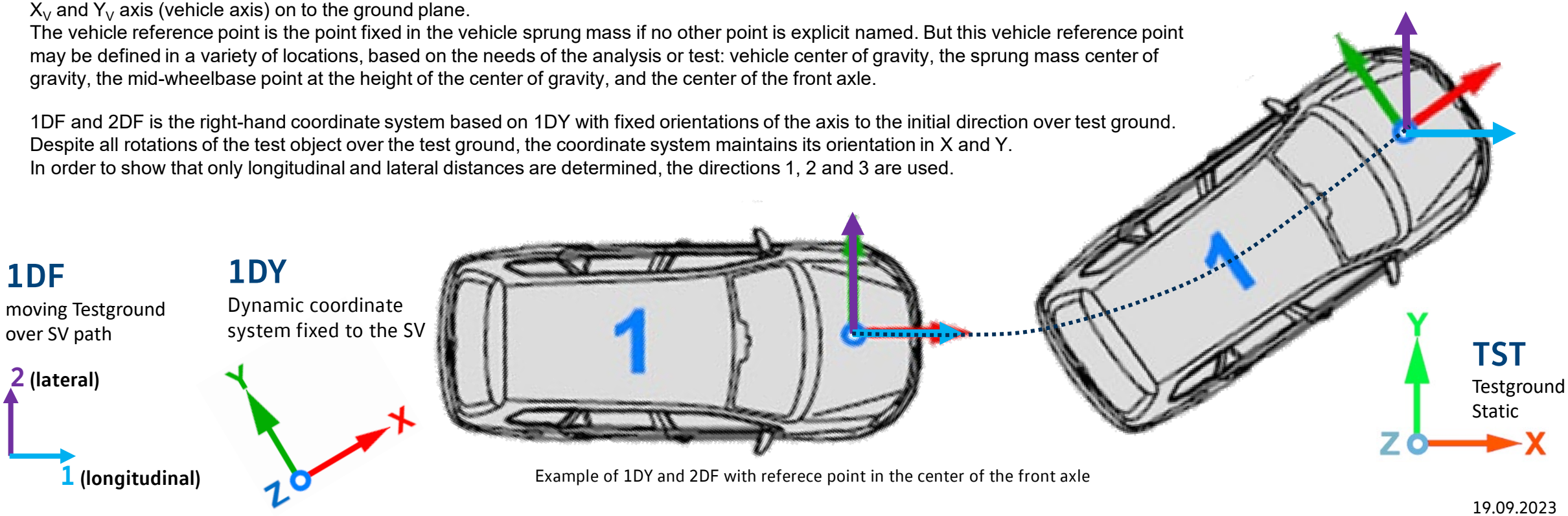
ID	Characteristic	Directions	Description	Remark
1DY	SV dynamic	X Y Z	Dynamic coordinate system fixed to the SV	Vehicle coordinate systemaccording ISO 8855. Moving direction is X
2DY	Target dynamic	X Y Z	Dynamic coordinate system fixed to the target	Analog to a vehicle coordinate system according ISO 8855. Moving direction is X
1DF	SV dynamic with orientation fixed over TST	1 2 3	Dynamic coordinate system with orientation fixed to TST; center fixed to the moving SV	Vehicle coordinate system based on 1DY on test start. Moving direction is 1
2DF	target dynamic with orientation fixed over TST	1 2 3	Dynamic coordinate system with orientation fixed to TST; center fixed to the moving target	Vehicle coordinate system based on 2DY on test start. Moving direction is 1
TST	Testground Static	X Y Z	Stationary earth-fixed axis system with an origin that is fixed in the ground plane	Derived from NED system by moving the origin to a point at the test ground and rotating the X axis to the main driving direction.

Explanation from RED F

1DY and 2DY are right-hand coordinate systems according to ISO 8855, where: $Z = \vec{X} \times \vec{Y}$.
The X and Y axes of the coordinate system are parallel to the ground plane, with the X and Y axis aligned with the vertical projection of the X_V and Y_V axis (vehicle axis) on to the ground plane.
The vehicle reference point is the point fixed in the vehicle sprung mass if no other point is explicit named. But this vehicle reference point may be defined in a variety of locations, based on the needs of the analysis or test: vehicle center of gravity, the sprung mass center of gravity, the mid-wheelbase point at the height of the center of gravity, and the center of the front axle.

1DF and 2DF is the right-hand coordinate system based on 1DY with fixed orientations of the axis to the initial direction over test ground.
Despite all rotations of the test object over the test ground, the coordinate system maintains its orientation in X and Y.
In order to show that only longitudinal and lateral distances are determined, the directions 1, 2 and 3 are used.



Example of 1DY and 2DF with referece point in the center of the front axle

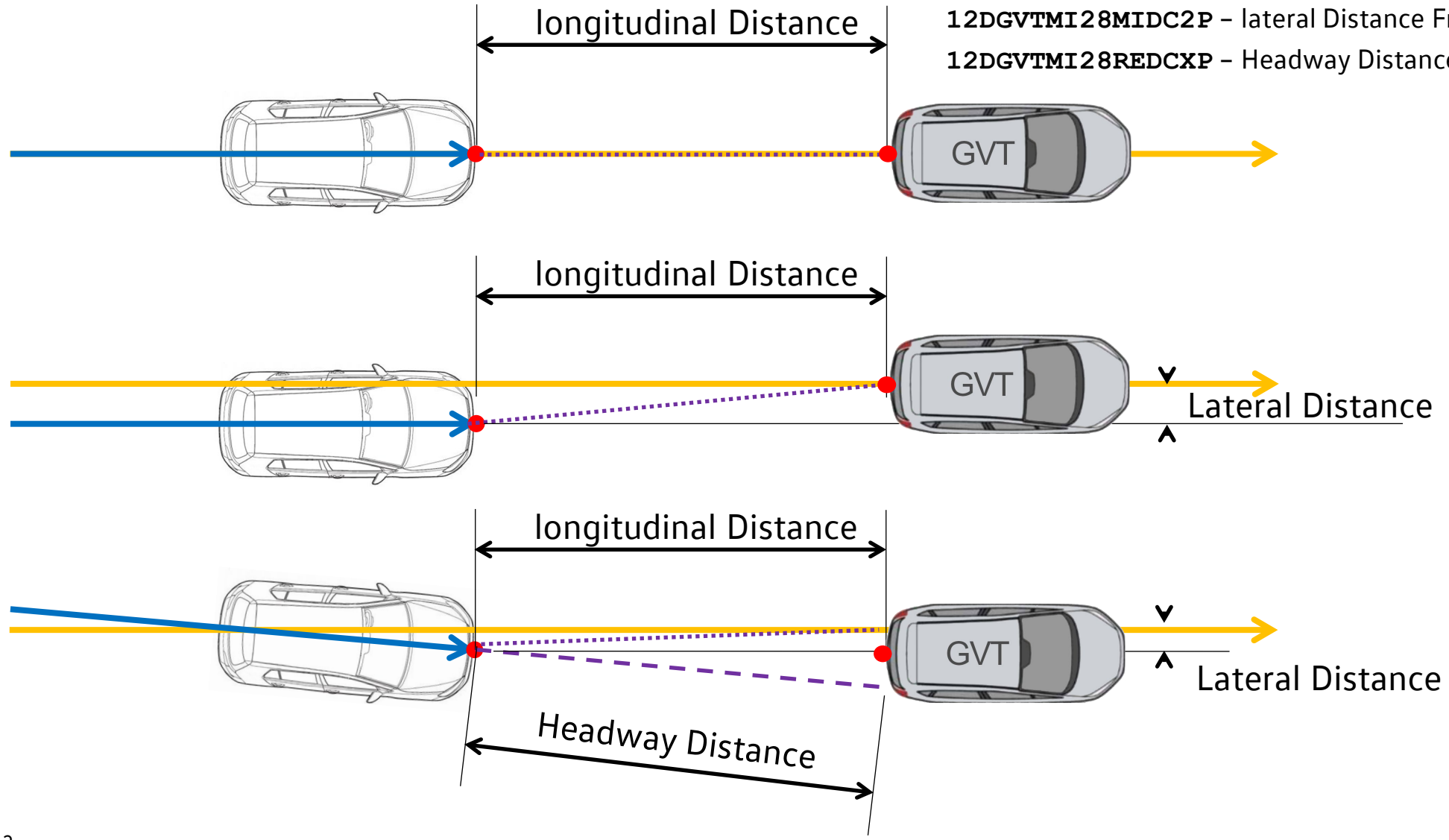
Lage der Referenzpunkte für Abstandsmessungen

C2C – CCRs, CCRm, CCRb

12DGVTMI28MIDC1P - longitudinal Distance Front VUT- Back GVT

12DGVTMI28MIDC2P – lateral Distance Front VUT- Back GVT

12DGVTMI28REDCXP – Headway Distance Front VUT- Back GVT (in X)



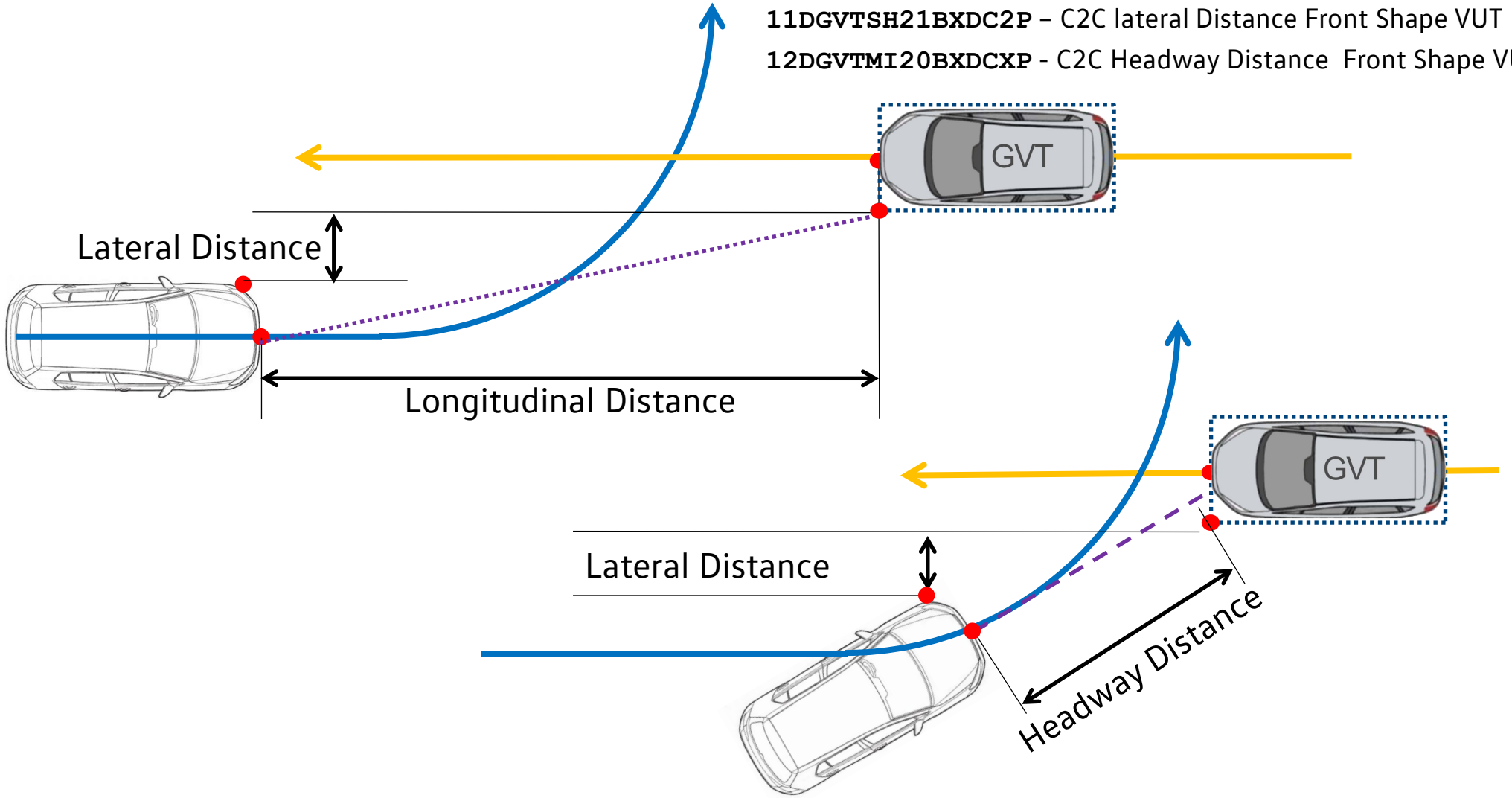
Lage der Referenzpunkte für Abstandsmessungen

C2C – CCFtap

11DGVTSH21BXDC1P - C2C longitudinal Distance Front Shape VUT – GVT Box

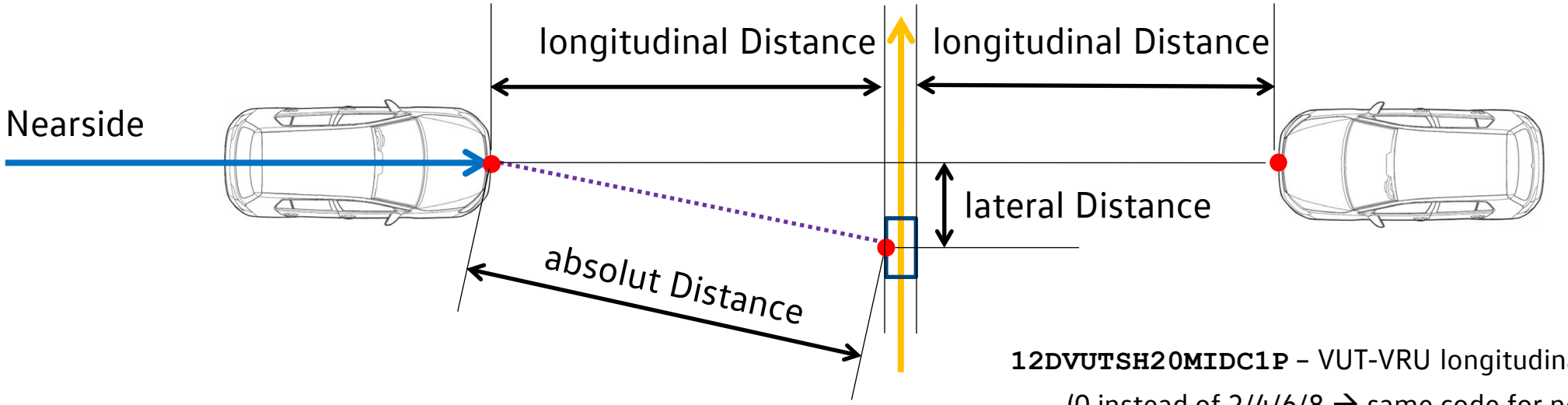
11DGVTSH21BXDC2P – C2C lateral Distance Front Shape VUT – GVT Box

