17905 - Astrometric Cross Calibration for JWST and HST

Cycle: 32, Proposal Category: CAL/WFC3

(Availability Mode: RESTRICTED)

INVESTIGATORS

Name	*Institution*
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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) LMC-FIELD-1	WFC3/UVIS	1	25-Mar-2025 15:00:21.0	yes
02	(1) LMC-FIELD-1	WFC3/IR	1	25-Mar-2025 15:00:22.0	yes
03	(1) LMC-FIELD-1	ACS/WFC	1	25-Mar-2025 15:00:22.0	yes

3 Total Orbits Used

ABSTRACT

Observe the primary JWST astrometric field in WFC3/UVIS, WFC3/IR and ACS/WFC. While this target has been observed with HST, a recent epoch will help constrain proper motions for astrometric cross-calibration.

OBSERVING DESCRIPTION

We will obtain WFC3 and ACS observations of the Large Magellanic Cloud star field lying within the continuous viewing zone of JWST. We repeat observations of the same field taken with ACS in 2006 (program 10753) and then repeated in 2017 (program 14911) with large dithers ~one-third the

FOV. The ACS astrometric catalog is used for calibrating the geometric distortion and scale of the JWST instruments and is large enough (5'x5') so that the JWST observations can be executed at any time of year. WFC3 observed this field in 2009 but with only 1 orbit each in UVIS and IR (programs 11444 and 11445).

This program will be used to create an improved astrometric catalog for calibrating the geometric distortion of the JWST instruments and for cross-calibration between HST and JWST at the current epoch. In addition, the UVIS data will include a single exposure of F814W to allow for the construction of a color magnitude diagram.

ACS observations in visit 03 are designed to match orientation (211 degrees) of visits 06 and 07 in program 14911 which executed on 22-Jul-2017. 90 degree rolled orients will also be allowed to increase schedulability. A total of 5 different postargs are used to cover the FOV covered in 14911.

UVIS (visit 01) will be oriented -45 degrees from ACS to cover the same area of the sky, and the IR (visit 02) orientation will be set to match UVIS. For UVIS a total of 5 different postargs are used to cover most of the FOV covered by ACS. The single F814W exposure will be taken at the center of the postargs. For IR, a total of 8 postargs are used to account for the smaller individual IR exposure FOV.

Visit

Proposal 17905, WFC3/UVIS (01) Tue Mar 25 19:00:22 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT -45D TO -45D FROM 03

