

# HST Status

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Space Telescope Users Committee  
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## HST Status

- ❖ Observatory and Instruments
  - ACS
- ❖ Servicing Mission 4 (SM4)
- ❖ Proposal Cycles
- ❖ FY07 Funding

## ACS Suspensions

- ❖ ACS Suspension on 19 June 2006
  - Science observations resumed after switch to Side-2 electronics with 2 July SMS
- ❖ ACS Suspension on 23 September 2006
  - WFC returned to service on 1 October
  - HRC returned to service on 15 October
  - SBC is functional and expected to resume operations within next weeks

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## First ACS Suspension

- ACS suspended on 19 June 2006
- What was observed
  - All ones were read back from WFC and HRC CCD Electronics Box (CEB) A/D telemetry FIFOs
  - Status buffer messages : +15V and +5V supply voltages at high limits
  - 36 CEB limit-checked parameters were found to be out-of-limits
  - ACS current decreased 1.2-1.8 amps (no current spike in ACS)
  - Anomaly lasted about 7 seconds before ACS suspended
- The most likely cause was a loss of the Side 1 +15V power rail, due to failure of an Interpoint DC-DC converter

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## ACS Timeline

Date (2006)	Event
June 19	ACS suspends at 17:15 UTC. Tiger Team formed.
June 20	ACS Suspend Status Meetings start. Analysis of ACS data prior to suspension shows that it looks normal. SMOV preparations begin in case switch to Side-2 is necessary.
June 21	ACS CEB Anomaly Review Board created.
June 22	Observing timeline intercepted with SMS containing no ACS activities. Tiger Team passes off investigation to ARB. ACS transitioned to Operate mode on Side-1 as recommended by TT.
June 23	ACS Team decides to recommend WFC temperature set-point change.
June 27	ARB recommends switch-over to Side-2. ARB endorses WFC temperature setpoint change.
June 29	FRR for switch-over to Side-2 held - Switch-over approved. New FSW uploaded to ACS.
June 30	Uplink and real-time switch to Side-2. CCD electronics boards powered. ACS safed for SMS intercept on July 2.

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## ACS Timeline (continued)

Date (2006)	Event
July 2	Intercept of SMS with ACS activities.
July 3	Successful checkout of ACS memory / dumps.
July 4	WFC temperature set-point lowered from -77 C to -81 C. Successful resumption of CCD calibration and science observations.
July 7	ARB lifts moratorium on SBC observations. ARB considers risks/benefits of ACS Side-1 testing.
July 11	ARB votes that risks to ACS assets outweigh benefits of Side-1 testing.
July 12	Press release for first Side-2 science observation.
July 13	HST Project concurs that Side-1 tests should not be done at this time.
July 16	SMS contains SBC SMOV activities.
July-August	Analysis of SMOV / science data; no anomalies found.

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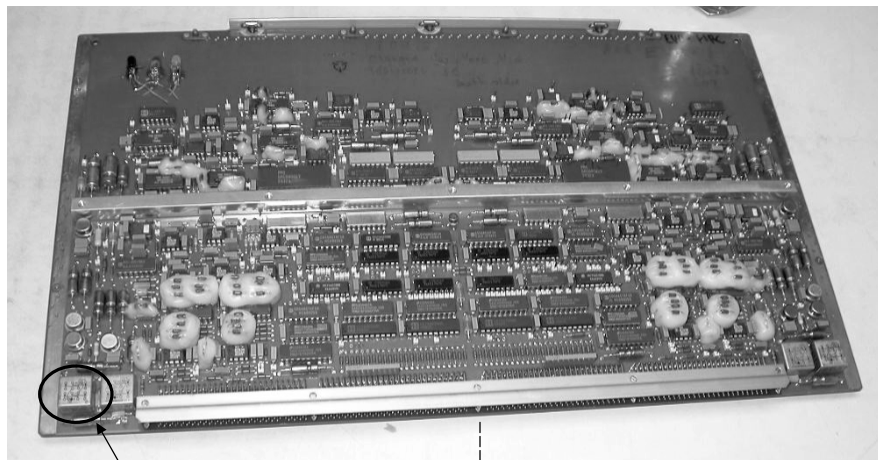
## Second ACS Suspension - ACS/HRC Timeline

