



10841 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch Observations)

Cycle: 15, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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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>
01	(4) NGC362-WFPC2-POS1	WFPC2	1	17-Jan-2008 14:42:59.0	yes
02	(5) NGC362-WFPC2-POS2	WFPC2	1	17-Jan-2008 14:43:04.0	yes
03	(3) NGC6681-WFPC2-POS1	WFPC2	1	17-Jan-2008 14:43:07.0	yes
04	(3) NGC6681-WFPC2-POS1	WFPC2	1	17-Jan-2008 14:43:10.0	yes
05	(6) NGC6624-WFPC2-POS1	WFPC2	1	17-Jan-2008 14:43:12.0	yes
06	(6) NGC6624-WFPC2-POS1	WFPC2	1	17-Jan-2008 14:43:15.0	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>
07	(1) NGC7099-WFPC2-POS1	WFPC2	1	17-Jan-2008 14:43:18.0	yes
08	(2) NGC7099-WFPC2-POS2	WFPC2	1	17-Jan-2008 14:43:21.0	yes
09	(7) NGC7078-WFPC2-POS1	WFPC2	1	17-Jan-2008 14:43:24.0	yes
10	(7) NGC7078-WFPC2-POS1	WFPC2	1	17-Jan-2008 14:43:27.0	yes

10 Total Orbits Used

ABSTRACT

Establishing the presence or absence of intermediate-mass black holes (IMBH) in globular clusters is crucial for understanding the evolution of dense stellar systems. Observationally, this search has been hampered by the low number of stars with known velocities in the central few arcseconds. This limits our knowledge of the velocity dispersion in the region where the gravitational influence of any IMBH would be felt. In Cycle 13, we successfully obtained ACS/HRC images of the centers of five carefully chosen Galactic globular clusters (GO-10401) for a new proper motion study. Although the science case was approved and the first epoch images obtained, the requested future cycle observations were not granted (due to a general policy decision based on the strong uncertainties at the time concerning the immediate future of HST). We have now assessed the quality of the first epoch observations. The HRC resolution reveals many isolated stars in to the very center of each cluster that remained blended or unresolved in previous WFPC2 data. Given a two year baseline, we are confident that we can achieve the proper motion precision required to place strict limits on the presence of an IMBH. Therefore, we request the second-epoch, follow-up observations to GO-10401 in order to measure the proper motions of stars in our target clusters. These velocity measurements will allow us to: (i) place constraints on the mass of a central black hole in each cluster; (ii) derive the internal velocity dispersion as a function of cluster radius; (iii) verify or reject previous reports of cluster rotation; and (iv) directly measure velocity anisotropy as a function of radius. If no second epoch data are obtained then the observing time already invested in the first epoch will have been wasted.

OBSERVING DESCRIPTION

The success of this project hinges on accurate astrometric measurements for a large number of stars in the centers of five crowded Galactic globular clusters. This program was originally scheduled for execution with ACS/HRC, and has been approved for WFPC2 with the loss of ACS/HRC. In order to suppress bright giants, we will take measurements in the F450W filter using the WFPC2, which provides the best compromise between crowding issues and reasonable exposure times. The first epoch observations were taken as part of GO-10401, and we use those to scale the exposure times here. Using the ACS and WFPC2 ETCs, we find a difference in sensitivity between ACS/HRC F435W and WFPC2 F450W of a factor of 2, and account for this in the exposure times. The exposure time estimates have also been checked independently based on WFPC2 observations available in the archive. In order to balance our need for longer exposure times with not saturating too many bright stars, we will use gain=15.

