



## 15178 - Probing jets from young embedded sources

Cycle: 25, Proposal Category: GO

(JWST Initiative)

(Availability Mode: SUPPORTED)

### INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
<b>Dr. Brunella Nisini (PI) (ESA Member) (Contact)</b>	<b>INAF, Osservatorio Astronomico di Roma</b>	<b>brunella.nisini@oa-roma.inaf.it</b>
Dr. Jochen Eisloffel (CoI) (ESA Member)	Thuringer Landessternwarte Tautenburg (TLS)	jochen@tls-tautenburg.de
Dr. Deirdre Coffey (CoI) (ESA Member)	University College Dublin	deirdre.coffey@ucd.ie
Dr. Francesca Bacciotti (CoI) (ESA Member)	INAF, Osservatorio Astrofisico di Arcetri, Firenze	fran@arcetri.astro.it
Dr. Carlo F. Manara (CoI) (ESA Member)	European Southern Observatory - Germany	cmanara@eso.org
Prof. Thomas P. Ray (CoI) (ESA Member)	Dublin Institute For Advanced Studies	tr@cp.dias.ie
Dr. Sylvie Cabrit (CoI) (ESA Member)	Observatoire de Paris	sylvie.cabrit@obspm.fr
Dr. Teresa Giannini (CoI) (ESA Member)	INAF, Osservatorio Astronomico di Roma	giannini@oa-roma.inaf.it
Simone Antonucci (CoI) (ESA Member)	INAF, Osservatorio Astronomico di Roma	antonucci@oa-roma.inaf.it
Dr. Patrick Hartigan (CoI) (AdminUSPI)	Rice University	hartigan@sparky.rice.edu
Dr. Linda Podio (CoI) (ESA Member)	Osservatorio Astrofisico di Arcetri	lpodio@arcetri.astro.it

### 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) HH-34 (5) HH-34IR	WFC3/IR WFC3/UVIS	4	07-Dec-2018 11:00:50.0	yes
02	(2) HH46 (6) HH46-IR	WFC3/IR WFC3/UVIS	4	07-Dec-2018 11:00:52.0	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>
03	(3) HH1-MMS (7) HH1-MMN	WFC3/IR WFC3/UVIS	4	07-Dec-2018 11:00:56.0	yes
04	(4) HH111 (8) HH111-IR	WFC3/IR WFC3/UVIS	4	07-Dec-2018 11:01:00.0	yes

16 Total Orbits Used

## **ABSTRACT**

Jets are intimately related to the process of star formation and disc accretion. Our present knowledge of this key ingredient in protostars mostly relies on observations of optical jets from T Tauri stars, where the original circumstellar envelope has been already cleared out. However, to understand how jets are originally formed and how their properties evolve with time, detailed observations of young accreting protostars, i.e. the class 0/I sources, are mandatory. The study of class 0/I jets will be revolutionised by JWST, able to penetrate protostars dusty envelopes with unprecedented sensitivity and resolution. However, complementary information on parameters inferred from lines in different excitation regimes, for at least a representative sample of a few bright sources, is essential for a correct interpretation of the JWST results. Here we propose to observe four prototype bright jets from class 0/I sources with the WFC3 in narrow band filters in order to acquire high angular resolution images in the [OI]6300A, [FeII]1.25 and [FeII]1.64 $\mu$ m lines. These images will be used to: 1) provide accurate extinction maps of the jets that will be an important archival reference for any future observation on these jets. 2) measure key parameters as the mass flux, the iron abundance and the jet collimation on the hot gas component of the jets. These information will provide an invaluable reference frame for a comparison with similar parameters measured by JWST in a different gas regime. In addition, these observations will allow us to confront the properties of class 0/I jets with those of the more evolved T Tauri stars.

## **OBSERVING DESCRIPTION**

We want to obtain narrow-band images with the WFC3 of four classical class 0/I jets (HH34IRS, HH1-jet, HH111 (Orion, d=400 pc) and HH46 IRS (Gum nebula, d=450 pc)) in three transitions, namely the [FeII]1.25 $\mu$ m, 1.64 $\mu$ m (F126N and F164N WFC3/IR filters) and the [OI]6300A lines (F631N WFC3/UVIS filter). For each image centered on the desired line, we will obtain also a narrow-band image on the adjacent continuum (F130N, F167N, and F645N), to perform an optimum subtraction of the source direct and scattered light.

The default dither pattern would be appropriate for our observations.

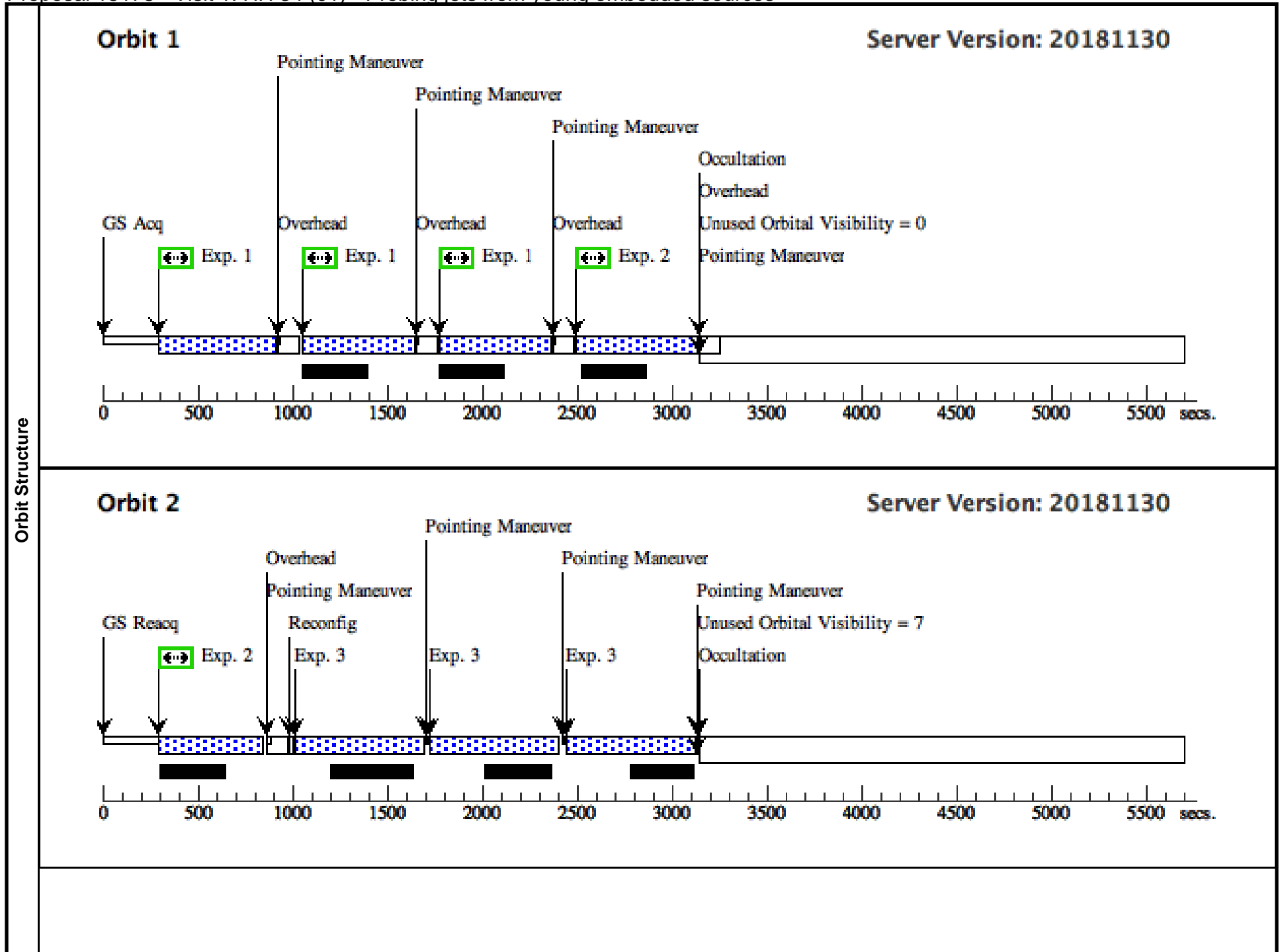
Proposal 15178 - Visit 1: HH 34 (01) - Probing jets from young embedded sources

Fri Dec 07 16:01:01 GMT 2018

<b>Visit</b>	<b>Proposal 15178, Visit 1: HH 34 (01), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: ORIENT 60D TO 75 D Comments: Includes OI 6300 6450A Continuum 1.67um Continuum FeII 1.64um 1.30um Continuum FeII 1.25um					
	<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>	
		(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=2.806 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=47.11 Angle Between Sides= Center Pattern=false	(1)	
		(2)	Pattern Type=WFC3-UVIS-GAP-LINE Purpose=MOSAIC Number Of Points=2 Point Spacing=2.414 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.759 Angle Between Sides= Center Pattern=true	(2)	
		(3)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false	(3), (4), (6)	
(4)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false	(5)			
<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)	HH-34	RA: 05 35 30.0509 (83.8752121d) Dec: -06 27 29.50 (-6.45819d) Equinox: J2000		V=(?) 1e-15	Reference Frame: SIMBAD
Comments: Optical WFC3 setup for HH34. Includes jet, source, redshifted side and southern bow Category=ISM Description=[HERBIG-HARO OBJECT, JET, PROTOPLANETARY DISK, STAR FORMING REGION] Extended=YES						
(5)	HH-34IR	RA: 05 35 30.7755 (83.8782312d) Dec: -06 27 40.30 (-6.46119d) Equinox: J2000		V=(?) 1-e-15	Reference Frame: ICRS	
Comments: Position for WFC/IR images. Orient places jet axis to go from one corner to another. Manages to get jet, redshifted side and southern bow shock Category=ISM Description=[HERBIG-HARO OBJECT, JET, PROTOPLANETARY DISK, STAR FORMING REGION] Extended=YES						

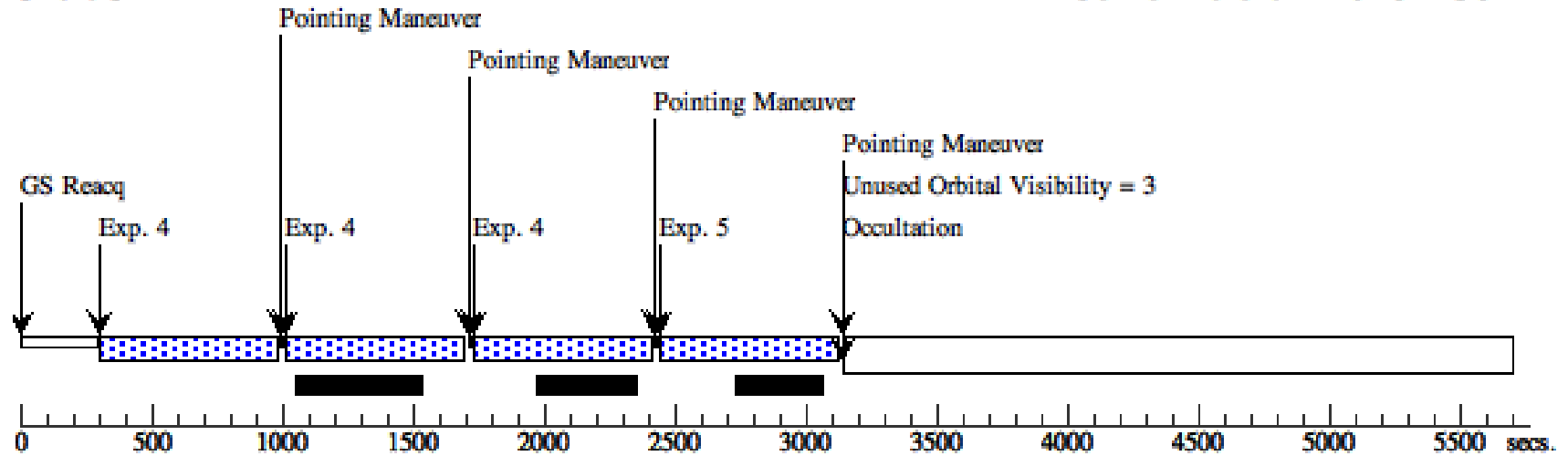
Proposal 15178 - Visit 1: HH 34 (01) - Probing jets from young embedded sources

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	OI 6300	(1) HH-34	WFC3/UVIS, ACCUM, UVIS-FIX	F631N	FLASH=10		Pattern 1, Exps 1-1 in Visit 1: HH 34 (01) (1)	480 Secs (1764 Secs) [=>588.0 Secs (Pattern 1)] [=>588.0 Secs (Pattern 2)] [=>588.0 Secs (Pattern 3)]	[1]
	2	F645N Cont inuum	(1) HH-34	WFC3/UVIS, ACCUM, UVIS-FIX	F645N	FLASH=10		Pattern 2, Exps 2-2 in Visit 1: HH 34 (01) (2)	490 Secs (1168 Secs) [=>618.0 Secs (Pattern 1)] [=>550.0 Secs (Pattern 2)]	[1] [2]
	3	F167N Cont inuum	(5) HH-34IR	WFC3/IR, MULTIACCUM, IR-FIX	F167N	NSAMP=14; SAMP-SEQ=SPAR S50		Pattern 3, Exps 3-3 in Visit 1: HH 34 (01) (3)	652.938154 Secs (1958.814 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[2]
	4	FeII 1.64um	(5) HH-34IR	WFC3/IR, MULTIACCUM, IR-FIX	F164N	NSAMP=14; SAMP-SEQ=SPAR S50		Pattern 3, Exps 4-4 in Visit 1: HH 34 (01) (3)	652.938154 Secs (1958.814 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[3]
	5	F130N Cont inuum	(5) HH-34IR	WFC3/IR, MULTIACCUM, IR-FIX	F130N	SAMP-SEQ=SPARS 50; NSAMP=14		Pattern 4, Exps 5-5 in Visit 1: HH 34 (01) (4)	652.938154 Secs (1305.876 Secs) [=>(Pattern 1)] [=>(Pattern 2)]	[3] [4]
	6	FeII 1.25um	(5) HH-34IR	WFC3/IR, MULTIACCUM, IR-FIX	F126N	SAMP-SEQ=SPARS 50; NSAMP=14		Pattern 3, Exps 6-6 in Visit 1: HH 34 (01) (3)	652.938154 Secs (1958.814 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[4]



