

STIS Cycle 9 Calibration Plan

ID (C8)	Proposal Title	Frequency	Estimated Time (orbits)		Scheduling Required	Resources Required (FTE)	Products	Accuracy Required	Notes
			“External”	“Internal”					
Routine Monitoring Programs									
8836	CCD Performance Monitor	2 per year		42	Dec 00, Jun 01	4 weeks	CDBS, IHB	0.1 ADU 0.5 e-/hr	Measures gain, readnoise, edge-response CTE, biases at non-standard gain.
8837 8864	CCD Dark Monitor	14 per week		840		10	CDBS	15% weekly, 8% monthly	
8838 8865	CCD Bias Monitor	weekly		426		12	CDBS	0.1 ADU	For all supported gains and binnings.
8840	CCD Read Noise Monitor	monthly		28		4	CDBS, IHB	1%	Read noise monitor for non-standard amps (A,B,C) (for HST ARB)
8841	CCD Hot Pixel Annealing	monthly		168		4	CDBS, IHB		Removes hot pixels, tracks permanent growth.
8845	CCD Spectroscopic Flats	monthly		79		6	CDBS	<1%	
8846	CCD Imaging Flats	monthly		18		4	CDBS	<1%	
8848	CCD Dispersion Solutions	annually		4		2	CDBS	0.1 pixel	
8851	CCD Sparse-field CTE internal	2 per year (1 in gain 1, 1 in gain 4)		64	Feb 01	5	ISR, IHB	1%	Measures CTE using internal cal lamps and readouts through amps B&D. 32 int. orbits for gain 1 + 32 for gain 4
8854	CCD Sparse-field CTE external	annually	6		Sep 00	5	PASP, IHB	1%	Measures CTE at different signal levels with varying background, amps B&D.
8847	CCD full-field sensitivity	2 per year	3		Sep 00, Mar 01	3	ISR, IHB	1%	Monitor CCD sensitivity over whole field of view using standard star field.
8855	Slit wheel repeatability	annually		1		1	ISR	0.1 pixel	
8856	CCD Sensitivity Monitor	4 per year	6			2	CDBS	2%	Standard star spectra at the field center; [OII] images to monitor focus.
-----	STIS Spectroscopic Sensitivity (both CCD & MAMAs)	biannually	0 in Cycle 9			0 in Cycle 9	CDBS	1%	Basic sensitivity measure. Higher S/N, more modes than sensitivity monitor.

ID (C8)	Proposal Title	Frequency	Estimated Time (orbits)		Scheduling Required	Resources Required (FTE)	Products	Accuracy Required	Notes
			“External”	“Internal”					
8842	CCD PSF library	annually	3			3	IHB, ISR, web	1%	A, F, and K star were still missing from Cycles 7 & 8 calibration data.
8857	MAMA Sensitivity & Focus Monitor	monthly	22			6	CDBS	2% (sens) 10% (FWHM)	Standard star spectra at field center. ACQ/PEAK monitors slit throughput, a measure of focus.
8858	MAMA Full-field Sensitivity	2 per year	6		9/00; 3/ 01	6	ISR, IHB	1%	Star cluster in imaging mode.
8843	MAMA Dark Monitor	2/week/ detector		208		6	CDBS, ISR	1%	
8859	MAMA Fold distribution	2 per year		4		1	ISR, TIPS	5%	Monitor performance of MAMA microchannel plates
8862	MAMA FUV flats	annually		10	ON HOLD	4	CDBS	1%	Wavelength independent pixel-to-pixel response stability
8863	MAMA NUV flats	annually		10	ON HOLD	4	CDBS	1%	Wavelength independent pixel-to-pixel response stability
8859	MAMA Dispersion Solutions	annually		10		3	CDBS	0.1 pixel	Annual monitor of dispersion solutions.
Special Calibration Programs									
8849	HST Faint standards extension	Repeat once in Cycle 9	16			2 for SISD	PASP article	1% grat-ing;10% prism	Four stars; check for suitability (variability). Outsourced in Cycle 8 (D. Finley), no funding needed in Cycle 9.
8850	Deep CCD/G750M Wavecals	Once		2	Early	1	STAN, CDBS	0.1 pixel	Get deep wavecals for the red G750M settings.
8852	G750M Ghosts	Once	2		Early	3 (0 for SISD)	STAN, IHB	5%	Model CCD window ghosts for G750M spectral.
8844	Spectroscopic PSFs (52x0.2, 52x0.2F1 & 52x0.2F2 slits)	Once	11		Early	4 (1 for SISD)	STAN, IHB	1%	5% accuracy @ 10 ⁻⁶ of peak flux.
8839	CCD CTE for extended targets	Once (in Cycle 9)	4			4	PASP, IHB	2%	G430L spectra of bright E galaxy; Imaging of compact galaxy cluster.
8853	CCD Residual Images after Overillumination	once (repeat of Cycle 7 proposal)	2	3		2	ISR, STAN, IHB	sub-DN level	Re-measure remanence level as a function of color. External star with G230LB; tungsten lamp as red source.

