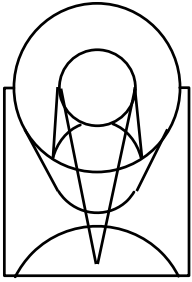


STUC - COS Update

18 October 2007

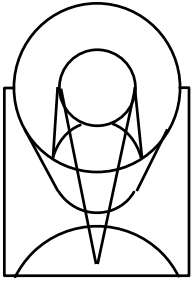




Agenda



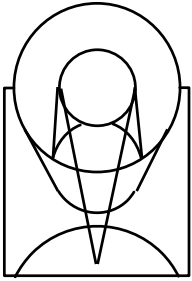
- New Structure of the Team
- SMGT
- SMOV
- TV & Ground Testing
- Ground System
- User Support
- Miscellaneous



COS/STIS Team



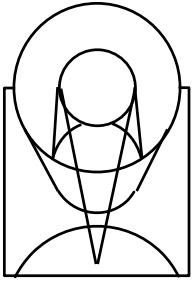
- New organization of the Instruments Division in place
- Old COS and STIS Teams have been jointed together
 - Optimization of resources
 - Technical cross-fertilization
- COS/STIS Team Lead responsible for personnel and technical work
- COS (Tony Keyes) and STIS (Charles Proffitt) technical leads appointed



SMGT Rationale



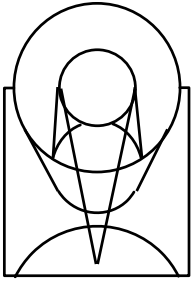
- Demonstrate end-to-end readiness of the ground system to support SMOV
- Test and demonstrate readiness of operational COS instructions and PDB elements
 - Does not exercise all combinations of allowed modes and setups, but does exercise all command paths
- Test all special commanding required on-orbit for SMOV
 - Examples include: first-time NUV detector turn-on; NUV detector recovery from anomaly; NUV fold test, first-time FUV detector turn-on



SMGT Activities



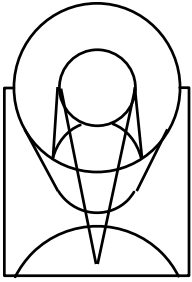
- STScI SMS generated through proposal 874
- First COS SMGT (26-27 July 2007)
 - Started on 26 July 2007; STScI SMS portion planned to last ~ 24 hours
 - Anomalous NUV HV shutdown occurred after ~ 4 hours of SMS execution during MAMA fold test
 - A couple of errors present and corrected in the SMS
- Second COS SMGT (7-8 September 2007)
 - Dry-run executed 21-23 August 2007
 - Real test executed 7-8 September 2007
 - All special commanding executed successfully
 - Test data delivered successfully to STScI



SMGT Liens



- NUV Fold test re-run required
 - Data sampling did not return sufficient signal for analysis
 - Data was sampled via engineering telemetry
 - Science exposure added at the end to capture all the data
- Target Acquisition macro instruction timing
 - Some timing pads in commanding will likely be modified
- Mechanism relative-move macro modification required
 - Aperture mechanism moves are not always made in preferred direction
- Currently in the process of clearing the SMGT liens *against bench* and *against SI* (26 November 2007)

