



10618 - The Light Echoes around V838 Monocerotis: MHD in 3 Dimensions, Circumstellar Mapping, and Dust Physics

Cycle: 14, Proposal Category: GO

(Availability Mode: SUPPORTED)

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VISITS

<i>Visit</i>	<i>Targets</i>	<i>Configurations</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) V838-MON	ACS/WFC	3	08-Nov-2005 21:34:08.0	yes

Proposal 10618 - Overview

<i>Visit</i>	<i>Targets</i>	<i>Configurations</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
02	(1) V838-MON	ACS/WFC	3	08-Nov-2005 21:34:16.0	yes
03	(1) V838-MON	ACS/WFC	3	08-Nov-2005 21:34:23.0	yes
04	(1) V838-MON	ACS/WFC	3	08-Nov-2005 21:34:31.0	yes
05	(2) V838-MON-ECHO	ACS/WFC	1	08-Nov-2005 21:34:35.0	yes
06	(2) V838-MON-ECHO	ACS/WFC	4	08-Nov-2005 21:34:42.0	yes
07	(2) V838-MON-ECHO	ACS/WFC	2	08-Nov-2005 21:34:47.0	yes

19 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 ever seen. The light echoes, which were imaged by us with HST during 2002, provide the means to accomplish four 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; and (4) Determine the distance to V838 Mon through two independent direct geometric techniques (polarimetry and angular expansion rates).

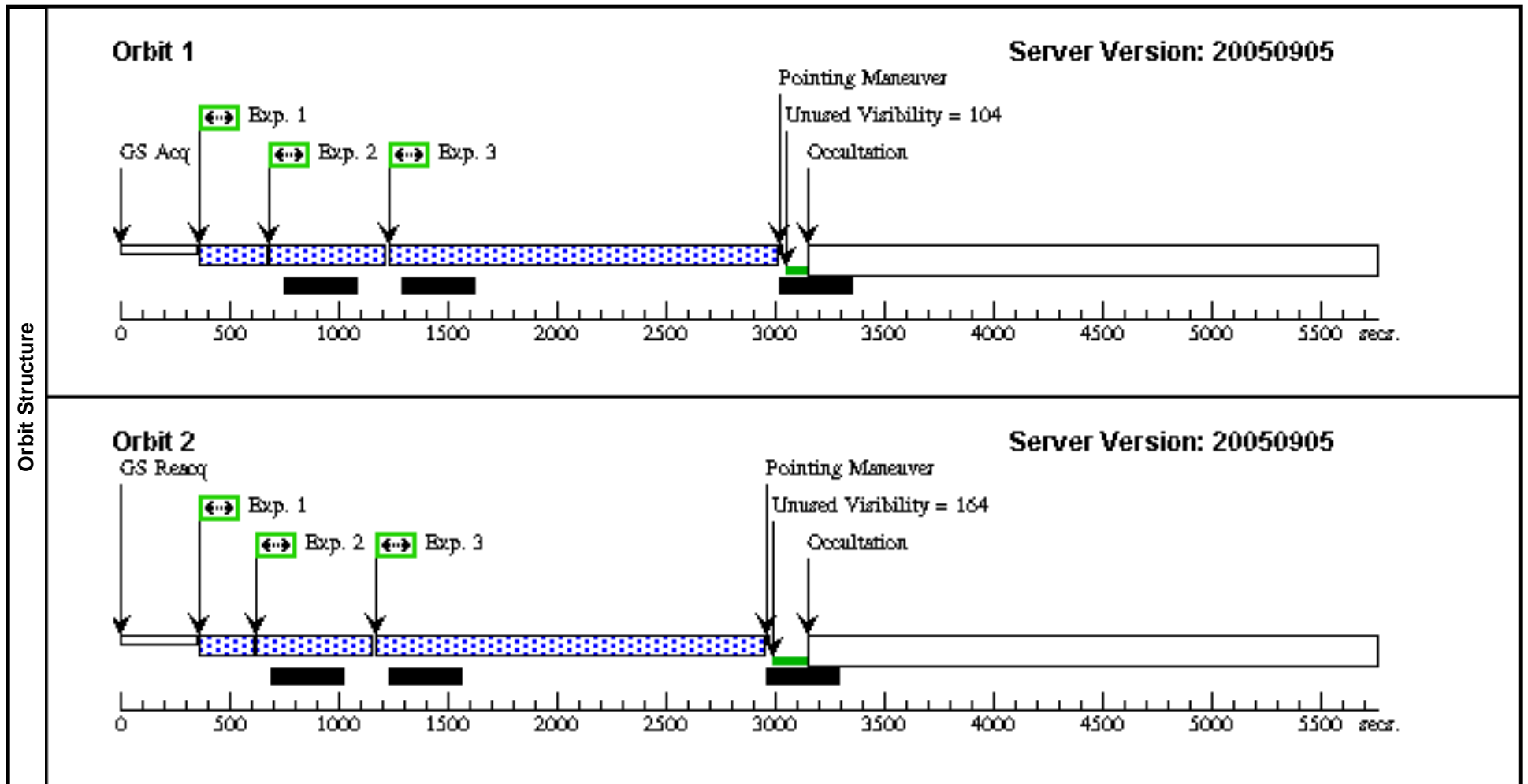
Because of the extreme rarity of light echoes, this is almost certainly the only opportunity to achieve such results during the lifetime of HST. We propose a campaign during Cycle 14 of imaging the echoes every 8 days for a total of 6 epochs, in order to fully map a thin slab through the dust shell and achieve the other goals listed above.

