14500 - Two Birds One Stone: Simultaneous Atmospheric Pre-Screening of Two Temperate Earth-Sized Exoplanets During Their Double Transit

Cycle: 23, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) 2MASS-J23062928-0502285	WFC3/IR	4	21-Apr-2016 21:03:29.0	yes

4 Total Orbits Used

ABSTRACT

We have detected three temperate Earth-sized planets transiting an ultra-cool dwarf star only 12 pc away, TRAPPIST-1. This discovery sparks the era of detailed characterization and habitability assessment of Earth-sized exoplanets. It also opens a new chapter for exoplanetology: comparative planetology in the realm of temperate terrestrial planets.

TRAPPIST-1's system is currently the subject of an intense, worldwide follow-up effort that spans the electromagnetic spectrum from the UV to radio. Being uniquely suited for NIR and UV high-precision observations, HST has a key role to play in this follow-up effort.

Updated ephemerids resulting from two Spitzer DDTs show that TRAPPIST-1 b and c will transit simultaneously on May 4th, 2016 at 9h10 UT providing a unique and rare opportunity to study for the first time, and simultaneously, the atmospheres of temperate Earth-sized planets outside of the Solar System. We propose a 4-orbit pre-screening program with WFC3 to definitely test the H/He-dominated atmospheric scenario for these planets and determine the relative inclination of both planets, bringing invaluable constraints on the dynamical history of the system.

OBSERVING DESCRIPTION

We propose to observe the simultaneous transits on May 4th of the two inner planets of the Ultra Cool Dwarf TRAPPIST-1 with WFC3 to determine the planetary transmission spectra. The visit will consist of four orbits timed such that that two happen before the transit, one happens during the double transit (8:47UT to 9:32UT), and one happens after the transit.

Visit

Proposal 14500, Visit 01, implementation Fri Apr 22 01:03:33 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: BETWEEN 04-MAY-2016:05:20:00 AND 04-MAY-2016:06:10:00; VISIBILITY INTERVAL 53 M

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	2MASS-J23062928-0502285	RA: 23 06 30.2880 (346.6262000d) Dec: -05 02 36.30 (-5.04342d) Equinox: J2000		V=18.798 R=16.47, I=14.02, J=11.35, K=10.30	Reference Frame: SIMBAD

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

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) 2MASS-J23062928-0502285	WFC3/IR, MULTIACCUM, IRSUB256	F139M	SAMP-SEQ=RAPID; NSAMP=10	GS ACQ SCENARIO BASE1B3		2.77815 Secs (2.778 Secs) *[==>]*	*[1]*

	2	(1) 2MASS-J23062928-0502285	WFC3/IR, MULTIACCUM, GRISM256	G141	SAMP-SEQ=SPARS25; NSAMP=6	SPATIAL SCAN 0.027,90.0 Degrees,Round trip	112.00801 Secs X 37 (8288.593 Secs)	
							[==>(Copy 1, Forward)] *[==>(Copy 1, Reverse)]* *[==>(Copy 2, Forward)]* *[==>(Copy 2, Reverse)]* *[==>(Copy 3, Forward)]* *[==>(Copy 3, Reverse)]* *[==>(Copy 4, Forward)]* *[==>(Copy 4, Reverse)]* *[==>(Copy 5, Forward)]* *[==>(Copy 5, Reverse)]* *[==>(Copy 6, Forward)]* *[==>(Copy 6, Reverse)]* *[==>(Copy 7, Forward)]* *[==>(Copy 7, Reverse)]* *[==>(Copy 8, Forward)]* *[==>(Copy 8, Reverse)]* *[==>(Copy 9, Forward)]* *[==>(Copy 9, Reverse)]*	***[1]***
							[==>(Copy 10, Forward)] *[==>(Copy 10, Reverse)]* *[==>(Copy 11, Forward)]* *[==>(Copy 11, Reverse)]* *[==>(Copy 12, Forward)]* *[==>(Copy 12, Reverse)]* *[==>(Copy 13, Forward)]* *[==>(Copy 13, Reverse)]* *[==>(Copy 14, Forward)]* *[==>(Copy 14, Reverse)]* *[==>(Copy 15, Forward)]* *[==>(Copy 15, Reverse)]* *[==>(Copy 16, Forward)]* *[==>(Copy 16, Reverse)]* *[==>(Copy 17, Forward)]* *[==>(Copy 17, Reverse)]* *[==>(Copy 18, Forward)]* *[==>(Copy 18, Reverse)]* *[==>(Copy 19, Forward)]*	***[2]***

