

# Glaring Study



Solar Glint and Glare by  
Reflection of Solar Panels and  
other reflective surfaces

# Content

- Regulations
- Definition of Glaring
- Reflection on surfaces
- Examples of glaring
- Glaring calculation
- Glaring survey
- Glare-reducing measurements



# Regulations

- FAA Technical Guidance for Evaluating Selected Solar Technologies on Airports (Form 7460)



# Regulations - criteria

- Duration of the Glaring Hazard is the most important criteria
  - maximum glare duration per day (e.g. 30 minutes)
  - cumulated glare duration per year (e.g. 30 hours)
- Magnitude of the glare is less important, sun reflection almost always = disability glare
- Measurement / Simulation for single points of interest



# Definition of Glaring

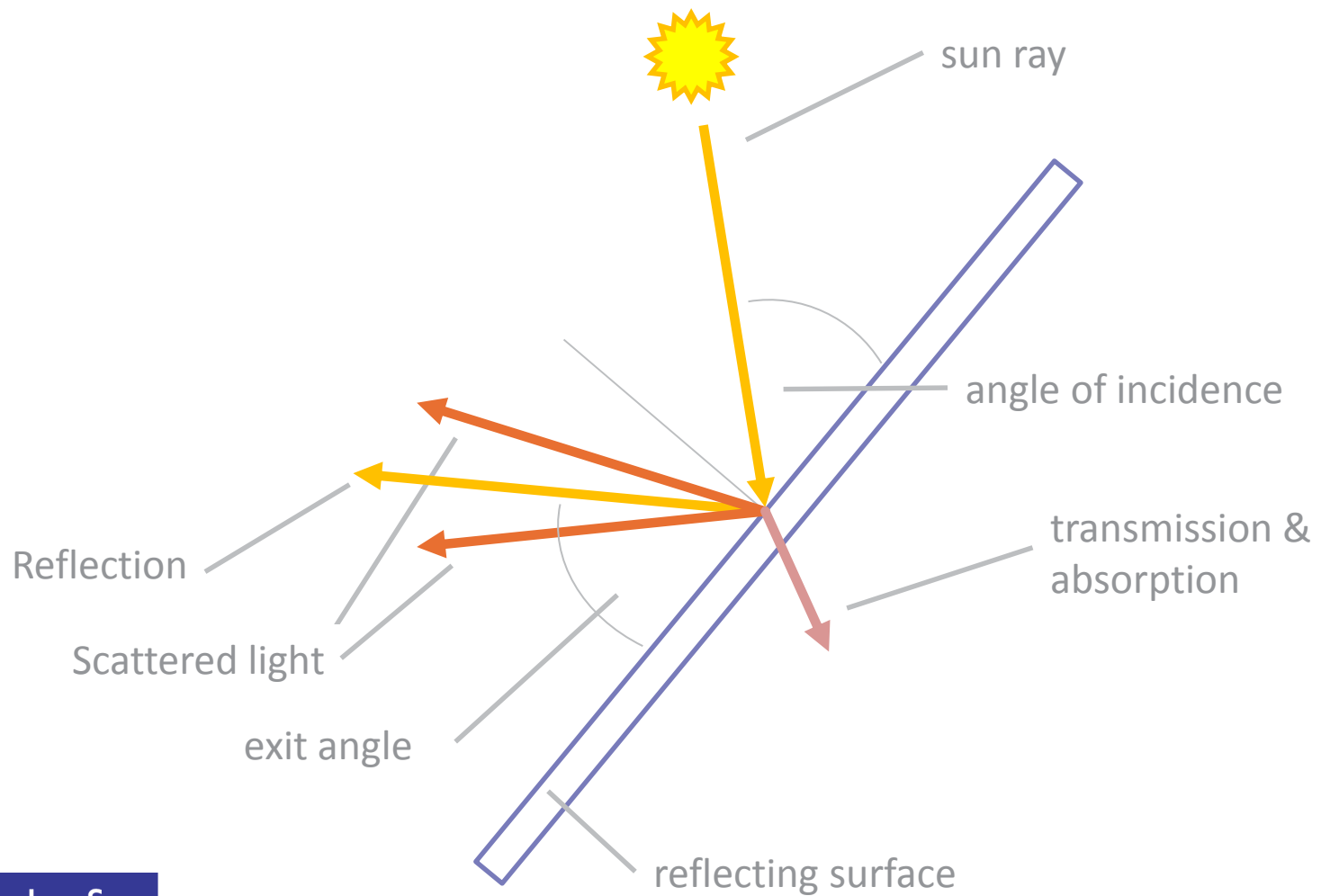
- Disability Glare

The generally accepted metric for disability glare is the equivalent veiling luminance

