Important NEO, special Main Belt, & Trojan, Occultations 2026

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Adapted from the IOTA 2025 Annual Meeting in September

2025 December 30

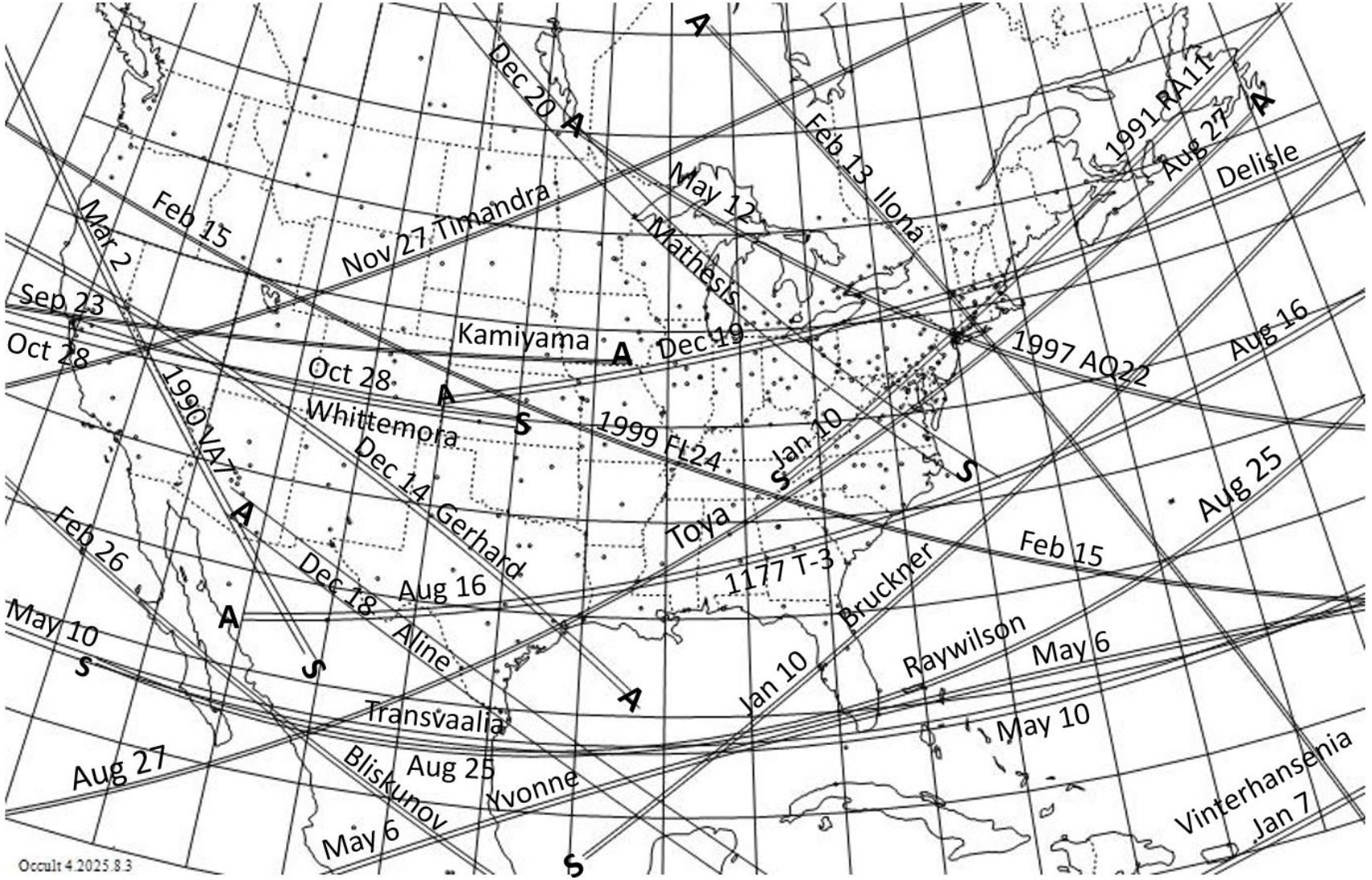
The original version of this also had several slides of late 2025 events, removed from this version; some of the better events

are underlined or circled in red

Outline

- 2026 Bright Occultations for the RASC Observer's Handbook
- 2026 NEA Occultations
- 2026 Special Main Belt Asteroidal Occultations
- 2026 Trojan Occultations
- 2026 Distant Object Occultations, esp. Jan. 30th 2013 LU28 Occultation
- 2026 Lunar Grazing Occultations
- RASC Observer's Handbook and IOTA special events Web Sites

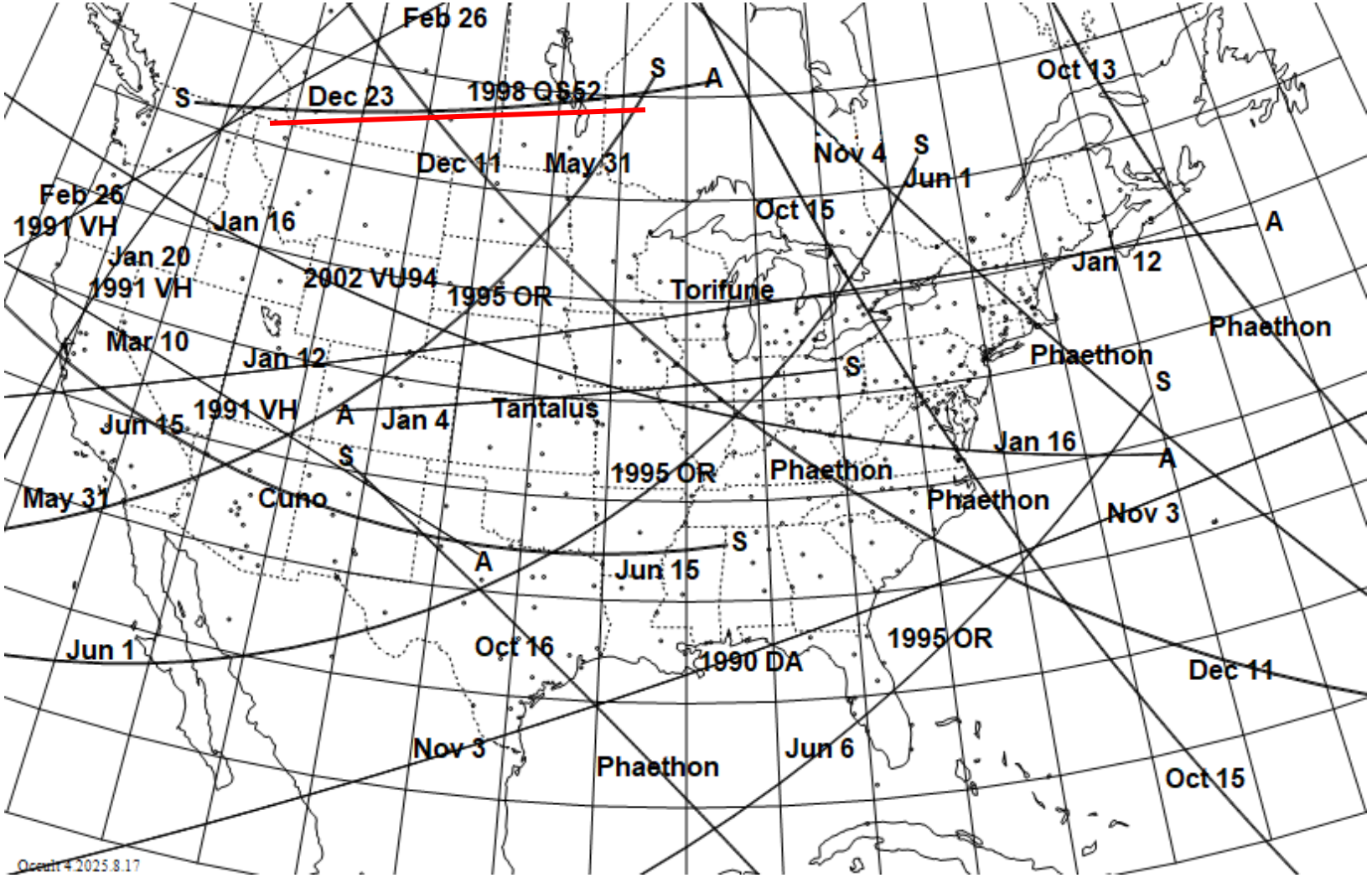
2026 Bright Occultations for the RASC Observer's Handbook