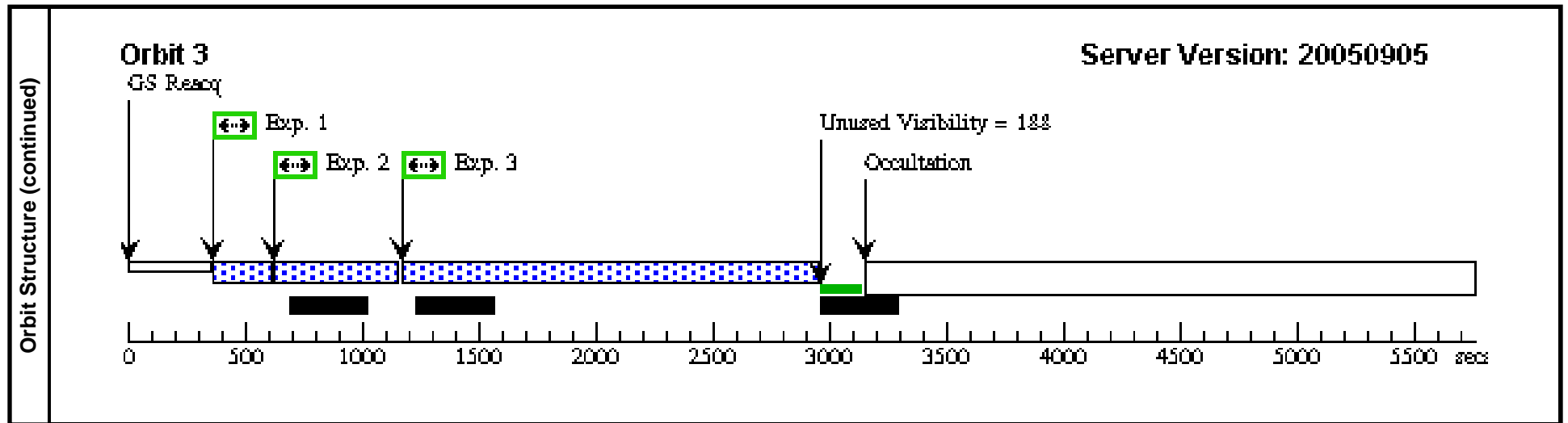
OBSERVING DESCRIPTION

We will use the ACS/WFC to obtain images of the light echoes around V838 Mon in B, V, and I. There will be 6 visits of 3 orbits each, with a spacing of 8 days between visits, for the purpose of obtaining a high-resolution, three-dimensional map of the circumstellar dust. In addition, we will obtain 1 orbit of polarimetry during one of the visits.

Proposal 10618 - Visit 01 - The Light Echoes around V838 Monocerotis: MHD in 3 Dimensions, Circumstellar Mapping, and Dust Physics

Visit	Proposal 10618, Visit 01 Wed Nov 09 02:34:49 GMT 2005 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: PCS MODE FINE; SCHED 60%; ORIENT 115.0D TO 115.0 D; ORIENT 205.0D TO 205.0 D; ORIENT 295.0D TO 295.0 D; ORIENT 25.0D TO 25.0 D; ORIENT 250.0D TO 250.0 D; ORIENT 340.0D TO 340.0 D; BEFORE 01-FEB-2006:00:00:00									
	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=85.3 Angle Between Sides= Center Pattern=true					(1-3)		
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	V838-MON	RA: 07 04 5.2000 (106.0216667d) Dec: -03 50 45.00 (-3.84583d) Equinox: J2000 Plate Id: (?)		V=15.5	Coordinate Source: Previous data				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(1) V838-MON	(1) V838-MON	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO		Pattern 1-3 (1)	100.0 Secs	
									[==>(Pattern 1)]	[1]
									[==>(Pattern 2)]	[2]
									[==>(Pattern 3)]	[3]
	2	(1) V838-MON	(1) V838-MON	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO		Pattern 1-3 (1)	350.0 Secs	
									[==>(Pattern 1)]	[1]
									[==>(Pattern 2)]	[2]
									[==>(Pattern 3)]	[3]
	3	(1) V838-MON	(1) V838-MON	ACS/WFC, ACCUM, WFCENTER	F435W	CR-SPLIT=NO		Pattern 1-3 (1)	1600.0 Secs	
								[==>(Pattern 1)]	[1]	
								[==>(Pattern 2)]	[2]	
								[==>(Pattern 3)]	[3]	

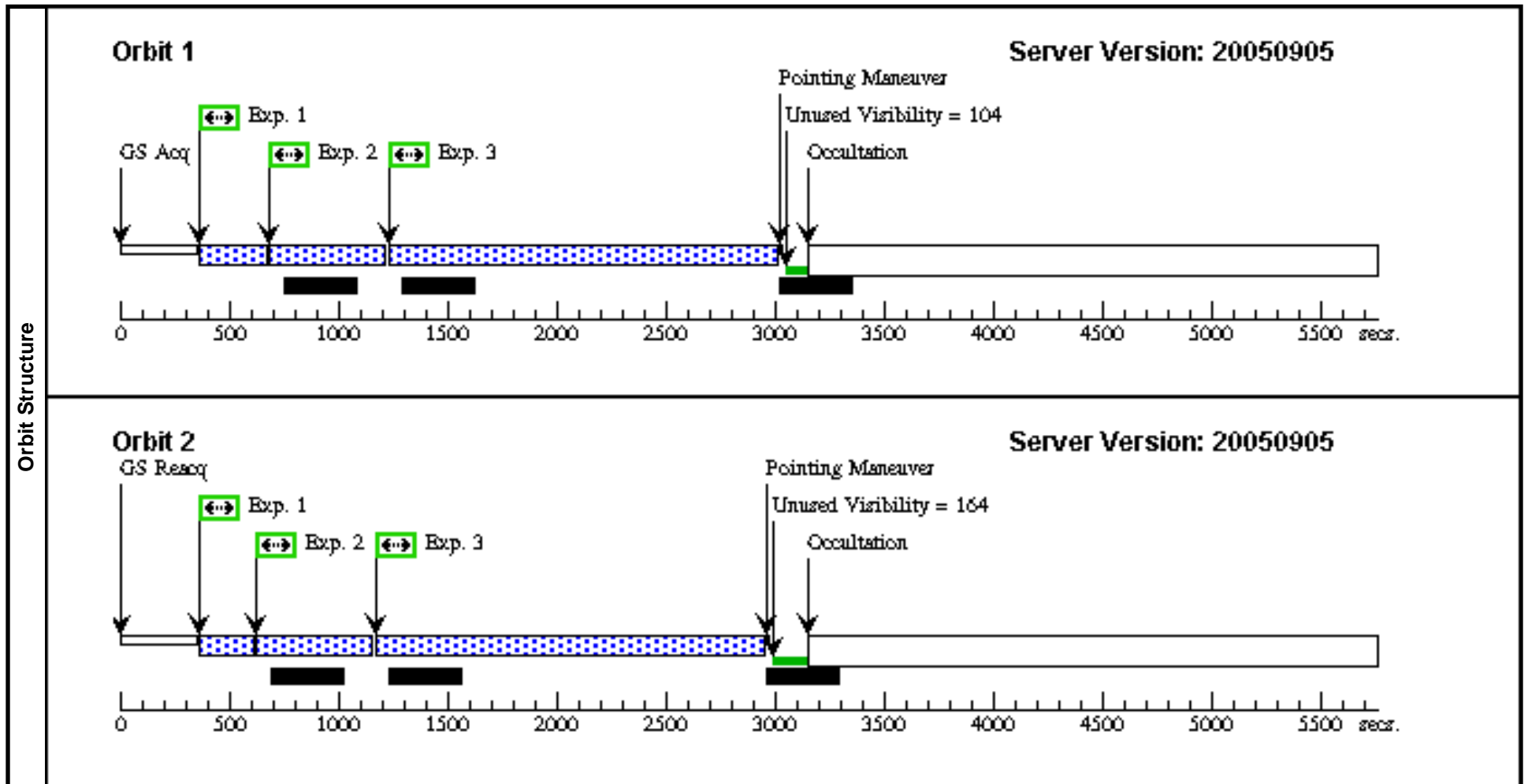


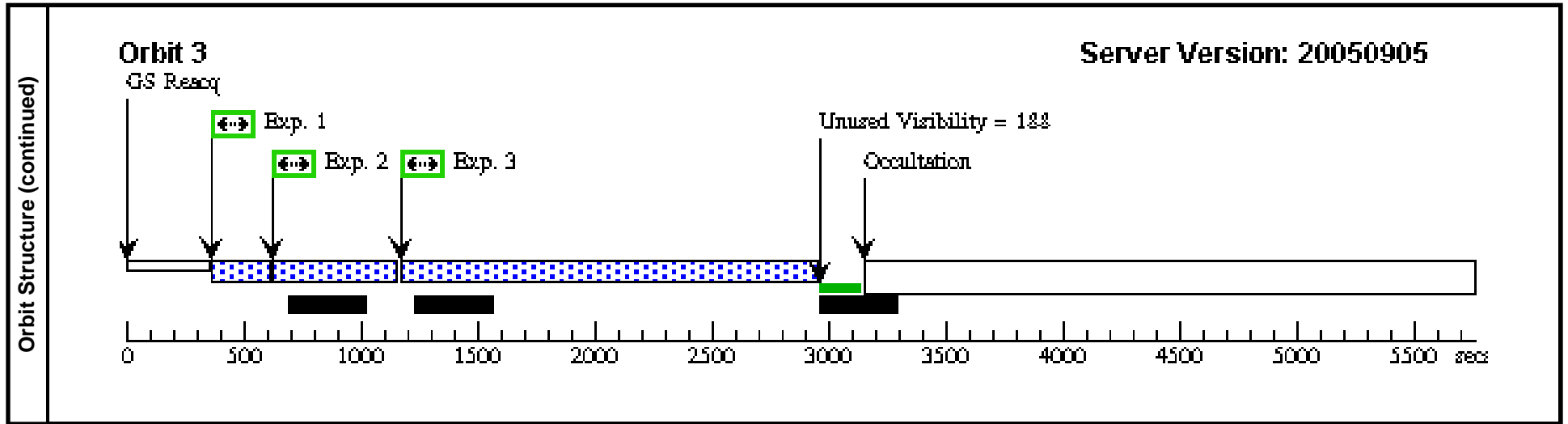


Proposal 10618 - Visit 02 - The Light Echoes around V838 Monocerotis: MHD in 3 Dimensions, Circumstellar Mapping, and Dust Physics

