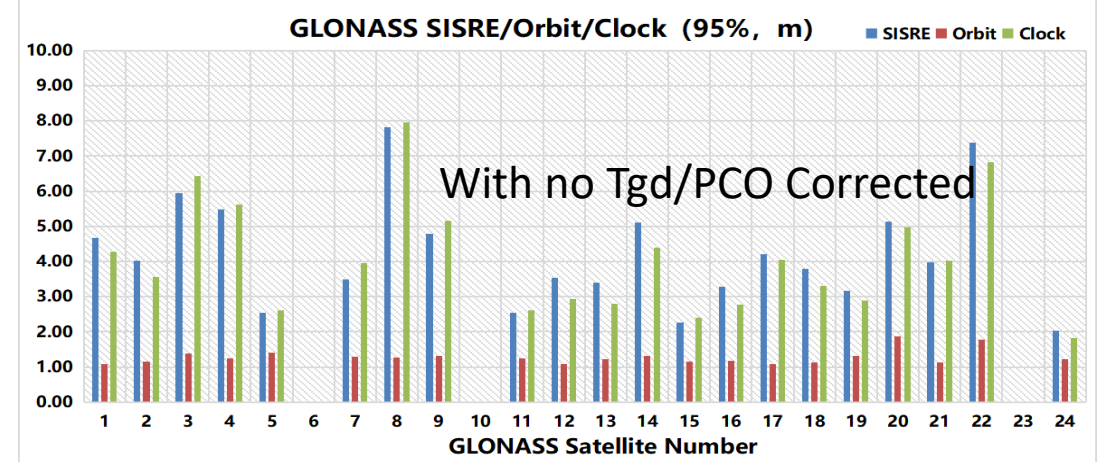
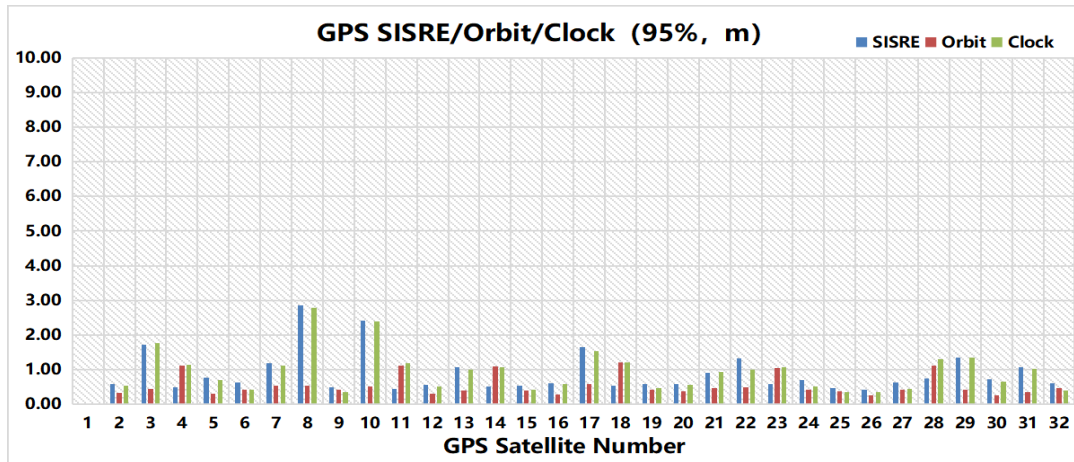
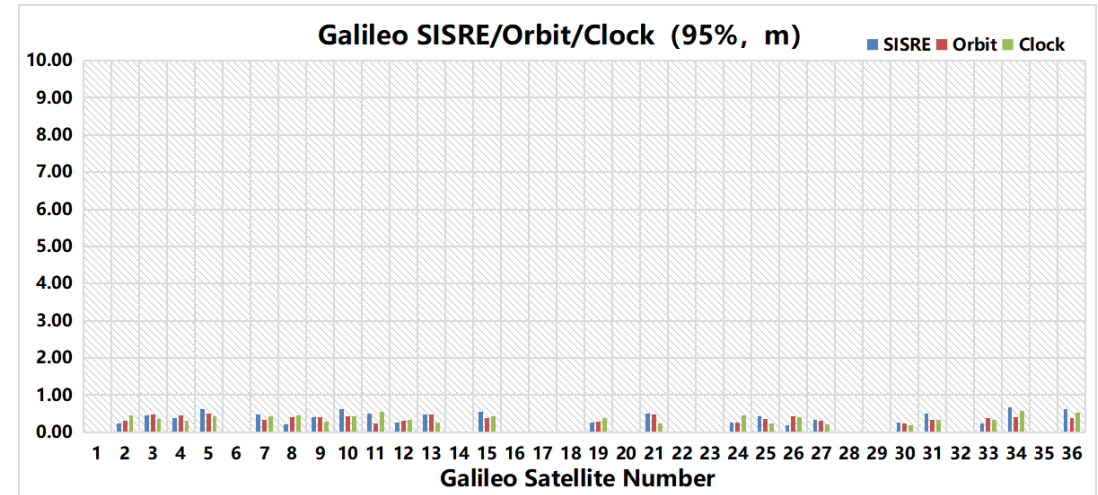
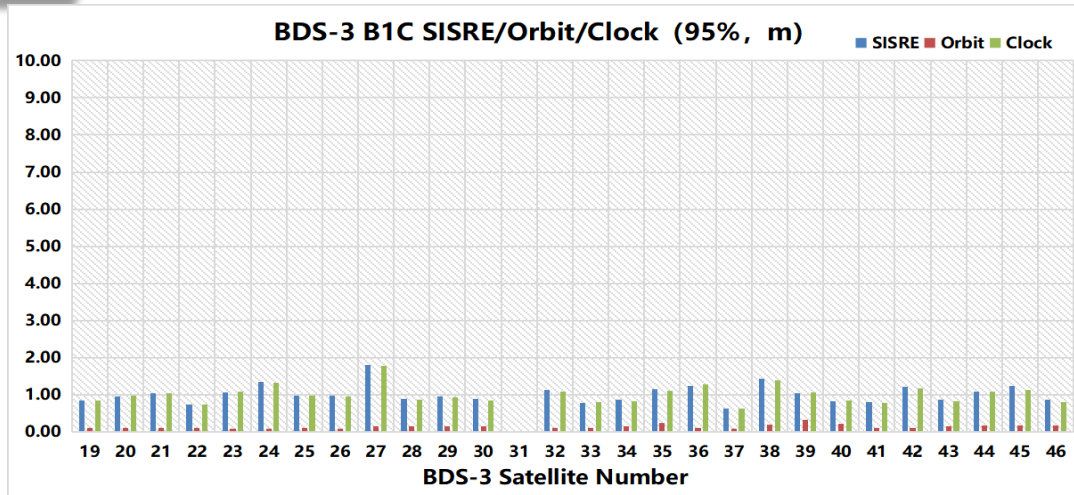




