Occultation Trips Summer 2025

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There are opportunities this summer to further the evidence that asteroid (20426) Fridlund is in fact a double asteroid system and if established, the orbital characteristics can be measured.

The original evidence comes from an occultation observation at the Westport Observatory in Westport, CT made in October, 2021. The light curve is shown in Figure 1. The main asteroid causes the star to disappear for 17 exposures. Prior to the main dip, there are two adjacent exposures suggesting a moon. The shadow is not total due to the moon's size (diffraction effects).

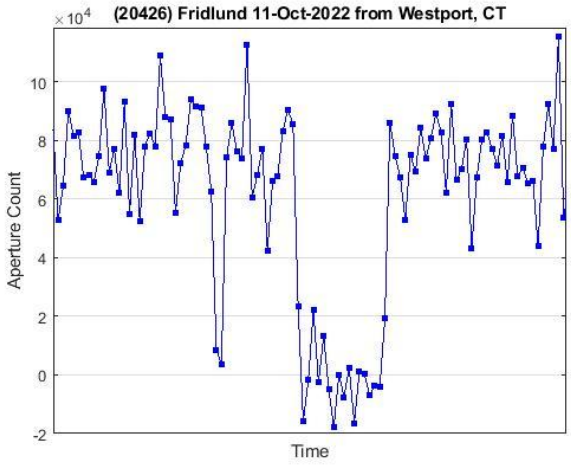


Figure 1 Occultation by asteroid Fridlund observed at WAS in 2021.

Upcoming Events

There are 7 possible chances this season to find the elusive moon. None of the upcoming events have occultation shadows over CT, so these opportunities require some travel. The main events are listed in Table 1.

Table 1 Upcoming Occultations by asteroid (20426) Fridlund

Event Date/Time (EDT)	Location	Distance From WAS	Event Magnitude	Event Duration	Notes
Fri 20-Jun 01:30	AL-NY Cherry Spring, PA	320 miles	14.6	0.6 sec	Larger Apertures Required
8-Jul	SE Canada		13.1	0.50 sec	
Mon 14-Jul 10:43 PM	SE Maine	500 miles	13.7	0.64 sec	Best single event. Maybe Canada stations 3-Day go/no-go decision window.
21-Jul 10:14 pm	SE Canada (Halifax)		13.1	0.73 sec	
26-Jul 01:37 AM	SE Canada (Halifax)			0.81 sec	
Wed 6-Aug 11:17 PM	MS-MI (Indiana)	770 miles	13.5	1.27 sec	
Fri 8-Aug 11:31 PM	TX-WI (Illinois)	1000 miles	13.8	1.40 sec	
Tue 12-Aug 11:08 PM	TX-WI (Eastern IA)	1100 miles	13.4	1.95 sec	

Each event has its own set of issues. The first one is the most difficult due to the star magnitude and larger telescopes are required to make a significant detection. The 14-Jul event is in the SE corner of Maine and then Canada. The small footprint over the USA makes it more susceptible to weather concerns.

