Multi-messenger Meteor Observations with the PRISMA Network

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Research Topic:

Development of advanced technologies for multi-platform meteor observation from ground and space.

Objectives:

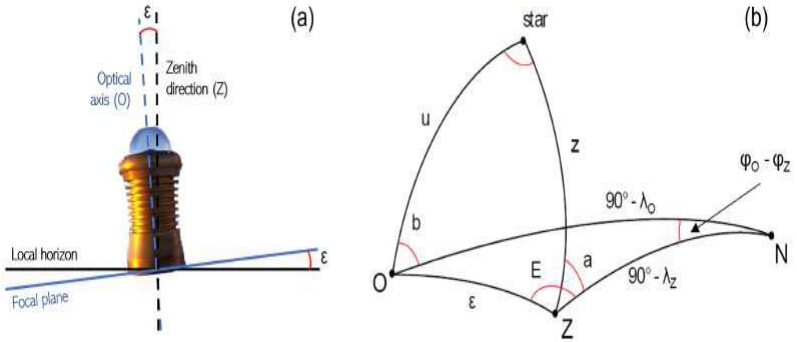
Combine multi-technique observations

Implement an Integrated Alert System (IAS) to collect and correlate data across optical, seismic, and infrasound networks.

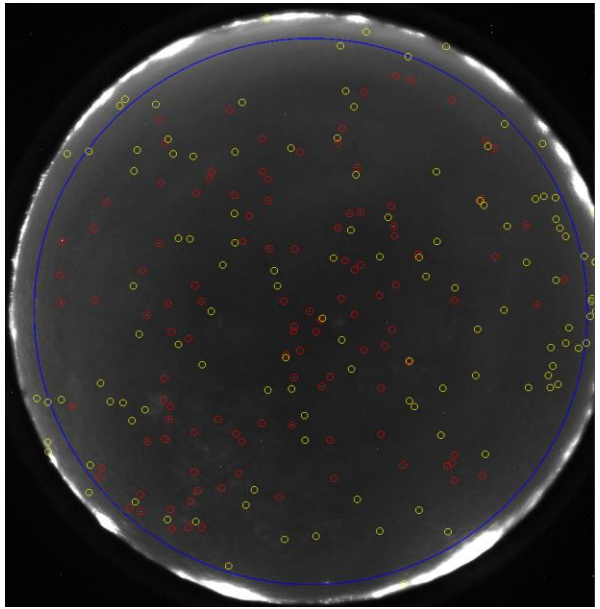
Support PRISMA optical network through integration, validation, and maintenance.

