17926 - Enabling cross instrument proper motions with Draco dSph and NGC 2419

Cycle: 32, 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) DRACO-F1	ACS/WFC WFC3/UVIS	3	30-Jan-2025 11:02:51.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
02	(1) DRACO-F1	WFC3/UVIS	3	30-Jan-2025 11:02:52.0	yes
03	(2) NGC-2419	ACS/WFC WFC3/UVIS	2	30-Jan-2025 11:02:53.0	yes
04	(2) NGC-2419	WFC3/UVIS	2	30-Jan-2025 11:02:53.0	yes

10 Total Orbits Used

ABSTRACT

An unexpected way that ACS/WFC has transformed our knowledge of the Universe is through kinematics, especially via the measurement of proper motions (PMs) for galaxies and star clusters across the Local Group (LG) and beyond. This work requires extremely high precision astrometry and relies on long time baselines. Together, these requirements have made ACS the best, and in many cases, the only instrument for this type of work. Through observations of the Draco and NGC 2419, this proposal aims to cross-calibrate ACS/WFC with WFC3/UVIS and JWST/NIRCam to enable this important science to continue after ACS/WFC is decommissioned. We will also improve the determination of the type of dark matter halo in the Milky Way satellite galaxy Draco dwarf spheriodal, core or cusp, to a limit of 10 sigma. This will be the best data to date for resolving the tension of the core-cusp problem in Lambda CMD. We will also investigate the kinematic properties of the known multiple populations in the distant massive Milky Way Globular cluster NGC 2419 , which will help constraints its formation and evolution.

OBSERVING DESCRIPTION

We propose to observe Draco dSph and the Milky Way globular cluster NGC 2419 in order to cross match the astrometric results with near simultaneous HST/ACS and HST/WFC3 observations of these targets. This will allow us to astrometrically calibrate these instruments to enable future proper motion measurements using cross observatory and cross instrument calibrations we derive. This will enable to use of ACS images as first epochs even after ACS is decommissioned, something that is not currently possible without a second epoch of ACS measurements. We will also compare with JWST NIRCam.

Visit

Proposal 17926, Visit 01 Thu Jan 30 16:02:54 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: ORIENT 59D TO 61 D; GROUP 01,02 WITHIN 90D

Fixed Targets

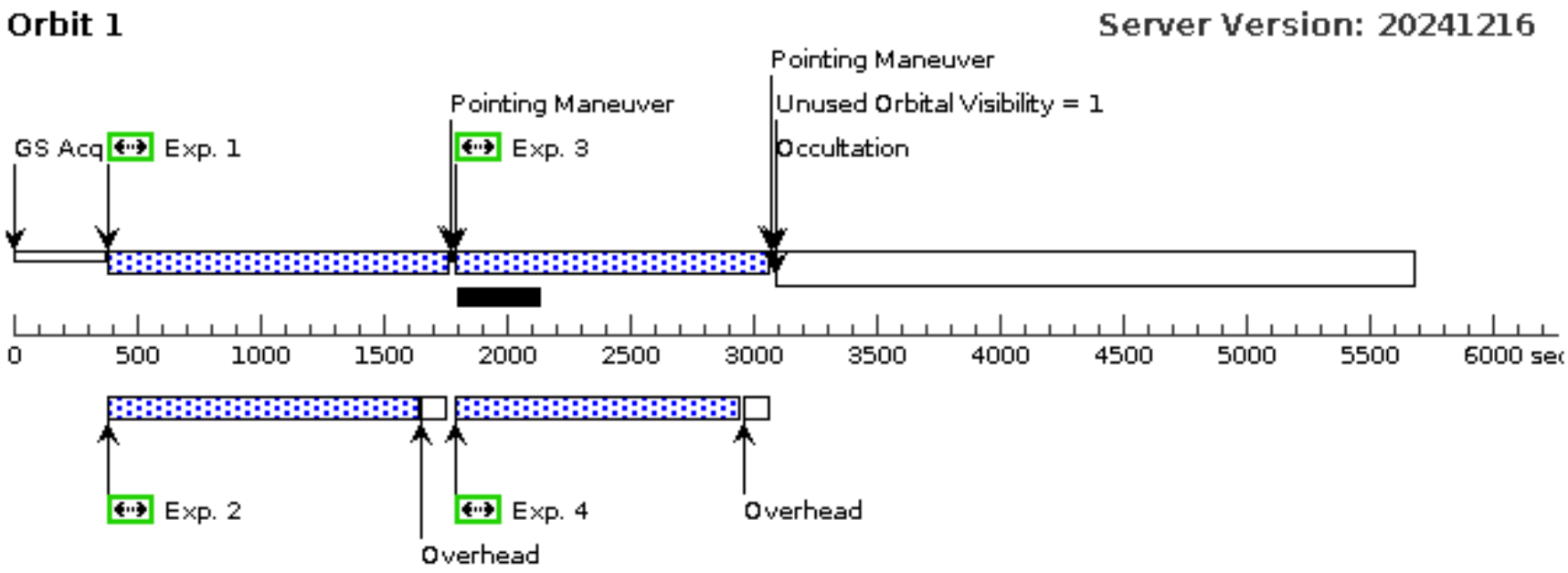
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DRACO-F1	RA: 17 20 49.1617 (260.2048404d) Dec: +57 54 50.88 (57.91413d) Equinox: J2000		V=18	Reference Frame: ICRS

