

# WFPC2 Cycle 11 Calibration Plan

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## ABSTRACT

*The Cycle 11 Calibration Program, extending from July 1, 2002 to June 30, 2003 will continue to monitor the health of WFPC2, using the standard suite of calibrations, as well as some special programs to characterize other aspects of the instrument. The most significant change in the routine monitors concerns the length of time between decontaminations. This period has been increased from 28 days to 49 days because data from the last few cycles indicate that the contamination rate has been decreasing. Special programs include more efforts to characterize CTE, a revisit of the long-vs.-short anomaly, photometry of non-standard filters for creating new zeropoints, as well as an effort to cross-calibrate WFPC2 and ACS filters. Because there are significantly fewer primary WFPC2 science observations in cycle 11, with the advent of ACS, the calibration plan has been significantly scaled back, but without sacrificing the quality of data required to calibrate the instrument. For cycle 11, 40 external orbits will be used, compared to 61 in cycle 10.*

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## 1. Introduction

There is a significant decrease in WFPC2 primary orbits during cycle 11, due to ACS coming on-line, but parallel observations will continue to be taken in conjunction with other instruments. Therefore, the cycle 11 calibration program has been scaled back, but will continue to provide the necessary calibrations required for all cycle 11 WFPC2 observations, as well as maintaining the minimum health and safety requirements.

Decontaminations to anneal hot pixels and remove contaminants on the cold CCD window will continue in cycle 11, along with routine calibration observations such as the photometric monitors, darks, biases, and flat fields. There is, however, one significant change: the interval between decontaminations has been increased from 28 days to 49 days. This is possible because the contamination rate appears to be decreasing with time.

Other scaled-back programs include the Earthflats and astrometric monitor. There was a recent major update to flat field reference files, as documented by Koekemoer et. al. in

*ISR-2002-02: Updated WFPC2 Flatfield Reference Files for 1995 - 2001.* For cycle 11, fewer Earthflats are being executed, to be used primarily to track possible small-scale changes that will be updated to the current flat field reference files.

Astrometric monitor observations will be done once a year (once per cycle), compared to twice a year in past cycles. Since the astrometric properties of the chips are changing more slowly with time, decreasing the frequency of the monitor to once a year is sufficient to track changes. The CTE characterization program continues to monitor CTE in the WFPC2, as in previous cycles. However, two new components have been added to this program: observations to better characterize the long-vs.-short anomaly, and a test of 2x2 pixel-binned observations to see if binning reduces CTE. This may also be of general interest to other instruments, such as ACS. Data from the Photometric Characterization program will, as in past cycles, be used to verify photometric stability.

A new program has been added to the cycle 11 calibration plan: WFPC2-ACS Photometric Cross-Calibration. Observations of two globular clusters spanning a wide range of metallicities, as well as the Sloan primary standard star, will be observed with WFPC2 using a wide range of commonly-used filters.

The time allocated for cycle 11 calibrations is 40 external orbits (compared to 61 orbits in cycle 10), and 2170 internal/occultation orbits. This allocation spans July 1 '02 to July 31 '03 (an extra month's worth of observations are added to aid in the transition to the next cycle). As always, about 10% of the total external orbit time allocation has been set aside for calibration issues that arise during cycle 11, amounting to 3 external orbits.

**Table 1: Summary of Cycle 11 Orbit Allocation (July 1 '02 - July 31 '03)**

Type	External Orbits	Internals
Monitors: decons, darks, internals, Earthflats, UV & VIS-FLATs	19	2170
Continuation/New Special Programs	17	1
Reserve (Unexpected Items)	3	
<b>Total</b>	<b>40</b>	<b>2171</b>

