



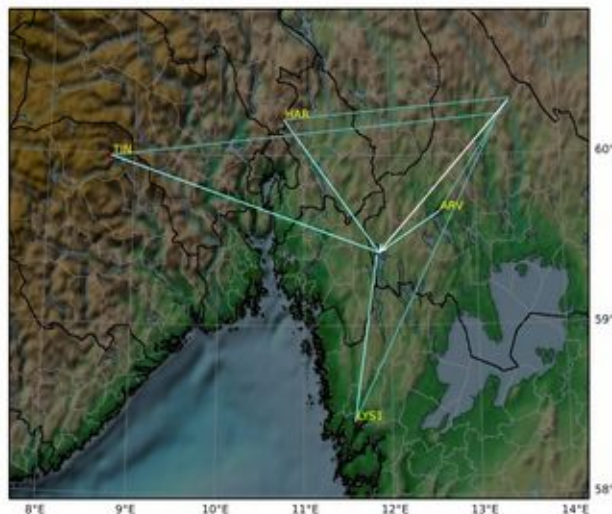
Meteor detection using allsky-kamera

Calculations - a working example

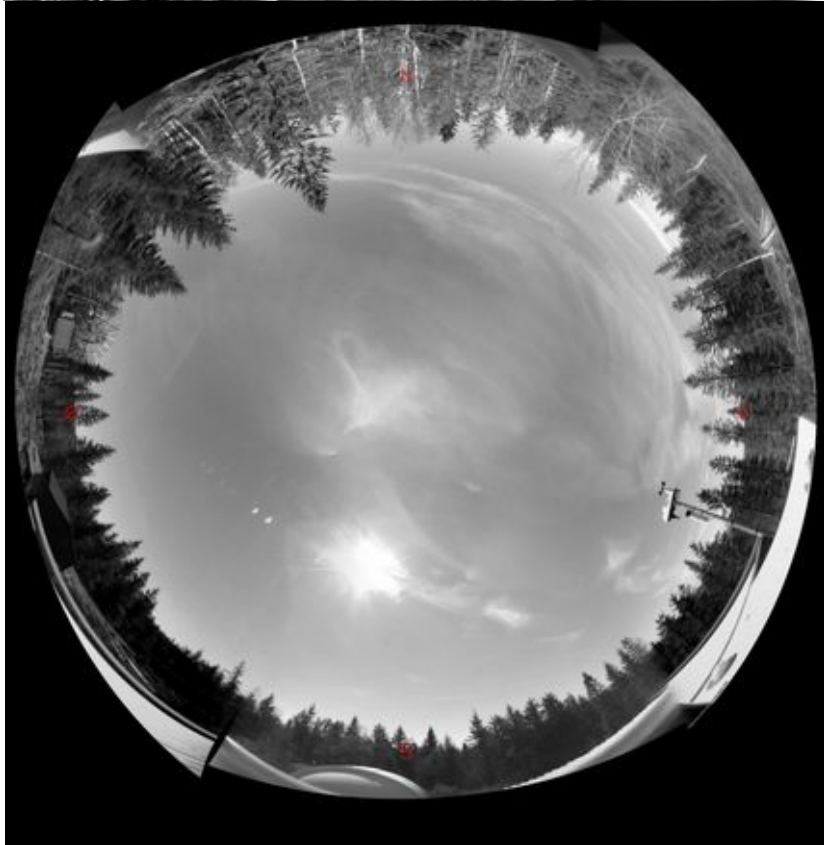
Vegard Rekaa, Solobservatoriet (Norway)