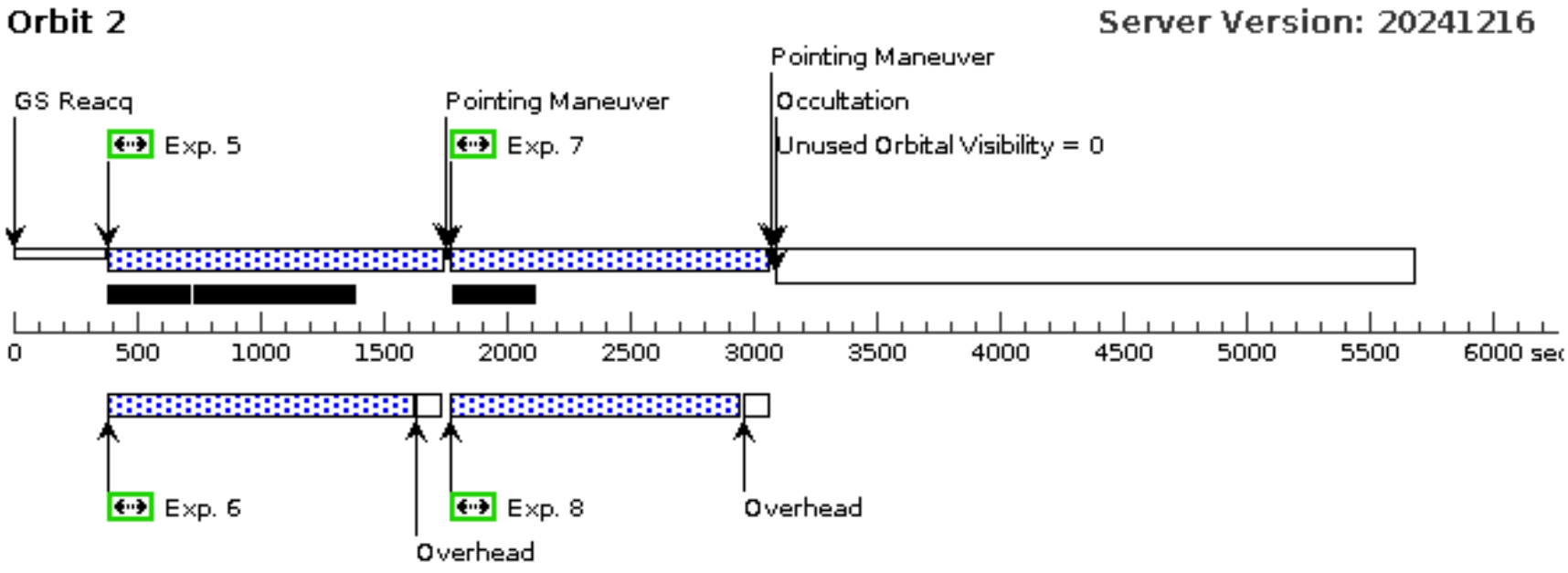
Comments:
Category=GALAXY
Description=[DWARF ELLIPTICAL]

