



## 11125 - The Dynamical Evolution of Globular Clusters

Cycle: 16, Proposal Category: GO

(Availability Mode: SUPPORTED)

### INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
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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>
04	(1) NGC-5053-N	WFPC2	2	17-Jan-2008 21:35:54.0	yes
05	(1) NGC-5053-N	WFPC2	4	17-Jan-2008 21:36:00.0	yes
02	(2) NGC-5466-N	WFPC2	2	17-Jan-2008 21:36:04.0	yes
06	(2) NGC-5466-N	WFPC2	4	17-Jan-2008 21:36:08.0	yes
03	(3) NGC-5897-S	WFPC2	2	17-Jan-2008 21:36:12.0	yes
07	(3) NGC-5897-S	WFPC2	4	17-Jan-2008 21:36:17.0	yes

18 Total Orbits Used

### ABSTRACT

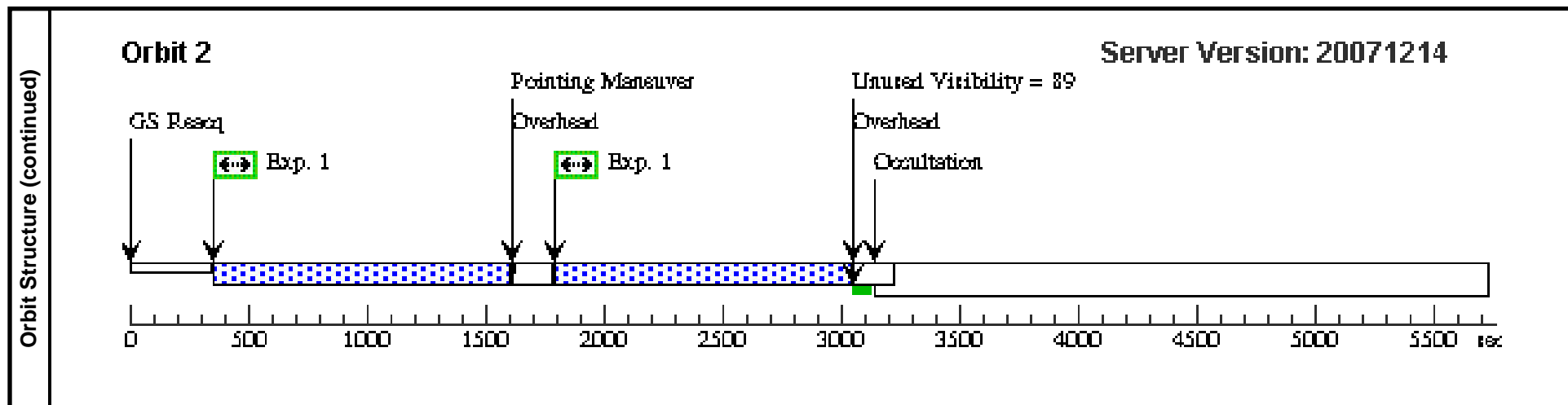
Globular clusters evolve through dynamical interactions, with primordial binaries extending the time until core collapse by up to an order of magnitude, depending on the initial binary fraction. These dynamical interactions plus mass segregation causes the binary fraction to rise in the core

but fall at larger radii. We hope to eventually test these broad predictions by comparing them to the binary properties for globular clusters at different states of evolution, defined by the ratio of their age to the dynamical relaxation time at the half-light radius. The most important unknown aspects in the modeling process are the initial conditions of binaries in the cluster. Here we propose to determine the initial binary fraction as a function of radius by studying three of the dynamically youngest globular clusters (NGC 5053, NGC 5466, and NGC 5897). The presence of binaries thickens the Main Sequence in a color-magnitude diagram, which can be detected with deep multicolor images.

### **OBSERVING DESCRIPTION**

For NGC 5053, NGC 5466 and NGC 5897, we will obtain off-center imaging observations in F606W (2 orbits per object) and F814W (4 orbits per object). For each of these three clusters, a single field will be imaged.

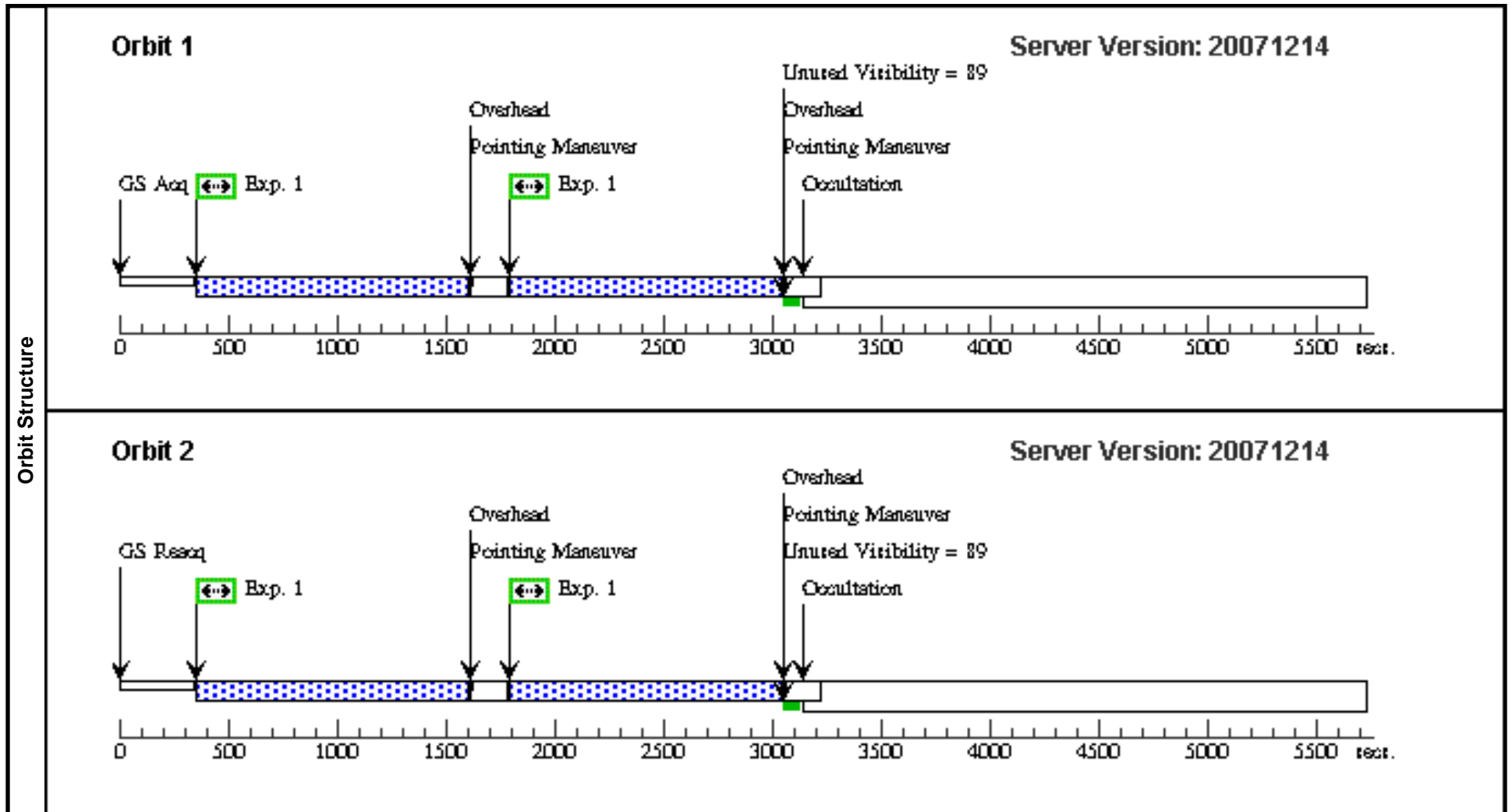
<b>Visit</b>	<b>Proposal 11125, Visit 04</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFPC2 Special Requirements: (none)										
	<b>Patterns</b>	#	<b>Primary Pattern</b>				<b>Secondary Pattern</b>				<b>Exposures</b>
(1)		Pattern Type=WFPC2-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.559017 Line Spacing=0.559017		Coordinate Frame=POS-TARG Pattern Orientation=26.56505 Angle Between Sides=143.1301 Center Pattern=false						(1)	
<b>Fixed Targets</b>	#	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>		<b>Fluxes</b>		<b>Miscellaneous</b>		
	(1)	NGC-5053-N	RA: 13 16 27.0000 (199.1125000d) Dec: +17 45 14.00 (17.75389d) Equinox: J2000				V=9.5+/-0.1		Reference Frame: NED		
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>											
<b>Exposures</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	ngc5053nV	(1) NGC-5053-N	WFPC2, IMAGE, WFALL	F606W	ATD-GAIN=15; CR-SPLIT=NO		Pattern 1-1 (1)	1100.0 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]		[1]  [2]
<b>Orbit Structure</b>	<p><b>Orbit 1</b> <span style="float: right;"><b>Server Version: 20071214</b></span></p> <p>The diagram shows a horizontal timeline from 0 to 5500 seconds. A blue shaded region from approximately 400s to 3000s represents the observation period. Key events are marked with arrows: GS Acq at ~200s, Exp. 1 (green box) at ~400s, Pointing Maneuver at ~1600s, another Exp. 1 (green box) at ~1800s, Occultation at ~3000s, and a final Pointing Maneuver at ~3100s. Labels 'Overhead' and 'Unused Visibility = 89' are placed above the timeline.</p>										

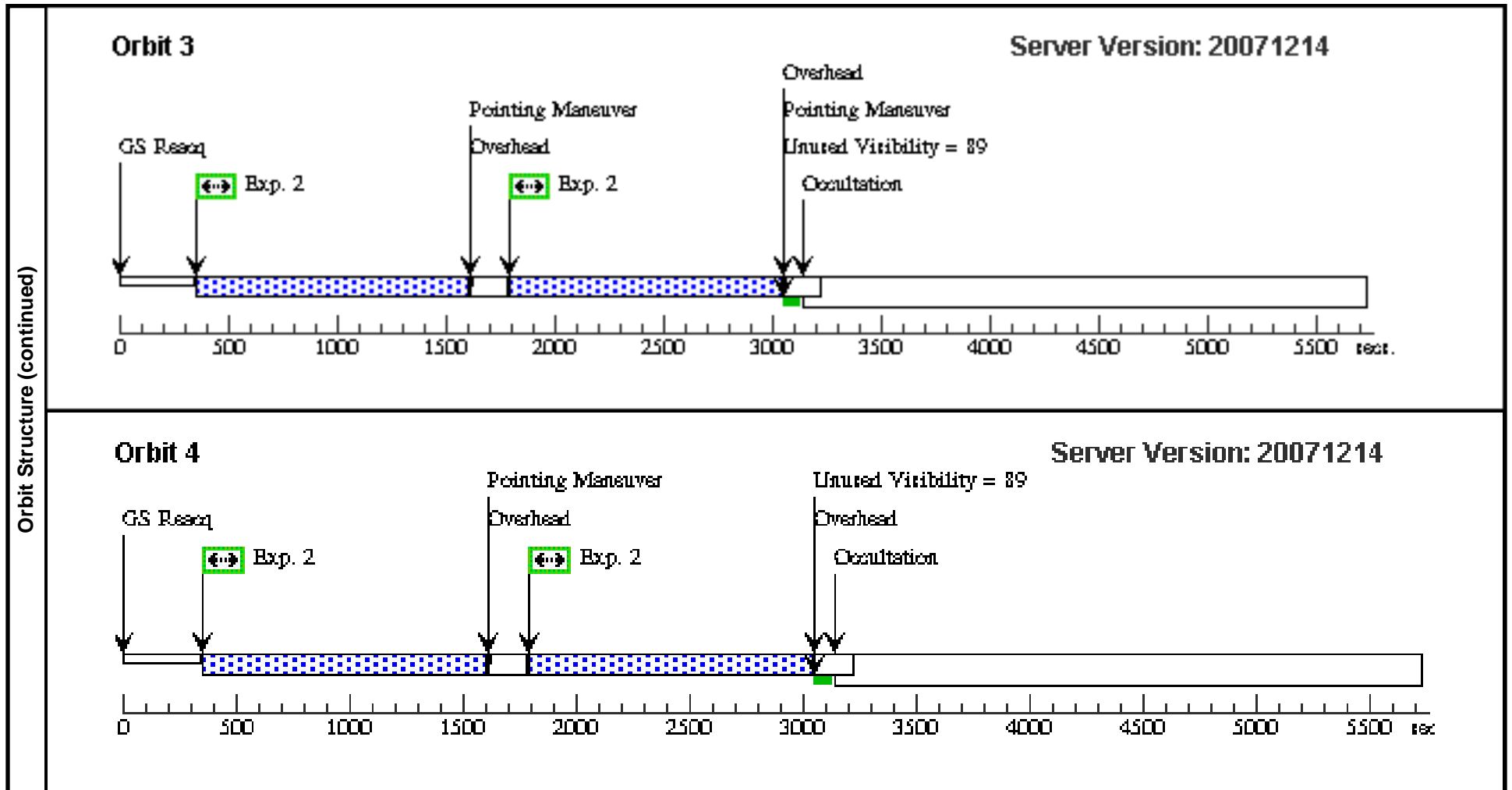


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