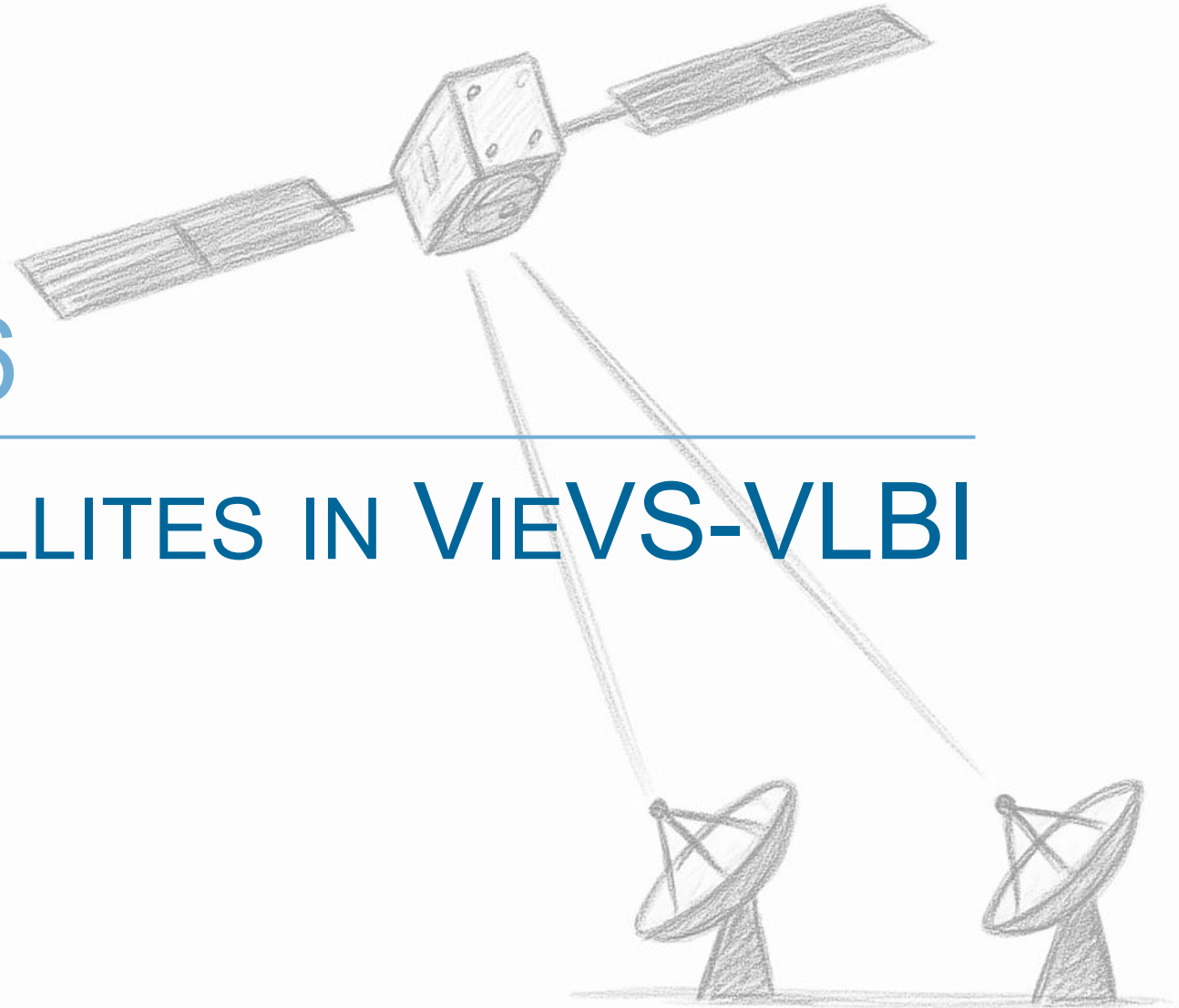
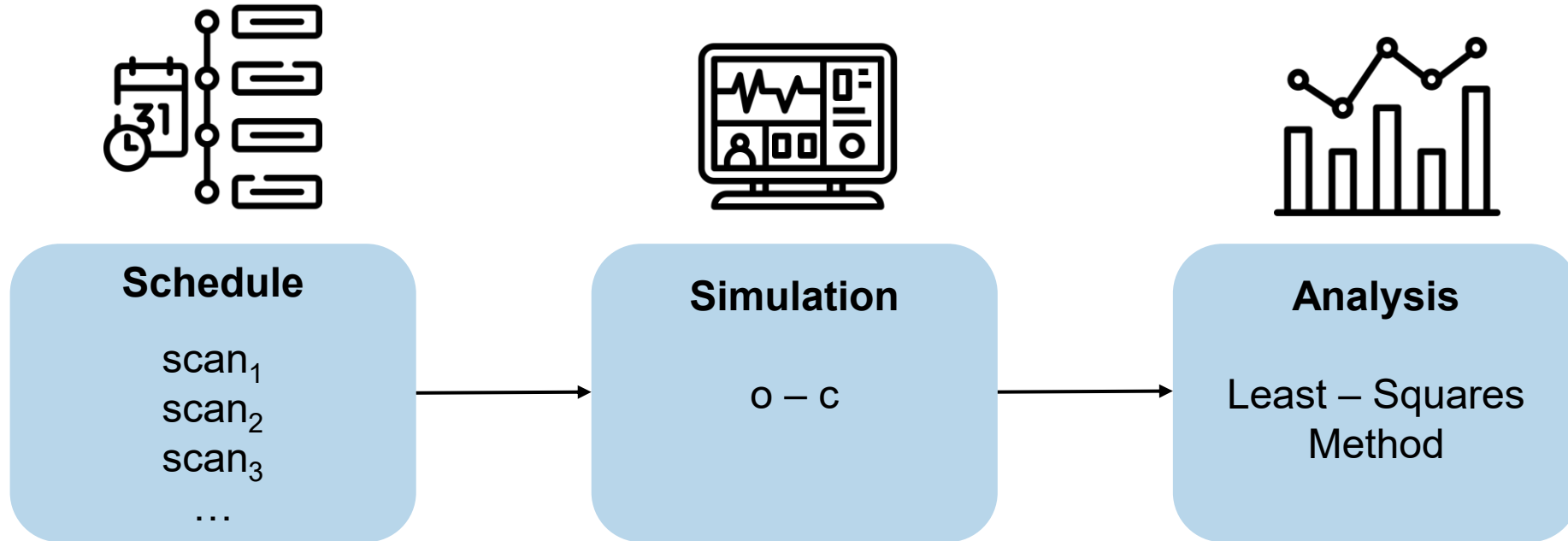