- Discomfort Glare

A nuisance measured on the deBoer's Scale

# Reflection on Surfaces



# Examples

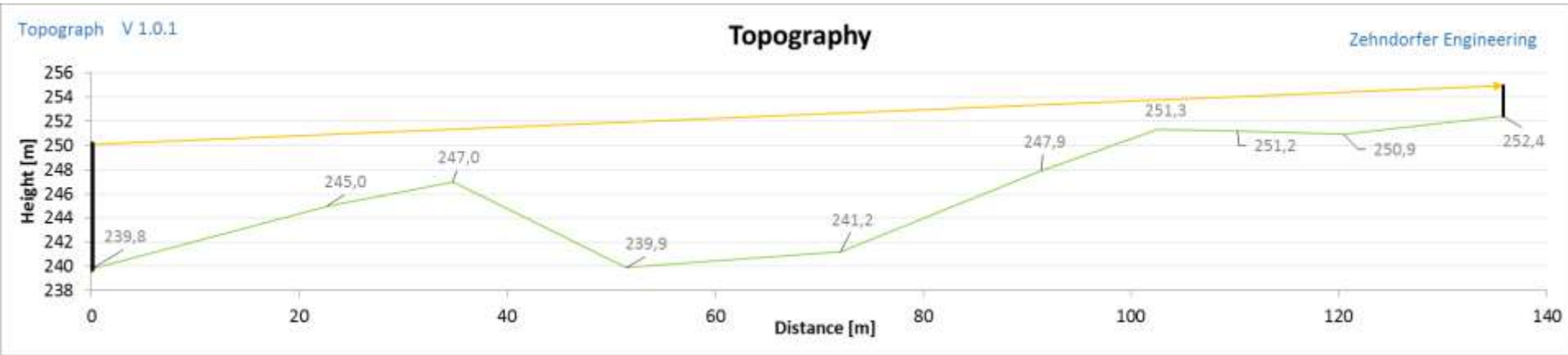
- Dazzling of highway traffic
- Dazzling of air traffic control towers
- Train driver not able to recognize a train signal
- neighbor disturbed by the glare of a large-scale PV plant

# Solar Glare Calculation

- Duration during the year
- Duration during one day
- Angle to line of vision
- angle between sun and reflection
- size considerations
- distances and travel time considerations