ID (C8)	Proposal Title	Frequency	Estimated Time (orbits)		Scheduling Required	Resources Required (FTE)	Products	Accuracy Required	Notes
			“External”	“Internal”					
8891	Test of STIS End of Slit Pseudo-Aperture Locations	Once (in Cycle 9)	3			1 day	IHB	20% of aperture width	Check implementation of the new pseudo-apertures at row 900.
TOTAL TIME (including all executions)			84 (C8: 149)	1917 (1927)		105 (168)			

Proposal ID 8836: STIS Cycle 9: CCD Performance Monitor

Plan

Purpose Measure the baseline performance of the CCD system.

Description This activity measures the baseline performance of the CCD subsystem. Only nominal amplifier D is used. Bias, Dark, and Flat Field exposures are taken in order to measure read noise, darkcurrent, CTE (EPER method), and gain. Full frame and binned observations are made. Bias frames are also taken in subarray readouts to check the bias level for ACQ and ACQ/PEAK observations. Dark exposures are made in 2x2 binned mode. All exposures are internals.

Fraction 35%

GO/GTO

Programs

Supported

Resources 42 internal orbits.

Required:

Observation

Resources 4 weeks

Required:

Analysis

Products Reference files, Instrument Handbook

Accuracy 0.1 e⁻/ADU for gain, 0.5 e⁻/hour dark current

Goals

Scheduling & Every 6 months: Dec 2000, Jun 2001

Special

Requirements

Proposal ID's 8837 & 8864: STIS Cycle 9: CCD Dark Monitor

Plan

Purpose Monitor the darks for the STIS CCD.

Description

Fraction Obtain darks at GAIN=1 in order to monitor CCD behavior

GO/GTO and chart growth of hot and bad pixels. See how well the

Programs anneals work for the CCD. This proposal is a continuation of

Supported 8408, All exposures are internal and fit in occultation orbits.

Resources 840 internal orbits

Required:

Observation

Resources 10 weeks

Required:

Analysis

Products Reference files (weekly superdarks, bad pixel tables).

Accuracy 15% weekly, 8% monthly (per pixel)

Goals

Scheduling& Phase in Cycle 9 proposal on August 29, 2000.

Special

Requirements

Proposal ID 8838: STIS Cycle 9: CCD Bias Monitor

Plan

Purpose Monitor the bias pattern & hot columns in the STIS CCD

Description Take full-frame bias exposures in binning factor 1x1, 1x2, 2x1, and 2x2 at gain=1, and at 1x1 binning in gain=4. All exposures are internals and fit in occultation orbits. This proposal consolidates all previous and planned bias calibration proposals. Most exposures are 1x1 binning at gain=1.

Fraction 30%

GO/GTO

Programs

Supported

Resources 426 internal orbits

Required:

Observation

Resources 12 weeks

Required:

Analysis

Products Updates of the CDBS bias reference files; Monitoring TIR.

Accuracy Bias level: better than 0.1 ADU at any position within CCD

Goals frame; read-out noise negligible.

Scheduling& Phase in on August 30, 2000.

Special

Requirements

Proposal ID 8840: STIS Cycle 9: CCD Read Noise Monitor

Plan

Purpose Monitor the read noise for the non-standard amplifiers of the STIS CCD to pin down the source for any noise changes.

Description This proposal measures the read noise of the STIS CCD using pairs of bias frames. Only the non-standard amplifiers (A, B, C) are used. (Amp D, the primary amp, is monitored daily in the normal bias program.) Full frame and binned observations are made in both Gain 1 and Gain 4, with binning factors of 1 x 1, 1 x 2, 2 x 1 and 2 x 2. All exposures are internals.

Fraction 0%

GO/GTO

**Programs
Supported**

Resources 28 internal orbits

**Required:
Observation**

Resources 4 weeks

**Required:
Analysis**

Products Updates of CDBS bias reference files; Monitoring TIR.

Accuracy Read-out noise: 1%

Goals

Scheduling & Phase in by July 2000, running through Aug 2001.

**Special
Requirements**

Proposal ID 8841: STIS Cycle 9: CCD Hot Pixel Annealing

Plan

Purpose The effectiveness of the CCD hot pixel annealing process is assessed by measuring the dark current behavior before and after annealing and by searching for any window contamination effects. In addition CTE performance is examined by looking for traps in a low signal level flat.

Description The characteristics of the CCD will first be defined by a series of Bias, Dark and flat-field exposures. The CCD Thermoelectric cooler (TEC) will then be turned off to allow the CCD detector temperature to rise (from about -83C to +5C). The CCD will be left in the uncooled state for approximately 12 hours. At the end of this period, the TEC will be turned back on and the CCD cooled down to its normal operating temperature. Bias, Dark and flat-field images will be repeated to check for changes in the CCD characteristics. The flat field exposures will permit evaluation of any window contamination acquired during the annealing period.

Fraction 35%

**GO/GTO
Programs
Supported**

Resources 168 internal orbits
**Required:
Observation**

Resources 4 FTE weeks
**Required:
Analysis**

Products Darks become part of superdark reference files; ISR tracks annealing performance; monthly report.

Accuracy n/a
Goals

**Scheduling&
Special
Requirements** Schedule monthly, starting in Sep 2000.

Proposal ID 8845: STIS Cycle 9: CCD Spectroscopic Flats

Plan

Purpose Obtain CCD flats on the STIS CCD in spectroscopic mode.

Description 1). Take monthly flats for one grating (G430M, 5216 Angstroms) with Gain=1 and 4. Use Tungsten lamps.
2). Monitor one grating (G750M, 6581 A) twice per year at GAIN=1. Use Tungsten lamps.
The following flats are taken once in cycle 9 (at GAIN=4):
3). G750L with Tungsten lamps.
4). G430L with Deuterium lamp
5). G230MB at 2557 and 3115 A with Deuterium lamp.
6). G230LB with Deuterium lamps.

Fraction 30%

GO/GTO

Programs

Supported

Resources 79 internal orbits

Required:

Observation

Resources 6 FTE weeks

Required:

Analysis

Products PFL reference files for CCD; ISR

Accuracy <1%

Goals

Scheduling& First Cycle 9 visit should be early Sep 2000.

Special

Requirements

Proposal ID 8846: STIS Cycle 9: CCD Imaging Flats

Plan

Purpose Investigate flat-field stability over a monthly period.

Description Obtain a series of CCD flats using the MIRROR and without aperture every month to monitor the characteristics of the CCD response. Also look for the development of new cosmetic defects. Get flats for F28XOII and F28XOIII. Continuation of 8412.

Fraction 30%

GO/GTO

Programs

Supported

Resources 18 internal orbits

Required:

Observation

Resources 6 FTE weeks

Required:

Analysis

Products PFL reference files; ISR

Accuracy 0.5% pixel-to-pixel, except 0.8% for OII.

Goals

Scheduling& First visit should occur early Sep 2000.

Special

Requirements

Proposal ID 8848: STIS Cycle 9: CCD Dispersion Solutions

Plan

Purpose Obtain deep engineering wavecalcs for all CCD gratings at several wavelength centers as a yearly monitor of derived dispersion solutions.

Description Wavelength dispersion solutions will be determined on a yearly basis as part of a long-term monitoring program (program 8413 was executed in Cycle 8). Deep engineering wavecalcs for each CCD grating will be obtained. Wavelength centers will be selected at extreme and central settings of each grating. Intermediate settings will also be taken to check the reliability of derived dispersion solutions. Only Prime modes will have been selected for observation in this program. The purely internal wavelength calibrations will be taken using the Pt/Cr-Ne line lamp and the appropriate 2-pixel wide long slit, 52x0.1; GAIN=4.

Fraction 38%

GO/GTO

Programs

Supported

Resources 6 internal orbits

Required:

Observation

Resources 2 FTE weeks

Required:

Analysis

Products DSP Reference file

Accuracy 0.2 pixels

Goals

Scheduling& Execute visit towards the end of Cycle 9.

Special

Requirements

Proposal ID 8851: STIS Cycle 9: CCD Sparse Field CTE Internal

Plan

Purpose Measure the charge transfer efficiency of the STIS CCD in the parallel direction, in both gain = 1 and gain = 4.

Description The sparse-field CTE will be measured via internal calibration internal lamp observations taken through narrow slits. If there is a CTE effect, charge will be left behind as the image is shifted through pixels during readout. The further the charge needs to be shifted to be read out, the more charge it will lose. Because the D amp and the B amp read out at opposite ends of the CCD, the ratio in image intensity (B amp/D amp) should increase as the image position moves closer to the B amp and (and further from the D amp end). For the parallel CTE measurement, the test will use the the cross-disperser slits: 0.05X29, 0.05x31NDB, and 0.05x31NDA slits, projected on different parts of the detector via special commanding of the slit wheel. The series of exposures are executed once for GAIN=1, and once for GAIN=4 to test the effect of different bias voltages.

Fraction 35%

GO/GTO

Programs

Supported

Resources 64 internal orbits

Required:

Observation

Resources 5 FTE weeks

Required:

Analysis

Products ISR, IHB update

Accuracy 1%

Goals

Scheduling& Schedule visits at around Feb 2001.

Special

Requirements

Proposal ID 8854: STIS Cycle 9: CCD Sparse Field CTE External

Plan

Purpose Establish an accurate correction for low count level nonlinearity (CTE) that can be used for direct analysis of science data.

