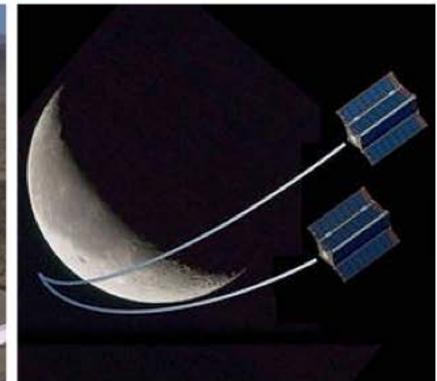
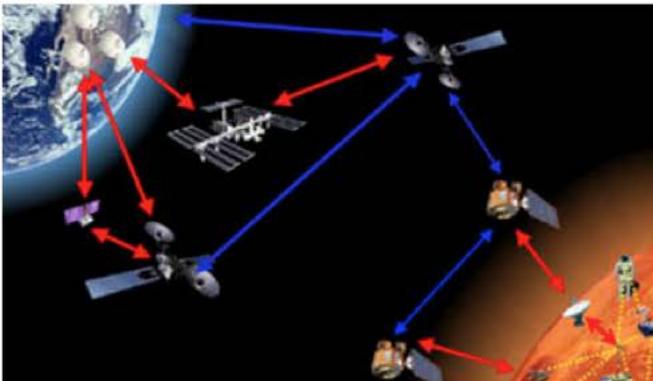
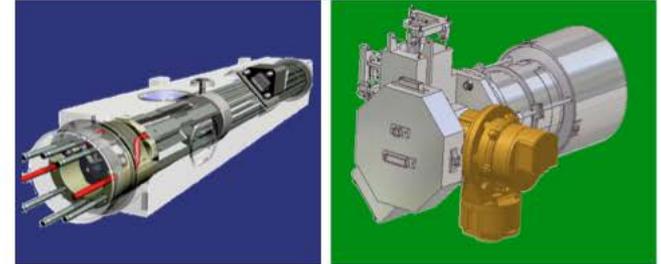
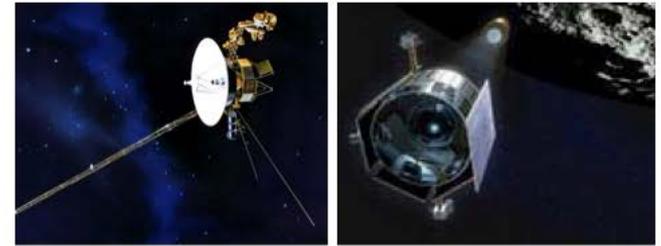
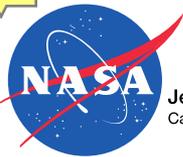


The Goldstone Deep Space Communications Complex

Michael Clements
Goldstone Complex Manager



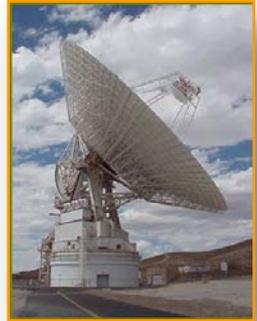


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The Goldstone Deep Space Communications Complex

The Antennas

- Goldstone Consists of 8 Operational Deep Space Stations (DSS)
- Antenna Sizes Range from 34 Meters to 70 Meters in Diameter
 - DSS-13 (34m BWG: R&D)
 - DSS-14 (70m)
 - DSS-15 (34m HEF)
 - DSS-24, 25 & 26 (34m BWG)
 - DSS-28 (34m HSB: GAVRT)



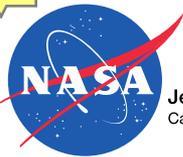
The Complex

- Approximately 45 miles NW of Barstow, CA & 155 miles from JPL
- Goldstone covers ~52 square miles of Territory & is located on Fort Irwin Military Reservation
- 5 Primary Sites (Echo, Mars, Apollo, Venus & Gemini)
- Centralized Control of Assets at the Signal Processing Center (SPC-10) located at Mars Site

The People

- ~ 160 Personnel Operate/Maintain all Aspects of Complex Functions
- Very Diverse Skill-Sets
 - Spacecraft Communication Operators
 - Electronic/Digital, RF, Communications, Hydro-Mechanical Technicians & Field Engineers
 - Electrical, HVAC, System Controls, Fire Protection, Facility Maintenance Technicians & Field Engineers
 - Finance, Logistics, Business & Armed Security Support Staff
 - Outreach



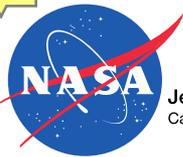


The Goldstone Deep Space Communications Complex

The Environment

- Vast Array of Wildlife
- Goldstone is home to wide variety of flora & fauna, two endangered species & some dangerous species
- Temperatures Range from Below Zero to +120° F



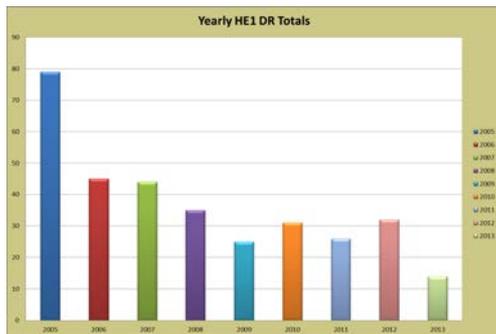


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Operational Efficiency

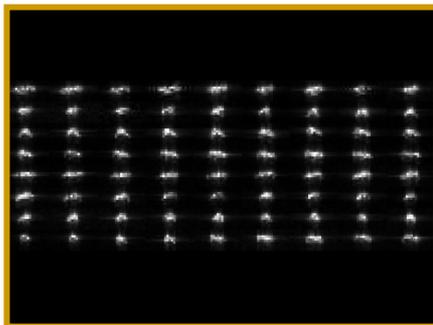
- High Power Radiation Clearance Process
- Improved Workstations
- 2-Links per Operator

