



# 12182 - Measuring the physical properties of the Milky Way nuclear star cluster with proper motions

Cycle: 18, Proposal Category: GO  
(Availability Mode: SUPPORTED)

## INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
<b>Mr. Tuan Do (PI)</b>	<b>University of California - Los Angeles</b>	<b>tdo@astro.ucla.edu</b>
Dr. Andrea M. Ghez (CoI)	University of California - Los Angeles	ghez@astro.ucla.edu
Dr. Mark Morris (CoI)	University of California - Los Angeles	morris@astro.ucla.edu
Dr. Rainer Schodel (CoI)	Instituto de Astrofisica de Andalucia (IAA)	rainer@iaa.es
Dr. Jessica R. Lu (CoI)	California Institute of Technology	jlu@astro.ucla.edu
Dr. William I. Clarkson (CoI)	University of California - Los Angeles	clarkson@astro.ucla.edu
Dr. David Merritt (CoI)	Rochester Institute of Technology	merritt@astro.rit.edu
Dr. Brad M. Hansen (CoI)	University of California - Los Angeles	hansen@astro.ucla.edu
Ms. Sylvana Yelda (CoI)	University of California - Los Angeles	syelda@astro.ucla.edu

## VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
46	(10) MW-NSC-V35 (11) MW-NSC-V36 (12) MW-NSC-V37 (14) MW-NSC-V40 (19) MW-NSC-V37-COPY	WFC3/IR	5	30-Mar-2011 21:01:13.0	yes

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
47	(13) MW-NSC-V38 (15) MW-NSC-V41 (16) MW-NSC-V42 (17) MW-NSC-V43 (22) MW-NSC-V38-COPY	WFC3/IR	5	30-Mar-2011 21:01:43.0	yes
48	(23) MW-NSC-V38-COPY-1	WFC3/IR	1	30-Mar-2011 21:01:56.0	yes
49	(10) MW-NSC-V35 (11) MW-NSC-V36 (12) MW-NSC-V37 (13) MW-NSC-V38 (14) MW-NSC-V40 (15) MW-NSC-V41 (16) MW-NSC-V42 (17) MW-NSC-V43 (18) MW-NSC-V35-COPY (19) MW-NSC-V37-COPY (20) MW-NSC-V43-COPY (21) MW-NSC-V41-COPY (22) MW-NSC-V38-COPY (23) MW-NSC-V38-COPY-1 (24) MW-NSC-V38-COPY-2	WFC3/IR	5	30-Mar-2011 21:02:21.0	yes

16 Total Orbits Used

### **ABSTRACT**

Nuclear star clusters have been proposed as a byproduct of galaxy formation, analogous to supermassive black holes, because their mass scales with host galaxy properties in a similar way as the ( $M_{\text{bh}}\text{-}\sigma$ ) and ( $M_{\text{bh}}\text{-}M_{\text{bulge}}$ ) relationships. While the nuclear star cluster at the center of the Milky Way offers us an opportunity to study such a system with a level of detail not possible in external galaxies, this potential has not been realized due to the impracticality in obtaining wide-field, high angular resolution, and high precision kinematic measurements from the ground. We propose to use WFC3 on HST to measure, for the first time, the proper motions of stars out beyond the half-light radius of the cluster ( $\sim 7$  pc). These observations will allow us to derive three fundamental properties of the cluster that have been poorly constrained in the past: (1) the total mass, (2)

the distribution of mass, and (3) the rotational signature of the cluster. The underlying mass distribution and total mass are requirements for placing the Milky Way nucleus in context with galaxy scaling relationships. The rotational profile will provide constraints on the origin of the nuclear star cluster, offering perhaps a physical explanation for the link between supermassive black holes and nuclear star clusters.

## **OBSERVING DESCRIPTION**

Our characterization of the nuclear star cluster will be conducted with both astrometric and three-filter photometric measurements. The Galactic center is optically obscured, 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.

### Astrometry

To achieve the science goals outlined in this proposal, we require a 3x3 mosaic with WFC3-IR to obtain complete azimuthal sampling out to 180" from the cluster center; this will enable a robust determination of the orientation of the cluster rotation as well as characterize the velocity anisotropy for mass modeling. In cycles 18, we will not include the central field (green box in Figure 2) as it was already approved in program GO-11671 (PI: Ghez). We will use the F153M medium band filter for astrometric measurements, because the broad-band H filter will saturate the bright stars ( $H < 11$ ) before the first read. We estimate that with  $t_{\text{int}}=249$  s using STEP50 readout pattern with 10 MULTIACCUM reads, we can efficiently achieve a SNR  $\sim 100$  for  $H=18$ , which would be required for 1 mas astrometric precision (astrometric precision scales as  $0.7 \text{ FWHM/SNR}$ ). This integration time and sampling mode requires 248 s to dump the WFC3 buffer, which can be done in parallel with the following exposure, thus minimizing readout overhead. Also importantly with this integration time, sources fainter than  $H=15$  will be in no danger of saturation, ensuring that persistence will have minimal impact for most regions of the detector.

Each field will be composed of 4 dithers in sub-pixel step sizes to sample the pixel phase of the PSF to account for the under-sampled PSF of WFC3. We require that the orientation of the mosaic be the same in each cycle in order to perform precise relative astrometry. The Orient special requirement should be 270 degrees to avoid duplicating Program 11671 and to optimally combine this dataset with the data taken with that program. We would also like the entire mosaic in F153M to be completed in 1 visit (5 orbits) in order to minimize drifts in the astrometry. To combine all fields, a 10" overlap between each field is necessary to include enough common stars to derive a robust transformation.

Two additional fields adjacent to this mosaic (with a 10 arcsecond overlap) is observed to provide statistics on the number of bulge stars that may be

present in our sample to gauge the effect of bulge contamination on our kinematic measurements of the cluster.

The astrometric experiment will require 5 orbits in Cycle 18.

### Photometry

We also propose to carry out narrow-band imaging in multiple filters with WFC3 during Cycle 18 to correct for the highly variable extinction in this region. This measurement is used to determine the number counts and to gauge the completeness of the sample. The colors will also allow us some discrimination of foreground and background sources, as well as dynamically unrelaxed young stars in this region. We choose to observe using the medium band continuum filters F127M, F139M, and F153M to measure the slope and magnitude of the spatially variable extinction, which requires  $\sim 3\%$  photometry to achieve. In order to reach the required photometry precision, we require  $t_{\text{int}} = 449$  s for the F127M filter (using NSAMP = 14, with the STEP50 readout pattern), and  $t_{\text{int}} = 249$  s for the F139M filter (using NSAMP = 10, with the STEP50 readout pattern). We can use the photometry from the F153M astrometric observations, so this filter will not need to be repeated. The photometry also requires 4 dithers in each field to sample the PSF. The photometric experiment will require a total of 11 orbits in Cycle 18, split into three visits.

Proposal 12182 - Visit 46 - Measuring the physical properties of the Milky Way nuclear star cluster with proper motions

