17871 - X-Ray Jets in Microquasars

Cycle: 32, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*
Prof. Stephane Corbel (PI) (ESA Member) (Contact)	**Commissariat a l'Energie Atomique (CEA)**
Dr. Philip Kaaret (CoI) (CoPI) (AdminUSPI) (Contact)	NASA Marshall Space Flight Center
Dr. John A. Tomsick (CoI)	University of California - Berkeley
Dr. Giulia Migliori (CoI) (ESA Member)	INAF - Istituto di Radioastronomia
Prof. Rob Fender (CoI) (ESA Member)	University of Oxford
Dr. Jerome A. Orosz (CoI)	San Diego State University
Dr. Tasso Tzioumis (CoI)	Australian National University

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) XRAY-JETS	WFC3/IR	1	12-Nov-2024 10:03:48.0	yes
02	(1) XRAY-JETS	WFC3/IR	1	12-Nov-2024 10:03:49.0	yes
03	(1) XRAY-JETS	WFC3/IR	2	12-Nov-2024 10:03:49.0	yes
04	(1) XRAY-JETS	WFC3/IR	2	12-Nov-2024 10:03:50.0	yes

6 Total Orbits Used

ABSTRACT

We propose Target of Opportunity (ToO) observations for detailed studies of X-ray jets from microquasars. Following the discovery by Chandra of radio/X-ray jets in five microquasars, it becomes clear that X-ray jets are probably much more common than previously thought, and they offer an

exciting new way to probe the physics of relativistic jets from black holes and their feedback on the ISM. The proposed ToO observations are optimized to discover and study (flux evolution, morphology, SED, proper motion, ...) new X-ray jets from microquasars, triggered by their detection as radio lobes. This will have implications not only for the study of jets from Galactic X-ray binaries, but also for our understanding of relativistic jets from active galactic nuclei (AGN).

OBSERVING DESCRIPTION

HST observations in the IR will complement the measurements of the extended jets in the radio and X-rays and be used to bridge the gap in the spectral energy distribution. We will use WFC3 with the F160W. The observations will be 1 HST orbit for the first two Chandra observations and 2 HST orbits for the two final observations when we expect the jets to be much fainter and more extended. On each orbit, we will observe with the WFC3/F160W with 2 dither positions. The response for HST is longer than 3 weeks, therefore not constraining for HST. The separation between observations will be approximately by one month, except for the last observation which will 2 months after the third.

Visit

Proposal 17871, Visit 01, implementation Tue Nov 12 15:03:50 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: TOO RESPONSE TIME 21.0D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=1.908 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Generic Targets

#	Name	Criteria	Description
(1)	XRAY-JETS	Discovery of a new, variable radio source at least 2 arcsec from a known black hole candidate.	

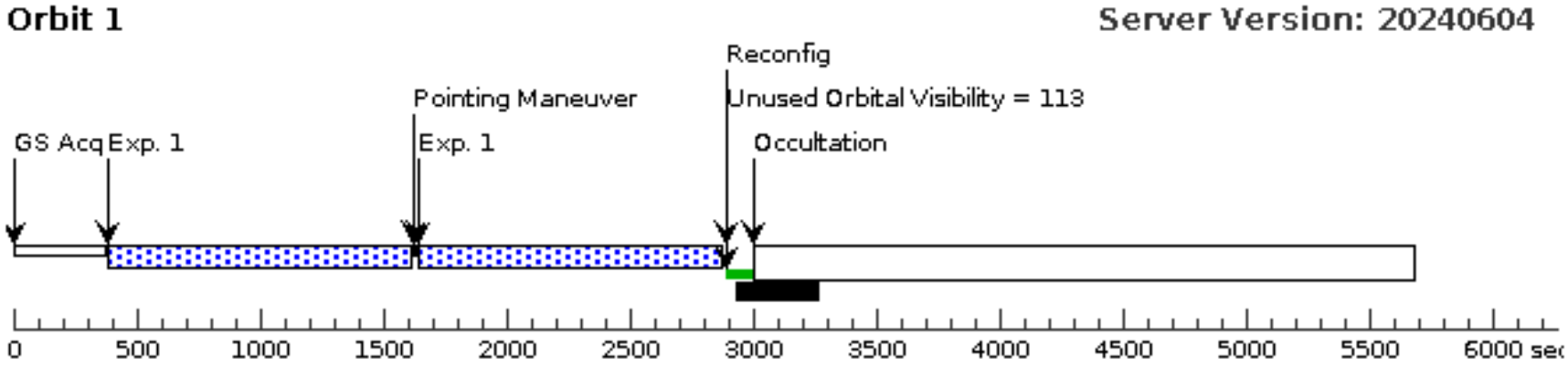
Comments: Since the flux information is used to check for over-illumination of sensitive detectors, we give the V-mag for the central black hole. It will be a point source and be significantly brighter than the extended jets that are the science focus of the proposal. In the decaying phases of the outburst, i.e. when the transient radio jets are observed, the black hole should be dimmer than 19th magnitude in V.