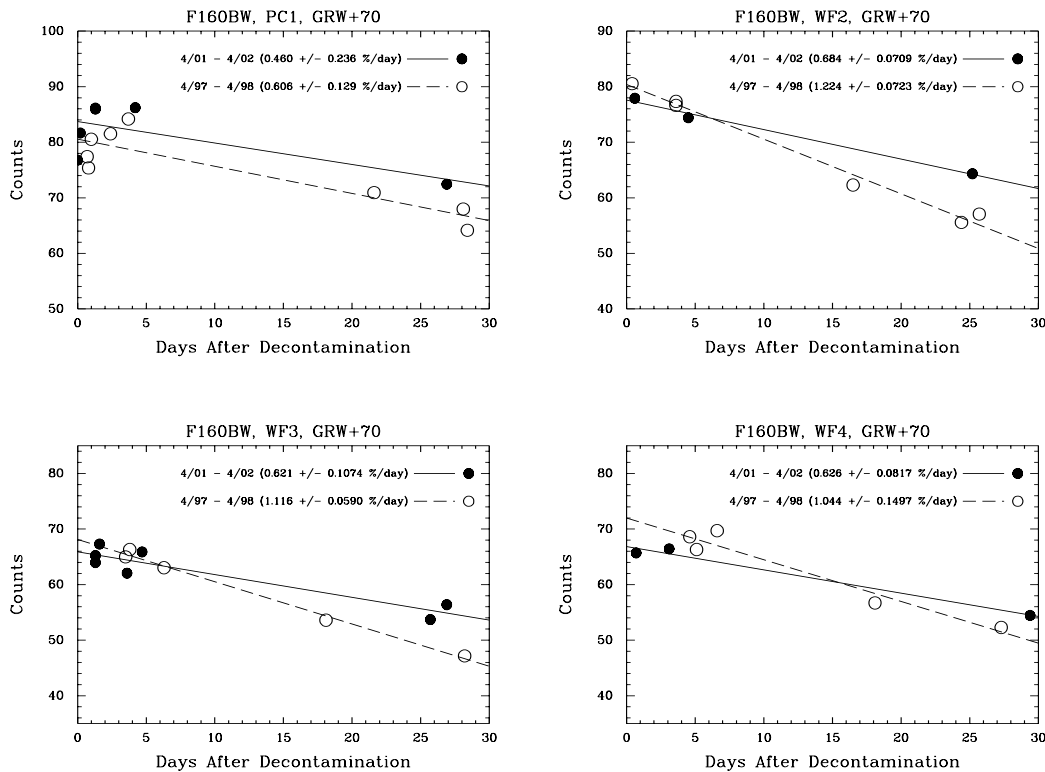
## 2. A Detailed Description of Cycle 11 Calibration Programs

### *Monitors*

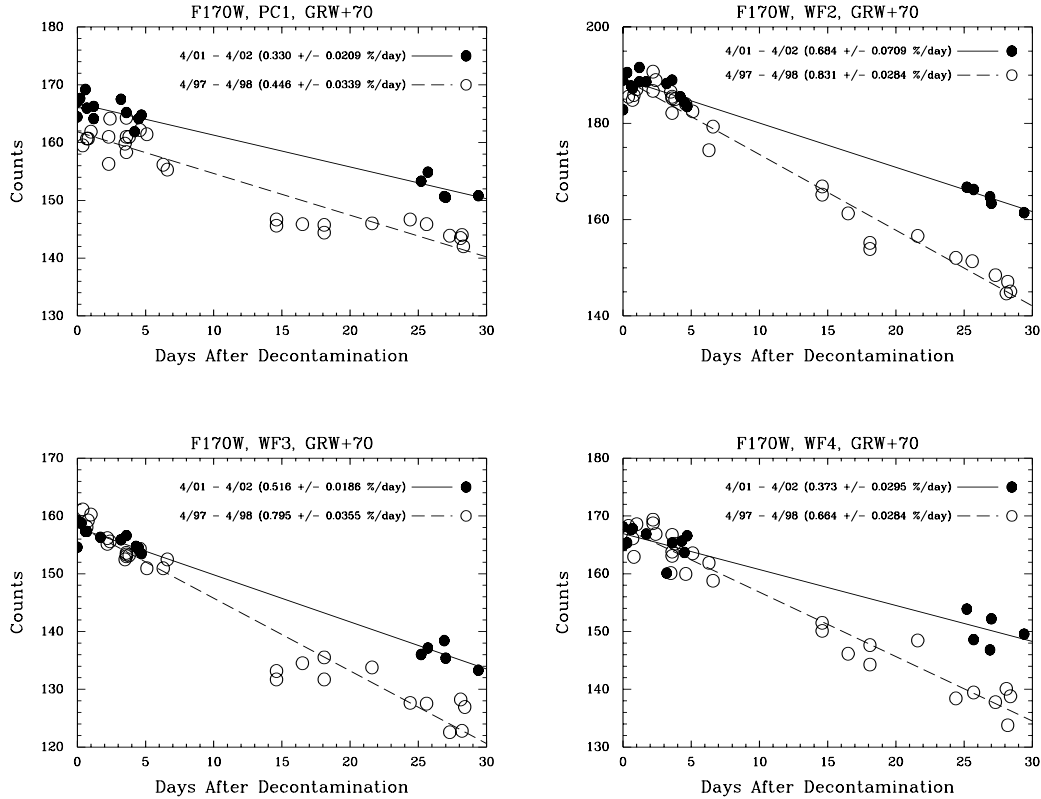
For most of WFPC2's operational lifetime (except during Servicing Mission Observatory Verification periods), decontaminations have been done every 28 days to anneal hot