- ACS Suspended Saturday, 23 September 2006
  - Telemetry showed that the HRC ASPC2 board was missing its +35V input
  - This voltage is needed for CCD bias level and reset drain operation
  - Loss of +35V believed to leave HRC unusable
  - An ACS-free SMS was implemented the following week
  - ARB was convened to determine cause of suspension
    - Failure of A2/A3 contacts to close in K1 relay
    - Solder joints from K1 relay to ASPC2 board
  - Problem is unrelated to June 2006 Side-1 electronics failure

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K1 relay

ASPC2  
(C,D half of CCD)

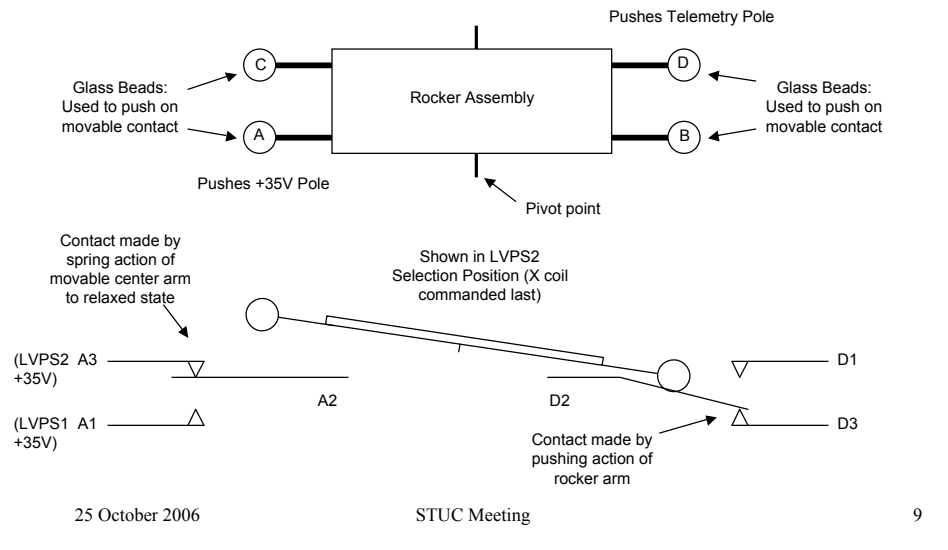
ASPC1  
(A,B half of CCD)

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## Relay Operation



## ACS/HRC Timeline

- WFC returned to service on 1 October 2006
  - Not affected by HRC relay issue
- HRC returned to service on 15 October 2006
  - Single toggle of relay restored electrical contact
  - ARB has recommended never toggling problematic relay again
- SBC is functional but powered off
  - ARB is examining options for bringing SBC on line
    - Previous use of SBC required toggle of problematic HRC relay to allow HRC to be turned off for SBC observations
    - Power / current / thermal issues are being worked
      - Option 1: CCDs and SBC on simultaneously
      - Option 2: CCDs off when SBC is on
  - Return to operations expected within the next weeks

## ACS/HRC Post Recovery Performance

- Internal bias and dark exposures from ACS Daily Monitor Program (10758) have been examined
  - Data were obtained after the ACS anneal on 16 October
  - Read noise and dark current track historical averages
  - Bias levels were slightly higher than historical average, but this is expected for short time after anneals; returned to normal
- Data look perfectly normal, with no anomalies noted

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## ACS/HRC Post Recovery Performance

- First post-recovery science data were obtained 18 October
  - G800L observations of SN1987A (Kirshner SAINTs program; GO10867)
  - Historical data were pulled for comparison
  - Exposures dithered to remove cosmic rays
- Data look perfectly normal, with no anomalies noted