2026 OCCULTATIONS OF BRIGHT STARS BY MAIN-BELT ASTEROIDS

Date	UT	Occulting Body	Star	Mag.	RA (2000) h m s	Dec ° ′ ″	ΔMag.	Dur. s	Path
Jan. 7	01:44	1544 Vinterhansenia	88 Piscium	5.8	01 14 42.4	06 59 42	10.3	1.4	Nic-PR
Jan. 10	00:17	3955 Bruckner	SAO 57768	7.9	05 13 57.3	37 12 26	7.9	2.2	FL
Jan. 10	23:25	46564 1991 RA11	HIP 1653	7.7	00 20 43.7	03 26 59	10.6	1.0	TN-NL
Feb. 13	06:54	1182 Ilona	HIP 67060	7.5	13 44 31.3	–17 56 13	8.7	2.3	ON–LI
Feb. 15	07:09	29848 1999 FL24	SAO 97775	7.5	08 23 00.1	17 40 06	10.6	1.0	SC-OR
Feb. 26	06:14	5572 Bliskunov	TYC 4933-00970-1	8.5	11 32 06.6	–03 31 53	8.9	1.7	Mex-Baja
Mar. 2	13:03	6785 1990 VA7	HIP 46673	6.4	09 30 56.6	44 41 02	9.5	3.0	Mex-OR
May 6	04:30	1301 Yvonne	HIP 56106	7.5	11 30 01.7	24 53 04	8.5	6.6	Mex-BS
May 10	04:44	715 Transvaalia	HIP 67355	6.3	13 48 17.9	–06 50 15	8.1	2.4	BS-Baja
May 12	06:48	12029 1997 AQ22	SAO 162337	8.1	19 13 44.2	–15 59 36	9.8	7.8	MB-LI
Aug. 16	03:49	19898 1177 T-3	PPM 174499	7.2	23 51 47.9	09 03 23	11.6	2.7	SC-Mex
Aug. 25	02:42	3790 Raywilson	SAO 163951	8.4	20 52 57.2	–17 33 29	9.3	1.2	BS-Baja
Aug. 27	07:57	6990 Toya	SAO 165105	8.5	22 28 47.2	–12 13 46	9.3	1.0	NL-Mex
Sep. 23	09:36	8045 Kamiyama	HIP 109678	8.2	22 13 03.3	03 20 57	8.9	1.0	IA-CA
Oct. 28	12:16	931 Whittemora	HIP 45209	7.9	09 12 47.5	16 37 49	6.6	2.0	CA-KS
Nov. 27	04:00	603 Timandra	SAO 75166	8.2	02 09 11.9	25 19 14	7.5	1.5	ON-CA
Dec. 14	10:17	7215 Gerhard	SAO 38189	8.0	02 38 36.3	44 33 44	9.0	2.1	TX-CA
Dec. 18	09:09	266 Aline	SAO 157068	8.5	12 03 47.9	–13 54 03	6.0	5.5	AZ-Mex
Dec. 19	00:17	12742 Delisle	SAO 94416	8.3	05 14 59.4	13 00 51	8.3	2.0	NS-KS
Dec. 20	11:19	454 Mathesis	SAO 59160	8.3	06 30 37.7	31 52 22	4.7	6.6	NC-SK

