

# Real-Time Working-Group

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## Real-Time Service

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# Outline

- Overview of Real-Time Working Group Charter
- Overview of AC Contributions and RTS Combinations
- Progress since last AM Meeting
- Future Work



# Overview of the **Working Group Charter (1)**

- Maintain and expand the multi-GNSS real-time reference station network of IGS stations
- Monitor and improve the quality of GNSS real-time observations and broadcast ephemerides
- Provide precise real-time corrections for orbits, clock, biases and atmospheric delays
- Provide and monitor combinations of correction data streams for IGS real-time products

For more information visit <https://igs.org/wg/real-time/#charter>

# Overview of the **Working Group Charter (2)**

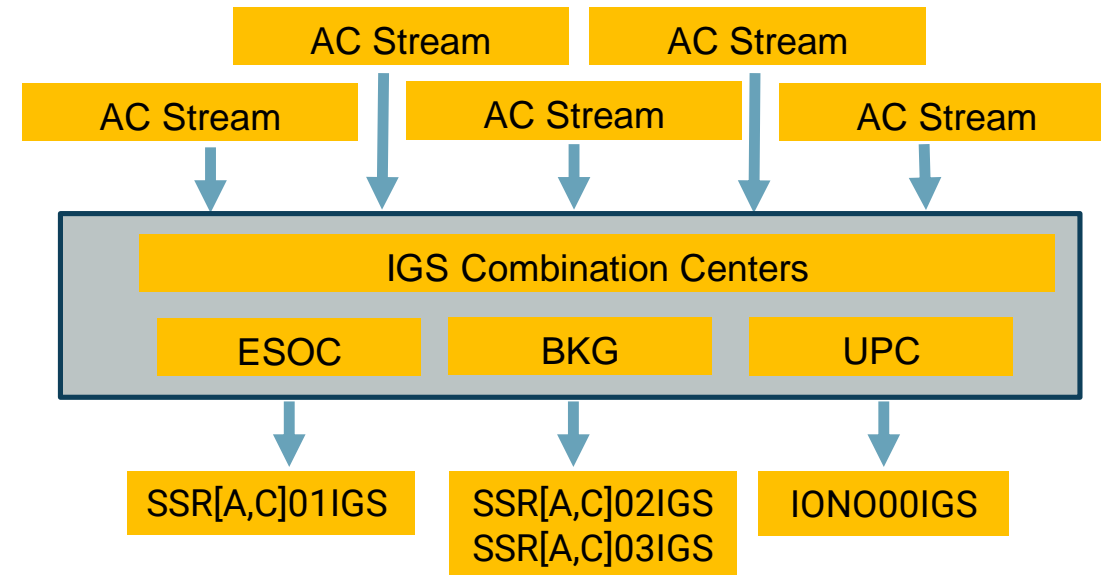
- Develop new and improved RT products
- Work with the RT ACC to transition these products to the Real Time Service (RTS)
- Develop and improve open standards for real-time data and products
- Investigate new streaming technologies
- Provide access to reference station streams and correction streams through the internet

For more information visit <https://igs.org/wg/real-time/#charter>

# Overview of Contributions and Combinations

Analysis Center	Mountpoints*	GPS	GLO	GAL	BDS	VTEC
BKG	SSR[A,C]00BKG	X	X	X		
CAS	SSR[A,C]00CAS	X	X	X	X	X
CNES	SSR[A,C]00CNE	X	X	X	X	X
DLR (GSOC)	SSR[A,C]00DLR	X	X	X	X	
ESA (ESOC)	SSR[A,C]00ESA SSR[A,C]01ESA	X				
GFZ	SSR[A,C]00GFZ SSR[A,C]01GFZ	X	X	X	X	
GMV	SSR[A,C]00GMV	X	X	X	X	
NRCan	SSR[A,C]00NRC	X				
SHAO	SSR[A,C]00SHA	X	X	X	X	
UPC	IONO00UPC					X
Wuhan Uni	SSR[A,C]00WHU	X	X	X	X	X

<https://igs.org/rtsc/contributors/>



\*) SSRA indicated APC reference, SSRC indicates CoM reference of orbit corrections