VIEVS DAYS 2026

SATELLITES IN VIEVS-VLBI

Helene Wolf | TU Wien





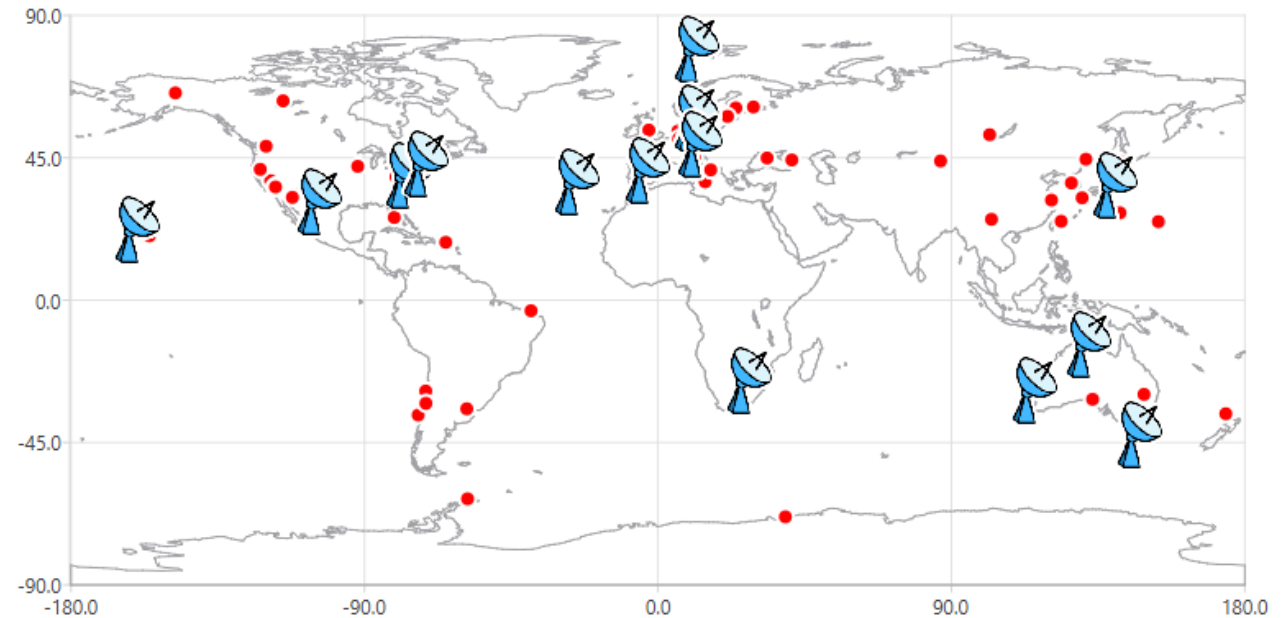
Schedule icons created by Freepik - Flaticon