vegard@solobservatoriet.no

Tel.: +47 61 32 30 31

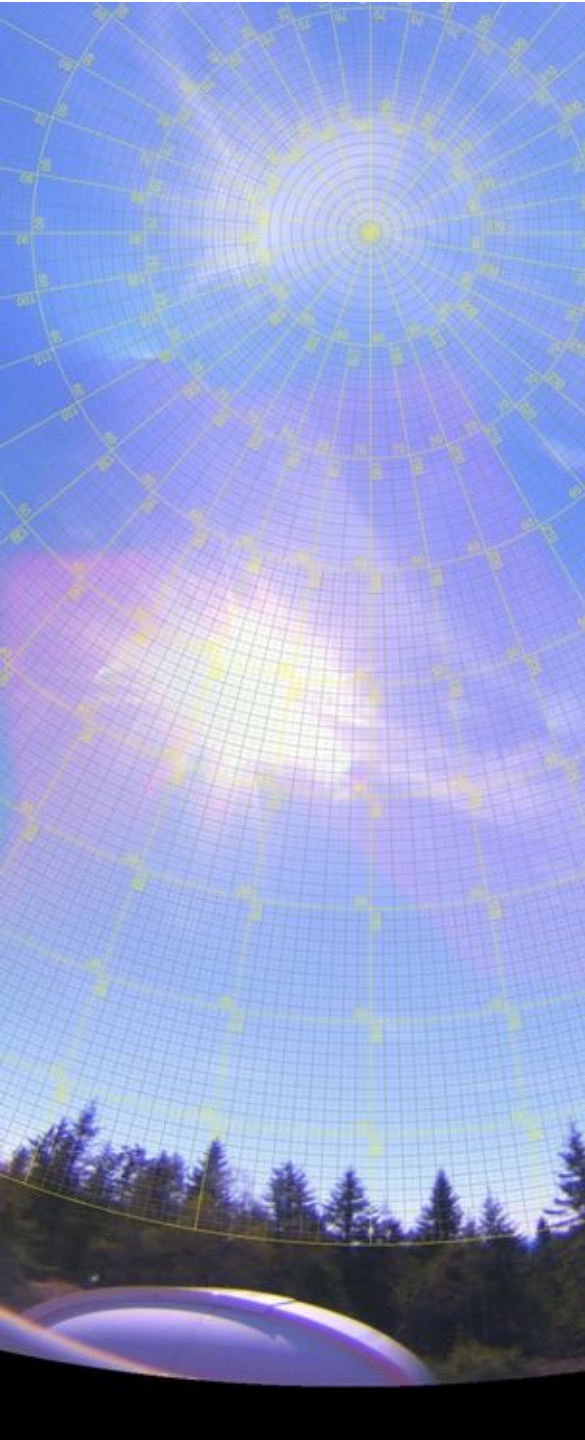


Solobservatoriet
Harestua
Stedet for undring og læring



Perspective in panorama and fisheye projections:

- Draw lines in the pictures above, how you believe planes trail will look, when it is flying (use the red letters marking N,S,Ø,V):
 - In a straight line from north to south.
 - Turning as it comes from east, turning towards south.
- Draw the path the sun follows from morning (east) to evening (west). To help you on the way, this image is taken mid day and the sun is south and at its highest elevation.
- Compare your answers with someone else. Did you get similar answers?
- Can you give any reason for why or why not?



Coordinates

In the grid to the left, the thick horizontal lines marks elevations from the horizon (0°) and in steps of 10° up to Zenith, where all vertical lines meet. Thick vertical lines mark Azimuth in steps of 10° .