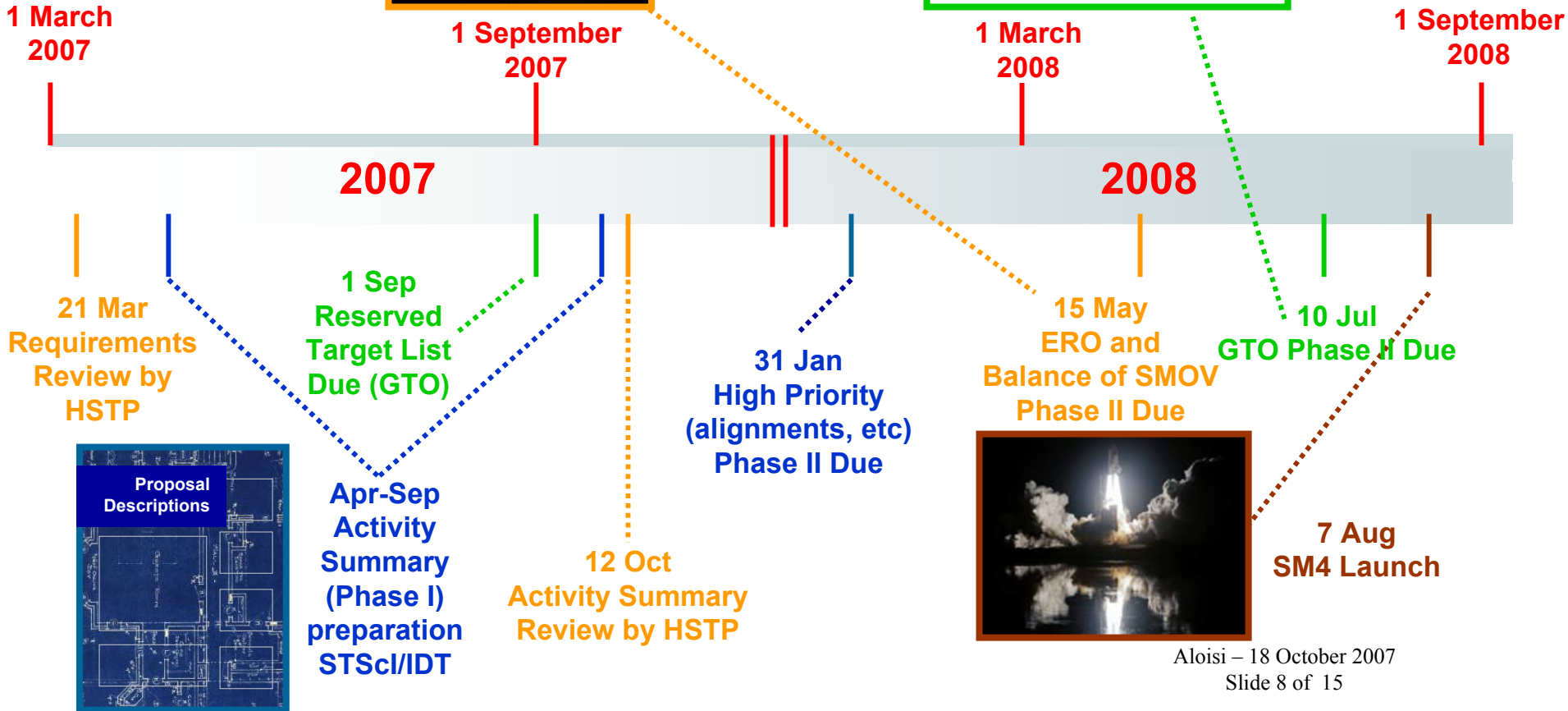
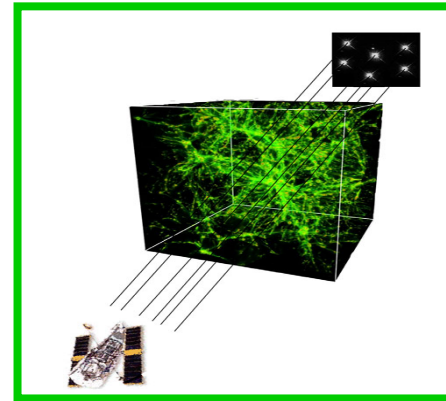
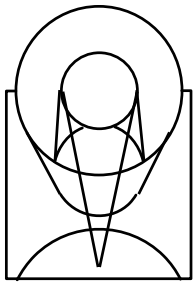


