



17136 - Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star

Cycle: 30, Proposal Category: GO

(UV Initiative)

(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) 2MASS-J04372171+2651014	WFC3/UVIS	1	02-Oct-2023 17:00:17.0	yes
02	(1) 2MASS-J04372171+2651014	WFC3/IR	1	02-Oct-2023 17:00:18.0	yes
03	(1) 2MASS-J04372171+2651014	WFC3/UVIS	1	02-Oct-2023 17:00:19.0	yes
04	(1) 2MASS-J04372171+2651014	WFC3/IR	1	02-Oct-2023 17:00:20.0	yes
05	(1) 2MASS-J04372171+2651014	WFC3/UVIS	1	02-Oct-2023 17:00:21.0	yes
06	(1) 2MASS-J04372171+2651014	WFC3/UVIS	1	02-Oct-2023 17:00:21.0	yes

ABSTRACT

Studies of directly imaged planets extend exoplanet surveys to greater separations from the stars, test giant planet formation models, probe the composition of the progenitor disks and can reveal circumplanetary disks, but these objects are rare. We report a faint, co-moving companion to an M dwarf member of the Taurus star-forming region with a brightness and color consistent with super-Jupiter mass planet. This companion is one of the youngest, least massive planets that has been directly imaged. While the object is readily detected in K-band (2.2 microns) AO imaging, key observations at shorter wavelengths are marginal or infeasible from the ground and the host star is too faint for "extreme" high-order AO systems. We propose imaging of this object with HST and WFC3 to (1) determine the spectral energy distribution of 2M0437b and compare it to model atmospheres to determine the companion's temperature, luminosity, radius and, via evolutionary models, estimate its mass; (2) constrain the cloudiness and metallicity of the atmosphere via detailed modeling of atmospheric radiative transfer; and (3) search for evidence for an accreting circumplanetary disk in the form of H-alpha or excess UV emission. Multi-planet systems have been found around other young stars and our imaging could also reveal additional, fainter companions of the star at smaller separations.

OBSERVING DESCRIPTION

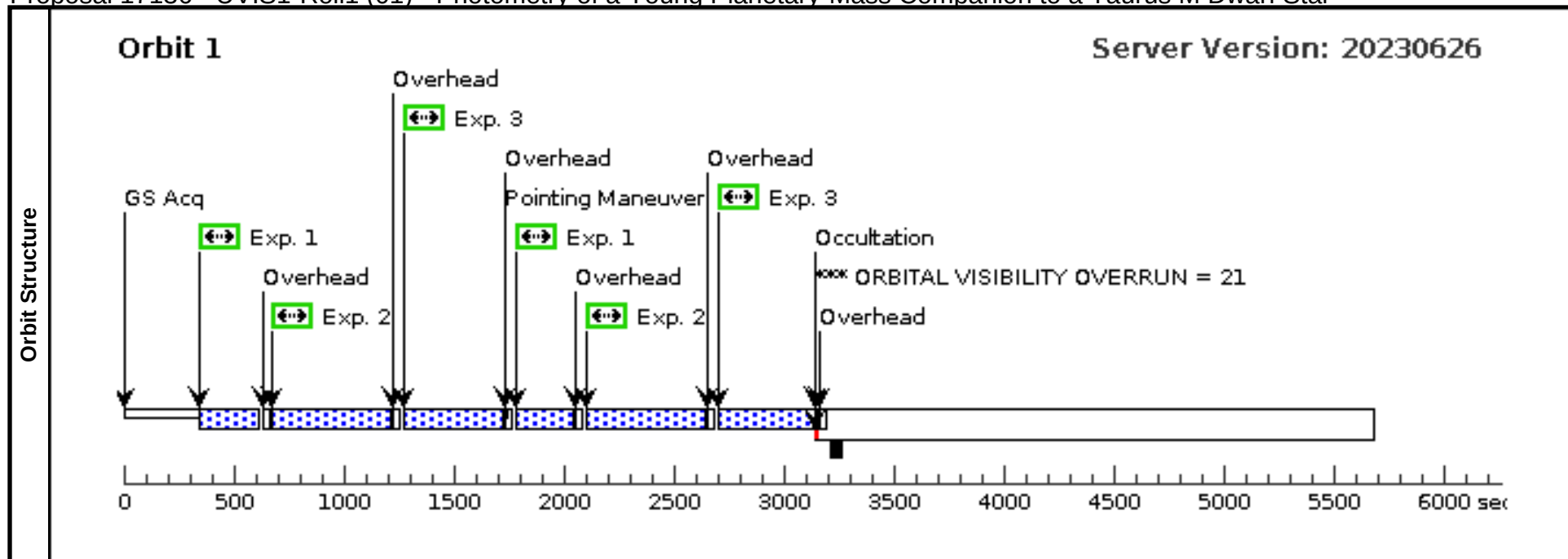
Photometry in multiple pass-bands that cover the blue part of the SED (< 2 microns for 2M0437b) can usefully constrain an object's T_{eff} , which, along with luminosity, is a key input parameter to models of young giant planets. Clouds can complicate the SED- T_{eff} relation; disambiguation is possible by comparing the emission inside and outside the absorption bandpass of a strong gaseous absorber, i.e. H₂O, but the H₂O bands are inaccessible from the ground. Photometry in the near UV can detect or constrain accretion from a circumplanetary disk but these are not possible to perform on faint objects from the ground.

