



Session 2: Combination at observation level

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Classical combination approaches:

- Common parameters between techniques:
 - Station coordinates
 - ERPs
 - (Scale)
- Usually not yet considered:
 - Geocenter
 - Gravity field
 - Satellite orbits
 - Troposphere
 - (Clocks)

Combination at the observation level allows it to combine „all“ common parameters



Troposphere parameters:

- Microwave techniques (GNSS, VLBI, DORIS)
- Height difference has to be taken into account
- Studies by:
 - *Krügel et al. (2007), JoG Special Issue „VLBI“*
 - *Thaller (2008), PhD thesis, GFZ STR 08/15*
- Troposphere Ties can (partly) replace Local Ties:
 - Co-location sites with missing Local Ties
 - Co-location sites with discrepancies between LT and space geodetic coordinate estimates



Satellite orbits:

- LEO satellites:
 - GNSS, SLR, DORIS
 - Gravity field parameters could play a role?

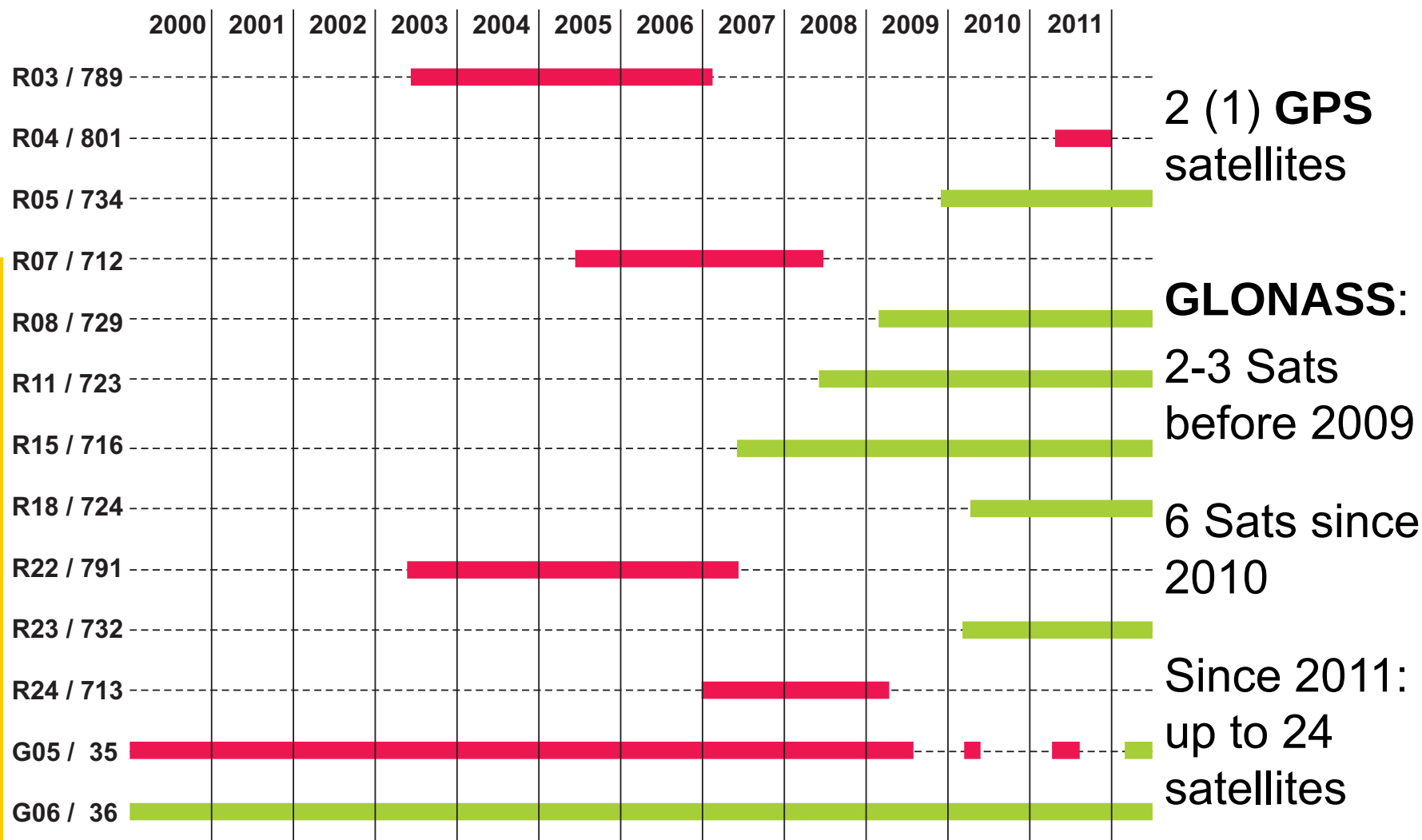
- GNSS satellites:
 - GNSS, SLR
 - GLONASS plays a key role, because only 2 GPS satellites are equipped with laser retro-reflector arrays (LRAs)
 - Length of solution could be problematic (number of SLR observations)