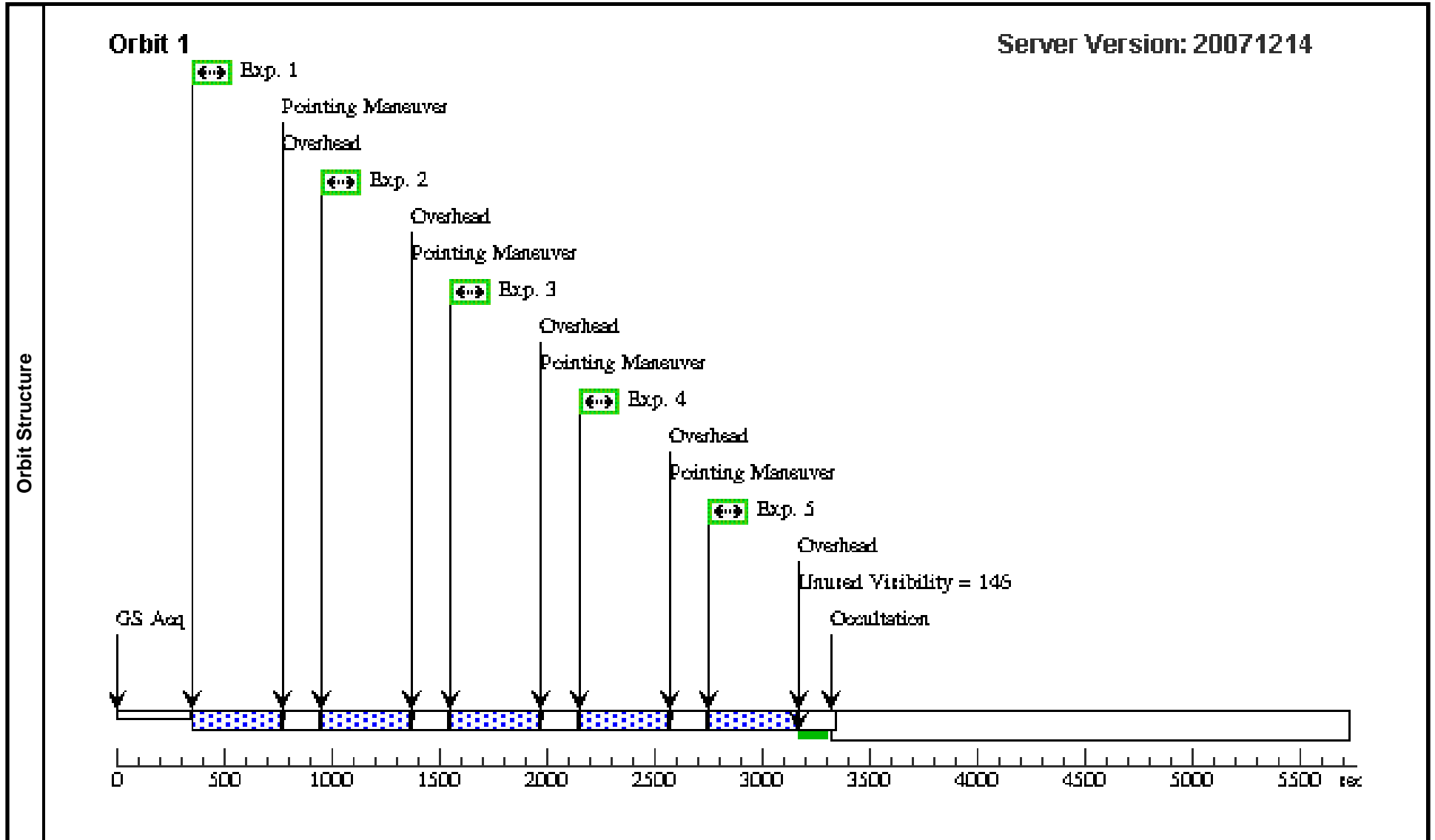
Each cluster will be observed in two separate visits, taken at different orientations. This will allow us to test, and if needed account for, the effects of CTE. We have designed 4 and 5 point dither patterns to best sample the face of each PC pixel. For NGC7078, we also include 2 short exposures, which will give an additional handle on the CTE and possibly some measurements for stars which saturate on the long exposures (this cluster is expected to have the highest number of saturated stars in the central regions).

The object coordinates are now on the ICRS system. We used the available web-based tool to convert the coordinates from proposal 10401 to this system.

Proposal 10841 - Visit 01 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch ...

Thu Jan 17 19:43:30 GMT 2008

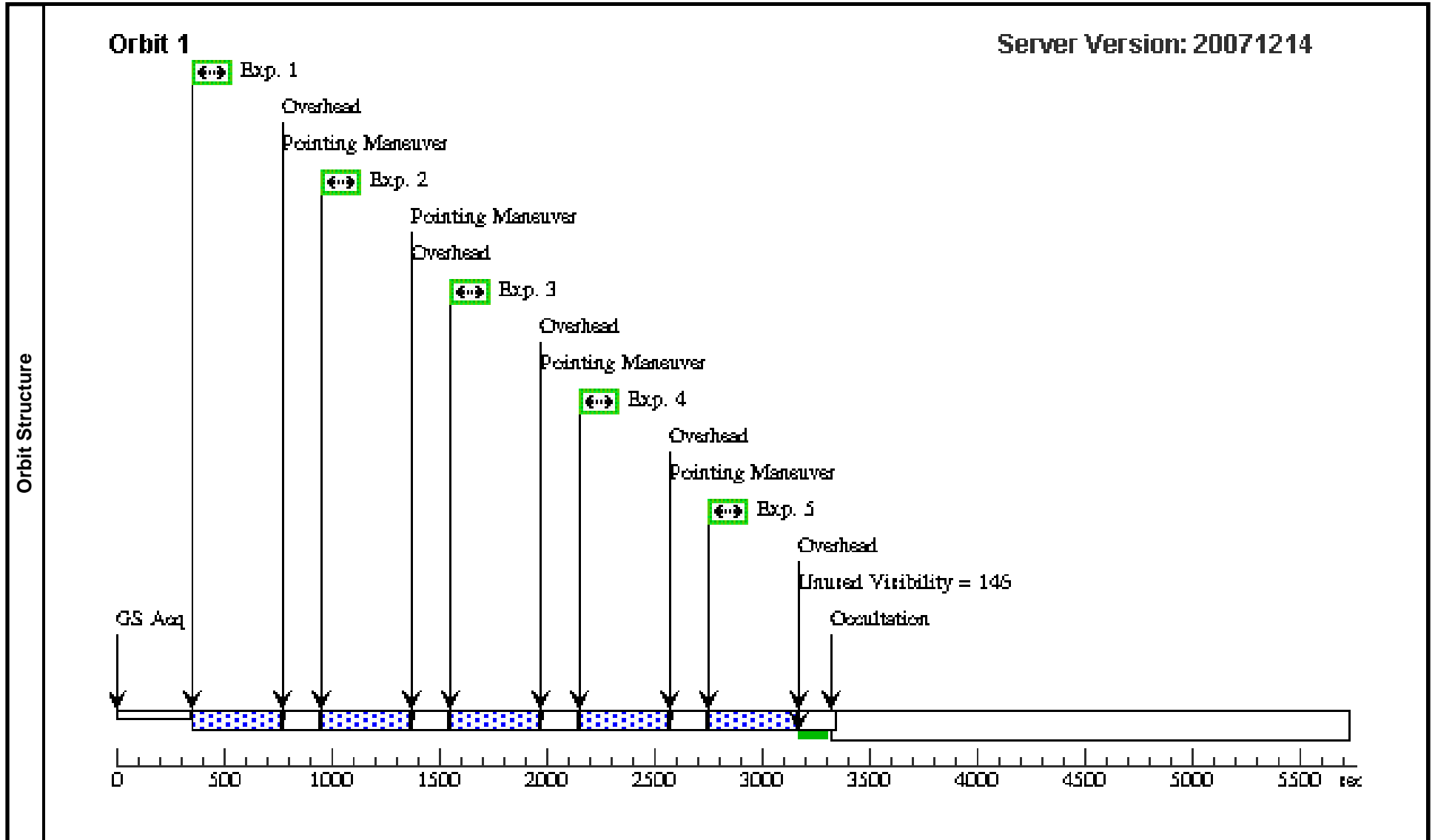
Visit	Proposal 10841, Visit 01, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: ORIENT 267.0D TO 287.0 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(4)	NGC362-WFPC2-POS1	RA: 01 03 14.3700 (15.8098750d) Dec: -70 50 58.00 (-70.84944d) Equinox: J2000		V=6.4	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	N362-WFP C2-POS1	(4) NGC362-WFPC2 -POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15			230.0 Secs [==>]	[1]
	2	N362-WFP C2-POS2	(4) NGC362-WFPC2 -POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.3562, 0.2101		230.0 Secs [==>]	[1]
	3	N362-WFP C2-POS3	(4) NGC362-WFPC2 -POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.1644, 0.3745		230.0 Secs [==>]	[1]
	4	N362-WFP C2-POS4	(4) NGC362-WFPC2 -POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.3927,- 0.1461		230.0 Secs [==>]	[1]
	5	N362-WFP C2-POS5	(4) NGC362-WFPC2 -POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.2192,- 0.3471		230.0 Secs [==>]	[1]



