



18021 - FUV imaging of massive Magellanic Clouds clusters

Cycle: 33, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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Pablo Ignacio Marchant Campos (CoI) (ESA Member)	Ghent University
Dr. Reinhold Willcox (CoI) (ESA Member)	Institute of Astronomy, KU Leuven

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) NGC1818-FIELD1	STIS/FUV-MAMA	1	12-Mar-2026 15:00:13.0	yes
02	(2) NGC1818-FIELD2	STIS/FUV-MAMA	1	12-Mar-2026 15:00:14.0	yes
03	(3) NGC1818-FIELD3	STIS/FUV-MAMA	1	12-Mar-2026 15:00:14.0	yes
04	(4) NGC1818-FIELD4	STIS/FUV-MAMA	1	12-Mar-2026 15:00:14.0	yes
05	(5) NGC330-FIELD1	STIS/FUV-MAMA	1	12-Mar-2026 15:00:14.0	yes
06	(6) NGC330-FIELD2	STIS/FUV-MAMA	1	12-Mar-2026 15:00:15.0	yes
07	(7) NGC330-FIELD3	STIS/FUV-MAMA	1	12-Mar-2026 15:00:15.0	yes
08	(8) NGC330-FIELD4	STIS/FUV-MAMA	1	12-Mar-2026 15:00:15.0	yes

8 Total Orbits Used

ABSTRACT

Stripped stars are one of the most exciting types of massive binary interaction products. They are the hot, helium-rich cores of intermediate and high-mass stars that have lost their envelope through mass transfer or common-envelope evolution. Stripped stars dramatically enhance the ionization radiation budget of massive stars and are excellent candidate progenitors of hydrogen-poor core-collapse supernovae.

Given their temperature and small sizes, stripped stars are hard to detect in the optical. Using NUV SWIFT photometry, a newly proposed method, based on NUV-optical color-indexes, has recently been successful in identifying a dozen such stripped stars in the Magellanic Clouds (MCs). However, the quality of the PSF and its photometric precision have limited these studies to low-density field regions, and to more massive stripped stars with no or optically-faint companions. Here we propose to take the detection of stripped stars to the next level, by testing and validating the use of HST FUV photometry in two 25-40 Myr massive MC clusters.

As FUV photometry is challenging given Brightness Object Protection constraints, we used archival WFC3/F225W photometry and VLT/MUSE integral field spectroscopy to avoid problematic objects in the clusters targeted here.

Characterizing the full stripped-star population is crucial to constrain binary evolution models and can only be achieved with FUV imaging. Our pilot project will open the possibility to detect stripped stars in their native clusters (hence assign them an age!), particularly stripped stars with optically bright companions (unidentifiable in the NUV or optical) and lower-mass stripped stars than possible so far.

OBSERVING DESCRIPTION

We aim to obtain deep STIS.MAMA FUV F25QTZ imaging at 4 positions in 2 different clusters in the magellanic clouds to:

- identified stripped stars in dense environments
- characterise the FUV crowding of sources in the MCs to prepare the upcoming UVEX mission

Using archival mF225W data (published in Milone+2018,2023), we identified these positions so that no stars is brighter than $mF225w=13.5$

Using ground-based integra-field spectroscopy (Bodensteiner+2022 for NGC330; unpublished for NGC1818), we check that there are no O-type stars in the field of view.

Proposal 18021 (STScI Edit Number: 0, Created: Thursday, March 12, 2026, 2:00:15PM Eastern Standard Time) - Overview

The combination of these two requirements ($T_{\text{eff}} < 30\text{kK}$ and mF225w) allow us to guarantee to safety of the instrument. We also check the total count rate by integrating the source fluxes over the FOV and found out that the global count rate of the detector stays $< 10\,000\text{ cnt/s}$

We plan 1 orbit per position. Given we don't need particular acquisition, we have a $\sim 2400\text{sec}$ integration duration that we split into 2 sub-exposure dither by 2arcsec to correct for cosmic and detector defects. We aim to reach sources with $(\text{Vega})\text{MagFUV} = 23$ ($\text{ABmag} \sim 24.5$) at 5sigma.

