THE OCCULTATION OF SAO 60107 BY (516) AMHERSTIA ON JAN. 14, 2002. R. Bookamer[1], H. Povenmire[2] and K.I. Povenmire[3], [1]9310 Fleming Grant Rd. Micco, FL 32976, nukerb@aol.com, [2]215 Osage Dr. Indian Harbour Bch., FL 32937, cpovenmire@cfl.rr.com,[3]215 Osage Dr. Indian Harbour Bch., FL 32937, cpovenmire@cfl.rr.com.

Introduction: On the night of September 20, 1903, astronomer R.S. Dugan discovered a bright asteroid while observing at Heidelberg, Germany. It was later numbered and named (516) Amherstia.

The occultation of stars by asteroids is a common event. Favorable occultations of a star where valuable data can be obtained on the shape and diameter of asteroids are rare events.

A favorable occultation: On January 14, 2002 at approximately 0:19 UT, a favorable occultation of (516) Amherstia occurred over north Florida. This rare metallic asteroid (Class M) has an estimated diameter of 76 km (47 miles). The projected path width was approximately 50 miles.

The path of the occultation as projected onto the Earth ran from Russia, across Europe and the Atlantic Ocean, ending in Florida and the Gulf of Mexico. The end of the path ran from the northeast to the southwest over the Jacksonville, Florida area. Since Amherstia is relatively small, the maximum predicted duration of occultation was approximately 5.3 seconds.

Target star and observations: The star that was occulted was SAO 60107. It is magnitude +7.46 and spectral class G5. It is not a known binary. This star is also known as HIP 36335, PPM 72830 and TYC 2460-02215-1. It has the (2000.0) coordinates of R.A. 07h 28m 44s.09, Dec. +34º 26' 12". 9. It is located about 2.8º northwest of Castor in the constellation of Gemini.

A number of advanced amateur astronomers came from as far as the Washington, D.C. area and Texas to observe this event. They were joined by other observers from Florida and Georgia.

About 10 stations were manned from south Georgia to the St. Augustine area. Many used videocameras with image intensifiers and others were visual observations using tape recorders and WWV receivers.

The weather forecast changed rapidly from good to bad. In the hours before the occultation, the skies looked favorable with only high, wispy cirrus clouds. After sunset, the clouds thickened and the transparency dropped. At the time of occultation, the extinction was about 2.5 magnitudes. The star now appeared about +10 magnitude. The seeing or steadiness of the atmosphere was excellent. This changed the event observationally from highly favorable to marginal.

Reductions: One of the visual chords was observed from Race Track Rd., an east-west road southwest of Jacksonville. The coordinates were long. 81º 34'. 338 W. and lat. 30º 06'. 665 N. at an altitude of 10m. The telescope used was a 25-cm, F/4.5 reflector with a power of 36x.

The time of Disappearance was 0:18:57.1 and the time of Reappearance was 0:19:02.2 UT, after personal correction was applied. Because the Disappearance occurs without warning, the surprise or "Startle Effect" can occur. This has to be carefully estimated. This implied an occultation duration of approximately 5.1 seconds and that this chord was close to the maximum diameter of the asteroid. Since the events were sharp, there was no indication that either the star or asteroid were binary. No secondary events were observed which could have indicated minor satellites.

Several important points were immediately found by this singular observation. First, the occultation occurred approximately 7 seconds earlier than predicted. Second, Amherstia may be about 10 percent larger than predicted by the longer occultation duration.

When the other observed chords were reduced, they implied a diameter of approximately 41.9 + or – 3.3 km. The shape appears to be roughly circular. As with all observations where mixed methods are used, there are likely to be large residuals. The results here are the best compromise that can be interpreted from the data.

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Reference: Povenmire, H. (1980) Graze Observers Handbook 2nd Ed. JSB Enterprises Indian Harbour Bch., FL.