



## Geminids 2006 in Romania visual and photographic results



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**SOCIETATEA ASTRONOMICĂ ROMÂNĂ DE METEORI**  
**THE ROMANIAN SOCIETY FOR METEORS AND ASTRONOMY**



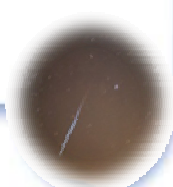
# Observers and conditions

Some meteor observers were active, but not so many as in the Perseid campaign, because of the winter time conditions and, very important, because the maximum activity of Geminids was in the middle of the week, when the young people had to go to the school; also, more of them had exams in that period.

In the end, there were active observers in 6 places inside Romania and one outside Romania (Simona Vaduvescu), in Sunset Field, Blue Ridge Mount, USA.

For our analyses we used reports from 3 places with good observational conditions.

Sky conditions were good in the night of December 13/14 and with some clouds and variable limiting magnitude next nights.





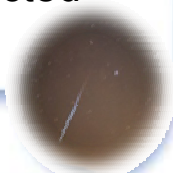
# Visual ZHR estimation

In the analysis below the observational data of the following 5 contributors have been used: Valentin Grigore (GRIVA), Cristina Tinta (TINCR), Oana Suciuc (SUCOA), Andreea Nanciu (NANAN) and Silviu Vasile (VASSI).

The observers were spread over three locations across Romania, as follows:

- Priboiu (25.4 E, 45.0 N) – 120 km North from Bucharest
- Frumusani (26.2 E, 44.3 N) – 10 km from Bucharest
- Turda (23.8 E, 46.6 N) – in the Central-Northwest part of Romania
  
- The total effective observing time: 26 hours
- Nights: 3 - 13/14, 14/15 and 15/16 of December
- Counted Geminids: above 1000
- Other active minor showers observed: Monocerotids (MON),  $\sigma$ -Hydrids (HYD), Coma Berenicids (COM), Ursids (URS), Antihelion Source (ANT) and sporadic background

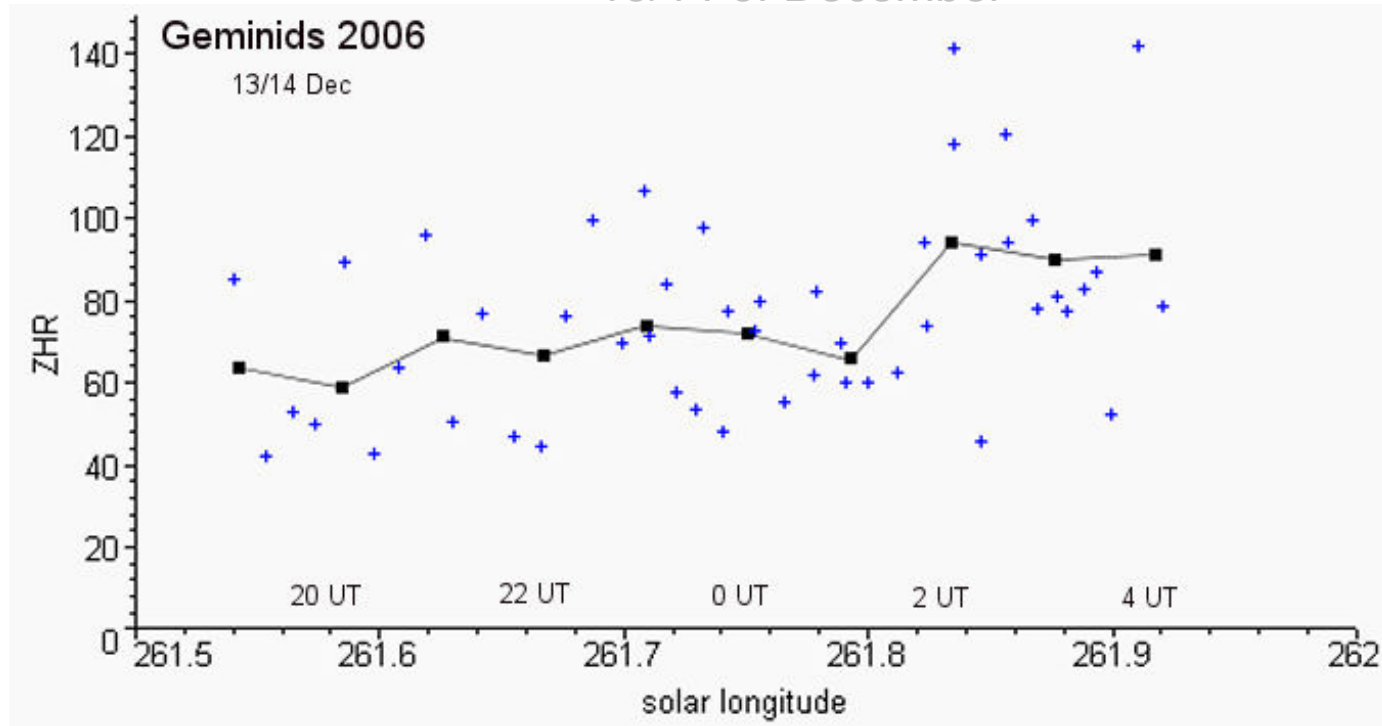
Most of the observations are concentrated on the night before the predicted maximum (14 Dec, 11 UT).