Wed Nov 09 02:34:49 GMT 2005

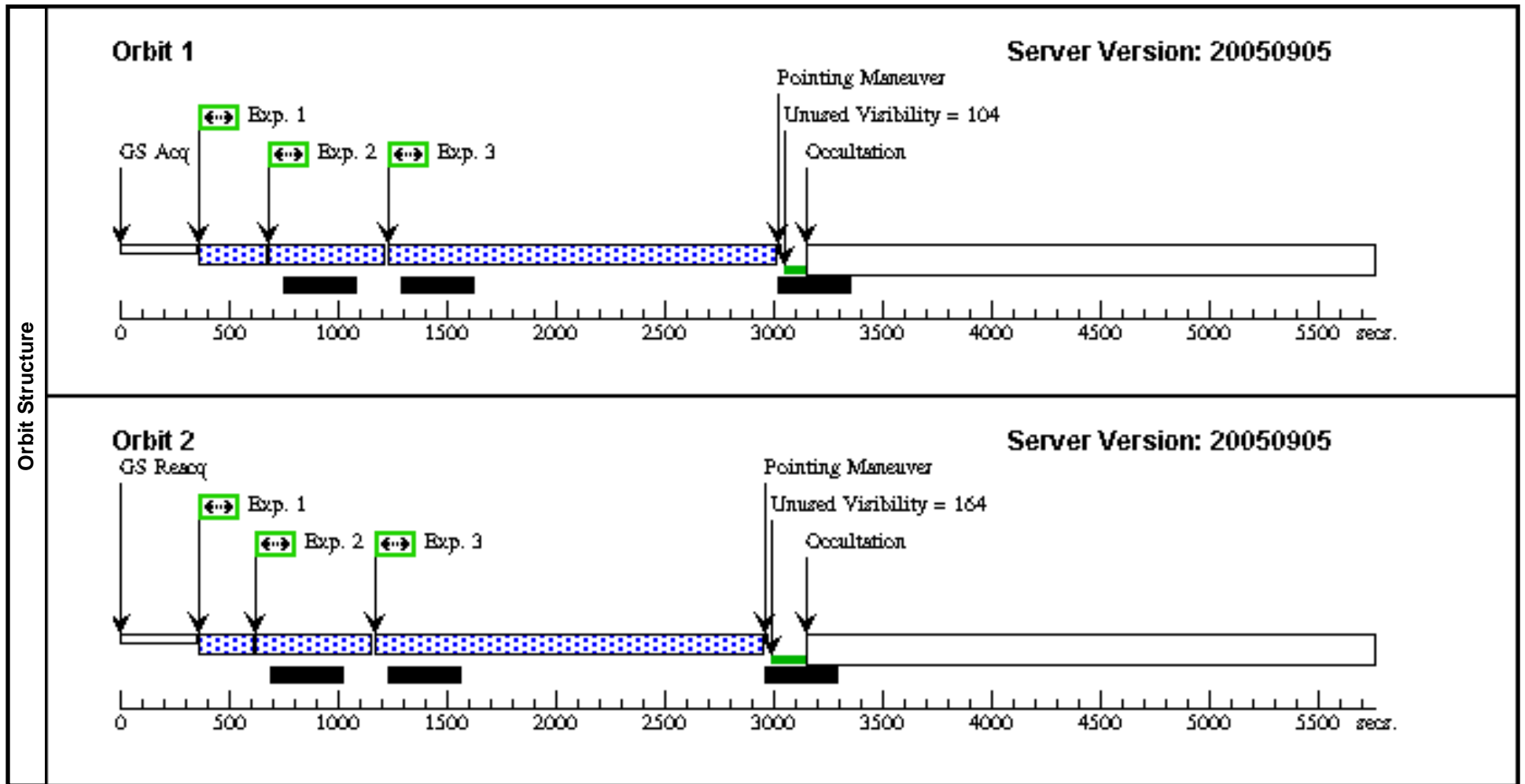
Visit	Proposal 10618, Visit 02 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: PCS MODE FINE; SCHED 60%; SAME ORIENT AS 01; AFTER 01 BY 7.5 D TO 8.5 D; BEFORE 01-FEB-2006:00:00:00									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
		(1)	Pattern Type=ACS-WFC-DITHER- LINE Purpose=DITHER Number Of Points=3 Point Spacing=2.994 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.3 Angle Between Sides= Center Pattern=true					(1-3)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(1)	V838-MON	RA: 07 04 5.2000 (106.0216667d) Dec: -03 50 45.00 (-3.84583d) Equinox: J2000 Plate Id: (?)			V=15.5	Coordinate Source: Previous data			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) V838-MON	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO		Pattern 1-3 (1)	100.0 Secs	
									[=>(Pattern 1)]	[1]
									[=>(Pattern 2)]	[2]
									[=>(Pattern 3)]	[3]
	2		(1) V838-MON	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO		Pattern 1-3 (1)	350.0 Secs	
									[=>(Pattern 1)]	[1]
									[=>(Pattern 2)]	[2]
									[=>(Pattern 3)]	[3]
	3		(1) V838-MON	ACS/WFC, ACCUM, WFCENTER	F435W	CR-SPLIT=NO		Pattern 1-3 (1)	1600.0 Secs	
								[=>(Pattern 1)]	[1]	
								[=>(Pattern 2)]	[2]	
								[=>(Pattern 3)]	[3]	

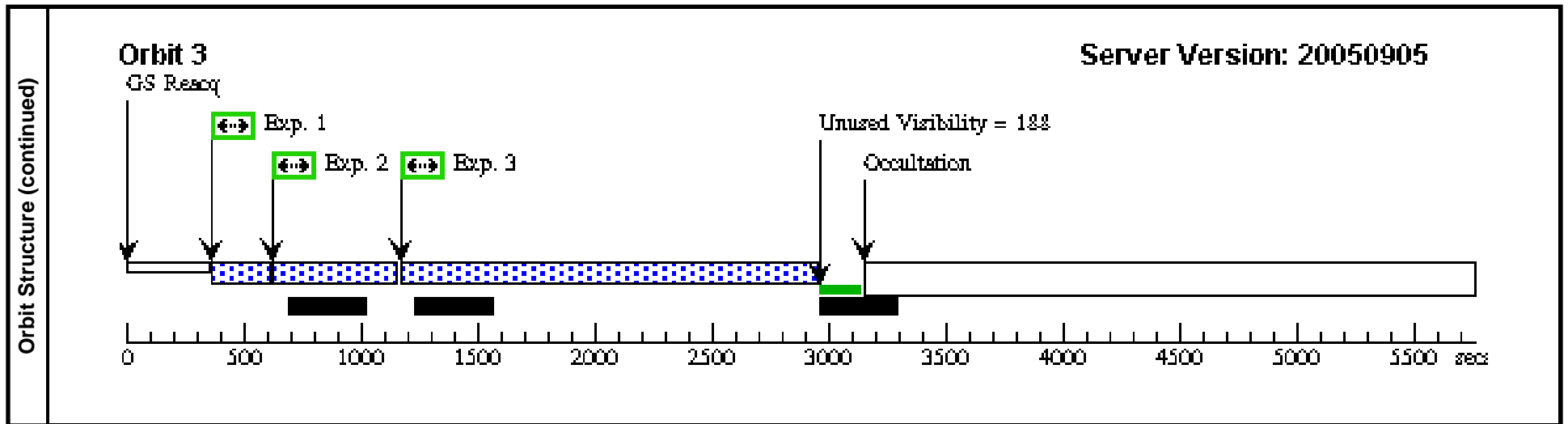




Proposal 10618 - Visit 03 - The Light Echoes around V838 Monocerotis: MHD in 3 Dimensions, Circumstellar Mapping, and Dust Physics