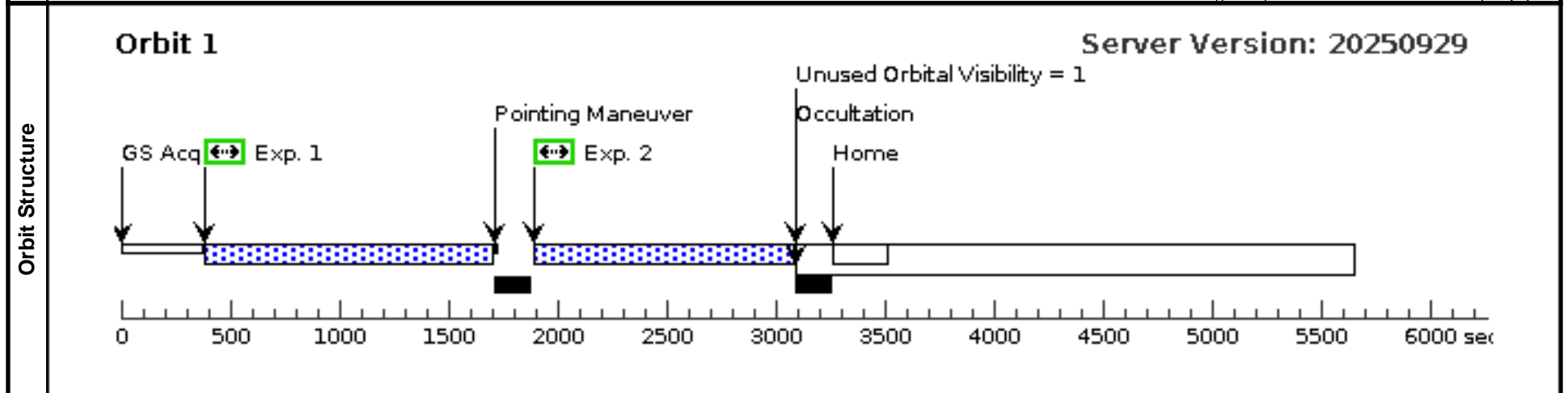
Proposal 18021 - Visit 01 - FUV imaging of massive Magellanic Clouds clusters

Thu Mar 12 19:00:15 GMT 2026

Visit	Proposal 18021, Visit 01, implementation				
	Diagnostic Status: No Diagnostics				
	Scientific Instruments: STIS/FUV-MAMA				
	Special Requirements: ORIENT 35D TO 55 D; ORIENT 125D TO 145 D; ORIENT 215D TO 235 D; ORIENT 305D TO 325 D				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	NGC1818-FIELD1	RA: 05 04 16.1500 (76.0672917d) Dec: -66 26 15.40 (-66.43761d) Equinox: J2000	Epoch of Position: 2000	V=15.5 mF225>13.5 VEGAMAG	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
	<i>Category=STELLAR CLUSTER</i>					
	<i>Description=[OPEN CLUSTER]</i>					

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.im.20 21549)	(1) NGC1818-FIELD1	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0			1173 Secs (1173 Secs)	
									[==>]	[1]
	2	(STIS.im.20 21549)	(1) NGC1818-FIELD1	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0	POS TARG 2,2		1173 Secs (1173 Secs)	
									[==>]	[1]



