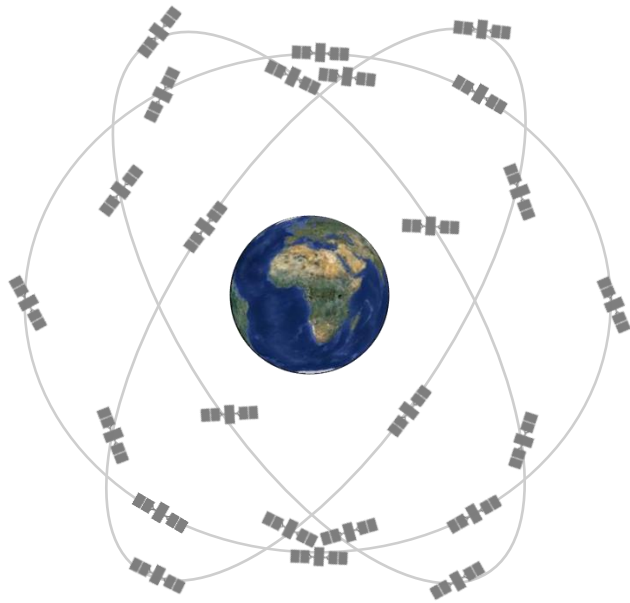


GNSS Signal Generation

GLONASS

Facts and figures

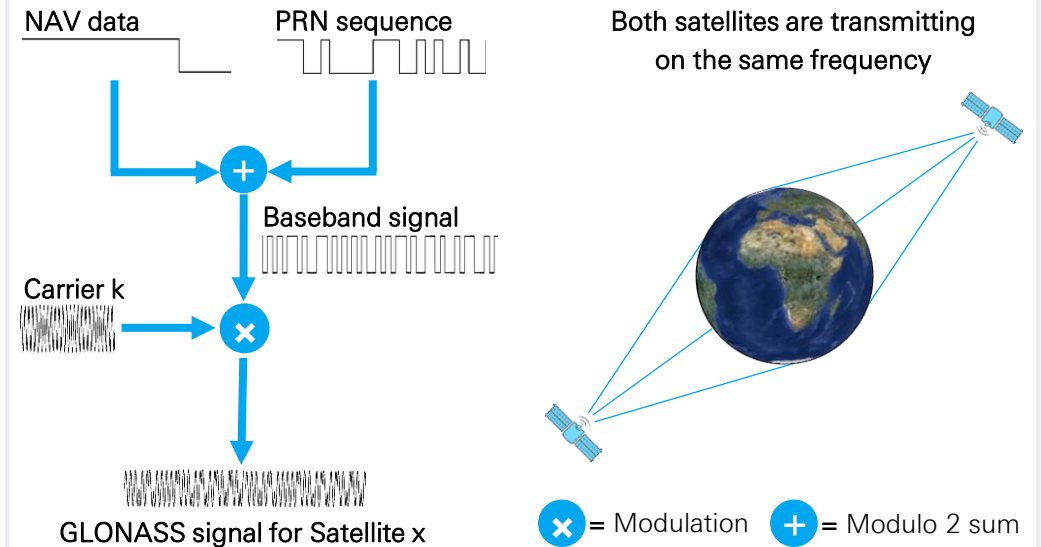


- Operated by the Russian government
- Provides free standard positioning service (ST) and precision positioning service (VT) for authorized users
- 24 baseline satellites; currently 23 operational SVs
- 3 orbital planes with an inclination of 64.8°
- Orbital altitude: ~19.150 km
- Orbital period: 11h 16min
- Ground track repetition period: 8 sidereal days

GLONASS signal plan

Service name	C/A	P	G3I G3Q
Frequency band	G1 G2	G1 G2	G3
Center frequency [MHz]	$1602 \pm k \cdot 0.5625$ $1246 \pm k \cdot 0.4375$ $k \in [-7,6]$	$1602 \pm k \cdot 0.5625$ $1246 \pm k \cdot 0.4375$ $k \in [-7,6]$	1202.025
Modulation	BPSK(0.5)	BPSK(5)	QPSK(10)
Access technique	FDMA	FDMA	CDMA
Code frequency [MHz]	0.511	5.11	1.023
PRN code length	511	$5.11 \cdot 10^6$	10230
Data rate [bps]	50	50	100

