Shooting Stars on Camera: Colour, Composition and Contrasts

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Overview

To determine the, origin, speed, and frequency of the observed Taurids and the Quadrantids. To photograph and film meteors, then analyse the data using UFO Analysis software.

Aims

1.To Expand our knowledge about the possible existence of extra-terrestrial materials.
2. Experience being a 'working scientist'.
3. To track the origin, speed, frequency of meteors: Taurids & Quadrantids
4.Learn skills of communication and team work
5. To photograph meteors, and analyse Data using UFO Analysis software.
6. To verify meteors with data from other UKMON cameras

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Background information

We've been studying meteors with the help of Dr Ashley King et al.and UKMON. Meteor velocity can vary from ~ 12km/s to ~72km/s (If the meteor's velocity is faster than this, then it has to be from outside the Solar System). A single meteor at 0.004 grams can produce 980 watts of energy. With our camera, we can capture images of and eventually upload them to UKMON.

Methodology

Observance of Meteors: Lie down still on a waterproof mat at night facing the corresponding constellation using the Starwalk 2 App, and record frequency of meteors. Photography: Get a time set light sensitive camera, connect to a computer where you can access the photos and videos. A capsule will protect the camera from the precipitation. Analyse Data using UFO Analysis software, and delete the unnecessary files such as aeroplanes, and insects.

Results

Observance of Meteors :Table 1. Photography: On 20 Jan17, the same meteor was captured in 2 places WP, and Wilcot, Newbury (Fig. 1, and 3). Some images captured by WP: Figs. 1,4 & 5). Fig.4, is the brightest meteor (-1.7) and Fig. 5 is the faintest (+1.1).

Conclusion

1) The Quadrantids were faster than the Taurids.
2) We saw more Quadrantids than Taurids.
3) The Quadrantids are from asteroid - the 2003 EH1. The Taurids are associated with comet Encke. These sources will affect their speed and direction. Those outside the Solar system travel faster.
4) Our camera picked up a meteor (Fig1) which corresponds with the same one found in Wilcot, Newbury (fig. 3).

Evaluation

What went well was that we used a live CCTV camera to automatically capture pictures of meteors. We also used special UFO analysis software to analyse the pictures so that we could overlay actual images over theoretical. This is more accurate than just calculating it by hand. Difficulties encountered included technical problems such as the computer shutting down due to updates. Also, some days were cloudy, so we had too many pictures without any meteors. Water droplets, helicopters, aeroplanes, birds and insects also triggered the camera, thus filling the folders with void images. The data that we gather is relevant in the real world because amateurs and scientists alike are very interested in it. We can use it to predict where a meteor may appear in different meteor showers. Additionally, we could use this data as it gives clues to their origin. This data is also used to create a ground map of the observed meteor paths (e.g. Fig. 2)

Table 1

	Quadrantids	Taurids	Data source
Speed miles/s	26	18	amsmetors.org.
Frequency	19	8	WP
Direction of Meteors	See table Fig 6	See table Fig 7	Time and Date .com Vercalendario site

Time																								
00:00		02:00		04:00		06:00		08:00		10:00		12:00		14:00		16:00		18:00		20:00		22:00	
Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.
77°	165°	63°	247°	39°	271°	15°	287°	-	-	-	-	-	-	-	-	-	-	10°	70°	34°	86°	59°	106°

Fig. 7

Fig.1The Plough

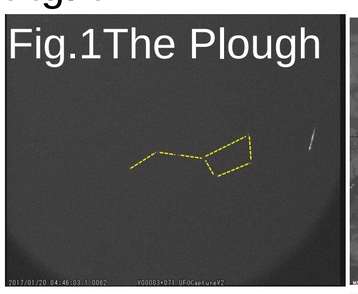

Fig.2 Ground map

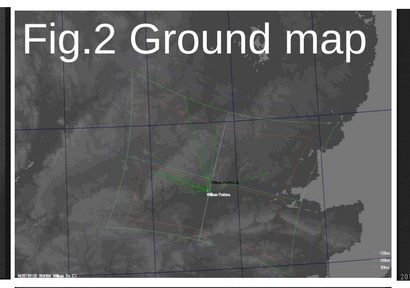

Fig.3

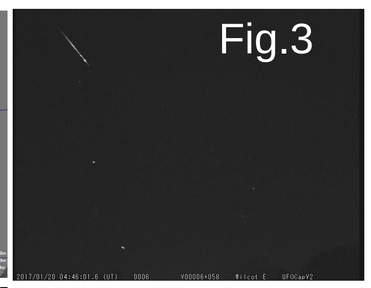

Fig. 4

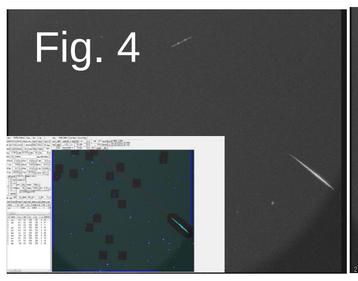

Fig.5

Fig.6

Quadrantids meteor shower for London (Night between 3 January and 4 January)

Time	Azimuth/Direction
Wed 17:00	326° ↖
Wed 18:00	335° ↖
Wed 19:00	345° ↖
Wed 20:00	354° ↑
Wed 21:00	4° ↑
Wed 22:00	14° ↗
Wed 23:00	23° ↗
Thu 00:00	32° ↗
Thu 01:00	41° ↗
Thu 02:00	49° ↗
Thu 03:00	57° →
Thu 04:00	64° →
Thu 05:00	71° →
Thu 06:00	78° →
Thu 07:00	87° →

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