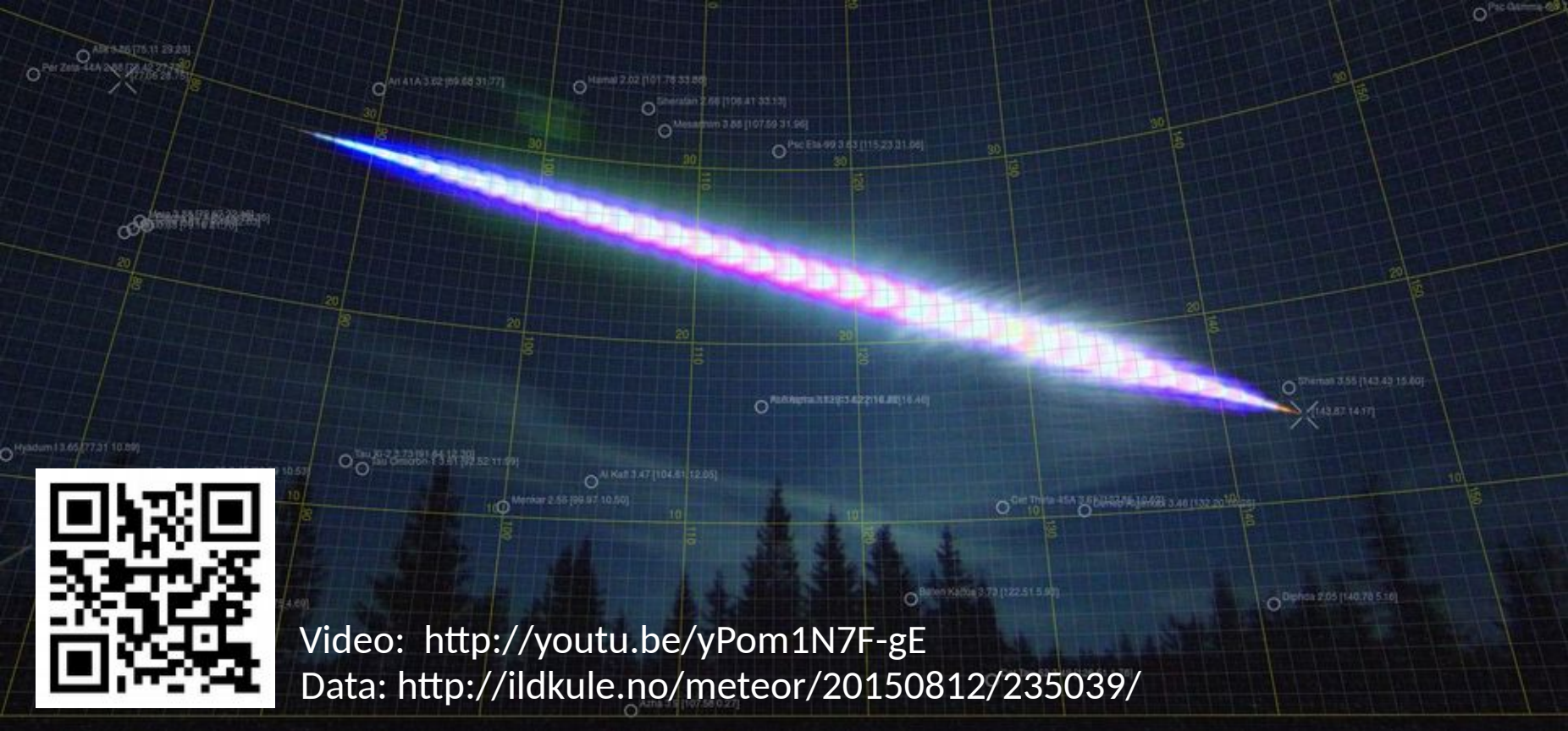
- Use the diagram the say elevation of the sun on the day of this image.

This image was taken mid-day from latitude 60° north. At winter solstice, the sun reaches it's highest elevation at $6,5^\circ$ and an elevation of $53,5^\circ$ at summer solstice. At the equinoxes, the sun rises 30° above the horizon.

- Use the measured elevation of the sun to estimate in what month this image was taken.

Azimuth helps us indicate north, south, east and west in terms of measured angles, where north equals 0° , east equals 90° , and so forth.

- What are the corresponding angles / values of the azimuth for south and west?

