



# 13391 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

Cycle: 21, Proposal Category: GO  
(Availability Mode: SUPPORTED)

## INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
<b>Dr. Nathan Smith (PI) (Contact)</b>	<b>University of Arizona</b>	<b>nathans@as.arizona.edu</b>
Ms. Megan Reiter (CoI) (Contact)	University of Arizona	mreiter@as.arizona.edu
Prof. John Bally (CoI)	University of Colorado at Boulder	john.bally@colorado.edu

## VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) HH900	ACS/WFC WFC3/IR	3	28-Jan-2014 21:09:27.0	yes
02	(2) HH903	ACS/WFC WFC3/IR	3	28-Jan-2014 21:09:53.0	yes
03	(3) HH1004-1005	ACS/WFC WFC3/IR	3	28-Jan-2014 21:10:17.0	yes
04	(4) HH1006	ACS/WFC WFC3/IR	3	28-Jan-2014 21:10:43.0	yes
05	(5) HH1007-1015	ACS/WFC WFC3/IR	3	28-Jan-2014 21:11:04.0	yes
06	(6) HH1010	ACS/WFC WFC3/IR	3	28-Jan-2014 21:11:25.0	yes

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
07	(7) HH1014	ACS/WFC WFC3/IR	3	28-Jan-2014 21:11:46.0	yes
08	(8) HHC-4-5-6-7	ACS/WFC WFC3/IR	3	28-Jan-2014 21:12:10.0	yes
57	(7) HH1014	ACS/WFC WFC3/IR	3	28-Jan-2014 21:12:31.0	yes

27 Total Orbits Used

### **ABSTRACT**

Based on H-alpha imaging of the Carina Nebula with ACS, we discovered 40 new Herbig-Haro (HH) jets marking outflows from young stars. This is valuable because (1) it is a large sample of jets at one distance, (2) the driving sources are intermediate-mass (IM) stars (1-8 Msun), allowing us to investigate the bridge between low- and high-mass star formation, and (3) the jets are exposed to the same feedback source and trace various stages of being uncovered by the advancing ionization front. This sample is all the more valuable because it can be placed in the context of a well-understood environment that has been studied extensively with HST, Spitzer, Chandra, and from the ground.

We propose to image 13 of these jets in the [Fe II] 1.26-micron and 1.64-micron lines. These lines suffer less extinction than optical lines, trace embedded jets, and are essential to measure the total mass in these dense outflows. Four jets have already been imaged in the F126N and F164N filters to make public release images; these images demonstrate that [FeII] emission traces a large mass of neutral gas not seen in H-alpha emission and traces the jet back into the cloud to the Spitzer-identified driving source. This study will permit a detailed comparison of the jet properties (e.g. mass-loss rate, momentum injection, mass-loss history) to IM protostar properties (e.g. accretion rate, luminosity, envelope mass and structure) during the most active accretion. These relationships are poorly determined for IM protostars. Additionally, the flux ratio of [Fe II] lines will trace the spatially dependent extinction through the cloud, providing a map of the density structure in the extended envelope.

### **OBSERVING DESCRIPTION**

We propose to obtain WFC3-IR images of a sample of embedded HH jets in the Carina Nebula, using the F126N, F164N, F130N, and F167N filters to trace [Fe II] emission and adjacent continuum from the portions of the jets that are inside dark globules. We will essentially duplicate the ERO images of HH 666 and HH 901/902 taken by the instrument teams with WFC3-IR. We will obtain images in the F126N and F164N filters to trace [Fe

II] emission, and F130N and F167N for the nearby continuum to subtract. Total on-source integration times in the F164N filter were 2400-2800 sec (40-47 min) in the ERO/DD programs. We will adopt the same observing strategy, with a box-dither pattern to avoid dead-pixel artifacts. Exposure times in the [Fe II] (F126N and F164N) and the line-free continuum filters (F130N and F167N) must be equal in order to subtract continuum emission at the same signal-to-noise. The Carina Nebula can be observed in CVZ mode, with 96 minutes available per orbit. The on-source exposures require  $43 + 43 = 86$  min. With guide-star acquisition (6 min) and exposure overheads, we fit all four exposures in two CVZ orbits. We have constructed 8 visits of two orbits each corresponding to our 8 proposed pointings for a total of 16 orbits with CVZ viewing.

Each visit is composed of four primary exposures corresponding to the F126N, F164N, F130N, and F167N filters. We use a modified box dither pattern (pattern D4, as suggested in the WFC3 instrument manual) with four pointings to avoid the death star and minimize the impact of the IR blobs.

Parallel ACS: We also propose to obtain coordinated parallel ACS/WFC H $\alpha$  images in the F658N filter for all pointings. This will effectively increase the total area of our previous H $\alpha$  survey of Carina, substantially increasing its archival value for our own studies and for other users. Exposure times for the parallel ACS fields are long (and not CR-SPLIT) in order to maximize on-sky time in the parallel observations without the ACS buffer dump requirements compromising the WFC3-IR primary observations.

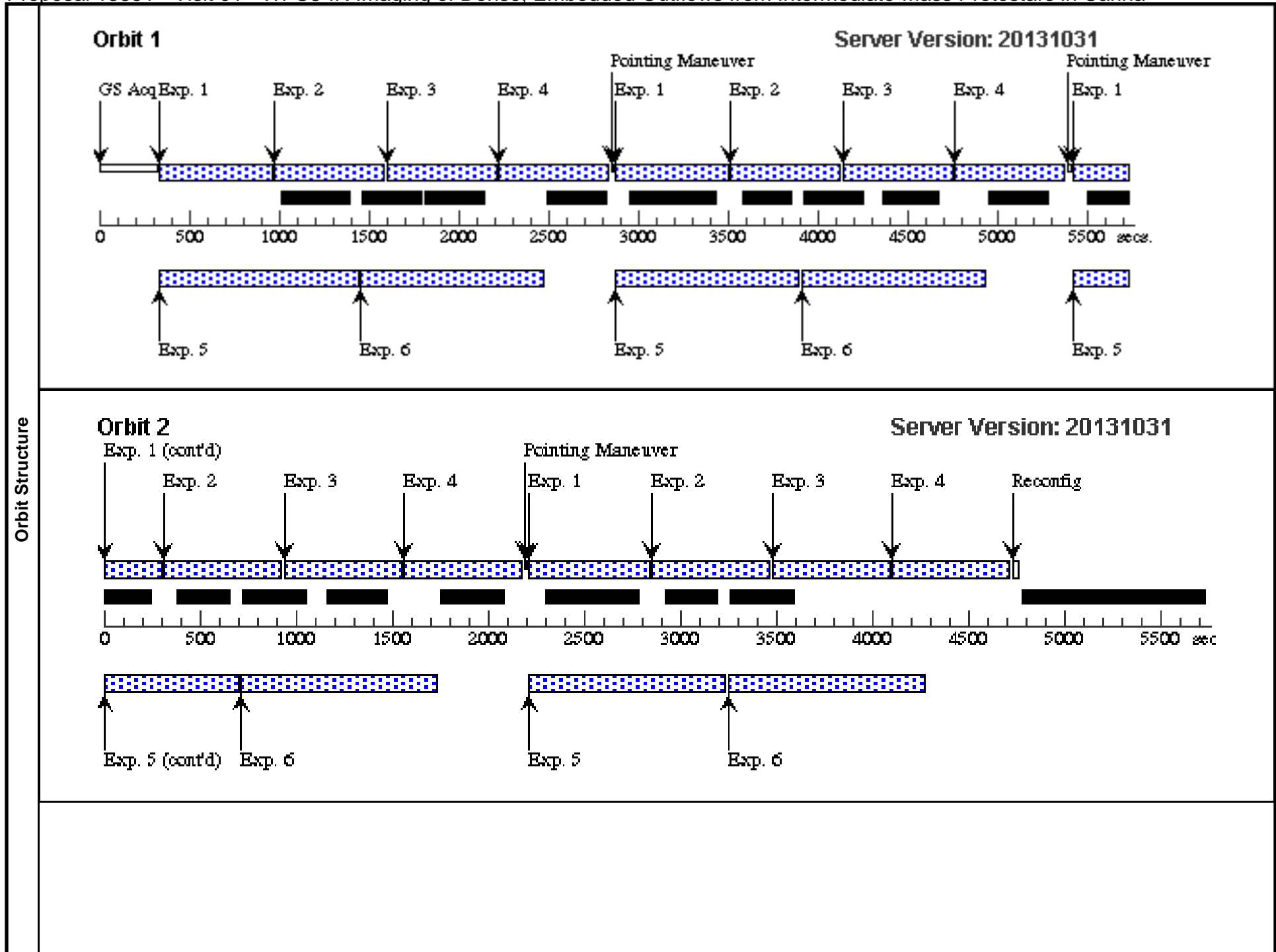
Proposal 13391 - Visit 01 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

