11671 - Kinematic Reconstruction of the Origin and IMF of the Massive Young Clusters at the Galactic Center

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) ARCHES	WFC3/IR	3	08-Jul-2010 21:01:15.0	yes
04	(1) ARCHES	WFC3/IR	4	08-Jul-2010 21:01:34.0	yes
02	(2) QUINTUPLET	WFC3/IR	3	08-Jul-2010 21:01:50.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
05	(2) QUINTUPLET	WFC3/IR	4	08-Jul-2010 21:02:07.0	yes
03	(3) SGRA	WFC3/IR	3	08-Jul-2010 21:02:21.0	yes
06	(3) SGRA	WFC3/IR	4	08-Jul-2010 21:02:36.0	yes

21 Total Orbits Used

ABSTRACT

We propose to exploit the wide field capabilities of Wide Field Camera 3 to study star formation at the Galactic center. By studying young stars located in the most physically extreme region of our Galaxy, we can test star formation theories, which suggest that such environments should favor high mass stars and, in extreme cases, should suppress star formation entirely. Specifically, we will measure the proper motions and photometry of stars over the full extent of the three massive young clusters that have been identified at the Galactic Center (Arches, Quintuplet, and the Young Nuclear Star Cluster). These observations are a factor of 2000 more efficient than what can be done with ground-based adaptive optics. Our goals are two-fold. First, we hope to establish the initial sites of star formation in order to obtain an accurate estimate of the conditions that led to the stellar populations within these clusters. Answering this question for the Young Nuclear Star Cluster is particularly important as it establishes whether or not star formation can indeed proceed within 0.1 pc of our Galaxy's supermassive black hole. Second, we will measure the IMF in the Arches and Quintuplet, where dynamical evolution is less severe, using proper motions to determine membership and to reveal the tidal radius. Probing how the properties of the emergent stellar populations within our Galaxy may be affected by the physical environment in which they arise is an important first step to understanding how they might vary as a function of cosmic time and thereby affect our models of galaxy formation and evolution.

OBSERVING DESCRIPTION

Update July 2010 -- based on experience with visit 03, we now want to use patterns as per visit 3 and 6, but rotated to ensure more uniform pixel phase coverage. As visit 06 is scheduling and uses pattern 5 SPIRAL, we have made copies of the existing spiral patterns, changed the orientation of the patterns, and set visits 1,2,4,5 to use these patterns. So patterns change 2SPIRAL --> 6SPIRAL and 5SPIRAL --> 7SPIRAL.

Experience with visit 03 also suggests that for some objects the brightest few pix can saturate in <10s. To provide finer sampling for the initial 10s for as many objects as possible, we add two exposures to the end of each of the final astrometric orbits with the 512x512 subarray and dither by (n+0.5, m+0.5) pix. This allows 11 samples for the first 10s and seven for the first 6s (compared to 3 and 2 for the same intervals in full-frame mode).

Update August 2009 - ORIENT ranges specified. We need to observe at the same U3 angle in subsequent cycles, so we have selected the ORIENT values that give the broadest possible schedule windows (according to APT).

Our experiments on the Arches, Quintuplet, and the Young Nuclear Star Cluster will be conducted with both astrometric and three-filter photometric measurements. The Galactic Center is optically obscured and the three clusters have a large (~100") predicted spatial extent; therefore, all observations will be conducted with WFC3 in the near infrared. The specific requirements and exposure times for the astrometry and photometry are described below. Our group has significant experience in working with high precision astrometric and photometric data sets both in general and from HST.

Astrometry:
To achieve the required 1 mas astrometric precision with WFC3, it is important that the orientation and positioning of the fields of view are the same for our observations in all three HST cycles (17, 18, and 19). Additionally, we will improve the PSF sampling by using a spiral dither pattern that has sub-pixel steps. The total extent of the dither pattern is less than 20 pixels. These requirements are all necessary to reduce the effects of optical distortion; however, to achieve the most accurate astrometry, we must have a high quality optical distortion solution for the camera. Our science requires a distortion solution that yields residuals of <0.01 pixels (1 mas) in WFC3-IR. Members of our group have shown that this level of distortion correction is possible for under-sampled PSFs such as in WFC3. Distortion calibration to 0.005 pixels has been achieved with ACS and is also planned for WFC3 using similar techniques. To minimize the impact of any residual distortions, we request that the astrometric observations within each cluster have the SAME ORIENT with small POS TARG offsets in all three cycles.

Our observations should reach at least a SNR ~100 for an H=20 star. Individual exposure times are limited by the effects of persistence from saturated sources, which can negatively impact astrometry and photometry. We chose a medium band filter for our astrometry rather than a wide filter in order to avoid saturating the brightest sources in the field (H=10) prior to the first detector read. Some saturated sources are inevitable since the brightest sources are H=10 in the Quintuplet and H=12 in the Arches. These sources will saturate in less than 3 s; however, the density of bright stars is low enough that hard-saturating all stars with H<15 (<100 stars in the 120" field of view) should produce persistence images with a low enough density that dithering can shift sources in subsequent exposures on to persistence-free portions of the detector. Saturated sources will be recoverable from the earliest reads of the up-the-ramp samples used by WFC3. The maximum possible exposure time to avoid persistence images from stars fainter than H=15 is ~350 s. Therefore, our H-band astrometric program will consist of a series of exposures with texp =349.2 to accommodate 12 MULTIACCUM readouts (STEP 50 readout pattern).

Photometry:
Photometry will be extracted from three medium band filters: F153M, F139M, and F127M to accurately construct extinction maps for all three clusters and mass functions for the Arches and Quintuplet. These measurements require reaching a SNR of ~35 at m_F139M ~ 21.5 and m_F127M ~ 23. Saturation considerations are similar to those described above and the optimal exposure times for the two filters are t_{exp,F139M} = 349 s and t_{exp,F127M} =600 s. Again to maximize sampling of the PSF, we choose sub-pixel steps for the dither patterns.

REAL TIME JUSTIFICATION
In order to achieve the necessary astrometric precision, we need observations in cycle 17, 18, and 19 to be observed at the same roll angle.

Visit

Proposal 11671, Visit 01, scheduling Fri Jul 09 01:02:42 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 90D TO 100 D; ORIENT 270D TO 280 D

Comments: === July 2010 - updated to use rotated spiral dither patterns. Two short exposures added.

Arches Astrometry and F153M Photometry.
We need to optimize the scheduling of these Cycle 17 observations such that it is easy to schedule Cycle 18 and 19 observations at the exact same orientation.

*August 2008 - To enable cycle18,19 observations to be scheduled at the same orientation as Cycle17, we specify ORIENT ranges that have the maximum interval of ORIENT availability that we were able to determine with APT. *NOTE* these ORIENTS are values within APT; correspondence with Tricia Royle indicates that the operational software returns different ORIENTS. We request confirmation of the intervals of availability for these ORIENT ranges in future cycles, if possible.*

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(6)	Pattern Type=SPIRAL	Coordinate Frame=POS-TARG		(1)
	Purpose=DITHER	Pattern Orientation=11.0		
	Number Of Points=21	Angle Between Sides=		
	Point Spacing=0.42	Center Pattern=false		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	ARCHES	RA: 17 45 50.5000 (266.4604167d)		V=16.5+/-0.1	Reference Frame: ICRS
		Dec: -28 49 20.00 (-28.82222d)		J=11.5,	
		Equinox: J2000		H=10.5,	
				K=10.2	

Comments: The V-magnitude is for the brightest optical star in the field of view.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) ARCHES	WFC3/IR, MULTIACCUM, IR-FIX	F153M	SAMP-SEQ=STEP50; NSAMP=12		Pattern 6, Exps 1-1 (6)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]*	***[1]***
								[==>(Pattern 8)] *[==>(Pattern 9)]* *[==>(Pattern 10)]* *[==>(Pattern 11)]* *[==>(Pattern 12)]* *[==>(Pattern 13)]* *[==>(Pattern 14)]*	***[2]***
								[==>(Pattern 15)] *[==>(Pattern 16)]* *[==>(Pattern 17)]* *[==>(Pattern 18)]* *[==>(Pattern 19)]* *[==>(Pattern 20)]* *[==>(Pattern 21)]*	***[3]***
2	Short_exp_subarray_end	(1) ARCHES	WFC3/IR, MULTIACCUM, IRSUB512-FIX	F153M	SAMP-SEQ=RAPID; NSAMP=15			*[==>]*	***[3]***
3	Short_exp_subarray_end	(1) ARCHES	WFC3/IR, MULTIACCUM, IRSUB512-FIX	F153M	SAMP-SEQ=RAPID; NSAMP=15	POS TARG 0.6075,0.4235		*[==>]*	***[3]***

Orbit Structure

Orbit 1

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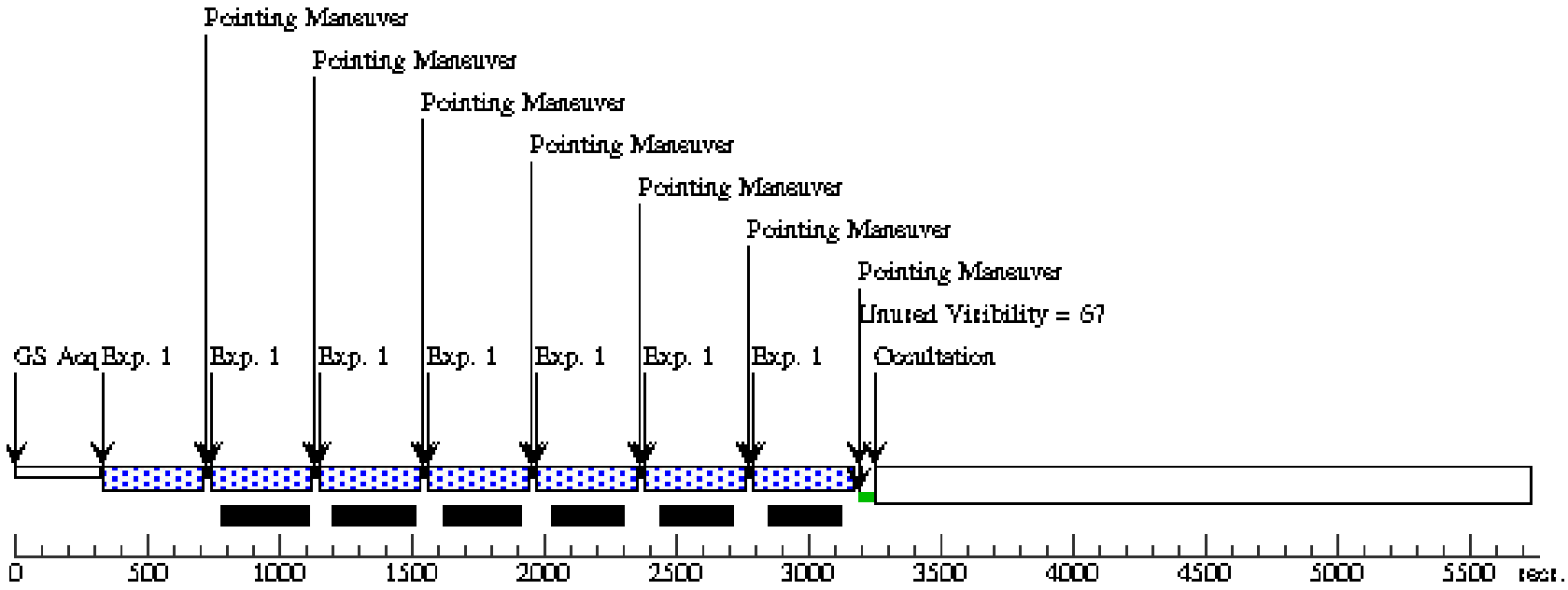

