



11655 - Dynamics of the Galactic bulge/bar

Cycle: 17, 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	(1) FIELD171634-293427	ACS/WFC	2	21-Jul-2008 21:28:47.0	yes
02	(2) FIELD170715-330243	ACS/WFC	2	21-Jul-2008 21:29:00.0	yes
03	(3) FIELD180506-355410	ACS/WFC	2	21-Jul-2008 21:29:09.0	yes
04	(4) FIELD175623-385613	ACS/WFC	2	21-Jul-2008 21:29:17.0	yes
05	(5) FIELD180310-295129	ACS/WFC	1	21-Jul-2008 21:29:21.0	yes

9 Total Orbits Used

ABSTRACT

We request second-epoch ACS observations of four star fields in the Galactic bar. These will allow us to measure proper motions for tens of thousands of stars well below the turnoff, to construct a dynamical model for the bulge/bar (in combination with data already in hand from other HST fields, and from VLT spectroscopy), and hence to take a unique look at the internal dynamical structure of the central regions of our Galaxy.

By relating the kinematics with stellar population we can elucidate the formation history of the bulge and bar, and their relation to the surrounding Galactic disk.

This is a resubmission of an approved Cycle 15 proposal that was hit by the ACS malfunction.

OBSERVING DESCRIPTION

We propose to reobserve four fields in the far side (negative longitude) of the Galactic bar. We obtained first-epoch F814W images for these fields in 2003 as part of our cycle 12 proposal (in which we also completed the 2nd epoch observations for our fields in the near side of the bar). With the data requested here we will complete the HST imaging portion of the project, and will have proper motion data in hand for 11 bulge/bar fields, covering the full extent of the bar. We will have at least 10,000 stars per field.

Astrometric accuracy is crucial, and we will follow the methodology of our earlier work (Kuijken & Rich 2002, based on Anderson & King 2000): a mix of short and long, dithered exposures such that we can correct accurately for sub-pixel position uncertainties. Per field we require one orbit for five (3×7.5 minutes and 2×1 minute) F814W exposures. A second orbit for each field is required for similar exposures in F555W: these data will not be used for proper motion measurements (there being no equivalent first epoch) but the resulting colour-magnitude diagram will be used for photometric parallax measurements so that the kinematics can be related to distance down the line of sight (Kuijken & Rich 2002). The proper motion accuracy we have been able to achieve with WFPC2 images over a 6-year baseline is better than 1mas/yr (equivalent to 30 km/s at the distance to the bulge), in spite of the poor sampling offered by the WF chips. The key to achieving this accuracy was to observe in F814W, which has the widest PSF of the broad bands, and to dither extensively.

We request a final orbit for an F814W-only observation of Baade's window. This field has been observed roughly every three years since 1994, and this final epoch will further improve the astrometric accuracy there. More importantly, it will enable us to cross check in detail the accuracies of proper motions derived from WFPC2/WFPC2, WFPC2/ACS and ACS/ACS combinations.

Our total request is thus for nine orbits, covering 5 fields.

NOTE on ORIENT values chosen:

