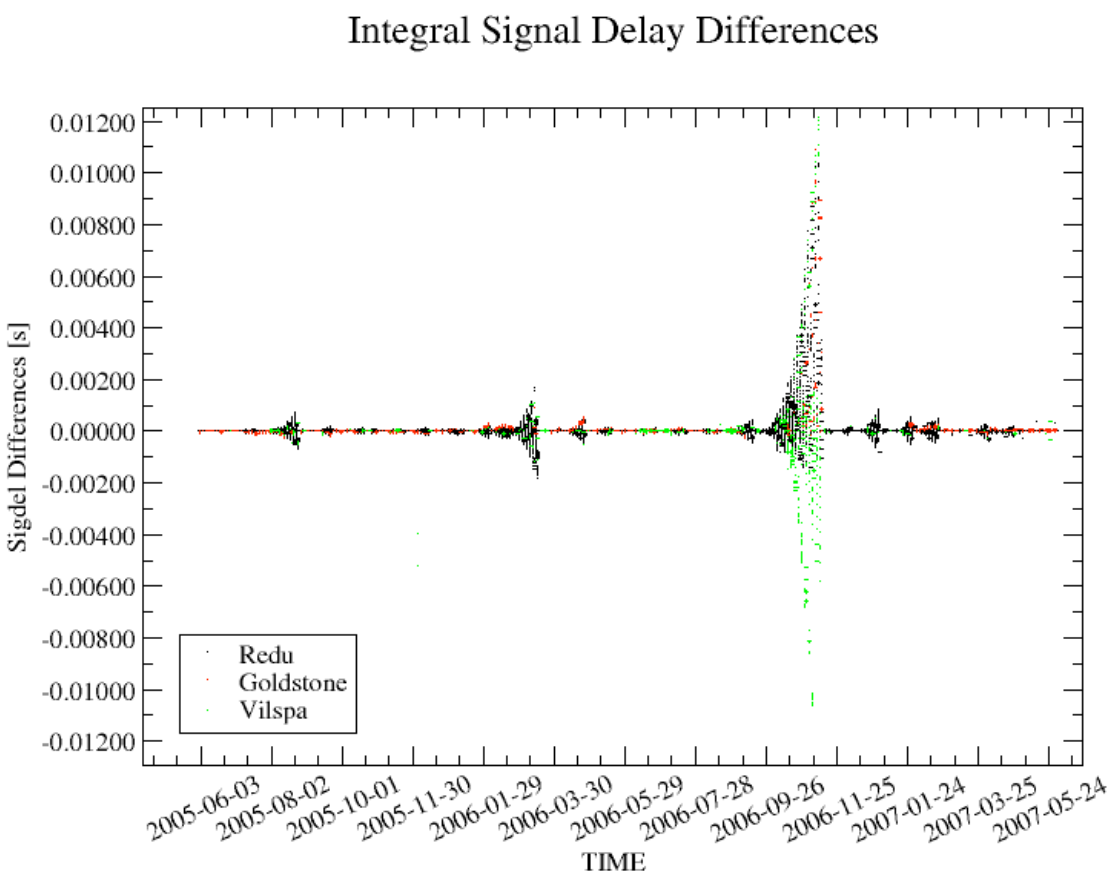
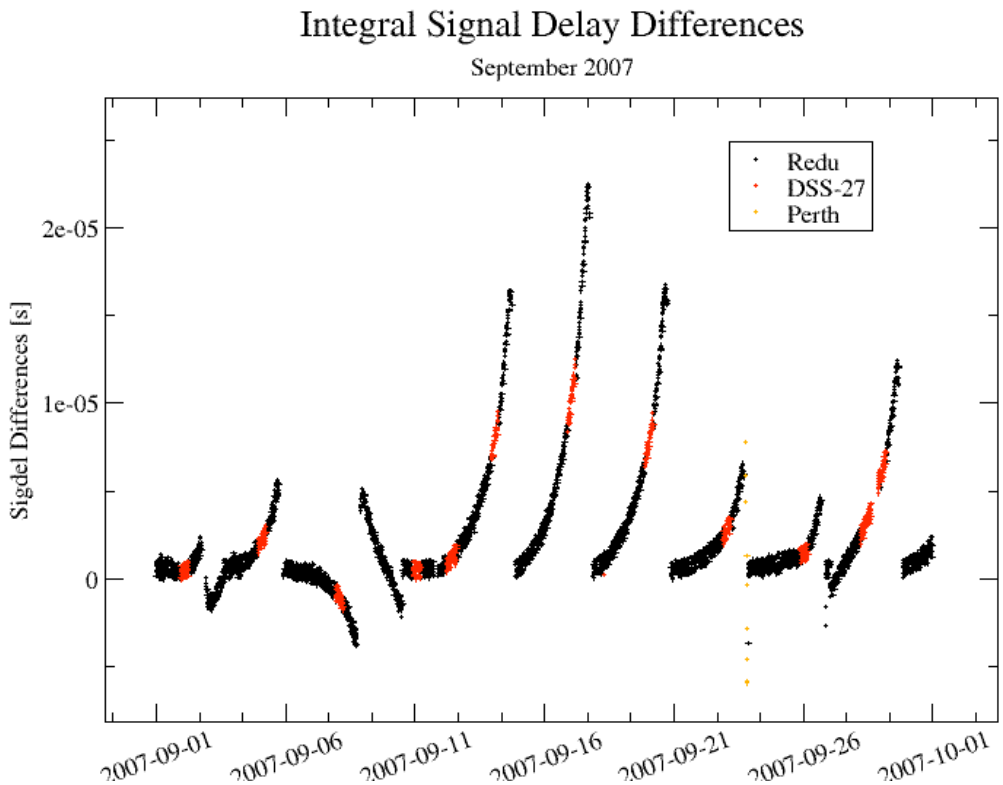
Magnitude of Errors and affected Periods.