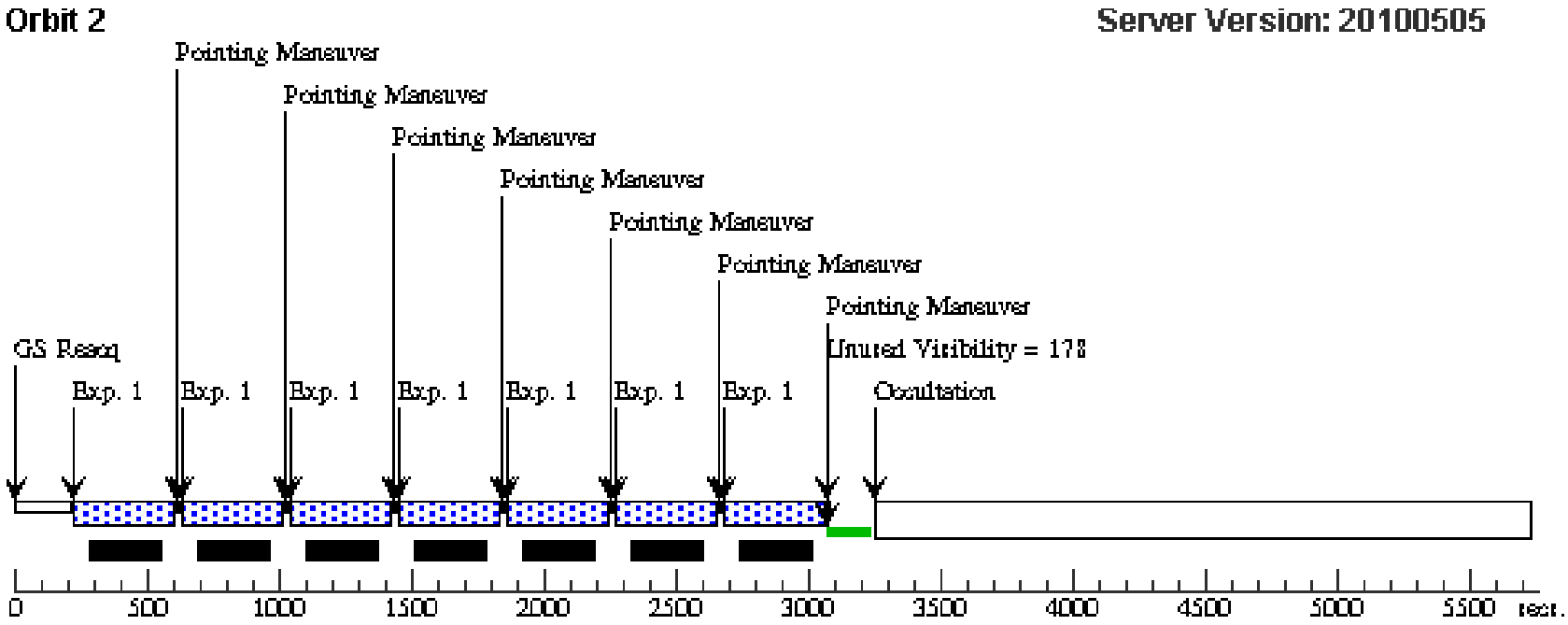
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GS Reacq
Unused Visibility = 17%
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 1
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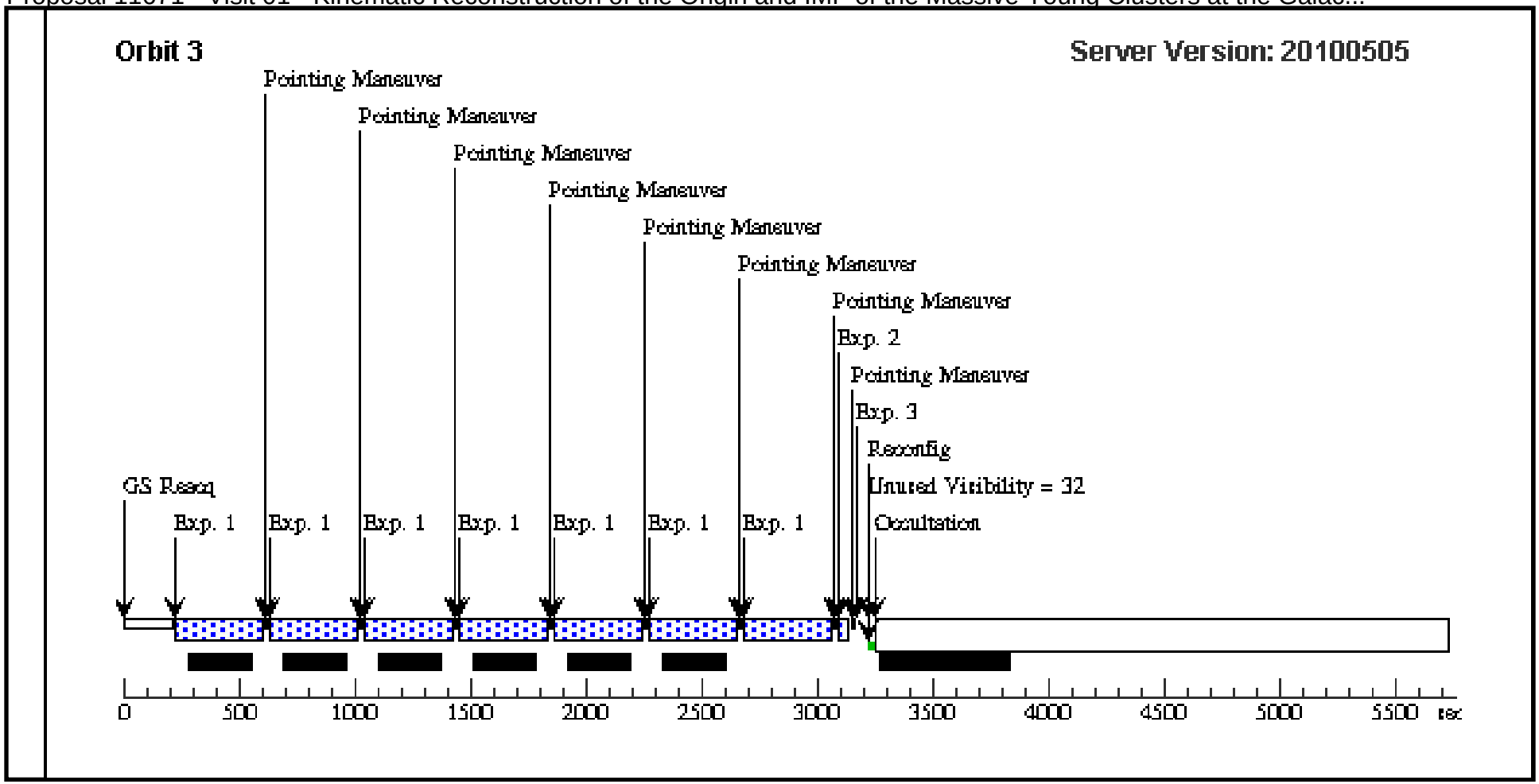
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Exp. 2
Pointing Maneuver
Exp. 3
Reconfig
Unused Visibility = 32
GS Reacq
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Occultation
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1000
1500
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3000
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4000
4500
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5500
sec

Visit

Proposal 11671, Visit 04, scheduling Fri Jul 09 01:02:45 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SAME ORIENT AS 01

Comments: Arches F139M and F127M Photometry

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(2), (4), (6)
(7)	Pattern Type=SPIRAL Purpose=DITHER Number Of Points=7 Point Spacing=0.43 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=28.0 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

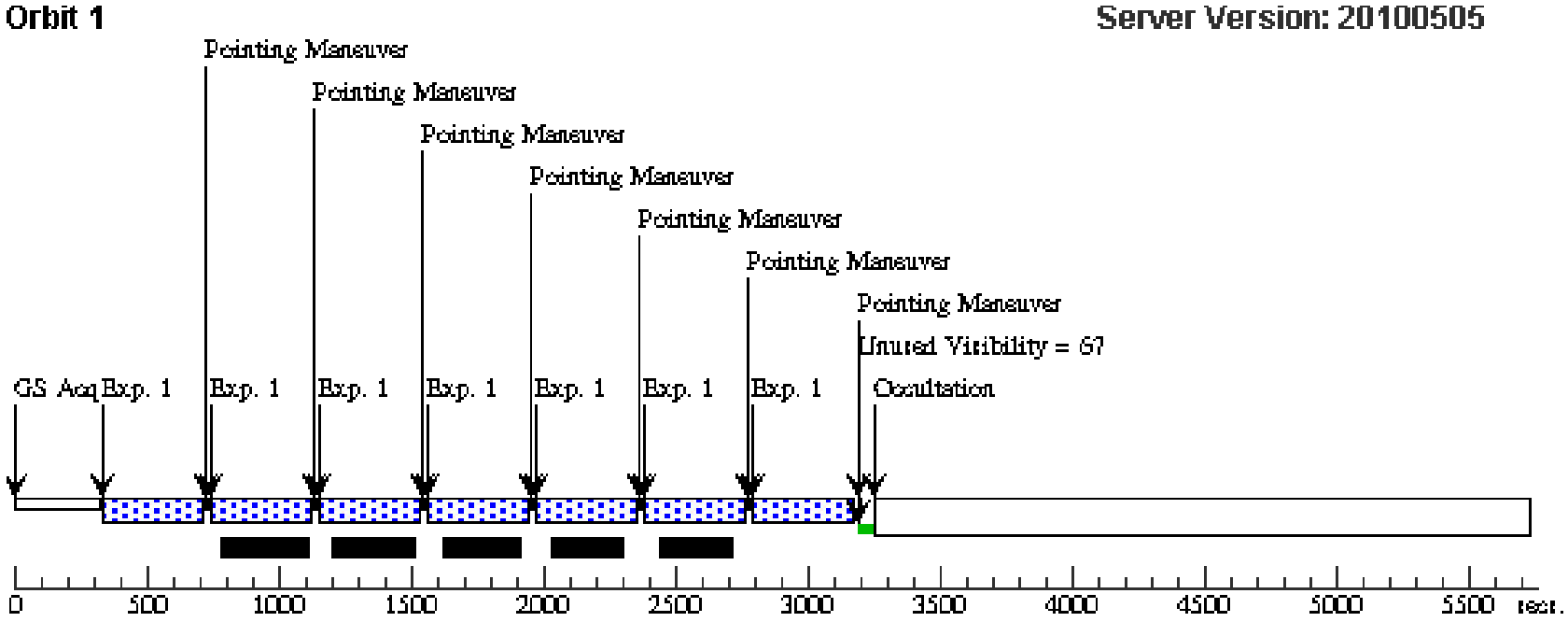
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	ARCHES	RA: 17 45 50.5000 (266.4604167d) Dec: -28 49 20.00 (-28.82222d) Equinox: J2000		V=16.5+/-0.1 J=11.5, H=10.5, K=10.2	Reference Frame: ICRS