The extended jet should have a flux around 1E-6 Jy at 1.5 microns over 1.2 arcsecond diameter region and a spectrum with a F_nu index of -0.7 and reddening of A_V = 4.75.

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) XRAY-JETS	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=7; SAMP-SEQ=SPARS200		Pattern 1, Exps 1-1 in Visit 01 (1)	1202.932693 Secs (2405.865 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*

Orbit Structure



Visit

Proposal 17871, Visit 02, implementation Tue Nov 12 15:03:50 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: TOO RESPONSE TIME 21.0D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=1.908 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Generic Targets

#	Name	Criteria	Description
(1)	XRAY-JETS	Discovery of a new, variable radio source at least 2 arcsec from a known black hole candidate.	

Comments: Since the flux information is used to check for over-illumination of sensitive detectors, we give the V-mag for the central black hole. It will be a point source and be significantly brighter than the extended jets that are the science focus of the proposal. In the decaying phases of the outburst, i.e. when the transient radio jets are observed, the black hole should be dimmer than 19th magnitude in V.

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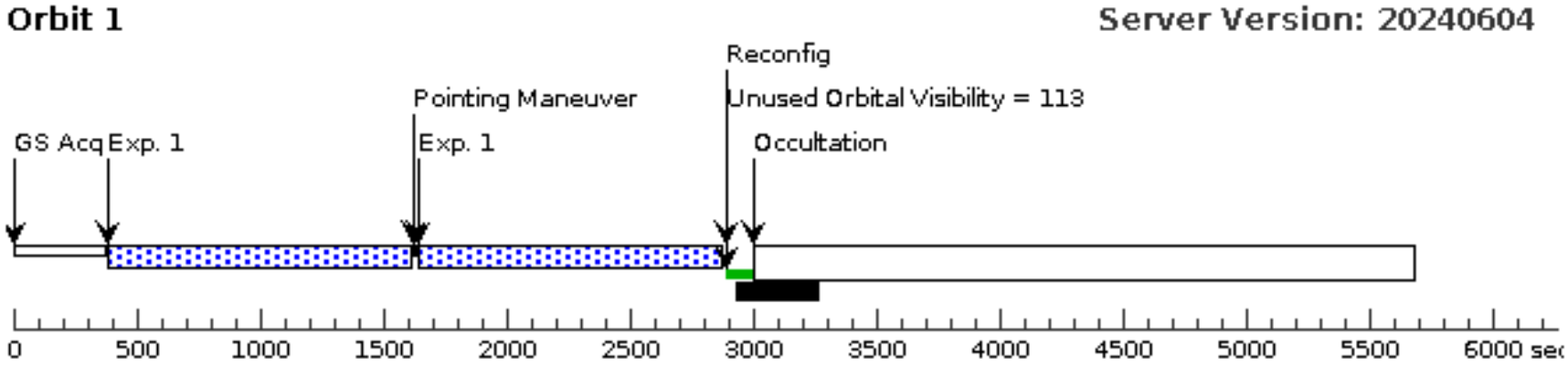
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) XRAY-JETS	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=7; SAMP-SEQ=SPARS200		Pattern 1, Exps 1-1 in Visit 02 (1)	1202.932693 Secs (2405.865 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*

Orbit Structure



Visit

Proposal 17871, Visit 03, implementation Tue Nov 12 15:03:50 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: TOO RESPONSE TIME 21.0D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=1.908 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)

Generic Targets

#	Name	Criteria	Description
(1)	XRAY-JETS	Discovery of a new, variable radio source at least 2 arcsec from a known black hole candidate.	