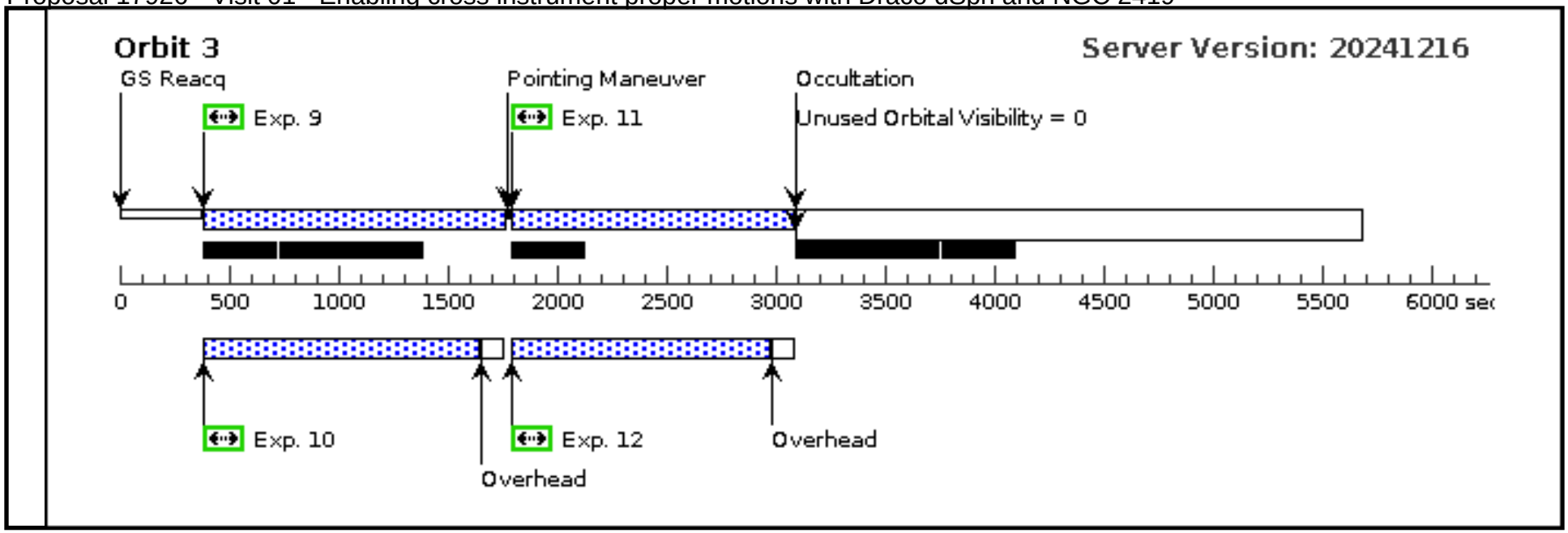
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) DRACO-F1	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0,0	Prime + Parallel Group 1-2 in Visit 01	1140 Secs (1175 Secs) *[==>1175.0 Secs]*	 ***[1]***
2		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W			Prime + Parallel Group 1-2 in Visit 01	1140 Secs (1235 Secs) *[==>1235.0 Secs]*	 ***[1]***
3		(1) DRACO-F1	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.1647,0.0124	Prime + Parallel Group 3-4 in Visit 01	1140 Secs (1145 Secs) *[==>1145.0 Secs]*	 ***[1]***
4		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W			Prime + Parallel Group 3-4 in Visit 01	1140 Secs (1155 Secs) *[==>1155.0 Secs]*	 ***[1]***
5		(1) DRACO-F1	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.3293,0.0248	Prime + Parallel Group 5-6 in Visit 01	1140 Secs (1237 Secs) *[==>1237.0 Secs]*	 ***[2]***
6		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W			Prime + Parallel Group 5-6 in Visit 01	1140 Secs (1247 Secs) *[==>1247.0 Secs]*	 ***[2]***
7		(1) DRACO-F1	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.0747,0.1294	Prime + Parallel Group 7-8 in Visit 01	1140 Secs (1166 Secs) *[==>1166.0 Secs]*	 ***[2]***
8		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W			Prime + Parallel Group 7-8 in Visit 01	1140 Secs (1176 Secs) *[==>1176.0 Secs]*	 ***[2]***
9		(1) DRACO-F1	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.2393,0.1418	Prime + Parallel Group 9-10 in Visit 01	1140 Secs (1252 Secs) *[==>1252.0 Secs]*	 ***[3]***
10		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W			Prime + Parallel Group 9-10 in Visit 01	1140 Secs (1262 Secs) *[==>1262.0 Secs]*	 ***[3]***
11		(1) DRACO-F1	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.4039,0.1541	Prime + Parallel Group 11-12 in Visit 01	1140 Secs (1171 Secs) *[==>1171.0 Secs]*	 ***[3]***
12		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W			Prime + Parallel Group 11-12 in Visit 01	1140 Secs (1181 Secs) *[==>1181.0 Secs]*	 ***[3]***

