14465 - Peering to the Heart of Massive Star Birth

Cycle: 23, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Prof. Jonathan Charles Tan (PI) (Contact)	**University of Florida**	**jt@astro.ufl.edu**
Dr. Yichen Zhang (CoI)	Universidad de Chile	yczhang.astro@gmail.com
Dr. Nicola Da Rio (CoI)	University of Florida	ndario@ufl.edu
Dr. Kei Tanaka (CoI)	University of Florida	ktanaka@ufl.edu
Dr. Jan Erling Staff (CoI)	University of Florida	mr_erling1@hotmail.com

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) G035.20-0.74	WFC3/IR	1	15-Dec-2015 21:20:25.0	yes
02	(2) IRAS07299-1651	WFC3/IR	1	15-Dec-2015 21:20:26.0	yes
03	(3) AFGL5180	WFC3/IR	1	15-Dec-2015 21:20:28.0	yes
04	(4) G339.88-1.26	WFC3/IR	1	15-Dec-2015 21:20:29.0	yes
05	(5) IRAS16562-3959	WFC3/IR	1	15-Dec-2015 21:20:30.0	yes

5 Total Orbits Used

ABSTRACT

We propose a small survey of massive/intermediate-mass protostars with WFC3/IR to probe J and H band continuum emission, the Pa-beta and the [FeII] emission. The protostar sample is already the subject of approved SOFIA-FORCAST observations from 10-40 microns. Combined with sophisticated radiative transfer models, these observations are providing the most detailed constraints on the nature of massive protostars, their

luminosities, outflow cavity structures and orientations, and distribution of surrounding dense core gas and dust. Recently, we were also awarded ALMA Cycle 3 time to study these sources at up to 0.14" resolution. The proposed HST observations, with very similar resolution, have three main goals: 1) Detect and characterize J and H band continuum emission from the massive/intermediate-mass protostars, which is expected to arise from jet and outflow knot features and from scattered light emerging from the outflow cavities; 2) Detect and characterize Pa-beta and [FeII] line emission tracing ionized and FUV-illuminated regions around the massive protostars, important diagnostics of the protostellar source and its outflow structure; 3) Search for lower-mass protostars that may be clustered around the forming massive protostar. All of these objectives will help test massive star formation theories. The high sensitivity and angular resolution of WFC3/IR enables these observations to be carried out efficiently in a timely fashion. Mid-Cycle observations are critical for near contemporaneous observation with ALMA, since jet/outflow knots may have large proper motions, and to maximize the potential time baseline for a future HST study of jet/outflow proper motions.

OBSERVING DESCRIPTION

This is very straight forward program.
5 visits, each of them of one orbit, each of them on one of 5 independent targets.
For each orbit, the target is observed with WFC3/IR imaging in 4 filters.

Visit

Proposal 14465, Visit 01 Wed Dec 16 02:20:32 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

