Subject: Rev 275 Status Report - Problematic ESA Supports

Date: Sunday, May 21, 2017 at 8:07:42 PM Pacific Daylight Time

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To: Rss@cdsa.jpl.nasa.gov

Dear All,

It's been very busy and I did not have a chance to send reports sooner.

We are less than 1.5h away from periapse. Unfortunately, the uplink transfers to/from ESA have been problematic.

The supports started out good. DSS-35 was first to provide the uplink. The antenna was red yesterday, but Canberra brought in maintenance people over the weekend to fix the problems, which they did!

We then transferred the uplink from DSS-35 to ESA's New Norcia station (DSS-74), without a sweep. Round-trip-light-time later, we were surprised to lose the coherent signals for a couple of minutes. DSS-35 re-acquired X-band ~1m40s later and Ka-band ~7m later. In the open-loop receivers, we had to use frequency offsets to put the signals back in the 1 KHz recording bandwidth (1300 Hz at X-band and 5000 Hz at Ka-band).

We found out that DSS-74's uplink was 1200 Hz off! Luckily, the DST was quick to re-acquire and lost lock for a short period of time.

The plan was then to transfer the uplink from DSS-74 to DSS-55, without a sweep. However, because ESA's uplink was off, we asked DSS-55 to sweep the uplink. The station turned transmitter on, stopped the ramps for a few seconds, did a sweep, then resumed ramping (they can't sweep while ramping). RTLT later, the DST again dropped lock for a few seconds. We lost the coherent signals in the open-loop receivers for about 45 seconds. The closed-loop receivers were out of lock for 3m15s because the operators let automation re-acquire the signal instead of doing it manually.

We then transferred the uplink from DSS-55 to ESA's Malargue station (DSS-84). Before the transfer, the ESA operator checked that the uplink frequency that was provided to him was good. The stations did the transfer, but 44 minutes later, the ESA operator reported that his frequency was way off (120 KHz away from where it should be!) and that he'd have to stop the uplink, restart it and sweep. This will result in loss of coherent data during gravity's critical period. As we expected, we switched to 1-way RTLT after the transfer (we are currently 1-way). If DSS-84's second uplink was successful, the 1-way period should last ~44m and we'll switch back to coherent (with DSS-84) 1hr before periapse.

We don't know the exact reason why ESA's uplink was off. ESA started using a different configuration during Rev 274 in order to keep their downlink (in particular Ka-band) within their 16 KHz recordings. They configured their stations with an altered BLF for the uplink and then re-configured the downlink frequency with the DSN BLF. Today, I asked that they revert back to the old configuration if the new configuration was going to impact uplink in any way, but they proceeded with the new configuration. I'm not sure that's the reason for the uplink problems, but uplink transfers were working very well until they started using this new configuration.

I'll update you when I can.

Regards,
Aseel