



## 14639 - Finding AM CVn stars in 47 Tuc

Cycle: 24, Proposal Category: GO

(Availability Mode: SUPPORTED)

### INVESTIGATORS

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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) NGC-104	WFC3/UVIS	3	29-Jul-2016 14:12:49.0	yes
02	(1) NGC-104	WFC3/UVIS	3	29-Jul-2016 14:12:51.0	yes
03	(1) NGC-104	WFC3/UVIS	3	29-Jul-2016 14:12:52.0	yes
04	(1) NGC-104	WFC3/UVIS	1	29-Jul-2016 14:12:53.0	yes

10 Total Orbits Used

## **ABSTRACT**

We propose to observe 47 Tuc in He I (using the redshifted H-alpha filter centered on 665 nm) and a relatively broad emission line filter for slightly higher redshift H-alpha at 680 nm to get a clean continuum measurement. These narrow band images will reveal sources in the cluster which are strong in one of the two filters, but not in the other. The objects strong in only H-alpha will be strong candidates for being cataclysmic variables, while the objects strong in only He I will be strong candidates to be ultracompact binaries -- accreting compact objects in which the donor star is a white dwarf. These objects are key tracers of whether globular clusters are important factories for making gravitational wave sources, and Type Ia supernovae. Furthermore, because AM CVn stars are the only class of objects which has a characteristic lifetime shorter than the dynamical evolution timescale of the cluster while also being likely to be numerous, developing an approach for finding them also opens up the possibility of examining the historical evolution of the cores of globular clusters.