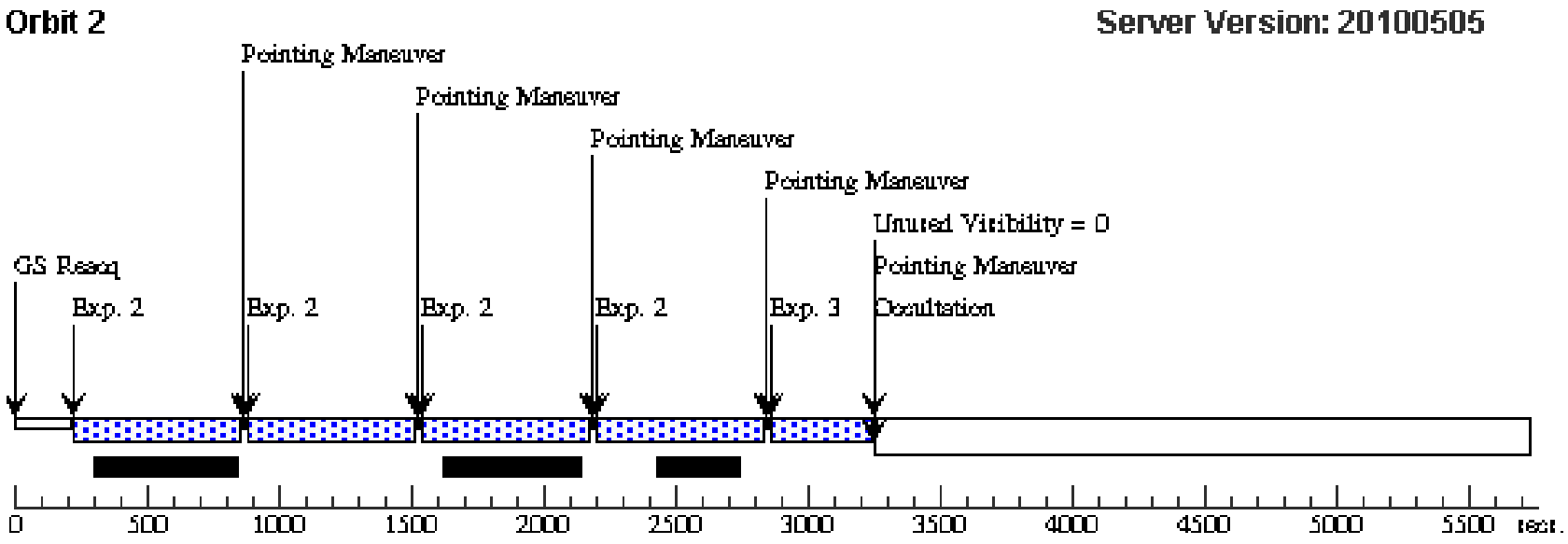
Comments: The V-magnitude is for the brightest optical star in the field of view.

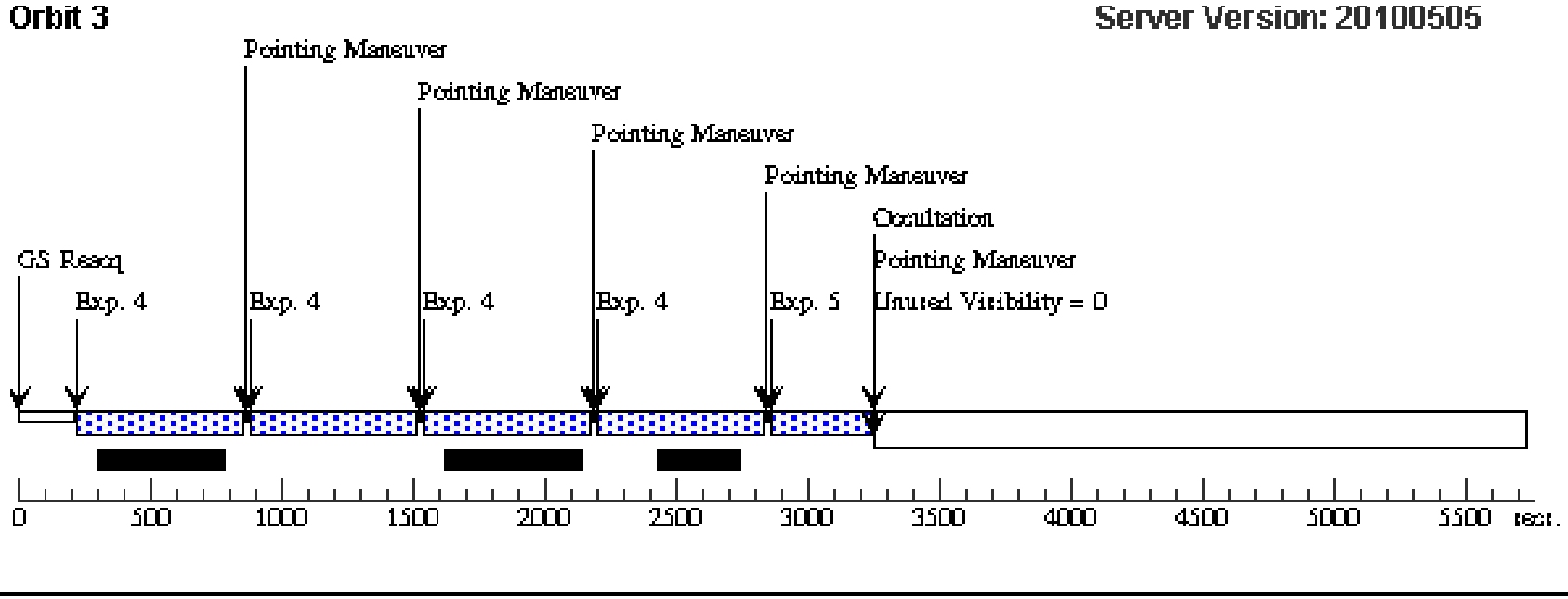
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) ARCHES	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12		Pattern 7, Exps 1-1 (7)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]*	***[1]***
2		(1) ARCHES	WFC3/IR, MULTIACCUM, IR-FIX	F127M	SAMP-SEQ=STEP100; NSAMP=12		Pattern 1, Exps 2-2 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[2]***
3		(1) ARCHES	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12			*[==>]*	***[2]***
4		(1) ARCHES	WFC3/IR, MULTIACCUM, IR-FIX	F127M	SAMP-SEQ=STEP100; NSAMP=12	POS TARG 0,-0.42	Pattern 1, Exps 4-4 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[3]***
5		(1) ARCHES	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12	POS TARG 0,-0.42		*[==>]*	***[3]***
6		(1) ARCHES	WFC3/IR, MULTIACCUM, IR-FIX	F127M	SAMP-SEQ=STEP100; NSAMP=12	POS TARG 0.7,0.42	Pattern 1, Exps 6-6 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[4]***
7		(1) ARCHES	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12	POS TARG 0.7,0.42		*[==>]*	***[4]***

Orbit Structure



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Occultation
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GS Reacq
Exp. 4
Exp. 4
Exp. 4
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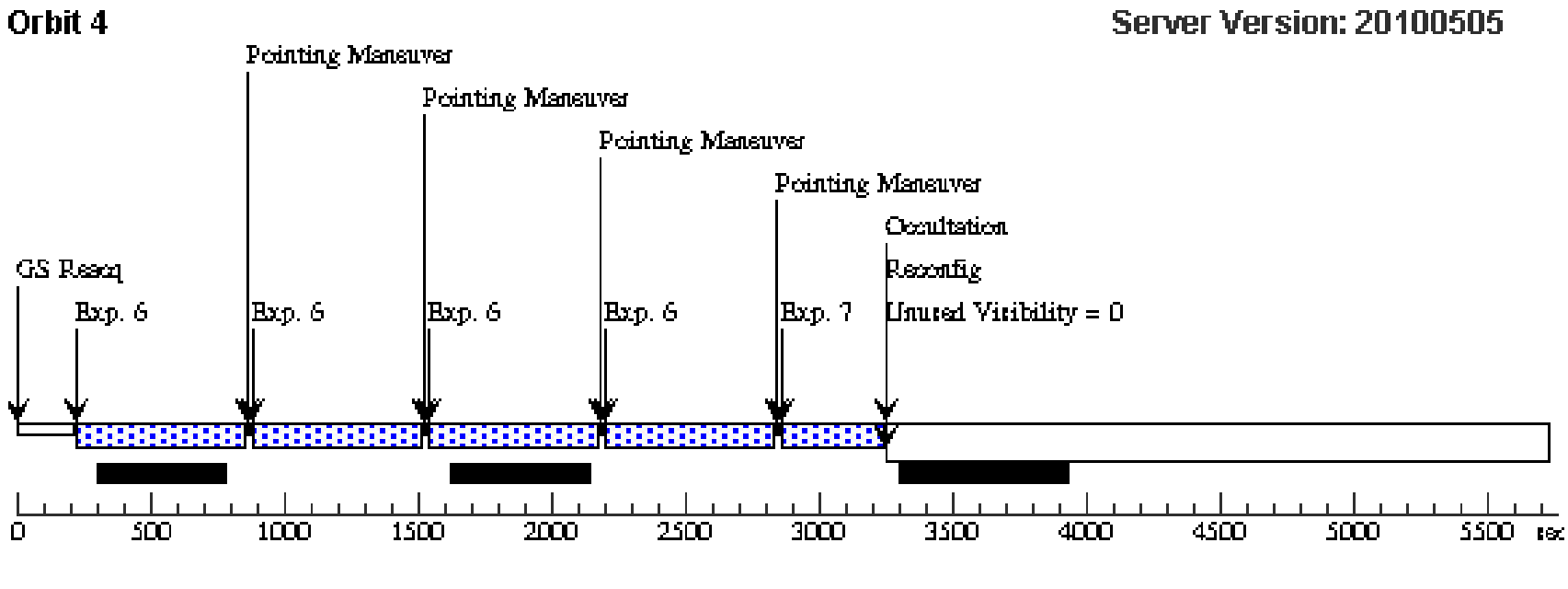
5000
5500
sec.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Exp. 6
Exp. 6
Exp. 7
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5500
sec

Visit

Proposal 11671, Visit 02, scheduling Fri Jul 09 01:02:46 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 90D TO 100 D; ORIENT 270D TO 280 D

Comments: Quintuplet Astrometry and F153M Photometry.
We need to optimize the scheduling of these Cycle 17 observations such that it is easy to schedule Cycle 18 and 19 observations at the exact same orientation.