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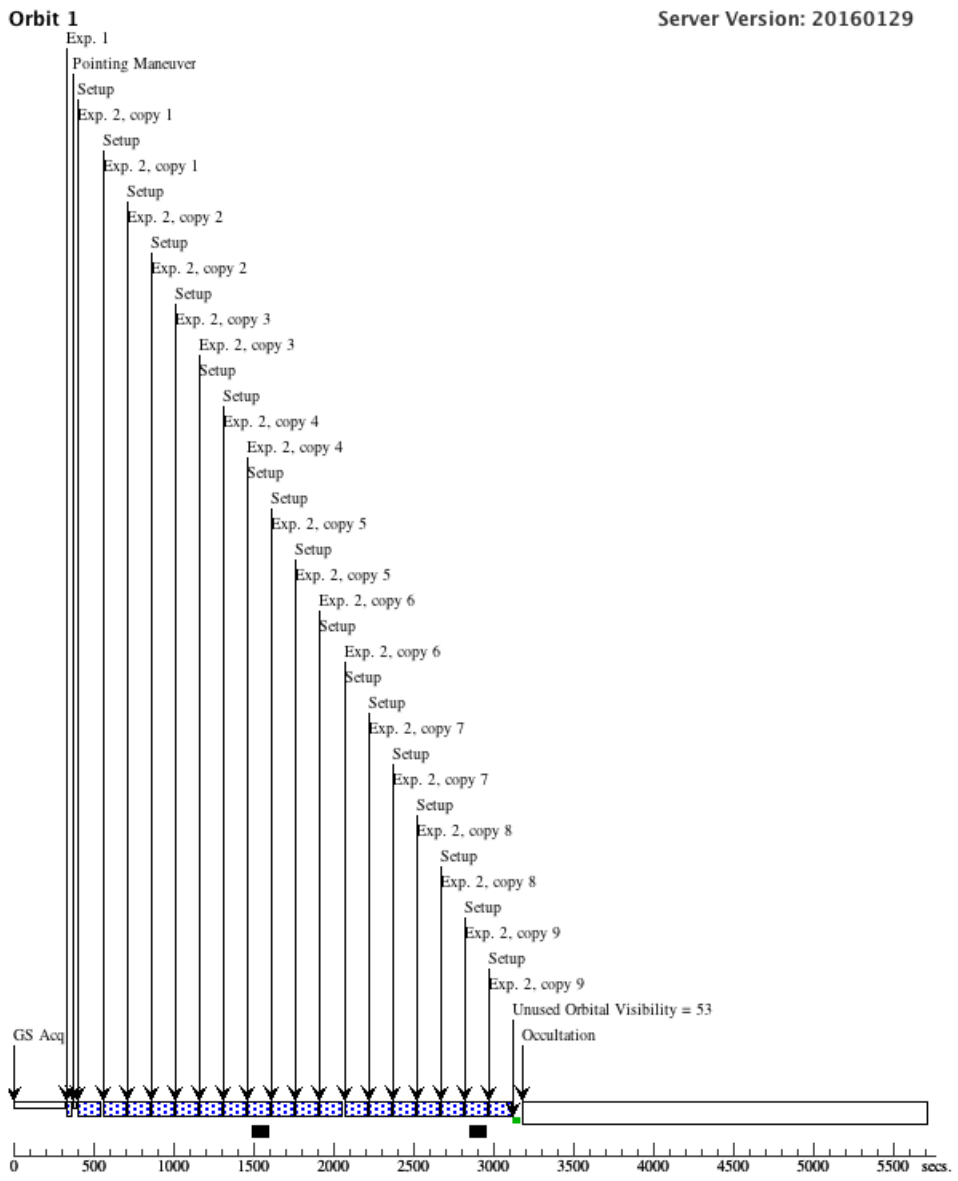
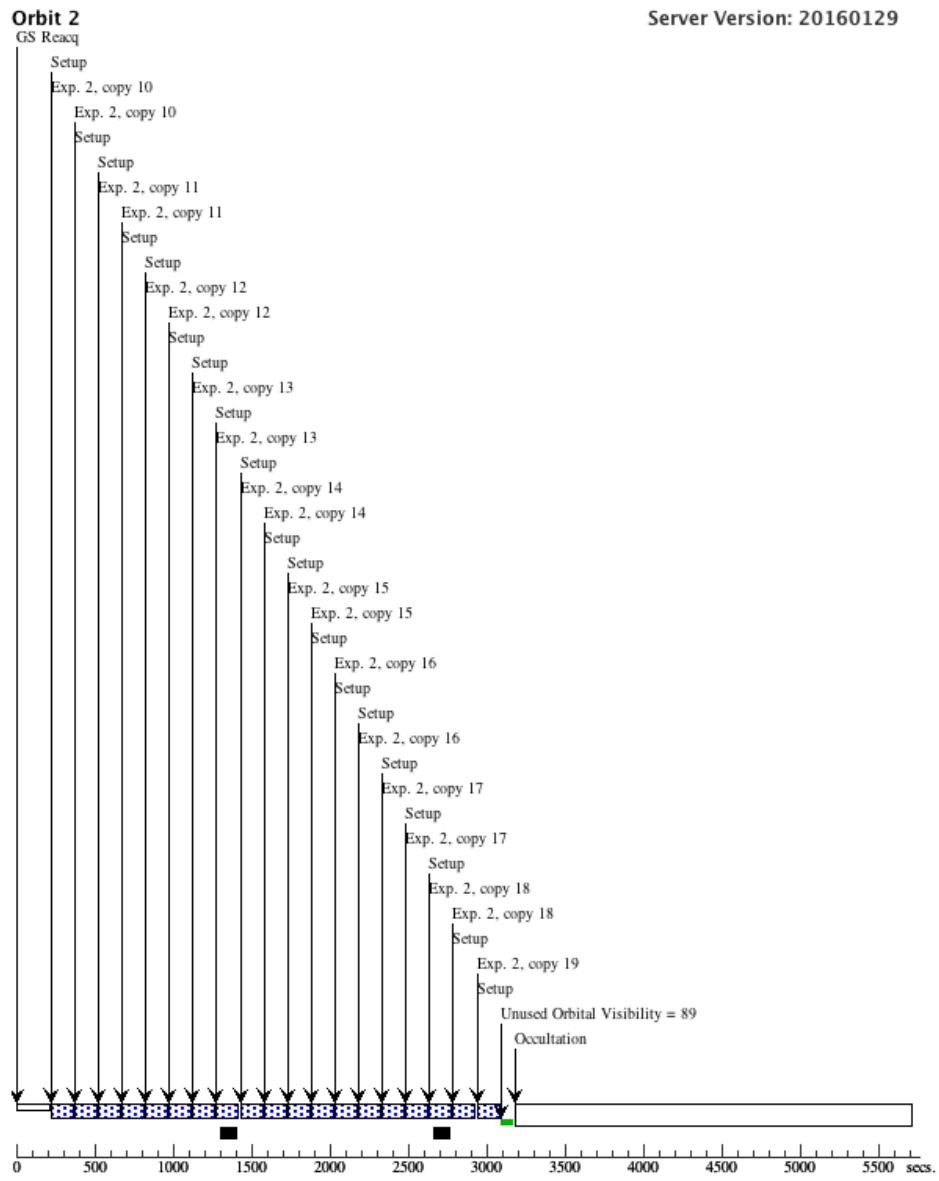
		[==>(Copy 29, Forward)] *[==>(Copy 29, Reverse)]* *[==>(Copy 30, Forward)]* *[==>(Copy 30, Reverse)]* *[==>(Copy 31, Forward)]* *[==>(Copy 31, Reverse)]* *[==>(Copy 32, Forward)]* *[==>(Copy 32, Reverse)]* *[==>(Copy 33, Forward)]* *[==>(Copy 33, Reverse)]* *[==>(Copy 34, Forward)]* *[==>(Copy 34, Reverse)]* *[==>(Copy 35, Forward)]* *[==>(Copy 35, Reverse)]* *[==>(Copy 36, Forward)]* *[==>(Copy 36, Reverse)]* *[==>(Copy 37, Forward)]* *[==>(Copy 37, Reverse)]*	***[4]***

