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From: Anabtawi, Aseel (332K) <aseel.anabtawi@jpl.nasa.gov>
Sent: Friday, March 07, 2014 12:12 AM
To: Rss@cgsa.jpl.nasa.gov
Subject: T99 Gravity - Ops Report #3
Attachments: 2014_065_T99_KaPower.pdf

Dear All,

The last part of the T99 gravity observation was covered by Madrid's DSS-55. When the station first enabled Monopulse, it started driving the antenna off-point. Monopulse was disabled and the offsets were cleared. The station tried enabling Monopulse two more times, but they were again unsuccessful. Station maintenance was not available to perform a Monopulse on-point phase calibration, so we decided to forgo Monopulse and to use blind pointing. The station recommended using the def55.sem 4th order pointing model instead of the cas55.sem model that was loaded at the time, but when the switch was made, we saw a 1.5 drop in Ka-band power. We asked the station to switch back to cas55.def, and Ka-band power improved by 1.5 dBs.

Madrid turned its transmitter on 19 minutes after the preceding (and shortly overlapping) DSS-34 turned its transmitter off. An uplink transfer was not possible due to transmitter elevation limits. This resulted in a coherent data gap round-trip-light-time later. The gap occurred about 9 hours after Titan C/A.

The T99 gravity observation is now over.

T99 Titan Gravity Ops Summary:

- About 30 hours of continuous DSN support.
- Titan C/A was at 065/1745 ERT over DSS-34 at an altitude of 1500 km.
- Overall, operationally a success.
- First DSS-55 support: Weather was clear with 7.4 kph winds. Problem with Monopulse pre-cal calibrations. Station performed on-point phase calibrations and was then able to successfully enable Monopulse. No jump in power was observed when Monopulse was first enabled. DSS-55 started the uplink then transferred to DSS-25.
- DSS-25 support: Weather was clear and no winds. Nominal support. Provided partial uplink then transferred to DSS-34. 1 dB jump in power was observed when Monopulse was first enabled.
- DSS-34 support: Weather was overcast. Nominal support. Monopulse was utilized throughout the support. No jump in power was visible when Monopulse was first enabled – an indication that the pointing model was good.
- Second DSS-55 support: Weather was clear with 2.3 mph winds. Problem with Monopulse driving the antenna off-point. Used blind pointing. [DR# 107834](#) was opened.
- Uplink gap between DSS-34 and DSS-55 due to transmitter elevation limits.
- Intermittent problems with the RSS ops room eDMD displays. Cause unknown. No impact to data acquisition.
- Manual intervention was needed to resolve the problem with the Automated Link Build (ALB) software not allocating the correct Ka-band receivers at Goldstone and Madrid. Canberra had ALB installed, but not activated. DRs N109507, N109508, N109509 and N109510 were opened. The receiver allocation changes were made the day before T99, so T99 operations and data acquisition were not impacted.

Attached are our post-pass Ka-band power plots (4 pages).

The data should be available soon. We'll let you know when they are ready.

The outbound GSE will take place on DOY 066 (very early Friday PST) and will be covered partially by Goldstone, and mostly by Canberra.

Regards,

Aseel

From: <Anabtawi>, aseel <aseel.anabtawi@jpl.nasa.gov>
Date: Thursday, March 6, 2014 12:04 PM
To: "Rss@cgsa.jpl.nasa.gov" <Rss@dcs04.jpl.nasa.gov>
Subject: T99 Gravity - Ops Report #2

Dear All,

Canberra's DSS-34 continued to track nominally through Titan's C/A and the data looked very good. C/A was around 1745 ERT (9:45 am PST) at an elevation angle of ~69 degrees.

Attached is a screenshot of DSS-34 open-loop (RSR) displays during the C/A period. X-band is on the left, and Ka-band on right. On top are the FFTs plots, and on the bottom the frequency residuals.

We have about 10 hours of data acquisition remaining. They'll be covered by Canberra (ongoing track) and Madrid's DSS-55.

I'll send a report at the end of the experiment.

Regards,
Aseel

From: <Anabtawi>, aseel <aseel.anabtawi@jpl.nasa.gov>
Date: Thursday, March 6, 2014 8:06 AM
To: "Rss@cgsa.jpl.nasa.gov" <Rss@dcs04.jpl.nasa.gov>
Subject: T99 Gravity - Ops Report #1

Dear All,

Our T99 gravity observation is in progress, and we are about 11 hours into the coherent data acquisition.

The experiment is supported by all DSN complexes, starting with Madrid's DSS-55, then Goldstone's DSS-25, Canberra's DSS-34, and ending with DSS-55 again, for a total of about 30 hours of continuous DSN support! The first DSS-55 track completed successfully. Currently, DSS-25 (setting) and DSS-34 (rising) are tracking. DSS-34 will be supporting Titan's Closest Approach about 2 hours from now.

Monopulse has been working nominally. The weather has been mostly good. It's overcast at Canberra and we're seeing occasional Ka-band power fluctuations, but overall, the data look good.

We encountered some minor operational problems, but nothing that resulted in data degradation or loss. The first was with the DSS-55 pre-cal Monopulse calibrations. The station was getting bad phase and gain values. The problem was resolved by having DSS-55 perform two on-point phase calibrations soon after Ka-band signal acquisition (luckily, we had some 1-way time before the start of the T99 coherent data acquisition). The station then enabled monopulse and it worked nominally. The second problem was with our eDMD monitor displays freezing from time to time. It's being investigated.

I mentioned at our last team telecon that the DSN's new Automated Link Build (ALB) software was going to be installed at Canberra just prior to our inbound GSE track, and the concern that we may run into problems with the Ka-band receiver allocation. The software was installed as planned, but was not activated. It will not be activated until Sunday, so Canberra will continue to manually build the link for our T99 and GSE supports. As for Goldstone and Madrid (which have been using ALB),

the Cassini NOPE spent a long time yesterday manually changing the receiver allocations to ensure that the correct receivers are allocated to Cassini. Thanks to his efforts, we've had no problems with the receiver allocations so far.

The inbound GSE over Canberra on DOY 064 was nominal.

I'll send another report after C/A.

Regards,
Aseel