Thu Mar 31 01:02:32 GMT 2011

<b>Visit</b>	<p><b>Proposal 12182, Visit 46, scheduling</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Scientific Instruments: WFC3/IR</p> <p>Special Requirements: (none)</p> <p><i>Comments: The southern half of the mosaic fields for photometry in F127M and F139M</i></p>
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<b>Diagnostics</b>	<p>(Visit 46) Warning (Orbit Planner): VISIBILITY OVERRUN</p>
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<b>Patterns</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Primary Pattern</th> <th>Secondary Pattern</th> <th>Exposures</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>                     Pattern Type=WFC3-IR-DITHER-BOX-MIN                      Purpose=DITHER                      Number Of Points=4                      Point Spacing=0.572                      Line Spacing=0.365                 </td> <td>                     Coordinate Frame=POS-TARG                      Pattern Orientation=18.528                      Angle Between Sides=74.653                      Center Pattern=true                 </td> <td>(1), (3), (4), (5), (6), (7), (8), (9)</td> </tr> </tbody> </table>	#	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=true	(1), (3), (4), (5), (6), (7), (8), (9)
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<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(10)</td> <td>MW-NSC-V35</td> <td>                     RA: 17 45 53.0746 (266.4711442d)                      Dec: -29 00 15.96 (-29.00443d)                      Equinox: J2000                 </td> <td></td> <td>                     V=14+/-0.1                      J=9.7,                      H=7.2,                      K=6.0                 </td> <td>Reference Frame: ICRS</td> </tr> <tr> <td colspan="6"><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></td> </tr> <tr> <td>(11)</td> <td>MW-NSC-V36</td> <td>                     RA: 17 45 46.1714 (266.4423808d)                      Dec: -29 01 47.61 (-29.02989d)                      Equinox: J2000                 </td> <td></td> <td>                     V=14+/-0.1                      J=9.5,                      H=8.6,                      K=8.3                 </td> <td>Reference Frame: ICRS</td> </tr> <tr> <td colspan="6"><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></td> </tr> <tr> <td>(12)</td> <td>MW-NSC-V37</td> <td>                     RA: 17 45 39.2683 (266.4136179d)                      Dec: -29 03 19.23 (-29.05534d)                      Equinox: J2000                 </td> <td></td> <td>                     V=14+/-0.1                      J=9.5,                      H=8.6,                      K=6.8                 </td> <td>Reference Frame: ICRS</td> </tr> <tr> <td colspan="6"><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></td> </tr> <tr> <td>(14)</td> <td>MW-NSC-V40</td> <td>                     RA: 17 45 33.1377 (266.3880738d)                      Dec: -29 01 59.72 (-29.03326d)                      Equinox: J2000                 </td> <td></td> <td>                     V=14+/-0.1                      J=9.1,                      H=7.5,                      K=6.7                 </td> <td>Reference Frame: ICRS</td> </tr> <tr> <td colspan="6"><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></td> </tr> <tr> <td>(19)</td> <td>MW-NSC-V37-COPY</td> <td>                     RA: 17 45 36.3170 (266.4013208d)                      Dec: -29 02 41.32 (-29.04481d)                      Equinox: J2000                 </td> <td></td> <td>                     V=14+/-0.1                      J=9.5,                      H=8.6,                      K=6.8                 </td> <td>Reference Frame: ICRS</td> </tr> <tr> <td colspan="6"><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></td> </tr> </tbody> </table>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(10)	MW-NSC-V35	RA: 17 45 53.0746 (266.4711442d) Dec: -29 00 15.96 (-29.00443d) Equinox: J2000		V=14+/-0.1 J=9.7, H=7.2, K=6.0	Reference Frame: ICRS	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>						(11)	MW-NSC-V36	RA: 17 45 46.1714 (266.4423808d) Dec: -29 01 47.61 (-29.02989d) Equinox: J2000		V=14+/-0.1 J=9.5, H=8.6, K=8.3	Reference Frame: ICRS	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>						(12)	MW-NSC-V37	RA: 17 45 39.2683 (266.4136179d) Dec: -29 03 19.23 (-29.05534d) Equinox: J2000		V=14+/-0.1 J=9.5, H=8.6, K=6.8	Reference Frame: ICRS	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>						(14)	MW-NSC-V40	RA: 17 45 33.1377 (266.3880738d) Dec: -29 01 59.72 (-29.03326d) Equinox: J2000		V=14+/-0.1 J=9.1, H=7.5, K=6.7	Reference Frame: ICRS	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>						(19)	MW-NSC-V37-COPY	RA: 17 45 36.3170 (266.4013208d) Dec: -29 02 41.32 (-29.04481d) Equinox: J2000		V=14+/-0.1 J=9.5, H=8.6, K=6.8	Reference Frame: ICRS	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
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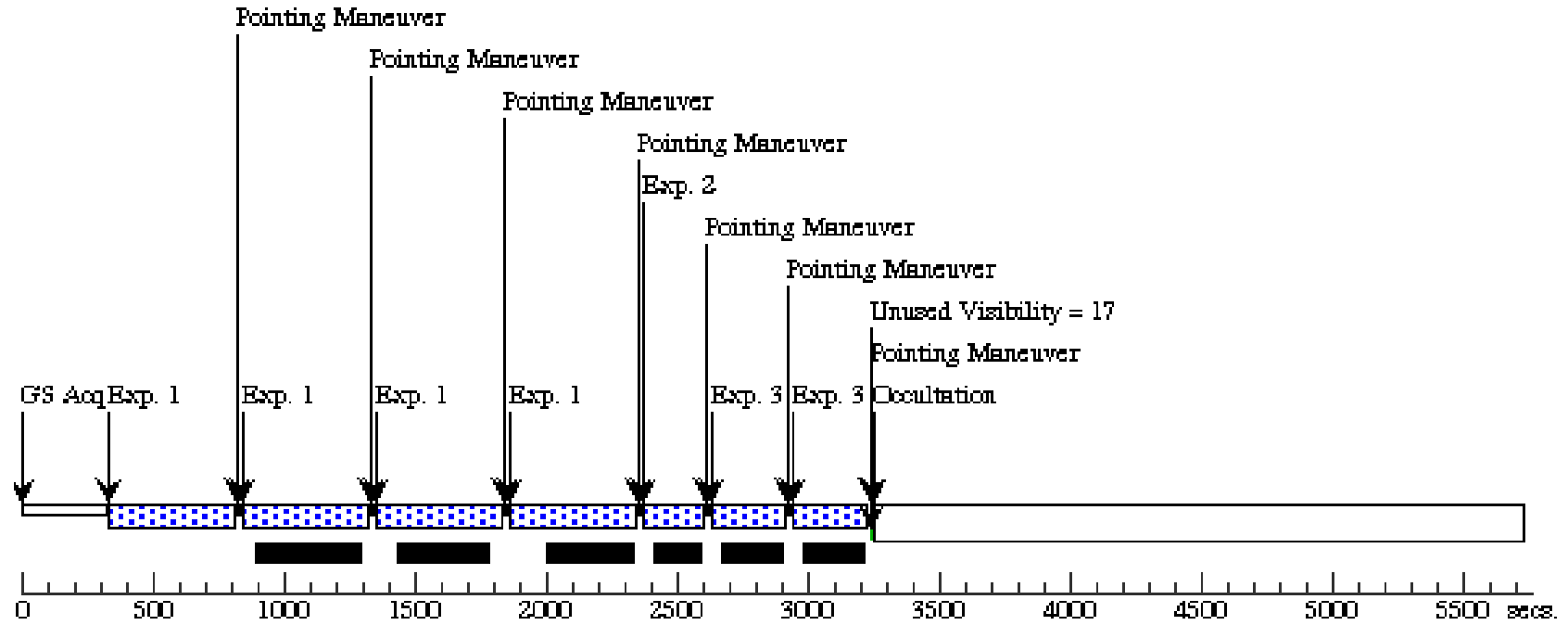
Proposal 12182 - Visit 46 - Measuring the physical properties of the Milky Way nuclear star cluster with proper motions

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
Exposures	1	(10) MW-NSC-V35	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=14; SAMP-SEQ=STEP5 0		Pattern 1, Exps 1-1 i n Visit 46 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2	(10) MW-NSC-V35	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=9; SAMP-SEQ=STEP5 0	POS TARG 0,0,0		[==>]	[1]
	3	(10) MW-NSC-V35	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=10; SAMP-SEQ=STEP5 0		Pattern 1, Exps 3-3 i n Visit 46 (1)	[==>(Pattern 1)]	[1]
								[==>(Pattern 2)]	[2]
	4	(11) MW-NSC-V36	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=14; SAMP-SEQ=STEP5 0		Pattern 1, Exps 4-4 i n Visit 46 (1)	[==>(Pattern 1)]	[2]
								[==>(Pattern 2)]	
	5	(11) MW-NSC-V36	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=10; SAMP-SEQ=STEP5 0		Pattern 1, Exps 5-5 i n Visit 46 (1)	[==>(Pattern 1)]	[2]
								[==>(Pattern 2)]	[3]
	6	(12) MW-NSC-V37	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=14; SAMP-SEQ=STEP5 0		Pattern 1, Exps 6-6 i n Visit 46 (1)	[==>(Pattern 1)]	[3]
								[==>(Pattern 2)]	
	7	(12) MW-NSC-V37	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=10; SAMP-SEQ=STEP5 0		Pattern 1, Exps 7-7 i n Visit 46 (1)	[==>(Pattern 1)]	[4]
[==>(Pattern 2)]									
8	(14) MW-NSC-V40	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=14; SAMP-SEQ=STEP5 0		Pattern 1, Exps 8-8 i n Visit 46 (1)	[==>(Pattern 1)]	[4]	
							[==>(Pattern 2)]		
9	(14) MW-NSC-V40	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=10; SAMP-SEQ=STEP5 0		Pattern 1, Exps 9-9 i n Visit 46 (1)	[==>(Pattern 1)]	[5]	
							[==>(Pattern 2)]		
10	(19) MW-NSC-V37- COPY	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=14; SAMP-SEQ=STEP5 0	POS TARG 0,0		[==>]	[5]	
11	(19) MW-NSC-V37- COPY	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=9; SAMP-SEQ=STEP5 0	POS TARG 0,0		[==>]	[5]	