Visit	Proposal 10618, Visit 03 Wed Nov 09 02:34:51 GMT 2005 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: PCS MODE FINE; SCHED 60%; SAME ORIENT AS 01; AFTER 01 BY 15 D TO 16.5 D; BEFORE 01-FEB-2006:00:00:00										
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=85.3 Angle Between Sides= Center Pattern=true					(1-3)				
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
(1)	V838-MON	RA: 07 04 5.2000 (106.0216667d) Dec: -03 50 45.00 (-3.84583d) Equinox: J2000 Plate Id: (?)					V=15.5	Coordinate Source: Previous data			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
1	(1)	V838-MON	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO		Pattern 1-3 (1)	100.0 Secs			
								[=>(Pattern 1)]		[1]	
								[=>(Pattern 2)]		[2]	
[=>(Pattern 3)]		[3]									
2	(1)	V838-MON	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO		Pattern 1-3 (1)	350.0 Secs			
								[=>(Pattern 1)]		[1]	
								[=>(Pattern 2)]		[2]	
[=>(Pattern 3)]		[3]									
3	(1)	V838-MON	ACS/WFC, ACCUM, WFCENTER	F435W	CR-SPLIT=NO		Pattern 1-3 (1)	1600.0 Secs			
								[=>(Pattern 1)]		[1]	
								[=>(Pattern 2)]		[2]	
[=>(Pattern 3)]		[3]									

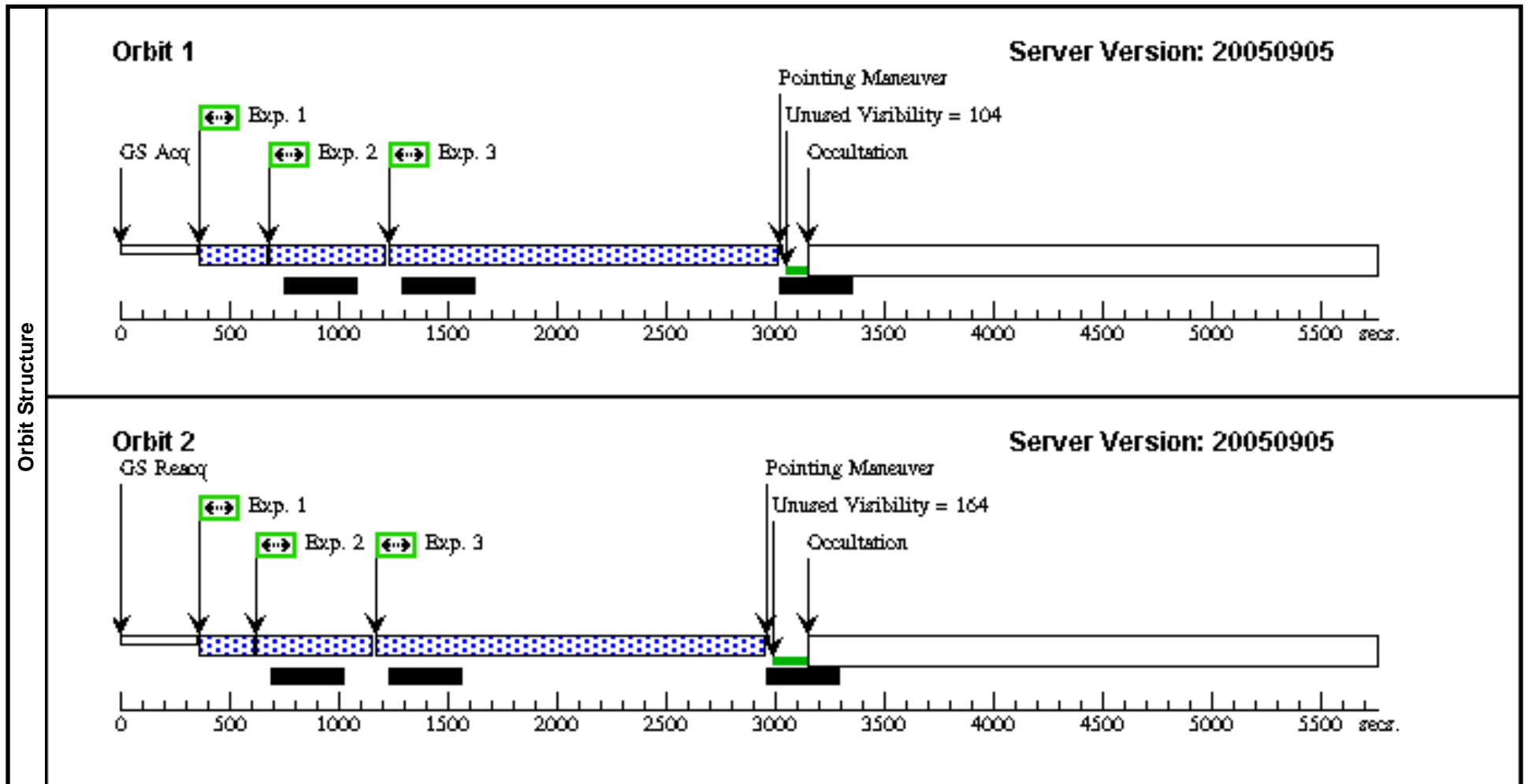


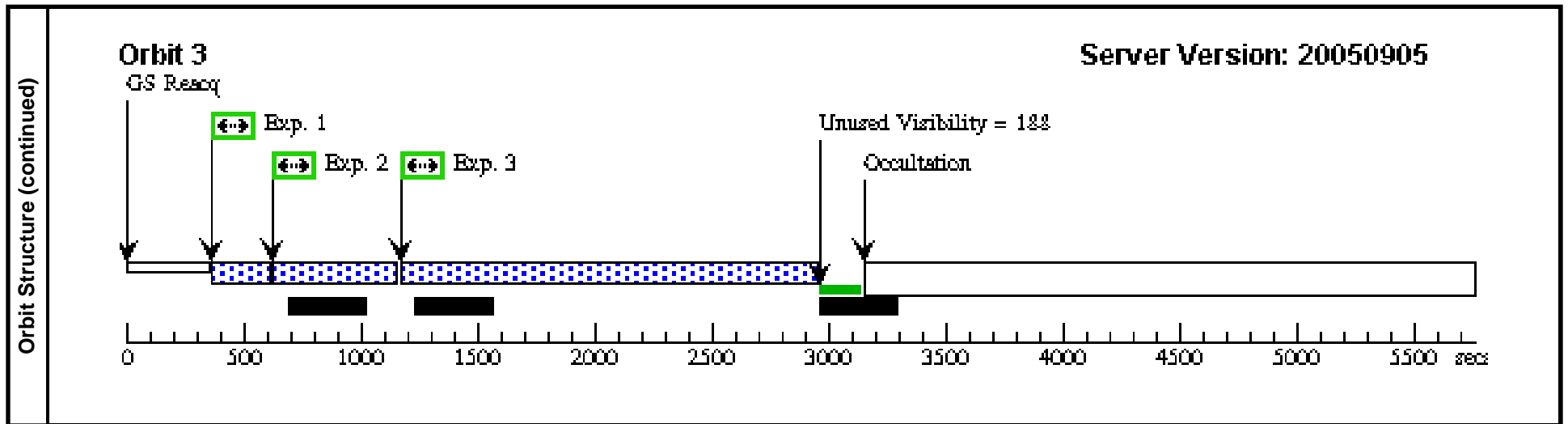


Proposal 10618 - Visit 04 - The Light Echoes around V838 Monocerotis: MHD in 3 Dimensions, Circumstellar Mapping, and Dust Physics

