17889 - Tracking the Emergence of an Accretion Disk in an LFBOT

Cycle: 32, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*
Anna Yen Qin Ho (PI) (Contact)	**Cornell University**
Mr. Wynn Vicente Jacobson-Galan (CoI)	California Institute of Technology
Dr. Daniel Perley (CoI) (ESA Member)	Liverpool John Moores University
Dr. Lin Yan (CoI)	California Institute of Technology
Igor Andreoni (CoI)	NASA Goddard Space Flight Center
Dr. Ping Chen (CoI)	Weizmann Institute of Science
Genevieve Schroeder (CoI)	Northwestern University
Gokul Prem Srinivasaragavan (CoI)	University of Maryland
Dr. Yu-jing Qin (CoI)	California Institute of Technology
Jada Vail (CoI)	Cornell University
Harlan Phillips (CoI)	University of California - Berkeley
Marquice Sanchez-Fleming (CoI)	Cornell University
Jacob Wise (CoI) (ESA Member)	Liverpool John Moores University
Dr. Jesper Sollerman (CoI) (ESA Member)	Stockholm University
Ola Bochenek (CoI) (ESA Member)	Liverpool John Moores University
Jamie Wright (CoI) (ESA Member)	Liverpool John Moores University

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) AT2024WPP	WFC3/UVIS	2	29-Nov-2024 14:00:17.0	yes
02	(1) AT2024WPP	WFC3/UVIS	4	29-Nov-2024 14:00:18.0	yes

6 Total Orbits Used

ABSTRACT

In recent years, high-cadence wide-field surveys have revealed unexpected new classes of phenomena, including luminous fast blue optical transients (LFBOTs) such as AT2018cow. The progenitor of LFBOTs is unknown, but they likely involve the formation of an accretion disk that transitions from super-Eddington to ~sub-Eddington accretion rates on a timescale of ~100 days. One of the major clues was HST's detection of luminous UV emission at the position of AT2018cow 2-4 after the original transient. Unfortunately, in AT2018cow the lack of observations between 2 months post-transient and 2 years post-transient meant that the emergence of this luminous UV source was not observed. In this proposal we request HST UV observations of AT2024wpp, the first LFBOT that is both nearby enough and discovered early enough to obtain a detailed UV light curve on timescales spanning days to years. The goal of our DD request is to monitor the UV light curve of AT2024wpp from 2 months to 2 years post-outburs. Multi-frequency HST observations will teach us both about the progenitor of LFBOTs and about the accretion physics operating in these systems; observational constraints on disk physics in this phase would have broad astrophysical applications. In addition, detecting the transient with HST will enable precise astrometry for comparison to a later host-galaxy image, another important clue to the progenitor system.

OBSERVING DESCRIPTION

As per our Phase I proposal we request two non-disruptive ToO activations. The first will consist of 2 orbits, 4 filters total, and should take place in the window Dec 10-19 (but all 4 filters should be observed close together in time). The second is 4 orbits, 4 filters total, and should take place in the window June 18 - July 22 (but again, all 4 filters should be observed close together in time).

Visit

Proposal 17889, Epoch1 (01), implementation Fri Nov 29 19:00:19 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 10-DEC-2024:00:00:00 AND 20-DEC-2024:00:00:00; TOO RESPONSE TIME 21.0D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2), (3), (4)