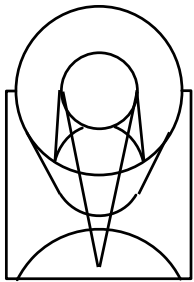
SMOV4 Activities



- Successful SMOV4 “delta” requirements review by HSTP on 21 March 2007
 - COS requirements expanded and updated for this review
 - No significant changes to COS requirements
- Successful SMOV activity summary (Phase I) review by HSTP on 12 October 2007
 - Mapping of requirements to programs, assignment of resources, and program description (STScI and COS IDT)
- SMOV Program (Phase II) generation: Nov 2007 – July 2008

SMOV4 Activity Timeline





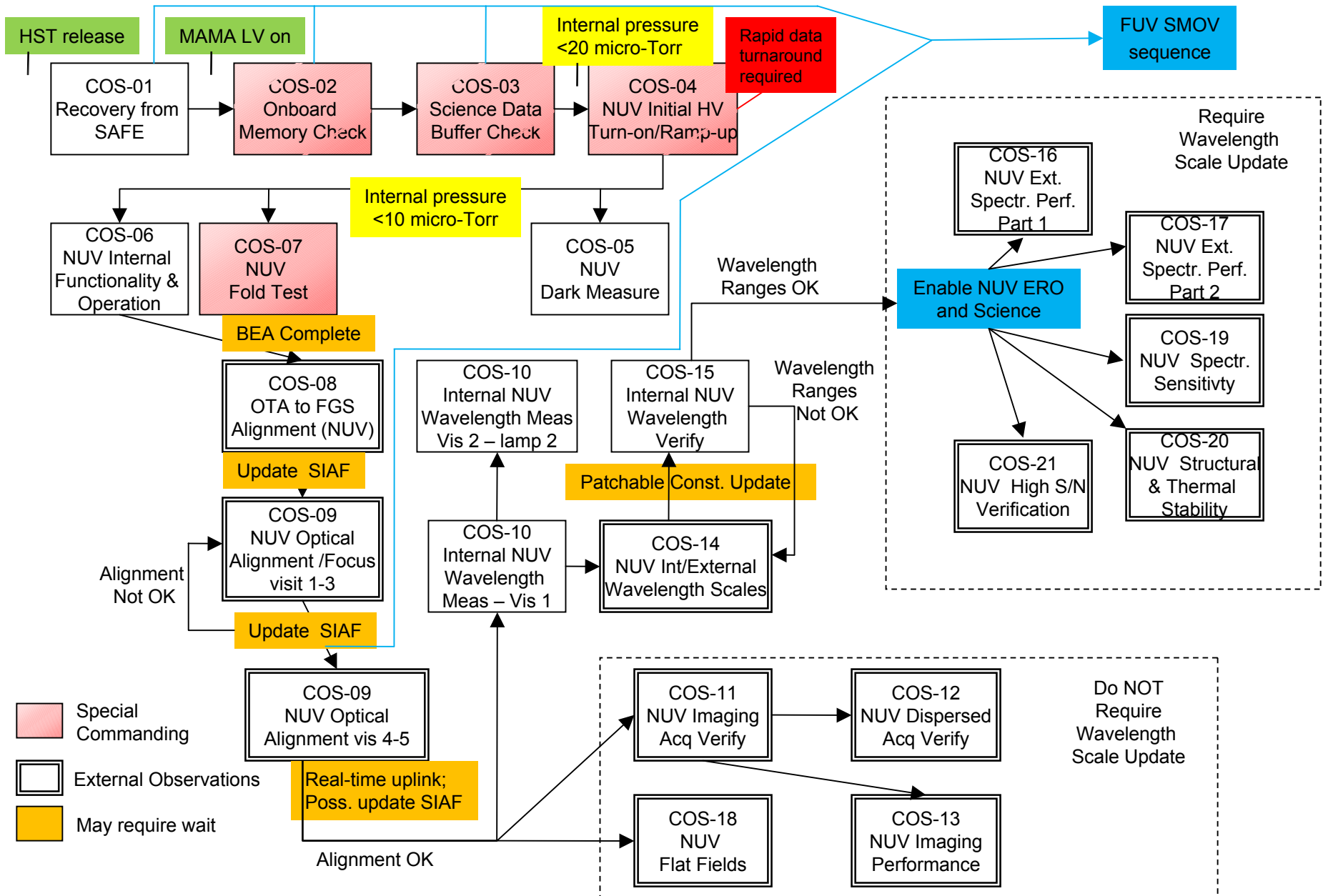
SMOV4 Plan Overview



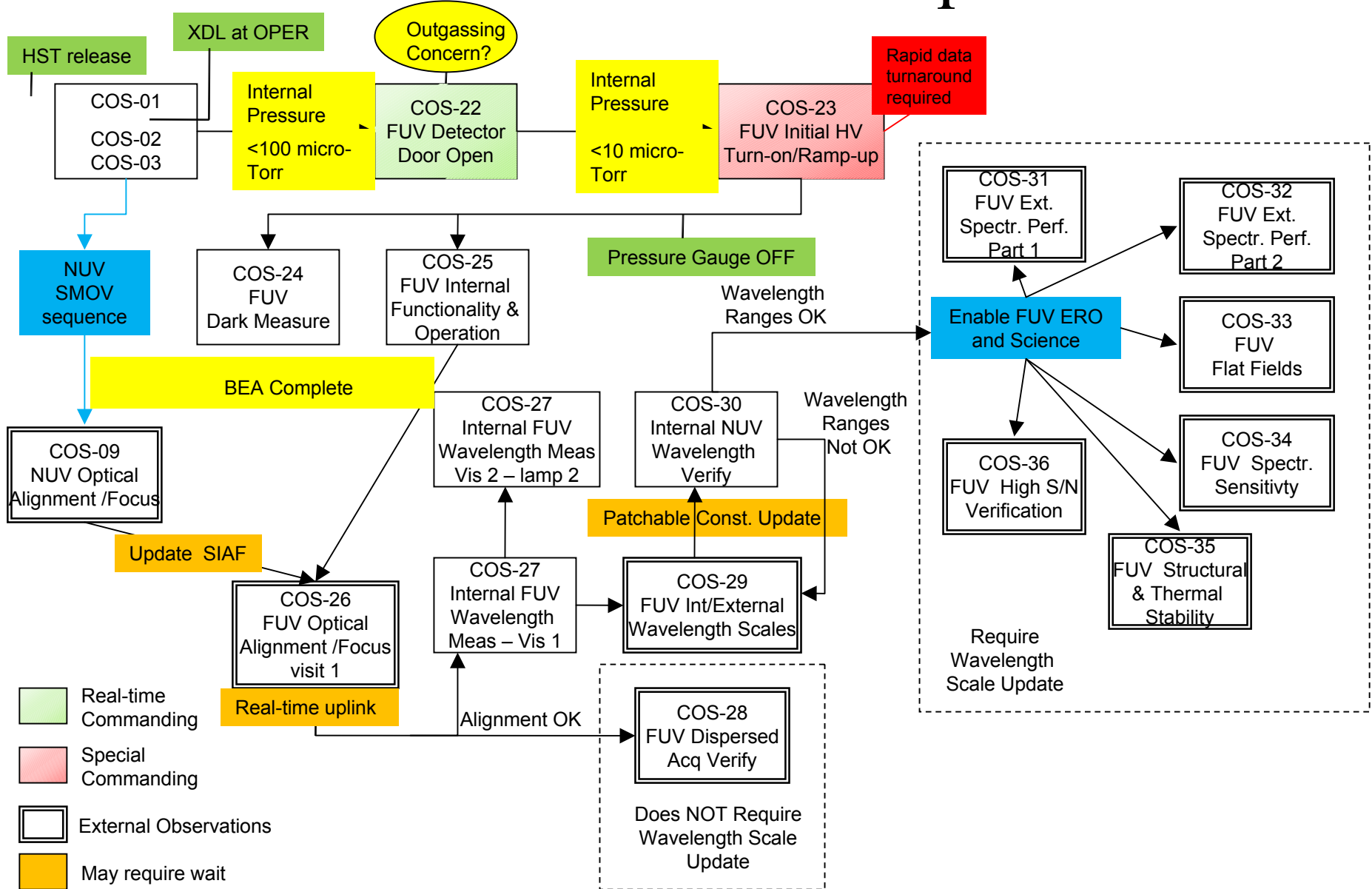
- 36 activities currently identified for both NUV & FUV
- Sequence and duration established
 - NUV will start first, followed immediately afterwards by FUV
 - In current very conservative draft COS SMOV will terminate around end November (~ 1 month later than any other SI)
 - In the process to shorten the total SMOV period for COS
- Total of 145 (internal) & 100 (external) orbits currently estimated

