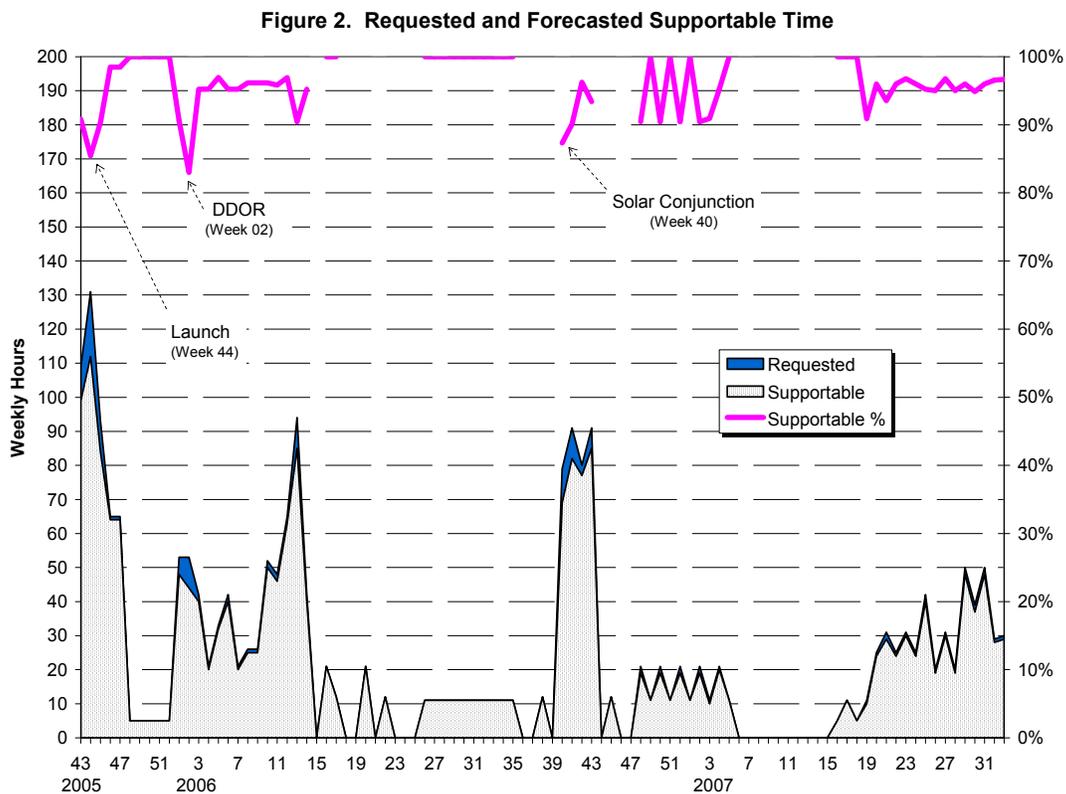


Assumptions

1. Venus Express requirements that are supportable at any of the 34-meter X-band capable antennas are allocated on the ULP and forecast in this assessment at DSN antennas where capacity in the VEX view period is highest.
2. The VEX Goldstone and Madrid view periods overlap from 19 minutes in week 01 of 2006 to 3 hours in week 09. The 4-hour request for DDOR support at the Goldstone/Madrid overlap is not possible until week 11. The lack of a Madrid overlap causes the Cruise and Approach delta differential one-way ranging (DDOR) requests prior to week 11 to be forecast at the Goldstone/Canberra overlap.
3. At the time of this assessment view periods for the STEREO Ahead and STEREO Behind launches planned for February of 2006 were not available and this assessment does not include additional loading that may result from the launch of these spacecraft or requirements supporting their prime science phases prior to July of 2006.
4. This assessment does not include additional loading that may result from the proposed DSS-45 downtime planned in 2006 weeks 41-50.
5. Requirements for VEX Capture were not received in time to be included in this assessment.



Summary

Figure 2 is a product of the Forecaster tool that was used for this study and it shows both requested and supportable weekly hours and the forecasted supportable percent. Venus Express will receive most of the coverage that they request over the life of the mission. The exceptions

to this are in the 3 weeks identified in Figure 2 when VEX may only achieve an average of 85% of their requested coverage. Each of these exceptions is discussed below.

In week 44 of 2005 VEX requires 16 hours of support from the Goldstone and Madrid 34-meter beam waveguide one (34BWG1) antennas each day and the requirement is forecast 85% supportable. VEX has contention with several other users at these two antennas. Chandra is performing routine tracking and requires fourteen 1-hour passes, IMAGE also is performing routine tracking and requires eight 1-hour passes, and Stardust requires six to seven 4-hour passes in preparation for their trajectory change maneuver (TCM). The VEX and Stardust view period overlap is about 50%. Chandra and IMAGE are both low Earth orbiting missions and contention occurs on the days when their view periods overlap those of VEX and Stardust.

In week 02 of 2006 VEX requires 4 hours of support at the overlap of two antennas for delta differential one-way ranging (DDOR). Five DDOR passes are requested in week 02. The VEX view period overlap at Goldstone and Madrid is only 20 minutes and cannot support the 4-hour request (see Assumption No. 2), however the requirement forecast at the Goldstone/Canberra overlap using DSS-24/45 is 83% supportable. VEX has contention with several users of the Canberra 34-meter antennas. The New Horizons spacecraft launches on Tuesday of this week and requests continuous support, Mars Reconnaissance Orbiter is approaching Mars and also requests continuous support, Voyager 2 requests two 8-hour passes at DSS-45 for routine tracking, and preventative maintenance is planned on each Canberra antenna. The New Horizons view period has 100% overlap with VEX at the point required to support the DDOR request and the VEX view period is fully overlapped by the Voyager 2 view period and the time required for antenna maintenance.

In week 40 of 2006 VEX is in their solar conjunction phase and requests two 10-hour passes on DSS-14 or DSS-63 and five 10-hour passes at any of the 34-meter Goldstone or Madrid X-band capable antennas. On average with the requirements forecast on the 70M and 34HEF Subnets are 87% supportable. VEX has contention at DSS-14 and DSS-63 with several other users of the 70M resources. Goldstone Solar System Radar requires five 8-hour supports at DSS-14 for observing the 2001 CB21 Asteroid, Mars Express requires seven 10-hour passes during their solar corona phase, MAP requires four to five 45-minute passes, and two 8-hour periods of preventative maintenance are required at DSS-14 and one 9.5-hour maintenance period is required at DSS-63. The VEX and Asteroid 2001 CB21 view periods overlap >50%. The VEX view period has full overlap with the Mars Express view period and the periods required for antenna maintenance at Goldstone and Madrid.

Conclusion

Overall, the forecast shows that Venus Express should expect to receive most of the coverage requested for their launch, navigation and radio science requirements. In all but three weeks the VEX request is forecast above 90% supportable. In 2005 week 44 and in 2006 weeks 13 and 40 the VEX requests average only 85% supportable. It is reasonable to expect that some negotiation with other User's will be needed in these weeks to resolve contention for time on the Network.

The levels of supportability for the VEX mission reported in this preliminary assessment may be effected by pending changes to the baseline mission set. It is recommended that this assessment is followed by an expanded study to include the VEX Venus Orbit Insertion and Capture requirements, the STEREO A and B launch requirements after a final launch date is approved, and the expected changes that are needed to approve the downtime at DSS-45.

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