Signal modulation



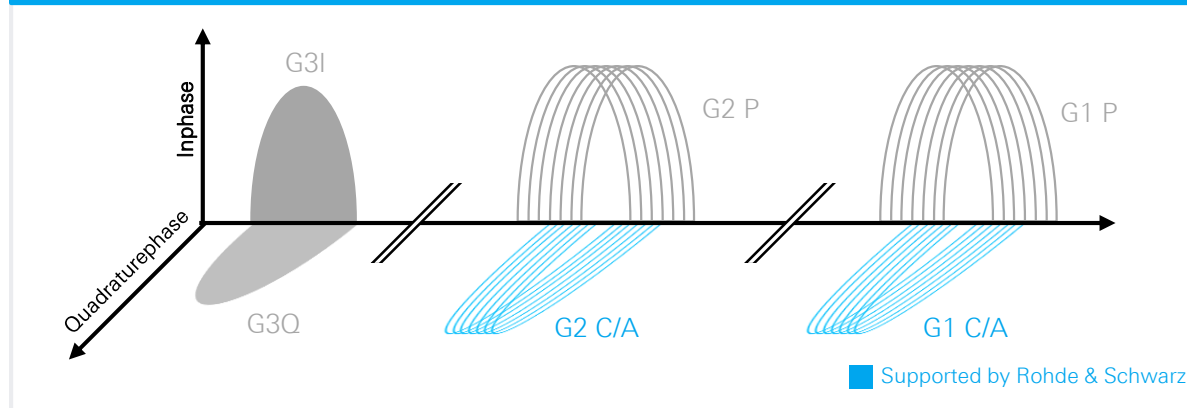
Your challenge

- Glonass technology is found in a wide variety of applications, reaching from car navigation systems over geodetic measurement equipment to personal fitness trackers
- The performance of each newly developed Glonass receiver has to be tested before it is brought to market
- Controlled and realistic conditions are a prerequisite to get conclusive test results
- Glonass receivers cannot be tested in a real-world environment since this is time-consuming, costly and almost impossible to reproduce
- The structure of Glonass signals is complex and therefore difficult to create manually

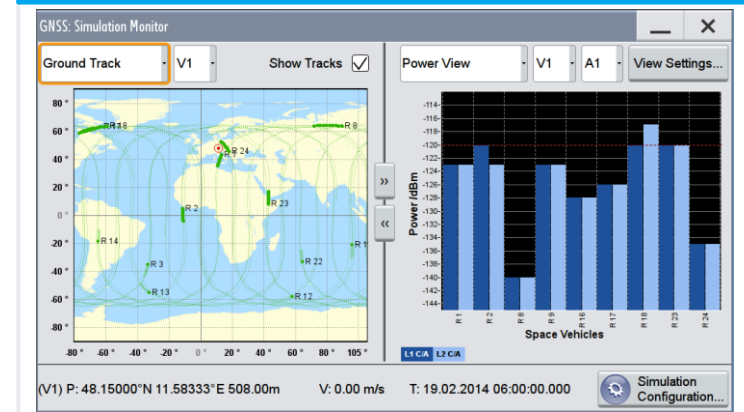
Our solution

- Use the R&S®SMBV100A or the R&S®SMW200A to simulate complex satellite constellations in real-time and with unlimited simulation time
- Perform tests in the lab under controlled and repeatable conditions using a R&S®GNSS simulator
- Perform production tests with the R&S®SMBV-P101 or pre-computed waveforms from R&S®WinIQSIM2
- Generate signals for all available GNSS systems:
 - Glonass (C/A)
 - GPS (C/A, P, L2C), Galileo (E1 OS), Beidou (B1I,B2I)

GLONASS spectrum



GLONASS simulation in the R&S®SMW200A



Combined G1 C/A and G2 C/A simulation performed by the R&S®SMW200A.

Rohde & Schwarz Solutions for GNSS Signal Generation



- GNSS simulator, R&S®SMBV100A
- GNSS simulator, R&S®SMW200A
- GNSS production tester, R&S®SMBV-P101
- GNSS waveforms with R&S®WinIQSIM2