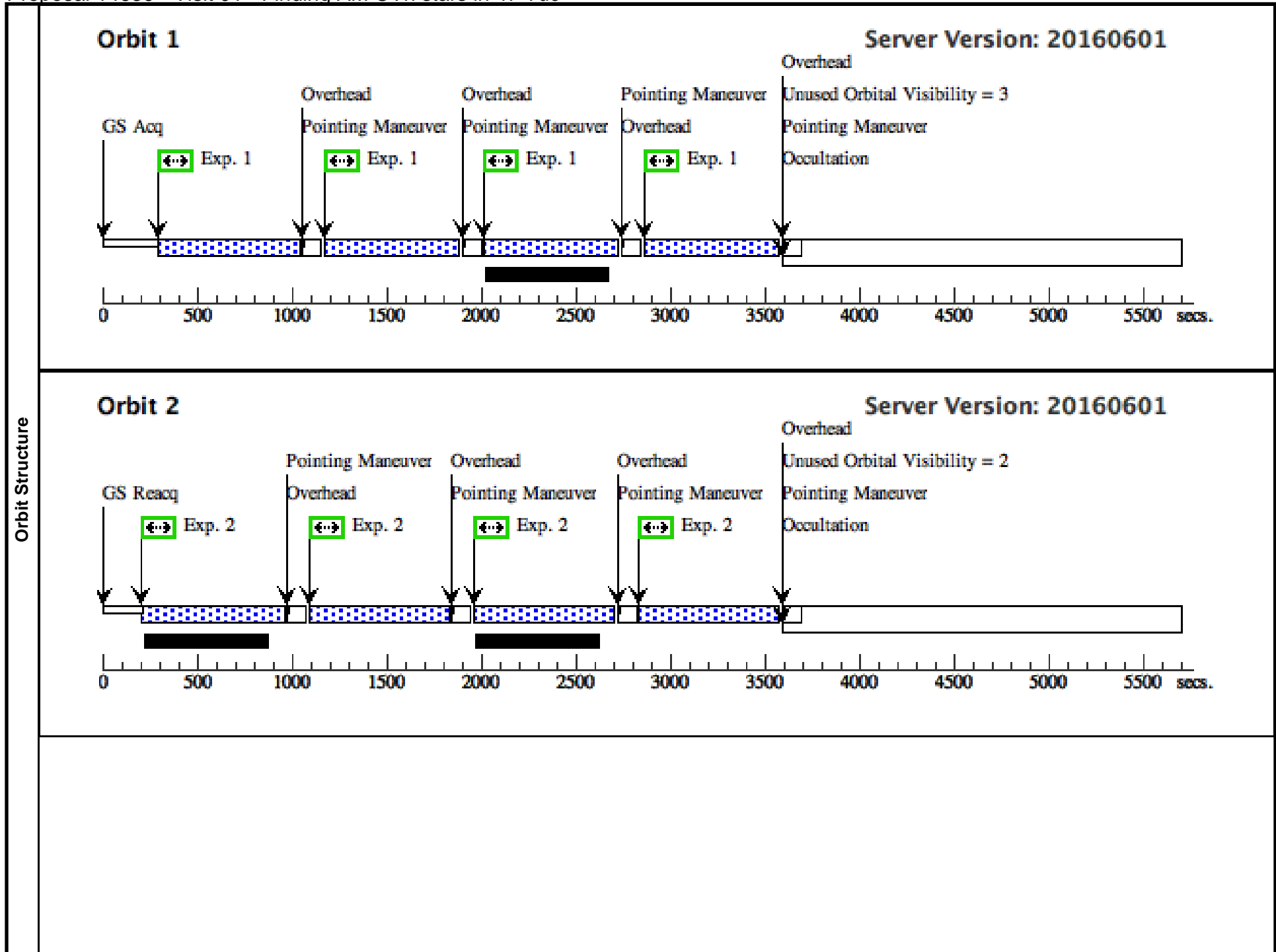
## **OBSERVING DESCRIPTION**

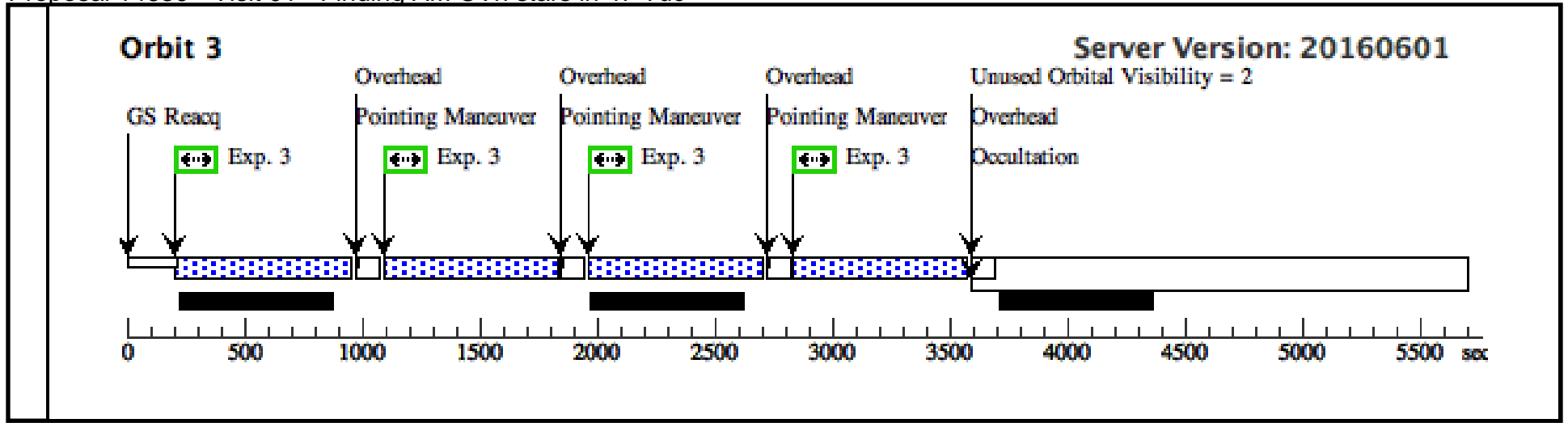
The proposal is to make narrow band images of the globular cluster 47 Tuc. The F665N filter will be used as a He I filter, while the F680N filter will be used as a continuum filter. The main goal is to search for hydrogen deficient stars like AM CVn stars.