# Overview of Contributions and Combinations

Analysis Center	Mountpoints*	GPS	GLO	GAL	BDS	VTEC
BKG	SSR[A,C]00BKG	X	X	X		
CAS	SSR[A,C]00CAS	X	X	X	X	X
CNES	SSR[A,C]00CNE	X	X	X	X	X
DLR (GSOC)	SSR[A,C]00DLR	X	X	X	X	
ESA (ESOC)	SSR[A,C]00ESA SSR[A,C]01ESA	X				
GFZ	SSR[A,C]00GFZ SSR[A,C]01GFZ	X	X	X	X	
GMV	SSR[A,C]00GMV	X	X	X	X	
NRCan	SSR[A,C]00NRC	X				
SHAO	SSR[A,C]00SHA	X	X	X	X	
UPC	IONO00UPC					X
Wuhan Uni	SSR[A,C]00WHU	X	X	X	X	X

<https://igs.org/rtsc/contributors/>

Agency	Mountpoints*	GPS	GLO	GAL	BDS	VTEC
ESOC	SSR[A,C]01IGS	X				
BKG	SSR[A,C]02IGS	X	X	X		
BKG	SSR[A,C]03IGS	X	X	X	X	
UPC	IONO00IGS					X

<https://igs.org/rtsc/products/>

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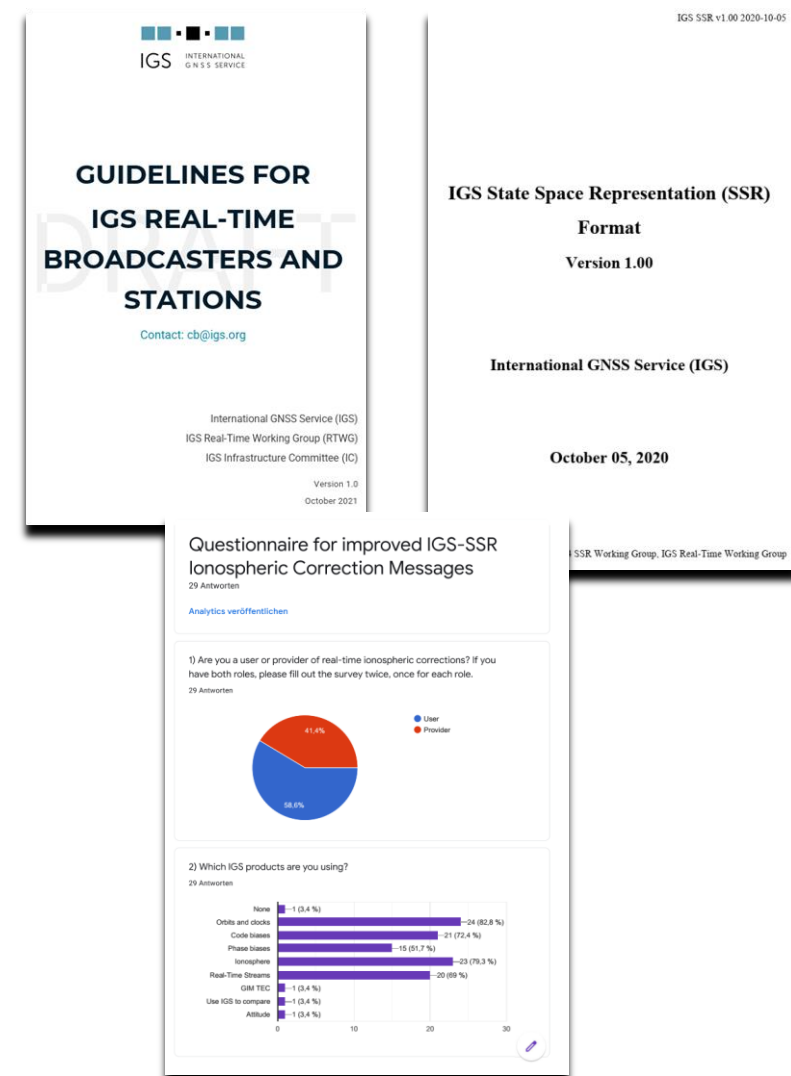
SSR[A,C]01IGS
 SSR[A,C]02IGS  
SSR[A,C]03IGS
IONO00IGS

\*) SSRA indicated APC reference, SSRC indicates CoM reference of orbit corrections

