12497 - Constraining Stellar Feedback : A Census of Shock-ionized Gas in Nearby Starbursts Galaxies.

Cycle: 19, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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Dr. Mark S. Westmoquette (CoI) (ESA Member)	European Southern Observatory - Germany	mwestmoq@eso.org

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) MRK-178	WFC3/UVIS	4	22-Jul-2011 00:59:15.0	yes
02	(2) NGC-4861	WFC3/UVIS	4	22-Jul-2011 00:59:31.0	yes

8 Total Orbits Used

ABSTRACT

Stellar feedback is one of the most important engines of galaxy formation and evolution. However, the observational constraints are not yet established. We propose to investigate this problem by observing 2 nearby star-forming galaxies, selected to fill an unexplored niche in the key 2-dimensional parameter space of host galaxy's stellar mass and star formation rate density. From the WFC3 narrow-band observations in the light of H-alpha, H-beta, [OIII], and [SII], we will : (1) produce the line diagnostic diagrams, [O III](5007)/H-beta vs. [S II](6716+6731)/H-alpha, (2) discriminate the feedback-driven shock-ionized component from the ionized gas, (3) measure the energy budget of the shocks from star forming feedback. Those observations, joined by our previous data and studies on nearby starburst galaxies, will yield the efficiency of the feedback, i.e. the

fraction of the star formation's mechanical energy transported out of the starburst site rather than radiated away, as a function of both stellar mass and star formation rate intensity. The high angular resolution of HST is crucial for separating the shock fronts (~10pc = 0.2'' at 10 Mpc) from the photo-ionized regions. This project will provide the quantitative foundation of stellar feedback and a gauge for determining the role of feedback in the energetics, structure, and star formation history of galaxies.

OBSERVING DESCRIPTION

The two starburst galaxies, MRK-178 and NGC4861, will be observed using the four narrow-band filters, F487N, F502N, F657N(or F658N), and F673N and two broad and medium filters, F814W and F547M.

The 4 orbits are assigned to each galaxy. The observing strategy is the same with the WFC3 ERS 1, GO11360.

The field of view of WFC3/UVIS is enough to cover our target, the starburst region of each galaxy.
The observed H-apha wavelenghs are 6568.5 for Mrk178 and 6581.3 for NGC4861, which are fit within the F657N and F658N throughputs.

Visit

Proposal 12497, Visit 01, implementation Fri Jul 22 04:59:37 GMT 2011

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2), (3), (4), (5), (6)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	MRK-178	RA: 11 33 29.9458 (173.3747742d) Dec: +49 14 34.27 (49.24285d) Equinox: J2000		V=14.50+/-0.1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	mrk f487n	(1) MRK-178	WFC3/UVIS, ACCUM, UVIS-FIX	F487N			Pattern 1, Exps 1-1 in Visit 01 (1)	2400 Secs *[==>930.0 Secs (Pattern 1)]* *[==>930.0 Secs (Pattern 2)]* *[==>930.0 Secs (Pattern 3)]*	***[1]***
2	mrk f673n	(1) MRK-178	WFC3/UVIS, ACCUM, UVIS-FIX	F673N			Pattern 1, Exps 2-2 in Visit 01 (1)	2400 Secs *[==>968.0 Secs (Pattern 1)]* *[==>968.0 Secs (Pattern 2)]* *[==>968.0 Secs (Pattern 3)]*	***[2]***
3	mrk f657n	(1) MRK-178	WFC3/UVIS, ACCUM, UVIS-FIX	F657N			Pattern 1, Exps 3-3 in Visit 01 (1)	1200 Secs *[==>400.0 Secs (Pattern 1)]* *[==>400.0 Secs (Pattern 2)]* *[==>400.0 Secs (Pattern 3)]*	***[3]***
4	mrk f502n	(1) MRK-178	WFC3/UVIS, ACCUM, UVIS-FIX	F502N			Pattern 1, Exps 4-4 in Visit 01 (1)	1200 Secs *[==>430.0 Secs (Pattern 1)]* *[==>430.0 Secs (Pattern 2)]* *[==>430.0 Secs (Pattern 3)]*	***[3]***
5	mrk f547m	(1) MRK-178	WFC3/UVIS, ACCUM, UVIS-FIX	F547M			Pattern 1, Exps 5-5 in Visit 01 (1)	600 Secs *[==>484.0 Secs (Pattern 1)]* *[==>484.0 Secs (Pattern 2)]* *[==>484.0 Secs (Pattern 3)]*	***[4]***
6	mrk f814w	(1) MRK-178	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Pattern 1, Exps 6-6 in Visit 01 (1)	400 Secs *[==>348 Secs (Pattern 1)]* *[==>348 Secs (Pattern 2)]* *[==>348 Secs (Pattern 3)]*	***[4]***

Orbit Structure

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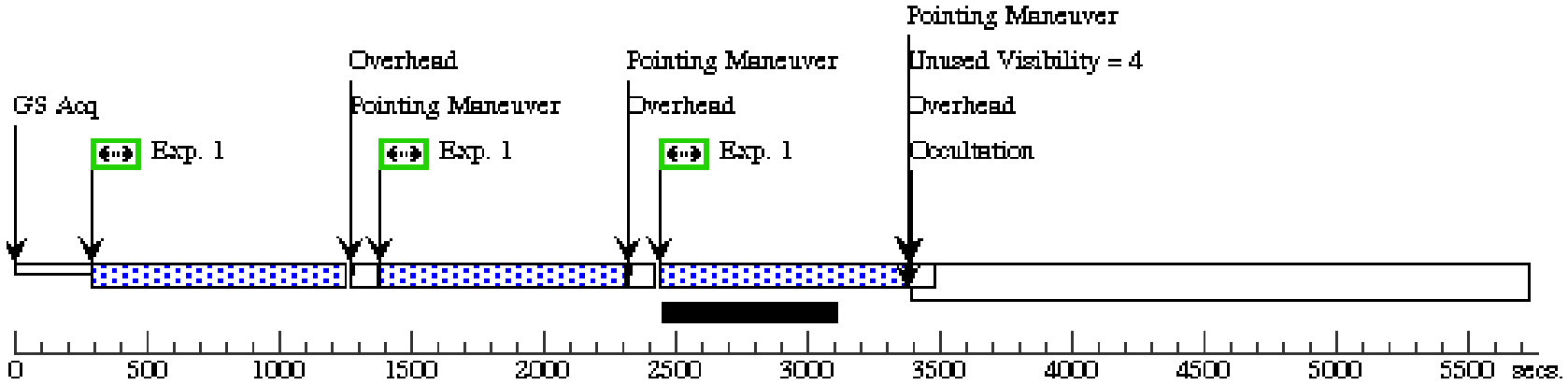

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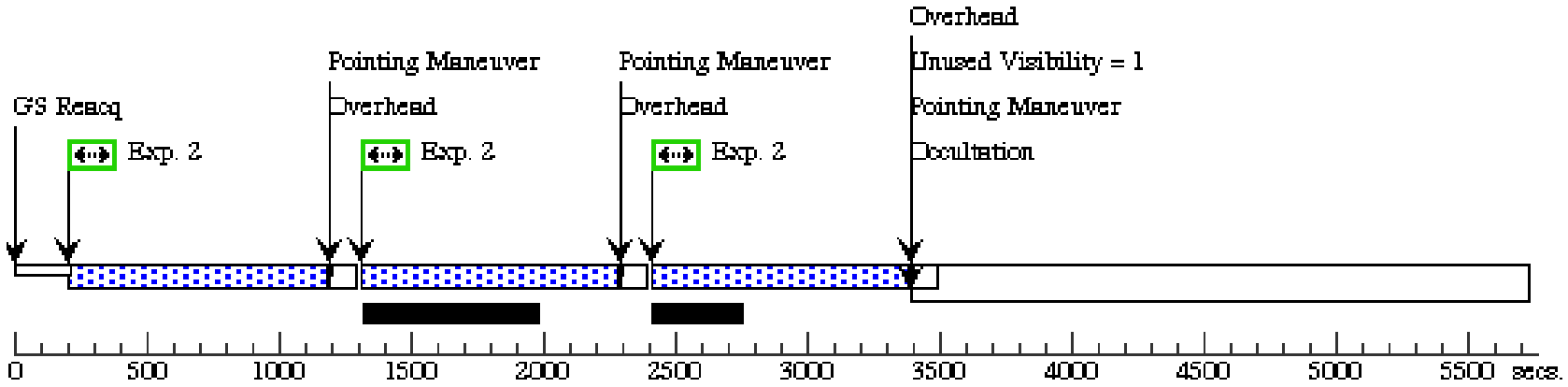