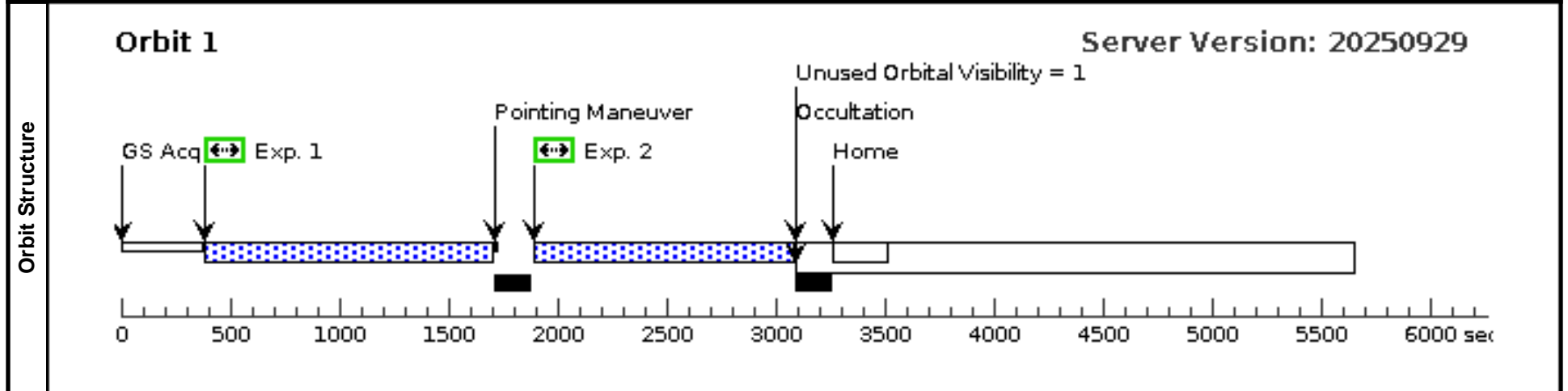
Proposal 18021 - Visit 02 - FUV imaging of massive Magellanic Clouds clusters

Thu Mar 12 19:00:16 GMT 2026

Visit	Proposal 18021, Visit 02, implementation				
	Diagnostic Status: No Diagnostics Scientific Instruments: STIS/FUV-MAMA Special Requirements: ORIENT 35D TO 55 D; ORIENT 125D TO 145 D; ORIENT 215D TO 235 D; ORIENT 305D TO 325 D				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(2)	NGC1818-FIELD2	RA: 05 04 11.4500 (76.0477083d) Dec: -66 26 23.80 (-66.43994d) Equinox: J2000		V=15.062 mF225>13.5 VEGAMAG	Reference Frame: ICRS
	<i>Comments:</i> Category=STELLAR CLUSTER Description=[OPEN CLUSTER]					

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.im.20 21549)	(2) NGC1818-FIELD2	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0			1173 Secs (1173 Secs) [=>]	[1]
	2	(STIS.im.20 21549)	(2) NGC1818-FIELD2	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0	POS TARG 2,2		1173 Secs (1173 Secs) [=>]	[1]



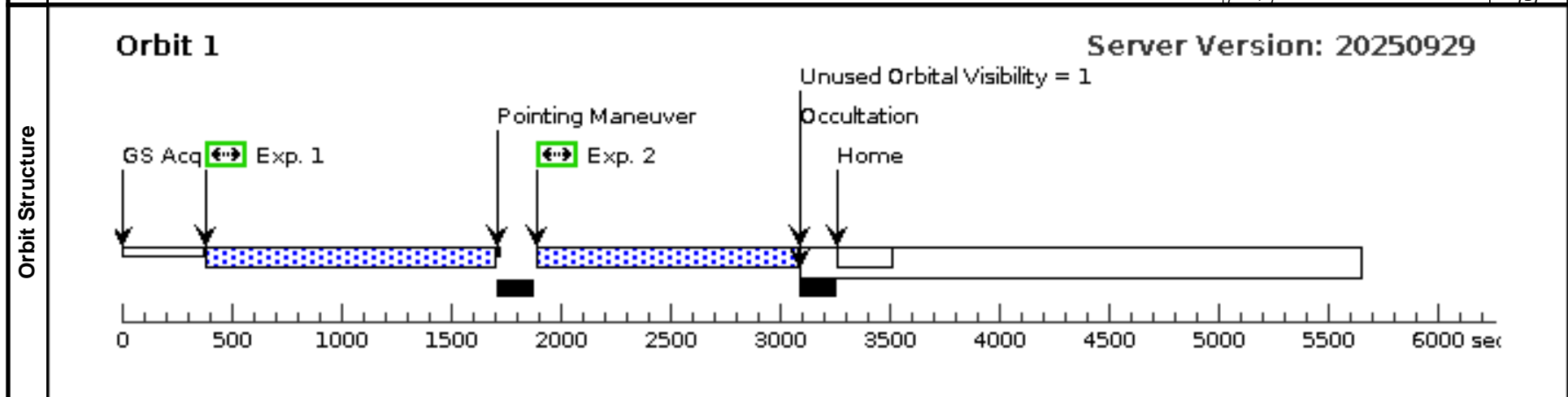
Proposal 18021 - Visit 03 - FUV imaging of massive Magellanic Clouds clusters

