

# 14221 - HST Confirmation and Characterization of a Potentially Habitable World

Cycle: 23, Proposal Category: GO

(UV Initiative)

(Availability Mode: AVAILABLE)

## **INVESTIGATORS**

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### **VISITS**

Visit	Targets used in Visit	Configurations used in Visit	Orbits Used		OP Current with Visit?
01	(1) 2M11301450+0735180 WAVE	STIS/CCD STIS/FUV-MAMA	5	01-Feb-2018 17:02:06.0	yes
11	(1) 2M11301450+0735180 WAVE	STIS/CCD STIS/FUV-MAMA	5	01-Feb-2018 17:02:09.0	yes
21	(1) 2M11301450+0735180 WAVE	STIS/CCD STIS/FUV-MAMA	4	01-Feb-2018 17:02:12.0	yes

Proposal 14221 (STScI Edit Number: 0, Created: Thursday, February 1, 2018 5:02:13 PM EST) - Overview 14 Total Orbits Used

### **ABSTRACT**

Atmospheric characterization of exoplanets in habitable zones is one of the greatest challenge of astrophysics. In fact, all known potential targets either do not transit, or they transit stars too faint or distant, making them impossible to probe with transit spectroscopy. A recently announced K2 planet candidate found in the habitable zone of a nearby M dwarf, could be a game changer as the first habitable-zone super-Earth (2.2 R\_Earth) amenable to characterization. We propose to use HST to (1) validate the planet candidate by observing a high-precision near-infrared transit with WFC3 and (2) characterize its atmosphere by detecting an extended hydrogen exosphere in the far ultraviolet with STIS. Hydrogen escape is indeed a telltale sign of terrestrial planets enduring a runaway greenhouse effect. Further considerations on the habitable potential of the planet thus need to be vet against a detection of hydrogen escape. Our recent STIS Lyman-alpha observations of a moderately irradiated neptune show that extended upper atmospheres can reach much larger sizes around such planets than around very hot exoplanets. We could thus obtain a significant detection with a modest amount of HST orbits. In parallel, we started a ground-based campaign to constrain the yet unknown mass of this planet with Doppler measurements. Combining the Lyman-alpha transit depth with the measurement of the planet bulk density (from the accurate near-infrared transit and the Doppler mass), will reveal for the first time whether an exoplanet can be telluric and actually habitable, or if it is losing its water because of a runaway greenhouse effect.

#### **OBSERVING DESCRIPTION**

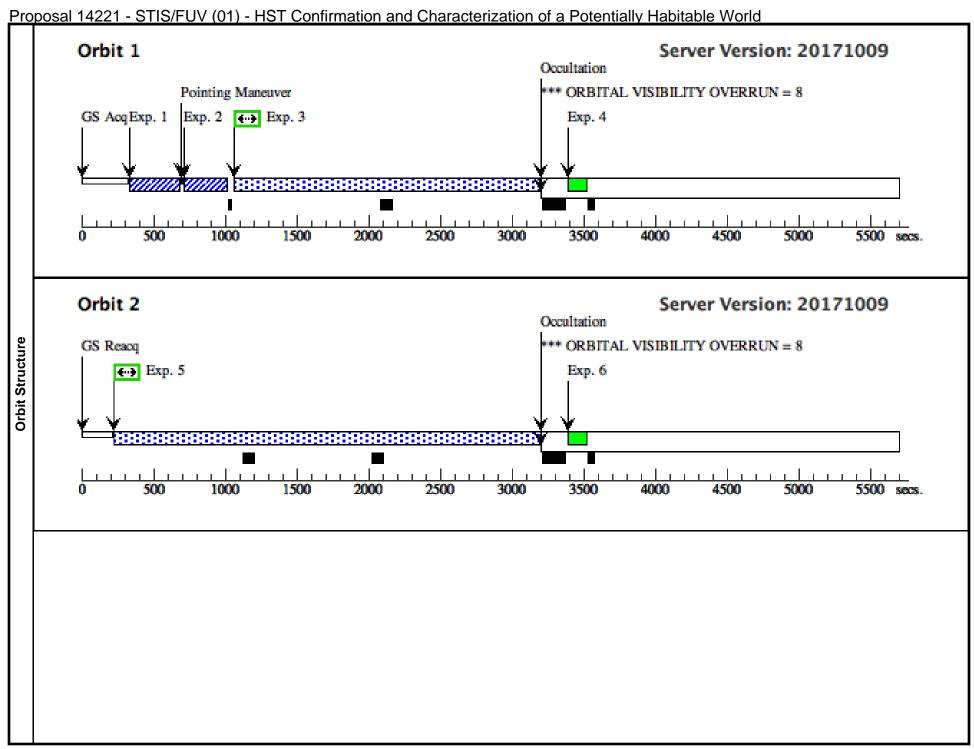
We are going to observe one transit of exoplanet EPIC 201912552.01, which lies in the habitable zone of its M dwarf host. The planet was found by the K2 survey; and two transits are known, yielding some uncertainties on the planet transit ephemeride. We use the ephemeride to impose phase constraints on the first (ACQ) exposure of the first orbit in the visit. These constraints are set to allow observation of 2 orbits before the transit, 2 orbits after the transit, and one orbit (the third one) within the optical transit of the planet. The UV transit can be much longer than the optical transit, and orbits 2 and 4 could catch an extended transit. We are submitted a Spitzer DDT to observe a NIR transit, which could significantly firm up the transit ephemeride (this was the original purpose of another WFC3 visit in this programme, which has been removed by the TAC).