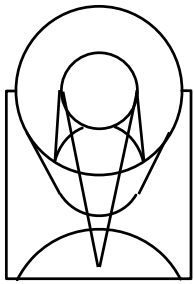
	external	internal
NUV	84	75
FUV	61	25
Total	145	100

COS SMOV4 NUV Sequence



COS SMOV4 FUV Sequence

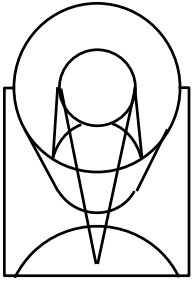




Thermal-Vacuum & Ground Testing



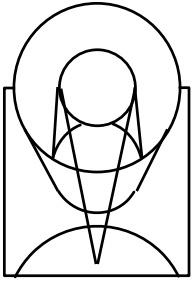
- Successful TAGFLASH test conducted at COS TV II in December 2006
 - Exercised flashes for all gratings and wavelength settings
 - Identified modest updates to commanding due to lamp turn-on characteristics
 - Ongoing assessment and verification of OSM drifts
- TV II data processed by OPUS to be ingested in MAST
 - Header keyword verification ~ 90% complete
- Reference file delivery from IDT currently undergoing
 - About half of the files (10/19) delivered
- New functional and grating efficiency tests performed on 8-10 October 2007
 - Confirmed trend for degradation of NUV gratings (up to ~ 25% at launch)
 - No plans at this point to change COS gratings



Ground System Activities



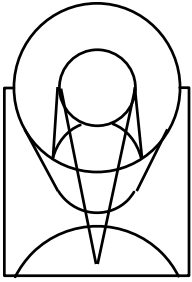
- Proposal and Scheduling System
 - All science exposure and calibration commanding is complete
- CALCOS (Pipeline) Development
 - Most pipeline steps tested against instrument data (screening, thermal distortion, geometrical correction, dead-time correction, flatfield, 1-d extraction, wavecal processing, etc)
 - TAGFLASH coded and partially tested - Final testing with TV II and SMGT exposures
 - Verification of pipeline and reference files on TV I/II and SMGT data will start in November 2007
 - Post-pipeline tools in development



User Support



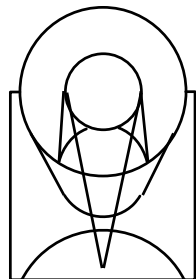
- COS Instrument Handbook in preparation
 - Updated version provided to IDT for second review
 - To be distributed with Cycle 17 Call for Proposals (Dec 2007)
- COS Data Handbook to be started in Nov 2007
- COS input provided for Cycle 17 CP and Primer
- COS ETCs
 - Spectroscopic ETCs in final acceptance testing (except 2nd order issues)
 - Imaging and Target Acquisition ETCs under development
 - To be distributed with Cycle 17 Call for Proposals (Dec 2007)
- STScI COS Website in transformation: suggestions welcome
 - <http://www.stsci.edu/hst/cos/>



