



## 16452 - Is the Lucy Mission Target (52246) Donaldjohanson a Binary?

Cycle: 28, 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) DONALDJOHANSON	WFC3/UVIS	1	04-Dec-2020 18:00:19.0	yes
51	(1) DONALDJOHANSON	WFC3/UVIS	1	04-Dec-2020 18:00:22.0	yes

2 Total Orbits Used

### ABSTRACT

(52246) Donaldjohanson is a Main Belt asteroid target of opportunity that the Lucy mission will fly by in April 2025. In August 2020 it was revealed to have an exceptionally high amplitude and long period lightcurve. We propose here to test the possibility that this extreme lightcurve is produced by a synchronous binary. Such a system can explain both the amplitude and period with physically reasonable component shapes. The observations will take advantage of the only opportunity prior to 2025 when such a binary could be resolved by HST during the unusually close perihelic opposition in December 2020. The identification of a binary impacts the choice of target acquisition software to be used by the Lucy spacecraft

Proposal 16452 (STScI Edit Number: 1, Created: Friday, December 4, 2020 at 6:00:23 PM Eastern Standard Time) - Overview during flyby.

### **OBSERVING DESCRIPTION**

Single orbit visit of asteroid (52246) Donaldjohanson in Nov-Dec 2020 when it is less than 1.08 AU from Earth. 9 dithered exposures in each of the F438W and F555W filters.

Proposal 16452 - Visit 01 - Is the Lucy Mission Target (52246) Donaldjohanson a Binary?