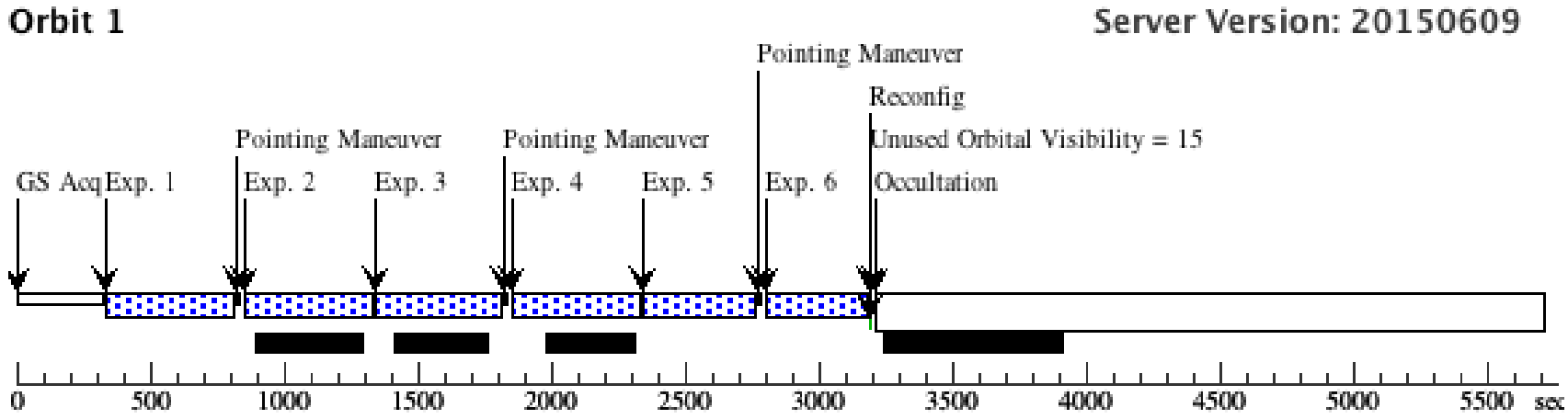
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	G035.20-0.74	RA: 18 58 13.0300 (284.5542917d) Dec: +01 40 36.14 (1.67671d) Equinox: J2000		V=25	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F128N-a	(1) G035.20-0.74	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
2	F128N-b	(1) G035.20-0.74	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 1.930,1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
3	F164N-a	(1) G035.20-0.74	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 1.930,1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
4	F164N-b	(1) G035.20-0.74	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
5	F110W	(1) G035.20-0.74	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=13; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		399.233383 Secs (399.233 Secs) *[==>]*	*[1]*
6	F160W	(1) G035.20-0.74	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 3,3		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14465, Visit 02 Wed Dec 16 02:20:32 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 90D TO 90 D

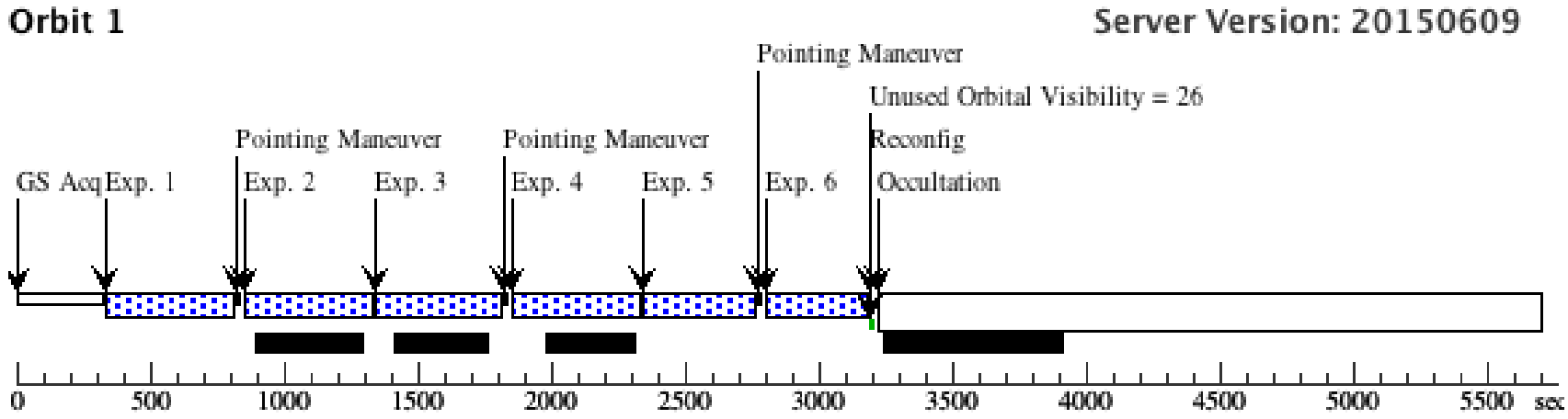
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	IRAS07299-1651	RA: 07 32 7.0000 (113.0291667d) Dec: -16 58 40.00 (-16.97778d) Equinox: J2000		V=25	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F128N-a	(2) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
2	F128N-b	(2) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 1.930,1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
3	F164N-a	(2) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 1.930,1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
4	F164N-b	(2) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
5	F110W	(2) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=13; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		399.233383 Secs (399.233 Secs) *[==>]*	*[1]*
6	F160W	(2) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 3,3		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14465, Visit 03 Wed Dec 16 02:20:32 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