Per Slot Availability & Continuity -- GLONASS



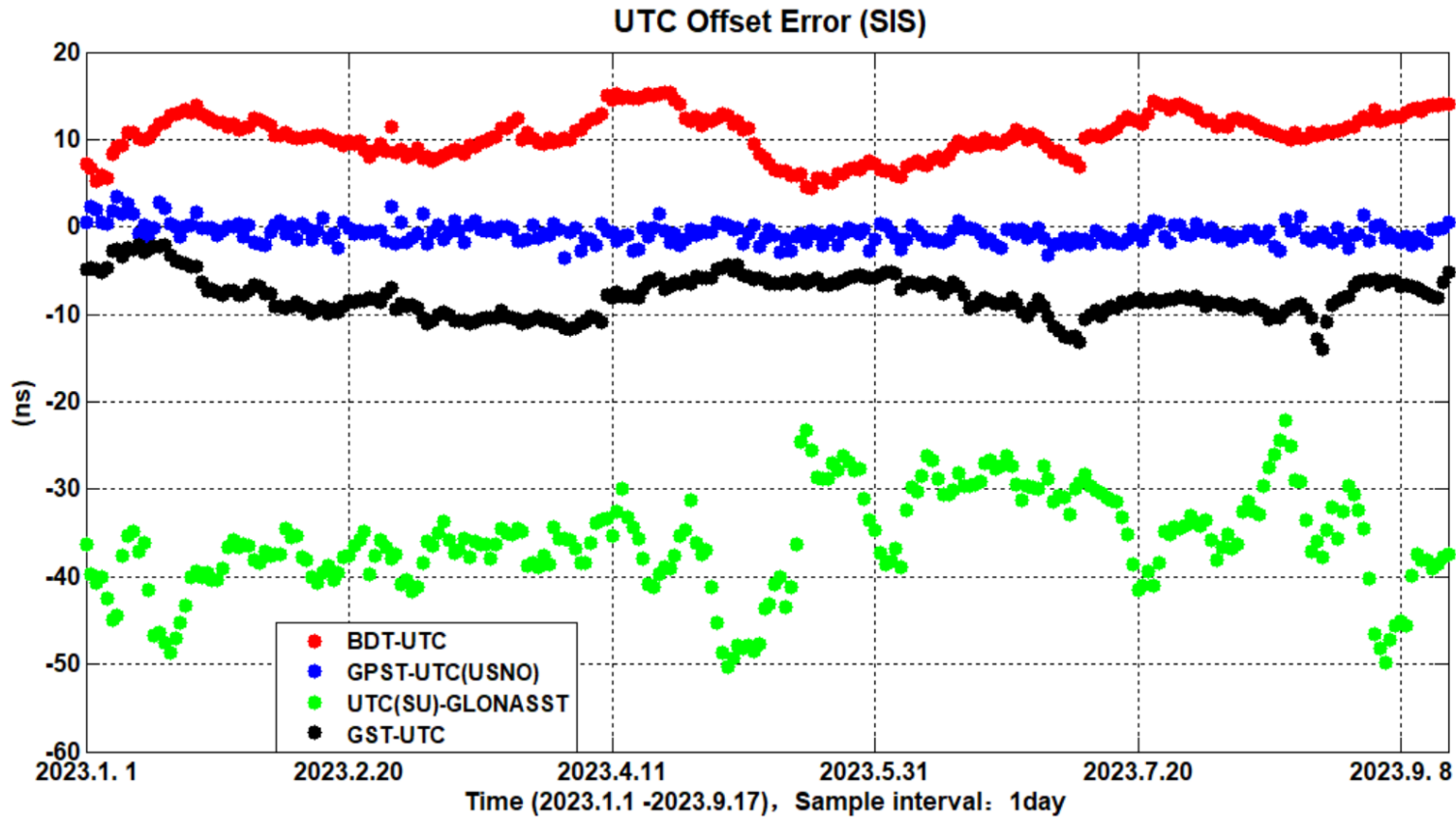
Signal-In-Space Rang Error



SISRE (95%) for BDS/GPS/GLONASS/Galileo (2023 Aug)