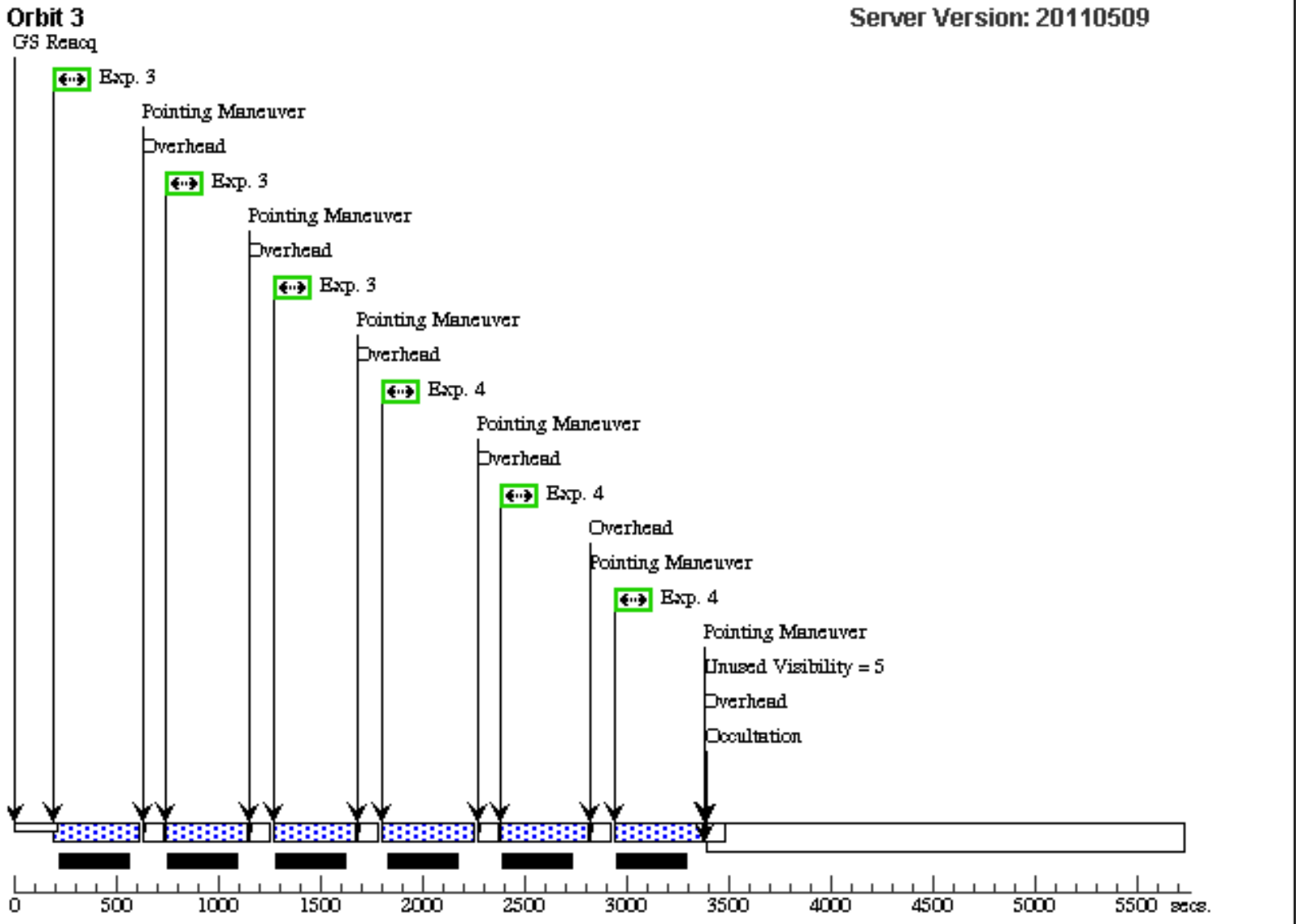
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GS Reacq
Exp. 3
Pointing Maneuver
Overhead
Exp. 3
Pointing Maneuver
Overhead
Exp. 3
Pointing Maneuver
Overhead
Exp. 4
Pointing Maneuver
Overhead
Exp. 4
Overhead
Pointing Maneuver
Exp. 4
Pointing Maneuver
Unused Visibility = 5
Overhead
Occultation
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1000
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2000
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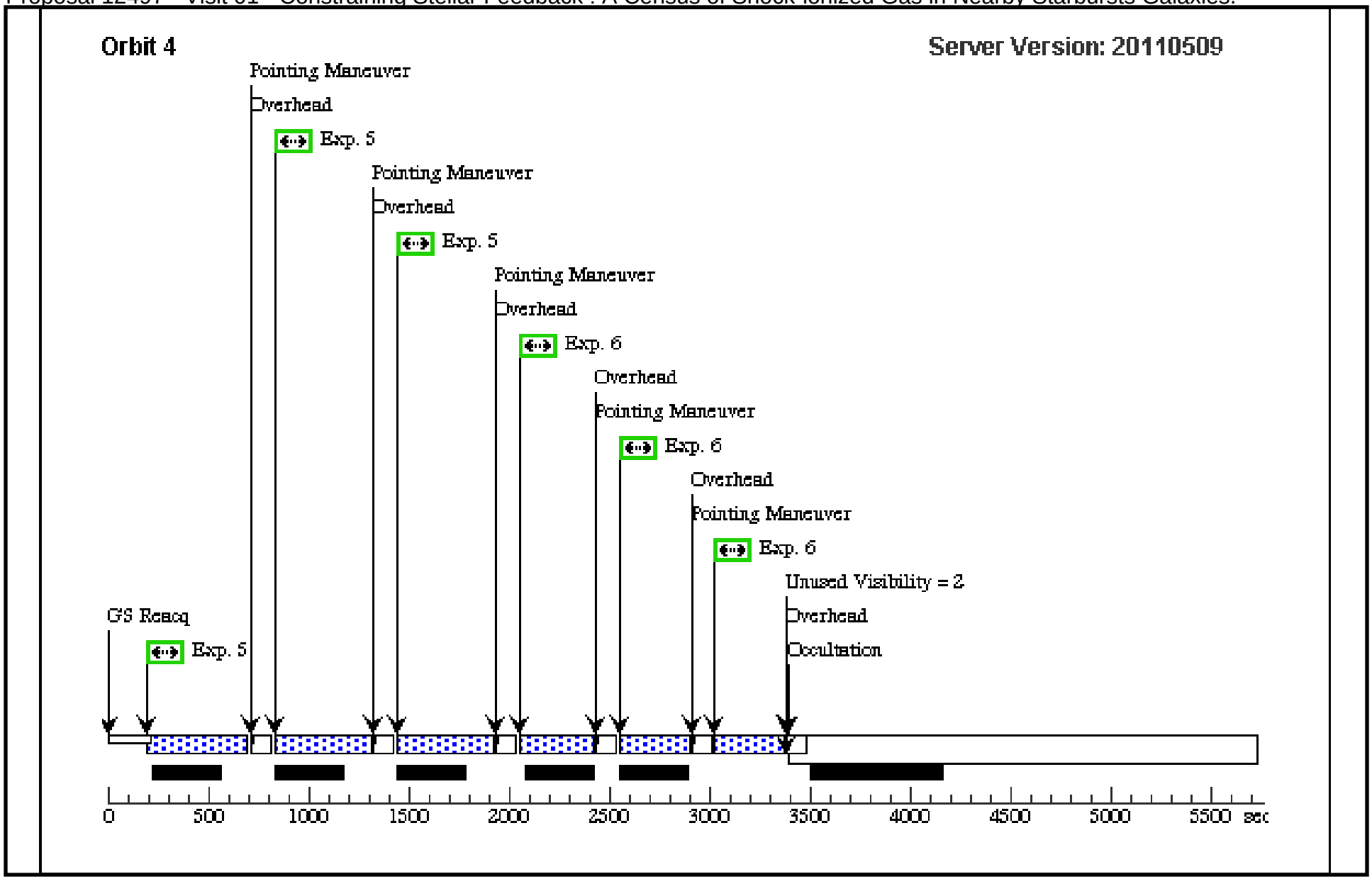
3000
3500
4000
4500
5000
5500
secs.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Server Version: 20110509
Pointing Maneuver
Overhead
Exp. 5
Pointing Maneuver
Overhead
Exp. 5
Pointing Maneuver
Overhead
Exp. 6
Overhead
Pointing Maneuver
Exp. 6
Overhead
Pointing Maneuver
Exp. 6
Unused Visibility = 2
Overhead
Occultation
GS Reacq
Exp. 5
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 12497, Visit 02, implementation Fri Jul 22 04:59:39 GMT 2011

