15667 - VLA & HST Monitoring of Sgr A* in July 2019 with Spitzer and Chandra

Cycle: 26, 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) SGR-A	WFC3/IR	6	08-Jul-2019 20:00:19.0	yes
02	(1) SGR-A	WFC3/IR	2	08-Jul-2019 20:00:22.0	yes

8 Total Orbits Used

ABSTRACT

We propose to use the VLA and WFC3/HST as part of an observing campaign led by Spitzer and Chandra for continuous monitoring of Sgr A* in July 2019. The Chandra (2x24h) and Spitzer (2x24h) have already been approved.

The Spitzer mission is scheduled to end in November 2019, the last chance for Spitzer monitoring, which is unique in terms of its continuous coverage in the mid-IR. It is well established that an expanding synchrotron source model can explain flare emission from Sgr A* at radio wavelengths. However, it is not clear if radio, submm and IR flare emission are related to each other. If there is a relationship between low and high frequency emission, our measurements will test a predication in which a time delay between radio and IR tells us about the importance of opacity in the adiabatic expansion of plasma ejected from Sgr A*. In addition, they provide insight into particle acceleration of relativistic particles by determining the synchrotron cooling time scale at mid and near-IR by using Spitzer and HST. In particular, the adiabatic expansion model can explain the simultaneity of peak flare emission at mid-IR and submm in terms of of optical depth effects.

OBSERVING DESCRIPTION

The 8 orbits of this proposal need to be scheduled in coordination with the Spitzer, Chandra, and VLA observations of Sgr A* that will be taking place between 12 July 2019 and 4 August 2019. We intend to split the 8 HST orbits allocated to this program into 2 visits of 4 back-to-back orbits each, to obtain monitoring of Sgr A* over a time period of ~6 hours during each of those 2 visits. The 2 visits will be scheduled to overlap as much as possible with the simultaneous observations by the other observatories.

We will obtain WFC3/IR observations with the F153M filter and the SPARS-25 readout sequence. This readout sequence not only gives us equally-spaced readout intervals of 25 secs to keep the detector stable, but also results in exposures of 5-6 min duration, which is long enough to perform WFC3 buffer dumps in parallel with the exposures, thus maximizing our on-source time. We will embed the exposures within 4-point dither pattern, in order to mitigate the effects of bad pixels, flat-field uncertainties, and persistence from bright stars. A total of 8 such exposures can be obtained within each orbit, giving us nearly constant coverage of Sgr A* over a span of about 50 mins per orbit.

As of 9 Jan 2019, the exact dates and times of the coordinated Spitzer and Chandra observations have not yet been determined. They will be determined from the following list of candidate orbital periods:

Orbit	Begin UT	End UT
2753	12 JUL 10:01	14 JUL 05:29
2754	15 JUL 01:29	16 JUL 20:57

2755 17 JUL 16:57 19 JUL 12:24
2756 20 JUL 08:24 22 JUL 03:52
2757 22 JUL 23:52 24 JUL 19:20
2758 25 JUL 15:20 27 JUL 10:48
2759 28 JUL 06:48 30 JUL 02:16
2760 30 JUL 22:16 01 AUG 17:45
2761 02 AUG 13:45 04 AUG 09:14

A preliminary schedule should be available in March 2019 and a final schedule perhaps in late May 2019. Once those dates are released, we will pick two of them on which to schedule the HST visits. For now, we have simply set the BETWEEN times for the HST visits to be within the above range of 12 JUL 2019 through 04 AUG 2019.

