14770 - Proper Motions of the Crater-Leo Group: Testing the Group Infall Scenario

Cycle: 24, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Sangmo Tony Sohn (PI) (Contact)	**Space Telescope Science Institute**	**tsohn@stsci.edu**
Dr. Marcel Pawlowski (CoI)	University of California - Irvine	marcel.pawlowski@case.edu
Dr. Gurtina Besla (CoI)	University of Arizona	gbesla@email.arizona.edu
Dr. Roeland P. van der Marel (CoI)	Space Telescope Science Institute	marel@stsci.edu
Prof. Stacy S. McGaugh (CoI)	Case Western Reserve University	ssm69@case.edu

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) CRATER-2 ANY	ACS/WFC WFC3/UVIS	2	29-Jul-2016 15:33:52.0	yes
02	(2) CRATER-2 ANY	ACS/WFC WFC3/UVIS	2	29-Jul-2016 15:33:54.0	yes
03	(3) LEO-V ANY	ACS/WFC WFC3/UVIS	2	29-Jul-2016 15:33:56.0	yes
04	(3) LEO-V ANY	ACS/WFC WFC3/UVIS	2	29-Jul-2016 15:33:58.0	yes

8 Total Orbits Used

ABSTRACT

While substantial progress has been made in studying the dynamical properties of individual Milky Way (MW) satellites, groups of satellites have gained much interests only recently although such groups have long been predicted by cosmological simulations. Testing the picture of group infall requires the identification of candidate systems and measurement of their full 6D phase-space coordinates to assess the validity of a common orbital history. The Crater-Leo group of MW satellites (Crater 1/2, Leo II, IV, and V) constitute the best such candidates. Their numbers, positions, distances, line-of-sight velocities, and star formation histories (SFHs) are all indicative of a common origin. However, proper motion (PM) is the one key ingredient missing to study these valuable objects in great detail. Leo II has existing multi-epoch data in the archive and Leo IV will soon have PMs from our ongoing HST program. We propose to measure the PMs of the other 3 objects that belong to the Crater-Leo Group: Crater 1/2 and Leo V. These PMs will allow us to definitively confirm or rule out associations. There is a high chance that our measurements will identify the first known group of low-mass MW satellites, a key milestone towards ratifying LCDM theory. This finding will revolutionize research in near field cosmology by allowing to study the formation histories of dwarf galaxy having originated from, and interacted with, the same group environment. Regardless of the outcome, the newly defined orbits of these systems will furthermore place powerful constraints on the potential of the MW halo at distances where few probes exist. In Cycle 24, we will obtain first-epoch images for the two galaxies Crater 2 and Leo V. The deep F606W and F814W observations will allow us to create astrometric/photometric catalogs, construct CMDs, and study SFHs of the target galaxies in detail.

OBSERVING DESCRIPTION

The final goal of this program is to measure absolute proper motions for 3 target objects: globular cluster Crater 1, and dwarf galaxies Crater 2 and Leo V. In the current Cycle 24 program (GO-14770), we will obtain first-epoch data for Crater 2 and Leo V. We will observe these two galaxies using F606W and F814W filters to construct color-magnitude diagrams that allow (1) detailed study of their star formation histories and (2) selection of member stars to be used for proper motion measurements. Each galaxy will be observed for 2 orbits in F606W, and 2 orbits in F814W. Each orbit will be split into one short and two long exposures. Individual exposures will be dithered via POSTARG following a customized dithered pattern . To maximize the time baseline between this first-epoch and future (Cycle 26) second-epoch observations, we added Timing Requirements for all visits. We have also added Group requirements for each galaxy so that these visits can be treated as single epoch data for astrometric analysis. For Leo V, we also added Orientation Requirements to place the parallel WFC3/UVIS field near the semi-major axis of this galaxy.

Visit

Proposal 14770, Crater2-F606W (01), implementation Fri Jul 29 19:33:59 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: BEFORE 01-FEB-2017:00:00:00; GROUP 01,02 WITHIN 15D

Comments: This is the first visit for galaxy Crater 2. In this visit, we will image Crater 2 using the F606W filter for both primiary ACS/WFC and parallel WFC3/UVIS observations. Two orbits are required to complete this visit. Each orbit will consist of one short and two long exposures. To maximize the time baseline between this first-epoch and future (Cycle 26) second-epoch observations, we added Timing Requirements of "Before 01-FEB-2017" for this visit. This will ensure that our first-epoch observations are carried as early as possible. We have also added Group requirements of "within 15 days" for visits 01 and 02, so that these visits can be treated as single epoch data for astrometric analysis.

