17683 - WFC3 IR Time-Dependent Sensitivity: Clusters

Cycle: 32, Proposal Category: CAL/WFC3

(Availability Mode: RESTRICTED)

INVESTIGATORS

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Ms. Jennifer Mack (CoI) (Contact)	Space Telescope Science Institute

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) 47TUC DARK	WFC3/IR	1	28-Oct-2025 16:00:14.0	yes
A1	(2) 47TUC DARK	WFC3/IR	1	28-Oct-2025 16:00:15.0	yes
B1	(2) 47TUC DARK	WFC3/IR	1	28-Oct-2025 16:00:16.0	yes
02	(3) M-4	WFC3/IR	1	28-Oct-2025 16:00:16.0	yes
03	(3) M-4	WFC3/IR	1	28-Oct-2025 16:00:17.0	yes

5 Total Orbits Used

ABSTRACT

We continue the monitoring of the sensitivity of the WFC3/IR channel using relative photometry of the clusters M-4 and 47 Tuc, as performed in HST programs 16864, 16512, 17260, and 17363. This program serves to complement the sensitivity change slopes from the M35 scans, G102/G141 measurements, and standard star photometric monitoring.

We observe the same targets as 17260 (M4 and 47 Tuc external fields) and use similar observation strategies, though some exposures were necessarily shortened due to the reduced gyro mode effects on orbital visibility length. As 47 Tuc was imaged twice in the previous cycle, we swap to observing M4 twice and 47 Tuc once to keep a roughly balanced cadence.

These observations will help constrain the time dependent sensitivity change through 2025, as well as provide a rich dataset for examining other detector behaviors.

OBSERVING DESCRIPTION

These observations use a very similar observing strategy as seen in 17260 as well as 17363. For the M4 visits, the two F110W exposures remain the same, however the second of the F160W exposures was shortened to fit within the shorter orbit. For 47 Tuc the dark exposure in the middle of the visit was shortened from NSAMP = 15 to NSAMP=8 to fit within the shortened orbit.

The M4 visits consist of 4 exposures, starting with two F110W and ending with two F160W exposures. The F110W exposures will use the SPARS50 sample sequence with 14 samples. The F160W exposures will only use 13 and then 10 samples, due to the shorter orbital length due to RGM After each exposure POSTARGS of 2.5" will be applied, to mitigate self persistence.

The 47 Tuc observations match the observing strategy from 13563 of alternating F160W exposures of the cluster with dark frames. Though the dark frames are unecessary for this monitoring, we keep them to specifically keep consistent detector conditions, to eliminate systematics due to observation strategy differences.

Visit

Proposal 17683, 47Tuc Rolled (01), failed Tue Oct 28 20:00:17 GMT 2025

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 310D TO 318 D

Diagnostics

(47Tuc Rolled (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

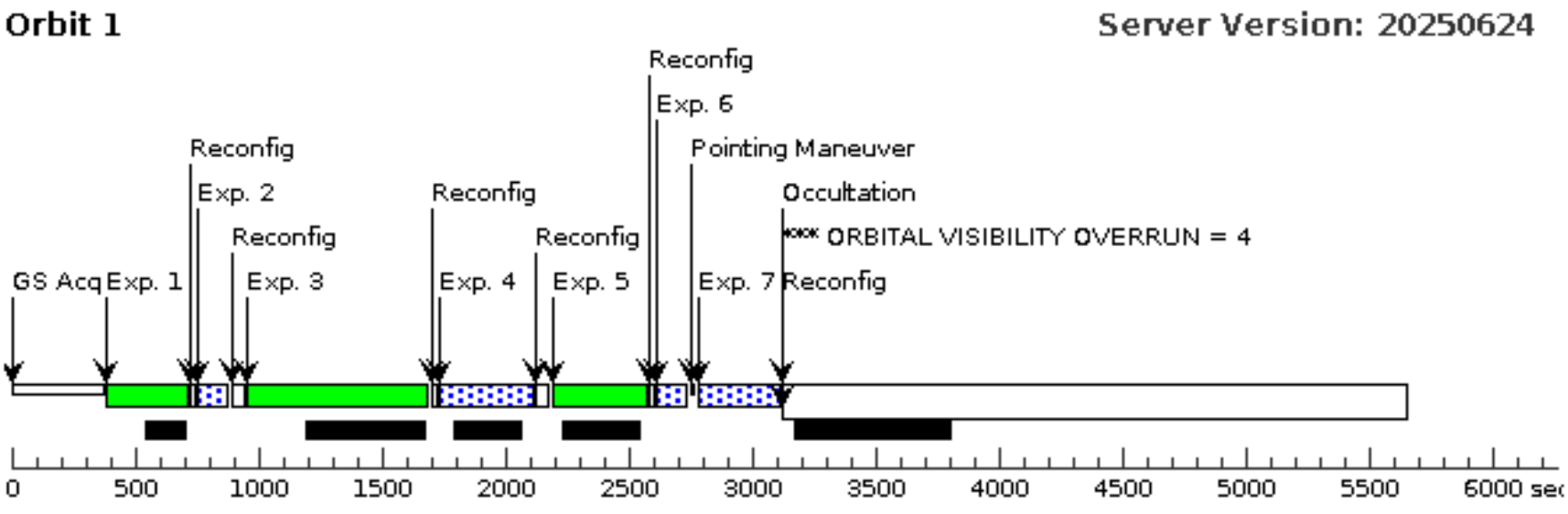
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	47TUC	RA: 00 22 27.8446 (5.6160192d)		V=22.0	Reference Frame: ICRS
	Alt Name1: NGC104	Dec: -72 04 4.75 (-72.06799d)			
		Equinox: J2000			

Comments:
Category=CALIBRATION
Description=[DETECTOR LINEARITY TEST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS25; NSAMP=13	GS ACQ SCENARIO BASE1O3		302.938471 Secs (302.938 Secs) *[==>]*	*[1]*
2	Short	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS10; NSAMP=10			92.940958 Secs (92.941 Secs) *[==>]*	*[1]*
3	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS50; NSAMP=15			702.938605 Secs (702.939 Secs) *[==>]*	*[1]*
4	Long	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS25; NSAMP=15			352.939501 Secs (352.94 Secs) *[==>]*	*[1]*
Comments: Designed to just saturate V=20 stars.									
5	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS50; NSAMP=8			352.935448 Secs (352.935 Secs) *[==>]*	*[1]*
6	Short	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS10; NSAMP=10			92.940958 Secs (92.941 Secs) *[==>]*	*[1]*
7	Extra External	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS25; NSAMP=13	POS TARG 4,4		302.938471 Secs (302.938 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 17683, 47Tuc Rolled (A1), completed Tue Oct 28 20:00:17 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 30D TO 65 D; BETWEEN 01-OCT-2025:00:00:00 AND 01-JAN-2026:00:00:00

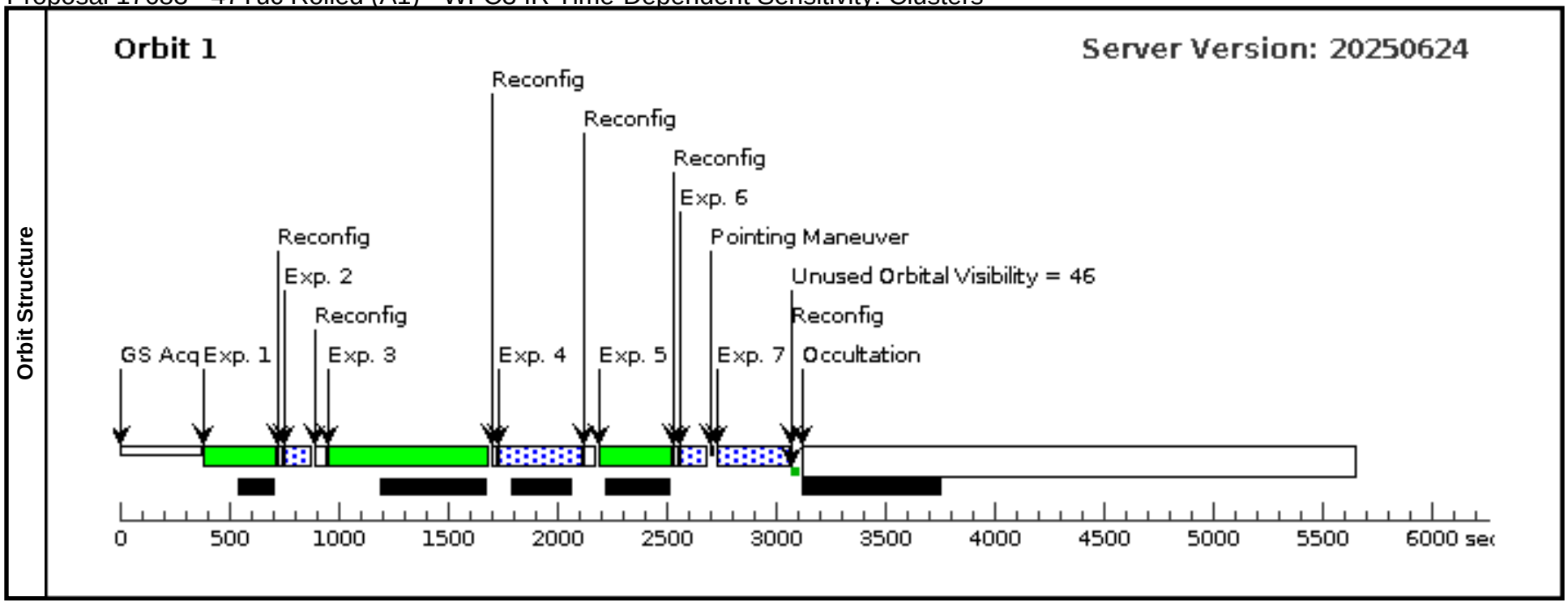
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	47TUC Alt Name1: NGC104	RA: 00 22 27.8446 (5.6160192d) Dec: -72 04 4.75 (-72.06799d) Equinox: J2000		V=22.0	Reference Frame: ICRS

Comments:
Category=CALIBRATION
Description=[DETECTOR LINEARITY TEST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS25; NSAMP=13	GS ACQ SCENARIO BASE1O3		302.938471 Secs (302.938 Secs) *[==>]*	***[1]***
2	Short	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS10; NSAMP=10			92.940958 Secs (92.941 Secs) *[==>]*	***[1]***
3	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS50; NSAMP=15			702.938605 Secs (702.939 Secs) *[==>]*	***[1]***
4	Long	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS25; NSAMP=15			352.939501 Secs (352.94 Secs) *[==>]*	***[1]***
Comments: Designed to just saturate V=20 stars.									
5	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS50; NSAMP=7			302.934997 Secs (302.935 Secs) *[==>]*	***[1]***
6	Short	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS10; NSAMP=10			92.940958 Secs (92.941 Secs) *[==>]*	***[1]***
7	Extra External	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS25; NSAMP=13	POS TARG 4,4		302.938471 Secs (302.938 Secs) *[==>]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20250624
Reconfig
Reconfig
Reconfig
Exp. 6
Pointing Maneuver
Unused Orbital Visibility = 46
Reconfig
Occultation
Reconfig
Exp. 2
Reconfig
GS Acq
Exp. 1
Exp. 3
Exp. 4
Exp. 5
Exp. 7
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 17683, 47Tuc Rolled (B1) Tue Oct 28 20:00:17 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 30D TO 65 D; BETWEEN 01-NOV-2025:00:00:00 AND 31-JAN-2026:00:00:00

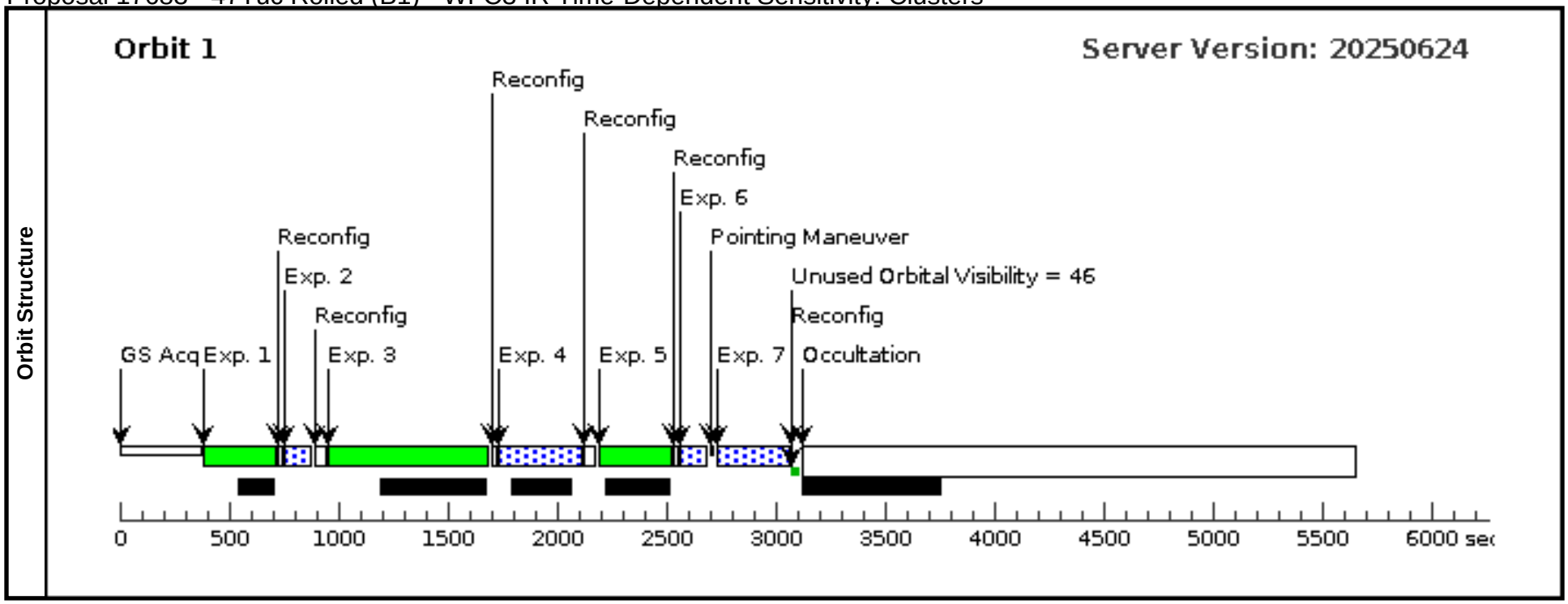
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	47TUC Alt Name1: NGC104	RA: 00 22 27.8446 (5.6160192d) Dec: -72 04 4.75 (-72.06799d) Equinox: J2000		V=22.0	Reference Frame: ICRS

Comments:
Category=CALIBRATION
Description=[DETECTOR LINEARITY TEST]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS25; NSAMP=13	GS ACQ SCENARIO BASE1O3		302.938471 Secs (302.938 Secs) *[==>]*	 ***[1]***
2	Short	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS10; NSAMP=10			92.940958 Secs (92.941 Secs) *[==>]*	 ***[1]***
3	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS50; NSAMP=15			702.938605 Secs (702.939 Secs) *[==>]*	 ***[1]***
4	Long	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS25; NSAMP=15			352.939501 Secs (352.94 Secs) *[==>]*	 ***[1]***
Comments: Designed to just saturate V=20 stars.									
5	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS50; NSAMP=7			302.934997 Secs (302.935 Secs) *[==>]*	 ***[1]***
6	Short	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS10; NSAMP=10			92.940958 Secs (92.941 Secs) *[==>]*	 ***[1]***
7	Extra External	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS25; NSAMP=13	POS TARG 4,4		302.938471 Secs (302.938 Secs) *[==>]*	 ***[1]***


Orbit Structure
Orbit 1
Server Version: 20250624
Reconfig
Reconfig
Reconfig
Exp. 6
Pointing Maneuver
Unused Orbital Visibility = 46
Reconfig
Occultation
Reconfig
Exp. 2
Reconfig
GS Acq
Exp. 1
Exp. 3
Exp. 4
Exp. 5
Exp. 7
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 17683, M-4 (02), completed Tue Oct 28 20:00:17 GMT 2025

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 280D TO 282 D; BETWEEN 01-JAN-2025:00:00:00 AND 15-MAR-2025:00:00:00