Visit

Proposal 15667, Visit 01, implementation Tue Jul 09 00:00:23 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: BETWEEN 12-JUL-2019:10:01:00 AND 04-AUG-2019:09:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(1)
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.572 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides= Center Pattern=false		(2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SGR-A	RA: 17 45 40.0360 (266.4168167d) Dec: -29 00 28.17 (-29.00783d) Equinox: J2000	Epoch of Position: 2015.5	V=35 0.15 mJy in H-band	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=STELLAR CLUSTER
Description=[ACCRETION DISK]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SGR-A	WFC3/IR, MULTIACCUM, IR	F153M	SAMP-SEQ=SPARS25; NSAMP=12		Pattern 1, Exps 1-1 in Visit 01 (1)	277.937956 Secs X 9 (10005.766 Secs)	
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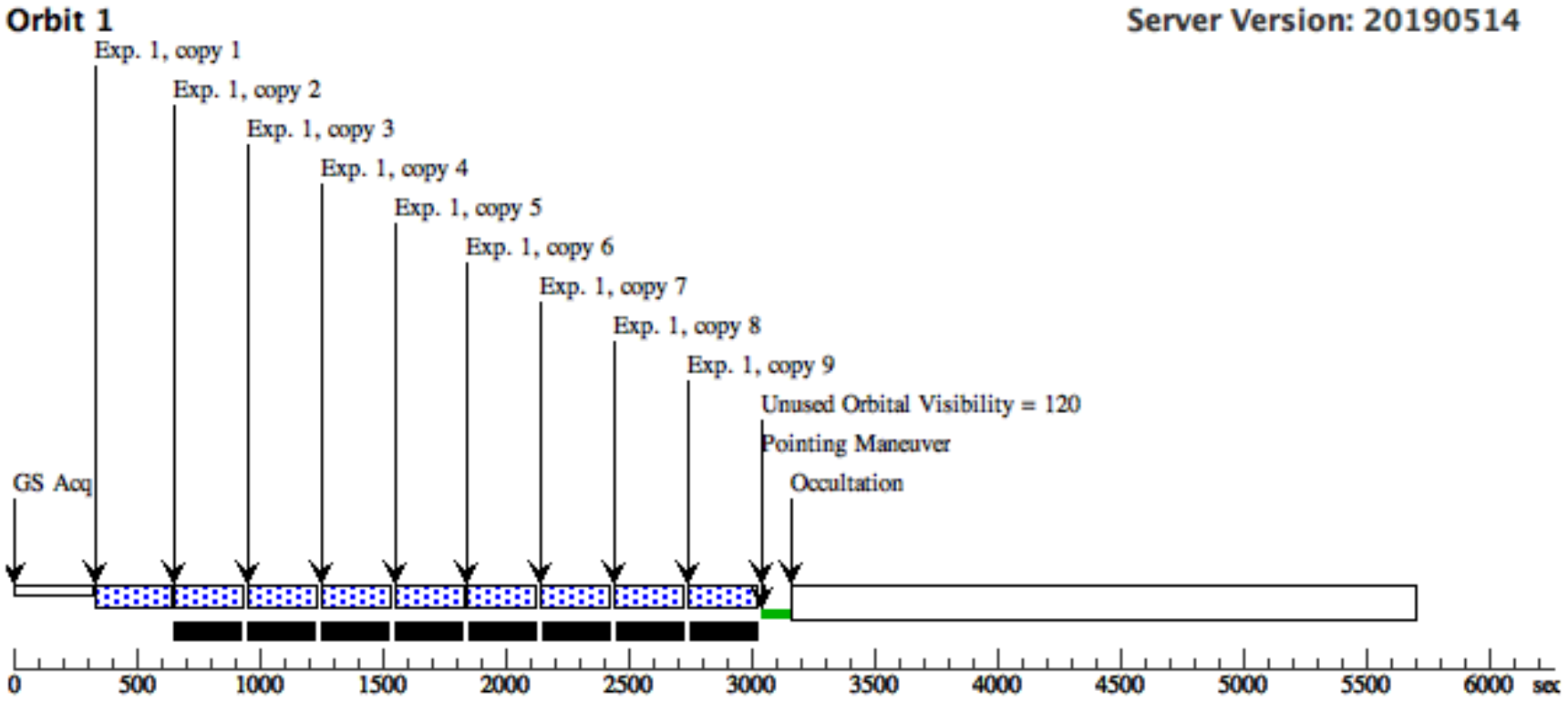
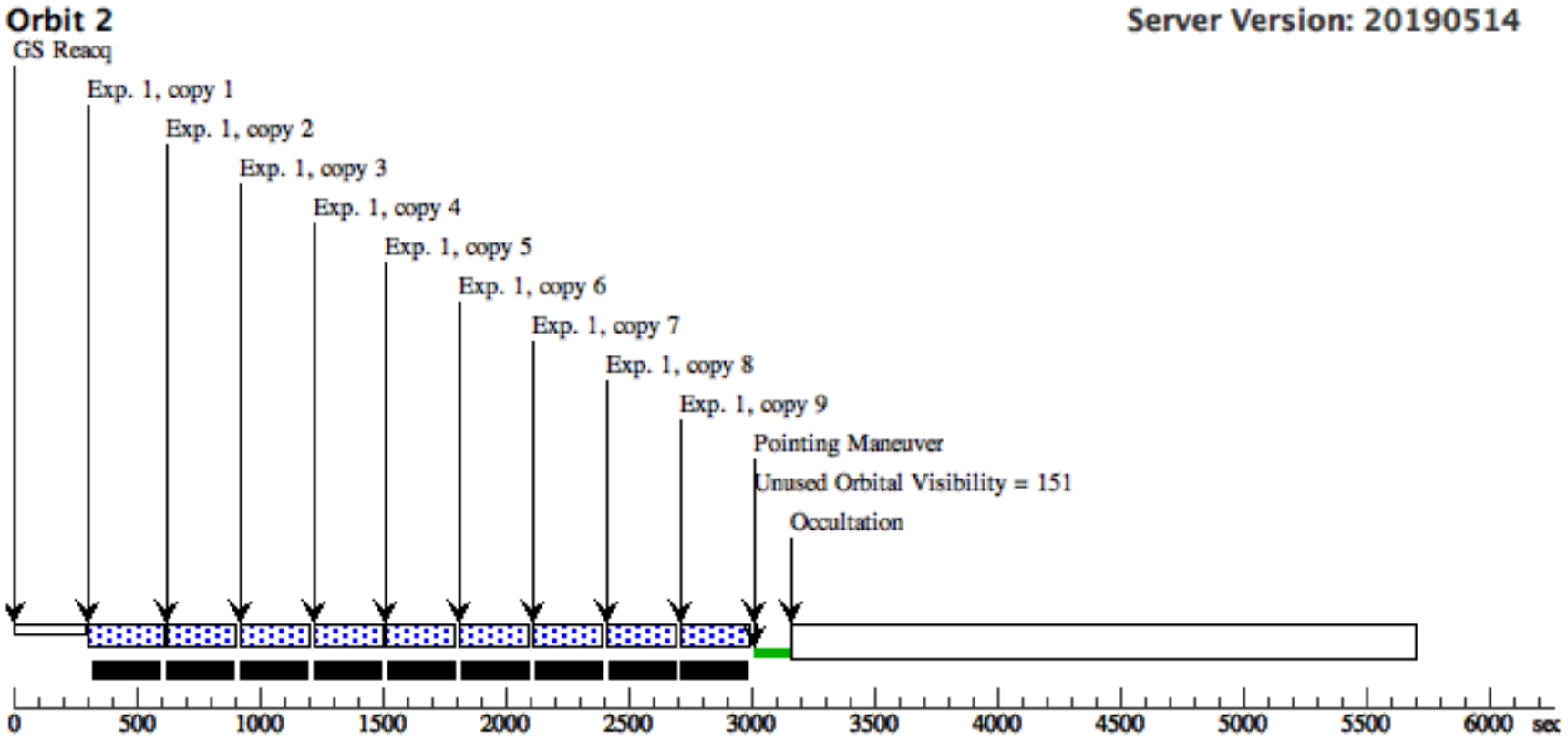
								[==>(Pattern 1, Copy 2)]	
								[==>(Pattern 1, Copy 3)]	
								[==>(Pattern 1, Copy 4)]	