*August 2008 - To enable cycle18,19 observations to be scheduled at the same orientation as Cycle17, we specify ORIENT ranges that have the maximum interval of ORIENT availability that we were able to determine with APT. *NOTE* these ORIENTS are values within APT; correspondence with Tricia Royle indicates that the operational software returns different ORIENTS. We request confirmation of the intervals of availability for these ORIENT ranges in future cycles, if possible.*

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(6)	Pattern Type=SPIRAL	Coordinate Frame=POS-TARG		(1)
	Purpose=DITHER	Pattern Orientation=11.0		
	Number Of Points=21	Angle Between Sides=		
	Point Spacing=0.42	Center Pattern=false		
	Line Spacing=			

Fixed Targets

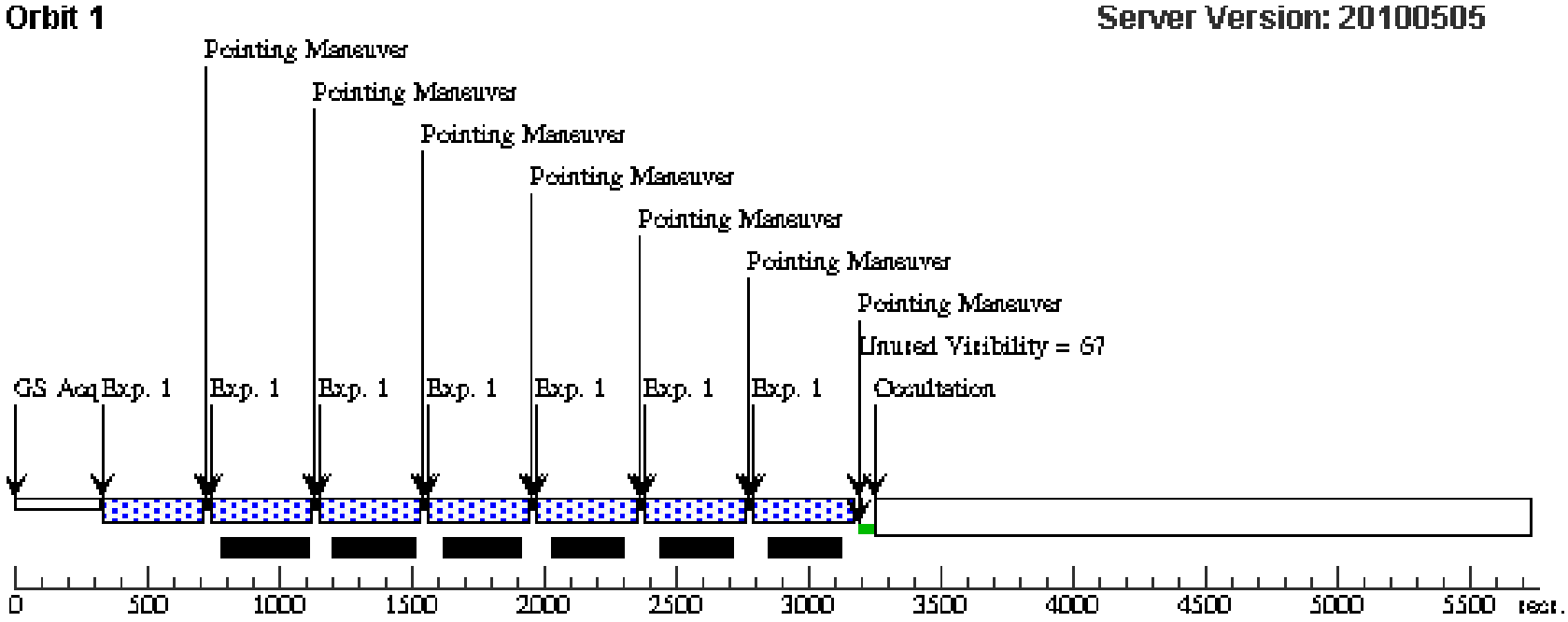
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	QUINTUPLET	RA: 17 46 13.9000 (266.5579167d)		V=15.6+/-0.1	Reference Frame: ICRS
		Dec: -28 49 48.00 (-28.83000d)		J=11.8,	
		Equinox: J2000		H=8.9,	
				K=7.29	

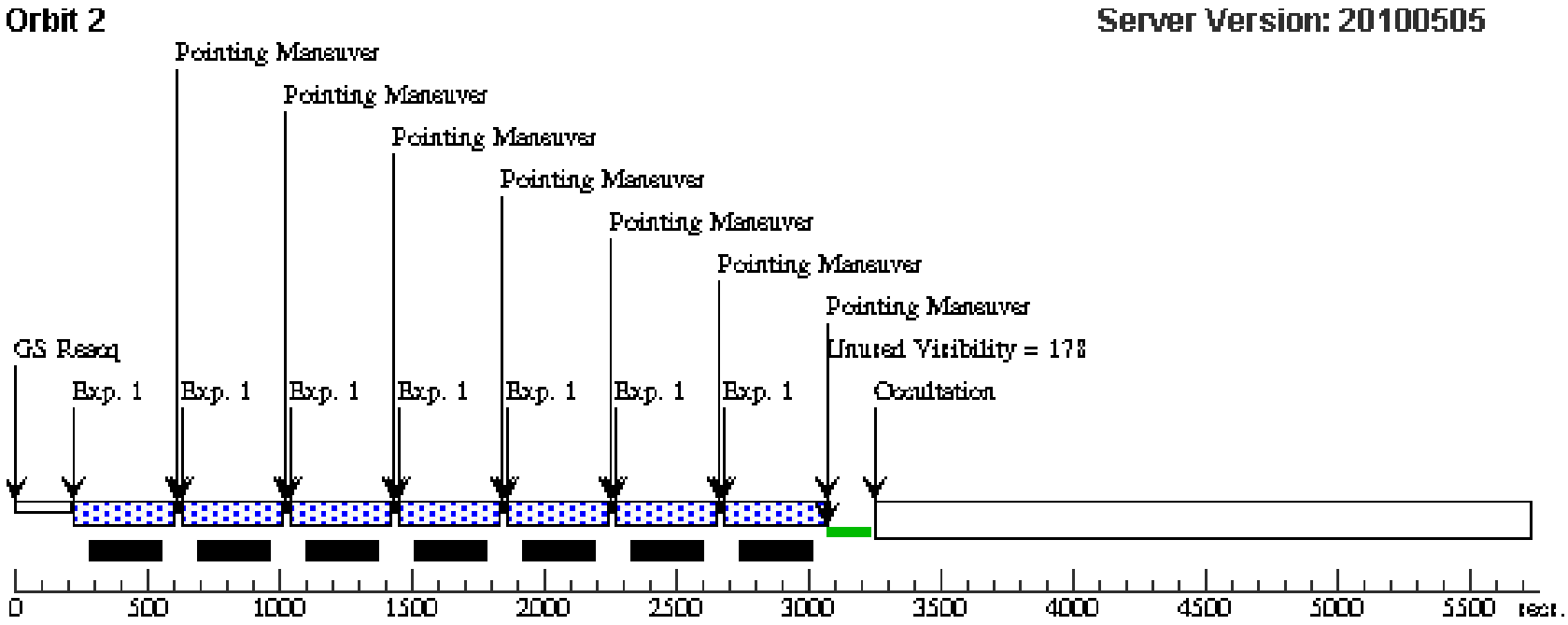
Comments: The fluxes are for the brightest star in the WFC3 field of view. The brightest optical star is different from the brightest near-infrared star.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(2) QUINTUPLET	WFC3/IR, MULTIACCUM, IR-FIX	F153M	SAMP-SEQ=STEP50; NSAMP=12		Pattern 6, Exps 1-1 (6)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]*	***[1]***
								[==>(Pattern 8)] *[==>(Pattern 9)]* *[==>(Pattern 10)]* *[==>(Pattern 11)]* *[==>(Pattern 12)]* *[==>(Pattern 13)]* *[==>(Pattern 14)]*	***[2]***
								[==>(Pattern 15)] *[==>(Pattern 16)]* *[==>(Pattern 17)]* *[==>(Pattern 18)]* *[==>(Pattern 19)]* *[==>(Pattern 20)]* *[==>(Pattern 21)]*	***[3]***
2	Short_exp_subarray_end	(2) QUINTUPLET	WFC3/IR, MULTIACCUM, IRSUB512-FIX	F153M	SAMP-SEQ=RAPID; NSAMP=15			*[==>]*	***[3]***
3	Short_exp_subarray_end	(2) QUINTUPLET	WFC3/IR, MULTIACCUM, IRSUB512-FIX	F153M	SAMP-SEQ=RAPID; NSAMP=15	POS TARG 0.6075,0.4235		*[==>]*	***[3]***