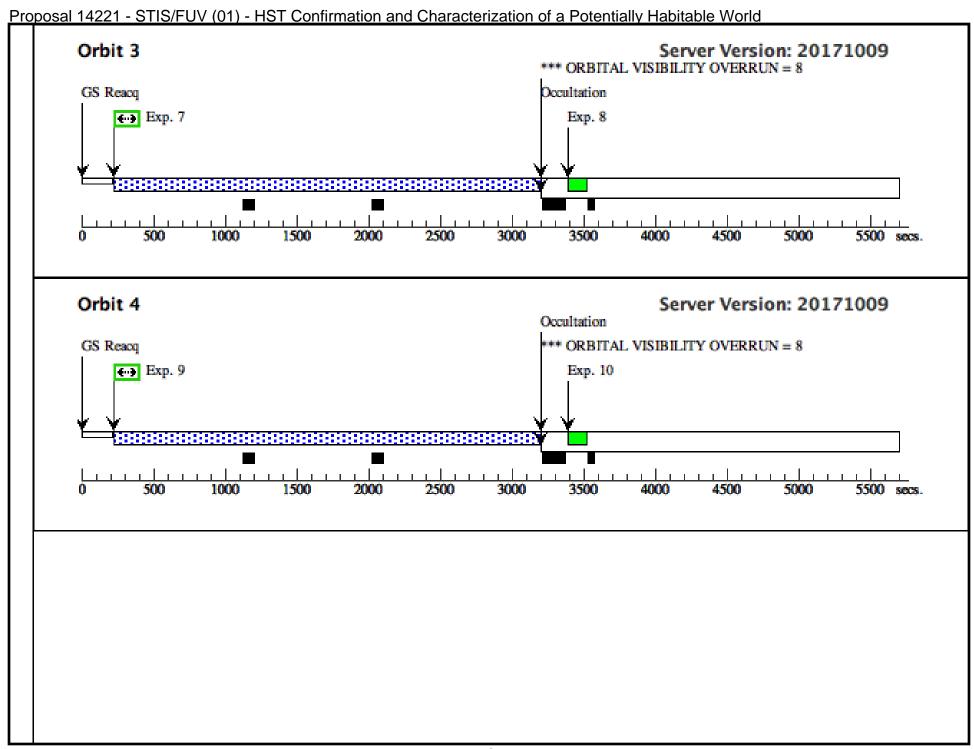
The science observations are all done with STIS/FUV-MAM/G140M using time-tag mode. Because the ACQ/PEAK is quite long, we won't repeat it in the subsequent orbits to save science time. I will also make a request to be able to use GO wavecals during occultations.