Orbit Structure



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Exp. 10
Exp. 12
Overhead
Overhead

Visit

Proposal 17926, Visit 02

Thu Jan 30 16:02:54 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: GROUP 02,01 WITHIN 90D

Fixed Targets

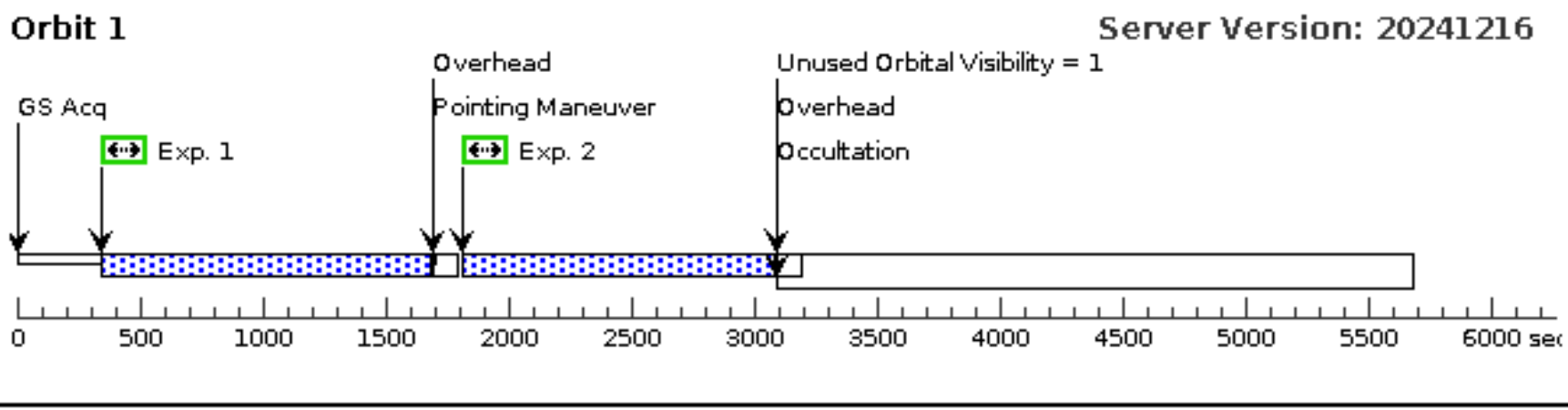
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	DRACO-F1	RA: 17 20 49.1617 (260.2048404d) Dec: +57 54 50.88 (57.91413d) Equinox: J2000		V=18	Reference Frame: ICRS