Fixed Targets

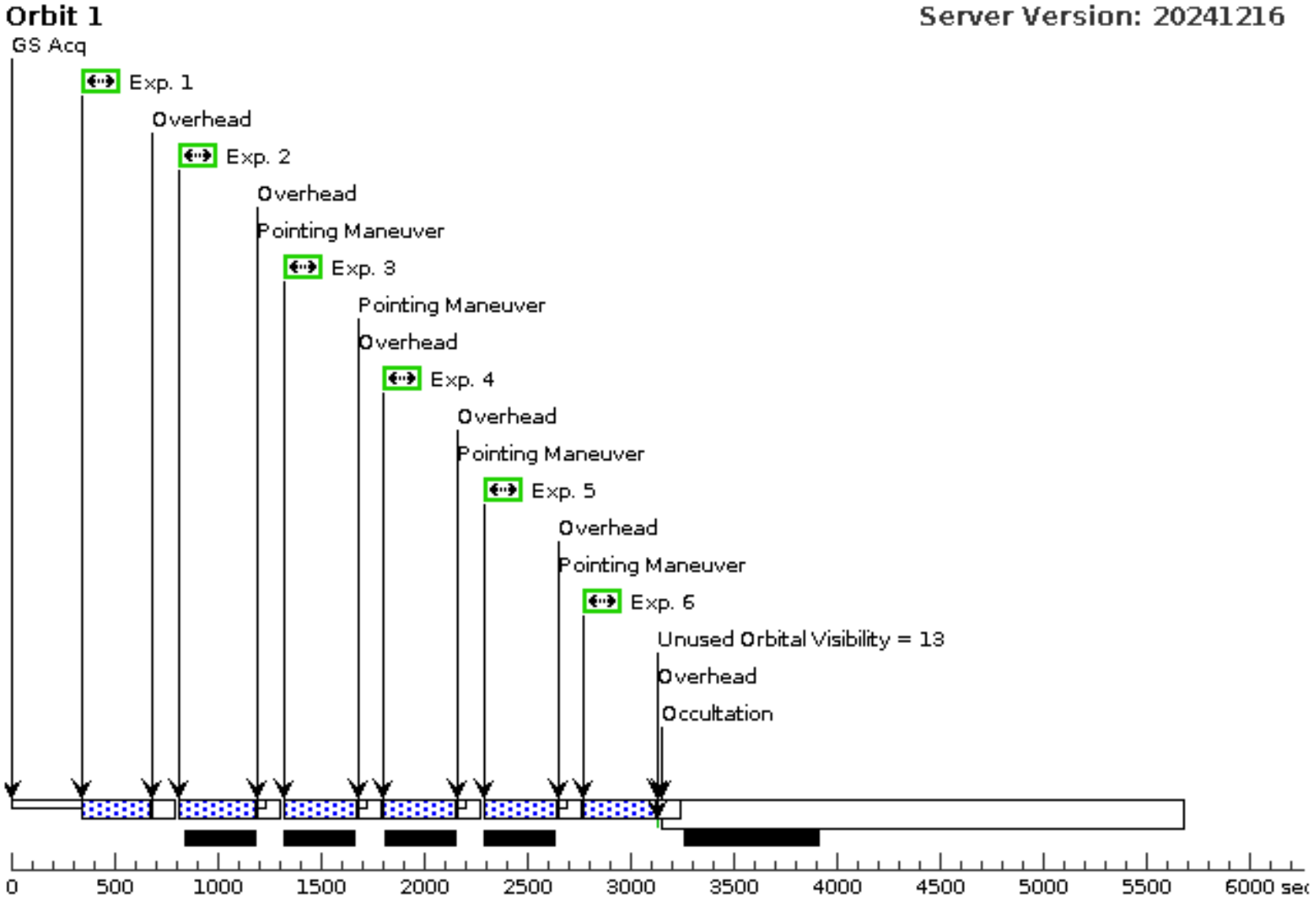
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	LMC-FIELD-1	RA: 05 21 57.6500 (80.4902083d) Dec: -69 29 54.11 (-69.49836d) Equinox: J2000		V=23.0	Reference Frame: Antiquity and Obliquity

Comments:
Category=UNIDENTIFIED
Description=[HIGH LATITUDE FIELD]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	UVIS/F814 W Center	(1) LMC-FIELD-1	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	FLASH=15			300 Secs (300 Secs) *[==>]*	 ***[1]***
2	UVIS/F606 W Center	(1) LMC-FIELD-1	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	FLASH=10			350 Secs (350 Secs) *[==>]*	 ***[1]***
3	UVIS/F606 W Dither 1	(1) LMC-FIELD-1	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	FLASH=10	POS TARG 45,-45		350 Secs (350 Secs) *[==>]*	 ***[1]***
4	UVIS/F606 W Dither 2	(1) LMC-FIELD-1	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	FLASH=10	POS TARG -45,-45		350 Secs (350 Secs) *[==>]*	 ***[1]***
5	UVIS/F606 W Dither 3	(1) LMC-FIELD-1	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	FLASH=10	POS TARG -45,45		350 Secs (350 Secs) *[==>]*	 ***[1]***
6	UVIS/F606 W Dither 4	(1) LMC-FIELD-1	WFC3/UVIS, ACCUM, UVIS-CENTER	F606W	FLASH=10	POS TARG 45,45		350 Secs (350 Secs) *[==>]*	 ***[1]***

Orbit Structure



Visit

Proposal 17905, WFC3/IR (02) Tue Mar 25 19:00:22 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: SAME ORIENT AS 01