								[==>(Pattern 1, Copy 5)]	***[1]***
								[==>(Pattern 1, Copy 6)]	
								[==>(Pattern 1, Copy 7)]	
								[==>(Pattern 1, Copy 8)]	
								[==>(Pattern 1, Copy 9)]	
								[==>(Pattern 2, Copy 1)]	
								[==>(Pattern 2, Copy 2)]	
								[==>(Pattern 2, Copy 3)]	
								[==>(Pattern 2, Copy 4)]	
								[==>(Pattern 2, Copy 5)]	***[2]***
								[==>(Pattern 2, Copy 6)]	
								[==>(Pattern 2, Copy 7)]	
								[==>(Pattern 2, Copy 8)]	
								[==>(Pattern 2, Copy 9)]	
								[==>(Pattern 3, Copy 1)]	
								[==>(Pattern 3, Copy 2)]	
								[==>(Pattern 3, Copy 3)]	
								[==>(Pattern 3, Copy 4)]	
								[==>(Pattern 3, Copy 5)]	***[3]***
								[==>(Pattern 3, Copy 6)]	
								[==>(Pattern 3, Copy 7)]	
								[==>(Pattern 3, Copy 8)]	
								[==>(Pattern 3, Copy 9)]	
								[==>(Pattern 4, Copy 1)]	
								[==>(Pattern 4, Copy 2)]	
								[==>(Pattern 4, Copy 3)]	
								[==>(Pattern 4, Copy 4)]	
								[==>(Pattern 4, Copy 5)]	
								[==>(Pattern 4, Copy 6)]	
								[==>(Pattern 4, Copy 7)]	
								[==>(Pattern 4, Copy 8)]	***[4]***
								[==>(Pattern 4, Copy 9)]	