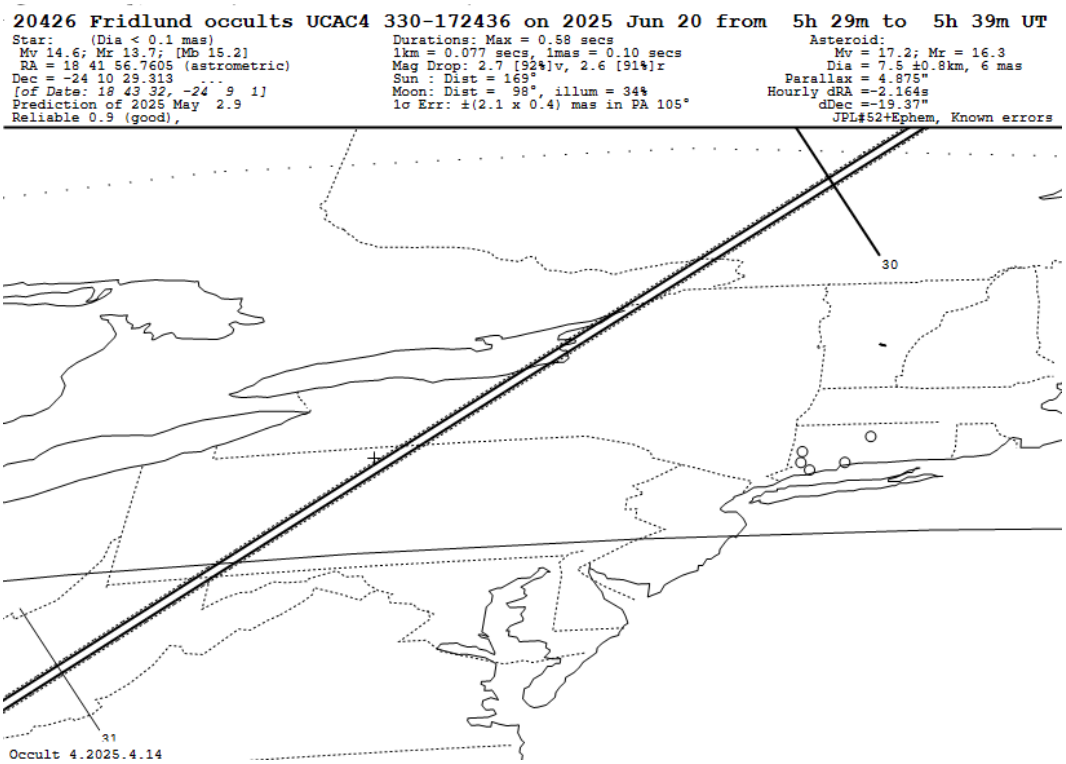
Preparation

Due to the difficulty of making occultation measurements in the field, there will be practice sessions to prepare for these events. Due also to the travel, any minor must be accompanied by a parent or approved guardian.

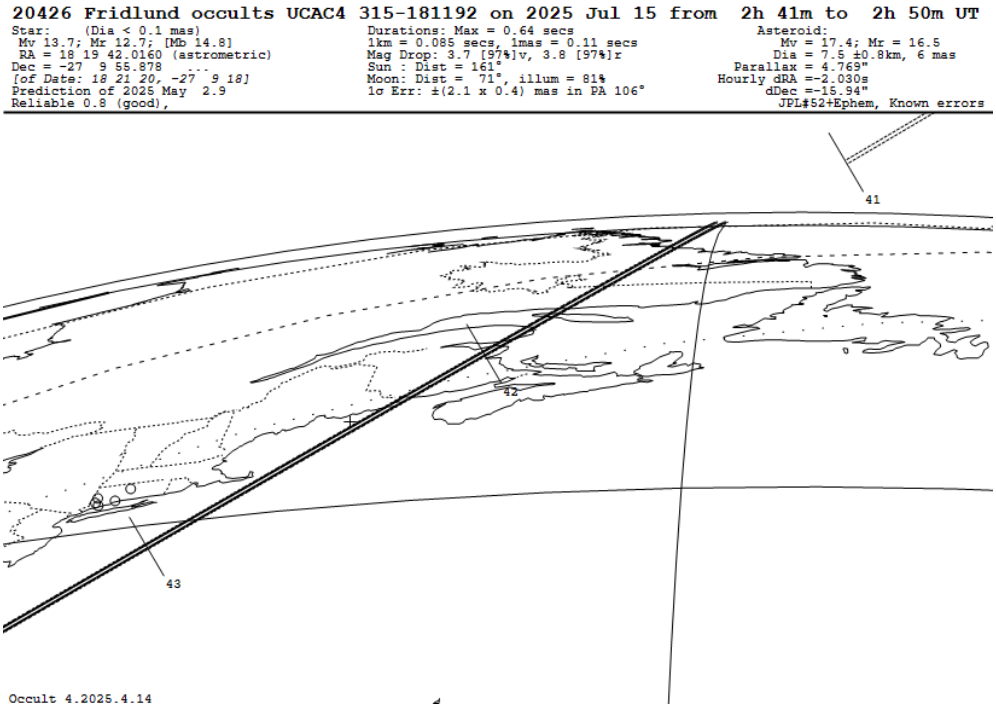
Any interested potential observers please contact me directly at kgreen@was-ct.org or via phone (203) 895-8022.

Appendix: Maps of the Summer 2025 main events

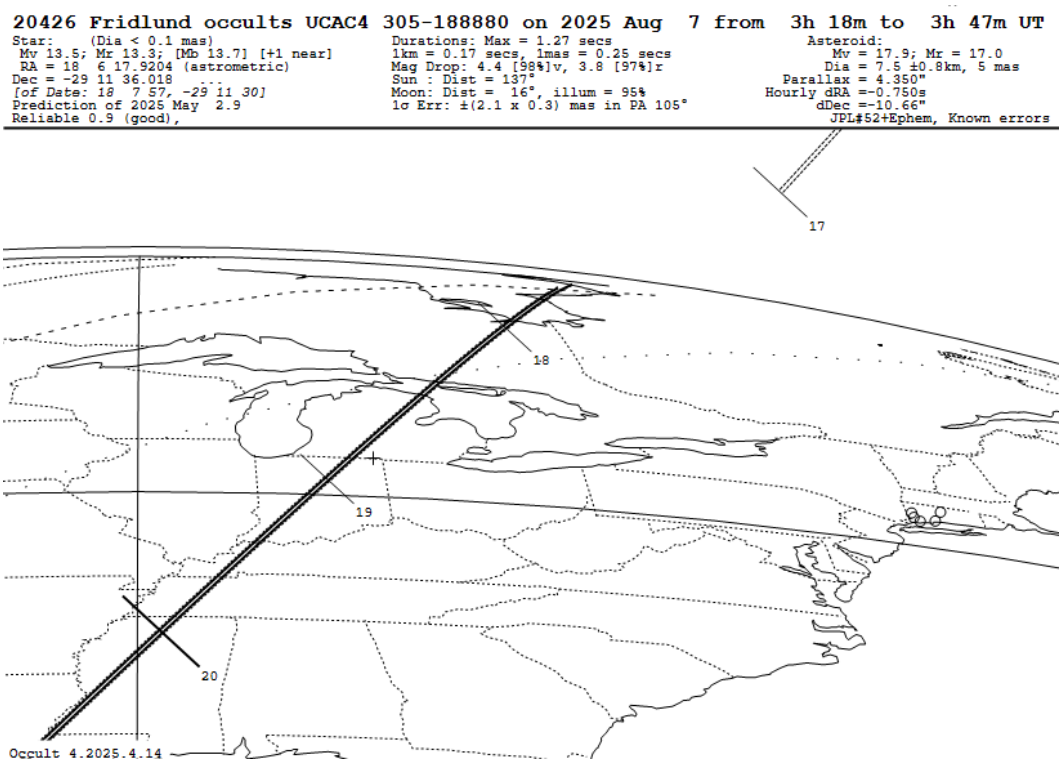
20-JUN



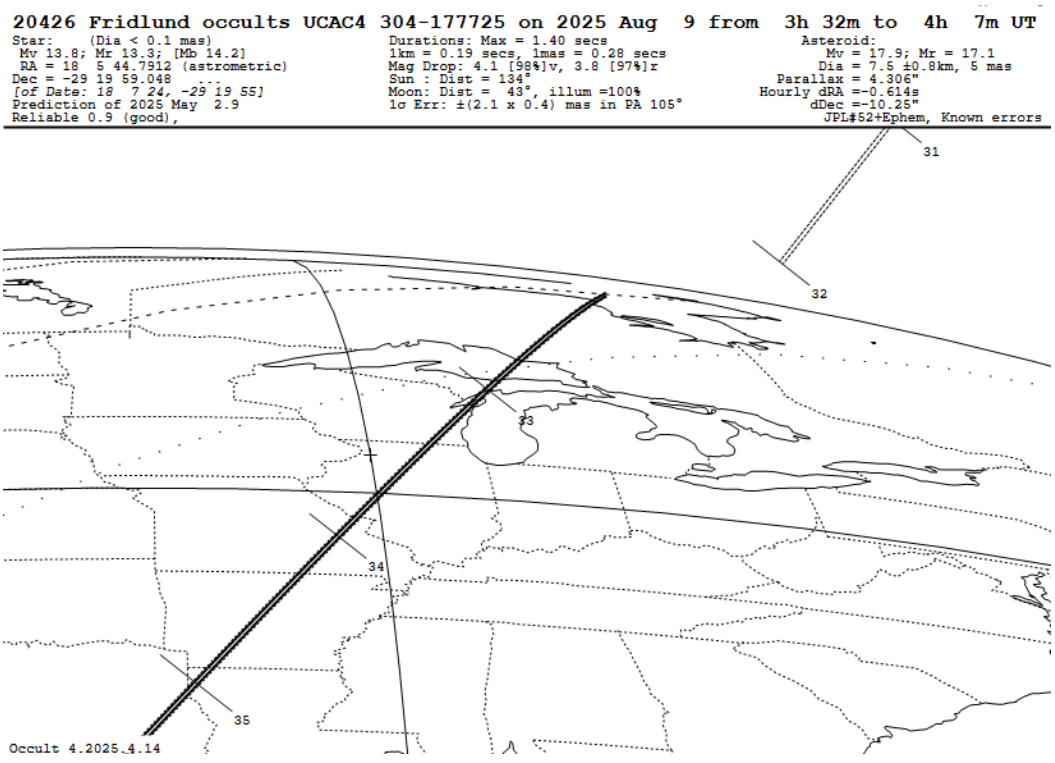
14-JUL



6-AUG


20426 Fridlund occults UCAC4 305-188880 on 2025 Aug 7 from 3h 18m to 3h 47m UT
Star: (Dia < 0.1 mas)
Mv 13.5; Mr 13.3; [Mb 13.7] [+1 near]
RA = 18 6 17.9204 (astrometric)
Dec = -29 11 36.018 ...
[of Date: 18 7 57, -29 11 30]
Prediction of 2025 May 2.9
Reliable 0.9 (good),
Durations: Max = 1.27 secs
1km = 0.17 secs, 1mas = 0.25 secs
Mag Drop: 4.4 [98%]v, 3.8 [97%]r
Sun : Dist = 137°
Moon: Dist = 16°, illum = 95%
1σ Err: ±(2.1 x 0.3) mas in PA 105°
Asteroid:
Mv = 17.9; Mr = 17.0
Dia = 7.5 ±0.8km, 5 mas
Parallax = 4.350"
Hourly dRA =-0.750s
dDec =-10.66"
JPL#52+Ephem, Known errors
17
18
19
20
Occult 4.2025.4.14

8-AUG


20426 Fridlund occults UCAC4 304-177725 on 2025 Aug 9 from 3h 32m to 4h 7m UT
Star: (Dia < 0.1 mas)
Mv 13.8; Mr 13.3; [Mb 14.2]
RA = 18 5 44.7912 (astrometric)
Dec = -29 19 59.048 ...
[of Date: 18 7 24, -29 19 55]
