17580 - Probing the AGN-Host Relationship in the LINER /CT-AGN NGC 4102

Cycle: 31, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*
Dr. Giuseppina Fabbiano (PI) (Contact)	**Smithsonian Institution Astrophysical Observatory**
Dr. Martin Elvis (CoI)	Smithsonian Institution Astrophysical Observatory
Dr. Walter Peter Maksym III (CoI)	NASA Marshall Space Flight Center
Dr. Alessandro Paggi (CoI) (ESA Member)	University of Torino
Dr. Margarita Karovska (CoI)	Smithsonian Institution Astrophysical Observatory
Dr. Aneta Siemiginowska (CoI)	Smithsonian Institution Astrophysical Observatory
Dr. Anna Trindade Falcao (CoI)	NASA Goddard Space Flight Center / ORAU

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) NGC-4102	WFC3/UVIS	4	12-Mar-2026 14:00:14.0	yes
05	(1) NGC-4102	WFC3/UVIS	4	12-Mar-2026 14:00:15.0	yes
02	(1) NGC-4102	WFC3/UVIS	4	12-Mar-2026 14:00:16.0	yes
03	(1) NGC-4102	WFC3/UVIS	1	12-Mar-2026 14:00:17.0	yes
04	(1) NGC-4102	WFC3/UVIS	1	12-Mar-2026 14:00:17.0	yes
06	(1) NGC-4102	WFC3/UVIS	1	12-Mar-2026 14:00:18.0	yes

15 Total Orbits Used

ABSTRACT

High-resolution Chandra and multi-wavelength maps of the inner regions of nearby active galaxies are revealing an increasingly complex and intriguing picture of the AGN and its multi-faceted interaction with the host galaxy (feedback). We propose a deep probe into the AGN-host relationship in NGC 4102, a luminous LINER and a Compton-Thick (CT) AGN in the near universe (D~17 Mpc, 1"~100pc). With joint Chandra and HST observations, we propose to investigate the properties of the soft extended X-ray emission spatially and spectrally and distinguish between Seyfert, LINER, and star formation powered X-ray emission on scales from ~30pc to 5kpc. The spatial study of the hard X-ray emission (>2.5 keV), may provide key evidence of the interaction of the AGN with thick molecular clouds.

OBSERVING DESCRIPTION

We aim to measure [O III], H-alpha, H-beta, the [S II] 6717,6731 and red & blue continua of NGC 4102. Ratios between continuum-subtracted line maps will be used to make "BPT maps" to diagnose the local ionization state.

The overall goals are similar to Programs #15350 (PI: Maksym), #15609 (PI: Fabbiano) and #16837 (PI: Fabbiano), as are the basic strategies. Filters and instruments are comparable to #16837, and it is a WFC3-only program. Our goal is to reach >3-sigma detection for all lines within <1 arcsec of the nucleus.

This will require 4 orbits of [O III] (F502N), 4 orbits of H-beta (F487N), 1 orbit of [S II] (F673N) and <1 orbit of H-alpha (F658N). Even the faintest H-alpha regions will be detected at ~23-sigma in one orbit, so we pack the continuua into the H-alpha orbit.

Given the number of exposures, it is possible to use a box dither to improve PSF sampling for [O III], H-beta and [S II]. H-alpha and continuum observations are short and use a CR-split.

Pre-flash amounts are typically 17, except for F814W (12).

[O III] has been re-observed due to a failed observation.

H-alpha must also be re-observed, due to a failed observation. Continuum bands from the original visit are fine, only H-alpha is needed.

Visit

Proposal 17580, NGC 4102 [O III] (01), failed Thu Mar 12 18:00:18 GMT 2026

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Comments: 4 orbits of exposure for NGC 4102 using F502N. The box dither pattern should improve resolution (should it become relevant). We are using CR splits in association with the dither pattern, which may be overkill for cosmic ray removal (no CR splits were used in a similar exposure for NGC 5005) but should be very thorough.

Diagnostics

(NGC 4102 [O III] (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN
(NGC 4102 [O III] (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN
(NGC 4102 [O III] (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN
(NGC 4102 [O III] (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(2)	Pattern Type=WFC3-UVIS-GAP-LINE	Coordinate Frame=POS-TARG	Pattern Type=WFC3-UVIS-DITHER-BOX	Coordinate Frame=POS-TARG	(1)
	Purpose=MOSAIC	Pattern Orientation=85.759	Purpose=DITHER	Pattern Orientation=23.884	
	Number Of Points=4	Angle Between Sides=	Number Of Points=4	Angle Between Sides=81.785	
	Point Spacing=2.414	Center Pattern=true	Point Spacing=0.173	Center Pattern=false	
	Line Spacing=		Line Spacing=0.112		

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-4102	RA: 12 06 22.9831 (181.5957629d)	Epoch of Position: 2000	V=11.13	Reference Frame: SIMBAD
		Dec: +52 42 40.38 (52.71122d)	Redshift: 0.00282		
		Equinox: J2000			

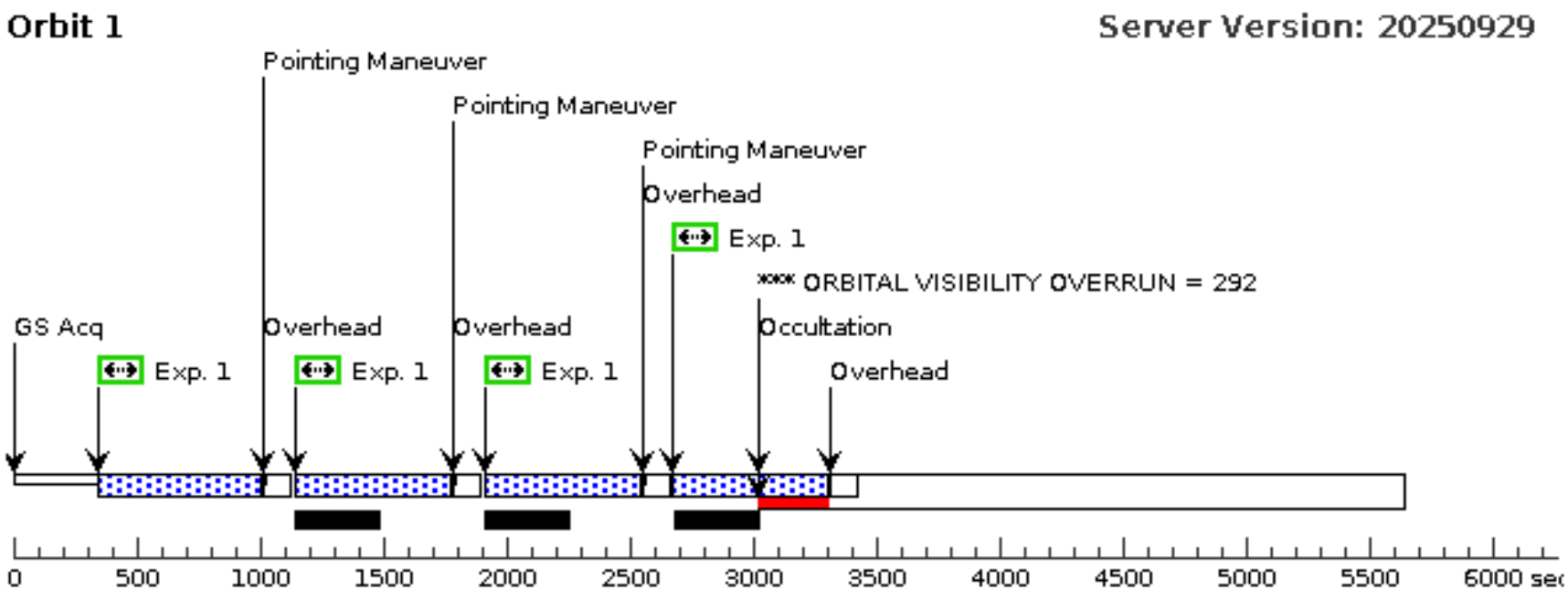
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