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 320D TO 360 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2), (3), (4), (5), (6)

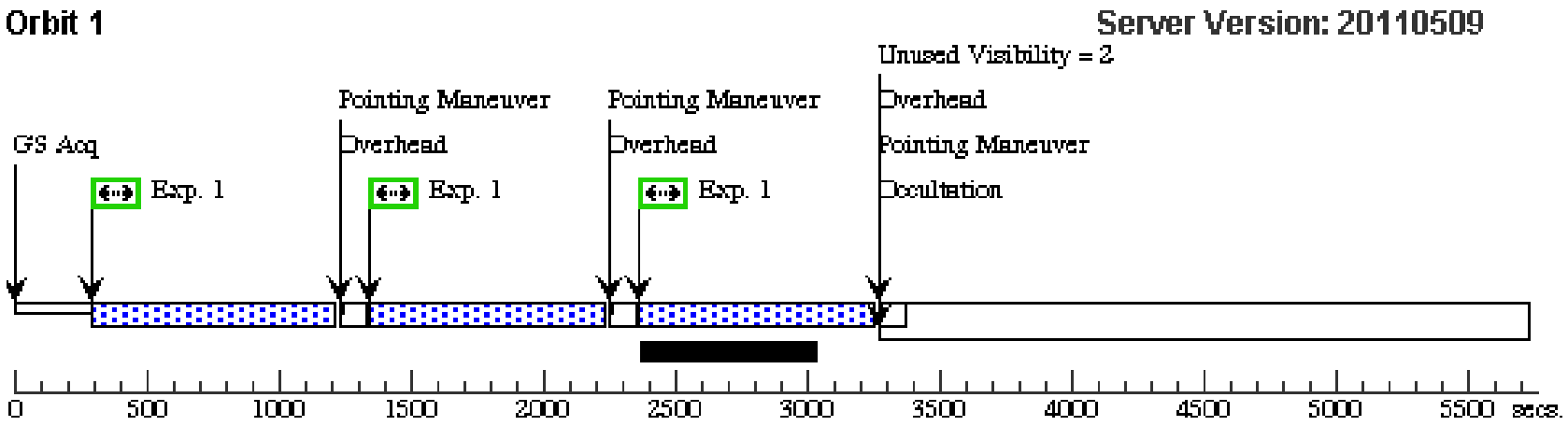
Fixed Targets

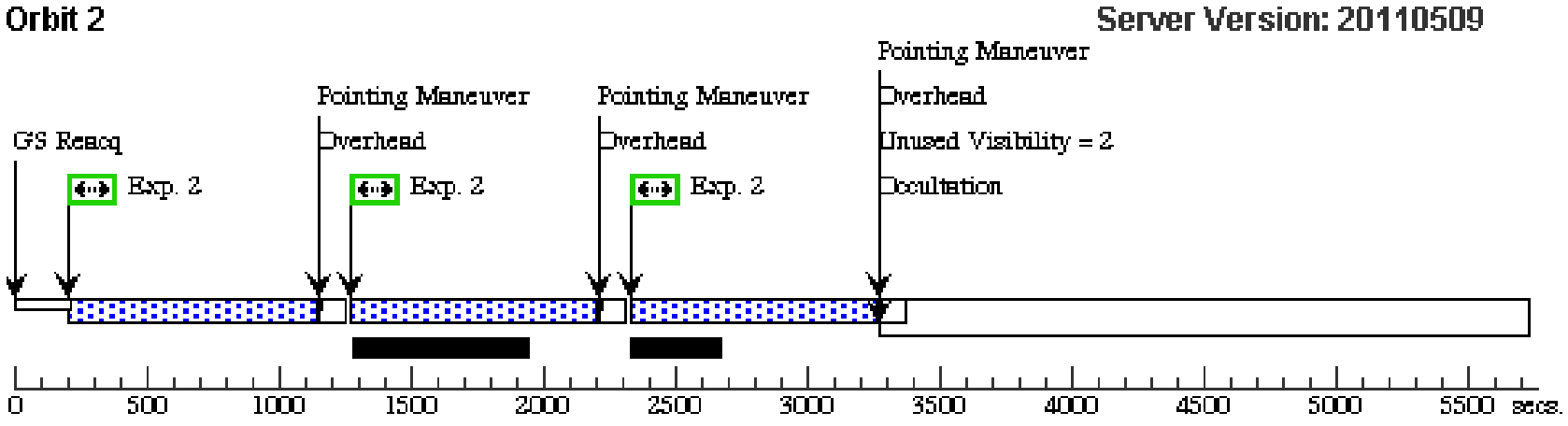
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-4861	RA: 12 59 1.5738 (194.7565575d) Dec: +34 51 22.98 (34.85638d) Equinox: J2000		V=12.32+/-0.1	Reference Frame: ICRS

