Meteor spectrum obtained by a DSLR camera

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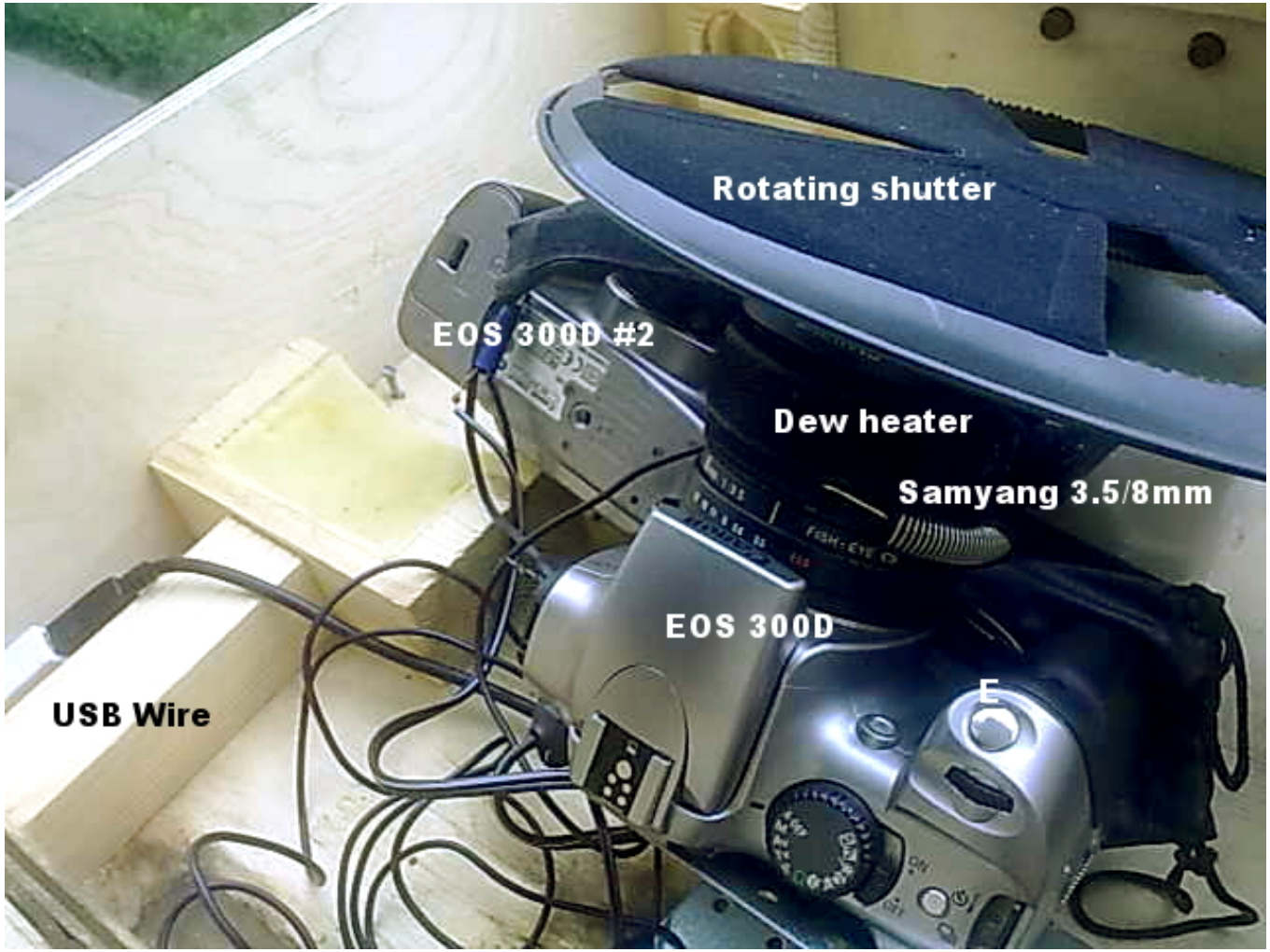
Spectral observations at PFN28 Warszawa

Spectral observations started in the middle of July 2010.



Equipment

Canon 300D DSLR Camera and Porst 1.8/35mm lens.