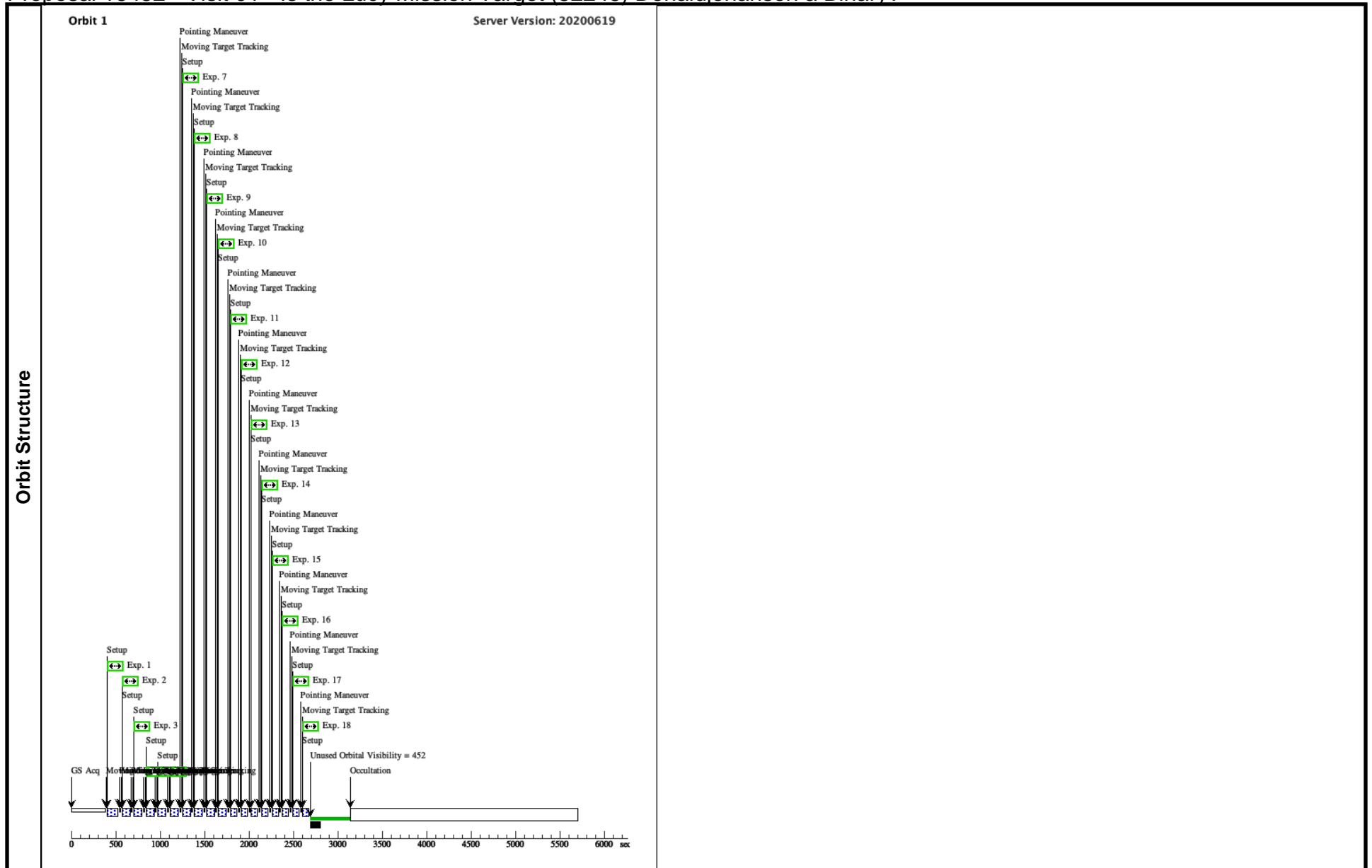
Fri Dec 04 23:00:23 GMT 2020

<b>Visit</b>	<p><b>Proposal 16452, Visit 01, failed</b></p> <p><b>Diagnostic Status: No Diagnostics</b></p> <p>Scientific Instruments: WFC3/UVIS</p> <p>Special Requirements: BETWEEN 03-DEC-2020:07:12:00 AND 03-DEC-2020:19:12:00; BETWEEN 28-NOV-2020:20:24:00 AND 29-NOV-2020:08:24:00; BETWEEN 08-DEC-2020:19:12:00 AND 09-DEC-2020:07:12:00; BETWEEN 23-NOV-2020:06:00:00 AND 23-NOV-2020:18:00:00; BETWEEN 14-DEC-2020:00:00:00 AND 14-DEC-2020:12:00:00; BETWEEN 19-DEC-2020:07:12:00 AND 19-DEC-2020:19:12:00</p>						
<b>Solar System Targets</b>	<b>#</b>	<b>Name</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Window</b>	<b>Ephem Center</b>
	(1)	DONALDJOHANS ON	TYPE=ASTEROID,A=2.38340821770 8659,E=0.1869719367322857,I=4.423 713412634814 ,O=262.8234180381248,W=213.18746 89016715,M=197.7867423053335,EQ UINOX=J2000,EPOCH=05-AUG- 2019:00:00:00,EpochTimeScale=TDB				EARTH
<p><i>Comments: Description=Main Belt</i></p>							

Proposal 16452 - Visit 01 - Is the Lucy Mission Target (52246) Donaldjohanson a Binary?

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
Exposures	1	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.0000,0.0000		40 Secs (40 Secs)	[==>]	[1]
	2	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.0927,0.3376		40 Secs (40 Secs)	[==>]	[1]
	3	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.1851,0.1978		40 Secs (40 Secs)	[==>]	[1]
	4	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.2381,0.5063		40 Secs (40 Secs)	[==>]	[1]
	5	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.3305,0.3665		40 Secs (40 Secs)	[==>]	[1]
	6	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.4232,0.6644		40 Secs (40 Secs)	[==>]	[1]
	7	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.4760,0.5352		40 Secs (40 Secs)	[==>]	[1]
	8	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.5687,0.8331		40 Secs (40 Secs)	[==>]	[1]
	9	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.6610,0.6933		40 Secs (40 Secs)	[==>]	[1]
	10	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.0000,0.0000		20 Secs (20 Secs)	[==>]	[1]
	11	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.0927,0.3376		20 Secs (20 Secs)	[==>]	[1]
	12	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.1851,0.1978		20 Secs (20 Secs)	[==>]	[1]
	13	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.2381,0.5063		20 Secs (20 Secs)	[==>]	[1]
	14	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.3305,0.3665		20 Secs (20 Secs)	[==>]	[1]
	15	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.4232,0.6644		20 Secs (20 Secs)	[==>]	[1]
	16	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.4760,0.5352		20 Secs (20 Secs)	[==>]	[1]
	17	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.5687,0.8331		20 Secs (20 Secs)	[==>]	[1]
	18	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.6610,0.6933		20 Secs (20 Secs)	[==>]	[1]