Vital-signs icons created by surang - Flaticon

Analysing icons created by VectorPortal - Flaticon

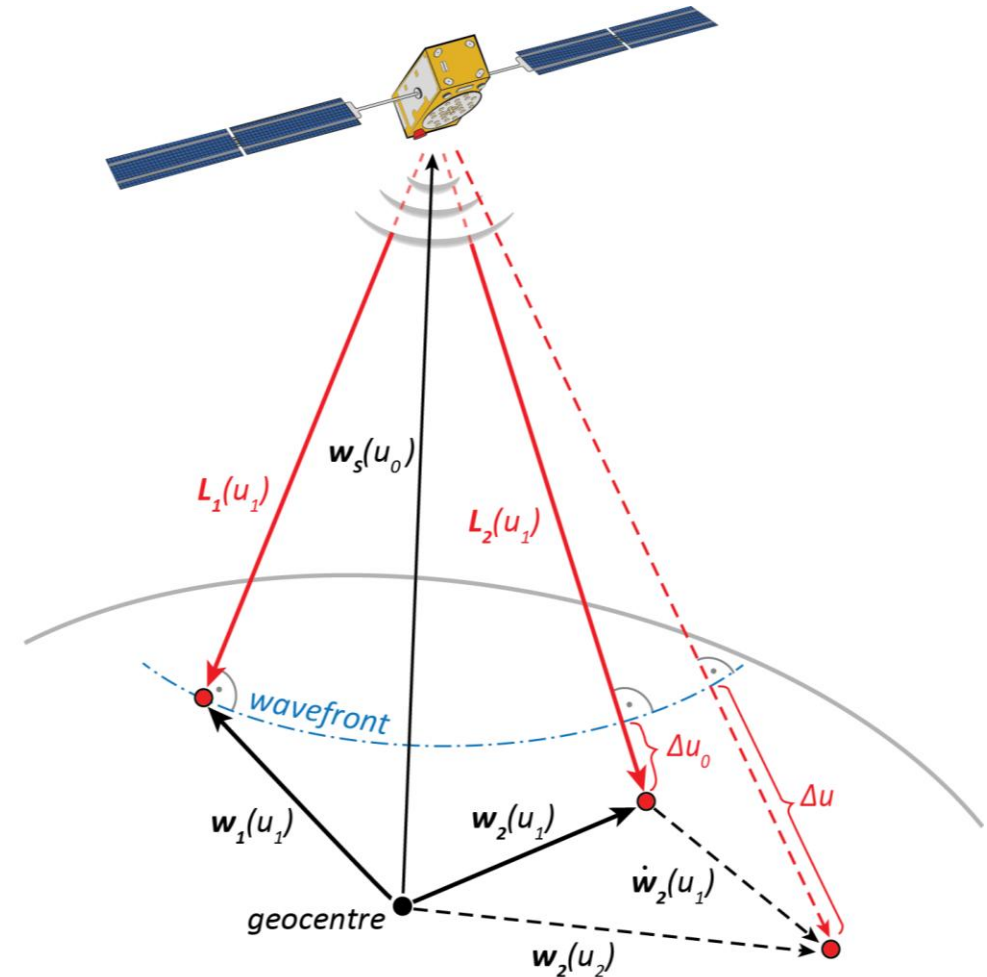
- Scheduling
 - 24-hour session on 3. August 2025
 - 14 stations
 - Genesis satellite orbit based on TLE file

- session statistics
 - # sat scans: 67
 - # quasar scans: 784
 - # total scans: 851



Since satellite observations are not yet supported in the vgosDB format, an NGS file is used.

- Models implemented in VieVS-VLBI
 - Klioner et al., 1991
 - Duev et al., 2012



As no real observations to satellites are available this session is simulated!