Orbit Structure

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GS Reacq
Unused Visibility = 17%
Exp. 1
Exp. 1
Exp. 1
Exp. 1
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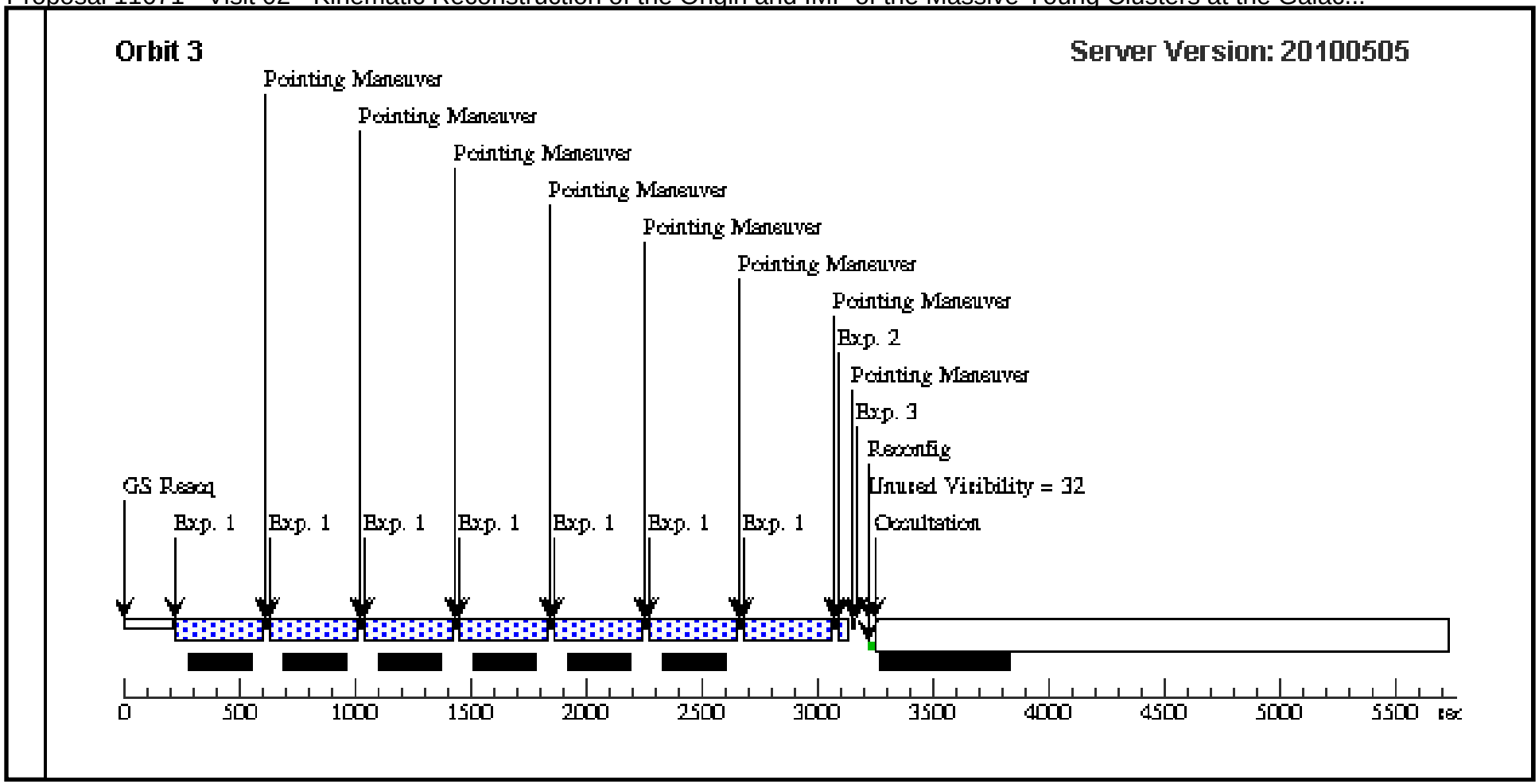
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Pointing Maneuver
Exp. 3
Reconfig
Unused Visibility = 32
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sec

Visit

Proposal 11671, Visit 05, scheduling Fri Jul 09 01:02:48 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SAME ORIENT AS 02

Comments: Quintuplet F139M and F127M Photometry

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(2), (4), (6)
(7)	Pattern Type=SPIRAL Purpose=DITHER Number Of Points=7 Point Spacing=0.43 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=28.0 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

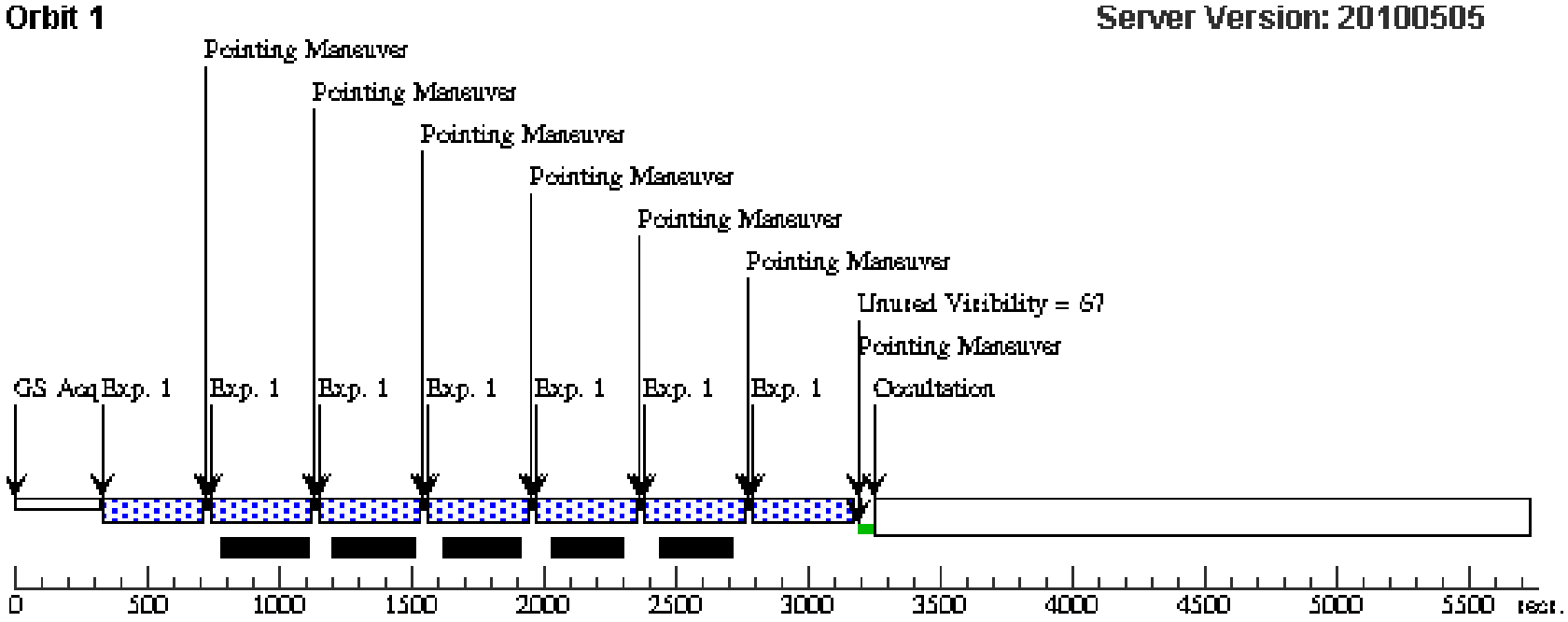
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	QUINTUPLET	RA: 17 46 13.9000 (266.5579167d) Dec: -28 49 48.00 (-28.83000d) Equinox: J2000		V=15.6+/-0.1 J=11.8, H=8.9, K=7.29	Reference Frame: ICRS

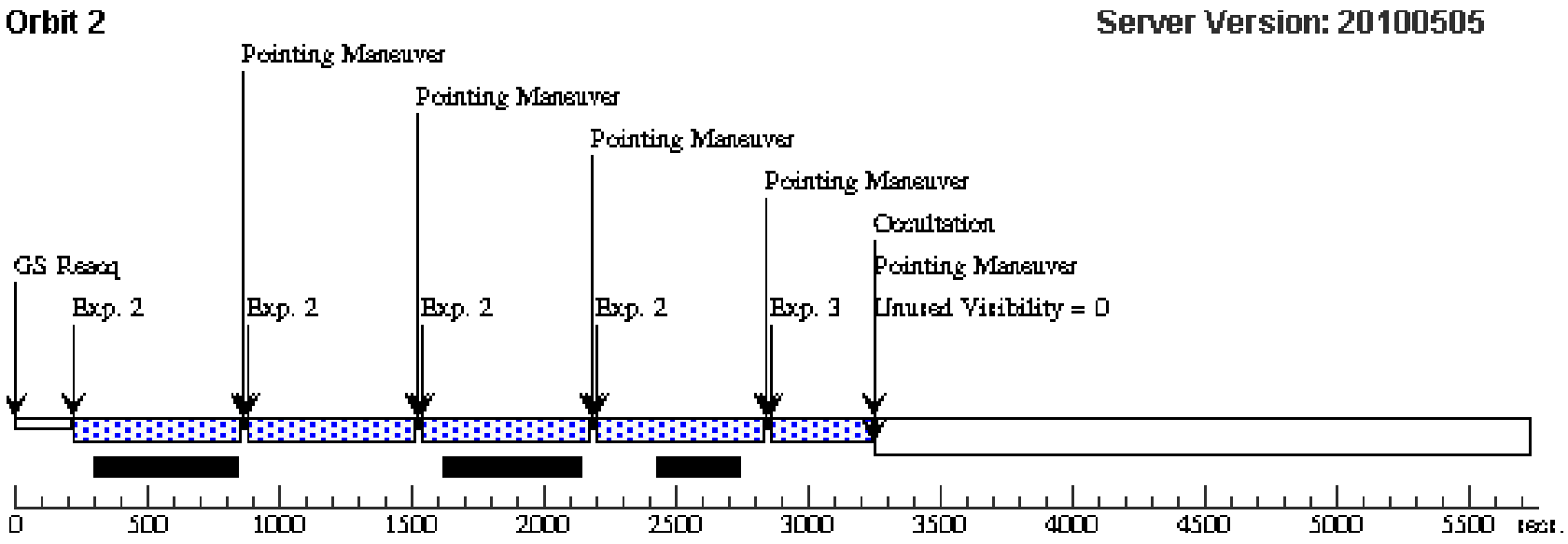
Comments: The fluxes are for the brightest star in the WFC3 field of view. The brightest optical star is different from the brightest near-infrared star.