Fixed Targets

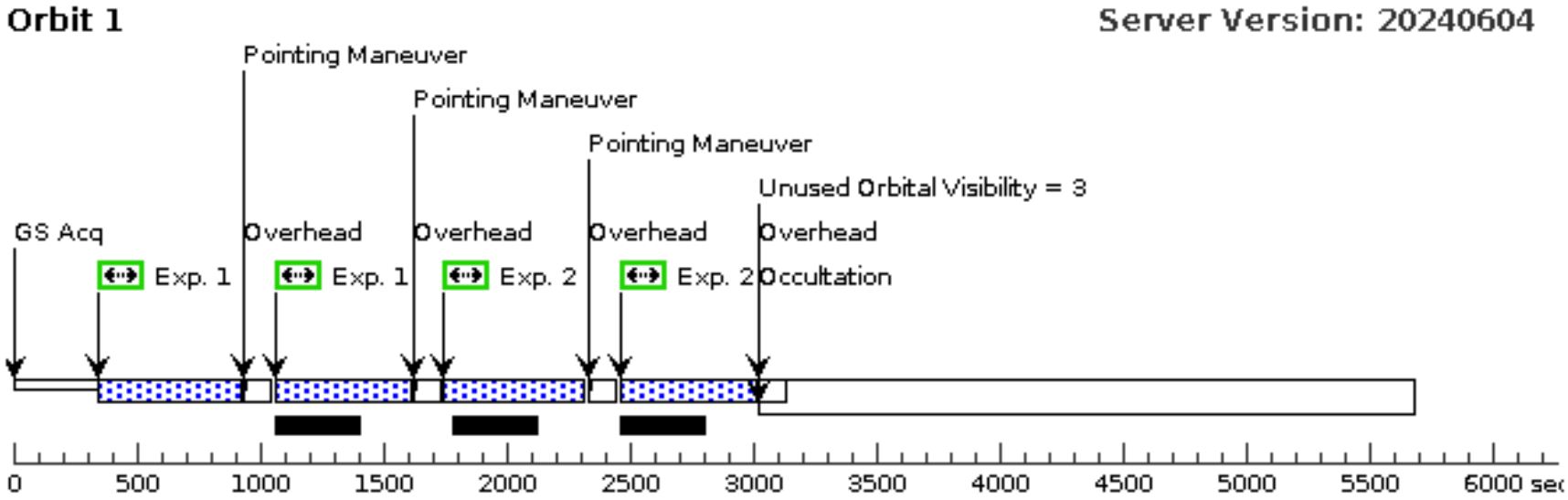
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	AT2024WPP	RA: 02 42 5.4833 (40.5228471d) Dec: -16 57 23.07 (-16.95641d) Equinox: J2000	Redshift: 0.0868	V=23	Reference Frame: ICRS

