Comparing eyewitness-derived trajectories of bright meteors to ground truth data

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The NASA Meteoroid Environment Office (MEO) is the only US government agency tasked with analyzing meteors of public interest. When queried about a meteor observed over the United States, the MEO must respond with a characterization of the trajectory, orbit, and size within a few hours. Using observations from meteor networks like the NASA All Sky Fireball Network [1] or the Southern Ontario Meteor Network [2], such a characterization is often easy. If found, casual recordings from the public and stationary web cameras can be used to roughly analyze a meteor if the camera's location can be identified and its imagery calibrated. This technique was used with great success in the analysis of the Chelyabinsk meteorite fall [3].

But if the event is outside meteor network coverage, if an insufficient number of videos are found, or if the imagery cannot be geolocated or calibrated, a timely assessment can be difficult if not impossible. In this situation, visual reports made by eyewitnesses may be the only resource available. This has led to the development of a tool to quickly calculate crude meteor trajectories from eyewitness reports made to the American Meteor Society [4]. The output is illustrated in Figure 1. A description of the tool, example case studies, and a comparison to ground truth data observed by the NASA All Sky Fireball Network will be presented.

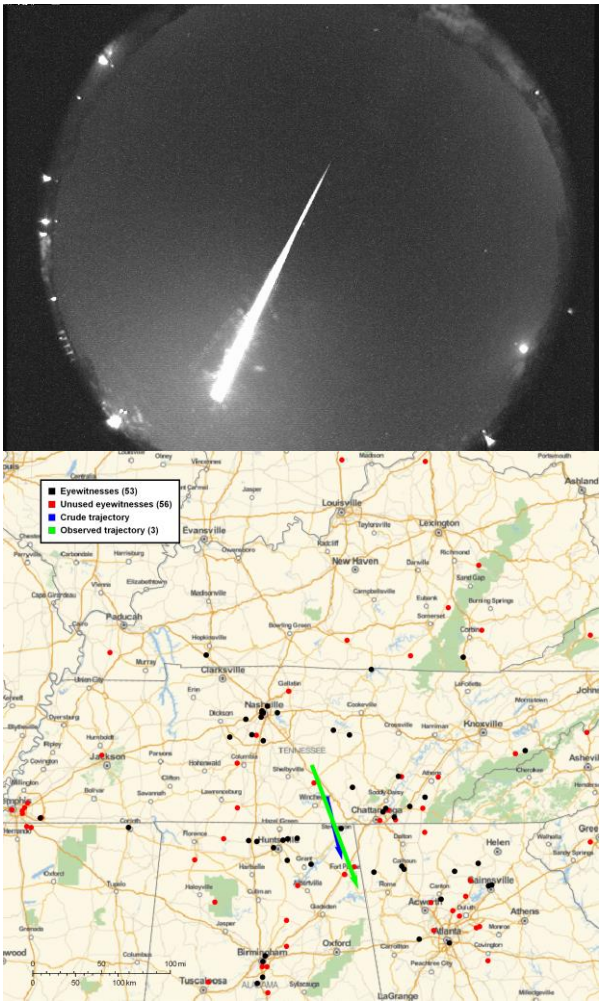

Fig 1 (top) Meteor observation by the NASA All Sky Fireball Network. (bottom) Ground track of the crude eyewitness-derived trajectory compared to the observed ground track.

References

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