2026 NEA Occultations for the RASC Handbook

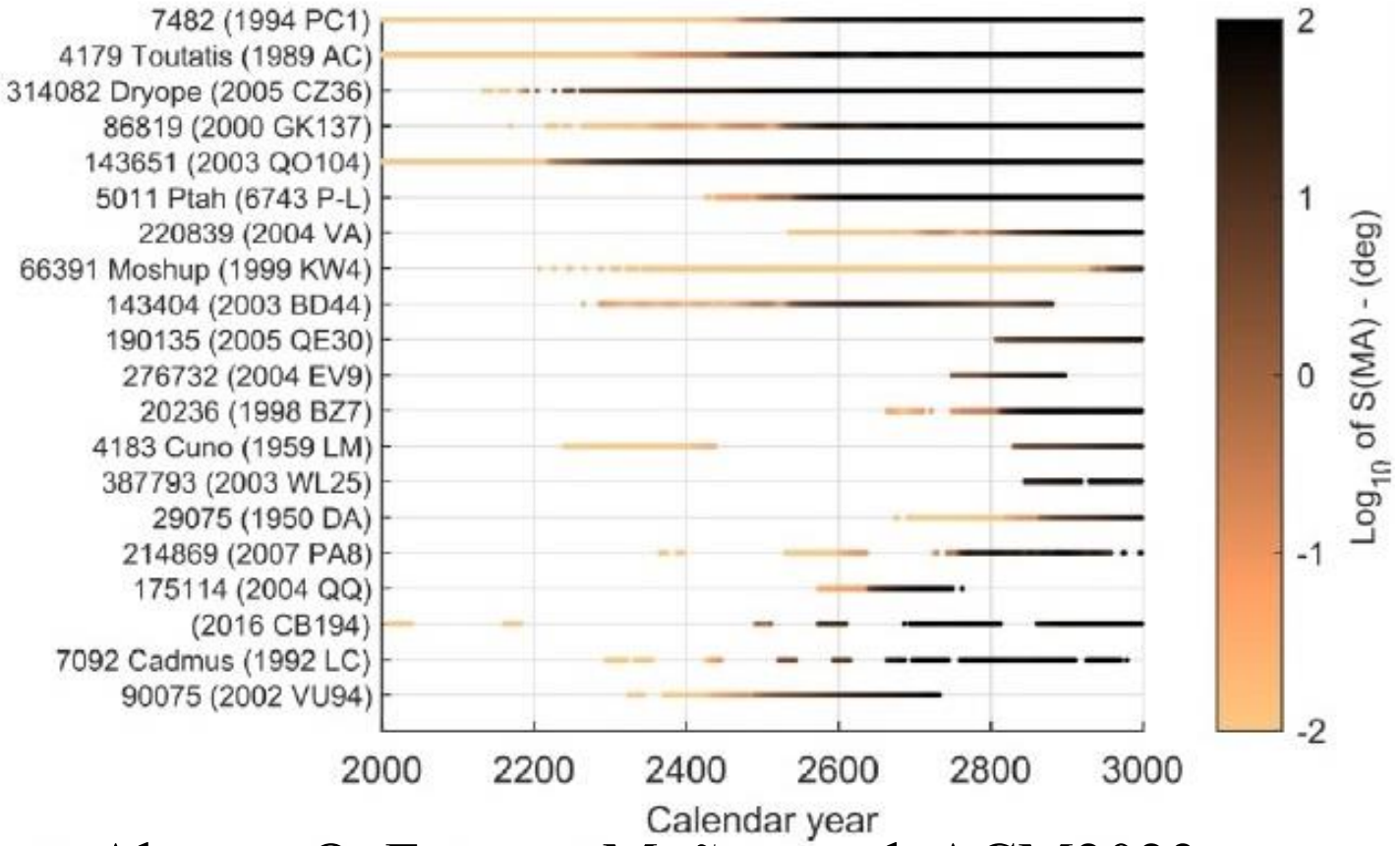


2026 OCCULTATIONS BY NEAR-EARTH ASTEROIDS

Date	UT	Occulting Body	Star	Mag.	RA (2000) h m s	Dec ° ′ ″	Dur. ΔMag.	Dur. s	Path
Jan. 4	11:53	2102 Tantalus	UCAC4 525-066359	10.8	17 30 20.7	14 59 19	7.5	0.05	CO-OH
Jan. 12	4:07	98943 Torifune	TYC 0628-00546-1	9.9	01 52 08.8	12 32 15	10.3	0.05	CA-NS
Jan. 16	9:37	90075 2002 VU94	UCAC4 497-042225	12.0	07 21 13.1	09 19 56	7.2	0.13	VA-OR
Jan. 20	9:25	35107 1991 VH	TYC 4789-02263-1	10.3	06 26 52.6	–02 54 14	5.5	0.11	CA-AB
Feb. 26	5:11	35107 1991 VH	TYC 1879-02260-1	10.9	06 30 19.1	23 15 35	6.4	0.13	OR-SK
Mar. 10	8:38	35107 1991 VH	TYC 1901-01002-1	10.5	06 48 50.3	27 25 26	7.4	0.12	CA-TX
May 31	8:33	42532 1995 OR	TYC 6846-01117-1	8.3	18 05 00.8	–26 11 34	9.6	0.57	ON-CA
Jun. 1	7:08	42532 1995 OR	UCAC4 319-131327	12.2	18 04 18.9	–26 15 30	5.6	0.45	QC-Baja
Jun. 6	8:00	42532 1995 OR	UCAC4 317-124748	10.4	18 00 06.5	–26 36 26	7.3	0.40	FL
Jun. 15	9:32	4183 Cuno	UCAC4 323-217727	12.5	20 29 38.8	–25 34 59	2.0	0.35	AL-CA
Oct. 13	2:57	3200 Phaethon	UCAC4 729-055114	12.4	17 50 52.9	55 43 07	2.7	0.15	NL-NS
Oct. 15	3:10	3200 Phaethon	TYC 3909-01508-1	11.5	18 29 46.2	54 40 28	3.6	0.16	ON-VA
Oct. 16	1:28	3200 Phaethon	TYC 3918-00457-1	12.0	18 46 13.4	53 58 53	3.0	0.16	NM-TX
Nov. 3	4:31	29075 1950 DA	SAO 55996-Scomp	9.9	02 55 08.0	32 35 49	0.7	0.12	GA-Mex
Nov. 4	0:35	3200 Phaethon	TYC 2712-00378-1	11.0	21 33 51.2	35 03 53	4.7	0.22	ON-MA
Dec. 11	3:31	3200 Phaethon	UCAC4 553-138490	11.0	23 05 28.6	20 26 07	6.6	0.28	AB-NC
=> Dec. 23	1:12	16960 1998 QS52	TYC 5182-02104-1	9.1	20 49 49.5	–03 36 31	12.3	0.17	WA-ON

Defending Earth from Potentially Hazardous Asteroids (PHA's)

- Well-known is (99924) Apophis with multiple Earth-returns that amplify errors
- 500m (101955) Bennu has about 0.04% chance of Earth impact in 2880 Sep 24
- 1.4km (29075) 1950 DA has a 0.003% chance to impact Earth in 2880 Mar. 16.

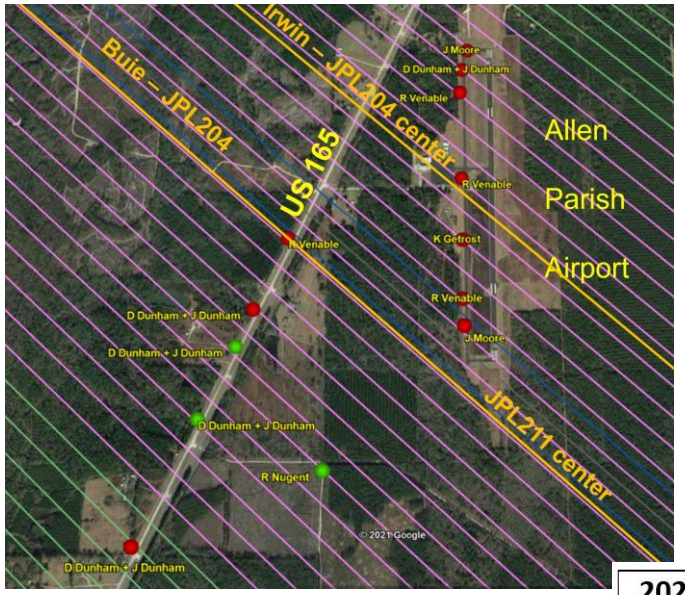


Above, O. Fuentes-Muñoz et al, ACM2023

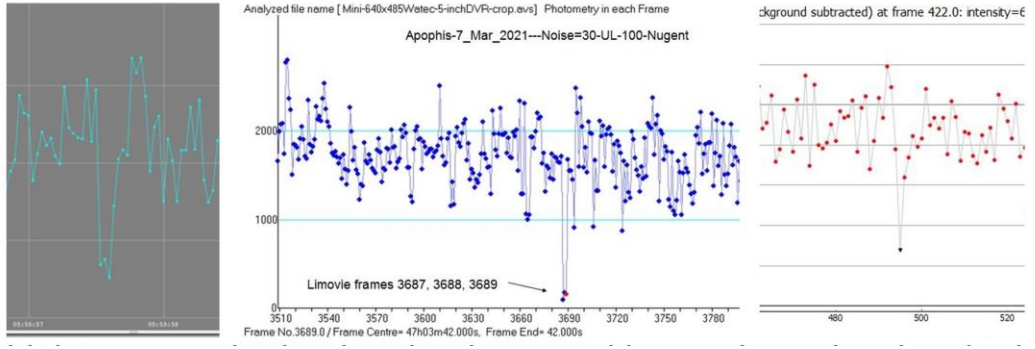
It is one of 20 PHA's for which occultation observations are sought as their orbits are not now known well-enough to exclude impact during the next 1000 years, and also are 1 km or larger so they are capable of causing severe worldwide problems.

2021 Occultations by (99942) Apophis -1

The 1st observed event on March 7th benefitted from a JPL prediction based on radar data from Mar. 4-6; the star was 8.4-mag. NY Hydrae, an eclipsing binary with high Gaia RUWE.



Above, the 2 pre-pointed 8cm Dunham unattended systems that recorded positives; 3 others they deployed had misses.



Above, the 3 positive light curves for the March 7th occultation.

Left: Stations near Oakdale, Louisiana with the planned lines; Green dots mark positive sites, red dots mark sites that had no occultation (negatives).

Right: Residuals from the first 5 Apophis occultations from the JPL 214a orbit that gave 0 weight to Mar. 7 since the star's Gaia RUWE was high. The high-precision orbit, with radar & occultations, retired the risk of impact with Earth for at least a century.

2021 Date	mag. [1]	Loc. [2]	Total #	# pos.	Δα [3]	Δδ [3]	Δt [3]	RUWE [4]
March 7	8.4	LA,OK,CO,BC	29	3	-11.0	+1.2	+0.17	1.45 [5]
March 22	10.0	FL,AL,IL	9	1	+0.4	-0.5	-0.02	1.15
April 4	11.0	NM	8	3	+0.3	-0.1	-0.01	0.90
April 10	12.6	Japan	2	1?	marginal detection, not used			
April 11	10.1	NM	3	3	+0.5	-0.5	-0.03	0.85

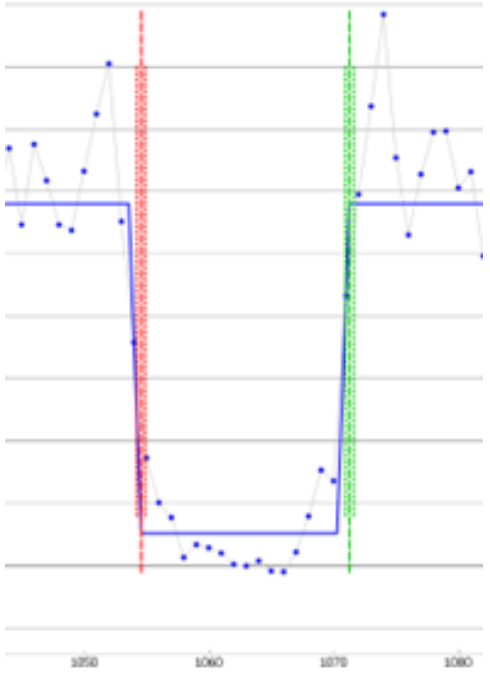
[1] This is the Gaia g magnitude of the occulted star.
[2] For location, the country is given, or 2-letter US State/Canadian Province codes.
[3] The O-C residuals are relative to JPL orbit 214a, in mas, but in seconds for Δt.
[4] The RUWE is for the Gaia 3rd Early Data Release (EDR3); values >1.40 indicate stars that are likely to have positional errors larger than the formal errors from the Gaia astrometric solution.
[5] The star is NY Hydrae, an eclipsing variable with a 4.8-day period.

Analog video, optimized for 30 fps, are still among the best systems for recording short NEA occultations.

