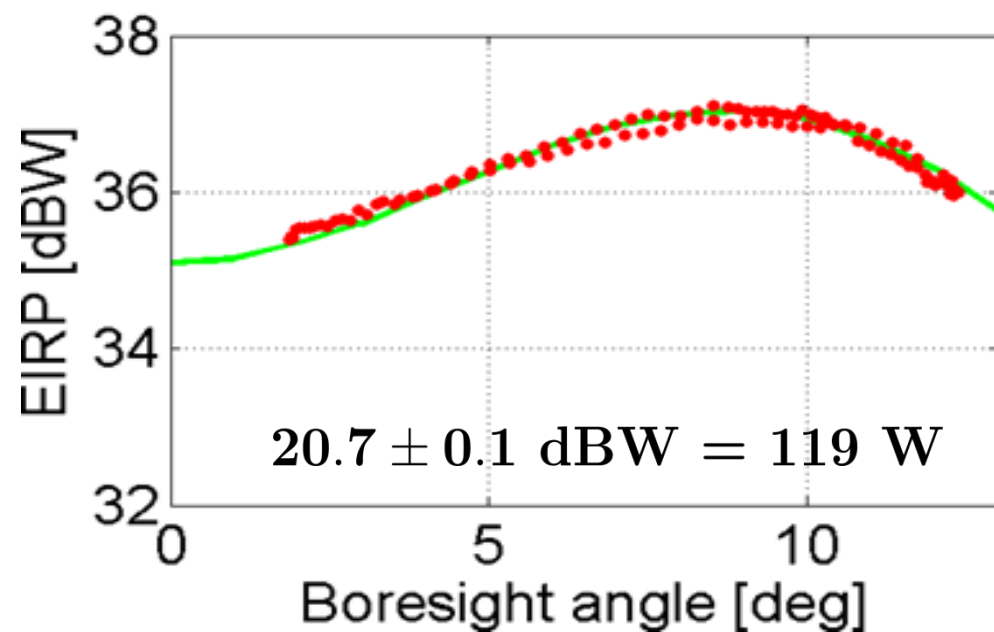
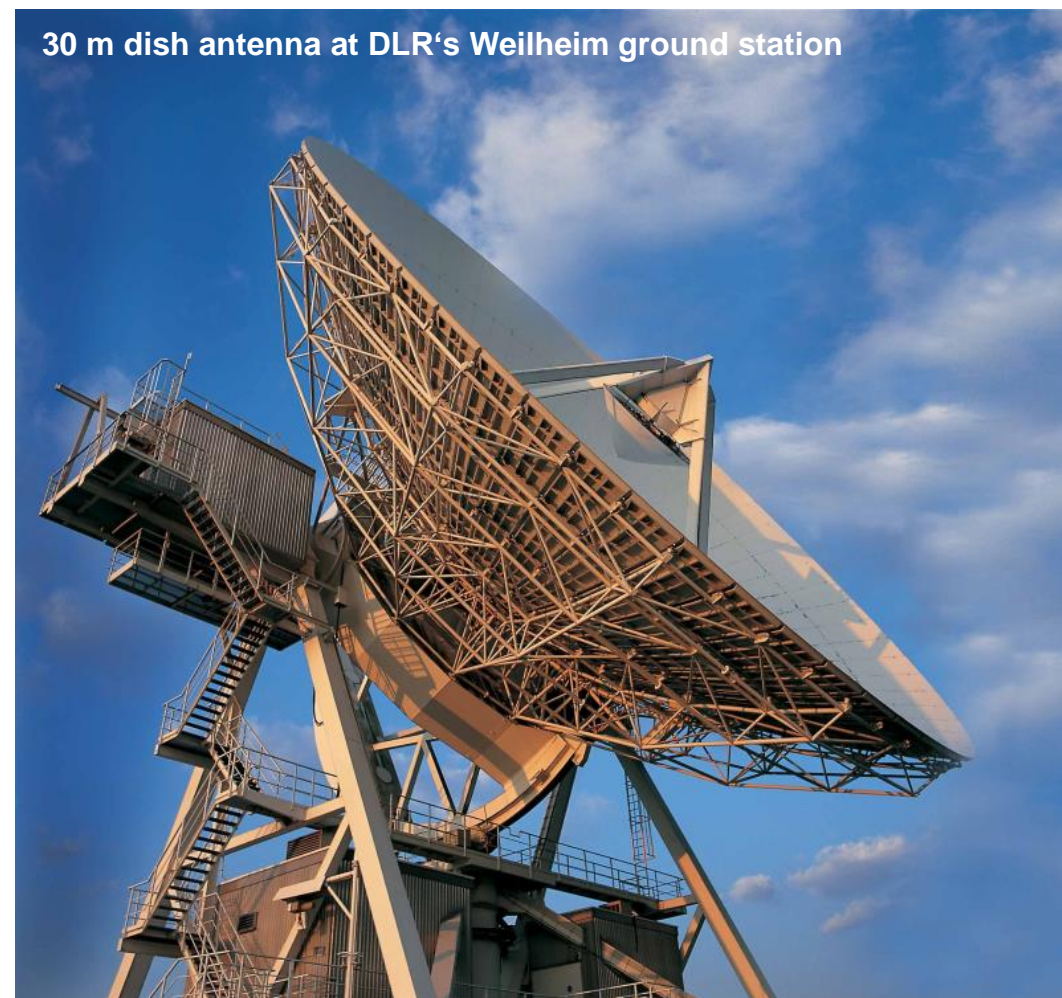