- errors

- Troposphere



- Clock errors



- White noise



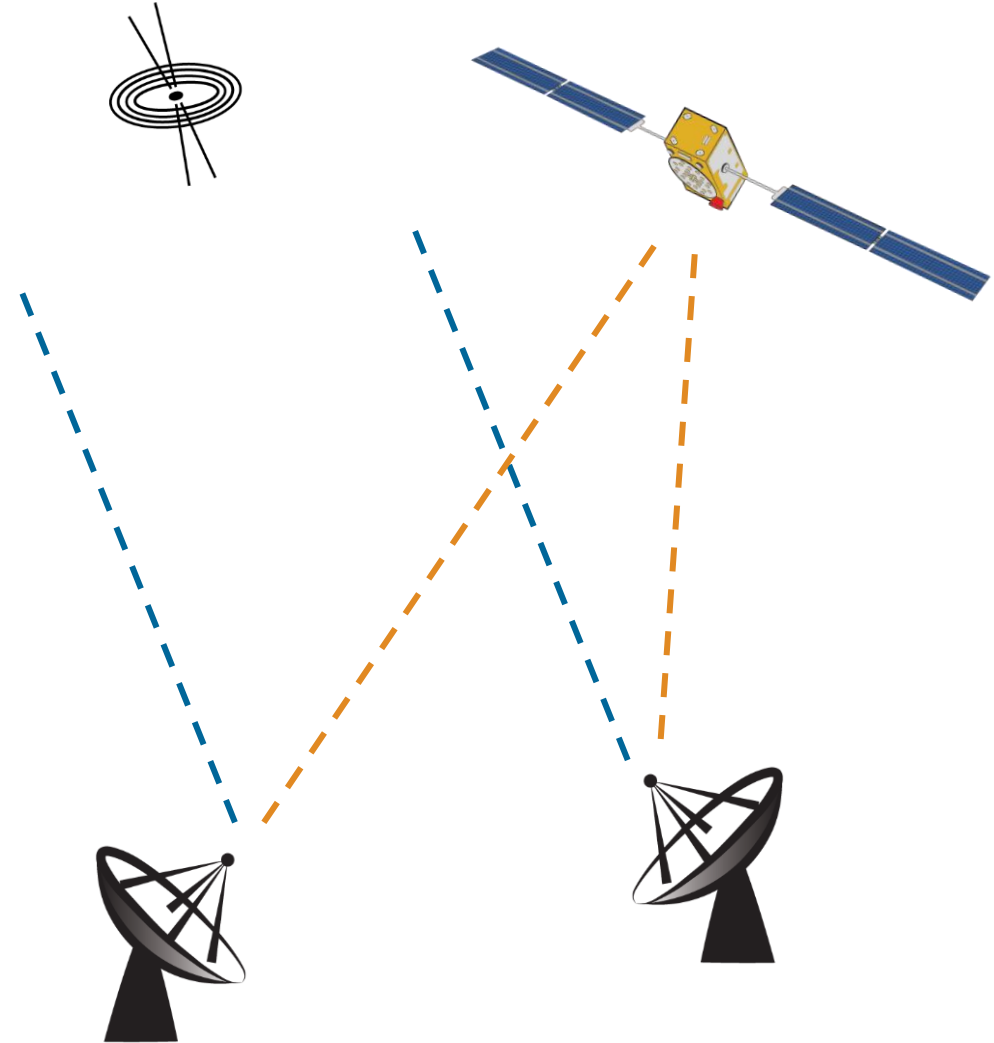
$$observed = computed + trp + clk + wn$$

Cloud icons created by Freepik - Flaticon

Impulse icons created by Indygo - Flaticon

Alarm-clock icons created by Freepik - Flaticon

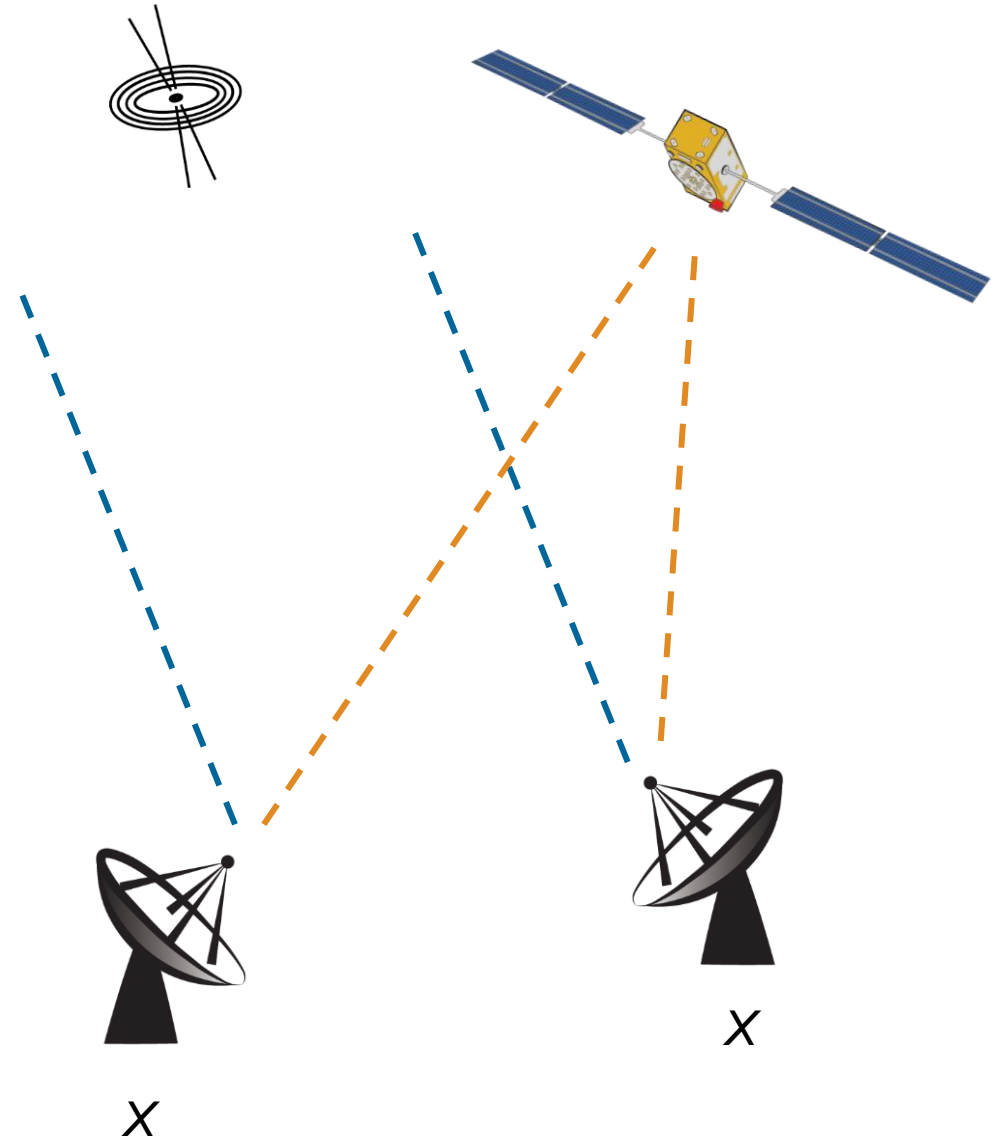
- estimation of station coordinates
- estimation of satellite position
- estimation of orbital elements