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Exposures

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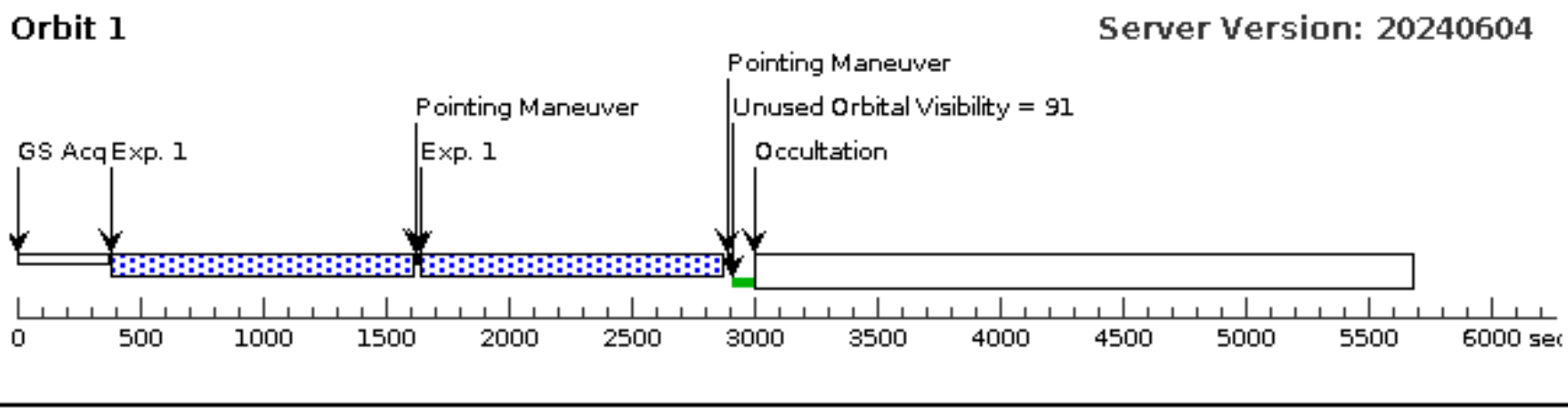
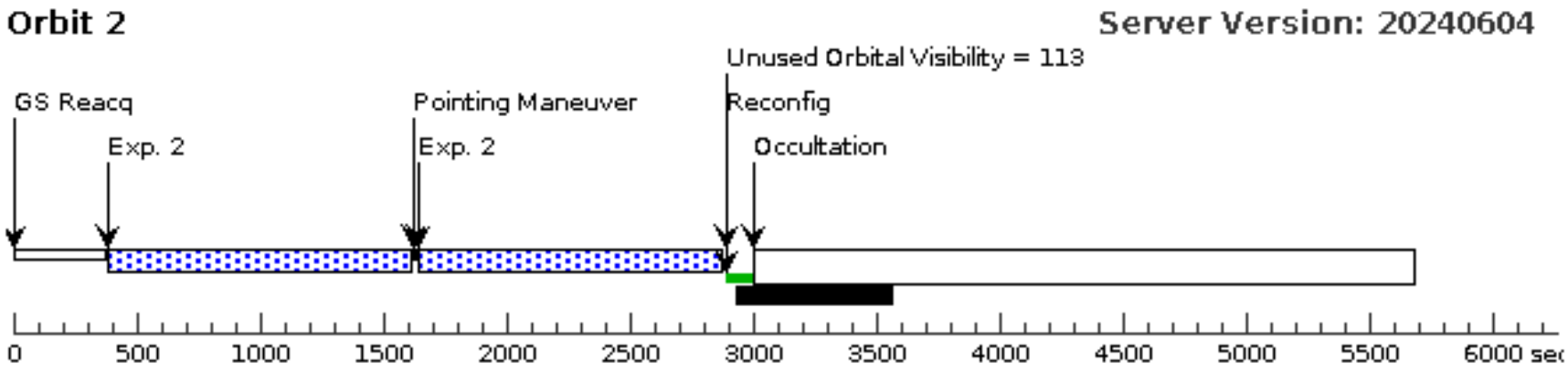
1		(1) XRAY-JETS	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=7; SAMP-SEQ=SPARS200		Pattern 1, Exps 1-1 in Visit 03 (1)	1202.932693 Secs (2405.865 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2		(1) XRAY-JETS	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=7; SAMP-SEQ=SPARS200		Pattern 1, Exps 2-2 in Visit 03 (1)	1202.932693 Secs (2405.865 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***

Orbit Structure





Visit

Proposal 17871, Visit 04, implementation Tue Nov 12 15:03:50 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: TOO RESPONSE TIME 21.0D

Patterns

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(1)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=1.908 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1), (2)

