



18215 - Supporting the JUICE mission through HST astrometry of Kallichore

Cycle: 33, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>
Dr. Juan Luis Rizos (PI) (ESA Member) (Contact)	Instituto de Astrofísica de Andalucía (IAA)
Dr. Benjamin Proudfoot (CoI) (CoPI) (AdminUSPI) (Contact)	University of Central Florida Board of Trustees
Dr. Simon Bernard Porter (CoI) (CoPI)	Southwest Research Institute
Prof. Jose Maria Gomez-Limon Gallardo (CoI) (ESA Member) (CoPI)	Instituto de Astrofísica de Andalucía (IAA)
Alvaro Alvarez-Candal (CoI) (ESA Member) (CoPI)	Instituto de Astrofísica de Andalucía (IAA)
Dr. Altair Ramos Gomes-Junior (CoI) (CoPI)	Universidade Federal de Uberlândia
Prof. Luisa Maria Lara (CoI) (ESA Member) (CoPI)	Instituto de Astrofísica de Andalucía (IAA)
Dr. Olivier Witasse (CoI) (ESA Member) (CoPI)	European Space Agency - ESTEC
Dr. Paul Hartogh (CoI) (ESA Member) (CoPI)	Max Planck Institute for Solar System Research

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) KALLICHORE	WFC3/UVIS	1	18-Nov-2025 11:00:15.0	yes
02	(1) KALLICHORE	WFC3/UVIS	1	18-Nov-2025 11:00:16.0	yes

2 Total Orbits Used

ABSTRACT

Kallichore (Jupiter XLIV) is a faint irregular satellite of Jupiter and the closest of the outer moons to the nominal JUICE trajectory. Refining its poorly constrained orbit is essential to assess the feasibility of a potential close JUICE flyby. On December 15, 2025, Kallichore will occult a relatively bright star along a well-placed ground track across Europe. We request two single-orbit HST/WFC3-UVIS visits to obtain high-precision

Proposal 18215 (STScI Edit Number: 3, Created: Tuesday, November 18, 2025, 11:00:16AM Eastern Standard Time) - Overview
astrometry of Kallichore in the days preceding this event. These observations will reduce the predicted shadow-path uncertainty from hundreds to a few tens of kilometers, enabling a coordinated ground-based campaign and providing key input for JUICE navigation and mission planning. Moreover, the ultra-precise astrometry will further improve our understanding of the dynamical evolution and physical properties of Jupiter's irregular satellites.

OBSERVING DESCRIPTION

We request two single-orbit visits with WFC3/UVIS, scheduled for November 30 and December 4, 2025, separated by four days to maximize temporal coverage. Each visit will obtain eight 97-s exposures using the UVIS2-2K2C-SUB aperture and the F606W filter, selected for its combination of high throughput and well-characterized PSF. Observations will be executed in non-sidereal tracking mode, following the predicted motion of Kallichore. A box-dither pattern will be applied between exposures to improve PSF sampling and mitigate detector artifacts. Simulations with the HST Exposure Time Calculator (G2V spectrum, high background) indicate an SNR > 14 per frame, including a post-flash level of 17 electrons to mitigate charge-transfer efficiency losses. We verified with the HST Exposure Time Calculator that stars fainter than magnitude 17 will not be saturated. The fields include at least three non-saturated Gaia DR3 stars suitable for differential astrometry.

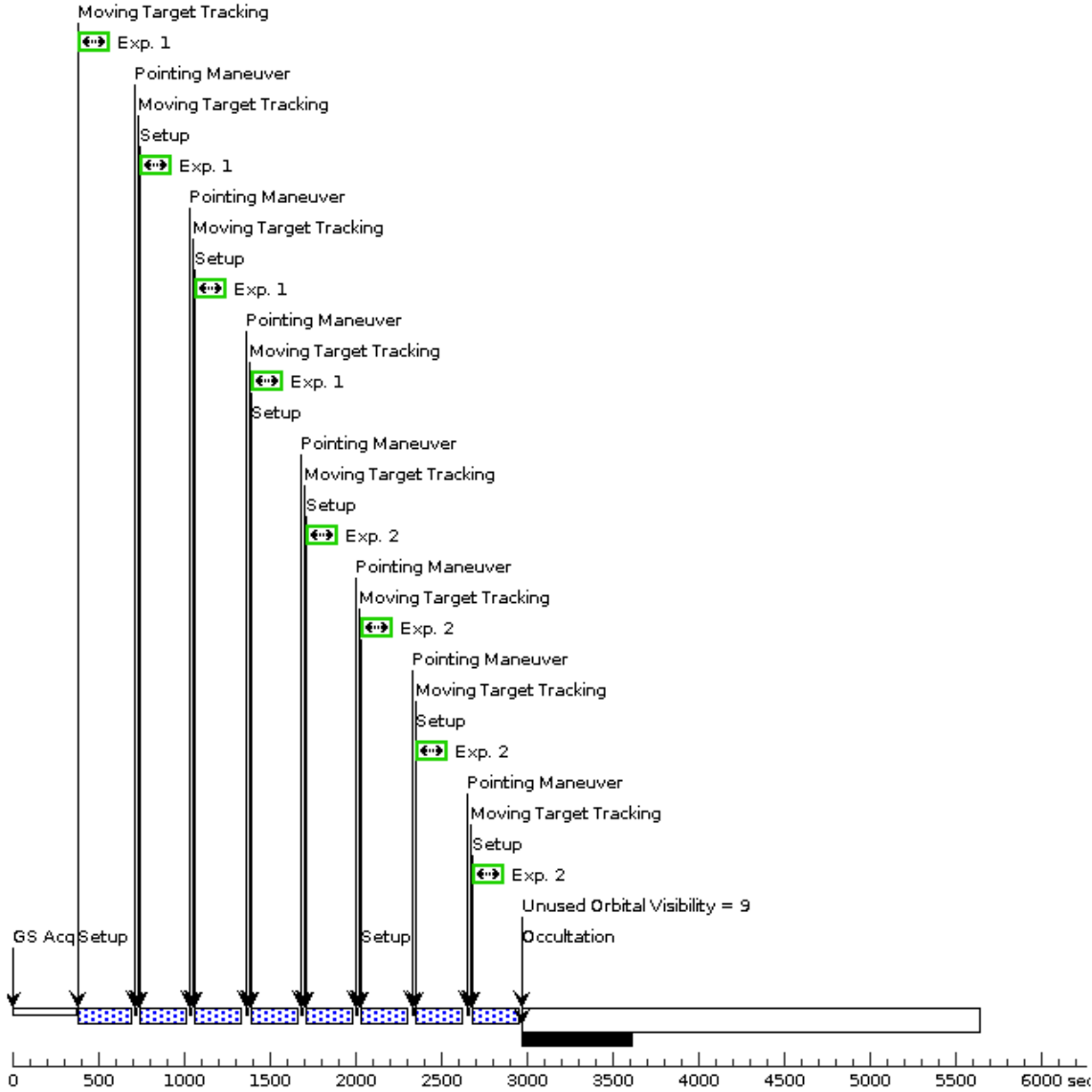
Proposal 18215 - Visit 01 - Supporting the JUICE mission through HST astrometry of Kallichore

