Deep Space Network Update

National Aeronautics and Space Administration

Pete Vrotsos, SCaN Deputy Program Manager for Network Operations
Planetary Science Subcommittee of the NAC Science Committee
September 30, 2016

NAC SC Finding on the Deep Space Network

Finding: The Science Committee finds that the Planetary Science Subcommittee (PSS) is alarmed by reports of increasing data losses by active planetary missions (e.g., Cassini, with details provided by the Outer Planets Assessment Group in their February 2016 finding on the Deep Space Network), especially following a 10% funding cut to the Deep Space Network at the end of 2015. The PSS supports aggressive efforts to address this issue and would like to hear updates as soon as possible. In particular, current NASA science missions using the Deep Space Network should be asked to inform NASA about recent Deep Space Network performance changes they have experienced.



SCaN Response to NAC Finding: Executive Summary

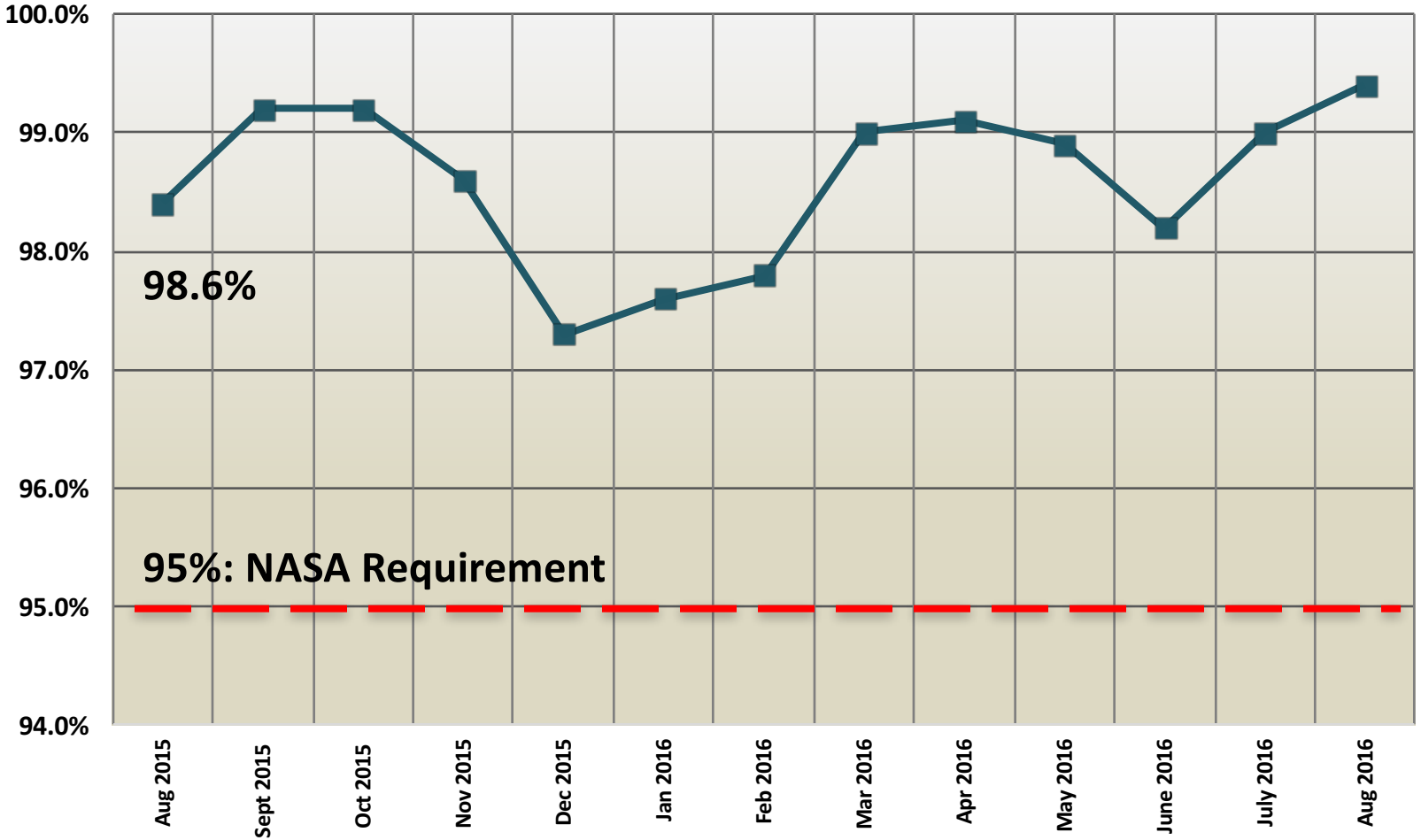
- The Science Committee findings is linking a one year appropriations reduction to overall ability of the DSN to perform its day-to-day functions.
- SCaN has conducted thorough review of the DSN performance from Dec 2015-Feb 2016 performance in response to the NAC PSS finding
- SCaN has not detected any systemic increasing mission data loss
- The 2016 appropriations cut to the DSN was 3.8%.
  - Reductions were applied non- day to day operations and maintenance activities