Analysis *Station Coordinates*

- estimation of station coordinates based on
 - **all observations**
 - *satellite observations only*
 - *quasar observations only*
 - *satellite and quasar observations **separately***

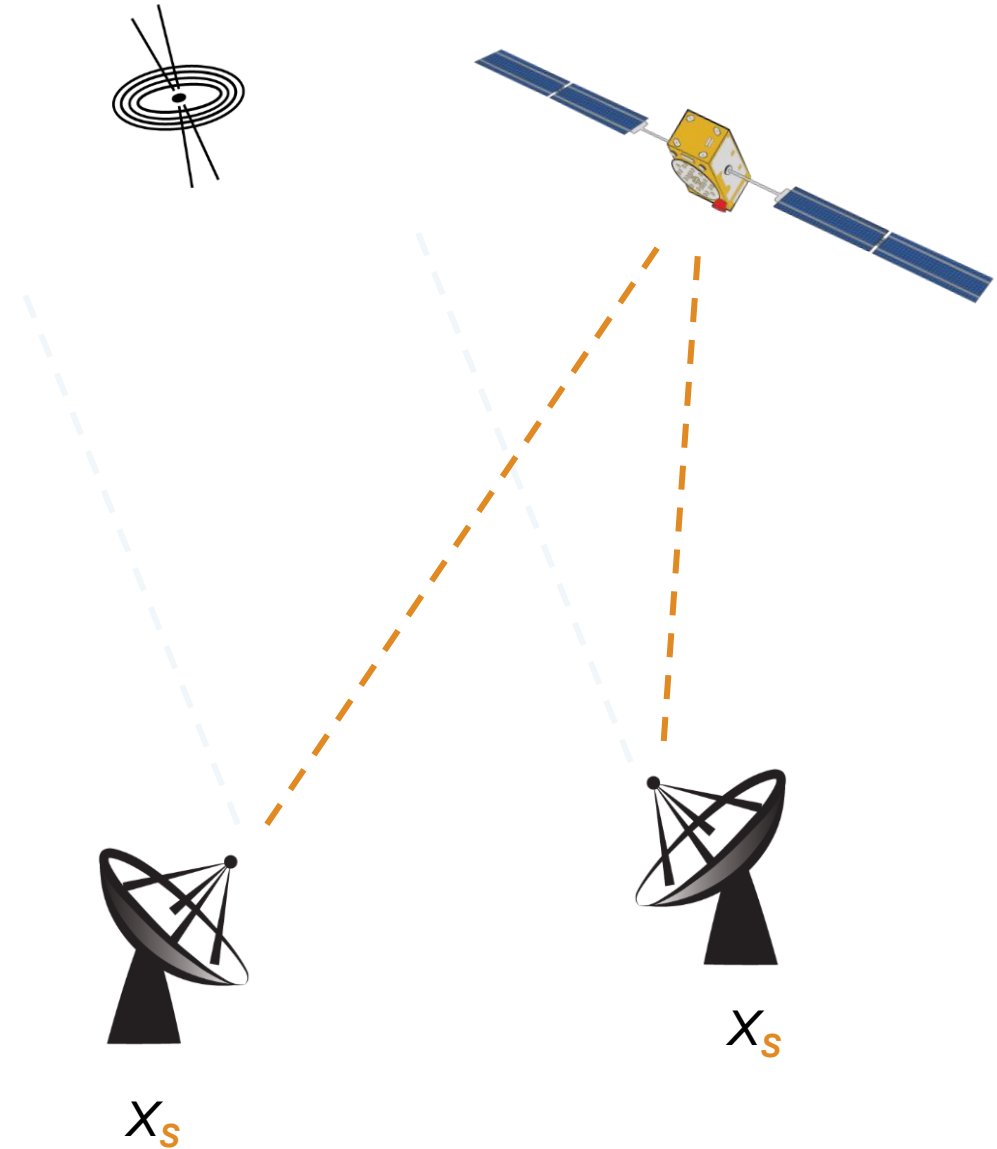
→ *station position in combined frame X*