We will obtain photometry of 2M0437 in the UV, optical, and infrared using Wide Field Camera 3 (WFC3). WFC3 and its UVIS and IR channels are the only option in the IR (> 1 microns) and its lower dark current and read noise and smaller pixel scale make it the preferred instrument over the Advanced Camera for Surveys (ACS) to study faint companions at UV/optical wavelengths. The instrument has been previously used to obtain photometry and spectra of many resolved ultra-cool dwarf companions and giant planets. We will obtain imaging in nine pass-bands: F814W, F105W, F125W, and F160W to determine the overall shape of the SED, F127M and F139M to measure absorption in the H₂O band and constrain cloudiness and water abundance, and F336W, F625W, F656N (H-alpha), and F625W filters to assess UV excess and H-alpha emission due to accretion. (The F625W photometry serves as a continuum control for the F336W and F656N measurements.) A complete set of observations will be repeated at a different (25 deg offset) roll angle to carry out angular differential imaging (ADI) in order to construct difference images in which the

roll-invariant stellar PSF, a significant source of systematics, is mostly removed, leaving positive and negative images of the companion. Different roll positions will occur on different orbits. The UVIS (336W, 625W, F656N, F814W) and IR channels (F105W, F125W, F127M, F139M, F160W) observations will also occur on separate orbits, and the complete program requires 6 orbits. Within each orbit the observations will take place at 2 or 4 dither positions for optical or IR, respectively, cycling through the 2 (UVIS) or 5 (IR) filters at each position. The star is at +26 deg declination and visible for 53 minutes during each orbit. We used the WFC3 Exposure Time Calculator to apportion the available time to achieve, as far as possible, uniform sensitivity across all filters. For the calculations in the wide and medium filters we assumed a Phoenix model of the SED of a nominal L7 spectral type, normalized by the K-band magnitude. We also repeated the calculations for L5 and T2 spectral types as bracketing cases. We divided one UVIS-dedicated orbit evenly between 814W and 656N. For the H-alpha feasibility calculations we considered accretion rates of $1e-8, 3e-8, 1e-7$ M_{Jup}/yr used a magnetospheric model relation for planets to estimate the flux. We calculated stellar (chromospheric) emission in H-alpha we assumed a fractional luminosity relative to the bolometric luminosity value of $1.5e-4$, appropriate for young rapidly rotating stars with magnetic saturation. For the F625W calculations we assumed that the flux in H-alpha dominates. Since the F625W observations are only to determine a baseline, we minimized the resource commitment, adjusting the exposure time to 240 sec for a minimal detection (SNR=5) at the lower accretion rate and avoidance of saturation at the higher accretion rate. The remaining available 832 sec in that orbit will be used for the F336W observation. For the feasibility calculations in that band, we linearly scaled from HST observations of DH Tau b which were modeled²⁴ to infer an accretion rate of $3e-9$ M_{Jup}/yr To calculate the contrast with the chromospheric emission from the star, we used typical colors and absolute magnitudes of active M4 dwarfs. We included an overhead of 6.5 min for guide star acquisition, 2.6 min for each UVIS integration or 1 min for each IR integration, and 20 sec or 1 min for the small angle maneuvers (dithering, $<1''.25$) for UVIS and IR, respectively. Integration times in the IR filters were adjusted to achieve a uniform SNR=70 (without the stellar scattered light noise contribution) for each filter. We then used the TinyTim HST+WFC3 PSF simulator and our SNR and contrast ratios estimates from the ETC to generate simulated images at two roll angles and the difference images. These predict the clear detection of the companion in all pass-bands. N.B.: We are breaking the UVIS observations into two epochs separated by at least three days to be more robust to potential variability in H-alpha emission. One epoch (4 orbits) will include both UVIS and all IR observations. The second epoch will consist of an identical set of UVIS observations only.

Proposal 17136 - UVIS1-Roll1 (01) - Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star

Visit	Proposal 17136, UVIS1-Roll1 (01), completed										Mon Oct 02 21:00:22 GMT 2023		
	Diagnostic Status: Warning												
	Scientific Instruments: WFC3/UVIS												
	Special Requirements: ORIENT 348.5D TO 58.5 D; ORIENT 78.5D TO 148.5 D; ORIENT 168.5D TO 238.5 D; ORIENT 258.5D TO 328.5 D												
Comments: This visit (1 orbit) consists of complete set of UVIS observations at the first epoch at the first roll angle.													
Diagnostics	(UVIS1-Roll1 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN												
Patterns	#	Primary Pattern					Secondary Pattern					Exposures	
	(3)	Pattern Type=WFC3-UVIS-DITHER-LINE Coordinate Frame=POS-TARG Pattern Orientation=46.84 Purpose=DITHER Angle Between Sides= Number Of Points=2 Center Pattern=false Point Spacing=0.145 Line Spacing=										(1-3)	
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections			Fluxes		Miscellaneous		
	(1)	2MASS-J04372171+2651014		RA: 04 37 21.7230 (69.3405125d)		Proper Motion RA: 6.451543114067509E-4			V=(?)		Reference Frame: SIMBAD		
		Alt Name1: 2M0437		Dec: +26 51 1.50 (26.85042d)		sec of time/yr			Gaia G=14.3				
				Equinox: J2000		Proper Motion Dec: -0.026988999911736755							
Category=STAR													
Description=[YSO]													
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB		F625W	FLASH=10		Pattern 3, Exps 1-3 in UVIS1-Roll1 (01) (3)	240 Secs (480 Secs)			
										[==>(Pattern 1)]		[1]	
										[==>(Pattern 2)]			
	2		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB		F656N	FLASH=20		Pattern 3, Exps 1-3 in UVIS1-Roll1 (01) (3)	526 Secs (1052 Secs)			
										[==>(Pattern 1)]		[1]	
										[==>(Pattern 2)]			
3		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB		F336W	FLASH=15		Pattern 3, Exps 1-3 in UVIS1-Roll1 (01) (3)	416 Secs (832 Secs)				
									[==>(Pattern 1)]		[1]		
									[==>(Pattern 2)]				