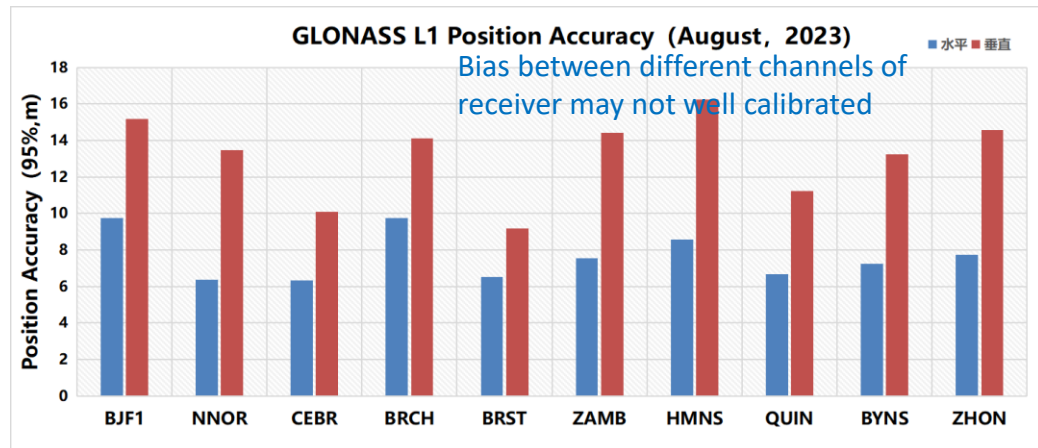
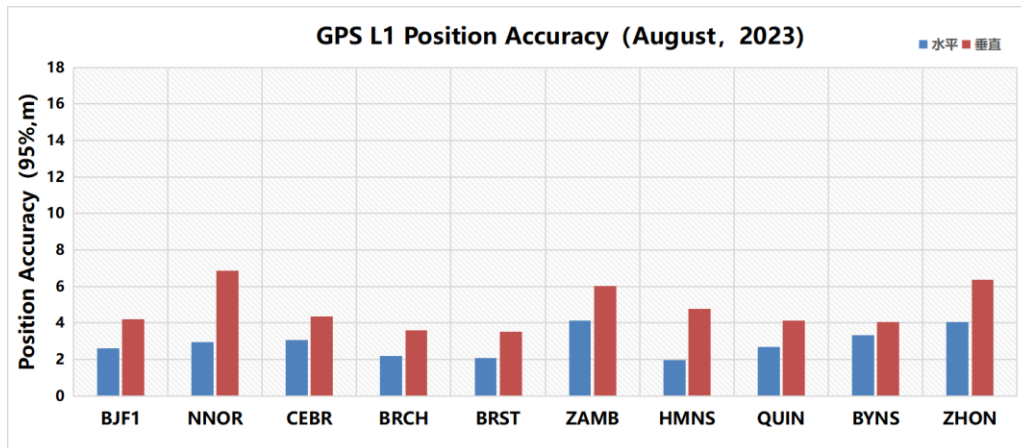
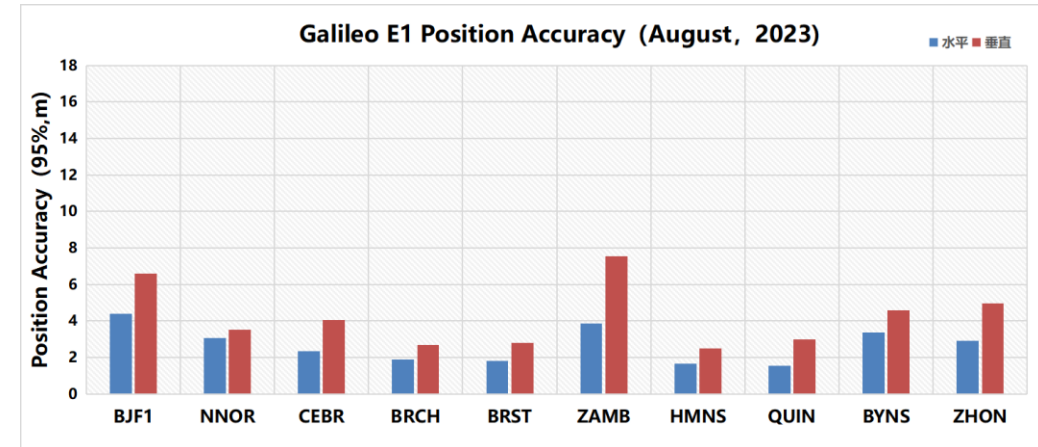
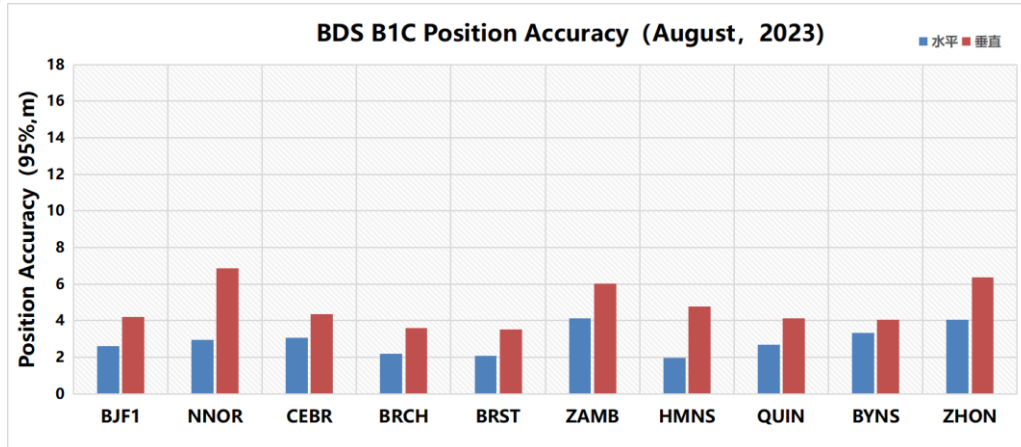
UTC OE