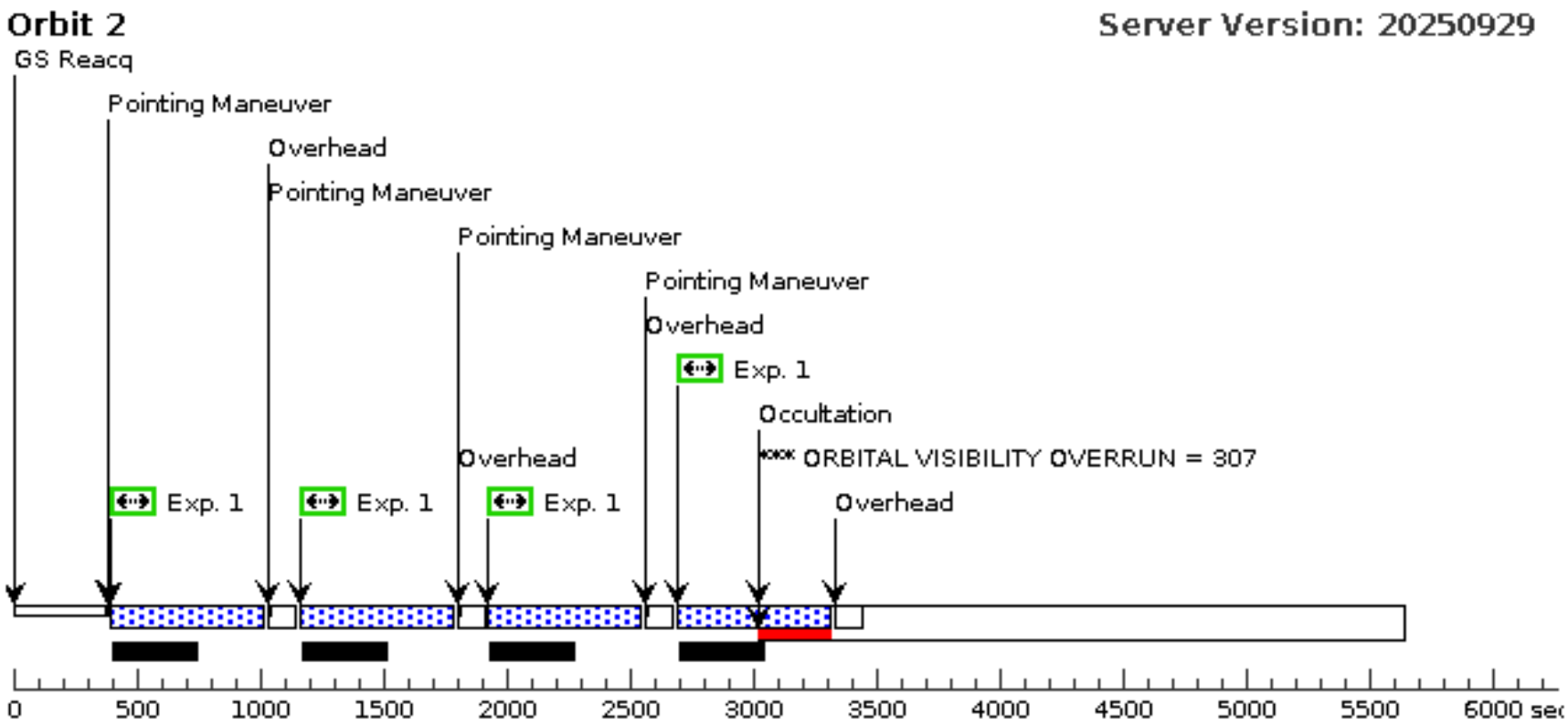
Coordinates were refined to the radio nucleus centroid from VLA data.
Category=ISM
Description=[EMISSION LINE NEBULA, NLR, NUCLEUS]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NGC 4102 [O III]	(1) NGC-4102	WFC3/UVIS, ACCUM, UVIS	F502N	FLASH=17		Pattern 2, Exps 1-1 in NGC 4102 [O III] (01) (2)	500 Secs (10040 Secs)	
								[==>629.0 Secs (Pattern 1,1)]	***[1]***
								[==>629.0 Secs (Pattern 1,2)]	
								[==>629.0 Secs (Pattern 1,3)]	
								[==>629.0 Secs (Pattern 1,4)]	
								[==>627.0 Secs (Pattern 2,1)]	***[2]***
								[==>627.0 Secs (Pattern 2,2)]	
								[==>627.0 Secs (Pattern 2,3)]	
								[==>627.0 Secs (Pattern 2,4)]	
								[==>627.0 Secs (Pattern 3,1)]	***[3]***
								[==>627.0 Secs (Pattern 3,2)]	
								[==>627.0 Secs (Pattern 3,3)]	
								[==>627.0 Secs (Pattern 3,4)]	
								[==>627.0 Secs (Pattern 4,1)]	***[4]***
								[==>627.0 Secs (Pattern 4,2)]	
								[==>627.0 Secs (Pattern 4,3)]	
								[==>627.0 Secs (Pattern 4,4)]	

