



Upcoming Occultations by Lucy Targets

Brian A. Keeney^{1,2}, Marc W. Buie¹, Harold F. Levison¹, and the Lucy occultation team

¹Solar System Science & Exploration Division, Southwest Research Institute, Boulder, CO; ²brian.keeney@swri.org



Introduction

NASA's Lucy mission will be the first spacecraft to visit Jupiter's Trojan asteroids [1,2]. Occultations by Lucy's prime mission targets have been crucial in characterizing their sizes and shapes, as well as searching for satellites [6-11]. Here we present a list of upcoming occultations by Lucy mission targets before the first Trojan encounter in August 2027.

Occultation Search

We searched for upcoming occultations of stars with Gaia magnitudes $G < 14$ by Lucy's Trojan targets. The magnitude limit was chosen to ensure reasonable signal-to-noise observations with 20- to 40-cm telescopes in exposure times of ~500 ms, and the ephemerides used are consistent with all previous occultation astrometry [4-8,10]. This list was further filtered to keep only the occultations that intercept pre-defined regions of interest with a maximum Sun altitude of -12° and a minimum stellar altitude of 20° at event time.

References / Acknowledgements

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Events before L₄ Encounter

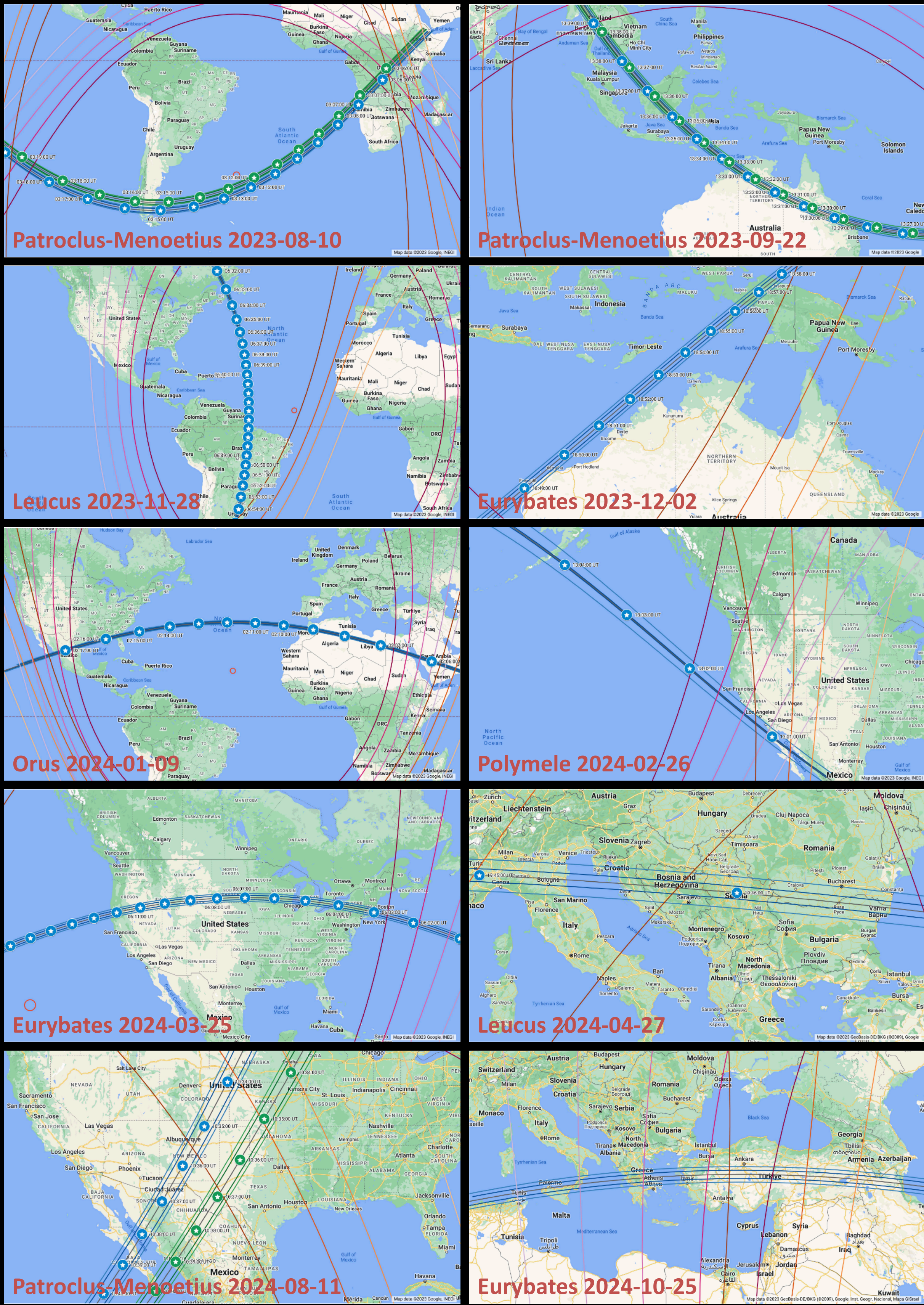
Object	UT Date	G (mag)	Speed (km/s)	Moon Elon. (°)	Moon Phase	Regions
Patroclus-Menoetius	2023-08-10	13.2	14.7	109	0.33	Argentina; Namibia
Patroclus-Menoetius	2023-09-22	11.7	10.8	50	0.47	NT & QLD, Australia
Leucus	2023-11-28	13.5	6.5	60	0.99	S. America; Canada
Eurybates	2023-12-02	13.4	5.3	9	0.72	Australia; Indonesia
Orus	2024-01-09	13.6	16.8	151	0.08	TX, GA, FL; N. Africa
