Cycle 15+16 WFPC2 Calibration Augmentation

- Augment calibration plan to address increased WFPC2 utilization / importance in Cycles 15 & 16. Better calibration of CTE and WF4 photometry.
- Some observations are time sensitive -- must start observing 6 June 2007 if SM4 moved early to ~July 2008 (target visibility issues, etc.).
- Specific needs of Cycle 16 GO programs will be considered later, after Phase II deadline, and some additional orbits might be requested.
- Total augmentation request: 33 external orbits, 264 internal orbits.
<table>
<thead>
<tr>
<th>ID</th>
<th>Proposal Title (PI)</th>
<th>Frequency</th>
<th>Requested Augmentation (orbits)</th>
<th>Existing Allocation (orbits)</th>
<th>Products</th>
<th>Accuracy Required</th>
<th>Notes</th>
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<tbody>
<tr>
<td></td>
<td>Closeout Programs</td>
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<tr>
<td>11030</td>
<td>WF4 Anomaly (Dixon)</td>
<td>Every 6 months</td>
<td>3 “External”</td>
<td>2 “External”</td>
<td>CDBS, IHB, WWW</td>
<td>1-2%</td>
<td>March 2008 temperature reduction; WF4 photometry test</td>
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<td></td>
<td></td>
<td></td>
<td>27 “Internal”</td>
<td>54 “Internal”</td>
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<tr>
<td>11032</td>
<td>CTE Extended Targets (Golimowski)</td>
<td>once</td>
<td>26 “Internal”</td>
<td>8 “Internal”</td>
<td>ISR, IHB</td>
<td>0.03 mag</td>
<td>Abell 1689, HDF-N field</td>
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<td></td>
<td>Routine Monitors</td>
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<tr>
<td>11022</td>
<td>WFPC2 Decons &amp; Associated Observations (Biretta)</td>
<td>Decons every 45d - 60d</td>
<td>3 “External”</td>
<td>12 “Internal”</td>
<td>CDBS, Inst Hbk, Synphot, WWW reports</td>
<td>1-2%</td>
<td>Decons, photometric monitor, internals, UV throughput, VISFLATS and UVFLATS.</td>
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<tr>
<td></td>
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<td>48 “Internal”</td>
<td>188 “Internal”</td>
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<tr>
<td>11023, 11070</td>
<td>Standard Darks (Part 1 &amp; Part 2; (Biretta)</td>
<td>weekly, except decon week</td>
<td>132 “External”</td>
<td>528 “Internal”</td>
<td>CDBS</td>
<td>1 e-/hr</td>
<td>CDBS updates and weekly WWW hot pixel lists.</td>
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<tr>
<td>11024</td>
<td>Internal Monitor (Biretta)</td>
<td>weekly, except decon week</td>
<td>22 “External”</td>
<td>88 “Internal”</td>
<td>CDBS</td>
<td>0.8e-/pix</td>
<td>BIAS, INTFLATS in F555W for gain and throughput stability measurements</td>
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<tr>
<td>11025</td>
<td>CTE Monitor (Biretta)</td>
<td>1/year</td>
<td>1 “Internal”</td>
<td>4 “Internal”</td>
<td>ISR</td>
<td>0.03 mag</td>
<td>Continue CTE monitor</td>
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<tr>
<td>11027</td>
<td>Visible Earth Flats (Gonzaga)</td>
<td>continuous</td>
<td>25 “Internal”</td>
<td>100 “External”</td>
<td>CDBS</td>
<td>0.3%</td>
<td>F502N only (time dependence only)</td>
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<tr>
<td>11028</td>
<td>UV Earth Flats (Gonzaga)</td>
<td>continuous</td>
<td>10 “Internal”</td>
<td>40 “Internal”</td>
<td>CDBS</td>
<td>0.3%</td>
<td>F255W only</td>
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**TOTAL TIME (including all executions)**

<table>
<thead>
<tr>
<th></th>
<th>“External”</th>
<th>“Internal”</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>33</td>
<td>264</td>
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<tr>
<td></td>
<td>26</td>
<td>998</td>
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WFPC2 Closeout Programs