Miscellaneous



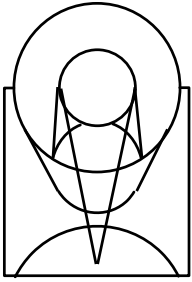
- COS Team is supporting SM4 simulations at GSFC for training purposes (~ 4 STScI members + IDT):
 - First COS SIM on 11 October 2007
 - Second COS SIM on 28 November 2007
 - Third COS JIS currently scheduled for 29 May 2007
- STScI will be hosting the next COS Science Team Meeting on 26 October 2007
- COS Team is going to heavily support the Austin AAS meeting and the Bologna Workshop in January 2008



Cosmic Origins Spectrograph

Supplementary Material

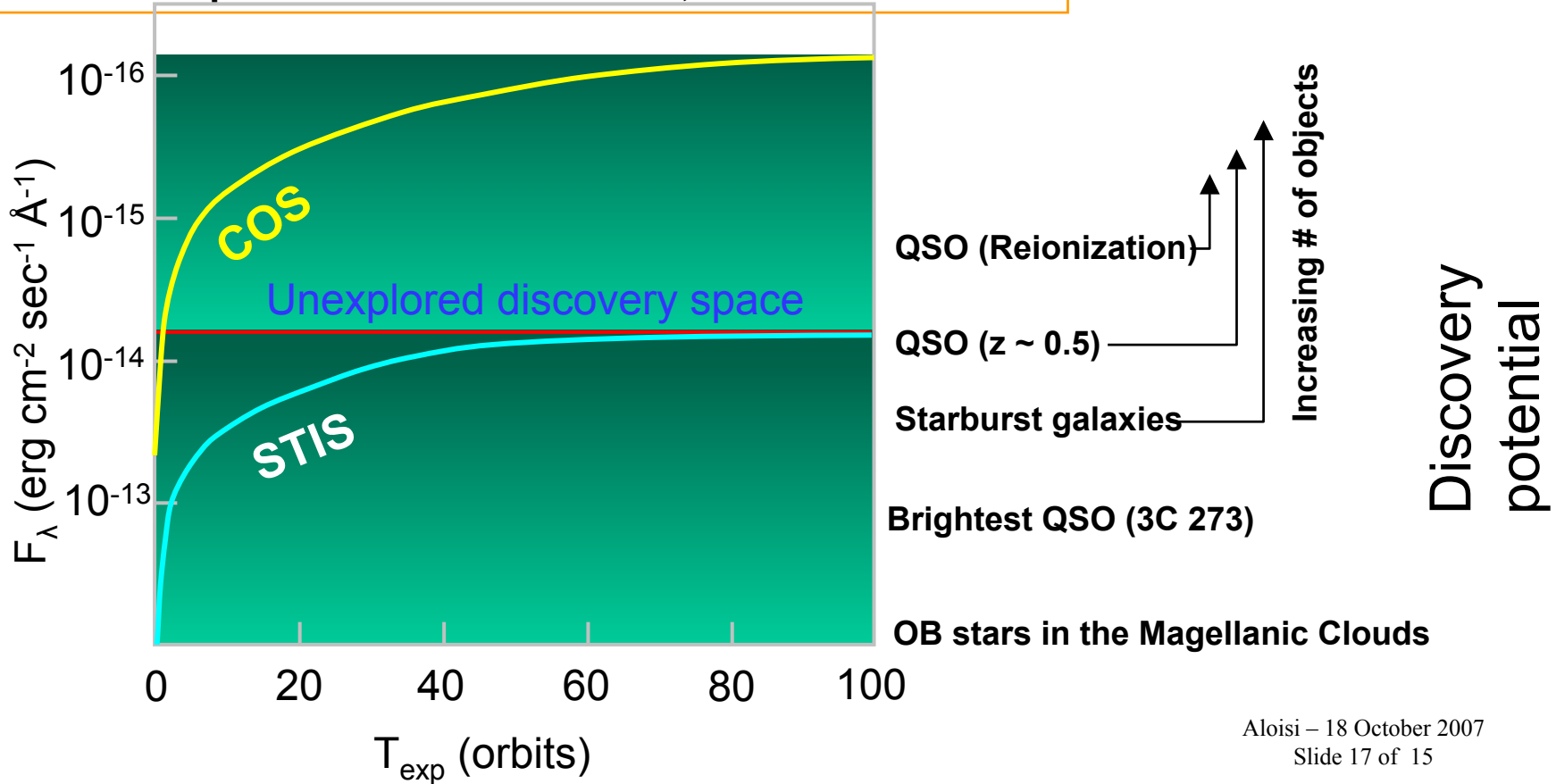


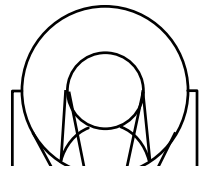


COS Discovery Potential

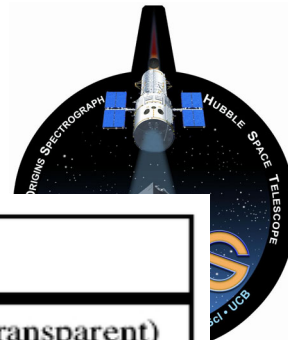


Limiting flux as function of exposure time to reach S/N=10 with spectral resolution $\lambda/\Delta\lambda=20,000$ at 1600 Å

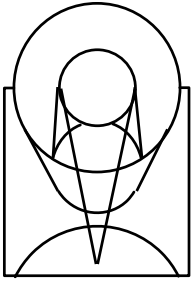




Cosmic Origins Spectrograph Detector Characteristics



		FUV MCP	NUV MAMA
Photocathode		CsI (opaque)	Cs ₂ Te (semi-transparent)
Window		None	MgF ₂ (re-entrant)
Wavelength range		1150 – 2050 Å	1700 – 3200 Å
Active area		85 x 10 mm (two)	25.6 x 25.6 mm