Wed Jan 29 02:12:45 GMT 2014

<b>Visit</b>	<b>Proposal 13391, Visit 01, completed</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: CVZ; ORIENT 270D TO 310 D					
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>		
	(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.384 Line Spacing=8.609	Coordinate Frame=POS-TARG Pattern Orientation=28.202 Angle Between Sides=69.714 Center Pattern=false		(1-6)	
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(1)	HH900	RA: 10 45 19.3000 (161.3304167d) Dec: -59 44 23.00 (-59.73972d) Equinox: J2000		V=10	Reference Frame: ICRS

Proposal 13391 - Visit 01 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) HH900	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=12; SAMP-SEQ=STEP100			Pattern 2, Exps 1-6 in Visit 01 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 01	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
	2	(1) HH900	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=12; SAMP-SEQ=STEP100			Pattern 2, Exps 1-6 in Visit 01 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 01	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
	3	(1) HH900	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=12; SAMP-SEQ=STEP100			Pattern 2, Exps 1-6 in Visit 01 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 01	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
	4	(1) HH900	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=12; SAMP-SEQ=STEP100			Pattern 2, Exps 1-6 in Visit 01 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 01	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
	5	(1) HH900	ACS/WFC, ACCUM, WFC	F658N				Pattern 2, Exps 1-6 in Visit 01 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 01	900 Secs (3600 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
	6	(1) HH900	ACS/WFC, ACCUM, WFC	F658N				Pattern 2, Exps 1-6 in Visit 01 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 01	900 Secs (3600 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]



**Orbit 3**

**Server Version: 20131031**



Proposal 13391 - Visit 02 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

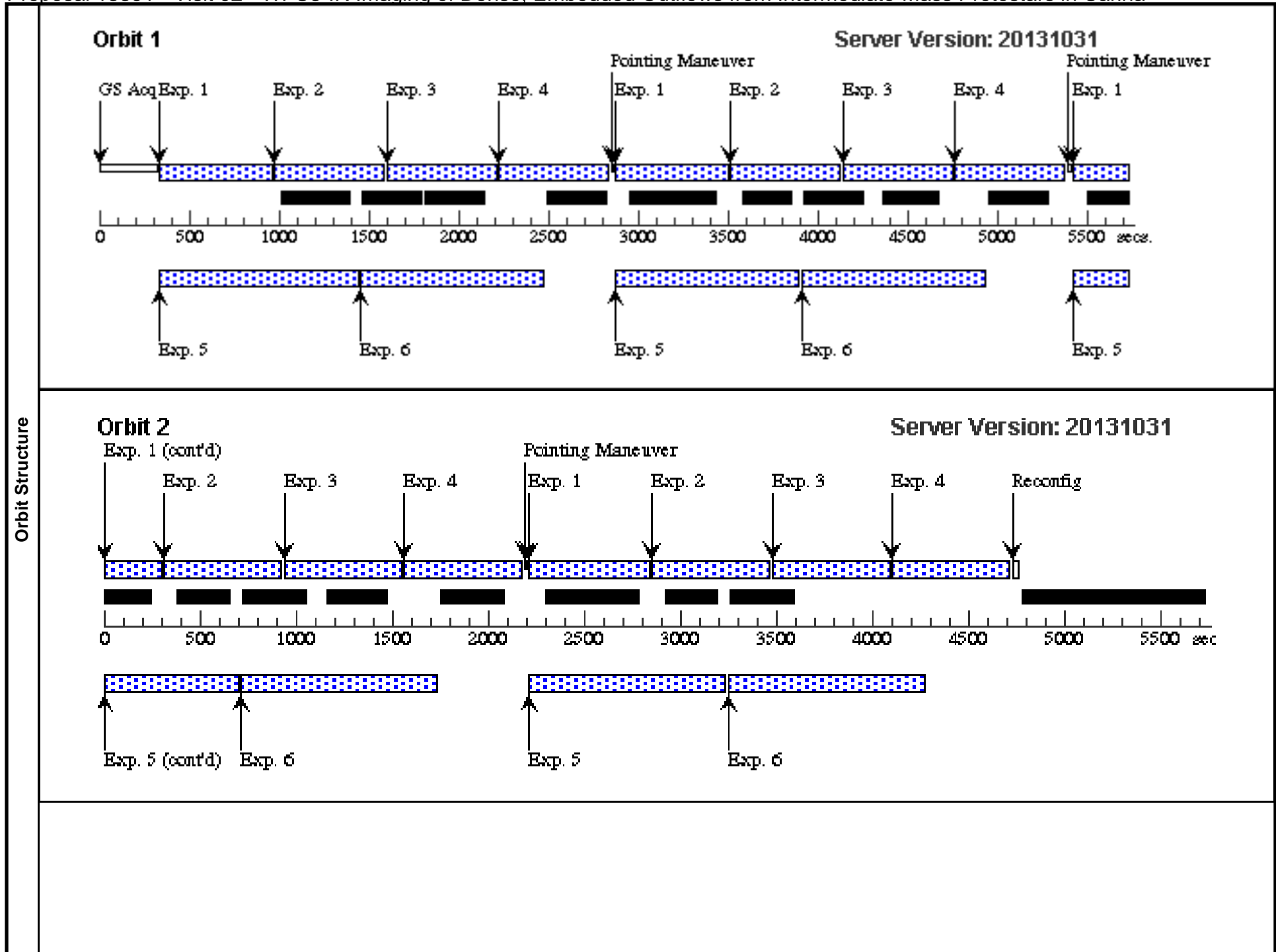
Wed Jan 29 02:12:48 GMT 2014

<b>Visit</b>	<b>Proposal 13391, Visit 02, scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: CVZ; ORIENT 25D TO 65 D					
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>		
	(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.384 Line Spacing=8.609	Coordinate Frame=POS-TARG Pattern Orientation=28.202 Angle Between Sides=69.714 Center Pattern=false		(1-6)	
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(2)	HH903	RA: 10 45 56.6000 (161.4858333d) Dec: -60 06 8.00 (-60.10222d) Equinox: J2000		V=10	Reference Frame: ICRS



