STEREO Project

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Objectives

- Understand the origin and consequences of coronal mass ejections (CME's)
- Determine the processes that control CME evolution
- Discover the mechanism and sites of solar energetic particle acceleration
- Determine the 3-D structure and dynamics of coronal and interplanetary plasma and magnetic fields.
- Probe the solar dynamo through its effects on the corona and heliosphere.

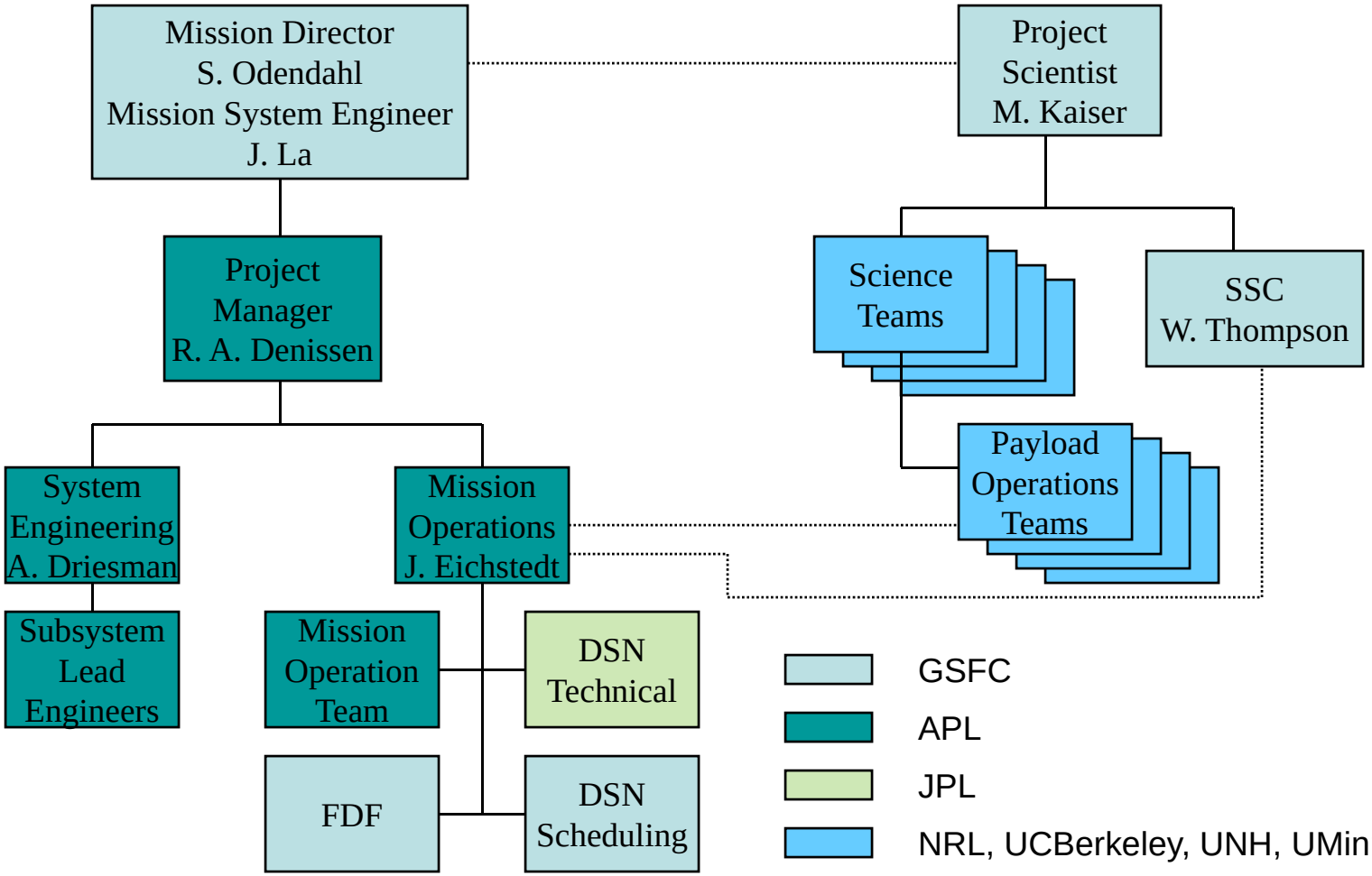
Project Status/Update

Observatories are in their proper heliocentric orbits and the prime science mission began on January 22nd, 2007. Met minimum mission requirements for 2 spacecraft operations. Collecting on average more than 6.5 GBits per day on each spacecraft.