	2	(1) SGR-A	WFC3/IR, MULTIACCUM, IR	F153M	SAMP-SEQ=SPARS 25; NSAMP=12	Pattern 2, Exps 2-2 in Visit 01 (2)	277.937956 Secs X 9 (5002.883 Secs) *[==>(Pattern 1, Copy 1)]* *[==>(Pattern 1, Copy 2)]* *[==>(Pattern 1, Copy 3)]* *[==>(Pattern 1, Copy 4)]* *[==>(Pattern 1, Copy 5)]* *[==>(Pattern 1, Copy 6)]* *[==>(Pattern 1, Copy 7)]* *[==>(Pattern 1, Copy 8)]* *[==>(Pattern 1, Copy 9)]* *[==>(Pattern 2, Copy 1)]* *[==>(Pattern 2, Copy 2)]* *[==>(Pattern 2, Copy 3)]* *[==>(Pattern 2, Copy 4)]* *[==>(Pattern 2, Copy 5)]* *[==>(Pattern 2, Copy 6)]* *[==>(Pattern 2, Copy 7)]* *[==>(Pattern 2, Copy 8)]* *[==>(Pattern 2, Copy 9)]*	***[5]*** ***[6]***

Orbit Structure




Orbit 2
Server Version: 20190514
GS Reacq
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Exp. 1, copy 3
Exp. 1, copy 4
Exp. 1, copy 5
Exp. 1, copy 6
Exp. 1, copy 7
Exp. 1, copy 8
Exp. 1, copy 9
Pointing Maneuver
Unused Orbital Visibility = 151
Occultation
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2000
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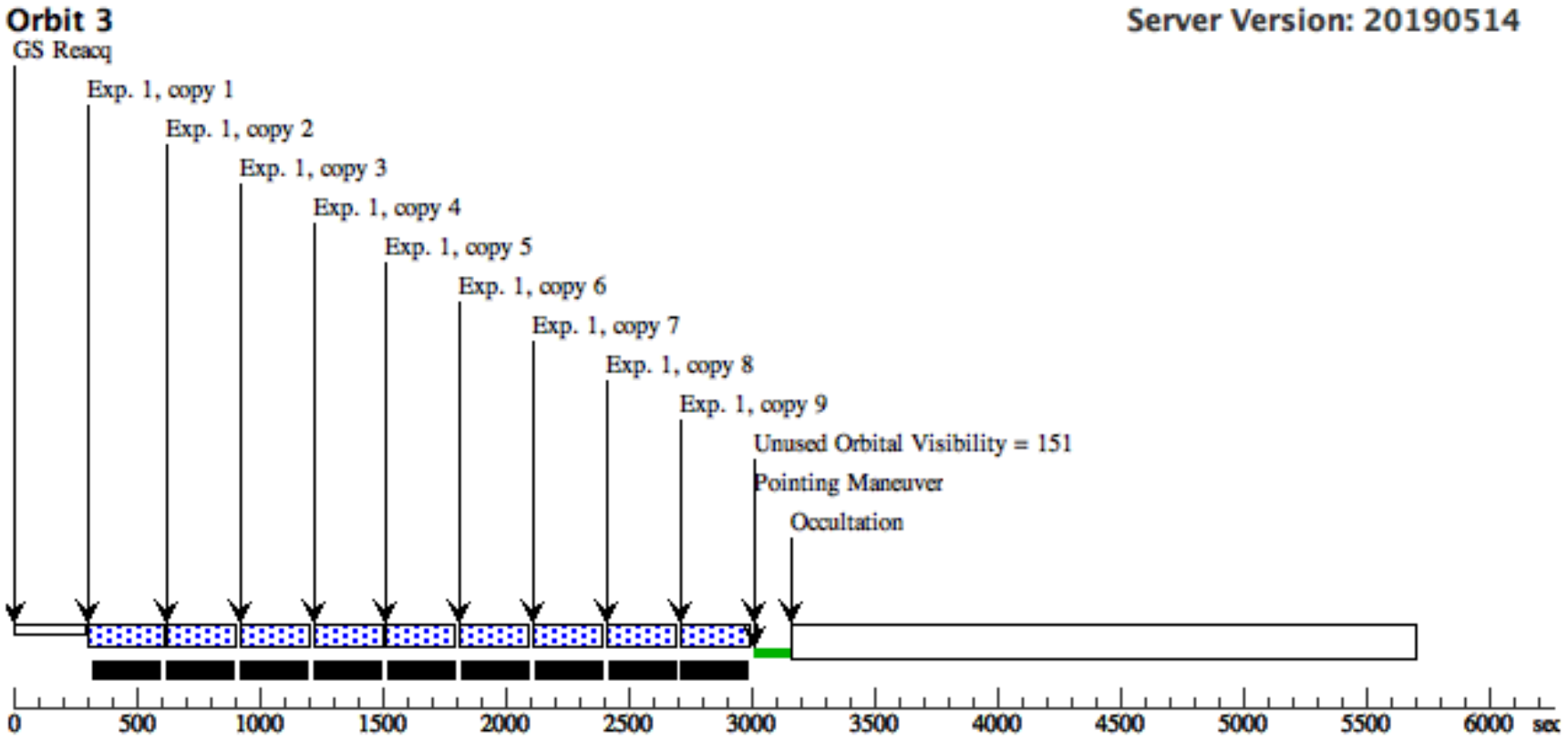
4500
5000
5500
6000
sec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Server Version: 20190514
GS Reacq
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Exp. 1, copy 2
Exp. 1, copy 3
Exp. 1, copy 4
Exp. 1, copy 5
Exp. 1, copy 6
Exp. 1, copy 7