Analysis Station Coordinates

- estimation of station coordinates based on
 - *all observations*
 - **satellite observations only**
 - *quasar observations only*
 - *satellite and quasar observations **separately***

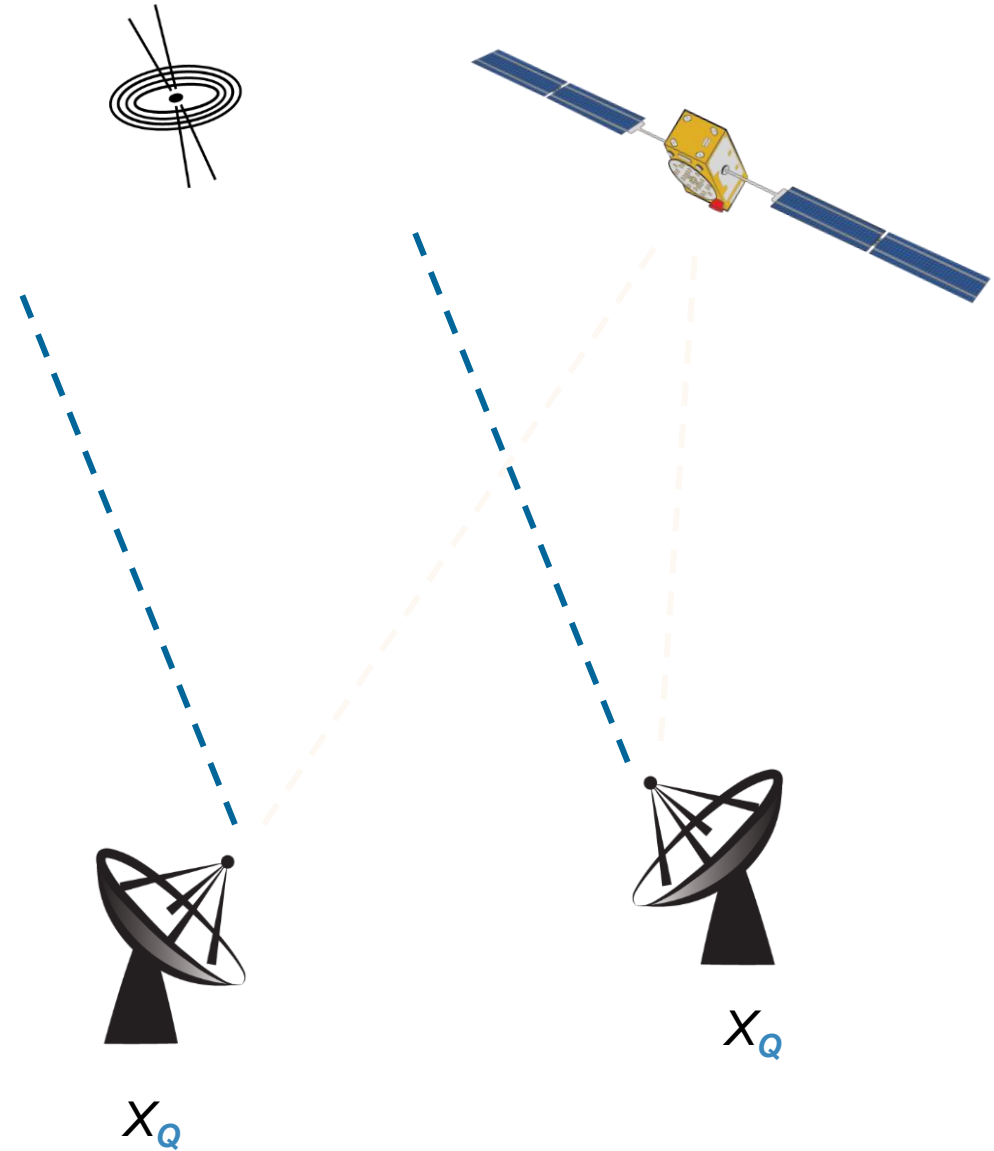
→ *station position in satellite frame X_S*



Analysis *Station Coordinates*

- estimation of station coordinates based on
 - *all observations*
 - *satellite observations only*
 - **quasar observations only**
 - *satellite and quasar observations **separately***