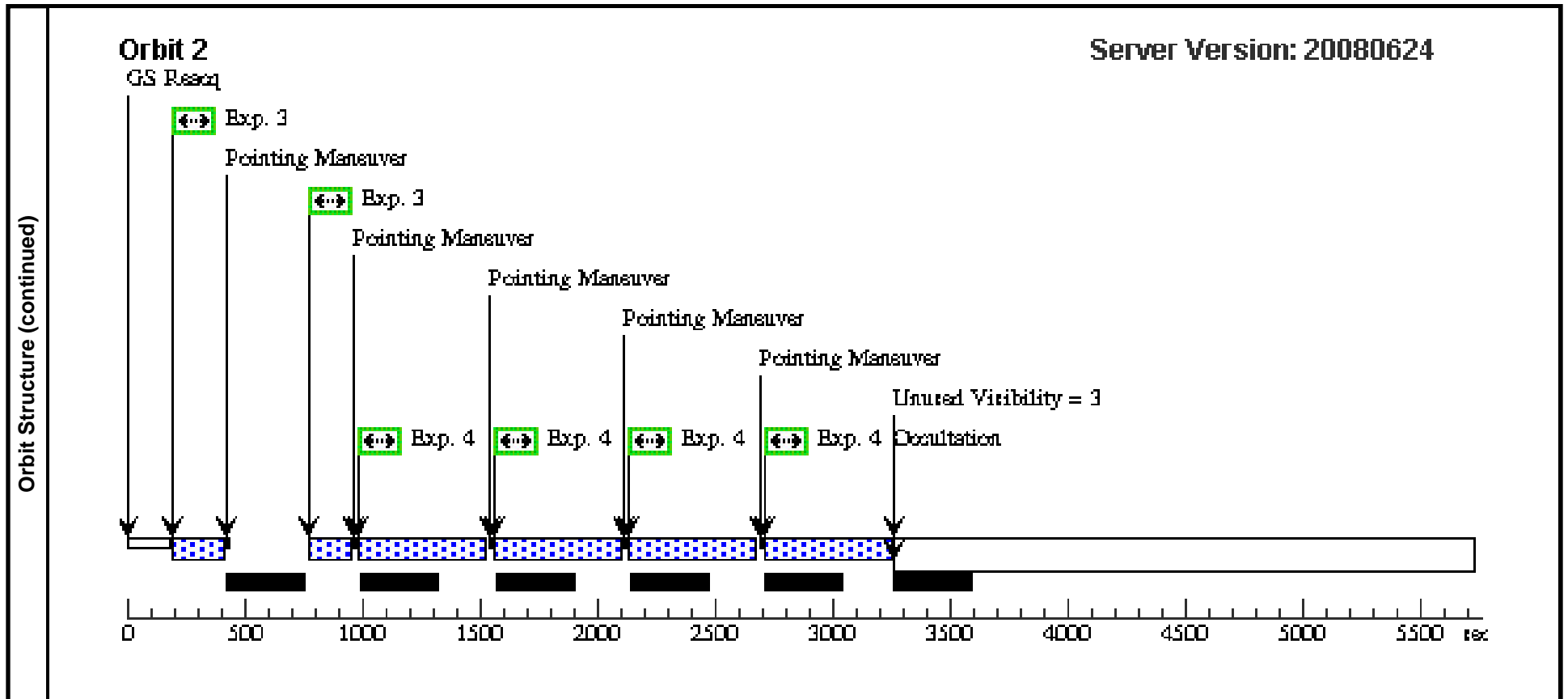
In order to optimize the overlap with the first-epoch data, we have specified four possible ORIENT ranges for each field (multiples of 90 degrees, $\pm 2^\circ$, from the first-epoch observations). The preferred value, which corresponds to the first epoch observations, is given in the comments field for each visit.

All observations are schedulable with full visibility with the ORIENTS chosen.

Proposal 11655 - Visit 01 - Dynamics of the Galactic bulge/bar

Tue Jul 22 01:29:25 GMT 2008

Visit	Proposal 11655, Visit 01, implementation Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 77.470490D TO 77.470490 D Comments: field 1716 Preferred ORIENT is 77.5 Alternate ORIENTs may be added only if preferred ORIENT is not possible: 75-80, 165-170, 255-260, 345-350.									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false	(2), (4)						
	(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=.1825 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false	(1), (3)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	FIELD171634-293427	RA: 17 16 34.0000 (259.1416667d) Dec: -29 34 27.00 (-29.57417d) Equinox: J2000		V=21.0+/-5.0	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	short exposures	(1) FIELD171634-293427	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO; GAIN=2.0		Pattern 1-1 (2)	50 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2	long exposures	(1) FIELD171634-293427	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO; GAIN=2.0		Pattern 2-2 (1)	371 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	3	short exposures	(1) FIELD171634-293427	ACS/WFC, ACCUM, WFC	F555W	CR-SPLIT=NO; GAIN=2.0		Pattern 3-3 (2)	50 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[2]