Thu Mar 12 19:00:16 GMT 2026

Visit	Proposal 18021, Visit 03, implementation				
	Diagnostic Status: No Diagnostics Scientific Instruments: STIS/FUV-MAMA Special Requirements: ORIENT 35D TO 55 D; ORIENT 125D TO 145 D; ORIENT 215D TO 235 D; ORIENT 305D TO 325 D				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(3)	NGC1818-FIELD3	RA: 05 04 10.9200 (76.0455000d) Dec: -66 25 54.30 (-66.43175d) Equinox: J2000	Epoch of Position: 2000	V=16.1 mF225>13.5 VEGAMAG	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=STELLAR CLUSTER Description=[OPEN CLUSTER]					

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.im.20 21549)	(3) NGC1818-FIELD3	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0			1173 Secs (1173 Secs) [=>]	[1]
	2	(STIS.im.20 21549)	(3) NGC1818-FIELD3	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0	POS TARG 2,2		1173 Secs (1173 Secs) [=>]	[1]



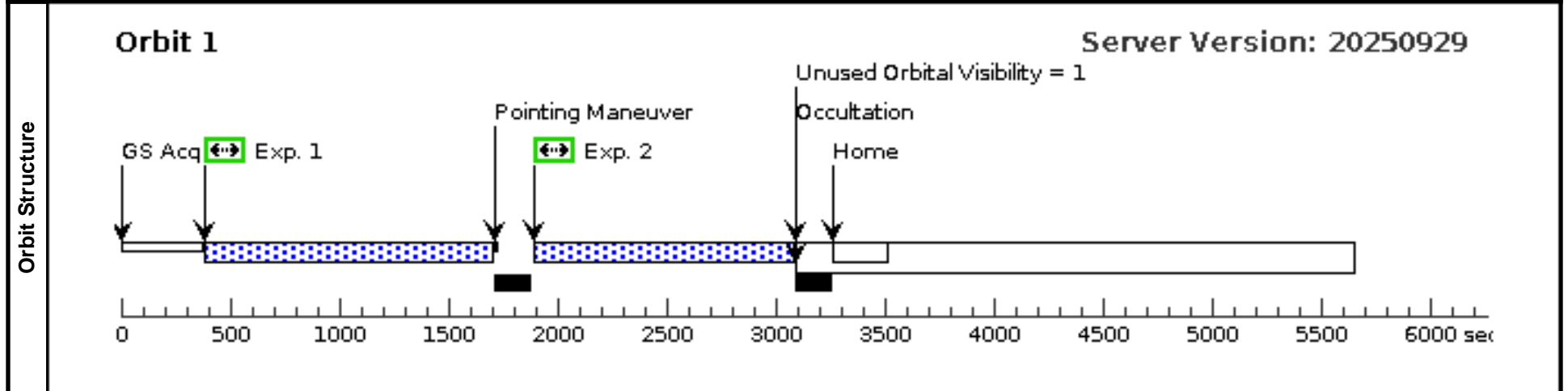
Proposal 18021 - Visit 04 - FUV imaging of massive Magellanic Clouds clusters