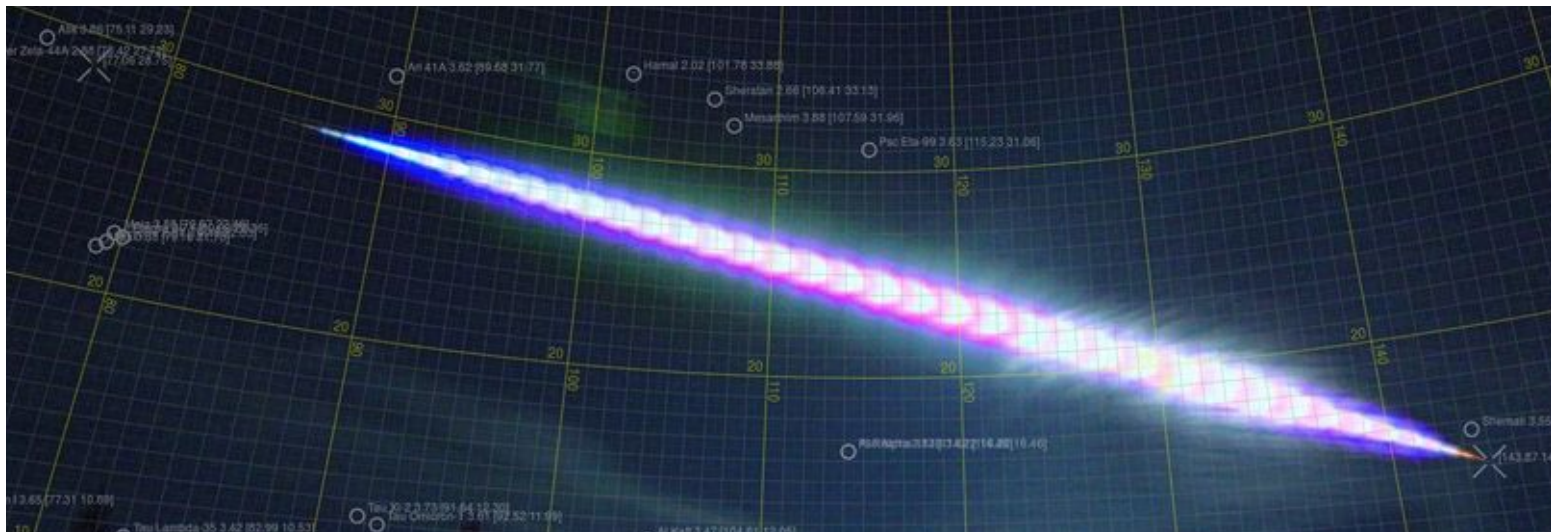


Video: <http://youtu.be/yPom1N7F-gE>

Data: <http://ildkule.no/meteor/20150812/235039/>

Flight distance

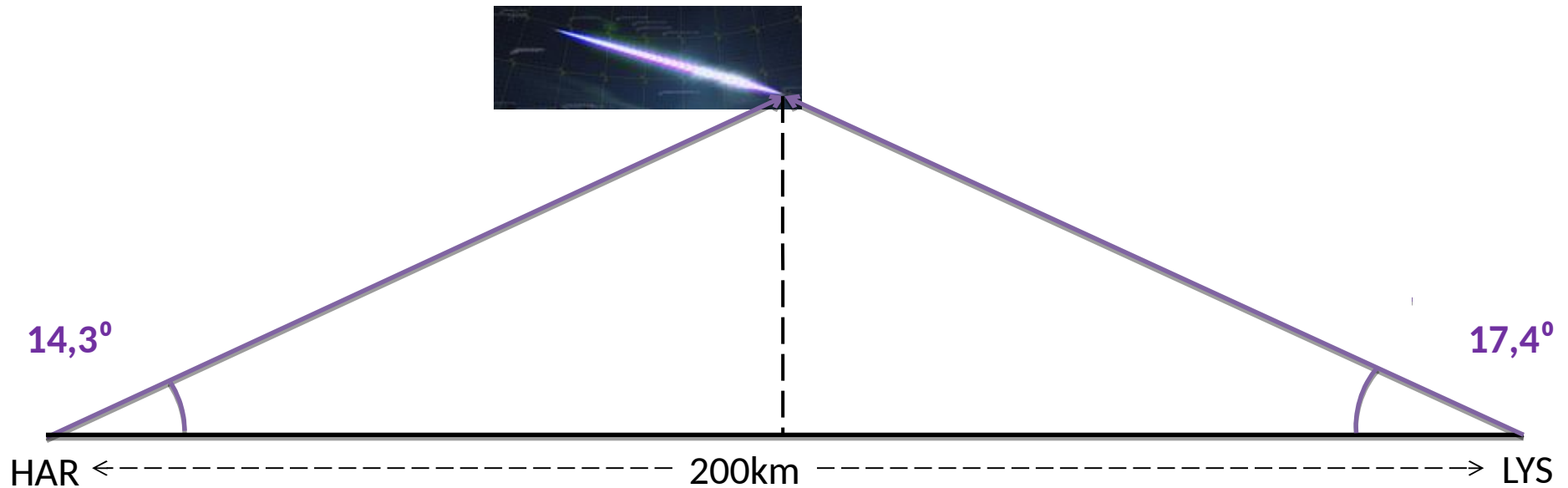
- Measure the flight distance in terms of azimuth and elevation in the sky.
- Calculate its travel distance (HINT: Use pythagoras on the measured angles)
length =
- Assuming this meteor was 100km away from the observer, how far is the meteor's flight path?



Speed

The camera that filmed this captured 5 frames per second. Measure the distance between two dark sections in the meteor trace, separated by five luminous fields.

- Calculate the angular speed (degrees per second) of the meteor
- Count the number of luminous fields and use this to estimate the total flight time of the meteor.
- Assuming the meteor is 100km away from us, can you calculate the speed (from flight distance in km) in km/s?



Elevation and distane to observers

The meteor was photographed from two locations approximatly on each side of where the glowing part of the meteors flight path ended. These to locations (HAR and LYS) are approx. 200Km apart and the elevation of the meteor was measured simultaneously to be 14,3 and 17,4 degrees.

Use the setup in the sketch above to calculate:

- The meteors distance to HAR
- The meteors distance to LYS
- The meteors altitide in km.