Proposal 10841 - Visit 02 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch ...

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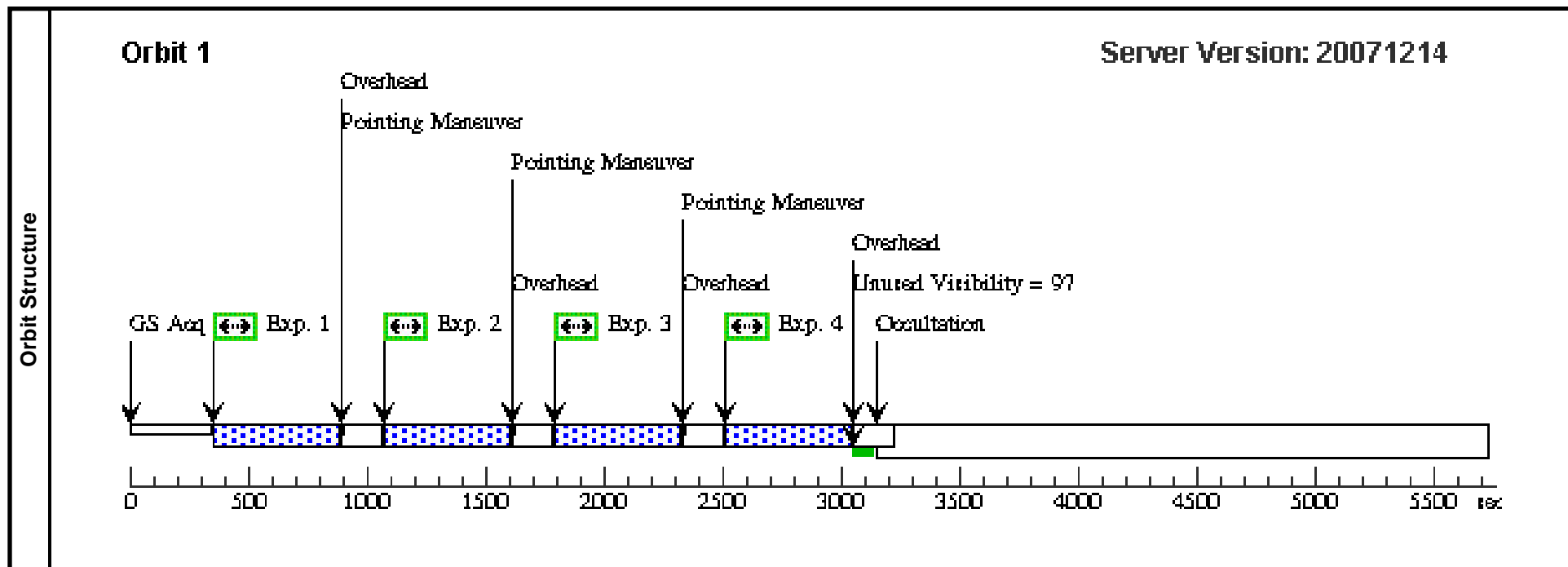
Visit	Proposal 10841, Visit 02, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: ORIENT 177.0D TO 197.0 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(5)	NGC362-WFPC2-POS2	RA: 01 03 14.6700 (15.8111250d) Dec: -70 50 59.90 (-70.84997d) Equinox: J2000		V=6.4	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	N362-WFP C2-POS1	(5) NGC362-WFPC2 -POS2	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15			230.0 Secs [==>]	[1]
	2	N362-WFP C2-POS2	(5) NGC362-WFPC2 -POS2	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.3562, 0.2101		230.0 Secs [==>]	[1]
	3	N362-WFP C2-POS3	(5) NGC362-WFPC2 -POS2	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.1644, 0.3745		230.0 Secs [==>]	[1]
	4	N362-WFP C2-POS4	(5) NGC362-WFPC2 -POS2	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.3927,- 0.1461		230.0 Secs [==>]	[1]
	5	N362-WFP C2-POS5	(5) NGC362-WFPC2 -POS2	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.2192,- 0.3471		230.0 Secs [==>]	[1]



Proposal 10841 - Visit 03 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch ...