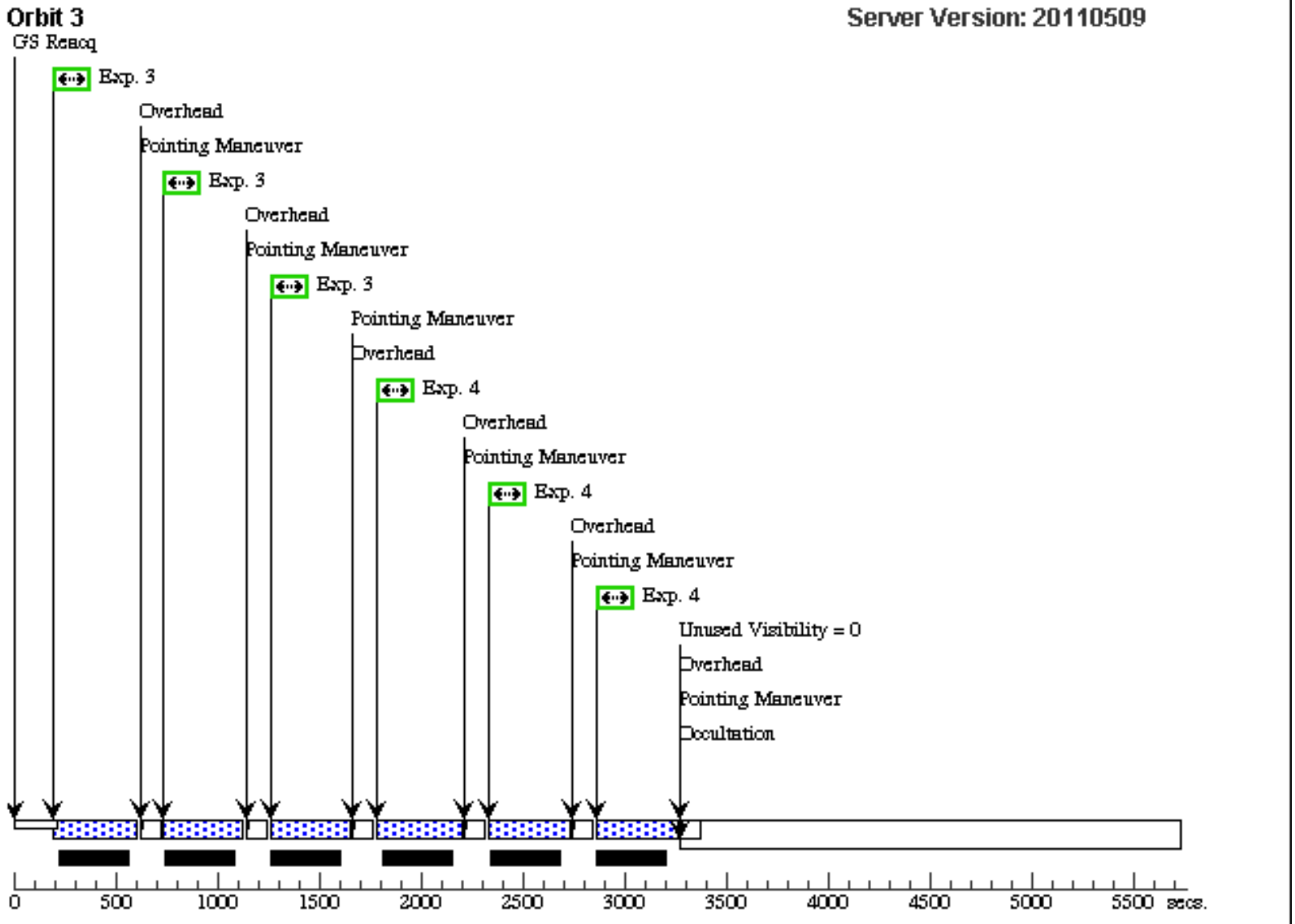
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	n4861 f487n	(2) NGC-4861	WFC3/UVIS, ACCUM, UVIS-FIX	F487N		GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in Visit 02 (1)	2400 Secs *[==>892.0 Secs (Pattern 1)]* *[==>892.0 Secs (Pattern 2)]* *[==>892.0 Secs (Pattern 3)]*	***[1]***
2	n4861 f673n	(2) NGC-4861	WFC3/UVIS, ACCUM, UVIS-FIX	F673N			Pattern 1, Exps 2-2 in Visit 02 (1)	2400 Secs *[==>929.0 Secs (Pattern 1)]* *[==>929.0 Secs (Pattern 2)]* *[==>929.0 Secs (Pattern 3)]*	***[2]***
3	n4861 f658n	(2) NGC-4861	WFC3/UVIS, ACCUM, UVIS-FIX	F658N			Pattern 1, Exps 3-3 in Visit 02 (1)	1200 Secs *[==>393.0 Secs (Pattern 1)]* *[==>393.0 Secs (Pattern 2)]* *[==>393.0 Secs (Pattern 3)]*	***[3]***
4	n4861 f502n	(2) NGC-4861	WFC3/UVIS, ACCUM, UVIS-FIX	F502N			Pattern 1, Exps 4-4 in Visit 02 (1)	1200 Secs *[==>400 Secs (Pattern 1)]* *[==>400 Secs (Pattern 2)]* *[==>400 Secs (Pattern 3)]*	***[3]***
5	n4861 f547m	(2) NGC-4861	WFC3/UVIS, ACCUM, UVIS-FIX	F547M			Pattern 1, Exps 5-5 in Visit 02 (1)	600 Secs *[==>446.0 Secs (Pattern 1)]* *[==>446.0 Secs (Pattern 2)]* *[==>446.0 Secs (Pattern 3)]*	***[4]***
6	n4861 f814w	(2) NGC-4861	WFC3/UVIS, ACCUM, UVIS-FIX	F814W			Pattern 1, Exps 6-6 in Visit 02 (1)	400 Secs *[==>348 Secs (Pattern 1)]* *[==>348 Secs (Pattern 2)]* *[==>348 Secs (Pattern 3)]*	***[4]***