pixels and remove contaminants that accumulate over time on the cold CCD windows. During this procedure, the CCDs are warmed to about  $+22^{\circ}\text{C}$ , from the operating temperature of  $-88^{\circ}\text{C}$ . The removal of contaminants improves throughput in UV filters, and as a result, the 28 day decontamination cycle was implemented to ensure that UV throughput never drops below 70%. Recent UV photometric data has indicated that the contamination rate is decreasing with time (See figures 1a & 1b, taken from the instrument science report, *Updated Contamination Rates for WFPC2 UV Filters* by McMaster, et. al., in preparation), allowing the interval between decontaminations to be safely increased to 49 days. This 49 day period is sufficient to ensure that the throughput decrease will not fall below 70%, and in addition, is optimally compatible with other timescales within the scheduling system. As a result, routine monitors tied to decontaminations, such as the photometric monitor of standard star GRW+70D5824, and internal monitors (darks, internal flat fields, Kspots, and biases) will occur less frequently. Other calibrations done once a cycle, that are tied to decontaminations, will occur as they have in past cycles. These are the UV throughput checks (GRW+70D5824 observed with UV filters), VISFLAT sweeps, and UVFLATs.

**Figure 1a.** Plot of WFPC2 standard star GRW+70D5824 countrates vs. days since decontamination, for all chips, using F160BW. A decrease in contamination rate is clearly seen in recent data.



**Figure 1b.** Plot of WFPC2 standard star GRW+70D5824 countrates vs. days since decontamination, for all chips, using F170W. A decrease in contamination rate is clearly seen in recent data.



Five darks with CLOCKS=OFF and one dark with CLOCKS=ON, each with 30 minute exposure times, will continue to execute every week. These darks will be used, along with darks taken before and after the decontaminations, to create dark reference files and hot pixel lists. Three 1000 second darks will be taken each day, on a non-interference basis, to be archived for use by users who need hot pixel information closer to the time of their observations.

The Internal Monitor program will continue to take biases and internal flats each week to monitor the health of WFPC2. INTFLAT and VISFLAT sweeps, linearity tests, and checks for filter rotation anomalies, will be taken as in the previous cycle. These observations will be used to monitor countrate linearity over time, create a backup database of flat fields, and will continue monitoring an anomaly in the filter rotation wheel (see *ISR WFPC2 02-04: An Analysis of WFPC2 Filter Positional Anomalies*, and *TIR WFPC2 02-06: Predicting Photometry Errors due to Linear Ramp Filter Offsets*, both by Gonzaga et al..)

Earthflat observations will continue to be taken, but in reduced numbers compared to previous cycles. This is because a new set of flat fields were recently created (see *ISR-2002-02: Updated WFPC2 Flatfield Reference Files for 1995 - 2001*, by Koekemoer, et. al.), so Earthflats taken in cycle 11 will primarily be used to track possible small-scale changes that need to be updated to current flat field reference files.

### ***Continuations of Special Programs***

Astrometric monitor observations will execute once a year in cycle 11, compared to twice a year in previous cycles. This is possible because data from the past few cycles indicate that the astrometric properties of the chips are changing more slowly with time. Therefore, an annual monitor is sufficient for tracking any shifts in the relative positions of the chips or changes in the astrometric solution. As in past monitors, a rich field in Omega Centauri will be observed with the F555W filter, along with internal Kspots. An improved astrometric solution for F555W was recently published by Casertano et al. in *ISR-2001-10: An Improved Geometric Solution for WFPC2*. The WFPC2 group expects to derive additional solutions for several other filters in the future.