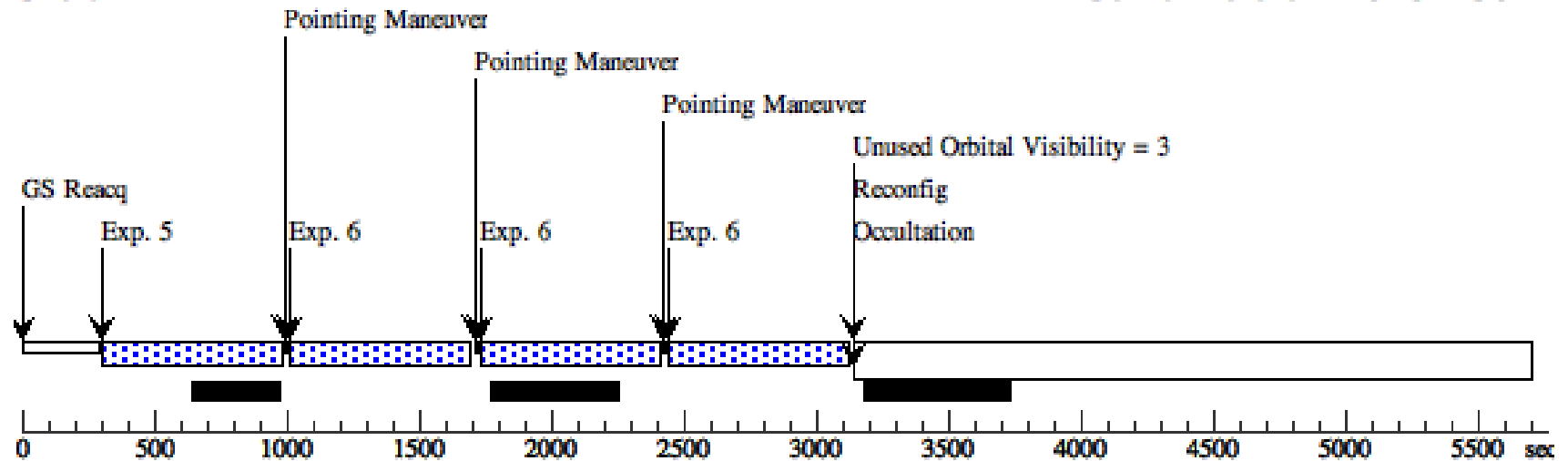
**Orbit 3**

Server Version: 20181130



**Orbit 4**

Server Version: 20181130



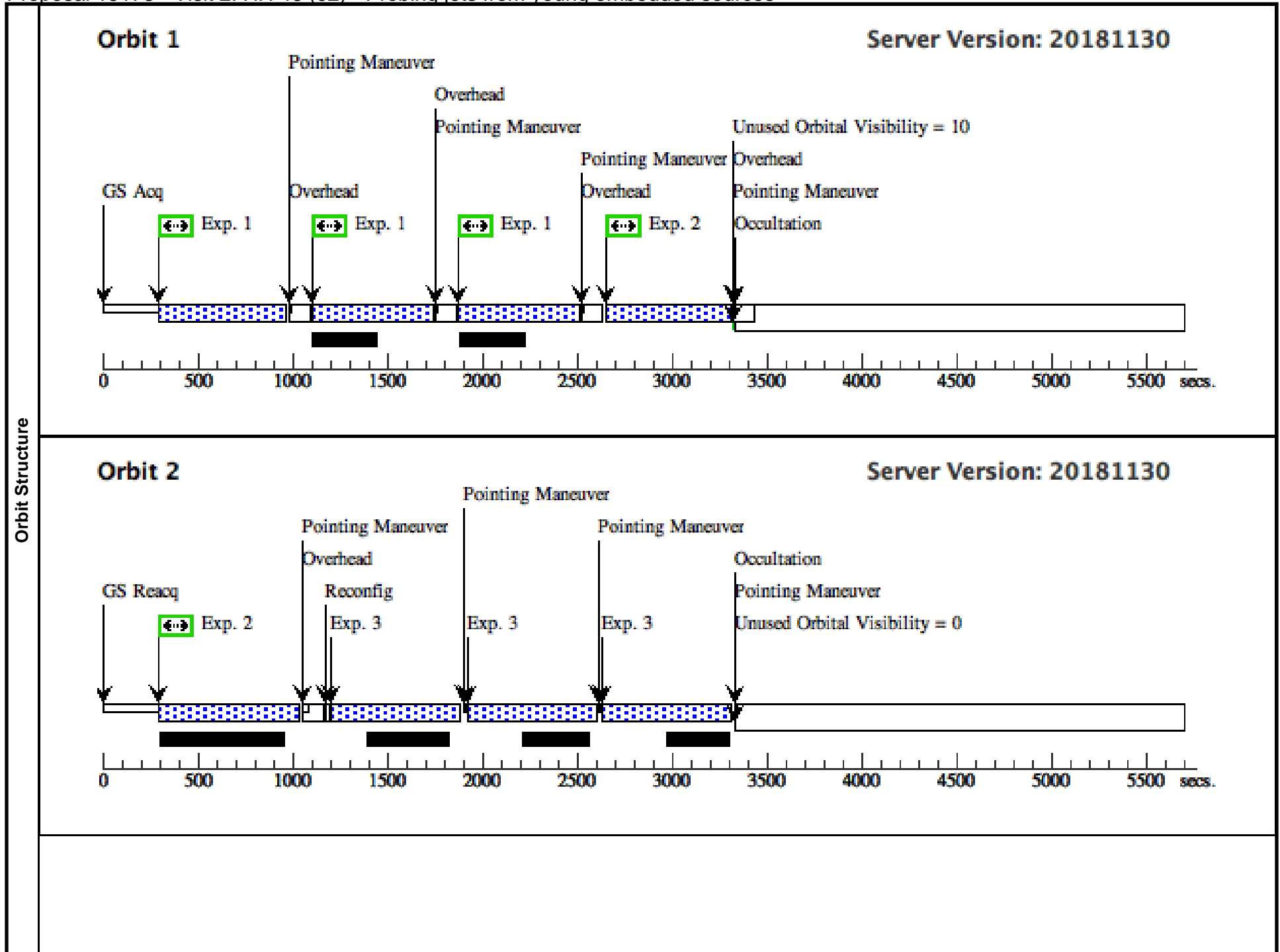
Proposal 15178 - Visit 2: HH 46 (02) - Probing jets from young embedded sources

Fri Dec 07 16:01:01 GMT 2018

<b>Visit</b>	<b>Proposal 15178, Visit 2: HH 46 (02), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: ORIENT 58D TO 62 D Comments: Includes OI 6300 6450A Continuum 1.67um Continuum FeII 1.64um 1.30um Continuum FeII 1.25um					
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>		<b>Secondary Pattern</b>	<b>Exposures</b>	
	(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=2.806 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=47.11 Angle Between Sides= Center Pattern=false		(1)	
	(2)	Pattern Type=WFC3-UVIS-GAP-LINE Purpose=MOSAIC Number Of Points=2 Point Spacing=2.414 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.759 Angle Between Sides= Center Pattern=true		(2)	
	(3)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(3), (4), (6)	
	(4)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(5)	
<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)	HH46	RA: 08 25 40.7031 (126.4195962d) Dec: -51 00 39.00 (-51.01083d) Equinox: J2000		V=(?) 1e-15	Reference Frame: SIMBAD
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=ISM Description=[HERBIG-HARO OBJECT, JET, PROTOPLANETARY DISK, STAR FORMING REGION] Extended=YES					
(6)	HH46-IR	RA: 08 25 44.4222 (126.4350925d) Dec: -51 00 37.65 (-51.01046d) Equinox: J2000		V=(?) 1e-15	Reference Frame: SIMBAD	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=ISM Description=[HERBIG-HARO OBJECT, JET, PROTOPLANETARY DISK, STAR FORMING REGION] Extended=YES						