Proposal 13391 - Visit 02 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(2) HH903	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=12; SAMP-SEQ=STEP100			Pattern 2, Exps 1-6 in Visit 02 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 02	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
	2	(2) HH903	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=12; SAMP-SEQ=STEP100			Pattern 2, Exps 1-6 in Visit 02 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 02	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
	3	(2) HH903	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=12; SAMP-SEQ=STEP100			Pattern 2, Exps 1-6 in Visit 02 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 02	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
	4	(2) HH903	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=12; SAMP-SEQ=STEP100			Pattern 2, Exps 1-6 in Visit 02 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 02	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
	5	(2) HH903	ACS/WFC, ACCUM, WFC	F658N				Pattern 2, Exps 1-6 in Visit 02 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 02	900 Secs (3600 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]
	6	(2) HH903	ACS/WFC, ACCUM, WFC	F658N				Pattern 2, Exps 1-6 in Visit 02 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 02	900 Secs (3600 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1] [2]



**Orbit 3**

**Server Version: 20131031**



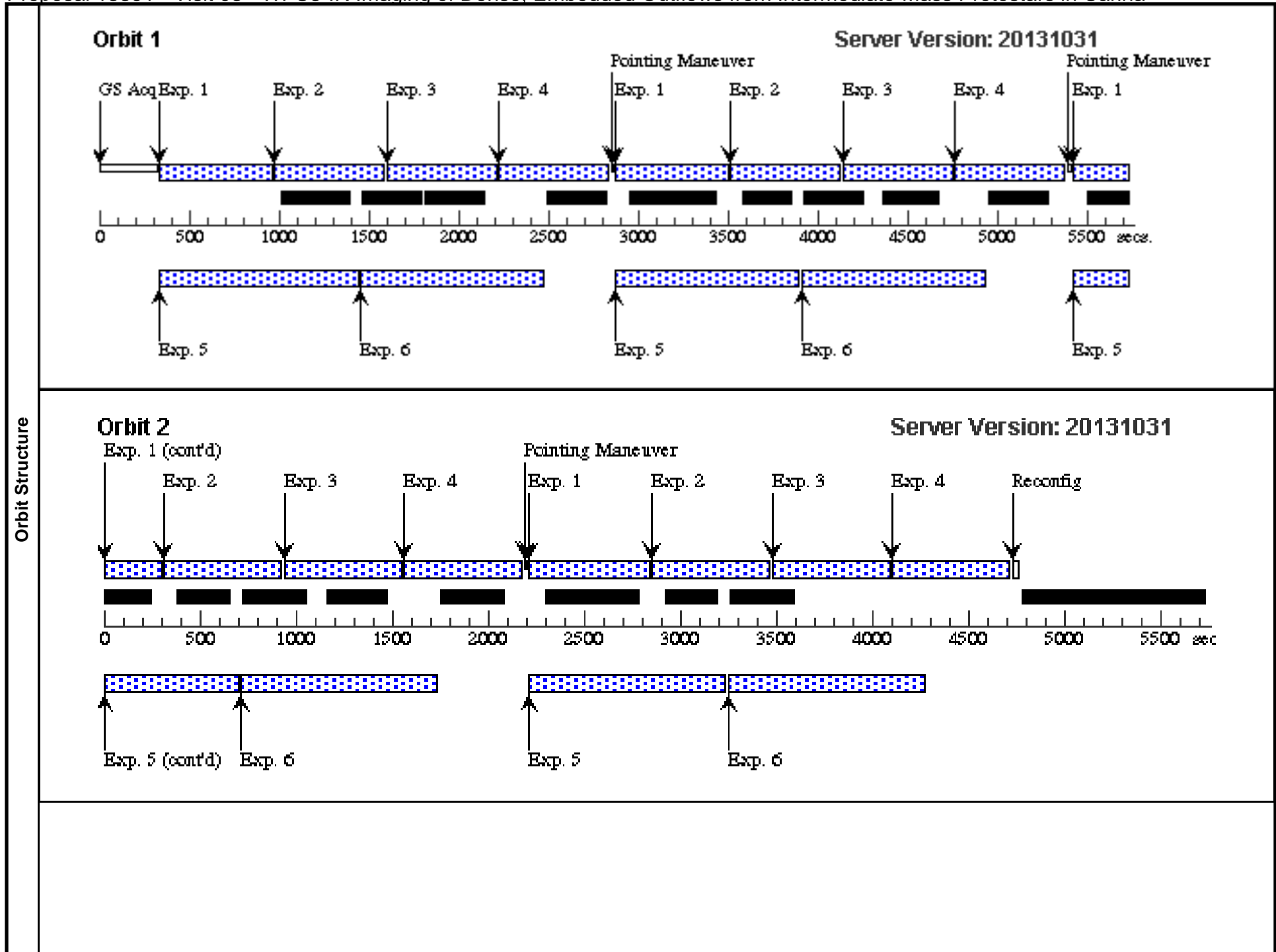
Proposal 13391 - Visit 03 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

Wed Jan 29 02:12:50 GMT 2014

<b>Visit</b>	<b>Proposal 13391, Visit 03, scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: CVZ; ORIENT 205D TO 245 D					
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>		
	(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.384 Line Spacing=8.609	Coordinate Frame=POS-TARG Pattern Orientation=28.202 Angle Between Sides=69.714 Center Pattern=false		(1-6)	
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(3)	HH1004-1005	RA: 10 46 44.8000 (161.6866667d) Dec: -60 10 20.00 (-60.17222d) Equinox: J2000		V=10	Reference Frame: ICRS

Proposal 13391 - Visit 03 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	(3) HH1004-1005	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 03 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 03	599.232292 Secs (2396.929 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]
	2	(3) HH1004-1005	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 03 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 03	599.232292 Secs (2396.929 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]
	3	(3) HH1004-1005	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 03 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 03	599.232292 Secs (2396.929 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]
	4	(3) HH1004-1005	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 03 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 03	599.232292 Secs (2396.929 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]
	5	(3) HH1004-1005	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 03 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 03	900 Secs (3600 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]
	6	(3) HH1004-1005	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 03 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 03	900 Secs (3600 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1] [2]