Description An exploratory Cycle 7 calibration proposal (7666) has been used to show that at low count levels the STIS CCD shows significant suppression of counts. The intensity and position dependence of the effect is consistent with CTE. (See Gilliland, Goudfrooij, and Kimble 1999, PASP, 111, 1009) A number of questions/issues came up in analyzing the existing calibration data that can only be pursued with more extensive observations: (1) This program will determine if suppression exists at higher background levels. (2) An x-dependence will be tested for. (3) Accurate results will be obtained for both spectroscopy and imaging modes. The best parts of the Cyc 8 CTE test (8415) are retained and strengthened while dropping one less robust visit. The basic technique is to observe a sparse field of stellar sources (~500-1000 imaging, ~50 spectroscopy). Exposures are cycled through at short, medium and long exposures (X5 steps). For the two targets (NGC6752 - imaging, NGC346 - spectroscopy) the observations are done in the CVZ and the cycle of short to long exposures is repeated X3 in one CVZ orbit assuring that a subset of the exposures will be obtained at significantly higher sky background levels. Analysis consists of ratioing extracted counts at the different exposure times and seeking a solution (based on Stetson 1998, PASP, 110, 1448 equations) for CTE correction coefficients that linearizes the full set of counts. Half of the total data set will be obtained using Amp B allowing for robust measurement of the parallel CTE with a well-posed, simpler technique of comparing object counts detected with these symmetric Amps.

Fraction 20%

GO/GTO

Programs

Supported

Resources 6 external orbits

Required:

Observation

Plan

Resources 3 FTE weeks

Required:

Analysis

Products ISR or PASP paper; algorithm for calibration and coefficients

Accuracy CTE correction coefficients will be determined to a relative 1%

Goals accuracy.

Scheduling& All orbits are CVZ. We need to have science observations

Special extending for a full 96 minute orbit in order to assure that a full
Requirements bright sky visibility period is sampled.

Proposal ID 8847: STIS Cycle 9: CCD Full-Field Sensitivity

Plan

Purpose Monitor CCD sensitivity over the whole field of view.

Description Measure a photometric standard star field in Omega Cen in 50CCD mode every six months to monitor CCD sensitivity over the whole field of view. Keep the spacecraft orientation within a suitable range (+/- 5 degrees) to keep the same stars in the same part of the CCD for every measurement. The second visit is done using both amps B & D to provide an additional CTE measurement at the end of Cycle 9.
This test will give a direct transformation of the 50CCD magnitudes to the Johnson-Cousins system for red sources. These transformations should be accurate to 1%. The stability of these transformations will be measured to the sub-percent level. These observations also provide a check of the astrometric and PSF stability of the instrument over its full field of view.

Fraction 20%

GO/GTO

**Programs
Supported**

Resources 3 external orbits

Required:

Observation

Resources 2 FTE weeks

Required:

Analysis

Products PHT reference file; ISR, STAN, IHB

Accuracy 1%

Goals

Scheduling& One visit every six months: Sep 00 and Mar 01

**Special
Requirements**

Proposal ID 8855: STIS Cycle 9: Slit Wheel Repeatability

Plan

Purpose Check the stability of the STIS slit wheel.

Description Verify the repeatability of the slit wheel for 3 STIS slits (52X0.2, 52X0.1, and 52X0.05) by taking images with the Pt/Cr/Ne lamp and the MAMA detector. Use the G230M (3055) grating with the NUV-MAMA, and rotate the slit wheel among the 3 chosen slits.

Fraction 100%

GO/GTO

Programs

Supported

Resources 1 internal orbit

Required:

Observation

Resources 1 FTE week

Required:

Analysis

Products ISR

Accuracy 0.1 pixel

Goals

Scheduling&

Special

Requirements

Proposal ID 8856: STIS Cycle 9: CCD Sensitivity Monitor (+ Imaging Focus Monitor)

Plan

Purpose Monitor sensitivity of each CCD grating mode to detect any change due to contamination or other causes.

Description Obtain exposures in each of the 3 low-resolution CCD spectroscopic modes every 3 months, and in each of the 3 medium-resolution modes every 6 months, using the same high-declination calibration standard, and ratio the results to the first observations to detect any trends. Also repeat one of the M mode exposures with Gain=4. In addition, each quarterly L sequence will be preceded by a [OII] direct CCD image to monitor the focus.

Fraction 40%

GO/GTO

Programs

Supported

Resources 6 external orbits

Required:

Observation

Resources 2 FTE weeks

Required:

Analysis

Products PHT reference files; ISR

Accuracy 2% at wavelength of least sensitivity

Goals

Scheduling& 1 orbit every 3 months for L modes 1 additional orbit every 6

Special months for M modes

Requirements

Proposal ID 8842: STIS Cycle 9: STIS PSF Library

Plan

Purpose To obtain high S/N observations of: (1) stars (both saturated and unsaturated) in F28X50LP images of an A star and an F star, and (2) deep coronagraphic PSFs for a K star. This will complement the available images for STIS imaging and coronagraphic PSF libraries.