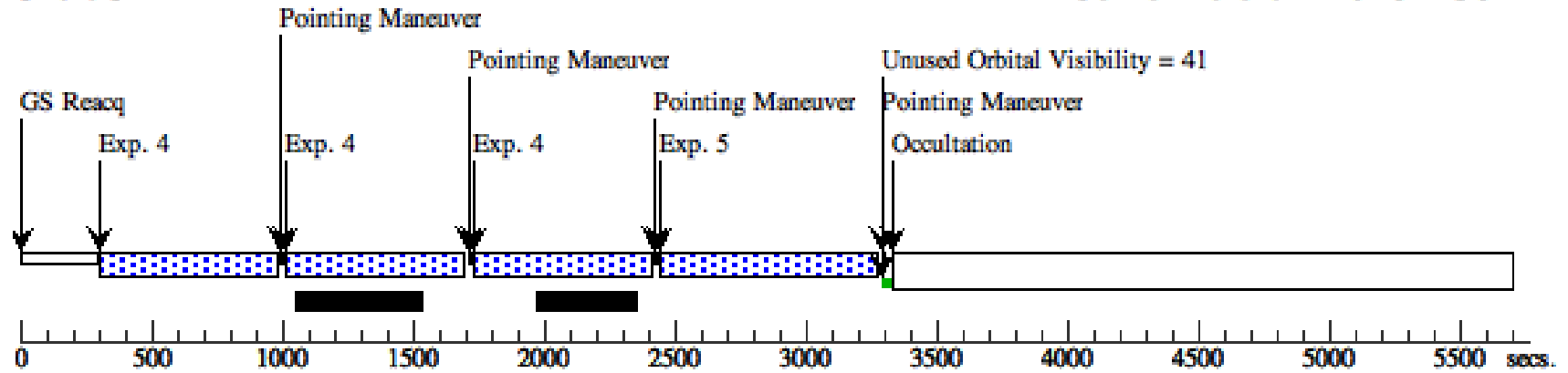
Proposal 15178 - Visit 2: HH 46 (02) - Probing jets from young embedded sources

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	OI 6300	(2) HH46	WFC3/UVIS, ACCUM, UVIS-FIX	F631N	FLASH=10		Pattern 1, Exps 1-1 in Visit 2: HH 46 (02) (1)	480 Secs (1920 Secs) [==>640.0 Secs (Pattern 1)] [==>640.0 Secs (Pattern 2)] [==>640.0 Secs (Pattern 3)]	[1]
	2	F645N Cont inuum	(2) HH46	WFC3/UVIS, ACCUM, UVIS-FIX	F645N	FLASH=10		Pattern 2, Exps 2-2 in Visit 2: HH 46 (02) (2)	490 Secs (1385 Secs) [==>640.0 Secs (Pattern 1)] [==>745.0 Secs (Pattern 2)]	[1] [2]
	3	F167N Cont inuum	(6) HH46-IR	WFC3/IR, MULTIACCUM, IR-FIX	F167N	NSAMP=14; SAMP-SEQ=SPAR S50		Pattern 3, Exps 3-3 in Visit 2: HH 46 (02) (3)	652.938154 Secs (1958.814 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]
	4	FeII 1.64um	(6) HH46-IR	WFC3/IR, MULTIACCUM, IR-FIX	F164N	NSAMP=14; SAMP-SEQ=SPAR S50		Pattern 3, Exps 4-4 in Visit 2: HH 46 (02) (3)	652.938154 Secs (1958.814 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[3]
	5	F130N Cont inuum	(6) HH46-IR	WFC3/IR, MULTIACCUM, IR-FIX	F130N	NSAMP=9; SAMP-SEQ=SPAR S100		Pattern 4, Exps 5-5 in Visit 2: HH 46 (02) (4)	802.934875 Secs (1605.87 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[3] [4]
	6	FeII 1.25um	(6) HH46-IR	WFC3/IR, MULTIACCUM, IR-FIX	F126N	SAMP-SEQ=SPARS 50; NSAMP=14		Pattern 3, Exps 6-6 in Visit 2: HH 46 (02) (3)	652.938154 Secs (1958.814 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[4]