The CTE Characterization program continues CTE monitors from previous cycles with observations of a field in Omega Centauri. Observations will also be taken in the 2x2 binning mode to see if this technique reduces CTE effects; this test could also be potentially useful for ACS observations. Another new component of this program is a better characterization of the long-vs.-short anomaly. High signal-to-noise observations will be taken in an uncrowded field, to test the hypothesis that the long-vs.-short effect is only relevant for very crowded fields (that, due to scattered light, has a much higher background compared to uncrowded fields).

As in past cycles, the Photometric Characterization program will continue to verify photometric stability in filters that are not routinely monitored, but in use during cycle 11, with observations of the standard star GRW+70D5824 in all four chips. Data from this and previous cycles will also be used to update photometric zeropoints used in Synphot.

### ***A New Special Program***

A new program in cycle 11 is the WFPC2-ACS Photometric Cross-Calibration. Observations will be taken of two globular clusters spanning a wide range of metallicities, as well as the Sloan standard star (BD+17D4708), using a wide range of commonly-used filters. These observations will produce a valuable tie-in between WFPC2, ACS, and Sloan filter photometric systems.

### **3. Conclusion**

The WFPC2 calibration program, although scaled back, will continue to meet the needs of cycle 11 WFPC2 users by providing on-going essential health and safety monitoring, and will also provide cross-calibration with ACS for users using both instruments.

The WFPC2 group at STScI is also beginning to lay out plans for closure of WFPC2 calibration work, making sure all major aspects of WFPC2 are well-characterized. A better idea of what needs to be done will emerge during the WFPC2 session at the upcoming Calibration Workshop (October, 2002), where user feedback will provide some guidance. One primary item for closure will be an accurate cross-calibration between WFPC2 and ACS, an effort that is being coordinated with ACS, starting this cycle.

A summary of the cycle 11 calibration program can be found in Appendix A, and a detailed description of each program in Appendix B. Comment on this calibration plan, suggestions for future cycles, and closure calibration issues, are welcome. Please contact the WFPC2 calibration program lead, Dr. Anton Koekemoer (*koekemo@stsci.edu*) or send e-mail to *help@stsci.edu*.

## Appendix A: WFPC2 Cycle 11 Calibration Plan

ID	Proposal Title	Frequency	Estimated Time (orbits)		Scheduling Required	Products	Accuracy Required	Notes
			“External”	“Internal”				
<b>Routine Monitoring Programs</b>								
	WFPC2 Decons & Associated Observations	Decons every 49d (from 28d)	20 (13 phot-mon, 5 UV throughput, 2 UV flats)	124	every 49d, UV throughput early	CDDBS, Inst Hbk, Synphot, WWW reports	1-2%	Decons, photometric monitor, internals, UV throughput, VISFLATS and UVFLATS.
	Standard Darks	weekly, except decon week		294	every 7 days, exact decon wk.	CDDBS	1 e-/hr	Also for WWW hot pixel lists.
	Supplemental Darks	0-3/day		1182	every day		n/a	For archive only, no analysis.
	Internal Monitor	weekly, exact decon week		53	every 7 days, exact decon week	CDDBS	0.8e-/pix	
	Earth Flats	continuous		150	mid-to-late	CDDBS	0.3%	
	UV Earth Flats	continuous		200	early-to-mid	CDDBS	3-10%	
	Intflat & VISFLATs Sweeps, Filter Anomaly Check	1/cycle		166	mid-cycle	TIR	0.3%	
<b>Special Calibration Programs</b>								
	Astrometric Monitor	1/cycle	1	1	mid-cycle	ISR, STSDAS	0.05”	ω Cen as well as K-spots.
	CTE Characterization	1/cycle	5		early, late	ISR	0.03 mag	Continuation of monitors, new tests (2x2 binning & long vs. short).
	Photometric Characterization	1/cycle	3		early	ISR, Synphot	1%	Std. star in all 4 chips. Non-monitor broadband filters, not UV.
	WFPC2-ACS Photometric Cross-Calibration	1/cycle	8		early	ISR, Synphot	1%	Cross-calibration with ACS, using NGC2419, 47 Tuc, ACS calib star, & Sloan Calibration Field.
	~10% reserve		3					Placeholder for unexpected items.
<b>TOTAL TIME (including all executions)</b>			<b>40</b>	<b>2171</b>				