Tue Nov 18 16:00:16 GMT 2025

Visit	Proposal 18215, Visit 01, scheduled Diagnostic Status: Informational Scientific Instruments: WFC3/UVIS Special Requirements: VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET									
	(Visit 01) Informational (Form): The Visit Planner and Spike may produce different schedulability results.									
Diagnosics										
Patterns	#	Primary Pattern			Secondary Pattern		Exposures			
	(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		(1), (2)			
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	KALLICHORE	STD=JUPITER	STD=KALLICHORE		NOT OCC OF KALLICHORE BY JUPITER FROM EARTH, SEP OF KALLICHORE IO FROM EARTH GT 10", SEP OF KALLICHORE EUROPA FROM EARTH GT 10", SEP OF KALLICHORE GANYMEDE FROM EARTH GT 10", SEP OF KALLICHORE CALLISTO FROM EARTH GT 10"	EARTH			
<i>Comments: The V-magnitude flux was obtained from the Minor Planet Center's Natural Satellites Ephemeris Service. From November 27, 2025 onward, the flux is below 23.6. Description=irregular</i>										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(WFC3UVIS.im.2225345)	(1) KALLICHORE	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F606W	FLASH=17		Pattern 1, Exps 1-1 in Visit 01 (1)	97 Secs (388 Secs)	
	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]									[1]
2	(WFC3UVIS.im.2225345)	(1) KALLICHORE	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F606W	FLASH=17		Pattern 1, Exps 2-2 in Visit 01 (1)	97 Secs (388 Secs)		
[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]									[1]	

Orbit Structure

Orbit 1



Proposal 18215 - Visit 02 - Supporting the JUICE mission through HST astrometry of Kallichore

Tue Nov 18 16:00:16 GMT 2025

Visit	Proposal 18215, Visit 02, implementation Diagnostic Status: Informational Scientific Instruments: WFC3/UVIS Special Requirements: BETWEEN 2025.339:04:40:00 AND 2025.339:05:50:00; VISIBILITY INTERVAL NO GYRO BIAS UPDATE ON MOVING TARGET
--------------	--

Diagnostics	(Visit 02) Informational (Form): The Visit Planner and Spike may produce different schedulability results.
--------------------	--

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(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	(1), (2)

Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
	(1)	KALLICHORE	STD=JUPITER	STD=KALLICHORE		NOT OCC OF KALLICHORE BY JUPITER FROM EARTH, SEP OF KALLICHORE IO FROM EARTH GT 10", SEP OF KALLICHORE EUROPA FROM EARTH GT 10", SEP OF KALLICHORE GANYMEDE FROM EARTH GT 10", SEP OF KALLICHORE CALLISTO FROM EARTH GT 10"	EARTH
<i>Comments: The V-magnitude flux was obtained from the Minor Planet Center's Natural Satellites Ephemeris Service. From November 27, 2025 onward, the flux is below 23.6. Description=irregular</i>							

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(WFC3UVIS.im.2225345)	(1) KALLICHORE	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F606W	FLASH=17		Sequence 1-2 Non-Int in Visit 02	97 Secs (388 Secs)	
								Pattern 1, Exps 1-1 in Sequence 1-2 Non-Int in Visit 02 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
	2	(WFC3UVIS.im.2225345)	(1) KALLICHORE	WFC3/UVIS, ACCUM, UVIS2-2K2C-SUB	F606W	FLASH=17		Sequence 1-2 Non-Int in Visit 02	97 Secs (388 Secs)	
							Pattern 1, Exps 2-2 in Sequence 1-2 Non-Int in Visit 02 (1)	[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]	