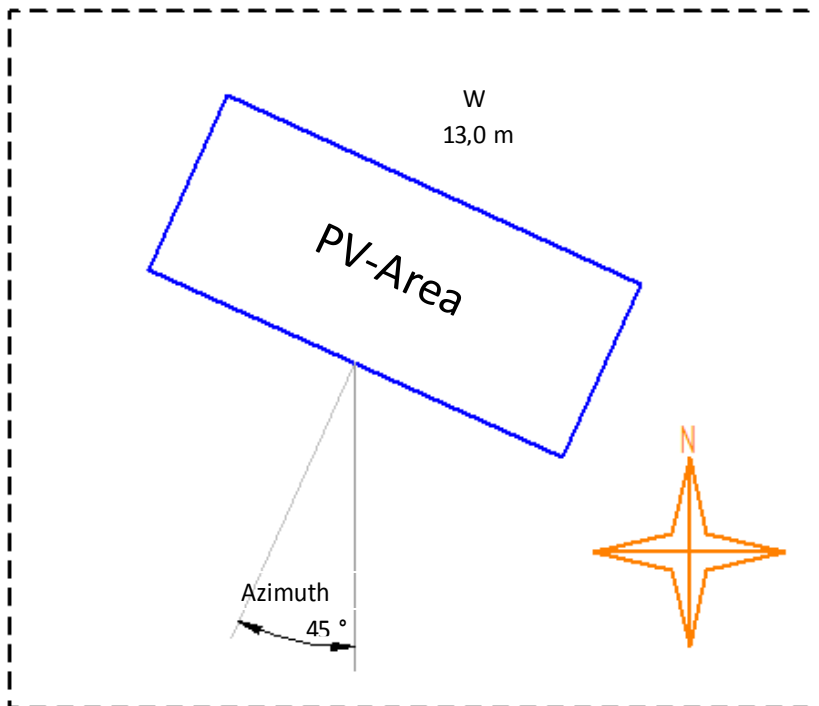


# Topography



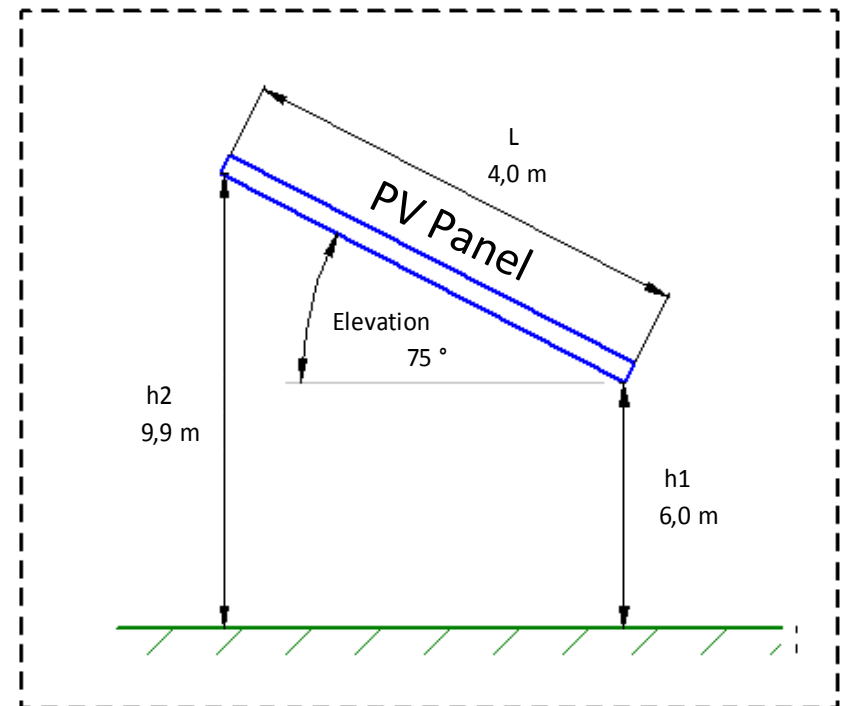
# Orientation of Surface in the space

Ground View (not to scale)