New method - two crossed diffraction gratings

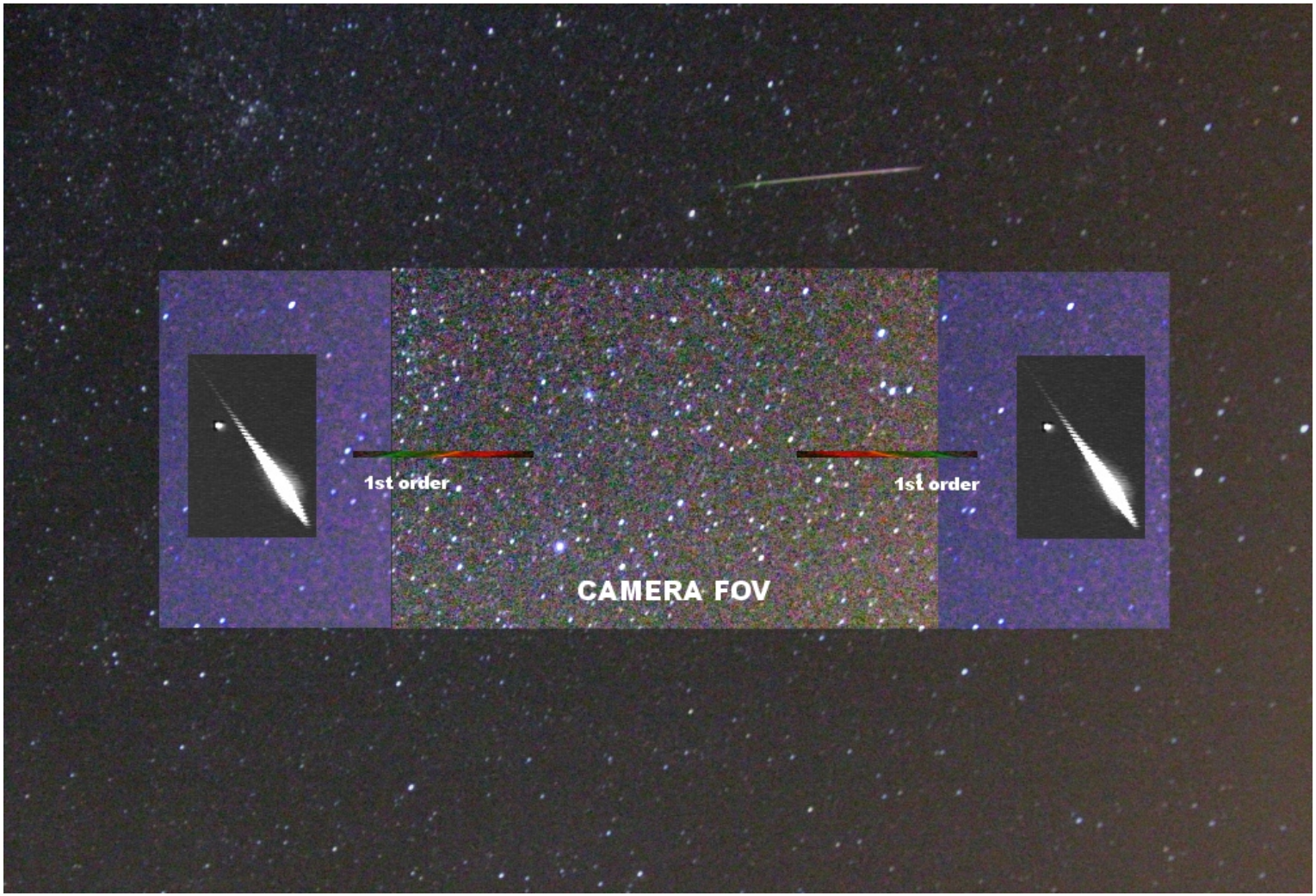
Thin plastic type 500 lpm diffraction gratings.

New method - two crossed diffraction gratings

White light source spectrum obtained with single grating.

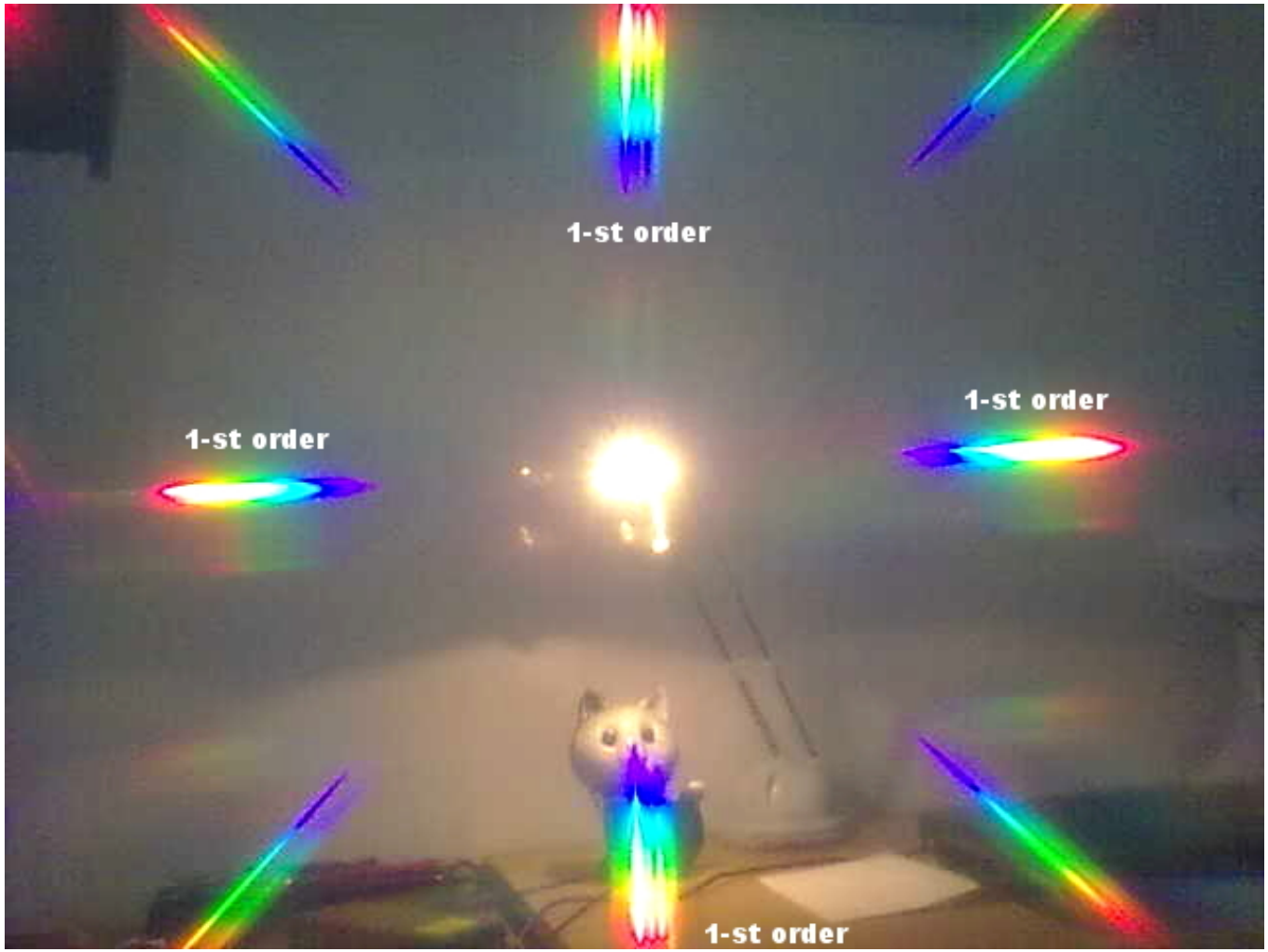
New method - two crossed diffraction gratings