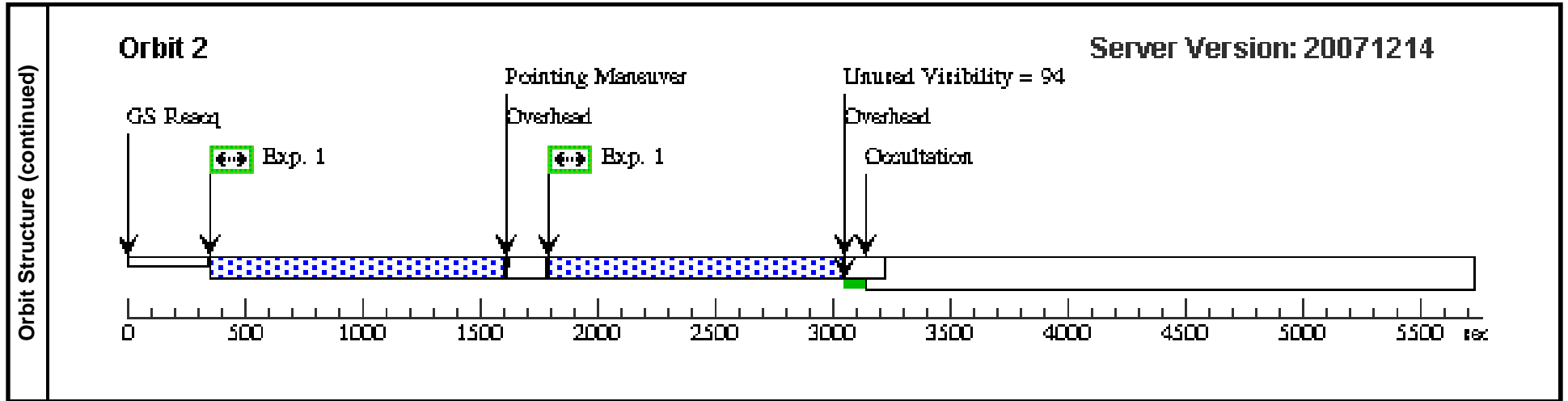
Fri Jan 18 02:36:22 GMT 2008