Diagnostics

(M-4 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

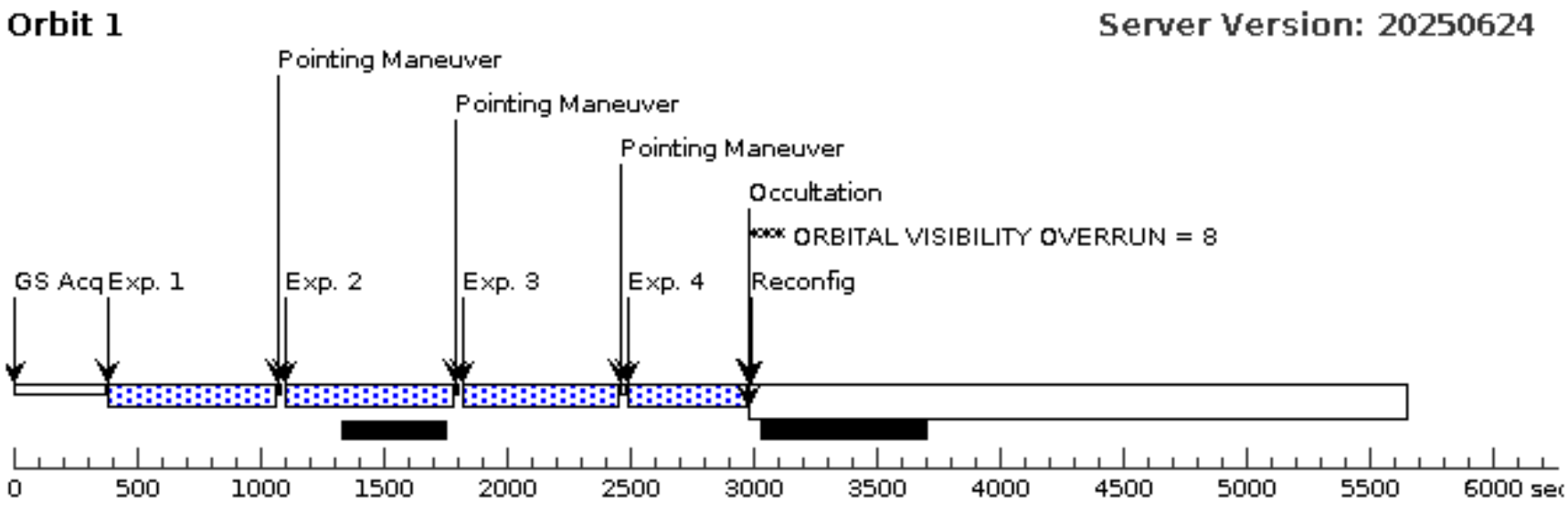
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	M-4	RA: 16 23 41.7160 (245.9238167d) Dec: -26 30 19.01 (-26.50528d) Equinox: J2000		V=5.9	Reference Frame: ICRS

Comments:
Category=STELLAR CLUSTER
Description=[GLOBULAR CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) M-4	WFC3/IR, MULTIACCUM, IR-UVIS-FIX	F110W	SAMP-SEQ=SPARS50; NSAMP=14	POS TARG -5,5		652.938154 Secs (652.938 Secs) *[==>]*	 ***[1]***
2		(3) M-4	WFC3/IR, MULTIACCUM, IR-UVIS-FIX	F110W	SAMP-SEQ=SPARS50; NSAMP=14	POS TARG -2.5,2.5		652.938154 Secs (652.938 Secs) *[==>]*	 ***[1]***
3		(3) M-4	WFC3/IR, MULTIACCUM, IR-UVIS-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=13	POS TARG 0,0		602.937703 Secs (602.938 Secs) *[==>]*	 ***[1]***
4		(3) M-4	WFC3/IR, MULTIACCUM, IR-UVIS-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=10	POS TARG -7.5,7.5		452.93635 Secs (452.936 Secs) *[==>]*	 ***[1]***

Orbit Structure



Visit

Proposal 17683, M-4 (03), completed Tue Oct 28 20:00:17 GMT 2025

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 280D TO 282 D; BETWEEN 01-APR-2025:00:00:00 AND 31-MAY-2025:00:00:00

Diagnostics

(M-4 (03)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	M-4	RA: 16 23 41.7160 (245.9238167d) Dec: -26 30 19.01 (-26.50528d) Equinox: J2000		V=5.9	Reference Frame: ICRS

Comments:
Category=STELLAR CLUSTER
Description=[GLOBULAR CLUSTER]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) M-4	WFC3/IR, MULTIACCUM, IR-UVIS-FIX	F110W	SAMP-SEQ=SPARS50; NSAMP=14	POS TARG -5,5		652.938154 Secs (652.938 Secs) *[==>]*	 ***[1]***
2		(3) M-4	WFC3/IR, MULTIACCUM, IR-UVIS-FIX	F110W	SAMP-SEQ=SPARS50; NSAMP=14	POS TARG -2.5,2.5		652.938154 Secs (652.938 Secs) *[==>]*	 ***[1]***
3		(3) M-4	WFC3/IR, MULTIACCUM, IR-UVIS-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=13	POS TARG 0,0		602.937703 Secs (602.938 Secs) *[==>]*	 ***[1]***
4		(3) M-4	WFC3/IR, MULTIACCUM, IR-UVIS-FIX	F160W	SAMP-SEQ=SPARS50; NSAMP=10	POS TARG -7.5,7.5		452.93635 Secs (452.936 Secs) *[==>]*	 ***[1]***

Orbit Structure