Event Anomalies

- The event that triggered the NAC SC was a series of anomalies at Canberra Deep Space Communications Complex (CDSCC) during the third week of January.
- Events were not driven by obsolescence
  - Two failures were the result of infant mortality with DSS-35 (newest Beam Wave Guide (BWG) antenna)
  - Site wide software anomaly at CDSSC local area network (LAN)

The DSN has met **ALL** L1, L2, L3 mission critical events from 2011 – 2016

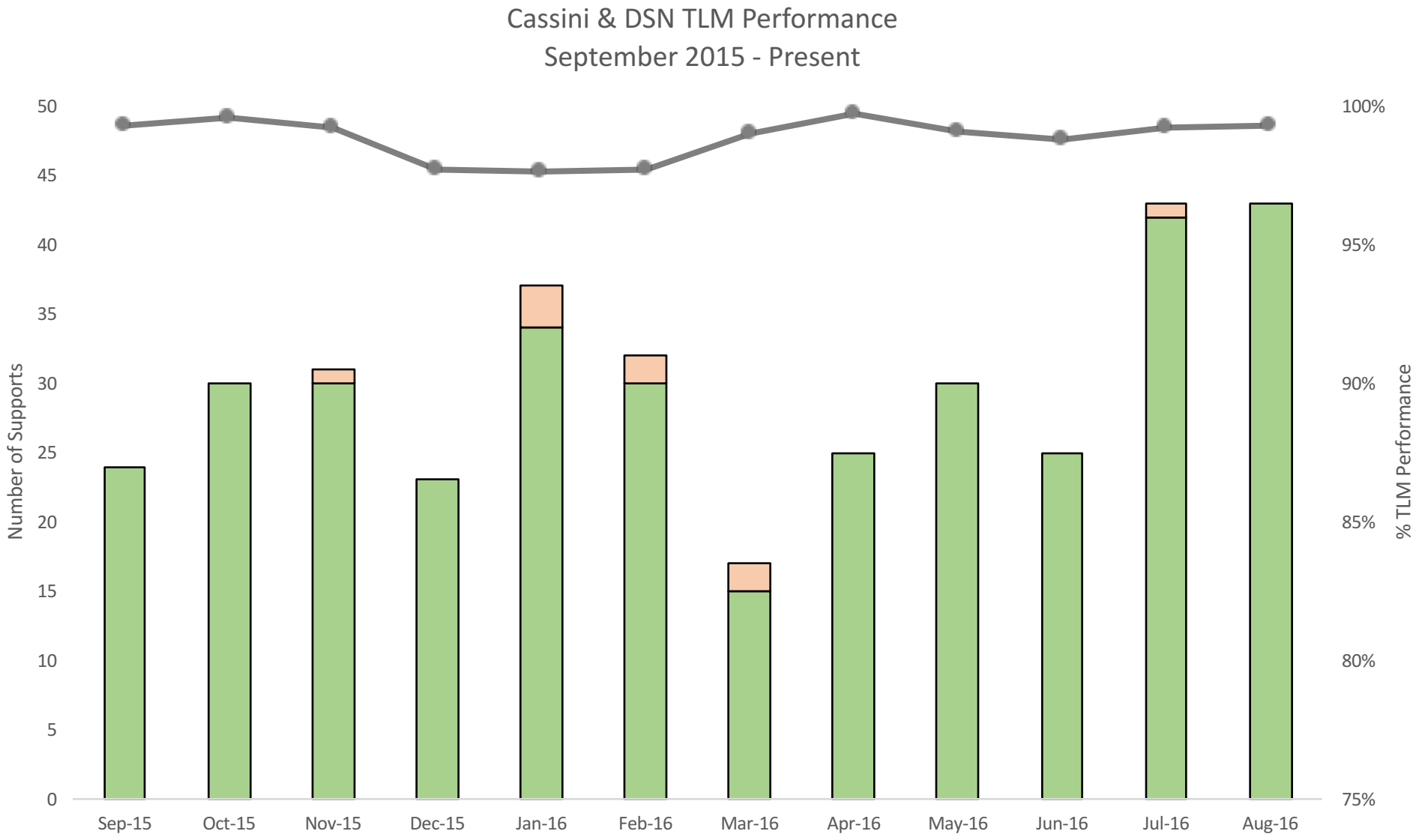
DSN Proficiency
August 2015 – August 2016