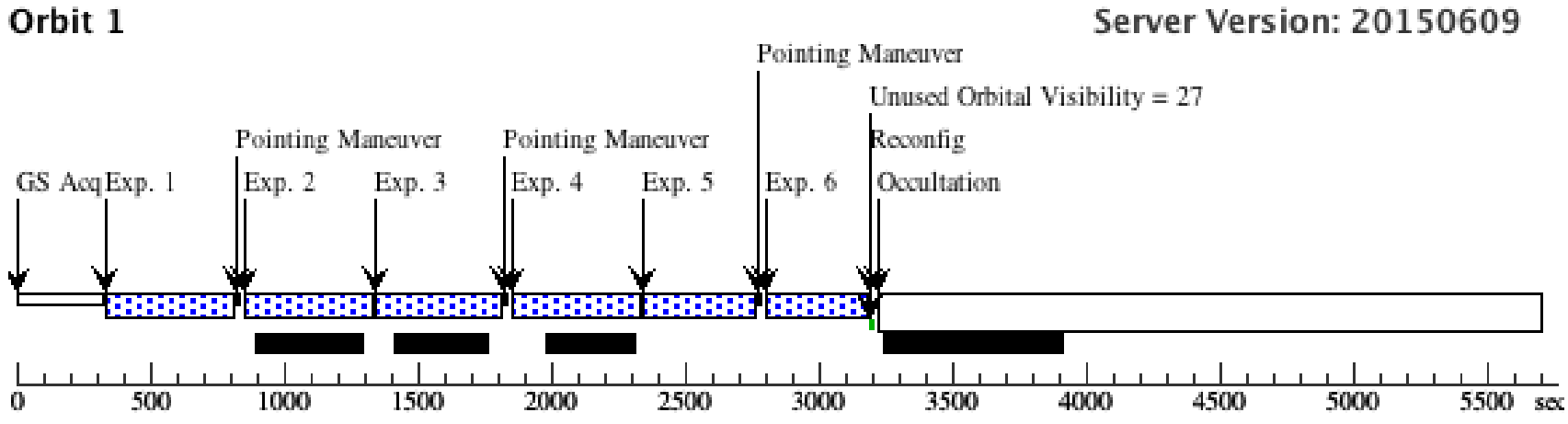
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	AFGL5180	RA: 06 08 53.3000 (92.2220833d) Dec: +21 38 30.00 (21.64167d) Equinox: J2000		V=25	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F128N-a	(3) AFGL5180	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
2	F128N-b	(3) AFGL5180	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 1.930,1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
3	F164N-a	(3) AFGL5180	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 1.930,1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
4	F164N-b	(3) AFGL5180	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
5	F110W	(3) AFGL5180	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=13; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		399.233383 Secs (399.233 Secs) *[==>]*	*[1]*
6	F160W	(3) AFGL5180	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 3,3		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14465, Visit 04 Wed Dec 16 02:20:32 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