Orbit Structure

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Overhead
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Pointing Maneuver
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Exp. 1
Occultation
Overhead
**** ORBITAL VISIBILITY OVERRUN = 307
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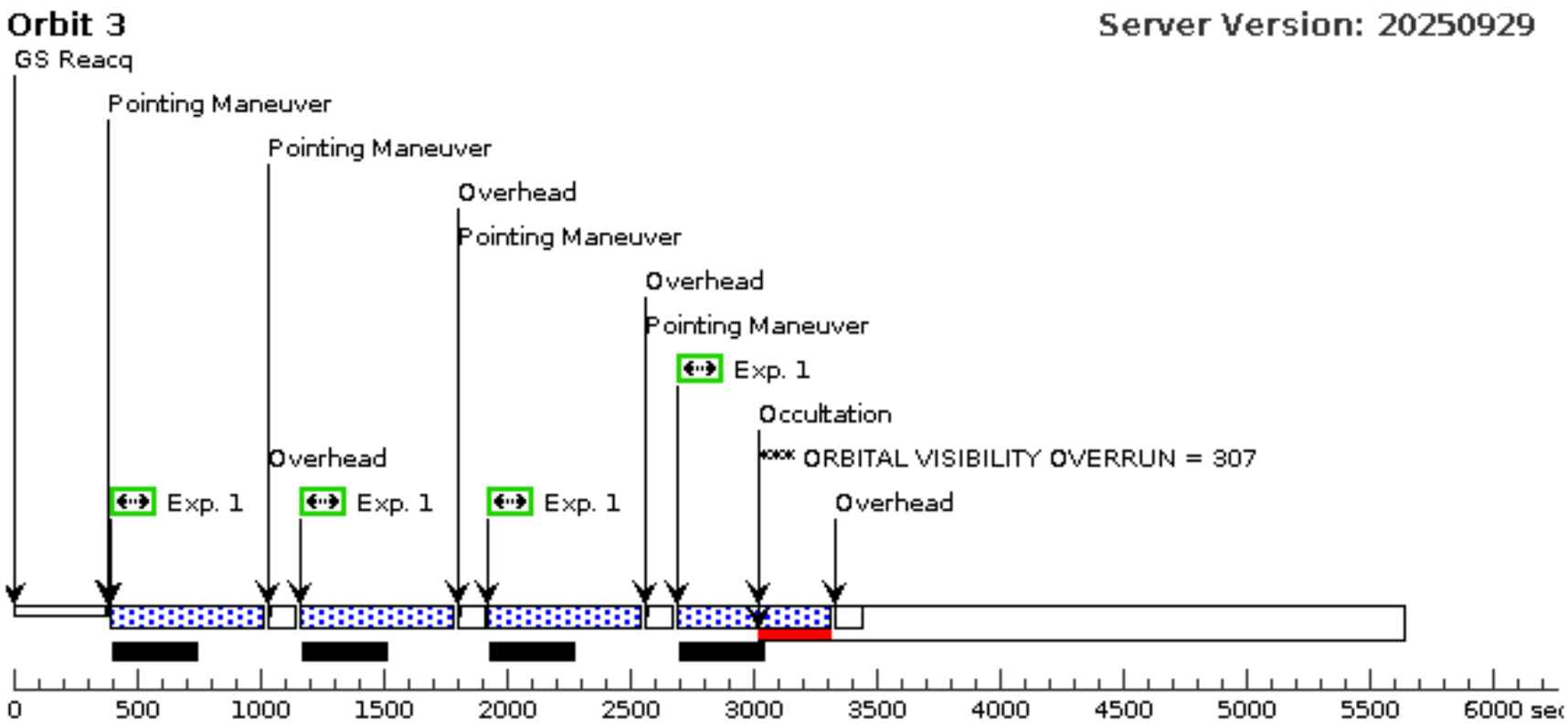
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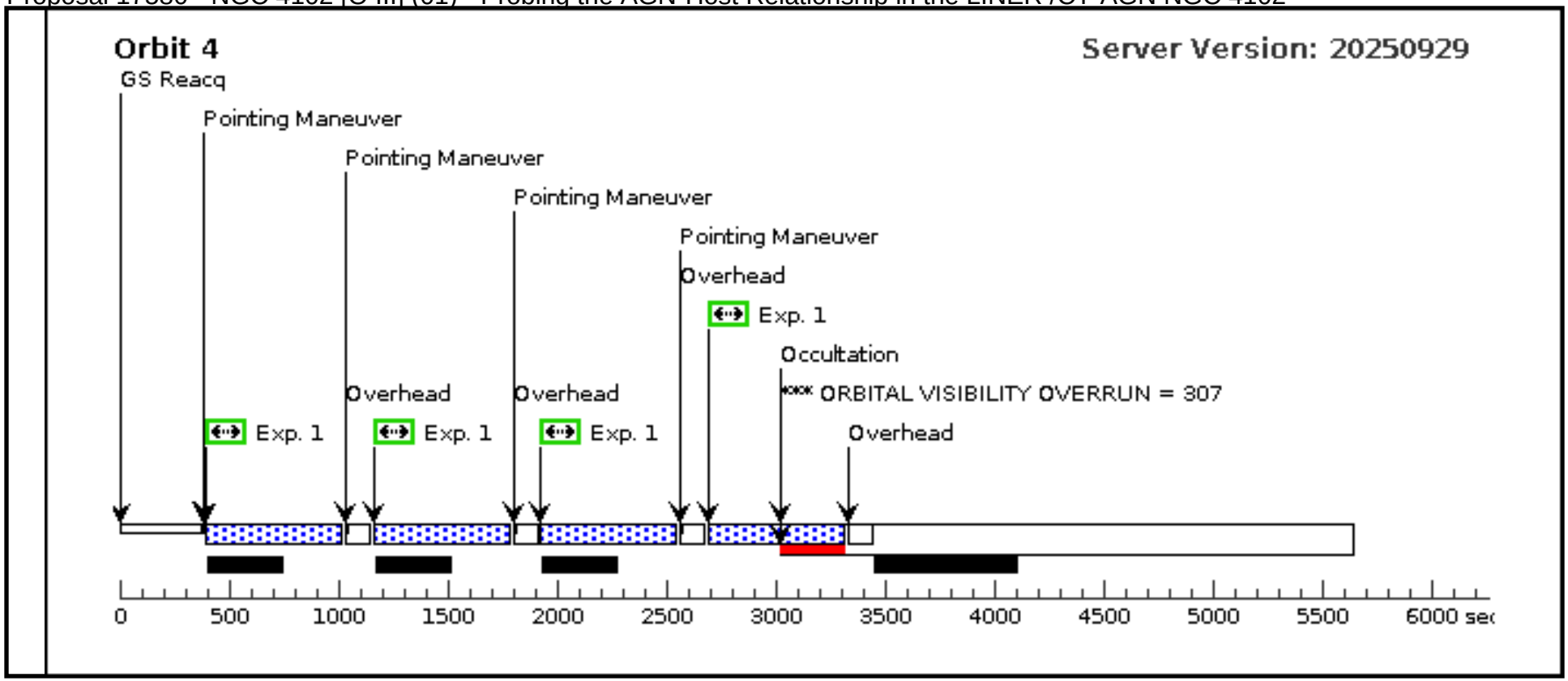
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**** ORBITAL VISIBILITY OVERRUN = 307
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Visit

Proposal 17580, NGC 4102 [O III] - re-observe (05), completed Thu Mar 12 18:00:18 GMT 2026

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Comments: 4 orbits of exposure for NGC 4102 using F502N. The box dither pattern should improve resolution (should it become relevant). We are using CR splits in association with the dither pattern, which may be overkill for cosmic ray removal (no CR splits were used in a similar exposure for NGC 5005) but should be very thorough.

This is a re-do of visit #01, which failed.

Diagnostics

(NGC 4102 [O III] - re-observe (05)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(NGC 4102 [O III] - re-observe (05)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(NGC 4102 [O III] - re-observe (05)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(NGC 4102 [O III] - re-observe (05)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(2)	Pattern Type=WFC3-UVIS-GAP-LINE	Coordinate Frame=POS-TARG	Pattern Type=WFC3-UVIS-DITHER-BOX	Coordinate Frame=POS-TARG	(1)
	Purpose=MOSAIC	Pattern Orientation=85.759	Purpose=DITHER	Pattern Orientation=23.884	
	Number Of Points=4	Angle Between Sides=	Number Of Points=4	Angle Between Sides=81.785	
	Point Spacing=2.414	Center Pattern=true	Point Spacing=0.173	Center Pattern=false	
	Line Spacing=		Line Spacing=0.112		

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-4102	RA: 12 06 22.9831 (181.5957629d)	Epoch of Position: 2000	V=11.13	Reference Frame: SIMBAD
		Dec: +52 42 40.38 (52.71122d)	Redshift: 0.00282		
		Equinox: J2000			

