



17519 - Chasing the tail: measuring a proper motion of the Coma cluster dwarf ram-pressure-stripped galaxy GMP2640 with its extraordinary star cluster population.

Cycle: 31, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>
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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) GMP2640	ACS/WFC WFC3/UVIS	1	03-Jun-2025 16:00:13.0	yes
02	(1) GMP2640	ACS/WFC WFC3/UVIS	1	03-Jun-2025 16:00:13.0	yes
03	(1) GMP2640	ACS/WFC WFC3/UVIS	1	03-Jun-2025 16:00:14.0	yes
04	(2) GMP2640-TAIL	ACS/WFC WFC3/UVIS	1	03-Jun-2025 16:00:14.0	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>
05	(2) GMP2640-TAIL	ACS/WFC WFC3/UVIS	1	03-Jun-2025 16:00:15.0	yes
06	(2) GMP2640-TAIL	ACS/WFC WFC3/UVIS	1	03-Jun-2025 16:00:15.0	yes
07	(2) GMP2640-TAIL	ACS/WFC WFC3/UVIS	1	03-Jun-2025 16:00:15.0	yes
08	(2) GMP2640-TAIL	ACS/WFC WFC3/UVIS	1	03-Jun-2025 16:00:16.0	yes
09	(2) GMP2640-TAIL	ACS/WFC WFC3/UVIS	1	03-Jun-2025 16:00:16.0	yes

9 Total Orbits Used

ABSTRACT

GMP2640 is the most luminous diffuse post-starburst galaxy in the Coma cluster ($D=99\text{Mpc}$) identified using data mining. Despite relatively low stellar mass ($2.4 \times 10^9 \text{MSun}$), it hosts a strikingly large population of 450+ massive intermediate-age star clusters detected in an archival HST image in its disk and hundreds of additional clusters in its spectacular 270kpc-long ram-pressure-blown tail. Measuring age gradient of clusters along the tail opens a unique opportunity to measure a velocity of GMP2640 in the plane of the sky, i.e. its proper motion at the striking distance of 100Mpc. We propose to collect high-resolution HST images of GMP2640 and its tail using WFC3 in prime orbits and ACS/WFC in coordinated parallel fields. We will detect star cluster populations and measure their ages, metallicities, hence mass and luminosity functions, and assess the plausibility of the formation of central star clusters in a dEs via mergers of in-situ formed star clusters. Our project will address the question of rich star cluster systems in low-mass galaxies as well as the question of dE/UDG formation via ram pressure stripping in galaxy clusters.

OBSERVING DESCRIPTION

Here we propose to obtain high-resolution NUV and optical images of the diffuse post-starburst galaxy GMP 2640 and its spectacular tail with WFC3/UVIS using a special combination of filters to disentangle age and metallicity effects in stellar populations (and Advanced Camera for Surveys in the coordinated parallel mode for the older part of the tail). The selected filters are F200LP, F350LP, and F600LP filters for WFC3-UVIS scheduled for the 6 primary orbits (3 orbits per field; 1 orbit per filter). (i) the F200LP-F350LP difference image provides the deepest broad-band near-UV imaging available at the HST, which is required to precisely age young and intermediate-age star clusters and by using UV stellar

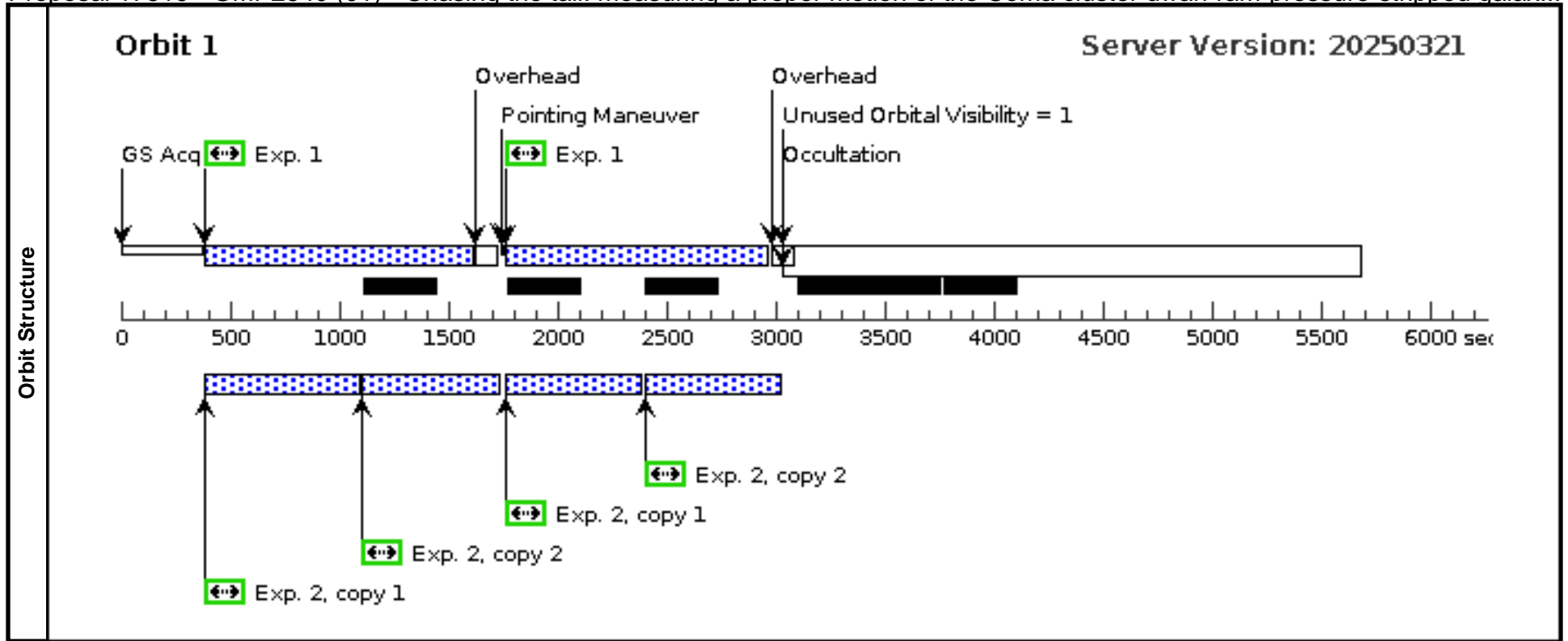
Proposal 17519 (STScI Edit Number: 2, Created: Tuesday, June 3, 2025, 3:00:17PM Eastern Standard Time) - Overview