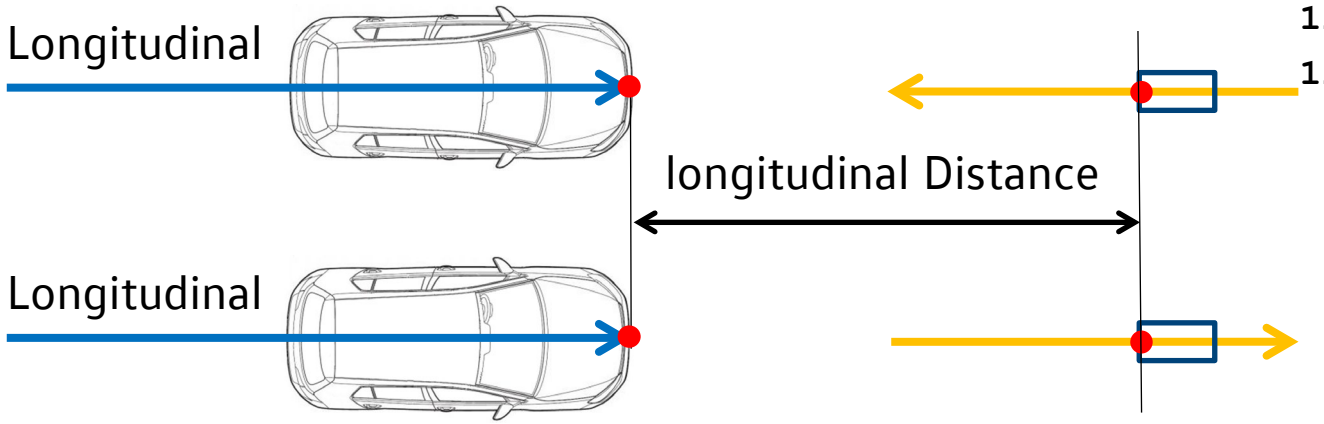
12DGVTMI20BXDCXP - C2C Headway Distance Front Shape VUT – GVT Box (in X)



Lage der Referenzpunkte für Abstandsmessungen

VRU – Nearside, Farside, Longitudinal





12DVUTSH20MIDC1P – VUT-VRU longitudinal Distance

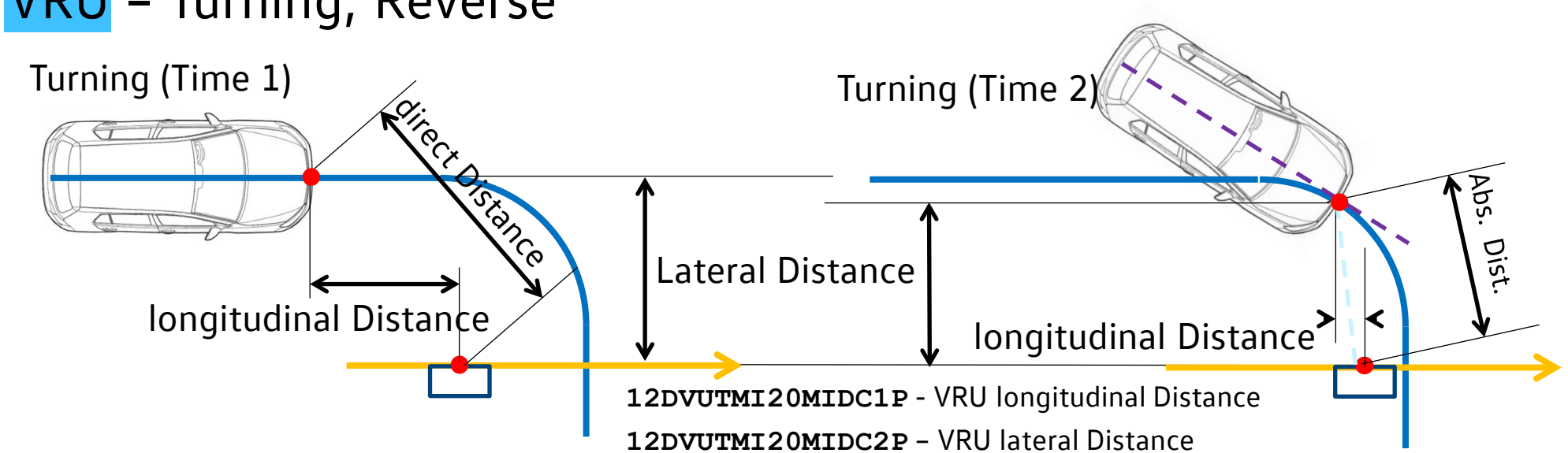
(0 instead of 2/4/6/8 → same code for nearside and farside