Orbit 1

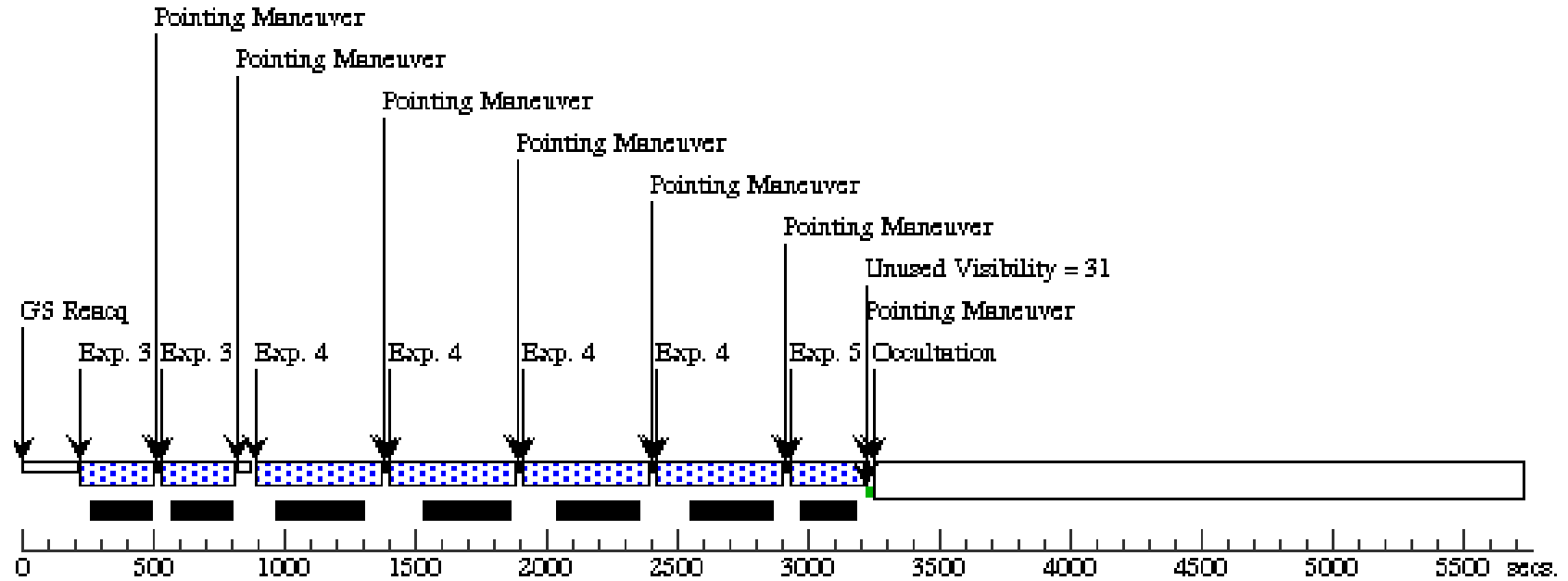
Server Version: 20100902

Orbit Structure



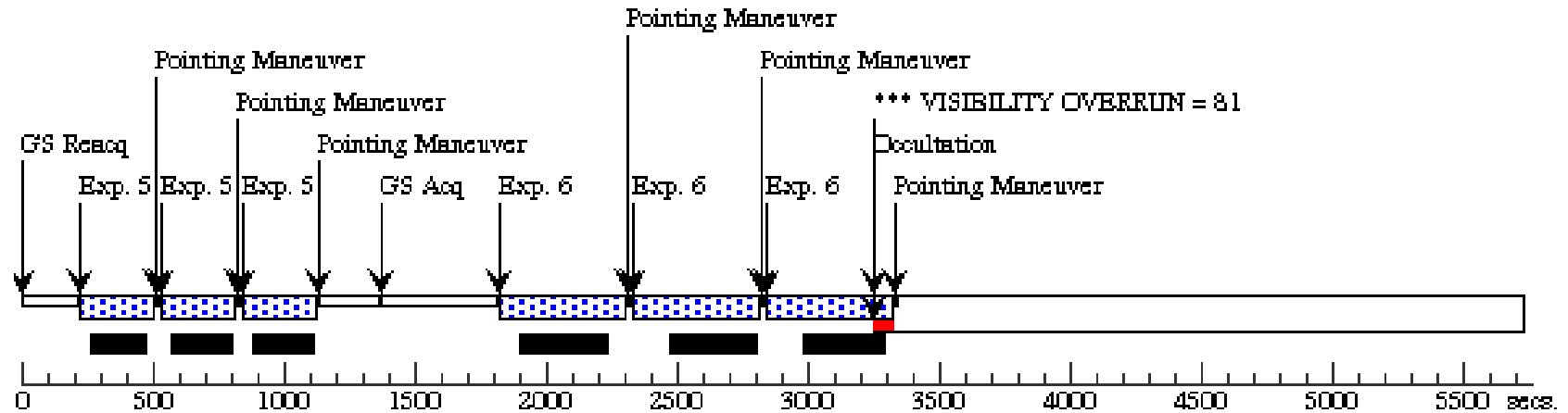
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Server Version: 20100902