Milestones

• Launched	Oct 25, 2006
• Obs. & inst check out	Nov 06 – Jan 07
• Begin Phase E operation	Jan 22, 2007
• Transition to SSMO	Jan 23, 2007
• 1st SECCHI Campaign	May 1-14, 2007
• 2nd SECCHI Campaign	Jan 7-20, 2007
• End of Prime Mission	Jan 2009

STEREO Phase E Organization Chart



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Major Milestone Timeline

❖ Start of Phase E Operations	Jan. 22nd 2007
❖ Program Handover to SSMO	Jan. 23rd 2007
❖ Lunar Transit on “B” Obs.	Feb. 25th 2007
❖ 1st SECCHI Campaign	May 1-14, 2007
❖ Min Science Req for 2 Obs.	July 20th, 2007
❖ Launch Anniversary Party	Oct 25th, 2007
❖ Leonid Shower (S/C A)	Oct 28th, 2007
❖ 2nd SECCHI Campaign	Jan 7-20, 2008
❖ End of Prime Mission	Jan 2009

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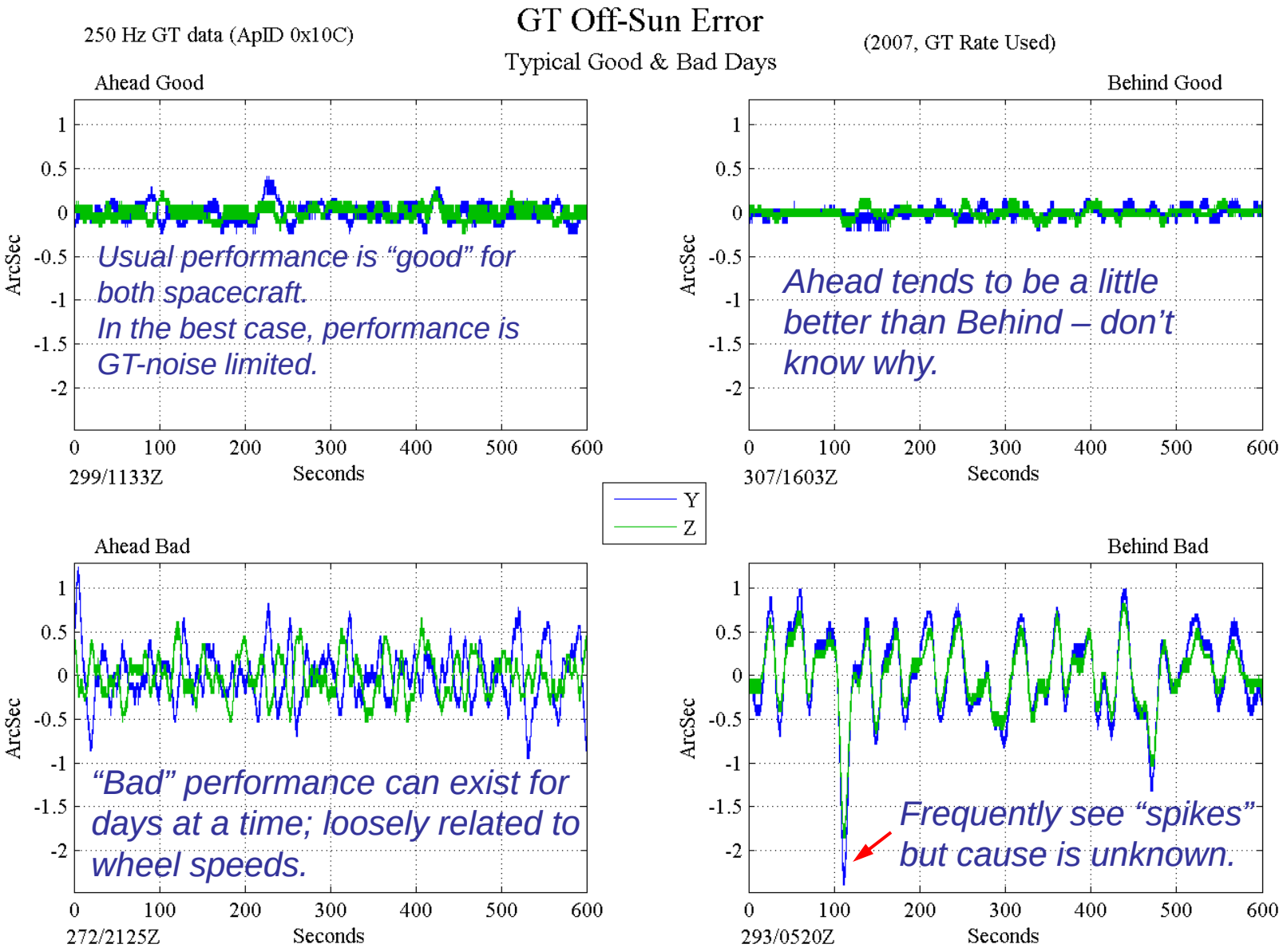
Program Status

- Observatories launched from Cape Canaveral on October 25th, 2007
- All maneuvers, phasing orbits, and swing-bys complete with observatories in heliocentric orbit with desired drift rate (~22 deg per year.)
- Transitioned to Phase E January 22nd
- The observatories are in operational mode and about 40 degrees apart.
- No planned G&C or C&DH flight software loads at this time.
- Spacecraft A operating on IMU2 due to failure of the X-gyro in IMU1

STEREO Typical Fine Sun Pointing



Program Status (cont.)