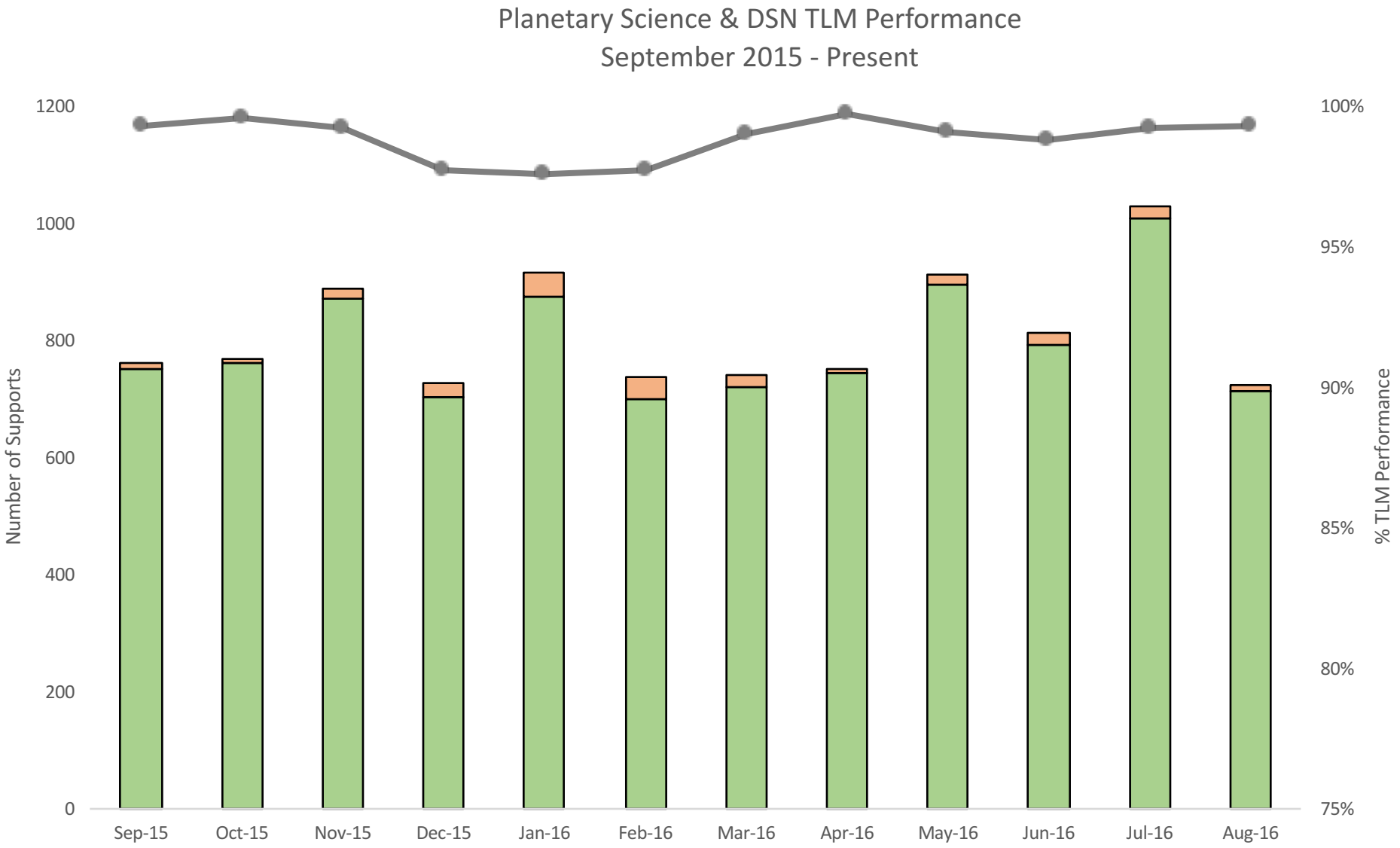
DSN 12-month Rolling Proficiency	
Aug 15	98.4%
Sep-15	99.2%
Oct-15	99.2%
Nov-15	98.6%
Dec-15	97.3%
Jan-16	97.6%
Feb-16	97.8%
Mar-16	99.0%
Apr-16	99.1%
May-16	98.9%
Jun-16	98.2%
Jul-16	99.0%
Aug-16	99.4%