continuum from B and A stars (GMP~2640 has a strong GALEX detection); (ii) F600LP will be the primary filter for the 2D light profile decomposition of the main galaxy spheroid; the F350_600LP-F650LP color will be used to estimate stellar population gradients. This filter combination will be crucial to measure star cluster ages and metallicities. We will use coordinated parallel observations of the outer part of the RPS tail of GMP 2640 with ACS/WFC using optical colors (2 orbits in F475W and 1 orbit in F814W for each pointing). The main goal of the parallel observations is to collect deep optical images of the filaments of the tail, which are not resolved into clusters in the ground-based Subaru HyperSuprimeCam (120 - 250 kpc from the center of GMP 2640). If we detect fainter and older star clusters, this will become an important step towards understanding the unbound star cluster population and its contribution to the intracluster light in Coma. For this reason, we have a position angle constraint of 110 ± 10 deg (a slight change in the angle can be compensated by shifting the center of the field) limiting the scheduling to Jun--Aug.

Proposal 17519 - GMP2640 (01) - Chasing the tail: measuring a proper motion of the Coma cluster dwarf ram-pressure-stripped galaxy...

Tue Jun 03 20:00:17 GMT 2025

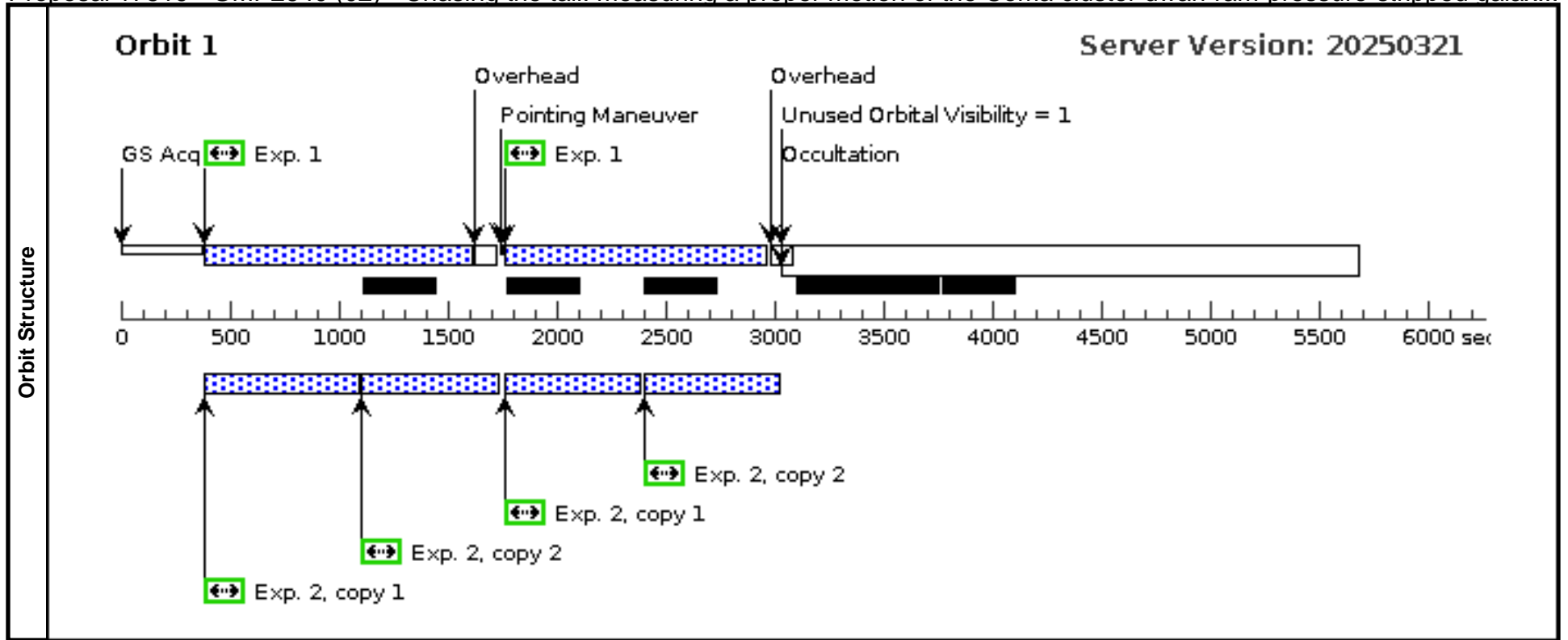
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Patterns	#	Primary Pattern	Secondary Pattern		Exposures					
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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	GMP2640	RA: 13 00 24.3232 (195.1013467d) Dec: +27 31 43.43 (27.52873d) Equinox: J2000		V=15.9	Reference Frame: ICRS				
Comments: Category=GALAXY Description=[DWARF ELLIPTICAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) GMP2640	(1) GMP2640	WFC3/UVIS, ACCUM, UVIS	F200LP			Pattern 1, Exps 1-2 in GMP2640 (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640 (01)	1275 Secs (2410 Secs) [==>1205.0 Secs (Pattern 1)] [==>1205.0 Secs (Pattern 2)]	[1]
2	(1) GMP2640	(1) GMP2640	ACS/WFC, ACCUM, WFC	F814W				Pattern 1, Exps 1-2 in GMP2640 (01) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640 (01)	525 Secs X 2 (1992 Secs) [==>503.0 Secs (Pattern 1, Copy 1)] [==>503.0 Secs (Pattern 1, Copy 2)] [==>493.0 Secs (Pattern 2, Copy 1)] [==>493.0 Secs (Pattern 2, Copy 2)]	[1]



