

## **(84522) 2002 TC302, a good Kuiper Belt Object occultation recorded in the eastern USA**

David and Joan Dunham

On 2021 November 11, around 2:55 UT, (84522) TC302, an approximately 500-km Kuiper Belt Object (KBO) 42.76 AU from the Earth, occulted an 11.7-mag. star in Triangulum, high in the southeast for the US and low in the west for western Europe. Although the UT date was Veteran's Day, the local time was 9:55pm of Nov. 10, Eastern Standard Time. The predicted path crossed western Europe as well as a wide swath of North America; a record 150 observers signed up to observe the occultation, expected to last up to 21 seconds, using IOTA's Occult Watcher tool, to provide good coverage across the path and its uncertainty, which was wider than the path itself. The IOTA prediction had the path over the southeastern Great Lakes, but another prediction by the Lucky Star Project (Paris Observatory) put the path rather centrally over Washington, DC, but with larger errors. Bad weather plagued many, but a high pressure area kept the sky clear over most areas east of the Appalachian Mountains.

The actual path was only about 0.3 path-width north of the Lucky Star prediction. In Maryland, the event was timed by Steve Conard, Kevin Hartnett, Andrew Scheck, and an anonymous eVscope user near Parkton. Mike Skrutskie, a Univ. of Virginia astronomer, recorded a 5s occultation from his home in Earlysville, only a mile northwest of the Charlottesville Airport. Observers at Fan Mtn. Observatory, a little farther south, as well as near Louisa and Fredericksburg, had no occultation, determining the location of the southern limit well. The central and northern part of the object were covered well mainly by European observers (and two in Texas), while the northernmost observer who had an occultation was George Viscome in Lake Placid, NY. The observations are fit well by a 467 km by 530 km ellipse, as shown in Fig. 1. The stations in eastern North America are shown on the map in Fig. 2.

Although we were visiting Maryland in this timeframe, on Nov. 10, we were with friends staying in Corolla, on the Outer Banks of NC. We used a 12-cm refractor to video record the target star for the miss that we had. While we were busy working to acquire the target, Tom Odt, came out to see what we were doing. At about 9:10 pm, Tom looked up and asked, "What's that comet moving from right to left?" We were surprised to see a "star" with a parabolic plume behind it, and learned later that it was the SpaceX Crew Dragon 3 taking 4 astronauts to the ISS.

Although we had a miss for this event, the night before, we recorded an occultation of a 9.6-mag. star by (535) Montague from three sites extending from Nags Head to Avon, NC. Two observers in Arizona also added to the determination of Montague's size and shape.

