The SMA Automated Station for Meteor Research

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ABSTRACT

In this paper, we summarize the presented poster regarding the active tracking meteors method and investigation of the SMA since 2006, with a specially devised automatised station. We also show how our joint collaboration with another tracking stations pertaining to the Spanish Meteor and Fireball Network (SPMN), as also with the Bootes 2 Station (pertaining to IAA-CSIC, Spain),

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1. The AllSky Camera

The camera is a non-refrigerated version of the ST-402ME (Fig. 1), coupled for a focal distance of 246mm, f/16. The box contains an USB extension, plus a 12V power source. The box's upper window over the camera mounts a RG-630 red filter, designed to reduce the light pollution. The windows is also warmed to reduce the dew condensation. The USB extensor enables its operation from a distance 50m away, at the controlling computer.

The control PC power source, as also the cameras, is controlled by a device with 4 relay outputs , manageable through the Internet via a specially designed dedicated web server (IP Relays).

Fig. 1.— The AllSky Camera. *(SMA)*

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The connections between the PC and the Camera (USB) are managed by 2 USB to Ethernet converters. The network cable, CAT-5 class, permits to manage all at a distance of 30m between the Camera and the PC with no problems (Fig. 2).

1.1. Image Capture

The camera software enables the all-night automatic image captures, then it is compared with the precedent one and its storing, only if it possess differential characteristics (with the precedent), for its posterior visual inspection.

The Meteor Cam software takes automatically sky images all-night, with a 30-secs exposure time. After an added second for integration, it starts the next capture. Those images appearing different after being software-compared with the precedent, are stored for subsequent study. The camera records meteors, artificial satellites, airplanes, bright comets, clouds and another meteorological phenomena.

2. Cameras Turning On and Off, Conversion to Another Image Formats

Weve developed a software that, depending on the date, calculates the sunrise and sunset times, therefore launching or stopping the program at optimal times. To turning the software on we also developed a script in charge of launching the meteors capture application, that also can set operating parameters to start the image captures in an absolutely automatized way. Every morning, after the cameras turning off, the software performs the images conversion form the SBIG format to the JPG, keeping the original size and proportions, enabling its visualization from a web browser.

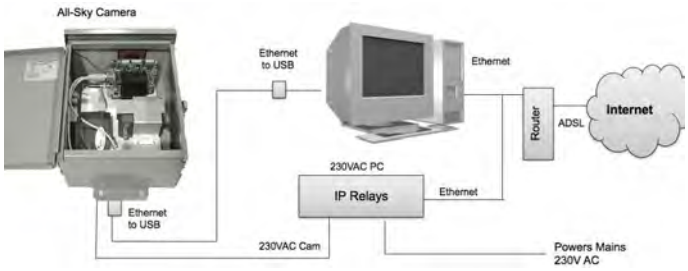

Fig. 2.— Connections Diagram. *(SMA)*

2.1. Accessing and working techniques

The control computer IP address is dynamic, but it is acceded through a dynamic IPs DNS manager. The accessing methods to the control computer are:

1. VNC: Total computer remotely controlled.
2. HTTP: Web portal to visualizing and revising the images.
3. FTP: For image download.
4. Dropbox folder to share images.

After that, images are revised by the members of the working group.

3. Conclusion and Results

The Remotely Controlled Automatised Astronomical Observatory El Pinillo of the SMA is located at Torremolinos, Málaga. Its been operative from 2006. Weve obtained images from meteors and fireballs from 38 different meteor showers and sporadic with magnitude value lesser than or equal to -2. Photographical examples can be seen from the figures 3 to 6

3.1. Current Working Lines

We're currently engaged in the following working and investigation areas:

1. The improvement of the connection all sky camera-computer.
2. Meteor astrometry.

4. Acknowledgements

The SMA collaborates (2005-2006) with the Spanish Meteor and Fireball Network (SPMN) and also with the Bootes 2 Station (IAA-CSIC) at Málaga, also continuously working with its own tracking station of the SMA at Torremolinos. We also want to express our deepest gratitude to both the SPMN Network and also, to the IAA-CSIC Bootes-2 department.

Fig. 3.— THE, 2010-06-13. 21h 47m 49s ±15s UT, mag. -9. *(SMA)*

Fig. 5.— SPO, 2011-11-22. 05h 58m 57s ±15s UT, mag. -7 *(SMA)*

Fig. 4.— DAU, 2010-09-06. 04h 19m 50s ±15s UT, mag. -8. *(SMA)*

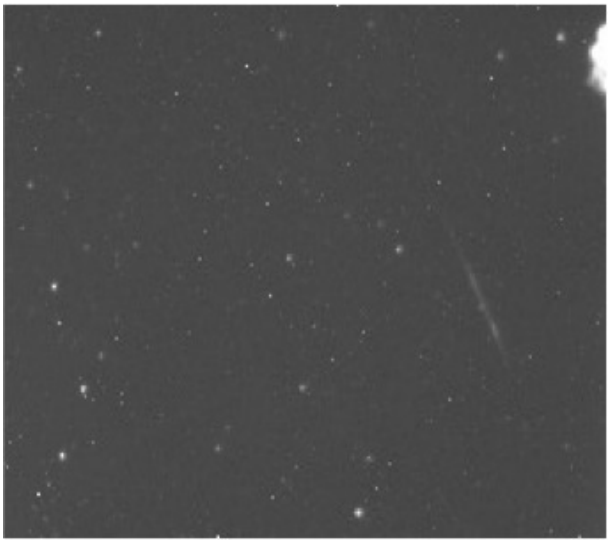

Fig. 6.— QUA, 2012-01-05. 06h 06m 06s ±15s UT, mag. -3. Two explosions. *(SMA)*

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