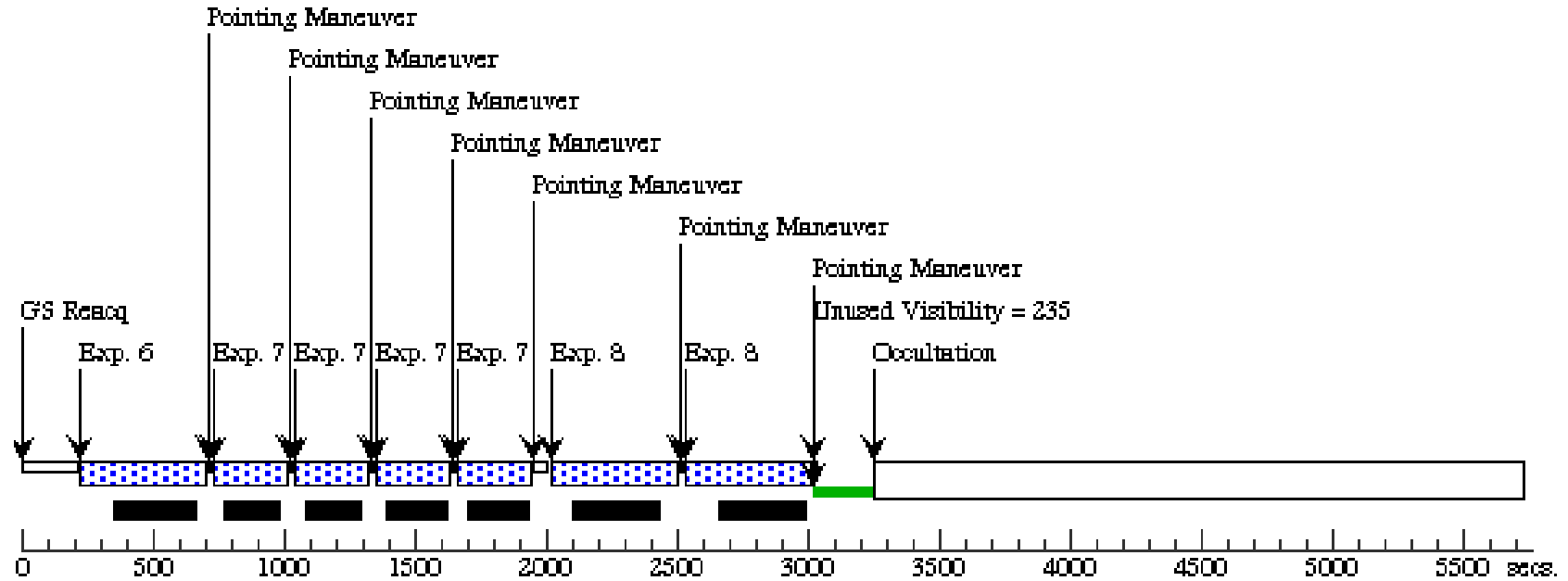
**Orbit 3**

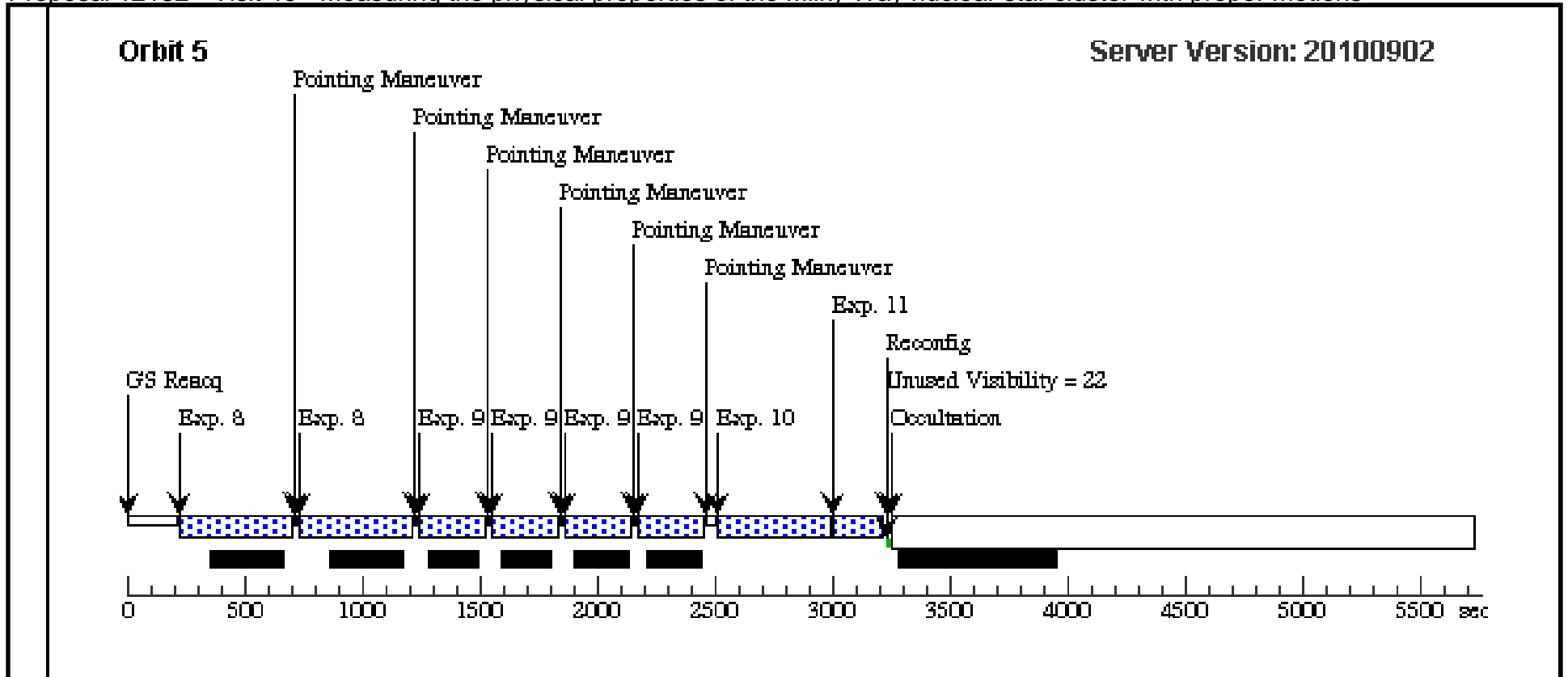
Server Version: 20100902



Orbit 4

Server Version: 20100902





Proposal 12182 - Visit 47 - Measuring the physical properties of the Milky Way nuclear star cluster with proper motions

Thu Mar 31 01:02:34 GMT 2011

<b>Visit</b>	<b>Proposal 12182, Visit 47, scheduling</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/IR Special Requirements: (none) <i>Comments: The northern half of the mosaic fields for photometry in F127M and F139M</i>

<b>Diagnostics</b>	(Visit 47) Warning (Orbit Planner): VISIBILITY OVERRUN
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<b>Patterns</b>	#	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=true	(1), (3), (4), (5), (6), (7), (8), (9)

<b>Fixed Targets</b>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(13)	MW-NSC-V38	RA: 17 45 46.9441 (266.4456004d) Dec: -28 58 56.49 (-28.98236d) Equinox: J2000		V=14+/-0.1 J=9.7, H=7.2, K=6.0	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
	(15)	MW-NSC-V41	RA: 17 45 40.8135 (266.4200562d) Dec: -28 57 37.01 (-28.96028d) Equinox: J2000		V=14+/-0.1 J=11.0, H=10.0, K=8.1	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
	(16)	MW-NSC-V42	RA: 17 45 33.9104 (266.3912933d) Dec: -28 59 8.62 (-28.98573d) Equinox: J2000		V=14+/-0.1 J=10.9, H=9.8, K=8.3	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
	(17)	MW-NSC-V43	RA: 17 45 27.0072 (266.3625300d) Dec: -29 00 40.20 (-29.01117d) Equinox: J2000		V=14+/-0.1 J=9.1, H=7.5, K=6.7	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
	(22)	MW-NSC-V38-COPY	RA: 17 45 47.4806 (266.4478358d) Dec: -28 57 32.46 (-28.95902d) Equinox: J2000		V=14+/-0.1 J=9.7, H=7.2, K=6.0	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					

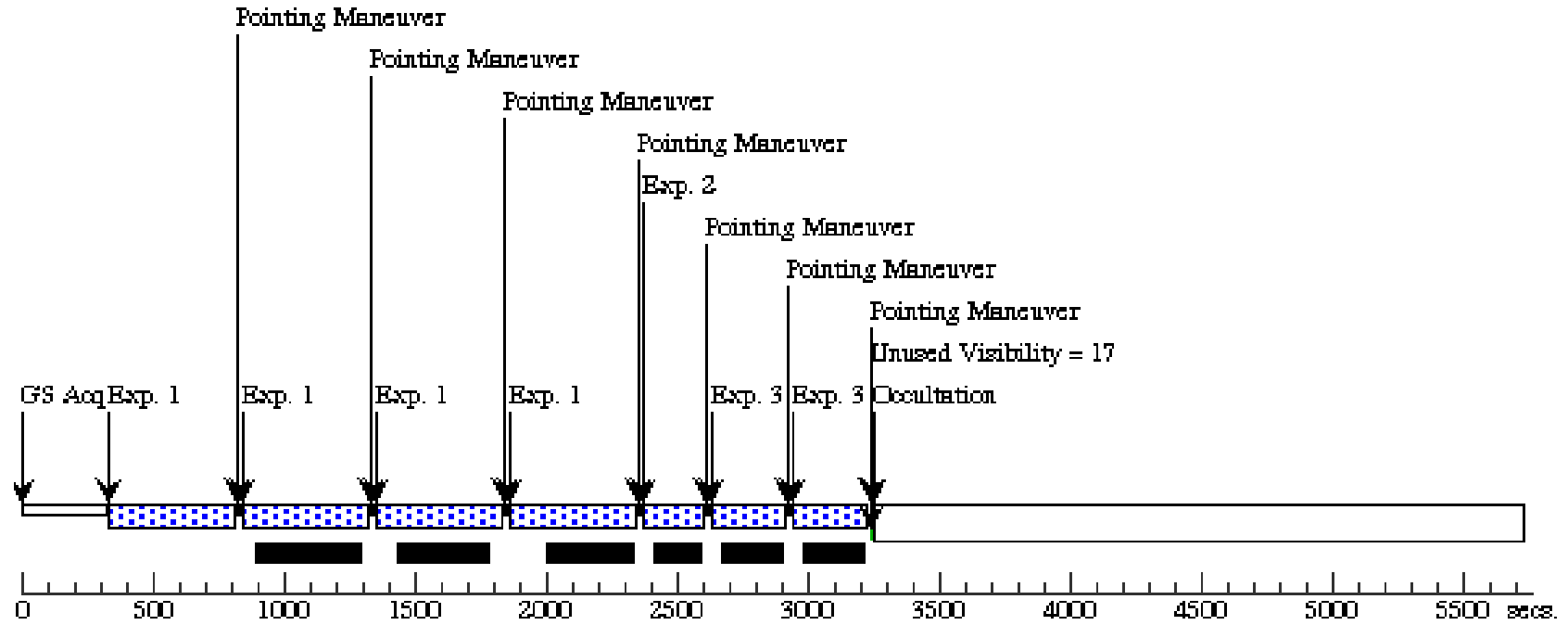
Proposal 12182 - Visit 47 - Measuring the physical properties of the Milky Way nuclear star cluster with proper motions

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
Exposures	1	(17) MW-NSC-V43	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=14; SAMP-SEQ=STEP5 0		Pattern 1, Exps 1-1 i n Visit 47 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2	(17) MW-NSC-V43	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=9; SAMP-SEQ=STEP5 0	POS TARG 0,0,0		[==>]	[1]
	3	(17) MW-NSC-V43	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=10; SAMP-SEQ=STEP5 0		Pattern 1, Exps 3-3 i n Visit 47 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]
	4	(16) MW-NSC-V42	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=14; SAMP-SEQ=STEP5 0		Pattern 1, Exps 4-4 i n Visit 47 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	5	(16) MW-NSC-V42	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=10; SAMP-SEQ=STEP5 0		Pattern 1, Exps 5-5 i n Visit 47 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2] [3]
	6	(15) MW-NSC-V41	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=14; SAMP-SEQ=STEP5 0		Pattern 1, Exps 6-6 i n Visit 47 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3] [4]
	7	(15) MW-NSC-V41	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=10; SAMP-SEQ=STEP5 0		Pattern 1, Exps 7-7 i n Visit 47 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[4]
	8	(13) MW-NSC-V38	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=14; SAMP-SEQ=STEP5 0		Pattern 1, Exps 8-8 i n Visit 47 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[4] [5]
	9	(13) MW-NSC-V38	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=10; SAMP-SEQ=STEP5 0		Pattern 1, Exps 9-9 i n Visit 47 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[5]
	10	(22) MW-NSC-V38- COPY	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=14; SAMP-SEQ=STEP5 0	POS TARG 0,0,0		[==>]	[5]