Serviced 37 missions with 98.6% proficiency

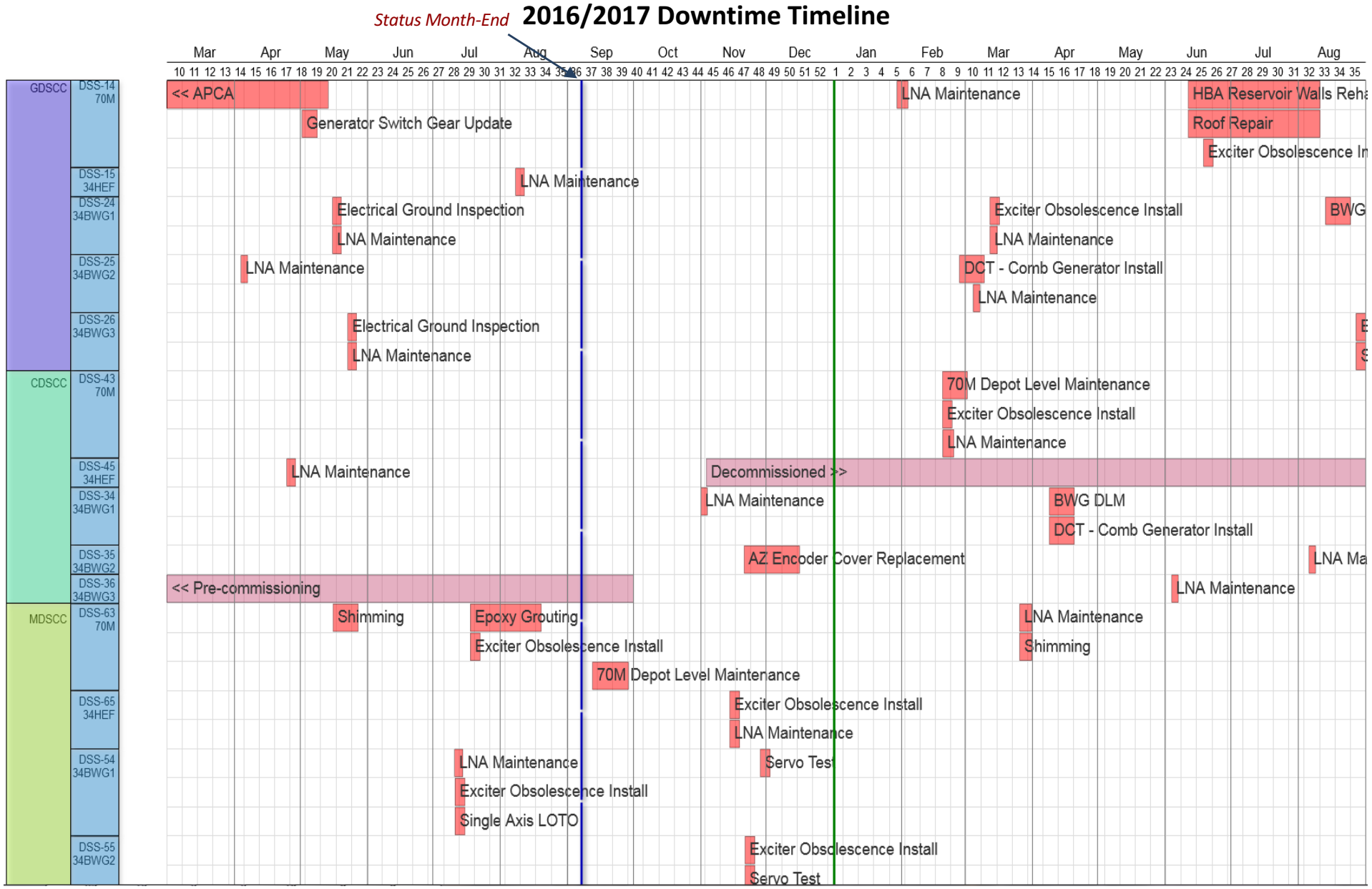
Cassini TLM Performance



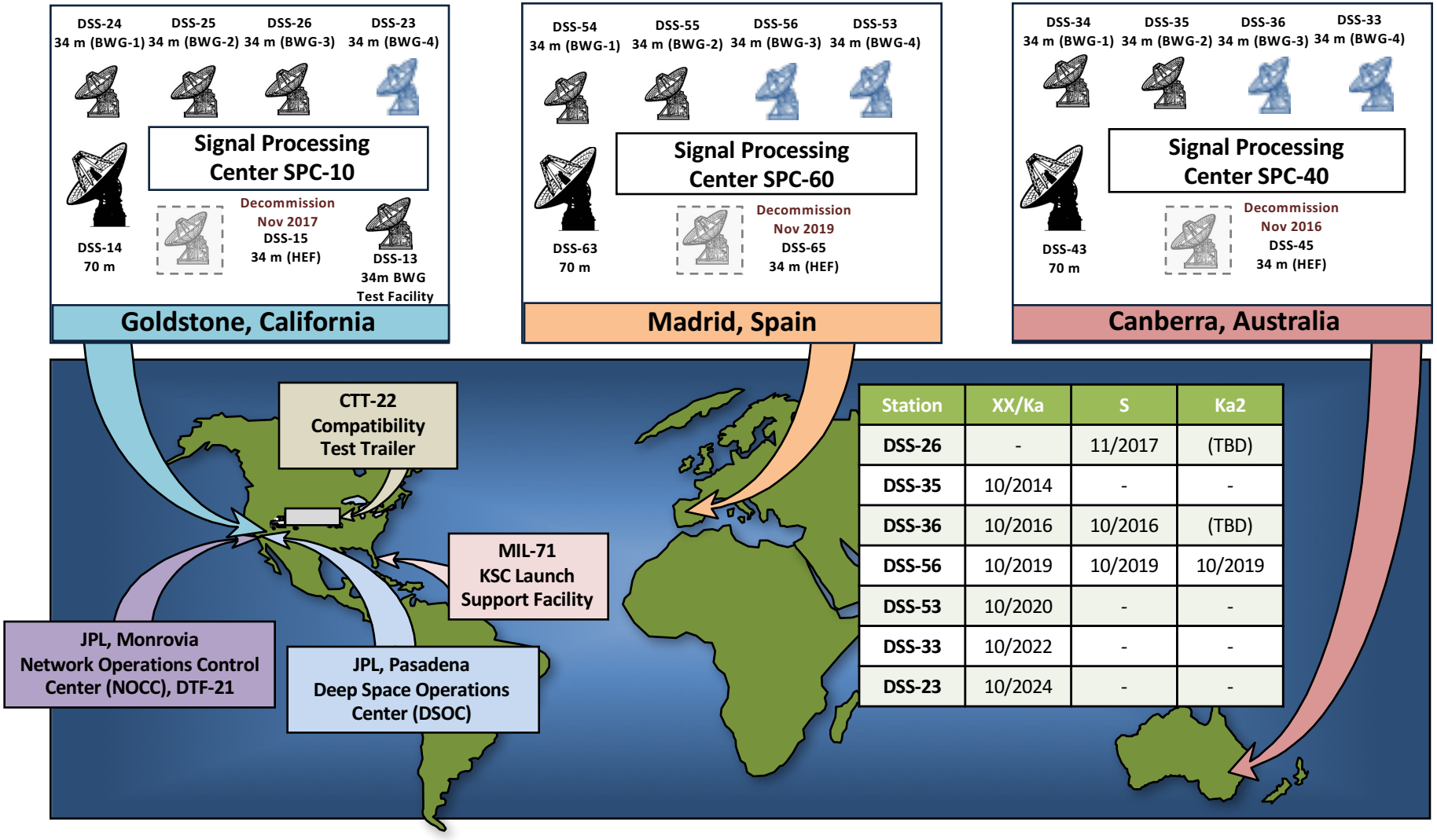
Planetary Science Mission TLM Performance



DSN Scheduled Downtime



Deep Space Network Assets



Station	XX/Ka	S	Ka2
DSS-26	-	11/2017	(TBD)
DSS-35	10/2014	-	-
DSS-36	10/2016	10/2016	(TBD)
DSS-56	10/2019	10/2019	10/2019
DSS-53	10/2020	-	-
DSS-33	10/2022	-	-
DSS-23	10/2024	-	-

DSN Aperture Enhancement Project

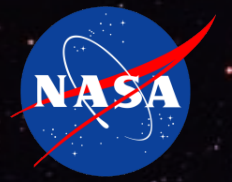
- SCaN developed DAEP in order to respond to concerns over aging 70 m infrastructure
- New 34 meter BWG antenna systems will feature higher reliability, enhanced performance, reduced operations and maintenance costs.

DSS-35	CDSCC	October 2014	Operational
DSS-36	CDSCC	October 2016	Operational
DSS-56	MDSCC	October 2019	Facility work started
DSS-53	MDSCC	October 2020	Facility work started
DSS-33	CDSCC	October 2022	Budgeted
DSS-23	GDSCC	October 2024	Planned

Canberra Deep Space Communications Complex (CDSCC)
Goldstone Deep Space Communications Complex (GDSCC)
Madrid Deep Space Communications Complex (MDSCC)

Program Implementation Review Findings

- SCaN recently underwent a Program Implementation Review (PIR). The board of the PIR found several strengths. Two of them include:
  - **"Exemplary success** in bringing data down on all 3 networks, consistently exceeding 95% requirement."
  - "Demonstrated ability **to manage dwindling budgets** by fully deploying annual funding and managing flexibility needs with process of prioritization of projects and ability to adjust schedules."



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