Orbit Structure



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GS Reacq
Exp. 3
Overhead
Pointing Maneuver
Exp. 3
Overhead
Pointing Maneuver
Exp. 3
Pointing Maneuver
Overhead
Exp. 4
Overhead
Pointing Maneuver
Exp. 4
Overhead
Pointing Maneuver
Exp. 4
Unused Visibility = 0
Overhead
Pointing Maneuver
Occultation
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5000
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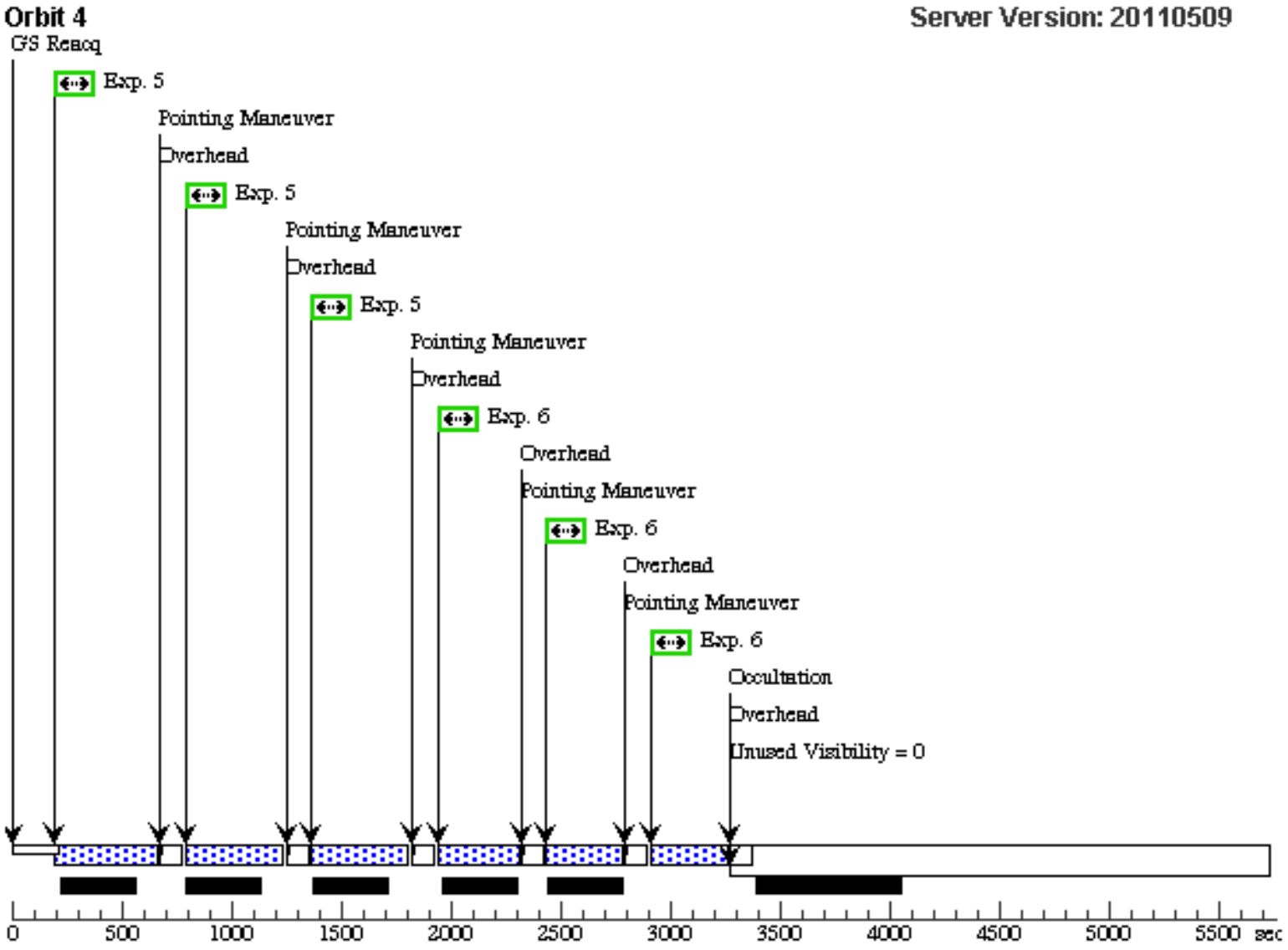
secs.


Orbit 4
Server Version: 20110509
GS Reacq
Exp. 5
Pointing Maneuver
Overhead
Exp. 5
Pointing Maneuver
Overhead
Exp. 5
Pointing Maneuver
Overhead
Exp. 6
Overhead
Pointing Maneuver
Exp. 6
Overhead
Pointing Maneuver
Exp. 6
Occultation
Overhead
Unused Visibility = 0
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sec