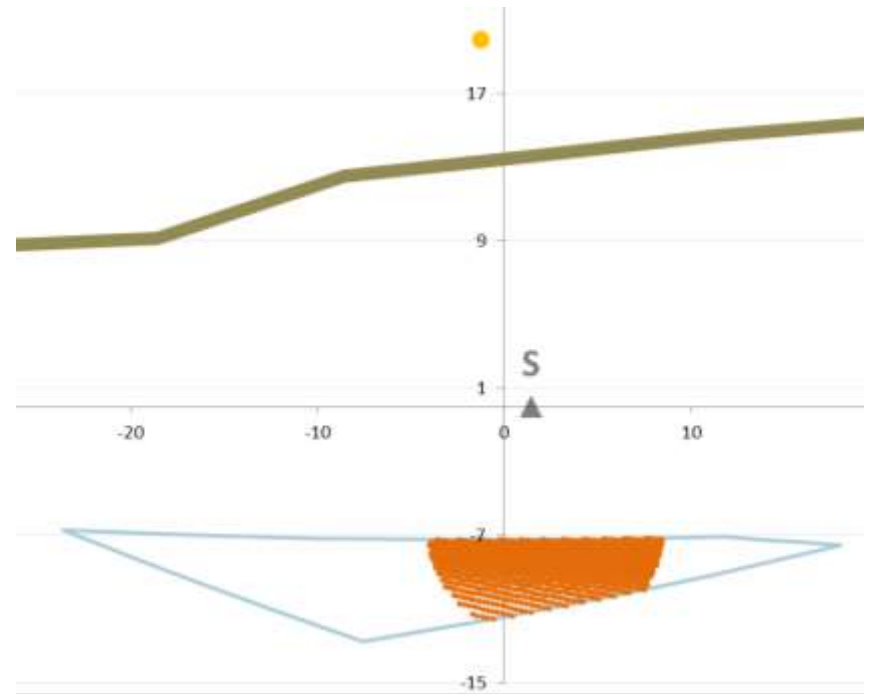
Blend-Rechner V 3.2.2

Profile View (not to scale)