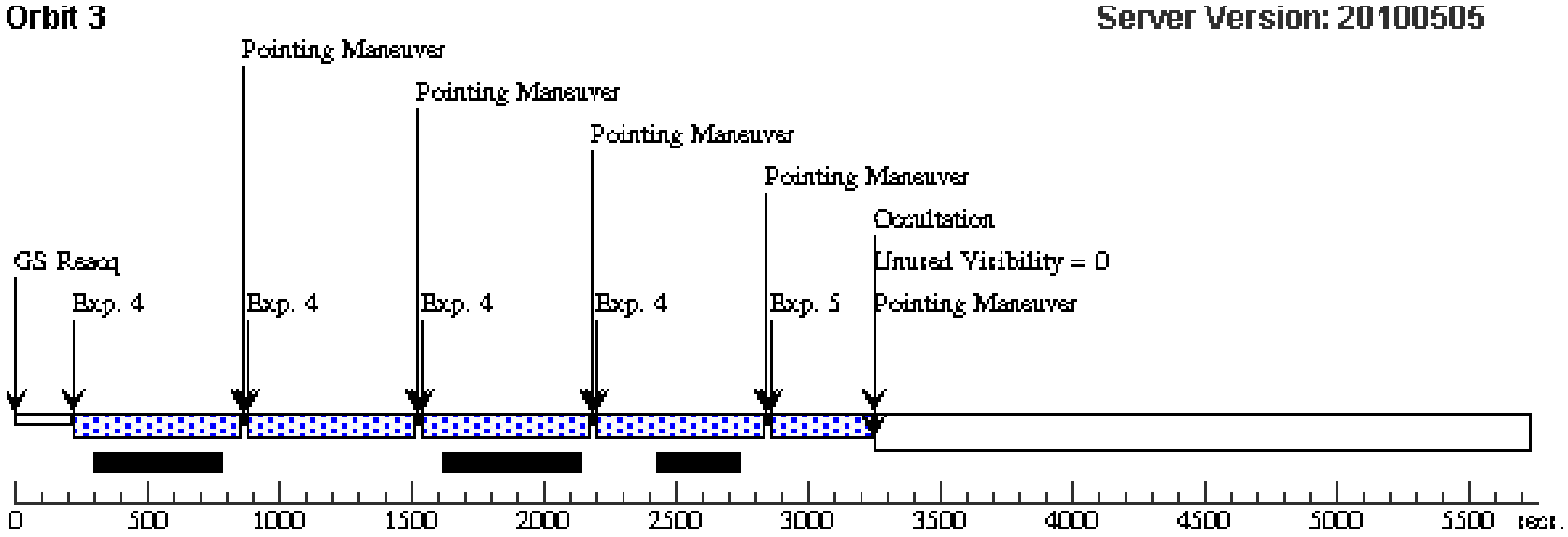
Exposures

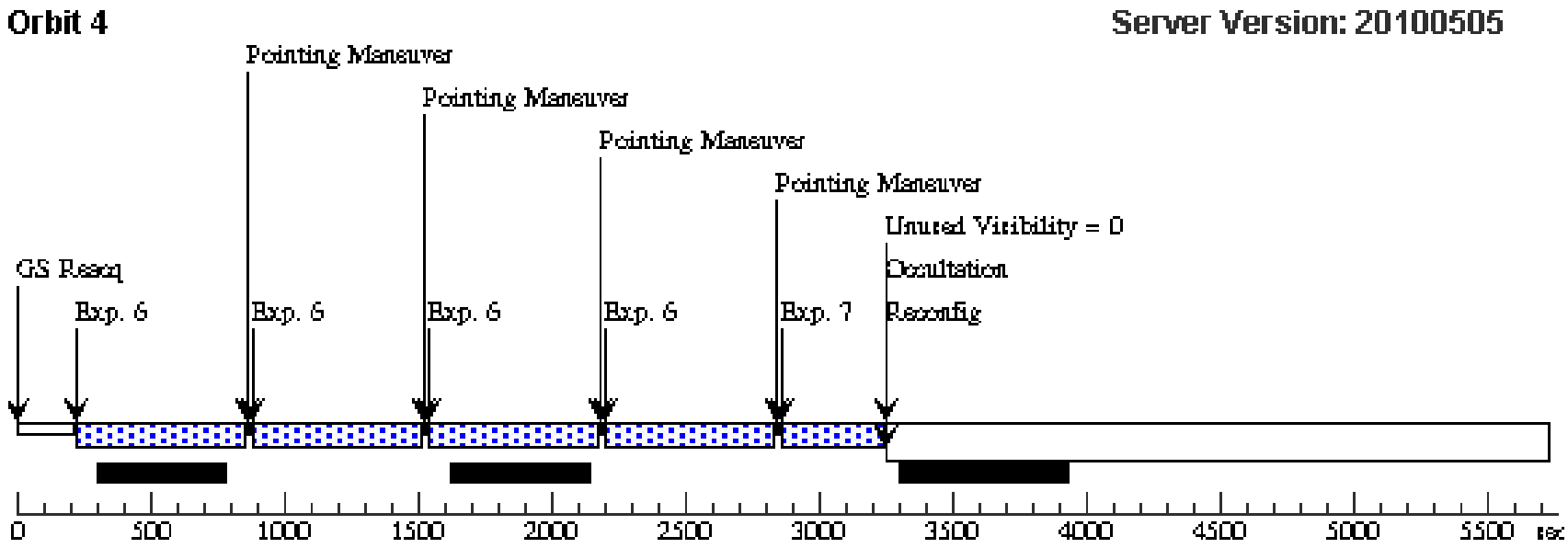
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(2) QUINTUPLET	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12		Pattern 7, Exps 1-1 (7)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]*	***[1]***
2		(2) QUINTUPLET	WFC3/IR, MULTIACCUM, IR-FIX	F127M	SAMP-SEQ=STEP100; NSAMP=12		Pattern 1, Exps 2-2 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[2]***
3		(2) QUINTUPLET	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12			*[==>]*	***[2]***
4		(2) QUINTUPLET	WFC3/IR, MULTIACCUM, IR-FIX	F127M	SAMP-SEQ=STEP100; NSAMP=12	POS TARG 0,-0.42	Pattern 1, Exps 4-4 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[3]***
5		(2) QUINTUPLET	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12	POS TARG 0,-0.42		*[==>]*	***[3]***
6		(2) QUINTUPLET	WFC3/IR, MULTIACCUM, IR-FIX	F127M	SAMP-SEQ=STEP100; NSAMP=12	POS TARG 0.7,0.42	Pattern 1, Exps 6-6 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[4]***
7		(2) QUINTUPLET	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12	POS TARG 0.7,0.42		*[==>]*	***[4]***

Orbit Structure






Orbit 3
Server Version: 20100505
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Occultation
Unused Visibility = 0
GS Reacq
Exp. 4
Exp. 4
Exp. 4
Exp. 4
Exp. 5
Pointing Maneuver
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.


Orbit 4
Server Version: 20100505
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Pointing Maneuver
Unused Visibility = 0
Occultation
GS Reacq
Exp. 6
Exp. 6
Exp. 6
Exp. 6
Exp. 7
Reconfig
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11671, Visit 03, completed Fri Jul 09 01:02:49 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 90D TO 100 D; ORIENT 270D TO 280 D

Comments: SgrA Astrometry and F153M Photometry.
We need to optimize the scheduling of these Cycle 17 observations such that it is easy to schedule Cycle 18 and 19 observations at the exact same orientation.

*August 2008 - To enable cycle18,19 observations to be scheduled at the same orientation as Cycle17, we specify ORIENT ranges that have the maximum interval of ORIENT availability that we were able to determine with APT. *NOTE* these ORIENTS are values within APT; correspondence with Tricia Royle indicates that the operational software returns different ORIENTS. We request confirmation of the intervals of availability for these ORIENT ranges in future cycles, if possible.*

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=SPIRAL	Coordinate Frame=POS-TARG		(1)
	Purpose=DITHER	Pattern Orientation=0		
	Number Of Points=21	Angle Between Sides=		
	Point Spacing=0.42	Center Pattern=false		
	Line Spacing=			

Fixed Targets

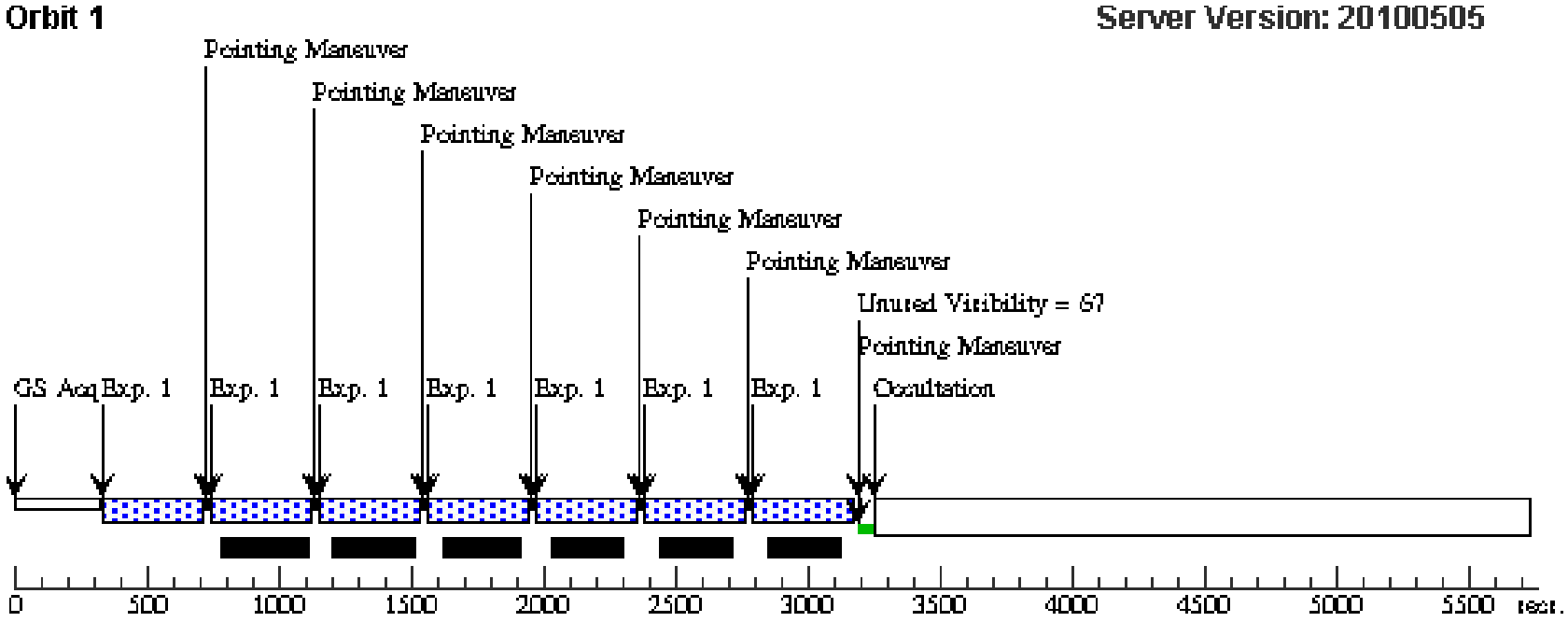
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	SGRA	RA: 17 45 40.0400 (266.4168333d)		V=14.0+/-0.1	Reference Frame: ICRS
		Dec: -29 00 28.10 (-29.00781d)		J=12.2,	
		Equinox: J2000		H=9.26,	
				K=6.5	

Comments: The fluxes are for the brightest star within the field-of-view for each filter. The brightest star is a different for all 4 filters.