<b>Visit</b>	<b>Proposal 11125, Visit 05</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFPC2 Special Requirements: SAME ORIENT AS 04									
	<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>				<b>Secondary Pattern</b>			
(1)		Pattern Type=WFPC2-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.559017 Line Spacing=0.559017	Coordinate Frame=POS-TARG Pattern Orientation=26.56505 Angle Between Sides=143.1301 Center Pattern=false					(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>				
	(1)	NGC-5053-N	RA: 13 16 27.0000 (199.1125000d) Dec: +17 45 14.00 (17.75389d) Equinox: J2000		V=9.5+/-0.1	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED 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	ngc5053n11	(1) NGC-5053-N	WFPC2, IMAGE, WFALL	F814W	ATD-GAIN=15; CR-SPLIT=NO		Pattern 1-1 (1)	1100.0 Secs	
									[=>(Pattern 1)]	[1]
									[=>(Pattern 2)]	[2]
									[=>(Pattern 3)]	[2]
									[=>(Pattern 4)]	[2]
2	ngc5053n12	(1) NGC-5053-N	WFPC2, IMAGE, WFALL	F814W	ATD-GAIN=15; CR-SPLIT=NO			Pattern 2-2 (1)	1100.0 Secs	
									[=>(Pattern 1)]	[3]
									[=>(Pattern 2)]	[3]
									[=>(Pattern 3)]	[4]
									[=>(Pattern 4)]	[4]





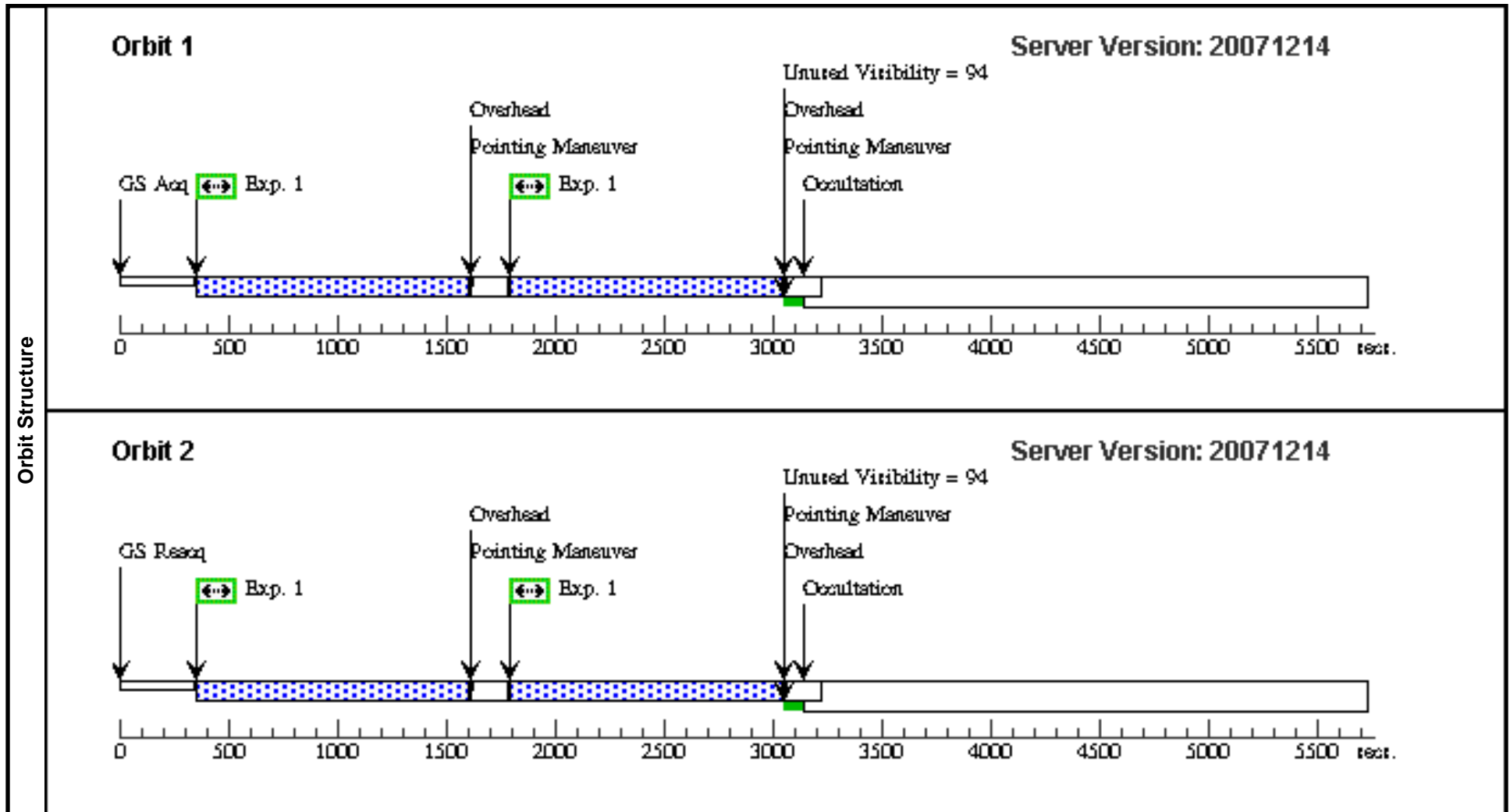