Exp. 1, copy 8
Exp. 1, copy 9
Unused Orbital Visibility = 151
Pointing Maneuver
Occultation
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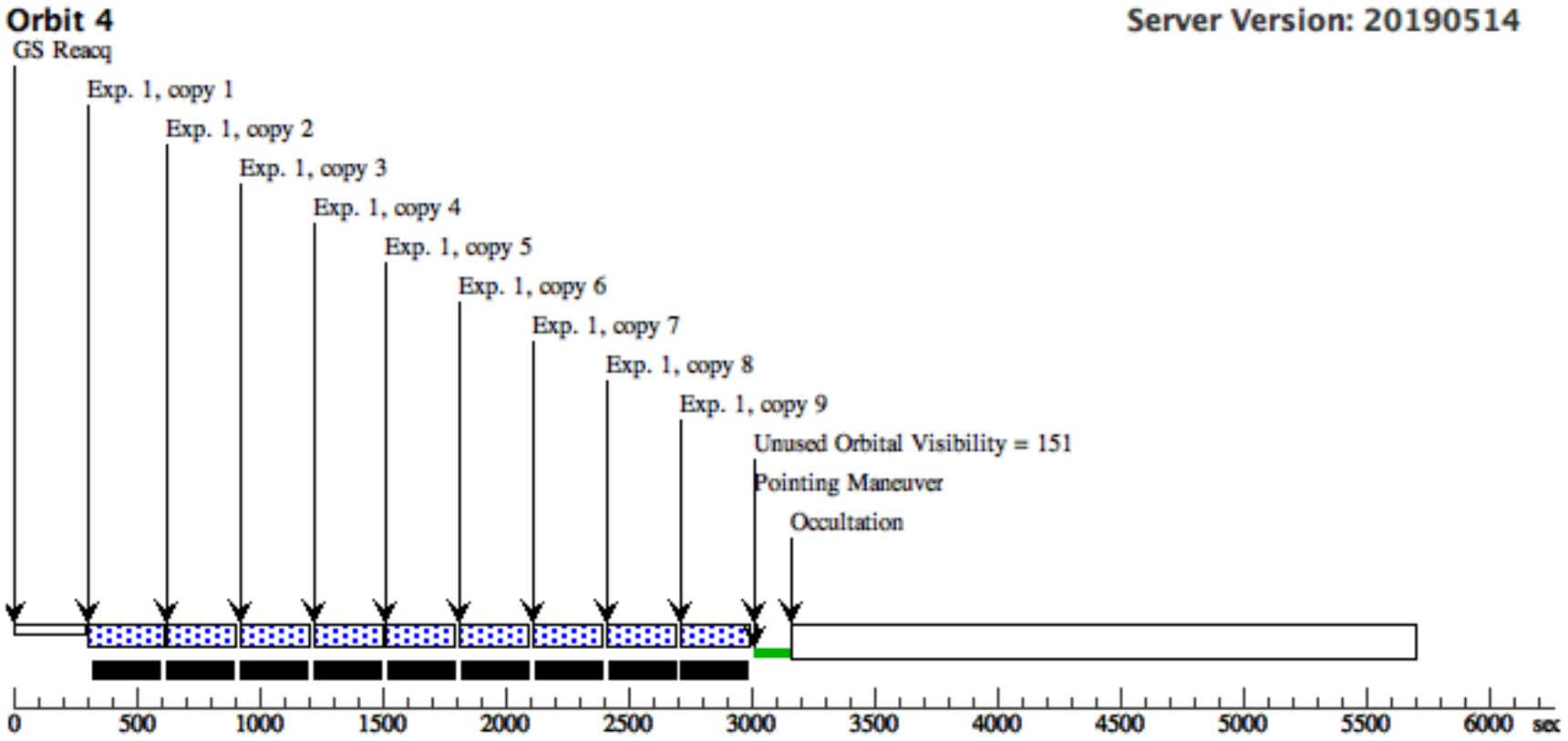
sec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Server Version: 20190514
GS Reacq
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Exp. 1, copy 2
Exp. 1, copy 3
Exp. 1, copy 4
Exp. 1, copy 5
Exp. 1, copy 6
Exp. 1, copy 7
Exp. 1, copy 8
Exp. 1, copy 9
Unused Orbital Visibility = 151
Pointing Maneuver
Occultation
0
500
1000
1500
2000
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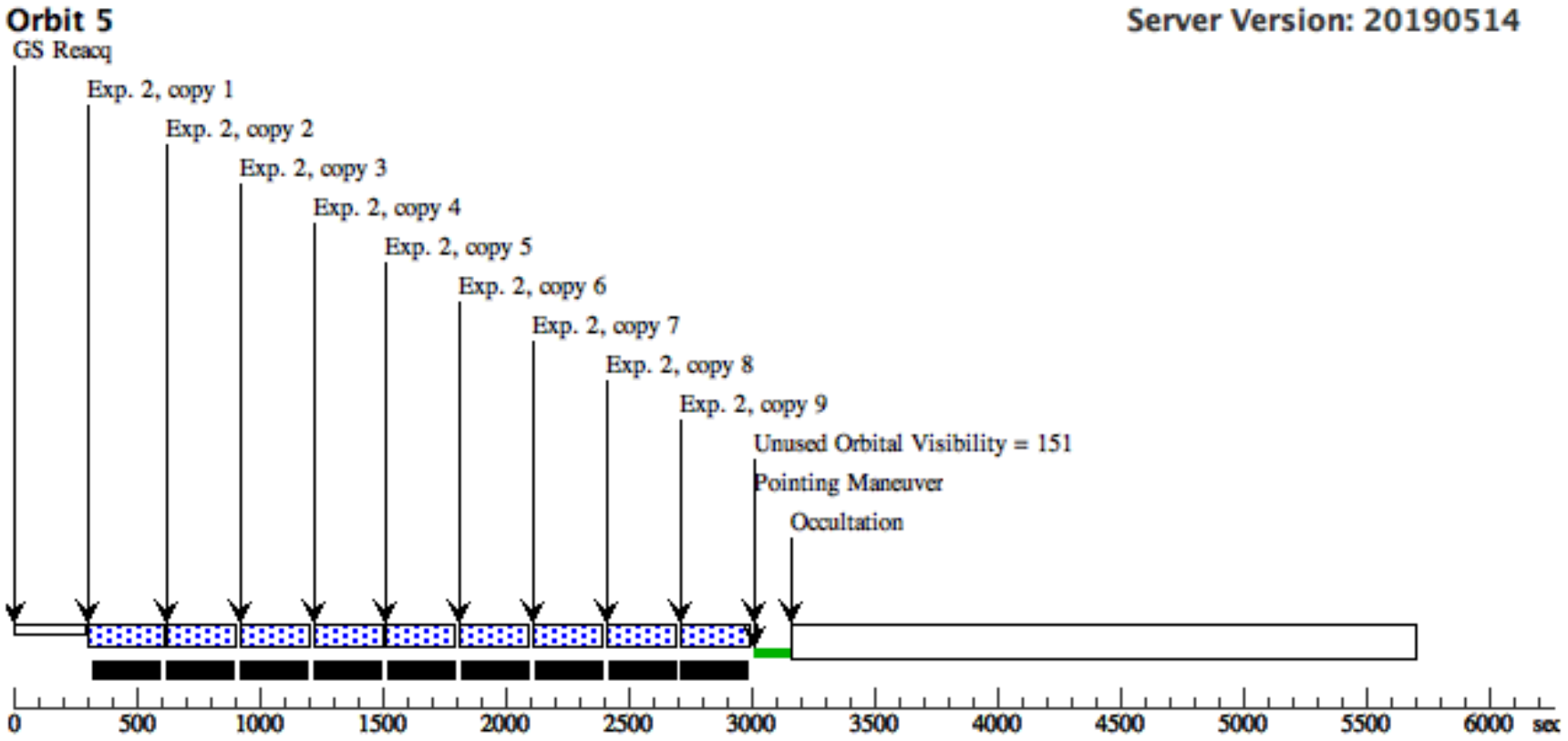
3000
3500
4000
4500
5000
5500
6000
sec