Much information about past observed Apophis occultations ia at **http://iota.jhuapl.edu/Apophis2021.htm.**

2021 Occultations by (99942) Apophis-2

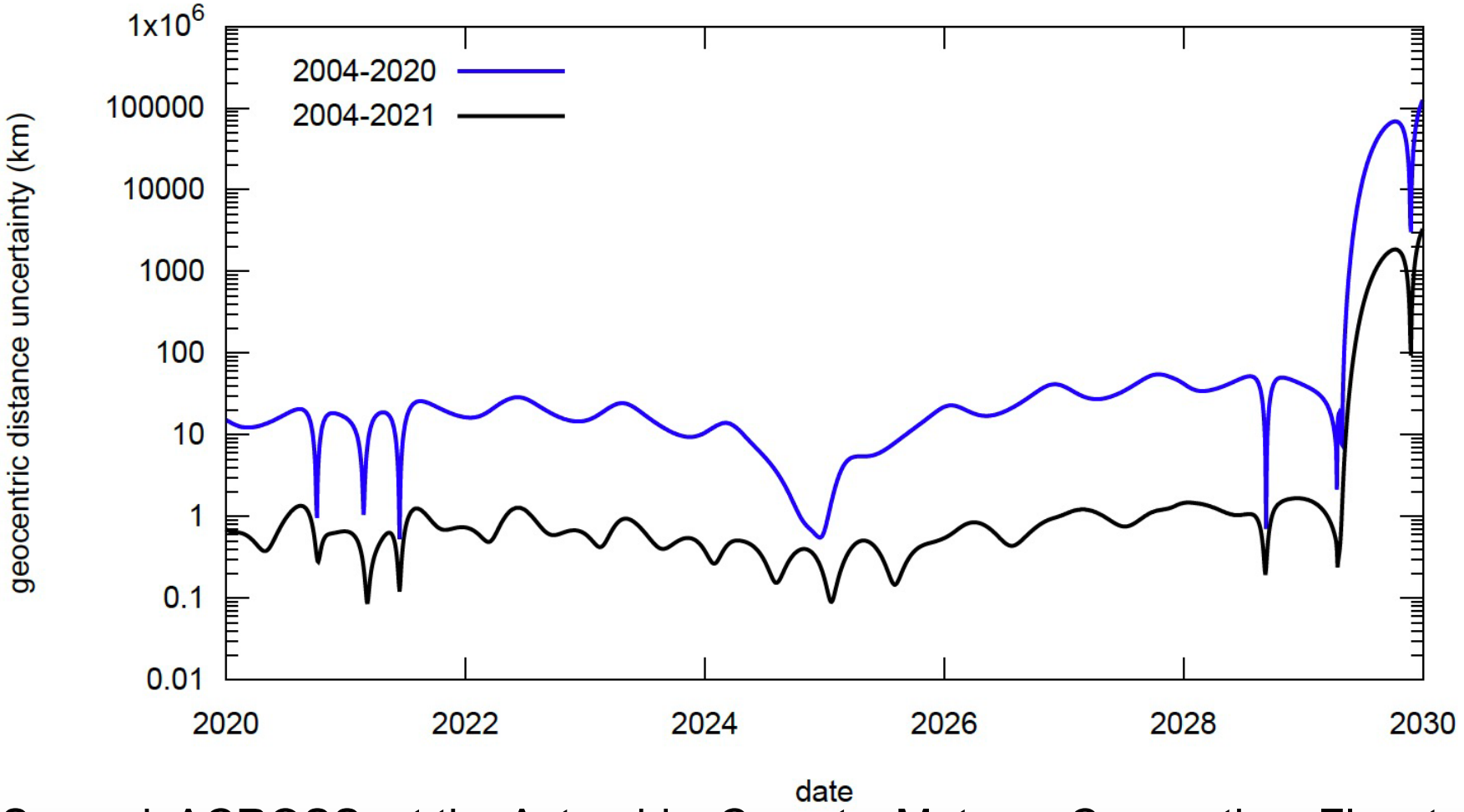
The 1st observed event on March 7th benefitted from a JPL prediction based on radar data from Mar. 4-6; the star was NY Hydrae, Hydrae, an eclipsing binary with high Gaia RUWE. On 2021 Mar. 22, R. Venable recorded the occultation of a 10.0-mag. star from 5 locations with large pre-pointed telescopes in Florida (**below**); he covered the east side of the predicted (JPL207) path while others covered the west side. To the **right** is Venable with one of his 14-in. Fastar (f/2.1) SCT's with specially-built low mount that adds stability and facilitates quick set-up. His fence of telescopes extended just far enough east to catch the critical occultation observation (green dot, positive) while the others were negative (red dots). With this effort, Venable saved Apophis' accurate orbit that helped retire its risk of impact; the subsequent events listed on the previous slide secured the orbit. Venable's subsequent deployments of his systems have led to other NEA occultation successes, especially for Didymos and Dimorphos.



Venable's 2021 Mar. 22 stations, Yeehaw Jct., Florida

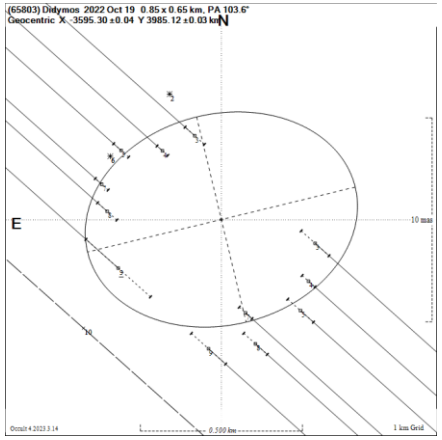
Above right, April 11 near Farmington, NM, light curve of the the occultation of a 10.1-mag. star by Apophis, by Kai Getrost, recorded with 100 frames per second with a QHY 174M GPS camera attached to a 20-inch Dobsonian telescope. Effects of Fresnel diffraction are evident.

Improvement of the orbit of Apophis by adding the 2021 Occultation Observations

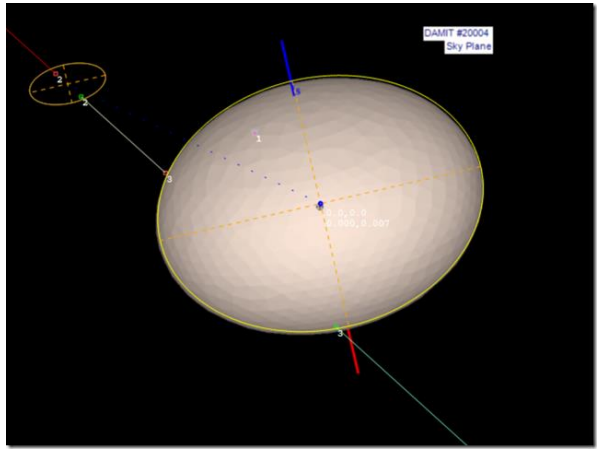


Presented by D. Souami, ACROSS, at the Asteroids, Comets, Meteors Convention, Flagstaff, AZ in June. The errors, in blue, from previous astrometry and 2021 radar already retired the risk of Apophis impact for the next 100 years, but adding the occultations, black curve, decreased them another order of magnitude.

Occultations by the Didymos/Dimorphos System, 2022-2023

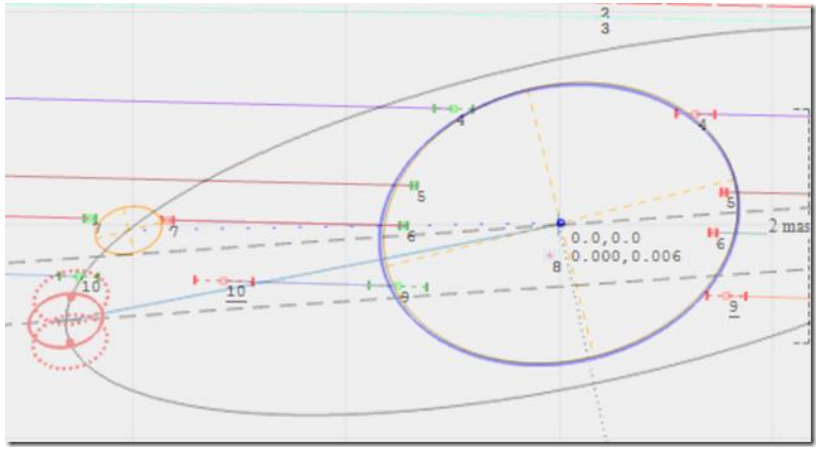


Sky plane plot of the Didymos occultation of an 11.2-mag. star in Japan, 2022 Oct. 18, one of the better-observed Didymos occultations.