Description Previous imaging program have taken deep dithered 50CCD images to provide deep comparison PSFs. However, only very limited deep dithered images exist using the 50LP filter. For stars cooler than $B-V=0.66$, data can be obtained from Ron Gililand's deep observations of 47 Tucanae (8267), while some data exists from program 8422 for a hot subdwarf and an M dwarf. The proposed observations will fill in the intermediate colors by providing deep F28X50LP images of A and F type stars (one orbit each). Shallower 50CCD images will also be taken of these stars. The program will use 256X256 subarrays to reduce data volume and buffer dumps. As to the coronagraphic part, K star observations will complement the available colors for coronagraphic PSFs.

Fraction 10%

GO/GTO

Programs

Supported

Resources 3 external orbits

Required:

Observation

Resources 3 FTE weeks

Required:

Analysis

Products Template PSFs in PSF library

Accuracy 1% at 10^{-6} of peak flux

Goals

Scheduling& As early as possible in Cycle 9

Special

Requirements

Proposal ID 8857: STIS Cycle 9: MAMA Sensitivity and Focus Monitor

Plan

Purpose Monitor sensitivity of each MAMA grating mode to detect any change due to contamination or other causes. Also monitor the STIS focus in a spectroscopic mode.

Description Obtain exposures in each of the 2 low-resolution MAMA spectroscopic modes monthly, in each of the 2 medium-resolution modes every 2 months, and in each of the 4 echelle modes every 6 months, using unique calibration standards for each mode, and ratio the results to the first observations to detect any trends. In addition, each monthly L sequence will be preceded by two spectroscopic ACQ/PEAKs with the CCD + G230LB and crossed linear patterns, with the purpose of measuring the focus (PSF across the dispersion as a function of UV wavelength); and each bimonthly M sequence will be preceded by a CCD/F28X500II direct image also to monitor the focus.

Fraction 65%

GO/GTO

**Programs
Supported**

Resources 22 external, SAA-free orbits

Required:

Observation

Resources 7 FTE weeks

Required:

Analysis

Products Interim reports and ISR on sensitivity monitor. TIR on focus-monitor. If the focus quality is found to degrade significantly, a separate program to take corrective action (such as an adjustment of the STIS correction mirror) may be implemented..

Accuracy Minimum S/N of 50 at the wavelength of least sensitivity for L

Goals modes and at the central wavelengths for M and E modes.

10% for focus changes, i.e FWHM of the profile across the dispersion

Plan

Scheduling& 1 orbit monthly for L modes plus focus monitor
Special 1 orbit every 2 months for M modes (plus [OII] image)
Requirements 2 orbits every 6 months for E modes

Proposal ID 8858: STIS Cycle 9: MAMA Full-Field Sensitivity

Plan

Purpose To monitor the sensitivity of the FUV-MAMA and NUV-MAMA over the full field.

Description By observing the globular cluster NGC6681 once every 6 months at roughly the same orientation (to keep the same stars in the same area of the detectors) we will monitor the full field sensitivity of the MAMA detectors and also monitor the astrometric and psf stability. These observations will be used to look for contamination, throughput changes, or formation of colour centers in the photocathode and window that might be missed by spectroscopic monitoring or difficult to interpret in flatfielding.

Fraction GO/GTO 21% of all STIS prime + parallel proposals (i.e. all STIS MAMA proposals), based on Cycle 8 statistics

Programs Supported

Resources Required: 6 external, SAA free orbits

Observation

Resources Required: 6 FTE weeks

Analysis

Products PHT reference files. Instrument Handbook; ISR

Accuracy 1%

Goals

Scheduling & Special Requirements One visit every six months: Sep 00 and Mar 01

Proposal ID 8843: STIS Cycle 9: MAMA Dark Monitor

Plan

- Purpose** This test performs the routine monitoring of the MAMA detector dark noise. This proposal will provide the primary means of checking on health of the MAMA detectors systems through frequent monitoring of the background count rate. The purpose is to look for evidence of change in the dark rate, indicative of detector problems developing.
- Description** Two times a week a 23min exposure is taken with the FUV and NUV MAMAs with the shutter closed. The exposures are taken in ACCUM mode. The length of the exposures is chosen to make them parallels.
- Fraction** 65%
- GO/GTO**
- Programs Supported**
- Resources Required:** 208 internal SAA free orbits
- Observation**
- Resources Required:** 6 FTE weeks
- Analysis**
- Products** Updates to DRK and BPX reference files; ISR
- Accuracy** Each measurement will give a statistical uncertainty of 1% for the global dark rate.
- Goals**
- Scheduling & Special Requirements** Two darks per detector per week. Schedule as parallels.

Proposal ID 8860: STIS Cycle 9: MAMA Fold Distribution

Plan

Purpose The performance of MAMA microchannel plates can be monitored using a MAMA fold analysis procedure. The fold analysis provides a measurement of the distribution of charge cloud sizes incident upon the anode giving some measure of changes in the pulse-height distribution of the MCP and, therefore, MCP gain.