## Appendix B

The following pages contain a detailed summary and justification for each cycle 11 calibration program. The Phase 2 versions of these programs can be accessed at

*<http://presto.stsci.edu/public/propinfo.html>*

# Proposal ID 9589: WFPC2 Cycle 11: Decontaminations and Associated Observations

## Plan

**Purpose** Monthly WFPC2 decons. Other programs tied to decons are also included: photometric stability check, pre- and post-decon internals, UV throughput checks, internal VISFLAT sweeps, and internal UVFLAT checks.

**Description** *Decontamination:* UV-blocking contaminants removed and hot pixels annealed by warming the CCDs to +22° C for 6 hours.

*Internals:* INTFLATs, biases, darks & Kspots, before/after decons.

*Photometric Monitor:* GRW+70d5824 is observed after each decon and before every other decon: (1) F170W in all chips to monitor for UV contamination. (2) As many as possible of F160BW, F218W, F255W, F336W, F439W, F555W, F814W will be observed within 1 orbit in a different chip each month.

*UV Throughput:* pre-decon PC & WF3 UV observations in most UV filters, post-decon observations of same filters in all 4 chips. Used to verify that the UV spectral response curve is unchanged.

*Internal UV flatfields:* obtained with the CAL channel's UV lamp using the filters F122M, F170W, F160BW, F185W, & F336W. The UVFLATs are used to monitor UV flatfield stability and the stability of the F160BW filter by using F170W as the control. The F336W ratio of VISFLAT to UVFLAT provides a diagnostic of the UV flatfield degradation & ties the UVFLAT and VISFLAT flatfield patterns. Two supplemental dark frames must be obtained immediately after each use of the lamp to check for possible after-images.

*VISFLAT mini-sweep:* Taken before and after a decon, once during the cycle. VISFLATs will also be taken with a ramp filter, one at each gain, to be done at the post-decon visit, to provide a check of the A-to-D correction. The F336W ratio of VISFLAT to UVFLAT provides a diagnostic of the UV flatfield degradation & ties the UVFLAT and VISFLAT flatfield patterns.

**Fraction** 100%  
**GO/GTO**  
**Programs**  
**Supported**

## Plan

- Resources** Total of 20 external and 124 “internal” orbits. Request covers 8  
**Required:** decons, through Aug 2003. External orbits needed: 13 orbits for  
**Observation** photometric monitoring, 5 orbits for UV throughput, 2 orbits for  
UVFLATs monitor (non-pointed, but displaces WFPC2 science  
because of timing requirements plus occultation periods before  
and after each orbit). 2 internal orbits for VISFLAT sweep, 2 for  
UVFLATs, and 120 internal orbits for darks, biases, Kspots, and  
INTFLAT monitors.
- Products** SYNPHOT, CDBS, Instr. Handbook, TIPS meetings, WWW  
reports, TIR, ISR; new UV flatfields if changes are detected.
- Accuracy** *Photometry:* less than 2% discrepancy between results, 1% rms  
**Goals** expected.  
*UV throughput:* better than 3%.  
*Flatfields:* temporal variations monitored at 1% level. Gain  
ratios: stable to better than 0.1%.  
*UVFLATs:* about 2-8% pixel-to-pixel expected (filter depen-  
dent). *VISFLATs:* stable to better than 1% in overall level and  
spatial variations (after correcting for lamp degradation). Con-  
tamination effects should be < 1%.
- Scheduling & Special** Upon request, all timing requirements hard-coded via special  
**Requirements** requirements. Cycle 11 proposal to begin after Cycle 10 July,  
2002, decon cycle.
- Decons:* every 49 days.
- Photometry:* Observations tied to within +/- 1 week of decons.
- Darks:* around decon, these are taken NON-INT to prevent  
residual image problems.
- VISFLAT sweep:* must be done with minimum number of lamp  
cycles to prevent further degradation of the lamp.
- UVFLATs:* Due to timing requirements, each visit covers a 2-  
hour time span--one visibility period and two occultation peri-  
ods.
- To prevent excessive degradation of the UV & VIS lamps, the  
SU durations for each UVFLAT or VISFLAT visit should be  
kept as follows: 2h 15m use of Cal Module (UV & VIS lamps),  
then 9h 45m off -- this keeps usage of cal channel within CARD  
of 3h on/ 12h off).