Orbit 5
Server Version: 20190514
GS Reacq
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Exp. 2, copy 2
Exp. 2, copy 3
Exp. 2, copy 4
Exp. 2, copy 5
Exp. 2, copy 6
Exp. 2, copy 7
Exp. 2, copy 8
Exp. 2, copy 9
Unused Orbital Visibility = 151
Pointing Maneuver
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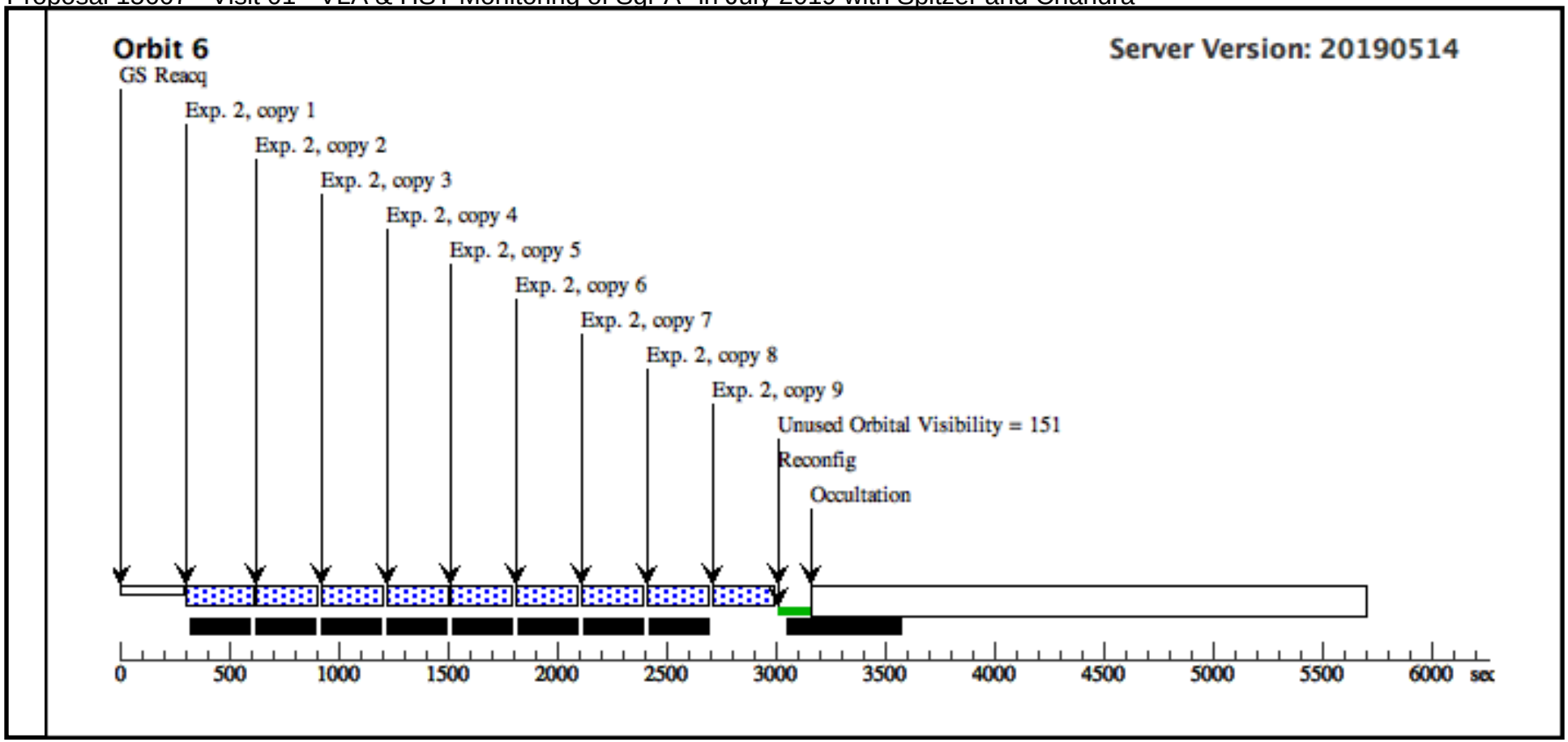
5500
6000
sec