Proposal 14639 - Visit 01 - Finding AM CVn stars in 47 Tuc

Fri Jul 29 18:12:54 GMT 2016

<b>Visit</b>	<b>Proposal 14639, Visit 01</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: (none)									
	(Exposure 1 (Pattern 1, Exps 1-1 in Visit 01)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 2 (Pattern 1, Exps 2-2 in Visit 01)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 3 (Pattern 1, Exps 3-3 in Visit 01)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser									
<b>Diagnosics</b>										
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>						
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1), (2), (3)					
<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)	NGC-104	RA: 00 24 5.3590 (6.0223292d) Dec: -72 04 53.20 (-72.08144d) Equinox: J2000		V=4.09	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>										
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>	<b>Orbit</b>
	1	(1) NGC-104	(1) NGC-104	WFC3/UVIS, ACCUM, UVIS	F665N			Pattern 1, Exps 1-1 in Visit 01 (1)	717 Secs (2868 Secs)	
	<i>Comments: No flash has been added because the object is a globular cluster, and the wings of the PSFs of nearby stars will provide a background level typically equivalent to a 9 electron flash.</i>									
	2	(1) NGC-104	(1) NGC-104	WFC3/UVIS, ACCUM, UVIS	F680N			Pattern 1, Exps 2-2 in Visit 01 (1)	745 Secs (2980 Secs)	
<i>Comments: No flash has been added because the object is a globular cluster, and the wings of the PSFs of nearby stars will provide a background level typically equivalent to a 9 electron flash.</i>										
3	(1) NGC-104	(1) NGC-104	WFC3/UVIS, ACCUM, UVIS	F665N			Pattern 1, Exps 3-3 in Visit 01 (1)	745 Secs (2980 Secs)		
<i>Comments: No flash has been added because the object is a globular cluster, and the wings of the PSFs of nearby stars will provide a background level typically equivalent to a 9 electron flash.</i>										

