

February 23, 2021

**ILRS QCB Meeting
February 23, 2021
Virtual Meeting
Next Meeting March 30, 2021
9:00 am EDT (13:00 UT)**

Participants

Erricos Pavlis, Matt Wilkinson, Peter Dunn, Van Husson, Jason Laing, Mike Pearlman, Randy Ricklefs, David Sarrocco, Toshi Otsubo, Rivers Lamb, Tom Oldham

The charts from the meeting are available at

https://ilrs.cddis.eosdis.nasa.gov/docs/2021/ILRSQCB_slides_20210223.pdf

See the charts for more detail.

Status of the ILRS ITRF contribution (Erricos)

The AC's are working toward a late February deadline toward submission of their solutions to the Combinations Centers; the final deadline for submission to the IERS (Zuheir) is April 10. Deliveries will be made in time blocks to expedite processing.

Update from Yebes (Jose)

Nice pictures of the Yebes Site in snow. Some work needed on the 30-meter legacy VLBI antenna required to repair snow damage to the blinds covering the detector cabin.

Simosato Biases

Range biases were estimated from recent solutions using the latest CoM values for Lageos and Lageos 2.

As shown previously by Van, the range biases look relatively flat from 2015 - until early 2018; then downward jumps are correlated with a detector change in early 2018 and the KHz laser implementation in late 2018. After that, the range data are sparser and more erratic, with abrupt changes that appear to be correlated with other events recorded by station staff. However, these events would not have caused changes in the centre of mass values at the observed magnitude. In all likelihood, the changes made involved more components and adjustments and their effect on the system delay/system behaviour.

After a detector change, the range bias fell almost 2 cm, and was stable afterwards for several months, with the time series showing similar features to the preceding period. The subsequent laser upgrade seems to have caused major problems with return rate/data quantity. It is noted

that when upgrading to kHz lasers with smaller energies per pulse, other groups at other stations (e.g. Herstmonceux, Potsdam) have had similar experiences that have often taken long periods of time to fully resolve.

It is possible that in the latest time period part/most of these problems have been successfully fixed and range bias has settled at a negative 5-10 mm (more data required).

Clarifications regarding the modelling of centre of mass corrections

Note detailing the parameters/events that are

- i) currently considered for the computation of centre of mass corrections,
- ii) adjusted during the computation,
- iii) ignored,

Among the latter several station-related issues are listed, with the common trend of deviations from the documented/nominal procedures.

One of the problems faced is undocumented changes (even permitted changes) in system configuration during operational sessions (Tahiti 7124). This highlights a current limitation in the availability and handling of ILRS of meta-data, and the ability of the user to accommodate these changes. The actions required to mend this situation would be wide-ranging, involving changes in the site log format, the CRD files generation process at the stations, the orbit dynamics codes to ingest CRD data in full, and the production of corrections and software to interrogate and exploit them.

LAGEOS-2 and LAGEOS-1 Range and Time Biases Differences (Van)

- An unmodeled station time bias can cause an apparent range bias difference between LAGEOS and LAGEOS-2. The difference in range bias between the LAGEOS satellites will be 3 mm per microsecond, which is the LAGEOS range rate;
- To keep SLR systematic errors below 1 mm, it is recommended that SLR station time tags/epochs be accurate to at least 100 nanoseconds;
- There are several hundred nanoseconds along track systematic differences between LAGEOS and LAGEOS-2 in the HITU pass-by-pass results that appear to be dependent upon the location of the station. Is this error in the station coordinates being used or is this something else in the modeling? Toshi will investigate.
- If there are several hundred nanosecond level along track differences in the LAGEOS and LAGEOS-2 orbits, can this induce mm level range bias differences between LAGEOS-1 and LAGEOS-2?

This topic will be continued.

Issues:

1. Stress Stations need for stable configurations;
2. More stress on long and short stability rather than NP rms
3. Stress need for up-to-date history logs;
4. Stress need for redundant barometers;
5. Stress need for frequent calibrations (ever 2 hours or at systems changes)

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