Prediction of 2025 May 2.9
Reliable 0.9 (good),
Durations: Max = 1.40 secs
1km = 0.19 secs, 1mas = 0.28 secs
Mag Drop: 4.1 [98%]v, 3.8 [97%]r
Sun : Dist = 134°
Moon: Dist = 43°, illum =100%
1σ Err: ±(2.1 x 0.4) mas in PA 105°
Asteroid:
Mv = 17.9; Mr = 17.1
Dia = 7.5 ±0.8km, 5 mas
Parallax = 4.306"
Hourly dRA =-0.614s
dDec =-10.25"
JPL#52+Ephem, Known errors
31
32
33
34
35
Occult 4.2025.4.14

12-AUG

20426 Fridlund occults J180458.64-293539.0 on 2025 Aug 13 from 3h 9m to 3h 55m

Star: (Dia = 0.7 mas)	Durations: Max = 1.95 secs	Asteroid:
Mv 13.4; Mr 11.9; [Mb 16.6] [+1 near]	1km = 0.26 secs, 1mas = 0.34 secs	Mv = 18.0; Mr = 17.2
RA = 18 4 58.6440 (astrometric)	Mag Drop: 4.6 [99%]v, 5.3 [99%]r	Dia = 7.5 ±0.8km, 5 mas
Dec = -29 35 39.036	Sun : Dist = 130°	Parallax = 4.217"
[of Date: 18 6 38, -29 35 37]	Moon: Dist = 99°, illum = 83%	Hourly dRA =-0.343s
Prediction of 2025 May 2.9	1σ Err: ±(2.3 x 1.0) mas in PA 110°	dDec = -9.46"
Reliable 0.9 (good),		JPL#52+Ephem, Known errors

Expect fades >0.2 secs (star dia)