→ *station position in quasar frame X_Q*

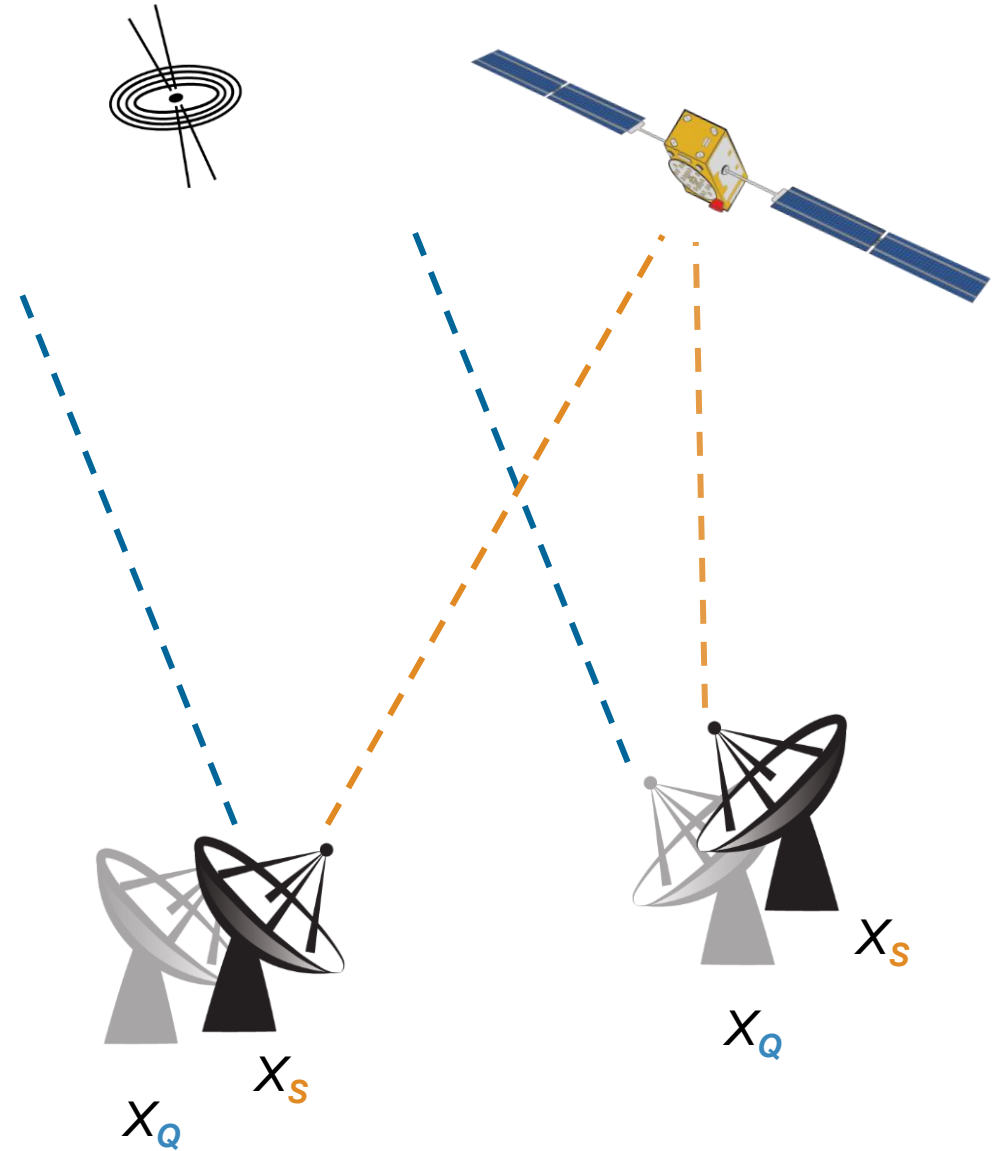


Analysis *Station Coordinates*

- estimation of station coordinates based on
 - *all observations*
 - *satellite observations only*
 - *quasar observations only*
- **satellite and quasar observations separately**