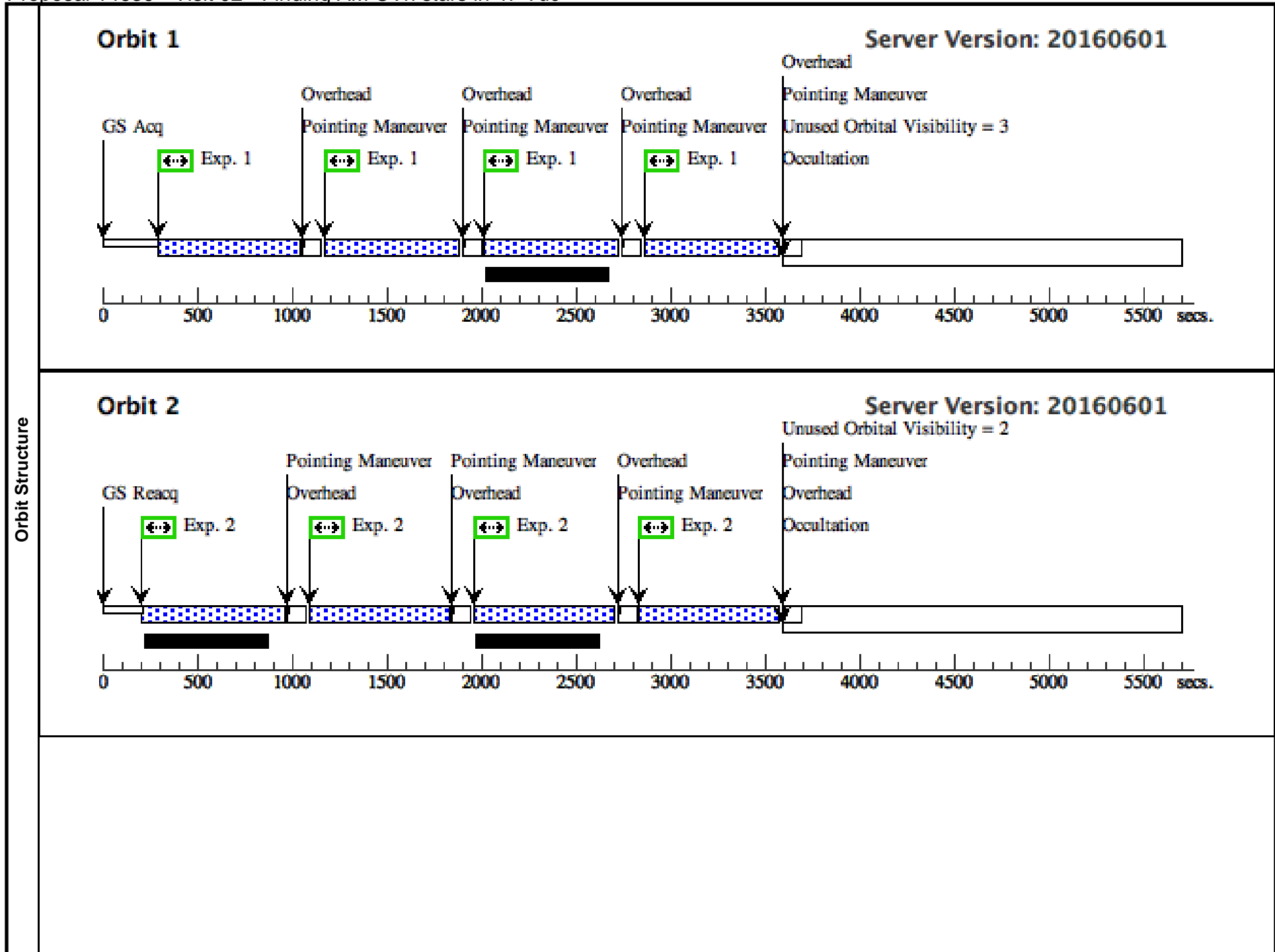


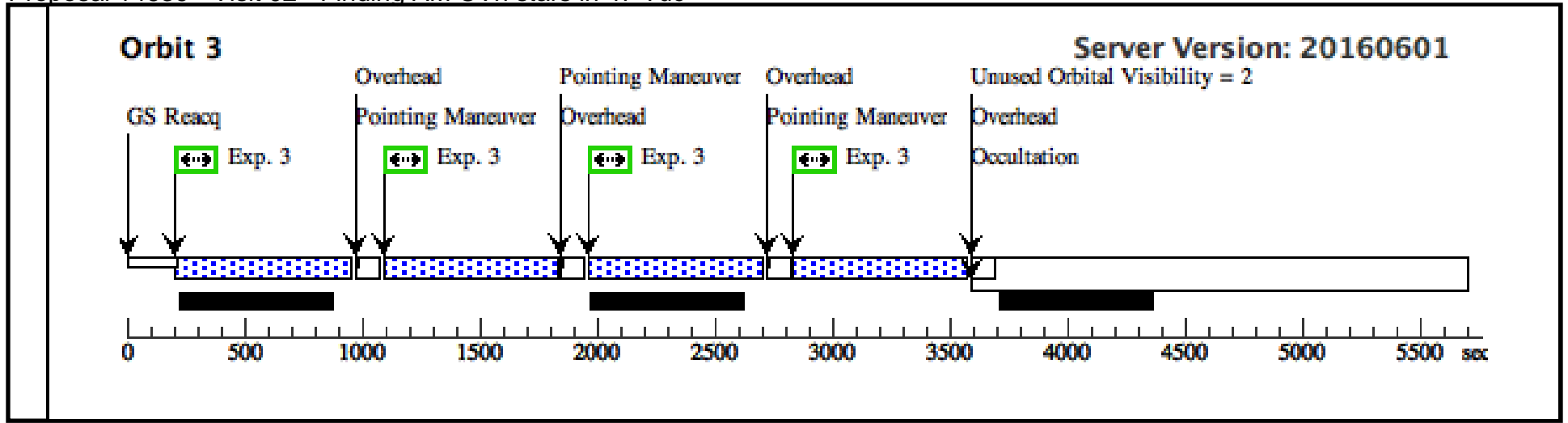


Proposal 14639 - Visit 02 - Finding AM CVn stars in 47 Tuc

Fri Jul 29 18:12:54 GMT 2016

<b>Visit</b>	<b>Proposal 14639, Visit 02</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: (none)									
	(Exposure 1 (Pattern 1, Exps 1-1 in Visit 02)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 2 (Pattern 1, Exps 2-2 in Visit 02)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 3 (Pattern 1, Exps 3-3 in Visit 02)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser									
<b>Diagnosics</b>										
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>						
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1), (2), (3)					
<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)	NGC-104	RA: 00 24 5.3590 (6.0223292d) Dec: -72 04 53.20 (-72.08144d) Equinox: J2000		V=4.09	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>										
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>	<b>Orbit</b>
	1	(1) NGC-104	(1) NGC-104	WFC3/UVIS, ACCUM, UVIS	F665N			Pattern 1, Exps 1-1 in Visit 02 (1)	717 Secs (2868 Secs)	
	<i>Comments: No flash has been added because the object is a globular cluster, and the wings of the PSFs of nearby stars will provide a background level typically equivalent to a 9 electron flash.</i>									
	2	(1) NGC-104	(1) NGC-104	WFC3/UVIS, ACCUM, UVIS	F680N			Pattern 1, Exps 2-2 in Visit 02 (1)	745 Secs (2980 Secs)	
<i>Comments: No flash has been added because the object is a globular cluster, and the wings of the PSFs of nearby stars will provide a background level typically equivalent to a 9 electron flash.</i>										
3	(1) NGC-104	(1) NGC-104	WFC3/UVIS, ACCUM, UVIS	F665N			Pattern 1, Exps 3-3 in Visit 02 (1)	745 Secs (2980 Secs)		
<i>Comments: No flash has been added because the object is a globular cluster, and the wings of the PSFs of nearby stars will provide a background level typically equivalent to a 9 electron flash.</i>										