**Orbit 3**

**Server Version: 20131031**



Proposal 13391 - Visit 04 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

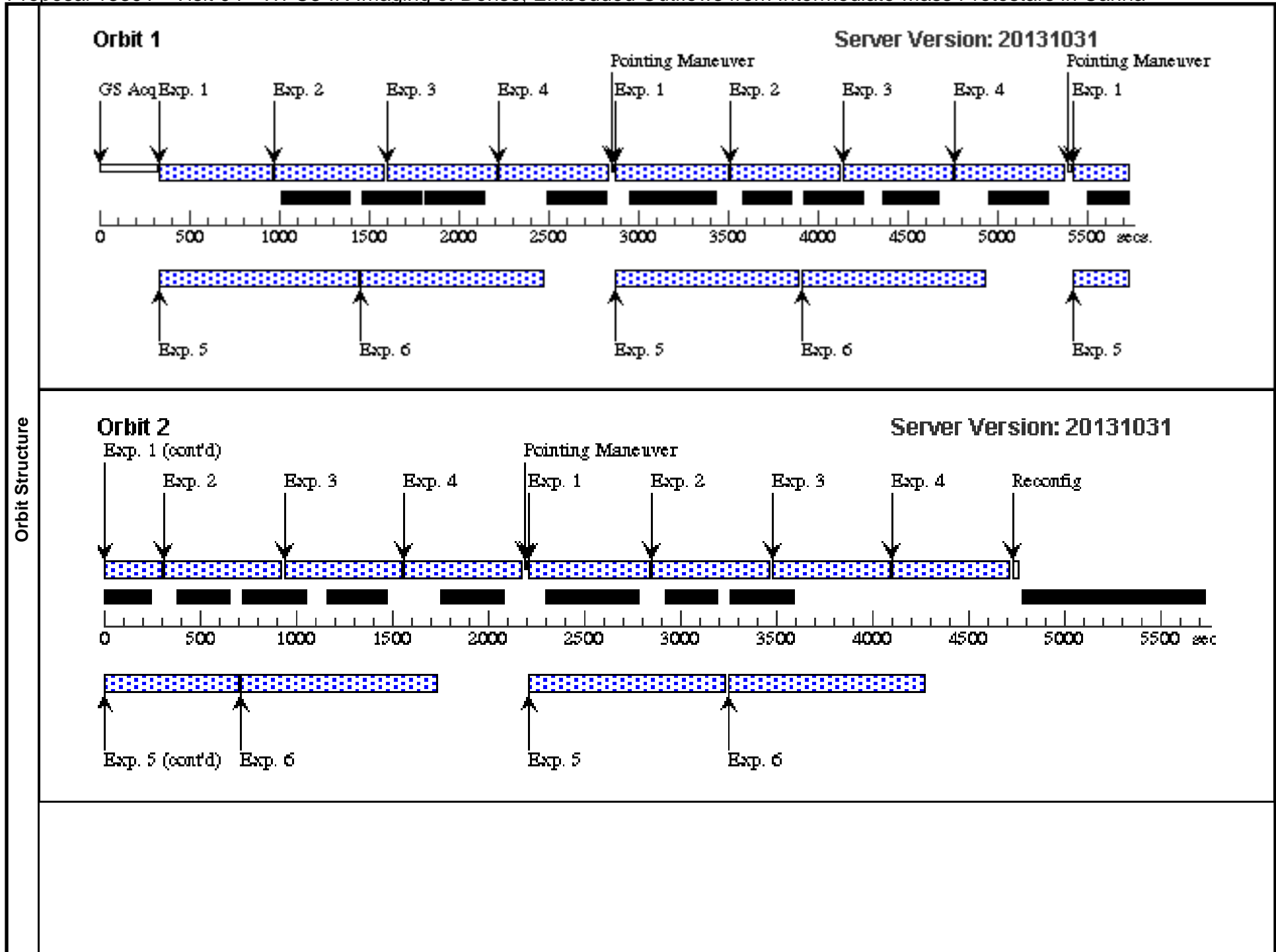
Wed Jan 29 02:12:52 GMT 2014

<b>Visit</b>	<b>Proposal 13391, Visit 04, scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: CVZ; ORIENT 115D TO 155 D					
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>		
	(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.384 Line Spacing=8.609	Coordinate Frame=POS-TARG Pattern Orientation=28.202 Angle Between Sides=69.714 Center Pattern=false		(1-6)	
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(4)	HH1006	RA: 10 46 33.0000 (161.6375000d) Dec: -60 03 54.00 (-60.06500d) Equinox: J2000		V=10	Reference Frame: ICRS



Proposal 13391 - Visit 04 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	(4) HH1006	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 04 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 04	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]   [2]
	2	(4) HH1006	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 04 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 04	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]   [2]
	3	(4) HH1006	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 04 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 04	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]   [2]
	4	(4) HH1006	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 04 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 04	599.232292 Secs (2396.929 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]   [2]
	5	(4) HH1006	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 04 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 04	900 Secs (3600 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]   [2]
	6	(4) HH1006	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 04 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 04	900 Secs (3600 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]   [2]