Proposal 17519 - GMP2640 (02) - Chasing the tail: measuring a proper motion of the Coma cluster dwarf ram-pressure-stripped galaxy...

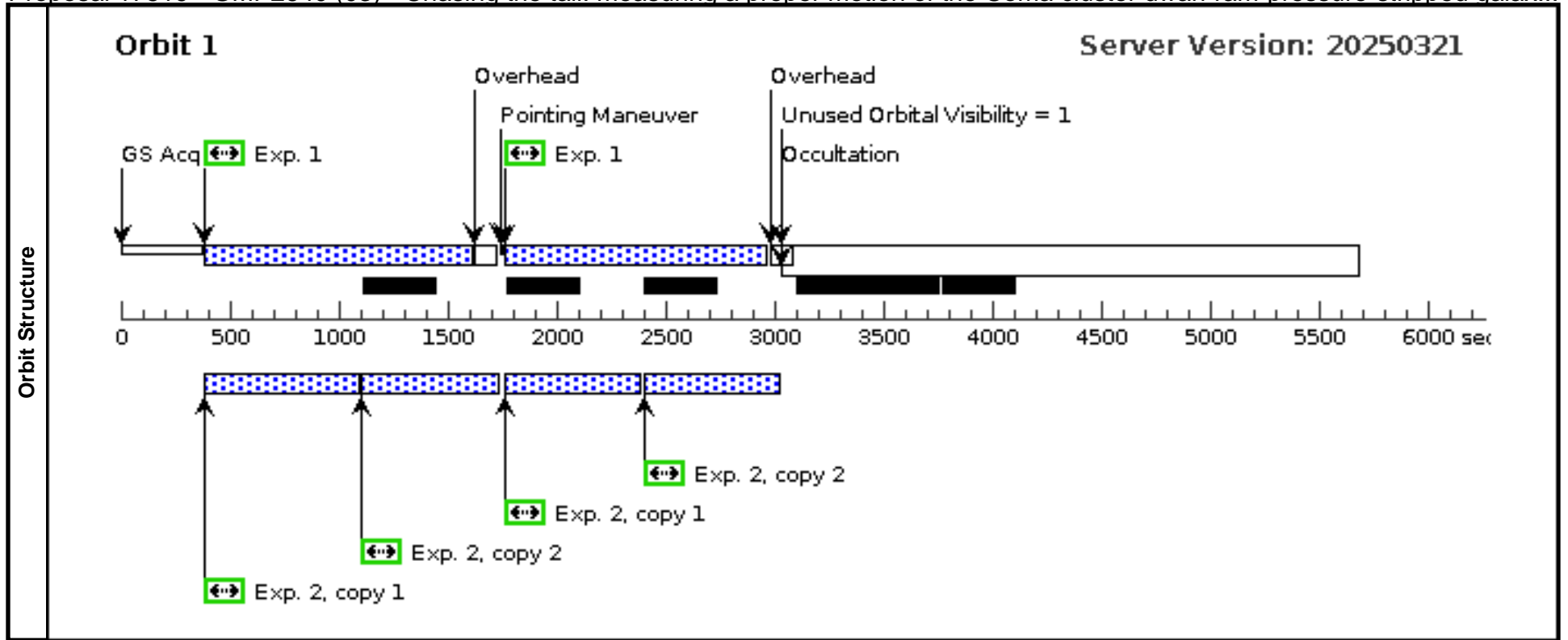
Tue Jun 03 20:00:17 GMT 2025

Visit	Proposal 17519, GMP2640 (02), completed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01									
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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	GMP2640	RA: 13 00 24.3232 (195.1013467d) Dec: +27 31 43.43 (27.52873d) Equinox: J2000		V=15.9	Reference Frame: ICRS				
<i>Comments:</i> Category=GALAXY Description=[DWARF ELLIPTICAL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) GMP2640	WFC3/UVIS, ACCUM, UVIS	F350LP				Pattern 1, Exps 1-2 in GMP2640 (02) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640 (02)	1275 Secs (2410 Secs) [==>1205.0 Secs (Pattern 1)] [==>1205.0 Secs (Pattern 2)]
2		(1) GMP2640	ACS/WFC, ACCUM, WFC	F475W				Pattern 1, Exps 1-2 in GMP2640 (02) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640 (02)	525 Secs X 2 (1992 Secs) [==>503.0 Secs (Pattern 1, Copy 1)] [==>503.0 Secs (Pattern 1, Copy 2)] [==>493.0 Secs (Pattern 2, Copy 1)] [==>493.0 Secs (Pattern 2, Copy 2)]	[1]



Proposal 17519 - GMP2640 (03) - Chasing the tail: measuring a proper motion of the Coma cluster dwarf ram-pressure-stripped galaxy...

