11713 - The Light Echoes around V838 Monocerotis

Cycle: 17, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) V838-MON-ECHO-COPY	ACS/WFC	4	29-May-2009 21:11:00.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
02	(1) V838-MON-ECHO-COPY	ACS/WFC	3	29-May-2009 21:11:07.0	yes

7 Total Orbits Used

ABSTRACT

V838 Monocerotis, which burst upon the astronomical scene in early 2002, is a completely unanticipated new object. It underwent a large-amplitude and very luminous outburst, during which its spectrum remained that of an extremely cool supergiant. A rapidly evolving set of light echoes around V838 Mon was discovered soon after the outburst, and quickly became the most spectacular display of the phenomenon yet seen. These light echoes provide the means to accomplish three unique types of measurements based on continued HST imaging during the event: (1) Study effects of MHD turbulence at high resolution and in 3 dimensions; (2) Construct the first unambiguous and fully 3-D map of a circumstellar dust envelope in the Milky Way; (3) Study dust physics in a unique setting where the spectrum and light curve of the illumination, and the scattering angle, are unambiguously known. We have also used our HST data to determine the distance to V838 Mon through a novel direct geometric technique.

Because of the extreme rarity of light echoes, this is almost certainly the only opportunity to achieve such results during the lifetime of HST. We propose two visits during Cycle 17, using the repaired ACS (or WFC3) in order to continue the mapping of the circumstellar dust and to accomplish the other goals listed above.

OBSERVING DESCRIPTION

This program contains two visits, 3 and 4 orbits each, for imaging of the light echo around V838 Mon with the ACS/WFC. Images will be taken in I (F814W). We will use a 3-point dither to remove the gap between the chips for the first visit, with 3 exposures at each of the 3 points. For the second visit there is a 4-point dither.

The visits will be roughly equally spaced during Cycle 17, one as soon after SM4 as practical, and the second in September 2009.

Visit

Proposal 11713, Visit 01 Sat May 30 01:11:11 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: SCHED 50%; BETWEEN 01-SEP-2009:00:00:00 AND 01-OCT-2009:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=4 Point Spacing=2.994 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.27 Angle Between Sides= Center Pattern=true		(1)

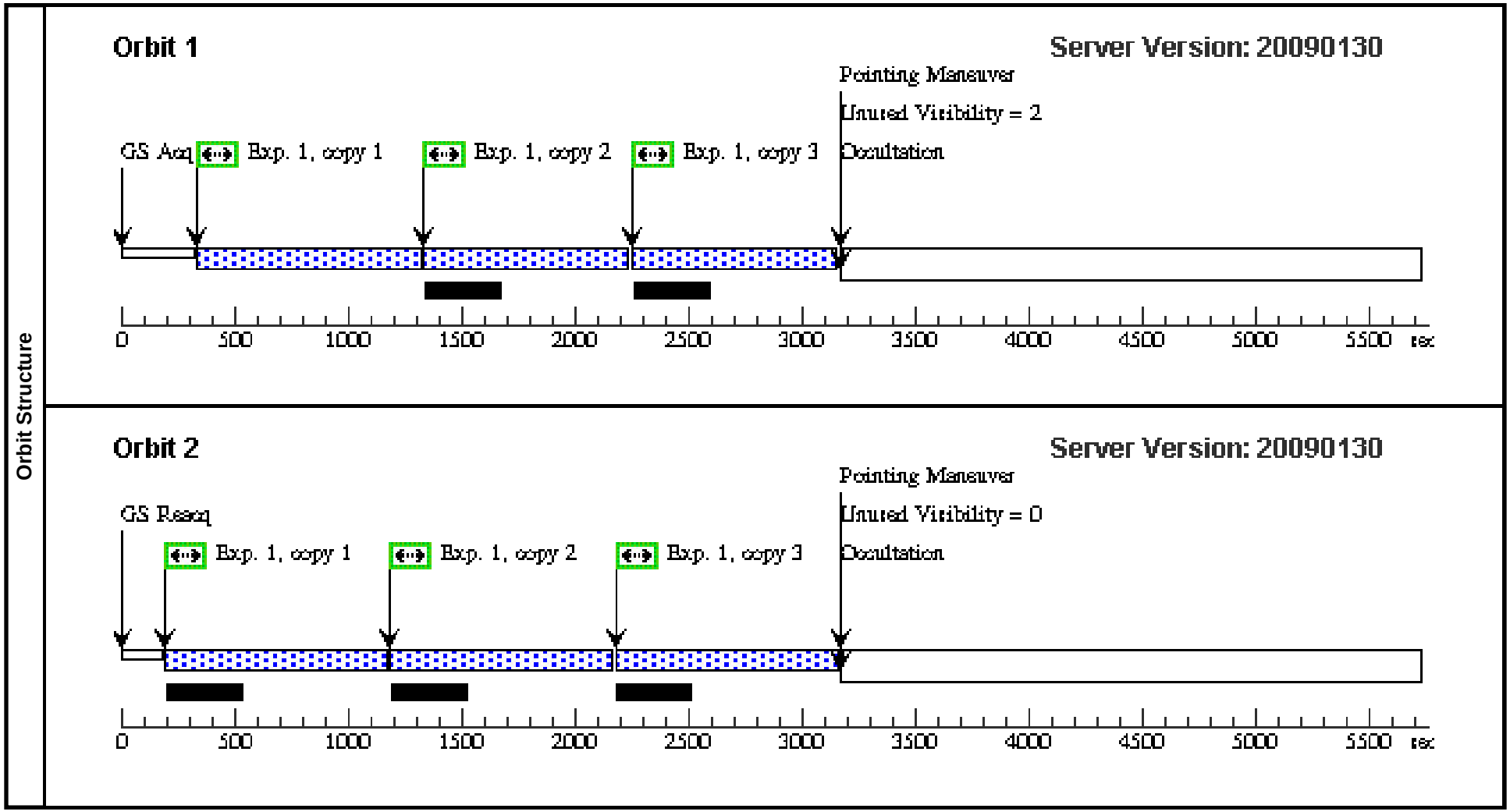
Fixed Targets

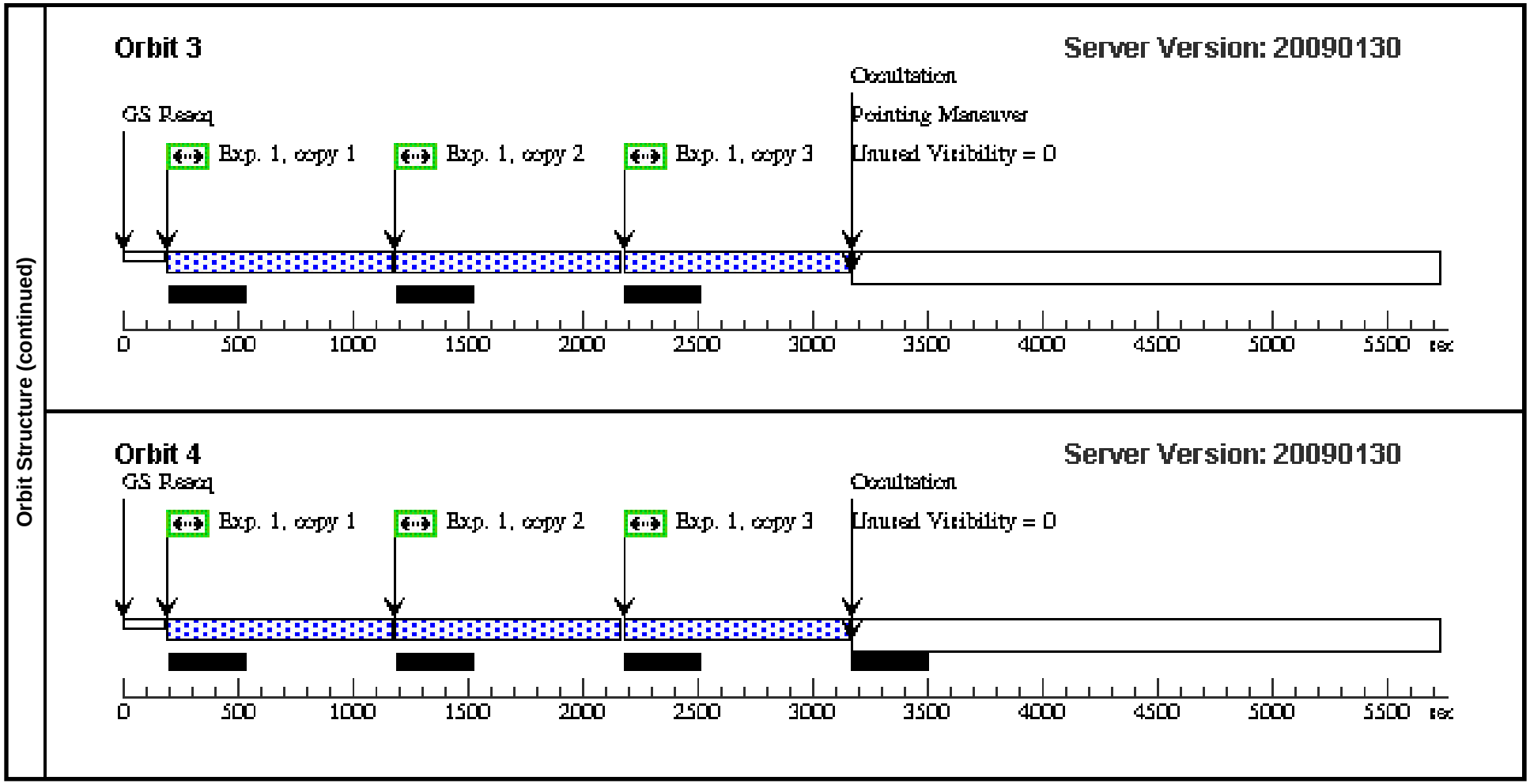
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	V838-MON-ECHO-COPY	RA: 07 04 5.8200 (106.0242500d) Dec: -03 50 40.00 (-3.84444d) Equinox: J2000		V=15.5	Reference Frame: ICRS

Comments: Geometric center of light echo, based on data from Cycle 14. 6/14/06: updated to ICRS reference frame, using galex website.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) V838-MON-ECHO-COPY	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO		Pattern 2, Exps 1-1 (2)	750 Secs X 3	
								[==>781.0 Secs (Pattern 1, Copy 1)] *[==>781.0 Secs (Pattern 1, Copy 2)]* *[==>781.0 Secs (Pattern 1, Copy 3)]*	***[1]***
								[==>855.0 Secs (Pattern 2, Copy 1)] *[==>855.0 Secs (Pattern 2, Copy 2)]* *[==>855.0 Secs (Pattern 2, Copy 3)]*	***[2]***
								[==>855.0 Secs (Pattern 3, Copy 1)] *[==>855.0 Secs (Pattern 3, Copy 2)]* *[==>855.0 Secs (Pattern 3, Copy 3)]*	***[3]***
								[==>855.0 Secs (Pattern 4, Copy 1)] *[==>855.0 Secs (Pattern 4, Copy 2)]* *[==>855.0 Secs (Pattern 4, Copy 3)]*	***[4]***


Orbit Structure
Orbit 1
Server Version: 20090130
Pointing Maneuver
Unused Visibility = 2
GS Acq
Exp. 1, copy 1
Exp. 1, copy 2
Exp. 1, copy 3
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Orbit 2
Server Version: 20090130
Pointing Maneuver
Unused Visibility = 0
GS Reacq
Exp. 1, copy 1
Exp. 1, copy 2
Exp. 1, copy 3
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec


Orbit Structure (continued)
Orbit 3
Server Version: 20090130
Occultation
GS Reacq
Pointing Maneuver
Exp. 1, copy 1
Exp. 1, copy 2
Exp. 1, copy 3
Unused Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Orbit 4
Server Version: 20090130
GS Reacq
Occultation
Exp. 1, copy 1
Exp. 1, copy 2
Exp. 1, copy 3
Unused Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11713, Visit 02 Sat May 30 01:11:13 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: PCS MODE FINE; SCHED 70%; BETWEEN 25-APR-2010:00:00:00 AND 25-MAY-2010:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=2.994 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.27 Angle Between Sides= Center Pattern=true		(1)

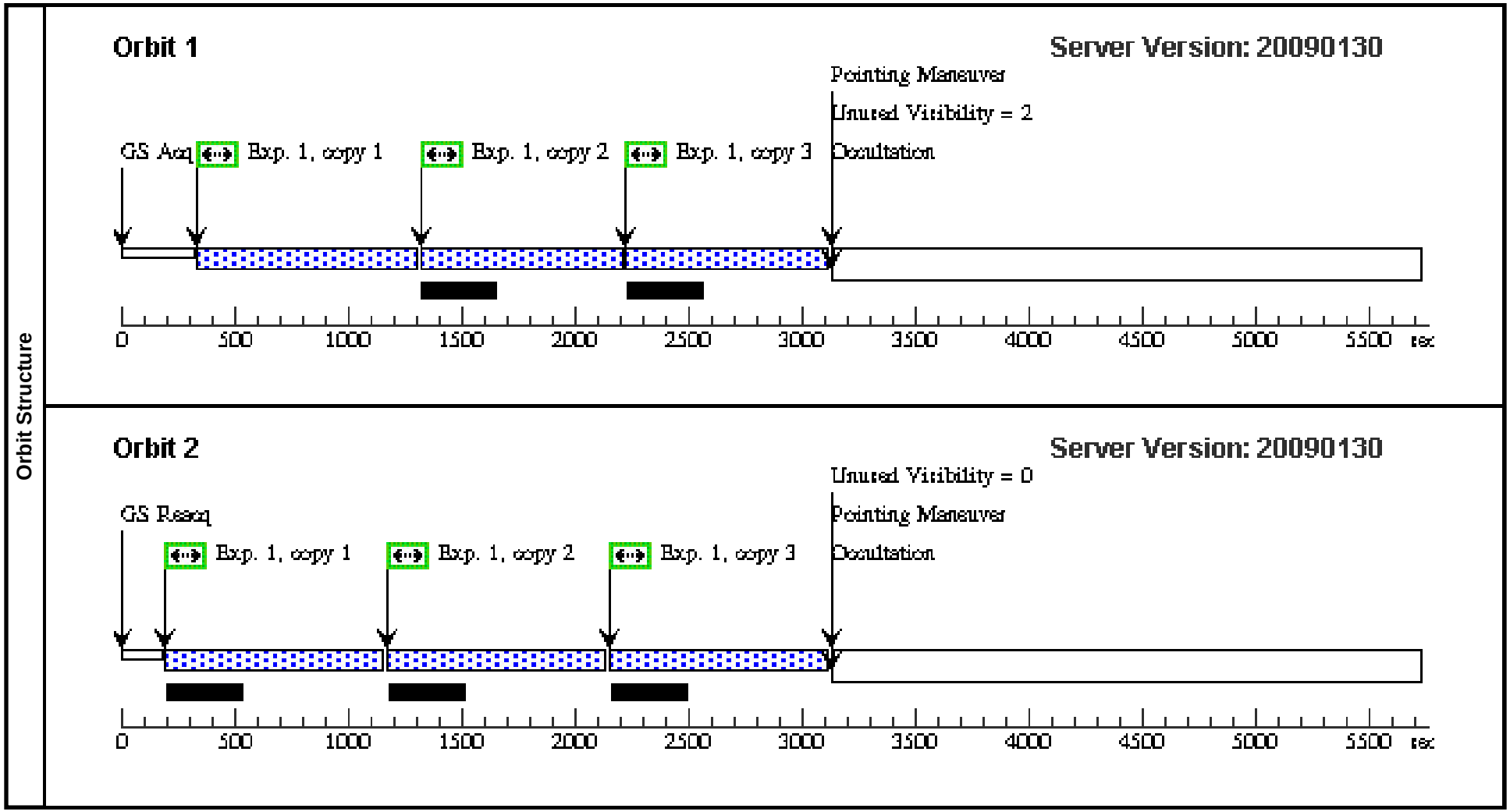
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	V838-MON-ECHO-COPY	RA: 07 04 5.8200 (106.0242500d) Dec: -03 50 40.00 (-3.84444d) Equinox: J2000		V=15.5	Reference Frame: ICRS

Comments: Geometric center of light echo, based on data from Cycle 14. 6/14/06: updated to ICRS reference frame, using galex website.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) V838-MON-ECHO-COPY	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO		Pattern 1, Exps 1-1 (1)	750 Secs X 3	
								[==>767.0 Secs (Pattern 1, Copy 1)] *[==>767.0 Secs (Pattern 1, Copy 2)]* *[==>767.0 Secs (Pattern 1, Copy 3)]*	***[1]***
								[==>841.0 Secs (Pattern 2, Copy 1)] *[==>841.0 Secs (Pattern 2, Copy 2)]* *[==>841.0 Secs (Pattern 2, Copy 3)]*	***[2]***
								[==>841.0 Secs (Pattern 3, Copy 1)] *[==>841.0 Secs (Pattern 3, Copy 2)]* *[==>841.0 Secs (Pattern 3, Copy 3)]*	***[3]***


Orbit Structure
Orbit 1
Server Version: 20090130
Pointing Maneuver
Unused Visibility = 2
GS Acq
Exp. 1, copy 1
Exp. 1, copy 2
Exp. 1, copy 3
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Orbit 2
Server Version: 20090130
Unused Visibility = 0
GS Reacq
Pointing Maneuver
Exp. 1, copy 1
Exp. 1, copy 2
Exp. 1, copy 3
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Orbit Structure (continued)