12DVUTMI20MIDC2P – VUT-VRU lateral Distance

12DVUTMI20MIDC0P – VUT-VRU absolut distance

Lage der Referenzpunkte für Abstandsmessungen

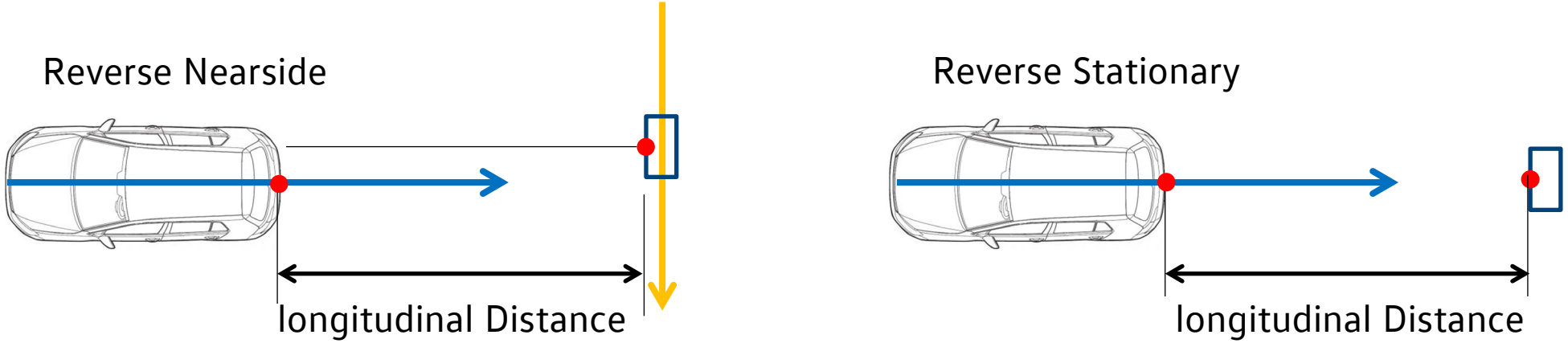
VRU – Turning, Reverse



12DVUTMI20MIDC1P - VRU longitudinal Distance

12DVUTMI20MIDC2P – VRU lateral Distance

12DVUTMI20MIDC0P – absolut distance



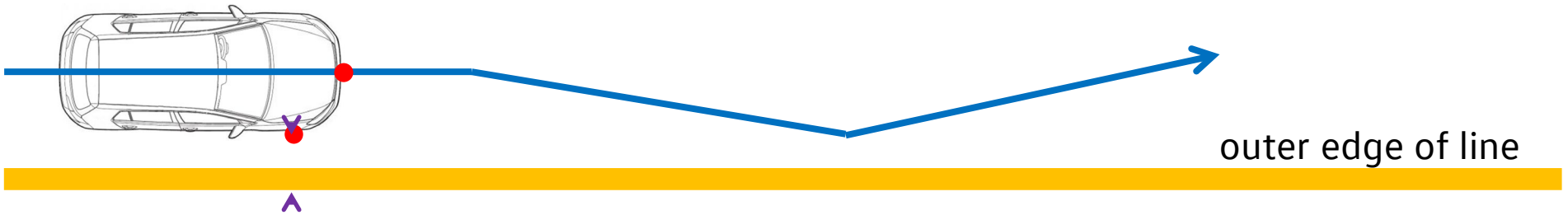
18DVUTMI20MIDC1P - VRU longitudinal Distance