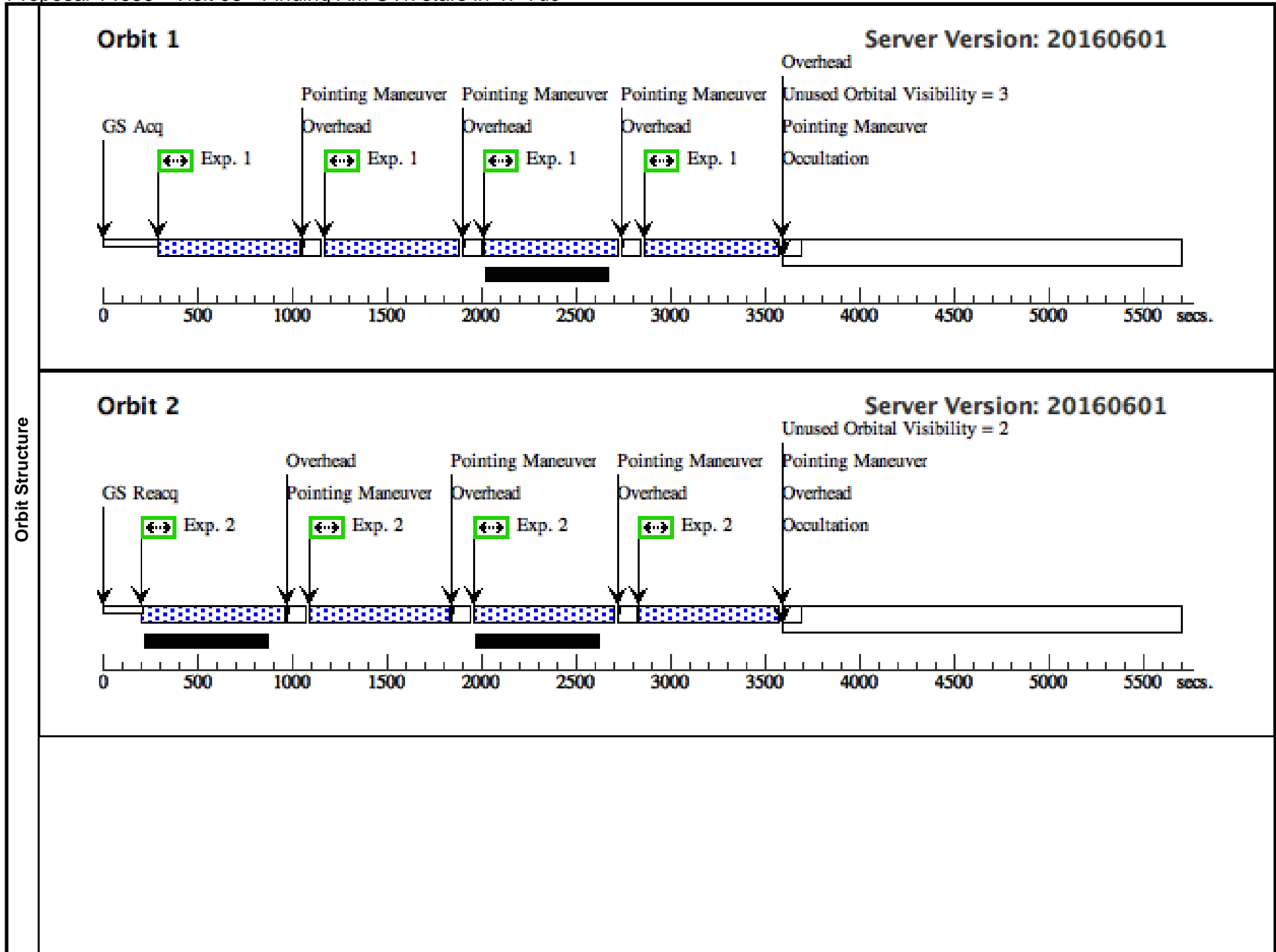


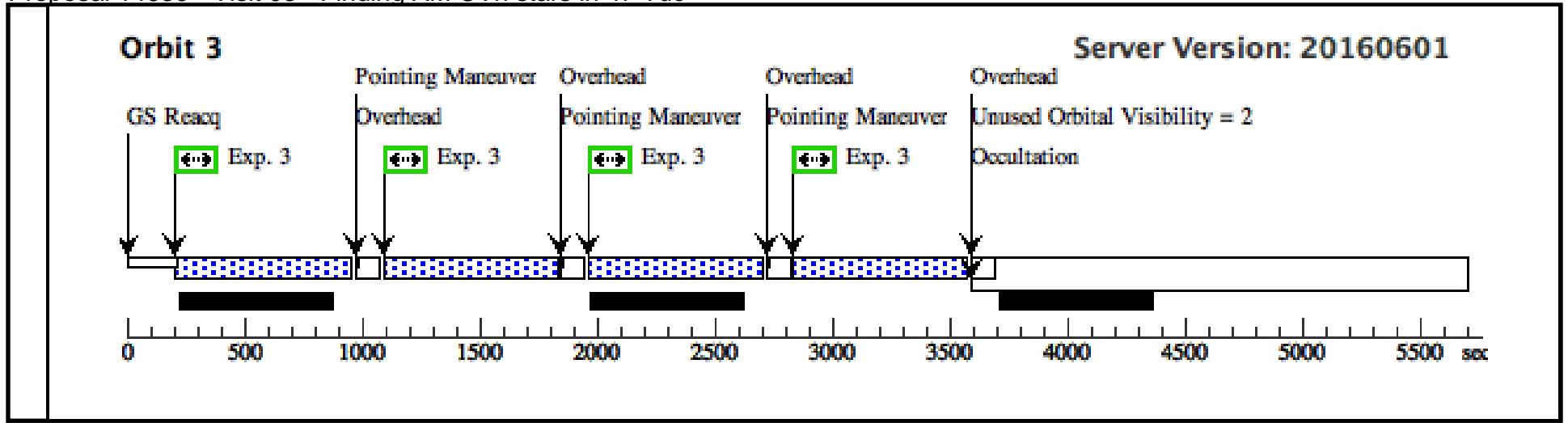


Proposal 14639 - Visit 03 - Finding AM CVn stars in 47 Tuc

Fri Jul 29 18:12:54 GMT 2016

<b>Visit</b>	<b>Proposal 14639, Visit 03</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: (none)									
	(Exposure 1 (Pattern 1, Exps 1-1 in Visit 03)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 2 (Pattern 1, Exps 2-2 in Visit 03)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser (Exposure 3 (Pattern 1, Exps 3-3 in Visit 03)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser									
<b>Diagnosics</b>										
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>						
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false		(1), (2), (3)					
<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)	NGC-104	RA: 00 24 5.3590 (6.0223292d) Dec: -72 04 53.20 (-72.08144d) Equinox: J2000		V=4.09	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>										
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time (Total)/[Actual Dur.]</b>	<b>Orbit</b>
	1	(1) NGC-104	(1) NGC-104	WFC3/UVIS, ACCUM, UVIS	F665N			Pattern 1, Exps 1-1 in Visit 03 (1)	717 Secs (2868 Secs)	
	<i>Comments: No flash has been added because the object is a globular cluster, and the wings of the PSFs of nearby stars will provide a background level typically equivalent to a 9 electron flash.</i>									
	2	(1) NGC-104	(1) NGC-104	WFC3/UVIS, ACCUM, UVIS	F680N			Pattern 1, Exps 2-2 in Visit 03 (1)	745 Secs (2980 Secs)	
<i>Comments: No flash has been added because the object is a globular cluster, and the wings of the PSFs of nearby stars will provide a background level typically equivalent to a 9 electron flash.</i>										