Significant
Reduction of
Human Errors

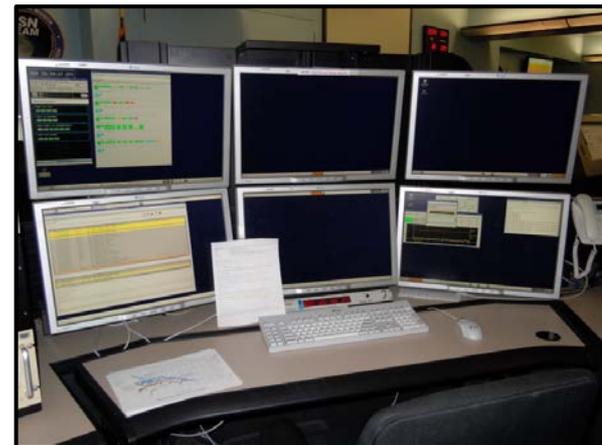


Goldstone Radiation Avoidance Map (GRAM)

- Increasing Demand on Goldstone High Power Radar

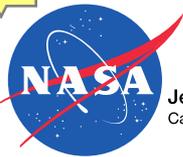


72 individual radar-generated images of asteroid 2012 DA14 created using data from NASA's 70m DSN antenna at Goldstone



Workstation Upgrades





GDSCC Recent Accomplishments

Reliability Improvements

- Site-Wide Uninterruptible Power Supply (SWUPS)
- Vast Infrastructure Upgrades
- Extensive Expansion of Infrared & Predictive Technologies
- DSS-14 70m DLM – Life Extension



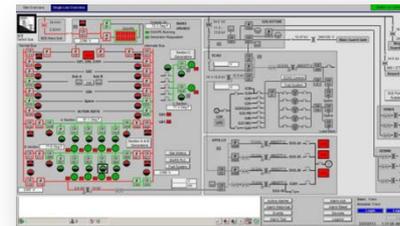
4MW SWUPS



DSS-14 (70M)
Suspended on 3
Sets of Legs



IR 'Find' Capture

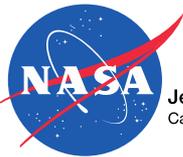


FAC VLAN
Implementation



HVAC
Upgrades





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The Deep Space Network

DSS-14: 70M Antenna Life Extension Tasks



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The Deep Space Network DSS-14: 70M Antenna Life Extension Tasks



Epoxy Grout Pour



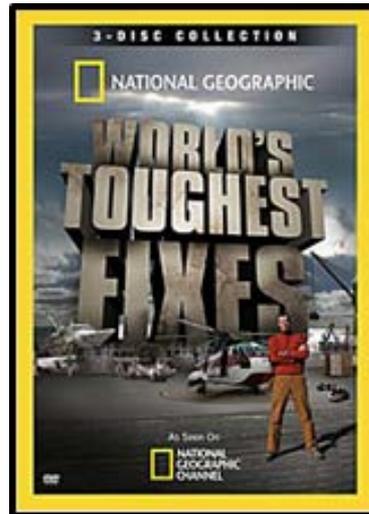
Alignment of Runner Segments



Rotating Structure Support
Installation



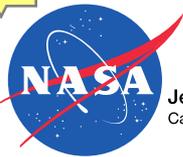
EI Bearing Replacement



Removal of Pad



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Future Upgrades & Initiatives

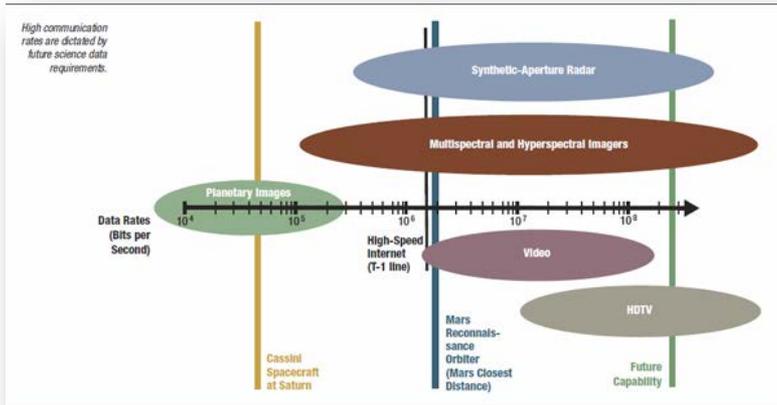
Future Upgrades & Initiatives

- 80kW Transmitter
- Addition of 4th 34m BWG Antenna
- Automated Link Builder (ALB)
- Consolidating Footprint
- Optical Communication



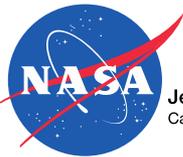
100kW Klystron under Test

Apollo Valley



High Communication Rates are Dictated by Future Science Data Requirements





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The Deep Space Network GDSCC In Action



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