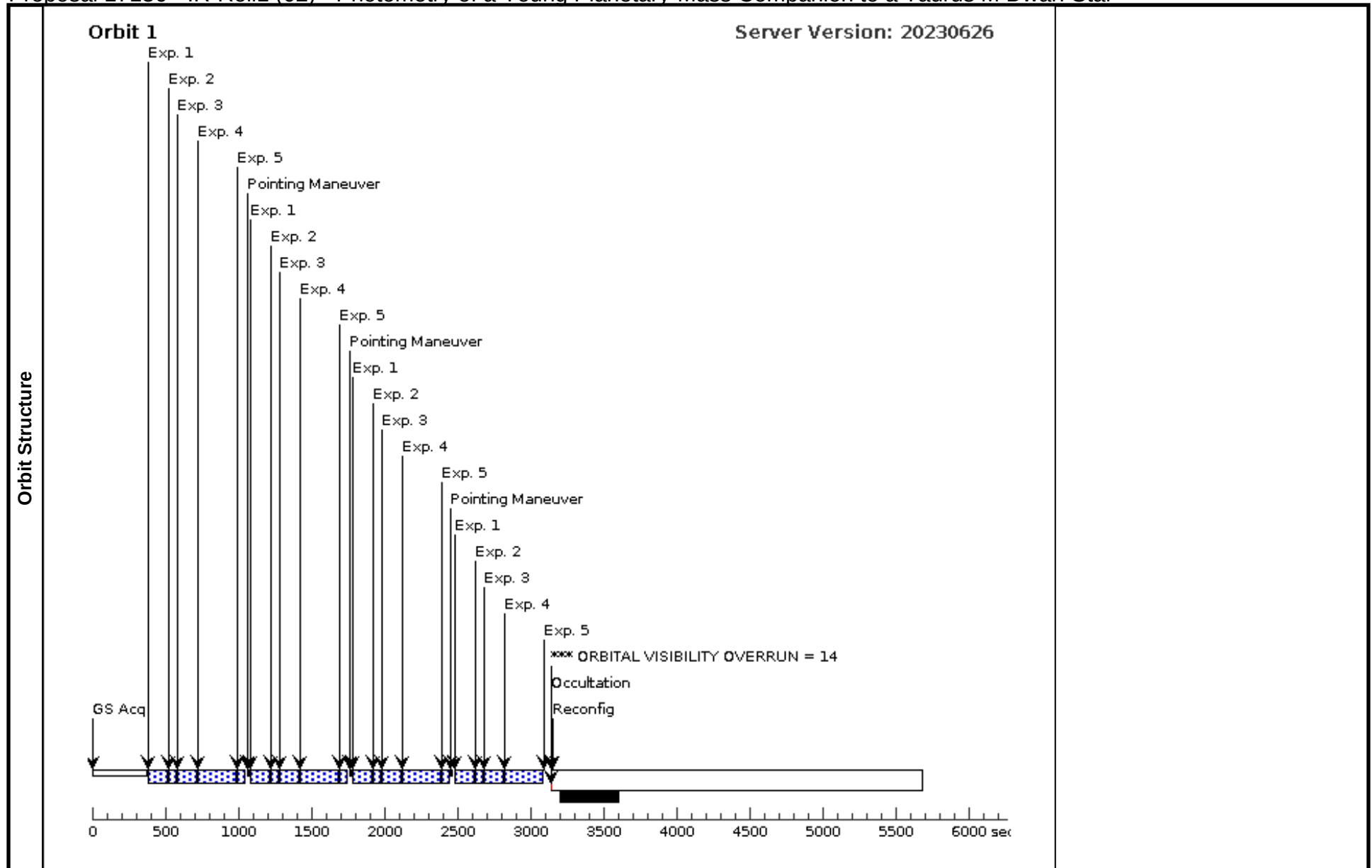


Proposal 17136 - IR-Roll1 (02) - Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star

Visit	Proposal 17136, IR-Roll1 (02), completed Mon Oct 02 21:00:22 GMT 2023				
	Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: SAME ORIENT AS 01; AFTER 01 BY 0.5 Orbits TO 1.5 Orbits <i>Comments: The visit (1 orbit) consist of a complete set of IR observations at the first roll angle.</i>				
Diagnostics	(IR-Roll1 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (IR-Roll1 (02)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.				
Patterns	#	Primary Pattern		Secondary Pattern	Exposures
	(4)	Pattern Type=BOX Purpose=DITHER Number Of Points=4 Point Spacing=1.408 Line Spacing=1.274		Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides=90 Center Pattern=false	(1-5)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(1)	2MASS-J04372171+2651014 Alt Name1: 2M0437	RA: 04 37 21.7230 (69.3405125d) Dec: +26 51 1.50 (26.85042d) Equinox: J2000	Proper Motion RA: 6.451543114067509E-4 sec of time/yr Proper Motion Dec: -0.026988999911736755 arcsec/yr Epoch of Position: 2015.5	V=(?) Gaia G=14.3 Reference Frame: SIMBAD
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=STAR Description=[YSO]				

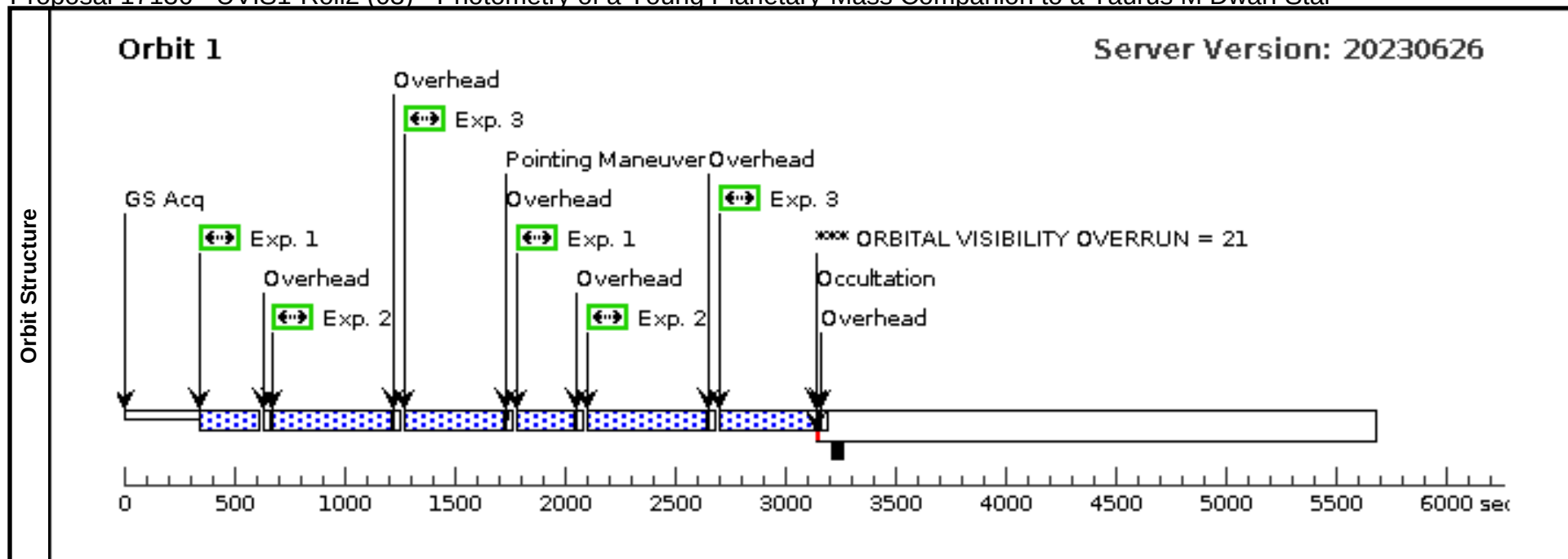
Proposal 17136 - IR-Roll1 (02) - Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) 2MASS-J04372171+2651014	WFC3/IR, MULTIACCUM, IRSUB256	F105W	NSAMP=15; SAMP-SEQ=SPAR S10		Pattern 4, Exps 1-5 in IR-Roll1 (02) (4)	103.128633 Secs (412.515 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	2		(1) 2MASS-J04372171+2651014	WFC3/IR, MULTIACCUM, IRSUB256	F125W	NSAMP=15; SAMP-SEQ=SPAR S5		Pattern 4, Exps 1-5 in IR-Roll1 (02) (4)	33.16592 Secs (132.664 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	3		(1) 2MASS-J04372171+2651014	WFC3/IR, MULTIACCUM, IRSUB256	F127M	NSAMP=15; SAMP-SEQ=SPAR S10		Pattern 4, Exps 1-5 in IR-Roll1 (02) (4)	103.128633 Secs (412.515 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	4		(1) 2MASS-J04372171+2651014	WFC3/IR, MULTIACCUM, IRSUB256	F139M	NSAMP=12; SAMP-SEQ=SPAR S25		Pattern 4, Exps 1-5 in IR-Roll1 (02) (4)	246.084244 Secs (984.337 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
	5		(1) 2MASS-J04372171+2651014	WFC3/IR, MULTIACCUM, IRSUB256	F160W	NSAMP=11; SAMP-SEQ=SPAR S5		Pattern 4, Exps 1-5 in IR-Roll1 (02) (4)	23.77008 Secs (95.08 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]