Configuring and Calibrating PRISMA cameras

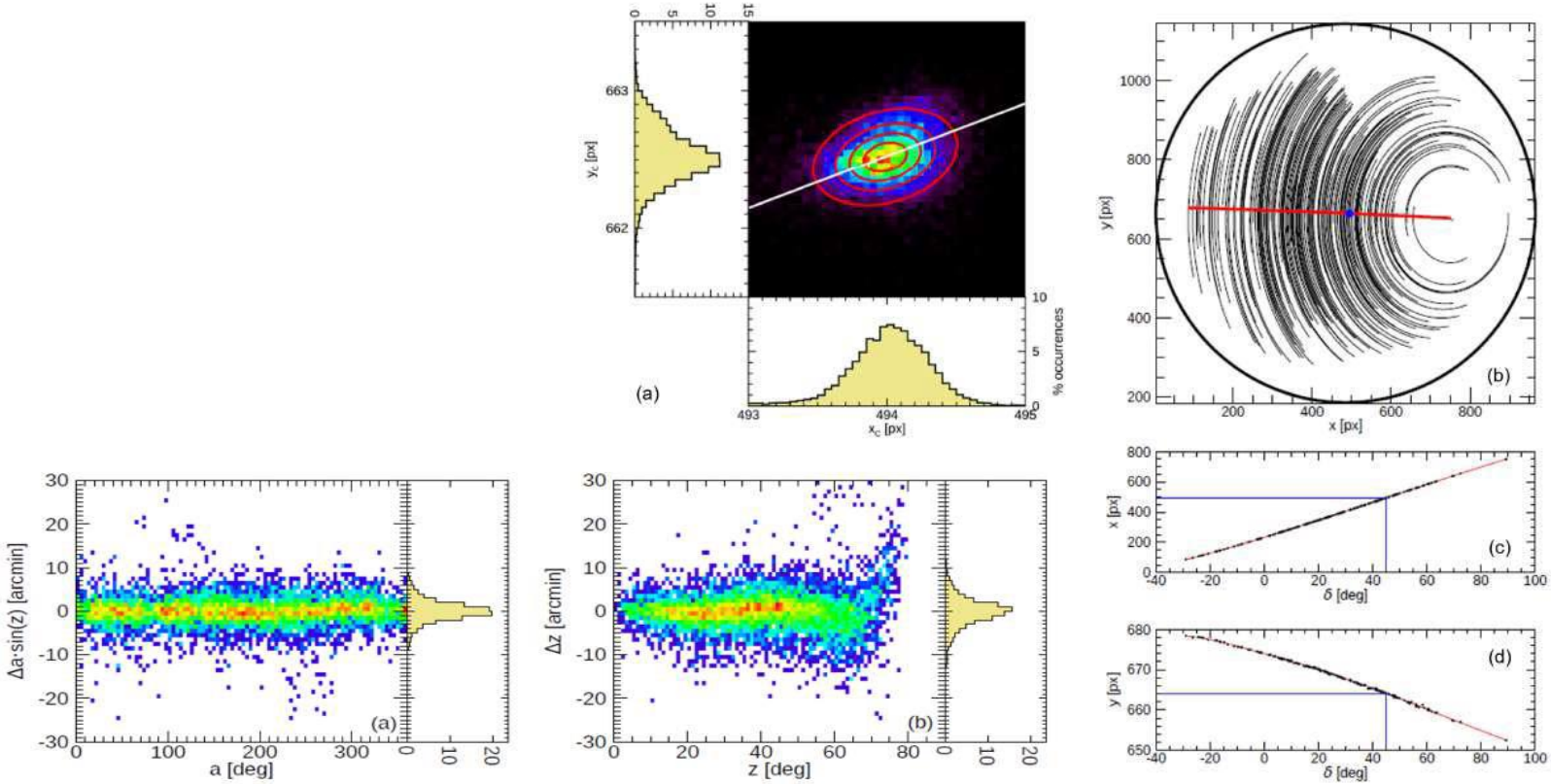
1. Astrometry Calibration of all-sky cameras



2. Source identification and catalogue correlation



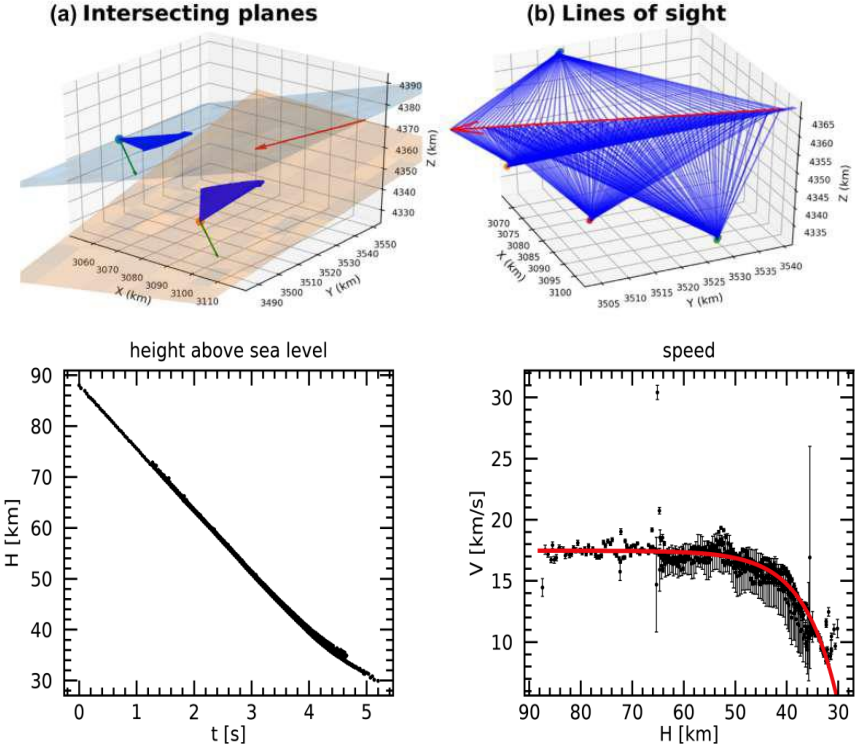
3.Determination of the asmetric solution