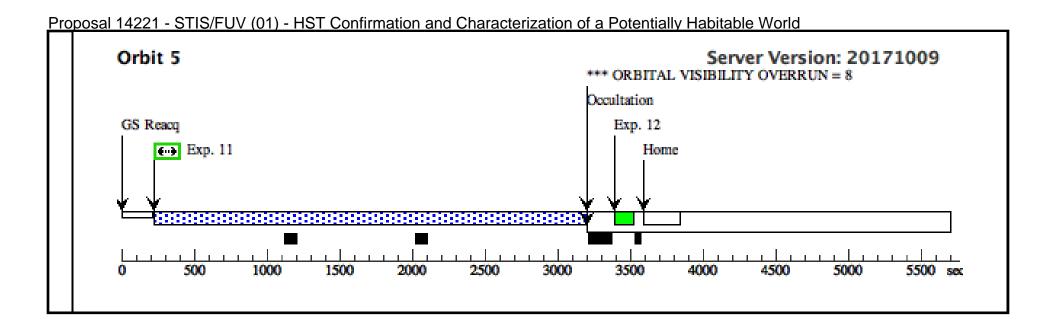
<u>Pr</u>	opos	<u>al 14221 - STIS/FU</u>	JV (01) - HST Confirmation a	and Characterization of a Pote	<u>entially Habitable W</u>	orld				
	Prop	osal 14221, STIS/FUV (01), fa	iled			Thu Feb 01 22:02:13 GMT 2018				
Visit	Diag	nostic Status: Warning								
	Scien	tific Instruments: STIS/CCD, S								
		Special Requirements: Period 32.939700 D AND ZERO-PHASE HJD2457264.391819								
L	Com	nents: This 5-orbit visit will cap	oture the transit of the planet using STIS/FUV-	MAMA.						
ı	(STIS	S/FUV (01)) Warning (Orbit Pla	nnner): ORBITAL VISIBILITY OVERRUN							
ı	(STIS	S/FUV (01)) Warning (Orbit Pla	nnner): ORBITAL VISIBILITY OVERRUN							
y,		S/FUV (01)) Warning (Orbit Pla	nnner): ORBITAL VISIBILITY OVERRUN							
ostic	(STIS	S/FUV (01)) Warning (Orbit Pla	nnner): ORBITAL VISIBILITY OVERRUN							
	(STIS	S/FUV (01)) Warning (Orbit Pla	nnner): ORBITAL VISIBILITY OVERRUN							
	(Scie	(Science (01.003)) Warning (Form): Sensitive exposures should have an ETC run number provided.								
ja Dia	(Scie	(Science (01.005)) Warning (Form): Sensitive exposures should have an ETC run number provided.								
1		(Science (01.007)) Warning (Form): Sensitive exposures should have an ETC run number provided.								
ı	(Scie	(Science (01.009)) Warning (Form): Sensitive exposures should have an ETC run number provided.								
L	(Scie	nce (01.011)) Warning (Form):	Sensitive exposures should have an ETC run n	umber provided.						
ı	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
ı	(1)	2M11301450+0735180	RA: 11 30 14.5092 (172.5604550d)	Proper Motion RA: -74 mas/yr	V=13.5+/-0.05	Reference Frame: ICRS				
		Alt Name1:	Dec: +07 35 18.05 (7.58835d)	Proper Motion Dec: -122 mas/yr	J=9.76,					
Targets	)	EPIC201912552	Equinox: J2000	Epoch of Position: 2000	H=9.13,					
15		Alt Name2: 2MASS11301450+0735	51		K=8.90					
9		80	· <del>-</del>							
<u>.</u> ≚	Com					ose data bases list proper motions. However, we will				
I۳		ele to retrieve those from conten gorv=STAR	nporaneous observations we are doing from the	e ground to follow-up the system. We will update	e the Phase 2 as soon as possible	e with these information.				
ı	Desc	ription=[EXTRA-SOLAR PLAN	VETARY SYSTEM, M V-IV]							
	Exter	nded=NO								

Proposal 14221 - STIS/FUV (01) - HST Confirmation and Characterization of a Potentially Habitable World

		Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
ŀ	1	ACQ (STIS.ta.733 994)		STIS/CCD, ACQ, F25ND3	MIRROR		PHASE 0.9942 TO 0 .9966	Sequence 1-4 Non-In t in STIS/FUV (01)	14 Secs (14 Secs) [==>]	[1]
	Com	/	ows to obtain S/N > 50	) for this acquisition exposure.						1
	2			STIS/CCD, ACQ/PEAK, 52X0.05	MIRROR			Sequence 1-4 Non-In	1 Secs (1 Secs)	
		(STIS.ta.771 489)	35180					t in STIS/FUV (01)	[==>]	[1]
	e wai	rning on CTE	evious setting (commen vs. low-background di: (ACQ/PEAK with a gr		,000 sec) ACQ/PE	AK procedure. I have th	us changed settings to s	simply use the mirror a	nd drop the grism. In 1 sec, the $S/N >$	150 and th
	#45s	allows to reac	h over S/N=40 at with	ssm) STIS/CCD/G750L at 7751 Angstroms The we switch to the MAMA.	s. The Spectroscop	ic ETC yields a warning	about the issue with ch	arge transfer #efficien	cy for low background, but we are just	t using the
	3	Science		STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 1-4 Non-In	1995 Secs (1995 Secs)	
			35180	52X0.05	1222 A	0; WAVECAL=NO		t in STIS/FUV (01)	[==>]	[1]
			r is of the same spectro target will be weaker	al type (M2V) as GJ 436, observed sev than GJ 436's.	veral time (e.g., Go	0#12965) in this configu	ration. The target is ~3	mag fainter and farthe	r away (30 pc vs. 10 pc) than GJ 436,	so the Lym
	4	GO-WAVE		STIS/FUV-MAMA, ACCUM,	G140M			Sequence 1-4 Non-In	[> ]	
		CAL		52X0.05	1222 A			t in STIS/FUV (01)	[==>]	[1]
S	5	Science	(1) 2M11301450+07 STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90	TIME=90	Sequence 5-6 Non-In t in STIS/FUV (01)	2961 Secs (2961 Secs)		
ıre		35180 52X0.05	52X0.05	1222 A	0			[==>]	[2]	
Exposures	Comments: The star is of the same spectral type (M2V) as GJ 436, observed several time (e.g., GO#12965) in this configuration. The target is ~3 mag fainter and farther away (30 pc vs. 10 pc) than GJ 436, so the Lyman-alpha flux of the target will be weaker than GJ 436's.									
X	6	GO-WAVE	-	STIS/FUV-MAMA, ACCUM,	G140M S		Sequence 5-6 Non-In	[>]		
_		CAL		52X0.05	1222 A			t in STIS/FUV (01)	[==>]	[2]
	7	Science		STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 7-8 Non-In	2961 Secs (2961 Secs)	
			35180	52X0.05	1222 A 0			t in STIS/FUV (01)	[==>]	[3]
	Comi an-al	ments: The sta lpha flux of the	r is of the same spectro target will be weaker	al type (M2V) as GJ 436, observed sev than GJ 436's.	veral time (e.g., Go	0#12965) in this configu	ration. The target is ~3	mag fainter and farthe	er away (30 pc vs. 10 pc) than GJ 436,	so the Lym
	8	GO-WAVE	WAVE	STIS/FUV-MAMA, ACCUM,	G140M			Sequence 7-8 Non-In	[==>]	
		CAL		52X0.05	1222 A			t in STIS/FUV (01)	[>]	[3]
	9	Science		STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90			2961 Secs (2961 Secs)	
			35180	52X0.05	1222 A	0		nt in STIS/FUV (01)	[==>]	[4]
	Comi an-al	ments: The sta lpha flux of the	r is of the same spectro target will be weaker	al type (M2V) as GJ 436, observed sev than GJ 436's.	veral time (e.g., G	0#12965) in this configu	ration. The target is ~3	mag fainter and farthe	r away (30 pc vs. 10 pc) than GJ 436,	so the Lym
	10	GO-WAVE	WAVE	STIS/FUV-MAMA, ACCUM,	G140M			Sequence 9-10 Non-I	[==>]	
		CAL		52X0.05	1222 A			nt in STIS/FUV (01)	1/	[4]
	11	Science		STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 11-12 Non	2961 Secs (2961 Secs)	
			35180	52X0.05	1222 A	0		-Int in STIS/FUV (0	[==>]	[5]
	Comi an-al	ments: The sta	r is of the same spectro target will be weaker	al type (M2V) as GJ 436, observed sev than GJ 436's.	veral time (e.g., Ge	0#12965) in this configu	ration. The target is ~3	-/	r away (30 pc vs. 10 pc) than GJ 436,	
ŀ		GO-WAVE		STIS/FUV-MAMA, ACCUM,	G140M			Sequence 11-12 Non	,	
		CAL		52X0.05	1222 A			-Int in STIS/FUV (0	[==>]	[5]
								1)		-