# Progress since last AM Meeting (Dec 2019)

## Real-Time Working Group

- 3 RT-WG video conferences (~20 members attending)
- Broadcaster Guidelines ready for release (in co-operation with infrastructure committee)
- New experimental Real-Time Ionospheric Combination Product (in co-operation with IONO-WG)
- Discussion of new IGS-SSR messages for attitude and PCO/PCV (IGS-SSR format task-force)
- Survey for improved IGS-SSR ionosphere messages (in co-operation with IONO-WG)
- New AC (SHAO, China) & station contributor (USACH, Chile)



# Progress since last AM Meeting (Dec 2019)

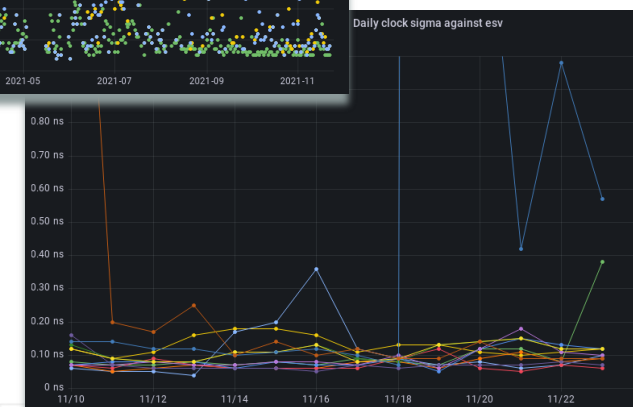
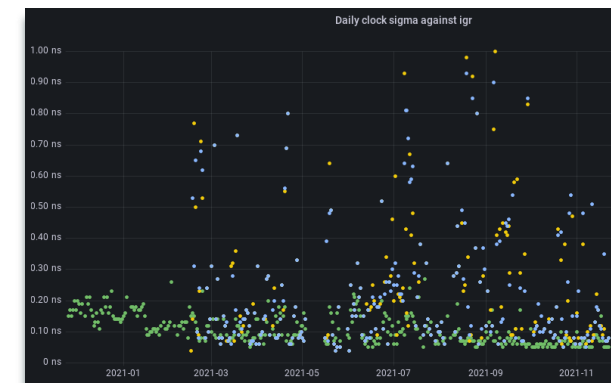
## Real-Time Service

- Transition to IGS-SSR for the RTS combination products and for all but one of the ACs
- Combination performance improvements
  - Excluding incompatible solutions from ESOC combination
  - Alignment of APC reference points to use single-frequency APC
- Extension of BKG combination to include Galileo and Beidou (in addition to GPS & GLONASS)
- Monitoring of AC streams and BKG combination streams extended to cover Galileo (in addition to GPS & GLONASS)



# Progress since last AM Meeting (Dec 2019)

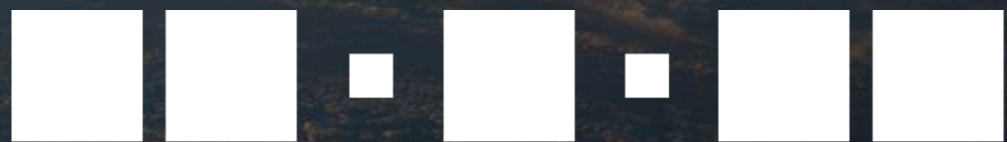
- Major website update by RT-ACC, RT-WG & IGS-CB (see <https://igs.org/wg/real-time> & <https://igs.org/rtts>)
- New and updated content on user access, formats, products, monitoring and contributors
- Daily updated orbit and clock monitoring plots
  - Generated by BKG from comparison reports from ESOC
  - Plot history of 365 days for RTS combinations (GPS only)
  - Plot history 14 days for AC and RTS solutions (GPS+GLO+GAL)
- Daily updated ionospheric correction monitoring plots
  - Generated by UPC based on reference from Jason-3 data
- PPP performance monitoring by BKG with BNC



## Future Work

- Planning of upcoming IGS workshop activities
- Further extension of IGS-SSR standard
  - GNSS satellite attitude message
  - GNSS satellite SRP/CoM offset & PCV, GDV
  - Improved ionospheric correction message
- Improved security concept for IGS caster infrastructure
- Monitoring of BeiDou in AC+RTS streams
- Use official IGS multi-GNSS batch product for monitoring of real-time streams





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GNSS SERVICE

**Thank You!**

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