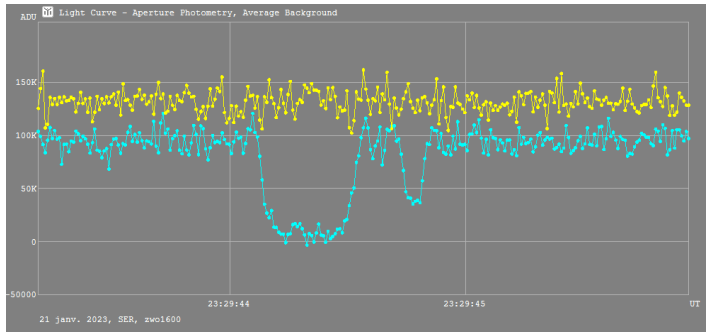


Sky-plane plot of the first observed occultation by Dimorphos, upper left, shortly before the occultation by Didymos, R. Venable, Crawford, FL, 2022 Oct. 19.

Far right: Lionel Rousselot's light curve of the 2023 Jan 21 Occ'n by Didymos and Dimorphos near Perigueux, France

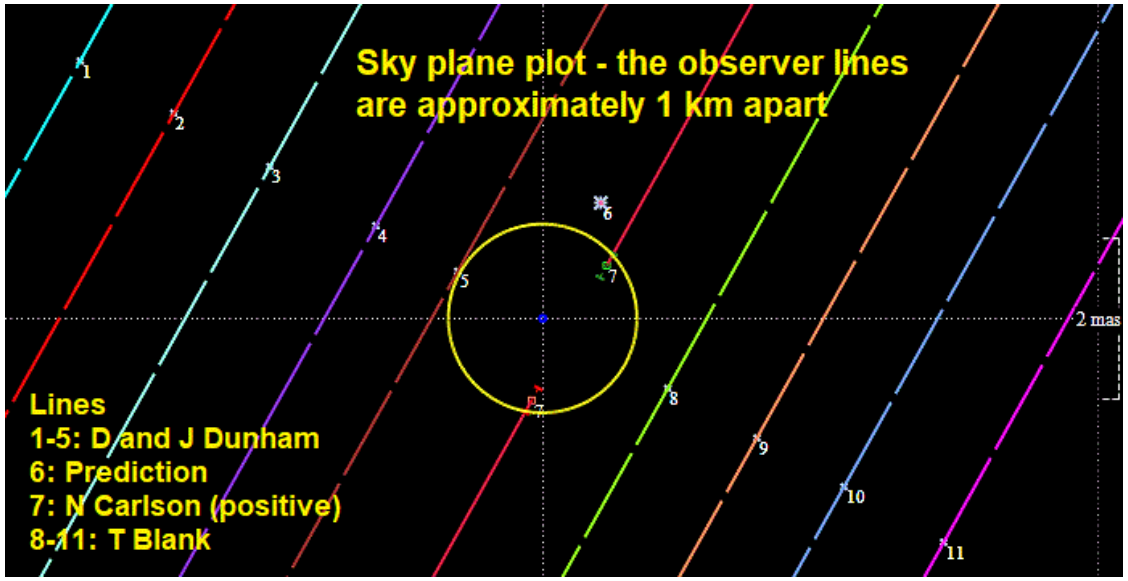


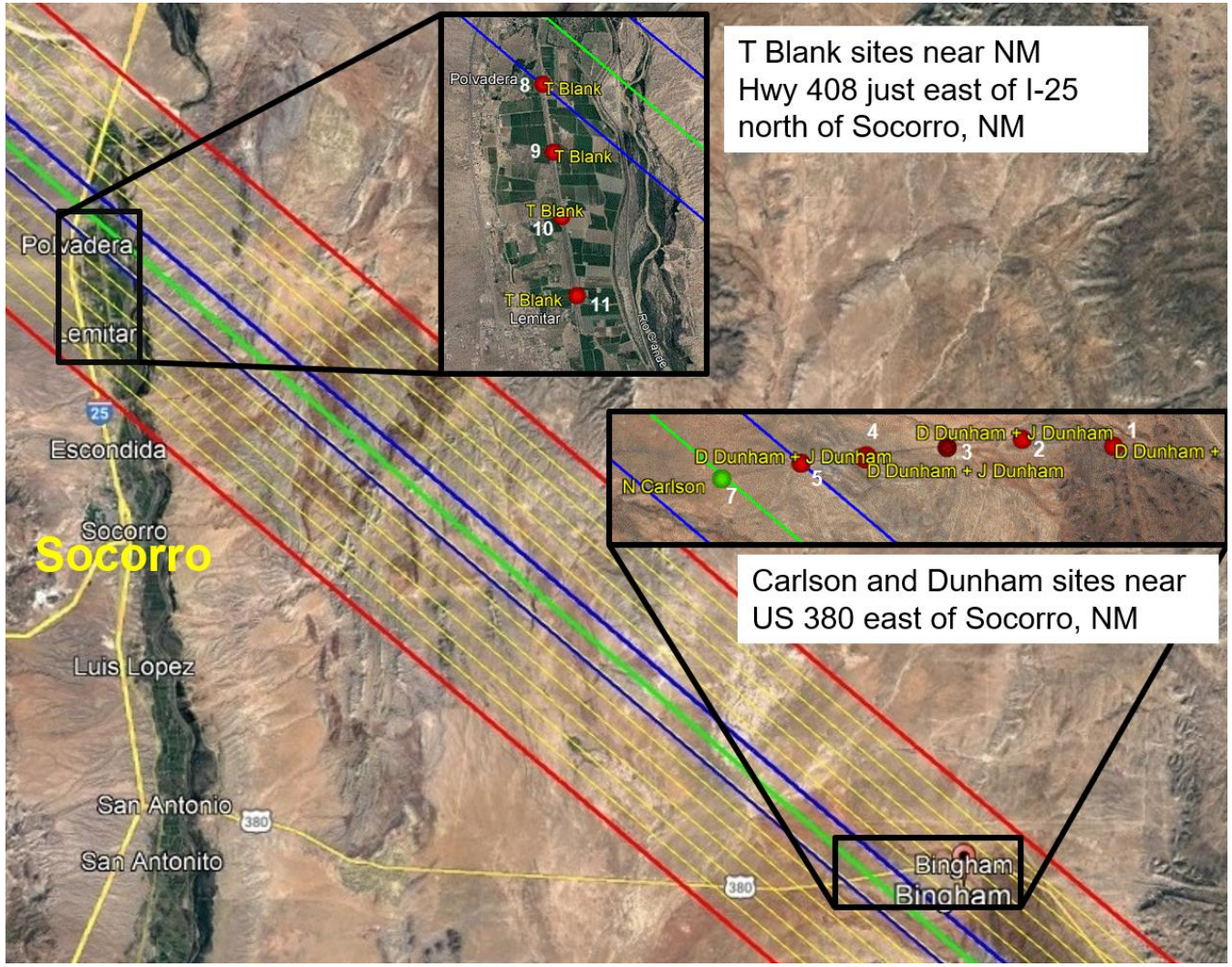
Sky plane plot of the occultation of a 9th-mag. star by Dimorphos and Didymos, observations organized by ACROSS in France by P. Tanga et al., 2023 Jan. 21.



Several other Didymos occ'ns have been observed around the world;
for more about results from them, especially on the orbits, see papers by Chesley (PDC 2023; ACM 2023); and about ACROSS by Souami et al. (ACM 2023).