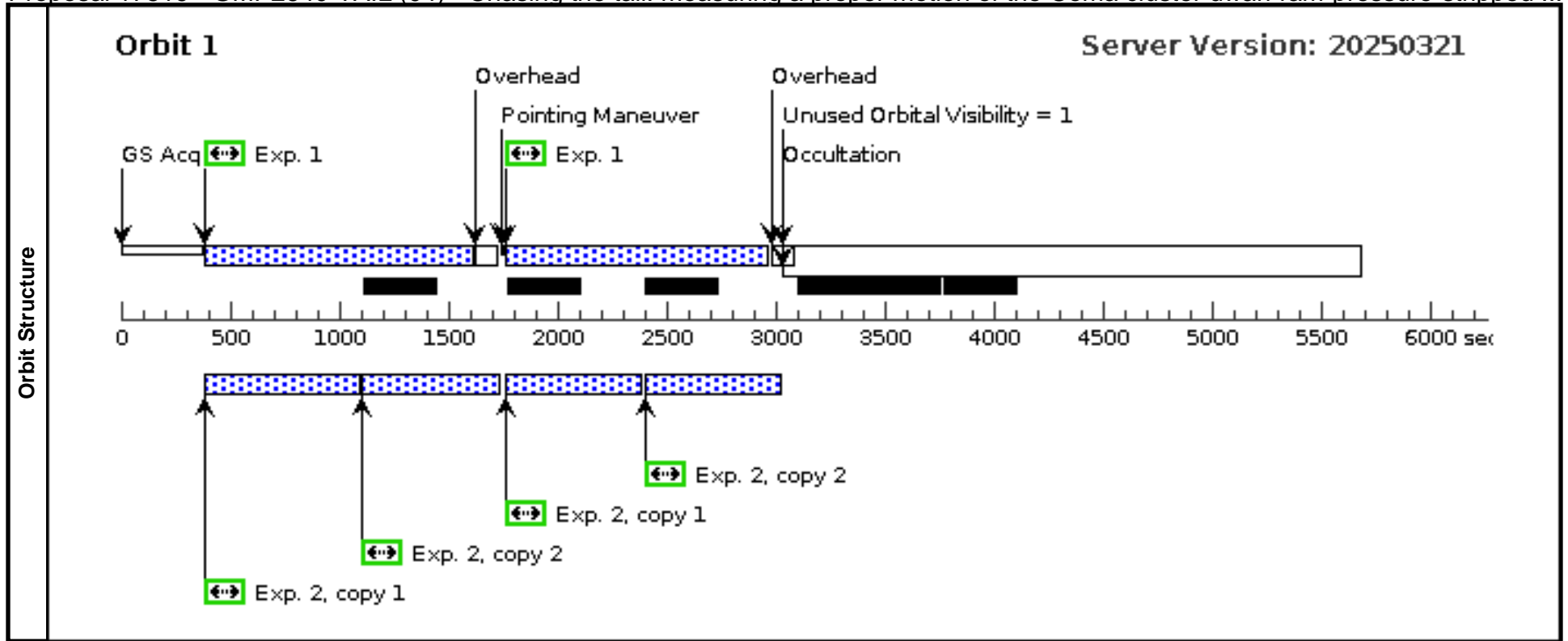
Visit	Proposal 17519, GMP2640 (03), completed Tue Jun 03 20:00:17 GMT 2025 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 01									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	GMP2640	RA: 13 00 24.3232 (195.1013467d) Dec: +27 31 43.43 (27.52873d) Equinox: J2000 <i>Comments:</i> Category=GALAXY Description=[DWARF ELLIPTICAL]		V=15.9	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) GMP2640		WFC3/UVIS, ACCUM, UVIS	F600LP			Pattern 1, Exps 1-2 in GMP2640 (03) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640 (03)	1275 Secs (2410 Secs) [==>1205.0 Secs (Pattern 1)] [==>1205.0 Secs (Pattern 2)]	[1]
2	(1) GMP2640		ACS/WFC, ACCUM, WFC	F475W			Pattern 1, Exps 1-2 in GMP2640 (03) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640 (03)	525 Secs X 2 (1992 Secs) [==>503.0 Secs (Pattern 1, Copy 1)] [==>503.0 Secs (Pattern 1, Copy 2)] [==>493.0 Secs (Pattern 2, Copy 1)] [==>493.0 Secs (Pattern 2, Copy 2)]	[1]	



Proposal 17519 - GMP2640-TAIL (04) - Chasing the tail: measuring a proper motion of the Coma cluster dwarf ram-pressure-stripped ...