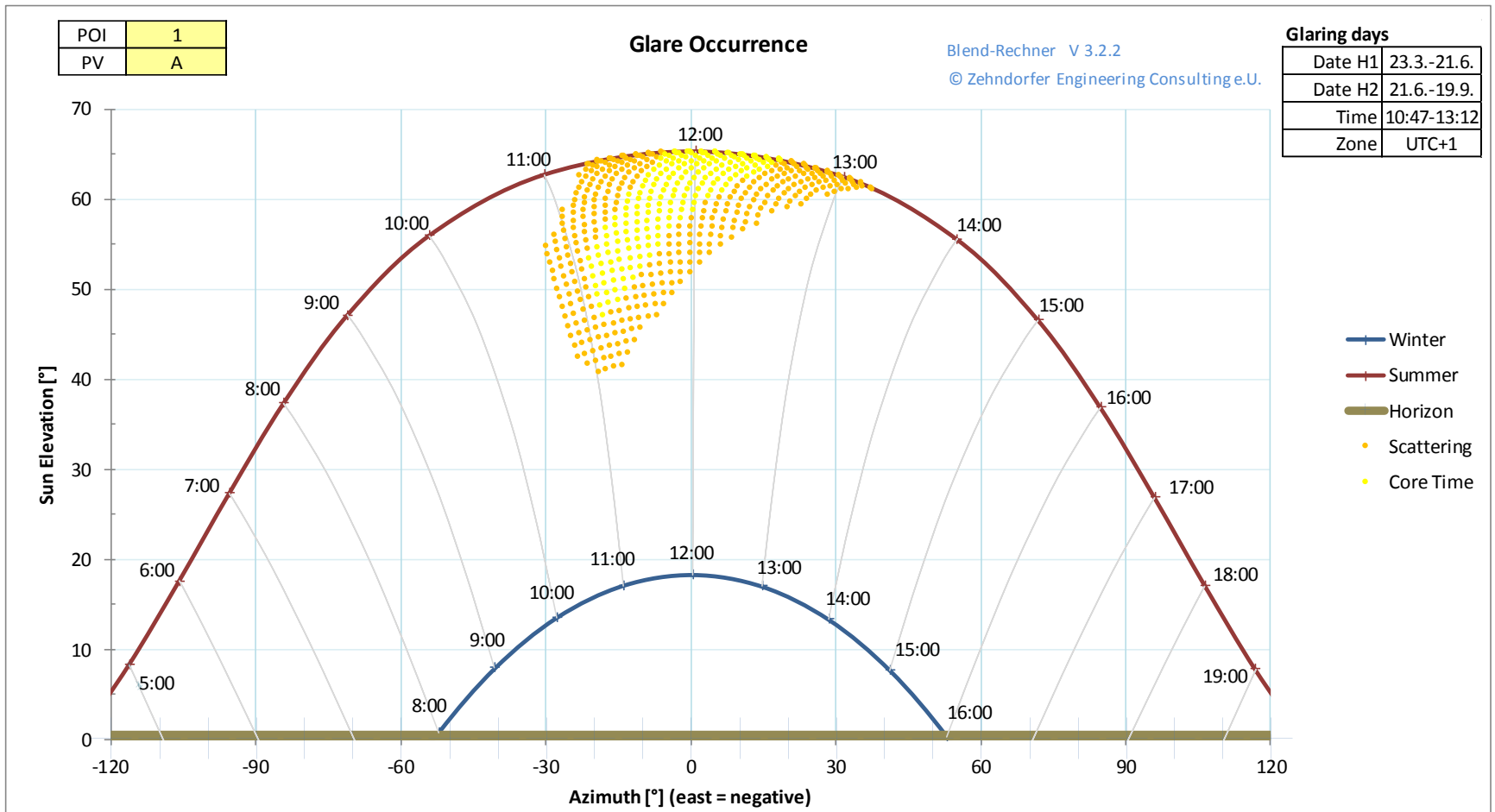


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# Calculation Model



# Glare Occurrence



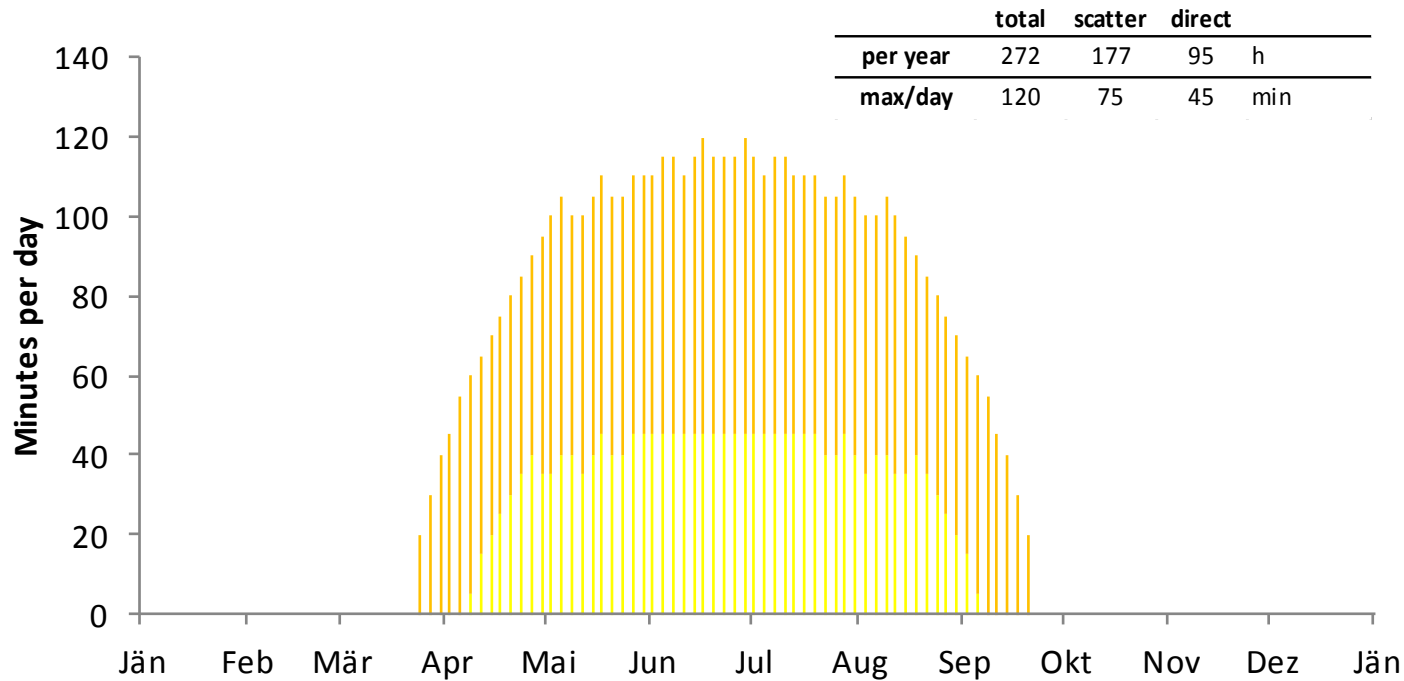