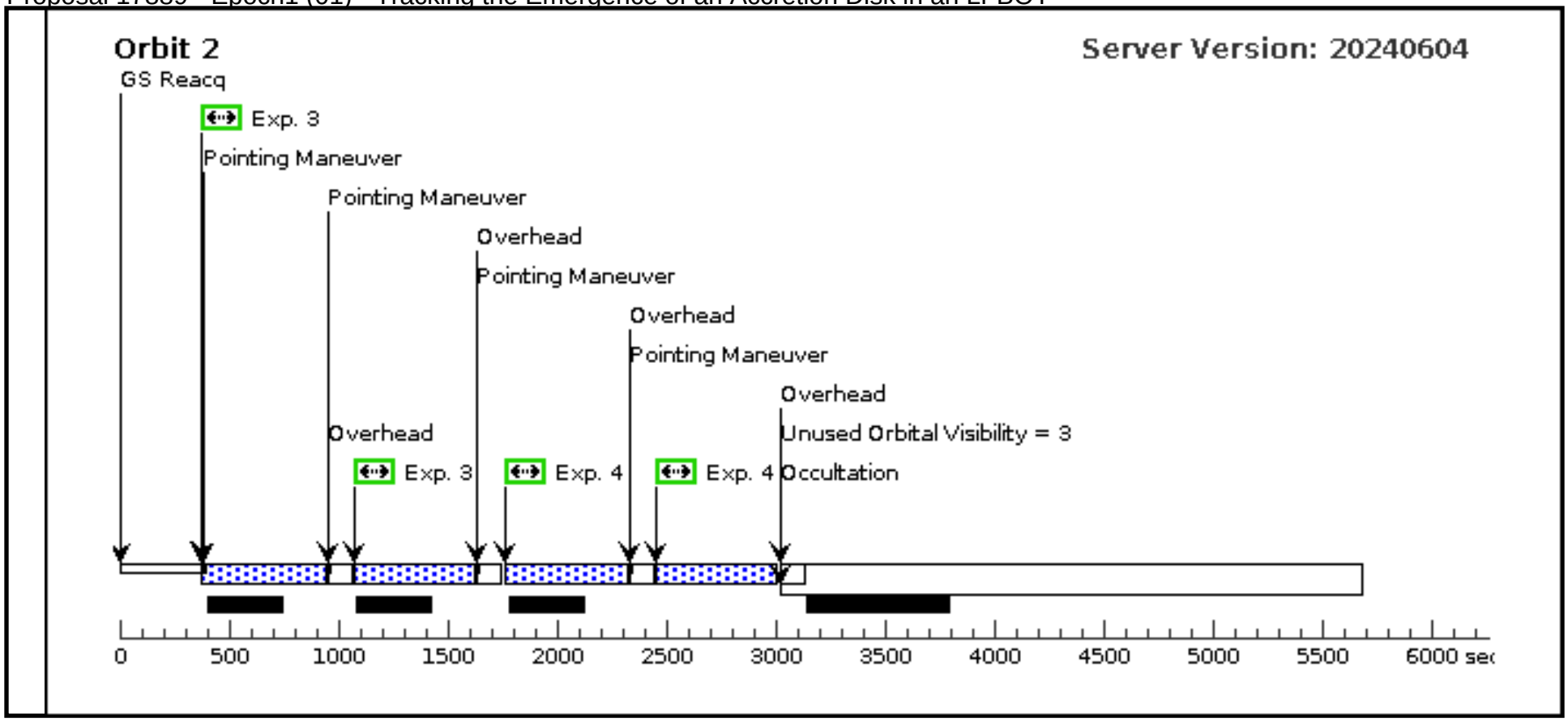
Comments:
Category=UNIDENTIFIED
Description=[ACCRETION DISK, EJECTA, OPTICAL EMITTER, RADIO EMITTER, X-RAY EMITTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) AT2024WPP	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19		Pattern 1, Exps 1-1 in Epoch1 (01) (1)	548 Secs (1096 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2		(1) AT2024WPP	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19		Pattern 1, Exps 2-2 in Epoch1 (01) (1)	548 Secs (1096 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
3		(1) AT2024WPP	WFC3/UVIS, ACCUM, UVIS	F555W	FLASH=6		Pattern 1, Exps 3-3 in Epoch1 (01) (1)	553 Secs (1098 Secs) *[==>549.0 Secs (Pattern 1)]* *[==>549.0 Secs (Pattern 2)]*	***[2]***
4		(1) AT2024WPP	WFC3/UVIS, ACCUM, UVIS	F814W	FLASH=6		Pattern 1, Exps 4-4 in Epoch1 (01) (1)	550 Secs (1098 Secs) *[==>549.0 Secs (Pattern 1)]* *[==>549.0 Secs (Pattern 2)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20240604
GS Reacq
Exp. 3
Pointing Maneuver
Pointing Maneuver
Overhead
Pointing Maneuver
Overhead
Pointing Maneuver
Overhead
Unused Orbital Visibility = 3
Occultation
Overhead
Exp. 3
Exp. 4
Exp. 4
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 17889, Epoch2 (02), implementation Fri Nov 29 19:00:19 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: BETWEEN 18-JUN-2025 AND 23-JUL-2025; TOO RESPONSE TIME 211.0D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1), (2), (3), (4)