Wed Nov 09 02:34:52 GMT 2005

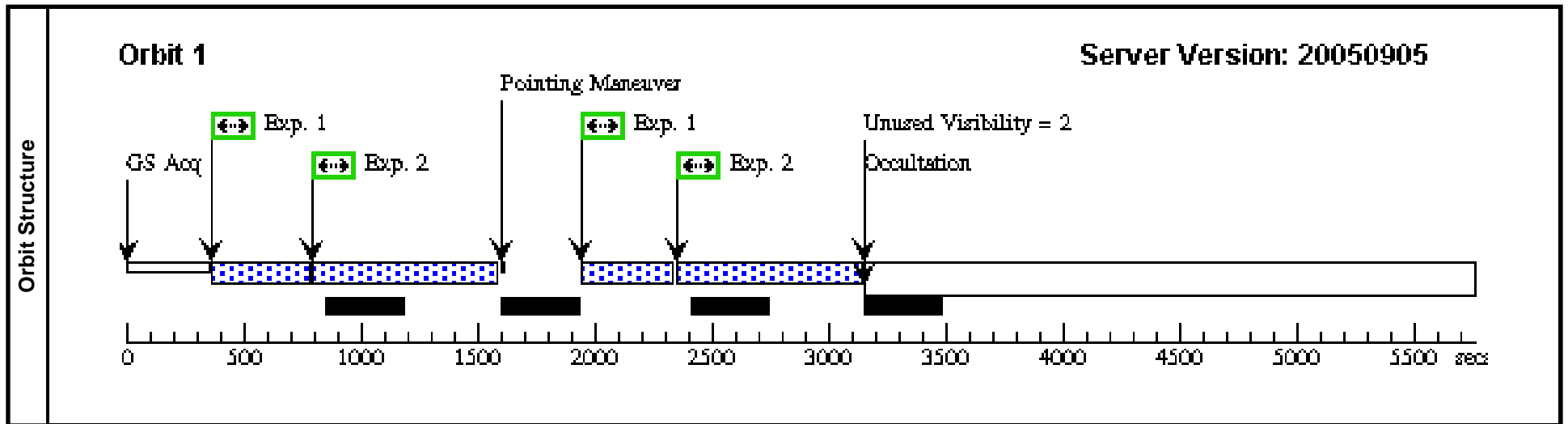
Visit	Proposal 10618, Visit 04 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: PCS MODE FINE; SCHED 60%; SAME ORIENT AS 01; AFTER 01 BY 23.5 D TO 24.5 D; BEFORE 01-FEB-2006:00:00:00									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
		(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=2.994 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.3 Angle Between Sides= Center Pattern=true					(1-3)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(1)	V838-MON	RA: 07 04 5.2000 (106.0216667d) Dec: -03 50 45.00 (-3.84583d) Equinox: J2000 Plate Id: (?)			V=15.5	Coordinate Source: Previous data			
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) V838-MON	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO		Pattern 1-3 (1)	100.0 Secs	
									[=>(Pattern 1)]	[1]
									[=>(Pattern 2)]	[2]
									[=>(Pattern 3)]	[3]
	2		(1) V838-MON	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO		Pattern 1-3 (1)	350.0 Secs	
									[=>(Pattern 1)]	[1]
									[=>(Pattern 2)]	[2]
									[=>(Pattern 3)]	[3]
	3		(1) V838-MON	ACS/WFC, ACCUM, WFCENTER	F435W	CR-SPLIT=NO		Pattern 1-3 (1)	1600.0 Secs	
								[=>(Pattern 1)]	[1]	
								[=>(Pattern 2)]	[2]	
								[=>(Pattern 3)]	[3]	





Proposal 10618 - Visit 05 - The Light Echoes around V838 Monocerotis: MHD in 3 Dimensions, Circumstellar Mapping, and Dust Physics

Visit		Proposal 10618, Visit 05 Wed Nov 09 02:34:52 GMT 2005 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: PCS MODE FINE; SCHED 60%; ORIENT 295.0022D TO 295.0022 D; AFTER 01; BETWEEN 29-NOV-2005:00:00:00 AND 03-DEC-2005:00:00:00								
Patterns	#	Primary Pattern		Secondary Pattern			Exposures			
	(3)	Pattern Type=ACS-WFC-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=2.994 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.3 Angle Between Sides= Center Pattern=true				(1-2)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	V838-MON-ECHO	RA: 07 04 5.3600 (106.0223333d) Dec: -03 50 41.10 (-3.84475d) Equinox: J2000 Plate Id: (?)		V=15.5	Coordinate Source: Previous data				
<i>Comments: Geometric center of light echo, based on data from Visit 1 of this program.</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) V838-MON-EC HO	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO		Pattern 1-2 (3)	100.0 Secs	
									[==>212.0 Secs (Pattern 1)]	[1]
									[==>212.0 Secs (Pattern 2)]	
2		(2) V838-MON-EC HO	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO			Pattern 1-2 (3)	350.0 Secs	
									[==>612.0 Secs (Pattern 1)]	[1]
									[==>612.0 Secs (Pattern 2)]	