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Coordinates were refined to the radio nucleus centroid from VLA data.
Category=ISM
Description=[EMISSION LINE NEBULA, NLR, NUCLEUS]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NGC 4102 [O III]	(1) NGC-4102	WFC3/UVIS, ACCUM, UVIS	F502N	FLASH=17		Pattern 2, Exps 1-1 in NGC 4102 [O III] - re-observe (05) (2)	500 Secs (9032 Secs)	
								[==>569.0 Secs (Pattern 1,1)]	***[1]***
								[==>569.0 Secs (Pattern 1,2)]	
								[==>569.0 Secs (Pattern 1,3)]	
								[==>569.0 Secs (Pattern 1,4)]	
								[==>563.0 Secs (Pattern 2,1)]	***[2]***
								[==>563.0 Secs (Pattern 2,2)]	
								[==>563.0 Secs (Pattern 2,3)]	
								[==>563.0 Secs (Pattern 2,4)]	
								[==>563.0 Secs (Pattern 3,1)]	***[3]***
								[==>563.0 Secs (Pattern 3,2)]	
								[==>563.0 Secs (Pattern 3,3)]	
								[==>563.0 Secs (Pattern 3,4)]	
								[==>563.0 Secs (Pattern 4,1)]	***[4]***
								[==>563.0 Secs (Pattern 4,2)]	
								[==>563.0 Secs (Pattern 4,3)]	
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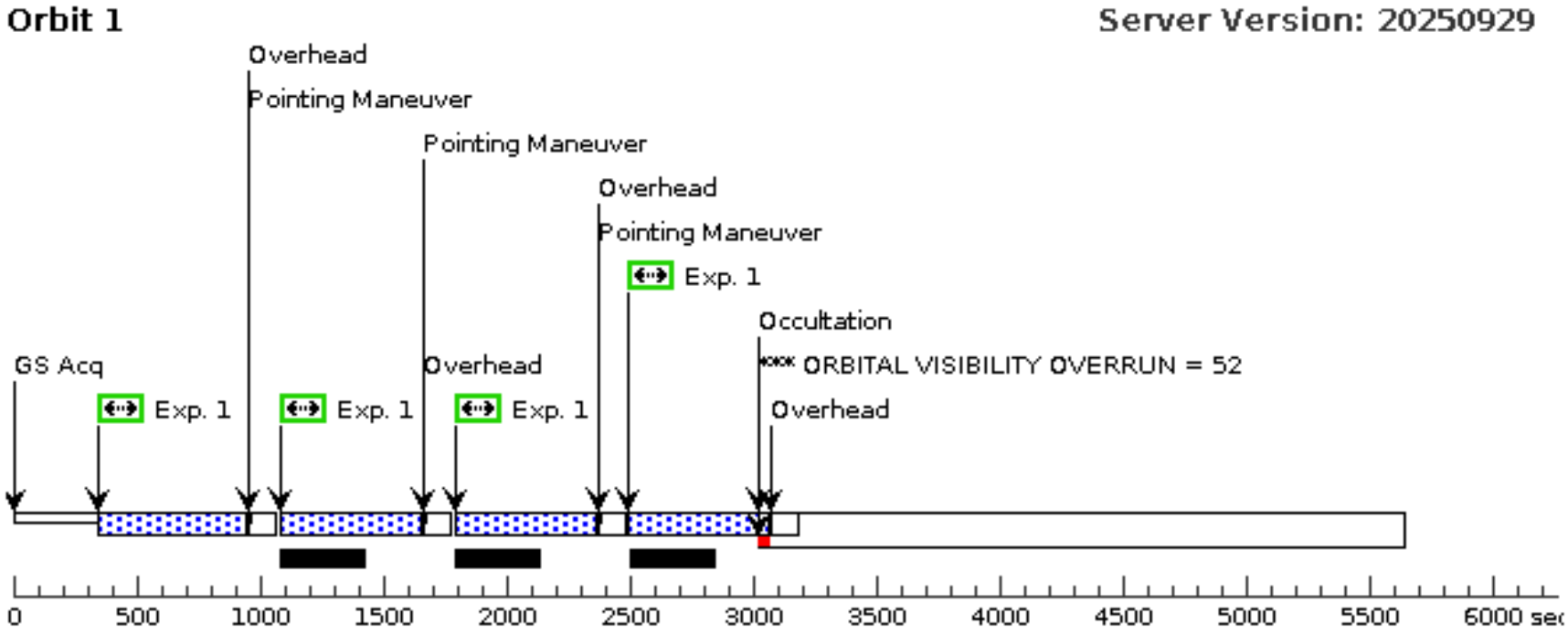
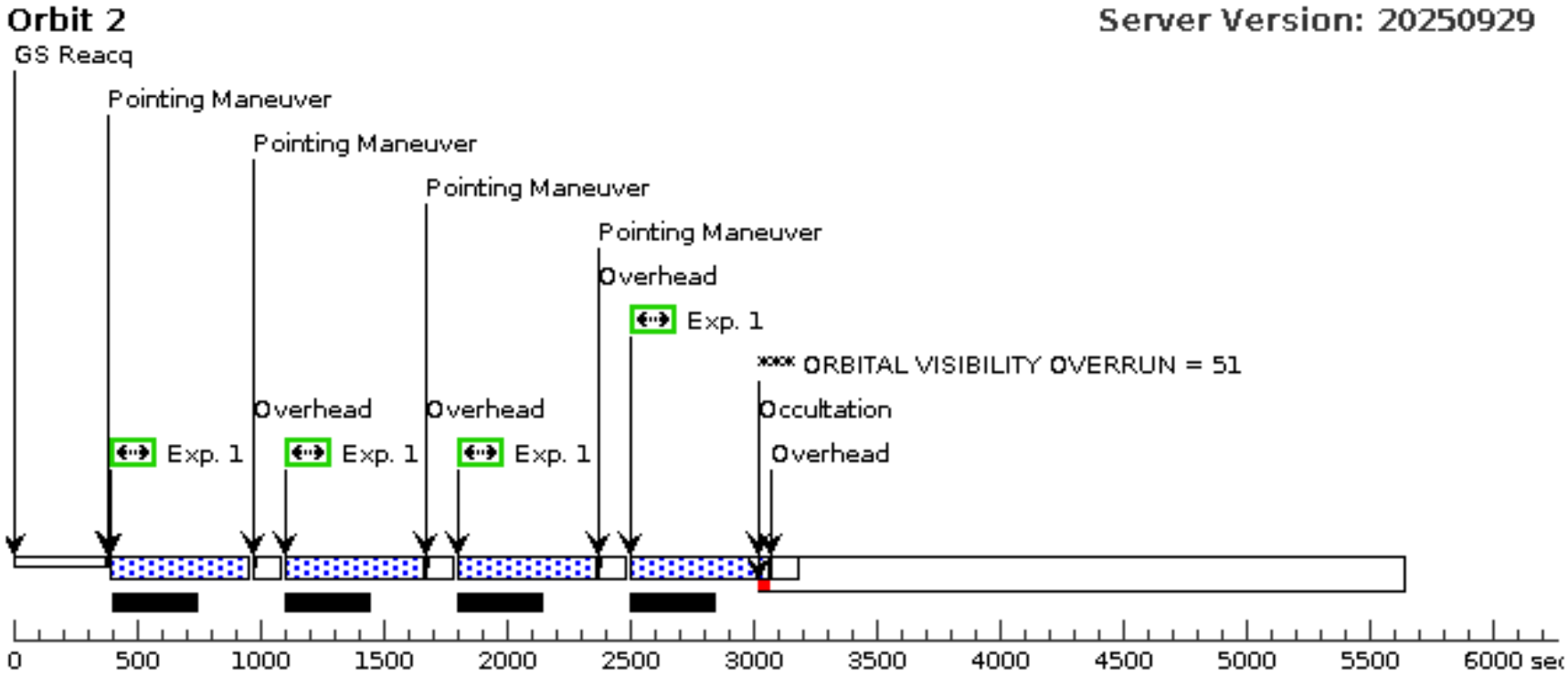
Orbit Structure