Fixed Targets

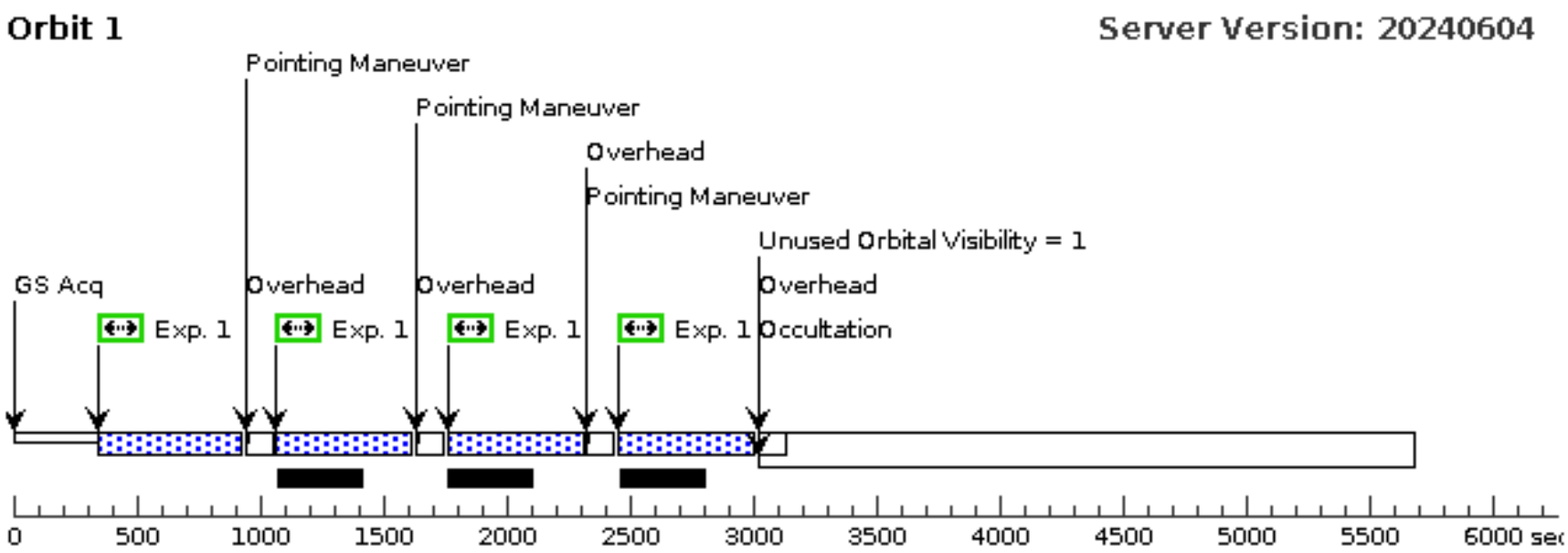
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	AT2024WPP	RA: 02 42 5.4833 (40.5228471d) Dec: -16 57 23.07 (-16.95641d) Equinox: J2000	Redshift: 0.0868	V=23	Reference Frame: ICRS

