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Polish Fireball Network

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Abstract

The PFN started in March 2004. Most of its observers are amateurs, members of Comets and Meteors Workshop. The network consists of 38 continuously working stations, where nearly 70 sensitive CCTV video and digital cameras operate. We create the PyFN software for trajectory and orbit calculation.

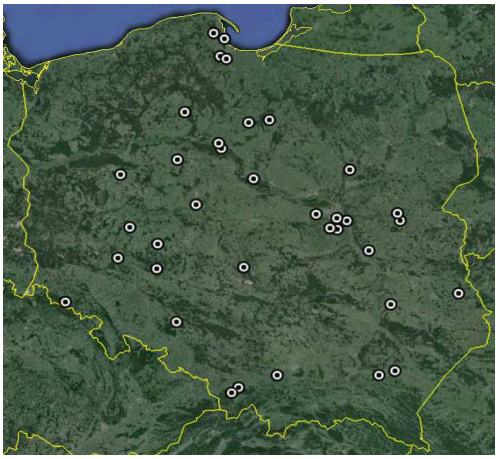

Figure 1: Positions of Polish Fireball Network video and photographic stations

1. Introduction

Since 2004 the Polish sky has been patrolled by cameras of Polish Fireball Network (PFN). Most of PFN observers are amateurs, members of Comets and Meteors Workshop and perform observations from their homes. Some stations are located in astronomical clubs and schools [1].

Table 1: List of PFN stations

ID	Name	Equipment 3
PFN03	Złotokłos	PAVO3
PFN06	Kraków	PAVO6, PAVO7
PFN13	Toruń	PAV14
PFN17	Gdynia	PAV20, PAV21
PFN19	Kobiernice	PAVO8
PFN20	Urzędów	PAV25, PAV26, PAV38
PFN24	Gniewowo	PAV12, PAV40
PFN30	Wrocław	PAV33, PAV34
PFN31	Szamotuły	PAV28, PAV29, PAV30, PAV31
PFN32	Chełm	PAV35, PAV36, PAV43, PAV60
PFN35	Białków	PAV39
PFN37	Nowe Miasto Lub.	PAV41
PFN38	Podgórzyn	PAV44, PAV49, PAV50
PFN39	Konin	PAV42
PFN40	Otwock	PAVO9, PAV52
PFN41	Twardogóra	PAV45, PAV53
PFN42	Błonie	PAV47, PAV48, PAV56, PAV58
PFN43	Siedlce	PAV27, PAV61, PAV67
PFN45	Łańcut	PAV55
PFN46	Grabnik	PAV57
PFN47	Jeziorko	PAV13, PAV62, PAV63, PAV65
PFN48	Rzeszów	PAV59, PAV64
PFN49	Helenów	PAV23
PFN51	Zelów	PAV22
PFN52	Stary Sielc	PAV66, PAV75
PFN53	Belęcin	PAV68
PFN54	Lęgowo	PAV69
PFN55	Ursynów	MDC01, MDC02
PFN56	Kolbudy	PAV71
PFN57	Krotoszyn	PAV70
PFN58	Opole	PAV72
PFN60	Bystra	PAV74
PFN61	Piwnice	PAV10
PFN62	Jabłonowo	MDC03
PFN63	Dobrzyń	MDC04
PFN64	Gostycyn	MDC05
PFN65	Żnin	MDC06

Figure 2: PF191012 Myszyniec fireball captured by all sky photographic camera at station PFN43.

The project also involved the Warsaw University Astronomical Observatory (OAUW), the Nicolaus Copernicus Astronomical Center (NCAC) and the National Centre of Nuclear Research RC POLATOM

2. Current status of PFN

The network consists of 38 continuously working stations, where 58 video cameras and 6 digital cameras operate. Map of PFN is presented on Figure 1. Detailed information about PFN stations is combined in Table 1.

We use sensitive CCTV video cameras (PAV). Most of cameras are equipped with CCTV lenses with a focal length f = 4 mm and F/1.2 what gives 65.6×49.2° field of view. Typical resolution of 5 minutes per pixel. Limiting magnitude of the system is +2 magnitude for meteors [1]. We use MetRec [2] software and UFOCapture[3] software for meteor detection. RecoStar and UFOAnnalyzer software are used for astrometric reduction of video recordings.

Newest "Meteor Digital Cameras" (MDC) cameras are based on sensitive digital cameras with wide or fish eye lenses.

We use also photographic equipment based on standard DSLR Canon cameras with wide angle lenses. All cameras work with shutter which produce brakes in meteor images for velocity estimation. Using this setup, on the night of Oct 18/19, 2012, at 00:23 UT, we recorded a −14.7 mag fireball – the highest Orionid meteor ever recorded [4] (see Figure 2).

Detections from all cameras are automatically transmitted via internet to central server where double station events are detected, analysed and then trajectory and obit is determined. All calculations are checked by manual inspection.

We create the PyFN software for trajectory and orbit calculation. PyFN utilize the Celpeha method described in [5].

Our Meteorite Section is the only group in Poland specialized in searching of meteorites with tested and validated methods of exploration. The main task of the Section is to find the meteorites dropped from bolides registered by Polish Fireball Network and offer them for free as the research material for the scientific institutions.

3. Summary and Conclusions

Combination of sensitive video cameras and photographic cameras allows us to record with good accuracy both, large number of faint meteors and unsaturated fireballs. We are preparing to setup new high resolution video and spectroscopic systems .

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