14695 - WFC3 Imaging of 24 um Dropout Protostars in Orion

Cycle: 24, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. S Thomas Megeath (PI) (Contact)	**University of Toledo**	**megeath@physics.utoledo.edu**
Joseph Jon Booker (CoI)	University of Toledo	joe@neoturbine.net
Amelia Marie Stutz (CoI) (ESA Member)	Max-Planck-Institut fur Astronomie, Heidelberg	stutz@mpia.de
Dr. Elise Furlan (CoI)	California Institute of Technology	furlan@ipac.caltech.edu
Marina A Kounkel (CoI)	University of Michigan	mkounkel@umich.edu
Dr. Thomas Stanke (CoI) (ESA Member)	European Southern Observatory - Germany	tstanke@eso.org
Nicole Karnath (CoI)	University of Toledo	nicole.karnath@rockets.utoledo.edu
Dr. Will Fischer (CoI)	NASA Goddard Space Flight Center	william.j.fischer@nasa.gov

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) 037003	WFC3/IR	1	29-Jul-2016 14:53:58.0	yes
02	(2) 092011	WFC3/IR	1	29-Jul-2016 14:53:59.0	yes
03	(3) 038002	WFC3/IR	1	29-Jul-2016 14:54:00.0	yes
04	(4) 302004	WFC3/IR	1	29-Jul-2016 14:54:01.0	yes

4 Total Orbits Used

ABSTRACT

We propose WFC3 imaging of four unusual candidate protostars that were uncovered in Spitzer and Herschel observations of the Orion Molecular Cloud. These sources exhibited a combination of weak 24 um fluxes, modest to bright 70 um fluxes, low luminosities and bolometric temperatures,

but comparatively bright emission between 3.6 and 8 um. Since they did not fall into one of the typical protostar classes, they were not targeted for futher study. A recent HST/WFC3 F160W snapshot survey serendiptiously imaged one of these sources, revealing a bipolar nebula with a broad dust lane and binary point sources. This suggest that the lack of 24 um emission might be due to dust clearing in the inner disk and envelope by the binary. We propose to image the remaining four other sources with WFC3 in the F160W band, all of which have been detected in lower resolution, ground-based H-band observations and three of which show some sign of extension in the H or Ks-band. F160W imaging is essential to understand the geometry and inclination of the envelope and interpret the SEDs. These data will place these objects into the context of our picture of protostellar evolution, and test the possibility that these are envelopes being cleared by the gravitational torques from binary systems.

OBSERVING DESCRIPTION

For each target we repeat the same observation in the F160W band. The observation consists of four separate dithers with Step 100 and 13 samples for a 600 second integration per exposure. A WFC3 line dither pattern with an angle of 41 degrees and a separation of 1.13 along the line is used to obtain sub-pixel sampling.

The targets are identified from Spitzer coordinates. In two case, they have been shifted by about 20" to capture additional YSOs near the targets.

Visit

Proposal 14695, Visit 01 Fri Jul 29 18:54:01 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=LINE	Coordinate Frame=POS-TARG		(1)
	Purpose=DITHER	Pattern Orientation=41.788		
	Number Of Points=4	Angle Between Sides=		
	Point Spacing=1.13306	Center Pattern=false		
	Line Spacing=			