## Proposal ID 9592: WFPC2 Cycle 11: Standard Darks

### Plan

**Purpose** Measure dark current & identify hot pixels.

**Description** Six 1800s exp/week with the shutter closed, five with clocks off, one with clocks on. This frequency is required due to the high formation rate of new hot pixels (several tens/CCD/day). Five darks per week are required for cosmic ray rejection, counterbalancing losses due to residual images, & improving the noise of individual measurements. Sometimes, no usable darks are available for a given week due to residual images, resulting in a longer-than-usual gap in the hot pixel lists, but in a decon week, information on hot pixels that became hot and then annealed would be lost irretrievably. As a result, pre-decon darks (see Decon proposal) are executed NON-INT and at least 30 min after any WFPC2 activity.

**Fraction** 90%

**GO/GTO**

**Programs**

**Supported**

**Resources** 294 “internal” orbits

**Required:**

**Observation**

**Products** Weekly darks delivered to CDBS and monthly tables of hot pixels on the WWW. Superdarks for use in generating pipeline dark reference files.

**Accuracy** Require  $\sim 1$  e-/hr (single-pixel rms) accuracy for most science applications. Expected accuracy in a typical superdark is 0.05 e-/hour for normal pixels. The need for regular darks is driven by systematic effects, such as dark glow (a spatially and temporally variable component of dark signal) and hot pixels, which cause errors that may exceed these limits significantly.

**Scheduling & Special Requirements** These darks are not run during decon weeks; decon week darks are in decon proposal. As requested, timing requirements have been hard-coded via special requirements.

## Proposal ID 9593 - 9595: WFPC2 Cycle 11: Supplemental Darks

### Plan

- Purpose** Images will allow for frequent monitoring of hot pixels.
- Description** This program is designed to provide up to three short (1000s) darks per day, to be used primarily for the identification of hot pixels. Shorter darks are used so that the observations can fit into almost any occultation period, making automatic scheduling feasible. These supplemental darks are low priority, and should be taken only when there is no other requirement for that specific occultation period. This program complements the higher priority Standard Darks proposal that has longer individual observations for producing high-quality pipeline darks and superdarks. Hot pixels are often a cause of concern for relatively short science programs, since they can mimic stars or mask key features of the observations: about 400 new hot pixels/CCD are formed between executions of the Standard Darks program. The supplemental darks are available to the GO community from the archive; there is no plan to use them in our standard analysis and products.
- Fraction GO/GTO Programs Supported** 30%
- Resources Required: Observation** 1182 “internal” orbits.
- Products** None, though some daily darks may occasionally be used for hot pixel lists if standard darks were lost.
- Accuracy Goals** For archive only, no STScI analysis provided.
- Scheduling & Special Requirements** Scheduled at low priority, non-interference basis, maximum of 3/day. Will require multiple proposal IDs due to large number of visits (1 dark/visit to maximize scheduling flexibility). If data volume is an issue for archive, supplemental darks may be dropped.

## Proposal ID 9596: WFPC2 Cycle 11: Internal Monitor

### Plan

**Purpose** This calibration proposal is the Cycle 11 routine internal monitor for WFPC2, to be run weekly to monitor the health of the cameras. A variety of internal exposures are obtained in order to provide a monitor of the integrity of the CCD camera electronics in both bays (gain 7 and gain 15), a test for quantum efficiency in the CCDs, and a monitor for possible buildup of contaminants on the CCD windows.

**Description** The internal observations consist of:

at gain=7: 4 biases, 2 F555W INTFLATs

at gain=15: 4 biases, 2 F555W INTFLATs

The entire set should be run once a week (except on decon weeks), on a non-interference basis. Proposal should start near the beginning of Cycle 11 (early August 2002), replacing Cycle 10 Internal Monitor proposal 8939. This proposal should not be run during Decon weeks as the decon proposal will contain the necessary internal images for those weeks. Each visit should be somewhat evenly spaced, i.e. they should be scheduled about 1 week +/- 2 days apart. Due to the change in DECON schedule for Cycle 11, this program should start during the week beginning with August 5, 2002. All visits in 8939 after the start of this program will be withdrawn.