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Exp. 1
**** ORBITAL VISIBILITY OVERRUN = 51
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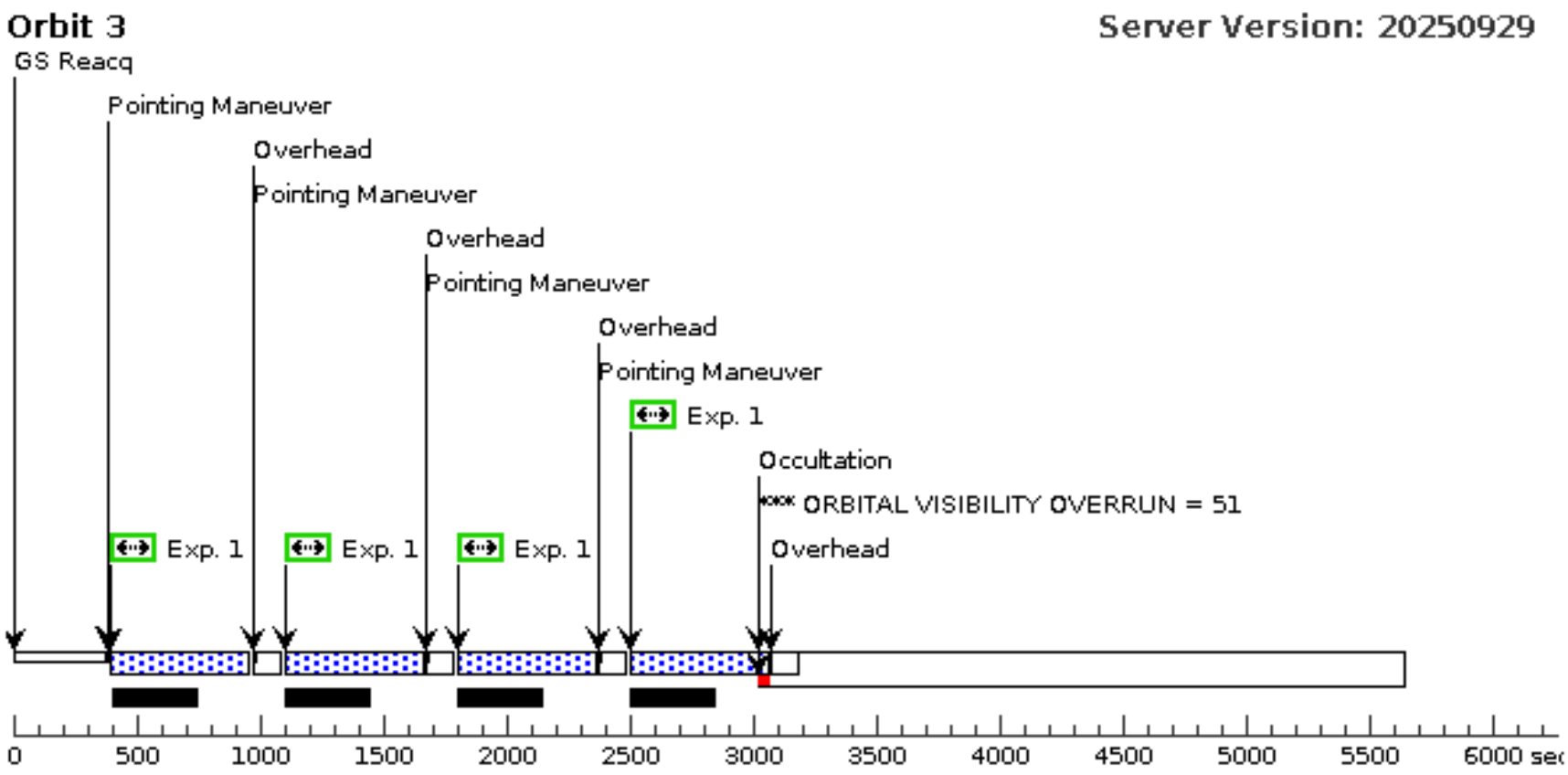
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Occultation
*** ORBITAL VISIBILITY OVERRUN = 51
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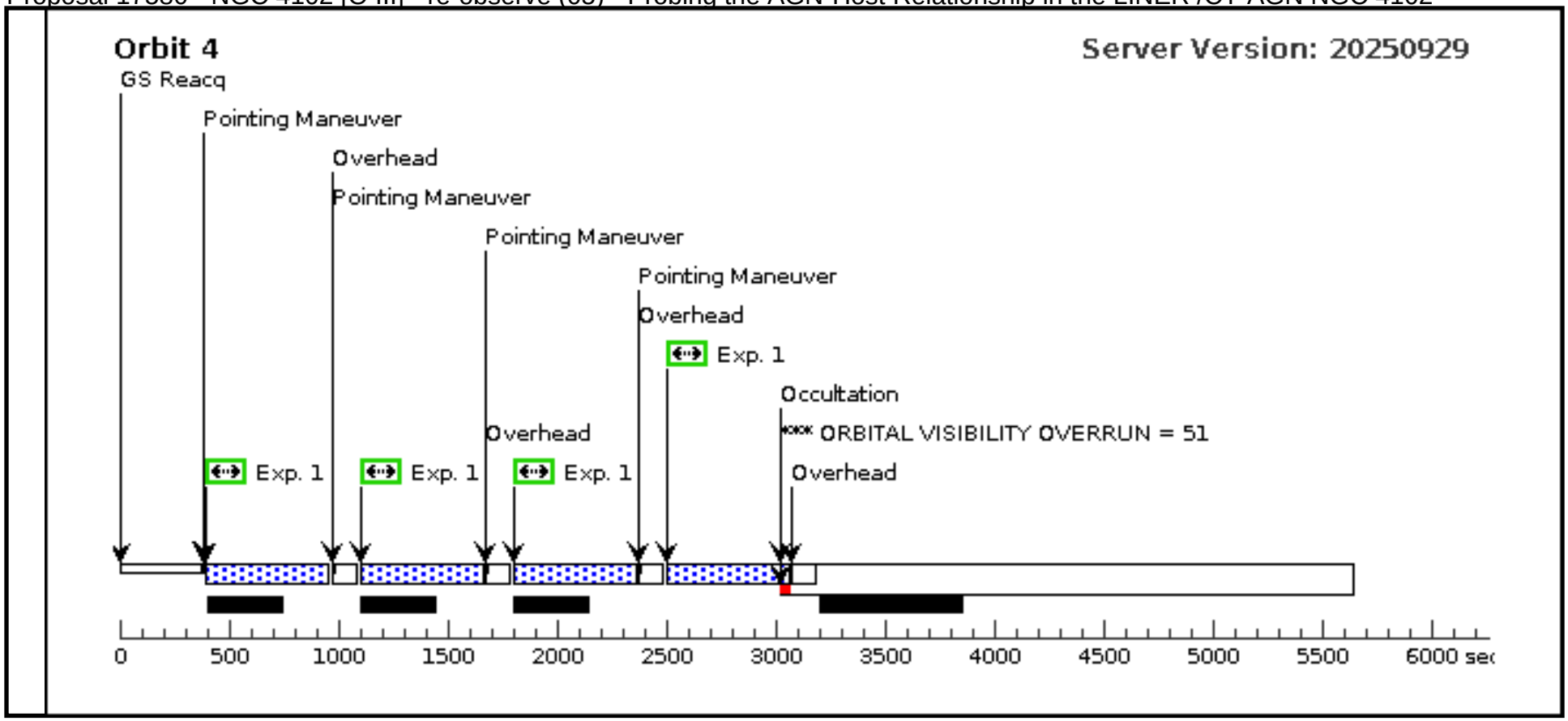
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**** ORBITAL VISIBILITY OVERRUN = 51
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Visit

Proposal 17580, NGC 4102 H-beta (02), completed Thu Mar 12 18:00:18 GMT 2026

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Diagnostics

(NGC 4102 H-beta (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN
(NGC 4102 H-beta (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN
(NGC 4102 H-beta (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN
(NGC 4102 H-beta (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(2)	Pattern Type=WFC3-UVIS-GAP-LINE Purpose=MOSAIC Number Of Points=4 Point Spacing=2.414 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.759 Angle Between Sides= Center Pattern=true	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)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-4102	RA: 12 06 22.9831 (181.5957629d) Dec: +52 42 40.38 (52.71122d) Equinox: J2000	Epoch of Position: 2000 Redshift: 0.00282	V=11.13	Reference Frame: SIMBAD

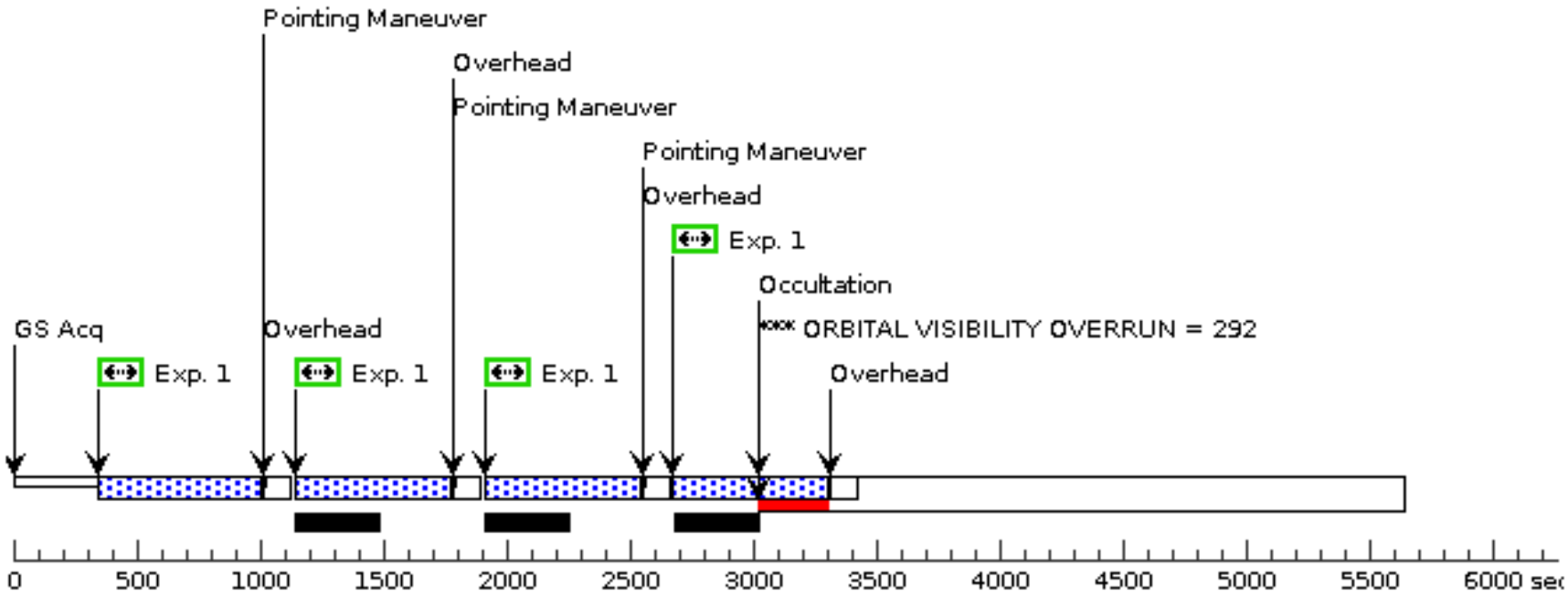
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