Orbit Structure

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Orbit 3
Server Version: 20160129
GS Reacq
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Unused Orbital Visibility = 89
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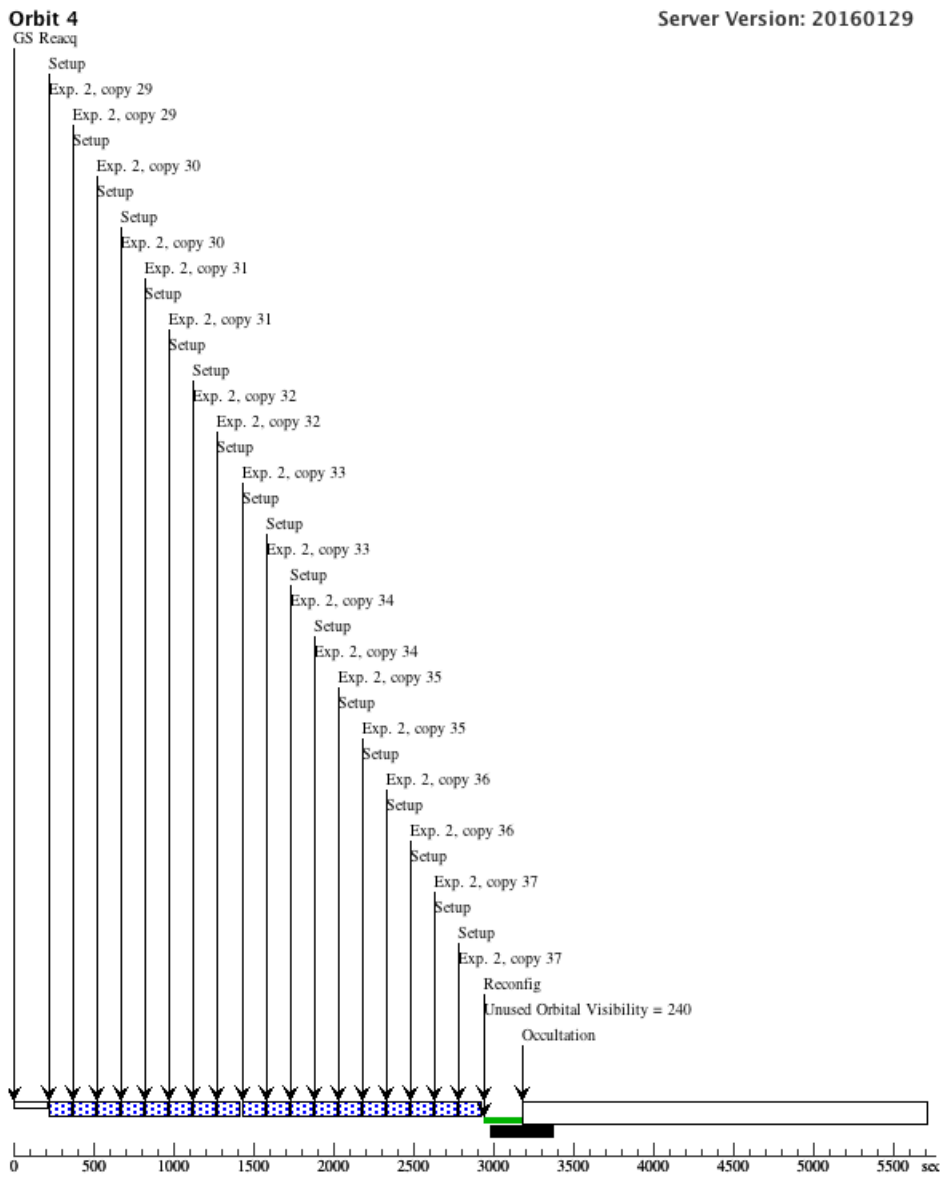
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Server Version: 20160129
GS Reacq
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Exp. 2, copy 36
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Exp. 2, copy 37
Reconfig
Unused Orbital Visibility = 240
Occultation
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1000
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2000
2500
3000
3500
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4500
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