Description While globally illuminating the detector with a flat field the valid event (VE) rate counter is monitored while various combinations of row and column folds are selected. The procedure is implemented using special commanding and is the same for the FUV and NUV MAMAs with the exception of the gratings/aperture/lamp combinations used for the flat fields. The procedure is described in STIS ISR 98-02

Fraction 65%

GO/GTO

Programs

Supported

Resources 4 internal SAA-free orbits

Required:

Observation

Resources 1 FTE weeks

Required:

Analysis

Products Technical Instrument Report and/or corrective action if serious changes are detected.

Accuracy Position of the peak in the fold distribution can be measured to about 5% accuracy from this procedure.

Goals

**Scheduling&
Special
Requirements** This proposal should execute in the spring and fall every year.

Proposal ID 8862: STIS Cycle 9: MAMA FUV Flats

Plan

Purpose This program will obtain FUV-MAMA flat-field observations with the Kr lamp for the construction of on-orbit pixel-to-pixel flats for select modes.

Description This program will obtain a set of FUV-MAMA flat-field observations with sufficient counts to construct pixel-to-pixel flat fields (D-flats) for select modes. Approximately 9 visits will be required to construct a D-flat, which is defined as $S/N = 100$ per low-res pixel. Experience with pre-flight and on-orbit monitoring flats show that the flat-field characteristics are in large measure color- and mode-independent, so that high-quality D-flats constructed with the G140M settings should suffice for all science programs.

This Cycle 9 calibration program calls for obtaining flats with G140M at 1470 Ang with multiple SLIT-STEP positions to illuminate below the fiducial bars. The most recent global count rate with the 52x0.05 aperture was 168628 counts/sec (o51009ncq). After 10 more exposures, the count rate is expected to have declined to 156,000 counts/sec, but this is still not quite low enough to allow use of the 52x0.1 aperture, which would approximately double the global count rate.

Fraction 40%

GO/GTO

Programs

Supported

Resources 10 internal SAA free orbits; ON HOLD for now, waiting for the

Required: analysis of the cycle 8 flats

Observation

Resources 4 FTE weeks

Required:

Analysis

Products PFL and/or DFL reference files; ISR if significant evolution is seen

Accuracy 1%

Goals

Plan

Scheduling & Special Requirements Schedule visit in July or August, 2001.

Proposal ID 8863: STIS Cycle 9: MAMA NUV Flats

Plan

Purpose This program will obtain NUV-MAMA flat-field observations with the D2 lamp for the construction of pixel-to-pixel flats for select modes.

Description This program will obtain a set of NUV-MAMA flat-field observations with sufficient counts to construct pixel-to-pixel flat fields (D-flats) for select modes. Approximately 10 visits will be required to construct a D-flat, which is defined as $S/N = 100$ per low-res pixel. Experience with pre-flight and on-orbit monitoring flats show that the flat-field characteristics are color- and mode-independent, so that high-quality D-flats constructed with the G230M settings should suffice for all science programs. This Cycle-9 calibration program calls for obtaining flats with G230M at 2659 Ang with 5 SLIT-STEP positions to illuminate regions of the detector normally shadowed by the slit fiducial bars. The most recent global count rate with the 52x0.2 aperture was 196536 counts/sec (o51110ftq). After 10 more exposures, the count rate is expected to have declined to 174,000 counts/sec.

Fraction 25%

GO/GTO

Programs Supported

Resources 10 internal SAA-free orbits, ON HOLD for now, waiting for the
Required: analysis of the Cycle 8 flats.

Observation

Resources 4 FTE weeks

Required:

Analysis

Products PFL and/or DFL reference files; ISR if significant evolution is seen.

Accuracy 1%

Goals

Plan

Scheduling & Special Requirements Schedule visit in July or August, 2001.

Proposal ID 8859: STIS Cycle 9: MAMA Dispersion Solutions

Plan

Purpose Obtain deep engineering wavecalcs for all MAMA gratings at several wavelength centers as a yearly monitor of derived dispersion solutions.

Description Wavelength dispersion solutions will be determined on a yearly basis as part of a long-term monitoring program. Deep engineering wavecalcs for each MAMA grating will be obtained. Wavelength centers will be selected at extreme and central settings of each grating. Intermediate settings will also be taken to check the reliability of derived dispersion solutions. Only Prime modes will have been selected for observation in this program. The purely internal wavelength calibrations will be taken using the Pt/Cr-Ne (CIM) line lamp and the appropriate 2 pixel wide supported slit.

Fraction 19% based on cycle 8 statistics.

GO/GTO

Programs Supported

Resources 10 internal SAA-free orbits

Required: Observation

Resources 3 FTE week

Required: Analysis

Products DSP reference files.

Accuracy 0.1 pixels

Goals

Scheduling & Toward end of cycle 9.