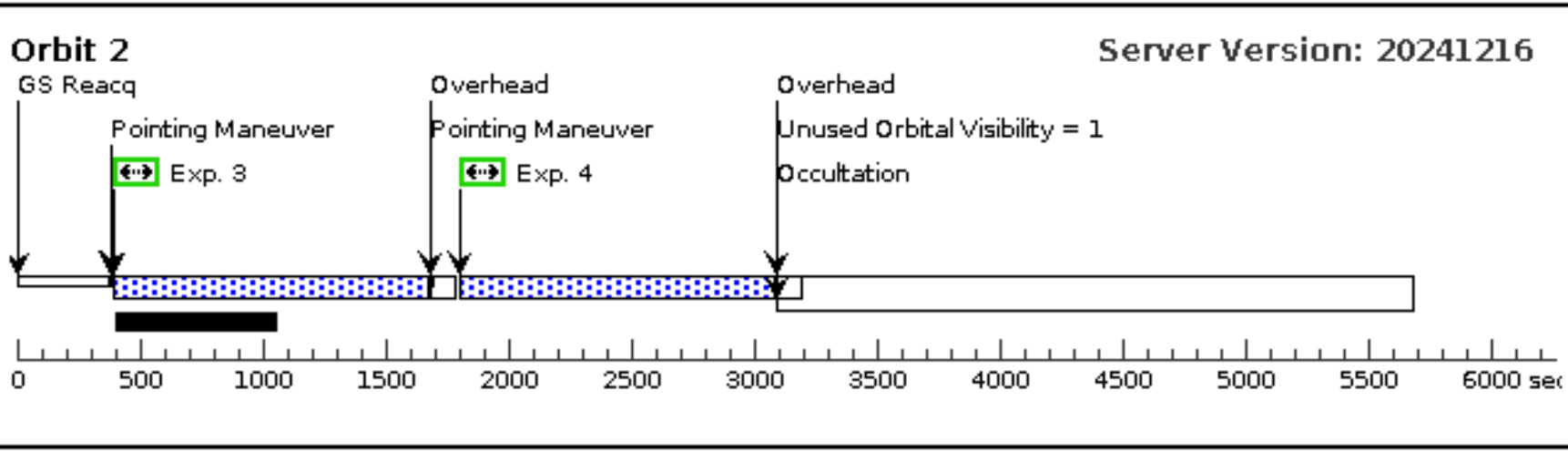
Comments:
Category=GALAXY
Description=[DWARF ELLIPTICAL]