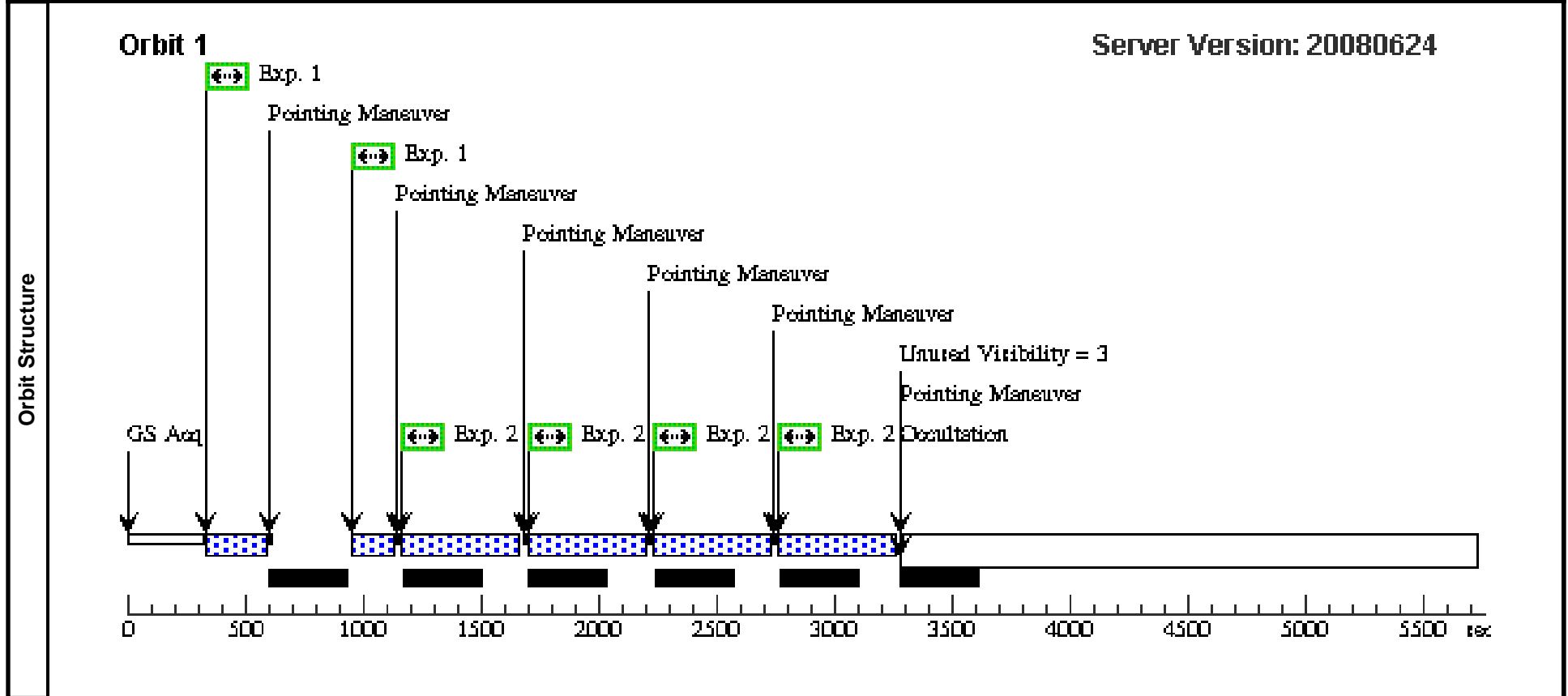
Proposal 11655 - Visit 02 - Dynamics of the Galactic bulge/bar