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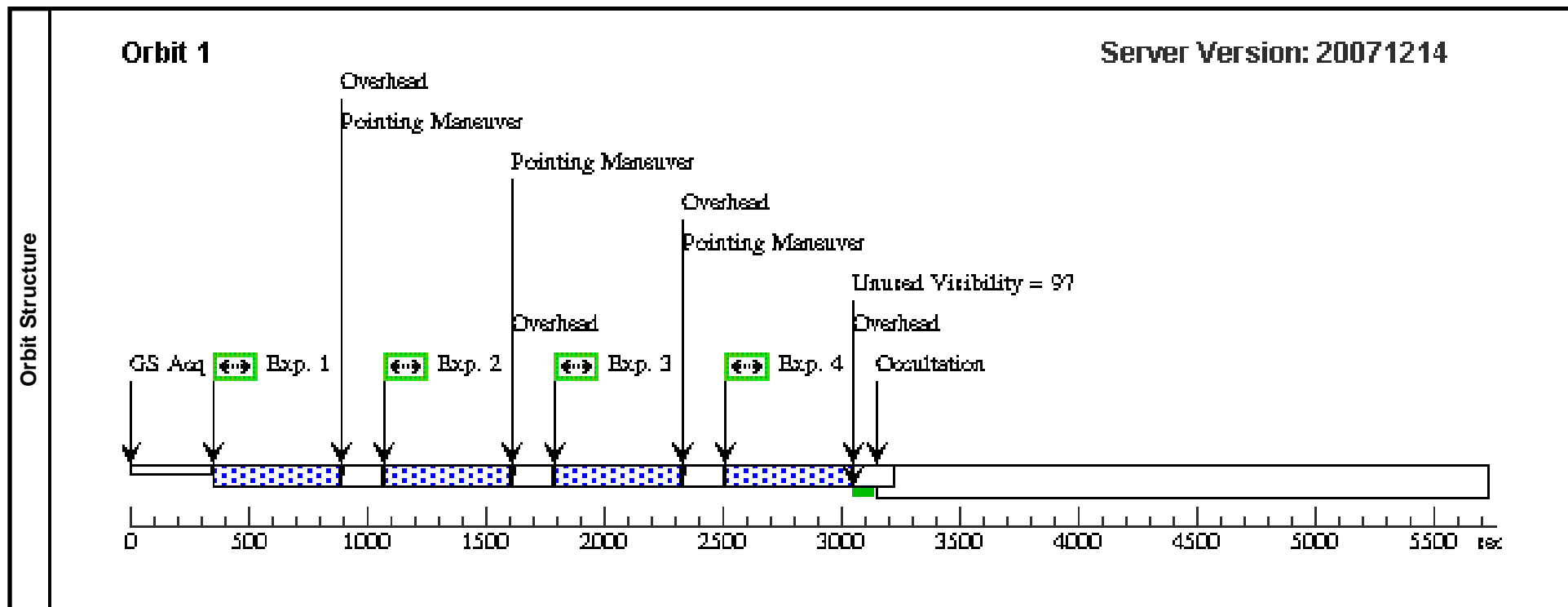
Visit	Proposal 10841, Visit 03, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: ORIENT 297.0D TO 317.0 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(3)	NGC6681-WFPC2-POS1	RA: 18 43 12.7100 (280.8029583d) Dec: -32 17 31.30 (-32.29203d) Equinox: J2000		V=7.87	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	N6681-WFP C2-POS1	(3) NGC6681-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.137,- 0.137		400.0 Secs [==>]	[1]
	2	N6681-WFP C2-POS2	(3) NGC6681-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.3882, -0.685		400.0 Secs [==>]	[1]
	3	N6681-WFP C2-POS3	(3) NGC6681-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.411,-0 .4338		400.0 Secs [==>]	[1]
	4	N6681-WFP C2-POS4	(3) NGC6681-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.1598,0 .1142000000000000 1		400.0 Secs [==>]	[1]



Proposal 10841 - Visit 04 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch ...