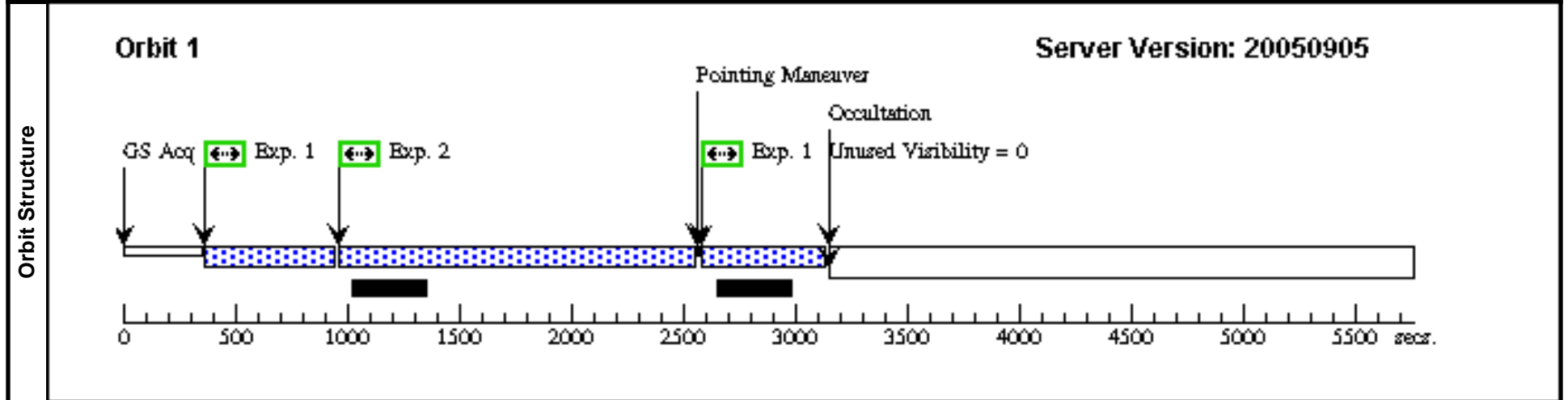
Proposal 10618 - Visit 06 - The Light Echoes around V838 Monocerotis: MHD in 3 Dimensions, Circumstellar Mapping, and Dust Physics

