

American Meteor Society Fireball reporting system and mobile application

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The American Meteor Society (AMS) founded in 1911 pioneered the visual study of meteors and has collected data relating to meteor observations and bright fireballs for over 100 years. In December 2010, the online fireball reporting system was upgraded to an interactive application that utilizes Google Maps and other programmatic methods to pinpoint the observer's location, azimuth and elevation values with a high degree of precision. The AMS has collected 10s of 1000s of witness reports relating to 100s of events each year since the new application was released.

Three dimensional triangulation methods that average the data collected from witnesses have been developed that can determine the start and end points of the meteor with an accuracy of <50 km (when compared to published solutions provided by operators of all sky cameras). RA and DEC radiant estimates can also be computed for all significant events reported to the AMS. With the release of the mobile application, the AMS is able to collect more precise elevation angles than through the web application. Users can file a new report directly on the phone or update the values submitted through a web report. After web users complete their fireball report online, they are prompted to download the app and update their observation with the more precise data provided by the sensors in the mobile device. The mobile app also provides an accurate means for the witness to report the elapsed time of the fireball. To log this value, the user drags the device across the sky where they saw the fireball. This process is designed to require no button click or user interaction to start and stop the time recording. A count down initiates the process and once the user's phone crosses the plane of azimuth for the end point of the fireball the velocity timer automatically stops. Users are asked to log the recording three times in an effort to minimize error. The three values are then averaged into a final score. Once enough witnesses have filed reports, elapsed time data collected from the mobile phone can be used to determine the velocity of the fireball. With the velocity, trajectory solution and RA/DEC the AMS can plot orbital estimates for significant fireball events reported to the society. Our hope is that overtime this catalog of events will reveal patterns relating to the origins of bright fireballs at certain times of year. The AMS also hopes to be able to associate fireball events reported to the society with known meteor showers when RA/DEC radiant estimates fall close enough to those of known showers. In addition to the enhanced fireball reporting application, the AMS Mobile App provides a meteor shower calendar with information, radiant maps and moon conditions for all upcoming showers. There is also a meteor observing function inside the app that enables meteor observers to log meteor observations directly on the phone and have that data uploaded to the AMS online database and associated with that users observing profile. To record observations the user simply points the device at the part of the sky where they saw the meteor. They then drag their finger across the screen in the direction the meteor traveled. The user is then prompted to enter the magnitude of the event and associate the meteor with a known shower that is active for that date. When the user completes their session, all of the data for each meteor along with the information relating to the session is uploaded to the AMS website. Users can then review the data online in the AMS member's area. Data across all users can be aggregated for statistical analysis and ZHR estimates.

Currently the AMS has over 10,000 registered users and facebook followers. In 2013 over 680,000 people visited the AMS website and the society received over 18,000 witness reports relating to 713 confirmed unique fireball events.

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References: AMSMeteors.org