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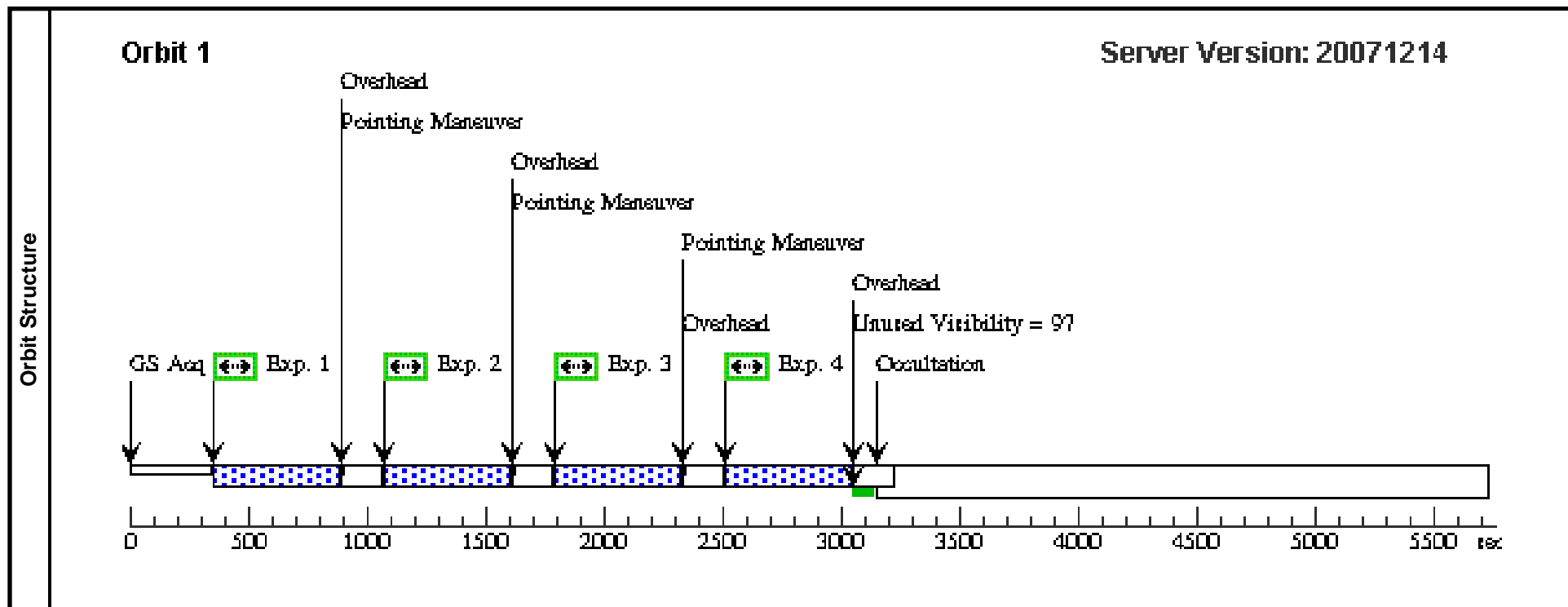
Visit	Proposal 10841, Visit 04, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: ORIENT 255.0D TO 285.0 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(3)	NGC6681-WFPC2-POS1	RA: 18 43 12.7100 (280.8029583d) Dec: -32 17 31.30 (-32.29203d) Equinox: J2000		V=7.87	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	N6681-WFP C2-POS1	(3) NGC6681-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.137,- 0.137		400.0 Secs [==>]	[1]
	2	N6681-WFP C2-POS2	(3) NGC6681-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.3882, -0.685		400.0 Secs [==>]	[1]
	3	N6681-WFP C2-POS3	(3) NGC6681-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.411,-0 .4338		400.0 Secs [==>]	[1]
	4	N6681-WFP C2-POS4	(3) NGC6681-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.1598,0 .1142000000000000 1		400.0 Secs [==>]	[1]



Proposal 10841 - Visit 05 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch ...

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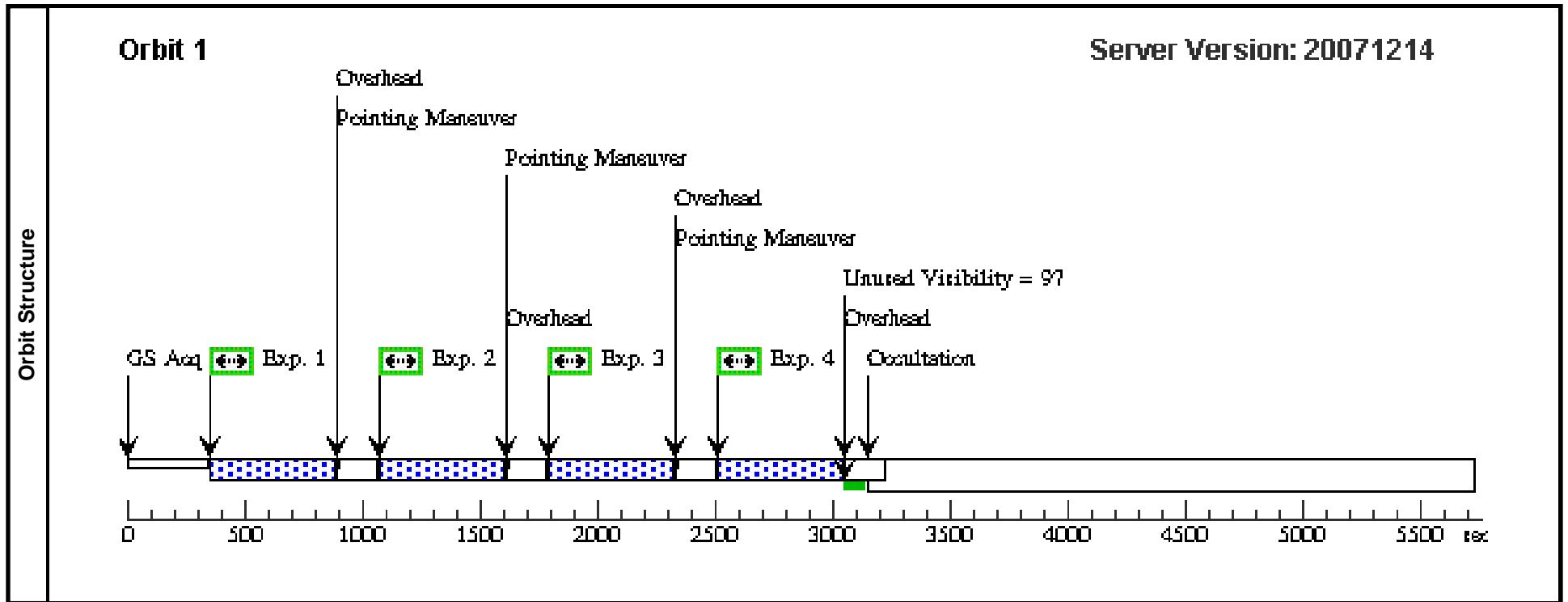
Visit	Proposal 10841, Visit 05, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: ORIENT 301.0D TO 321.0 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(6)	NGC6624-WFPC2-POS1	RA: 18 23 40.5300 (275.9188750d) Dec: -30 21 40.40 (-30.36122d) Equinox: J2000		V=7.87	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	N6624-WFP C2-POS1	(6) NGC6624-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.137,- 0.137		400.0 Secs [==>]	[1]
	2	N6624-WFP C2-POS2	(6) NGC6624-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.3882, -0.685		400.0 Secs [==>]	[1]
	3	N6624-WFP C2-POS3	(6) NGC6624-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.411,-0 .4338		400.0 Secs [==>]	[1]
	4	N6624-WFP C2-POS4	(6) NGC6624-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.1598,0 .1142000000000000 1		400.0 Secs [==>]	[1]