Proposal 17136 - UVIS1-Roll2 (03) - Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star

Visit	Proposal 17136, UVIS1-Roll2 (03), completed					Mon Oct 02 21:00:22 GMT 2023				
	Diagnostic Status: Warning									
	Scientific Instruments: WFC3/UVIS									
	Special Requirements: ORIENT 20D TO 30D FROM 02; AFTER 02 BY 0.5 Orbits TO 1.5 Orbits									
Diagnostics	Comments: This visit (1 orbit) consists of a complete set of UVIS observations at the first epoch at the second roll angle (about +25 deg).									
	(UVIS1-Roll2 (03)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN									
Patterns	(UVIS1-Roll2 (03)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.									
	#	Primary Pattern			Secondary Pattern		Exposures			
Fixed Targets	(3)	Pattern Type=WFC3-UVIS-DITHER-LINE		Coordinate Frame=POS-TARG			(1-3)			
		Purpose=DITHER		Pattern Orientation=46.84						
		Number Of Points=2		Angle Between Sides=						
		Point Spacing=0.145		Center Pattern=false						
		Line Spacing=								
	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	2MASS-J04372171+2651014	RA: 04 37 21.7230 (69.3405125d)	Proper Motion RA: 6.451543114067509E-4	V=(?)	Reference Frame: SIMBAD				
		Alt Name1: 2M0437	Dec: +26 51 1.50 (26.85042d)	sec of time/yr	Gaia G=14.3					
			Equinox: J2000	Proper Motion Dec: -0.026988999911736755						
				arcsec/yr						
				Epoch of Position: 2015.5						
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Category=STAR									
	Description=[YSO]									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F625W	FLASH=10		Pattern 3, Exps 1-3 in UVIS1-Roll2 (03) (3)	240 Secs (480 Secs)	
									[==>(Pattern 1)]	[1]
									[==>(Pattern 2)]	
	2		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F656N	FLASH=20		Pattern 3, Exps 1-3 in UVIS1-Roll2 (03) (3)	526 Secs (1052 Secs)	
									[==>(Pattern 1)]	[1]
									[==>(Pattern 2)]	
	3		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F336W	FLASH=15		Pattern 3, Exps 1-3 in UVIS1-Roll2 (03) (3)	416 Secs (832 Secs)	
									[==>(Pattern 1)]	[1]
									[==>(Pattern 2)]	