Pixel format		16384 x 1024 (two)	1024 x 1024
Pixel size		6 x 24 μm	25 x 25 μm
Spectral resolution element size		6 x 10 pix	3 x 3 pix
Quantum efficiency		26% at 1335 Å 12% at 1560 Å	10% at 2200 Å 8% at 2800 Å
Dark count rate		~0.5 cnt s ⁻¹ cm ⁻² ~7.2x10 ⁻⁷ cnt s ⁻¹ pix ⁻¹ ~4.3x10 ⁻⁵ cnt s ⁻¹ resel ⁻¹	~34 cnt s ⁻¹ cm ⁻² ~2.1x10 ⁻⁴ cnt s ⁻¹ pix ⁻¹ ~1.9x10 ⁻³ cnt s ⁻¹ resel ⁻¹
Detector global count rate limit	TTAG	~21,000 cnt s ⁻¹	~21,000 cnt s ⁻¹
	ACCUM	~60,000 cnt s ⁻¹ segment ⁻¹	~170,000 cnt s ⁻¹
Local count rate limit		~100 cnt s ⁻¹ resel ⁻¹ ~1.67 cnt s ⁻¹ pix ⁻¹	~1800 cnt s ⁻¹ resel ⁻¹ ~200 cnt s ⁻¹ pix ⁻¹



COS Spectral Resolution and Bandpass Summary



- FUV channel

- G130M $R > 20,000$ $\lambda\lambda$ 1150-1450
- G160M $R > 20,000$ 1405-1775
- G140L $R > 2,000$ 1230-2050

- NUV channel

- G185M $R > 16,000$ 1700-2100 (3x35)
- G225M $R > 20,000$ 2100-2500 (3x35)
- G285M $R > 20,000$ 2500-3000 (3x41)
- G230L $R > 1,700$ (most of bandpass) 1700-3200

- Bright Object Aperture (BOA) resolution degraded

- Wedge in ND filter degrades resolution by factor of ~ 2.5 for FUV modes and ~ 4 for NUV modes.