GNSS Satellite Transmit Power

- Needed for computation of antenna thrust
- Measurement of Equivalent Isotropically Radiated Power (EIRP) with high-gain antenna
- Corrections due to free space loss and atmosphere, transmit and receive antenna gain pattern



30 m dish antenna at DLR's Weilheim ground station

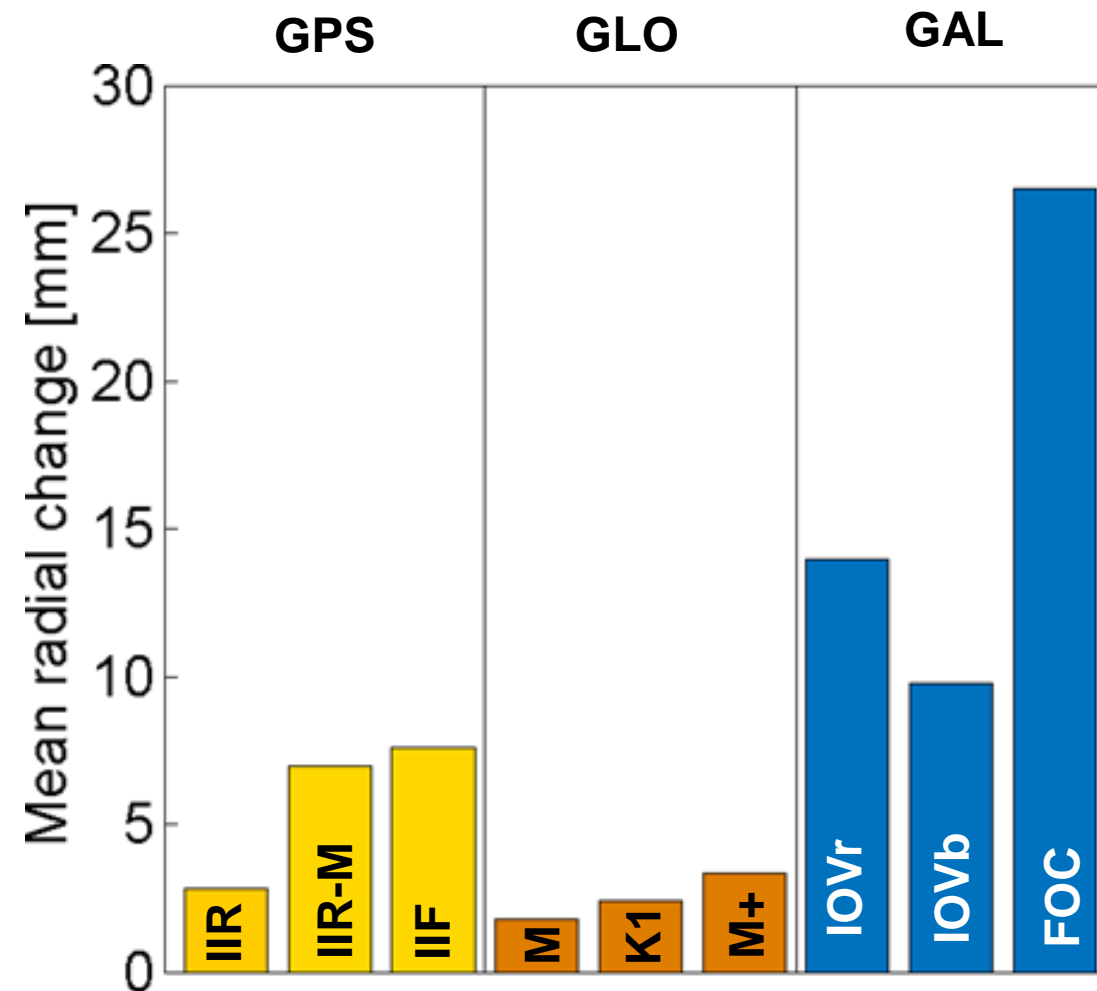


Proposed Values and Impact on Orbits

System	Type	Transmit Power [W]	Mass [kg]
GPS	IIA	50	930
	IIR	60	1080
	IIR-M	145	1080
	IIF	240	1633
GLONASS	M	25 – 85	1415
	M+	100	1415
	K1	105, 135	995
Galileo	IOV	95 – 105	695
	FOCe	265	660
	FOC	265	705 – 710

Steigenberger P, Thoelert S, Montenbruck O (2018) GNSS satellite transmit power and its impact on orbit determination, Journal of Geodesy 92(6):609-624, doi:

[10.1007/s00190-017-1082-2](https://doi.org/10.1007/s00190-017-1082-2)



Discussion

- Transmit power values and satellite mass available in SINEX metadata file:
http://mgex.igs.org/IGS_MGEX_Metadata.php
- No measurements for Block I and II
 - Use Block IIA power of 50 W ?
- No transmit antenna gain pattern for Block III
 - First guess: 300 W
 - Use IIR-M gain pattern for estimation?
- Uncertain mass of Block III
 - “on-orbit weight” of 2161 kg [1]
 - SRP estimates indicate higher mass
- Planned measurements of recently launched GLONASS satellites and selected older satellites

[1] <http://www.unoosa.org/documents/pdf/icg/2018/icg13/02.pdf>

Measured L1 EIRP for GPS III SV 01