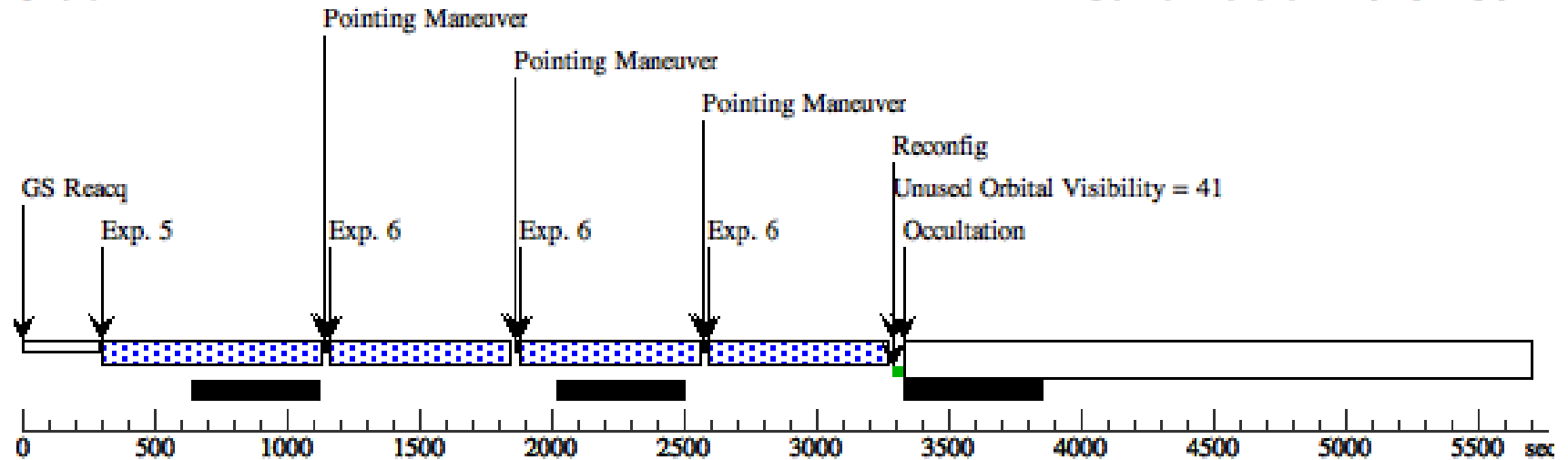
**Orbit 3**

Server Version: 20181130



**Orbit 4**

Server Version: 20181130



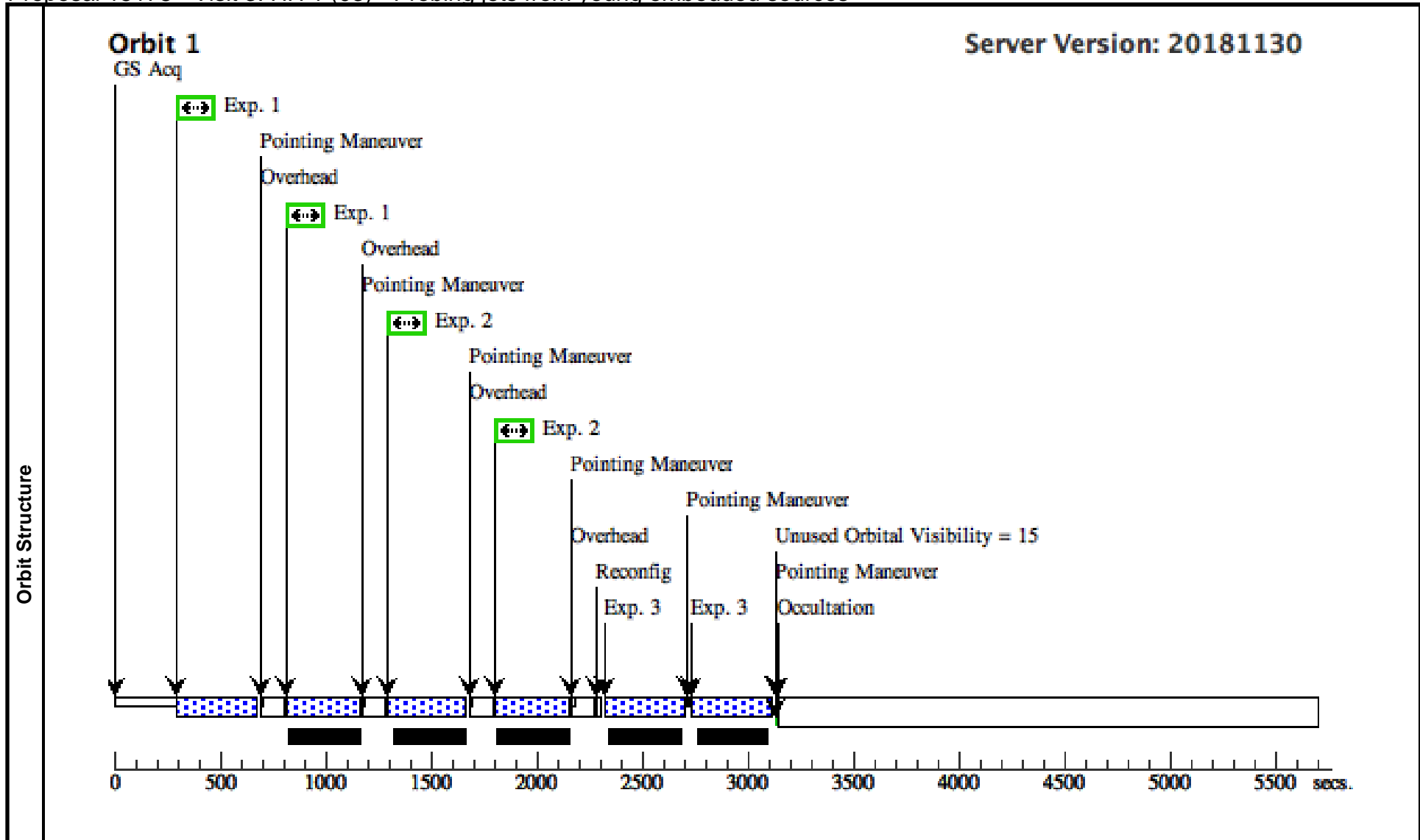
Proposal 15178 - Visit 3: HH 1 (03) - Probing jets from young embedded sources

Fri Dec 07 16:01:01 GMT 2018

<b>Visit</b>	<b>Proposal 15178, Visit 3: HH 1 (03), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: ORIENT 30D TO 40 D Comments: Includes OI 6300 6450A Continuum 1.67um Continuum FeII 1.64um 1.30um Continuum FeII 1.25um Two pointings needed to get both HH 1 and HH 2 given the Orient constraints and limited guide star availability. Both pointings include the jet.					
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>		
	(2)	Pattern Type=WFC3-UVIS-GAP-LINE Purpose=MOSAIC Number Of Points=2 Point Spacing=2.414 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=85.759 Angle Between Sides= Center Pattern=true		(1), (2), (7), (8)		
(4)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(3), (4), (5), (6), (9), (10), (11), (12)			
<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)	HH1-MMS	RA: 05 36 26.0146 (84.1083942d) Dec: -06 46 35.97 (-6.77666d) Equinox: J2000 Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=ISM Description=[HERBIG-HARO OBJECT, JET, PROTOPLANETARY DISK, STAR FORMING REGION] Extended=YES		V=1e-15	Reference Frame: SIMBAD
(7)	HH1-MMN	RA: 05 36 22.8199 (84.0950829d) Dec: -06 45 40.13 (-6.76115d) Equinox: J2000 Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=ISM Description=[HERBIG-HARO OBJECT, JET, PROTOPLANETARY DISK, STAR FORMING REGION] Extended=YES		V=1e-15	Reference Frame: SIMBAD	

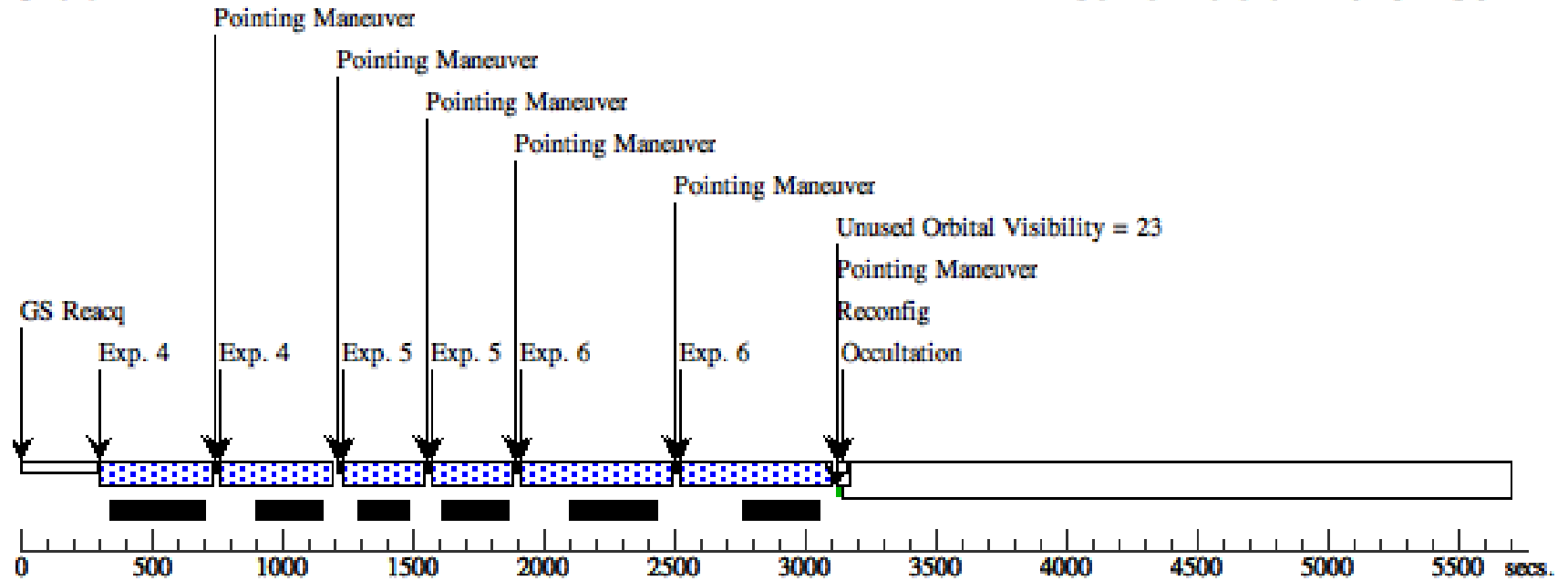
Proposal 15178 - Visit 3: HH 1 (03) - Probing jets from young embedded sources

