



# 13339 - R Aqr: a prototype for non-relativistic astrophysical jets and a key for understanding jet formation

Cycle: 21, 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) V-R-AQR	WFC3/UVIS	1	05-Oct-2014 21:00:52.0	yes
02	(1) V-R-AQR	WFC3/UVIS	1	05-Oct-2014 21:00:54.0	yes
06	(1) V-R-AQR	WFC3/UVIS	1	05-Oct-2014 21:00:55.0	yes
07	(1) V-R-AQR	WFC3/UVIS	1	05-Oct-2014 21:00:57.0	yes
03	(1) V-R-AQR	WFC3/UVIS	1	05-Oct-2014 21:00:58.0	yes

5 Total Orbits Used

## ABSTRACT

R Aqr is a well-known prototype for non-relativistic astrophysical jets. The R Aqr jet has been extensively observed in the ultraviolet, optical, and radio regimes. We propose to re-visit this enigmatic object with HST after twelve years, in order to measure the proper motions of its inner knots with unprecedented accuracy, to derive emission lines ratios for these knots, and to investigate the width of the jet at several distances from the jet

source. We will compare the results with numerical models of radiative shocks in propagating jets and of jet formation models and will determine the kinematics of the jet, the history of ejection events and basic parameters of the jet engine as e.g. the launching radius of the jet-ejecting accretion disk.

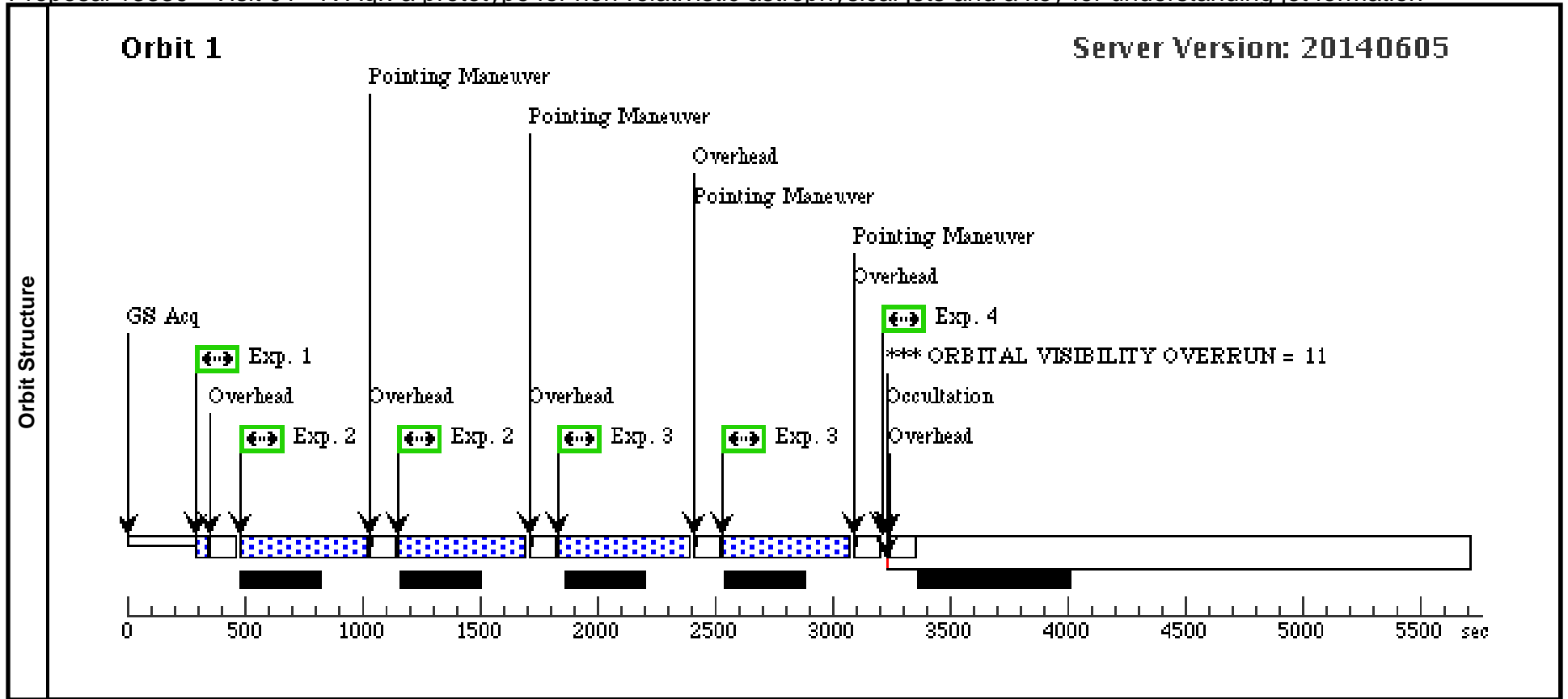
### **OBSERVING DESCRIPTION**

All images will be obtained with the WFPC3 UVIS camera. We will use three different filters, namely [OI]6300 (F631N), H $\alpha$ 6563 (F656N) and [NII]6548+6583 (F658N), in order to measure the emission line ratios in the jet knots and also the jet width along the full length of the jet, and the filter F502N for [OIII]5007 in order to follow up existing observations and measure the proper motion of knots in the jet.

Proposal 13339 - Visit 01 - R Agr: a prototype for non-relativistic astrophysical jets and a key for understanding jet formation

Mon Oct 06 01:01:00 GMT 2014

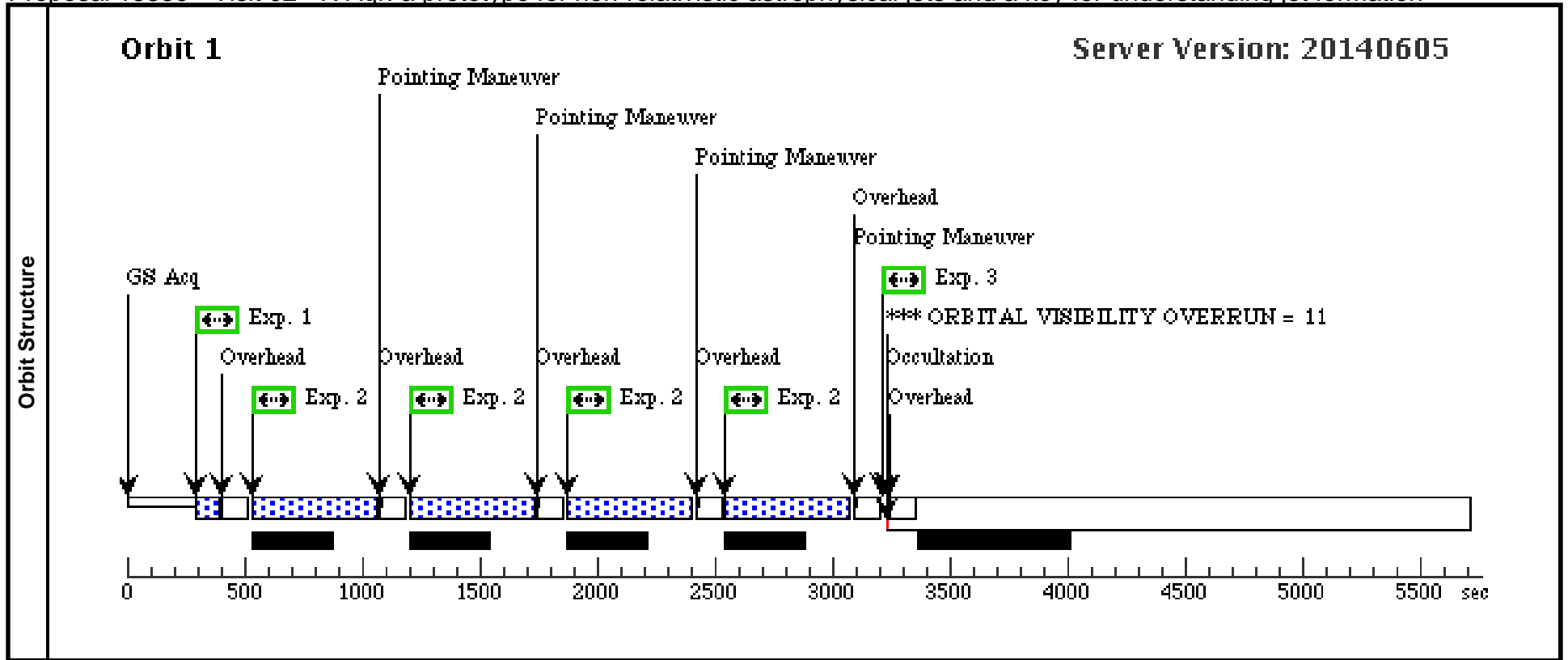
<b>Visit</b>	<b>Proposal 13339, Visit 01, completed</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 38D TO 60 D; ORIENT 218D TO 240 D									
	(Visit 01) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN									
<b>Diagnosics</b>										
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>	<b>Secondary Pattern</b>	<b>Exposures</b>						
	(2)	Pattern Type=WFC3-UVIS-DITHER- LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing= Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(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)	V-R-AQR	RA: 23 43 49.4616 (355.9560900d) Dec: -15 17 4.20 (-15.28450d) Equinox: J2000 <i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>		V=7.69	Reference Frame: ICRS				
<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) V-R-AQR	(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F502N	FLASH=11			15 Secs (15 Secs)	
									[==>]	[1]
	2	(1) V-R-AQR	(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F502N	FLASH=11		Pattern 2, Exps 2-2 in Visit 01 (2)	543 Secs (1086 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)]	[1]
3	(1) V-R-AQR	(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F631N	FLASH=11		Pattern 2, Exps 3-3 in Visit 01 (2)	543 Secs (1086 Secs)		
								[==>(Pattern 1)] [==>(Pattern 2)]	[1]	
4	(1) V-R-AQR	(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F631N	FLASH=11			15 Secs (15 Secs)		
								[==>]	[1]	