**Fraction** 100%

**GO/GTO**

**Programs**

**Supported**

**Resources** 53 "internal" orbits

**Required:**

**Observation**

**Products** CDBS (superbias created annually)

**Accuracy** 0.8 e-/pix for superbias reference file.

**Goals**

**Scheduling&** every 7 days (except during DECON); no special requirements

**Special**

**Requirements**

## Proposal ID 9598: WFPC2 Cycle 11: Earth Flats

### Plan

**Purpose** Monitor flatfield stability. This proposal obtains sequences of Earth streak flats to construct high quality flat fields for the WFPC2 filter set. These flat fields will allow mapping of the OTA illumination pattern and will be used in conjunction with previous internal and external flats to generate new pipeline superflats.

**Description** Observations of the bright Earth (Earthcals) are obtained in a variety of filters: F375N, F502N, F656N, F953N, F160BW, F336W, F343N, F390N, F437N, F469N, F487N, F631N, F658N, and F673N.

**Fraction** 100%

**GO/GTO**

**Programs  
Supported**

**Resources** 150 occultation periods.

**Required:**

**Observation**

**Products** New flatfields generated and delivered to CDBS if changes detected. (Most recent update was delivered to CDBS in early 2002.)

**Accuracy** The single-pixel signal-to-noise ratio expected in the flatfield is

**Goals** 0.3%.

**Scheduling &** None.

**Special  
Requirements**

## Proposal ID 9599: WFPC2 Cycle 11: UV Earth Flats

### Plan

**Purpose** Monitor flatfield stability. This proposal obtains sequences of Earth streak flats to improve the quality of pipeline flat fields for the WFPC2 UV filter set.

**Description** Earth streak-flats are taken in UV filters (F170W, F185W, F218W, F255W, F300W, F336W, and F343N). Those UV filters with significant red leak will also be observed crossed with selected broadband filters (F450W, F606W, F675W, and F814W), in order to assess and remove the red leak contribution.

**Fraction** ~10%

**GO/GTO**

**Programs**

**Supported**

**Resources** 200 occultation periods.

**Required:**

**Observation**

**Products** Updated flatfields for pipeline via CDBS. (Most recent delivery to CDBS made in early 2002.)

**Accuracy** 3-10%.

**Goals**

**Scheduling&**

**Special**

**Requirements**

# Proposal ID 9597: WFPC2 Cycle 11: Intflat and VISFLAT Sweeps, and Filter Rotation Anomaly Monitor

## Plan

**Purpose** Using INTFLAT observations, this WFPC2 proposal is designed to monitor the pixel-to-pixel flatfield response and provide a linearity check. The INTFLAT sequences, to be done once during the year, are similar to those from the Cycle 10 program 8942. The images will provide a backup database in the event of complete failure of the VISFLAT lamp as well as allow monitoring of the gain ratios. The sweep is a complete set of internal flats, cycling through both shutter blades and both gains. The linearity test consists of a series of intflats in F555W, in each gain and each shutter. As in Cycle 10, we plan to continue to take extra VISFLAT, INTFLAT, and Earthflat exposures to test the repeatability of filter wheel motions.

**Description** This proposal contains the intflat filter sweep, linearity and filter rotation tests.

*Linearity test:* flatfields are taken with F555W at a variety of exposure times, using shutters A & B, and gains 7 & 15. Since the INTFLATs have significant spatial structure, any non-linearity will appear as a non-uniform ratio of INTFLATs with different exposure times.

*Filter rotation check:* VISFLATs, INTFLATs, and Earthflats will be taken to test the repeatability of the filter wheel positioning. A problem is known to exist in several filters.

**Fraction** 100%

**GO/GTO**

**Programs**

**Supported**

**Resources** 166 “internal” orbits and occultation periods (for earth flats).

**Required:**

**Observation**

**Products** TIR, ISR

**Accuracy** 0.3%

**Goals**

**Scheduling&** once per cycle; no special requirements

**Special**

**Requirements**

## Proposal ID 9600: WFPC2 Cycle 11: Astrometric Monitor

### Plan

**Purpose** Verify relative positions of WFPC2 chips with respect to one another.

**Description** The positions of the WFPC2 chips with respect to each other appear to be shifting slowly (by about 1 pixel, since 1994). The rich field in w Cen (same positions as cycle 9 proposal 8813) is observed with large shifts (35'') in F555W only, once in the cycle. This will allow tracking of the shifts in the relative positions of the chips or changes in the astrometric solution at the sub-pixel level. Kelsall spot images will be taken in conjunction with each execution.