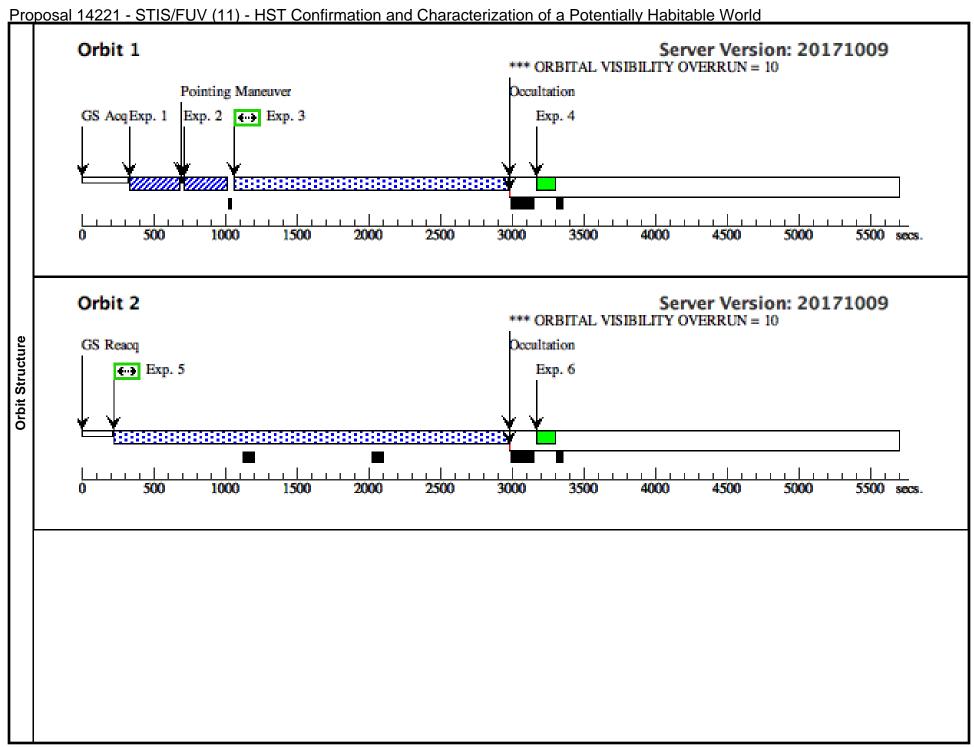


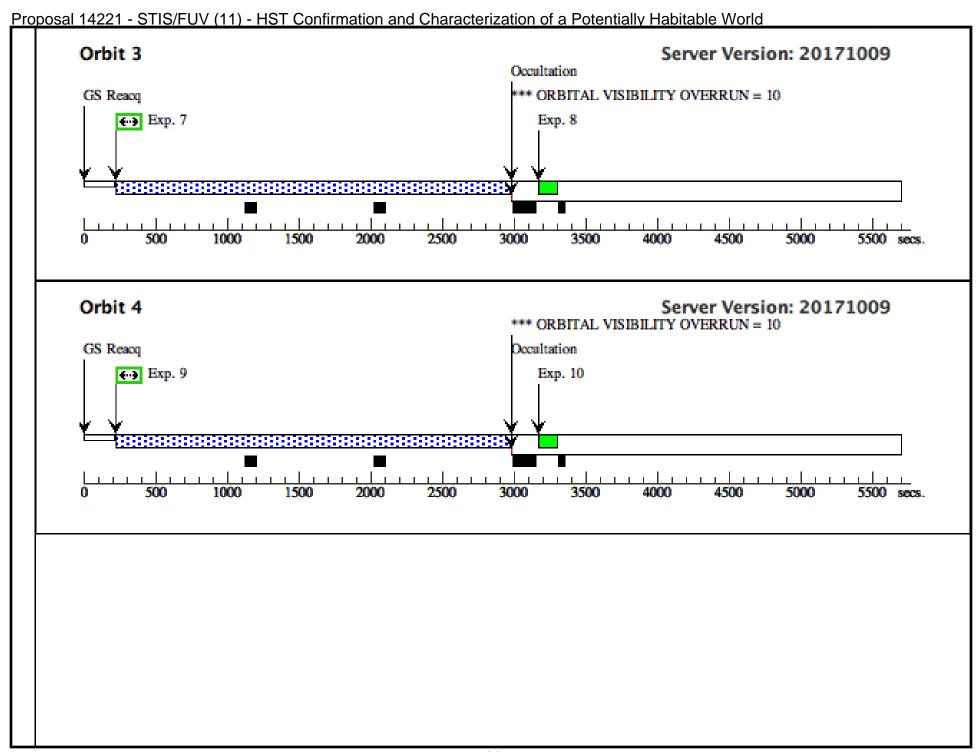


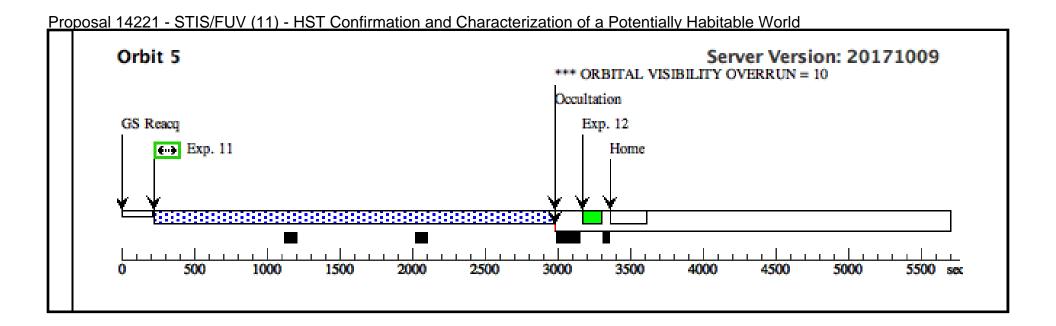
Pro	<u>oposal 14221 - STIS/FUV (11</u>	<u>1) - HST Confirmation ar</u>	nd Characterization of a Pot	<u>entially Habitable Wo</u>	orld				
	Proposal 14221, STIS/FUV (11), failed				Thu Feb 01 22:02:14 GMT 2018				
Visit	Diagnostic Status: Warning								
	Scientific Instruments: STIS/CCD, STIS/FUV								
>	Special Requirements: SCHED 100%; Period	d 32.939700 D AND ZERO-PHASE HJI	D2457264.391819						
	Comments: This 5-orbit visit will capture the Added as a repeat of visit 01 which did not ex	transit of the planet using STIS/FUV-M. xecute due to a STIS safing on 6/19/2016	AMA.						
	(STIS/FUV (11)) Warning (Orbit Planner): O	ORBITAL VISIBILITY OVERRUN							
	(STIS/FUV (11)) Warning (Orbit Planner): O	ORBITAL VISIBILITY OVERRUN							
ြ	(STIS/FUV (11)) Warning (Orbit Planner): O	ORBITAL VISIBILITY OVERRUN							
Ë	(STIS/FUV (11)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN								
S	(STIS/FUV (11)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN								
l g	(Science (11.003)) Warning (Form): Sensitive exposures should have an ETC run number provided.								