Special Requirements

Proposal ID 8849: STIS Cycle 9: HST Faint Standards Extension

Plan

Purpose Fainter standard stars are needed for the flux calibration of COS, while reobservations are required to check for variability and to improve S/N. The four pure hydrogen WD standard stars from the original FASTEX proposal 8423 will satisfy these requirements and provide useful new standards for the community. Since these stars are selected by D. Finley to be pure hydrogen, the models provide the shape of flux reference, while the STIS CCD spectrum sets the absolute level of the fluxes. The UV STIS spectra are also required to measure the small or negligible interstellar reddening. In addition, even fainter standards are required for the prism modes on ACS. The faint stars of NGC6681 observed first in cal proposal 8422 are appropriate but must be reobserved to verify stability and improve the S/N. Finally, Bohlin (2000, AJ, July) found a 2-3 sigma deviation of the observed flux of HZ43 and G191B2B from their models. An additional pair of observation of these two stars will improve the broadband statistics by doubling the number of observed low dispersion spectra from 2 to 4 and should resolve the question of whether the deviations from the model are due to instrumental effects or to problems with the model atmospheres.

Plan

Description STIS spectra with G140L, G230L, and G430L are required to establish four new pure hydrogen WD standard stars that are as much as 10X fainter than the current fundamental standards GD153 and GD71. The models of these stars are of adequate precision to extend the standard flux distributions to the G750L range and into the infrared to at least 2.5microns. The STIS absolute flux calibration provides the tie-in to the four primary WD standards.

Overheads including guide star and target acquisition account for about 15 min in the first orbit and only 5 min in the second, leaving about 35 and 45 min of exposure time in the first and second orbit, respectively. One MAMA obs will be in the first orbit, while the CCD and 2nd MAMA obs follow in the second orbit in that order, so that any problem at the end of the second orbit would only cut the MAMA obs short. The short wl OII filter is used for targ/acq just in case there is an unresolved red star in the acq field.

Several stars that are ~1000x fainter than GD71 are included in the 52x2 slit for spectra in the same three modes as the FASTEX stars. These very faint stars will also serve as targets for CTE measures in the imaging modes of instruments with CCD detectors.

Fraction 2%

GO/GTO

Programs Supported

Resources 16 external orbits

Required:

Observation

Resources 2 FTE weeks for SISD

Required:

Analysis

Products ISR, CDBS reference spectra tables

Accuracy 10% for Prism, 1% for gratings

Goals

Plan

Scheduling & Special Requirements The CCD visits for the bright primary standards HZ43 and G191B2B should be separated by at least one month, since that is the time scale for measurable changes in the CCD flat field. The delay must also be long enough to avoid thermal correlations that often make repeatability better on the few orbit time scales. The NGC6681 visits have an orient restriction, which requires a June 2001 schedule.

Proposal ID 8852: STIS Cycle 9: G750M Ghost Modelling

Plan

Purpose Make empirical model for M-grating ghosts

Description An empirical study of STIS CCD imaging and L-grating ghosts (caused by reflections in the CCD window) has been done in Cycle 8. G430L and G750L seem to have a geometry very similar to that of the imaging mode: A decent simulation of the ghost smear below point spectra has been proven possible in the L modes. However, the M-mode ghosts are found to have different characteristics in that the ghosts are bigger than in the L modes, they extend above the continuum at the current MSM position, and they are shifted along the dispersion axis. We propose to model the M-mode ghosts with high-S/N emission-line spectra, using a suitable target in the Orion nebula.

Fraction ~1%

GO/GTO

Programs

Supported

Resources 2 external orbits

Required:

Observation

Resources 3 FTE weeks

Required:

Analysis

Products Template Ghost model; Instrument Handbook

Accuracy ~5%

Goals

Scheduling & As early as possible in Cycle 9

Special

Requirements

Proposal ID 8850: STIS Cycle 9: Deep G750M Wavecals

Plan

Purpose Improve dispersion solutions for the red G750M settings

Description For G750M central wavelength settings of 7795 Å and redder, there are not enough strong emission lines in wavecals to render dispersion solutions to have residuals of order 0.2 pix, i.e., the standard GO wavecal exposures are not deep enough to detect enough emission lines (they are only good enough for deriving zero point offsets). Hence we propose to obtain very deep wavecals for those settings.

Fraction ~1% of all Cycle 8 STIS observations

GO/GTO

Programs

Supported

Resources 2 internal orbits

Required:

Observation

Resources 0.5 FTE weeks

Required:

Analysis

Products CDBS Reference files

Accuracy 0.2 pixel

Goals

Scheduling& As early as possible in Cycle 9

Special

Requirements

Proposal ID 8844: STIS Cycle 9: Spectroscopic PSFs

Plan

Purpose The primary advantage of STIS with HST in the visible portion of the spectrum is high angular resolution with excellent rejection along the slit. However no data is available that measures the spatial/spectral PSF to the limit of the CCD chip dimensions. We plan to acquire a set of deep spectroscopic images of isolated, point source stars with STIS for the purpose of correcting spectroscopic science observations for dispersed residual scattered light along the slit from the point-like central object. Using limited observations from the archive, we suspect that a dynamic range approaching 10^7 can be measured from the stellar core to 26" away at the limit of the CCD and aperture edge. This can be measured using first the normal slit on axis, then rotating the two fiducials, F1 and F2 into the chip center. F1 with M gratings is found to knock the stellar core down by 200x. We wish to measure the rejection of F2. Four different, isolated stars will be observed: stellar types are O5 V, A2 IV, G5 V, and M0 in order to fully sample the color dependence of the scattered light.