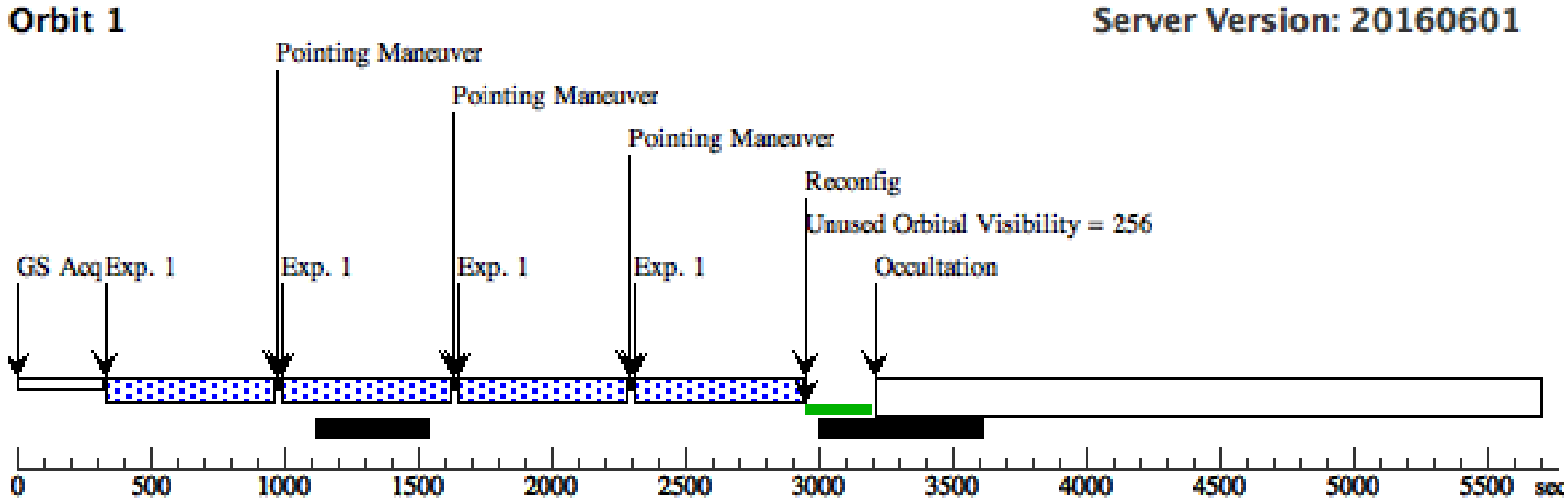
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	037003	RA: 05 37 0.3500 (84.2514583d) Dec: -06 37 10.95 (-6.61971d) 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		(1) 037003	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=STEP100; NSAMP=12		Pattern 1, Exps 1-1 in Visit 01 (1)	599.232292 Secs (2396.929 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 14695, Visit 02 Fri Jul 29 18:54:01 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=LINE	Coordinate Frame=POS-TARG		(1)
	Purpose=DITHER	Pattern Orientation=41.788		
	Number Of Points=4	Angle Between Sides=		
	Point Spacing=1.13306	Center Pattern=false		
	Line Spacing=			

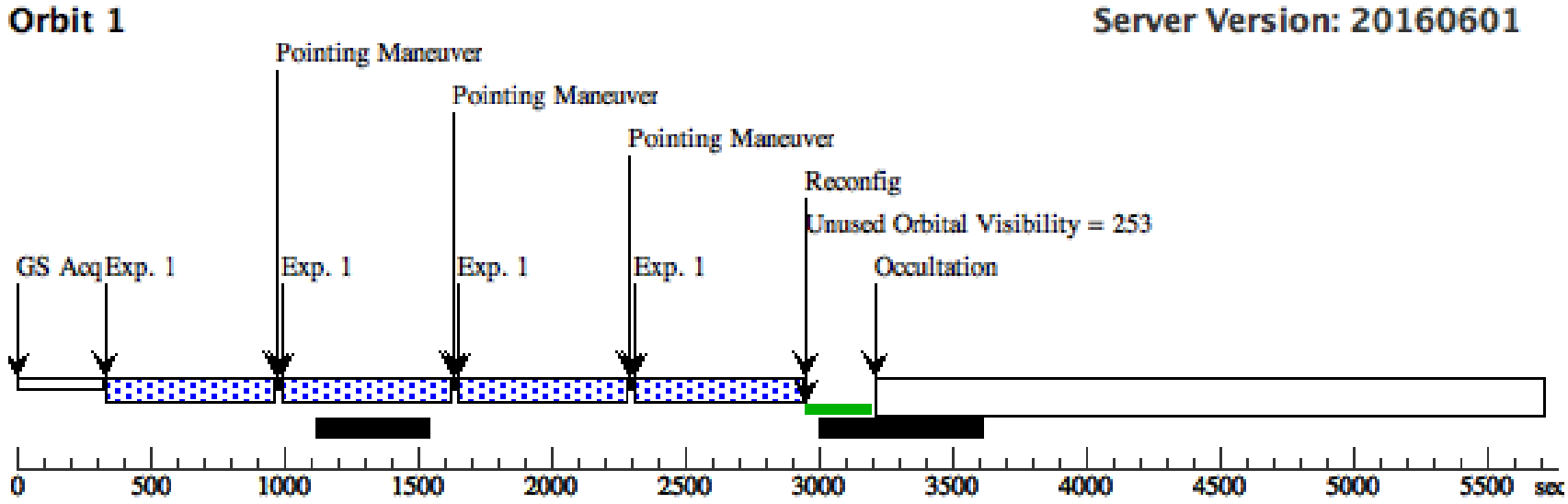
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	092011	RA: 05 46 26.1700 (86.6090417d) Dec: -00 04 45.31 (-.07925d) 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		(2) 092011	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=STEP100; NSAMP=12		Pattern 1, Exps 1-1 in Visit 02 (1)	599.232292 Secs (2396.929 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 14695, Visit 03 Fri Jul 29 18:54:01 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=LINE	Coordinate Frame=POS-TARG		(1)
	Purpose=DITHER	Pattern Orientation=41.788		
	Number Of Points=4	Angle Between Sides=		
	Point Spacing=1.13306	Center Pattern=false		
	Line Spacing=			