Orbit 1

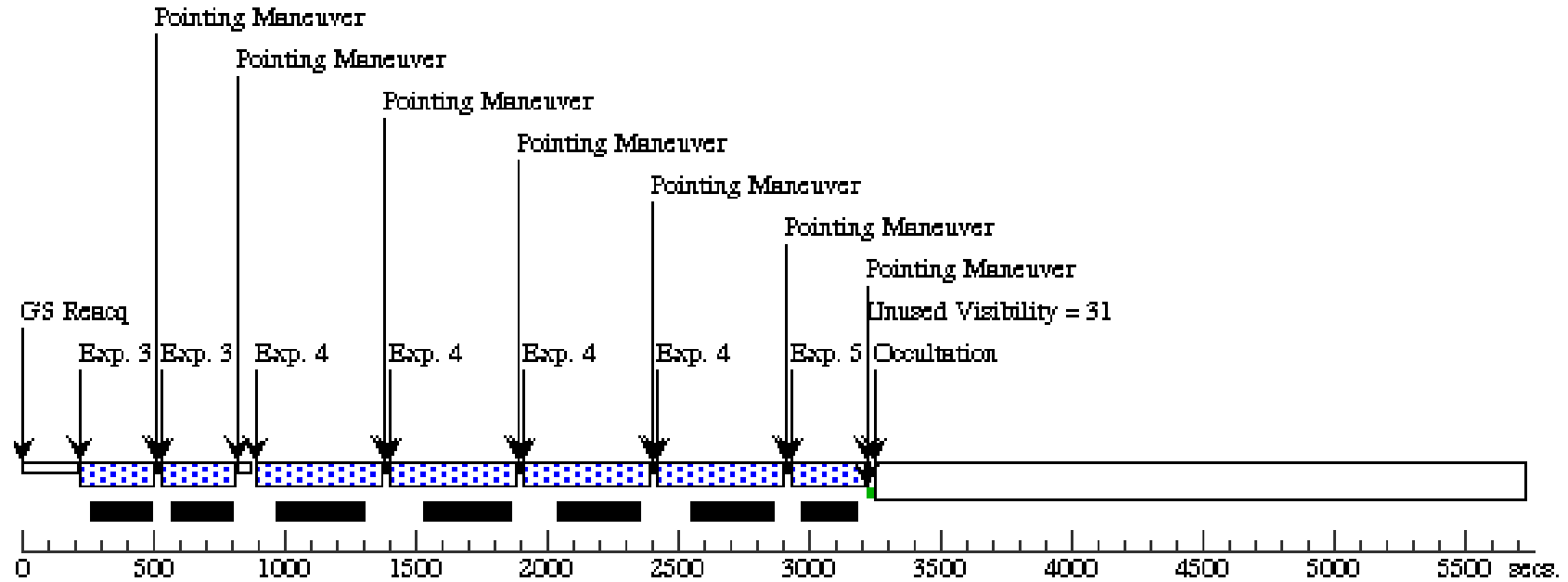
Server Version: 20100902

Orbit Structure



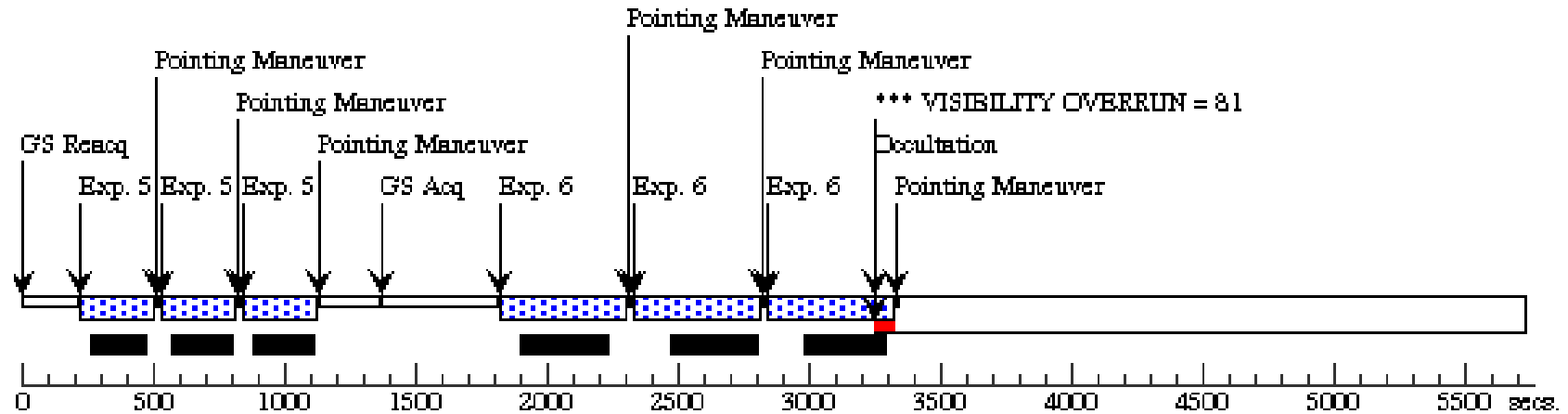
**Orbit 2**

Server Version: 20100902



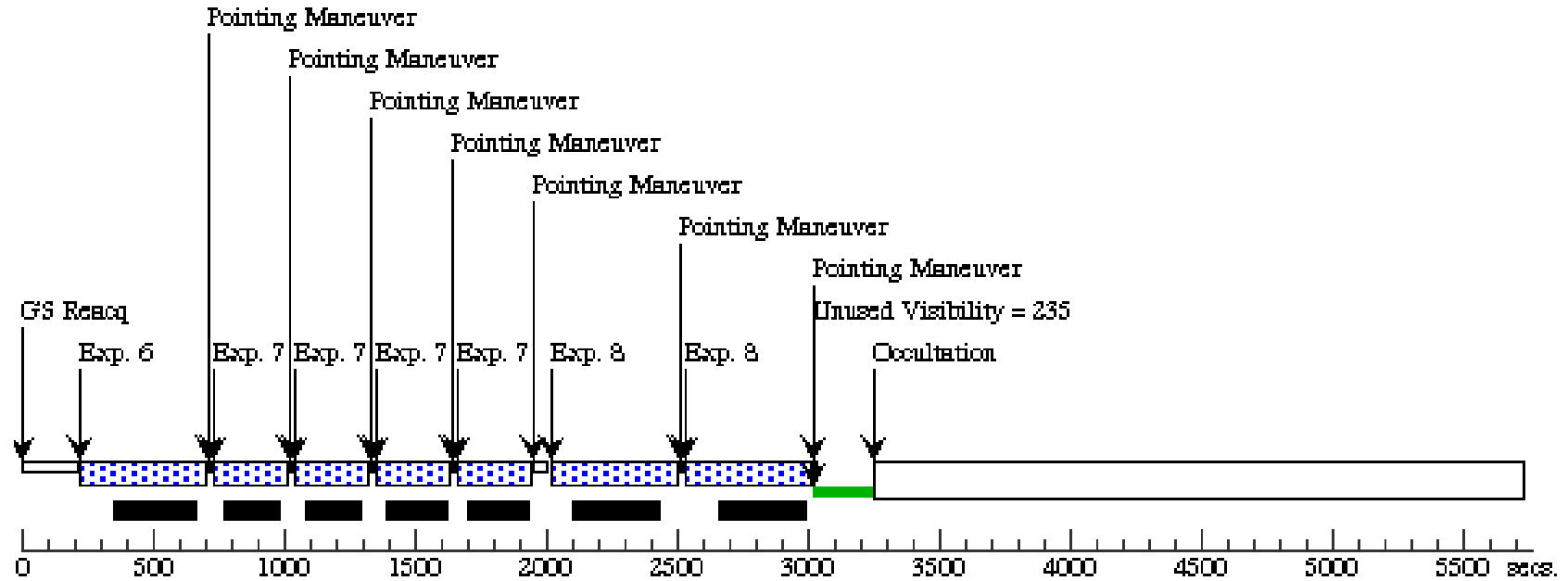
**Orbit 3**

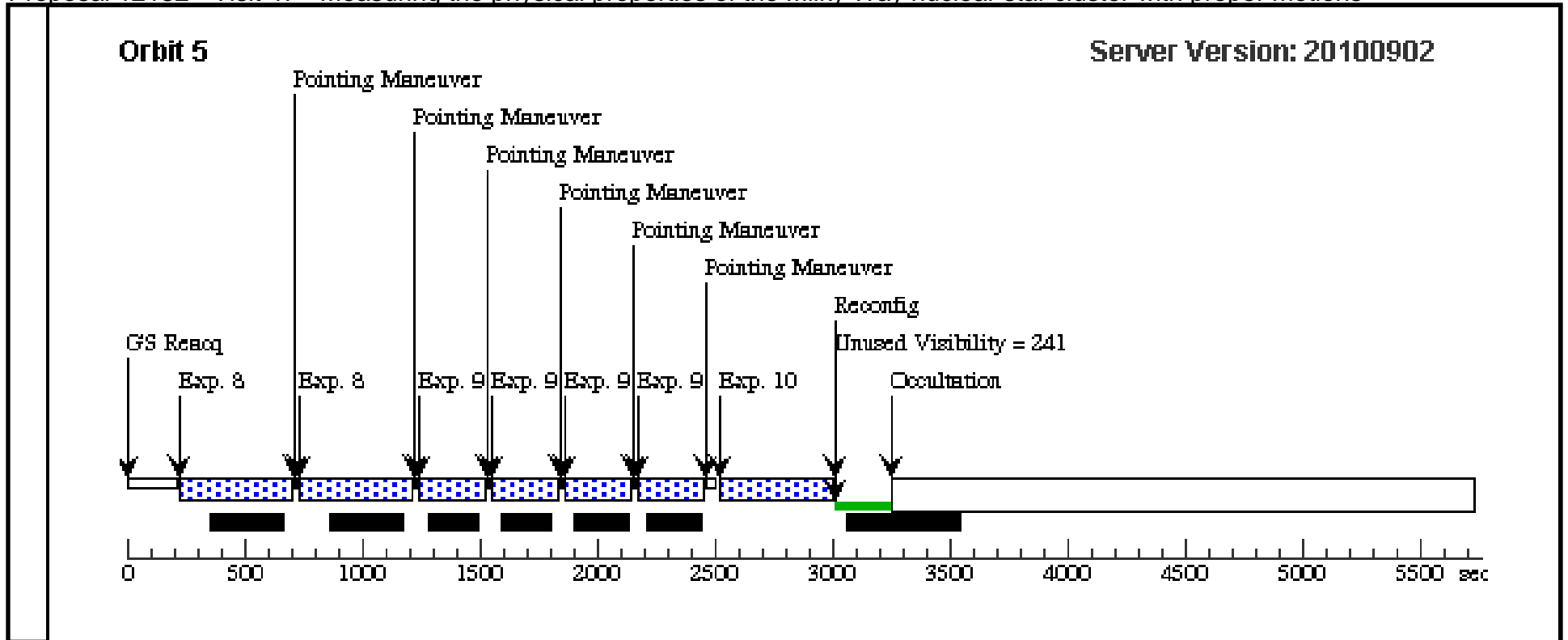
Server Version: 20100902



Orbit 4

Server Version: 20100902

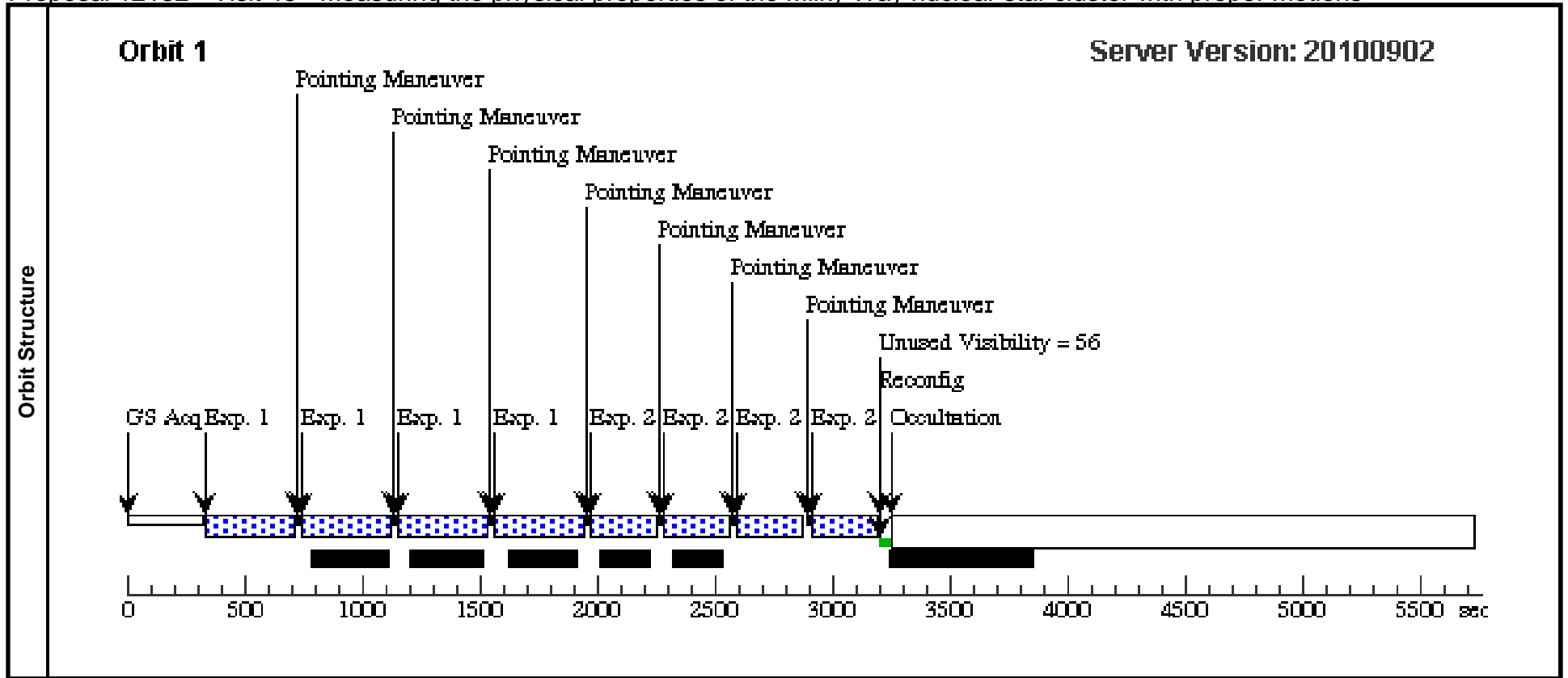




Proposal 12182 - Visit 48 - Measuring the physical properties of the Milky Way nuclear star cluster with proper motions

Thu Mar 31 01:02:36 GMT 2011

<b>Visit</b>	<b>Proposal 12182, Visit 48, completed</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: ORIENT 270D TO 270 D <i>Comments: Photometry in one of the calibration field for the characterization of the bulge population.</i>									
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>						
	(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=true		(1), (2)					
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>				
	(23)	MW-NSC-V38-COPY-1	RA: 17 45 53.7948 (266.4741450d) Dec: -28 57 25.51 (-28.95709d) Equinox: J2000		V=14+/-0.1 J=9.7, H=7.2, K=6.0	Reference Frame: ICRS				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>										
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time/[Actual Dur.]</b>	<b>Orbit</b>
	1	(23) MW-NSC-V38-COPY-1	(23) MW-NSC-V38-COPY-1	WFC3/IR, MULTIACCUM, IR-FIX	F127M	NSAMP=12; SAMP-SEQ=STEP5 0		Pattern 1, Exps 1-1 in Visit 48 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2	(23) MW-NSC-V38-COPY-1	(23) MW-NSC-V38-COPY-1	WFC3/IR, MULTIACCUM, IR-FIX	F139M	NSAMP=10; SAMP-SEQ=STEP5 0		Pattern 1, Exps 2-2 in Visit 48 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]