Tue Jun 03 20:00:17 GMT 2025

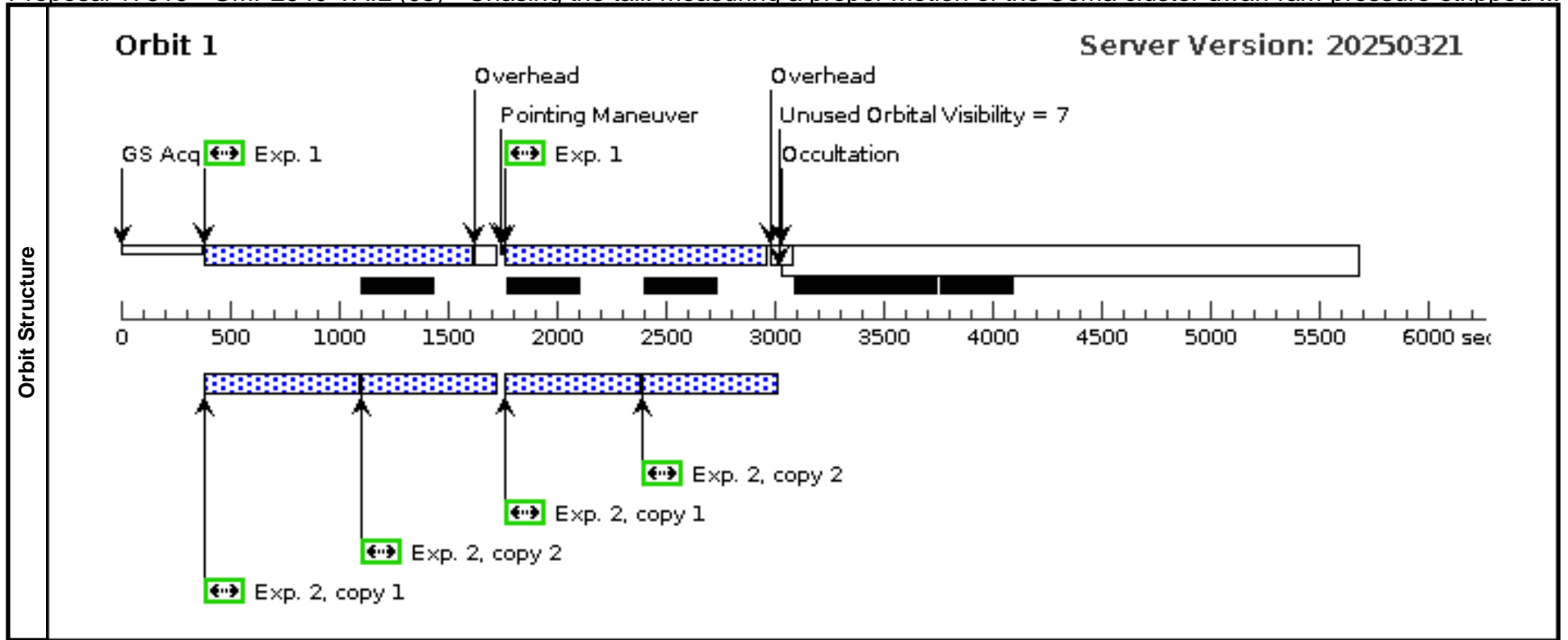
Visit	Proposal 17519, GMP2640-TAIL (04), failed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: ORIENT 130D TO 143 D									
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	(1)	Pattern Type=WFC3-UVIS-GAP-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.6 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.759 Angle Between Sides= Center Pattern=true		(1-2)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	GMP2640-TAIL	RA: 13 00 22.7926 (195.0949692d) Dec: +27 34 21.38 (27.57261d) Equinox: J2000		V=27.0	Reference Frame: ICRS				
	<i>Comments:</i> Category=ISM Description=[TIDAL TAIL]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) GMP2640-TAIL	WFC3/UVIS, ACCUM, UVIS	F200LP				Pattern 1, Exps 1-2 in GMP2640-TAIL (04) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640-TAIL (04)	1275 Secs (2410 Secs) [==>1205.0 Secs (Pattern 1)] [==>1205.0 Secs (Pattern 2)]
2		(2) GMP2640-TAIL	ACS/WFC, ACCUM, WFC	F814W				Pattern 1, Exps 1-2 in GMP2640-TAIL (04) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640-TAIL (04)	525 Secs X 2 (1992 Secs) [==>503.0 Secs (Pattern 1, Copy 1)] [==>503.0 Secs (Pattern 1, Copy 2)] [==>493.0 Secs (Pattern 2, Copy 1)] [==>493.0 Secs (Pattern 2, Copy 2)]	[1]



Proposal 17519 - GMP2640-TAIL (05) - Chasing the tail: measuring a proper motion of the Coma cluster dwarf ram-pressure-stripped ...