Exposures

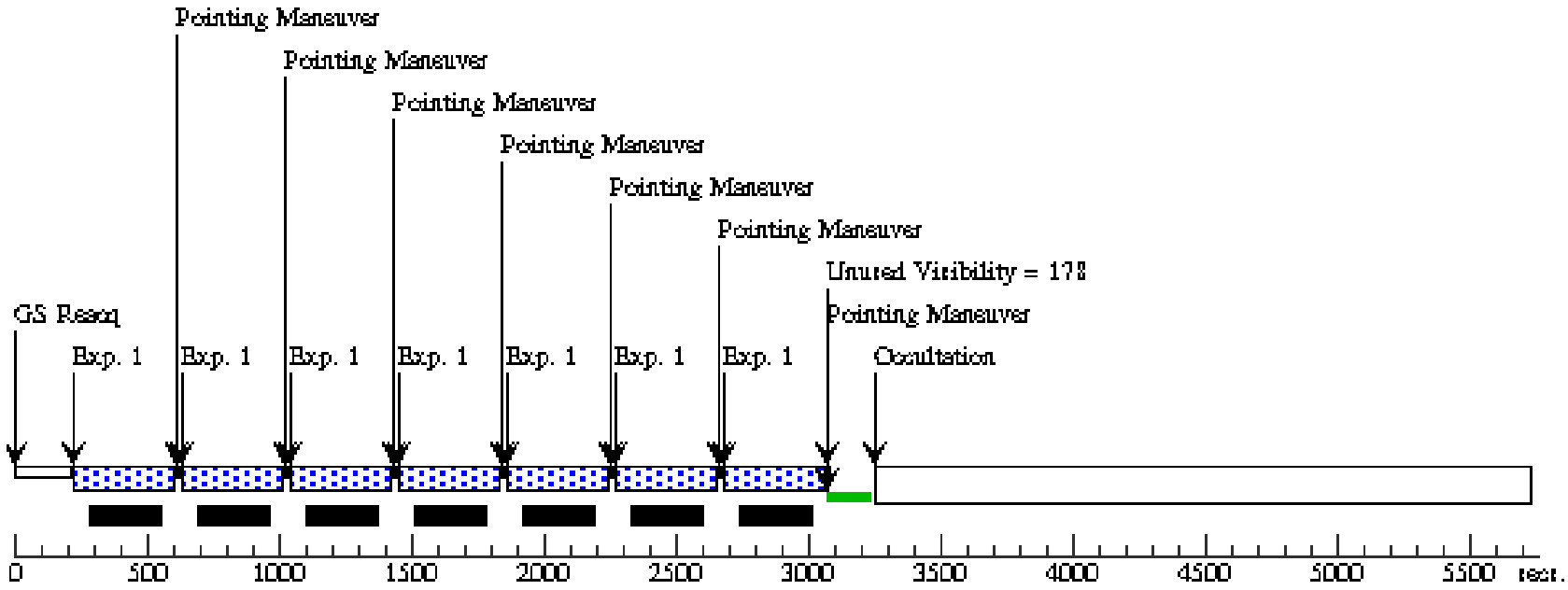
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp Time/[Actual Dur.]	Orbit
1		(3) SGRA	WFC3/IR, MULTIACCUM, IR-FIX	F153M	SAMP-SEQ=STEP50; NSAMP=12		Pattern 2, Exps 1-1 (2)	*[==>(Pattern 1)]*	
								[==>(Pattern 2)]	
								[==>(Pattern 3)]	
								[==>(Pattern 4)]	***[1]***
								[==>(Pattern 5)]	
								[==>(Pattern 6)]	
								[==>(Pattern 7)]	
								[==>(Pattern 8)]	
								[==>(Pattern 9)]	
								[==>(Pattern 10)]	
								[==>(Pattern 11)]	***[2]***
								[==>(Pattern 12)]	
								[==>(Pattern 13)]	
								[==>(Pattern 14)]	
								[==>(Pattern 15)]	
								[==>(Pattern 16)]	
								[==>(Pattern 17)]	
								[==>(Pattern 18)]	***[3]***
								[==>(Pattern 19)]	
								[==>(Pattern 20)]	
								[==>(Pattern 21)]	

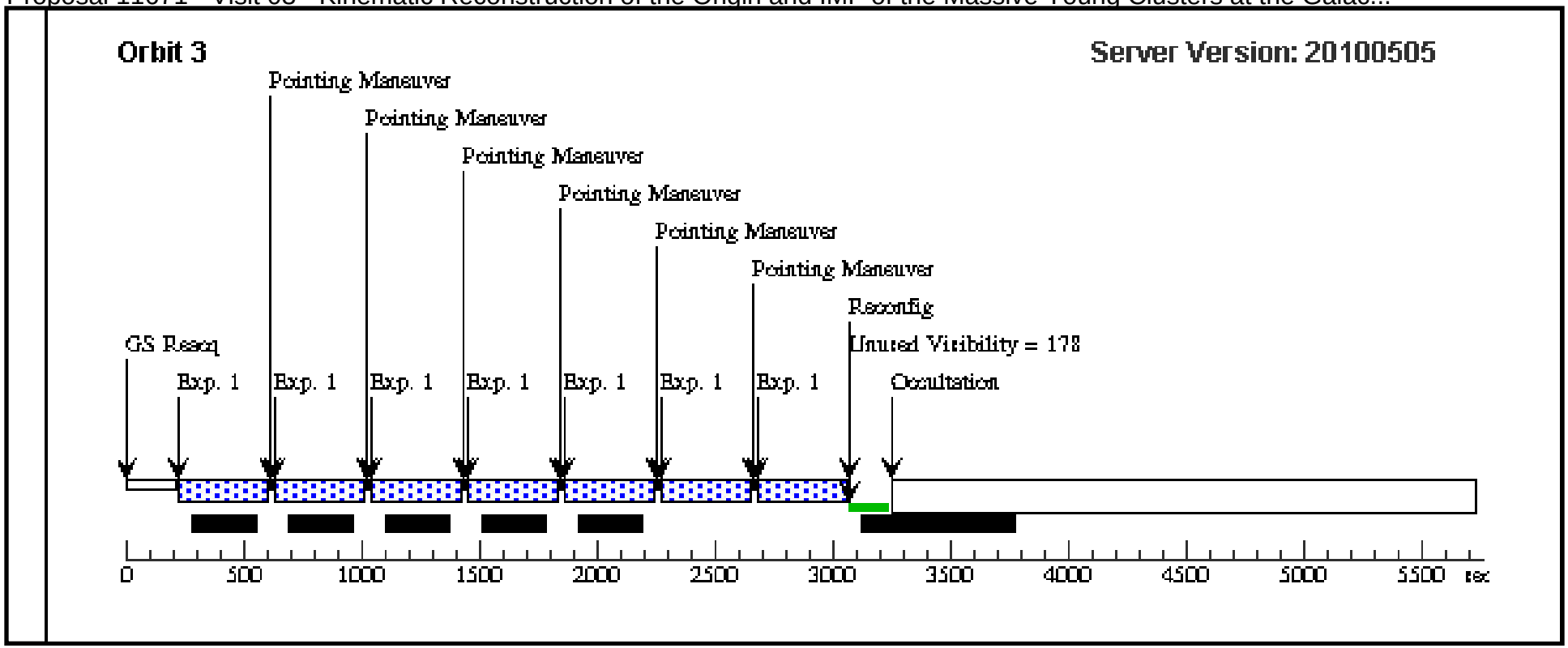
Orbit Structure



Orbit 2

Server Version: 20100505




Orbit 3
Server Version: 20100505
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Reconfig
GS Reacq
Unused Visibility = 178
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Exp. 1
Occultation
0
500
1000
1500
2000
2500
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3500
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4500
5000
5500
sec

Visit

Proposal 11671, Visit 06, scheduling Fri Jul 09 01:02:49 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SAME ORIENT AS 03

Comments: SgrA F139M and F127M Photometry

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(2), (4), (6)
(5)	Pattern Type=SPIRAL Purpose=DITHER Number Of Points=7 Point Spacing=0.42 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

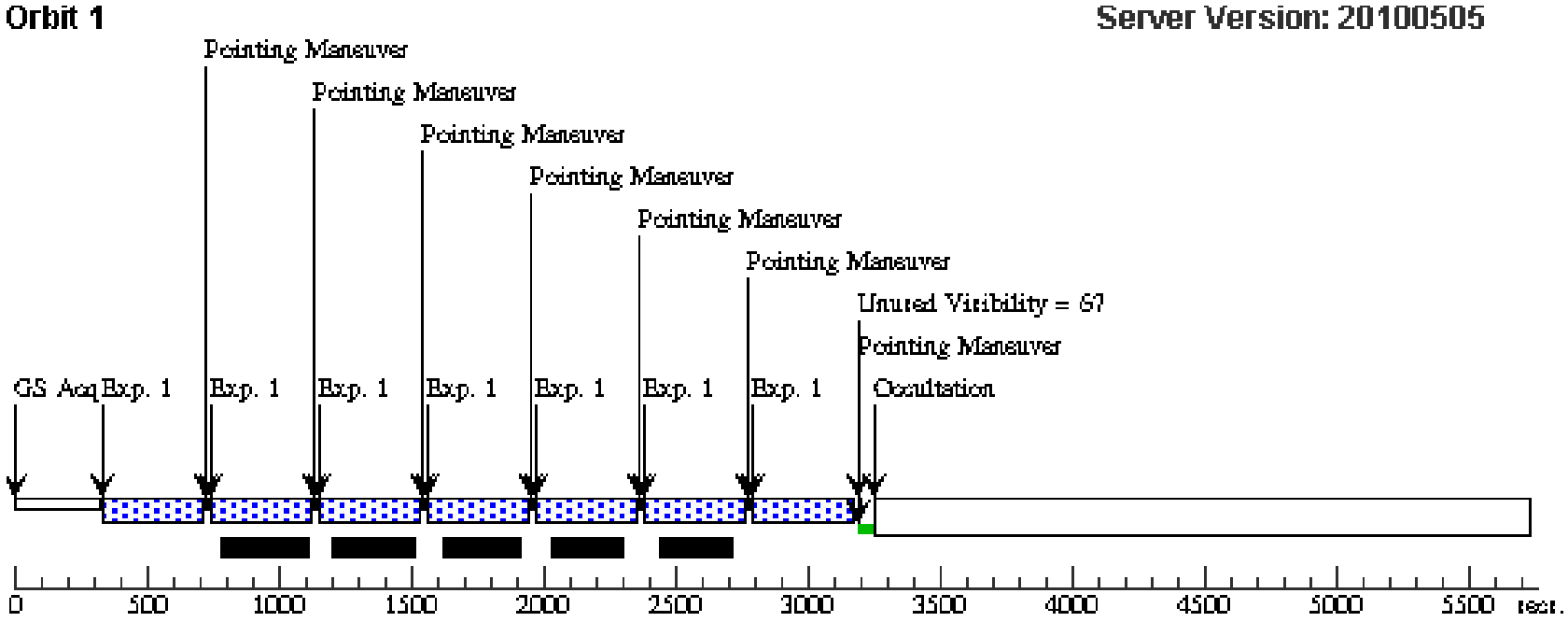
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	SGRA	RA: 17 45 40.0400 (266.4168333d) Dec: -29 00 28.10 (-29.00781d) Equinox: J2000		V=14.0+/-0.1 J=12.2, H=9.26, K=6.5	Reference Frame: ICRS

