NEMO Vol 2.
Status of the NEar real-time MOnitoring system

Esther Drolshagen[1], Theresa Ott[1], Detlef Koschny[2], Gerhard Drolshagen[1], Pierrick Mialle[4], Jeremie Vaubaillon[3], and Björn Poppe[1]

[1]University of Oldenburg
[2]ESA, SSA-NEO Segment
[3]Observatoire de Paris
[4]*CTBTO PTS/IDC, Vienna International Center*

NEMO Logo

NEMO
NEar-real time MOnitoring system

Emphasis:

Bright fireballs, not all meteors

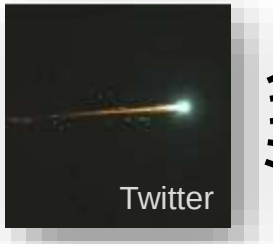
Goal:

Validate models of meteoroid fluxes and the near-Earth asteroid population

Fireball over Warwick, Australia – 18. Aug. 2017

Main Objective

Fireball Sighting



Brighter – 10 mag

Current Situation

IMO

cneos

AEROSPACE

+ additional fireball systems

Google Alerts

NEMO

Difficult (e.g. at ESA) to react to queries from public or journalists.

Coordination with FIS

Events brighter −10 mag

FIS

- **F**ireball **I**nformation **S**ystem from Space Situational Awareness – Near Earth Object (NEO)
- in preparation at the NEO Coordination Center in Frascati, Itlay

Goal

Information on Objects which:

- Regularly impact the Earth atmosphere
- Are too small to be detected by NEO surveys
- Cause bright fireballs

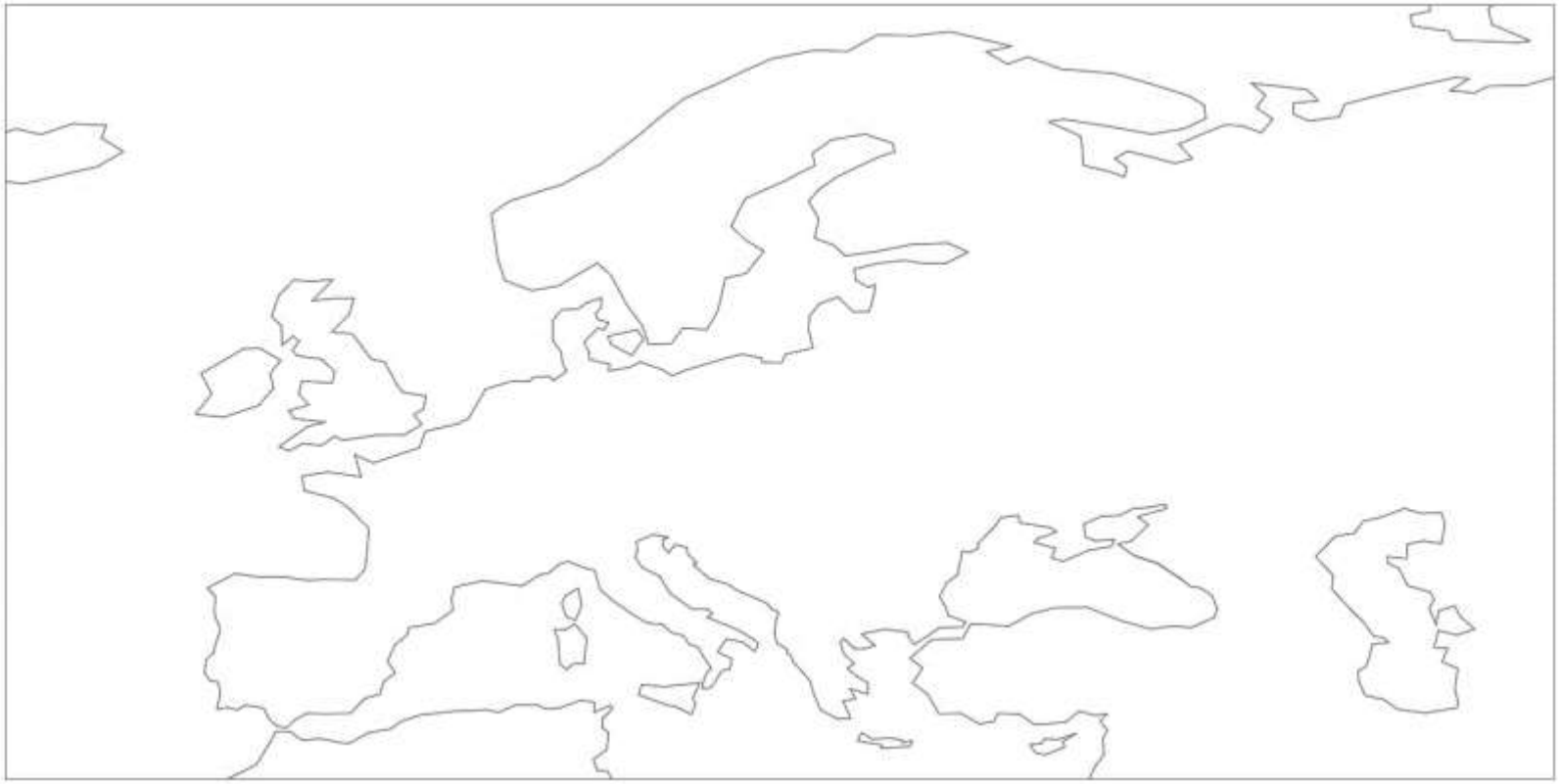
➔ Close the gap between large meteoroids and small asteroids

Data sources

- Data from infrasound stations of the CTBTO – Comprehensive nuclear-Test-Ban Treaty Organisation
- Publicly available data from US Government sensors
- Re-entry predictions of satellites and space debris
- Internet and social media
- Meteor networks

