

Consolidated Communications for Low Cost Planetary Missions

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Abstract

As part of reducing the cost of operating Deep Space planetary missions, JPL has developed and deployed a highly-accurate digital receiver capable of recovering telemetry at rates as high as 26 Msymbols/s. This receiver also provides interim products needed for navigation (ranging and Doppler) and open-loop recording for radio-science. JPL is currently assessing the consolidation of all of these functions (receiving, telemetry, ranging, doppler, and open-loop recording) into a single rack that could be remotely controlled to support all the downlink functions of the mission. When deployed, it will provide an operationally-efficient downlink processor that can be run from the mission's operations center, as well as from a Principal Investigator's office. An additional benefit will be the improved performance and reliability enabled via advanced technology (e.g. turbo-code decoder with a 2.5 dB advantage over the standard CCSDS error-correcting code, almost doubling the available downlink rate). Without this consolidation, the telemetry, navigation, and radio-science mission support would require separate, sometimes overlapping, suites of operational support, increasing the cost of mission support. This paper discusses the motivation, details, and benefits of this consolidation.