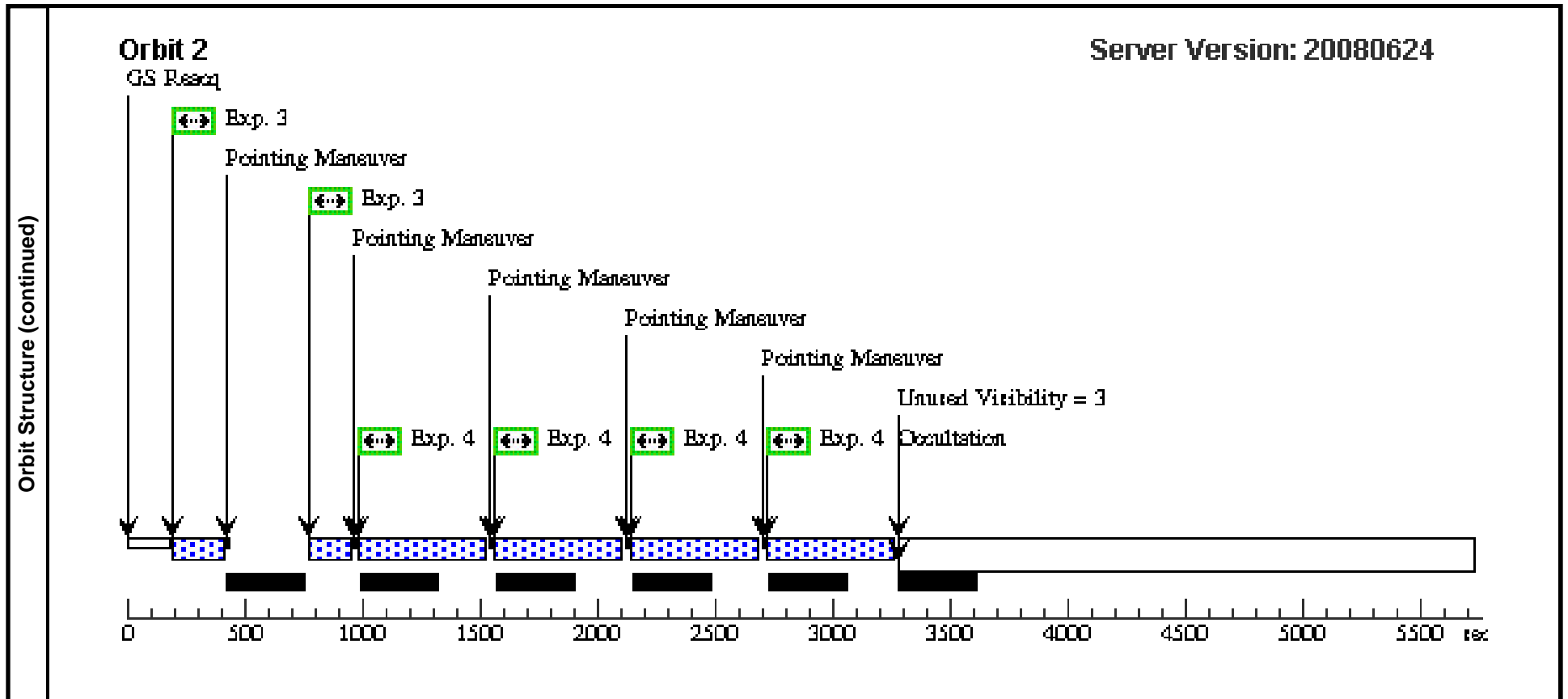
Tue Jul 22 01:29:26 GMT 2008

Visit	Proposal 11655, Visit 02, implementation Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 64.755707D TO 64.755707 D Comments: field 1707 Preferred ORIENT is 64.8 Alternate ORIENTs may be added only if preferred ORIENT is not possible: 63-67, 153-157, 243-247, 333-337.									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
(1)		Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false					(2), (4)		
(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=.1825 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false					(1), (3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	FIELD170715-330243	RA: 17 07 15.0000 (256.8125000d) Dec: -33 02 43.00 (-33.04528d) Equinox: J2000		V=21.0+/-5.0	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	short exposures	(2) FIELD170715-330243	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO; GAIN=2.0		Pattern 1-1 (2)	50 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2	long exposures	(2) FIELD170715-330243	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO; GAIN=2.0		Pattern 2-2 (1)	375 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	3	short exposures	(2) FIELD170715-330243	ACS/WFC, ACCUM, WFC	F555W	CR-SPLIT=NO; GAIN=2.0		Pattern 3-3 (2)	50 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[2]

Proposal 11655 - Visit 02 - Dynamics of the Galactic bulge/bar

Exposures (continued)	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	4	long exposures	(2) FIELD170715-33 0243	ACS/WFC, ACCUM, WFC	F555W	CR-SPLIT=NO; GAIN=2.0		Pattern 4-4 (1)	420 Secs [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[2]