Thu Mar 12 19:00:16 GMT 2026

Visit	Proposal 18021, Visit 04, implementation				
	Diagnostic Status: No Diagnostics Scientific Instruments: STIS/FUV-MAMA Special Requirements: ORIENT 35D TO 55 D; ORIENT 125D TO 145 D; ORIENT 215D TO 235 D; ORIENT 305D TO 325 D				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(4)	NGC1818-FIELD4	RA: 05 04 16.4100 (76.0683750d) Dec: -66 25 47.20 (-66.42978d) Equinox: J2000	Epoch of Position: 2000	V=15.785 mF225>13.5 VEGAMAG	Reference Frame: ICRS
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=STELLAR CLUSTER Description=[OPEN CLUSTER]						

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.im.20 21549)	(4) NGC1818-FIELD4	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0			1173 Secs (1173 Secs) [=>]	[1]
2	(STIS.im.20 21549)	(4) NGC1818-FIELD4	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0	POS TARG 2,2		1173 Secs (1173 Secs) [=>]	[1]	



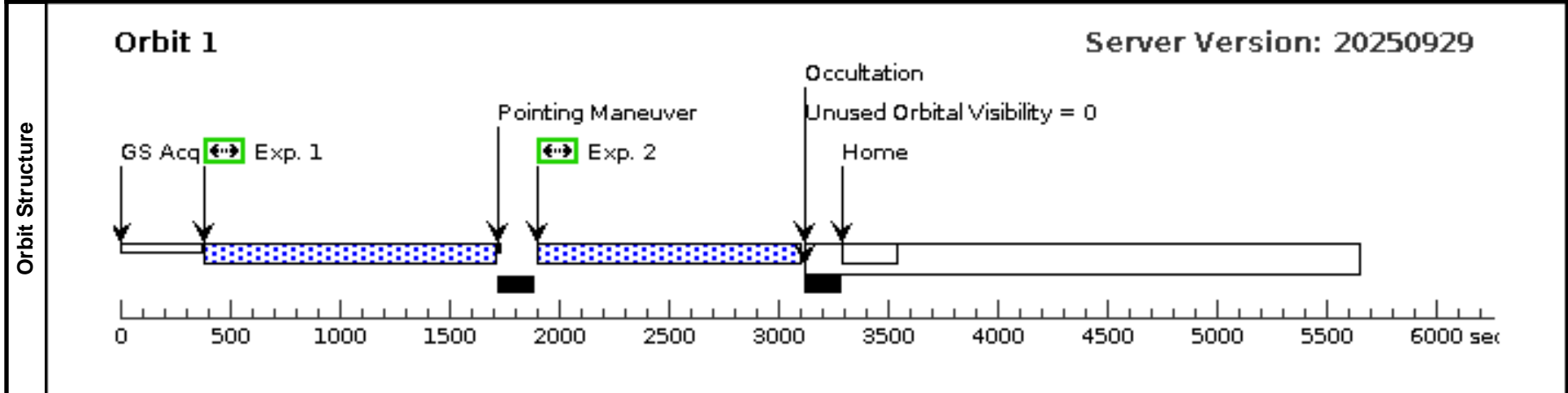
Proposal 18021 - Visit 05 - FUV imaging of massive Magellanic Clouds clusters

Thu Mar 12 19:00:16 GMT 2026

Visit	Proposal 18021, Visit 05, implementation				
	Diagnostic Status: No Diagnostics				
	Scientific Instruments: STIS/FUV-MAMA				
	Special Requirements: ORIENT 35D TO 55 D; ORIENT 125D TO 145 D; ORIENT 215D TO 235 D; ORIENT 305D TO 325 D				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(5)	NGC330-FIELD1	RA: 00 56 23.2400 (14.0968333d) Dec: -72 28 7.00 (-72.46861d) Equinox: J2000	Epoch of Position: 2000	V=12.6 mF225>13.5 VEGAMAG	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
	<i>Category=STELLAR CLUSTER Description=[OPEN CLUSTER]</i>					