Fixed Targets

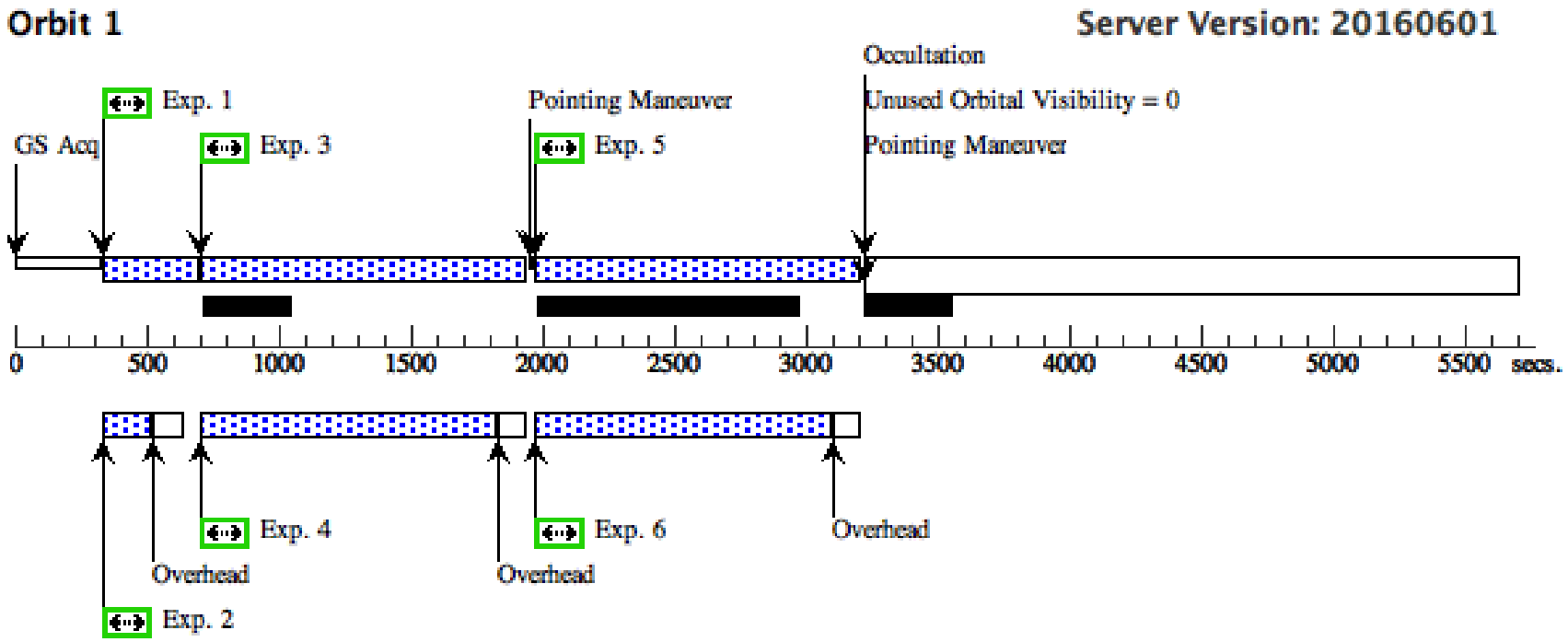
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	CRATER-2	RA: 11 49 14.4000 (177.3100000d) Dec: -18 24 46.80 (-18.41300d) Equinox: J2000		V=12.15+/-0.1	Reference Frame: ICRS

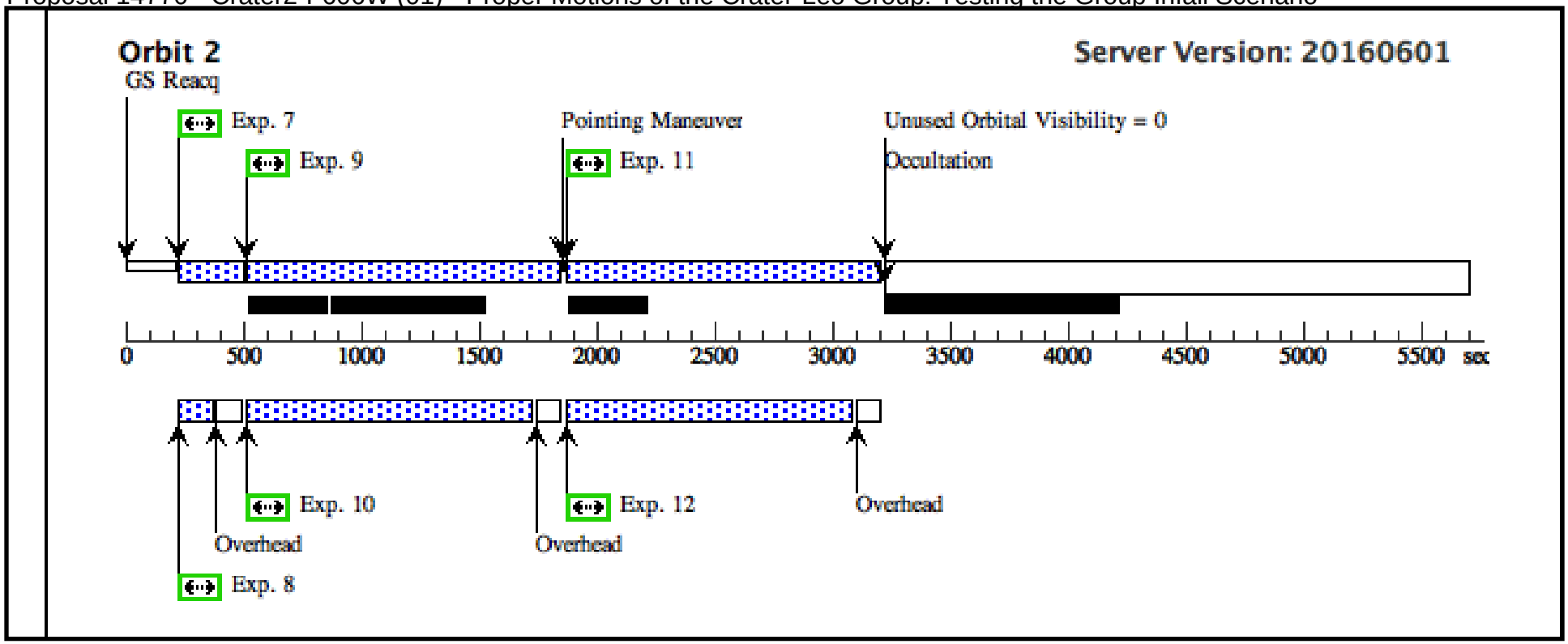
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) CRATER-2	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.0000,0.0000	Sequence 1-6 Non-Int in Crater2-F606W (01) Prime + Parallel Group 1-2 in Sequence 1-6 Non-Int in Crater2-F606W (01)	150 Secs (150 Secs) *[==>]*	***[1]***
2		ANY	WFC3/UVIS, ACCUM, UVIS	F606W	FLASH=6.0		Sequence 1-6 Non-Int in Crater2-F606W (01) Prime + Parallel Group 1-2 in Sequence 1-6 Non-Int in Crater2-F606W (01)	150 Secs (150 Secs) *[==>]*	***[1]***
3		(2) CRATER-2	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.0000,0.0000	Sequence 1-6 Non-Int in Crater2-F606W (01) Prime + Parallel Group 3-4 in Sequence 1-6 Non-Int in Crater2-F606W (01)	1109 Secs (1109 Secs) *[==>]*	***[1]***
4		ANY	WFC3/UVIS, ACCUM, UVIS	F606W			Sequence 1-6 Non-Int in Crater2-F606W (01) Prime + Parallel Group 3-4 in Sequence 1-6 Non-Int in Crater2-F606W (01)	1119 Secs (1119 Secs) *[==>]*	***[1]***
5		(2) CRATER-2	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.148,0.086	Sequence 1-6 Non-Int in Crater2-F606W (01) Prime + Parallel Group 5-6 in Sequence 1-6 Non-Int in Crater2-F606W (01)	1109 Secs (1109 Secs) *[==>]*	***[1]***
6		ANY	WFC3/UVIS, ACCUM, UVIS	F606W			Sequence 1-6 Non-Int in Crater2-F606W (01) Prime + Parallel Group 5-6 in Sequence 1-6 Non-Int in Crater2-F606W (01)	1119 Secs (1119 Secs) *[==>]*	***[1]***
7		(2) CRATER-2	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.222,0.240	Sequence 7-12 Non-Int in Crater2-F606W (01) Prime + Parallel Group 7-8 in Sequence 7-12 Non-Int in Crater2-F606W (01)	151 Secs (151 Secs) *[==>]*	***[2]***
8		ANY	WFC3/UVIS, ACCUM, UVIS	F606W	FLASH=6.0		Sequence 7-12 Non-Int in Crater2-F606W (01) Prime + Parallel Group 7-8 in Sequence 7-12 Non-Int in Crater2-F606W (01)	150 Secs (150 Secs) *[==>]*	***[2]***

	9	(2) CRATER-2	ACS/WFC, ACCUM, WFC	F606W	POS TARG 0.222,0.240	Sequence 7-12 Non-Int in Crater2-F606W (01) Prime + Parallel Group 9-10 in Sequence 7-12 Non-Int in Crater2-F606W (01)	1205 Secs (1205 Secs) *[==>]*	***[2]***
	10	ANY	WFC3/UVIS, ACCUM, UVIS	F606W		Sequence 7-12 Non-Int in Crater2-F606W (01) Prime + Parallel Group 9-10 in Sequence 7-12 Non-Int in Crater2-F606W (01)	1215 Secs (1215 Secs) *[==>]*	***[2]***
	11	(2) CRATER-2	ACS/WFC, ACCUM, WFC	F606W	POS TARG 0.074,0.154	Sequence 7-12 Non-Int in Crater2-F606W (01) Prime + Parallel Group 11-12 in Sequence 7-12 Non-Int in Crater2-F606W (01)	1205 Secs (1205 Secs) *[==>]*	***[2]***
	12	ANY	WFC3/UVIS, ACCUM, UVIS	F606W		Sequence 7-12 Non-Int in Crater2-F606W (01) Prime + Parallel Group 11-12 in Sequence 7-12 Non-Int in Crater2-F606W (01)	1215 Secs (1215 Secs) *[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20160601
GS Reacq
Exp. 7
Exp. 9
Pointing Maneuver
Exp. 11
Unused Orbital Visibility = 0
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 10
Overhead
Exp. 12
Overhead
Overhead
Exp. 8

Visit

Proposal 14770, Crater2-F814W (02), implementation Fri Jul 29 19:33:59 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: BEFORE 01-FEB-2017:00:00:00; GROUP 02,01 WITHIN 15D

Comments: This is the second visit for galaxy Crater 2. In this visit, we will image Crater 2 using the F814W filter for both primiary ACS/WFC and parallel WFC3/UVIS observations. Two orbits are required to complete this visit. Each orbit will consist of one short and two long exposures. To maximize the time baseline between this first-epoch and future (Cycle 26) second-epoch observations, we added Timing Requirements of "Before 01-FEB-2017" for this visit. This will ensure that our first-epoch observations are carried as early as possible. We have also added Group requirements of "within 15 days" for visits 01 and 02, so that these visits can be treated as single epoch data for astrometric analysis.

Fixed Targets

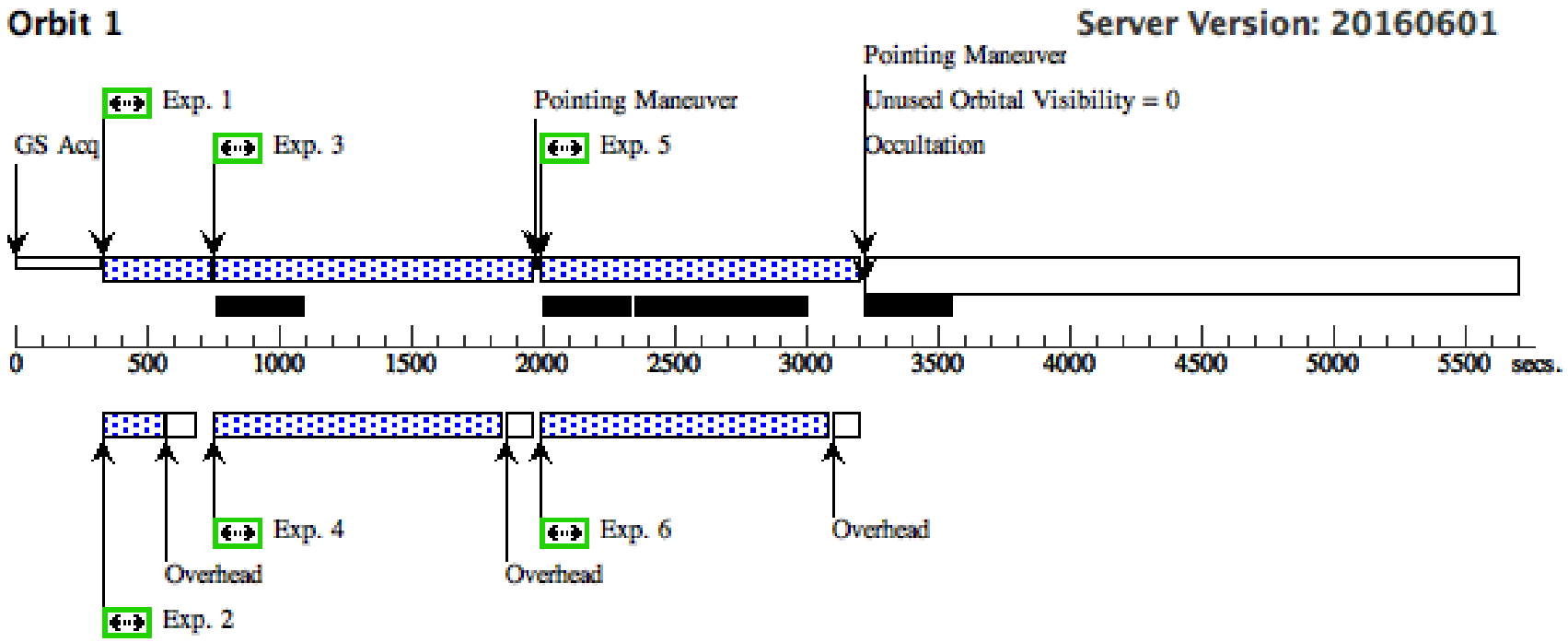
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	CRATER-2	RA: 11 49 14.4000 (177.3100000d) Dec: -18 24 46.80 (-18.41300d) Equinox: J2000		V=12.15+/-0.1	Reference Frame: ICRS

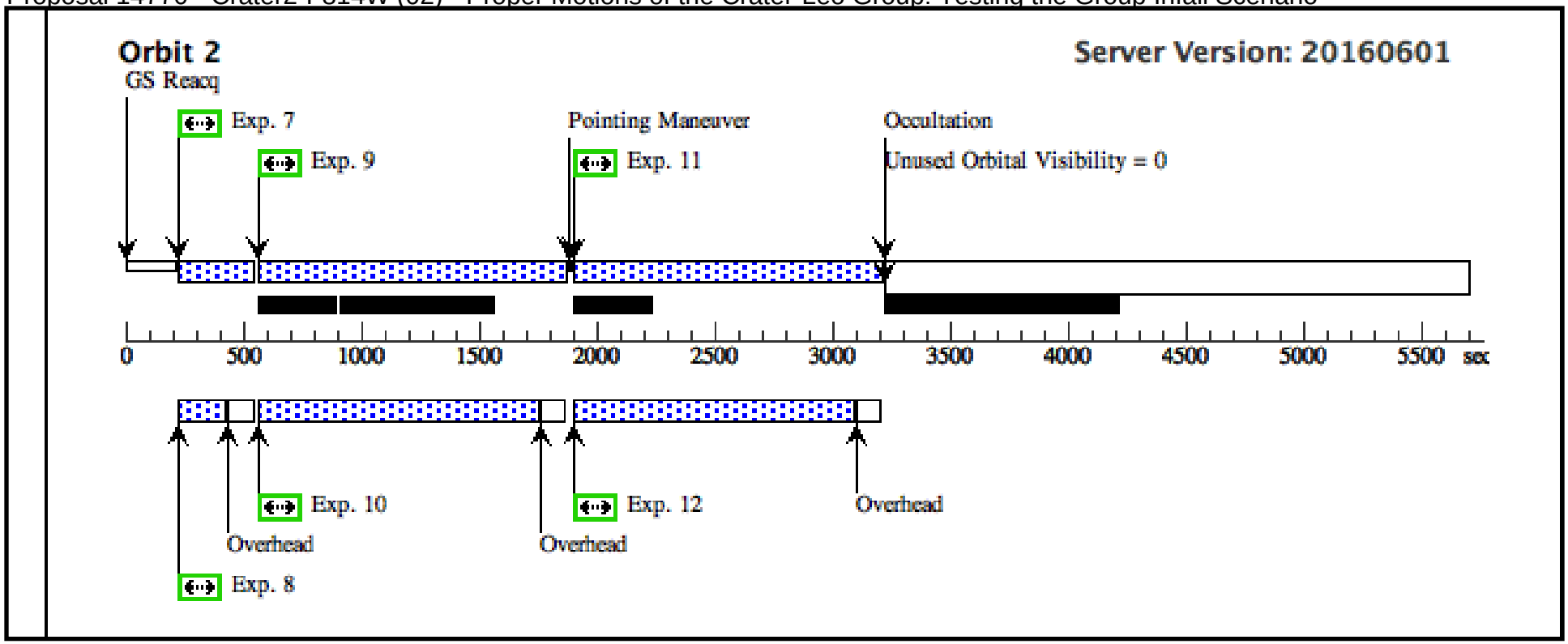
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) CRATER-2	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.0000,0.0000	Sequence 1-6 Non-Int in Crater2-F814W (02) Prime + Parallel Group 1-2 in Sequence 1-6 Non-Int in Crater2-F814W (02)	200 Secs (200 Secs) *[==>]*	***[1]***
2		ANY	WFC3/UVIS, ACCUM, UVIS	F814W	FLASH=7.0		Sequence 1-6 Non-Int in Crater2-F814W (02) Prime + Parallel Group 1-2 in Sequence 1-6 Non-Int in Crater2-F814W (02)	200 Secs (200 Secs) *[==>]*	***[1]***
3		(2) CRATER-2	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.0000,0.0000	Sequence 1-6 Non-Int in Crater2-F814W (02) Prime + Parallel Group 3-4 in Sequence 1-6 Non-Int in Crater2-F814W (02)	1086 Secs (1086 Secs) *[==>]*	***[1]***
4		ANY	WFC3/UVIS, ACCUM, UVIS	F814W			Sequence 1-6 Non-Int in Crater2-F814W (02) Prime + Parallel Group 3-4 in Sequence 1-6 Non-Int in Crater2-F814W (02)	1096 Secs (1096 Secs) *[==>]*	***[1]***
5		(2) CRATER-2	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.148,0.086	Sequence 1-6 Non-Int in Crater2-F814W (02) Prime + Parallel Group 5-6 in Sequence 1-6 Non-Int in Crater2-F814W (02)	1086 Secs (1086 Secs) *[==>]*	***[1]***
6		ANY	WFC3/UVIS, ACCUM, UVIS	F814W			Sequence 1-6 Non-Int in Crater2-F814W (02) Prime + Parallel Group 5-6 in Sequence 1-6 Non-Int in Crater2-F814W (02)	1096 Secs (1096 Secs) *[==>]*	***[1]***
7		(2) CRATER-2	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.222,0.240	Sequence 7-12 Non-Int in Crater2-F814W (02) Prime + Parallel Group 7-8 in Sequence 7-12 Non-Int in Crater2-F814W (02)	200 Secs (200 Secs) *[==>]*	***[2]***
8		ANY	WFC3/UVIS, ACCUM, UVIS	F814W	FLASH=7.0		Sequence 7-12 Non-Int in Crater2-F814W (02) Prime + Parallel Group 7-8 in Sequence 7-12 Non-Int in Crater2-F814W (02)	200 Secs (200 Secs) *[==>]*	***[2]***

	9	(2) CRATER-2	ACS/WFC, ACCUM, WFC	F814W	POS TARG 0.222,0.240	Sequence 7-12 Non-Int in Crater2-F814W (02) Prime + Parallel Group 9-10 in Sequence 7-12 Non-Int in Crater2-F814W (02)	1183 Secs (1183 Secs) *[==>]*	***[2]***
	10	ANY	WFC3/UVIS, ACCUM, UVIS	F814W		Sequence 7-12 Non-Int in Crater2-F814W (02) Prime + Parallel Group 9-10 in Sequence 7-12 Non-Int in Crater2-F814W (02)	1193 Secs (1193 Secs) *[==>]*	***[2]***
	11	(2) CRATER-2	ACS/WFC, ACCUM, WFC	F814W	POS TARG 0.074,0.154	Sequence 7-12 Non-Int in Crater2-F814W (02) Prime + Parallel Group 11-12 in Sequence 7-12 Non-Int in Crater2-F814W (02)	1182 Secs (1182 Secs) *[==>]*	***[2]***
	12	ANY	WFC3/UVIS, ACCUM, UVIS	F814W		Sequence 7-12 Non-Int in Crater2-F814W (02) Prime + Parallel Group 11-12 in Sequence 7-12 Non-Int in Crater2-F814W (02)	1192 Secs (1192 Secs) *[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20160601
GS Reacq
Exp. 7
Exp. 9
Pointing Maneuver
Exp. 11
Occultation
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 10
Exp. 12
Overhead
Overhead
Overhead
Exp. 8

Visit

Proposal 14770, LeoV-F606W (03), implementation Fri Jul 29 19:33:59 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SCHED 80%; ORIENT 14D TO 84 D; ORIENT 194D TO 244 D; BEFORE 01-MAY-2017:00:00:00; GROUP 03,04 WITHIN 15D

Comments: This is the first visit for galaxy LeoV. In this visit, we will image Leo V using the F606W filter for both primiary ACS/WFC and parallel WFC3/UVIS observations. Two orbits are required to complete this visit. Each orbit will consist of one short and two long exposures. To maximize the time baseline between this first-epoch and future (Cycle 26) second-epoch observations, we added Timing Requirements of "Before 01-MAY-2017" for this visit. This will ensure that our first-epoch observations are carried as early as possible. We have added Group requirements of "within 15 days" for visits 03 and 04, so that these visits can be treated as single epoch data for astrometric analysis. We also added Orientation Requirements to place the parallel WFC3/UVIS field along the semi-major axis of Leo V. The Schedulability was accordingly reduced to 80.

Fixed Targets

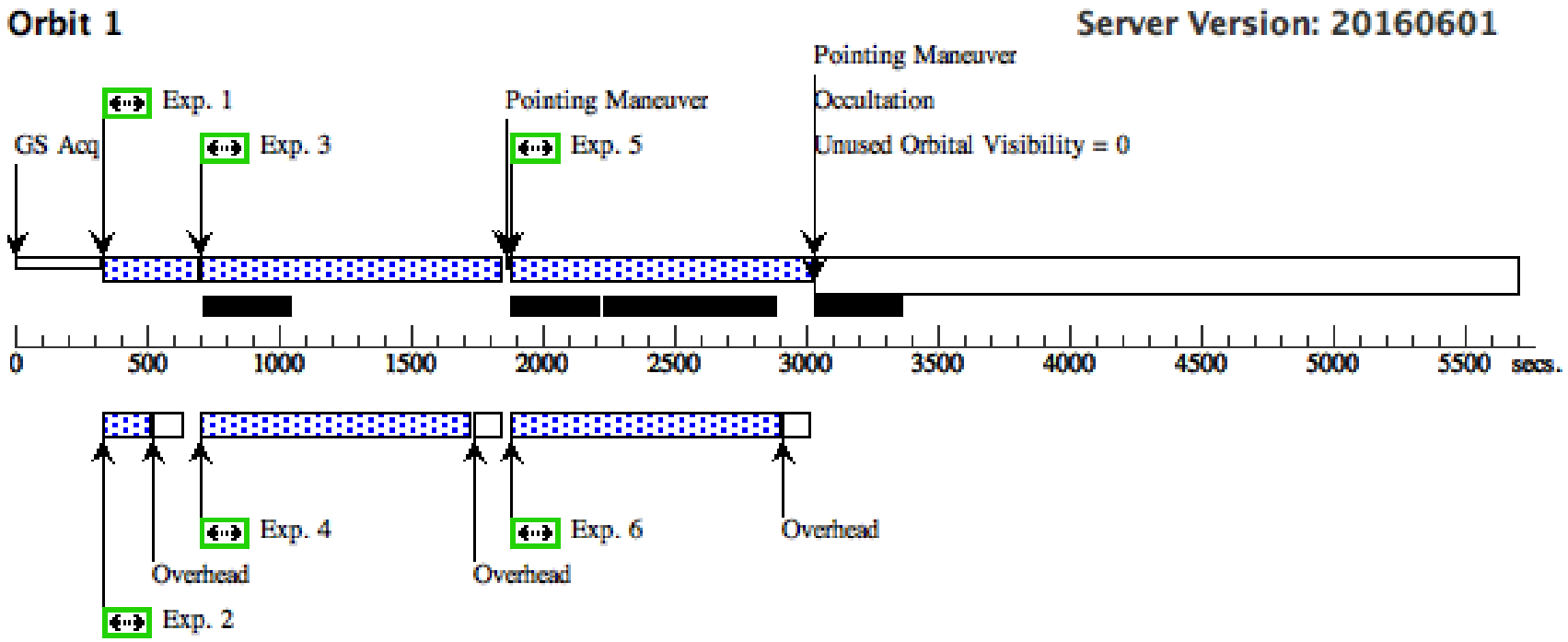
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	LEO-V	RA: 11 31 9.6000 (172.7900000d) Dec: +02 13 12.00 (2.22000d) Equinox: J2000		V=16.0+/-0.4	Reference Frame: ICRS