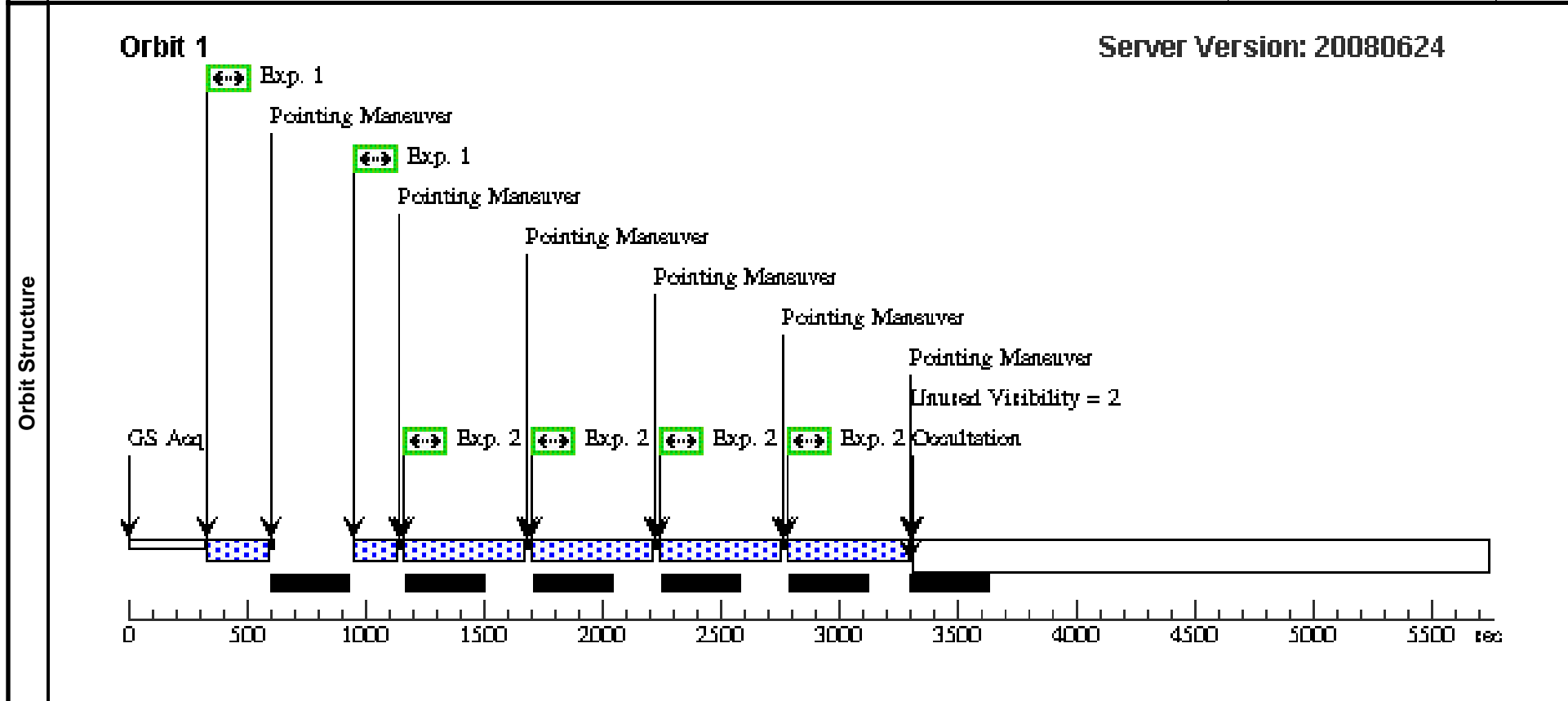


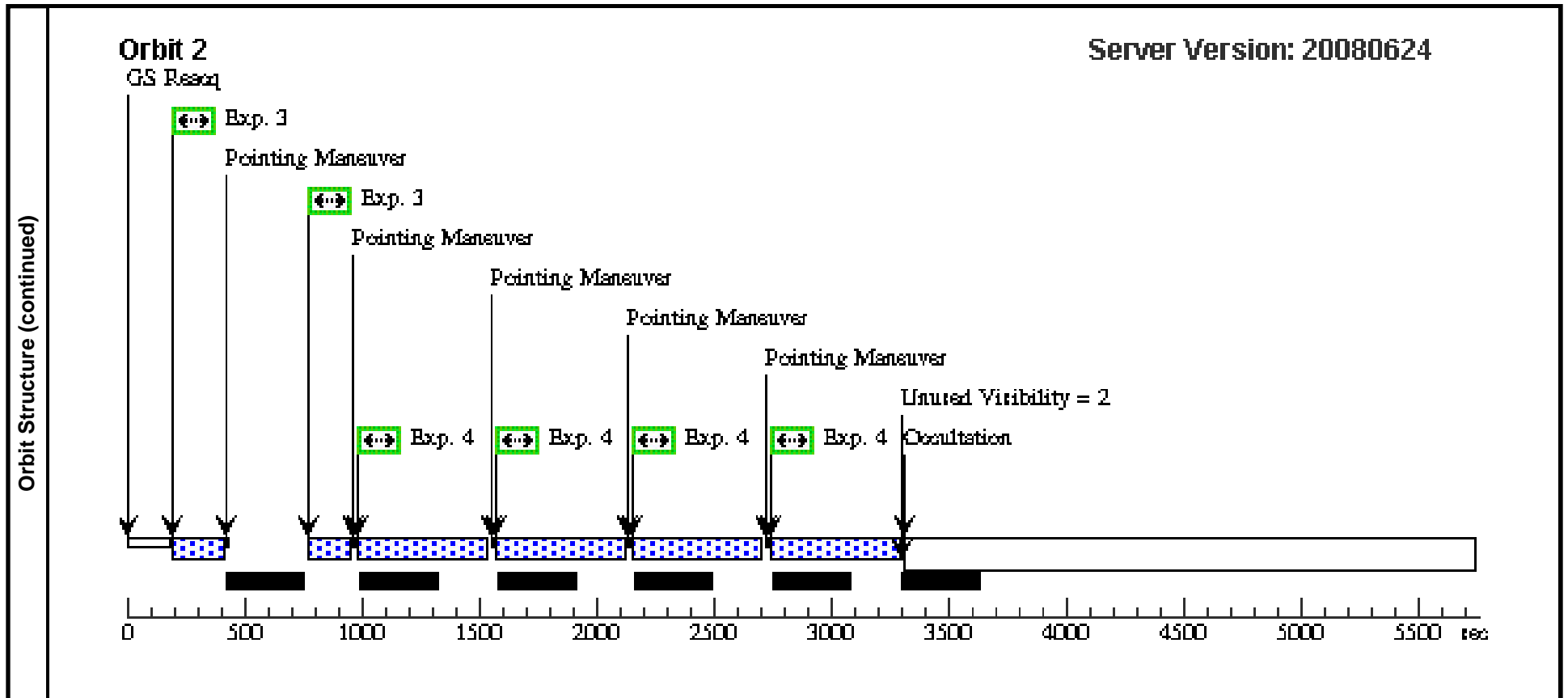
Proposal 11655 - Visit 03 - Dynamics of the Galactic bulge/bar

Tue Jul 22 01:29:26 GMT 2008

Visit	Proposal 11655, Visit 03, implementation Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 81.496399D TO 81.496399 D Comments: <i>field 1805</i> Preferred ORIENT is 81.5 Alternate ORIENTs may be added only if preferred ORIENT is not possible: 79-84, 169-174, 259-264, 349-354.									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
(1)		Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false					(2), (4)		
(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=.1825 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false					(1), (3)			
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	FIELD180506-355410	RA: 18 05 6.0000 (271.2750000d) Dec: -35 54 10.00 (-35.90278d) Equinox: J2000		V=21.0+/-5.0	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	short exposures	(3) FIELD180506-35410	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO; GAIN=2.0		Pattern 1-1 (2)	50 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2	long exposures	(3) FIELD180506-35410	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO; GAIN=2.0		Pattern 2-2 (1)	382 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	3	short exposures	(3) FIELD180506-35410	ACS/WFC, ACCUM, WFC	F555W	CR-SPLIT=NO; GAIN=2.0		Pattern 3-3 (2)	50 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[2]

Exposures (continued)	#	Label	Target	Config, Mode, Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	4	long exposures	(3) FIELD180506-355410	ACS/WFC, ACCUM, WFC	F555W	CR-SPLIT=NO; GAIN=2.0		Pattern 4-4 (1)	427 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[2]