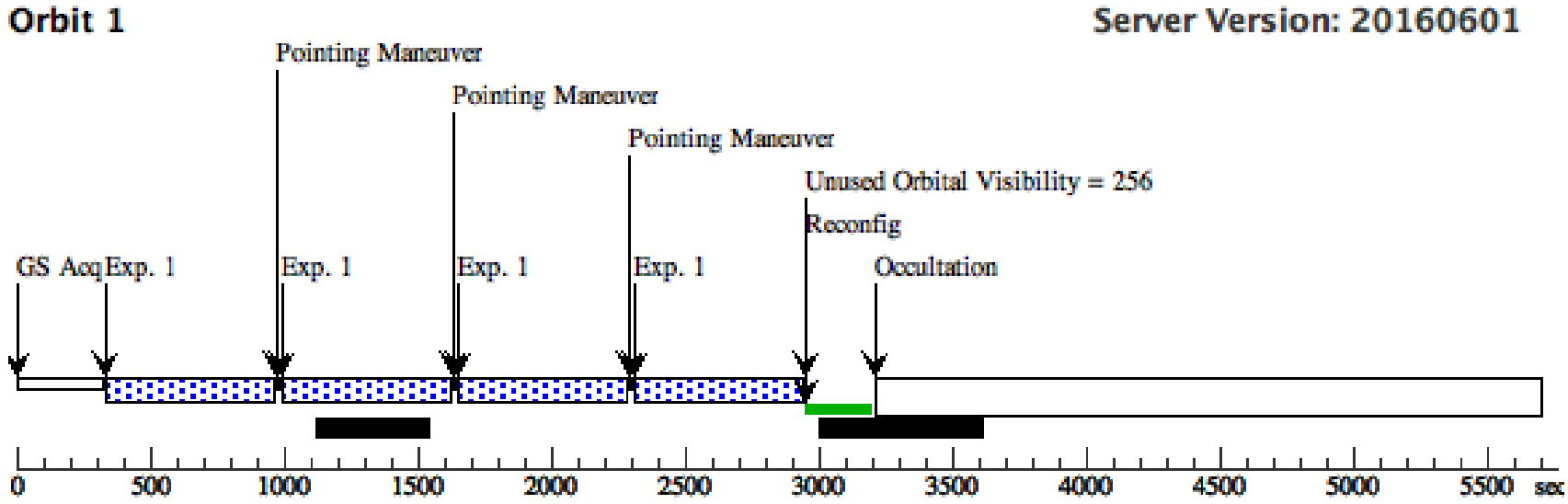
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	038002	RA: 05 36 10.7900 (84.0449583d) Dec: -06 49 6.93 (-6.81859d) 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		(3) 038002	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=STEP100; NSAMP=12		Pattern 1, Exps 1-1 in Visit 03 (1)	599.232292 Secs (2396.929 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure



Visit

Proposal 14695, Visit 04 Fri Jul 29 18:54:01 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=LINE	Coordinate Frame=POS-TARG		(1)
	Purpose=DITHER	Pattern Orientation=41.788		
	Number Of Points=4	Angle Between Sides=		
	Point Spacing=1.13306	Center Pattern=false		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	302004	RA: 05 46 16.0000 (86.5666667d) Dec: +00 21 12.02 (.35334d) 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		(4) 302004	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=12; SAMP-SEQ=STEP100		Pattern 1, Exps 1-1 in Visit 04 (1)	599.232292 Secs (2396.929 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	*[1]*

Orbit Structure