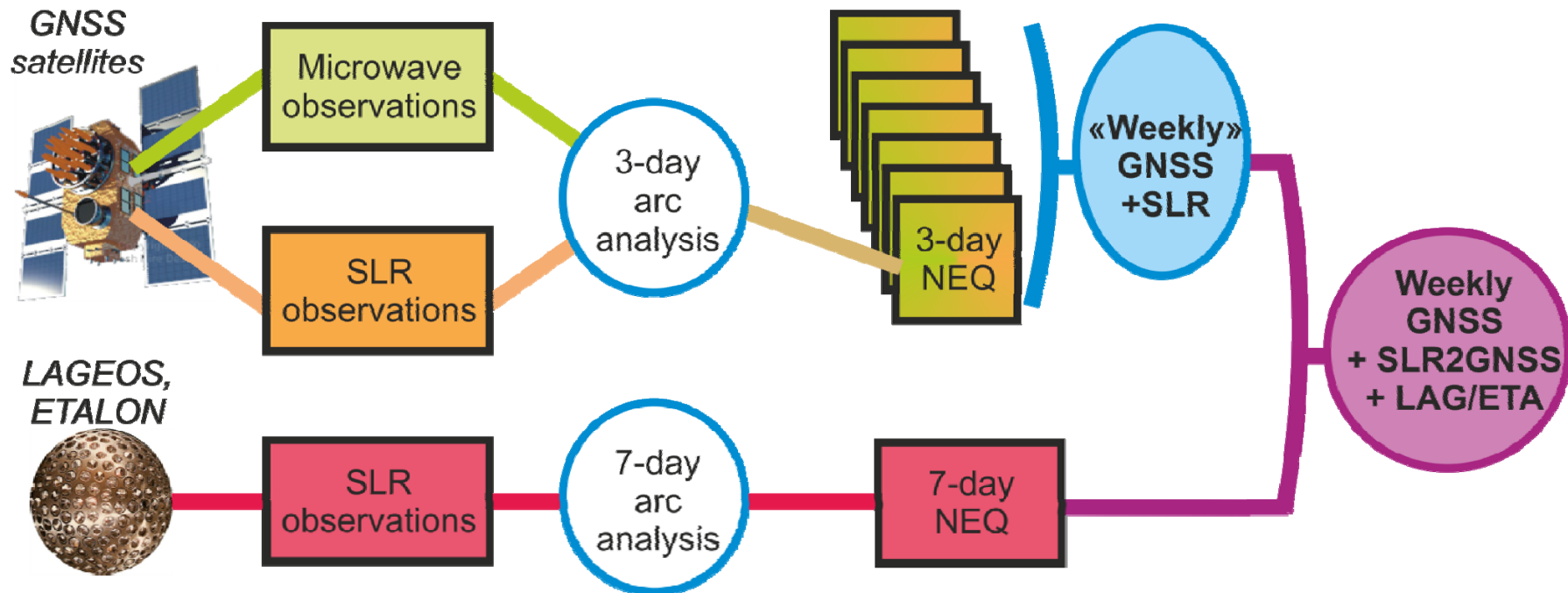


Solution Length:

- GNSS part:
 - Short orbital arcs (**1-3 days**) are possible = standard procedure
 - Longer orbital arcs (weekly and longer): deficiencies in orbit modelling may cause problems
- SLR part:
 - **Weekly** orbital arcs as standard procedure
 - Shorter orbital arcs: limited amount of data will cause loss of quality of SLR-derived parameters
- A compromise has to be found!

GNSS-SLR combination: Satellite co-locations





ITRF2013 Call encourages to deliver pre-combined solutions (for comparison only);

CODE will work on a contribution for GNSS-SLR