Proposal 10841 - Visit 06 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch ...

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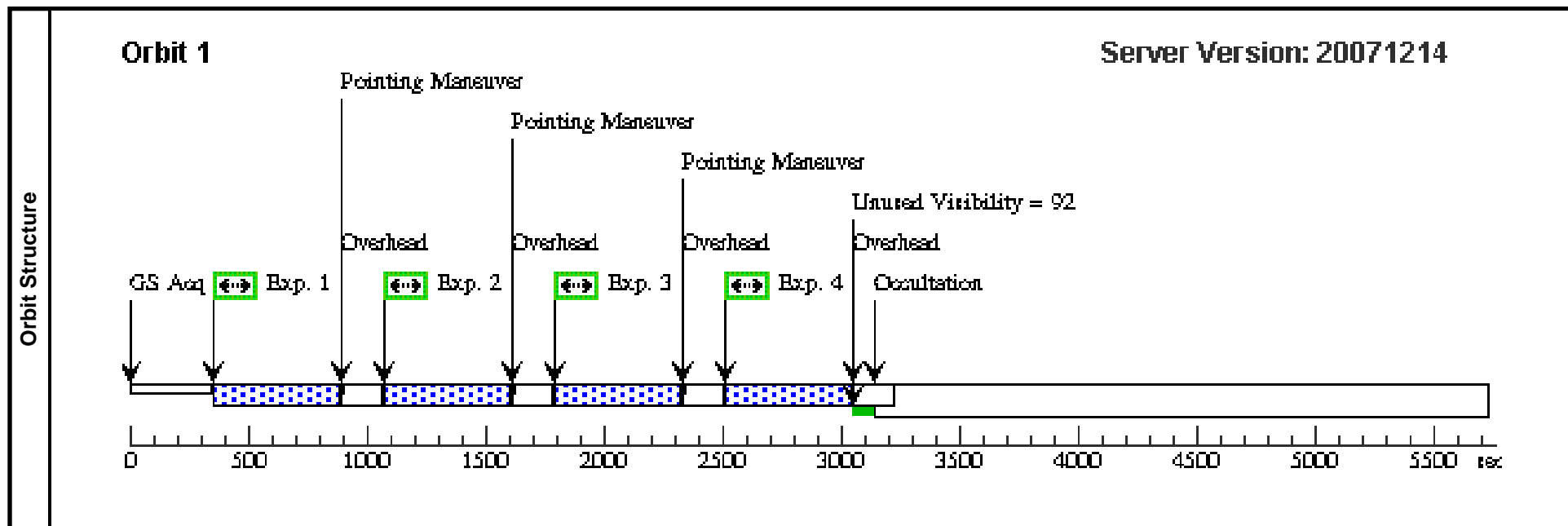
Visit	Proposal 10841, Visit 06, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: ORIENT 260.0D TO 290.0 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(6)	NGC6624-WFPC2-POS1	RA: 18 23 40.5300 (275.9188750d) Dec: -30 21 40.40 (-30.36122d) Equinox: J2000		V=7.87	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	N6624-WFP C2-POS1	(6) NGC6624-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.137,- 0.137		400.0 Secs [==>]	[1]
	2	N6624-WFP C2-POS2	(6) NGC6624-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.3882, -0.685		400.0 Secs [==>]	[1]
	3	N6624-WFP C2-POS3	(6) NGC6624-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.411,-0 .4338		400.0 Secs [==>]	[1]
	4	N6624-WFP C2-POS4	(6) NGC6624-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.1598,0 .1142000000000000 1		400.0 Secs [==>]	[1]



Proposal 10841 - Visit 07 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch ...