# Glare Duration

POI	1
PV	A

## Glare Duration [min]

Blend-Rechner V 3.2.2

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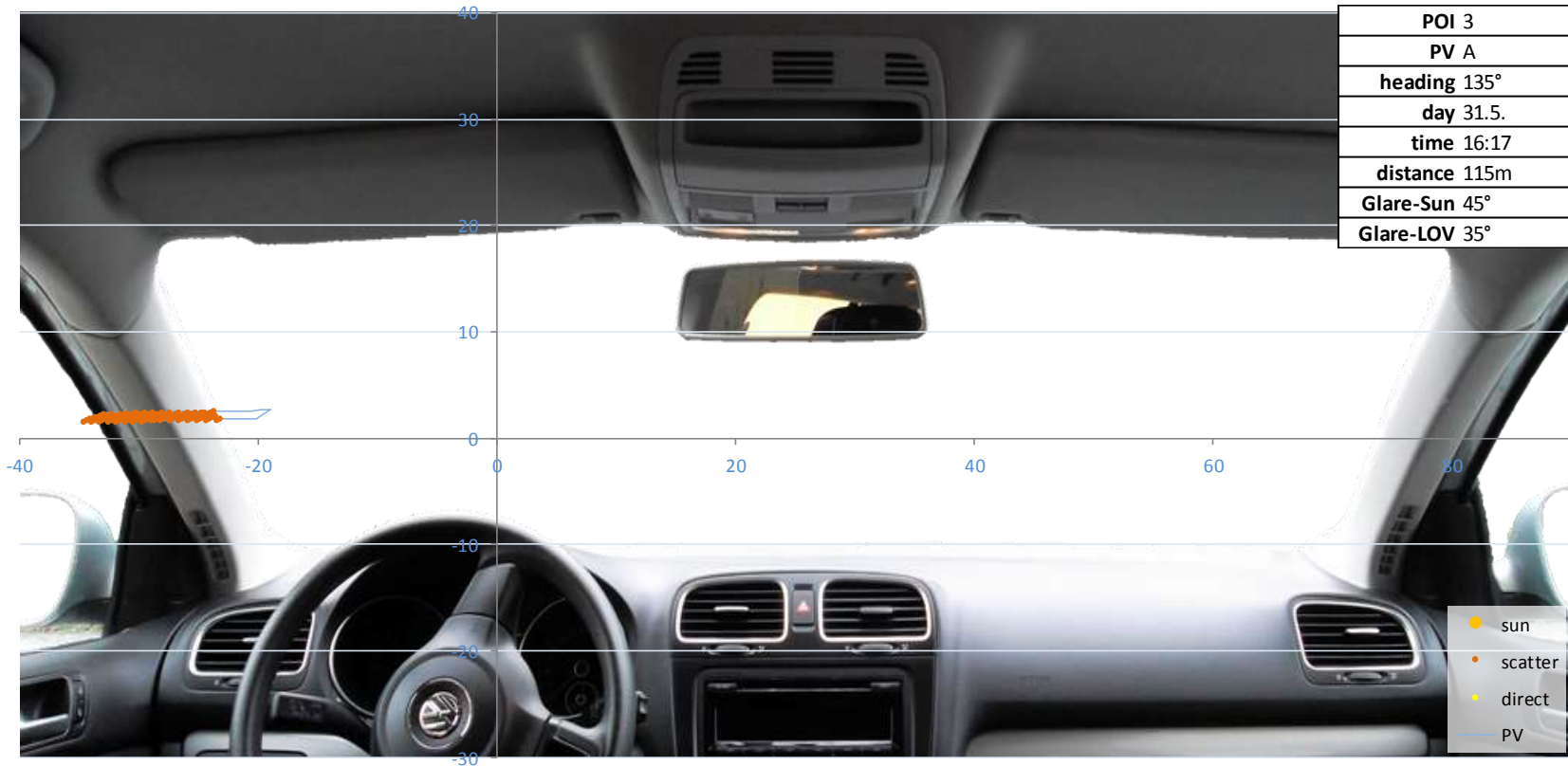