Tue Jun 03 20:00:17 GMT 2025

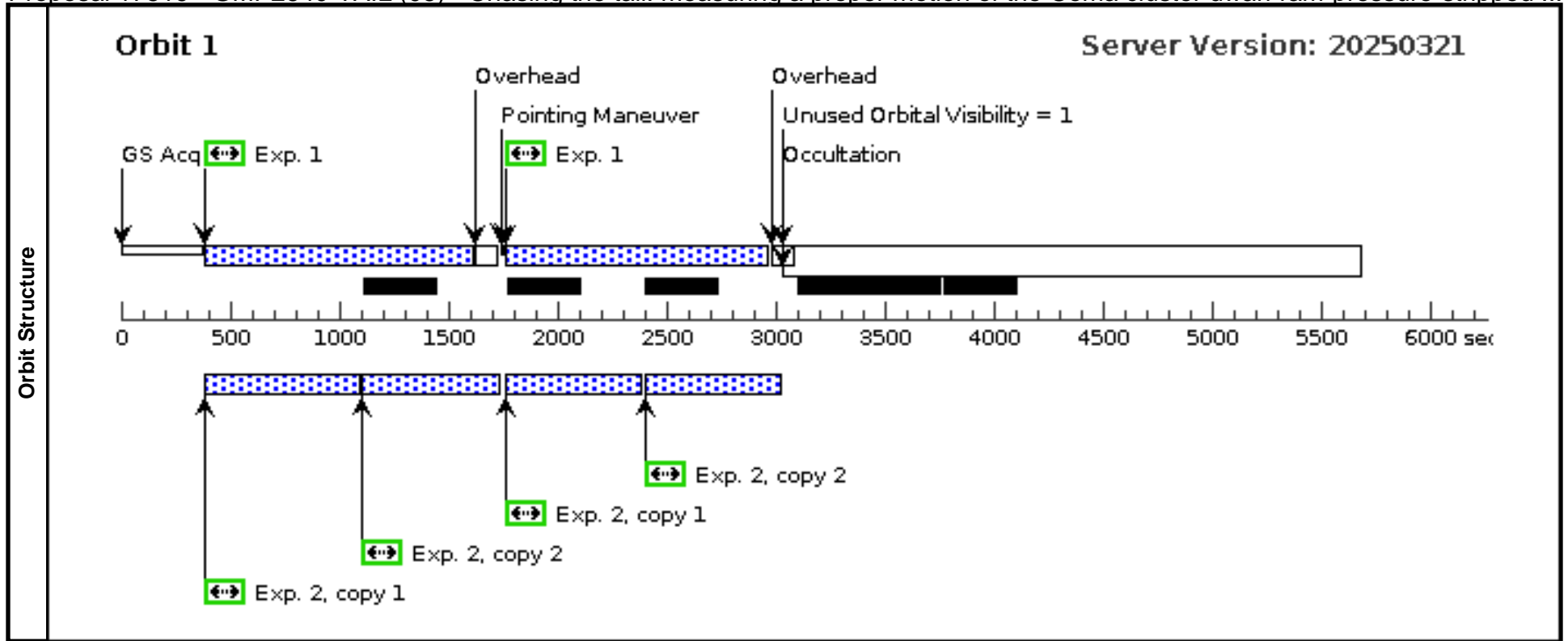
Visit	Proposal 17519, GMP2640-TAIL (05), failed Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SAME ORIENT AS 04									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=WFC3-UVIS-GAP-LINE Purpose=DITHER Number Of Points=2 Point Spacing=3.6 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.759 Angle Between Sides= Center Pattern=true		(1-2)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	GMP2640-TAIL	RA: 13 00 22.7926 (195.0949692d) Dec: +27 34 21.38 (27.57261d) Equinox: J2000		V=27.0	Reference Frame: ICRS				
<i>Comments:</i> Category=ISM Description=[TIDAL TAIL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) GMP2640-TAIL	WFC3/UVIS, ACCUM, UVIS	F350LP				Pattern 1, Exps 1-2 in GMP2640-TAIL (05) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640-TAIL (05)	1275 Secs (2406 Secs) [==>1203.0 Secs (Pattern 1)] [==>1203.0 Secs (Pattern 2)]
2		(2) GMP2640-TAIL	ACS/WFC, ACCUM, WFC	F475W				Pattern 1, Exps 1-2 in GMP2640-TAIL (05) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640-TAIL (05)	525 Secs X 2 (1986 Secs) [==>501.0 Secs (Pattern 1, Copy 1)] [==>501.0 Secs (Pattern 1, Copy 2)] [==>492.0 Secs (Pattern 2, Copy 1)] [==>492.0 Secs (Pattern 2, Copy 2)]	[1]



Proposal 17519 - GMP2640-TAIL (06) - Chasing the tail: measuring a proper motion of the Coma cluster dwarf ram-pressure-stripped ...