FOV of the system with single grating.



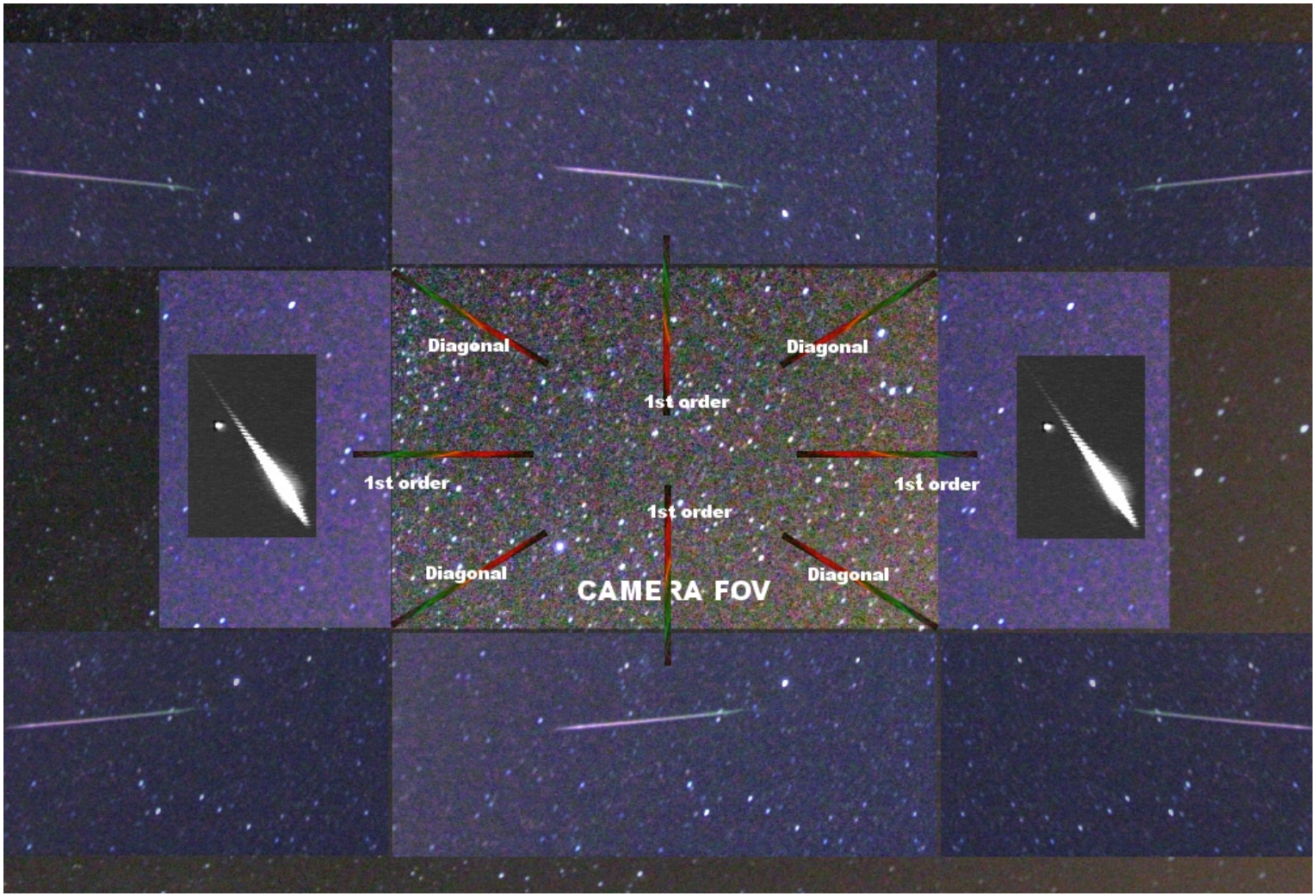
New method - two crossed diffraction gratings

White light source spectrum obtained with two crossed grating. Suprisingly not four but eight spectras are visible