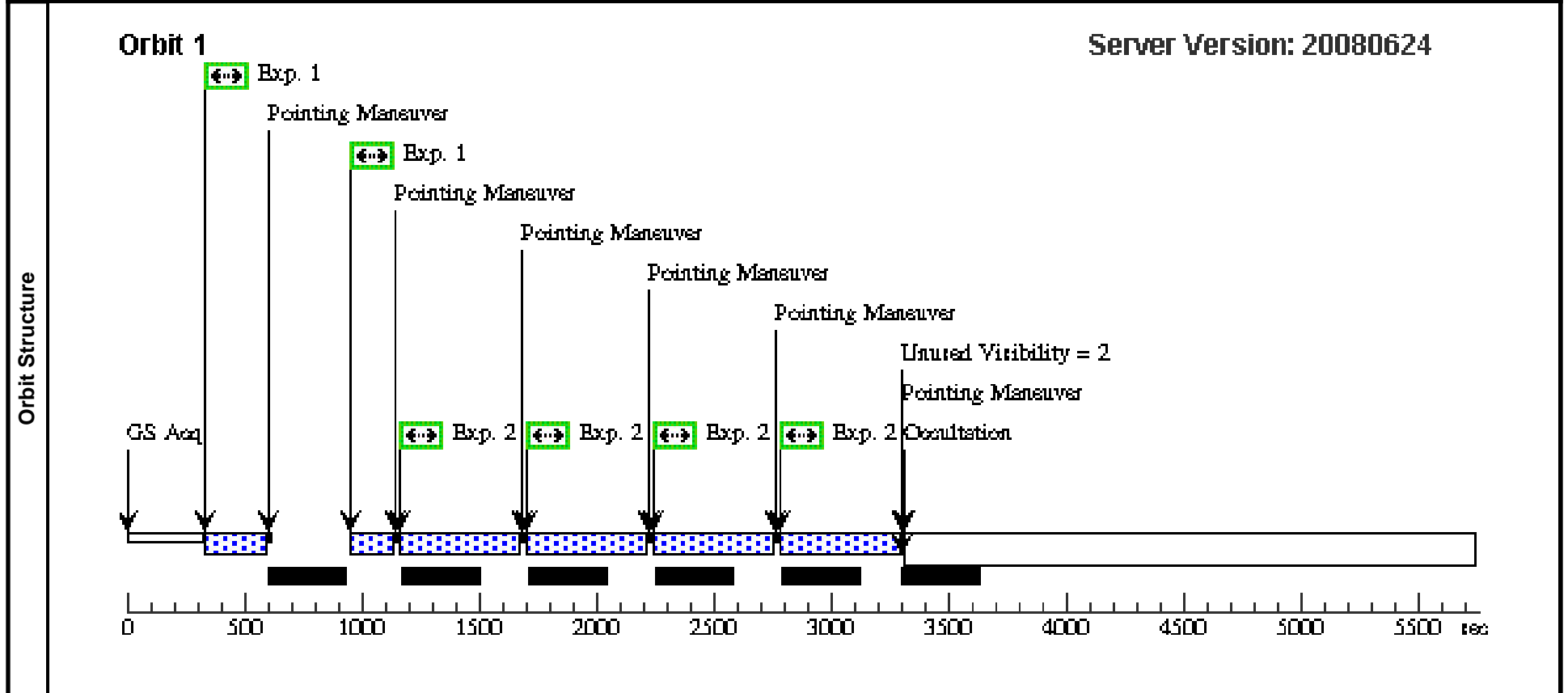
Proposal 11655 - Visit 04 - Dynamics of the Galactic bulge/bar