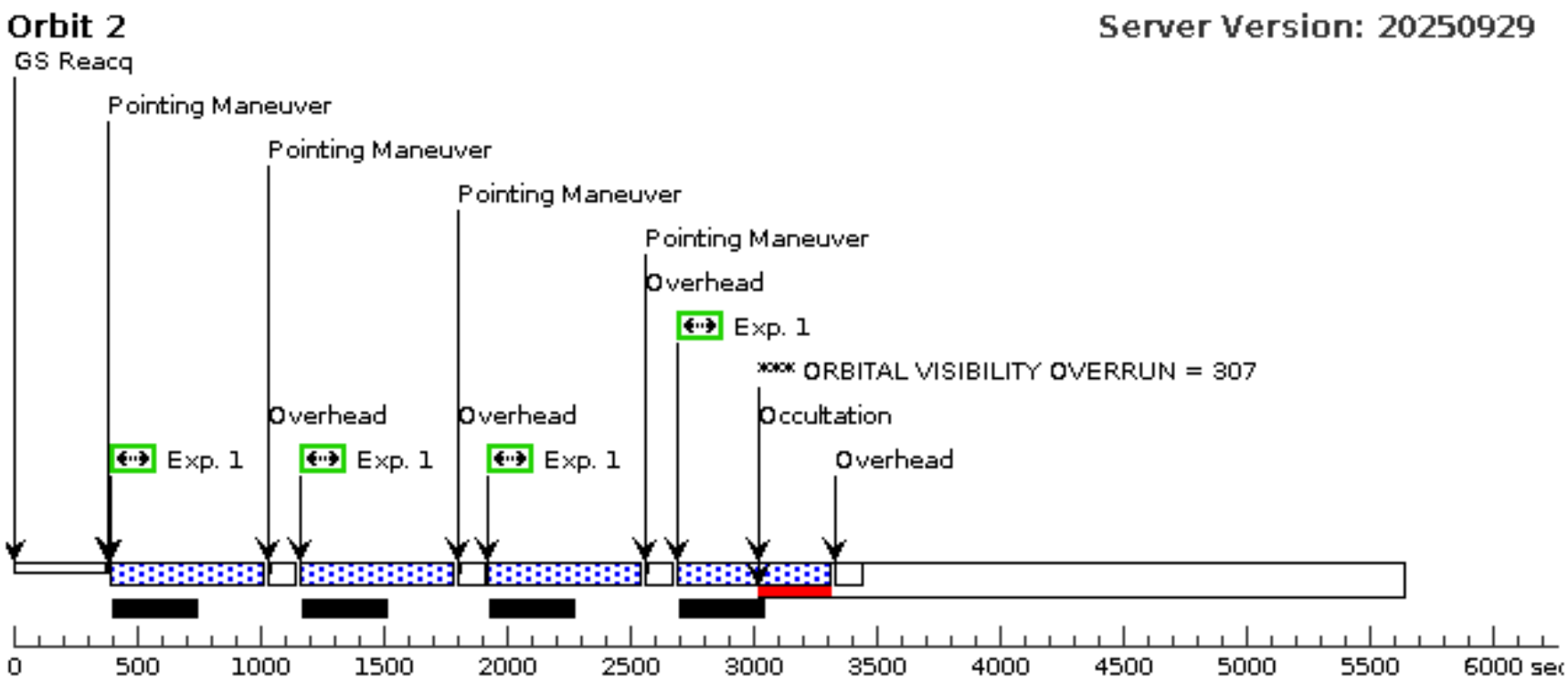
Coordinates were refined to the radio nucleus centroid from VLA data.
Category=ISM
Description=[EMISSION LINE NEBULA, NLR, NUCLEUS]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NGC 4102 H-beta	(1) NGC-4102	WFC3/UVIS, ACCUM, UVIS	F487N	FLASH=17		Pattern 2, Exps 1-1 in NGC 4102 H-beta (02) (2)	500 Secs (10040 Secs)	
								[==>629.0 Secs (Pattern 1,1)] *[==>629.0 Secs (Pattern 1,2)]* *[==>629.0 Secs (Pattern 1,3)]* *[==>629.0 Secs (Pattern 1,4)]*	***[1]***
								[==>627.0 Secs (Pattern 2,1)] *[==>627.0 Secs (Pattern 2,2)]* *[==>627.0 Secs (Pattern 2,3)]* *[==>627.0 Secs (Pattern 2,4)]*	***[2]***
								[==>627.0 Secs (Pattern 3,1)] *[==>627.0 Secs (Pattern 3,2)]* *[==>627.0 Secs (Pattern 3,3)]* *[==>627.0 Secs (Pattern 3,4)]*	***[3]***
								[==>627.0 Secs (Pattern 4,1)] *[==>627.0 Secs (Pattern 4,2)]* *[==>627.0 Secs (Pattern 4,3)]* *[==>627.0 Secs (Pattern 4,4)]*	***[4]***