<b>Visit</b>	<b>Proposal 11125, Visit 02</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFPC2 Special Requirements: (none)									
	<b>Patterns</b>	#	<b>Primary Pattern</b>				<b>Secondary Pattern</b>			
(1)		Pattern Type=WFPC2-BOX		Coordinate Frame=POS-TARG						(1)
<b>Fixed Targets</b>	#	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>		<b>Miscellaneous</b>		
	(2)	NGC-5466-N	RA: 14 05 27.3000 (211.3637500d) Dec: +28 35 6.00 (28.58500d) Equinox: J2000			V=9+/-0.1		Reference Frame: NED		
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>										
<b>Exposures</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	ngc5466nV	(2) NGC-5466-N	WFPC2, IMAGE, WFALL	F606W	ATD-GAIN=15; CR-SPLIT=NO		Pattern 1-1 (1)	1100.0 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
<b>Orbit Structure</b>	<p><b>Orbit 1</b> <span style="float: right;"><b>Server Version: 20071214</b></span></p> <p>The diagram shows a horizontal timeline from 0 to 5500 seconds. Key events are marked with arrows and labels: GS Acq at ~200s, Exp. 1 at ~400s, Pointing Maneuver at ~1600s, Exp. 1 at ~1800s, Occultation at ~3000s, and another Pointing Maneuver at ~3100s. A bar at the bottom indicates 'Unused Visibility = 94'.</p>									