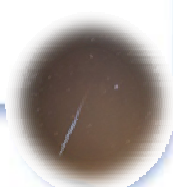


# Visual ZHR estimation

## 13/14 of December



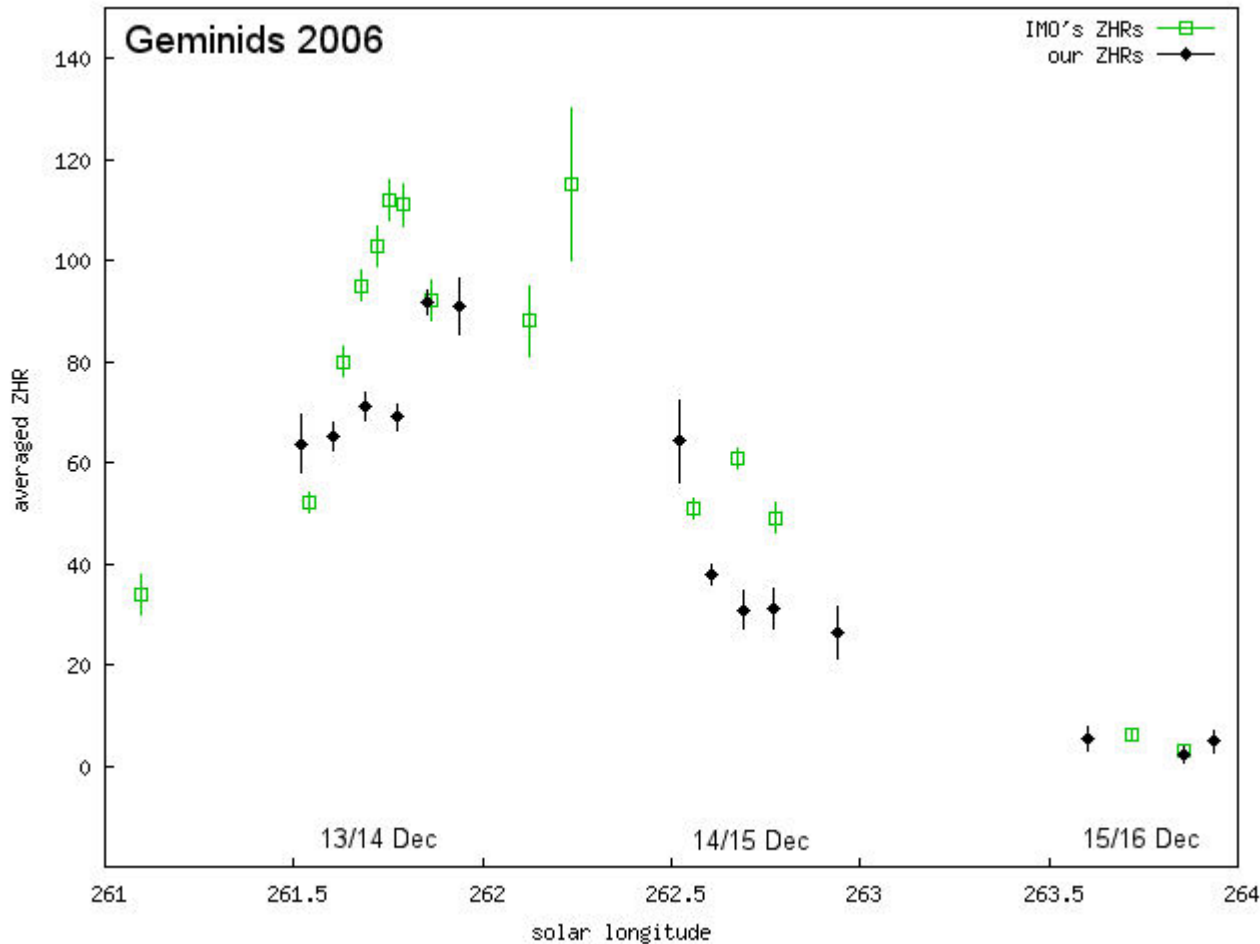
- Individual ZHRs (blue crosses)
- Averaged ZHRs at one hour interval (black squares)
- Counted meteors interval : from 10 to 20 minutes interval, depending on observer
- High fluctuations have been observed after 2h UT
- An increasing trend is apparent, from a ZHR of 60 to almost 100 at the end of the observing night





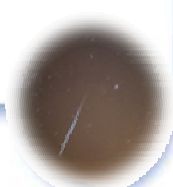
# Visual ZHR estimation

overall ZHR variation



- Overall ZHR variation lasting three nights (black dots)
- IMO's preliminary results (green squares)

A good activity is recorded also on the night 14/15 of December, suggesting the decreasing slope of Geminids activity.





# Visual ZHR estimation

The individual ZHRs are computed with the standard IMO technique, taking into account a population index of 2.0 (as in IMO's preliminary analysis) and the zenithal attraction for the radiant. No perception corrections were applied.

In conclusion, Geminids 2006 meteor activity is quite well covered with visual observations from Romania and we want to thank to all contributors cited previously for their valuable observational material.





# Photographical results

**Observers:**

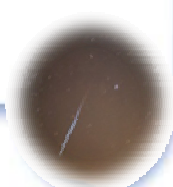
**Valentin Grigore**

- **Location: Priboiu**
- **Camera: 2 cameras using 400 and 800 ISO films**

**Photos were made in parallel with visual observations**

**Alexandru Conu**

- **Location: Frumusani**
- **Camera: digital, 1600 ISO**





Geminids 2006



-4.5 Geminid in Coma Berenices

•Location: Priboiu-Targoviste, Romania •Date: 2006.12.13/14 •Apparition: 23:11:22 UT  
•Start: 23:09:59 UT, End: 23:11:57 UT •Field Center: RA=12h00m, Dec=+15°00'  
•Camera: Canon T70, Lens: Canon 50/1.4 •Film: Konica VX400  
©Author: Valentin Grigore, SARM - The Romanian Society for Meteors and Astronomy







## Geminids 2006



### -6 Geminid in Canis Major, near $\beta$ CMa (Mirzam)

- Location: Priboiu-Targoviste, Romania
- Date: 2006.12.13/14
- Apparition: 00:17:03 UT
- Start: 00:11:22 UT, End: 00:18:22 UT
- Camera: Canon T70, Lens: Canon 50/1.4
- Film: Konica VX400
- ©Author: Valentin Grigore, SARM - The Romanian Society for Meteors and Astronomy





## Geminids 2006



### 0° Geminid in Orion

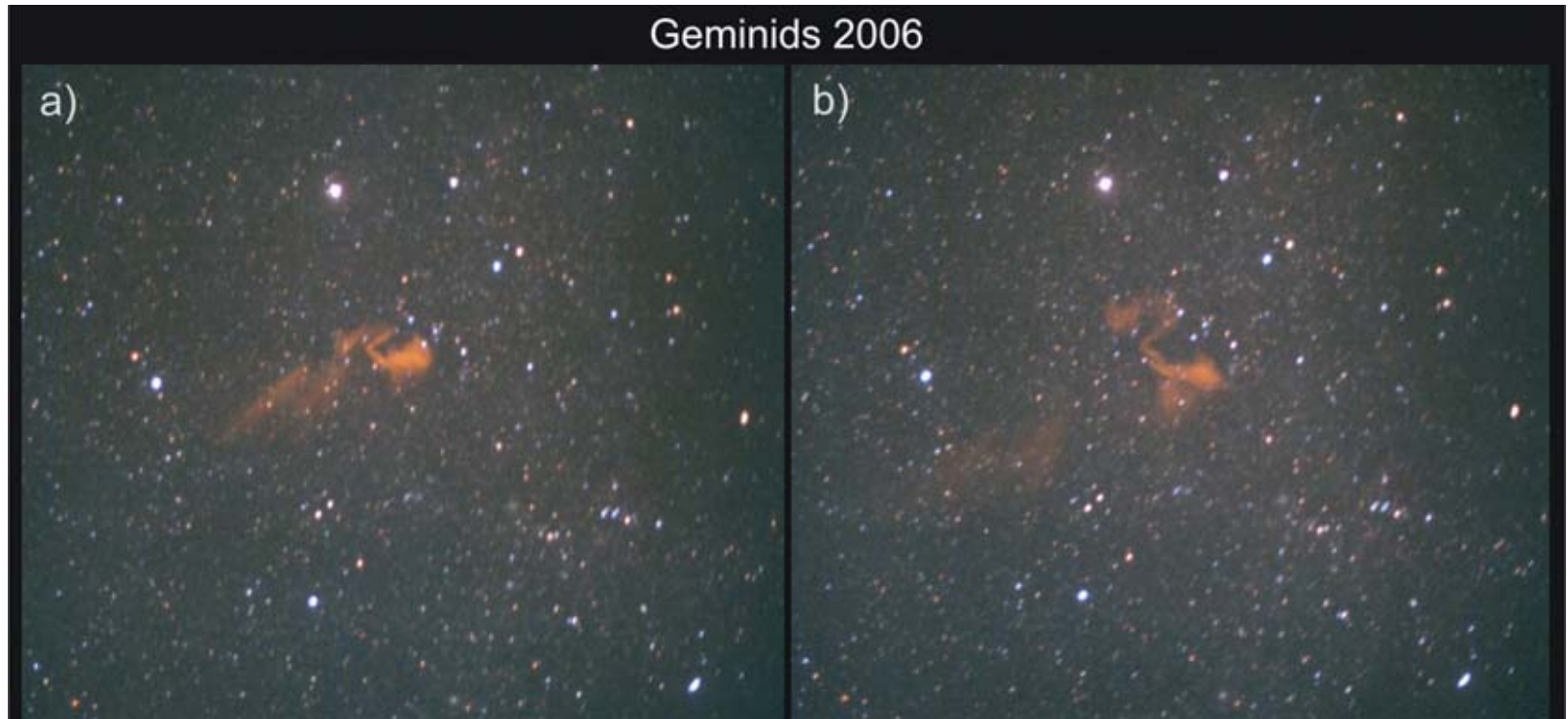
- Location: Priboiu-Targoviste, Romania •Date: 2006.12.13/14 •Apparition: 01:18:56 UT
- Start: 01:09 UT, End: 01:19 UT •Field Center:  $\alpha$  Ori (Betelgeuse)
- Camera: Canon T70, Lens: Canon 50/1.4 •Film: Konica VX400
- ©Author: Valentin Grigore, SARM - The Romanian Society for Meteors and Astronomy





## A very special persistent train:

- Very bright, approximately -1 magnitude in the first 1, 2 seconds
- Very special colors in same time on its length: blue, red, orange and yellow



Geminids 2006

## Evolution of a -10 Geminid persistent train in Auriga

- Location: Priboiu-Targoviste, Romania
  - Date: 2006.12.14/15
  - Apparition of fireball: 23:24:22 UT
  - Exposure: a) 30 sec. Start at 23:25:22 UT, b) 30 sec. Start at 23:25:52 UT
  - Camera: Canon T70, Lens: Canon 50/1.4
  - Film: Konica VX400
- ©Author: Valentin Grigore, SARM - The Romanian Society for Meteors and Astronomy





## Geminids 2006



### -2 and +0.5 Geminids

Location: 44° 19' 32" N, 26° 14' 00" E

Date: December 14th 2006, Start: 00:07:46 UT, End: 00:07:56 UT

+0.5 meteor at: 00:07:49 UT, -2 meteor at 00:07:53 UT

Field center: RA: 5h24m, Dec: +1°57'

Camera: Canon EOS Digital Rebel, with Canon EF 50/1.8 II at f/2.0, ISO 1600

Author: Alex Conu, Romania







## Geminids 2006



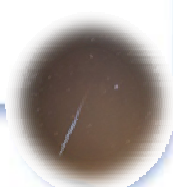
6 Geminids and 1 Sporadic

Location: 44°19'32" N, 26°14'00" E

Date: December 13-14 2006, Start: 22:59 UT, End: 00:52 UT with lots of brakes due to dew

Camera: Canon EOS Digital Rebel with Canon EF-S 18-55 4.6-5.6 at f/3.5, ISO 1600

Author: Alex Conu, The Romanian Society for Meteors and Astronomy

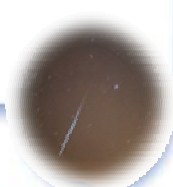




# Double station observation

-6 Geminid fireball  
December 13/14

**We've been lucky enough to observe the same fireball from two different locations. Alex Conu plotted the meteor and Valentin Grigore photographed it. Using these observations, Alex calculated the path of the fireball through the atmosphere. Also, geocentric right ascension and declination of the fireball's radiant have been calculated. The values are consistent with IMO predictions. Details about this double station observation can be found in the poster presented by Alex Conu.**





# Double station observation

photographical and visual

-6 Geminid fireball, December 13/14

Valentin Grigore, Priboiu



Alexandru Conu, Frumusani



For the final results, see the poster presentation





# Acknowledgments

**We thanks to all observers who spent long winter nights working visual and photographical.**

**Also, thanks to IMO for support and to the organizers of this IMC, François Colas and Jérémie Vaubaillon for their important help to attend this conference.**