Dia	(Science (11.005)) Warning (Form): Sensitive exposures should have an ETC run number provided.								
Ι-	(Science (11.007)) Warning (Form): Sensitive exposures should have an ETC run number provided.								
	(Science (11.009)) Warning (Form): Sensitive	(Science (11.009)) Warning (Form): Sensitive exposures should have an ETC run number provided.							
	(Science (11.011)) Warning (Form): Sensitive	e exposures should have an ETC run nu	mber provided.						
	# Name Targ	get Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
l	` '	11 30 14.5092 (172.5604550d)	Proper Motion RA: -74 mas/yr	V=13.5+/-0.05	Reference Frame: ICRS				
l st	Alt Name1: Dec:	+07 35 18.05 (7.58835d)	Proper Motion Dec: -122 mas/yr	J=9.76,					
Targets	EPIC201912552 Equir	nox: J2000	Epoch of Position: 2000	H=9.13,					
ed Ta	Alt Name2: 2MASS11301450+07351 80			K=8.90					
Fix	Comments: This object was generated by the be able to retrieve those from contemporaneo Category=STAR Description=IEXTRA-SOLAR PLANETARY S	ous observations we are doing from the g			ose data bases list proper motions. However, we will with these information.				

Proposal 14221 - STIS/FUV (11) - HST Confirmation and Characterization of a Potentially Habitable World