**Orbit 3**

**Server Version: 20131031**



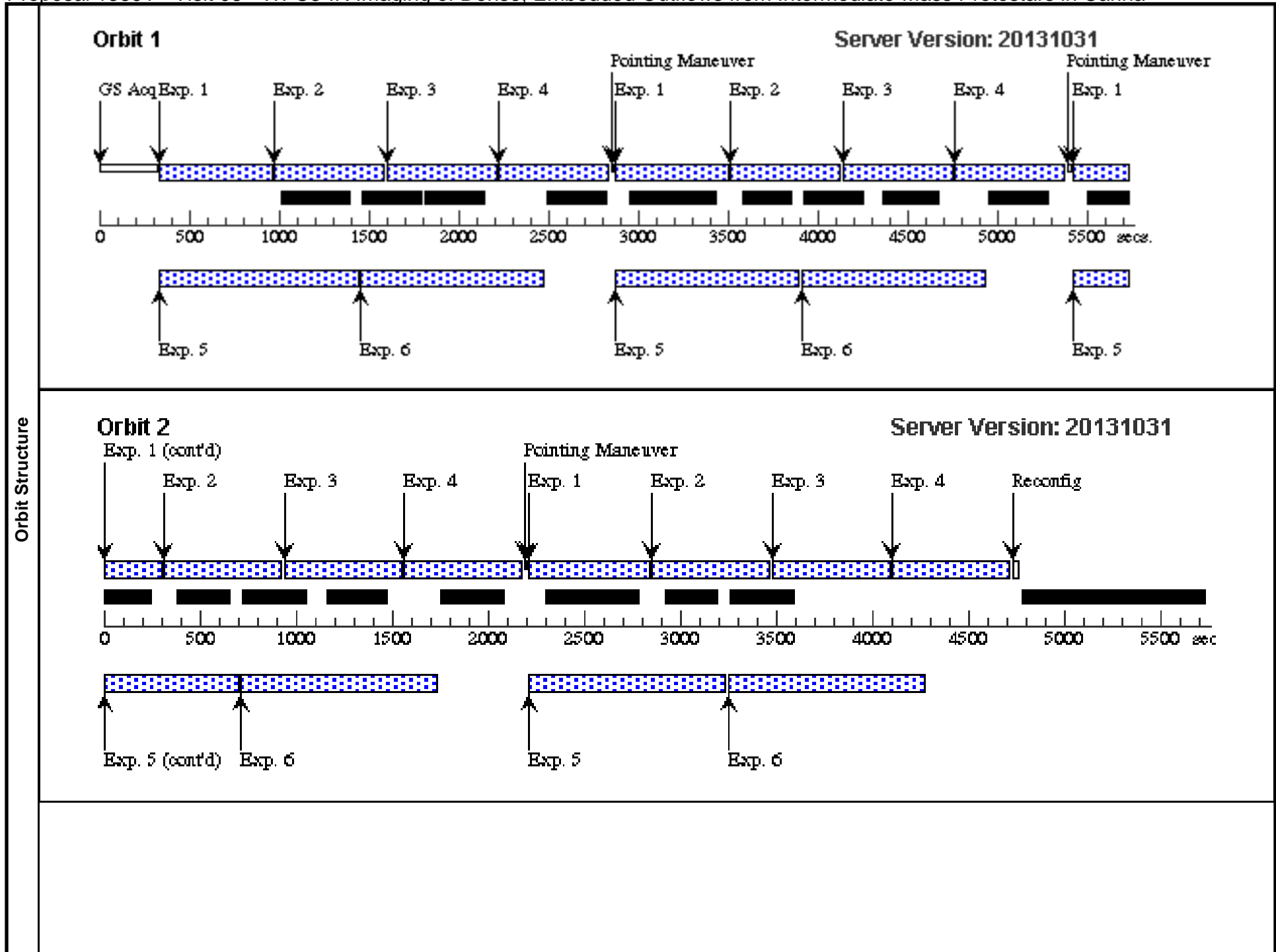
Proposal 13391 - Visit 05 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

Wed Jan 29 02:12:53 GMT 2014

<b>Visit</b>	<b>Proposal 13391, Visit 05, scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: CVZ; ORIENT 25D TO 65 D					
	<b>Patterns</b>	# (2)	<b>Primary Pattern</b> Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.384 Line Spacing=8.609	<b>Secondary Pattern</b> Coordinate Frame=POS-TARG Pattern Orientation=28.202 Angle Between Sides=69.714 Center Pattern=false	<b>Exposures</b> (1-6)	
<b>Fixed Targets</b>	# (5)	<b>Name</b> HH1007-1015	<b>Target Coordinates</b> RA: 10 44 29.5000 (161.1229167d) Dec: -60 23 5.00 (-60.38472d) Equinox: J2000	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b> V=10	<b>Miscellaneous</b> Reference Frame: ICRS

Proposal 13391 - Visit 05 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
Exposures	1	(5) HH1007-1015	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 05 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 05	599.232292 Secs (2396.929 Secs)		
							[==>(Pattern 1)]		[1]	
							[==>(Pattern 2)]		[2]	
							[==>(Pattern 3)]			
							[==>(Pattern 4)]			
	2	(5) HH1007-1015	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 05 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 05	599.232292 Secs (2396.929 Secs)		
								[==>(Pattern 1)]		[1]
								[==>(Pattern 2)]		[2]
								[==>(Pattern 3)]		
								[==>(Pattern 4)]		
	3	(5) HH1007-1015	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 05 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 05	599.232292 Secs (2396.929 Secs)		
								[==>(Pattern 1)]		[1]
								[==>(Pattern 2)]		[2]
								[==>(Pattern 3)]		
								[==>(Pattern 4)]		
	4	(5) HH1007-1015	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 05 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 05	599.232292 Secs (2396.929 Secs)		
								[==>(Pattern 1)]		[1]
								[==>(Pattern 2)]		[2]
								[==>(Pattern 3)]		
								[==>(Pattern 4)]		
	5	(5) HH1007-1015	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 05 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 05	900 Secs (3600 Secs)		
								[==>(Pattern 1)]		[1]
								[==>(Pattern 2)]		[2]
								[==>(Pattern 3)]		
							[==>(Pattern 4)]			
6	(5) HH1007-1015	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 05 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 05	900 Secs (3600 Secs)			
							[==>(Pattern 1)]		[1]	
							[==>(Pattern 2)]		[2]	
							[==>(Pattern 3)]			
							[==>(Pattern 4)]			