Orbit Structure

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Exp. 1
**** ORBITAL VISIBILITY OVERRUN = 307
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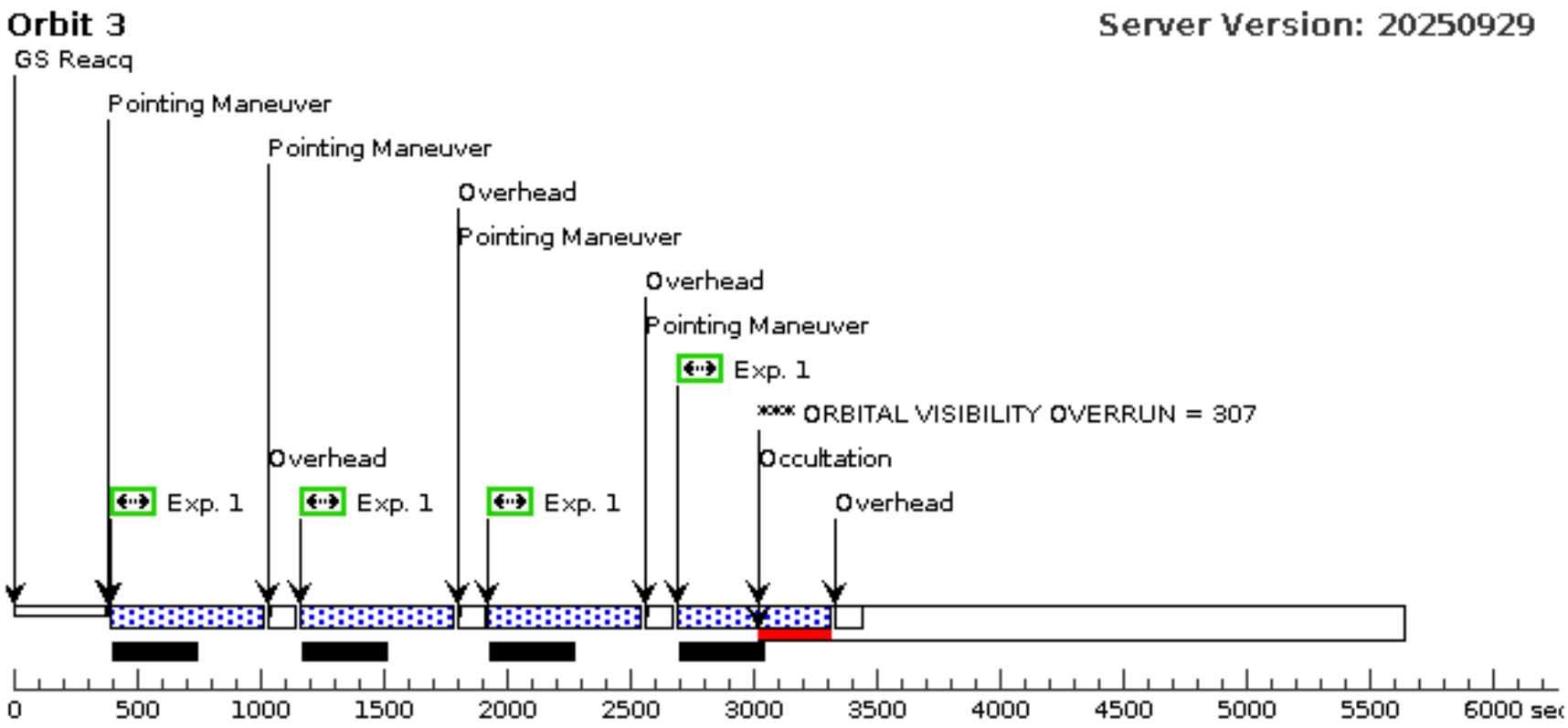
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Occultation
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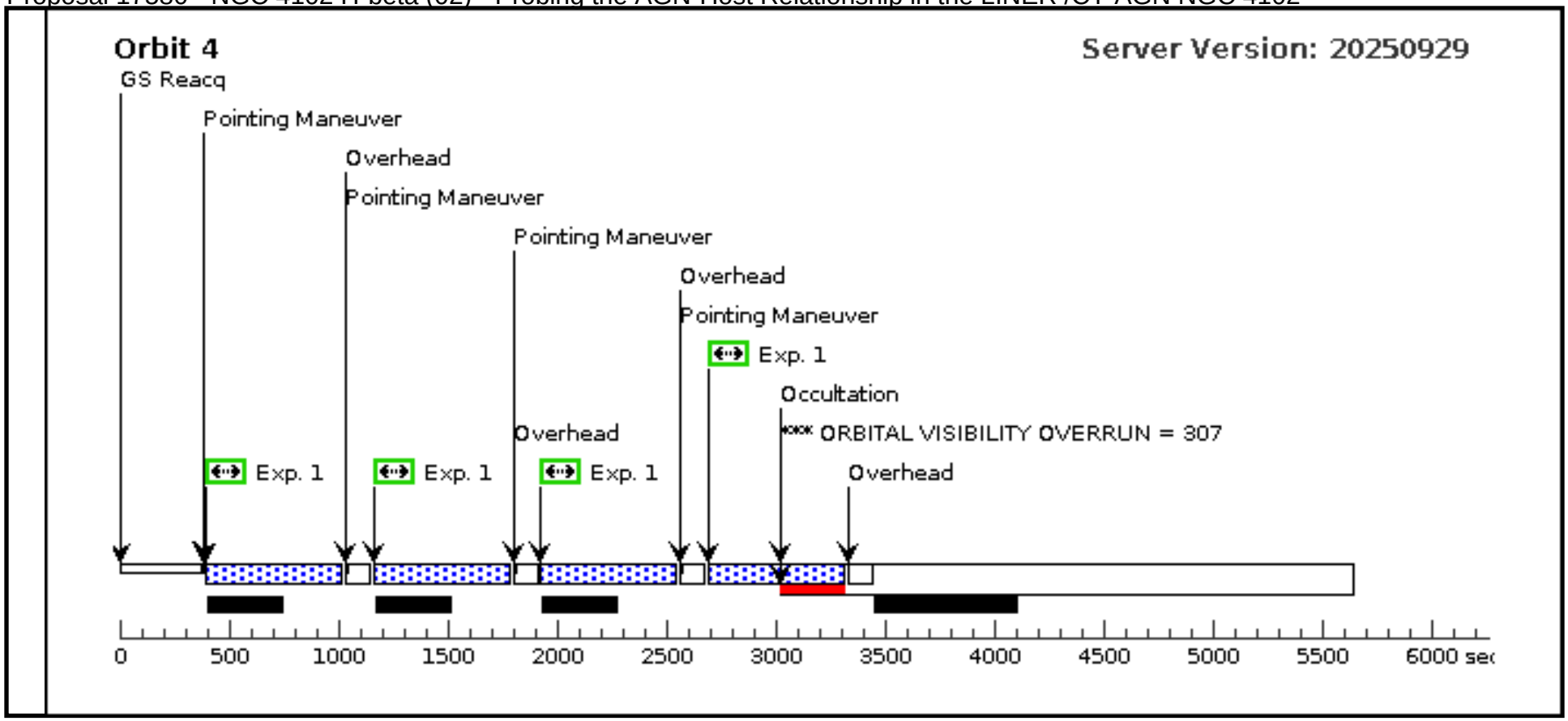
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**** ORBITAL VISIBILITY OVERRUN = 307
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6000 sec

Visit

Proposal 17580, NGC 4102 [S II] (03), completed Thu Mar 12 18:00:18 GMT 2026

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Comments: 1 orbit of exposure for NGC 4102 using F673N. We are using 4 dithered exposures which should be good for cosmic ray rejection and resolution.

Diagnostics

(NGC 4102 [S II] (03)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-GAP-LINE	Coordinate Frame=POS-TARG		(1)
	Purpose=MOSAIC	Pattern Orientation=85.759		
	Number Of Points=4	Angle Between Sides=		
	Point Spacing=2.414	Center Pattern=true		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-4102	RA: 12 06 22.9831 (181.5957629d)	Epoch of Position: 2000	V=11.13	Reference Frame: SIMBAD
		Dec: +52 42 40.38 (52.71122d)	Redshift: 0.00282		
		Equinox: J2000			

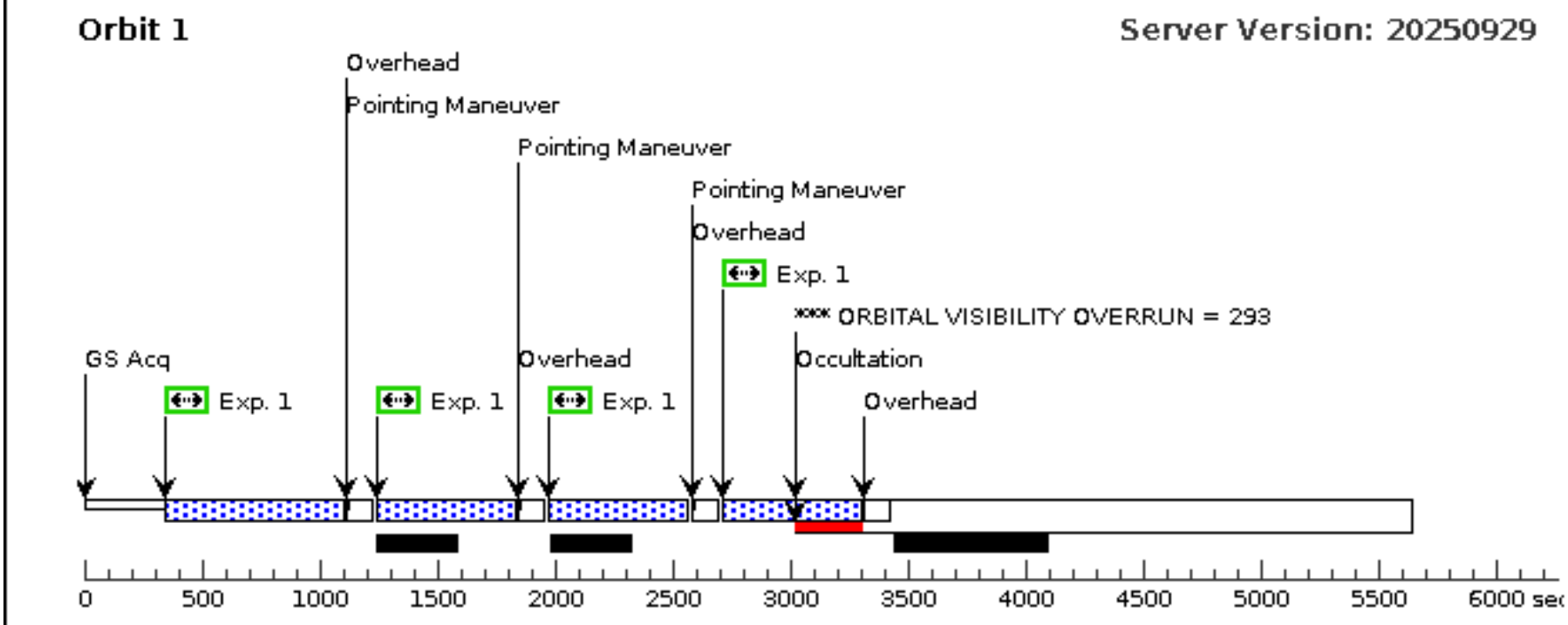
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Coordinates were refined to the radio nucleus centroid from VLA data.
Category=ISM
Description=[EMISSION LINE NEBULA, NLR, NUCLEUS]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NGC 4102 [S II]	(1) NGC-4102	WFC3/UVIS, ACCUM, UVIS	F673N	FLASH=17		Pattern 1, Exps 1-1 in NGC 4102 [S II] (03) (1)	500 Secs (2517 Secs)	
								[==>726.0 Secs (Pattern 1)]	***[1]***
								[==>597.0 Secs (Pattern 2)]	
								[==>597.0 Secs (Pattern 3)]	
								[==>597.0 Secs (Pattern 4)]	