Proposal 12182 - Visit 49 - Measuring the physical properties of the Milky Way nuclear star cluster with proper motions

Thu Mar 31 01:02:36 GMT 2011

<b>Visit</b>	<b>Proposal 12182, Visit 49, scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR Special Requirements: (none) <i>Comments: Astrometric fields. The orientation should be 270 in order to optimally combine with observations of the central field by HST in Cycle 17. Two adjacent fields to the north-east of the mosaic are used for calibration of the effect of bulge star contamination in the cluster kinematic measurements. The calibration fields were not in the original Phase I proposal, but they have been approved by the TTRB.</i>								
	<b>Patterns</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Primary Pattern</th> <th>Secondary Pattern</th> <th>Exposures</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>                     Pattern Type=WFC3-IR-DITHER-BOX-MIN                      Purpose=DITHER                      Number Of Points=4                      Point Spacing=0.572                      Line Spacing=0.365                 </td> <td>                     Coordinate Frame=POS-TARG                      Pattern Orientation=18.528                      Angle Between Sides=74.653                      Center Pattern=true                 </td> <td>(1), (3), (4), (6), (7), (9), (11), (12), (14), (15)</td> </tr> </tbody> </table>	#	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=true
#	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=true	(1), (3), (4), (6), (7), (9), (11), (12), (14), (15)						

Proposal 12182 - Visit 49 - Measuring the physical properties of the Milky Way nuclear star cluster with proper motions