3	(1) NGC-104	(1) NGC-104	WFC3/UVIS, ACCUM, UVIS	F665N			Pattern 1, Exps 3-3 in Visit 03 (1)	745 Secs (2980 Secs)		
<i>Comments: No flash has been added because the object is a globular cluster, and the wings of the PSFs of nearby stars will provide a background level typically equivalent to a 9 electron flash.</i>										





<b>Visit</b>	<b>Proposal 14639, Visit 04</b>	
	<b>Diagnostic Status: Warning</b>	
	Scientific Instruments: WFC3/UVIS	
	Special Requirements: (none)	

<b>Diagnostics</b>	(Exposure 1 (Pattern 1, Exps 1-1 in Visit 04)) Warning (Form): FLASH level may be too low for this exposure or a short subexposure. See extended explanation in the diagnostic browser
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<b>Patterns</b>	#	Primary Pattern	Secondary Pattern	Exposures
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.173 Line Spacing=0.112	Coordinate Frame=POS-TARG Pattern Orientation=23.884 Angle Between Sides=81.785 Center Pattern=false	

<b>Fixed Targets</b>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	NGC-104	RA: 00 24 5.3590 (6.0223292d) Dec: -72 04 53.20 (-72.08144d) Equinox: J2000		V=4.09	Reference Frame: SIMBAD

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*

<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1)	NGC-104	WFC3/UVIS, ACCUM, UVIS	F665N				Pattern 1, Exps 1-1 in Visit 04 (1)	717 Secs (2868 Secs)

*Comments: No flash has been added because the object is a globular cluster, and the wings of the PSFs of nearby stars will provide a background level typically equivalent to a 9 electron flash.*