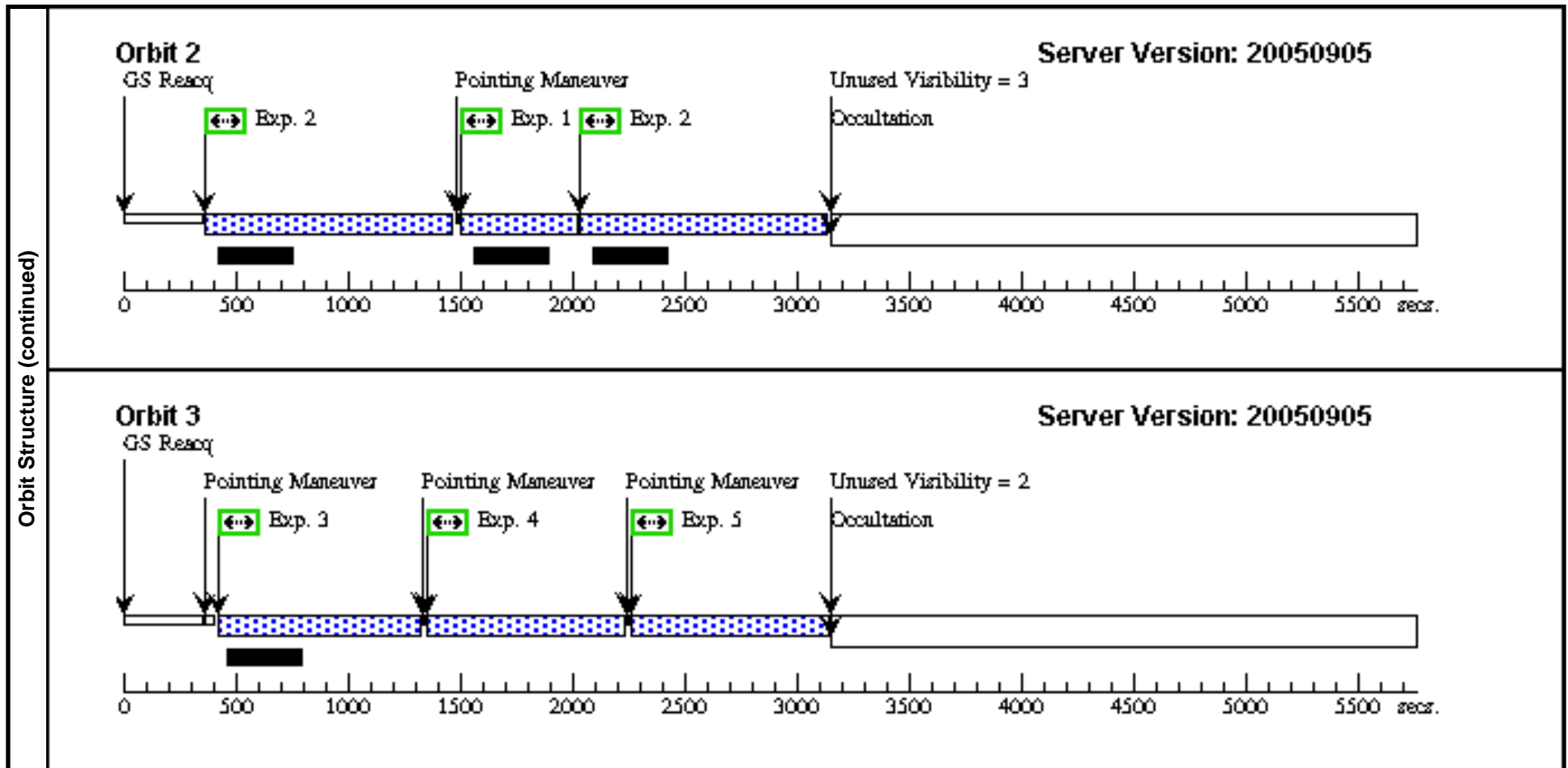
Wed Nov 09 02:34:53 GMT 2005

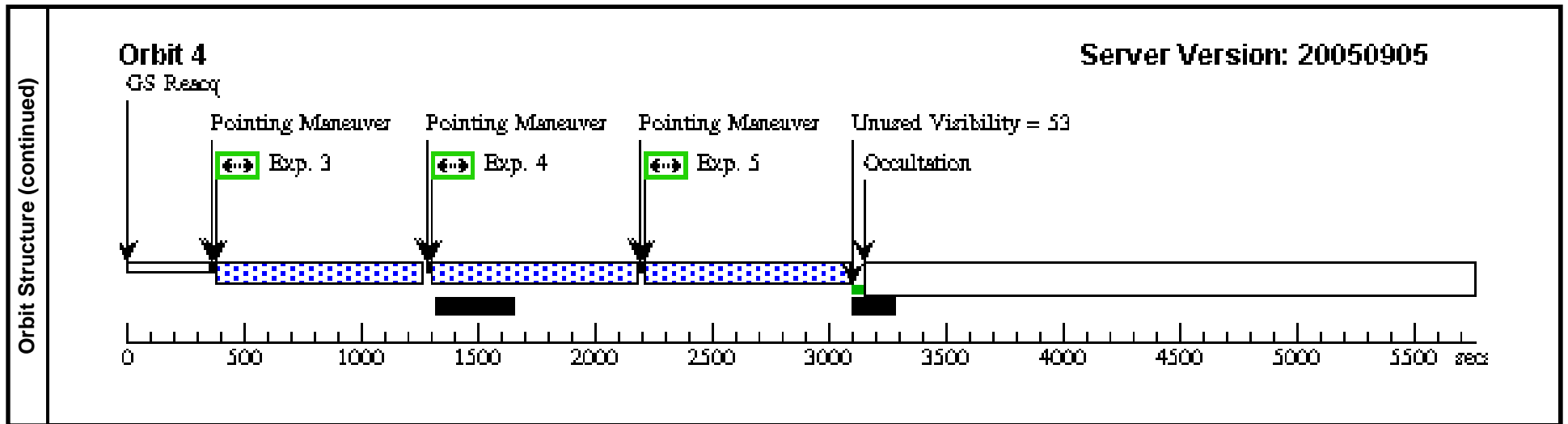
Visit	Proposal 10618, Visit 06 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: PCS MODE FINE; SCHED 60%; ORIENT 340.0022D TO 340.0022 D; AFTER 01; BETWEEN 13-DEC-2005:00:00:00 AND 20-DEC-2005:00:00:00									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
		(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=2.994 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.3 Angle Between Sides= Center Pattern=true					(1-2)	
	(4)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=47.2 Angle Between Sides= Center Pattern=true					(3-5)		
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	V838-MON-ECHO	RA: 07 04 5.3600 (106.0223333d) Dec: -03 50 41.10 (-3.84475d) Equinox: J2000 Plate Id: (?)		V=15.5	Coordinate Source: Previous data				
<i>Comments: Geometric center of light echo, based on data from Visit 1 of this program.</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) V838-MON-EC HO	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO		Pattern 1-2 (2)	340.0 Secs [=>377.0 Secs (Pattern 1)] [=>377.0 Secs (Pattern 2)] [=>(Pattern 3)]	[1] [2]
2		(2) V838-MON-EC HO	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO		Pattern 1-2 (2)	925.0 Secs [=>1412.0 Secs (Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[1] [2]	
3		(2) V838-MON-EC HO	ACS/WFC, ACCUM, WFC	F606W POL0V	CR-SPLIT=NO		Pattern 3-5 (4)	470.0 Secs [=>687.0 Secs (Pattern 1)] [=>687.0 Secs (Pattern 2)]	[3] [4]	
4		(2) V838-MON-EC HO	ACS/WFC, ACCUM, WFC	F606W POL60V	CR-SPLIT=NO		Pattern 3-5 (4)	470.0 Secs [=>687.0 Secs (Pattern 1)] [=>687.0 Secs (Pattern 2)]	[3] [4]	

Proposal 10618 - Visit 06 - The Light Echoes around V838 Monocerotis: MHD in 3 Dimensions, Circumstellar Mapping, and Dust Physics

Exposures (continued)	#	Label	Target	Config, Mode, Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	5		(2) V838-MON-EC HO	ACS/WFC, ACCUM, WFC	F606W POL120V	CR-SPLIT=NO		Pattern 3-5 (4)	470.0 Secs	
									[==>687.0 Secs (Pattern 1)]	[3]
									[==>687.0 Secs (Pattern 2)]	[4]







Proposal 10618 - Visit 07 - The Light Echoes around V838 Monocerotis: MHD in 3 Dimensions, Circumstellar Mapping, and Dust Physics

Visit		Proposal 10618, Visit 07 Wed Nov 09 02:34:53 GMT 2005 Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: PCS MODE FINE; SCHED 60%; ORIENT 25.002197D TO 25.002197 D; AFTER 01; BETWEEN 20-JAN-2006:00:00:00 AND 01-FEB-2006:00:00:00								
Patterns	#	Primary Pattern		Secondary Pattern			Exposures			
	(2)	Pattern Type=ACS-WFC-DITHER- LINE Purpose=DITHER Number Of Points=3 Point Spacing=2.994 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.3 Angle Between Sides= Center Pattern=true				(1-2)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	V838-MON-ECHO	RA: 07 04 5.3600 (106.0223333d) Dec: -03 50 41.10 (-3.84475d) Equinox: J2000 Plate Id: (?)		V=15.5	Coordinate Source: Previous data				
<i>Comments: Geometric center of light echo, based on data from Visit 1 of this program.</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) V838-MON-EC HO	ACS/WFC, ACCUM, WFCENTER	F814W	CR-SPLIT=NO		Pattern 1-2 (2)	340.0 Secs	
									[==>377.0 Secs (Pattern 1)]	[1]
									[==>377.0 Secs (Pattern 2)]	[1]
									[==>(Pattern 3)]	[2]
2		(2) V838-MON-EC HO	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO			Pattern 1-2 (2)	925.0 Secs	
									[==>1412.0 Secs (Pattern 1)]	[1]
									[==>(Pattern 2)]	[1]
									[==>(Pattern 3)]	[2]