Occultation of 8.4-mag. SAO 164452 (= HIP 106281) by (2102) Tantalus, 2023 May 7

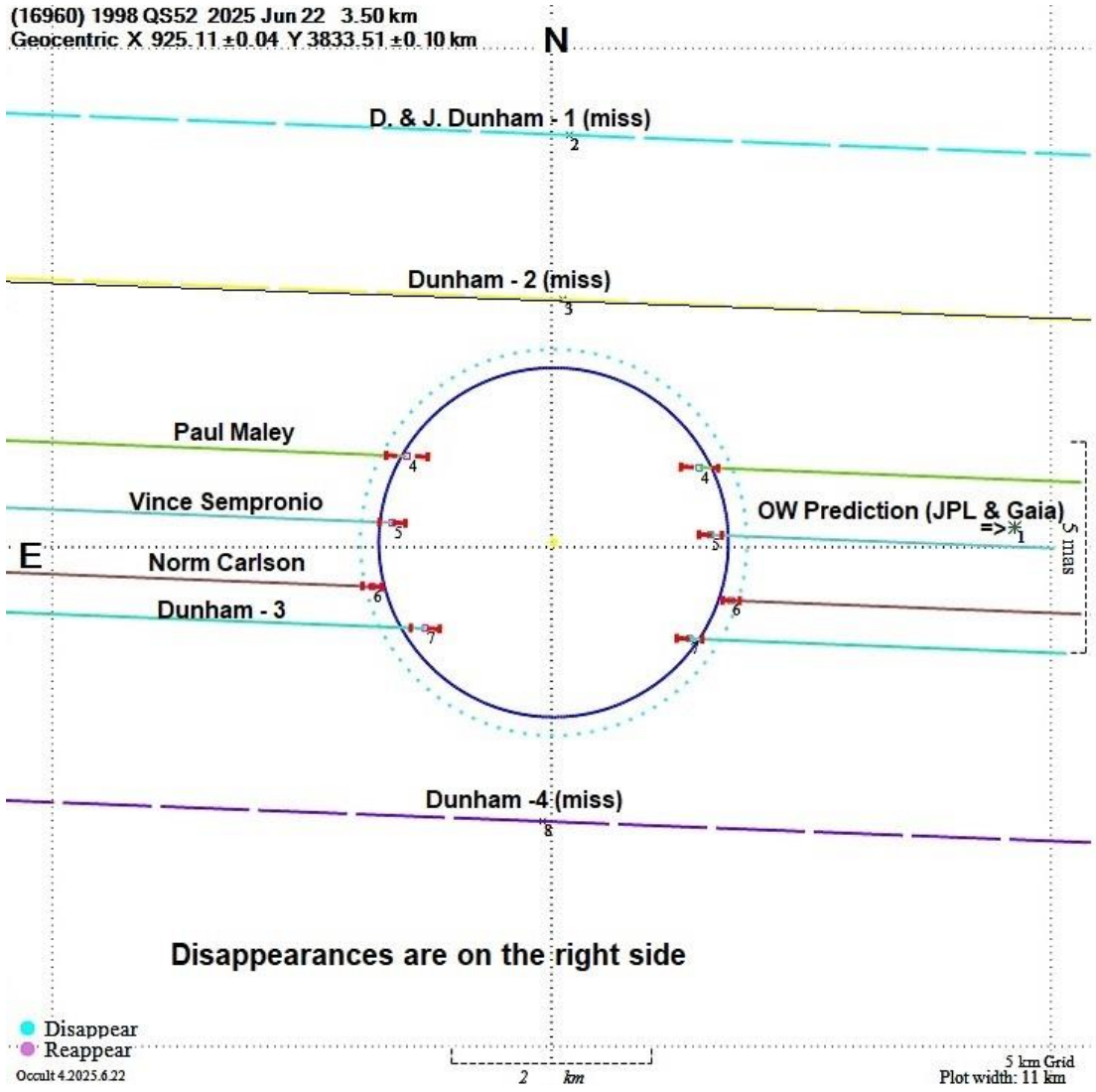




(2102) Tantalus is a 1.4-km PHA in a highly inclined (64° to the ecliptic) orbit that won't be in radar range again until 2038. This bright event provided a chance to record an occultation with easily-transported 8cm systems, like those we used for Apophis in 2021 March. IOTA members Ted Blank, and David and Joan Dunham, deployed and pre-pointed 10 of these systems near Socorro, N. Mex., to cover most of the 1-σ path error zone while Norm Carlson set up his larger (20cm) scope on the predicted center. We used a predicted 2-km diameter for our planning but later we found a better recently-published radar diameter of 1.4 km; also, the real error was much less than 1-σ. Next time, we'll have more concentration near the center.

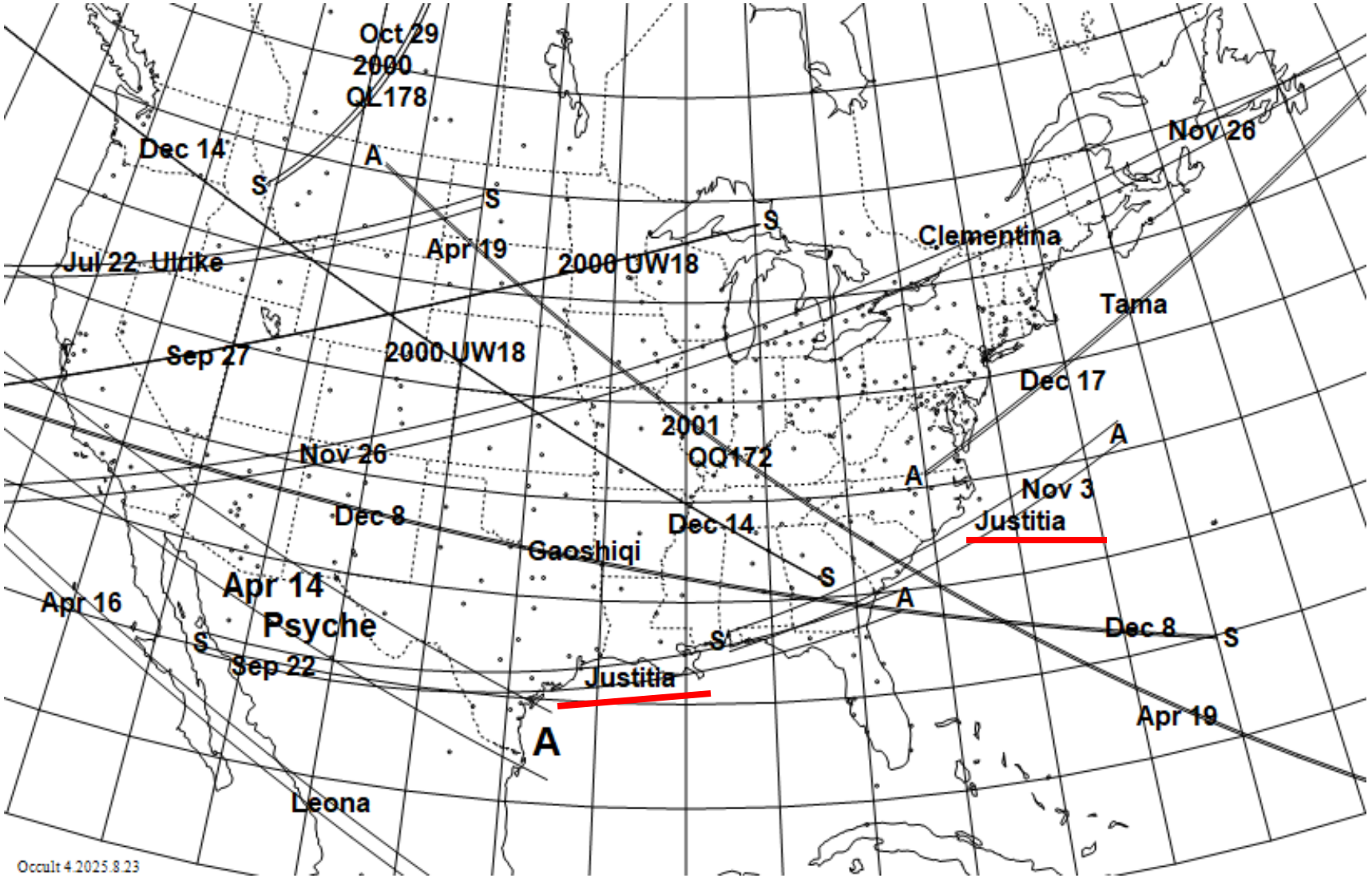
On 2022 Nov. 26, IOTA member Steve Messner recorded the 1st occultation by 7-km NEA (1866) Sisyphus in Minn.