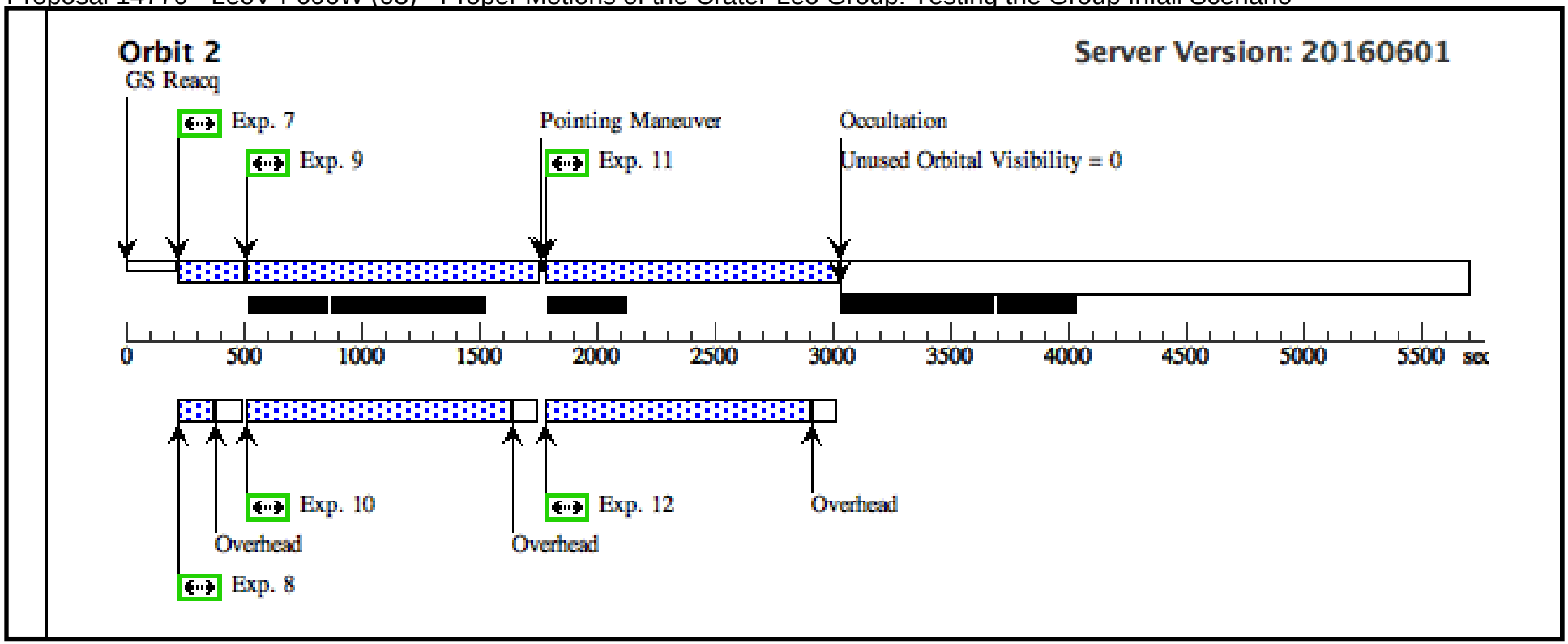
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) LEO-V	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.0000,0.0000	Sequence 1-6 Non-Int in LeoV-F606W (03) Prime + Parallel Group 1-2 in Sequence 1-6 Non-Int in LeoV-F606W (03)	150 Secs (150 Secs) *[==>]*	***[1]***
2		ANY	WFC3/UVIS, ACCUM, UVIS	F606W	FLASH=6.0		Sequence 1-6 Non-Int in LeoV-F606W (03) Prime + Parallel Group 1-2 in Sequence 1-6 Non-Int in LeoV-F606W (03)	150 Secs (150 Secs) *[==>]*	***[1]***
3		(3) LEO-V	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.0000,0.0000	Sequence 1-6 Non-Int in LeoV-F606W (03) Prime + Parallel Group 3-4 in Sequence 1-6 Non-Int in LeoV-F606W (03)	1016 Secs (1016 Secs) *[==>]*	***[1]***
4		ANY	WFC3/UVIS, ACCUM, UVIS	F606W			Sequence 1-6 Non-Int in LeoV-F606W (03) Prime + Parallel Group 3-4 in Sequence 1-6 Non-Int in LeoV-F606W (03)	1026 Secs (1026 Secs) *[==>]*	***[1]***
5		(3) LEO-V	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.148,0.086	Sequence 1-6 Non-Int in LeoV-F606W (03) Prime + Parallel Group 5-6 in Sequence 1-6 Non-Int in LeoV-F606W (03)	1016 Secs (1016 Secs) *[==>]*	***[1]***
6		ANY	WFC3/UVIS, ACCUM, UVIS	F606W			Sequence 1-6 Non-Int in LeoV-F606W (03) Prime + Parallel Group 5-6 in Sequence 1-6 Non-Int in LeoV-F606W (03)	1026 Secs (1026 Secs) *[==>]*	***[1]***
7		(3) LEO-V	ACS/WFC, ACCUM, WFC	F606W		POS TARG 0.222,0.240	Sequence 7-12 Non-Int in LeoV-F606W (03) Prime + Parallel Group 7-8 in Sequence 7-12 Non-Int in LeoV-F606W (03)	151 Secs (151 Secs) *[==>]*	***[2]***
8		ANY	WFC3/UVIS, ACCUM, UVIS	F606W	FLASH=6.0		Sequence 7-12 Non-Int in LeoV-F606W (03) Prime + Parallel Group 7-8 in Sequence 7-12 Non-Int in LeoV-F606W (03)	150 Secs (150 Secs) *[==>]*	***[2]***

	9	(3) LEO-V	ACS/WFC, ACCUM, WFC	F606W	POS TARG 0.222,0.240	Sequence 7-12 Non-Int in LeoV-F606W (03) Prime + Parallel Group 9-10 in Sequence 7-12 Non-Int in LeoV-F606W (03)	1112 Secs (1112 Secs) *[==>]*	***[2]***
	10	ANY	WFC3/UVIS, ACCUM, UVIS	F606W		Sequence 7-12 Non-Int in LeoV-F606W (03) Prime + Parallel Group 9-10 in Sequence 7-12 Non-Int in LeoV-F606W (03)	1122 Secs (1122 Secs) *[==>]*	***[2]***
	11	(3) LEO-V	ACS/WFC, ACCUM, WFC	F606W	POS TARG 0.074,0.154	Sequence 7-12 Non-Int in LeoV-F606W (03) Prime + Parallel Group 11-12 in Sequence 7-12 Non-Int in LeoV-F606W (03)	1112 Secs (1112 Secs) *[==>]*	***[2]***
	12	ANY	WFC3/UVIS, ACCUM, UVIS	F606W		Sequence 7-12 Non-Int in LeoV-F606W (03) Prime + Parallel Group 11-12 in Sequence 7-12 Non-Int in LeoV-F606W (03)	1122 Secs (1122 Secs) *[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20160601
GS Reacq
Exp. 7
Exp. 9
Pointing Maneuver
Exp. 11
Occultation
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 10
Exp. 12
Overhead
Overhead
Overhead
Exp. 8

Visit

Proposal 14770, LeoV-F814W (04), implementation Fri Jul 29 19:33:59 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS, ACS/WFC

Special Requirements: SCHED 80%; SAME ORIENT AS 03; BEFORE 01-MAY-2017:00:00:00; GROUP 04,03 WITHIN 15D

Comments: This is the second visit for galaxy LeoV. In this visit, we will image Leo V using the F814W filter for both primiary ACS/WFC and parallel WFC3/UVIS observations. Two orbits are required to complete this visit. Each orbit will consist of one short and two long exposures. To maximize the time baseline between this first-epoch and future (Cycle 26) second-epoch observations, we added Timing Requirements of "Before 01-MAY-2017" for this visit. This will ensure that our first-epoch observations are carried as early as possible. We have added Group requirements of "within 15 days" for visits 03 and 04, so that these visits can be treated as single epoch data for astrometric analysis. We also added Orientation Requirements of "Same Orient As Visit 03". The Schedulability was accordingly reduced to 80.

Fixed Targets

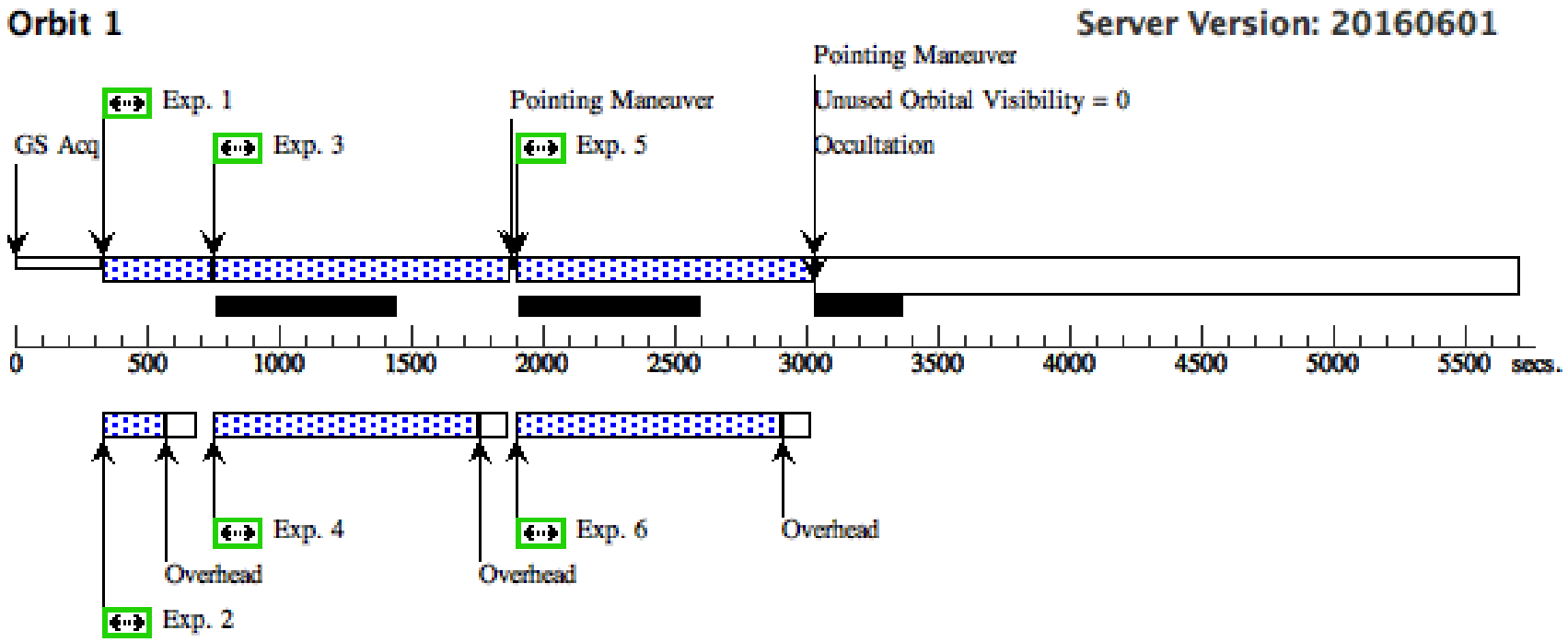
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	LEO-V	RA: 11 31 9.6000 (172.7900000d) Dec: +02 13 12.00 (2.22000d) Equinox: J2000		V=16.0+/-0.4	Reference Frame: ICRS

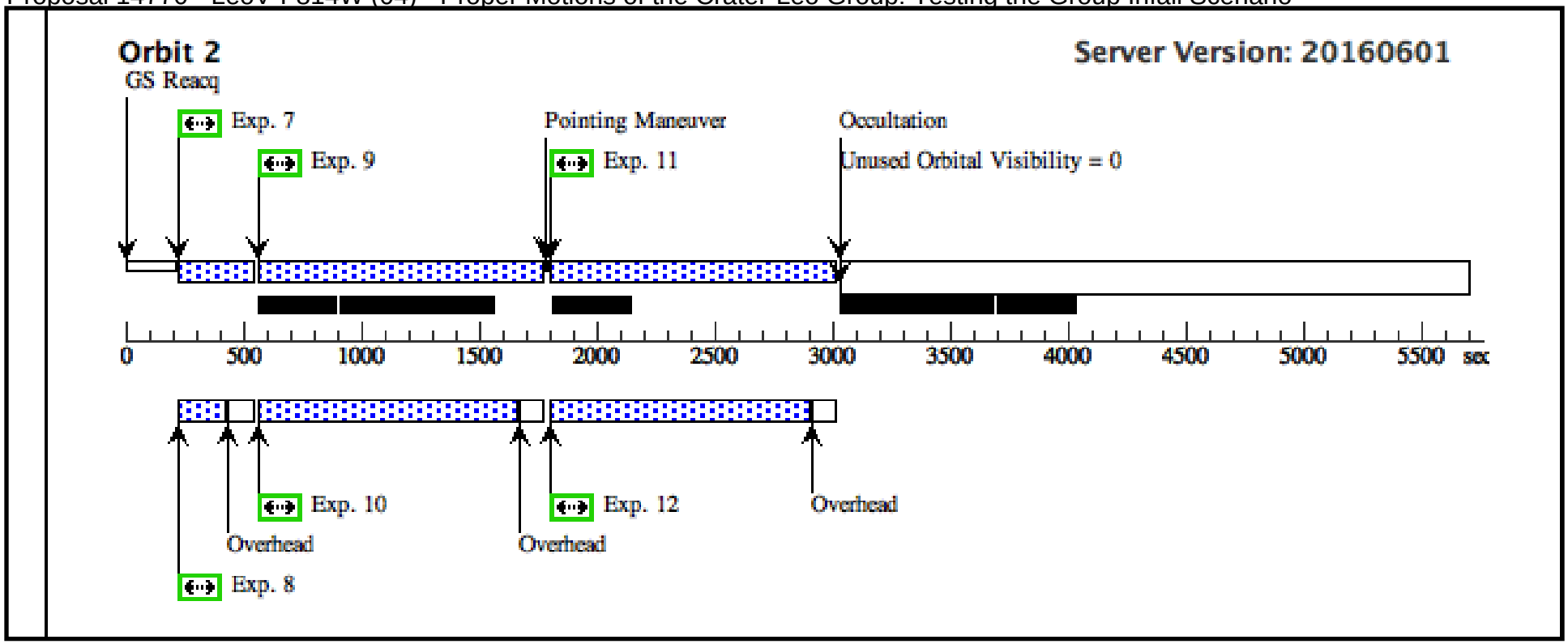
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) LEO-V	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.0000,0.0000	Sequence 1-6 Non-Int in LeoV-F814W (04) Prime + Parallel Group 1-2 in Sequence 1-6 Non-Int in LeoV-F814W (04)	200 Secs (200 Secs) *[==>]*	***[1]***
2		ANY	WFC3/UVIS, ACCUM, UVIS	F814W	FLASH=7.0		Sequence 1-6 Non-Int in LeoV-F814W (04) Prime + Parallel Group 1-2 in Sequence 1-6 Non-Int in LeoV-F814W (04)	200 Secs (200 Secs) *[==>]*	***[1]***
3		(3) LEO-V	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.0000,0.0000	Sequence 1-6 Non-Int in LeoV-F814W (04) Prime + Parallel Group 3-4 in Sequence 1-6 Non-Int in LeoV-F814W (04)	993 Secs (993 Secs) *[==>]*	***[1]***
4		ANY	WFC3/UVIS, ACCUM, UVIS	F814W			Sequence 1-6 Non-Int in LeoV-F814W (04) Prime + Parallel Group 3-4 in Sequence 1-6 Non-Int in LeoV-F814W (04)	1003 Secs (1003 Secs) *[==>]*	***[1]***
5		(3) LEO-V	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.148,0.086	Sequence 1-6 Non-Int in LeoV-F814W (04) Prime + Parallel Group 5-6 in Sequence 1-6 Non-Int in LeoV-F814W (04)	993 Secs (993 Secs) *[==>]*	***[1]***
6		ANY	WFC3/UVIS, ACCUM, UVIS	F814W			Sequence 1-6 Non-Int in LeoV-F814W (04) Prime + Parallel Group 5-6 in Sequence 1-6 Non-Int in LeoV-F814W (04)	1003 Secs (1003 Secs) *[==>]*	***[1]***
7		(3) LEO-V	ACS/WFC, ACCUM, WFC	F814W		POS TARG 0.222,0.240	Sequence 7-12 Non-Int in LeoV-F814W (04) Prime + Parallel Group 7-8 in Sequence 7-12 Non-Int in LeoV-F814W (04)	200 Secs (200 Secs) *[==>]*	***[2]***
8		ANY	WFC3/UVIS, ACCUM, UVIS	F814W	FLASH=7.0		Sequence 7-12 Non-Int in LeoV-F814W (04) Prime + Parallel Group 7-8 in Sequence 7-12 Non-Int in LeoV-F814W (04)	200 Secs (200 Secs) *[==>]*	***[2]***

	9	(3) LEO-V	ACS/WFC, ACCUM, WFC	F814W	POS TARG 0.222,0.240	Sequence 7-12 Non-Int in LeoV-F814W (04) Prime + Parallel Group 9-10 in Sequence 7-12 Non-Int in LeoV-F814W (04)	1090 Secs (1090 Secs) *[==>]*	***[2]***
	10	ANY	WFC3/UVIS, ACCUM, UVIS	F814W		Sequence 7-12 Non-Int in LeoV-F814W (04) Prime + Parallel Group 9-10 in Sequence 7-12 Non-Int in LeoV-F814W (04)	1100 Secs (1100 Secs) *[==>]*	***[2]***
	11	(3) LEO-V	ACS/WFC, ACCUM, WFC	F814W	POS TARG 0.074,0.154	Sequence 7-12 Non-Int in LeoV-F814W (04) Prime + Parallel Group 11-12 in Sequence 7-12 Non-Int in LeoV-F814W (04)	1089 Secs (1089 Secs) *[==>]*	***[2]***
	12	ANY	WFC3/UVIS, ACCUM, UVIS	F814W		Sequence 7-12 Non-Int in LeoV-F814W (04) Prime + Parallel Group 11-12 in Sequence 7-12 Non-Int in LeoV-F814W (04)	1099 Secs (1099 Secs) *[==>]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20160601
GS Reacq
Exp. 7
Exp. 9
Pointing Maneuver
Exp. 11
Occultation
Unused Orbital Visibility = 0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Exp. 10
Overhead
Exp. 12
Overhead
Overhead
Exp. 8