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(10)	MW-NSC-V35	RA: 17 45 53.0746 (266.4711442d) Dec: -29 00 15.96 (-29.00443d) Equinox: J2000		V=14+/-0.1 J=9.7, H=7.2, K=6.0	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
(11)	MW-NSC-V36	RA: 17 45 46.1714 (266.4423808d) Dec: -29 01 47.61 (-29.02989d) Equinox: J2000		V=14+/-0.1 J=9.5, H=8.6, K=8.3	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
(12)	MW-NSC-V37	RA: 17 45 39.2683 (266.4136179d) Dec: -29 03 19.23 (-29.05534d) Equinox: J2000		V=14+/-0.1 J=9.5, H=8.6, K=6.8	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
(13)	MW-NSC-V38	RA: 17 45 46.9441 (266.4456004d) Dec: -28 58 56.49 (-28.98236d) Equinox: J2000		V=14+/-0.1 J=9.7, H=7.2, K=6.0	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
(14)	MW-NSC-V40	RA: 17 45 33.1377 (266.3880738d) Dec: -29 01 59.72 (-29.03326d) Equinox: J2000		V=14+/-0.1 J=9.1, H=7.5, K=6.7	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
(15)	MW-NSC-V41	RA: 17 45 40.8135 (266.4200562d) Dec: -28 57 37.01 (-28.96028d) Equinox: J2000		V=14+/-0.1 J=11.0, H=10.0, K=8.1	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
(16)	MW-NSC-V42	RA: 17 45 33.9104 (266.3912933d) Dec: -28 59 8.62 (-28.98573d) Equinox: J2000		V=14+/-0.1 J=10.9, H=9.8, K=8.3	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
(17)	MW-NSC-V43	RA: 17 45 27.0072 (266.3625300d) Dec: -29 00 40.20 (-29.01117d) Equinox: J2000		V=14+/-0.1 J=9.1, H=7.5, K=6.7	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					

Fixed Targets

## Proposal 12182 - Visit 49 - Measuring the physical properties of the Milky Way nuclear star cluster with proper motions

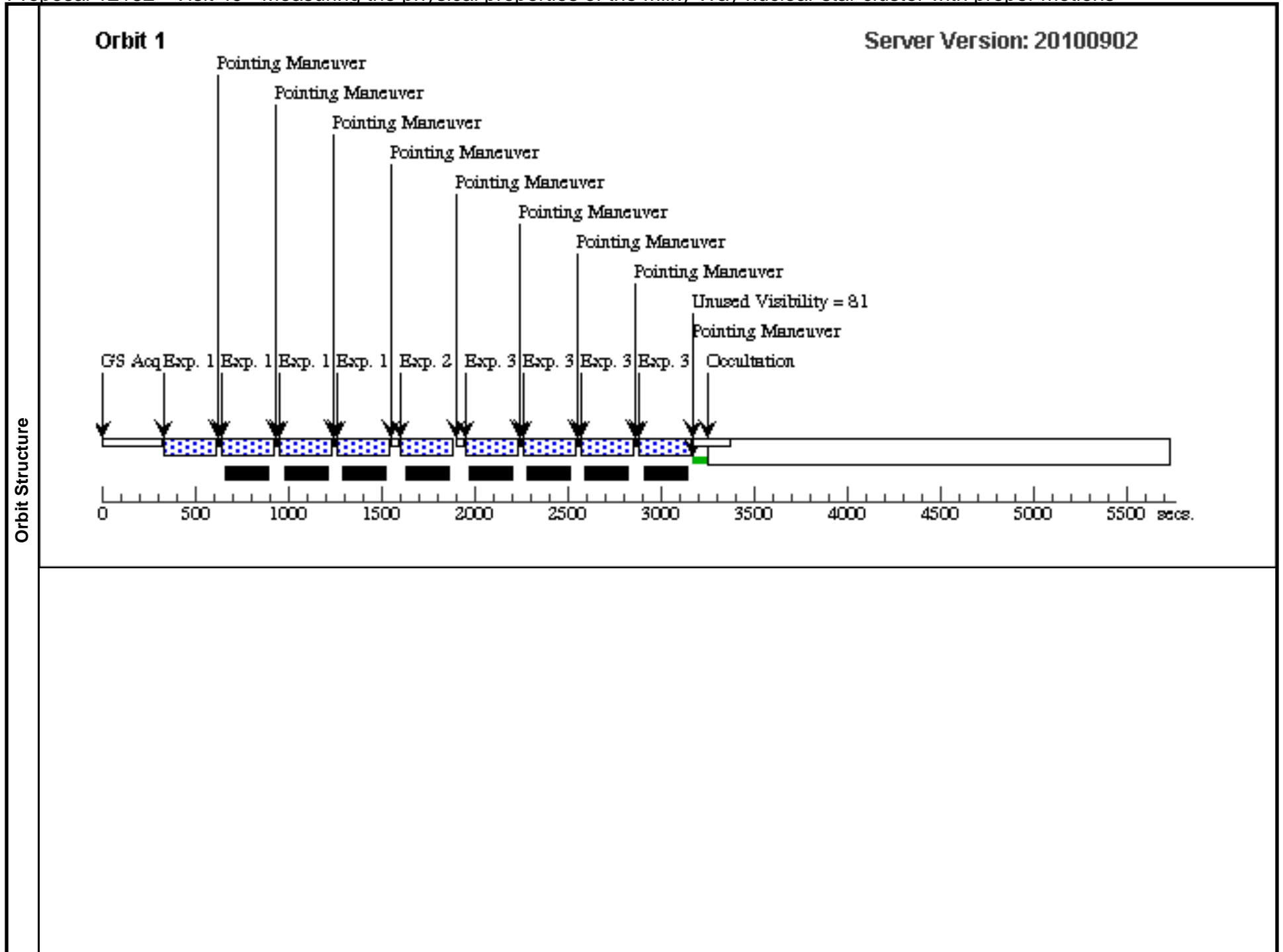
(18)	MW-NSC-V35-COPY	RA: 17 45 49.6154 (266.4567308d) Dec: -29 01 2.58 (-29.01738d) Equinox: J2000	V=14+/-0.1 J=9.7, H=7.2, K=6.0	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>				
(19)	MW-NSC-V37-COPY	RA: 17 45 36.3170 (266.4013208d) Dec: -29 02 41.32 (-29.04481d) Equinox: J2000	V=14+/-0.1 J=9.5, H=8.6, K=6.8	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>				
(20)	MW-NSC-V43-COPY	RA: 17 45 30.3600 (266.3765000d) Dec: -28 59 55.51 (-28.99875d) Equinox: J2000	V=14+/-0.1 J=9.1, H=7.5, K=6.7	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>				
(21)	MW-NSC-V41-COPY	RA: 17 45 37.5401 (266.4064171d) Dec: -28 58 21.71 (-28.97270d) Equinox: J2000	V=14+/-0.1 J=11.0, H=10.0, K=8.1	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>				
(22)	MW-NSC-V38-COPY	RA: 17 45 47.4806 (266.4478358d) Dec: -28 57 32.46 (-28.95902d) Equinox: J2000	V=14+/-0.1 J=9.7, H=7.2, K=6.0	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>				
(23)	MW-NSC-V38-COPY-1	RA: 17 45 53.7948 (266.4741450d) Dec: -28 57 25.51 (-28.95709d) Equinox: J2000	V=14+/-0.1 J=9.7, H=7.2, K=6.0	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>				
(24)	MW-NSC-V38-COPY-2	RA: 17 45 47.7699 (266.4490412d) Dec: -28 56 7.45 (-28.93540d) Equinox: J2000	V=14+/-0.1 J=9.7, H=7.2, K=6.0	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>				

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#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
Exposures	1	(10) MW-NSC-V35	WFC3/IR, MULTIACCUM, IR-FIX	F153M	SAMP-SEQ=STEP5 0; NSAMP=10		Pattern 1, Exps 1-1 in Visit 49 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2	(18) MW-NSC-V35-COPY	WFC3/IR, MULTIACCUM, IR-FIX	F153M	NSAMP=10; SAMP-SEQ=STEP5 0	POS TARG 0,0		[==>]	[1]
	3	(11) MW-NSC-V36	WFC3/IR, MULTIACCUM, IR-FIX	F153M	SAMP-SEQ=STEP5 0; NSAMP=10		Pattern 1, Exps 3-3 in Visit 49 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	4	(12) MW-NSC-V37	WFC3/IR, MULTIACCUM, IR-FIX	F153M	SAMP-SEQ=STEP5 0; NSAMP=10		Pattern 1, Exps 4-4 in Visit 49 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	5	(19) MW-NSC-V37-COPY	WFC3/IR, MULTIACCUM, IR-FIX	F153M	NSAMP=10; SAMP-SEQ=STEP5 0	POS TARG 0,0		[==>]	[2]
	6	(14) MW-NSC-V40	WFC3/IR, MULTIACCUM, IR-FIX	F153M	SAMP-SEQ=STEP5 0; NSAMP=10		Pattern 1, Exps 6-6 in Visit 49 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]
	7	(17) MW-NSC-V43	WFC3/IR, MULTIACCUM, IR-FIX	F153M	SAMP-SEQ=STEP5 0; NSAMP=10		Pattern 1, Exps 7-7 in Visit 49 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]
	8	(20) MW-NSC-V43-COPY	WFC3/IR, MULTIACCUM, IR-FIX	F153M	NSAMP=10; SAMP-SEQ=STEP5 0	POS TARG 0,0		[==>]	[3]
	9	(16) MW-NSC-V42	WFC3/IR, MULTIACCUM, IR-FIX	F153M	SAMP-SEQ=STEP5 0; NSAMP=10		Pattern 1, Exps 9-9 in Visit 49 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[3]
	10	(21) MW-NSC-V41-COPY	WFC3/IR, MULTIACCUM, IR-FIX	F153M	NSAMP=10; SAMP-SEQ=STEP5 0	POS TARG 0,0		[==>]	[4]
	11	(15) MW-NSC-V41	WFC3/IR, MULTIACCUM, IR-FIX	F153M	SAMP-SEQ=STEP5 0; NSAMP=10		Pattern 1, Exps 11-11 in Visit 49 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[4]