Observations of June 22 occultation by a large PHA



A good example of a well-observed Potentially Hazardous Asteroid (PHA) occultation occurred 2025 June 22 when 4-km (16960) 1998 QS52 occulted 9.9-mag. UCAC4 425-114048 = PPM 203111 in Aquila in a path across the south USA. This is one of the larger PHA's whose impact would result in worldwide devastation, but there's no risk of that in the next 1000 years. However, the longer-term risk is unknown. We used Astrid cameras to pre-point 3 scopes with apertures 12cm to 25cm, at unattended sites spread across the predicted path and its possible error range, in the southern suburbs of Tucson, AZ. We also recorded at a 4th attended site with a ZWO CCD camera with a GPS flash timer on a 20cm scope. We were joined by 3 others who recorded the event at other locations across the path, coordinated with OW to obtain 4 positive chords across 1998 QS52 and constraining miss chords to the north and south. The event occurred 0.22s early but with the path center only 0.3 km south of the prediction. 1998 QS52's diameter was about 3.5 km rather than the predicted 4.3 km. This gave a precise astrometric point that will improve the PHA's orbit, but one or two more occultations can measure any non-gravitational forces that will allow an even longer gauging of 1998 QS52's risk. Maley talked about risk in AZ; we were attacked by fire ants which left me in discomfort for a few days after.

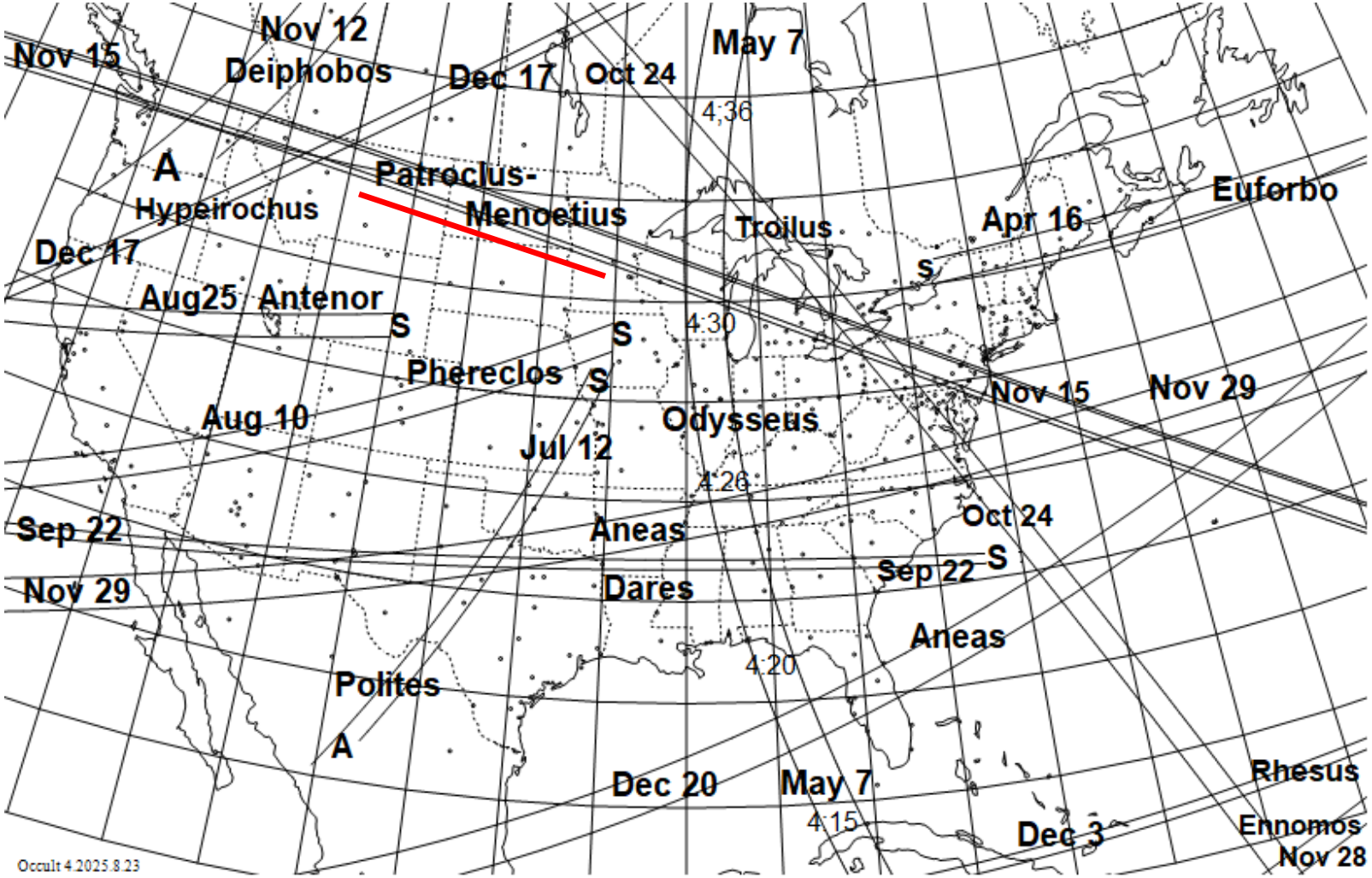
2026 Most Special Main Belt Occultations for the RASC Handbook



2026 Most Special Main Belt Occultations for the RASC Handbook

Date	UT	Occulting Body	Star	Mag.	RA (2000) h m s	Dec ° ′ ″	ΔMag.	Dur. s	Path
Apr. 14	04:31	16 Psyche	UCAC4 557-018528	11.4	05 41 51.8	21 22 32	1.0	8.0	CA-TX
Apr. 16	05:37	319 Leona	TYC 5563-00196-1	10.1	14 32 59.3	–07 32 57	6.0	3.8	Mex-Baja
Apr. 19	04:33	57291 2001 QQ172	TYC 5577-00390-1	10.5	14 44 33.9	–14 50 24	8.6	0.6	SC-MT
Jul. 22	10:18	885 Ulrike	HIP 6490	8.5	01 23 23.7	06 44 27	7.1	2.3	CA-ND
Sep. 22	02:16	269 Justitia	UCAC4 361-079307	11.4	16 45 13.6	–17 49 59	2.9	1.9	Mex-GA
Sep. 27	10:44	41689 2000 UW18	UCAC4 601-022407	9.8	05 34 54.2	30 03 27	10.1	0.2	CA-MI
Oct. 29	01:25	61784 2000 QL178	HIP 12015	8.9	02 34 56.5	15 23 16	9.2	0.6	SK-MT
Nov. 3	23:52	269 Justitia	TYC 6272-00535-1	10.2	18 15 44.7	–20 27 55	4.3	1.4	AL-SC
Nov. 26	07:37	252 Clementina	TYC 0709-02061-1	10.5	05 30 14.7	11 25 10	3.9	5.5	NL-CA
Dec. 8	10:19	3704 Gaoshiqi	TYC 1305-00933-1	10.6	05 28 39.7	18 56 36	5.4	0.8	GA-CA
Dec. 14	11:34	41689 2000 UW18	UCAC4 601-016899	11.3	05 05 45.8	30 08 23	7.2	0.2	GA-WA
Dec. 17	23:07	1089 Tama	UCAC4 579-022264	11.1	06 05 52.0	25 38 06	2.5	1.7	VA-NC

