# THE UK FIREBALL NETWORK: STAGE TWO OF THE GLOBAL FIREBALL OBSERVATORY.

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**Introduction:** The UK-Fireball Network (UKFN) is part of a larger effort by the Desert Fireball Network (DFN) to install autonomous cameras that continually monitor the night sky to capture fireball events as they enter Earth's atmosphere [1], ultimately creating the first Global Fireball Observatory (GFO) [2]. The primary aim is to provide accurate fall locations of any surviving meteorites, allowing for rapid recovery, and to calculate their orbit, and hence, origin in the solar system.

**The UK Fireball Network:** As part of a collaboration between Imperial College London, the University of Glasgow, and Curtin University, four cameras have been installed so far, with a further seven cameras planned (Fig. 1). This should provide nearly complete double-station coverage of the skies over the UK, with each camera having a field of view with a radius of 150 km. We anticipate that this network will observe 1-2 meteorites of searchable size per year [3]. UKFN have teamed up with several other UK-based networks, such as UKMON and SCAMP, collectively known as the UK Fireball Alliance (UKFAll), to put in place protocol for when such an event occurs. We have already had several joint fireball observations. A meteorite fall has not been recovered in the UK for nearly 30 years and it is the aim of the UKFN, with the GFO and UKFAll, to rectify this. The DFN have developed a free app with Thoughtworks, called Fireballs in the Sky, to allow for members of the public to report a sighting using their smartphones and increase the data set available [4].

Each camera has an 8-mm stereographic fisheye lens and takes one long exposure image every 30 seconds. The onboard computer performs an automated event detection search of each image, and if an event is detected, neighbouring cameras are autonomously checked to see if they also observed the event. Fireball velocities and trajectories are calculated using a de Bruijin sequence embedded in the long exposure images, which provides absolute timing data with temporal precision better than one millisecond after triangulation [5].

The installation of these cameras in the UK faces different challenges to those of DFN in Australia, including light pollution, higher rainfall, and cloud cover. However, so far, these factors seem to have had minimal impact on the operation of the installed cameras.

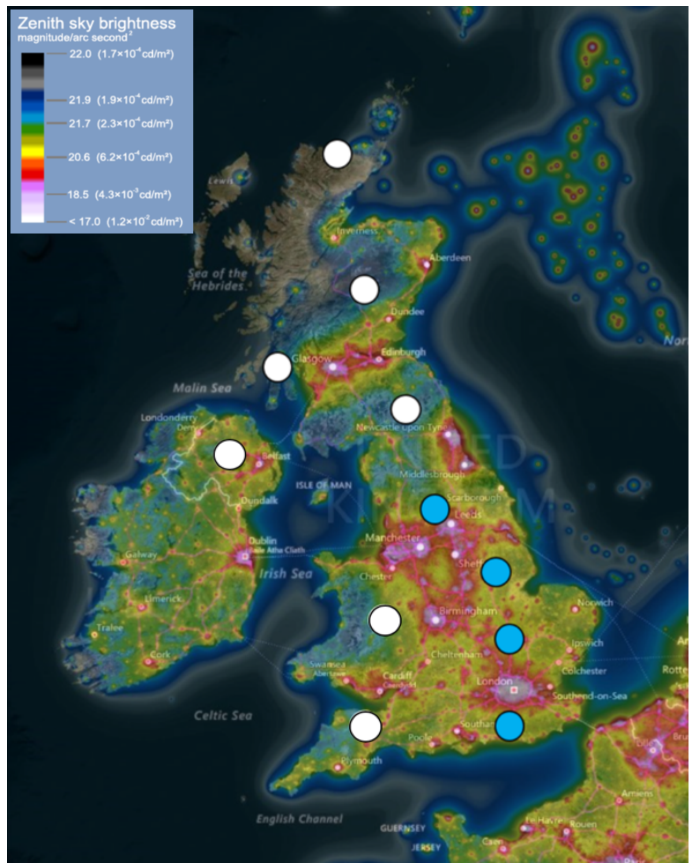


Figure 1: Zenith light pollution map of the UK with the blue dots marking the installed cameras to date, and the white dots showing planned installation locations. Anywhere 20.6 or higher (yellow-black) are considered optimum installation locations.

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**References:** [1] P.A. Bland et al. (2012) *Australian Journal of Earth Sciences* 59:2:177-187. [2] R.M. Howie et al. *Experimental Astronomy* 43:3:237-266. [3] M. Zolensky et al. (2006) *Meteorites and the Early Solar System II* 869-888. [4] P.A. Bland, et al., (2014) *Elements*, 160-161. [5] R.M. Howie et al. (2017) *Meteoritics and Planetary Science* 52:8:1669-1682.