18DVUTMI20MIDC2P – VRU lateral Distance

Lage der Referenzpunkte für Abstandsmessungen

LSS – Rightside

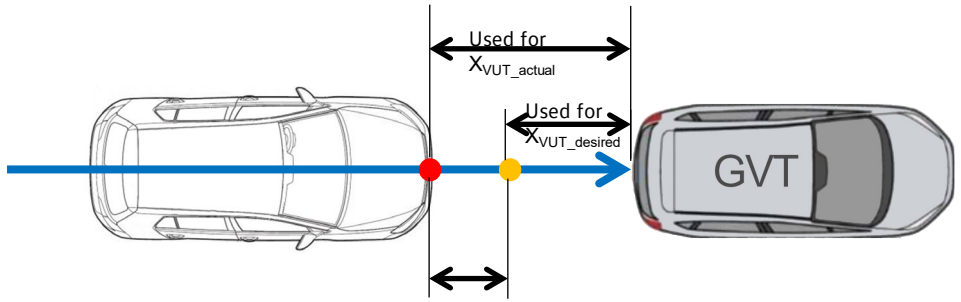
13DLININTY00DC2P - lateral distance Tyre to line crossing (inner edge)



13DLINOUTY00DC2P - lateral distance Tyre to line crossing (outer edge)

VUT Path error

VUT longitudinal path error

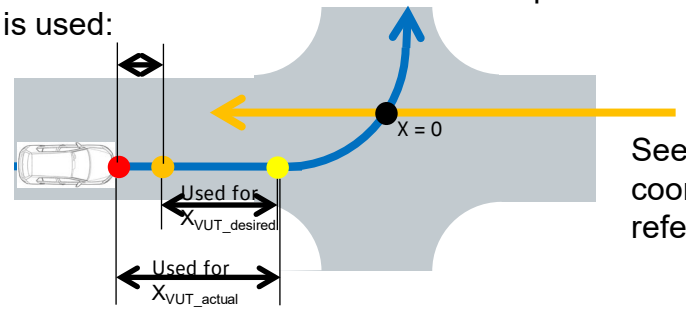


10VEHCPE0000DC1P = $X_{VUT\_desired}$ - X_{VUT_actual}

- X_{VUT_actual}: actual X-Coordinate of middle front of the VUT in relation to GVT
- $X_{VUT\_desired}$: desired X-Coordinate of middle front of the VUT in relation to GVT

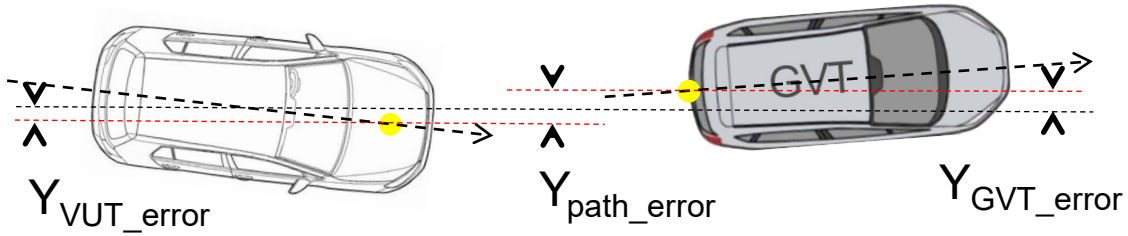
The longitudinal path error is the difference between actual distance VUT-GVT and desired distance VUT-GVT

***CCFtab+CMFtab:** Instead of GVT a fixed point before the collision point is used:



See Protocol for X coordinate of reference point

VUT lateral path error



10VEHCPE0000DC2P = Y_{VUT_error} + Y_{GVT_error}

CMFtab: The path error is calcualted by Y_{VUT_error}

10VEHCPE0000DC2P = Y_{VUT_error}