UTC OE, Jan to Sep 2023

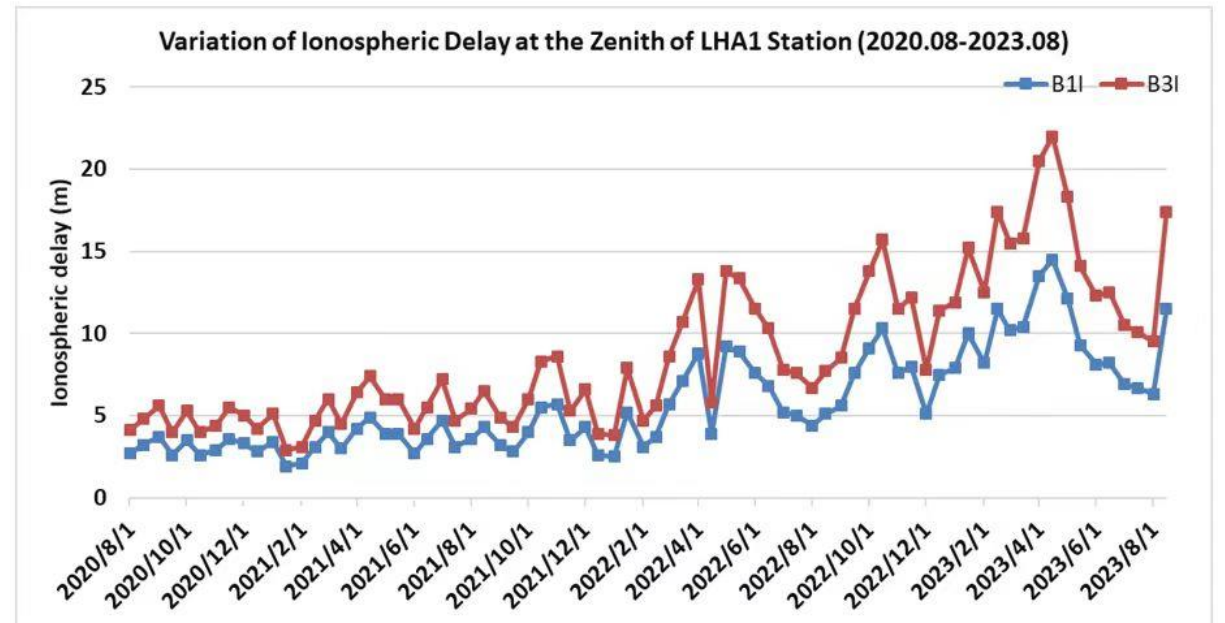
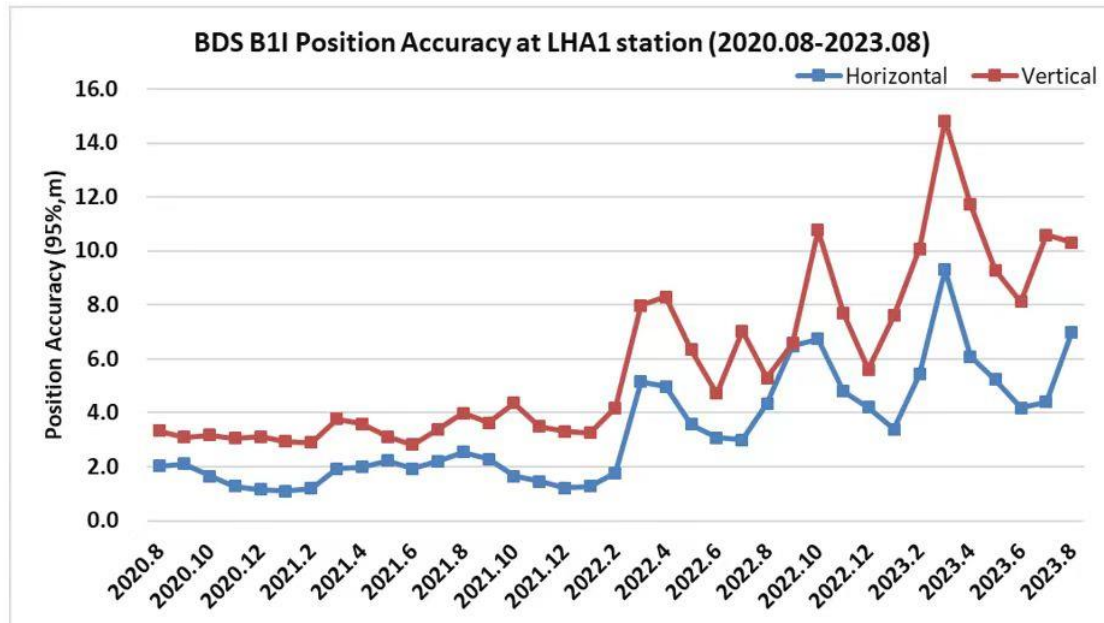
	95%	RMS	AVG	STD
BDS	14.6	10.8	10.5	2.5
GPS	2.5	1.3	-0.7	1.1
GLONASS	47.1	36.4	-35.9	5.7
Galileo	11.0	8.2	-7.9	2.3