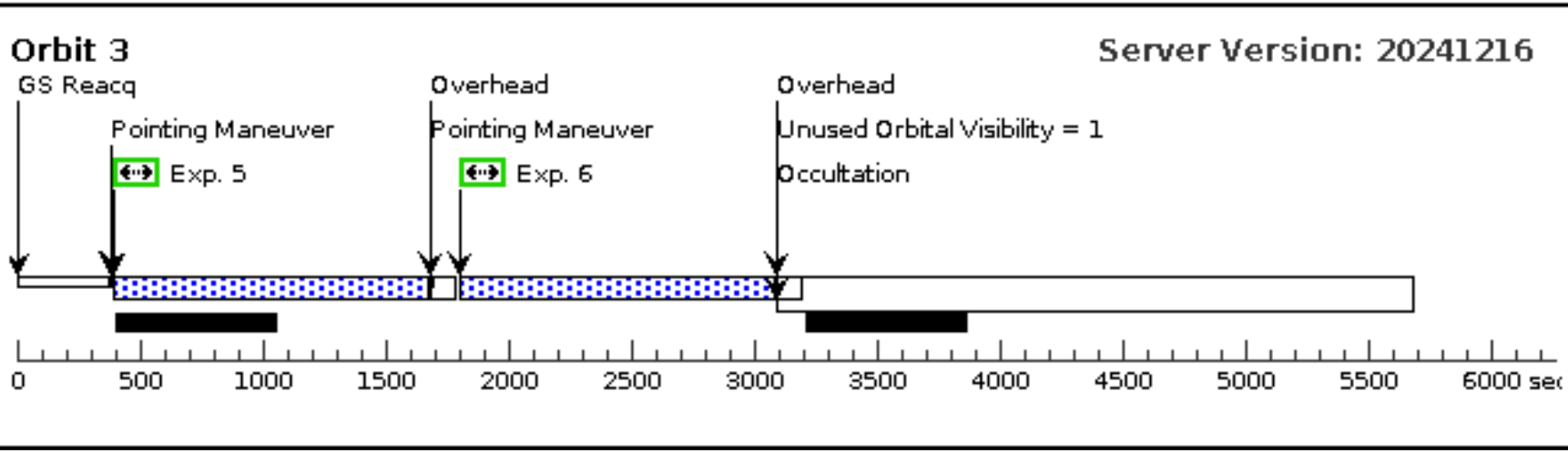
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W		POS TARG 0.000,0.000		1140 Secs (1311 Secs)	
								[==>1311.0 Secs]	***[1]***
2		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W		POS TARG 0.1318,0.010		1140 Secs (1271 Secs)	
								[==>1271.0 Secs]	***[1]***
3		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W		POS TARG 0.2634,0.0198		1140 Secs (1281 Secs)	
								[==>1281.0 Secs]	***[2]***
4		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W		POS TARG 0.0598,0.1035		1140 Secs (1281 Secs)	
								[==>1281.0 Secs]	***[2]***
5		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W		POS TARG 0.1914,0.1134		1140 Secs (1281 Secs)	
								[==>1281.0 Secs]	***[3]***
6		(1) DRACO-F1	WFC3/UVIS, ACCUM, UVIS	F606W		POS TARG 0.3231,0.1233		1140 Secs (1281 Secs)	
								[==>1281.0 Secs]	***[3]***

Orbit Structure







Visit

Proposal 17926, Visit 03 Thu Jan 30 16:02:54 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: ORIENT 256D TO 257 D; GROUP 03,04 WITHIN 90D

