ANALYSIS OF A POTENTIAL METEORITE-DROPPING EVENT OVER SPAIN IN 2009. M. J. Díaz[1], J. M. Madiedo[1], J. M. Trigo-Rodríguez[2], J. Moreno-Ventas[2], L López[3], F. Escalona[3] and C. Gómez[3]. [1]Facultad de Ciencias Experimentales. Universidad de Huelva. 21071 Huelva, Spain, madiedo@uhu.es. [2]Institute of Space Sciences (CSIC-IEEC). Campus UAB, Facultat de Ciències, Torre C5-p2. 08193 Bellaterra, Spain. [3]Asociación Astronómica Albireo, PO Box 377, 41700 Dos Hermanas (Sevilla), Spain.

Introduction: The SPanish Meteor Network (SPMN) is performing a continuous monitoring of meteor activity over Spain and neighbouring countries. For this purpose we employ, among other systems, several video observing stations located in different places in Spain which consist of an array of computer-controlled high-sensitivity CCD video cameras that automatically register meteor trails and store the corresponding images on hard disk [1].

One of the aims of our network is the recovery and analysis of meteorites and, so, we focus our attention on very bright fireballs that could give rise to meteorite falls. We present here the first results of the analysis of a potential meteorite-dropping event that took place over south-west Spain on May 12, 2009.

The May 12 event: A potential meteorite-dropping bolide with an absolute magnitude of –17±2 was recorded on May 12, 2009 at 21h54m35.03 +-0.01s from two of our meteor observing stations located in Andalusia (Sevilla and Doñana) [1, 2]. Both stations, which are separated by a distance of 70 km, employ an array of CCD video cameras to monitor the sky. Most of these are high-sensitivity b&w video devices we use to monitor the night sky. However, colour cameras with lower sensitivity are also used to detect bright events during day and night [3].

Fig 1. Compound image of the March 12, 2009 fireball recorded by one of the day-and-night CCD video cameras located in Sevilla.

The bolide travelled from west to north-west and exhibited no fragmentation (Fig. 1). It was recorded by a total of four CCD video cameras (3 high-sensitivity devices and one lower-sensitivity day-and-night camera) and the corresponding video sequences were automatically stored on hard disk by the meteor detection software UFOCapture (SonotaCo, Japan). Despite this event was very bright, no casual eyewitnesses reports were received.

Data reduction and first results: One of the software packages we have developed can be used to obtain the atmospheric trajectory of multi-station events recorded on video according to the procedures described in [4]. This program can also obtain the orbital parameters of the corresponding meteoroid and, from photometry or deceleration data, is able to calculate its mass [5]. Besides, it can be also used to simulate the dark flight and predict the impact point of a meteorite by taking into account the influence of atmospheric conditions (air density, wind profile, etc.) and several physical parameters of the meteoroid (particle shape, mass, spin, etc.). On the other hand, radiant and orbital data suggest that this fireball is related to another potential meteorite-dropping event registered on 2008 [6].

The atmospheric trajectory of the bolide was obtained from the images recorded from both observing stations. According to this, the luminous phase of the bolide started at a height of 96.1 km and finished at about 16.5 from the ground with a terminal velocity of about 3.5 km/s. The dynamic mass of the meteoroid was calculated at this terminal point from deceleration data in order to simulate the corresponding dark flight. A value of about 0.3 kg was obtained.

Once we could obtain the proper information at the terminal point of the trajectory, we proceeded with the calculation of the impact area. The dark flight was simulated by considering a value of the drag coefficient of 0.58 [4] The wind profile provided by *Agencia Estatal de Meteorología* (AEM) was included in the calculations in order to take into account the influence of atmospheric conditions. The impact point obtained in this way was located in the province of Huelva, in the western region of Andalusia. The first expeditions to find this meteorite are now in progress.

Conclusions: Our network is performing a continuous monitoring of meteor activity and meteorite-

dropping events over Spain and neighbouring countries. Some preliminary results related to the analysis of a potential meteorite-dropping event recorded by the SPMN over the south-west of Spain have been included here. The fireball could be imaged by several CCD video cameras located at two meteor observing stations separated by a distance of 70 km. We could obtain its atmospheric trajectory, terminal data and impact point with our data analysis software. Expeditions to find this meteorite have been organized. However, the characteristics of the impact area (dense vegetation and orography) and the small terminal mass of this meteorite have posed serious difficulties to the search tasks.

References: [1] Madiedo J.M. and Trigo J.M. (2008) *EMP* 102, 133-139. [2] Madiedo J.M. et al. (2010) *Advances in Astronomy* 2010, doi: 10.1155/2010/167494. [3] Madiedo J.M. et al. (2008) *EPSC*, abstract #00319. [4] Ceplecha Z. (1987) *Bull. Astron. Inst. Czechols*. 38, 222-234. [5] Bronshten V.A. (1983) *Physics of Meteoric Phenomena*, D. Reidel Publishing Company, Holland. [6] Madiedo J.M. et al. (2008) *EPSC*, abstract #00321.