

WFPC2 Closeout Plan

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WFPC2 Legacy

- Large fraction of HST output.
- Currently ~40% of HST post-repair orbits (prime, parallels, ext cals).
- By SM4: ~14 years on-orbit and ~120,000 science images.

Goals of Remaining WFPC2 Support

- Primary goal: ensure future archival users can readily obtain accurate results from WFPC2.
- Correct known calibration issues where possible.
- Document remaining known deficiencies.
- Make well-calibrated data easy to obtain.
- Minimize / eliminate need for manual user calibrations.
- Continue operating and calibrating WFPC2 up to SM4.

Priorities

- Keep WFPC2 operating as well as possible to SM4.
- Perform routine calibrations as previously done.
- Document known issues.
- Attempt to solve technical calibration issues while WFPC2 expertise exists.
- Make calibration easier for archival users, where possible.
- Defer most archive specific work (e.g. static archive) to future.
- Projects prioritized as committed / high / medium.

Specific Areas & Potential Projects

- Routine monitors and calibrations.
- Special closeout observations.
- WF4 anomaly.
- CTE studies.
- HST global photometric accuracy.
- Improve photometric zeropoints.
- Low light flats for broadband filters.
- Red-leaks in blue and UV filters.
- Narrowband and ramp filters.
- Documentation.
- User support / management / etc.

Routine Monitors and Calibrations

- Basic calibration observations to support on-going GO observations and special close-out programs.
- DECONs, biases, darks, flats, photometry data.
- Perform basic analyses – make bias and dark reference files, populate photometric monitor tables, measure CTE.
- Committed to do. 21 orbits. 0.7 FTE yrs.

Special Closeout Observations

- Special end-of-mission observations to enhance calibration.
- Topics addressed: CTE (background dependency, extended targets), low-light broad band flats, photometric zeropoints, red leaks, red filters, ramp & narrow band filters, polarizers, geometric distortion.
- Detailed plan at WFPC2 website
http://www.stsci.edu/hst/wfpc2/analysis/WFPC2_cyc1516_cal_plan_final.pdf
- Committed to write proposals and take data.
- 68 orbits. 0.3 FTE yrs.
- Analysis work discussed separately....

WF4 Anomaly

- Monitor health of WF4
- Keep WF4 functioning: Perform temperature adjustment in Jan. 2007, possibly also Aug, 2007.
- Document work on temperature adjustments & their impact.
- Derive and document photometric corrections.
- Impacts ~20% of images by numbers; science impact 6%?
- Has indirect impact on many areas of calibration.
- Committed to do. 0.5 FTE yr.

- Software tasks to correct photometry and background streaks.
- Pipeline-based corrections.
- Requires work from software / pipeline groups.
- High priority. 0.3 FTE yr.

CTE Studies

- CTE is greatest single lien on WFPC2 data quality, accuracy, and ease of use.
- Existing CTE correction equations derived prior to 2002. Re-derive corrections for entire mission.
- Simplify CTE corrections – currently 3 sets of corrections that often give different results.
- Image based corrections? Greatly simplify future archival use / improve accuracy if corrections were made in pipeline. Valuable asset for other instruments – WFPC2 good test bed – long history and large CTE.
- Impacts ~80% of data to some degree.
- High priority; 0.6 FTE yr.

HST Global Photometric Accuracy

- Compare photometric scales of past / current instruments.
- Study long-term trends in HST throughput (especially UV).
- WFPC2 has 14 year overlap with other instruments.
- Medium priority; 0.2 FTE yr.

Improve Photometric Zeropoints

- Accuracy ~2% in visual and red; only 3% to 4% in blue.
- Analyze additional standards & standard fields.
- Impacts ~45% of images.
- Medium priority; 0.3 FTE yr.

Low Light Flats for Broadband Filters

- Existing broadband filter flats are combination of ground test data and on-orbit illumination corrections derived from narrow-band filters.
- Directly derive flats for broadband filters:
- Sky flats: large archive of images available.
- Full moon Earth flats: earth illuminated by full moon provides correct brightness for direct broadband flats. (Effort needed from scheduling group.)
- Impacts ~94% of images.
- Medium priority; 0.4 FTE yr.

Red-Leaks in Blue and UV Filters

- Red-leaks not well calibrated on-orbit.
- Evaluate spatial variations and any long-term changes.
- Impacts ~35% of images.
- Medium priority; 0.2 FTE yr.

Narrow Band and Ramp Filters

- Possibility that filters change in space environment due to chemistry processes.
- Evaluate central wavelengths, band widths, throughputs.
- Some evidence for 5% - 10% photometry errors in ramps.
- Impacts ~4% of images.
- Medium priority; 0.5 FTE yr.

Documentation

- Instrument Handbook final version. Last full version 2004; only short updates since then.
- Data Handbook final version. Current version is Jan. 2002.
- Website Clean-up. Convert from “work in progress” to “final document.” Remove out-of-date / redundant / wrong material. Improve accessibility and usability. Sensible paths to material vs. historical accidents.
- Summary document “The WFPC2 Experience.” Single document summarizing history and issues from archival user point-of-view.
- High + medium priority tasks; 0.4 + 0.4 FTE yr.

Miscellaneous Items

User support

- Proposal reviews, help desk, etc.
- High priority. 0.1 FTE yr.

Management

- Closeout planning, presentations, meetings.
- Committed to do. 0.2 FTE yr.

Contingency

- Unexpected events, training new staff, SM4 delays, etc.
- 1 FTE yr.

Final Thoughts

- Projects outlined herein should be thought of as “potential” projects.
- Current WFPC2 staffing adequate to accomplish most of the “committed” projects – primarily operating WFPC2 until SM4.
- High and medium priority projects will require up-staffing WFPC2 group or outsourcing.
- Total effort in all projects is similar to past closeouts, but may be difficult to support concurrently with SM4, etc.

STUC Input Welcomed

- Are priorities correct?
- Suggest additional projects?
- Outsource some projects?