**Orbit 3**

**Server Version: 20131031**



Proposal 13391 - Visit 06 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

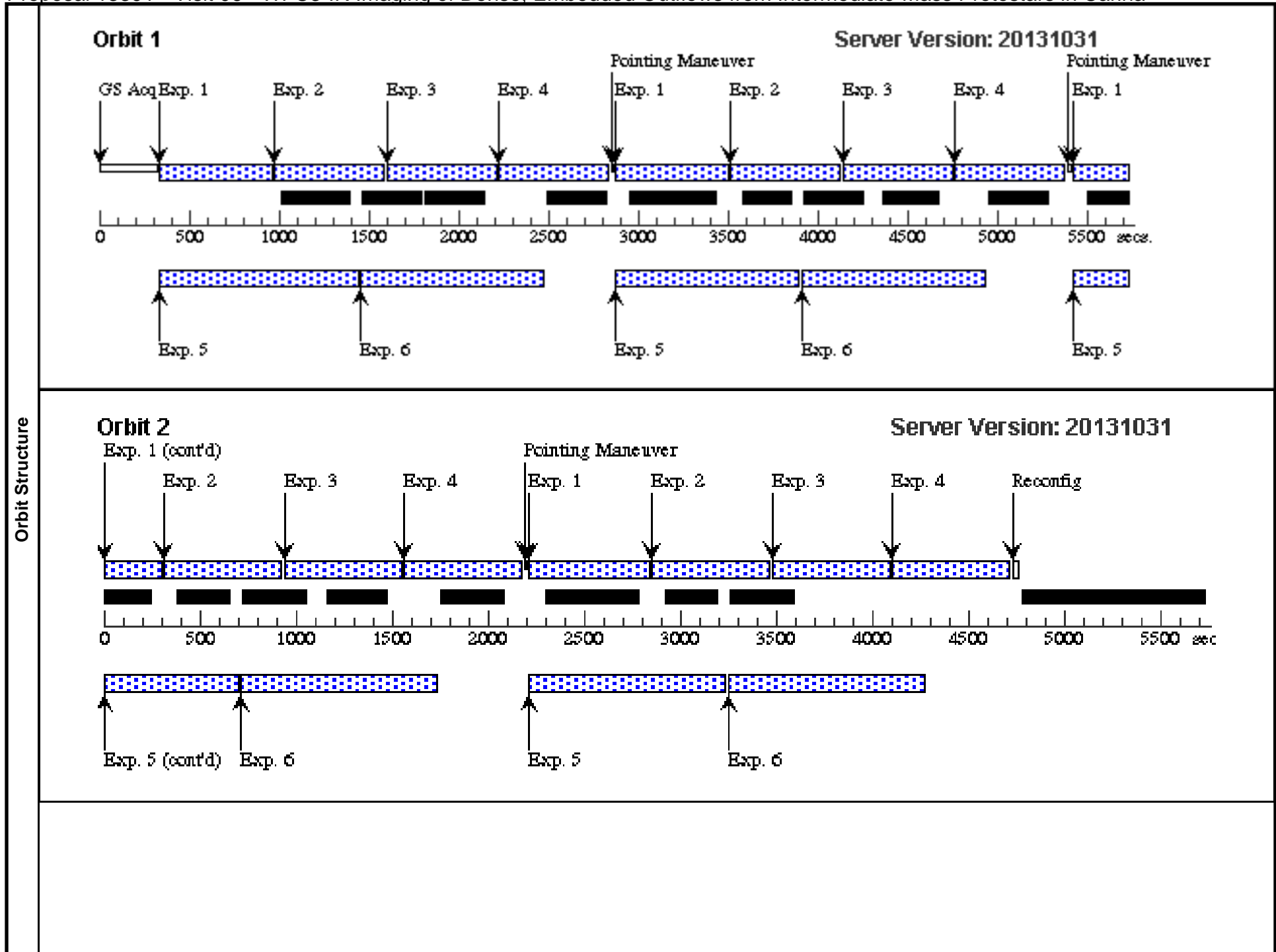
Wed Jan 29 02:12:55 GMT 2014

<b>Visit</b>	<b>Proposal 13391, Visit 06, scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: CVZ; ORIENT 25D TO 65 D					
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>		
	(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.384 Line Spacing=8.609	Coordinate Frame=POS-TARG Pattern Orientation=28.202 Angle Between Sides=69.714 Center Pattern=false		(1-6)	
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(6)	HH1010	RA: 10 41 48.7000 (160.4529167d) Dec: -59 43 38.00 (-59.72722d) Equinox: J2000		V=10	Reference Frame: ICRS



Proposal 13391 - Visit 06 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	(6) HH1010	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 06 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 06	599.232292 Secs (2396.929 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]   [2]
	2	(6) HH1010	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 06 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 06	599.232292 Secs (2396.929 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]   [2]
	3	(6) HH1010	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 06 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 06	599.232292 Secs (2396.929 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]   [2]
	4	(6) HH1010	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 06 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 06	599.232292 Secs (2396.929 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]   [2]
	5	(6) HH1010	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 06 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 06	900 Secs (3600 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]   [2]
	6	(6) HH1010	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 06 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 06	900 Secs (3600 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]   [2]



**Orbit 3**

**Server Version: 20131031**



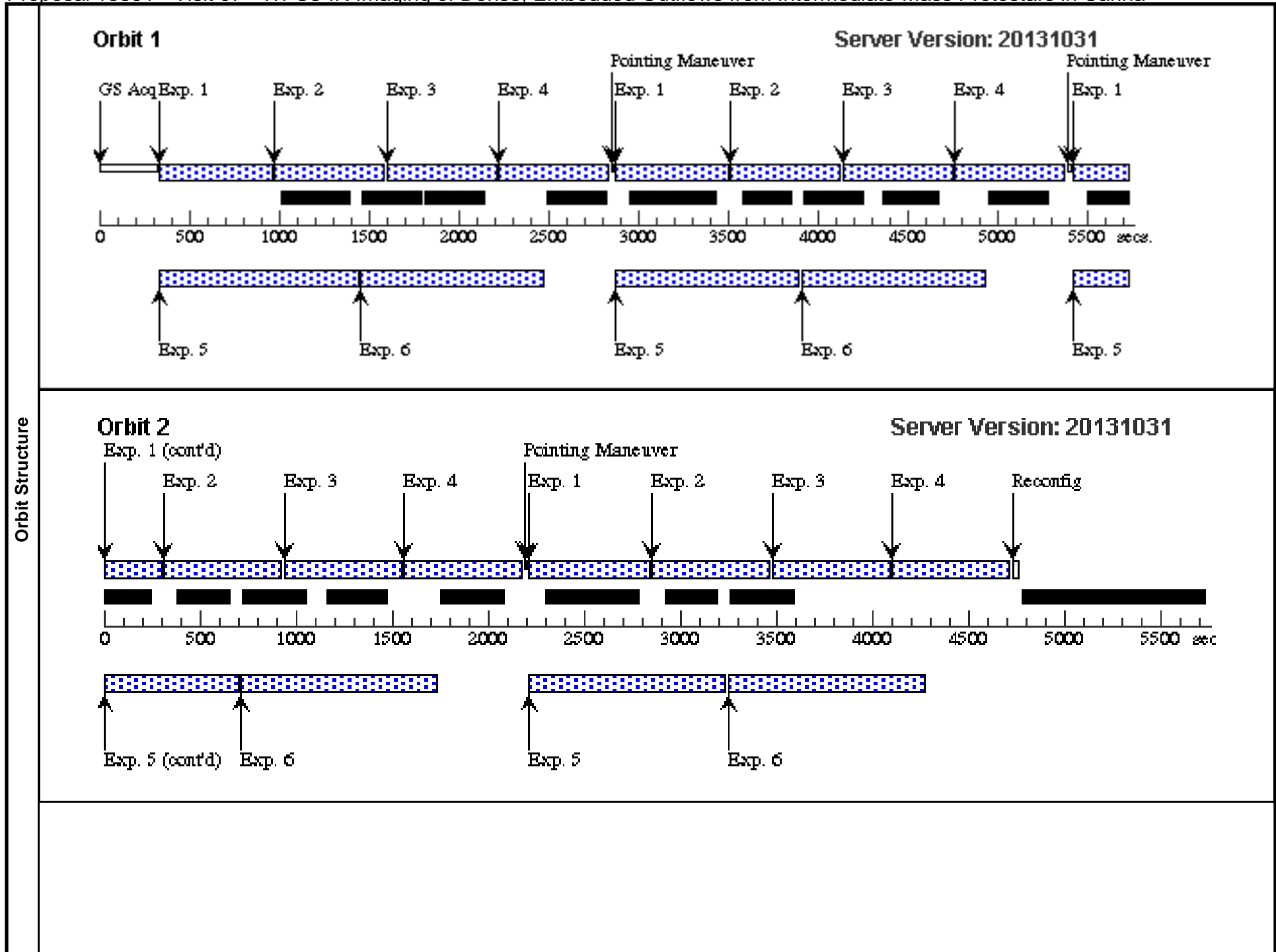
Proposal 13391 - Visit 07 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