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.im.20 21549)	(5) NGC330-FIELD 1	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0			1173 Secs (1188 Secs) [=>1188.0 Secs]	[1]
	2	(STIS.im.20 21549)	(5) NGC330-FIELD 1	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0	POS TARG 2,2		1173 Secs (1188 Secs) [=>1188.0 Secs]	[1]



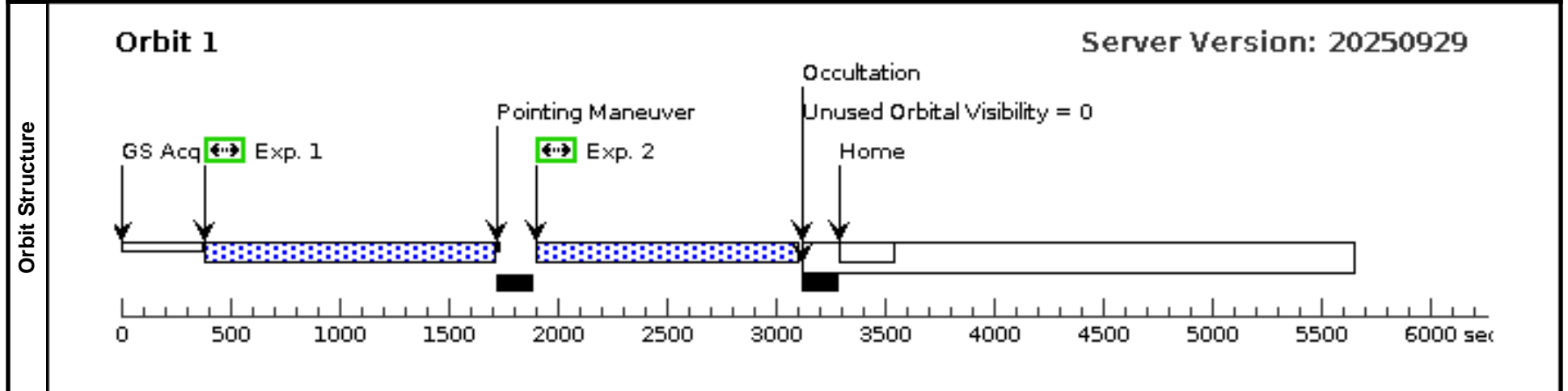
Proposal 18021 - Visit 06 - FUV imaging of massive Magellanic Clouds clusters

Thu Mar 12 19:00:16 GMT 2026

Visit	Proposal 18021, Visit 06, implementation				
	Diagnostic Status: No Diagnostics				
	Scientific Instruments: STIS/FUV-MAMA				
	Special Requirements: ORIENT 35D TO 55 D; ORIENT 125D TO 145 D; ORIENT 215D TO 235 D; ORIENT 305D TO 325 D				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(6)	NGC330-FIELD2	RA: 00 56 17.3600 (14.0723333d) Dec: -72 27 59.50 (-72.46653d) Equinox: J2000	Epoch of Position: 2000	V=13.52 mF225>13.5 VEGAMAG	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
	Category=STELLAR CLUSTER Description=[OPEN CLUSTER]					

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.im.20 21549)	(6) NGC330-FIELD 2	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0			1173 Secs (1188 Secs) [=>1188.0 Secs]	[1]
	2	(STIS.im.20 21549)	(6) NGC330-FIELD 2	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0	POS TARG 2,2		1173 Secs (1188 Secs) [=>1188.0 Secs]	[1]