Fixed Targets

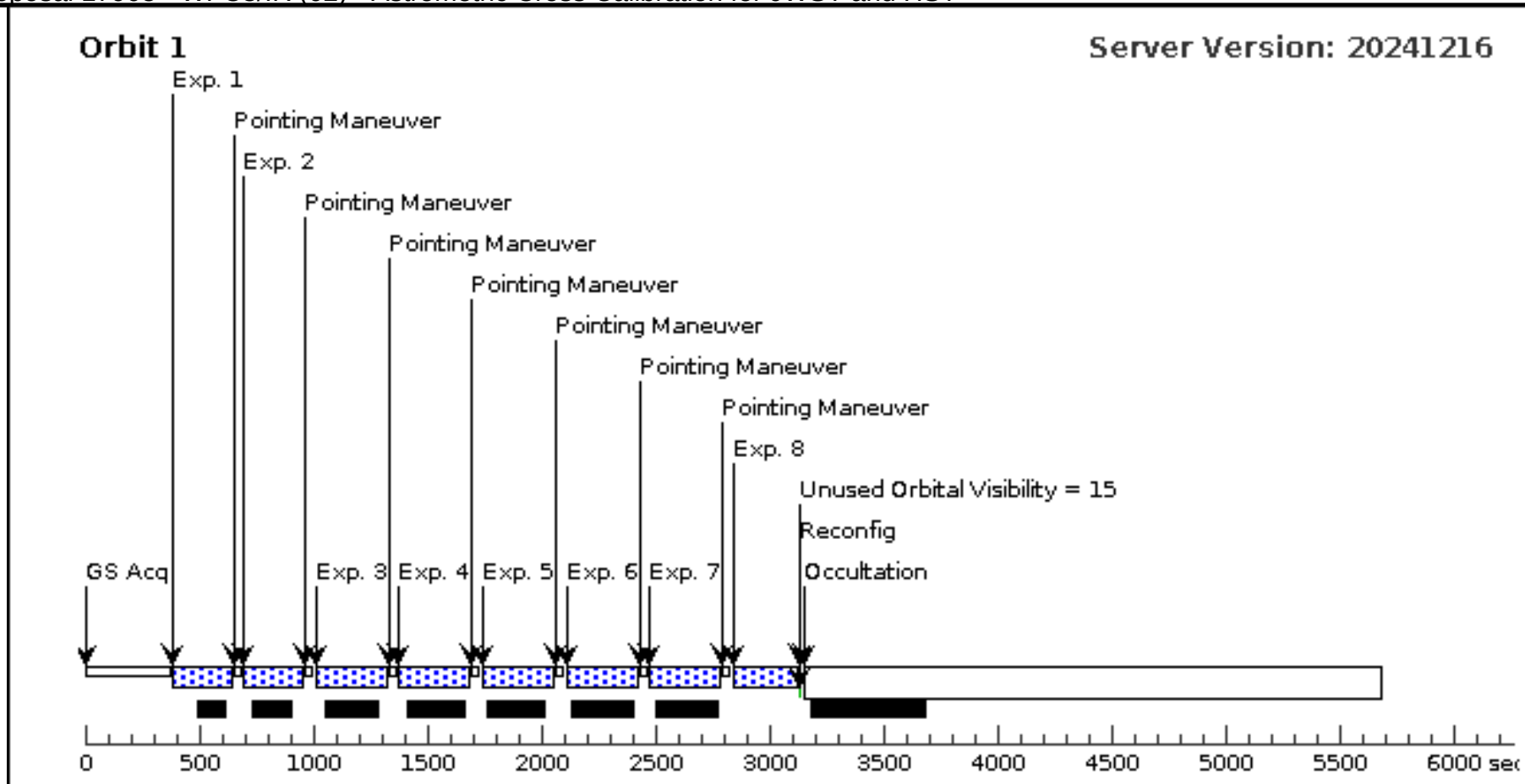
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	LMC-FIELD-1	RA: 05 21 57.6500 (80.4902083d) Dec: -69 29 54.11 (-69.49836d) Equinox: J2000		V=23.0	Reference Frame: Antiquity and Obliquity

Comments:
Category=UNIDENTIFIED
Description=[HIGH LATITUDE FIELD]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	IR/F160W Dither 1	(1) LMC-FIELD-1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 25; NSAMP=10	POS TARG 42,0		227.936926 Secs (227.937 Secs) *[==>]*	***[1]***
2	IR/F160W Dither 2	(1) LMC-FIELD-1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 25; NSAMP=10	POS TARG 42,47		227.936926 Secs (227.937 Secs) *[==>]*	***[1]***
3	IR/F160W Dither 3	(1) LMC-FIELD-1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 25; NSAMP=12	POS TARG 0,47		277.937956 Secs (277.938 Secs) *[==>]*	***[1]***
4	iR/F160W D ither 4	(1) LMC-FIELD-1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 25; NSAMP=12	POS TARG -42,47		277.937956 Secs (277.938 Secs) *[==>]*	***[1]***
5	IR/F160W Dither 5	(1) LMC-FIELD-1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 25; NSAMP=12	POS TARG -42,0		277.937956 Secs (277.938 Secs) *[==>]*	***[1]***
6	IR/F160W Dither 6	(1) LMC-FIELD-1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 25; NSAMP=12	POS TARG -42,-47		277.937956 Secs (277.938 Secs) *[==>]*	***[1]***
7	IR/F160W Dither 7	(1) LMC-FIELD-1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 25; NSAMP=12	POS TARG 0,-47		277.937956 Secs (277.938 Secs) *[==>]*	***[1]***
8	IR/F160W Dither 8	(1) LMC-FIELD-1	WFC3/IR, MULTIACCUM, IR-FIX	F160W	SAMP-SEQ=SPARS 25; NSAMP=11	POS TARG 42,-47		252.937441 Secs (252.937 Secs) *[==>]*	***[1]***

Orbit Structure



Visit

Proposal 17905, ACS/WFC (03) Tue Mar 25 19:00:23 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 211D TO 214 D; ORIENT 31D TO 34 D; ORIENT 121D TO 124 D; ORIENT 301D TO 304 D

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	LMC-FIELD-1	RA: 05 21 57.6500 (80.4902083d) Dec: -69 29 54.11 (-69.49836d) Equinox: J2000		V=23.0	Reference Frame: Antiquity and Obliquity

Comments:
Category=UNIDENTIFIED
Description=[HIGH LATITUDE FIELD]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACS/F606 W Center	(1) LMC-FIELD-1	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO; GAIN=2.0	POS TARG 0.0,0.0		343 Secs (343 Secs) *[==>]*	*[1]*
	Comments: Long exposure to build signal to noise for faint stars. *Utilize all available time for exposures.*								
2	ACS/F606 W Dither 1	(1) LMC-FIELD-1	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO; GAIN=2.0	POS TARG 45.0,-45.0		343 Secs (343 Secs) *[==>]*	*[1]*
	Comments: Long exposure to build signal to noise for faint stars. *Utilize all available time for exposures.*								
3	ACS/F606 W Dither 2	(1) LMC-FIELD-1	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO; GAIN=2.0	POS TARG -45.0,-45.0		343 Secs (343 Secs) *[==>]*	*[1]*
	Comments: Long exposure to build signal to noise for faint stars. *Utilize all available time for exposures.*								
4	ACS/F606 W Dither 3	(1) LMC-FIELD-1	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO; GAIN=2.0	POS TARG -45.0,45.0		343 Secs (343 Secs) *[==>]*	*[1]*
	Comments: Long exposure to build signal to noise for faint stars. *Utilize all available time for exposures.*								
5	ACS/F606 W Dither 4	(1) LMC-FIELD-1	ACS/WFC, ACCUM, WFCENTER	F606W	CR-SPLIT=NO; GAIN=2.0	POS TARG 45.0,45.0		343 Secs (343 Secs) *[==>]*	*[1]*
	Comments: Long exposure to build signal to noise for faint stars. *Utilize all available time for exposures.*								

Orbit Structure