Wed Jan 29 02:12:56 GMT 2014

<b>Visit</b>	<b>Proposal 13391, Visit 07, failed</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: CVZ; ORIENT 280D TO 320 D					
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>		
	(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.384 Line Spacing=8.609	Coordinate Frame=POS-TARG Pattern Orientation=28.202 Angle Between Sides=69.714 Center Pattern=false		(1-6)	
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(7)	HH1014	RA: 10 45 45.9000 (161.4412500d) Dec: -59 41 6.00 (-59.68500d) Equinox: J2000		V=10	Reference Frame: ICRS

Proposal 13391 - Visit 07 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(7) HH1014	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=12; SAMP-SEQ=STEP1 00	GS ACQ SCENARI O BASE1B3	Pattern 2, Exps 1-6 in Visit 07 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 07	599.232292 Secs (2396.929 Secs)	[1] [2]	
	2	(7) HH1014	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=12; SAMP-SEQ=STEP1 00		Pattern 2, Exps 1-6 in Visit 07 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 07	599.232292 Secs (2396.929 Secs)	[1] [2]	
	3	(7) HH1014	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=12; SAMP-SEQ=STEP1 00		Pattern 2, Exps 1-6 in Visit 07 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 07	599.232292 Secs (2396.929 Secs)	[1] [2]	
	4	(7) HH1014	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=12; SAMP-SEQ=STEP1 00		Pattern 2, Exps 1-6 in Visit 07 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 07	599.232292 Secs (2396.929 Secs)	[1] [2]	
	5	(7) HH1014	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 07 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 07	900 Secs (3600 Secs)	[1] [2]	
	6	(7) HH1014	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 07 (2)  Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 07	900 Secs (3600 Secs)	[1] [2]	



**Orbit 3**

**Server Version: 20131031**



Proposal 13391 - Visit 08 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

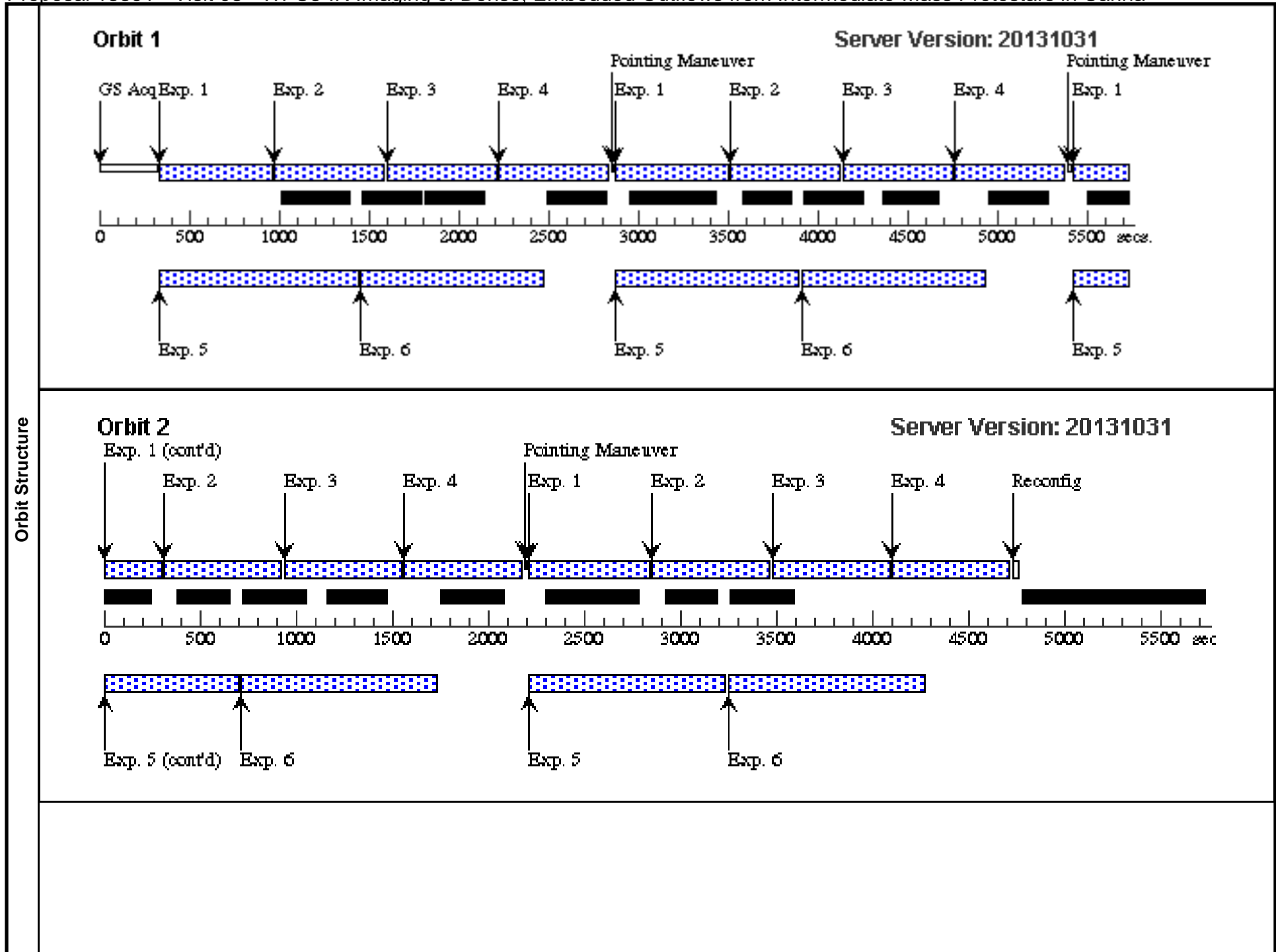
Wed Jan 29 02:12:58 GMT 2014

<b>Visit</b>	<b>Proposal 13391, Visit 08, scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: CVZ; ORIENT 340D TO 20 D					
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>		
	(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.384 Line Spacing=8.609	Coordinate Frame=POS-TARG Pattern Orientation=28.202 Angle Between Sides=69.714 Center Pattern=false		(1-6)	
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(8)	HHC-4-5-6-7	RA: 10 45 9.3000 (161.2887500d) Dec: -60 02 26.00 (-60.04056d) Equinox: J2000		V=10	Reference Frame: ICRS