Standard Positioning Accuracy



Challenge from Ionosphere Activity

The coming peak solar activity year would be challenged to global GNSS users

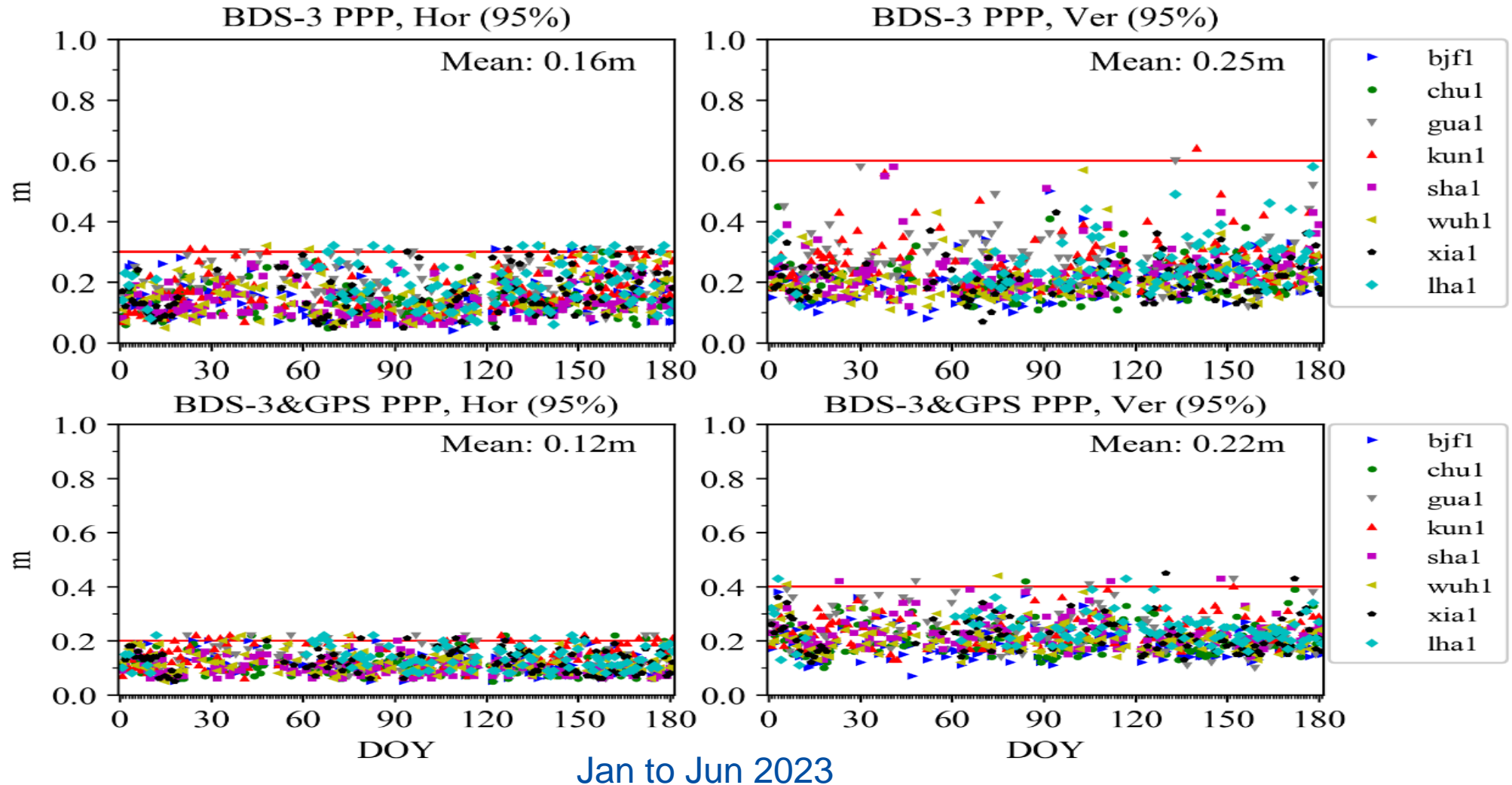




Latest Work

- Promote data transfer protocol to be national standard;
- Tracking BDS PPP-B2b signal and evaluate its performance;
- Apply for Galileo HAS service and evaluate the performance;
- Trying to analysis integrity related parameters for support aviation users(ARAIM);
- Take part in the ongoing ICG IGMA work, commit to share data, contribute to assessment calculation method.