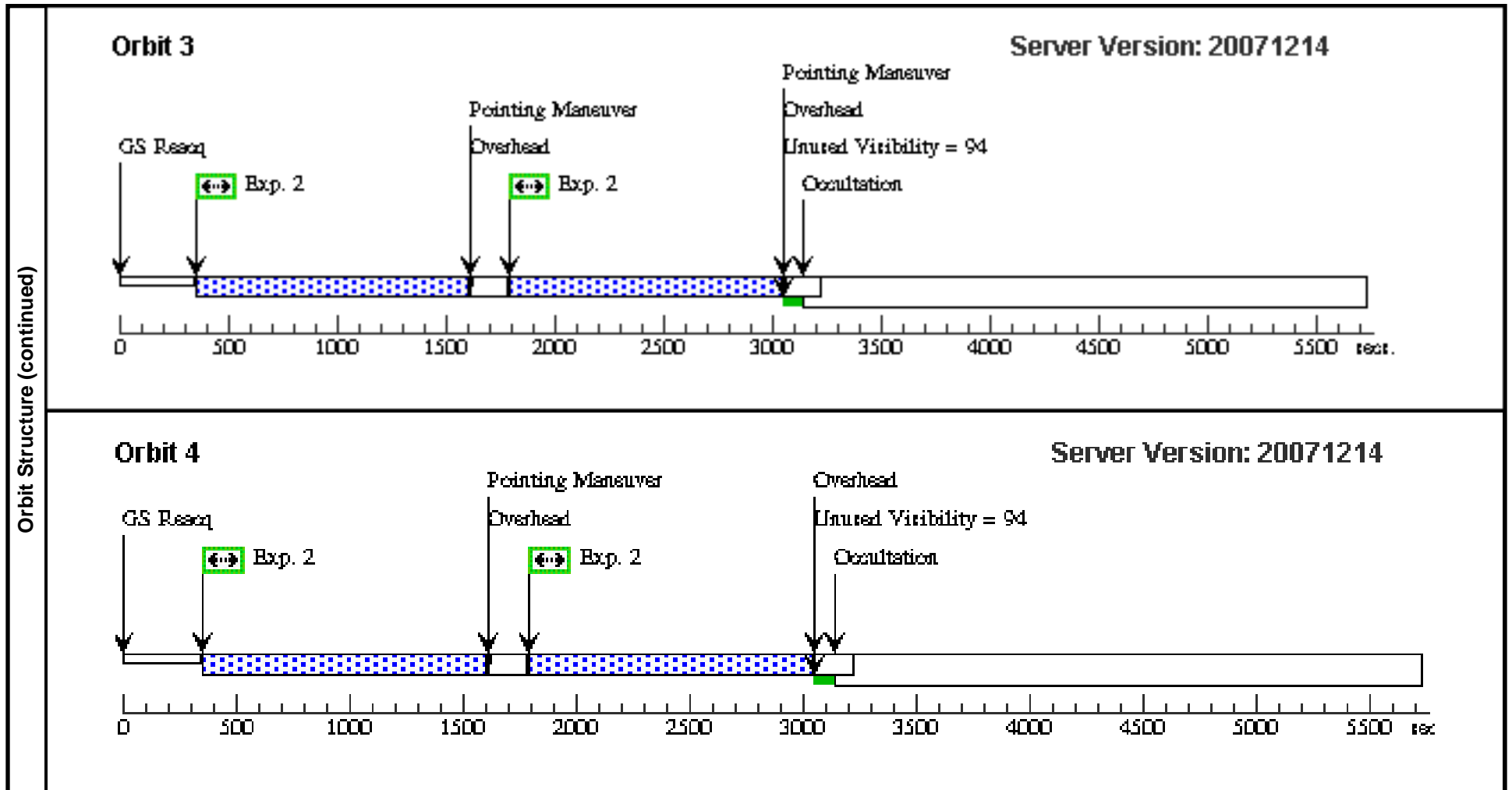


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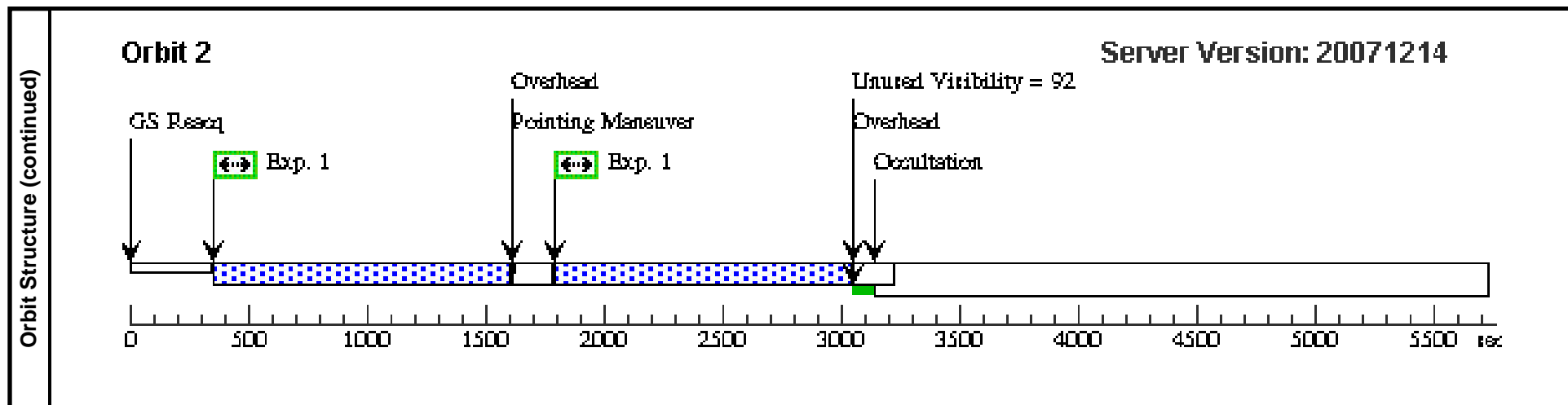
Fri Jan 18 02:36:23 GMT 2008