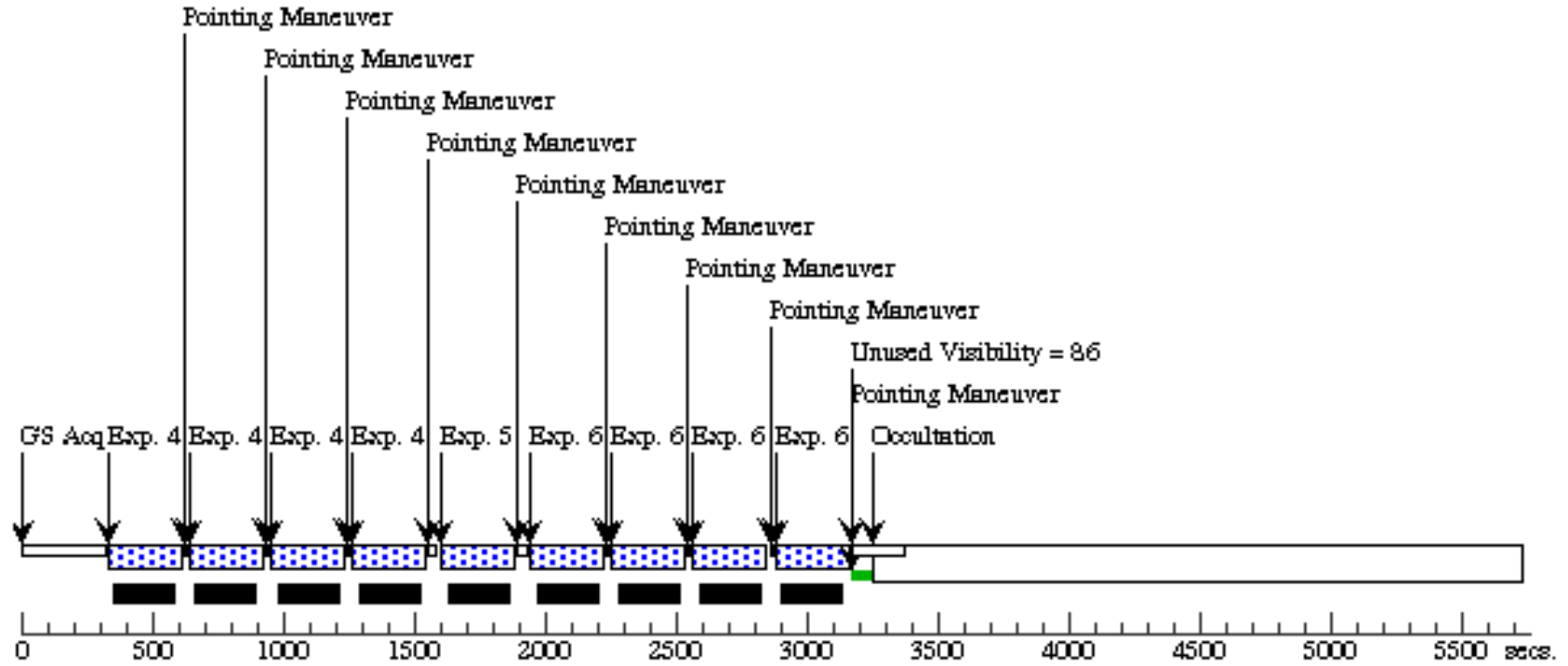
Proposal 12182 - Visit 49 - Measuring the physical properties of the Milky Way nuclear star cluster with proper motions

12	(13) MW-NSC-V38 WFC3/IR, MULTIACCUM, IR-FIX F153M	SAMP-SEQ=STEP5 0; NSAMP=10	Pattern 1, Exps 12-1 2 in Visit 49 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[4]
13	(22) MW-NSC-V38- COPY WFC3/IR, MULTIACCUM, IR-FIX F153M	NSAMP=10; POS TARG 0,0 SAMP-SEQ=STEP5 0		[==>]	[5]
14	(23) MW-NSC-V38- COPY-1 WFC3/IR, MULTIACCUM, IR-FIX F153M	SAMP-SEQ=STEP5 0; NSAMP=10	Pattern 1, Exps 14-1 4 in Visit 49 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[5]
15	(24) MW-NSC-V38- COPY-2 WFC3/IR, MULTIACCUM, IR-FIX F153M	SAMP-SEQ=STEP5 0; NSAMP=10	Pattern 1, Exps 15-1 5 in Visit 49 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[5]



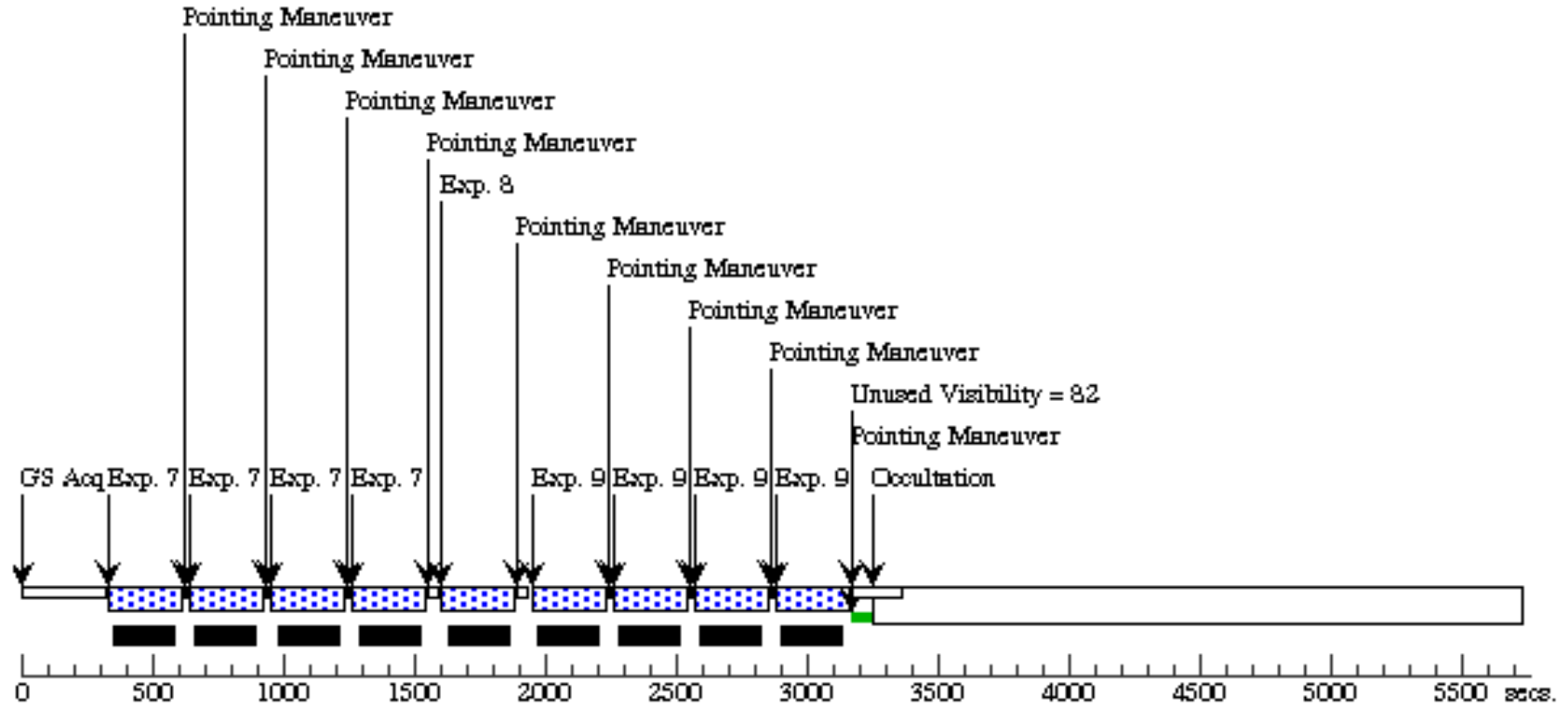
Orbit 2

Server Version: 20100902



Orbit 3

Server Version: 20100902



**Orbit 4**

Server Version: 20100902

