CONFIGURATION OVERVIEW

Jim Sneary
Description Outline

- Location within HST
- System / Subsystems Layout
- Post SRR Changes
Continuing The HST Legacy
Ultimate In-Service Replacement

WFC3 will replace WFPC2
in the Aft Shroud -V3 axis

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WFC3 Critical Design Review
WFC3 is a Hubble Space Telescope Radial Instrument

WFC3 utilizes the enclosure and radiator of the retrieved WF/PC 1

WFC3 will maintain the same mechanical and electrical interfaces as WFPC2

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Numerous WF/PC 1 Components Are Being Reused On WFC3

- Main (Detector) Radiator
- GSE Rotating Dolly
- B-Latch
- Guiderails
- A-Latch
- Mechanism Cover
- GSE Pick-Off Mirror Cover
- Radiator Truss Assembly
- Enclosure
- C-Latch (hidden)

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WFC3 Has Significant Subsystem Heritage

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WF/PC I H/W reuse
HST Heritage
New H/W
Electrical Subsystem
Simplified Block Diagram

1. Only one side shown
2. Cross-strapping not shown
3. Not shown:
   - RIU Expander Unit
   - SOFA Relay Box
   - Power Distribution Box

= redundant boxes
= redundant circuitry on the PWAs

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Electronics Locations On WFC3

Remote Interface Unit (RIU) 1 & 2; Extender Unit (EU) On back of rear enclosure bulkhead and not shown here.

- SOFA Electronics
- Bay 5
- Low Voltage Power Supply (LVPS) 1 & 2
- Heater Power Distribution Box (HPDB)
- Main Electronics Box 2 (MEB2)
- Bay 2
- Blind Mate Connector
- Detector (IR) Electronics Box (DEB)
- Enclosure

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UVIS Channel
- FOV 160 X 160 arc sec
- F/31
- OTA + WFC3 focal length = 78,000 mm
- 4k X 4k CCD, 15 mm pixels
- 200 - 1000 nm

IR Channel
- FOV 123 X 139 arc sec
- F/11
- OTA + WFC3 focal length = 29,000 mm
- 1k X 1k HgCdTe array, 18 mm pixels
- 850 - 1700 nm

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# Highlights Of Post-SRR Changes

- Reflective IR optical configuration changed to a refractive system
  - Incorporation of a refractive corrector plate (RCP) and an optimized ‘co-located’ cold stop
  - Benefit is overall instrument throughput improvement from 61 to 85 %

- Both detector focal planes (UVIS and IR) are mounted at an angle to optic axis to account for off-axis optical prescriptions

- Numerous packaging iterations for locations of mechanisms and electronics boxes.

- Down-selected to Marconi CCD for:
  - Noise performance and considerations for coating / QE stability and CTE

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UVIS Channel Detector

- Format: 2 x 2Kx4K CCDs
- Pixel size: 15 mm
- Field of View: 160x160 arcsec
- Bandpass: 200 to 1000 nm
- Read Noise: < 4 e- rms
- QE > 60% for 300 to 700 nm
- Charge Transfer Efficiency: > 0.99999 (start of life)
- Dark current: < 15 e-/pix/hr

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IR Demo Hardware
- Designed, Fabricated And Tested -

- Format: 1Kx1K HgCdTe/Silicon mux
- Pixel size: 18 um
- Field of View: 130x130 arcsec
- Bandpass: 850 to 1700 nm

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WFC3 Critical Design Review 12
Optical Assembly With Top Panel Removed

- UVM1 & Corrector Mechanism
- IR Detector
- SOFA (UVIS Filters)
- UVIS Detector
- UVIS Shutter
- IR Cold Enclosure RCP
- IR Filter Wheel
- IRM2 & Corrector Mechanism
- Channel Select Mechanism
- Athermalized Strut System
- IR Fold Mirror
- Pickoff Mirror
- Optical Bench
- Calibration Subsystem
- WF/PC H/W reuse
- HST Heritage
- New H/W

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WFC3 Thermal Configuration

External Radiator with External Spreader CCHPs (6) and Header CCHPs (2)

UVIS Flex CCHPs (2)

Optical Bench Cold Plate Control VCHP (1)

MEB CCHPs (2) Internal (2) External

IR Detector
Flex CCHPs (2)

IR Cold Enclosure
Flex CCHPs (2)

Optical Bench Cold Plate with Integral CCHP (1)

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December, 2000 WFC3 Critical Design Review 14