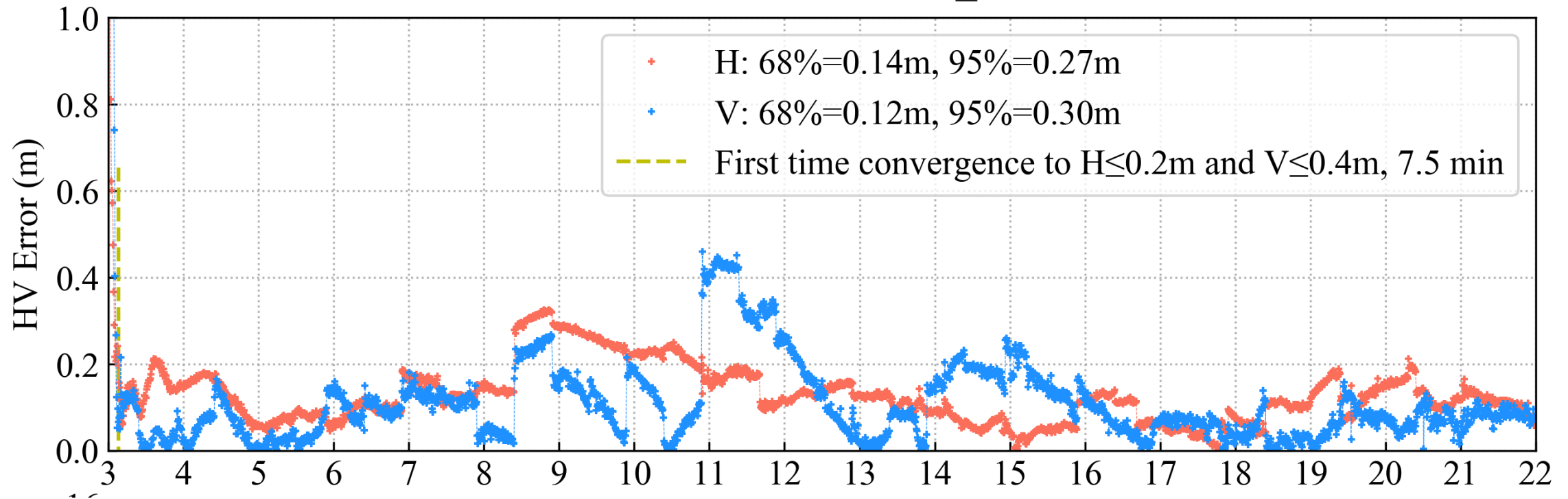
Evaluate BDS PPP(B2b-PPP) Performance





Evaluate Galileo HAS Performance