	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
ŀ	1	ACQ (STIS.ta.733 994)		STIS/CCD, ACQ, F25ND3	MIRROR		PHASE 0.9930 TO 0 .9966	Sequence 1-4 Non-In t in STIS/FUV (11)	14 Secs (14 Secs) [==>]	[1]
	Com	nments: 14s allo	ows to obtain S/N > 50	) for this acquisition exposure.						
	2			STIS/CCD, ACO/PEAK, 52X0.05	MIRROR			Sequence 1-4 Non-In	1 Secs (1 Secs)	
		(STIS.ta.771 489)	35180	, ,				t in STIS/FUV (11)	[==>]	[1]
	e wa	arning on CTE	evious setting (commer vs. low-background di (ACQ/PEAK with a gr		,000 sec) ACQ/PE	EAK procedure. I have th	us changed settings to s	simply use the mirror a	nd drop the grism. In 1 sec, the S/N >	150 and th
	#45s	s allows to reac	ch over S/N=40 at with	ism) STIS/CCD/G750L at 7751 Angstrom: The we switch to the MAMA.	s. The Spectroscop	oic ETC yields a warning	about the issue with ch	arge transfer #efficien	cy for low background, but we are just	t using the
	3	Science		STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 1-4 Non-In	1774 Secs (1774 Secs)	
			35180	52X0.05	1222 A	0; WAVECAL=NO		t in STIS/FUV (11)	[==>]	[1]
			r is of the same spectro target will be weaker	al type (M2V) as GJ 436, observed sev than GJ 436's.	veral time (e.g., Go	O#12965) in this configu	ration. The target is ~3	mag fainter and farthe	er away (30 pc vs. 10 pc) than GJ 436,	so the Lym
	4	GO-WAVE	WAVE	STIS/FUV-MAMA, ACCUM,	G140M			Sequence 1-4 Non-In	[==>]	
		CAL		52X0.05	1222 A			t in STIS/FUV (11)	[==>]	[1]
s	5	5 Science (1) 2M11301450+07 STIS/FUV-MAMA, TIME-TAG,	STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 5-6 Non-In	2740 Secs (2740 Secs)		
Ē			35180	52X0.05	1222 A	0		t in STIS/FUV (11)	[==>]	[2]
Exposures	Comments: The star is of the same spectral type (M2V) as GJ 436, observed several time (e.g., GO#12965) in this configuration. The target is ~3 mag fainter and farther away (30 pc vs. 10 pc) than GJ 436, so the Lym an-alpha flux of the target will be weaker than GJ 436's.									
ÄΓ	6	GO-WAVE	WAVE	STIS/FUV-MAMA, ACCUM,	G140M	140M		Sequence 5-6 Non-Ir	[==>]	
		CAL		52X0.05	1222 A			t in STIS/FUV (11)	[>]	[2]
	7	Science		STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 7-8 Non-In	2740 Secs (2740 Secs)	
			35180	52X0.05	1222 A 0			t in STIS/FUV (11)	[==>]	[3]
	Com an-a	nments: The sta alpha flux of the	r is of the same spectr e target will be weaker	al type (M2V) as GJ 436, observed sev than GJ 436's.	veral time (e.g., Go	O#12965) in this configu	ration. The target is ~3	mag fainter and farthe	er away (30 pc vs. 10 pc) than GJ 436,	so the Lym
	8	GO-WAVE	WAVE	STIS/FUV-MAMA, ACCUM,	G140M			Sequence 7-8 Non-In	[==>]	
		CAL		52X0.05	1222 A			t in STIS/FUV (11)	[==>]	[3]
	9	Science	(1) 2M11301450+07	STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 9-10 Non-I	2740 Secs (2740 Secs)	
			35180	52X0.05	1222 A	0		nt in STIS/FUV (11)	[==>]	[4]
	Com an-a	nments: The sta alpha flux of the	r is of the same spectro target will be weaker	al type (M2V) as GJ 436, observed sev than GJ 436's.	veral time (e.g., Go	O#12965) in this configu	ration. The target is ~3	mag fainter and farthe	er away (30 pc vs. 10 pc) than GJ 436,	so the Lym
		GO-WAVE	· ·	STIS/FUV-MAMA, ACCUM,	G140M			Sequence 9-10 Non-I	[==>]	
		CAL		52X0.05	1222 A			nt in STIS/FUV (11)	1/1	[4]
	11	Science		STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 11-12 Non	2740 Secs (2740 Secs)	
			35180	52X0.05	1222 A	0		-Int in STIS/FUV (1	[==>]	[5]
	Com	nments: The sta	r is of the same spectr target will be weaker	al type (M2V) as GJ 436, observed sev	veral time (e.g., Go	O#12965) in this configu	ration. The target is ~3	-/	er away (30 pc vs. 10 pc) than GJ 436,	1
ŀ		GO-WAVE		STIS/FUV-MAMA, ACCUM,	G140M			Sequence 11-12 Non		
	. 2	CAL		52X0.05	1222 A			-Int in STIS/FUV (1	[==>]	[5]
								1)		







Proposal 14221, STIS/FUV (21), implementation Thu Feb 01 22:02:14 GMT 2018 **Diagnostic Status: Warning** Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: SCHED 100%; Period 32.939700 D AND ZERO-PHASE HJD2457264.391819 Comments: This 4-orbit visit will capture the transit of the planet using STIS/FUV-MAMA. Added as a repeat of visit 11 which was lost due to a MAMA1 reset event (HOPR 88203). The repeat is 4 orbits instead of the original 5 to optimize schedulability. (STIS/FUV (21)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (STIS/FUV (21)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN Diagnostic (STIS/FUV (21)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (STIS/FUV (21)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN (Science (21.003)) Warning (Form): Sensitive exposures should have an ETC run number provided. (Science (21.005)) Warning (Form): Sensitive exposures should have an ETC run number provided. (Science (21.007)) Warning (Form): Sensitive exposures should have an ETC run number provided. (Science (21.009)) Warning (Form): Sensitive exposures should have an ETC run number provided Name **Target Coordinates** Targ. Coord. Corrections Fluxes Miscellaneous 2M11301450+0735180 V=13.5+/-0.05 RA: 11 30 14.5092 (172.5604550d) Proper Motion RA: -74 mas/yr Reference Frame: ICRS Fixed Targets Alt Name1: Dec: +07 35 18.05 (7.58835d) Proper Motion Dec: -122 mas/yr J=9.76, EPIC201912552 Equinox: J2000 Epoch of Position: 2000 H=9.13,Alt Name2: K = 8.902MASS11301450+07351 Comments: This object was generated by the targetselector and retrieved from the 2MASS database. It's also part of the K2 Ecliptic Plan Input Catalog. None of those data bases list proper motions. However, we will be able to retrieve those from contemporaneous observations we are doing from the ground to follow-up the system. We will update the Phase 2 as soon as possible with these information.