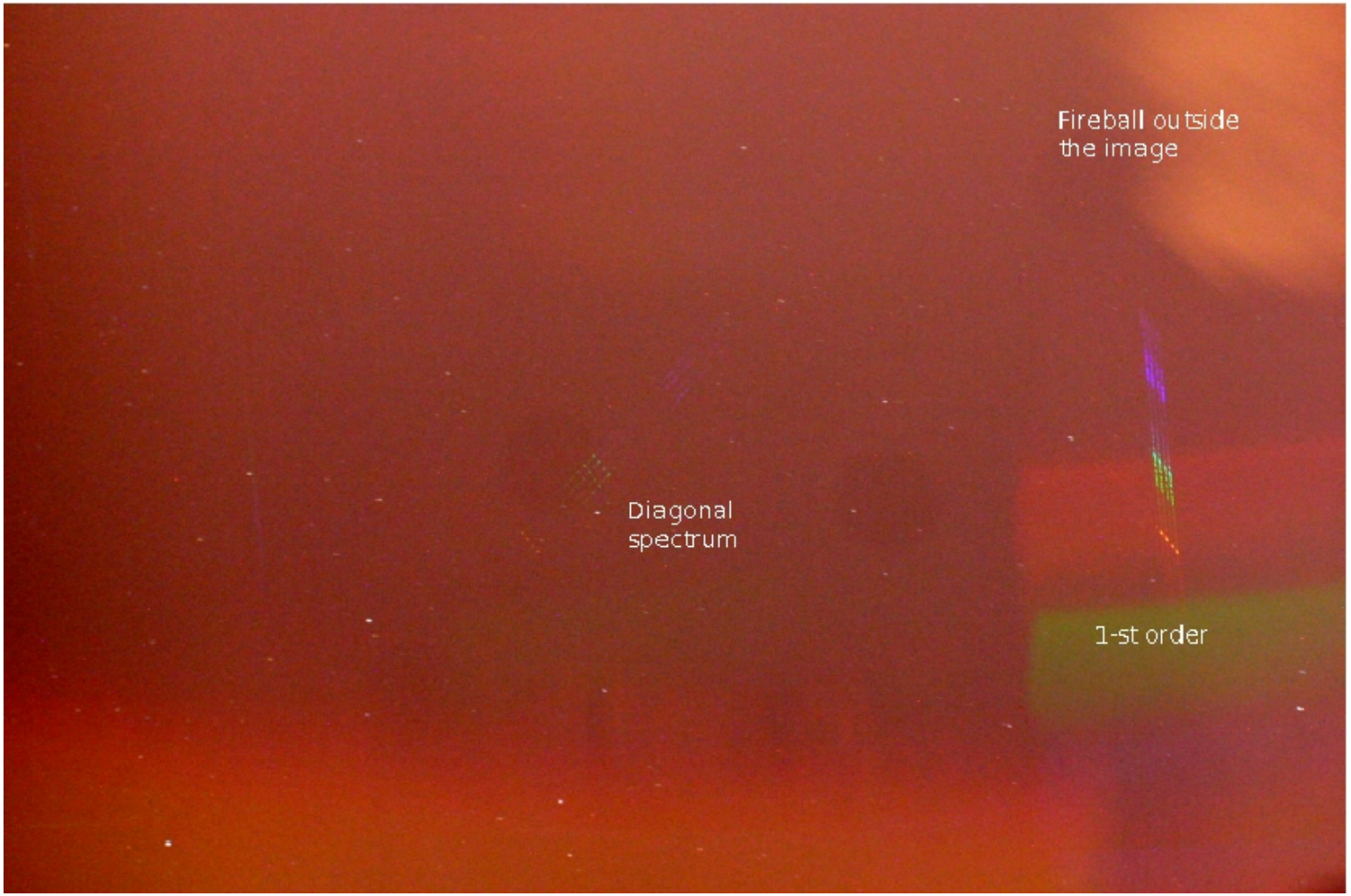


New method - two crossed diffraction gratings

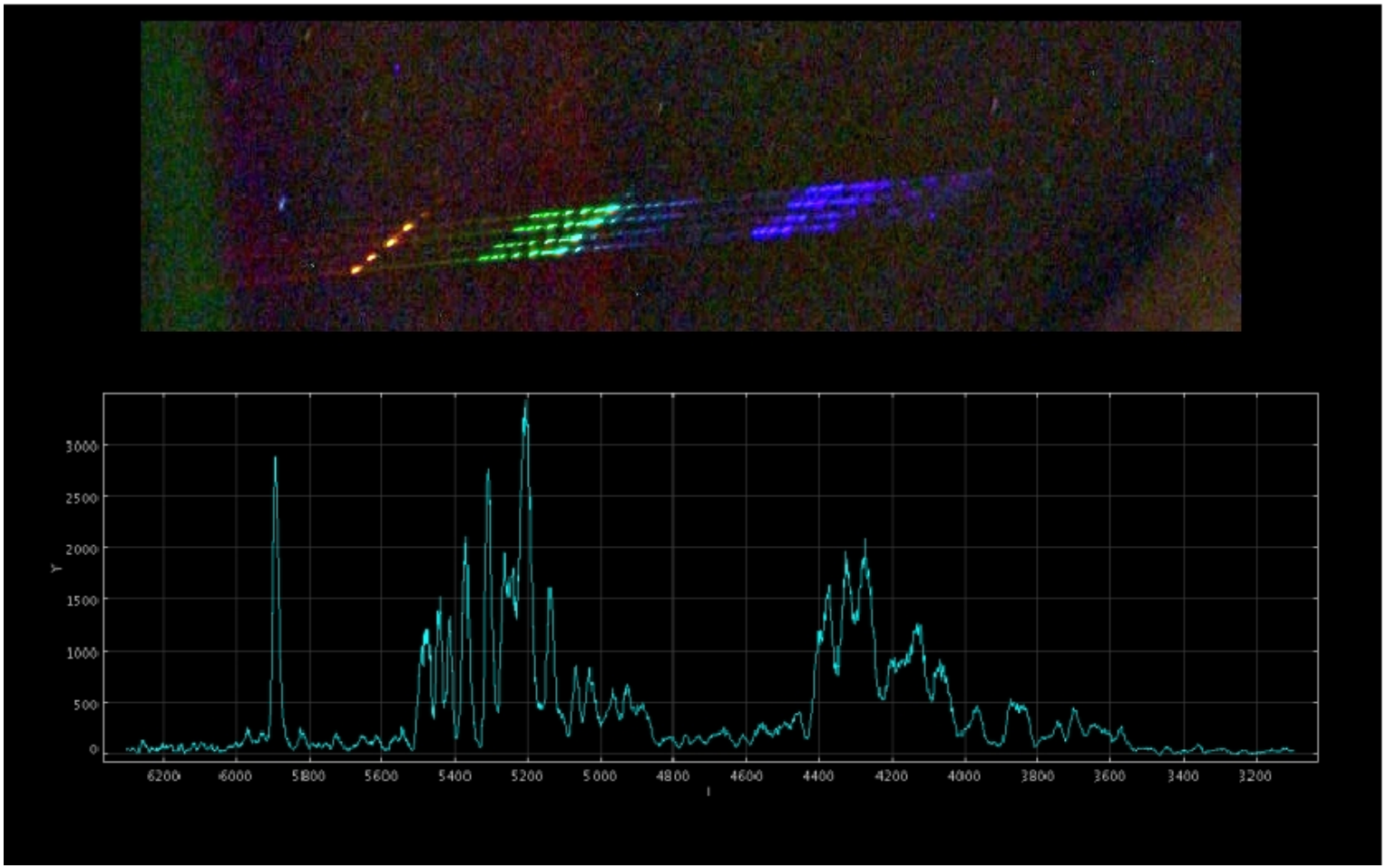
FOV of the system with crossed gratings.



First meteor spectrum captured after 2 weeks of observations.

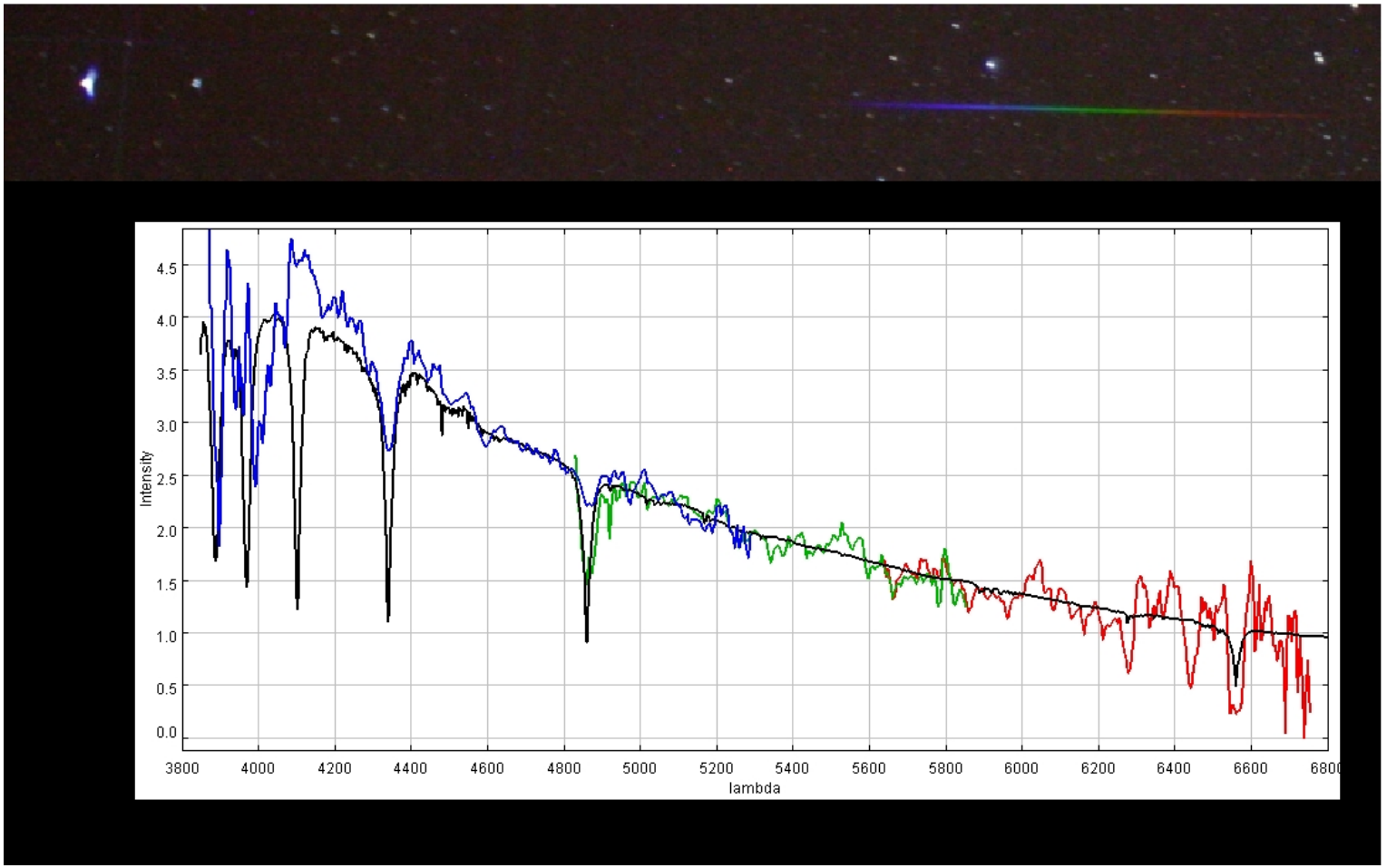


Raw meteor spectrum after substraction of background.



Spectrum calibration

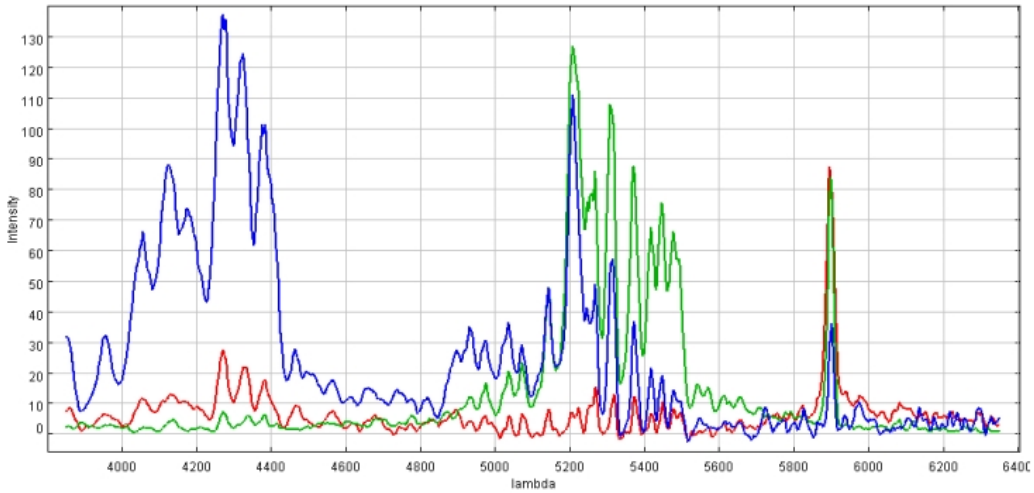
We used spectrum of Vega to calibrate spectral response of Canon 300D DSLR camera.



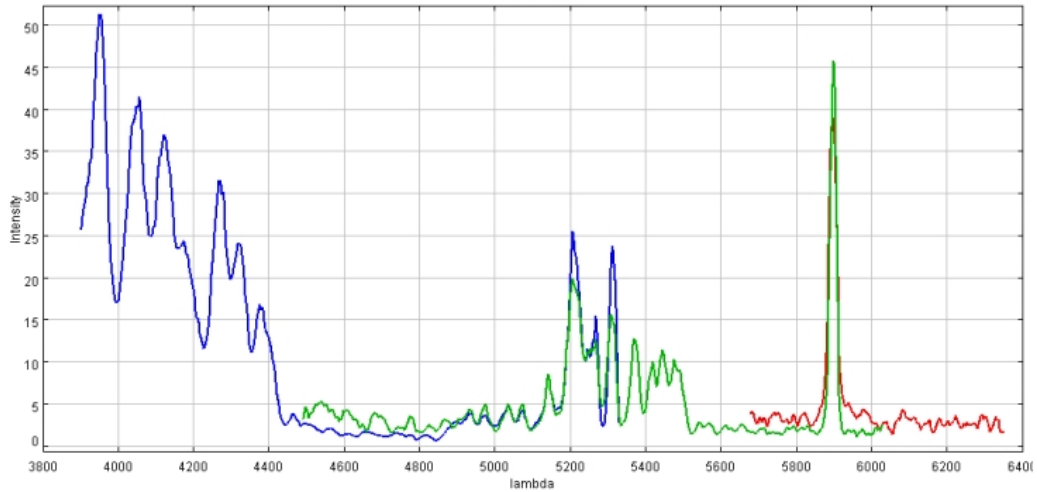
Spectrum calibration

Meteor spectrum before and after calibration.

RAW

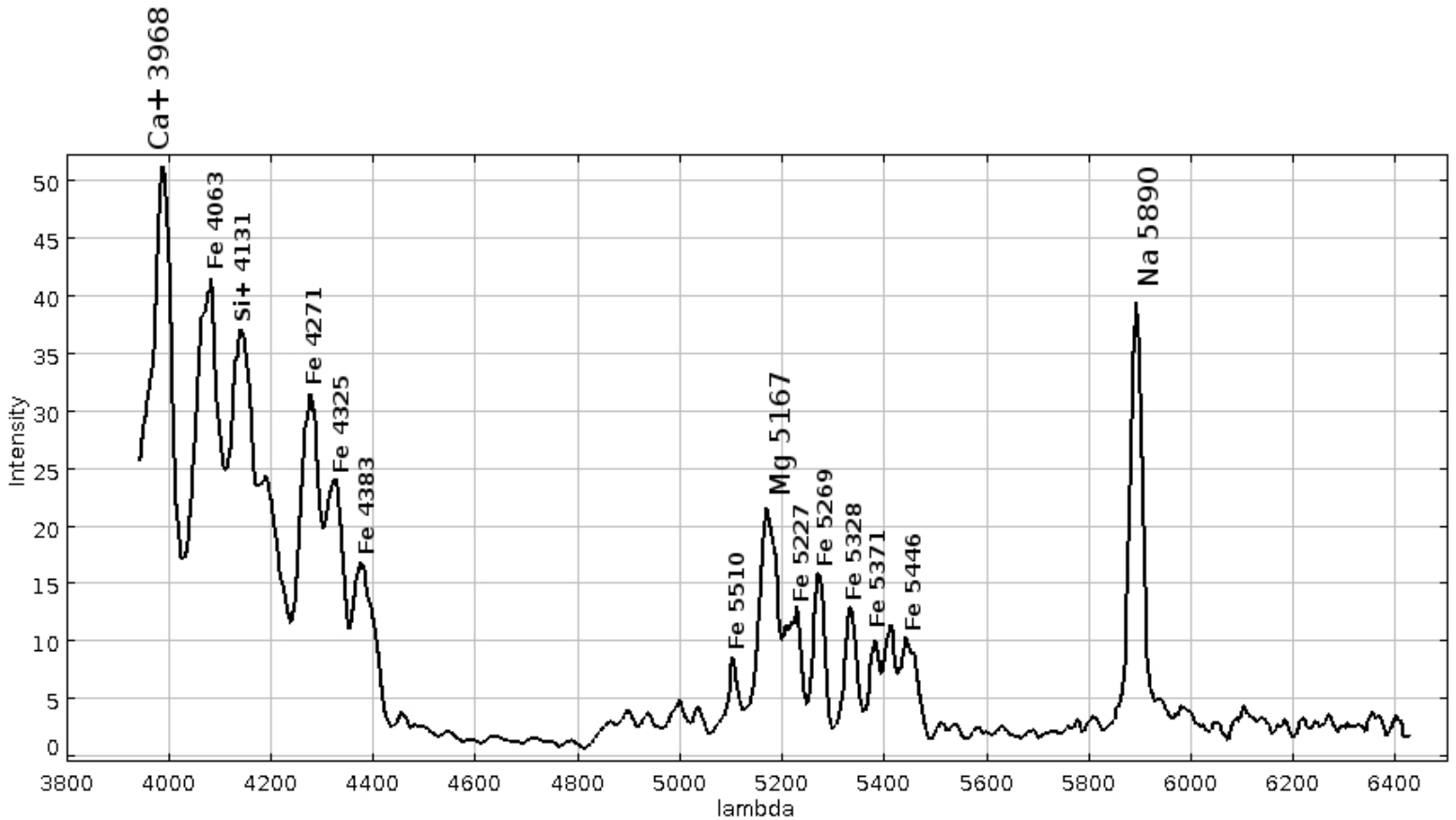


CALIBRATED



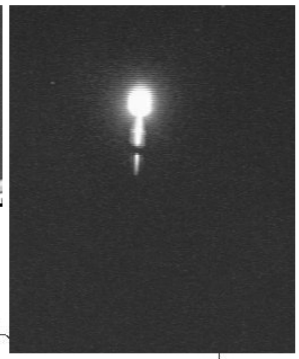
Spectral lines identification

Spectrum typical for low velocity fireballs

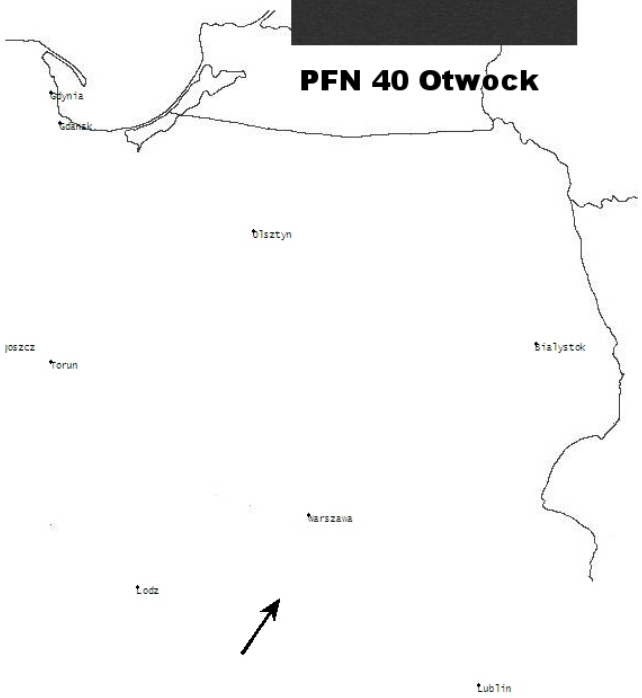


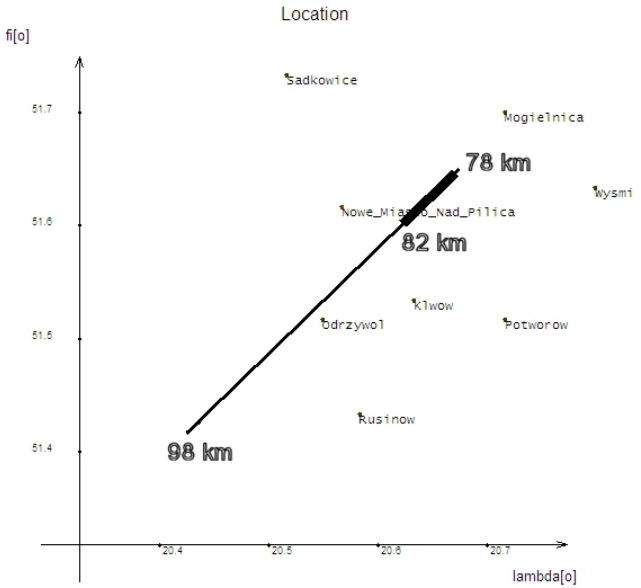
Trajectory of the fireball

PFN 32 Chelm



PFN 40 Otwock



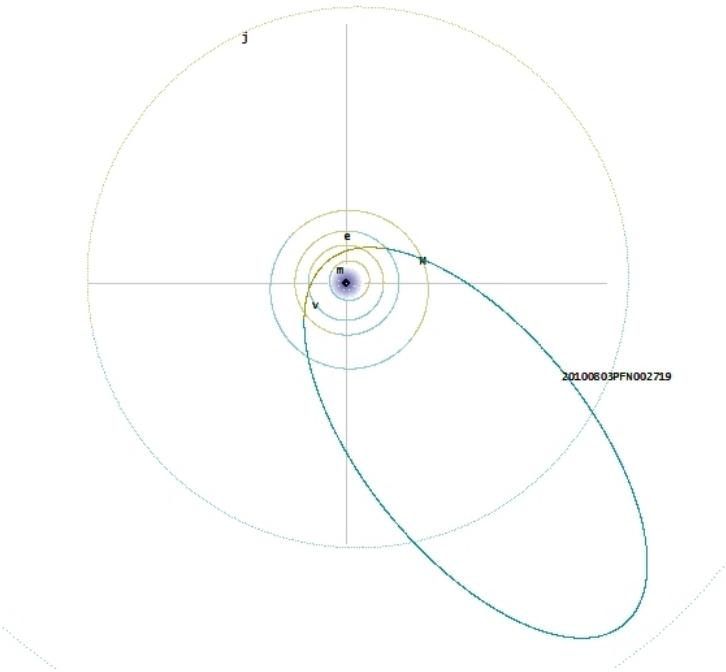


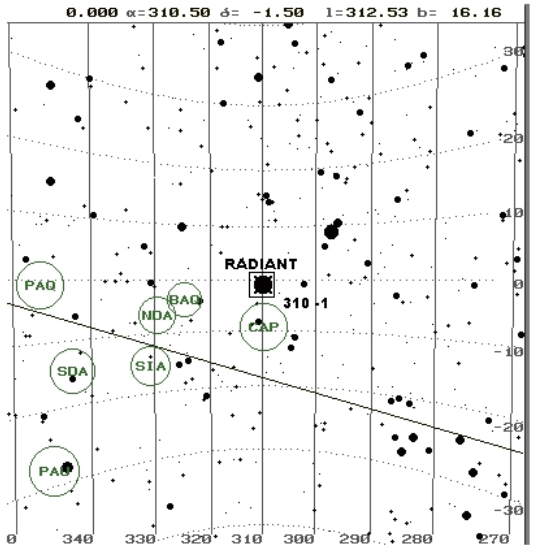
Fireball trajectory (merged). Points 1 to 17

point	time	lambda	fi	h	l
1	0	20.426	51.41753	98.4949	0
2	0.04	20.43544	51.42641	97.75248	1.415521
3	0.08	20.44542	51.4358	96.96848	2.910794
4	0.8	20.57952	51.56152	86.50638	22.91054
5	0.84	20.59082	51.57207	85.63132	24.58722
6	0.88	20.59701	51.57786	85.15166	25.50655
7	0.92	20.60573	51.58599	84.47749	26.79902
8	0.96	20.6141	51.5938	83.83051	28.03968
9	1	20.62246	51.60159	83.18535	29.27716
10	1.04	20.62834	51.60708	82.73132	30.14824
11	1.08	20.63459	51.6129	82.2494	31.07303
12	1.12	20.64237	51.62015	81.64947	32.22452
13	1.16	20.65001	51.62726	81.06187	33.35261
14	1.2	20.65933	51.63594	80.34412	34.73095
15	1.24	20.66482	51.64104	79.92213	35.54152
16	1.28	20.67366	51.64927	79.24308	36.84615
17	1.32	20.68415	51.65902	78.43769	38.39399

Orbital elements of the fireball

Radiant located in Antihelion source, close to Alpha Capricornids radiant





Designation: 20100803PFN002719 Nowe_Miasto_Nad_Pilica
Date: 2010 8 3
UT: 0.455954166666812
Solar longitude: 130.4497 +/- 3.093803E-05 deg

Geo. velocity:	26.4325	+/-	0.5460973 km/s
Geo. radiant RA:	309.4898	+/-	1.201842 deg
Geo. radiant Dec:	-4.212034	+/-	5.175987 deg
Geo. radiant ecliptic longitude:	-49.22356	+/-	1.889157 deg
Geo. radiant ecliptic latitude:	13.81255	+/-	4.990861 deg
Hel. velocity:	39.39068	+/-	0.7137347 km/s
Hel. radiant ecliptic longitude:	261.7606	+/-	0.821318 deg
Hel. radiant ecliptic latitude:	9.218902	+/-	3.426905 deg

Semimajor axis (a):	4.507477 AU		
1/a:	0.2218536	+/-	6.317571E-02 AU^-1
q:	0.551961	+/-	1.717937E-02 AU
Q:	8.462994	+/-	2.395583 AU
i:	12.1928	+/-	4.416573 deg
e:	0.8775455	+/-	3.415769E-02
true anomaly:	-88.6123	+/-	2.472232 deg
Ω:	130.4497 +/- 3.093803E-05		
ω:	268.6123 +/- 2.472232		
Orbital period:	9.569744 y		