Fixed Targets

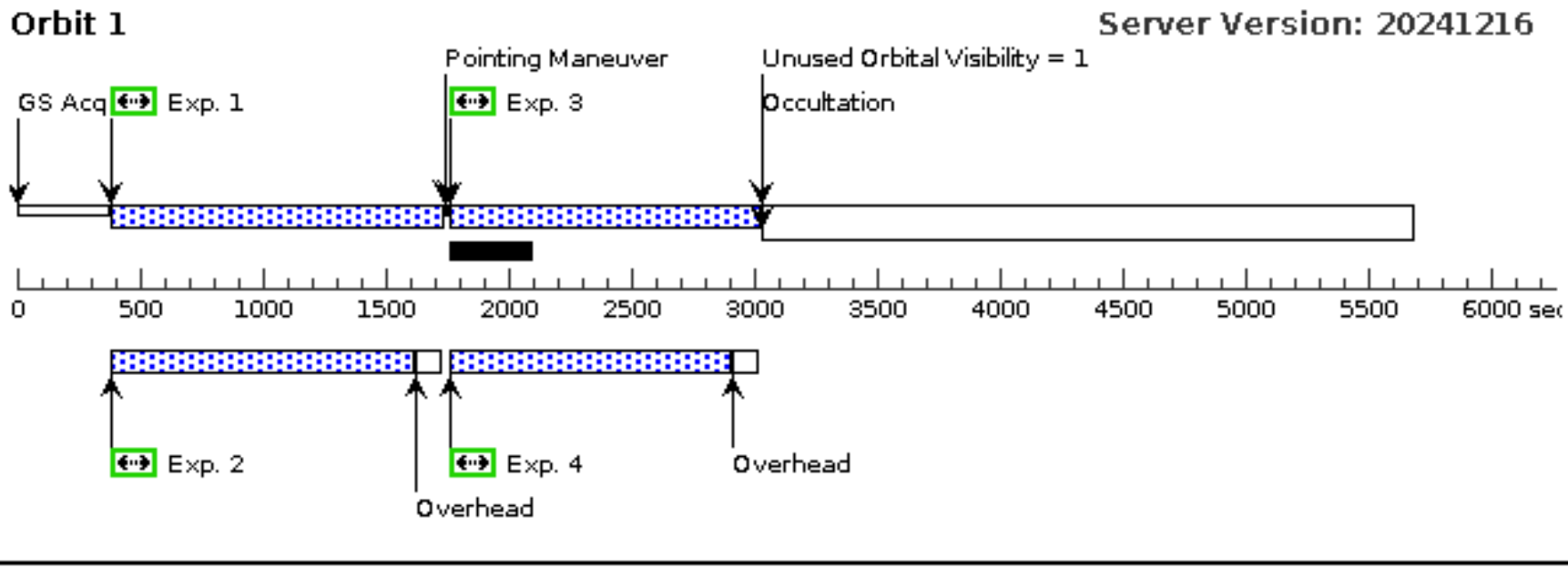
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-2419	RA: 07 37 49.4160 (114.4559000d) Dec: +38 51 2.86 (38.85079d) Equinox: J2000		V=18	Reference Frame: ICRS

