NASA SLR Operatinal Network Project Overview

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SLR Data Quantity

**total passes**
from July 1, 2012 through June 30, 2013

- HEO
- LAGEOS
- LEO

**total satellite pass performance standard is 1500 passes**

1500 (ILRS)

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SLR Data Quality

**LAGEOS RMS**
(single shot for satellite pass)
from April 1, 2013 through June 30, 2013

- Meets ALL ILRS guidelines:
  - LAGEOS RMS (1 cm NP Precision)
  - Short term bias stability (2 cm)
  - Long term bias stability (1 cm)

NASA Network Quality
NASA/ILRS Data Operations Center

◆ The NASA DOC advances since the last ILRS workshop

  – Conversion to CRD format processing (May 2012)
  – Daily analysis products require 24/7 connectivity/support
    • Improved redundancy and monitoring capability
    • Hardening of systems and management of processes
  – IT Security to industry standards
  – EDC/CDDIS comparison
  – QC standardization
  – Configuration Management of Hardware/SW/Processes
  – Re-Engineering Project
    • Obsolescence mitigation, process streamlining, reliability
    • Primary computer hot spare, added UPS for FTP server
    • Automation of manual processes, URL interface is planned

Greenbelt Operations Team
NASA Network Stations

- Peru (TLRS3) - Universidad Nacional de San Agustín (3 x 5 shifts)
  - REGINA collocated including survey
  - New LASER, EL axis repair
  - Improved yield
- Hawaii (TLRS4) – University of Hawaii (2 x 5 shifts)
  - Telescope mount refurbishment including survey
- California (MOBLAS 4) – EXELIS (2 x 5 shifts)
  - Site Survey performed
  - Refurbished RADAR

NASA Network Stations

- Australia (MOBLAS 5) – Geoscience Australia (3 x 7 shifts)
  - RADAR at NASA for refurbishment
- South Africa (MOBLAS 6) – HARTRAO (3 x 5 shifts)
  - NASA training 2012
  - Refurbished RADAR
- Maryland (MOBLAS 7) – EXELIS (3 x 5 shifts)
  - Refurbished RADAR
  - Refurbished Mount Slip Ring
  - Supported Successful collocation with NGSLR
  - VLBI Mask (for RFI impingement)
NASA Network Stations

- Tahiti (MOBLAS 8) - CNES, Universite Franciaise du Pacifique
  - Repaired RADAR, servo system, HEO ranging amplifier
  - FTLRS Collocation 2011
  - 2 shift operation 2013

- MLRS – University of Texas, CSR (2 x 5 shifts)
  - Telescope adjustment, Revised controller software
  - Pending: New LASER, Radar refurbishment
  - Continued Leadership in Lunar Ranging and SLR Analysis

NASA Network Stations Upgrades

- Obsolescence Mitigation
  - Limited funding
  - Highest risk components

- RADAR
  - Depot Level Refurbishment, Standardized Configuration
  - Improved Testing and Restricted Operational Modes

- MOBLAS servo system
  - Testing at NASA

- Event timer
  - Replaces time interval counter for all stations
  - Introduction 2014
NASA Lunar Laser Communications Demonstration

- LADEE spacecraft Launched September 6, 2013
  - Lunar Atmosphere and Dust Environment Explorer
- Lunar Laser Ground Terminal
  - ILRS Engineering Station
  - White Sands New Mexico
  - 4ea 15 cm transmitting telescopes
  - 4ea 40 cm reflective receive telescopes
- Passively tracked AJISAI several times allowing identification and correction of software issues
- Actively tracked AJISAI to check boresight alignment
- Immediately communicated with LADEE spacecraft for successful demonstration: 622 MBps downlink

SLR Operations Summary

- NASA SLR Network is functioning well
  - Deployment of obsolete component replacements will reduce risk of major network decline near term
  - Improvements in data quantity and quality are expected in 2014
- ILRS management and data analysis are functioning well
- Goals
  - Reduce risk of network downtime/failures by improving processes and proactively addressing obsolescence etc.
  - Improve data yield and quality
    - Event timer etc.
  - NASA DOC support ILRS daily data delivery with high proficiency
July 8 Wildfire Monument Peak, CA
PHOTO Courtesy of HPWREN

2/4/2013
http://space-geodesy.nasa.gov

Please see our safety Poster!

SLR
SATELLITE LASER RANGING

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