11030: WFPC2 Closeout: WF4 Anomaly (PI=Dixon)

- Keep WF4 alive for GO observations and closeout calibrations.
- Need additional temperature adjustment ~ March 2008 since SM4 slip.
- Various internal images taken to test resulting performance.
- Omega Cen to check PSF.
- Add 2 more orbits Omega Cen at low and high bias to test photometric corrections, which are more important to verify now.
- Cost: 3 more external orbits, 27 more internal orbits.
11032: WFPC2 Closeout: CTE for Extended Target (PI=Golimowski)

- Measure CTE at ~15 years on-orbit when effect is large.
- Likely last opportunity to study CTE effects on long-lived detector.
- Extended targets (galaxies, etc.) represent large component of WFPC2 archive and Cycle 16 proposal pool, but very little calibration data exists.
- Image galaxies in each CCD with two ORIENTS 180 degrees apart.
- Repeat entire Cycle 8 program 8456 (Abell 1689), rather than previously proposed partial repeat. Will provide CTE measurements in both F606W and F814W filters (two important filters and background levels).
- Add new target HDF-N field containing small, faint galaxies. Compare new data vs. original 1995 HDF and 2000 data in program 8389. Filter F606W.
- Cost: 26 more external orbits.
WFPC2 Cycle 15+16 Routine Monitors

11022: WFPC2 Cycle 15+16 Routine Cals: Decontaminations (PI=Biretta)

- Decontaminations every 45 - 60 days (synchronized with target).
- Monitor F170W in all 4 chips each decon when target available.
- Other UV & blue filters cycling among the different chips to fill orbit.
- Augment with 6 more months to allow SM4 as late as Dec. 2008.
- Cost: 3 more external orbits, 48 more internal orbits.
11023/11070: WFPC2 Cycle 15+16 Routine Cals: Standard Darks (PI=Biretta)

- Six 1800s exposures / week (5 with clocks off, 1 with clocks on).
- Used for weekly CDBS darks (hot pixels, superdark).
- Not scheduled during Decon weeks (those are in Decon proposal).
- Need is driven by ~week timescale for hot pixel growth.
- Augment with 6 more months to allow SM4 as late as Dec. 2008.
- Cost: 132 more internal exposures.
11024: WFPC2 Cycle 15+16 Routine Cals: Internal Monitor (PI=Biretta)

- Monitor the health of the camera electronics (bias level, gain stability, flat).
- Scheduled once / week, except for Decon weeks (are in Decon proposal).
- Each week: 4 BIAS frames, 2 INTFLATs at Gain=7 and Gain=15.
- Provides data for bi-annual superbias in CDBS.
- Augment with 6 more months to allow SM4 as late as Dec. 2008.
- Cost: 22 more internal orbits.
11025: WFPC2 Cycle 15+16 Routine Cals: CTE Monitor (PI=Biretta)

- Monitor CTE degradation; better characterize long-vs-short anomaly.
- Standard monitor, execute once per year.
- Omega Cen in F814W and F555W, in WF2 & WF4, gain 7 and some gain 15.
- Include high S/N Long vs. Short test for uncrowded field.
- Augment with 6 more months to allow SM4 as late as Dec. 2008.
- Cost: 1 more external orbit.
11027: WFPC2 Cycle 15+16 Routine Cals: Visible Earth Flats (PI=Gonzaga)

- Time-dependent changes are predominantly monochromatic (Koekemoer et al. 2001).
- Monitor only single visible filter, F502N.
- Combine and used to update filter flats in CDBS.
- Augment with 6 more months to allow SM4 as late as Dec. 2008.
- Cost: 25 more internal orbits.
11028: WFPC2 Cycle 15+16 Routine Cals: UV Earth Flats (PI=Gonzaga)

- Monitor potential UV throughput changes across the field caused by contaminants.
- Monitor single UV filter, F255W.
- Augment with 6 more months to allow SM4 as late as Dec. 2008.
- Cost: 10 more internal orbits.