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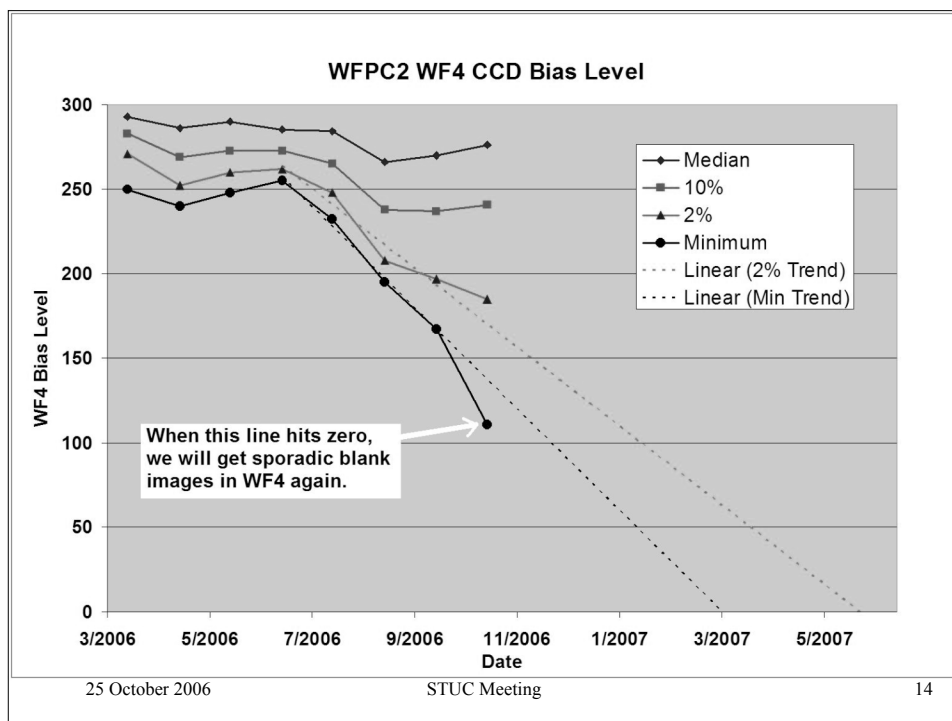
## WFPC2 - WF4 Bias Anomaly

- ❖ Discovered in fall 2005
- ❖ Zero or low WF4 bias images; other three CCDs are OK
- ❖ Exact cause unknown, but tight correlation of WF4 camera head temperature and bias level suggests problem in WF4 camera head electronics
- ❖ Reduction of temperature set point mitigated problem temporarily
- ❖ Now noticing downward trend in WF4 bias levels again

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## WFPC2 - WF4 Bias Anomaly

- ❖ Expect to see sporadic blank bias images within the next few months
- ❖ Exploring option of another corrective temperature adjustment with GSFC
- ❖ Potential science impact to be weighed against additional calibration effort, depending on time to SM4

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## Other Science Instruments

- ❖ Calibration Plans for Cycle 15 and 16:
  - Overview (Bill Sparks)
  - WFPC2 Plans (John Biretta)
  - NICMOS Plans (Nor Pirzkal)
- ❖ STIS Close-Out (Paul Goudfrooij)

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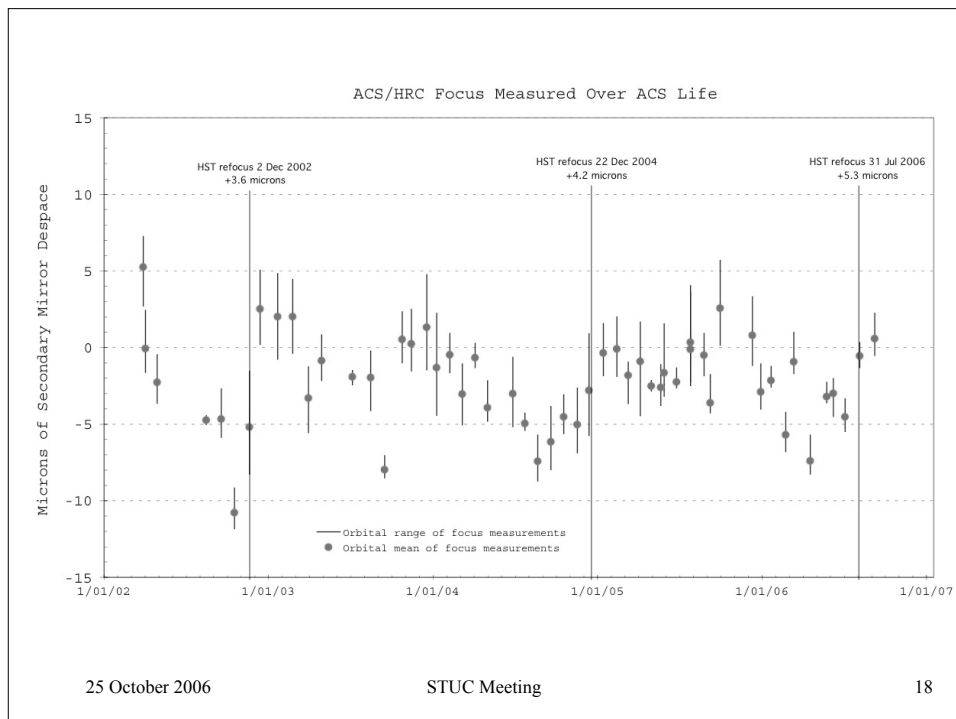
# Observatory Status