- Errors Since June 2005 to July 2007.
- Worst case approximately 15ms after 50 days without update of orbit file.
- Worst errors are seen at perigee.

INTEGRAL Time Correlation Error.

- Fix is to force a read of the orbit file at every transfer.
  - In use since June 2007.
- Monthly comparison of MCS and FD calculated delays.



September 2007, Maximum Observed Error: 23us

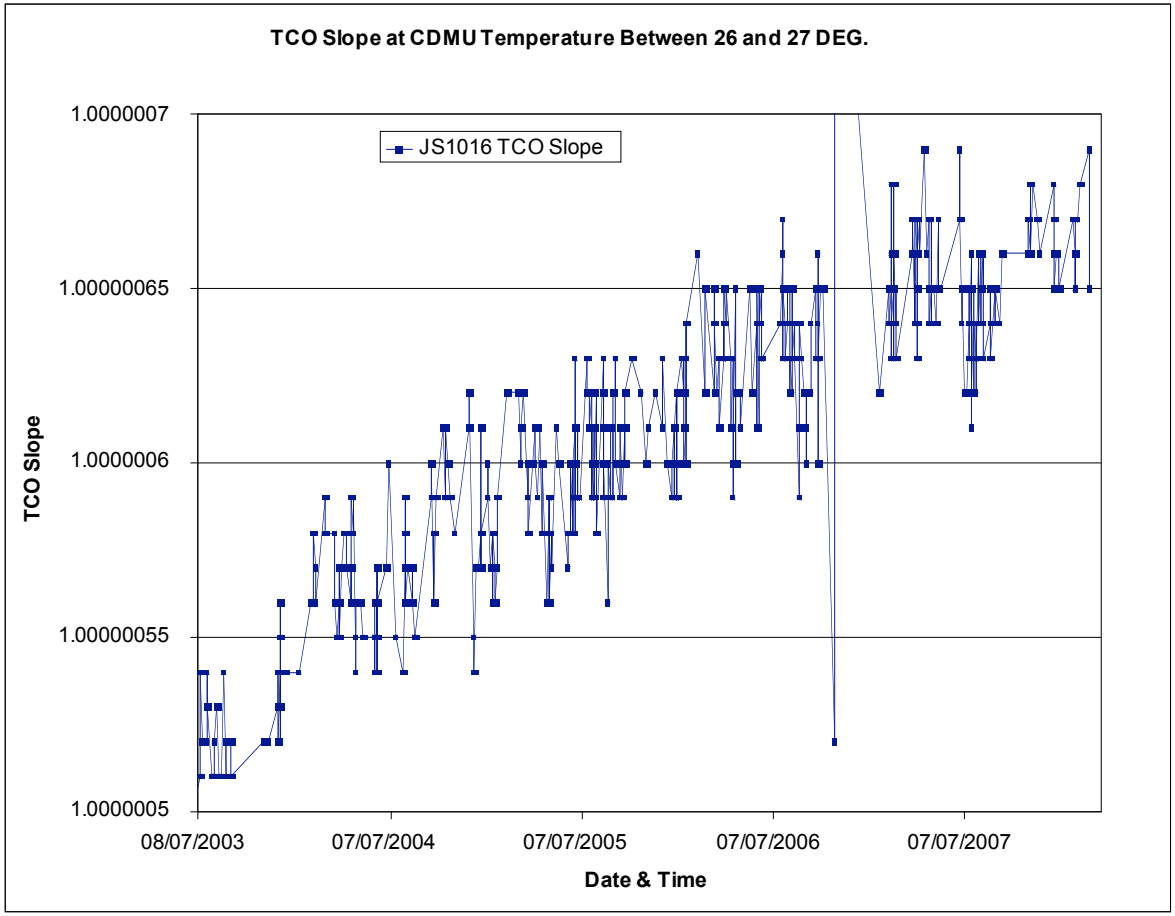
Reprocessing of historical data.

- Reprocess all data from launch.
- Use reconstituted orbit data => slightly more accurate than using predictions.
- Regenerate all OLFs from launch.
- Complete by ???.
- Fixes all other TCO problems:
  - Incorrect Station delay, launch until now – magnitude 47us
  - Incorrect On-board delay, launch until July 2003 – magnitude 867us.
  - Incorrect On-board delay 20/8/2003 until 28/6/2004 – magnitude 385us
  - Occasional Station timing problems.

Reprocessing of historical data.

- Recreated OLFs, for all CRAB revolutions – September 2008.
- Feedback received from SRON.
  - *"We are glad to close this study now satisfactorily and see NO objections for implementing the MOC TCO upgrades!"*
- Recreated OLFs for Revolutions 300 to 350 – April 2008.
- Feedback received from ISDC.
  - *"The largest deviations are now gone, even if smaller deviations have not improved."* (smaller deviations seem to be due to extrapolating across 4 hours perigee outage, which is unreliable)
  - ESOC FD verified recalculated delay correct to within 1us.
- Next step: re-generate revolutions 450 to 550 – large errors.

Oscillator Stability.



- According to ALENIA: Oscillator long term drift within Specs.