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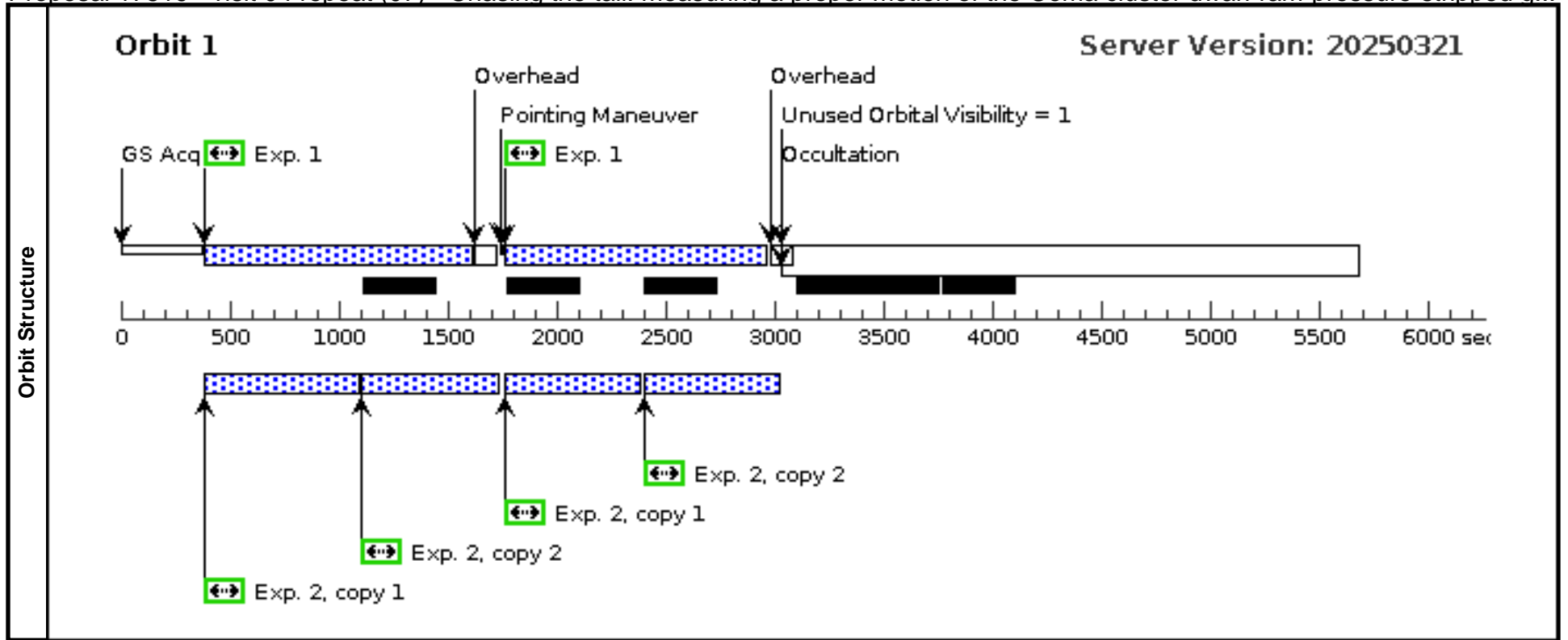
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	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
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<i>Comments:</i> Category=ISM Description=[TIDAL TAIL]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(2) GMP2640-TAIL	WFC3/UVIS, ACCUM, UVIS	F600LP				Pattern 1, Exps 1-2 in GMP2640-TAIL (06) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640-TAIL (06)	1275 Secs (2410 Secs) [==>1205.0 Secs (Pattern 1)] [==>1205.0 Secs (Pattern 2)]
2		(2) GMP2640-TAIL	ACS/WFC, ACCUM, WFC	F475W				Pattern 1, Exps 1-2 in GMP2640-TAIL (06) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in GMP2640-TAIL (06)	525 Secs X 2 (1992 Secs) [==>503.0 Secs (Pattern 1, Copy 1)] [==>503.0 Secs (Pattern 1, Copy 2)] [==>493.0 Secs (Pattern 2, Copy 1)] [==>493.0 Secs (Pattern 2, Copy 2)]	[1]



Proposal 17519 - visit 04 repeat (07) - Chasing the tail: measuring a proper motion of the Coma cluster dwarf ram-pressure-stripped g...

Tue Jun 03 20:00:17 GMT 2025

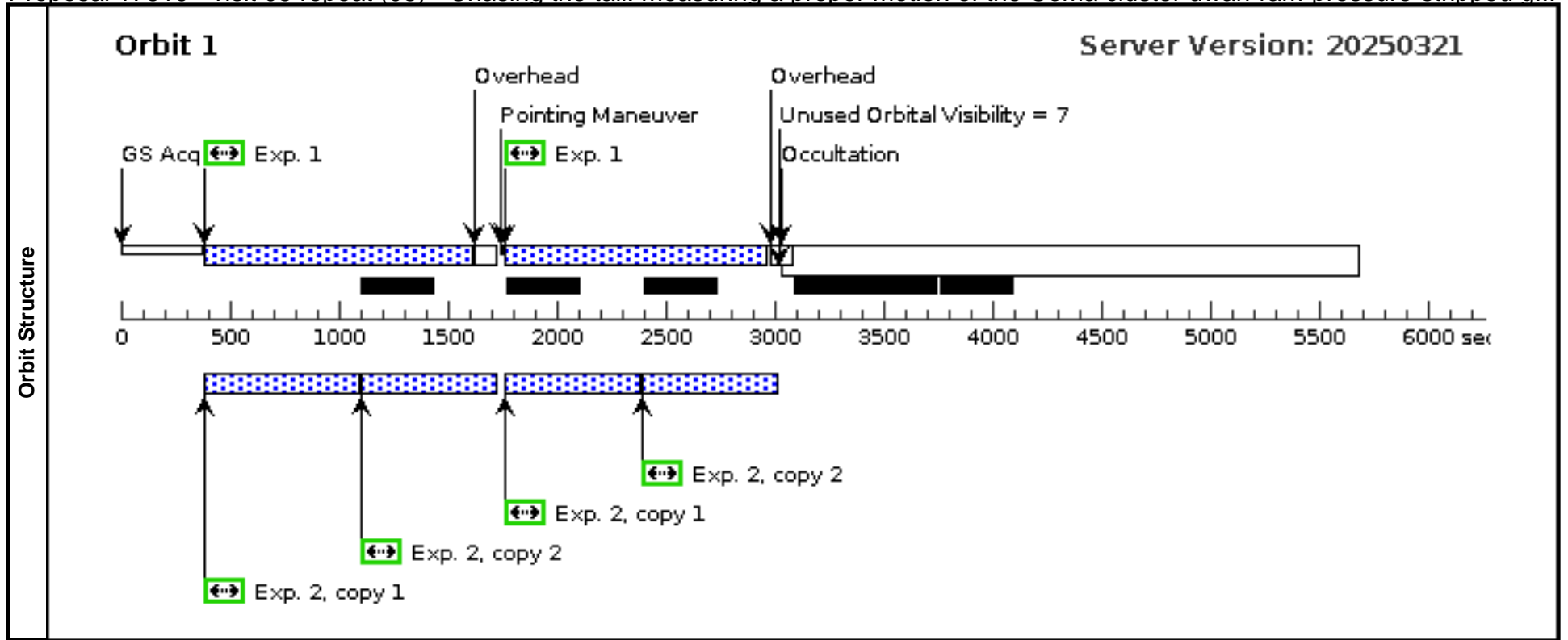
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	(visit 04 repeat (07)) Warning (Orbit Planner): Use Target ANY for parallel or add ORIENT to ensure pointing of parallel										
Diagnosics											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures	
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Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(2)	GMP2640-TAIL	RA: 13 00 22.7926 (195.0949692d) Dec: +27 34 21.38 (27.57261d) Equinox: J2000					V=27.0		Reference Frame: ICRS	
Comments: Category=ISM Description=[TIDAL TAIL]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(2) GMP2640-TAIL	WFC3/UVIS, ACCUM, UVIS	F200LP				Pattern 1, Exps 1-2 in visit 04 repeat (07) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in visit 04 repeat (07)	1275 Secs (2410 Secs) [==>1205.0 Secs (Pattern 1)] [==>1205.0 Secs (Pattern 2)]		[1]
	2	(2) GMP2640-TAIL	ACS/WFC, ACCUM, WFC	F814W				Pattern 1, Exps 1-2 in visit 04 repeat (07) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in visit 04 repeat (07)	525 Secs X 2 (1992 Secs) [==>503.0 Secs (Pattern 1, Copy 1)] [==>503.0 Secs (Pattern 1, Copy 2)] [==>493.0 Secs (Pattern 2, Copy 1)] [==>493.0 Secs (Pattern 2, Copy 2)]		[1]