→ *station position in quasar frame X_Q*

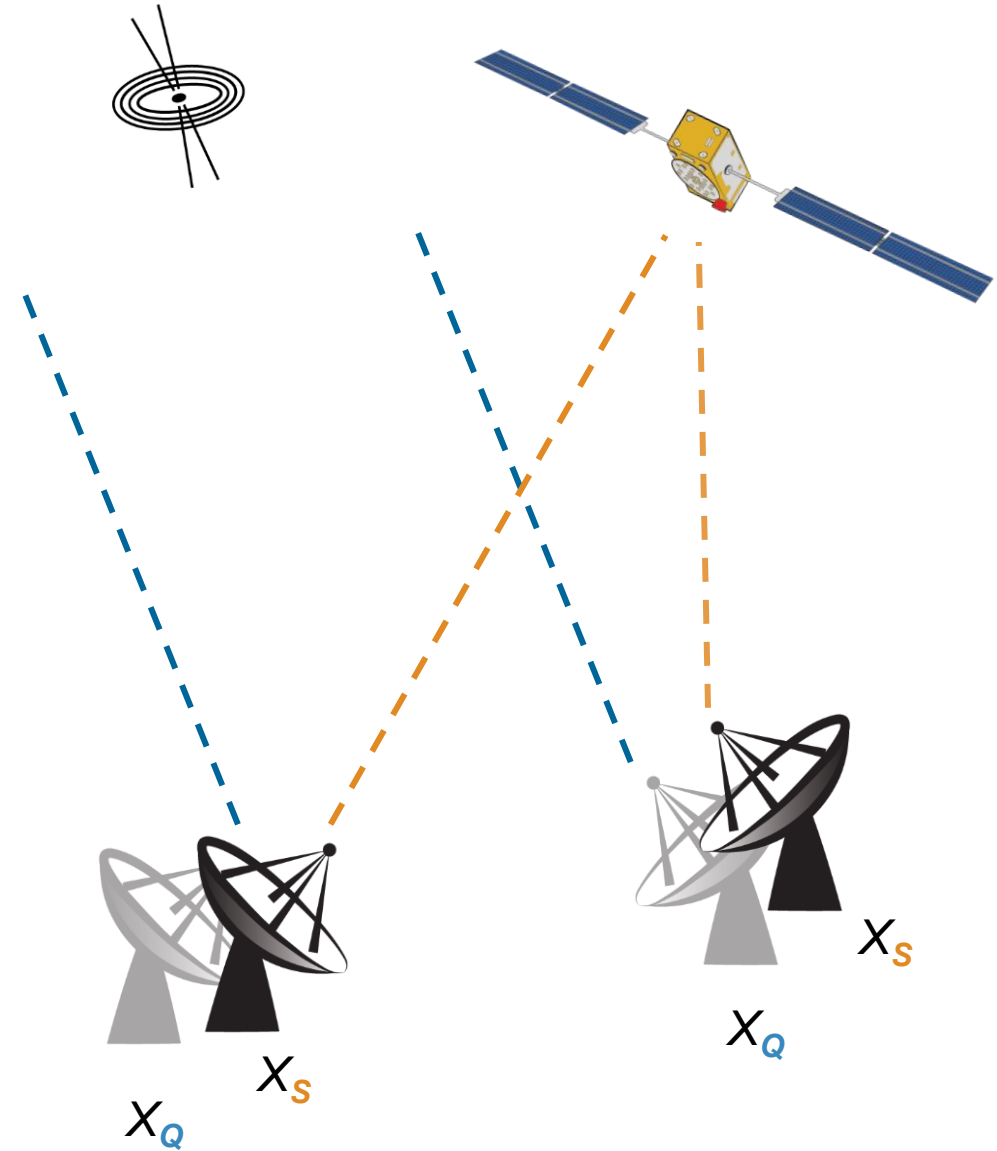
→ *station position in satellite frame X_S*



- estimation of station coordinates based on
 - *all observations*
 - *satellite observations only*
 - *quasar observations only*
- **satellite and quasar observations separately**

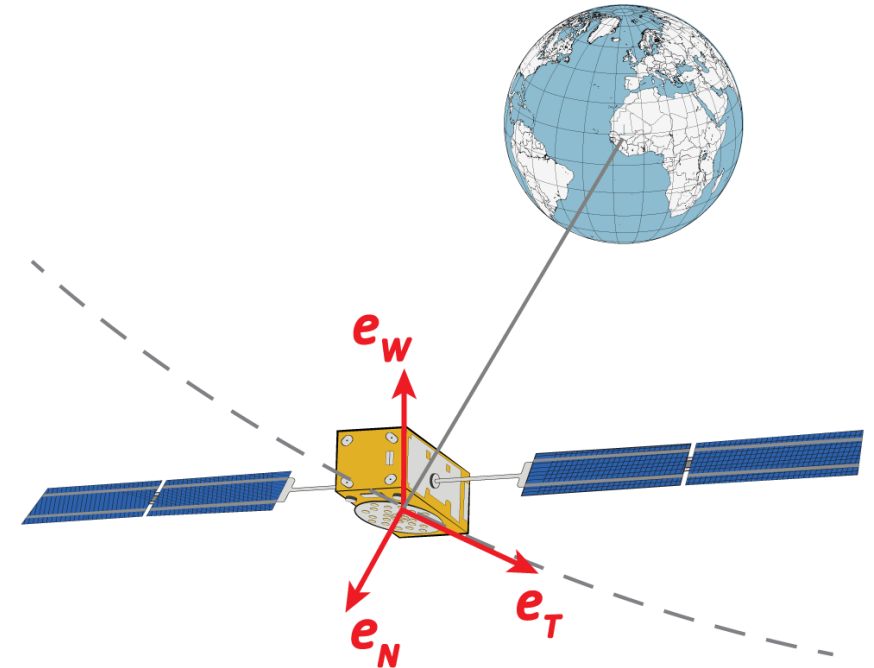
→ *station position in quasar frame X_Q*

→ *station position in satellite frame X_S*



For all options, the generation of the SINEX file is supported!

- estimation of satellite positions as piecewise-linear offsets
- possible frames
 - NTW (normal, tangential, cross-track)
 - RSW (radial, along-track, cross-track)
 - GCRF
 - TRF



- estimation of orbital elements as piecewise-linear offsets
 - semi-major axis
 - eccentricity
 - inclination
 - right ascension of the ascending node
 - argument of perigee
 - argument of latitude