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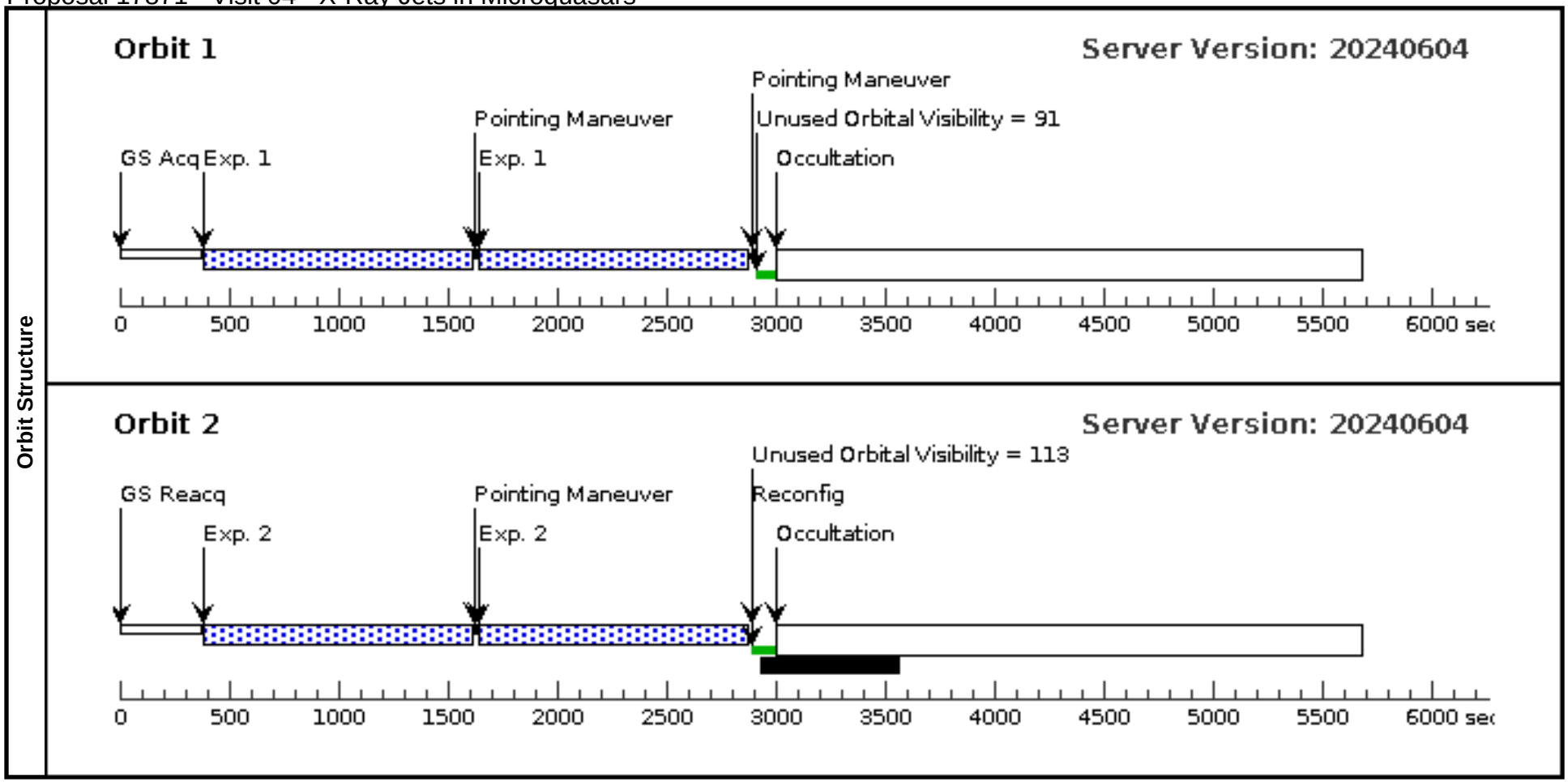
1		(1) XRAY-JETS	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=7; SAMP-SEQ=SPARS200		Pattern 1, Exps 1-1 in Visit 04 (1)	1202.932693 Secs (2405.865 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2		(1) XRAY-JETS	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=7; SAMP-SEQ=SPARS200		Pattern 1, Exps 2-2 in Visit 04 (1)	1202.932693 Secs (2405.865 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***


Orbit Structure
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Pointing Maneuver
Pointing Maneuver
Unused Orbital Visibility = 91
GS Acq
Exp. 1
Exp. 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec
Orbit 2
Server Version: 20240604
Unused Orbital Visibility = 113
GS Reacq
Pointing Maneuver
Reconfig
Exp. 2
Exp. 2
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec