



17118 - Taming the BEAST of N66 to resolve how star formation shapes the interstellar medium at low metallicity

Cycle: 30, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Claire E. Murray (PI) (Contact)	Space Telescope Science Institute	cmurray1@stsci.edu
Dr. Yumi Choi (CoI)	University of California - Berkeley	ychoi@stsci.edu
Dr. Karl D. Gordon (CoI)	Space Telescope Science Institute	kgordon@stsci.edu
Dr. Karin Marie Sandstrom (CoI)	University of California - San Diego	kmsandstrom@ucsd.edu
Dr. Benjamin F. Williams (CoI)	University of Washington	ben@astro.washington.edu
Dr. Julia Christine Roman-Duval (CoI)	Space Telescope Science Institute	duval@stsci.edu
Dr. Caroline Bot (CoI) (ESA Member)	Universite de Strasbourg I	caroline.bot@astro.unistra.fr
Dr. Karoline Gilbert (CoI)	Space Telescope Science Institute	kgilbert@stsci.edu
Dr. Lent Clifton Johnson (CoI)	Northwestern University	lcj@northwestern.edu
Dr. Roger Cohen (CoI)	Rutgers the State University of New Jersey	rc1273@physics.rutgers.edu
Petia Yanchulova Merica-Jones (CoI)	Space Telescope Science Institute	pyanchulova@stsci.edu
Dr. Martha L. Boyer (CoI)	Space Telescope Science Institute	mboyer@stsci.edu
Dr. Alec S. Hirschauer (CoI)	Space Telescope Science Institute	ahirschauer@stsci.edu
Dr. Kristen B W McQuinn (CoI)	Rutgers the State University of New Jersey	kristen.mcquinn@rutgers.edu
Christina Willecke Lindberg (CoI)	The Johns Hopkins University	clindbe2@jh.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) NGC-346-1	WFC3/UVIS	3	15-Jul-2022 12:01:46.0	yes
02	(2) NGC-346-2	WFC3/UVIS	3	15-Jul-2022 12:01:48.0	yes
03	(3) NGC-346-3	WFC3/UVIS	3	15-Jul-2022 12:01:50.0	yes
04	(4) NGC-346-4	WFC3/UVIS	3	15-Jul-2022 12:01:53.0	yes

12 Total Orbits Used

ABSTRACT

Although galaxies evolve by assembling the interstellar medium (ISM) into stars, standard gas tracers fail to account for the total ISM mass available for star formation. This is especially true at low metallicity and in strong radiation fields where dust shielding and dense molecular gas are scarce. Dust provides an independent tracer across phases, but its basic properties -- mass, grain size and extinction curve -- are poorly constrained between diverse environments. We propose to survey N66, the largest star-forming region in the low-metallicity Small Magellanic Cloud (SMC) with optical and ultraviolet imaging from Wide Field Camera 3. Along with archival imaging in the optical and IR from HST and JWST, we will constrain the intrinsic properties of resolved stars and the intervening dust independently from systematics of IR emission surveys and at 10x higher resolution. We will (1) quantify the influence of ionizing radiation fields on fundamental dust properties (2) map the ISM mass independently of emission systematics to quantify the nature of "dark" gas at low metallicity. HST is the only observatory with the superb resolution and UV sensitivity necessary for these objectives, and N66 is the perfect laboratory for quantifying the influence of star formation activity on the structure of the ISM in the SMC, an excellent prototype for galaxies in the distant Universe.

OBSERVING DESCRIPTION

In this program we plan to obtain WFC3/UVIS imaging in four bands: F225W, F275W, F336W and F475W.

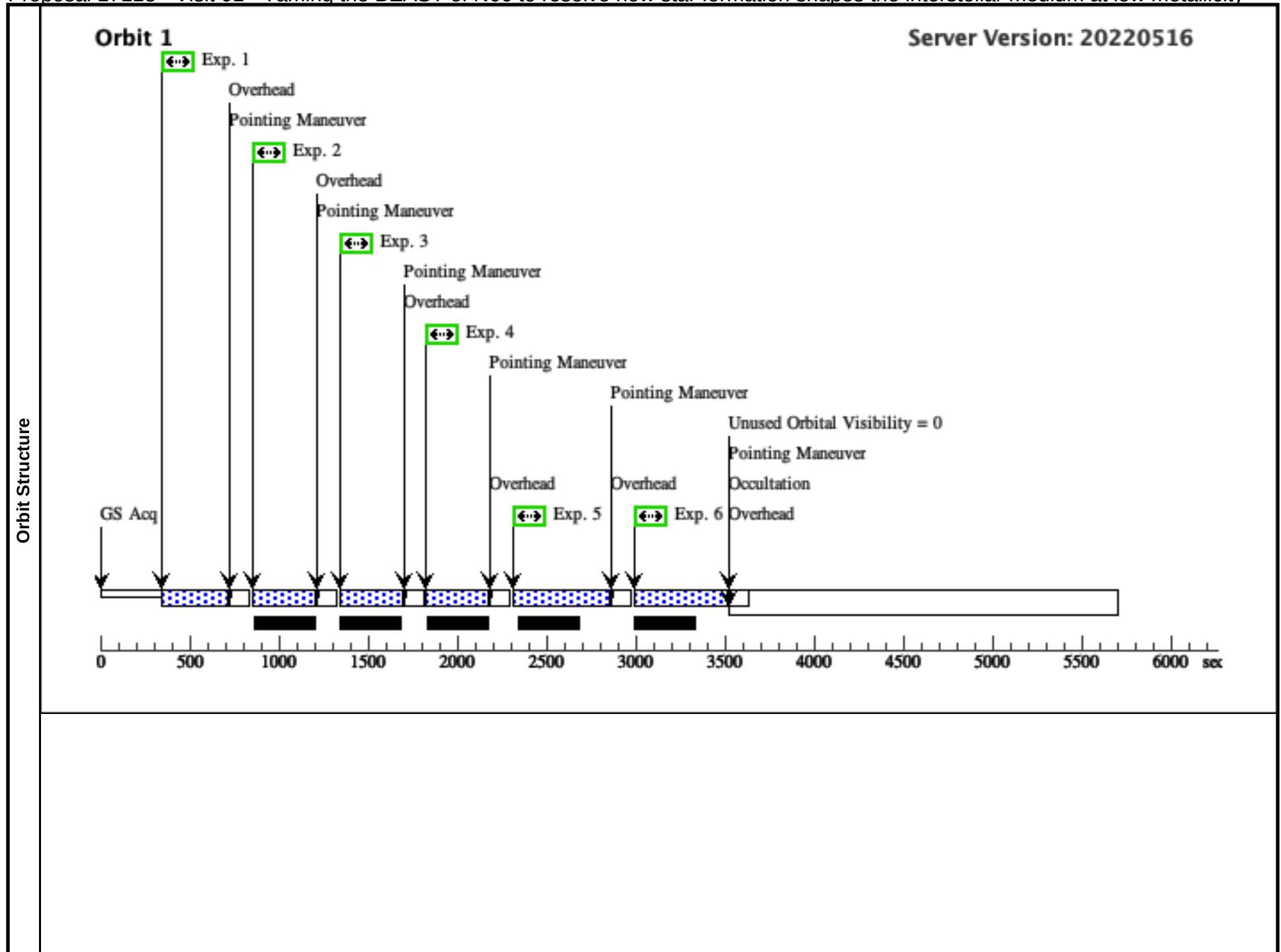
We design our pointing to replicate archival F555W and F814W observations (PIDs 10248, 13680) and to cover the extent of the ISM structure of interest (4 pointings required).

For each pointing, we arrange the exposures to minimize overheads. We include multiple exposures per band in order to include dither patterns (4 exposures each in F225W, F275W and F336W, and 3 exposures in F475W). In addition, we include a short "guard" exposure in F475W (5s) to

Proposal 17118 (STScI Edit Number: 0, Created: Friday, July 15, 2022 at 11:01:53 AM Eastern Standard Time) - Overview
capture bright sources.

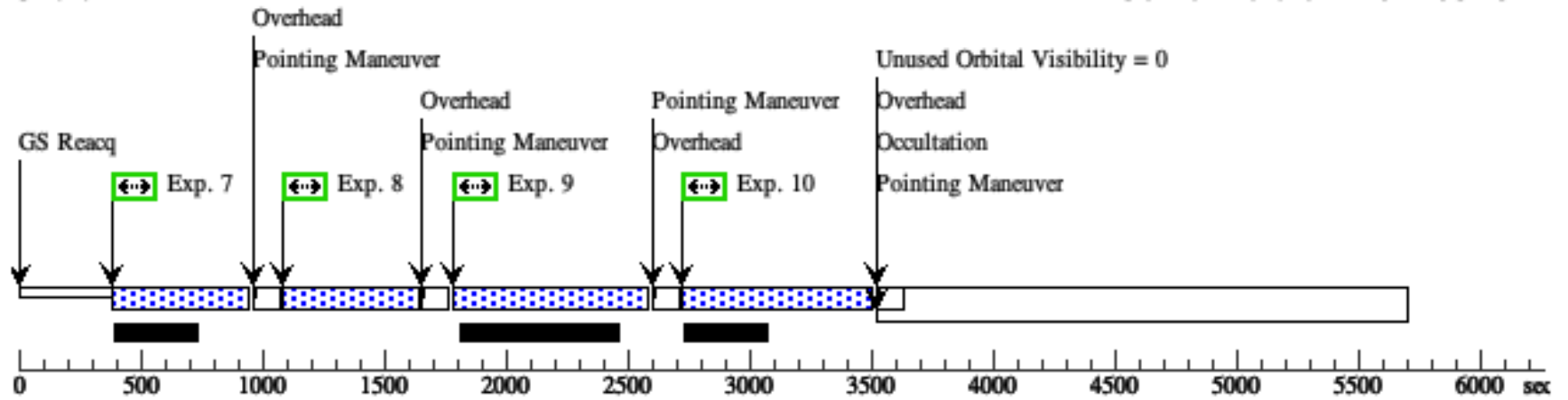
Proposal 17118 - Visit 01 - Taming the BEAST of N66 to resolve how star formation shapes the interstellar medium at low metallicity

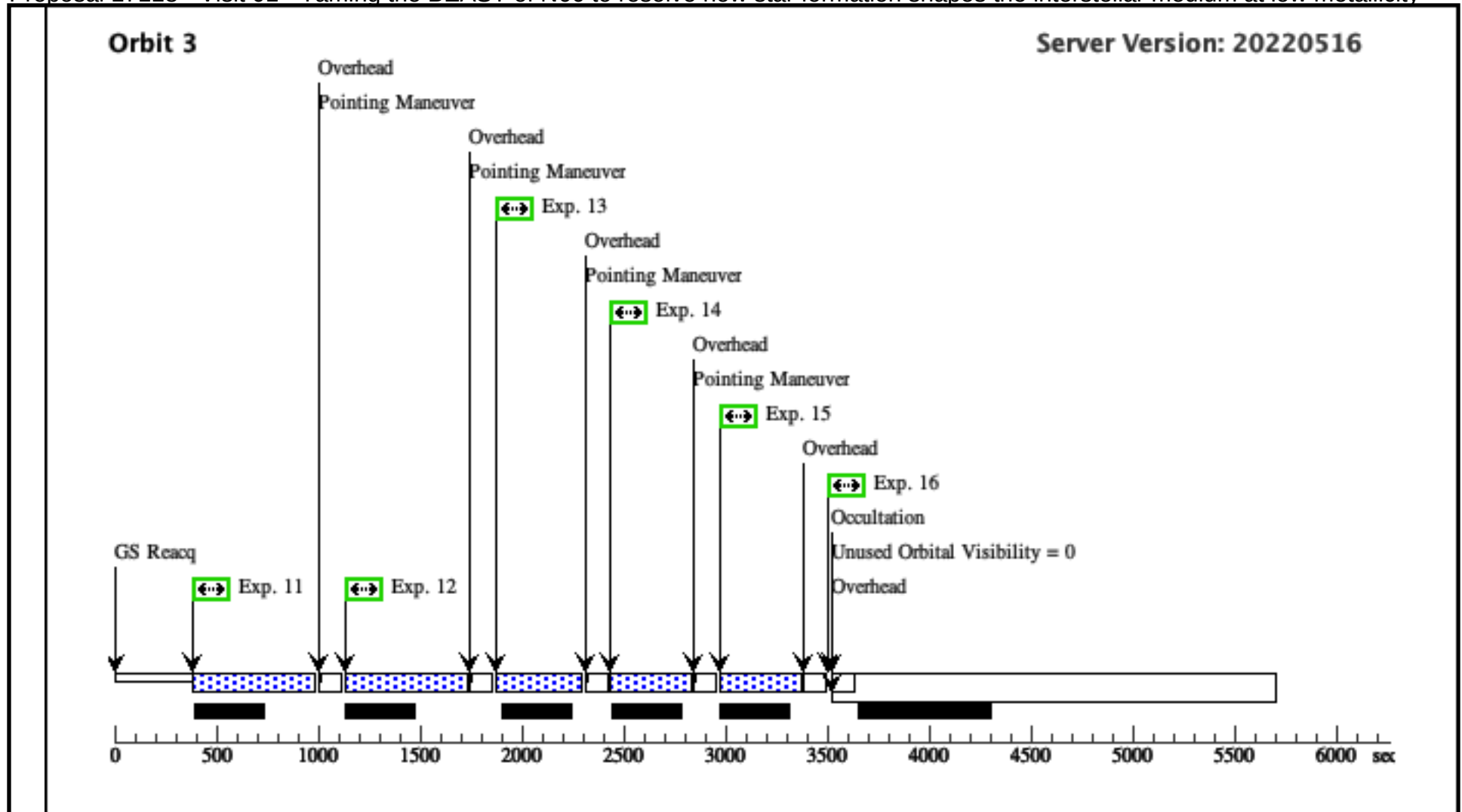
Visit	Proposal 17118, Visit 01										Fri Jul 15 16:01:54 GMT 2022	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: (none)											
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes		Miscellaneous				
	(1)	NGC-346-1	RA: 00 59 17.2050 (14.8216875d) Dec: -72 09 43.94 (-72.16221d) Equinox: J2000			V=14.59+/-0.3		Reference Frame: SIMBAD				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.											
	Category=STELLAR CLUSTER Description=[OB ASSOCIATION, STAR FORMING REGION, YOUNG ASSOCIATION]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1	F336W Exposure 1	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0,0		337 Secs (337 Secs) [==>]		[1]	
	2	F336W Exposure 2	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.1785,0.1908		348 Secs (348 Secs) [==>]		[1]	
	3	F336W Exposure 3	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.3173,0.3591		348 Secs (348 Secs) [==>]		[1]	
	4	F336W Exposure 4	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.4958,0.5101		348 Secs (348 Secs) [==>]		[1]	
	5	F275W Exposure 1	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0,0		520 Secs (520 Secs) [==>]		[1]	
	6	F275W Exposure 2	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.1785,0.1908		520 Secs (520 Secs) [==>]		[1]	
	7	F275W Exposure 3	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.3173,0.3591		560 Secs (560 Secs) [==>]		[2]	
	8	F275W Exposure 4	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.4958,0.5101		560 Secs (560 Secs) [==>]		[2]	
	9	F225W Exposure 1	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0,0		785 Secs (785 Secs) [==>]		[2]	
	10	F225W Exposure 2	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.1785,0.1908		786 Secs (786 Secs) [==>]		[2]	
	11	F225W Exposure 3	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.3173,0.3591		605 Secs (605 Secs) [==>]		[3]	
	12	F225W Exposure 4	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.4958,0.5101		606 Secs (606 Secs) [==>]		[3]	
	13	F475W Exposure 1	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10			400 Secs (400 Secs) [==>]		[3]	
	14	F475W Exposure 2	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10	POS TARG 0.1719,0.1970		400 Secs (400 Secs) [==>]		[3]	
	15	F475W Exposure 3	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10			400 Secs (400 Secs) [==>]		[3]	
	16	F475W Guard	(1) NGC-346-1	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=20			5 Secs (5 Secs) [==>]		[3]	



Orbit 2

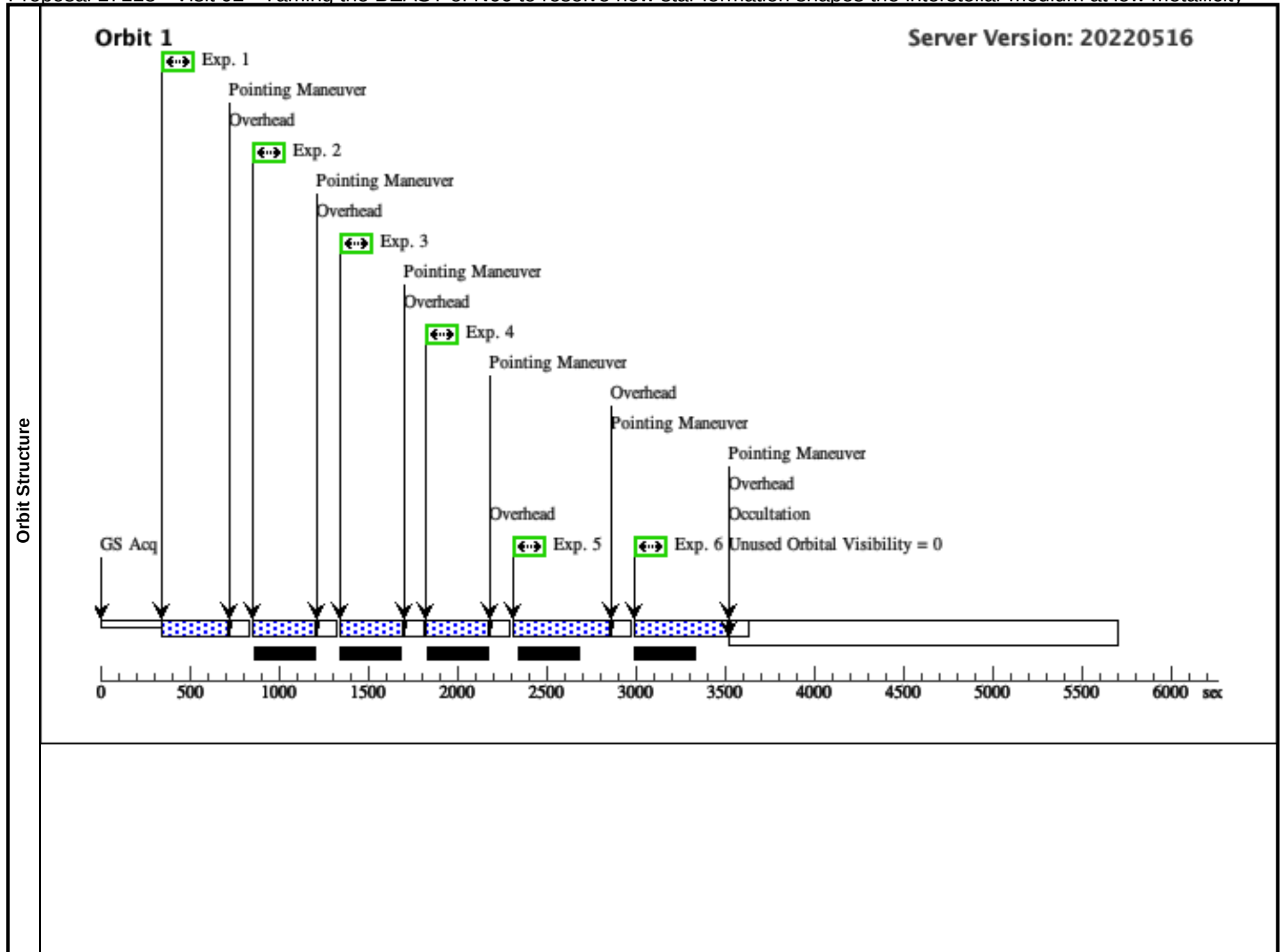
Server Version: 20220516





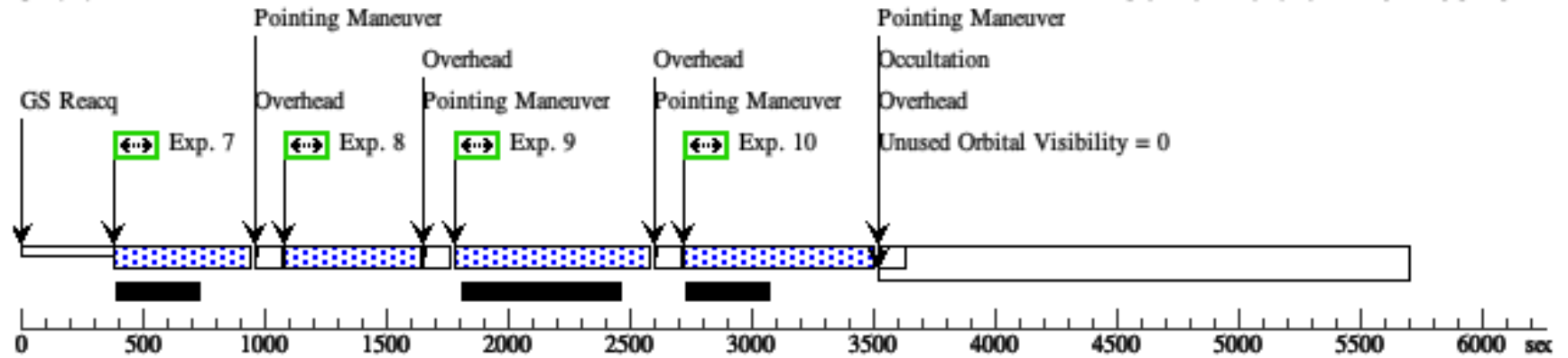
Proposal 17118 - Visit 02 - Taming the BEAST of N66 to resolve how star formation shapes the interstellar medium at low metallicity

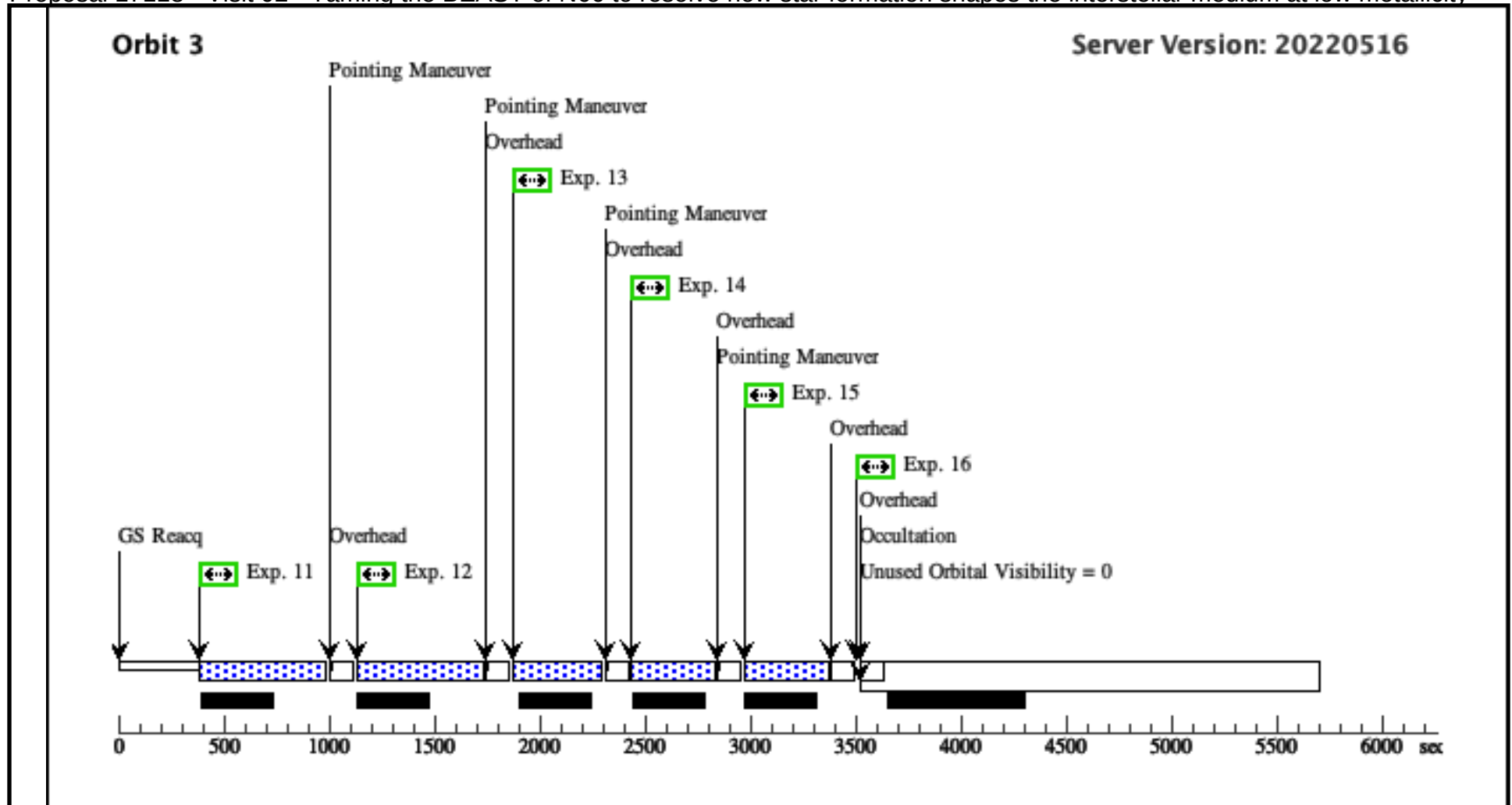
Visit	Proposal 17118, Visit 02										Fri Jul 15 16:01:54 GMT 2022	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: SAME ORIENT AS 01											
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(2)	NGC-346-2		RA: 00 59 4.5355 (14.7688979d)				V=14.59+/-0.3		Reference Frame: SIMBAD		
				Dec: -72 10 31.29 (-72.17536d)								
				Equinox: J2000								
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.											
	Category=STELLAR CLUSTER											
	Description=[OB ASSOCIATION, STAR FORMING REGION, YOUNG ASSOCIATION]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1	F336W Exp osure 1	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0,0		337 Secs (337 Secs)			
									[==>]		[1]	
	2	F336W Exp osure 2	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.1785,0 .1908		348 Secs (348 Secs)			
									[==>]		[1]	
	3	F336W Exp osure 3	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.3173,0 .3591		348 Secs (348 Secs)			
									[==>]		[1]	
	4	F336W Exp osure 4	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.4958,0 .5101		348 Secs (348 Secs)			
									[==>]		[1]	
	5	F275W Exp osure 1	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0,0		520 Secs (520 Secs)			
									[==>]		[1]	
	6	F275W Exp osure 2	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.1785,0 .1908		520 Secs (520 Secs)			
									[==>]		[1]	
	7	F275W Exp osure 3	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.3173,0 .3591		560 Secs (560 Secs)			
									[==>]		[2]	
	8	F275W Exp osure 4	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.4958,0 .5101		560 Secs (560 Secs)			
									[==>]		[2]	
	9	F225W Exp osure 1	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0,0		785 Secs (785 Secs)			
									[==>]		[2]	
	10	F225W Exp osure 2	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.1785,0 .1908		786 Secs (786 Secs)			
									[==>]		[2]	
	11	F225W Exp osure 3	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.3173,0 .3591		605 Secs (605 Secs)			
									[==>]		[3]	
	12	F225W Exp osure 4	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.4958,0 .5101		606 Secs (606 Secs)			
									[==>]		[3]	
	13	F475W Exp osure 1	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10			400 Secs (400 Secs)			
									[==>]		[3]	
	14	F475W Exp osure 2	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10	POS TARG 0.1719,0 .1970		400 Secs (400 Secs)			
								[==>]		[3]		
15	F475W Exp osure 3	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10			400 Secs (400 Secs)				
								[==>]		[3]		
16	F475W Gua rd	(2) NGC-346-2	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=20			5 Secs (5 Secs)				
								[==>]		[3]		



Orbit 2

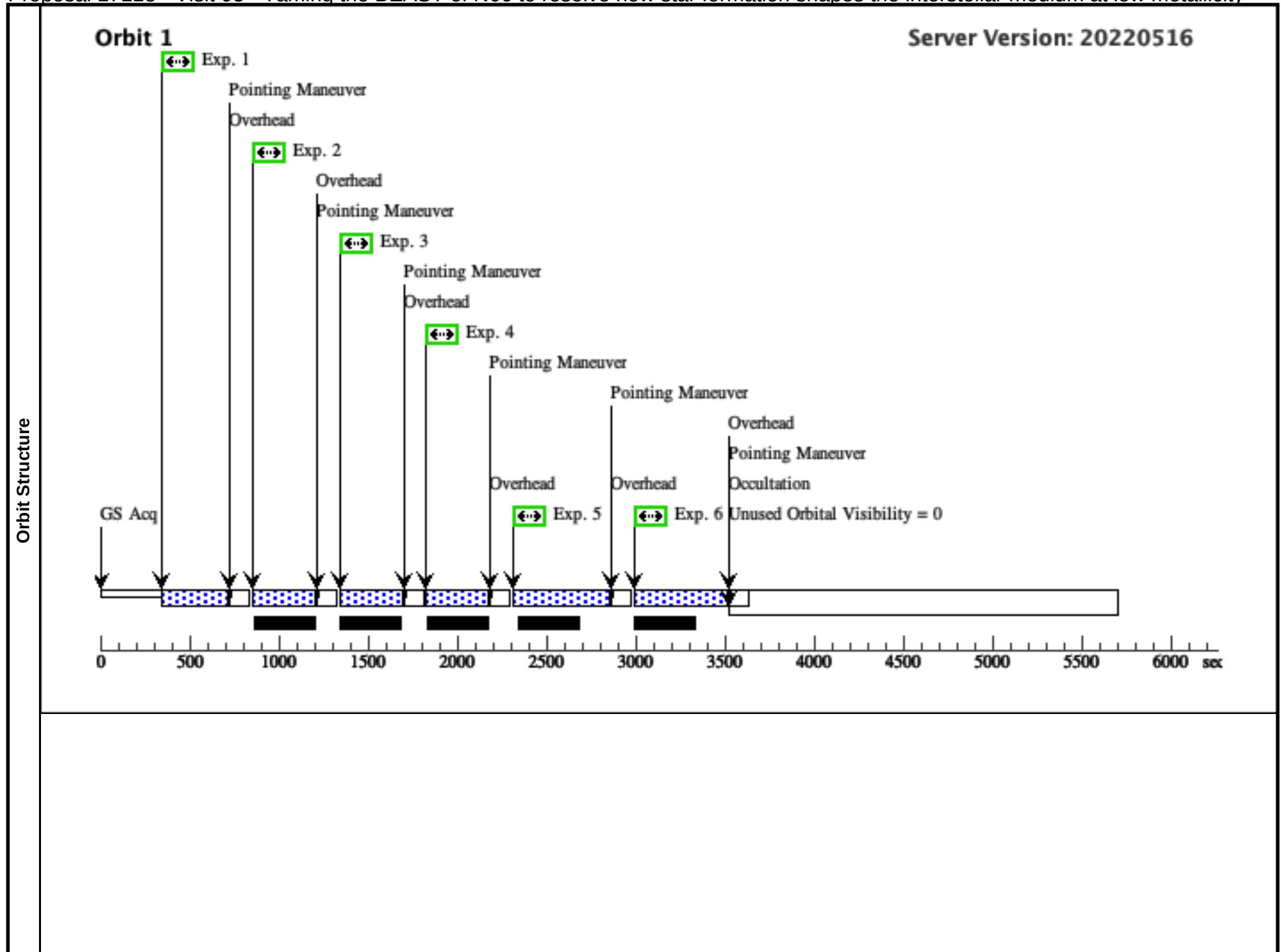
Server Version: 20220516





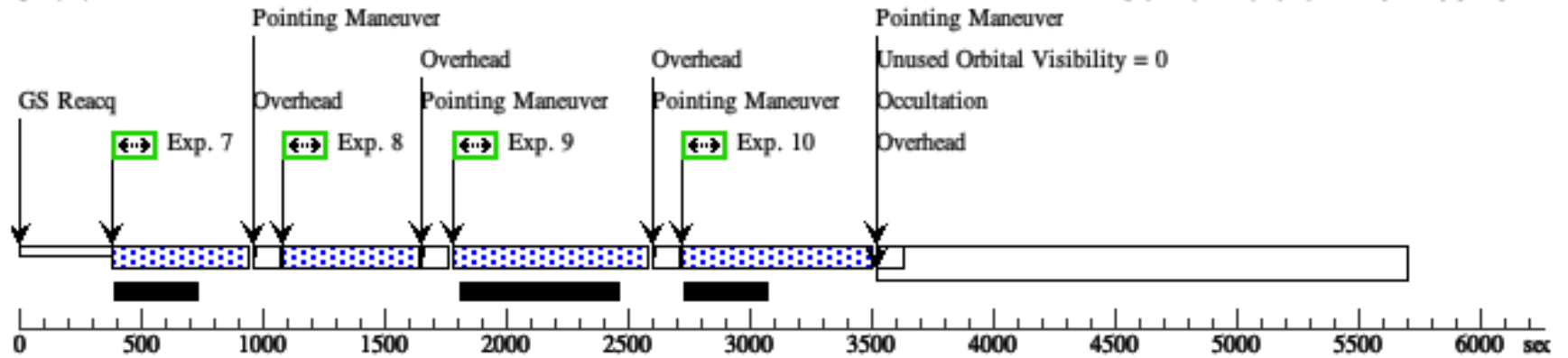
Proposal 17118 - Visit 03 - Taming the BEAST of N66 to resolve how star formation shapes the interstellar medium at low metallicity

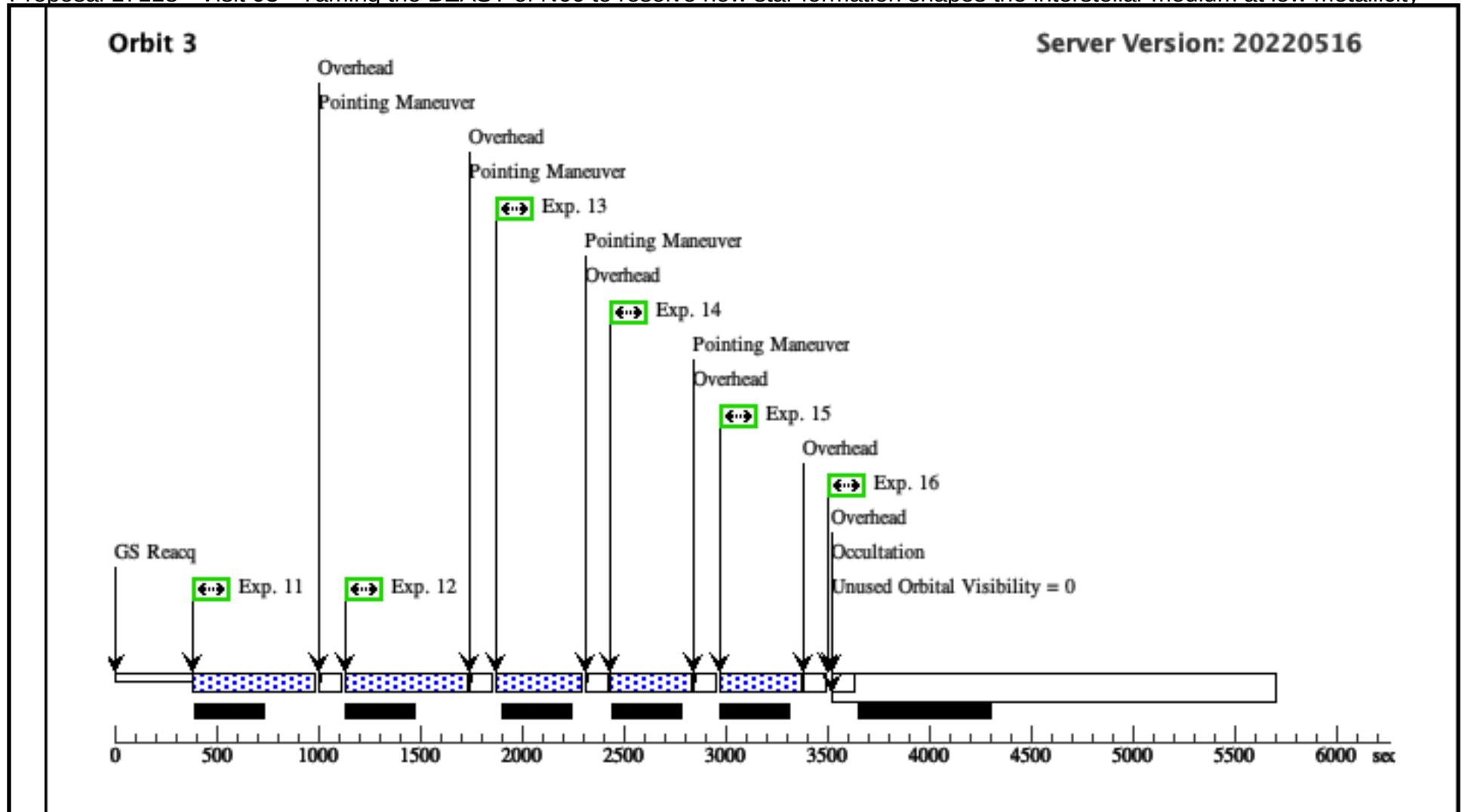
Visit	Proposal 17118, Visit 03										Fri Jul 15 16:01:54 GMT 2022	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: SAME ORIENT AS 01											
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(3)	NGC-346-3		RA: 00 58 41.1880 (14.6716167d)				V=14.59+/-0.3		Reference Frame: SIMBAD		
				Dec: -72 12 24.84 (-72.20690d)								
				Equinox: J2000								
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.											
	Category=STELLAR CLUSTER											
	Description=[OB ASSOCIATION, STAR FORMING REGION, YOUNG ASSOCIATION]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1	F336W Exp osure 1	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0,0		337 Secs (337 Secs)			
									[==>]		[1]	
	2	F336W Exp osure 2	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.1785,0 .1908		348 Secs (348 Secs)			
									[==>]		[1]	
	3	F336W Exp osure 3	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.3173,0 .3591		348 Secs (348 Secs)			
									[==>]		[1]	
	4	F336W Exp osure 4	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.4958,0 .5101		348 Secs (348 Secs)			
									[==>]		[1]	
	5	F275W Exp osure 1	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0,0		520 Secs (520 Secs)			
									[==>]		[1]	
	6	F275W Exp osure 2	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.1785,0 .1908		520 Secs (520 Secs)			
									[==>]		[1]	
	7	F275W Exp osure 3	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.3173,0 .3591		560 Secs (560 Secs)			
									[==>]		[2]	
	8	F275W Exp osure 4	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.4958,0 .5101		560 Secs (560 Secs)			
									[==>]		[2]	
	9	F225W Exp osure 1	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0,0		785 Secs (785 Secs)			
									[==>]		[2]	
	10	F225W Exp osure 2	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.1785,0 .1908		786 Secs (786 Secs)			
									[==>]		[2]	
	11	F225W Exp osure 3	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.3173,0 .3591		605 Secs (605 Secs)			
									[==>]		[3]	
	12	F225W Exp osure 4	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.4958,0 .5101		606 Secs (606 Secs)			
									[==>]		[3]	
	13	F475W Exp osure 1	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10			400 Secs (400 Secs)			
									[==>]		[3]	
	14	F475W Exp osure 2	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10	POS TARG 0.1719,0 .1970		400 Secs (400 Secs)			
								[==>]		[3]		
15	F475W Exp osure 3	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10			400 Secs (400 Secs)				
								[==>]		[3]		
16	F475W Gua rd	(3) NGC-346-3	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=20			5 Secs (5 Secs)				
								[==>]		[3]		



Orbit 2

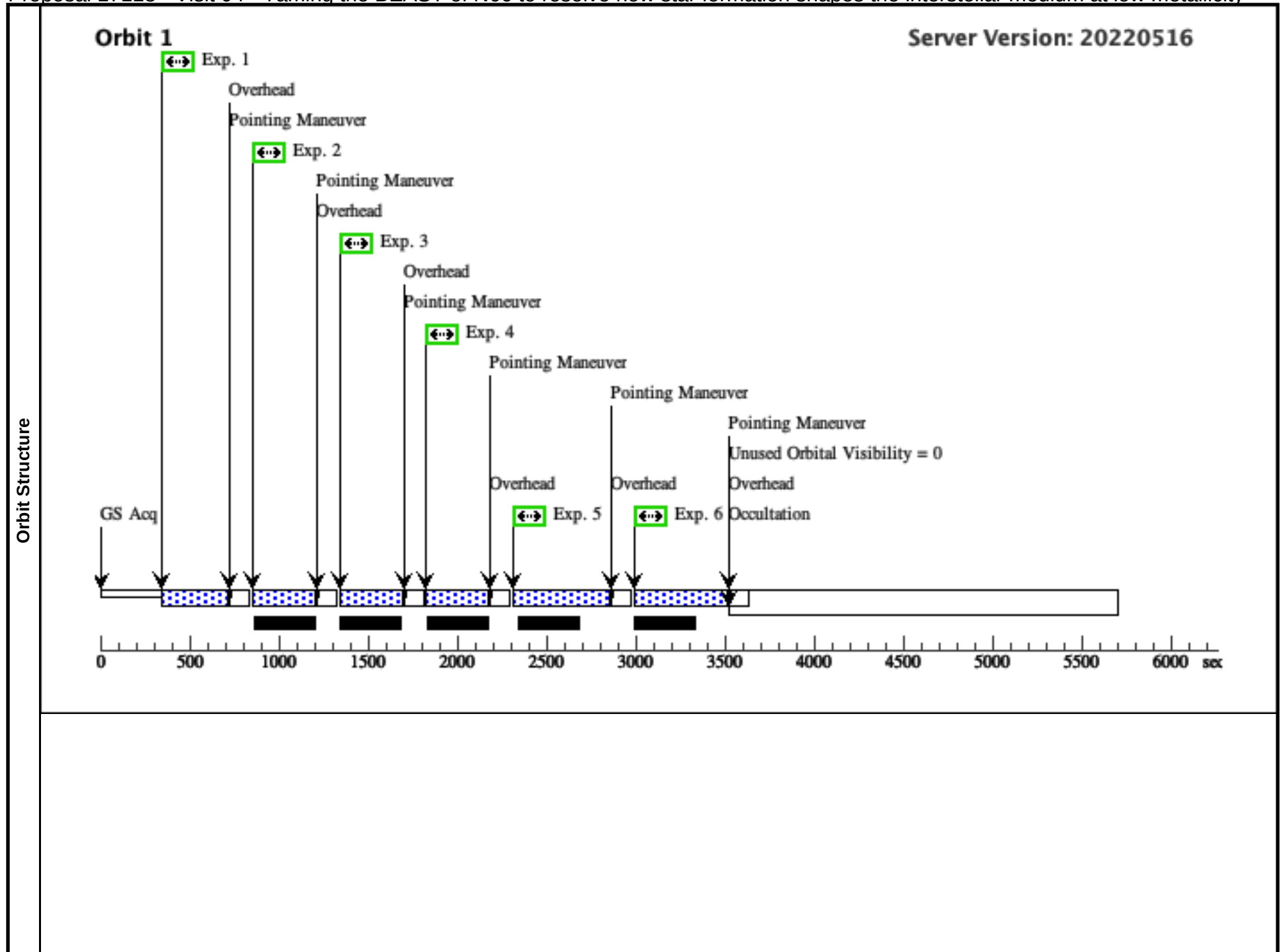
Server Version: 20220516





Proposal 17118 - Visit 04 - Taming the BEAST of N66 to resolve how star formation shapes the interstellar medium at low metallicity

Visit	Proposal 17118, Visit 04										Fri Jul 15 16:01:54 GMT 2022	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: SAME ORIENT AS 01											
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(4)	NGC-346-4		RA: 00 58 56.4391 (14.7351629d)				V=14.59+/-0.3		Reference Frame: SIMBAD		
				Dec: -72 11 54.81 (-72.19856d)								
				Equinox: J2000								
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.											
	Category=STELLAR CLUSTER											
	Description=[OB ASSOCIATION, STAR FORMING REGION, YOUNG ASSOCIATION]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1	F336W Exp osure 1	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0,0		337 Secs (337 Secs)			
									[==>]		[1]	
	2	F336W Exp osure 2	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.1785,0 .1908		348 Secs (348 Secs)			
									[==>]		[1]	
	3	F336W Exp osure 3	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.3173,0 .3591		348 Secs (348 Secs)			
									[==>]		[1]	
	4	F336W Exp osure 4	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=19	POS TARG 0.4958,0 .5101		348 Secs (348 Secs)			
									[==>]		[1]	
	5	F275W Exp osure 1	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0,0		520 Secs (520 Secs)			
									[==>]		[1]	
	6	F275W Exp osure 2	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.1785,0 .1908		520 Secs (520 Secs)			
									[==>]		[1]	
	7	F275W Exp osure 3	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.3173,0 .3591		560 Secs (560 Secs)			
									[==>]		[2]	
	8	F275W Exp osure 4	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F275W	FLASH=19	POS TARG 0.4958,0 .5101		560 Secs (560 Secs)			
									[==>]		[2]	
9	F225W Exp osure 1	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0,0		785 Secs (785 Secs)				
								[==>]		[2]		
10	F225W Exp osure 2	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.1785,0 .1908		786 Secs (786 Secs)				
								[==>]		[2]		
11	F225W Exp osure 3	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.3173,0 .3591		605 Secs (605 Secs)				
								[==>]		[3]		
12	F225W Exp osure 4	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F225W	FLASH=19	POS TARG 0.4958,0 .5101		606 Secs (606 Secs)				
								[==>]		[3]		
13	F475W Exp osure 1	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10			400 Secs (400 Secs)				
								[==>]		[3]		
14	F475W Exp osure 2	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10	POS TARG 0.1719,0 .1970		400 Secs (400 Secs)				
								[==>]		[3]		
15	F475W Exp osure 3	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=10			400 Secs (400 Secs)				
								[==>]		[3]		
16	F475W Gua rd	(4) NGC-346-4	WFC3/UVIS, ACCUM, UVIS	F475W	FLASH=20			5 Secs (5 Secs)				
								[==>]		[3]		



Orbit 2

Server Version: 20220516