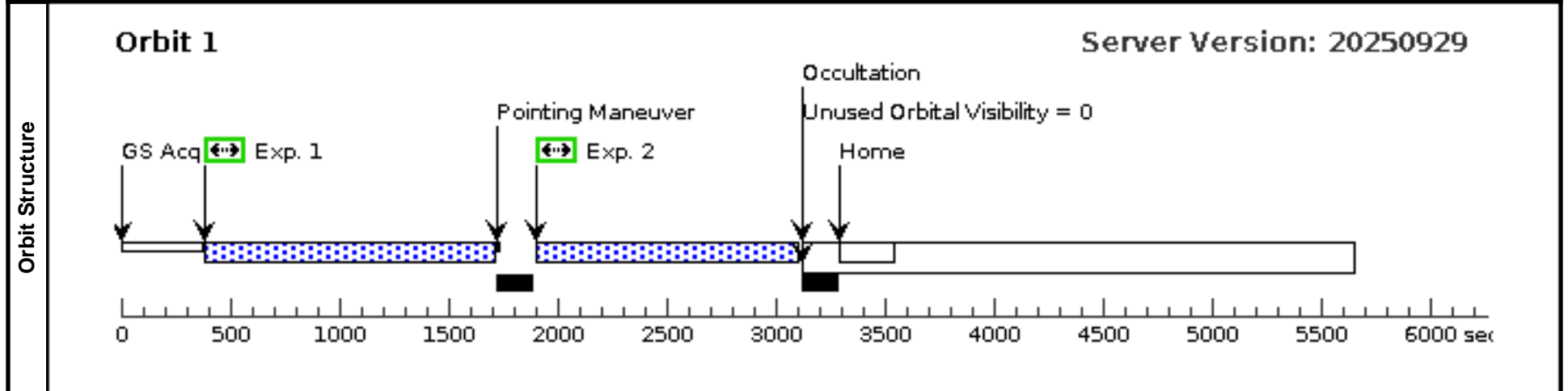
Proposal 18021 - Visit 07 - FUV imaging of massive Magellanic Clouds clusters

Thu Mar 12 19:00:16 GMT 2026

Visit	Proposal 18021, Visit 07, implementation				
	Diagnostic Status: No Diagnostics				
	Scientific Instruments: STIS/FUV-MAMA				
	Special Requirements: ORIENT 35D TO 55 D; ORIENT 125D TO 145 D; ORIENT 215D TO 235 D; ORIENT 305D TO 325 D				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(7)	NGC330-FIELD3	RA: 00 56 15.0100 (14.0625417d) Dec: -72 27 30.50 (-72.45847d) Equinox: J2000	Epoch of Position: 2000	V=13.81 mF225>13.5 VEGAMAG	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
	<i>Category=STELLAR CLUSTER</i> <i>Description=[OPEN CLUSTER]</i>					

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.im.20 21549)	(7) NGC330-FIELD 3	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0			1173 Secs (1188 Secs) [=>1188.0 Secs]	[1]
	2	(STIS.im.20 21549)	(7) NGC330-FIELD 3	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0	POS TARG 2,2		1173 Secs (1188 Secs) [=>1188.0 Secs]	[1]



Proposal 18021 - Visit 08 - FUV imaging of massive Magellanic Clouds clusters

Thu Mar 12 19:00:16 GMT 2026

Visit	Proposal 18021, Visit 08, implementation				
	Diagnostic Status: No Diagnostics				
	Scientific Instruments: STIS/FUV-MAMA				
	Special Requirements: ORIENT 35D TO 55 D; ORIENT 125D TO 145 D; ORIENT 215D TO 235 D; ORIENT 305D TO 325 D				

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(8)	NGC330-FIELD4	RA: 00 56 21.4500 (14.0893750d) Dec: -72 27 27.80 (-72.45772d) Equinox: J2000	Epoch of Position: 2000	V=13.14 mF225>13.5 VEGAMAG	Reference Frame: ICRS
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>					
	Category=STELLAR CLUSTER Description=[OPEN CLUSTER]					

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.im.20 21549)	(8) NGC330-FIELD 4	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0			1173 Secs (1188 Secs) [=>1188.0 Secs]	[1]
	2	(STIS.im.20 21549)	(8) NGC330-FIELD 4	STIS/FUV-MAMA, TIME-TAG, F25QZ	MIRROR	BUFFER-TIME=95 0	POS TARG 2,2		1173 Secs (1188 Secs) [=>1188.0 Secs]	[1]