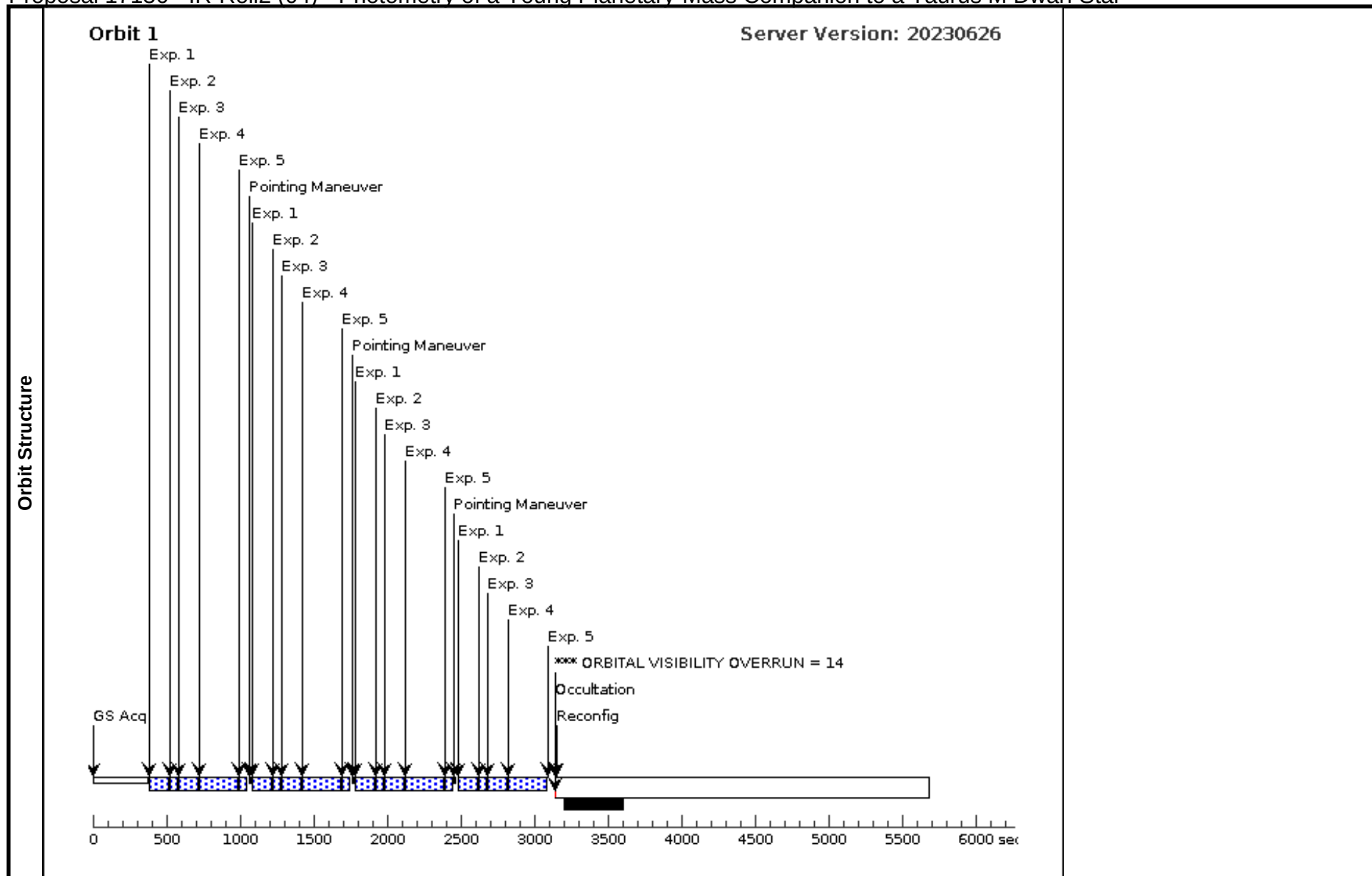


Proposal 17136 - IR-Roll2 (04) - Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star

Visit	Proposal 17136, IR-Roll2 (04), completed Mon Oct 02 21:00:22 GMT 2023				
	Diagnostic Status: Warning Scientific Instruments: WFC3/IR Special Requirements: SAME ORIENT AS 03; AFTER 03 BY 0.5 Orbits TO 1.5 Orbits <i>Comments: The visit (1 orbit) consist of a complete set of IR observations at the second roll angle (+25 deg).</i>				
Diagnostics	(IR-Roll2 (04)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (IR-Roll2 (04)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.				
Patterns	#	Primary Pattern		Secondary Pattern	Exposures
	(4)	Pattern Type=BOX Purpose=DITHER Number Of Points=4 Point Spacing=1.408 Line Spacing=1.274		Coordinate Frame=POS-TARG Pattern Orientation=0 Angle Between Sides=90 Center Pattern=false	(1-5)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(1)	2MASS-J04372171+2651014 Alt Name1: 2M0437	RA: 04 37 21.7230 (69.3405125d) Dec: +26 51 1.50 (26.85042d) Equinox: J2000	Proper Motion RA: 6.451543114067509E-4 sec of time/yr Proper Motion Dec: -0.026988999911736755 arcsec/yr Epoch of Position: 2015.5	V=(?) Gaia G=14.3 Reference Frame: SIMBAD
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=STAR Description=[YSO]				