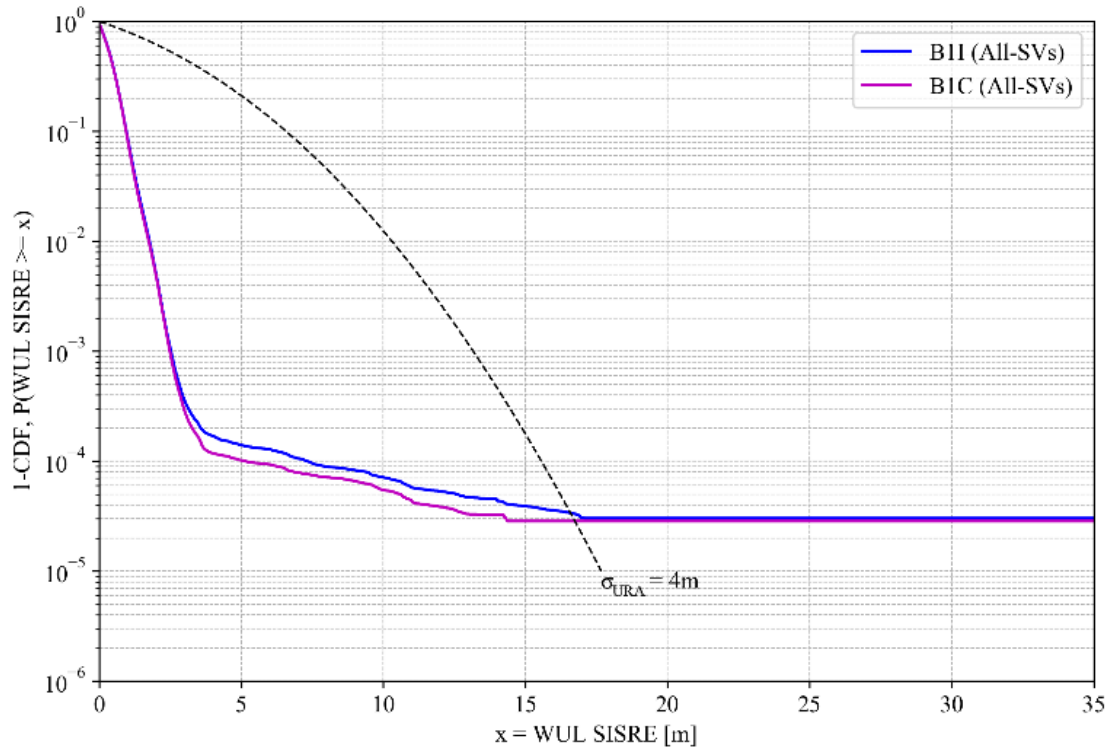
GANP Galileo&GPS_PPP



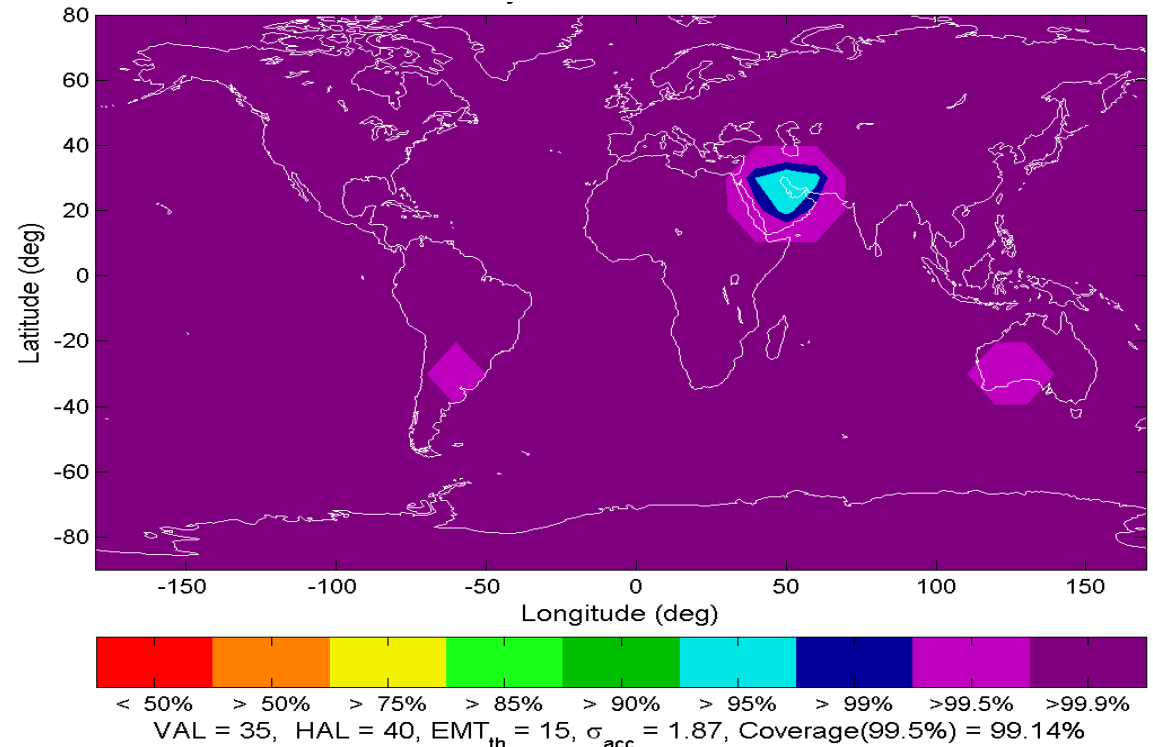
Galileo internet broadcast HAS service, 2023.05.23