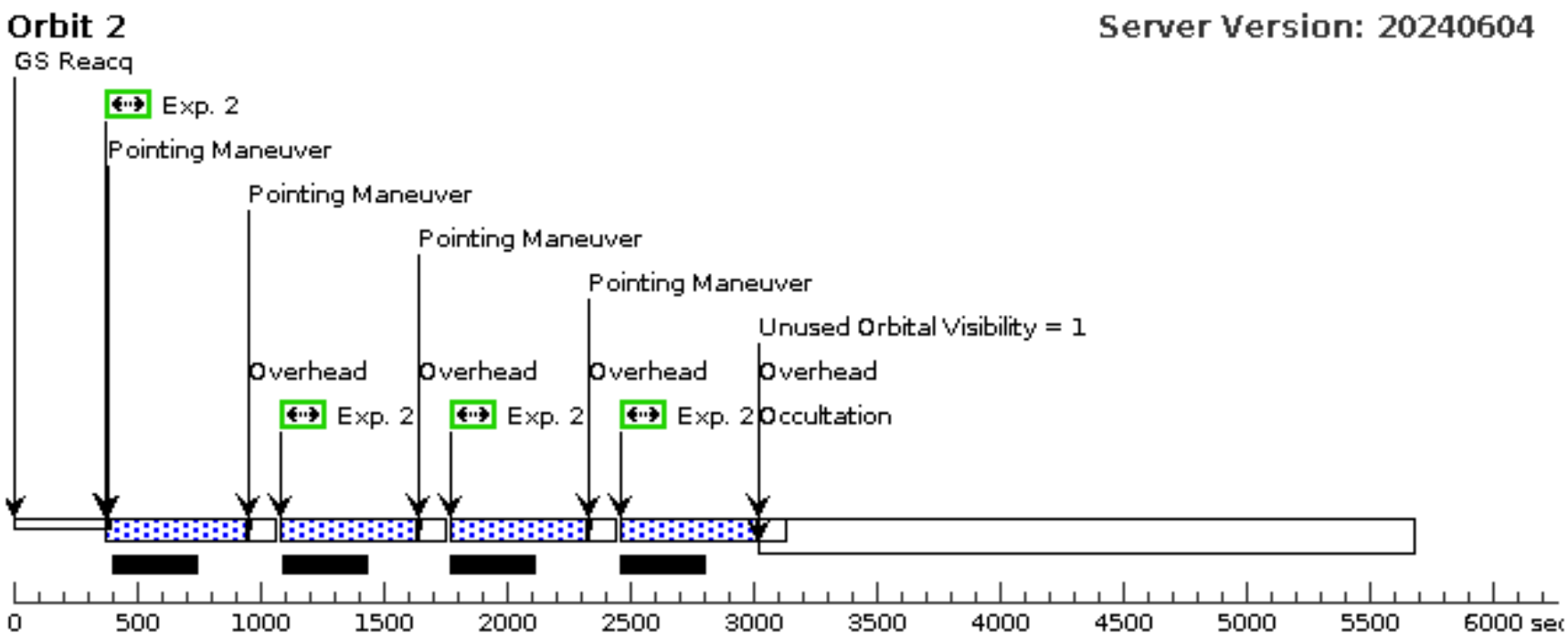
Comments:
Category=UNIDENTIFIED
Description=[ACCRETION DISK, EJECTA, OPTICAL EMITTER, RADIO EMITTER, X-RAY EMITTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) AT2024WPP	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=18		Pattern 2, Exps 1-1 in Epoch2 (02) (2)	555 Secs (2220 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(1) AT2024WPP	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=18		Pattern 2, Exps 2-2 in Epoch2 (02) (2)	550 Secs (2200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[2]***
3		(1) AT2024WPP	WFC3/UVIS, ACCUM, UVIS	F555W	FLASH=5		Pattern 2, Exps 3-3 in Epoch2 (02) (2)	554 Secs (2216 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[3]***
4		(1) AT2024WPP	WFC3/UVIS, ACCUM, UVIS	F814W	FLASH=7		Pattern 2, Exps 4-4 in Epoch2 (02) (2)	557 Secs (2216 Secs) *[==>554.0 Secs (Pattern 1)]* *[==>554.0 Secs (Pattern 2)]* *[==>554.0 Secs (Pattern 3)]* *[==>554.0 Secs (Pattern 4)]*	***[4]***