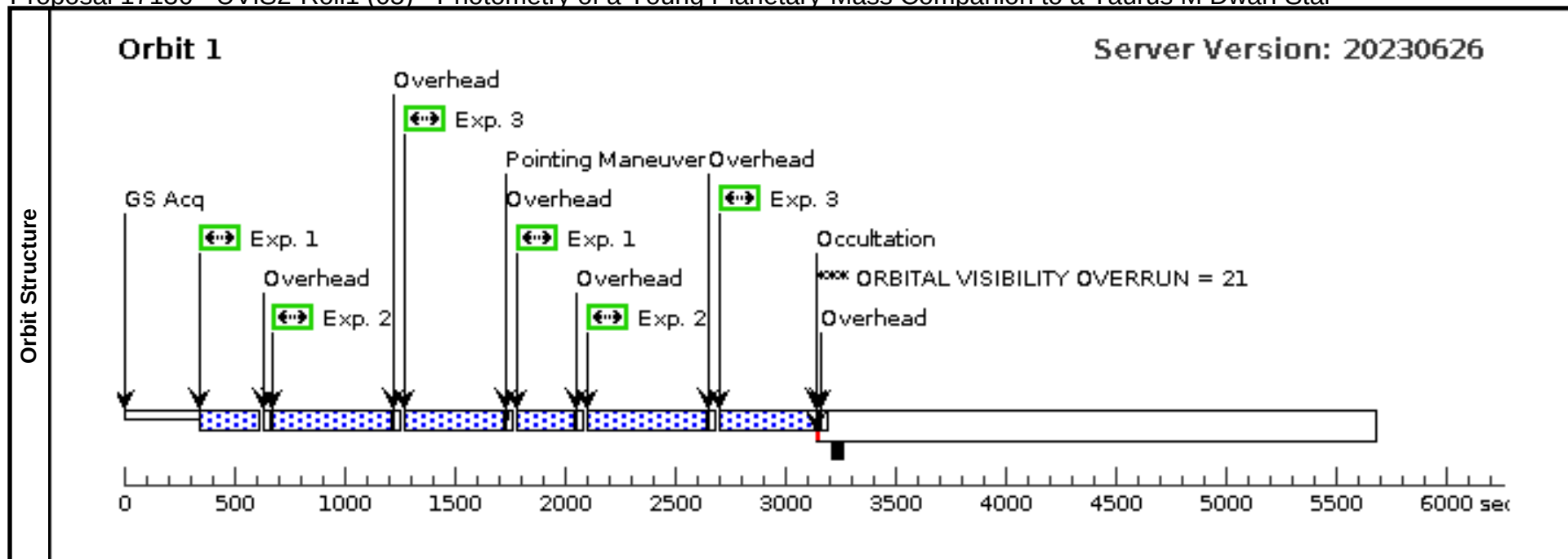
Proposal 17136 - IR-Roll2 (04) - Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) 2MASS-J04372171+2651014	WFC3/IR, MULTIACCUM, IRSUB256	F105W	NSAMP=15; SAMP-SEQ=SPAR S10		Pattern 4, Exps 1-5 in IR-Roll2 (04) (4)	103.128633 Secs (412.515 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2		(1) 2MASS-J04372171+2651014	WFC3/IR, MULTIACCUM, IRSUB256	F125W	NSAMP=15; SAMP-SEQ=SPAR S5		Pattern 4, Exps 1-5 in IR-Roll2 (04) (4)	33.16592 Secs (132.664 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	3		(1) 2MASS-J04372171+2651014	WFC3/IR, MULTIACCUM, IRSUB256	F127M	NSAMP=15; SAMP-SEQ=SPAR S10		Pattern 4, Exps 1-5 in IR-Roll2 (04) (4)	103.128633 Secs (412.515 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	4		(1) 2MASS-J04372171+2651014	WFC3/IR, MULTIACCUM, IRSUB256	F139M	NSAMP=12; SAMP-SEQ=SPAR S25		Pattern 4, Exps 1-5 in IR-Roll2 (04) (4)	246.084244 Secs (984.337 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	5		(1) 2MASS-J04372171+2651014	WFC3/IR, MULTIACCUM, IRSUB256	F160W	NSAMP=11; SAMP-SEQ=SPAR S5		Pattern 4, Exps 1-5 in IR-Roll2 (04) (4)	23.77008 Secs (95.08 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]