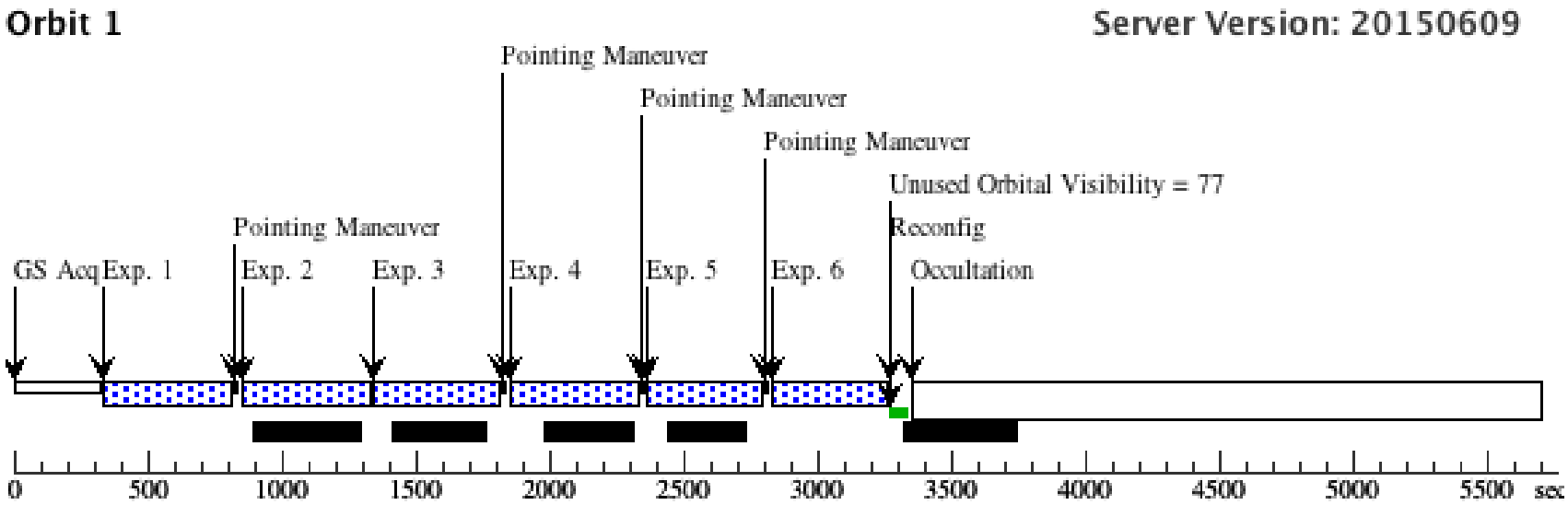
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	G339.88-1.26	RA: 16 52 4.6600 (253.0194167d) Dec: -46 08 34.20 (-46.14283d) Equinox: J2000		V=25	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F128N-a	(4) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
2	F128N-b	(4) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 1.930,1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
3	F164N-a	(4) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 1.930,1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
4	F164N-b	(4) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
5	F110W	(4) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=13; SAMP-SEQ=STEP50	POS TARG -3,-3		399.233383 Secs (399.233 Secs) *[==>]*	*[1]*
6	F160W	(4) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=13; SAMP-SEQ=STEP50	POS TARG 3,3		399.233383 Secs (399.233 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14465, Visit 05 Wed Dec 16 02:20:32 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(5)	IRAS16562-3959	RA: 16 59 41.6000 (254.9233333d) Dec: -40 03 44.00 (-40.06222d) Equinox: J2000		V=25	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F128N-a	(5) IRAS16562-3959	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
2	F128N-b	(5) IRAS16562-3959	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 1.930,1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
3	F164N-a	(5) IRAS16562-3959	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 1.930,1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
4	F164N-b	(5) IRAS16562-3959	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
5	F110W	(5) IRAS16562-3959	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=13; SAMP-SEQ=STEP50	POS TARG -1.930,-1.729		399.233383 Secs (399.233 Secs) *[==>]*	*[1]*
6	F160W	(5) IRAS16562-3959	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=13; SAMP-SEQ=STEP50	POS TARG 3,3		399.233383 Secs (399.233 Secs) *[==>]*	*[1]*

Orbit Structure