

7.5-mag. SAO 116025 to be occulted by (456) Abnoba around 3.9h UT Mar. 5, TX, Colo., Calgary

This binoculars (or mighty mini) occultation will occur this Wed. evening, 2020 Mar. 4 local time. An occultation by a satellite of Abnoba could occur over a wide area, as far west as Del Rio, Albuquerque, Salt Lake City, Spokane, and Kelowna (BC); and as far east as Baton Rouge, Tulsa, Wichita, and Lloydminster (AB/SK). If the weather forecast remains good, Joan and I are planning a multi-station deployment across the path in Colorado, probably north of Denver airport; we hope that local observers might help the effort with their own equipment, or with some that we can loan.

Abnoba's shadow will first hit the Texas Gulf Coast, at Matagorda, w. of Houston, at 9:51pm CST (= Mar. 5 at 2:51 UT), then passes just n.e. of Austin, which could have an occultation. At 9:52pm CST, the shadow will be about 60 miles west of Ft. Worth, then north of Amarillo a minute later. Two minutes later, just before 8:54pm MST, the path passes over the Star Haven Observatory (Strasburg, CO, near center) and the Denver Airport (at west edge of the path), then over Greeley and Ft. Collins. With prediction errors, there's a small chance for an occultation from Denver and Boulder, but chances for an event are higher 15 miles or more farther east. Just after 8:54pm MST, the path passes over Laramie, WY. At 8:55pm MST, the shadow sweeps across central Montana, and a minute later, it passes over Calgary, AB.

Steve Messner has set up a page for the event at

http://www.occultationpages.com/events/20200305_456_Abnoba.html including finder charts and maps, also with cloud cover forecast maps. Messner's page also has a link to Steve Preston's page with charts and event details; directly, that link is

http://www.asteroidoccultation.com/2020_03/0305_456_64338.htm. The star, SAO 116025 = HIP 38323 (spectral type K0), is in Canis Minor at J2000 RA 7h 51m 03.2s, Dec +0 deg. 40' 29", 5 deg. south-southeast of Procyon, 1.1 deg. south of 5.1-mag. zeta CMi (zeta Canis Minoris), and 0.6 deg. north of 5.7-mag. SAO 116019. The asteroid at 14th mag. doesn't need to be seen, but those with large telescopes might detect it during the occultation, which may last up to 6 seconds. The finder charts on Messner's page are all centered on the target star with north up (for Colorado, north up is also zenith up since the target is on the meridian when the occultation occurs; the view with zenith up will be only slightly rotated for other locations along the path from Texas to Alberta. The top chart is the most detailed, the Sky view from Google Earth, or Google Sky. Below it is a reversed-color printer-friendly version, so the blue stars shown on it, are actually orange, as shown in the black background chart above it. The charts below these were all produced with Guide8, from level 2 (wide field naked-eye view); I've hand-labelled the 73% sunlit Moon, which will shine at mag. -11, 27 degrees above and a little to the right of the target) to level 8 at the bottom, showing the video view that might be seen in an 8-in. SCT with a focal reducer. The wider views of the other charts refer to the small 50mm "mighty mini" and 80mm "midi" refractor systems that we'll be bringing. Also shown on all of the Guide charts is the "pre-point line of declination" extending to the right of the target. If you point your telescope to that line at the Universal Time marked along it, then turn off all tracking so the telescope does not move, the target will be near the center of the field of view when the occultation occurs. The tick marks are at 1-minute intervals; if a label is above the line, the time

is for the tick mark to the right of the label, while if the label is below the line, the time is for the tick mark to the left of the label. The last chart shows, on the pre-point line just over 2 minutes before the target, a tight triangle, effectively a triple star (but there's even a 4th faint star just to its northeast), whose component magnitudes are 7.3 (SAO 115967, about equal in brightness to the target star), 8.6, and 10.8; if you find it, it's an easy star hop (to the left) to the target. For those without robust go-to telescopes, there is no good pre-point opportunity that is substantially easier than just star-hopping to the target (first with your finder scope, to zeta CMi) from Procyon, although it might be a little easier to pre-point where the line passes north of Orion's belt shortly after the sky becomes dark enough to navigate. The pre-point times are for a location in the path just northeast of Denver, but are close enough to use as is for all locations in the path in northern Colorado. For other locations, find the occultation U.T. for your latitude from the table on Steve Preston's "Detailed Info" page, and form its difference from 3:53:58 UT, to determine the correction to apply to the pre-point times for your latitude. Let me know if you want more detailed charts of the pre-point line across Orion and Monoceros; we can post them, if there is interest in them.

As noted above, we could use more observers in northern Colorado. The path center passes only 3 km west of Star Haven Observatory near Strasburg, so I hope that someone can observe there; I've entered a tentative station there in Occult Watcher (OW). Please let me or OW know if you can try to observe this occultation, so we can coordinate plans to cover the path. If you don't have an occultation system of your own, we can provide one or two mighty mini systems, and the pre-point charts needed to point them. There are three highways that we might use for our deployment, which we'll select based on tomorrow's forecasts for Wed. night:

I-76, roughly from Barr Lake to Roggen.

I-70 and US36, from east Aurora to about Hwy 56 west of High Plains Raceway

US24 from near Ramah to somewhere n. or e. of Limon.

The orbit for Abnoba should be quite accurate as it has been updated by the JPL Horizons team using Gaia DR2 observations of Abnoba, as well as a point from a 3-station occultation observed in 2006. The Gaia DR2 star positions are normally very accurate, and this one has the usual small formal errors, around 0.4 milli-arc-seconds (mas), which is tiny compared with the 27 mas expected diameter of Abnoba. However, Gaia has a note for the star, "duplicated source flag", which experience has shown indicates that the real errors can be much larger than the formal errors, so I think a path shift as much as half a path-width (maybe even a little larger) is very possible. So we recommend that observers not in the path but rather near it, including in Denver and Boulder, try to observe. The Gaia flag may indicate that the star is a close double, so step events are possible, as are gradual events due to the star's angular diameter.

The current cloud cover forecasts look pretty good for Colorado, with just a few patches of clouds predicted in different places by the different models; as noted above, I'll decide tomorrow, along which highways we'll deploy our stations, based on what the forecasts say then. Unfortunately, it is expected to be mostly cloudy across the path in most other areas, including Texas. But the European model says it will be clear over the Panhandle (unlike the US

GFS model), while both models show a good break in the clouds along, or south of, I-10 from Houston to San Antonio.

David, dunham@starpower.net, cell 301-526-5590. 2020 March 2 afternoon