WFC3 IR Detector Status

Presentation to the
Space Telescope User Committee

April 20, 2006
Massimo Robberto
Historic recap

- FPA #64 has been installed in flight build Nr. 2.
  - Successfully passed Fall 2004 Thermal Vacuum campaign
  - Ready to flight
- The WFC3 project has discovered radiation induced glow from high energy particles on CdZnTe substrates
  - Increase of background may reduce sensitivity
- Solution: remove CdZnTe substrate (thinning)
  - Eliminates radiation induced glow
  - Possible increase of QE at shorter wavelengths
  - Visible window open down to 0.4 micron
New Lot Growth at RSC

In Fall 2005 Rockwell has fabricated two new lots of detectors for WFC3, with substrate removed.

✓ Radiation tests have confirmed that removal of the CdZnTe substrate eliminates the radiation induced background
✓ Substrate removal has resulted in improved quantum efficiency over earlier devices.
✓ Sensitivity is extended into the visible wavelength range.

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January 6, 2006 WFC3 Scientific Oversight Committee Meeting
QE For Flight Candidates

QE of New WFC3 Devices

![Diagram showing QE of new WFC3 devices across different wavelengths.

Wavelength (nm)

0 10 20 30 40 50 60 70 80 90 100
200 400 600 800 1000 1200 1400 1600 1800

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Dark Current

Cumulative Dark Current

T = 145 K

Percent of pixels above this dark rate

Dark rate (e/sec)

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Cumulative Mean Dark Rates

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Performance Metrics For Flight Candidate Devices

Discovery Efficiency relative to FPA64
Point sources - Average zodi - 2400s

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January 6, 2006

WFC3 Scientific Oversight Committee Meeting
More new Detectors

- RSC is producing eight more devices from the Lot 1 and 2 residual assets and from the recently completed lot 3. These detectors are
  - Thinned,
  - new BCS design,
  - correct torque.

delivered to the project:
  - FPA 128, FPA 129

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