- **Began automated unattended tracks April 30,2007**
  - Operations team reduced from 12 to 8 on May 1, 2007
  - MOC is manned 5 days a week, 8 hours a day
  - 1 attended track per week on each observatory (more if requested)
  - 95 % of tracks have been nominal and DSN station problems account for almost all of the other 5%.
  - Mission operations center collecting, on average, 7 Gbits per day in support of the prime science mission.
- **Special Observatory Events**
  - *8 instrument calibration events*
  - *8 High Gain Antenna Calibrations*
  - *8 Momentum Dumps (~every 6 weeks on ahead, 8 weeks on behind)*
  - *Software Patches and Parameter adjustments to RAM*
  - *Autonomy Rule Changes in RAM and EEPROM*

Performance Assessment

Technical			Schedule			Resources			Programmatic		
JUN	JUL	AUG	JUN	JUL	AUG	JUN	JUL	AUG	JUN	JUL	AUG
Y/G	G	G	G	G	G	G	G	G	G	G	G

Detailed Description: (for items identified as yellow or red)

- **Technical**
  - *Both Observatories operational. And collecting prime science data*
  - *Spacecraft A operating on IMU2*
- **Schedule**
  - *Routine operations – HGA and instrument cals, momentum dumps.*
- **Resources**
  - *No staffing or funding concerns at this time.*
- **Programmatic**
  - *No issues at this time.*

G	No current problem All commitments can be met	
Y	Major problem Identified solution Commitment is in jeopardy	
R	Major problem No identified solution Commitment cannot be met	

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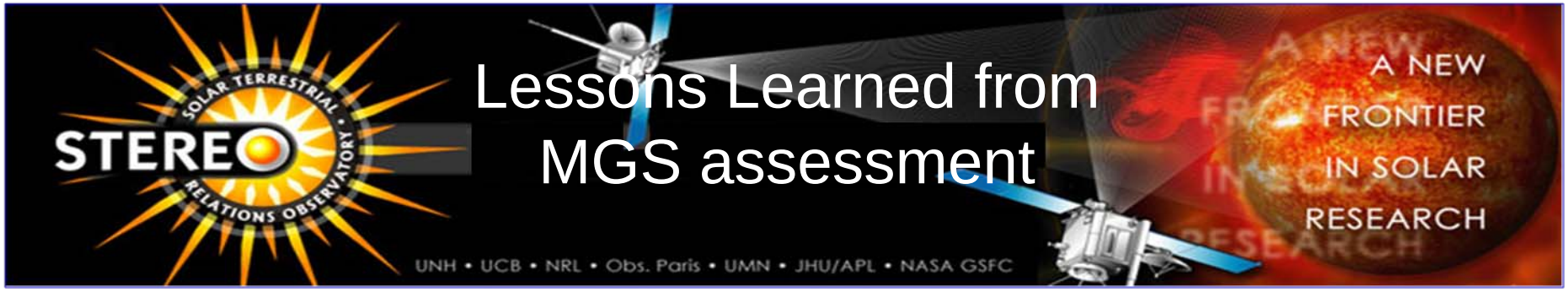

Lessons Learned from MGS assessment

- MGS Report reviewed and STEREO operations already incorporates all of the reports recommendations.
  - *STEREO maintains 2 HIL simulators (one for each spacecraft) configured to match the operation spacecraft.*
  - *All events on the observatories are thoroughly reviewed, approved by the CCB and simulated on the appropriate HIL simulator.*
  - *Raw memory loads are not done on STEREO and all events are run from pre-tested macros.*
  - *Flight software on both the spacecraft and the HIL simulators is under configuration control.*
  - *STEREO personnel are cross trained for maximum flexibility and to cover personnel changes and retraining.*

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Issues/Concerns

- SECCHI resets into maintenance mode
  - *4 times on each observatory*
  - *Data lost until next pass*
  - *SECCHI team is investigating and it is Being tracked by GSFC*

- Leonid Shower
  - *Observatory "A" passes through debris trail on October 31st.*
    - Predicting 2% increase from background
  - *Spacecraft OK*
    - Solar arrays on edge, Battery panel in RAM direction
  - *Instruments*
    - SECHHI plans to close doors as they do for a momentum dump
    - Plastic to turn off entrance system high voltage

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- Observatories are operating better than anticipated and collecting more than 6.5 Gbits/day
- Autonomous operations are going very smoothly.
- Flight software and autonomy is working as expected with few patches and no planned flight loads.
- The spacecraft are in Heliocentric orbits and about 40 degrees apart with large margins on both propellant and power.
- Continuing to work with the instrument science teams to improve the data where ever possible.
- STEREO movies and pictures in a number of museums around the world.
  - *Contacted to adapt format of current movie showing in several museums to provide to wider audience*
  - *Contacted about possible full feature IMAX movie*

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