Description We plan a suite of deep STIS spectrographic images of 2 isolated stars using the 52x0.2, F1 and F2 settings. We will also test the 52x0.1, F1 and F2 aperture settings on the A2 IV star to determine how much advantage in terms of spatial rejection of the telescope PSF would be realized with these apertures. The stars are chosen to have spectral types matching current and planned coronagraphic imaging science objects.

Fraction <~1%, possibly more in future cycles.

**GO/GTO
Programs
Supported**

Resources 11 external orbits

**Required:
Observation**

Resources 4 FTE weeks

**Required:
Analysis**

Plan

Products ISR, template PSFs, IHB

Accuracy 5% at 10^{-6} of central flux

Goals

Scheduling & As early as possible in Cycle 9

Special

Requirements

Proposal ID 8839: STIS Cycle 9: CCD CTE effect for extended sources

Plan

Purpose Determine CTE effect on extended sources in imaging and spectroscopy modes

Description Measure CTE effect for extended sources as a function of continuum intensity, for very popular uses of the STIS CCD:
(A) Spectrophotometry and equivalent widths, for varying extraction heights. The target is NGC 3998, a centrally peaked elliptical galaxy with strong absorption *and* emission lines. Center galaxy at row #900 to maximize CTI difference between the two amp readouts.
(B) Surface and aperture photometry of galaxies. The target is a field in Abell 1689, which has also recently been observed by WFPC2 for this purpose.

Fraction 20%

GO/GTO

**Programs
Supported**

Resources 4 external orbits

**Required:
Observation**

Resources 4 FTE weeks

**Required:
Analysis**

Products ISR/PASP, IHB, STAN

Accuracy CTE correction coefficients measured to 1% relative accuracy.

Goals

**Scheduling &
Special
Requirements**

Proposal ID 8853: STIS Cycle 9: CCD Residual Images after Overillumination

Plan

Purpose Measure the residual effect of overillumination of the CCD as a function of color (UV vs. RED). Test whether this effect has increased since Cycle 7 due to the increased Charge Transfer Inefficiency of the STIS CCD.

Description Saturate (by a factor 3) the CCD. Take a few dark frames afterwards to study the residual effect over time. Repeat the experiment, now taking bias frames instead of dark frames to study the effect of read-outs. Do this whole procedure using two setups: one in the UV (G230LB), using a bright, blue star, and one in the red (Internal Tungsten lamp through a cross-dispersed slit) to check for any dependence on color. Also repeat the experiment twice more, overexposing by factors ~15 and ~50 to study the remanence effect of a large illumination factor.

Fraction 25%

GO/GTO

**Programs
Supported**

Resources 2 external orbits + 3 internal orbits.

**Required:
Observation**

Resources 2 FTE weeks

**Required:
Analysis**

Products ISR, STAN, IHB

Accuracy sub-DN level

Goals

Scheduling & Visibility window of external target closes by Oct 15, 2000.

**Special
Requirements**

Proposal ID 8891: STIS Cycle 9: Test of STIS End of Slit Pseudo-Aperture Locations.

Plan

Purpose Decrease the charge lost during parallel transfer by a factor of ~5, for point sources. Test the implementation of new pseudo-apertures defined at row 900 on the CCD from the proposal-processing ground-system segment through the data calibration pipeline.

Description Using a bright white dwarf standard, for each aperture 52X2, 52X0.5, 52X0.2, 52X0.1, and 52X0.05: 1. Acquire the target at the center of the slit. 2. Take an image through the slit to verify the centering of the target. 3. Take a spectrum. Verify traces for the most popularly used grating settings (52X2,52X2E1/G430L/4300; 52X0.5,52X0.5E1/G430M/5216; 52X0.2,52X0.2E1/G430M/5216; 52X0.1,52X0.1E1/G750M 6768; 52X0.05,52X0.05E1/G750M/6768) 4. Acquire the target again using the pseudo-aperture definition (E1 ending). 5. Take another image to verify the positioning of the target. 6. Take another spectrum using the same grating used at the center location.

Fraction <~1%, possible more in future cycles

GO/GTO

Programs Supported

Resources 3 external orbits.

Required:

Observation

Resources 1 FTE day

Required:

Analysis

Products IHB

Accuracy 20% of aperture width

Goals

Scheduling&

Special

Requirements