Analysis of Meteor Event

1. Astrometric and photometric processing

2. Trajectory Calculation

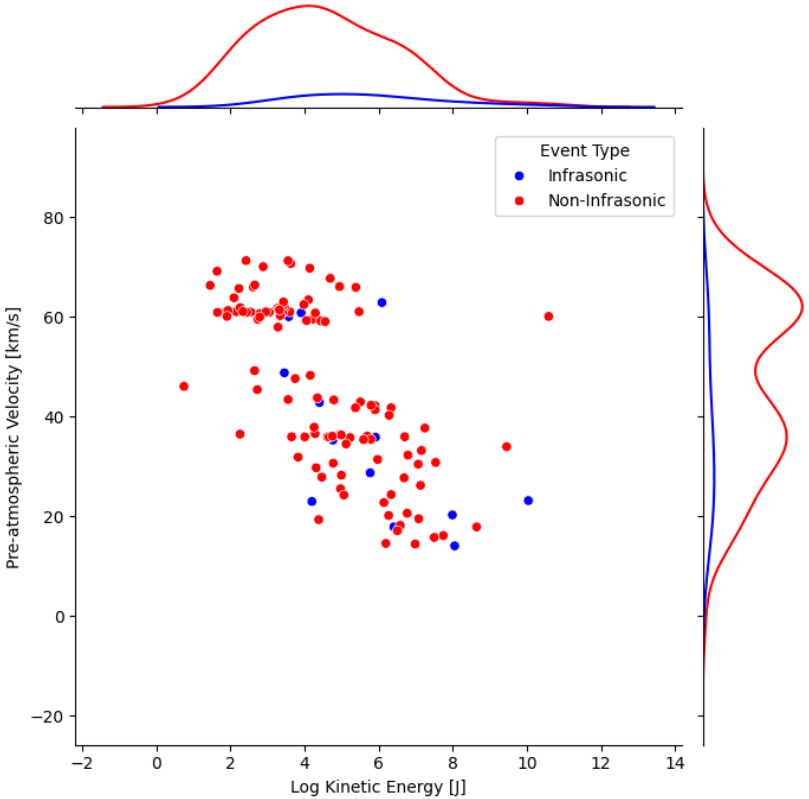


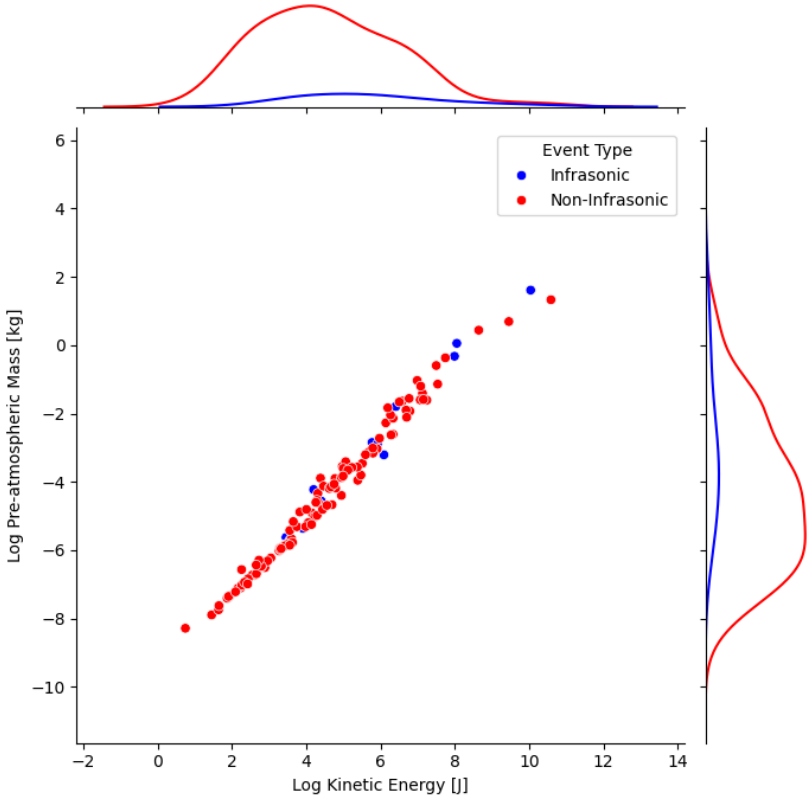
- 3. Physical Parameters of Meteor

Parameter	Initial Values	Final Values
Time of flight [s]	5.2	—
Velocity [km/s]	17.43	5.33
Mass [kg]	3.58	0.012
Energy [J]	5.44×10^8	—
Initial height [km]	87.76	30.75
Trajectory inclination [deg]	44.86	—