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	OI 6300	(3) HH1-MMS	WFC3/UVIS, ACCUM, UVIS-FIX	F631N	FLASH=12	GS ACQ SCENARI O BASE1B3	Pattern 2, Exps 1-1 i n Visit 3: HH 1 (03) (2)	350 Secs (700 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[1]
	2	F645N Cont inum	(3) HH1-MMS	WFC3/UVIS, ACCUM, UVIS-FIX	F645N	FLASH=12		Pattern 2, Exps 2-2 i n Visit 3: HH 1 (03) (2)	350 Secs (700 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[1]
	3	F167N Cont inum	(3) HH1-MMS	WFC3/IR, MULTIACCUM, IR-FIX	F167N	NSAMP=15; SAMP-SEQ=SPAR S25		Pattern 4, Exps 3-3 i n Visit 3: HH 1 (03) (4)	352.939501 Secs (705.879 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[1]
	4	FeII 1.64um	(3) HH1-MMS	WFC3/IR, MULTIACCUM, IR-FIX	F164N	NSAMP=9; SAMP-SEQ=SPAR S50		Pattern 4, Exps 4-4 i n Visit 3: HH 1 (03) (4)	402.935899 Secs (805.872 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[2]
	5	F130N Cont inum	(3) HH1-MMS	WFC3/IR, MULTIACCUM, IR-FIX	F130N	SAMP-SEQ=SPARS 25; NSAMP=12		Pattern 4, Exps 5-5 i n Visit 3: HH 1 (03) (4)	277.937956 Secs (555.876 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[2]
	6	FeII 1.25um	(3) HH1-MMS	WFC3/IR, MULTIACCUM, IR-FIX	F126N	SAMP-SEQ=SPARS 50; NSAMP=12		Pattern 4, Exps 6-6 i n Visit 3: HH 1 (03) (4)	552.937252 Secs (1105.875 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[2]
	7	OI 6300	(7) HH1-MMN	WFC3/UVIS, ACCUM, UVIS-FIX	F631N	FLASH=12		Pattern 2, Exps 7-7 i n Visit 3: HH 1 (03) (2)	387 Secs (700 Secs) [==>350.0 Secs (Pattern 1)] [==>350.0 Secs (Pattern 2)]	[3]
	8	F645N Cont inum	(7) HH1-MMN	WFC3/UVIS, ACCUM, UVIS-FIX	F645N	FLASH=12		Pattern 2, Exps 8-8 i n Visit 3: HH 1 (03) (2)	350 Secs (746 Secs) [==>373.0 Secs (Pattern 1)] [==>373.0 Secs (Pattern 2)]	[3]
	9	F167N Cont inum	(7) HH1-MMN	WFC3/IR, MULTIACCUM, IR-FIX	F167N	NSAMP=15; SAMP-SEQ=SPAR S25		Pattern 4, Exps 9-9 i n Visit 3: HH 1 (03) (4)	352.939501 Secs (705.879 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[3]
	10	FeII 1.64um	(7) HH1-MMN	WFC3/IR, MULTIACCUM, IR-FIX	F164N	NSAMP=10; SAMP-SEQ=SPAR S50		Pattern 4, Exps 10-1 0 in Visit 3: HH 1 (0 3) (4)	452.93635 Secs (905.873 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[4]
	11	F130N Cont inum	(7) HH1-MMN	WFC3/IR, MULTIACCUM, IR-FIX	F130N	SAMP-SEQ=SPARS 25; NSAMP=10		Pattern 4, Exps 11-1 1 in Visit 3: HH 1 (0 3) (4)	227.936926 Secs (455.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[4]
12	FeII 1.25um	(7) HH1-MMN	WFC3/IR, MULTIACCUM, IR-FIX	F126N	SAMP-SEQ=SPARS 50; NSAMP=12		Pattern 4, Exps 12-1 2 in Visit 3: HH 1 (0 3) (4)	552.937252 Secs (1105.875 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[4]	