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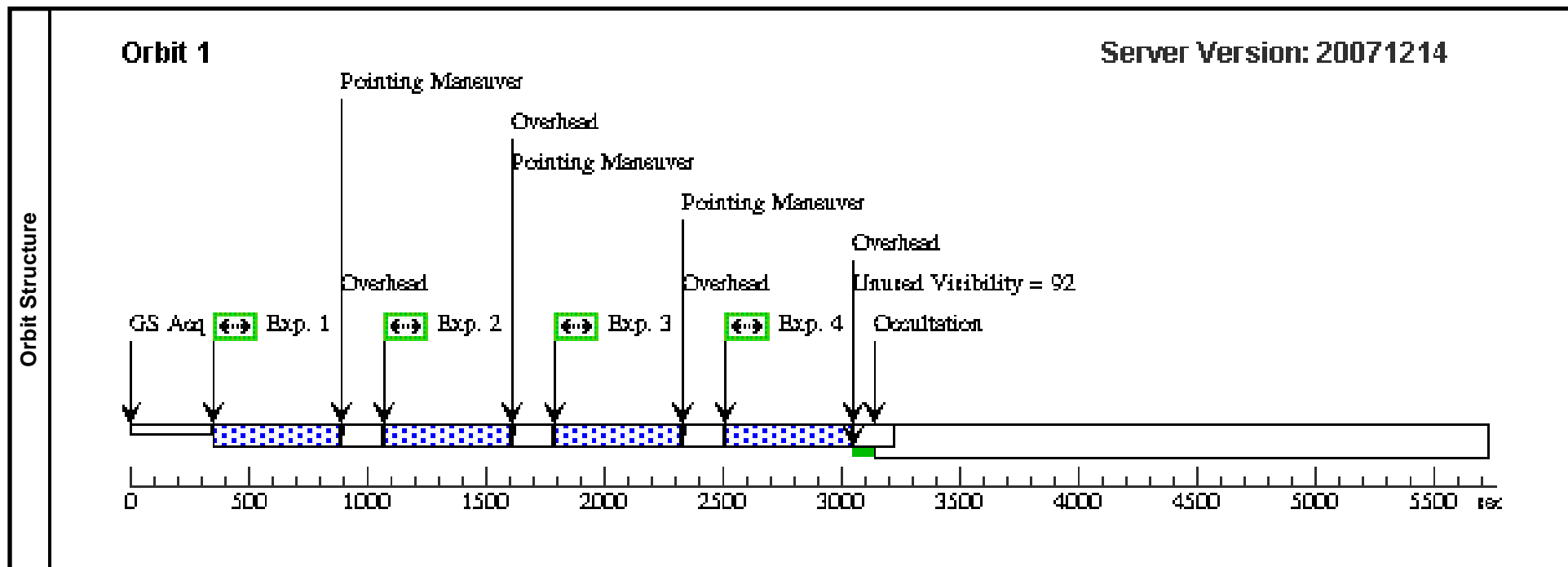
Visit	Proposal 10841, Visit 07, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: ORIENT 292.0D TO 312.0 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	NGC7099-WFPC2-POS1	RA: 21 40 22.2300 (325.0926250d) Dec: -23 10 48.00 (-23.18000d) Equinox: J2000		V=7.19	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	N7099-WFP C2-POS1	(1) NGC7099-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.137,- 0.137		400.0 Secs [==>]	[1]
	2	N7099-WFP C2-POS2	(1) NGC7099-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.3882, -0.685		400.0 Secs [==>]	[1]
	3	N7099-WFP C2-POS3	(1) NGC7099-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.411,-0 .4338		400.0 Secs [==>]	[1]
	4	N7099-WFP C2-POS4	(1) NGC7099-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.1598,0 .1142000000000000 1		400.0 Secs [==>]	[1]



Proposal 10841 - Visit 08 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch ...