Latitude	43° 42′ 35.1″ N	44° 13′ 16.1″ N
Longitude	8° 27′ 57.2″ E	8° 24′ 5.0″ E

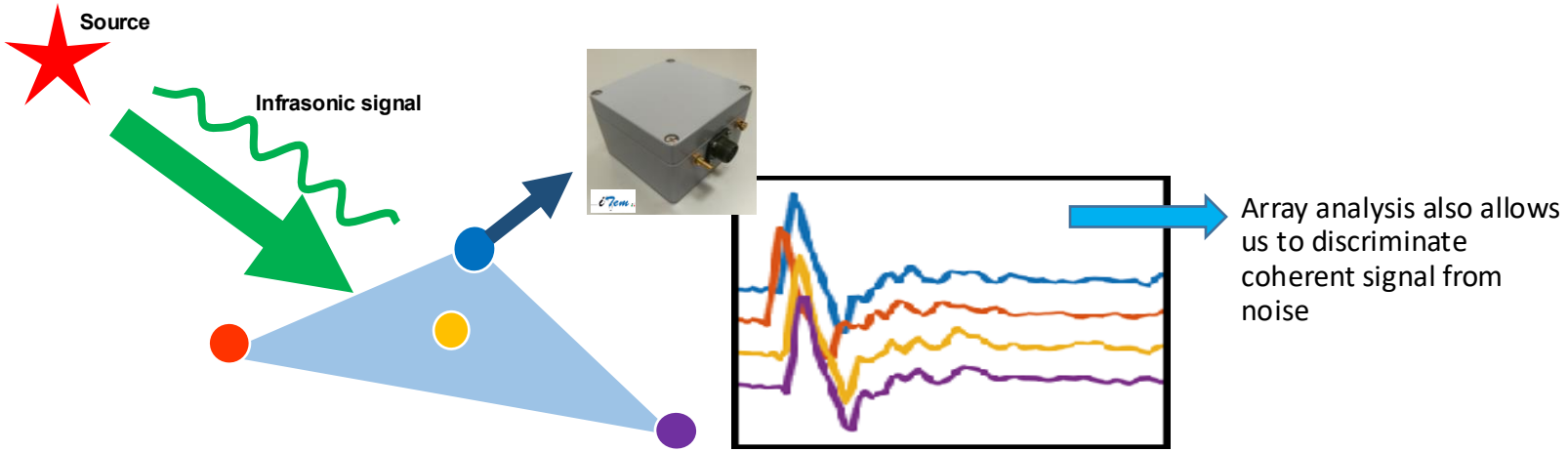
Meteor signals in Infrasonic data

- In 2018, **150 confirmed meteor events** were recorded by the PRISMA optical network.
- Out of these, **15 events were also detected by the infrasound network**.
- Analysis of **135 non-infrasound events** and **15 infrasound events**.





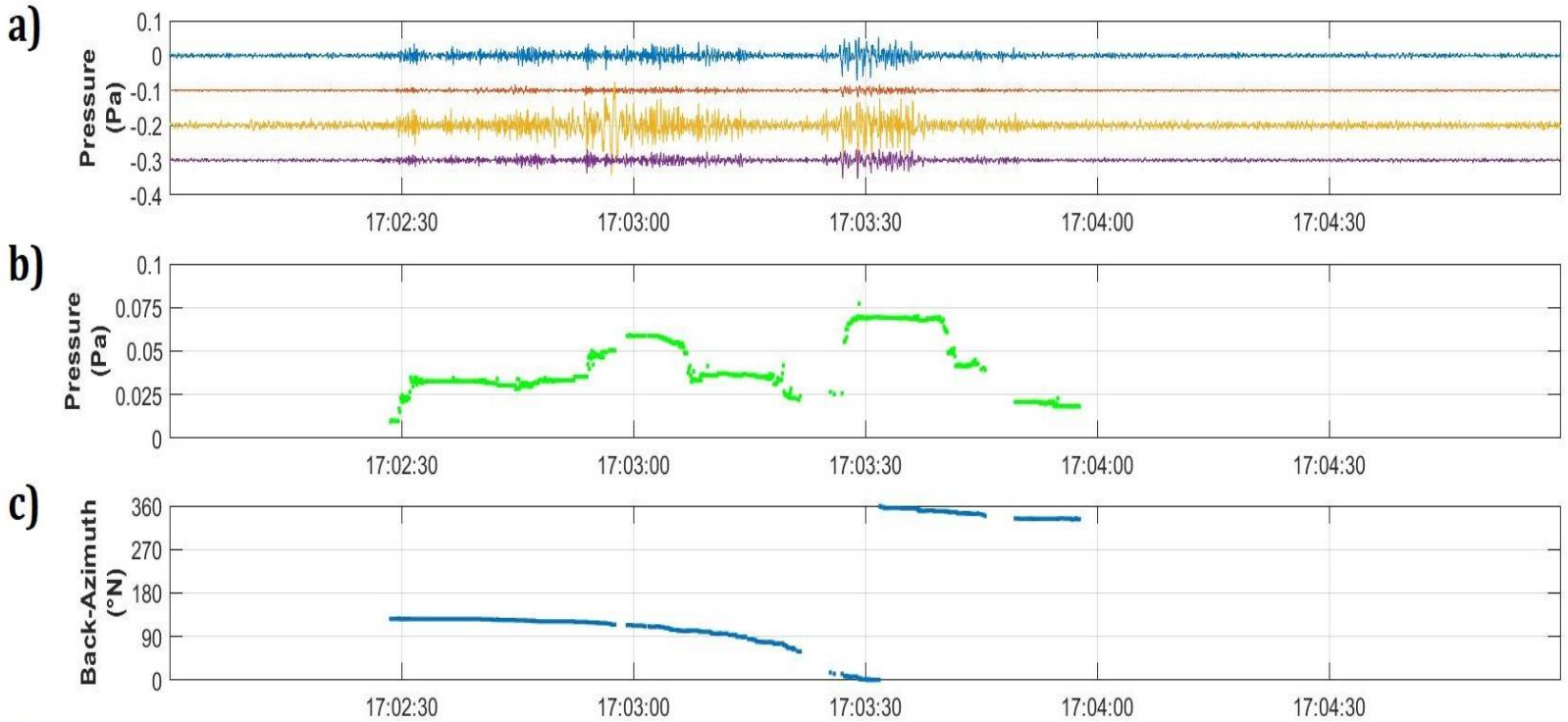
Infrasonic Array



G. Belli et al., Integrated analysis based on all-sky cameras and infrasonic array for the characterisation of small fireballs events, SnT 2023, 19-23 June 2023, Vienna"

- Infasonic array analysis: Infrasonic is typically recorded not with a single sensor but via an infrasonic array, which offers many advantages.

Aircraft signals in Infrasonic Array



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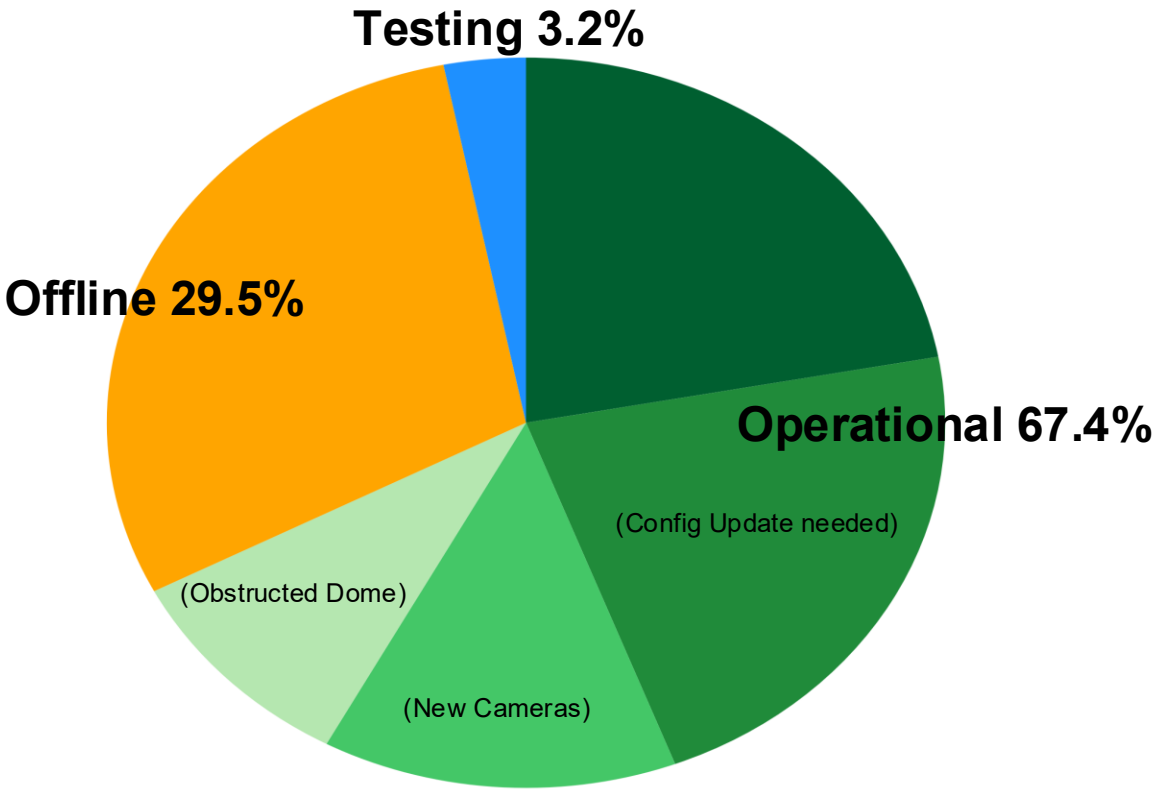
Status Overview of PRISMA Camera on Server



New Camera	Config. File
DEBW21	DEBW21_20241208
DEBW22	DEBW22_20250300
Muenstersch warzach	DEBY20_20241200
NICE	FRCA20_20250202
Frejus	FRCA21_20241223
Vinon	FRCA22_20250103
GREV20	GREV20_20250700
GREV21	GREV21_20250400
GRVO20	GRVO20_20250700

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