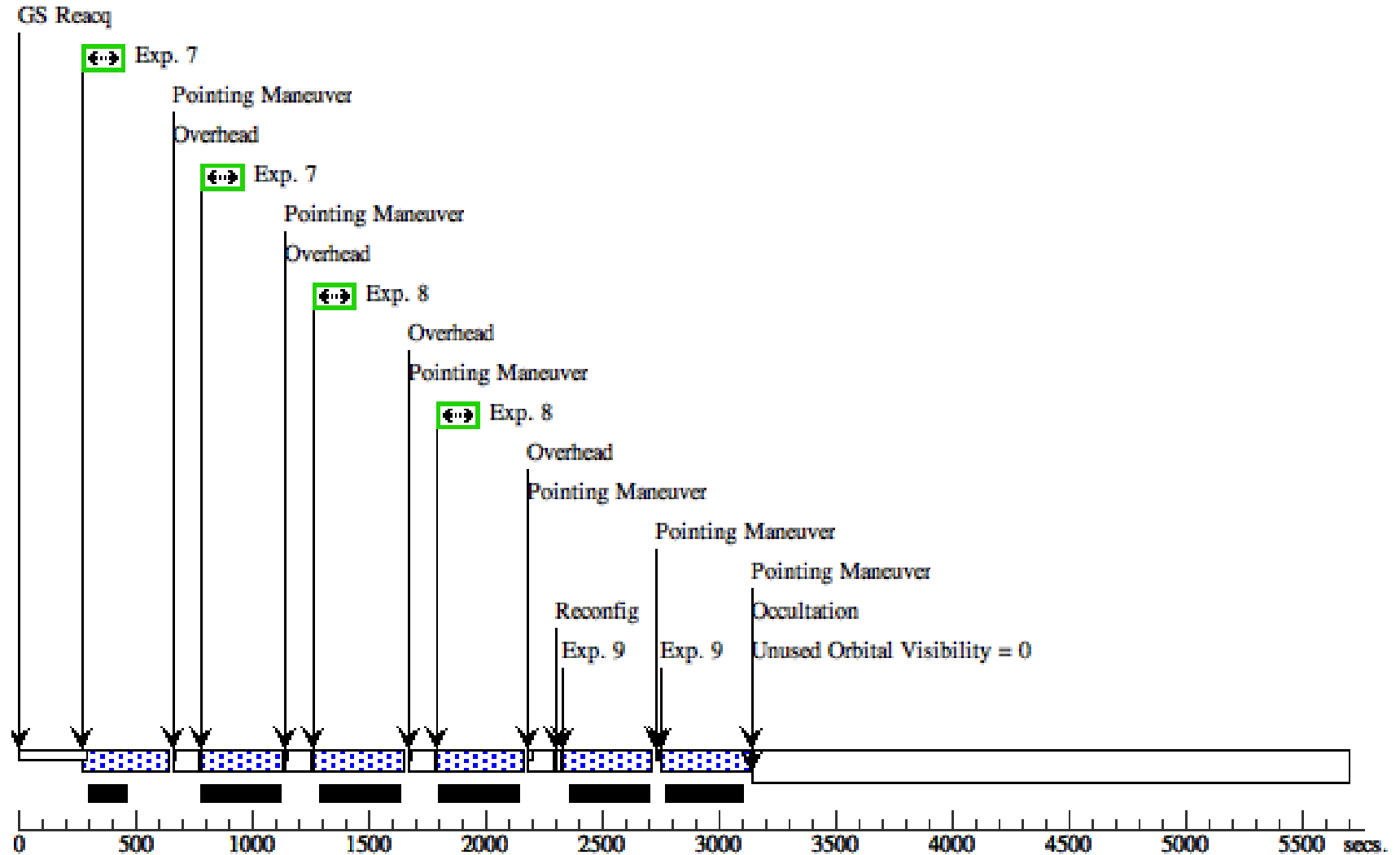
**Orbit 2**

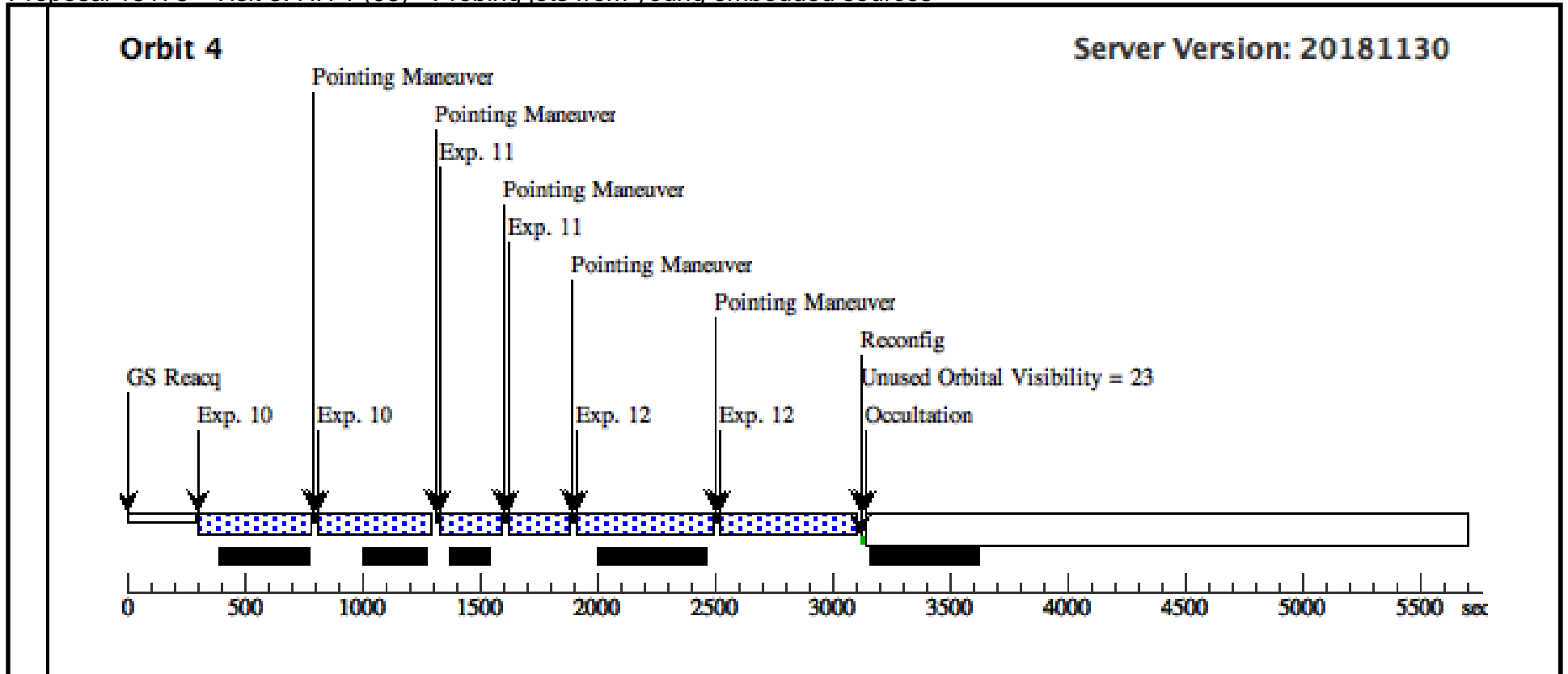
Server Version: 20181130



**Orbit 3**

Server Version: 20181130





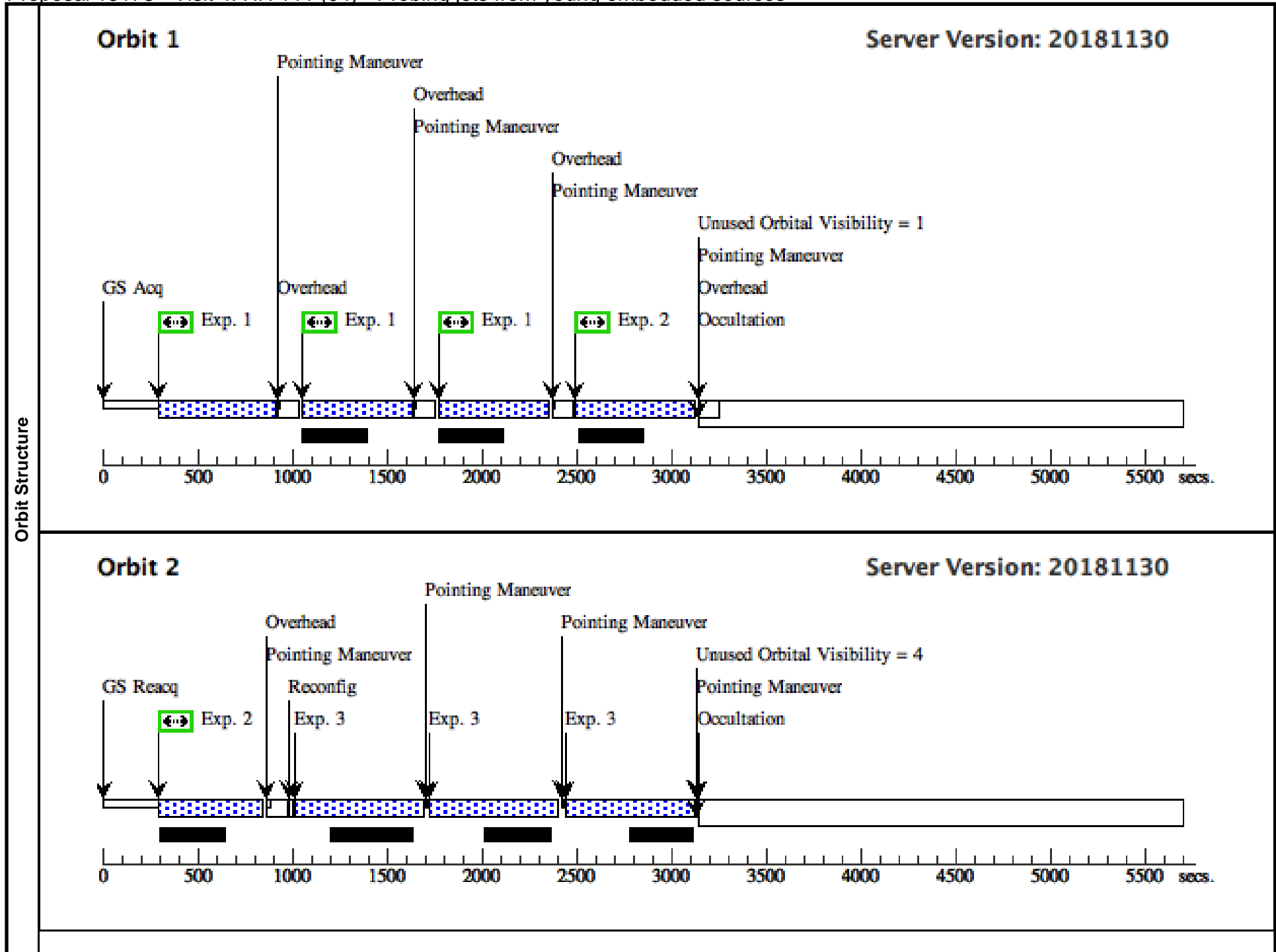
Proposal 15178 - Visit 4: HH 111 (04) - Probing jets from young embedded sources

Fri Dec 07 16:01:01 GMT 2018

<b>Visit</b>	<b>Proposal 15178, Visit 4: HH 111 (04), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/IR, WFC3/UVIS Special Requirements: ORIENT 95D TO 97 D Comments: Includes OI 6300 6450A Continuum 1.67um Continuum FeII 1.64um 1.30um Continuum FeII 1.25um					
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>		
	(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=2.806 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=47.11 Angle Between Sides= Center Pattern=false	(1)		
	(2)	Pattern Type=WFC3-UVIS-GAP-LINE Purpose=MOSAIC Number Of Points=2 Point Spacing=2.414 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.759 Angle Between Sides= Center Pattern=true	(2)		
	(3)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false	(3), (4), (6)		
(4)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false	(5)			
<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)	HH111	RA: 05 51 46.7308 (87.9447117d) Dec: +02 48 37.20 (2.81033d) Equinox: J2000		V=(?) 1e-15	Reference Frame: SIMBAD
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=ISM Description=[HERBIG-HARO OBJECT, JET, PROTOPLANETARY DISK, STAR FORMING REGION] Extended=YES						
(8)	HH111-IR	RA: 05 51 46.3702 (87.9432092d) Dec: +02 48 38.55 (2.81071d) Equinox: J2000		V=(?) 1e-15	Reference Frame: SIMBAD	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=ISM Description=[HERBIG-HARO OBJECT, JET, PROTOPLANETARY DISK, STAR FORMING REGION] Extended=YES						

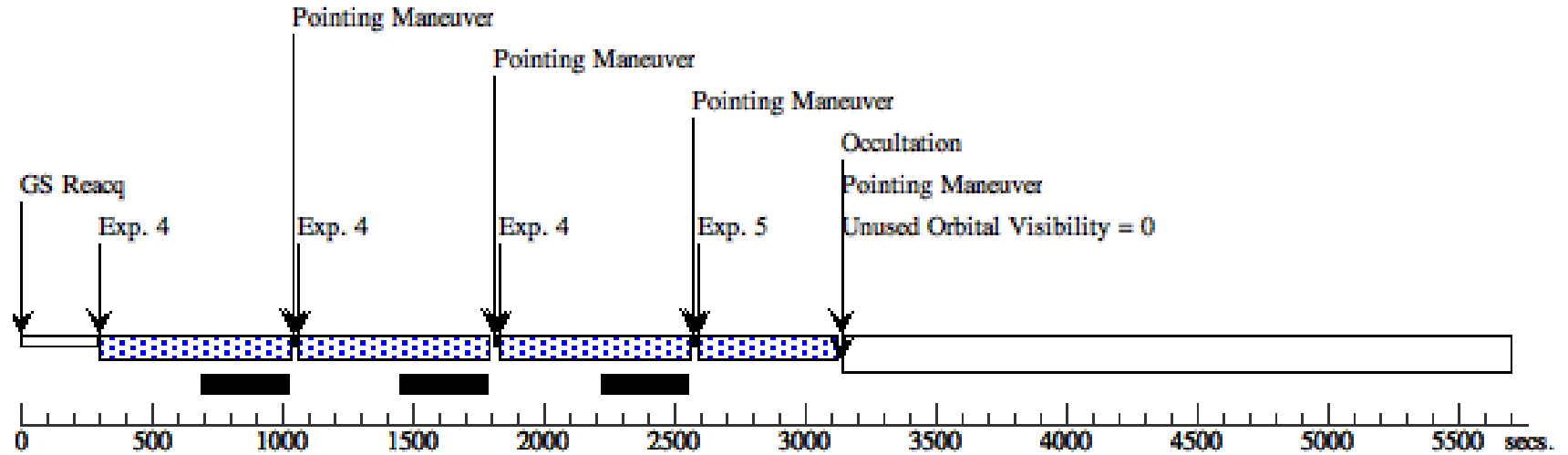
Proposal 15178 - Visit 4: HH 111 (04) - Probing jets from young embedded sources

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	OI 6300	(4) HH111	WFC3/UVIS, ACCUM, UVIS-FIX	F631N	FLASH=10		Pattern 1, Exps 1-1 in Visit 4: HH 111 (04) (1)	480 Secs (1761 Secs) [==>587.0 Secs (Pattern 1)] [==>587.0 Secs (Pattern 2)] [==>587.0 Secs (Pattern 3)]	[1]
	2	F645N Cont inuum	(4) HH111	WFC3/UVIS, ACCUM, UVIS-FIX	F645N	FLASH=10		Pattern 2, Exps 2-2 in Visit 4: HH 111 (04) (2)	490 Secs (1167 Secs) [==>617.0 Secs (Pattern 1)] [==>550.0 Secs (Pattern 2)]	[1] [2]
	3	F167N Cont inuum	(8) HH111-IR	WFC3/IR, MULTIACCUM, IR-FIX	F167N	NSAMP=14; SAMP-SEQ=SPAR S50		Pattern 3, Exps 3-3 in Visit 4: HH 111 (04) (3)	652.938154 Secs (1958.814 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]
	4	FeII 1.64um	(8) HH111-IR	WFC3/IR, MULTIACCUM, IR-FIX	F164N	NSAMP=15; SAMP-SEQ=SPAR S50		Pattern 3, Exps 4-4 in Visit 4: HH 111 (04) (3)	702.938605 Secs (2108.816 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[3]
	5	F130N Cont inuum	(8) HH111-IR	WFC3/IR, MULTIACCUM, IR-FIX	F130N	SAMP-SEQ=SPARS 50; NSAMP=11		Pattern 4, Exps 5-5 in Visit 4: HH 111 (04) (4)	502.936801 Secs (1005.874 Secs) [==>(Pattern 1)] [==>(Pattern 2)]	[3] [4]
	6	FeII 1.25um	(8) HH111-IR	WFC3/IR, MULTIACCUM, IR-FIX	F126N	SAMP-SEQ=SPARS 50; NSAMP=15		Pattern 3, Exps 6-6 in Visit 4: HH 111 (04) (3)	702.938605 Secs (2108.816 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[4]



### Orbit 3

Server Version: 20181130



### Orbit 4

Server Version: 20181130