Some specific goals

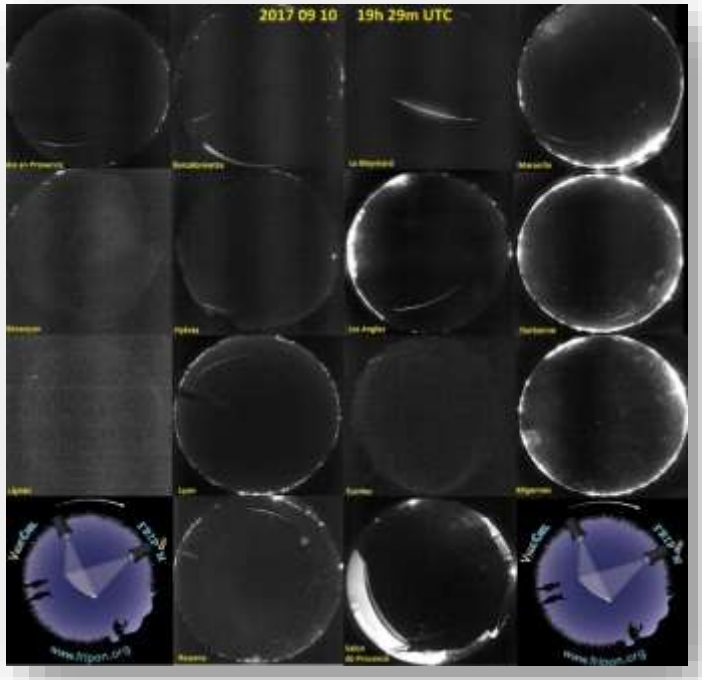
Europe: Objects > 10 cm



Local Meteor Detections
29 June 2018 – the Netherlands

FRIPON
Fireball Recovery and InterPlanetary Observation Network

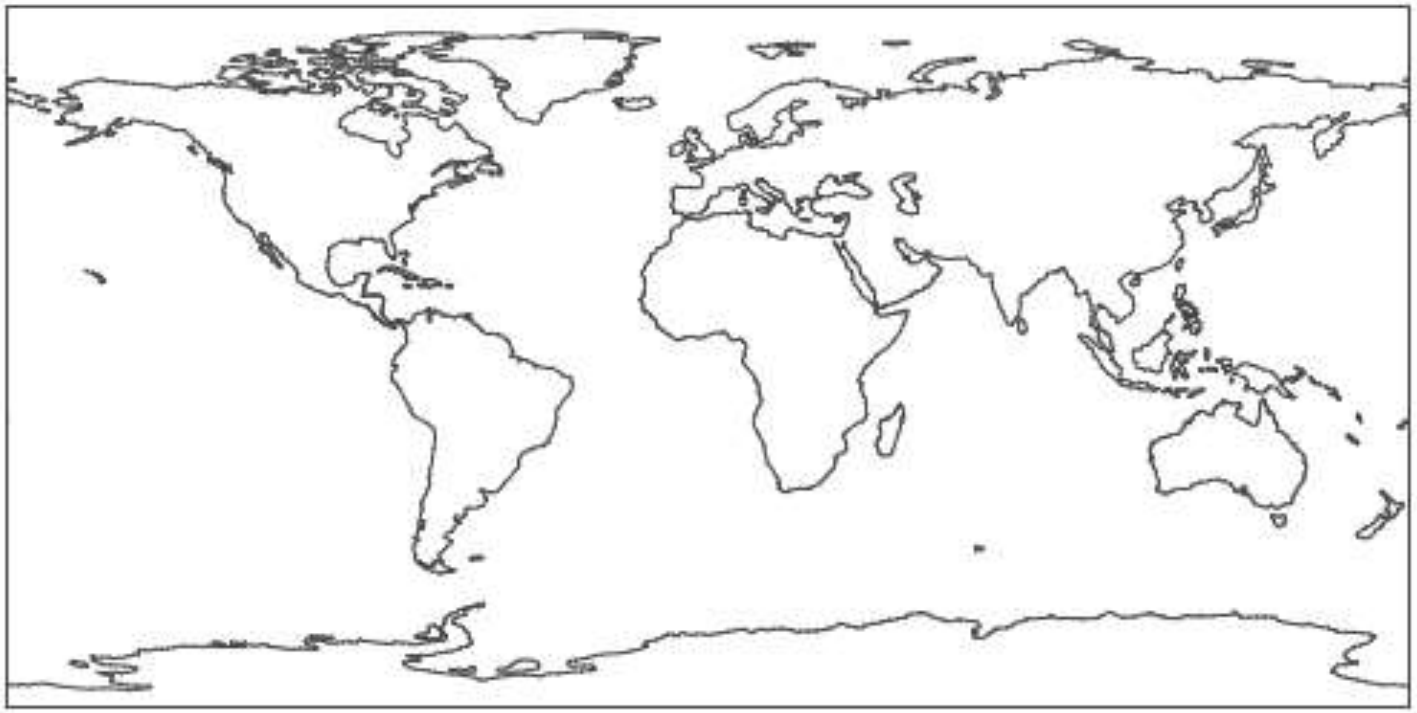
- Flux determination
- Sky Coverage



FRIPON.org