Orbit Structure



Visit

Proposal 17580, NGC 4102 H-alpha (04), failed Thu Mar 12 18:00:18 GMT 2026

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Diagnostics

(NGC 4102 H-alpha (04)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(3)	Pattern Type=WFC3-UVIS-GAP-LINE	Coordinate Frame=POS-TARG		(1-3)
	Purpose=MOSAIC	Pattern Orientation=85.759		
	Number Of Points=2	Angle Between Sides=		
	Point Spacing=2.414	Center Pattern=true		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-4102	RA: 12 06 22.9831 (181.5957629d)	Epoch of Position: 2000	V=11.13	Reference Frame: SIMBAD
		Dec: +52 42 40.38 (52.71122d)	Redshift: 0.00282		
		Equinox: J2000			

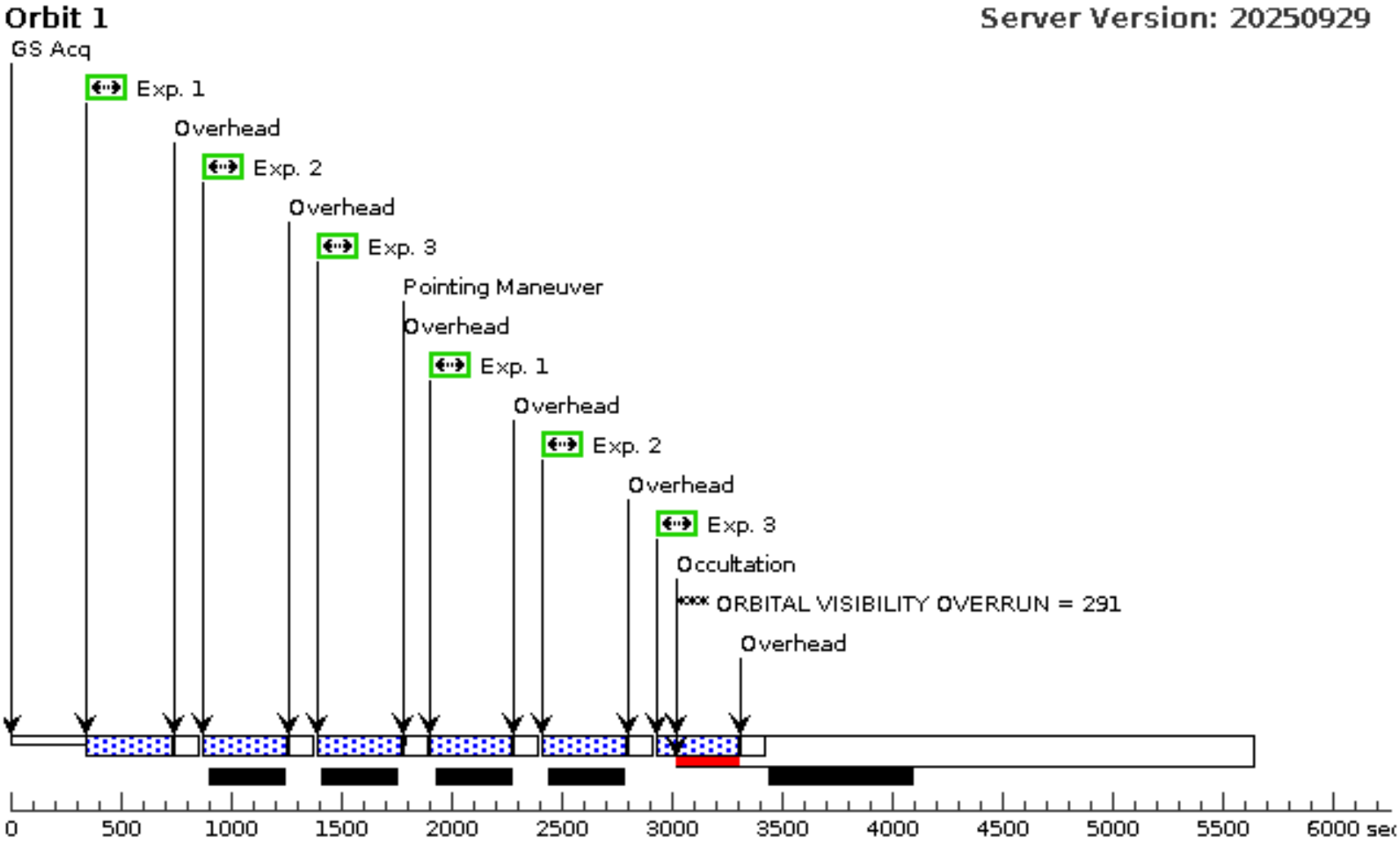
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Coordinates were refined to the radio nucleus centroid from VLA data.
Category=ISM
Description=[EMISSION LINE NEBULA, NLR, NUCLEUS]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NGC 4102 H-alpha	(1) NGC-4102	WFC3/UVIS, ACCUM, UVIS	F673N	FLASH=17		Pattern 3, Exps 1-3 in NGC 4102 H-alpha (04) (3)	350 Secs (708 Secs) *[==>356.0 Secs (Pattern 1)]* *[==>352.0 Secs (Pattern 2)]*	***[1]***
2	NGC 4102 blue	(1) NGC-4102	WFC3/UVIS, ACCUM, UVIS	F547M	FLASH=17		Pattern 3, Exps 1-3 in NGC 4102 H-alpha (04) (3)	350 Secs (708 Secs) *[==>356.0 Secs (Pattern 1)]* *[==>352.0 Secs (Pattern 2)]*	***[1]***
3	NGC 4102 red	(1) NGC-4102	WFC3/UVIS, ACCUM, UVIS	F814W	FLASH=12		Pattern 3, Exps 1-3 in NGC 4102 H-alpha (04) (3)	350 Secs (708 Secs) *[==>356.0 Secs (Pattern 1)]* *[==>352.0 Secs (Pattern 2)]*	***[1]***

Orbit Structure



Visit

Proposal 17580, NGC 4102 H-alpha - re-observe (06) Thu Mar 12 18:00:18 GMT 2026

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(3)	Pattern Type=WFC3-UVIS-GAP-LINE	Coordinate Frame=POS-TARG		(1)
	Purpose=MOSAIC	Pattern Orientation=85.759		
	Number Of Points=2	Angle Between Sides=		
	Point Spacing=2.414	Center Pattern=true		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-4102	RA: 12 06 22.9831 (181.5957629d)	Epoch of Position: 2000	V=11.13	Reference Frame: SIMBAD
		Dec: +52 42 40.38 (52.71122d)	Redshift: 0.00282		
		Equinox: J2000			

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Coordinates were refined to the radio nucleus centroid from VLA data.
Category=ISM
Description=[EMISSION LINE NEBULA, NLR, NUCLEUS]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NGC 4102 H-alpha	(1) NGC-4102	WFC3/UVIS, ACCUM, UVIS	F658N	FLASH=17		Pattern 3, Exps 1-1 in NGC 4102 H-alpha - re-observe (06) (3)	350 Secs (708 Secs) *[==>356.0 Secs (Pattern 1)]* *[==>352.0 Secs (Pattern 2)]*	*[1]*

Orbit Structure