Proposal 17519 - visit 05 repeat (08) - Chasing the tail: measuring a proper motion of the Coma cluster dwarf ram-pressure-stripped g...

Tue Jun 03 20:00:17 GMT 2025

Visit	Proposal 17519, visit 05 repeat (08) Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: (none)										
	(visit 05 repeat (08)) Warning (Orbit Planner): Use Target ANY for parallel or add ORIENT to ensure pointing of parallel										
Diagnosics											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures	
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Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(2)	GMP2640-TAIL	RA: 13 00 22.7926 (195.0949692d) Dec: +27 34 21.38 (27.57261d) Equinox: J2000					V=27.0		Reference Frame: ICRS	
Comments: Category=ISM Description=[TIDAL TAIL]											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(2) GMP2640-TAIL	WFC3/UVIS, ACCUM, UVIS	F350LP				Pattern 1, Exps 1-2 in visit 05 repeat (08) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in visit 05 repeat (08)	1275 Secs (2406 Secs) [==>1203.0 Secs (Pattern 1)] [==>1203.0 Secs (Pattern 2)]		[1]
	2	(2) GMP2640-TAIL	ACS/WFC, ACCUM, WFC	F475W				Pattern 1, Exps 1-2 in visit 05 repeat (08) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in visit 05 repeat (08)	525 Secs X 2 (1986 Secs) [==>501.0 Secs (Pattern 1, Copy 1)] [==>501.0 Secs (Pattern 1, Copy 2)] [==>492.0 Secs (Pattern 2, Copy 1)] [==>492.0 Secs (Pattern 2, Copy 2)]		[1]



Proposal 17519 - Visit 06 repeat (09) - Chasing the tail: measuring a proper motion of the Coma cluster dwarf ram-pressure-stripped g...

Tue Jun 03 20:00:17 GMT 2025

Visit	Proposal 17519, Visit 06 repeat (09) Diagnostic Status: Warning Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: (none)						
	(Visit 06 repeat (09)) Warning (Orbit Planner): Use Target ANY for parallel or add ORIENT to ensure pointing of parallel						
Diagnosics							
Patterns	#	Primary Pattern	Secondary Pattern		Exposures		
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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes		
	(2)	GMP2640-TAIL	RA: 13 00 22.7926 (195.0949692d) Dec: +27 34 21.38 (27.57261d) Equinox: J2000		V=27.0		
Comments: Category=ISM Description=[TIDAL TAIL]							
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.		
	1	(2) GMP2640-TAIL	WFC3/UVIS, ACCUM, UVIS	F600LP			
					Pattern 1, Exps 1-2 in Visit 06 repeat (09) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in Visit 06 repeat (09)	1275 Secs (2410 Secs) [==>1205.0 Secs (Pattern 1)] [==>1205.0 Secs (Pattern 2)]	[1]
					Pattern 1, Exps 1-2 in Visit 06 repeat (09) (1) Prime + Parallel Group 1-2 in Pattern 1, Exps 1-2 in Visit 06 repeat (09)	525 Secs X 2 (1992 Secs) [==>503.0 Secs (Pattern 1, Copy 1)] [==>503.0 Secs (Pattern 1, Copy 2)] [==>493.0 Secs (Pattern 2, Copy 1)] [==>493.0 Secs (Pattern 2, Copy 2)]	[1]