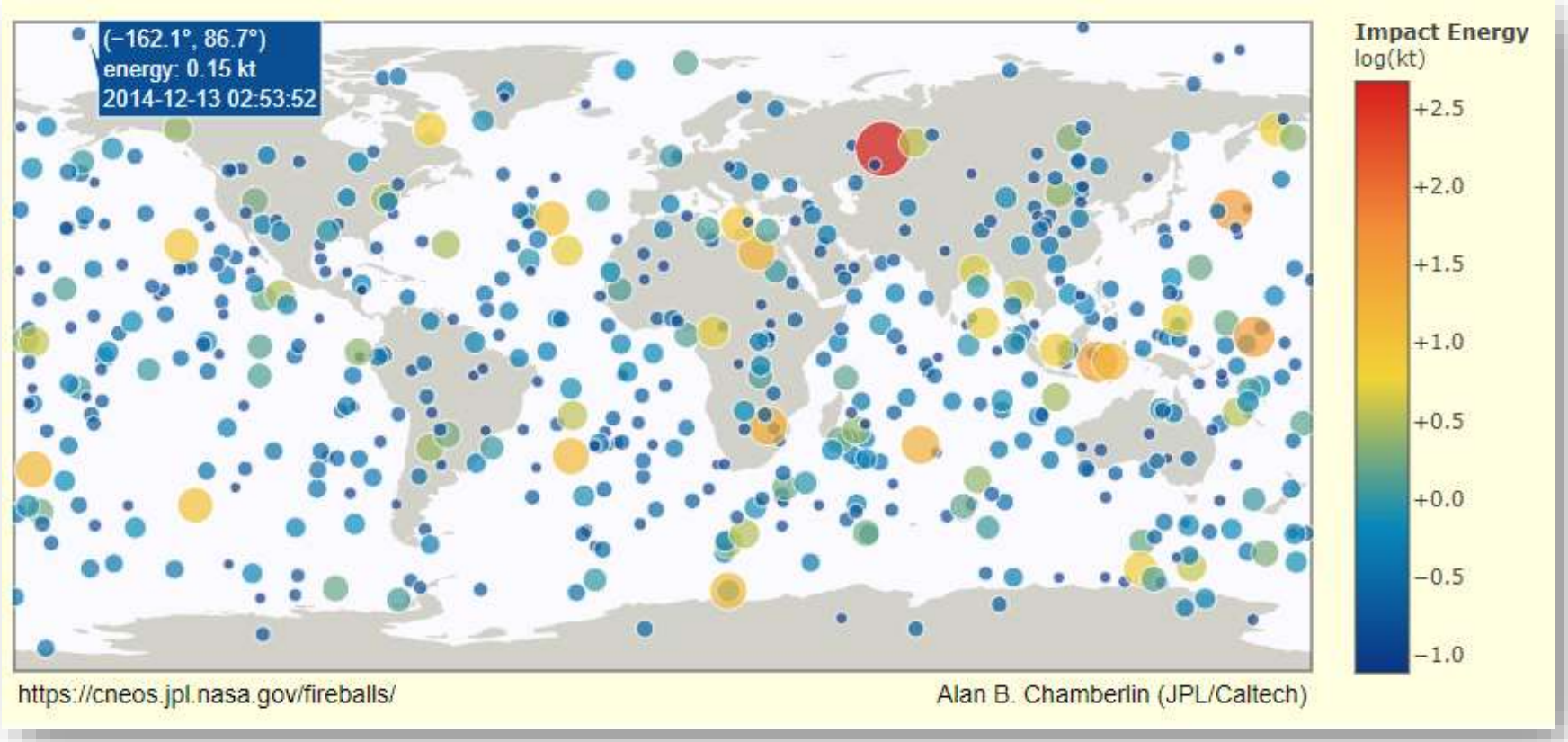
Some specific goals

Global: Objects > ca 1 m



Social Media

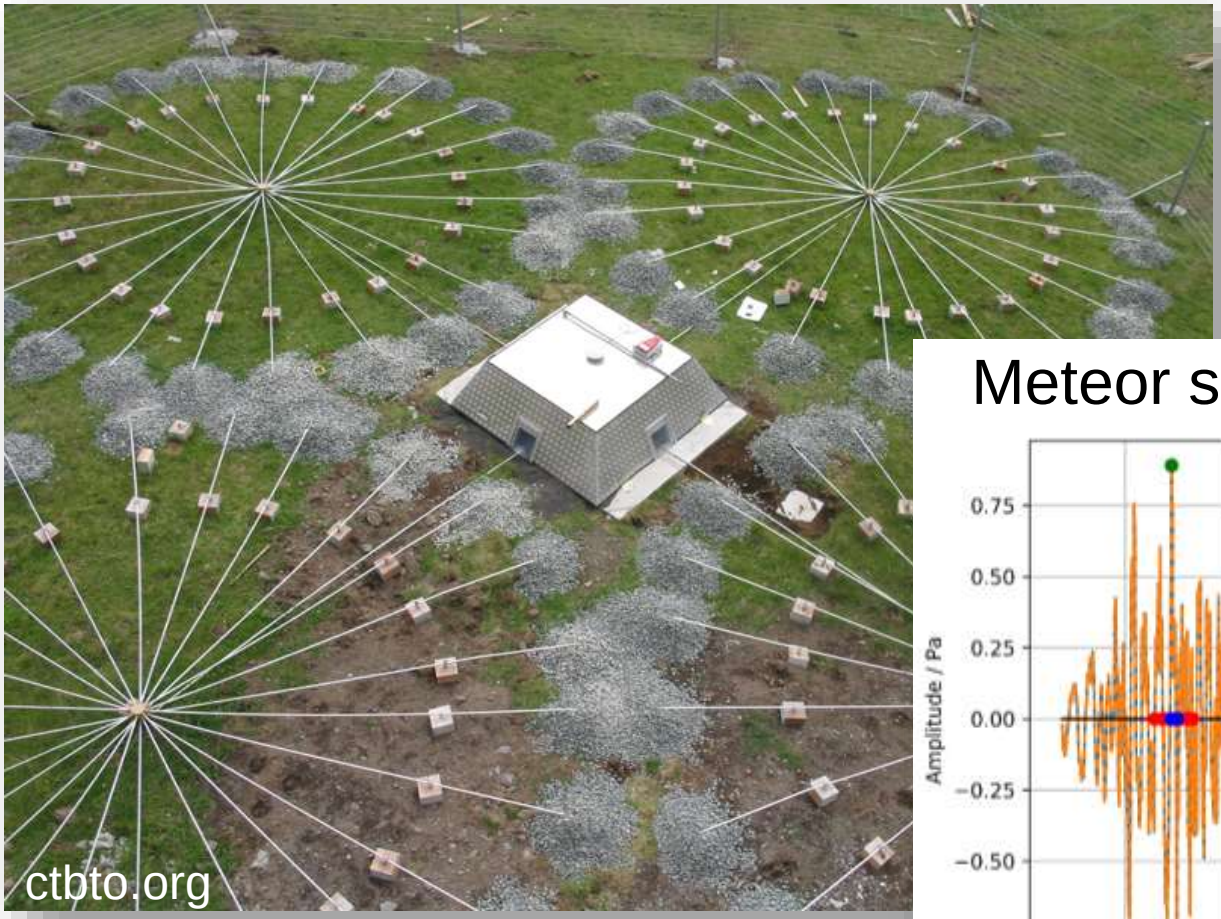
NASA
US Govt. Satellite Data



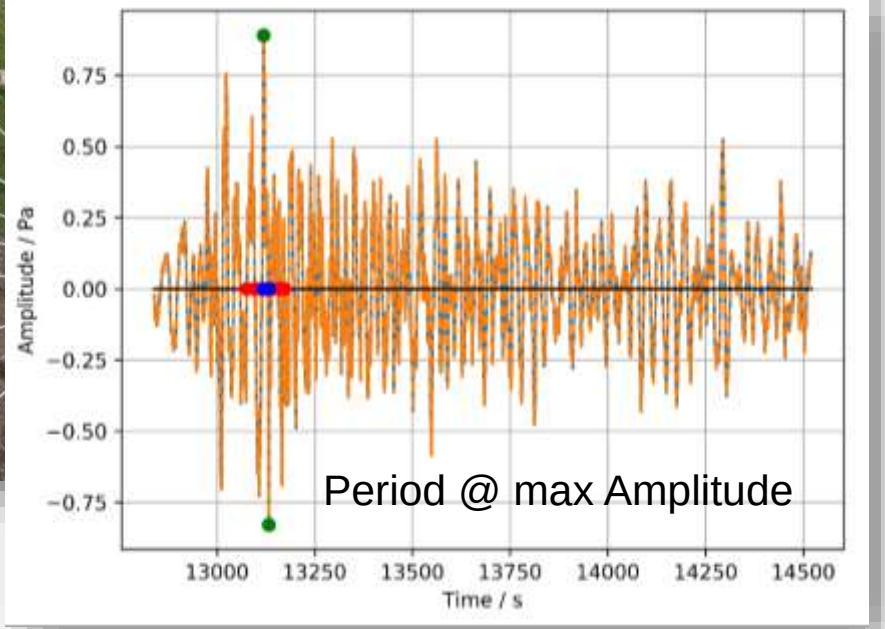
From CNEOS (Center for NEO Studies) and JPL (Jet Propulsion Laboratory)

CTBTO

IMS (International Monitoring System) - Infrasound



Meteor signal in waveform



NEMO Event

NEMO

NEMO Event


The Watchers
@TheWatchers_
Folgen
Very bright daylight #fireball explodes over #Russia, #meteorites possible
Very bright daylight fireball explodes over Russia, meteorites possible
A very bright daylight fireball exploded over western Russia at 01:11 UTC on June 21, 2018. The event lasted several seconds before the object disintegrated in a bri...
watchers.news
04:52 - 21. Juni 2018

NEMO Event

Daytime fireball over Russia

21 June 2018 - 01:15 UT (04:15 LT)

The Watchers
@TheWatchers_

Very bright daylight #fir
#Russia, #meteorites pc

Very bright daylight fireball explodes ove
A very bright daylight fireball exploded over
21, 2018. The event lasted several seconds
watchers.news

04:52 - 21. Juni 2018

14 46

Lassina Zerbo
@SinaZerbo

Folgen

#CTBT #IMS detection of a #Bolide above western #Russia The automatic process used 4 IMS infrasound stations; IS43 (#Russia - Dubna), IS26 (#Germany) IS48 (#Tunisia) IS42 (#Portugal – Azores Island). Analyst review expected to add about 7 additional #infrasound stations.

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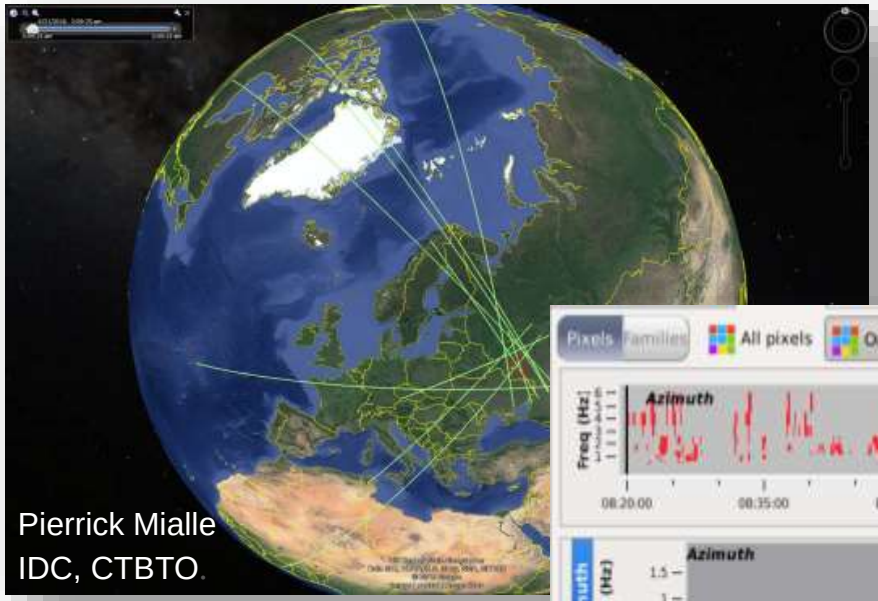
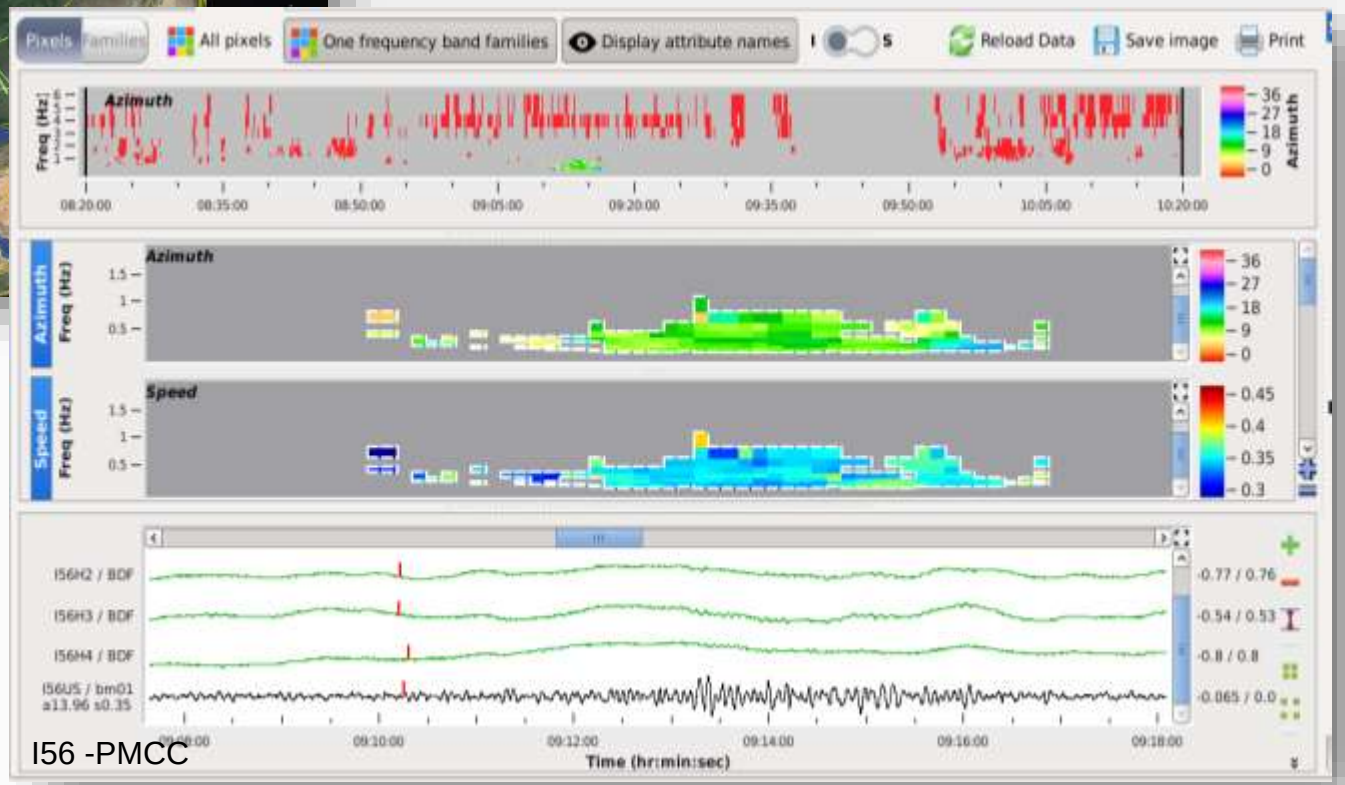
Daytime fireball over Russia
21 June 2018 - 01:15 UT (04:15 LT)

NEMO

Daytime fireball over Russia

21 June 2018 - 01:15 UT (04:15 LT)





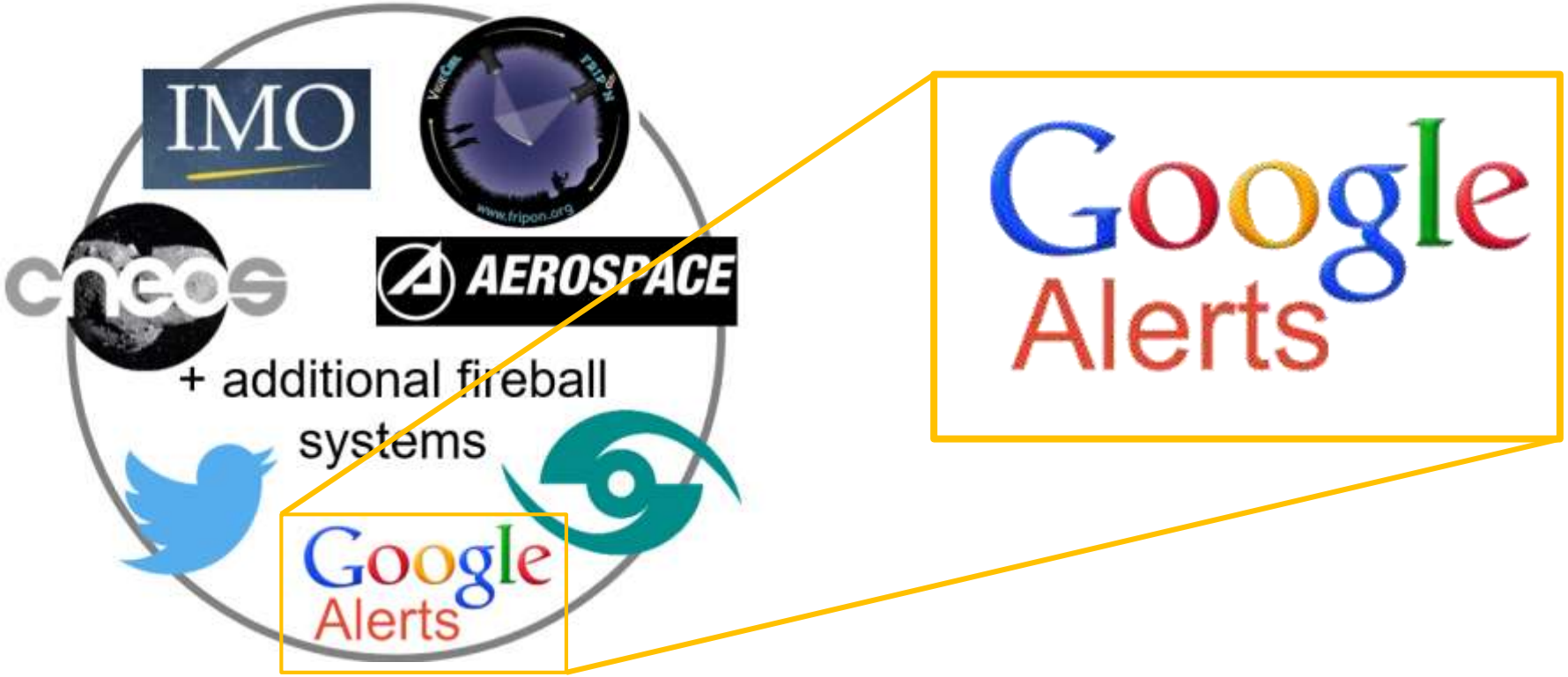
I56 -PMCC

Daytime fireball over Russia
21 June 2018 - 01:15 UT (04:15 LT)

10 Infrasound stations
- a source energy of **2.4 kt TNT.**
- a size of about **4 m**

CNEOS/JPL found
- a time of 01:16:20 UT
- a velocity of 14.4 km/s
- a source energy of **2.8 kt TNT.**

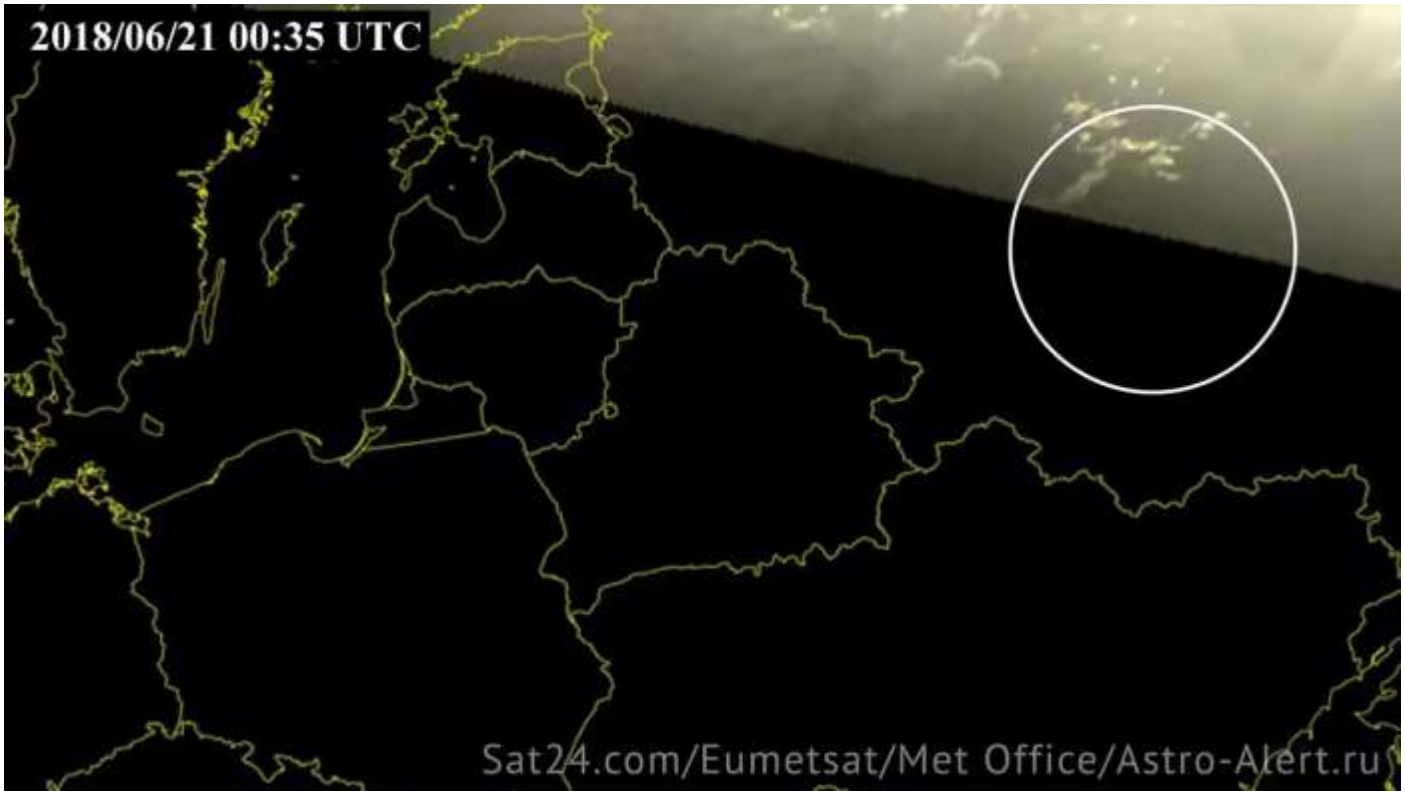
Daytime fireball over Russia
21 June 2018 - 01:15 UT (04:15 LT)



NEMO

Daytime fireball over Russia
21 June 2018 - 01:15 UT (04:15 LT)

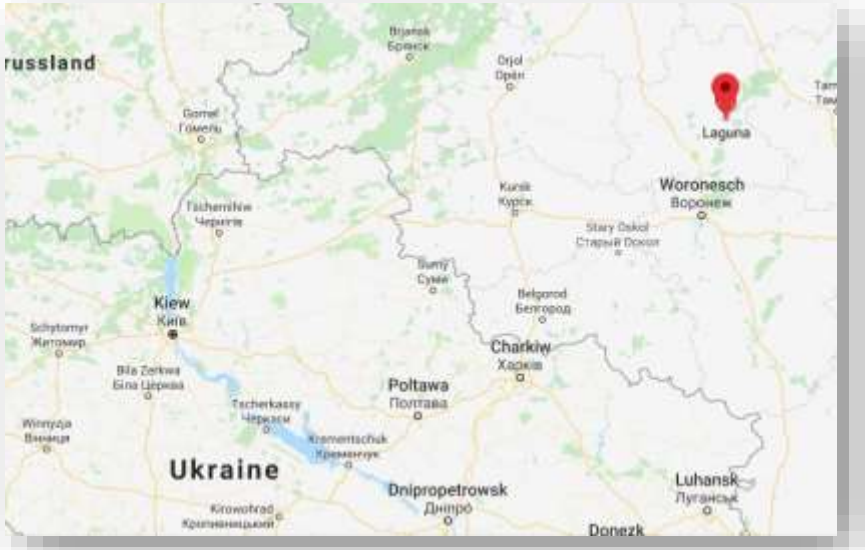
Detected with weather radar



Daytime fireball over Russia
21 June 2018 - 01:15 UT (04:15 LT)

Scientists from the Ural Federal University

- Found **3 meteorites**
- Smallest: 3 cm



Daytime fireball over Russia
21 June 2018 - 01:15 UT (04:15 LT)

NEMO

Daytime fireball over Russia
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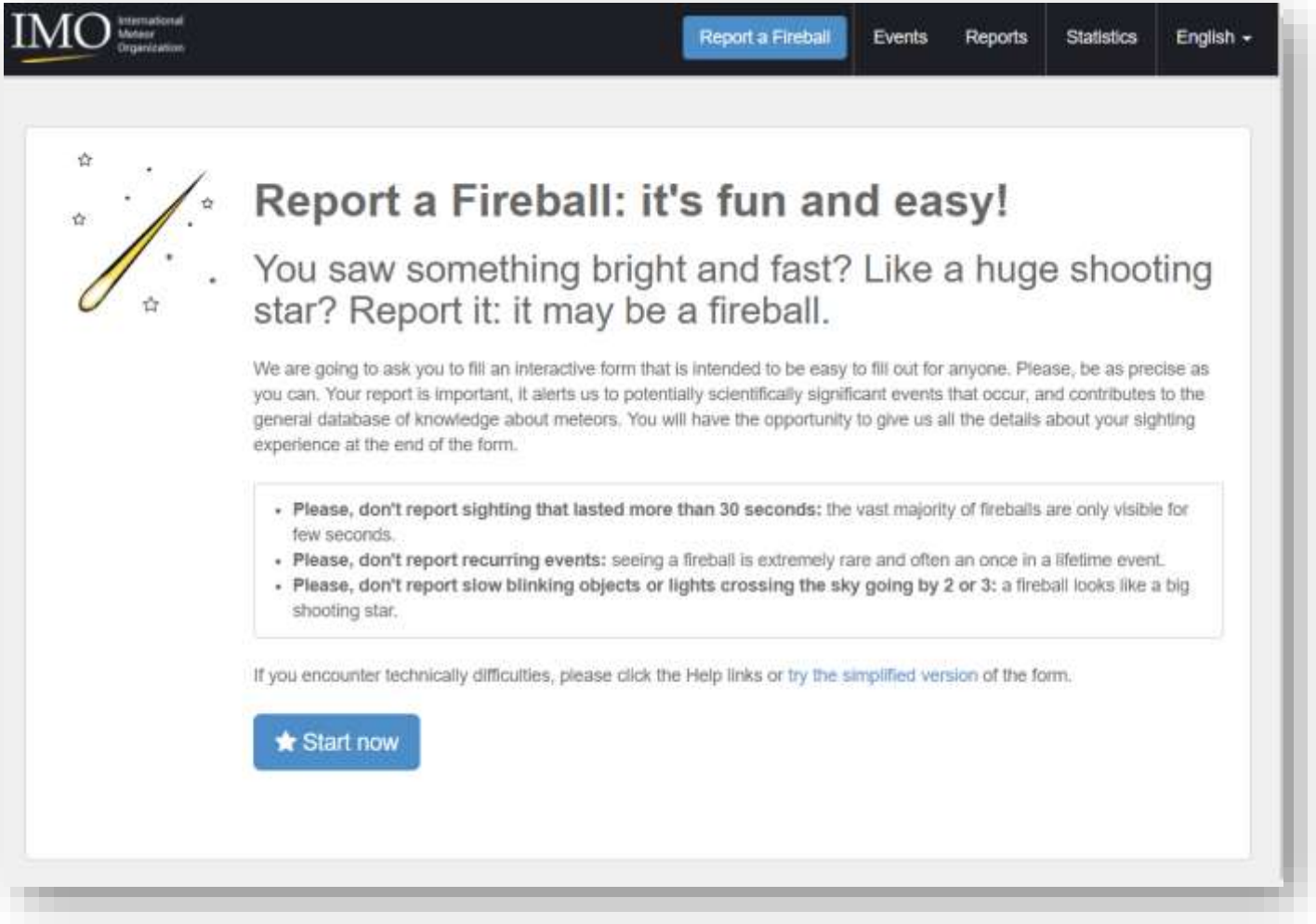

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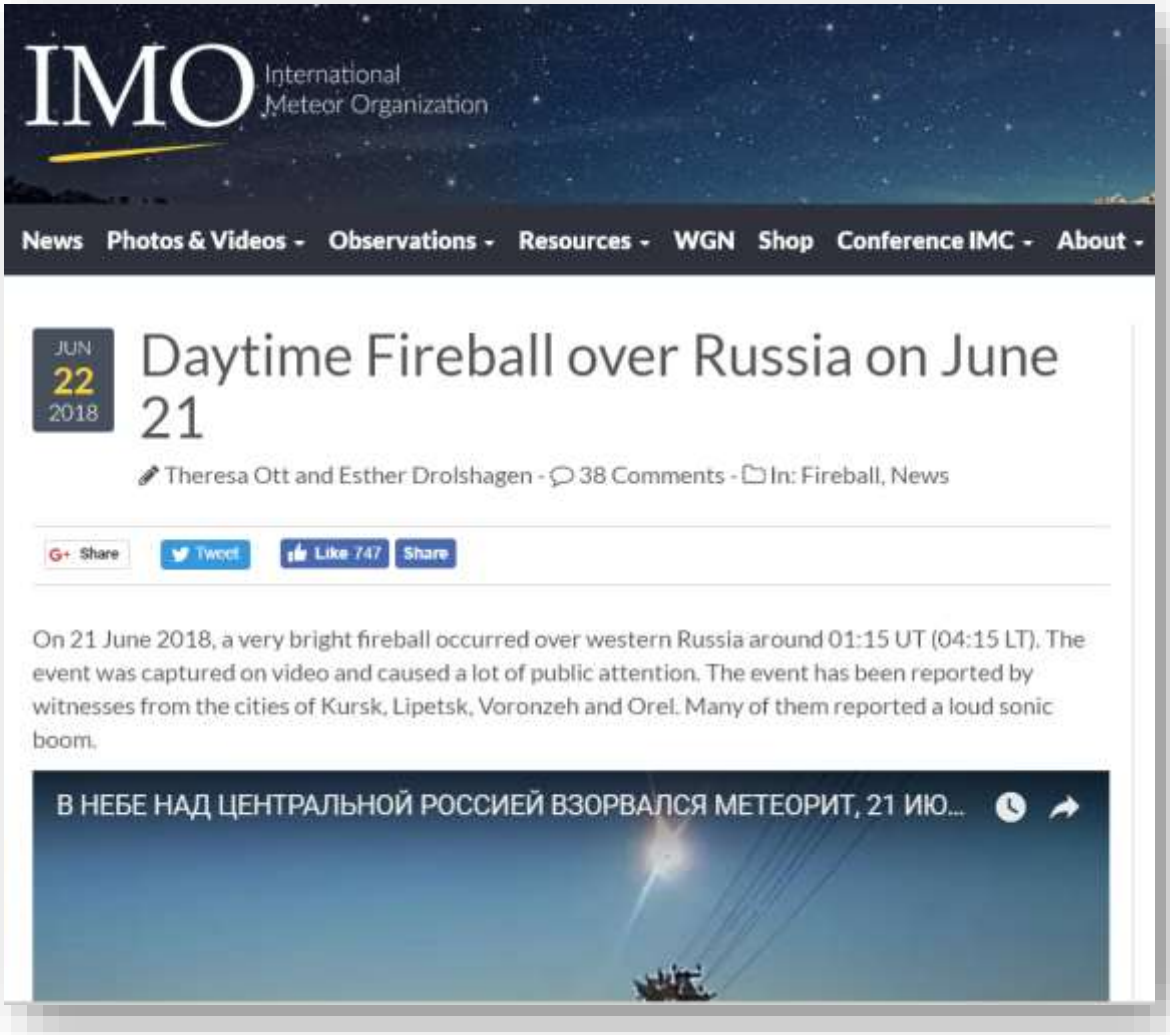
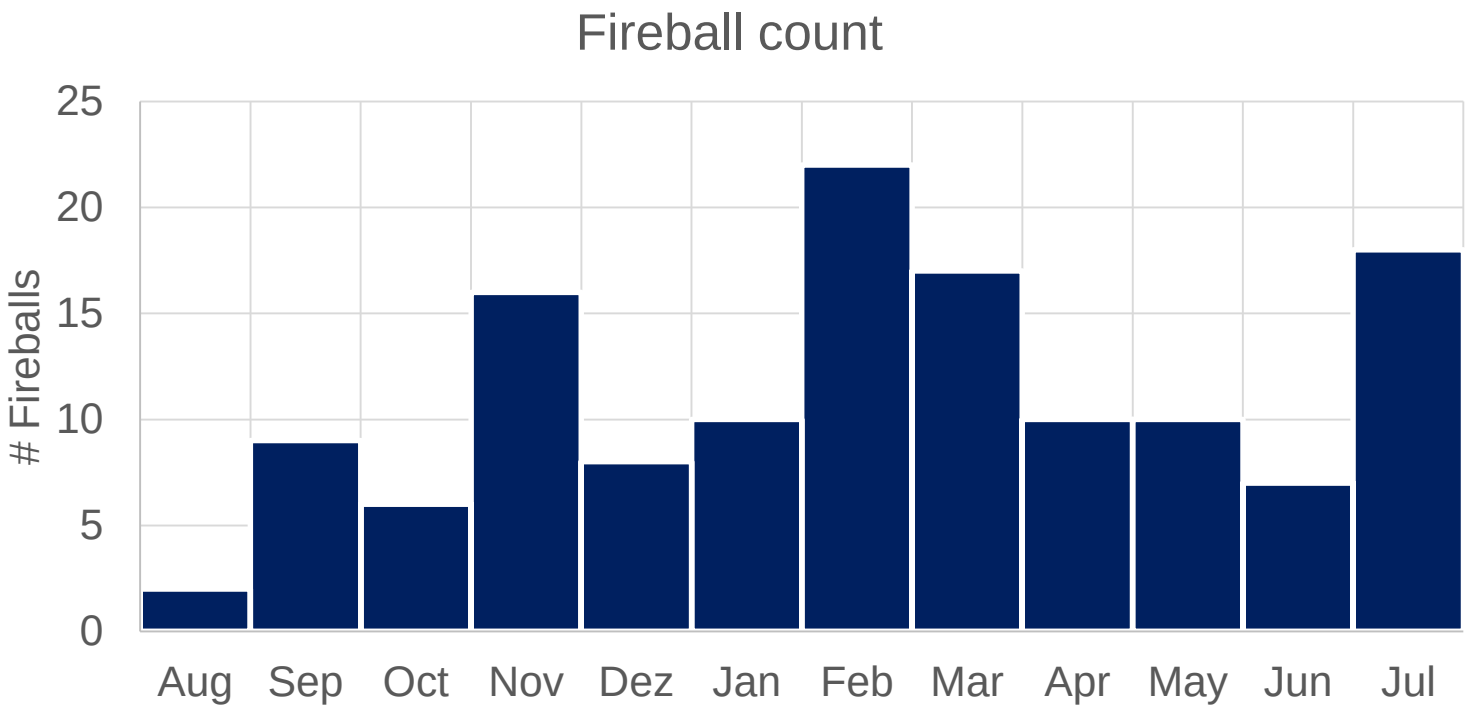
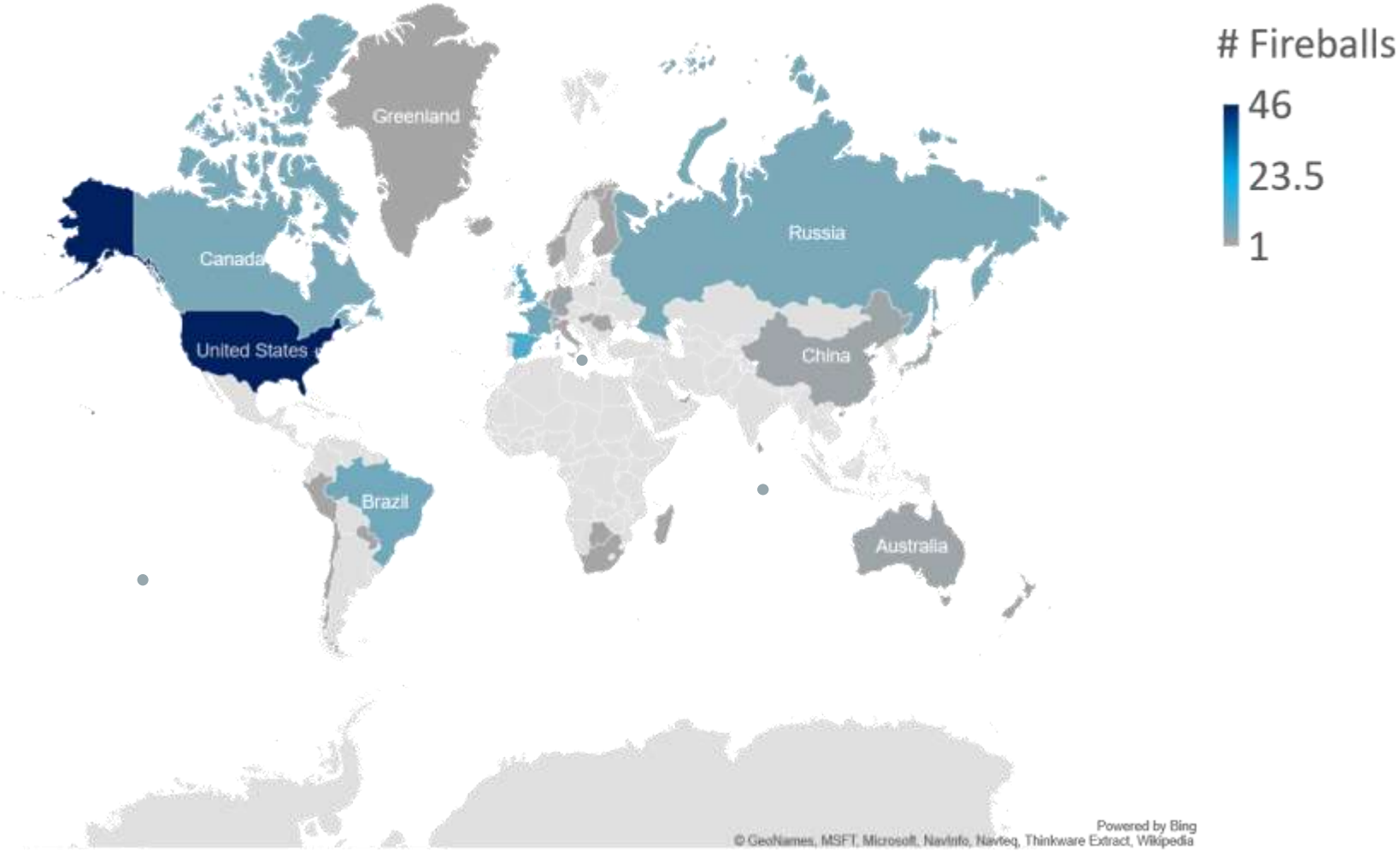


NEMO Events

- First NEMO Event was in August 2017
- About one year of test-operation
- Since then there are 135 Events in our alert-data-base

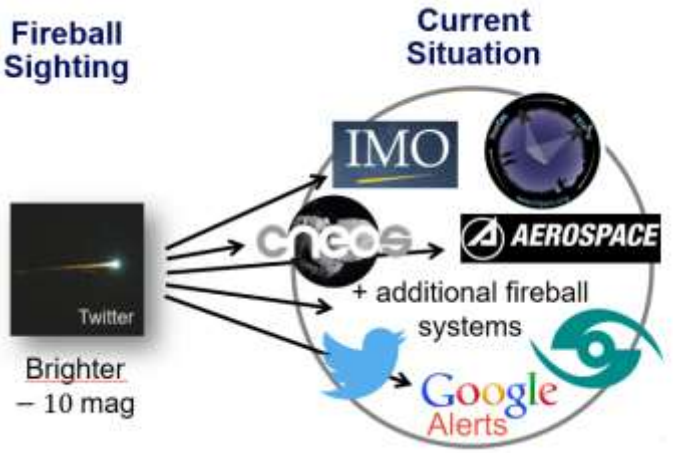


World Map Event



Outlook

- Stable NEMO monitoring of:
  - Twitter
  - Facebook
  - News
  - Etc.
- FRIPON fireball flux determination
- Reliable infrasound energy determination and semi-automation
- Data from existing fireball networks and other sources
  ➡ Access, analyze, and combine



Near-real time info!

Thank you for your attention

References

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World Map Event