Proposal 17136 - UVIS2-Roll1 (05) - Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star

Visit	Proposal 17136, UVIS2-Roll1 (05), implementation										Mon Oct 02 21:00:22 GMT 2023		
	Diagnostic Status: Warning												
	Scientific Instruments: WFC3/UVIS												
	Special Requirements: (none)												
Comments: This visit (1 orbit) consists of complete set of UVIS observations at the second epoch (>3 days later) at the first roll angle.													
Diagnostics	(UVIS2-Roll1 (05)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN												
Patterns	#	Primary Pattern					Secondary Pattern					Exposures	
	(3)	Pattern Type=WFC3-UVIS-DITHER-LINE Coordinate Frame=POS-TARG Pattern Orientation=46.84 Purpose=DITHER Angle Between Sides= Number Of Points=2 Center Pattern=false Point Spacing=0.145 Line Spacing=										(1-3)	
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections			Fluxes		Miscellaneous		
	(1)	2MASS-J04372171+2651014		RA: 04 37 21.7230 (69.3405125d)		Proper Motion RA: 6.451543114067509E-4 sec of time/yr			V=(?)		Reference Frame: SIMBAD		
		Alt Name1: 2M0437		Dec: +26 51 1.50 (26.85042d)		Proper Motion Dec: -0.026988999911736755 arcsec/yr			Gaia G=14.3				
				Equinox: J2000		Epoch of Position: 2015.5							
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.													
Category=STAR													
Description=[YSO]													
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit		
	1		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F625W	FLASH=10		Pattern 3, Exps 1-3 in UVIS2-Roll1 (05) (3)	240 Secs (480 Secs)				
									[==>(Pattern 1)]		[1]		
									[==>(Pattern 2)]				
	2		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F656N	FLASH=20		Pattern 3, Exps 1-3 in UVIS2-Roll1 (05) (3)	526 Secs (1052 Secs)				
									[==>(Pattern 1)]		[1]		
									[==>(Pattern 2)]				
3		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F336W	FLASH=15		Pattern 3, Exps 1-3 in UVIS2-Roll1 (05) (3)	416 Secs (832 Secs)					
								[==>(Pattern 1)]		[1]			
								[==>(Pattern 2)]					



Proposal 17136 - UVIS2-Roll2 (06) - Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star

Visit	Proposal 17136, UVIS2-Roll2 (06), scheduling										Mon Oct 02 21:00:22 GMT 2023
	Diagnostic Status: Warning										
	Scientific Instruments: WFC3/UVIS										
	Special Requirements: ORIENT 20D TO 30D FROM 05; AFTER 05 BY 0.5 Orbits TO 1.5 Orbits										
Comments: This visit (1 orbit) consists of a complete set of UVIS observations at the second epoch (>3 days later) at the second roll angle (about +25 deg).											
Diagnostics	(UVIS2-Roll2 (06)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN										
	(UVIS2-Roll2 (06)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.										
Patterns	#	Primary Pattern					Secondary Pattern				Exposures
	(3)	Pattern Type=WFC3-UVIS-DITHER-LINE Coordinate Frame=POS-TARG Pattern Orientation=46.84 Purpose=DITHER Angle Between Sides= Number Of Points=2 Center Pattern=false Point Spacing=0.145 Line Spacing=									(1-3)
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	2MASS-J04372171+2651014 Alt Name1: 2M0437	RA: 04 37 21.7230 (69.3405125d) Dec: +26 51 1.50 (26.85042d) Equinox: J2000		Proper Motion RA: 6.451543114067509E-4 sec of time/yr Proper Motion Dec: -0.026988999911736755 arcsec/yr Epoch of Position: 2015.5		V=(?) Gaia G=14.3		Reference Frame: SIMBAD		
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	Category=STAR Description=[YSO]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F625W	FLASH=10		Pattern 3, Exps 1-3 in UVIS2-Roll2 (06) (3)	240 Secs (480 Secs)		
									[==>(Pattern 1)]		[1]
									[==>(Pattern 2)]		
	2		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F656N	FLASH=20		Pattern 3, Exps 1-3 in UVIS2-Roll2 (06) (3)	526 Secs (1052 Secs)		
									[==>(Pattern 1)]		[1]
								[==>(Pattern 2)]			
3		(1) 2MASS-J04372171+2651014	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F336W	FLASH=15		Pattern 3, Exps 1-3 in UVIS2-Roll2 (06) (3)	416 Secs (832 Secs)			
								[==>(Pattern 1)]		[1]	
								[==>(Pattern 2)]			