# Line of Vision

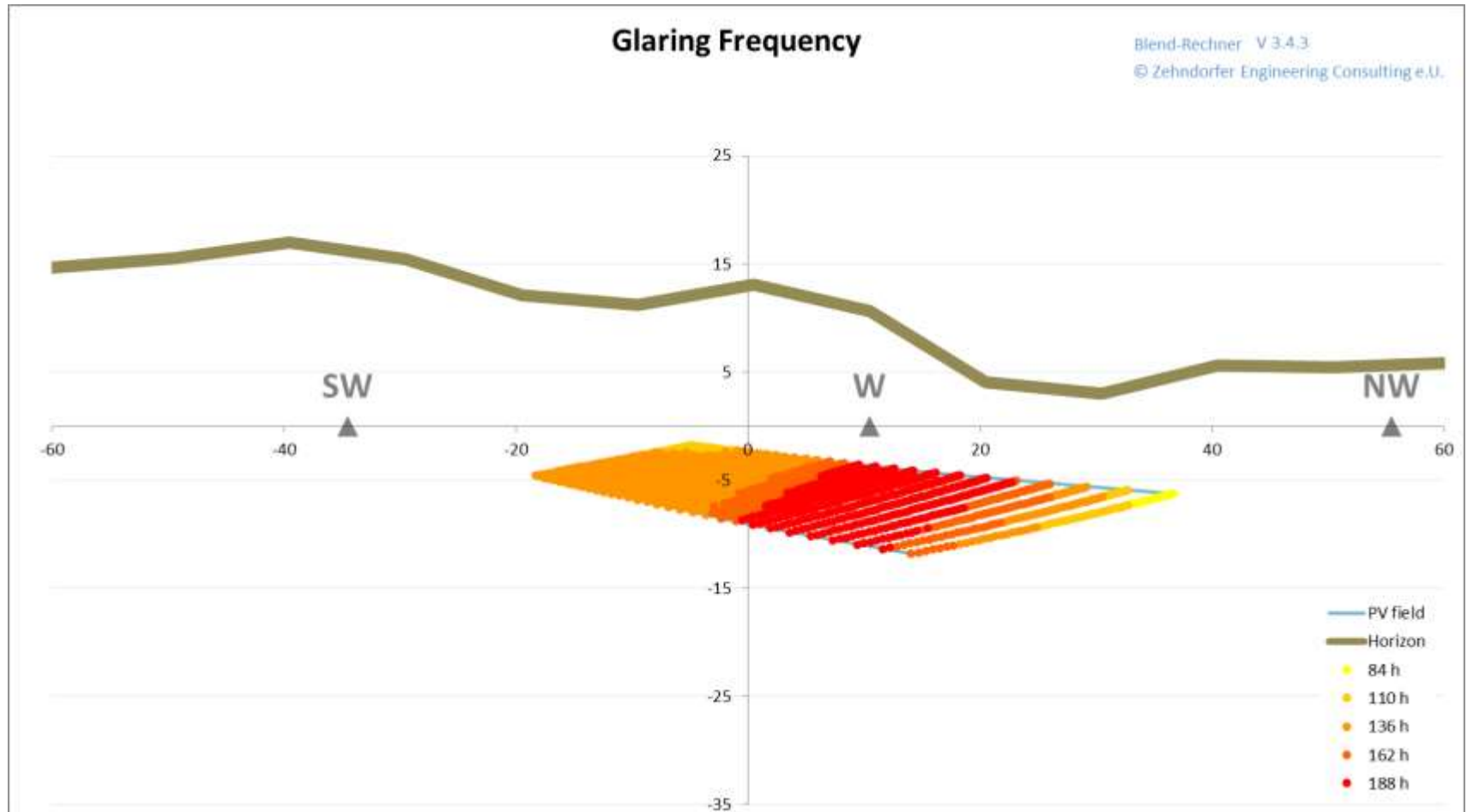
## Cockpit View

Blend-Rechner V 3.2.1

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# Glaring Frequency



# Solar Glare Assessment

- calibration of locations
  - PV Plant
  - Points of Interest
- Solar Glaring Calculation
  - What if? Iterative Process
  - Angle, Locations, Shading
- Interpretation and Evaluation



# Glare-reducing measurements

- Change of the reflecting surface
- Shading of the reflecting surface
- Shading of the point of interest
- Change or orientation



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