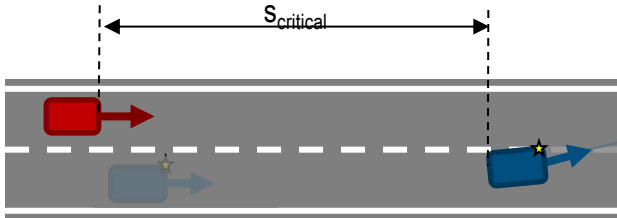


# Assessment of target lane

## ACSF C: Concept of defining “critical situation”



$$S_{critical} = (v_{rear} - v_{ACSF}) \cdot t_{reaction} + \frac{(v_{ACSF} - v_{rear})^2}{2 \cdot a_{rear}} + v_{ACSF} \cdot t_G$$

Parameter		Values for ACSF C (UNR79 para. 5.6.4.7.)
$v_{Rear}$	actual speed of rear vehicle	variable ( $\leq 130$ km/h)
$t_{Reaction}$	reaction time (of driver) in rear vehicle = time after the start of the LCM at which the deceleration of the rear vehicle starts	0.4 s*
$a_{Rear}$	deceleration of rear vehicle	3 m/s <sup>2</sup>
$v_{ACSF}$	actual speed of the ACSF vehicle	variable
$t_G$	time of safety gap of ACSF vehicle	1 s



Example:

$v_{Rear} = 130$  km/h

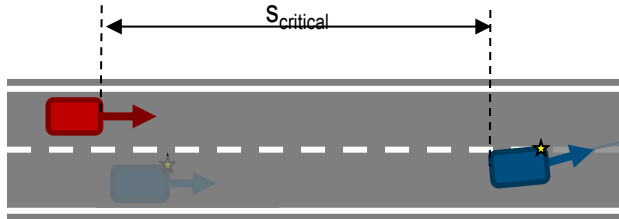
$v_{ACSF} = 80$  km/h

→  $s_{critical} = \underline{59.9 \text{ m}}$

\* +continuous lateral movement of the vehicle before crossing the lane marking.

# Assessment of target lane

## Proposal for ALKS lane change (GRVA/2020/33)



$$S_{critical} = (v_{rear} - v_{ALKS}) \cdot t_{reaction} + \frac{(v_{ALKS} - v_{rear})^2}{2 \cdot a_{rear}} + v_{ALKS} \cdot t_G$$

Parameter	Values for ALKS (2020/33 para. 5.2.6.6.1.)
$v_{Rear}$	variable ( $\leq 130$ km/h)
$t_{Reaction}$	0.4 s or 1.4 s <b>B</b>
$a_{Rear}$	3 m/s <sup>2</sup> <b>A</b>
$v_{ACSF}$	variable
$t_G$	1 s <b>C</b>



5.2.6.6.1. An approaching vehicle in the target lane should not have to decelerate at a higher level than A m/s<sup>2</sup>, B seconds after the ALKS vehicle starts crossing a lane marking, to ensure the distance between the two vehicles is never less than that which the lane change vehicle travels in C seconds.

With:

(a) A equal to 3 m/s<sup>2</sup>;

(b) B equal to:

(i) 0.4 seconds after the ALKS vehicle has crossed the lane marking, provided there was at least 1.0 s lateral movement of the ALKS vehicle within the starting lane in principle visible to an approaching vehicle from the rear without an obstruction before the LCM starts; or

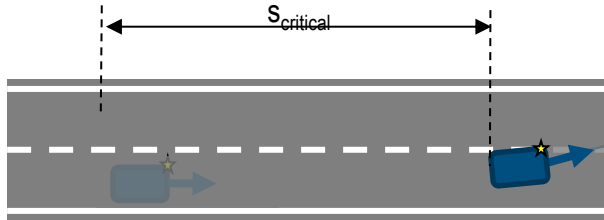
(ii) 1.4 seconds after the ALKS vehicle has crossed the lane marking, provided there was not at least 1.0 s lateral movement of the ALKS vehicle within the starting lane in principle visible to an approaching vehicle from the rear before the LCM starts.

(c) C equal to 1 second.

# Assessment of target lane

## Proposal for ALKS lane change (GRVA/2020/33)

- In case no approaching vehicle in target lane (same concept to ACSF C):



$$s_{critical} = (v_{rear} - v_{ALKS}) \cdot t_{reaction} + \frac{(v_{ALKS} - v_{rear})^2}{2 \cdot a_{rear}} + v_{ALKS} \cdot t_G$$

Parameter	Values for ALKS (2020/33 para. 5.2.6.6.2.)
$v_{Rear}$	e.g. 130 km/h
$t_{Reaction}$	0.4 s or 1.4 s
$a_{Rear}$	3 m/s <sup>2</sup>
$v_{ACSF}$	variable
$t_G$	1 s

5.2.6.6.2. If no approaching vehicle is detected by the system in the target lane, the minimal gap to the rear shall be calculated under the assumption that:

(a) an approaching vehicle on a target lane intended for faster traffic (including enter lanes) is travelling with the allowed or the advised maximum speed whichever is lower; or

(b) an approaching vehicle on a target lane intended for slower traffic (including exit lanes and shoulders temporarily opened for regular traffic) is travelling with a maximum speed difference of 20 km/h at the beginning of the LCM while not exceeding the allowed or advised maximum speed.