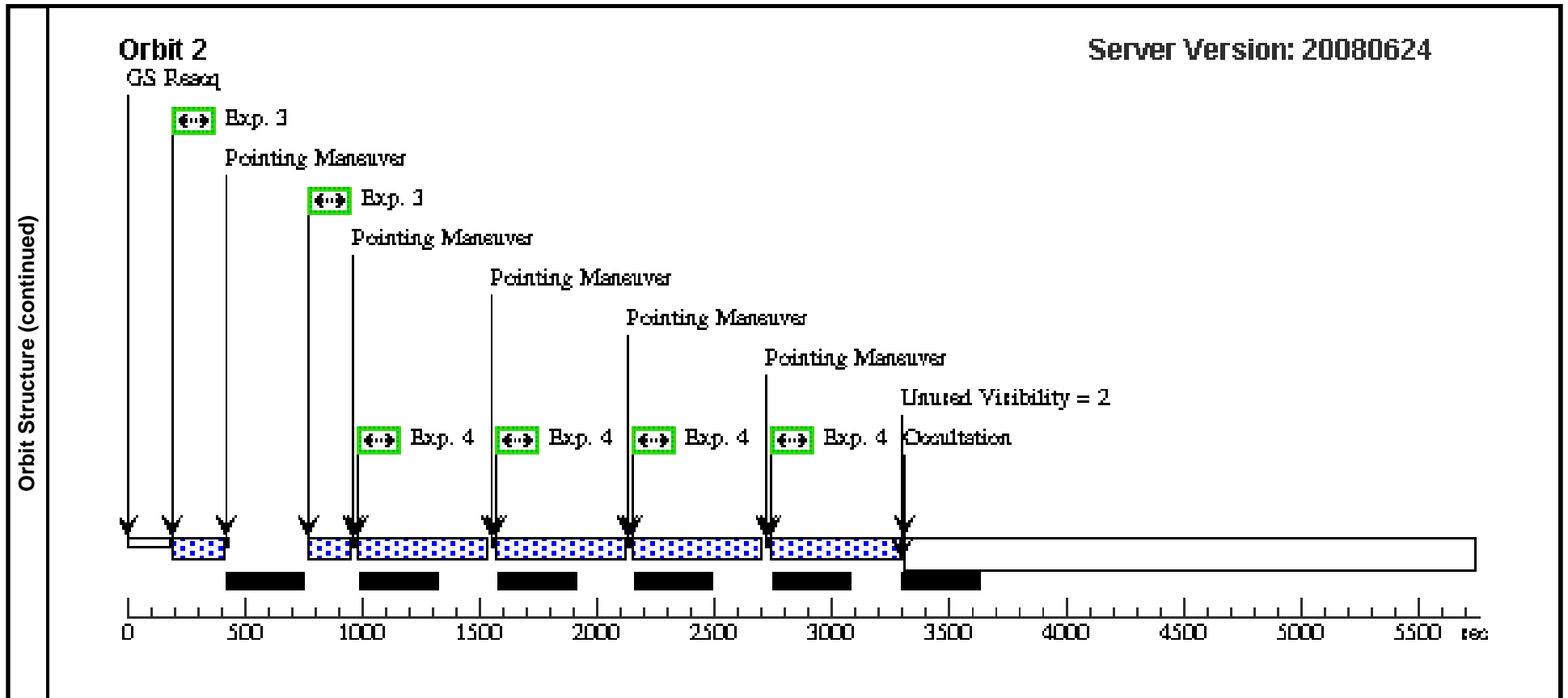
Tue Jul 22 01:29:27 GMT 2008

Visit	Proposal 11655, Visit 04, implementation Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 20D TO 24 D; ORIENT 110D TO 114 D Comments: <i>field 1756</i> Preferred ORIENT is 22 Alternate ORIENTs may be added only if preferred ORIENT is not possible: 20-24, 110-114, 200-204, 290-294.									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
		(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false					(2), (4)	
	(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=.1825 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false					(1), (3)		
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(4)	FIELD175623-385613	RA: 17 56 23.0000 (269.0958333d) Dec: -38 56 13.00 (-38.93694d) Equinox: J2000		V=21.0+/-5.0	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	short exposures	(4) FIELD175623-385613	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO; GAIN=2.0		Pattern 1-1 (2)	50 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[1]
	2	long exposures	(4) FIELD175623-385613	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO; GAIN=2.0		Pattern 2-2 (1)	382 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	3	short exposures	(4) FIELD175623-385613	ACS/WFC, ACCUM, WFC	F555W	CR-SPLIT=NO; GAIN=2.0		Pattern 3-3 (2)	50 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[2]

Proposal 11655 - Visit 04 - Dynamics of the Galactic bulge/bar

Exposures (continued)	#	Label	Target	Config, Mode, Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	4	long exposures	(4) FIELD175623-38 5613	ACS/WFC, ACCUM, WFC	F555W	CR-SPLIT=NO; GAIN=2.0		Pattern 4-4 (1)	427 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[2]





Proposal 11655 - Visit 05 - Dynamics of the Galactic bulge/bar

Tue Jul 22 01:29:28 GMT 2008

Visit	Proposal 11655, Visit 05, implementation Diagnostic Status: No Diagnostics Scientific Instruments: ACS/WFC Special Requirements: ORIENT 38D TO 42 D; ORIENT 128D TO 132 D; ORIENT 218D TO 222 D; ORIENT 308D TO 312 D Comments: Baade Window Preferred ORIENT is 40 Alternate ORIENTs may be added only if preferred ORIENT is not possible: 38-42, 128-132, 218-222, 308-312.									
	Patterns	#	Primary Pattern			Secondary Pattern			Exposures	
		(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false					(2)	
	(2)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=.1825 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false					(1)		
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(5)	FIELD180310-295129	RA: 18 03 9.3723 (270.7890512d) Dec: -29 51 42.35 (-29.86176d) Equinox: J2000		V=21.0+/-5.0	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	short exposures	(5) FIELD180310-295129	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO; GAIN=2.0		Pattern 1-1 (2)	50 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[1]
2	long exposures	(5) FIELD180310-295129	ACS/WFC, ACCUM, WFC	F814W	CR-SPLIT=NO; GAIN=2.0		Pattern 2-2 (1)	371 Secs [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]	