Proposal 13339 - Visit 02 - R Agr: a prototype for non-relativistic astrophysical jets and a key for understanding jet formation

Mon Oct 06 01:01:00 GMT 2014

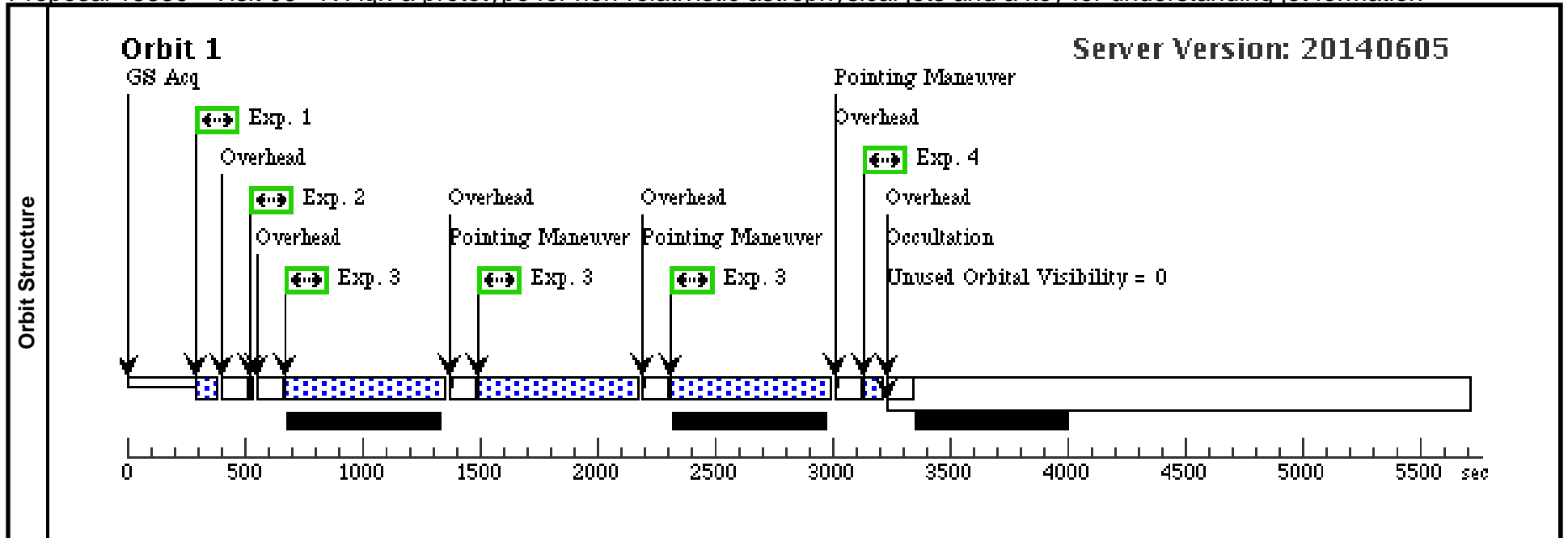
<b>Visit</b>	<b>Proposal 13339, Visit 02, scheduled</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 38D TO 60 D; ORIENT 218D TO 240 D										
	(Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN										
<b>Diagnosics</b>											
<b>Patterns</b>	<b>#</b>	<b>Primary Pattern</b>				<b>Secondary Pattern</b>				<b>Exposures</b>	
	(1)	Pattern Type=WFC3-UVIS-DITHER-BOX Coordinate Frame=POS-TARG Pattern Orientation=23.884 Purpose=DITHER Angle Between Sides=81.785 Number Of Points=4 Center Pattern=false Point Spacing=0.173 Line Spacing=0.112								(2)	
<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)	V-R-AQR	RA: 23 43 49.4616 (355.9560900d) Dec: -15 17 4.20 (-15.28450d) Equinox: J2000				V=7.69	Reference Frame: ICRS			
<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) V-R-AQR		WFC3/UVIS, ACCUM, UVIS1	F656N	FLASH=11			60 Secs (64 Secs)		
									[==>64.0 Secs ]		[1]
	2	(1) V-R-AQR		WFC3/UVIS, ACCUM, UVIS1	F656N	FLASH=11		Pattern 1, Exps 2-2 in Visit 02 (1)	540 Secs (2144 Secs)		
								[==>536.0 Secs (Pattern 1)]			
								[==>536.0 Secs (Pattern 2)]			
								[==>536.0 Secs (Pattern 3)]			
								[==>536.0 Secs (Pattern 4)]		[1]	
3	(1) V-R-AQR		WFC3/UVIS, ACCUM, UVIS1	F656N	FLASH=11			10 Secs (14 Secs)			
								[==>14.0 Secs ]		[1]	



