WFC3 SMOV Science Report

June 30, 2009

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WFC3 Science Report For Day Month 2009

<table>
<thead>
<tr>
<th>Previous 24 hours: Day 180 (June 29, 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 11808 – UVIS bowtie monitor, Visits 19-20</td>
</tr>
<tr>
<td>• 11446 – UVIS dark current, readnoise, and CTE, Visit 2</td>
</tr>
<tr>
<td>• 11447 – IR dark current, readnoise, and background, Visit 2</td>
</tr>
<tr>
<td>• 11424 – UVIS initial alignment, Visit 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Up-coming 24 hours: Day 181 (June 30, 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 11808 – UVIS bowtie monitor, Visits 21-22</td>
</tr>
<tr>
<td>• 11425 – WFC3 IR initial alignment, Visit 3</td>
</tr>
<tr>
<td>• 11426 – UVIS contamination monitor, Visits 11-13</td>
</tr>
<tr>
<td>• 11448 – UVIS SAA passage behavior, Visits 1-3</td>
</tr>
<tr>
<td>• 11425 – IR Initial Alignment, Visit 3</td>
</tr>
</tbody>
</table>
11808 – UVIS bowtie monitor

- Activity – visits 12-18, Baggett & Borders
- Objective – measure CCD pinning state/provide pinning exposure
- Status – each new visit of bowtie monitor intflats examined via several methods and compared to previous images.
- Results
  - No evidence of bowtie feature in image ratios.
  - While first post-anneal bowtie visit showed slight structures and overall level change similar to that seen in first SMOV bowtie visit, individual ratios since then have been flat to <1%.
  - From visit to visit, overall image ratio level fluctuates about +/- 0.5%.
Each bowtie visit contains 1 short, well-exposed intflat before & after the heavily-saturated pinning exposure.

- Ratio levels shown are computed as im1/im3 within each visit and plotted as a function of visit start time.
- Data levels of well-pinned images are slightly less than unity. This is attributed to tungsten lamp warm-up time in first exposure. Ratios of im1/im1 as well as im3/im3 show excellent repeatability from visit to visit (excluding visit 1 and post-anneal visit).
11426 UVIS contamination monitor

- Activity – visits 1-3, Baggett & Borders
- Objective – monitor photometric throughput as function of time and wavelength, to check for presence of possible contaminants
- Status – preliminary aperture photometry run and compared to ETC/synphot. Post-anneal data only available at this time, trending to commence with upcoming June 30 visits.
- Results
  - Observed countrates 1-15% higher than WFC3 ETC predictions (5 pix radius) in all but F814W filter, which is ~2% lower than ETC.
  - Observed countrates same as or up to ~10% higher than WFC3 synphot calcphoth predictions (40 pix radius) in all but F814W filter, which is 2-4% lower.
Quick look result based on GRW+70 standard star data from contamination monitor, more detailed calibration and analysis still in progress.

LHS: comparison of observed countrates to WFC3 ETC predictions (5 pix radius).

RHS: comparison of observed countrates to WFC3 to synphot calcphoth predictions (40 pix radius).
Proposal 11424, UVIS Initial Alignment

- **Activity** - Visit 3 of 3: images of open cluster NGC188 in F410M at 5 focus positions executed successfully on Monday 29 June
- **Objective** – Optimize UVIS image quality over field.
- **Status** – Images analyzed; encircled energy and phase retrieval used to determine alignment corrections. 30 stars used to sample the field.
- **Results**
  - Additional adjustment of (inner, outer) corrector cylinders of (+4,+4) steps required to compensate effect of focus move
  - Focus error well within breathing range, no change required
  - Corrections to be applied via realtime command before visit 1 of prop 11434 (Thursday, 2 July AM)...Ops request specified
11420 IR Detector Functional Test and Gain

- **Activity:** Visits 12 of 12, darks, internal flatfields
- **Objective:** Measure baseline performance and operability of the IR detector. Evaluate readnoise, dark current, gain, and reference pixels
- **Status:** Images analyzed
- **Results:** IR detector Functional Test revealed light leak.
  - 1 e/s/pix when staring at bright Earth with BLANK in and CSMID = IR. (~0.04 e/s/pix otherwise).
  - “Vent tube” and “BLANK warming” hypotheses nearly ruled out (but not proven entirely negligible yet).
  - IR darks (11447) likely compromised.
  - Recommend command change to place CSM in UVIS position when taking IR darks
- **Snowball rate in low Earth orbit** ~\((3 +/- 1)\) times that of **TV3**.
View of Earth from infinity facing the +V1 direction.

Ground track is only approximate.
Embargoed figure - Do not distribute
Embargoed figure - Do not distribute

Same data: zoomed vertical scale.
11449 SAA Passage Behavior

- Activity - 11449 Visits 01, 02
- Objective – To measure the CR rate in shallow and deep SAA Passages.
- Status – Raw, (final-zeroth) read images to find the percentage of CR-affected pixels.
- Preliminary Results
  - Middle of Shallow SAA Passage: ~5x more CR-affected pixels than beginning or end
  - Middle of Deep SAA Passage: >30x more CR-affected pixels than beginning or end
Program 11449

- IR Darks raw images
- SPARS50, NSAMP=4 (EXPTIME=152 sec)
- CR pix: ³ 4000 e-/hour/pix (still evaluating)

- Full frame, no binning
- CRs calculated in (last - zeroth) images
- Last read ONLY shown (no zeroth read subtraction shown)
PRELIMINARY RESULTS
Work in progress to determine:
• proper threshold for CR definition
• CR rates (e-/hour/pix) by Quad

• CR pix: ³ 4000 e-/hour/pix (still evaluating)