Proposal 13391 - Visit 08 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
Exposures	1	(8) HHC-4-5-6-7	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 08 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 08	599.232292 Secs (2396.929 Secs)		
							[==>(Pattern 1)]		[1]	
							[==>(Pattern 2)]		[2]	
							[==>(Pattern 3)]			
							[==>(Pattern 4)]			
	2	(8) HHC-4-5-6-7	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 08 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 08	599.232292 Secs (2396.929 Secs)		
								[==>(Pattern 1)]		[1]
								[==>(Pattern 2)]		[2]
								[==>(Pattern 3)]		
								[==>(Pattern 4)]		
	3	(8) HHC-4-5-6-7	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 08 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 08	599.232292 Secs (2396.929 Secs)		
								[==>(Pattern 1)]		[1]
								[==>(Pattern 2)]		[2]
								[==>(Pattern 3)]		
								[==>(Pattern 4)]		
	4	(8) HHC-4-5-6-7	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 08 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 08	599.232292 Secs (2396.929 Secs)		
								[==>(Pattern 1)]		[1]
								[==>(Pattern 2)]		[2]
								[==>(Pattern 3)]		
								[==>(Pattern 4)]		
	5	(8) HHC-4-5-6-7	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 08 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 08	900 Secs (3600 Secs)		
								[==>(Pattern 1)]		[1]
								[==>(Pattern 2)]		[2]
								[==>(Pattern 3)]		
							[==>(Pattern 4)]			
6	(8) HHC-4-5-6-7	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 08 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 08	900 Secs (3600 Secs)			
							[==>(Pattern 1)]		[1]	
							[==>(Pattern 2)]		[2]	
							[==>(Pattern 3)]			
							[==>(Pattern 4)]			



**Orbit 3**

**Server Version: 20131031**



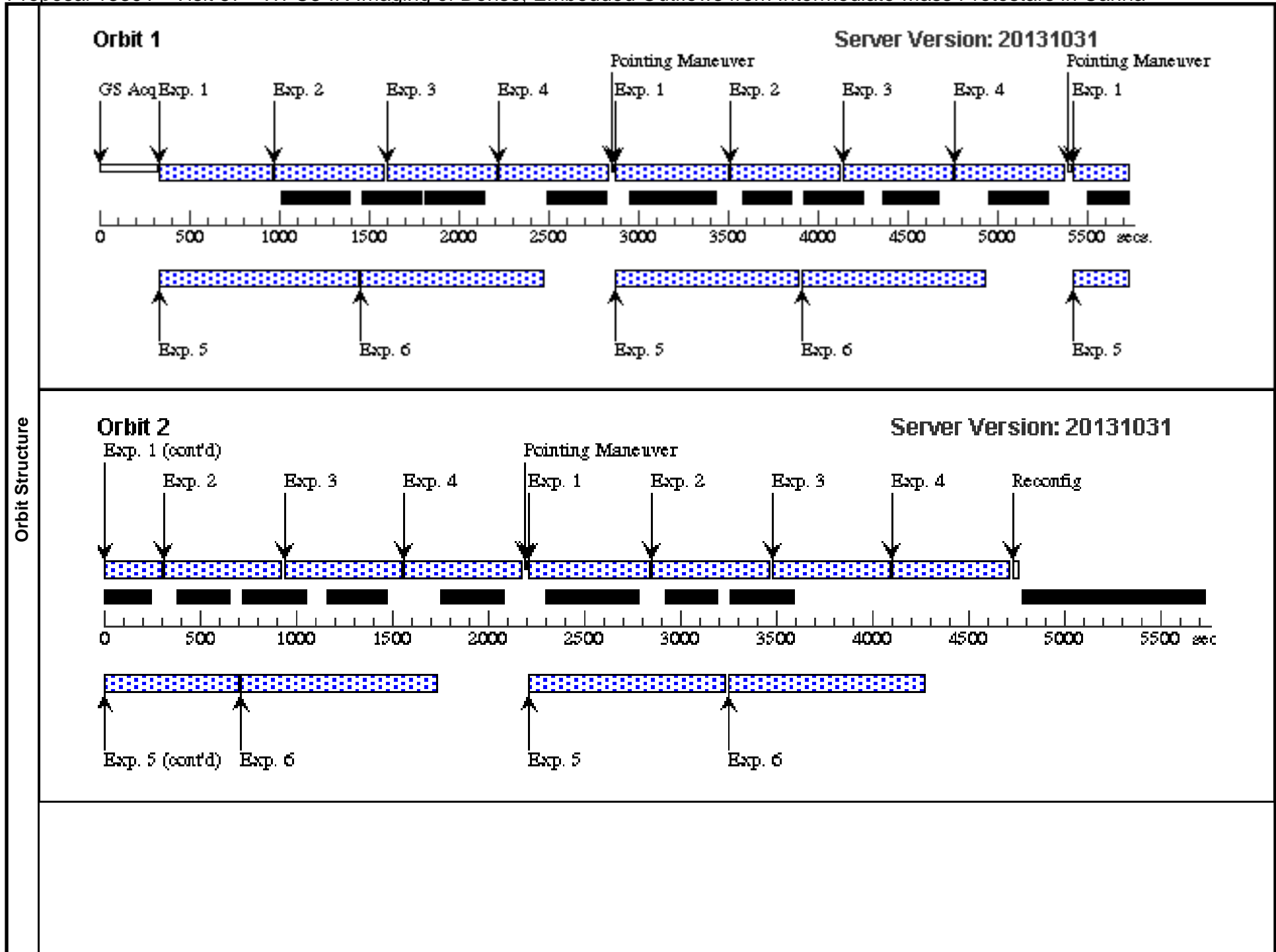
Proposal 13391 - Visit 57 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

Wed Jan 29 02:12:59 GMT 2014

<b>Visit</b>	<b>Proposal 13391, Visit 57</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: CVZ; ORIENT 280D TO 320 D Comments: <i>This is a repeat of visit 07 which failed.</i>					
	<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>	
	(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.384 Line Spacing=8.609	Coordinate Frame=POS-TARG Pattern Orientation=28.202 Angle Between Sides=69.714 Center Pattern=false		(1-6)	
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(7)	HH1014	RA: 10 45 45.9000 (161.4412500d) Dec: -59 41 6.00 (-59.68500d) Equinox: J2000		V=10	Reference Frame: ICRS

Proposal 13391 - Visit 57 - WFC3-IR Imaging of Dense, Embedded Outflows from Intermediate-Mass Protostars in Carina

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(7) HH1014	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=12; SAMP-SEQ=STEP100	GS ACQ SCENARI O BASE1B3	Pattern 2, Exps 1-6 in Visit 57 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 57	599.232292 Secs (2396.929 Secs)	[1] [2]	
	2	(7) HH1014	WFC3/IR, MULTIACCUM, IR	F167N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 57 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 57	599.232292 Secs (2396.929 Secs)	[1] [2]	
	3	(7) HH1014	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 57 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 57	599.232292 Secs (2396.929 Secs)	[1] [2]	
	4	(7) HH1014	WFC3/IR, MULTIACCUM, IR	F130N	NSAMP=12; SAMP-SEQ=STEP100		Pattern 2, Exps 1-6 in Visit 57 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 57	599.232292 Secs (2396.929 Secs)	[1] [2]	
	5	(7) HH1014	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 57 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 57	900 Secs (3600 Secs)	[1] [2]	
	6	(7) HH1014	ACS/WFC, ACCUM, WFC	F658N			Pattern 2, Exps 1-6 in Visit 57 (2) Prime + Parallel Group 1-6 in Pattern 2, Exps 1-6 in Visit 57	900 Secs (3600 Secs)	[1] [2]	



**Orbit 3**

**Server Version: 20131031**