ARAIM ISM Parameters Analysis

Overbounding the SIS range error

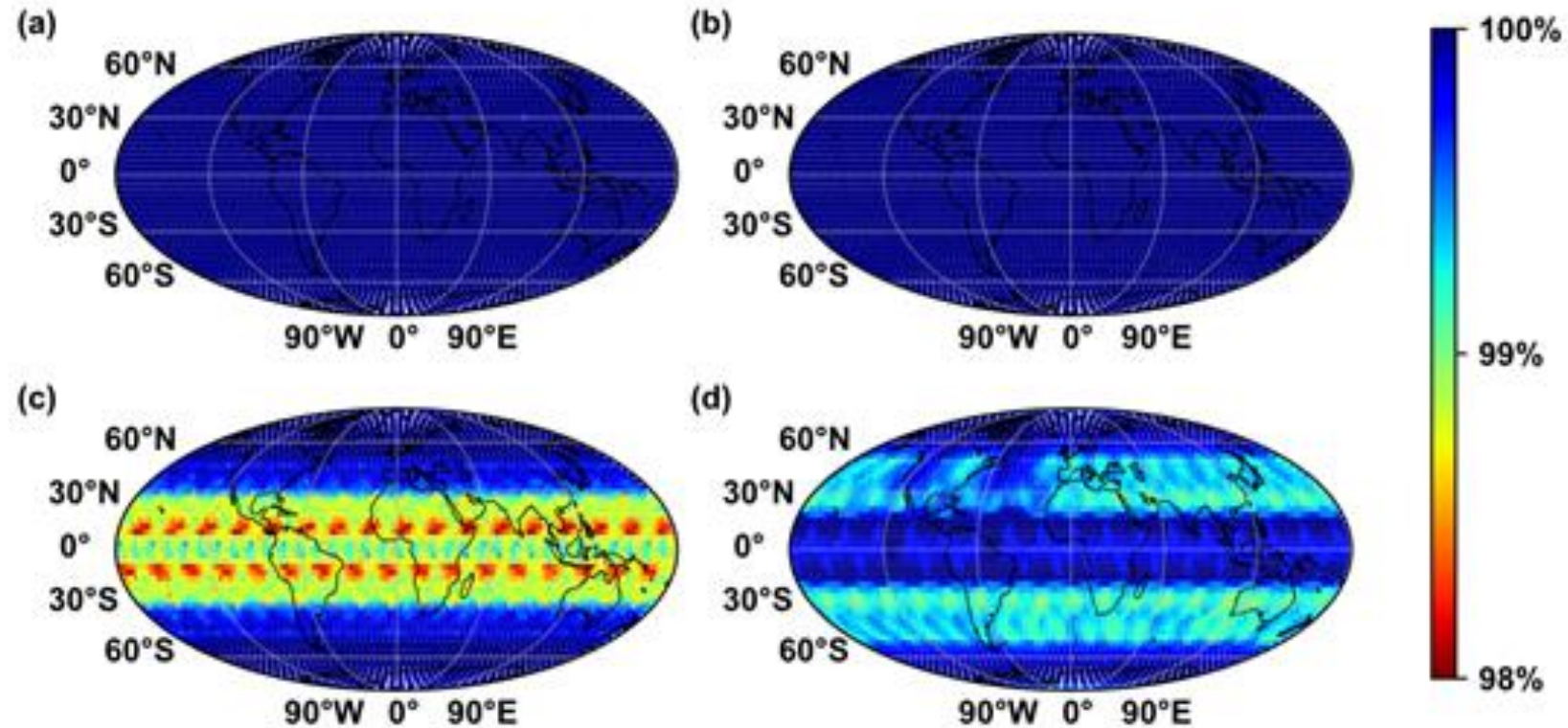


ARAIM User Availability(LPV-200) for multi-GNSS



BDS+Galileo+GPS, Current L1&L5 Constellation

Equal-arch-length Grid Method



Global PDOP availability, mask angle: 5° , BDS+GPS+GLONASS+Galileo, 2021 DOY 251-260



Summary

- Continuously providing assessment results for GNSS service;
- Tracking the new PPP/HAS services of GNSS;
- Trying to support professional application like civil aviation;
- Participate and contribute to IGMA work.

Thank you !

<http://www.igmas.org>