17363 - WFC3 IR Time-Dependent Sensitivity: Clusters

Cycle: 31, Proposal Category: CAL/WFC3

(Availability Mode: RESTRICTED)

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	(2) 47TUC DARK	WFC3/IR	1	07-Aug-2024 18:00:28.0	yes
02	(2) 47TUC DARK	WFC3/IR	1	07-Aug-2024 18:00:30.0	yes
03	(2) 47TUC DARK	WFC3/IR	1	07-Aug-2024 18:00:30.0	yes

3 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, and 17260. This program serves to complement the sensitivity change slopes from the M35 scans, G102/G141 measurements, and standard star photometric monitoring.

We observe the clusters M4 and 47Tuc using the same observation strategies in HST program 17260. Spefically, we propose a single epoch of M4 (using both F110W and F160W) and two epochs of 47Tuc (using solely F160W). This matches 17260 exactly, but deviates from prior programs 16864 and 16512 to balance the number of epochs of M4 and 47Tuc taken since 2020, allowing for more precise mesaurements of the sensitivity change in F160W. In future cycles the clusters will be swapped.

OBSERVING DESCRIPTION

These observations copy the targets, sample sequences, NSamps, and orbit structure of previously obtained WFC3/IR observations in 17260, as this yields the fewest systematics when attempting to measure sensitivity losses over time. We simply move the between windows one year later compared to 17260, to maintain the cadence of observation.

We propose a single M4 Visit to match Visit 01 of 17260, using the same filters, exposure times, sample sequences, dithers, and roll angle. This will help eliminate systematics when comparing the relative photometry. The visit consists 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 samples, due to the shorter orbital length (matching 17260). After each exposure POSTARGS of 2.5" will be applied, to mitigate self persistence.

The first visit of WFC3/IR observations of 47 Tuc (visit 02) was configued to be similar to 16864 Visit 05 (and match 17260 Visit 02 exactly), which itself was based on Visit 01 of 13563. As opposed to previous observations, the roll for the first epoch is constrained to be similar to 16964 Visit 05 (previous observations were unconstrained, leading to a mix of roll angles used). The structure of the visit itself is the same as 16864 (which itself differs be the next most recent epoch, from 13563, by changing the last dark to another F160W exposure). As performed in 16864 Visit 05, the last exposure is also dithered by approximately 40 pixels as this help mitigate the effect of self persistence. Visit 03 of this program repeates the observations of Visit02, but rolled at 180 degrees, and will take place approximately 6 months later, to better sample temporal changes in sensitivity. This matches 17260 Visit 03 exactly.

Visit

Proposal 17363, 47Tuc Rolled (01), implementation Wed Aug 07 22:00:31 GMT 2024

Diagnostic Status: Informational

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 179.9D TO 180D FROM 02; AFTER 03 BY 2 D TO 16 D

Diagnostics

(47Tuc Rolled (01)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Fixed Targets

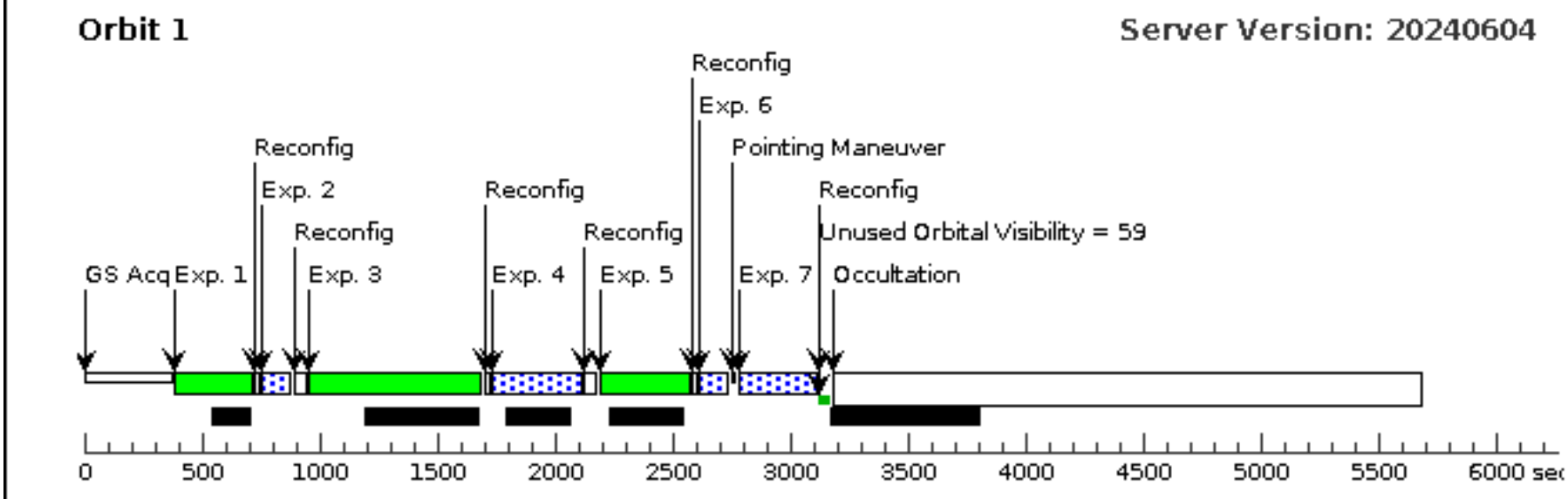
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	47TUC	RA: 00 22 27.8446 (5.6160192d)		V=22.0	Reference Frame: ICRS
	Alt Name1: NGC104	Dec: -72 04 4.75 (-72.06799d)			
		Equinox: J2000			

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 17363, 47Tuc (02), completed Wed Aug 07 22:00:31 GMT 2024

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 120D TO 135.0 D; BETWEEN 01-NOV-2023:00:00:00 AND 01-MAY-2024:00:00:00

Diagnostics

(47Tuc (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

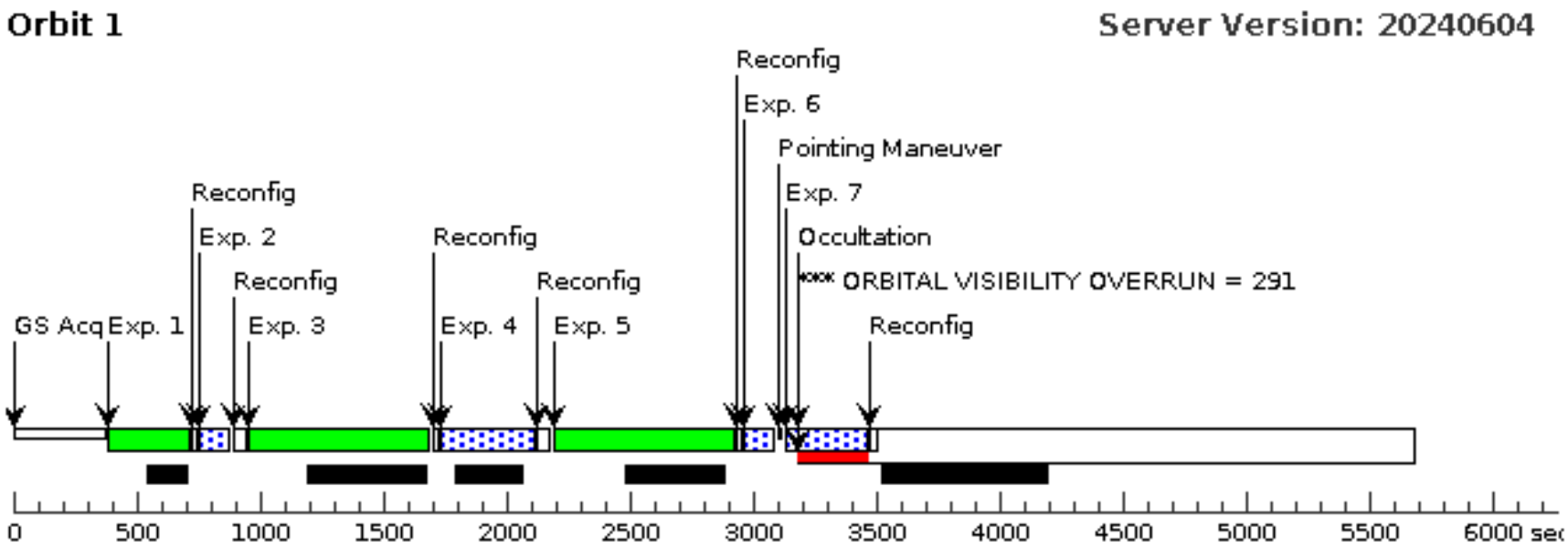
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	47TUC	RA: 00 22 27.8446 (5.6160192d)		V=22.0	Reference Frame: ICRS
	Alt Name1: NGC104	Dec: -72 04 4.75 (-72.06799d)			
		Equinox: J2000			

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=SPARS 25; NSAMP=13			302.938471 Secs (302.938 Secs)	
								[==>]	***[1]***
2	Short	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 10; NSAMP=10			92.940958 Secs (92.941 Secs)	
								[==>]	***[1]***
3	Dark	DARK	WFC3/IR, MULTIACCUM, IR	BLANK	SAMP-SEQ=SPARS 50; NSAMP=15			702.938605 Secs (702.939 Secs)	
								[==>]	***[1]***
4	Long	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 25; 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=SPARS 50; NSAMP=15			702.938605 Secs (702.939 Secs)	
								[==>]	***[1]***
6	Short	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 10; NSAMP=10			92.940958 Secs (92.941 Secs)	
								[==>]	***[1]***
7	Extra Extern al	(2) 47TUC	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 25; NSAMP=13	POS TARG 4,4		302.938471 Secs (302.938 Secs)	
								[==>]	***[1]***

Orbit Structure



Visit

Proposal 17363, 47Tuc Rolled (03), implementation Wed Aug 07 22:00:31 GMT 2024

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 179.9D TO 180D FROM 02; BETWEEN 01-AUG-2024:00:00:00 AND 01-OCT-2024:00:00:00

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=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 Extern al	(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