Proposal 13339 - Visit 06 - R Aqr: a prototype for non-relativistic astrophysical jets and a key for understanding jet formation

Mon Oct 06 01:01:00 GMT 2014

Visit	<b>Proposal 13339, Visit 06</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 38D TO 60 D; ORIENT 218D TO 240 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(3)	Pattern Type=WFC3-UVIS-DITHER- LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	V-R-AQR	RA: 23 43 49.4616 (355.9560900d) Dec: -15 17 4.20 (-15.28450d) Equinox: J2000		V=7.69	Reference Frame: ICRS				
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F656N	FLASH=11			60 Secs (60 Secs)	
									[==>]	[1]
	2		(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F656N	FLASH=11			10 Secs (10 Secs)	
									[==>]	[1]
3		(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F656N	FLASH=11			Pattern 3, Exps 3-3 i n Visit 06 (3)	697 Secs (2058 Secs) [==>686.0 Secs (Pattern 1)] [==>686.0 Secs (Pattern 2)] [==>686.0 Secs (Pattern 3)]	[1]
4		(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F502N	FLASH=11			15 Secs (50 Secs)		
								[==>50.0 Secs ]	[1]	

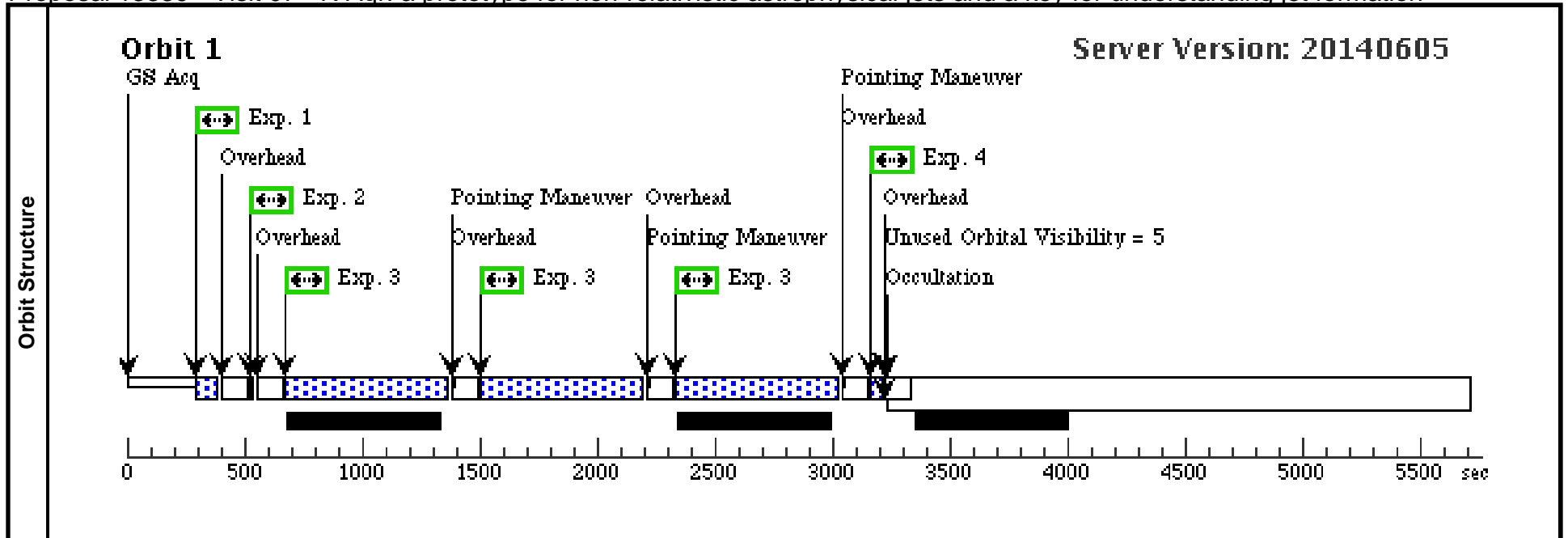




Proposal 13339 - Visit 07 - R Aqr: a prototype for non-relativistic astrophysical jets and a key for understanding jet formation

Mon Oct 06 01:01:00 GMT 2014

Visit	<b>Proposal 13339, Visit 07</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 38D TO 60 D; ORIENT 218D TO 240 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(3)	Pattern Type=WFC3-UVIS-DITHER- LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(3)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	V-R-AQR	RA: 23 43 49.4616 (355.9560900d) Dec: -15 17 4.20 (-15.28450d) Equinox: J2000		V=7.69	Reference Frame: ICRS				
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F658N	FLASH=11			60 Secs (60 Secs)	
									[==>]	[1]
	2		(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F658N	FLASH=11			10 Secs (10 Secs)	
									[==>]	[1]
3		(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F658N	FLASH=11			Pattern 3, Exps 3-3 i n Visit 07 (3)	697 Secs (2085 Secs) [==>695.0 Secs (Pattern 1)] [==>695.0 Secs (Pattern 2)] [==>695.0 Secs (Pattern 3)]	[1]
4		(1) V-R-AQR	WFC3/UVIS, ACCUM, UVIS1	F631N	FLASH=11			15 Secs (24 Secs)		
								[==>24.0 Secs ]	[1]	



Proposal 13339 - Visit 03 - R Agr: a prototype for non-relativistic astrophysical jets and a key for understanding jet formation

Mon Oct 06 01:01:01 GMT 2014

<b>Visit</b>	<b>Proposal 13339, Visit 03, scheduled</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: WFC3/UVIS Special Requirements: ORIENT 38D TO 60 D; ORIENT 218D TO 240 D										
	(Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN										
<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				(2)	
<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)	V-R-AQR	RA: 23 43 49.4616 (355.9560900d) Dec: -15 17 4.20 (-15.28450d) Equinox: J2000				V=7.69		Reference Frame: ICRS		
<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) V-R-AQR		WFC3/UVIS, ACCUM, UVIS1	F658N	FLASH=11			60 Secs (64 Secs)		
									[==>64.0 Secs ]		[1]
	2	(1) V-R-AQR		WFC3/UVIS, ACCUM, UVIS1	F658N	FLASH=11		Pattern 1, Exps 2-2 in Visit 03 (1)	540 Secs (2144 Secs)		
									[==>536.0 Secs (Pattern 1)] [==>536.0 Secs (Pattern 2)] [==>536.0 Secs (Pattern 3)] [==>536.0 Secs (Pattern 4)]		[1]
3	(1) V-R-AQR		WFC3/UVIS, ACCUM, UVIS1	F658N	FLASH=11			10 Secs (14 Secs)			
								[==>14.0 Secs ]		[1]	