Orbit 6
Server Version: 20190514
GS Reacq
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Exp. 2, copy 2
Exp. 2, copy 3
Exp. 2, copy 4
Exp. 2, copy 5
Exp. 2, copy 6
Exp. 2, copy 7
Exp. 2, copy 8
Exp. 2, copy 9
Unused Orbital Visibility = 151
Reconfig
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

Visit

Proposal 15667, Visit 02, scheduling Tue Jul 09 00:00:24 GMT 2019

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: BETWEEN 12-JUL-2019:10:01:00 AND 04-AUG-2019:09:00:00

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1		(1) SGR-A	WFC3/IR, MULTIACCUM, IR	F153M	SAMP-SEQ=SPARS25; NSAMP=12		Pattern 2, Exps 1-1 in Visit 02 (2)	277.937956 Secs X 5 (2779.38 Secs)	
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								[==>(Pattern 1, Copy 2)]	
								[==>(Pattern 1, Copy 3)]	***[1]***
								[==>(Pattern 1, Copy 4)]	
								[==>(Pattern 1, Copy 5)]	
								[==>(Pattern 2, Copy 1)]	
								[==>(Pattern 2, Copy 2)]	
								[==>(Pattern 2, Copy 3)]	***[2]***
								[==>(Pattern 2, Copy 4)]	
								[==>(Pattern 2, Copy 5)]	

Orbit Structure