Orbit Structure




Orbit 2
Server Version: 20240604
GS Reacq
Exp. 2
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Unused Orbital Visibility = 1
Overhead
Overhead
Overhead
Overhead
Exp. 2
Exp. 2
Exp. 2
Occultation
0
500
1000
1500
2000
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3000
3500
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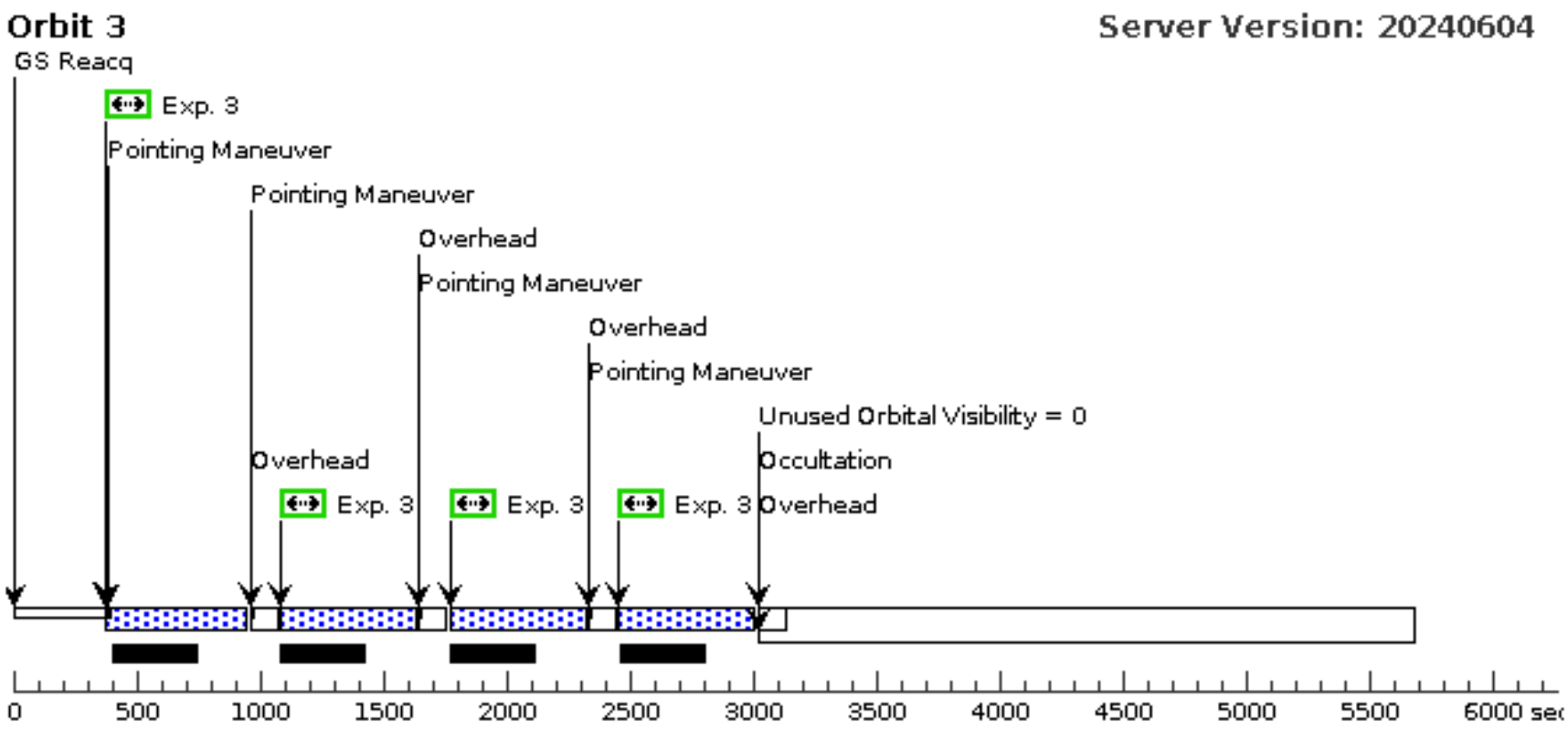
4500
5000
5500
6000 sec