Category=STAR

Description=[EXTRA-SOLAR PLANETARY SYSTEM, M V-IV]

Extended=NO

Proposal 14221 - STIS/FUV (21) - HST Confirmation and Characterization of a Potentially Habitable World

-10	JUSAI 1422	1 - 3 1 13/1 U V	(21) - HST Confirmatio	n and Chai	acterization or	a Fulcillally I	iabilable Wolf	u	
	# Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1 ACQ (STIS.ta.733 994)		STIS/CCD, ACQ, F25ND3	MIRROR		PHASE 0.99508 TO 0.99598	Sequence 1-4 Non-In t in STIS/FUV (21)	14 Secs (14 Secs) [==>]	[1]
	,	ows to obtain S/N > 50	) for this acquisition exposure.						1-3
-			STIS/CCD, ACQ/PEAK, 52X0.05	MIRROR			Sequence 1-4 Non-In	1 Cass (1 Cass)	
	(STIS.ta.771 489)		\$115/CCD, ACQ/FEAR, 32A0.03	WIKKOK			t in STIS/FUV (21)	[==>]	[1]
	Comments: The pr e warning on CTE	evious setting (comme vs. low-background di	nted below) resulted in a very long (~1 sappeared.	1,000 sec) ACQ/PE	EAK procedure. I have th	hus changed settings to	simply use the mirror a	nd drop the grism. In 1 sec, the S/N >	150 and th
	#45s allows to read	(ACQ/PEAK with a gr ch over S/N=40 at with acquisition, after whic	ism) a STIS/CCD/G750L at 7751 Angstrom ch we switch to the MAMA.	s. The Spectroscop	pic ETC yields a warning	g about the issue with c	harge transfer #efficien	cy for low background, but we are just	t using the
	3 Science		STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 1-4 Non-In	1774 Secs (1774 Secs)	
		35180	52X0.05	1222 A	0;		t in STIS/FUV (21)	[==>]	[1]
	a m		1. (191) G1 126 1	1.1. ( 6	WAVECAL=NO	er met		(20 10 ) 1 G1 (26	
	an-alpha flux of th	e target will be weaker		veral time (e.g., G	O#12965) in this configi	uration. The target is ~:	s mag fainter and farthe	er away (30 pc vs. 10 pc) than GJ 436,	so the Lym
Exposures	4 GO-WAVE CAL	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.05	G140M 1222 A			Sequence 1-4 Non-In t in STIS/FUV (21)	[==>]	[1]
8	·	(1) 23 51 12 21 15 2 25						25.10.5 (25.10.5 )	+
ΞI	5 Science	(1) 2M11301450+07 35180	STIS/FUV-MAMA, TIME-TAG, 52X0.05	G140M 1222 A	BUFFER-TIME=90 0		t in STIS/FUV (21)	2740 Secs (2740 Secs)	[2]
					O#12965) in this configi	uration. The target is ~3	B mag fainter and farthe	r away (30 pc vs. 10 pc) than GJ 436,	
L		e target will be weaker	than GJ 436's.						
	6 GO-WAVE CAL	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.05	G140M			Sequence 5-6 Non-In t in STIS/FUV (21)	f==>1	[2]
	CAL		32A0.03	1222 A			t III S 113/FUV (21)		[2]
	7 Science	(1) 2M11301450+07 35180	STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 7-8 Non-In	2740 Secs (2740 Secs)	
		35180	52X0.05	1222 A	U		t in STIS/FUV (21)	[==>]	[3]
	Comments: The sto an-alpha flux of th	ır is of the same spectr e target will be weaker	al type (M2V) as GJ 436, observed se than GJ 436's.	veral time (e.g., G	O#12965) in this configu	uration. The target is ~3	3 mag fainter and farthe	er away (30 pc vs. 10 pc) than GJ 436,	so the Lym
	8 GO-WAVE	WAVE	STIS/FUV-MAMA, ACCUM,	G140M			Sequence 7-8 Non-In	[==>]	
	CAL		52X0.05	1222 A			t in STIS/FUV (21)	[]	[3]
	9 Science		STIS/FUV-MAMA, TIME-TAG,	G140M	BUFFER-TIME=90		Sequence 9-10 Non-I	2740 Secs (2740 Secs)	
		35180	52X0.05	1222 A	0		nt in STIS/FUV (21)	[==>]	[4]
		ır is of the same spectr e target will be weaker		veral time (e.g., G	O#12965) in this configu	uration. The target is ~3	B mag fainter and farthe	er away (30 pc vs. 10 pc) than GJ 436,	so the Lym
	10 GO-WAVE	WAVE	STIS/FUV-MAMA, ACCUM,	G140M			Sequence 9-10 Non-I	[==>]	
	CAL		52X0.05	1222 A			nt in STIS/FUV (21)	11	[4]