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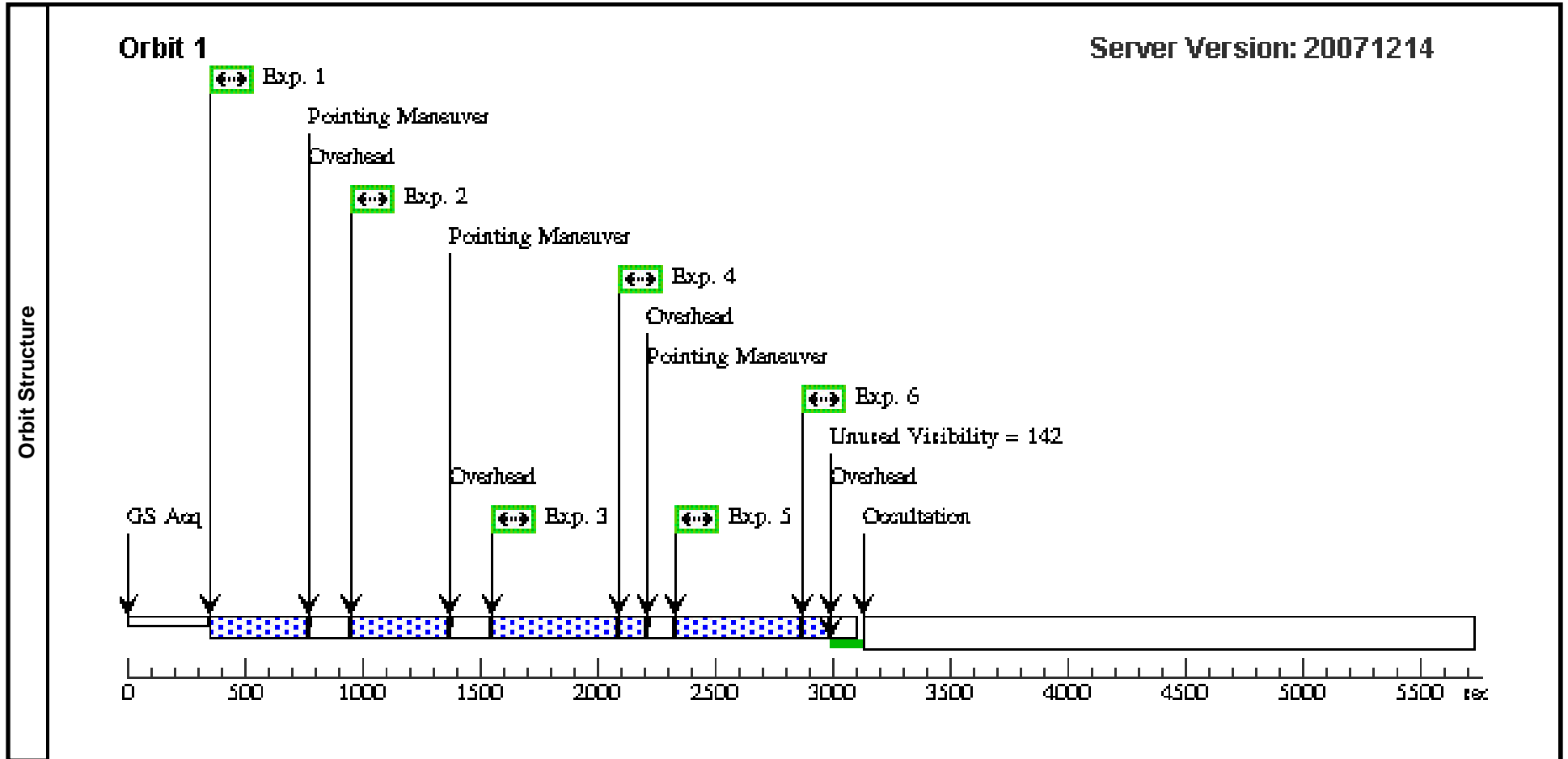
Visit	Proposal 10841, Visit 08, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(2)	NGC7099-WFPC2-POS2	RA: 21 40 22.2300 (325.0926250d) Dec: -23 10 48.00 (-23.18000d) Equinox: J2000		V=7.19	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	N7099-WFP C2-POS1	(2) NGC7099-WFPC 2-POS2	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.137,- 0.137		400.0 Secs [==>]	[1]
	2	N7099-WFP C2-POS2	(2) NGC7099-WFPC 2-POS2	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.3882, -0.685		400.0 Secs [==>]	[1]
	3	N7099-WFP C2-POS3	(2) NGC7099-WFPC 2-POS2	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.411,-0 .4338		400.0 Secs [==>]	[1]
	4	N7099-WFP C2-POS4	(2) NGC7099-WFPC 2-POS2	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.1598,0 .1142000000000000 1		400.0 Secs [==>]	[1]



Proposal 10841 - Visit 09 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch ...

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Visit	Proposal 10841, Visit 09, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: ORIENT 189.0D TO 209.0 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(7)	NGC7078-WFPC2-POS1	RA: 21 29 58.3000 (322.4929167d) Dec: +12 10 1.00 (12.16694d) Equinox: J2000		V=6.2	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	N7078-WFP C2-POS1	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.137,- 0.137		260.0 Secs [==>]	[1]
	2	N7078-WFP C2-POS2	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.3882, -0.685		260.0 Secs [==>]	[1]
	3	N7078-WFP C2-POS3	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.411,-0 .4388		260.0 Secs [==>]	[1]
	4	N7078-WFP C2-POS3s	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.411,-0 .4388		70.0 Secs [==>]	[1]
	5	N7078-WFP C2-POS4	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.1598,0 .1142000000000000 1		260.0 Secs [==>]	[1]
	6	N7078-WFP C2-POS4s	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.1598,0 .1142000000000000 1		70.0 Secs [==>]	[1]



Proposal 10841 - Visit 10 - A Proper Motion Search for Intermediate Mass Black Holes in Globular Clusters (2nd Epoch ...

Thu Jan 17 19:43:35 GMT 2008

Visit	Proposal 10841, Visit 10, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: ORIENT 240.0D TO 280.0 D									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(7)	NGC7078-WFPC2-POS1	RA: 21 29 58.3000 (322.4929167d) Dec: +12 10 1.00 (12.16694d) Equinox: J2000		V=6.2	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	N7078-WFP C2-POS1	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.137,- 0.137		260.0 Secs [==>]	[1]
	2	N7078-WFP C2-POS2	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG -0.3882, -0.685		260.0 Secs [==>]	[1]
	3	N7078-WFP C2-POS3	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.411,-0 .4338		260.0 Secs [==>]	[1]
	4	N7078-WFP C2-POS3s	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.411,-0 .4338		70.0 Secs [==>]	[1]
	5	N7078-WFP C2-POS4	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.1598,0 .1142000000000000 1		260.0 Secs [==>]	[1]
	6	N7078-WFP C2-POS4s	(7) NGC7078-WFPC 2-POS1	WFPC2, IMAGE, PC1-FIX	F450W	CR-SPLIT=NO; ATD-GAIN=15	POS TARG 0.1598,0 .1142000000000000 1		70.0 Secs [==>]	[1]