Orbit 3
Server Version: 20240604
GS Reacq
Exp. 3
Pointing Maneuver
Pointing Maneuver
Overhead
Pointing Maneuver
Overhead
Pointing Maneuver
Unused Orbital Visibility = 0
Occultation
Overhead
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3500
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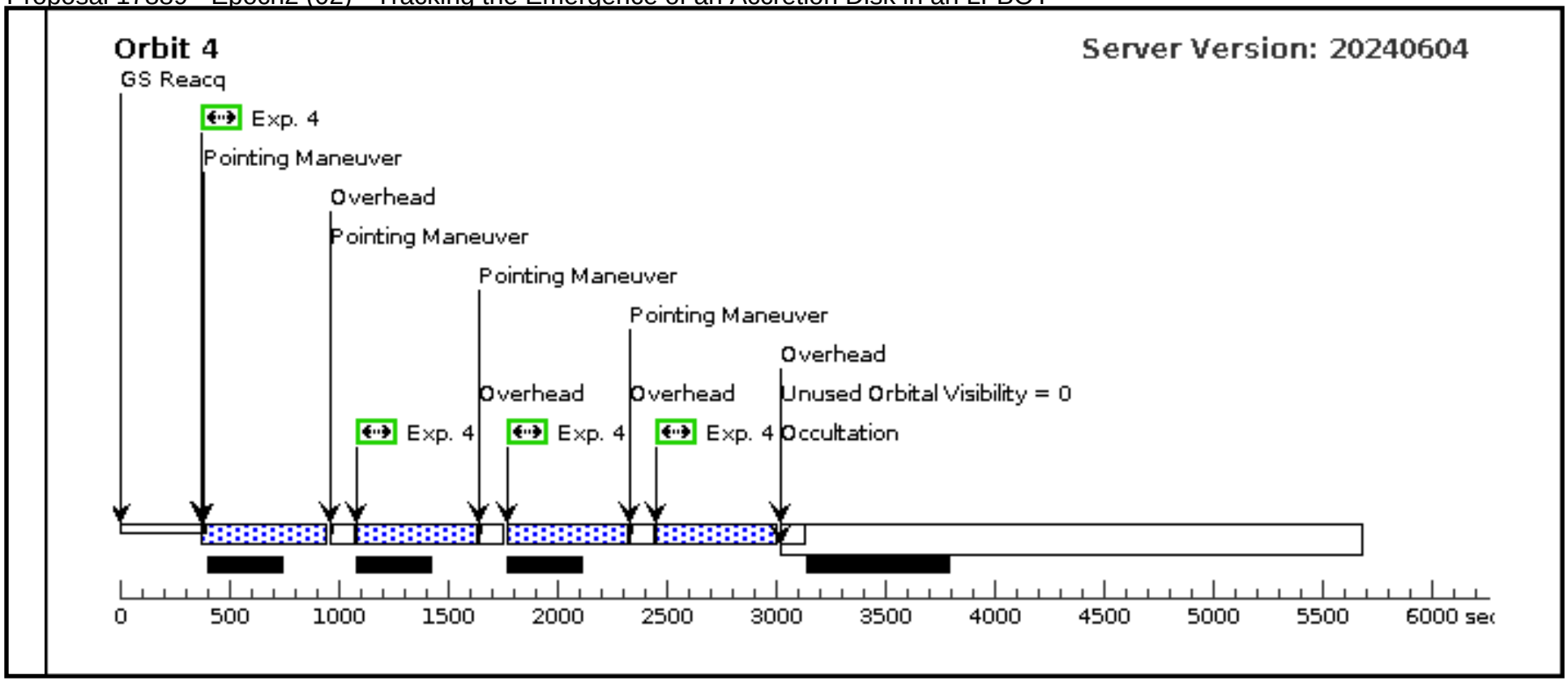
4500
5000
5500
6000 sec


Orbit 4
Server Version: 20240604
GS Reacq
Exp. 4
Pointing Maneuver
Overhead
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Overhead
Overhead
Overhead
Unused Orbital Visibility = 0
Exp. 4
Exp. 4
Exp. 4
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec