Transmitted by the expert from GTB

Informal Document No. **GRE-64-24**
(64th GRE, 4-7 October 2010,
agenda item 5(f))

Proposal for Amendments to Regulations 6,7 and 48

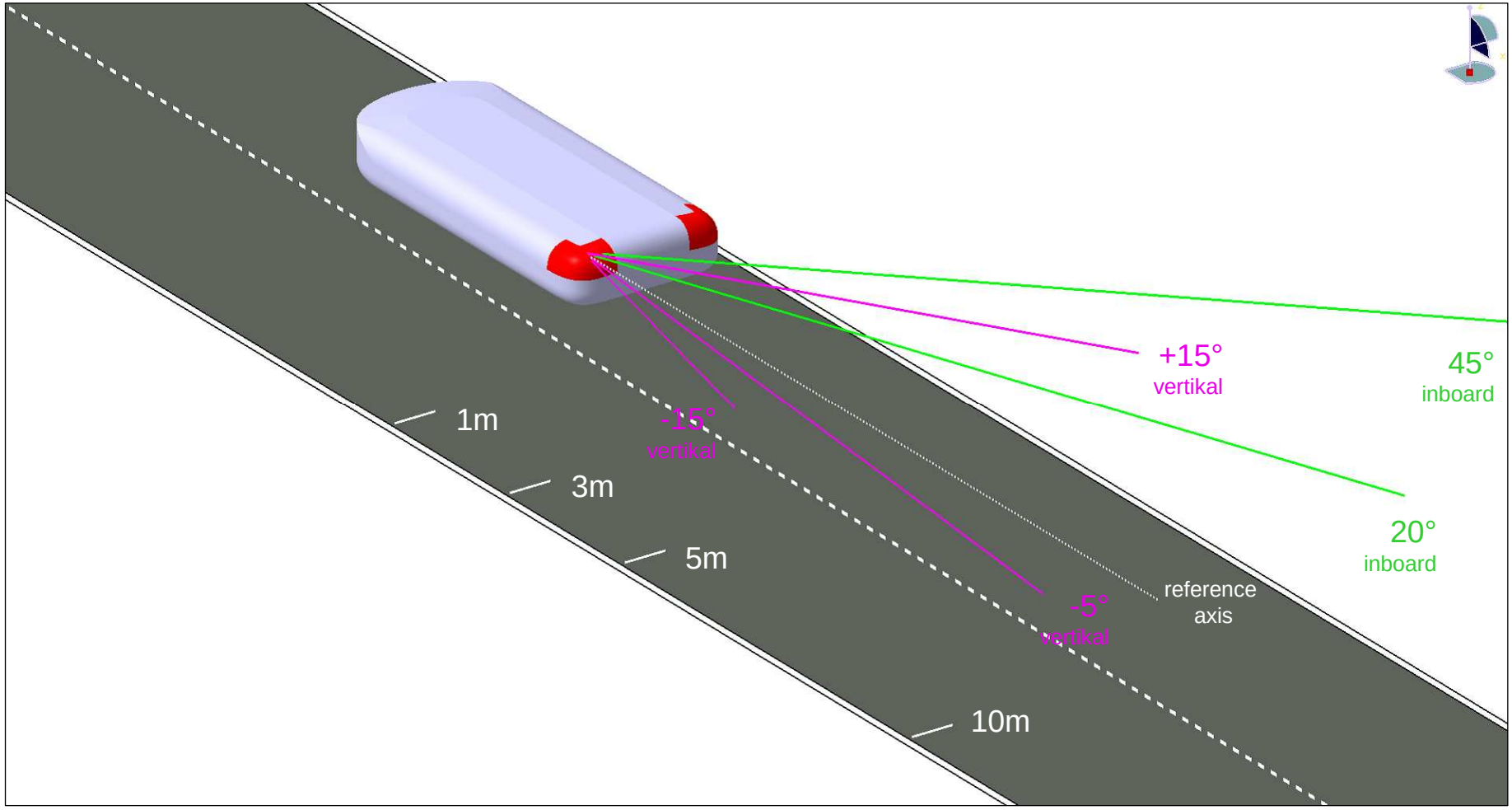
The diagrams reproduced below were prepared by the expert from the Working Party "Brussels 1952" (GTB) to provide supporting information in relation to the proposals to introduce, into regulation Nos. 6,7 and 48, provisions for reduced inboard geometric visibility below the horizontal plane for rear direction indicator, rear position lamp and stop lamp.

This supporting information applies to documents: ECE/TRANS/WP29/GRE/2010/29, ECE/TRANS/WP29/GRE/2010/31 and ECE/TRANS/WP29/GRE/2010/36.

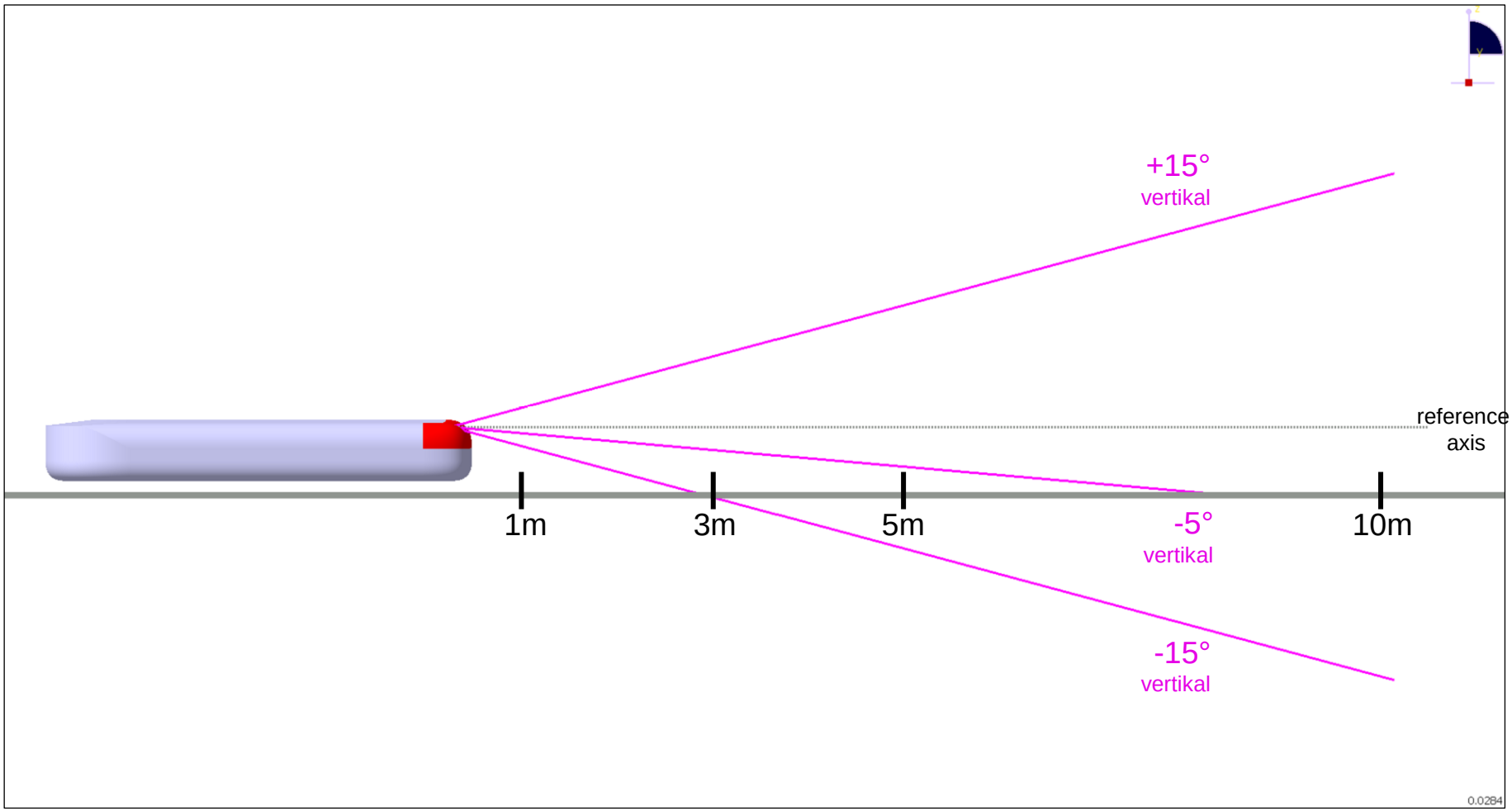
specifications / legend

- Width of rear lamps: 1.4 m
- Height of rear lamps: < 0.75 m
- Width of lanes: 2.0 m
- Measuring grids: 1 and 3 m (distance)
  1.2 m (height, different widths)
- Used light distribution: stop lamp (complete geometric visibility)
- other geometry: reference axis (white)
  line 15° up (purple)
  line 5° down (purple)
  line 15° down (purple)
  line 20° inboard (green)
  line 45° inboard (green)
- Distance markings: 1, 3, 5 and 10 m (relating to rear lamps)

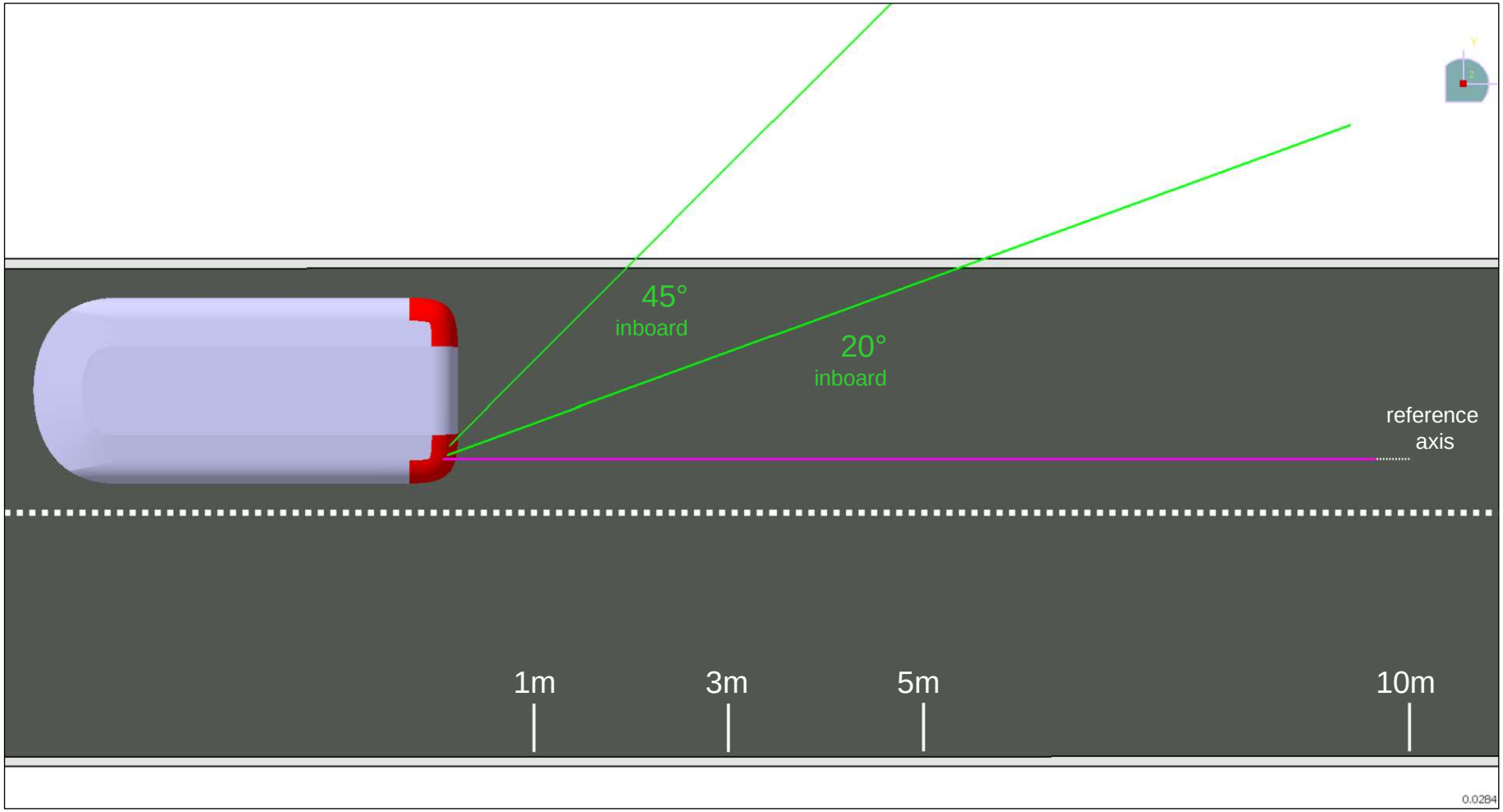
vehicle and road geometry birds-eye view