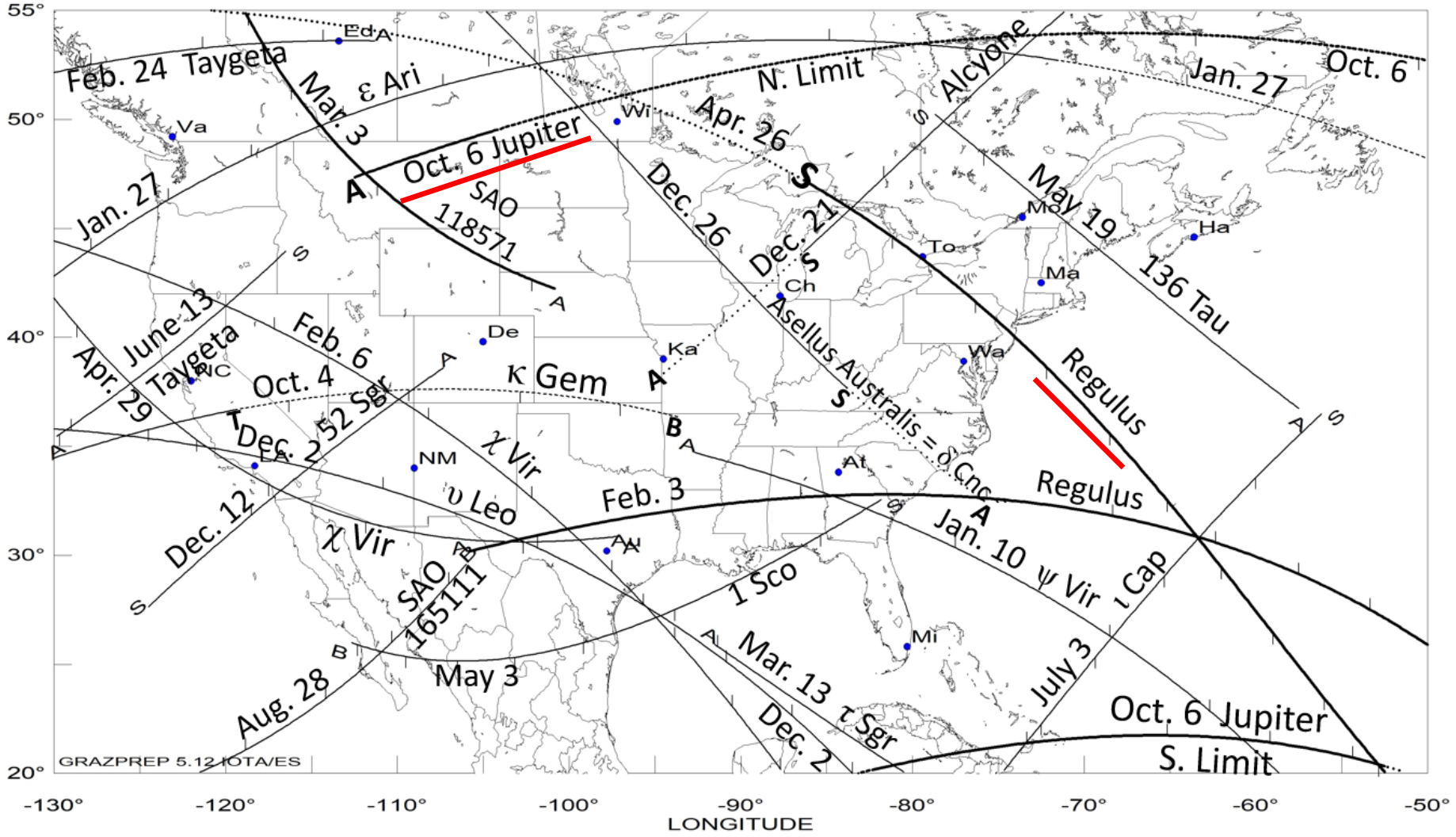
2026 Trojan Occultations for the RASC Handbook



2026 OCCULTATIONS BY TROJAN ASTEROIDS

Date	UT	Occulting Body	Star	Mag.	RA (2000) h m s	Dec ° ′ ″	ΔMag.	Dur. s	Path
Apr. 16	00:50	4063 Euforbo	TYC 1451-00474-1	11.0	13 18 27.1	16 16 02	5.2	6.0	NS-ON
May 7	04:28	1143 Odysseus	UCAC4 466-045930	11.7	11 04 47.2	03 10 30	4.2	53.3	Cuba-ON
Jul. 12	09:40	4867 Polites	UCAC4 681-030223	12.6	04 44 10.3	46 05 22	5.4	1.6	Mex-IA
Aug. 10	10:06	2357 Phereclos	UCAC4 553-012381	12.6	05 04 00.7	20 30 03	4.6	3.7	CA-IA
Aug. 25	11:17	2207 Antenor	UCAC4 536-018143	12.5	05 44 27.3	17 02 47	4.2	3.7	CA-WY
Sep. 22	09:52	4827 Dares	UCAC4 557-022192	10.9	05 58 25.5	21 16 42	7.4	3.3	Baja-SC
Oct. 24	08:07	1208 Troilus	TYC 2923-00412-1	9.2	05 42 17.5	43 17 16	7.4	6.9	NC-MB
Nov. 12	02:57	1867 Deiphobus	UCAC4 629-028807	11.3	05 57 00.4	35 40 38	4.8	10.1	AB-OR
Nov. 15	07:08	617 Patroclus	UCAC4 645-029843	13.4	05 35 10.8	38 52 03	2.2	8.5	NJ-BC
Nov. 15	07:08	Menoetius	UCAC4 645-029843	13.4	05 35 10.8	38 52 03	2.2	7.5	NJ-BC
Nov. 28	06:19	4709 Ennomos	UCAC4 534-020826	11.1	05 55 43.2	16 47 51	4.8	4.9	PR
Nov. 29	08:18	1172 Aneas	UCAC4 536-021460	11.9	05 55 53.4	17 08 34	4.0	8.1	VA-Baja
Dec. 3	04:22	9142 Rhesus	UCAC4 493-010469	8.5	05 05 34.5	08 28 08	9.6	2.4	Cuba
Dec. 17	04:49	15502 Hypeirochus	UCAC4 643-016950	11.2	03 49 43.6	38 34 14	6.1	3.3	MB-CA
Dec. 20	01:24	1172 Aneas	TYC 1299-01221-1	11.5	05 44 56.8	16 33 03	4.2	7.3	FL

2026 Lunar Grazing Occultations for the RASC Handbook



2026 Lunar Grazing Occultations for the RASC Handbook

Date	Object Name	ZC/SAO	d	m_V	%sl	L	W.U.T.	Lo.	La.
Jan. 10	ψ Virginis	ZC 1853	V	4.8	54–	S	6:32.4	–92	35
Jan. 27	ε Arietis	ZC 440	M	4.7	60+	S	1:55.0	–130	43
Feb. 3	Regulus	ZC 1487	W	1.4	98–	W	2:01.9	–106	30
Feb. 6	χ Virginis	ZC 1815	V	4.7	79–	S	7:42.4	–130	44
Feb. 24	Taygeta	ZC 539	W	4.3	45+	S	2:36.6	–130	52
Mar. 3		SAO 118571	V	7.4	6E	N	12:12.5	–118	55
Mar. 13	τ Sagittarii	ZC 2784	V	3.3	32–	S	9:00.6	–91	26
Apr. 26	Regulus	ZC 1487	W	1.4	70+	N	0:08.8	–120	55
Apr. 29	χ Virginis	ZC 1815	V	4.7	95+	N	9:05.9	–130	42
May 3	1 Scorpii	ZC 2263	V	4.6	97–	N	9:39.2	–112	26
May 19	136 Tauri	ZC 890	V	4.6	7+	N	0:57.5	–78	50
Jun. 13	Taygeta	ZC 539	W	4.3	4–	N	12:00.5	–130	35
Jul. 3	ι Capricorni	ZC 3126		4.3	91–	N	7:52.9	–74	20
Aug. 28		SAO 165111	M	8.7	17E	S	4:45.1	–121	20
Oct. 4	κ Geminorum	ZC 1170	A	3.6	40–	N	11:24.2	–130	34
Oct. 6	Jupiter			–1.9	20–	S	8:42.3	–83	20
Oct. 6	Jupiter			–1.9	20–	N	8:54.1	–112	47
Dec. 2	υ Leonis	ZC 1685	K	4.3	38–	S	9:59.8	–130	36
Dec. 12	52 Sagittarii	ZC 2864	A	4.6	8+	S	1:23.5	–124	28
Dec. 21	Alcyone	ZC 552	K	2.9	93+	S	21:57.3	–95	38
Dec. 26	Asellus Australis	ZC 1310		3.9	91–	S	12:14.3	–104	55

RASC Observer's Handbook and IOTA special events Web Sites

2026 Prediction Links, for North America and worldwide data

https://occultations.org/publications/rasc/2026/nam26grz.htm - Lunar grazes
https://occultations.org/publications/rasc/2026/nam26MBoccs.htm - Main Belt, the brighter events, but also for major planet, NEA, and Trojan occultations
https://occultations.org/publications/rasc/2024/nam24distantoccs.htm - TNOs, etc.
https://occultations.org/publications/rasc/2024/nam24Trojanoccs.htm - Trojans
https://occultations.org/publications/rasc/2024/nam24NEAoccs.htm - Near Earth Obj.
https://occultations.org/publications/rasc/2026/nam26MBspecialoccs.htm - Special MB (will be set up in January 2026)
https://occultations.org/publications/rasc/2024/nam24Planetoccs.htm - Major Planets

Instructions for using Occult4 to compute local and regional predictions:
http://www.lunar-occultations.com/iota/2026iotapredictions.pdf