- ❖ HST was refocused on 31 July 2006
- ❖ Secondary mirror was moved 5.34 $\mu\text{m}$  away from primary
- ❖ Follow-up focus monitoring observations show near-perfect focus

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## Servicing Mission 4 (SM4)

- ❖ Currently working towards SM4 launch not earlier than January 2008
- ❖ Final decision expected from NASA Administrator Griffin by end of October or early November
- ❖ SMOV activities have started up again
- ❖ STScI-internal SM4 work on track
- ❖ Detailed presentations:
  - WFC3 (John MacKenty)
  - COS (Tony Keyes)
  - Post-SM4 Instrument Capabilities (Jerry Kriss)

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## Proposal Cycles

- ❖ Issued Cycle 16 Call for Proposals on 13 October
- ❖ Cycle 16 Phase I deadline on 26 January 2007
- ❖ All documentation updated and available on the web
- ❖ Summary of changes in Neill Reid's presentation.

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## Cycle 15 Large/Medium/Treasury Execution Status as of 24 October

Proposal		Orbits			PI
ID	Title	Sched	Obs	Alloc	
10915	ACS Nearby Galaxy Survey	6	33	295	Dalcanton
10842	Coma Cluster Distance	-	10	190	Cook
10802	SHOES	6	35	186	Riess
10861	Coma Cluster Survey	-	-	164	Carter
10889	Study of Spiral Galaxies	-	30	128	De Jong
10862	Auroral Imaging of Jupiter and Saturn	-	-	128	Clark
10816	Formation History of Andromeda's Halo	2	94	128	Brown
10872	Lyman Emission Galaxies	-	15	75	Teplitz

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## Cycle 14 Large/Medium/Treasury Execution Status as of 24 October

Proposal		Orbits			PI
ID	Title	Sched	Obs	Alloc	
10496	Dark Energy Studies	1	218	219	Perlmutter
10632	Galaxies at $z > 6.5$ in the UDF	32	171	204	Stiavelli
10530	PEARS	<i>Done</i>	200	200	Malhotra
10775	Globular Cluster Survey	-	131	134	Sarajedini
10504	Cosmic Reionization	-	97	110	Ellis
10556	Neutral Gas Survey	3	101	109	Turnshek
10551	Gamma-Ray Bursts	4	85	100	Kulkarni
10505	Star Formation	<i>Done</i>	97	97	Gallart
10592	IR Galaxies	-	87	88	Evans
10610	Extrasolar Planets	-	68	72	Benedict
10503	Star Formation	<i>Done</i>	69	69	Da Costa
10497	Ia SN and Hubble Constant	<i>Done</i>	68	68	Riess

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## STScI Funding for HST

- ❖ HST-P issued budget guideline for FY07 on 10 October
- ❖ All STScI requests were fully or almost fully funded:
  - HST Science Operations
    - ☞ Must accommodate instrument closeouts and additional SM4 work
  - SM4, COS, WFC3 funded
  - Infrastructure improvements
    - ☞ Request was based on preliminary data
    - ☞ Amount received was lower than request, but in line with current needs