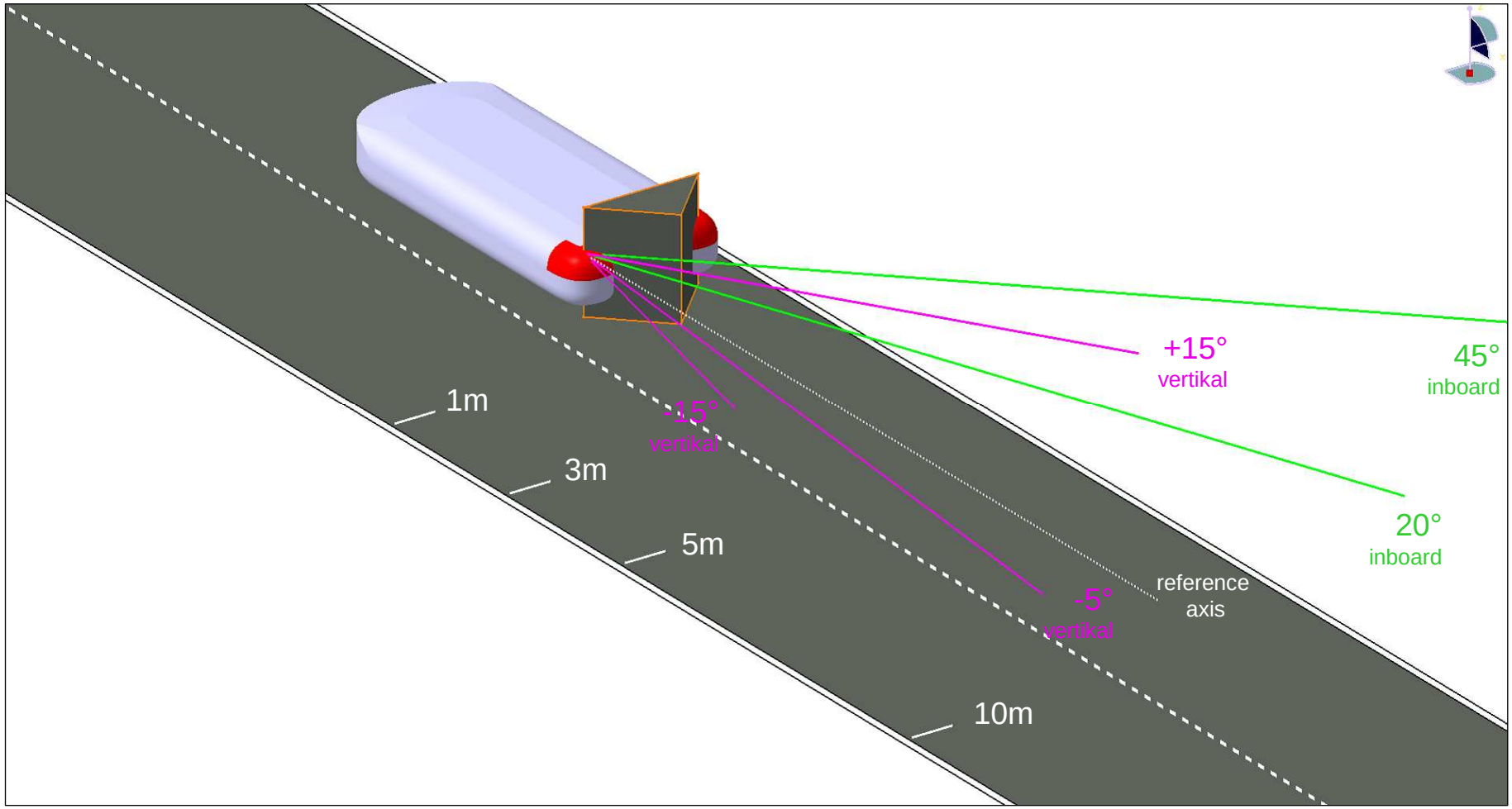
vehicle and road geometry - side view



vehicle and road geometry - top view

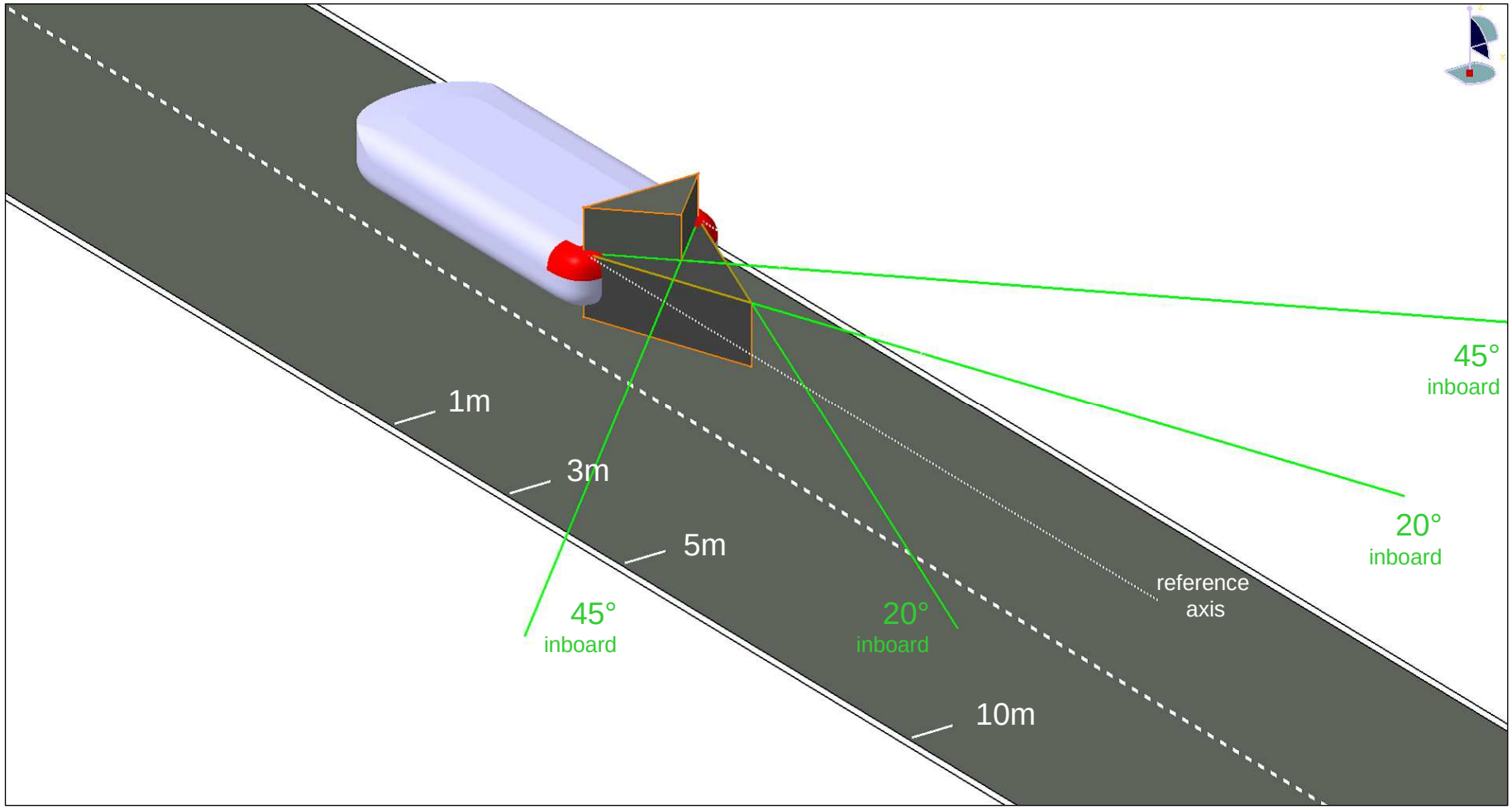


‘dark zone’
resulting from actual inboard geometric visibility (45°)



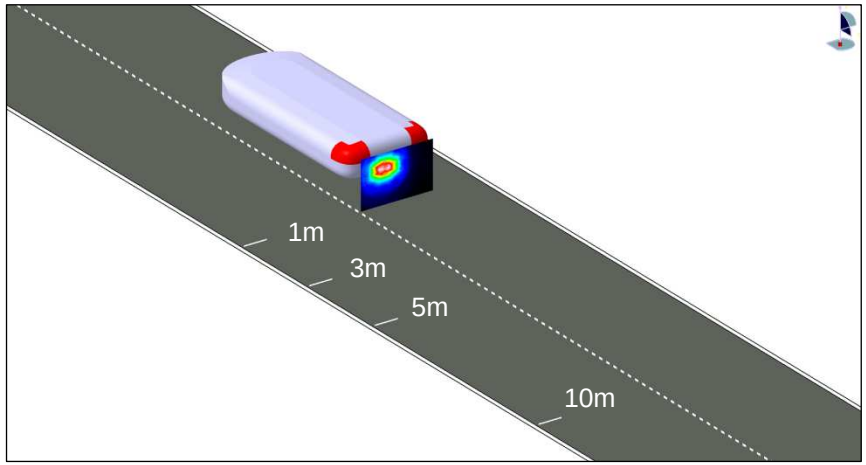
‘dark zone’
resulting from proposed inboard geometric visibility

Reduce visibility angle to **20°** inboard below the H plane (when mounted below 750 mm)



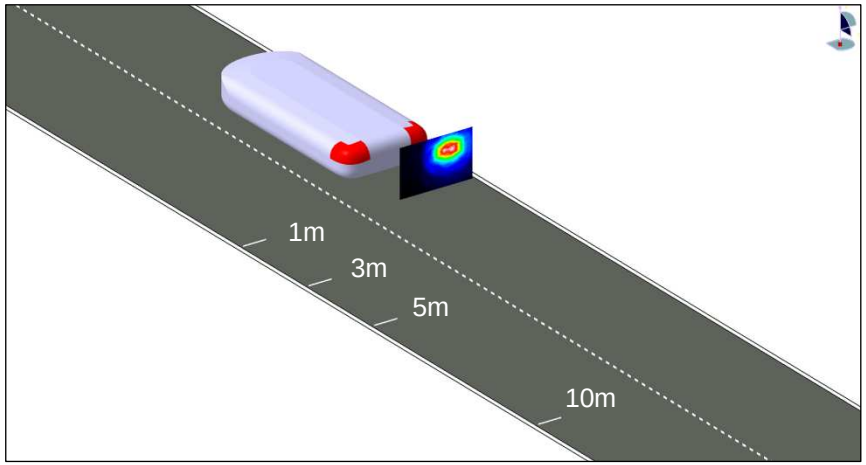
light intensity distribution (1 m grid) – influence of proposed reduction on visibility

left rear lamp



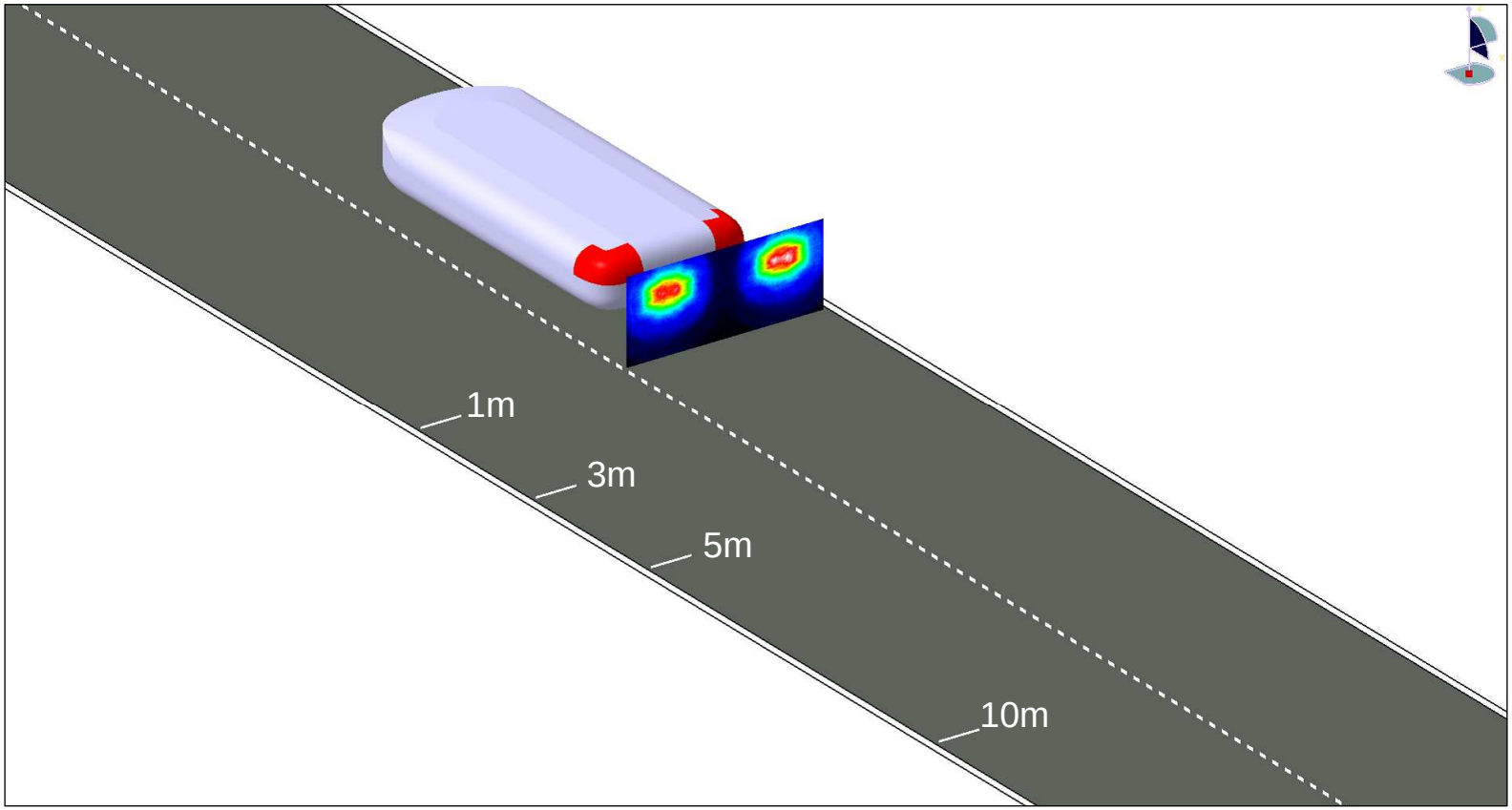
+

right rear lamp



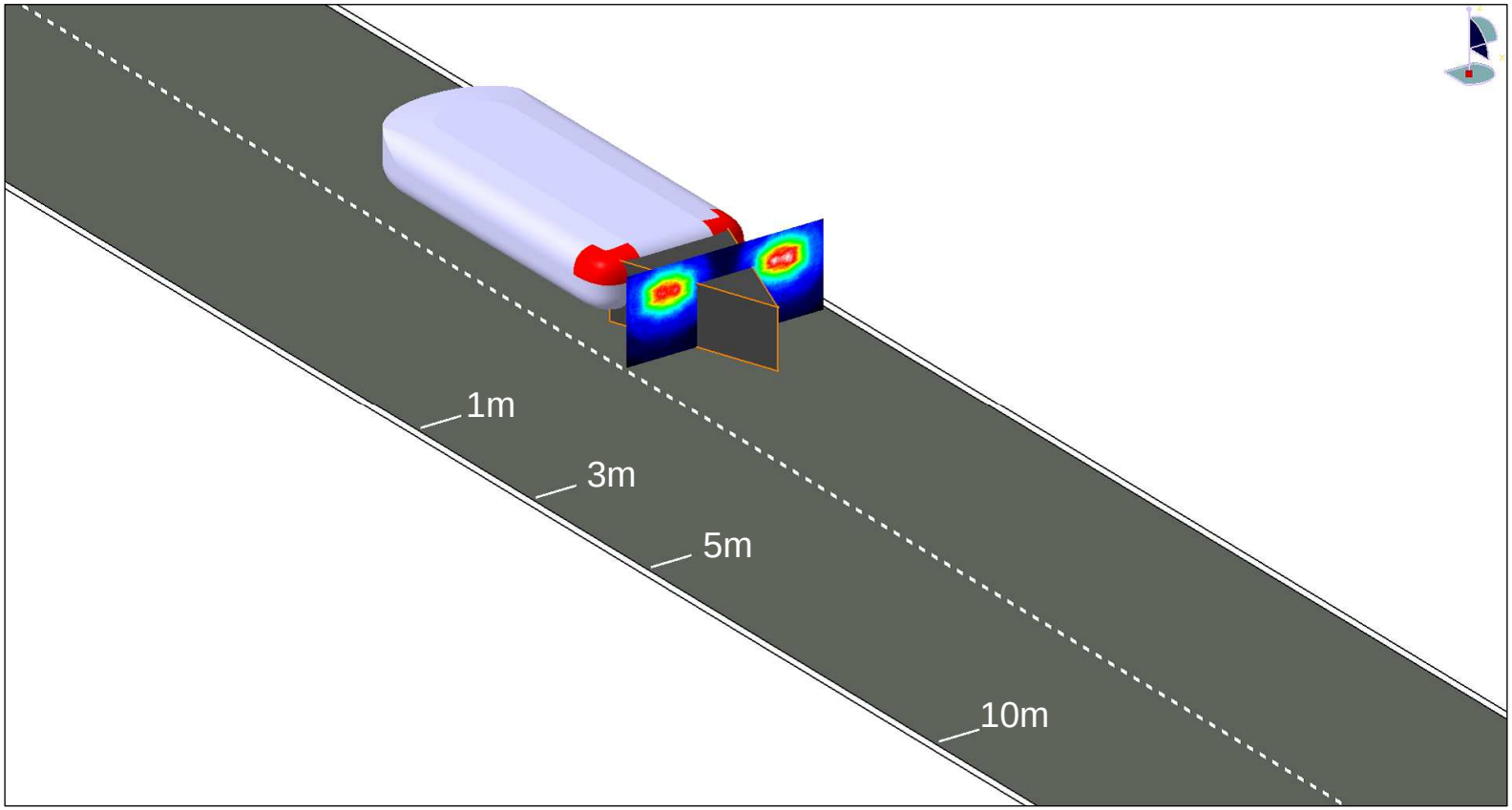
Light intensity distribution of the left and right mounted lamps plotted on a vertical plane located at 1m distance

light intensity distribution (1 m grid) – influence of proposed reduction on visibility (cont'd)



Light intensity distribution of the left and right mounted lamps plotted on a vertical plane located at 1 m distance. There is a dark area between the two lamps where no light is perceptible.

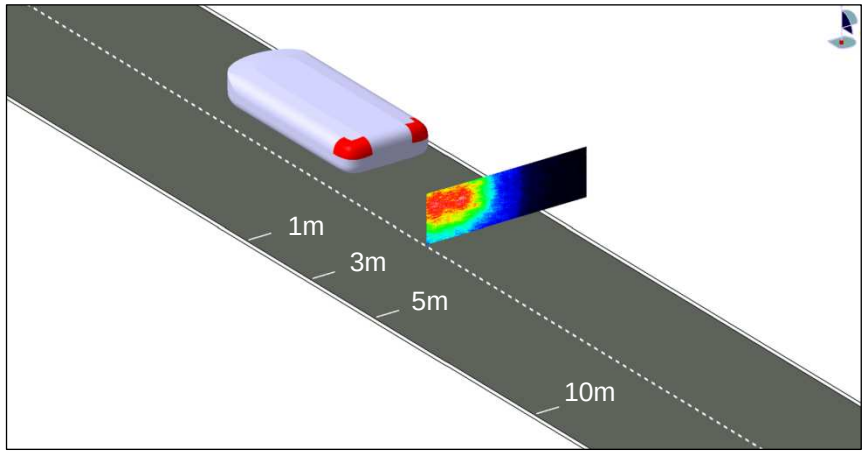
light intensity distribution (1 m grid) – influence of proposed reduction on visibility (cont'd)



Proposed reduction of inboard geometric visibility below the H plane does not compromise the required light distribution in space of the relevant function!

light intensity distribution (3 m grid) – influence of proposed reduction on visibility

left rear lamp



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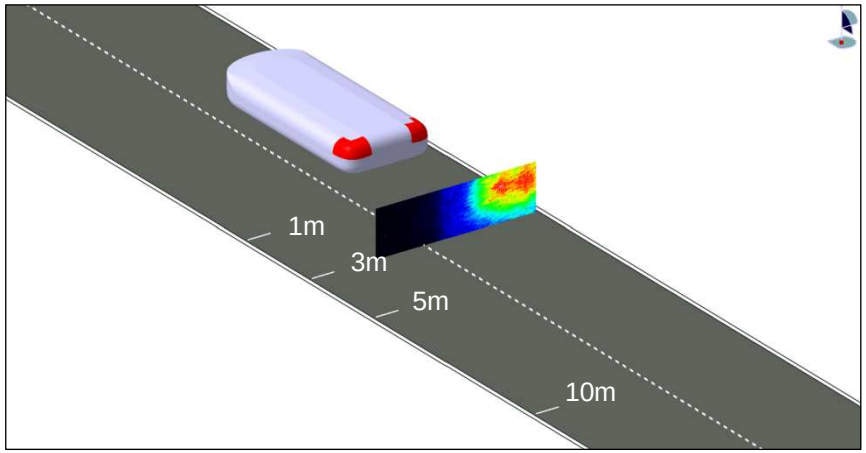
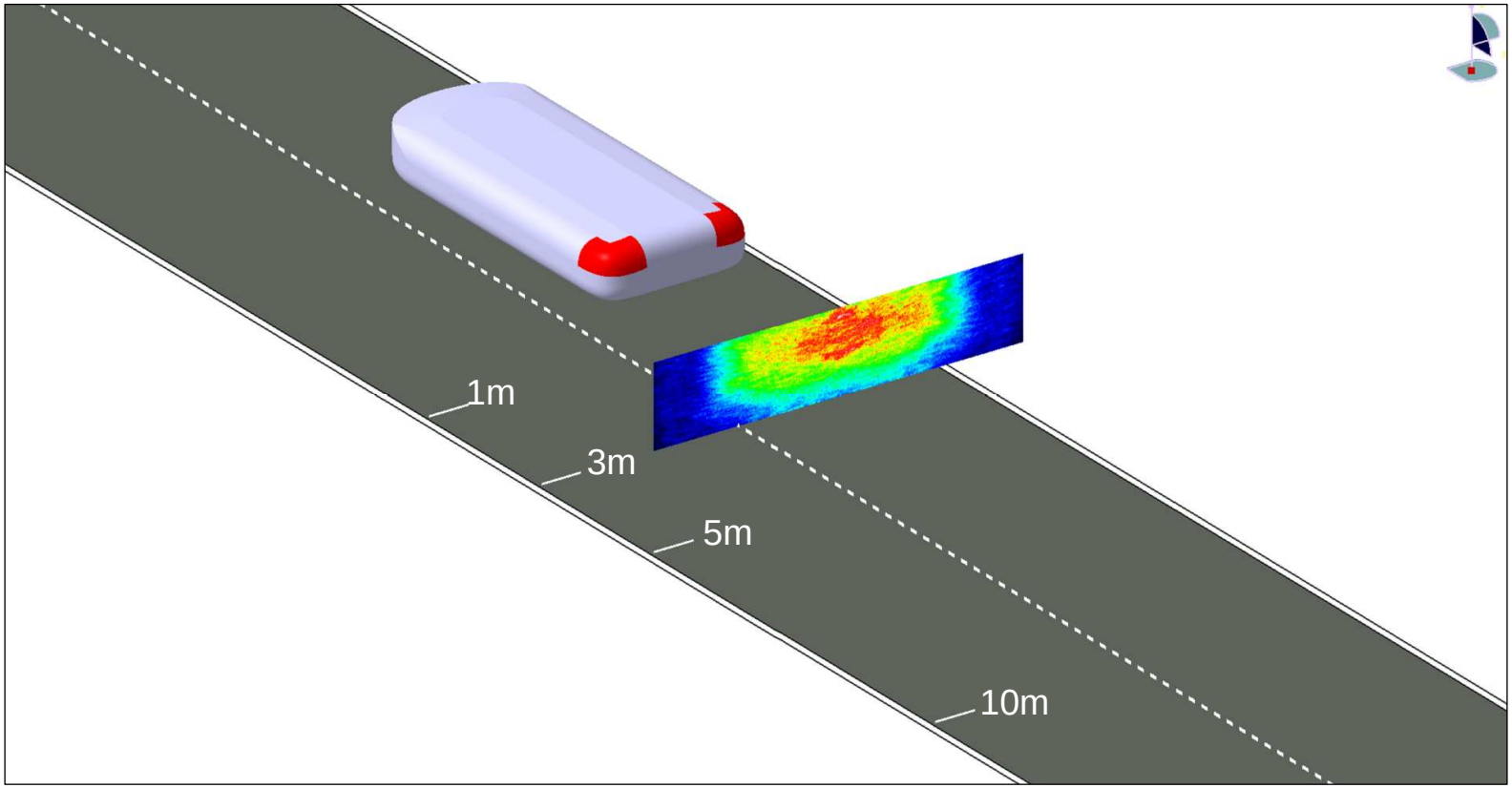
right rear lamp



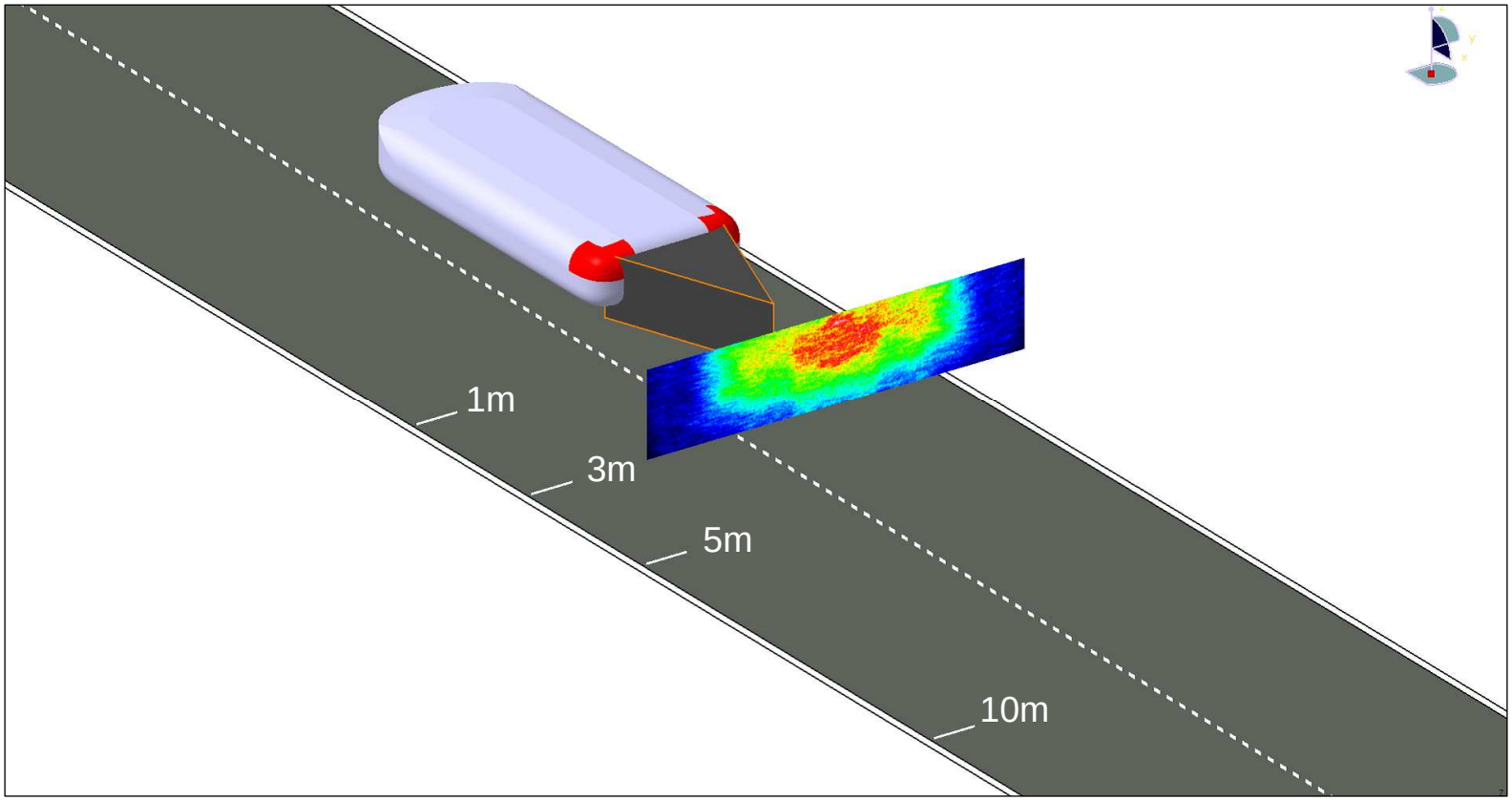
Light intensity distribution of the left and right mounted lamps plotted on a vertical plane located at 3m distance

light intensity distribution (3 m grid) – influence of proposed reduction on visibility (cont'd)



Light intensity distribution of the left and right mounted lamps plotted on the vertical plane located at 3 m distance. In the whole area an observer would perceive light from at least one rear lamp.

light intensity distribution (3 m grid) – influence of proposed reduction on visibility (cont'd)

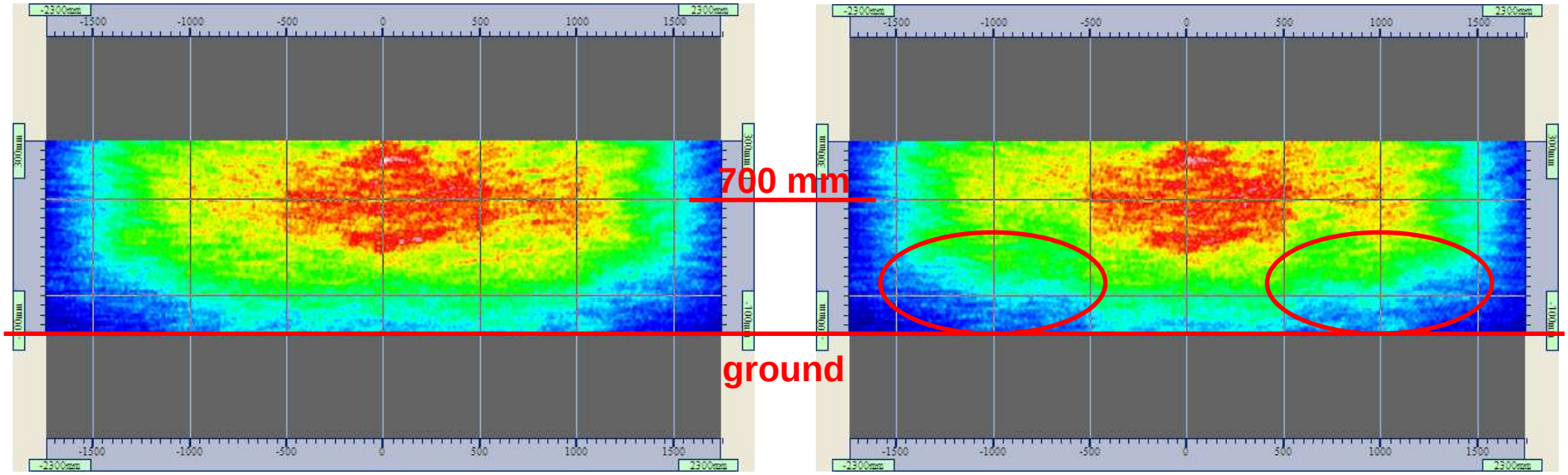


Influence of reduced inboard visibility angle – only minimal effect on the light perceived by the observer.

light intensity distribution (3 m grid) – influence of proposed reduction on visibility (cont'd)

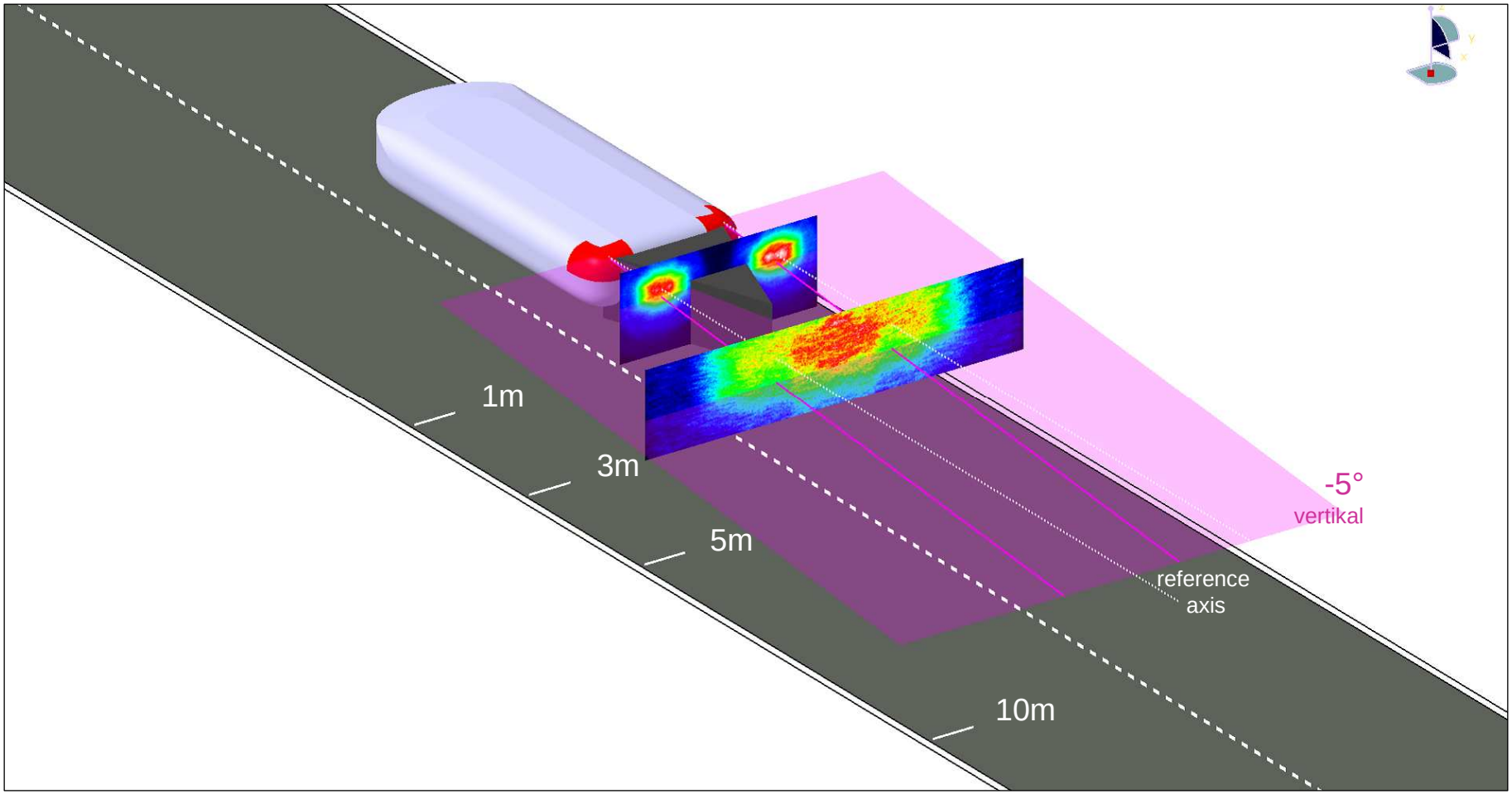
inboard visibility angle '– 45°

<u>reduced</u> inboard visibility angle '– 20°



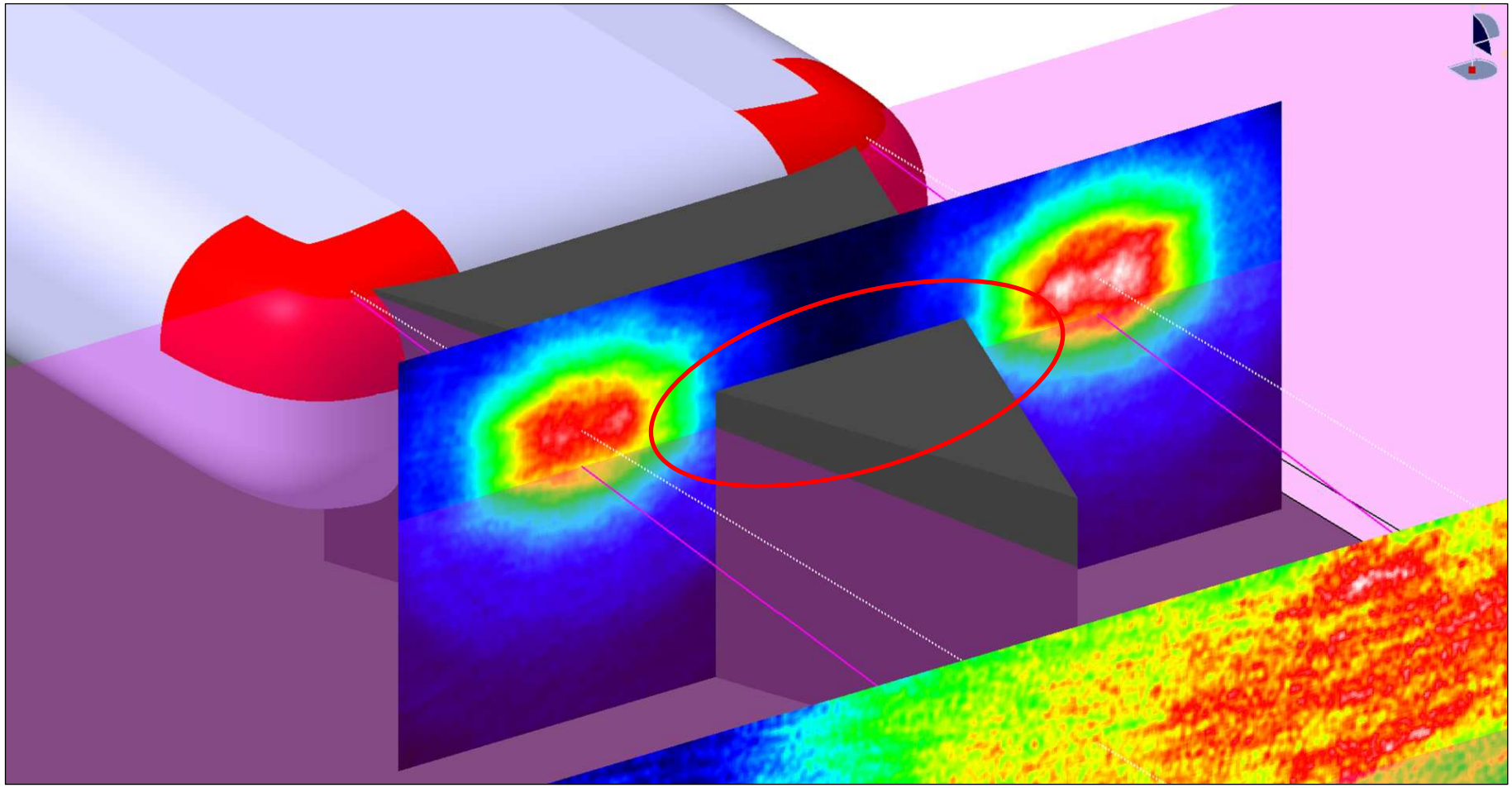
The noticeable variation of perceived light intensity distribution is only noticeable below the H plane (approx. up to 40 cm above the ground)

comparison of reduced inboard visibility to reduced downward visibility



Reduction of downward visibility restricted to mounting height less than 750 mm

only small difference between
reduced downward and inboard visibility



proposal for reduced inboard geometric visibility – conclusions

- Reduction of inboard visibility angle to 20° below t he H plane will increase the resulting ‘dark zone’ by approximately 1.2 m (from 0.72m to 1.92m).
  - Taking into account, that only inside a ‘small’ triangle behind the car and under the H plane the visibility of the rear lamps will be less perceptible, and assuming a typical hood of a (following) car with a length of at least 1.2 m minimum, the eyes of any following driver will not perceive any visibility reduction.
- At a distance of 3 m behind a vehicle, the combined light distribution of the left and right mounted lamps shows only minor effect due to a reduced inboard visibility angle
  - There is an insignificant reduction of the light intensity distribution below the H plane (approx. up to 40 cm above the ground – at 3 m distance
- Reduction of downward visibility angle to 5° (alread y current practice when mounted below 750 mm) has almost the same impact as the proposed reduction of inboard visibility angle to 20°
  - The proposed reduced in inboard geometric visibility is based upon this same 750mm mounting height.

➢ **No negative safety implications are expected from the reduction of the inboard geometric visibility angle from 45° to 20° be low the H plane.**