Polymele	2024-02-26	12.2	15.3	44	0.96	Baja, Mexico
Eurybates	2024-03-25	13.7	6.0	54	1.00	Continental US
Leucus	2024-04-27	12.2	13.8	134	0.86	Italy; Serbia
Patroclus-Menoetius	2024-08-11	13.4	5.2	147	0.39	CO, NM, TX; Mexico
Eurybates	2024-10-25	12.3	33.9	36	0.42	Greece; Turkey
Leucus	2025-03-15	10.6	16.5	33	0.98	Australia; Egypt; Sudan
Polymele	2025-04-22	11.2	10.8	149	0.36	NT & QLD, Australia
Orus	2026-02-10	11.9	10.9	58	0.45	N. Africa; Israel
Leucus	2026-04-25	14.0	15.3	54	0.61	Yucatan Peninsula; Colombia; Brazil
Leucus	2027-03-15	12.0	6.6	140	0.51	Japan; South Korea
Leucus	2027-05-12	9.9	17.3	89	0.41	SA & VIC, Australia

Table 1: Occultations of bright stars by Lucy targets between August 2023 and May 2027. Dates in the table are hyperlinks to the event pages at lucy.swri.edu/occultations.html, which contain more details and interactive maps for each occultation. The snapshots to the right show all events listed above that occur in 2023 and 2024.

Table 1 lists three occultations by the (617) Patroclus-Menoetius binary, but approximately 20 in 2026 have been omitted for clarity, observable primarily from the US, South America, and Europe. Since Lucy's Patroclus-Menoetius encounter does not occur until March 2033 [1], we prioritized identifying occultations by Lucy's other Trojan targets.

There are two upcoming occultations by (15094) Polymele that are suitable for detecting its satellite [7] again: one in Baja, Mexico in February 2024, and one in northern Australia in April 2025. Table 1 also lists two occultations by (21900) Orus, three occultations by (3548) Eurybates, and six occultations by (11351) Leucus before Lucy's L₄ encounter.

Next Opportunities



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