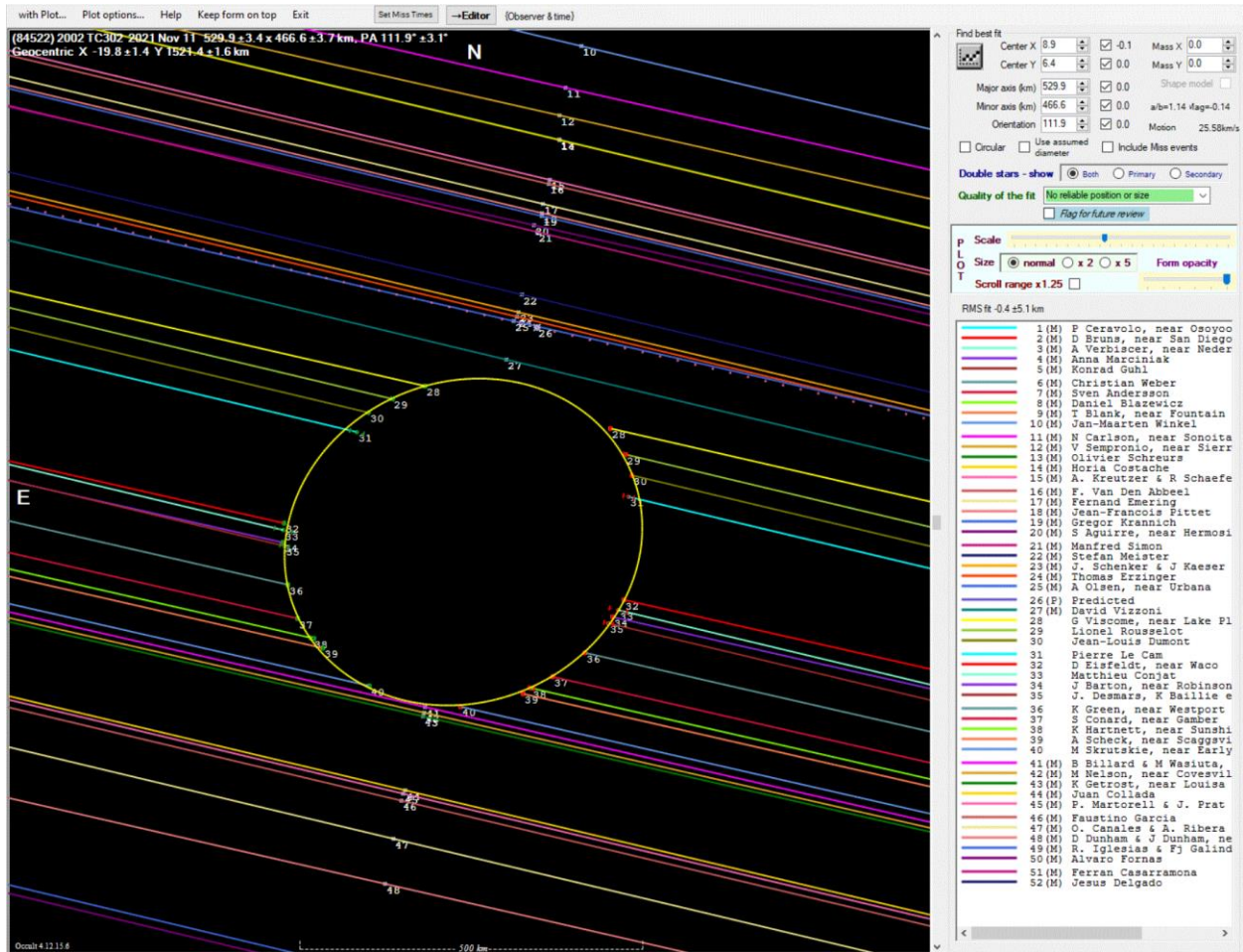


Figure 1: Sky plane Plot of timings of the occultation of 11.7-mag. UCAC4 616-007599 by the KBO 2002 TC302 on 2021 Nov. 10/11. Credit: John Moore, IOTA and Eric Frappa, Euraster.net.

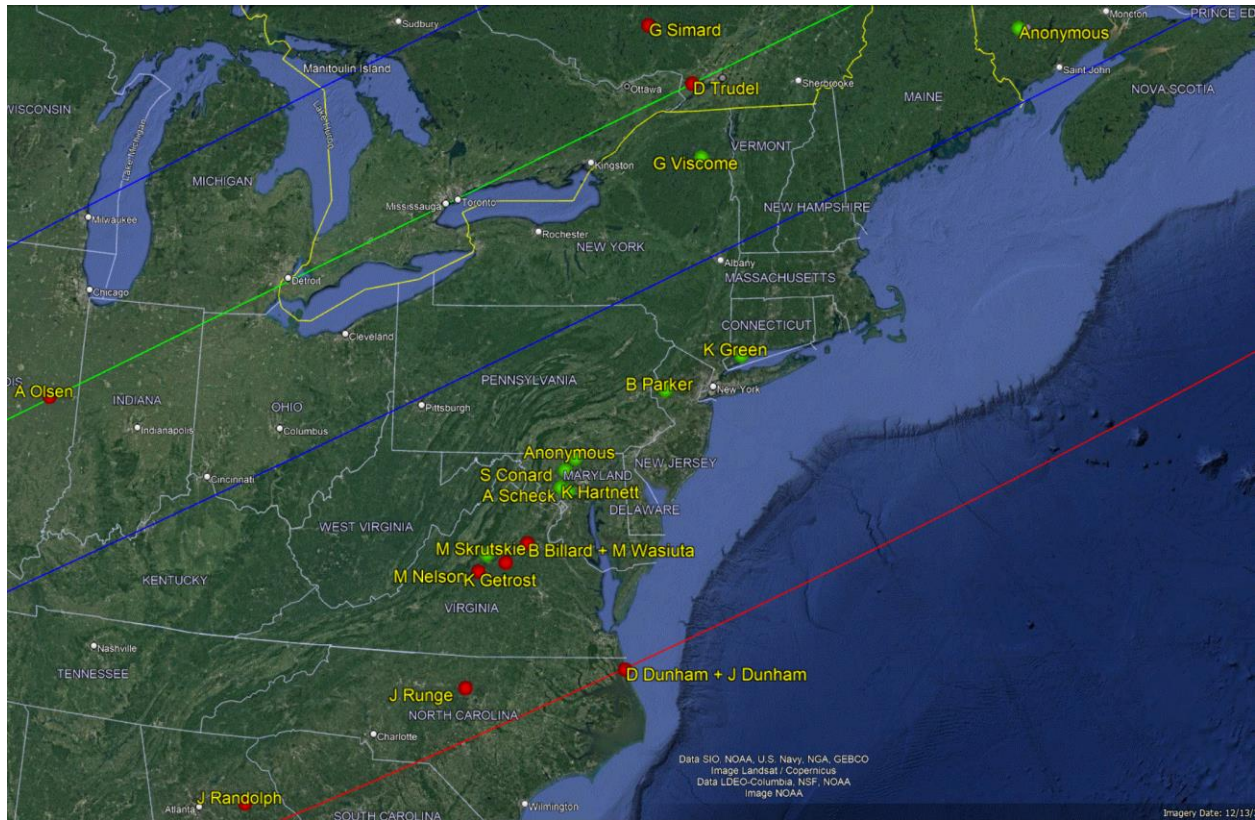


Figure 2: Map showing observer locations for the Nov. 10/11 KBO occultation in eastern North America. Green dots show stations from which an occultation was recorded, while red dots show miss stations. Credit: John Moore, IOTA and Google Earth.

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