Optical meteor systems used by the NASA Meteoroid Environment Office

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The NASA Meteoroid Environment Office (MEO) uses two main meteor camera networks to characterize the meteoroid environment: an all sky system and a wide field system to study cm and mm size meteors respectively.

The NASA All Sky Fireball Network consists of fifteen meteor video cameras in the United States, with plans to expand to eighteen cameras by the end of 2015. The camera design and All-Sky Guided and Real-time Detection (ASGARD) meteor detection software [1, 2] were adopted from the University of Western Ontario's Southern Ontario Meteor Network (SOMN). After seven years of operation, the network has detected over 12,000 multi-station meteors, including meteors from at least 53 different meteor showers. The network is used for speed distribution determination, characterization of meteor showers and sporadic sources, and for informing the public on bright meteor events.

The NASA Wide Field Meteor Network was established in December of 2012 with two cameras and expanded to eight cameras in December of 2014. The two camera configuration saw 5470 meteors over two years of operation with two cameras, and has detected 3423 meteors in the first five months of operation (Dec 12, 2014 – May 12, 2015) with eight cameras. We expect to see over 10,000 meteors per year with the expanded system. The cameras have a 20 degree field of view and an approximate limiting meteor magnitude of +5. The network's primary goal is determining the nightly shower and sporadic meteor fluxes.

Both camera networks function almost fully autonomously with little human interaction required for upkeep and analysis. The cameras send their data to a central server for storage and automatic analysis. Every morning the servers automatically generates an e-mail and web page containing an analysis of the previous night's events.

The current status of the networks will be described, alongside with preliminary results. In addition, future projects, CCD photometry and broadband meteor color camera system, will be discussed.

References

[1] Brown, P. et al. (2010) *WGN* 38, 25-30.
[2] Weryk, R. J. et al. (2008) *Earth Moon and Planets* 102, 241-246.