

AUTOMATIC DETECTION OF FIREBALLS IN ALL-SKY IMAGES I: THE CAMERA AND THE ALGORITHM.

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We have developed an all-sky camera to detect fireballs and bright meteors. It is also used as a cloud detector to remotely monitor the weather. This hub cap-type camera is built with commercial components like a aluminized light shield cap as the hemispherical reflector and a color webcam as a detector. The camera is installed in a closed cabinet that can be remotely opened. In the cabinet we install several sensors to monitor the weather. It checks if it is raining or windy to decide whether to open or close the camera. It also has a moving ring to eclipse the Sun and the Moon when they are over the horizon. The camera works autonomously during day and night. The first version of the system is installed in the *Observatorio Astronómico "Los Molinos"* (north of Montevideo, Uruguay). We plan to install a network of this type of instruments with the objective to determine the fireball trajectory and possibly recover the associated meteorite.

For the automatic detection of the fireballs we have developed an algorithm based on the application of the Hough transform in the image plane. Taking into consideration that the fireball trails look curved in the image plane but they correspond to maximum circles in the sky, we have developed the transformation from the x-y image plane phase-space to the phase-space of inclination and azimuth ($i-Az_0$) of the trail. After flat-fielding the image and binarized it, we applied the Hough transform and look for peaks in the ($i-Az_0$) phase space. Trails of a few tens of degrees long are easily detected with the algorithm.

We present results of the application of the algorithm to all-sky images of either the hub cap-type as well as the fisheye lens-type.