<b>Visit</b>	<b>Proposal 11125, Visit 06</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFPC2 Special Requirements: SAME ORIENT AS 02									
	<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>				<b>Secondary Pattern</b>			<b>Exposures</b>
(1)		Pattern Type=WFPC2-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.559017 Line Spacing=0.559017	Coordinate Frame=POS-TARG Pattern Orientation=26.56505 Angle Between Sides=143.1301 Center Pattern=false						(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>				
	(2)	NGC-5466-N	RA: 14 05 27.3000 (211.3637500d) Dec: +28 35 6.00 (28.58500d) Equinox: J2000		V=9+/-0.1	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED 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	ngc5466n11	(2) NGC-5466-N	WFPC2, IMAGE, WFALL	F814W	ATD-GAIN=15; CR-SPLIT=NO		Pattern 1-1 (1)	1100.0 Secs	
									[==>(Pattern 1)]	[1]
									[==>(Pattern 2)]	[2]
									[==>(Pattern 3)]	[2]
									[==>(Pattern 4)]	[2]
2	ngc5466n12	(2) NGC-5466-N	WFPC2, IMAGE, WFALL	F814W	ATD-GAIN=15; CR-SPLIT=NO			Pattern 2-2 (1)	1100.0 Secs	
									[==>(Pattern 1)]	[3]
									[==>(Pattern 2)]	[3]
									[==>(Pattern 3)]	[4]
									[==>(Pattern 4)]	[4]





<b>Visit</b>	Proposal 11125, Visit 03 Diagnostic Status: No Diagnostics Scientific Instruments: WFPC2 Special Requirements: (none)									
	<b>Patterns</b>	#	<b>Primary Pattern</b>				<b>Secondary Pattern</b>			
(1)		Pattern Type=WFPC2-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.559017 Line Spacing=0.559017		Coordinate Frame=POS-TARG Pattern Orientation=26.56505 Angle Between Sides=143.1301 Center Pattern=false						(1)
<b>Fixed Targets</b>	#	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>		<b>Fluxes</b>		<b>Miscellaneous</b>	
	(3)	NGC-5897-S	RA: 15 17 24.4000 (229.3516667d) Dec: -21 03 58.00 (-21.06611d) Equinox: J2000				V=8.5+/-0.1		Reference Frame: NED	
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>										
<b>Exposures</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	ngc5897sV	(3) NGC-5897-S	WFPC2, IMAGE, WFALL	F606W	ATD-GAIN=15; CR-SPLIT=NO		Pattern 1-1 (1)	1100.0 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
<b>Orbit Structure</b>	<b>Orbit 1</b> <span style="float: right;">Server Version: 20071214</span>									



Proposal 11125 - Visit 07 - The Dynamical Evolution of Globular Clusters

Fri Jan 18 02:36:25 GMT 2008

<b>Visit</b>	<b>Proposal 11125, Visit 07</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFPC2 Special Requirements: SAME ORIENT AS 03									
	<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>				<b>Secondary Pattern</b>			
(1)		Pattern Type=WFPC2-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.559017 Line Spacing=0.559017	Coordinate Frame=POS-TARG Pattern Orientation=26.56505 Angle Between Sides=143.1301 Center Pattern=false					(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>				
	(3)	NGC-5897-S	RA: 15 17 24.4000 (229.3516667d) Dec: -21 03 58.00 (-21.06611d) Equinox: J2000		V=8.5+/-0.1	Reference Frame: NED				
<i>Comments: This object was generated by the targetselector and retrieved from the NED 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	ngc5897sI1	(3) NGC-5897-S	WFPC2, IMAGE, WFALL	F814W	ATD-GAIN=15; CR-SPLIT=NO		Pattern 1-1 (1)	1100.0 Secs	
										[1]
										[2]
										[3]
										[4]
2	ngc5897sI2	(3) NGC-5897-S	WFPC2, IMAGE, WFALL	F814W	ATD-GAIN=15; CR-SPLIT=NO		Pattern 2-2 (1)	1100.0 Secs		
									[3]	
									[4]	