**Fraction** 20%

**GO/GTO**

**Programs  
Supported**

**Resources** 1 pointed orbit, 1 occultation period.

**Required:**

**Observation**

**Products** TIPS reports, ISR, update of chip positions in PDB and of geometric solution in STSDAS tasks metric and wmosaic if significant changes are found.

**Accuracy** At least 0.01'' in relative shifts; 0.05'' or better for absolute.

**Goals**

**Scheduling&** Schedule in mid-cycle, about 1 year after the last visit in cycle

**Special** 10 program 9253.

**Requirements**

## Proposal ID 9591: WFPC2 Cycle 11: CTE Characterization

### Plan

- Purpose** Monitor CTE changes during Cycle 11; test whether 2X2 binning affects CTE (may be relevant for ACS) and perform a high S/N long-vs.-short test in an uncrowded field.
- Description** Obtain observations of Omega Cen (NGC 5139) to track changes in the CTE (charge transfer efficiency) in WFPC2. A continuation of proposals in earlier cycles (7629, 8447, and 8821, 9254), the principal observations will be at gains 7 and 15, in F814W and F555W. The same pointing is used on WF2 and WF4. The relative orientation of the chips then results in stars at the bottom of one chip falling near the top of the other chip, hence providing a measurement of the CTE loss. We will make similar observations using 2X2 binning. This may reduce CTE loss since the largest loss is to the adjoining pixel, which gets included in the 2X2 bin in 50% of the cases. This may be relevant for ACS. We will also obtain a high S/N measurement of the long-vs.-short anomaly for uncrowded fields by taking 10 X 10s exposures in Omega Cen, in order to test the recent finding that the long-vs.-short problem is only relevant for crowded fields.
- Fraction GO/GTO Programs Supported** 30 - 50%
- Resources Required: Observation** 5 orbits
- Products** ISR and updates to published CTE correction formulae.
- Accuracy Goals** 0.03 magnitudes for the majority (90%) of cases
- Scheduling & Special Requirements** Monitoring portion of program to be done August - October, 2003 (i.e. one year after previous observations); August - October 2002 for other parts of the program.

# Proposal ID 9590: WFPC2 Cycle 11: Photometric Characterization

## Plan

- Purpose** Provide a check of the zeropoints and contamination rates in non-standard WFPC2 filters.
- Description** Observations of the standard star GRW+70D5824 in all four chips will be made using filters that are not routinely monitored but are still used in cycle 11 (F467M, F547M, F569W, F606W, F675W, F791W, F850LP, and F1042M). Images should be taken within 7 days after a decon, to minimize any contamination effects. Results from this program will be compared with archival data from earlier cycles.
- Fraction GO/GTO Programs Supported** 100%
- Resources Required: Observation** 3 orbits
- Products** ISR, SYNPHOT update.
- Accuracy Goals** 2-3% photometry.
- Scheduling & Special Requirements** Execute within 7 days of decon. To simplify scheduling process, timing requirements are hard-coded via special requirements.
- Requirements** Execute early in cycle.

# Proposal ID 9601: WFPC2 Cycle 11: WFPC2-ACS Photometric Cross-Calibration

## Plan

**Purpose** This proposal is aimed at providing photometric zeropoint cross-calibration between the commonly used WFPC2 photometric filter sets and those that will be used for ACS programs.

**Description** Observations of two globular clusters spanning a wide range in metallicity (NGC 2419 and 47 Tuc), as well as the Sloan primary standard star (BD+17D4708). These observations will produce a valuable tie-in between the WFPC2, ACS and Sloan filter photometric systems.

**Fraction** 100%

**GO/GTO**

**Programs**

**Supported**

**Resources** 8 orbits.

**Required:**

**Observation**

**Products** ISR, Synphot, WFPC2 and ACS Handbooks

**Accuracy** 1%

**Goals**

**Scheduling&**

**Special**

**Requirements**