# Proposal 16452 - Visit 01 - Is the Lucy Mission Target (52246) Donaldjohanson a Binary?



Proposal 16452 - Visit 51 - Is the Lucy Mission Target (52246) Donaldjohanson a Binary?

Fri Dec 04 23:00:23 GMT 2020

<b>Visit</b>	<b>Proposal 16452, Visit 51</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFC3/UVIS Special Requirements: BETWEEN 03-DEC-2020:07:12:00 AND 03-DEC-2020:19:12:00; BETWEEN 28-NOV-2020:20:24:00 AND 29-NOV-2020:08:24:00; BETWEEN 08-DEC-2020:19:12:00 AND 09-DEC-2020:07:12:00; BETWEEN 23-NOV-2020:06:00:00 AND 23-NOV-2020:18:00:00; BETWEEN 14-DEC-2020:00:00:00 AND 14-DEC-2020:12:00:00; BETWEEN 19-DEC-2020:07:12:00 AND 19-DEC-2020:19:12:00; BETWEEN 24-DEC-2020:19:12:00 AND 25-DEC-2020:09:12:00; BETWEEN 29-DEC-2020:23:24:00 AND 30-DEC-2020:11:24:00; BETWEEN 04-JAN-2021:07:20:00 AND 04-JAN-2021:19:20:00; BETWEEN 09-JAN-2021:10:00:00 AND 09-JAN-2021:22:00:00							
	<b>Solar System Targets</b>	<b>#</b>	<b>Name</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Window</b>	<b>Ephem Center</b>
	(1)	DONALDJOHANS ON	TYPE=ASTEROID,A=2.38340821770 8659,E=0.1869719367322857,I=4.423 713412634814 .O=262.8234180381248,W=213.18746 89016715,M=197.7867423053335,EQ UINOX=J2000,EPOCH=05-AUG- 2019:00:00:00,EpochTimeScale=TDB					EARTH
	<i>Comments: Description=Main Belt</i>							

Proposal 16452 - Visit 51 - Is the Lucy Mission Target (52246) Donaldjohanson a Binary?

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
Exposures	1	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.0000,0.0000		60 Secs (60 Secs)	[==>]	[1]
	2	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.0927,0.3376		60 Secs (60 Secs)	[==>]	[1]
	3	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.1851,0.1978		60 Secs (60 Secs)	[==>]	[1]
	4	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.2381,0.5063		60 Secs (60 Secs)	[==>]	[1]
	5	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.3305,0.3665		60 Secs (60 Secs)	[==>]	[1]
	6	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.4232,0.6644		60 Secs (60 Secs)	[==>]	[1]
	7	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.4760,0.5352		60 Secs (60 Secs)	[==>]	[1]
	8	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.5687,0.8331		60 Secs (60 Secs)	[==>]	[1]
	9	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F438W	FLASH=11	POS TARG 0.6610,0.6933		60 Secs (60 Secs)	[==>]	[1]
	10	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.0000,0.0000		30 Secs (30 Secs)	[==>]	[1]
	11	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.0927,0.3376		30 Secs (30 Secs)	[==>]	[1]
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	14	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.3305,0.3665		30 Secs (30 Secs)	[==>]	[1]
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	18	(1) DONALDJOHANSON	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F555W	FLASH=11	POS TARG 0.6610,0.6933		30 Secs (30 Secs)	[==>]	[1]

# Proposal 16452 - Visit 51 - Is the Lucy Mission Target (52246) Donaldjohanson a Binary?