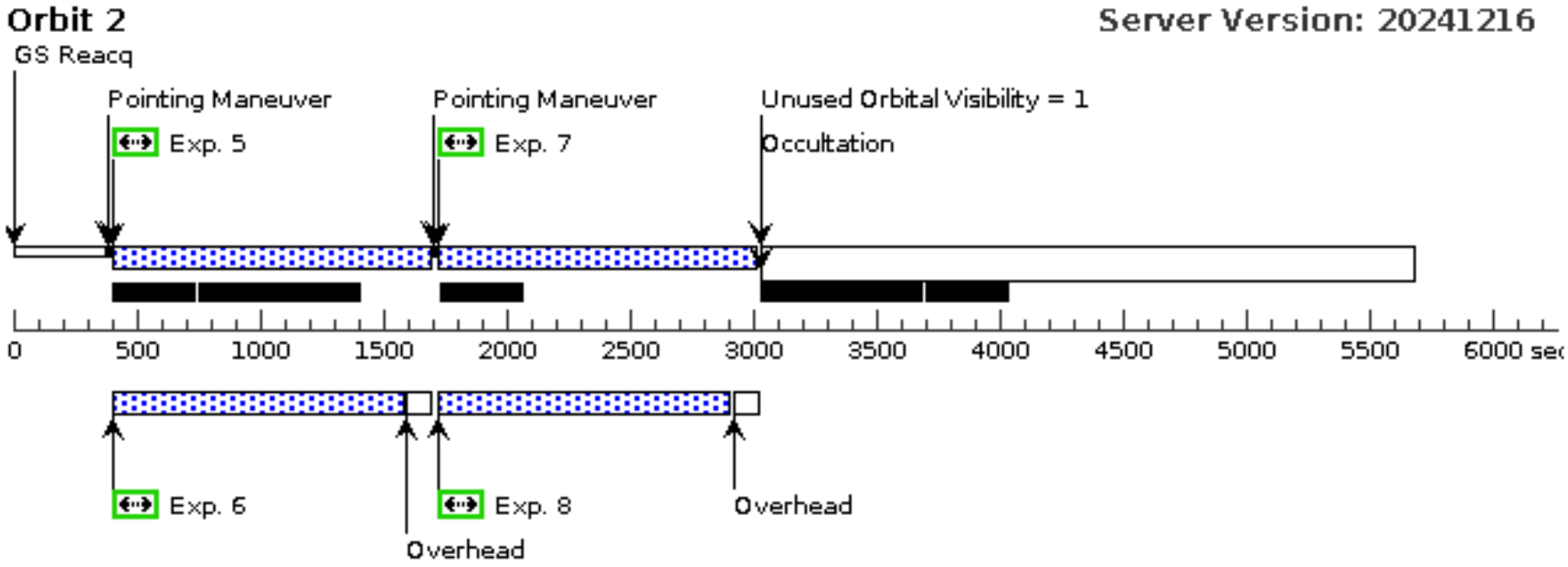
Comments:
Category=EXT-CLUSTER
Description=[GLOBULAR CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) NGC-2419	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0,0	Prime + Parallel Group up 1-2 in Visit 03	1140 Secs (1140 Secs) *[==>]*	***[1]***
2		(2) NGC-2419	WFC3/UVIS, ACCUM, UVIS	F814W			Prime + Parallel Group up 1-2 in Visit 03	1140 Secs (1200 Secs) *[==>1200.0 Secs]*	***[1]***
3		(2) NGC-2419	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.148,0.086	Prime + Parallel Group up 3-4 in Visit 03	1140 Secs (1140 Secs) *[==>]*	***[1]***
4		(2) NGC-2419	WFC3/UVIS, ACCUM, UVIS	F814W			Prime + Parallel Group up 3-4 in Visit 03	1140 Secs (1140 Secs) *[==>]*	***[1]***
5		(2) NGC-2419	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.222,0.240	Prime + Parallel Group up 5-6 in Visit 03	1140 Secs (1171 Secs) *[==>1171.0 Secs]*	***[2]***
6		(2) NGC-2419	WFC3/UVIS, ACCUM, UVIS	F814W			Prime + Parallel Group up 5-6 in Visit 03	1140 Secs (1181 Secs) *[==>1181.0 Secs]*	***[2]***
7		(2) NGC-2419	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.074,0.154	Prime + Parallel Group up 7-8 in Visit 03	1140 Secs (1171 Secs) *[==>1171.0 Secs]*	***[2]***
8		(2) NGC-2419	WFC3/UVIS, ACCUM, UVIS	F814W			Prime + Parallel Group up 7-8 in Visit 03	1140 Secs (1181 Secs) *[==>1181.0 Secs]*	***[2]***

Orbit Structure





Visit

Proposal 17926, Visit 04

Thu Jan 30 16:02:54 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: GROUP 04,03 WITHIN 90D

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-2419	RA: 07 37 49.4160 (114.4559000d) Dec: +38 51 2.86 (38.85079d) Equinox: J2000		V=18	Reference Frame: ICRS

Comments:
Category=EXT-CLUSTER
Description=[GLOBULAR CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) NGC-2419	WFC3/UVIS, ACCUM, UVIS	F814W		POS TARG 0.0,0.0		1140 Secs (1281 Secs)	
								[==>1281.0 Secs]	***[1]***
2		(2) NGC-2419	WFC3/UVIS, ACCUM, UVIS	F814W		POS TARG 0.158,0.070		1140 Secs (1241 Secs)	
								[==>1241.0 Secs]	***[1]***
3		(2) NGC-2419	WFC3/UVIS, ACCUM, UVIS	F814W		POS TARG 0.099,0.165		1140 Secs (1251 Secs)	
								[==>1251.0 Secs]	***[2]***
4		(2) NGC-2419	WFC3/UVIS, ACCUM, UVIS	F814W		POS TARG -0.060,0.095		1140 Secs (1251 Secs)	
								[==>1251.0 Secs]	***[2]***

Orbit Structure