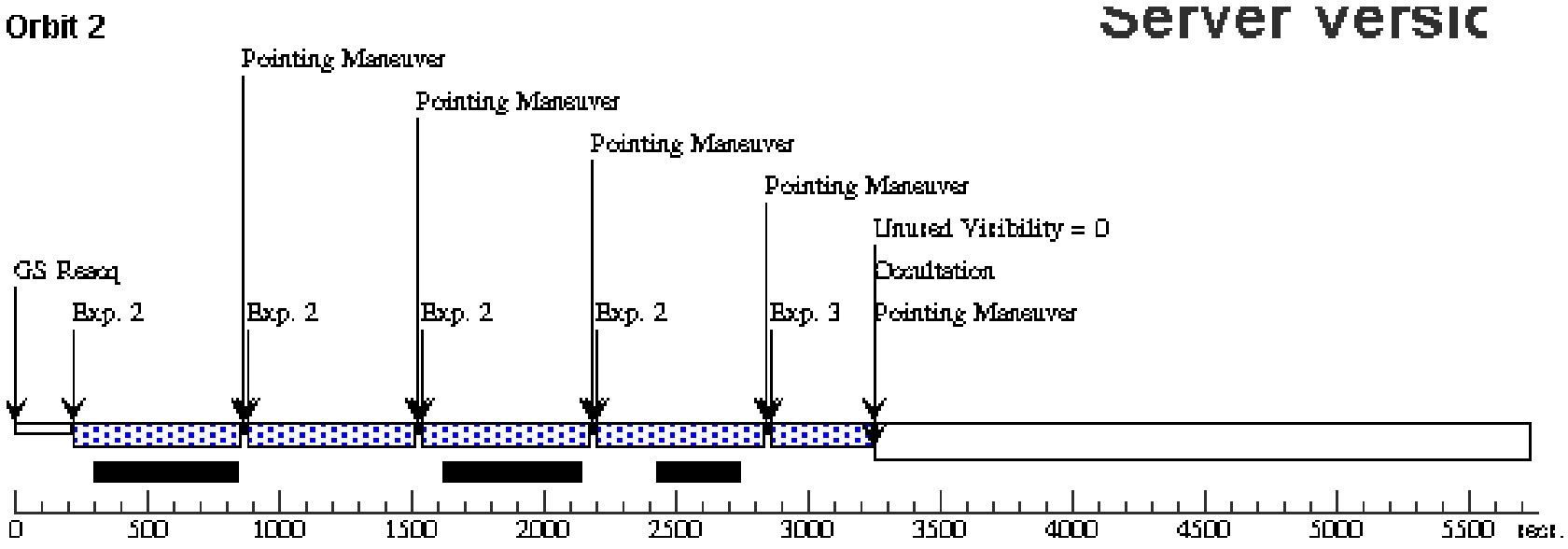
Comments: The fluxes are for the brightest star within the field-of-view for each filter. The brightest star is a different for all 4 filters.

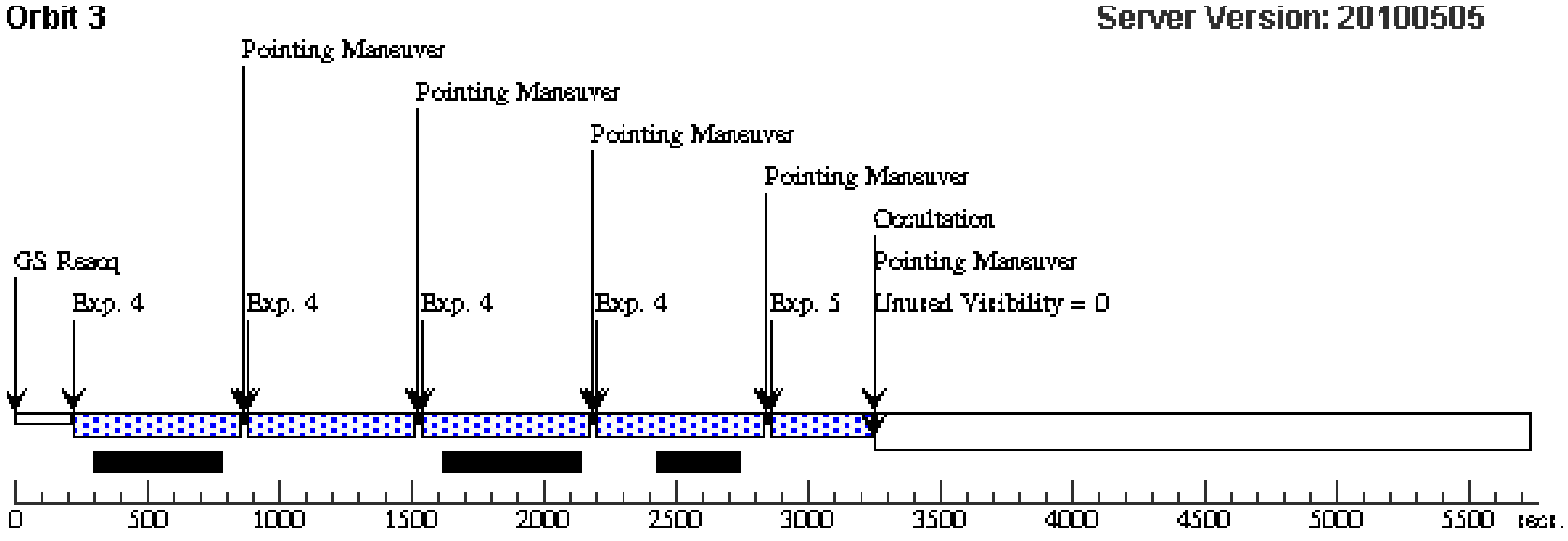
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(3) SGRA	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12		Pattern 5, Exps 1-1 (5)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]* *[==>(Pattern 5)]* *[==>(Pattern 6)]* *[==>(Pattern 7)]*	***[1]***
2		(3) SGRA	WFC3/IR, MULTIACCUM, IR-FIX	F127M	SAMP-SEQ=STEP100; NSAMP=12		Pattern 1, Exps 2-2 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[2]***
3		(3) SGRA	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12			*[==>]*	***[2]***
4		(3) SGRA	WFC3/IR, MULTIACCUM, IR-FIX	F127M	SAMP-SEQ=STEP100; NSAMP=12	POS TARG 0,-0.42	Pattern 1, Exps 4-4 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[3]***
5		(3) SGRA	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12	POS TARG 0,-0.42		*[==>]*	***[3]***
6		(3) SGRA	WFC3/IR, MULTIACCUM, IR-FIX	F127M	SAMP-SEQ=STEP100; NSAMP=12	POS TARG 0.7,0.42	Pattern 1, Exps 6-6 (1)	*[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[4]***
7		(3) SGRA	WFC3/IR, MULTIACCUM, IR-FIX	F139M	SAMP-SEQ=STEP50; NSAMP=12	POS TARG 0.7,0.42		*[==>]*	***[4]***

Orbit Structure






Orbit 3
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Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Occultation
Pointing Maneuver
GS Reacq
Exp. 4
Exp. 4
Exp. 4
Exp. 4
Exp. 5
Unused Visibility = 0
0
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1000
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2000
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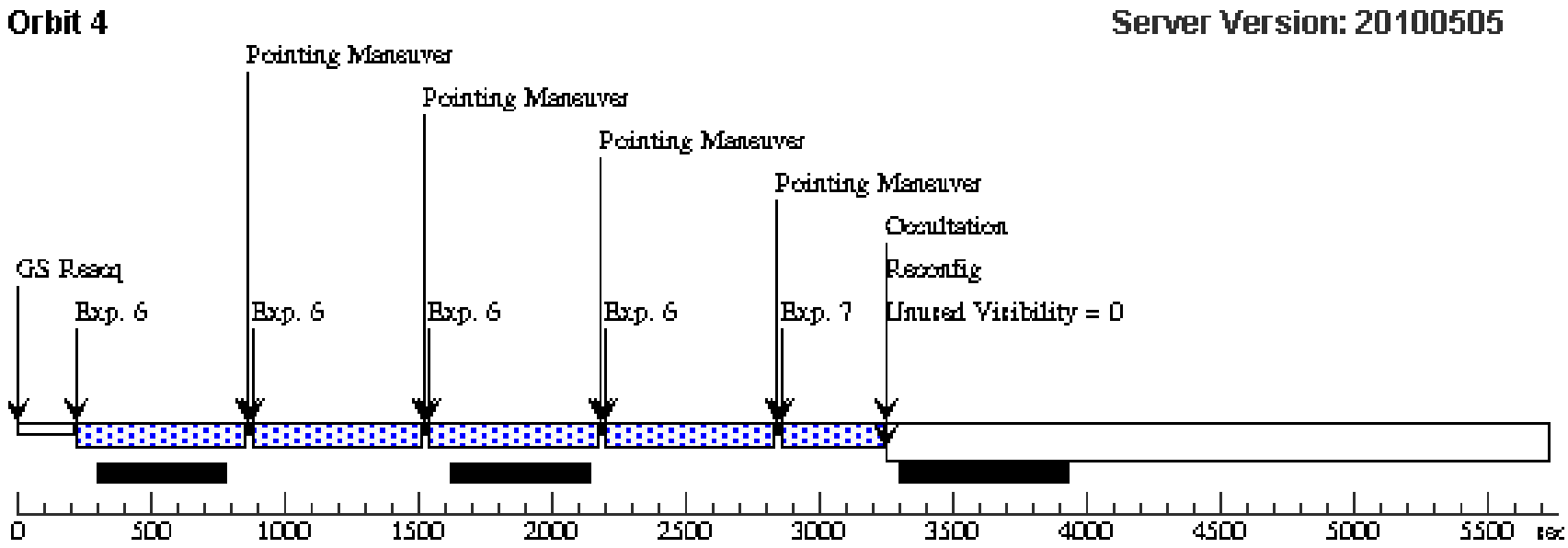
3000
3500
4000
4500
5000
5500
sec.


Orbit 4
Server Version: 20100505
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Occultation
Reconfig
GS Reacq
Exp. 6
Exp. 6
Exp. 6
Exp. 6
Exp. 7
Unused Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec