BSIS Alternative Test Procedure

Robot Implementation Overview

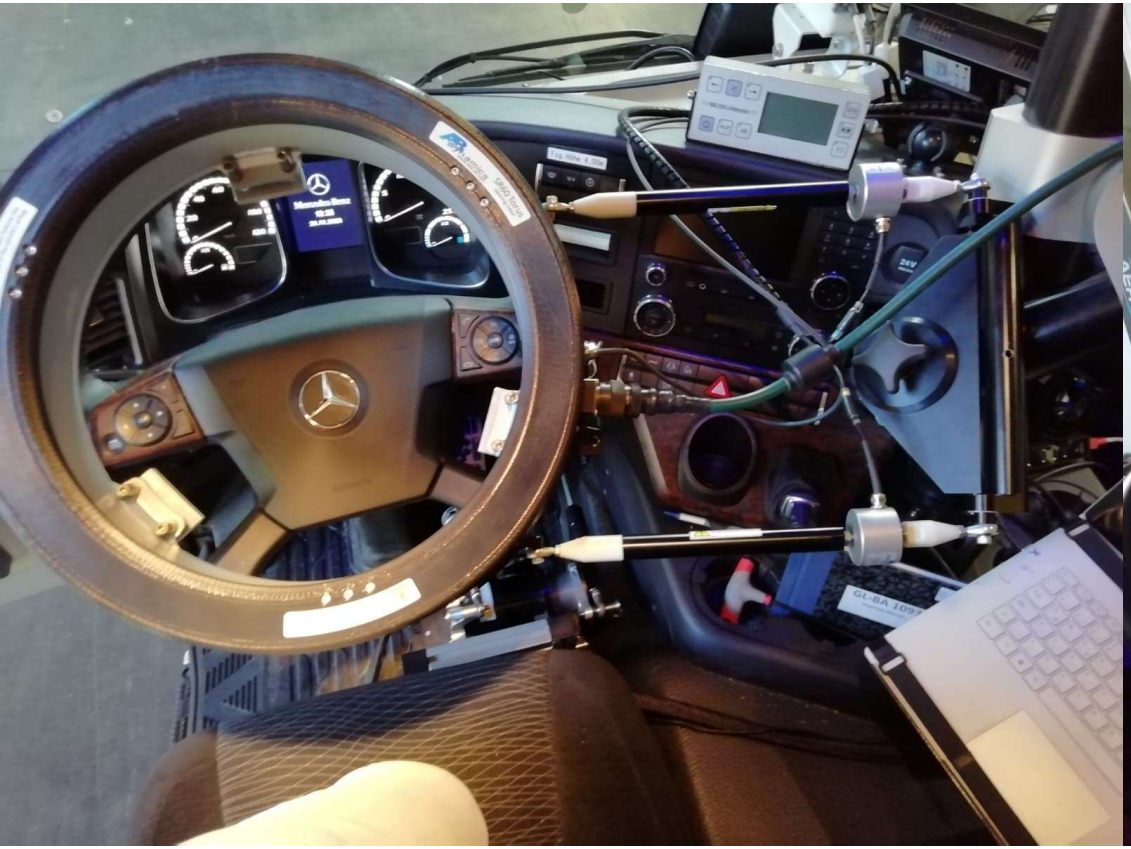
Vehicle

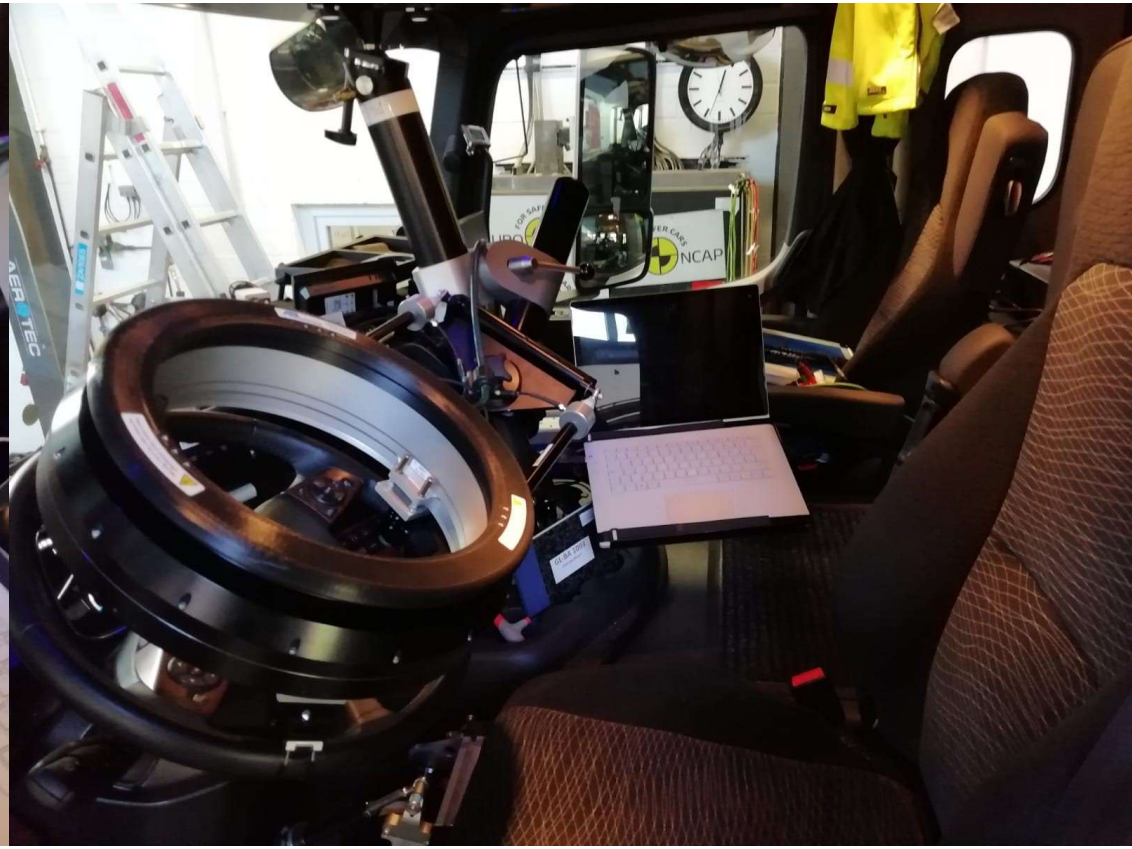
Sensor: ADMA G DGPS IMU

Actor: ABD SR 60
(60 Nm steering robot)

Actor: ABD CBAR
(combined brake + accelerator robot)

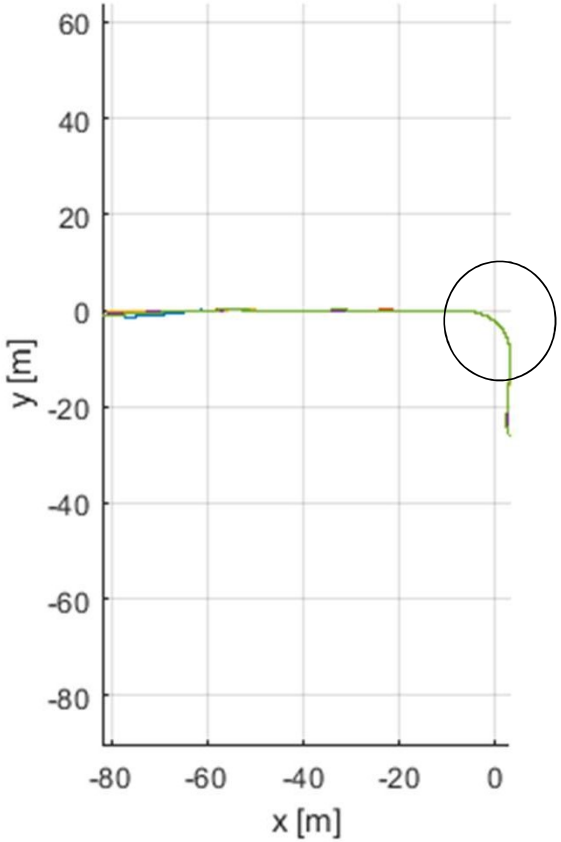
Steering Controller (Details)

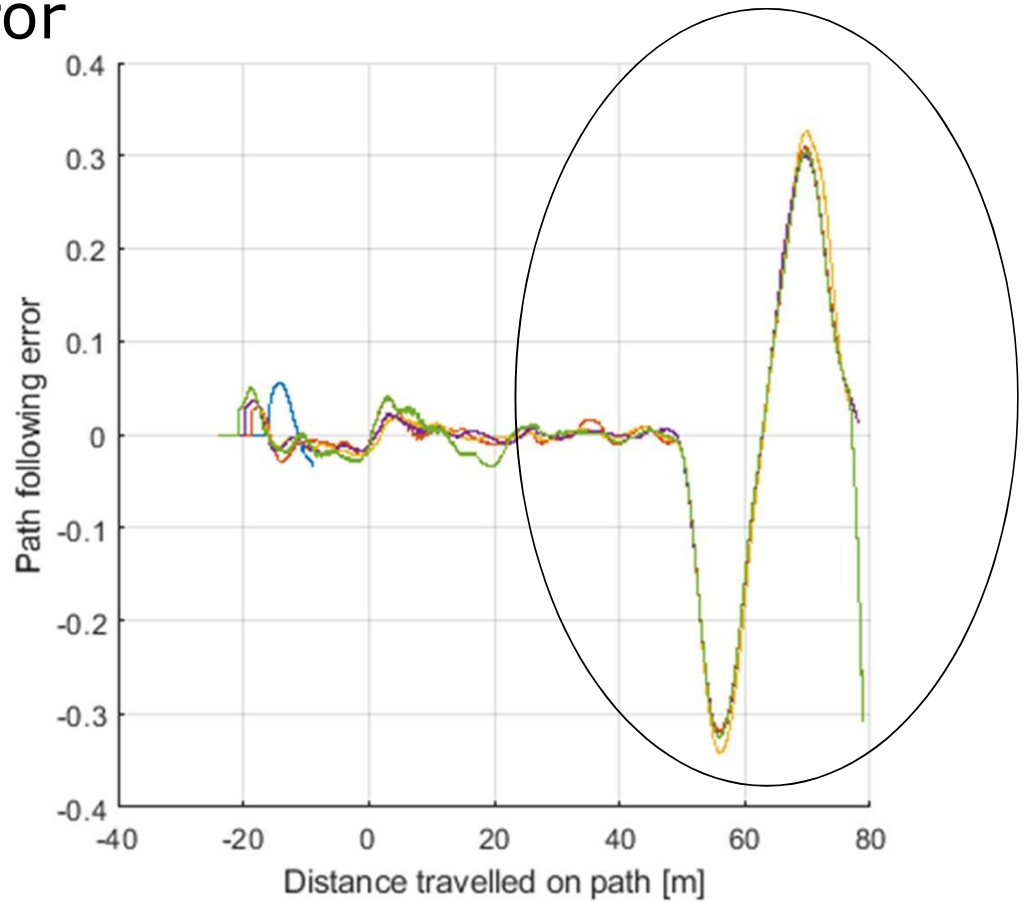




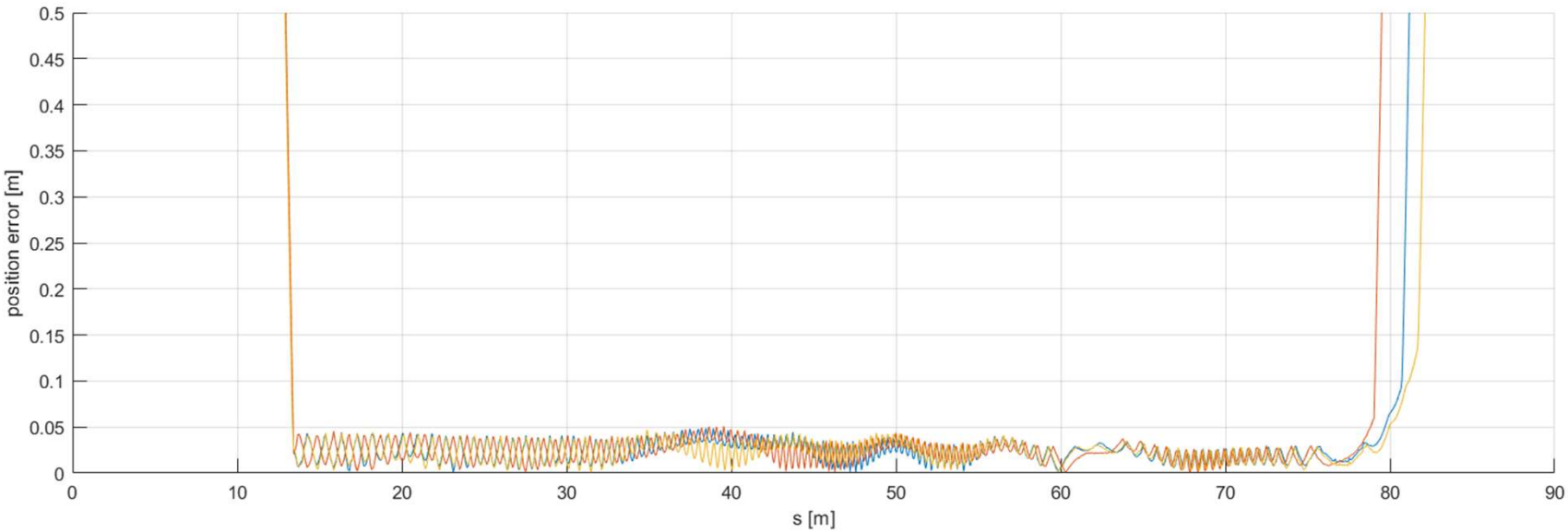
Accuracy results for trajectories from other vehicles:

15 km/h, Klothoide → ±0.35 m error



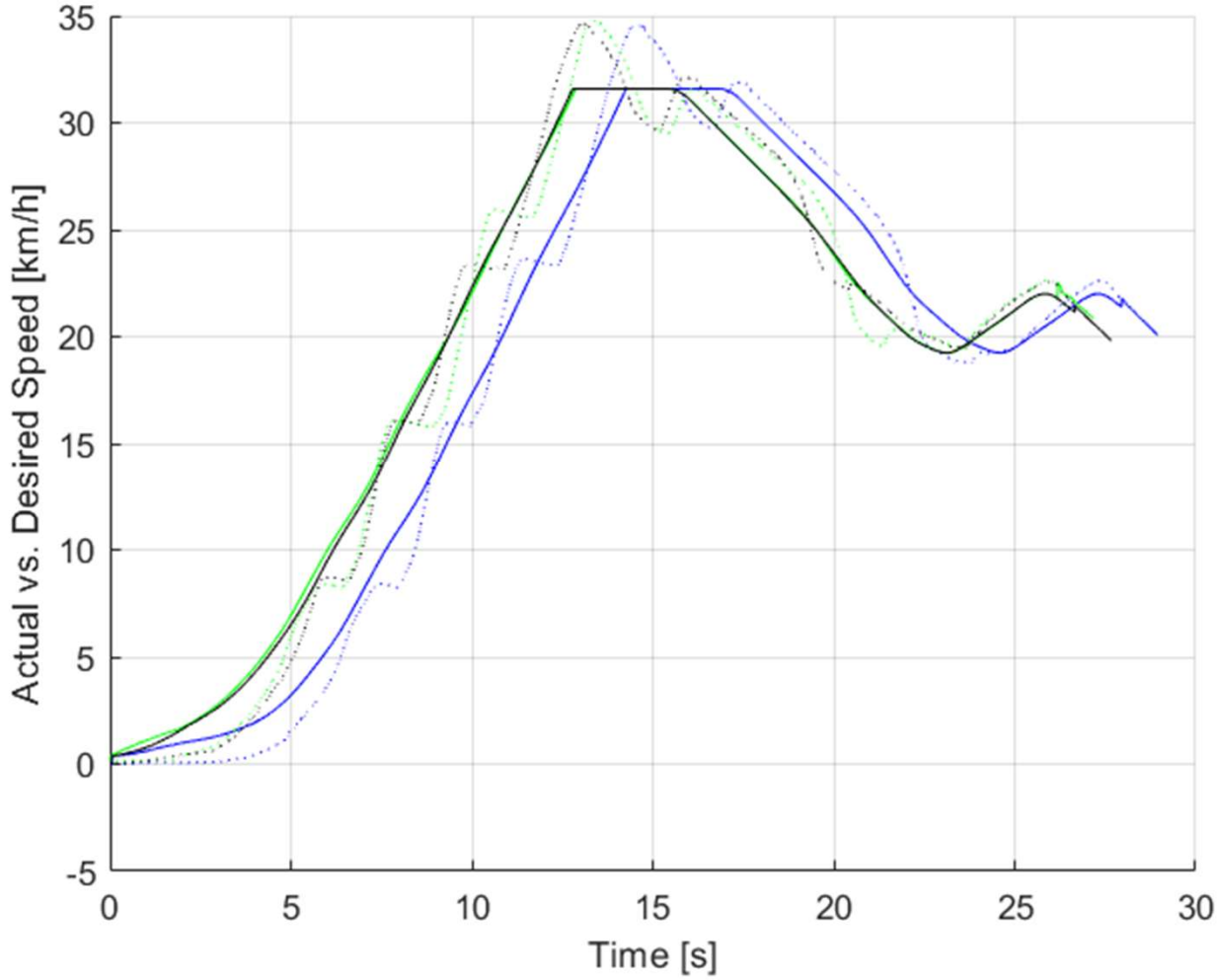


Position accuracy if trajectory recorded with the exact same vehicle: **approx. 5 cm!**



Actual vs.
Desired Speed:
Speed accuracy is not as good as expected due to shifting (slow gearbox).

Possible to improve with sync‘ed dummy.



Procedure

1. Record turn without dummy

Record trajectory (path+speed) of realistic turn

Replay trajectory without dummy and record again <u>with dummy controller</u>

2. Add dummy

Add dummy trajectory with dummy controller software

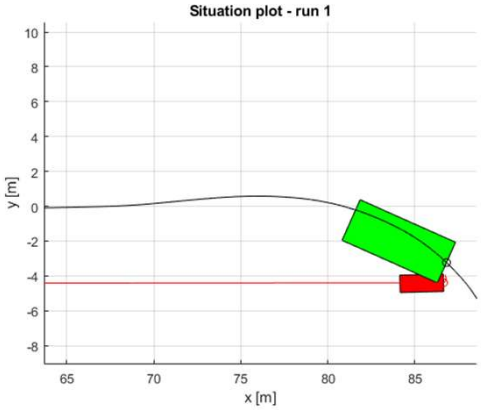
Define impact position

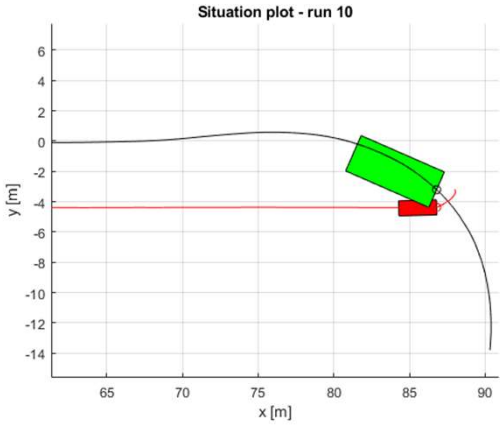
3. Perform test with vehicle and dummy

Perform sync'ed test without dummy to check repeatability (overrun platform!)

Test synchronized (abort before impact)

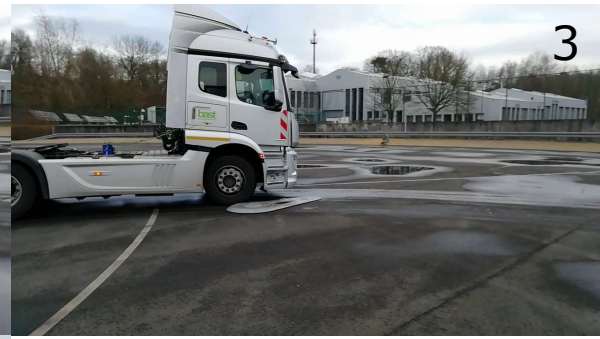
Videos

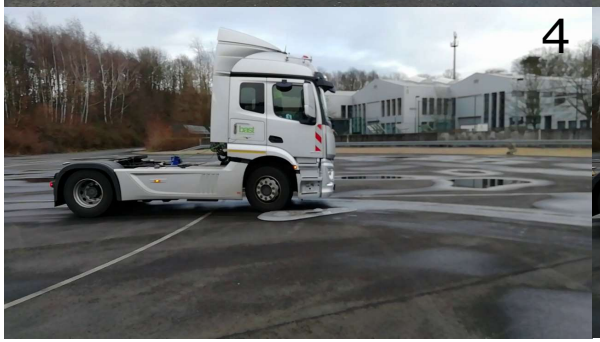

Situation plot - run 1
y [m]
x [m]
10
8
6
4
2
0
-2
-4
-6
-8
65
70
75
80
85

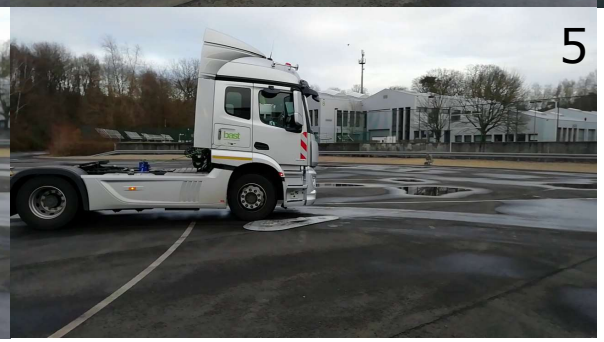

Situation plot - run 10
y [m]
x [m]
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
65
70
75
80
85
90

Results: Repeatability of Impact Situation

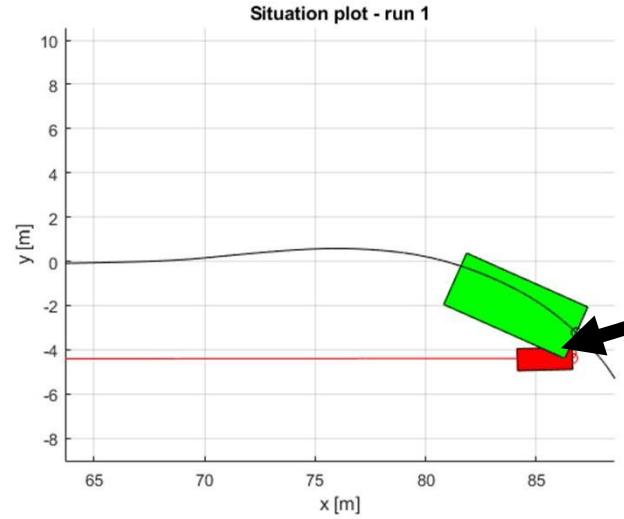
„Teached" impact

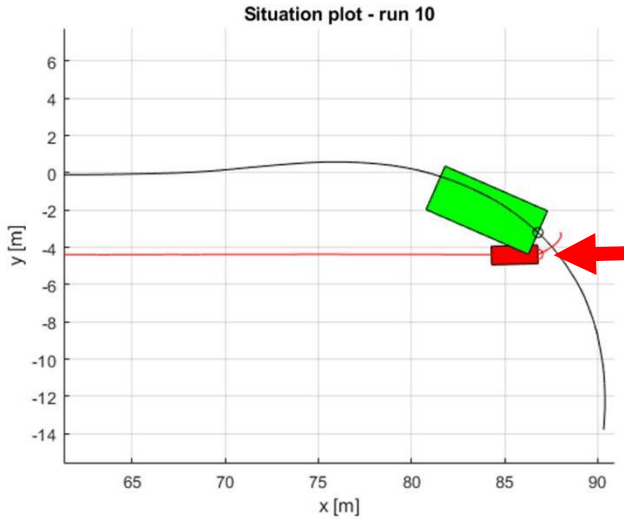


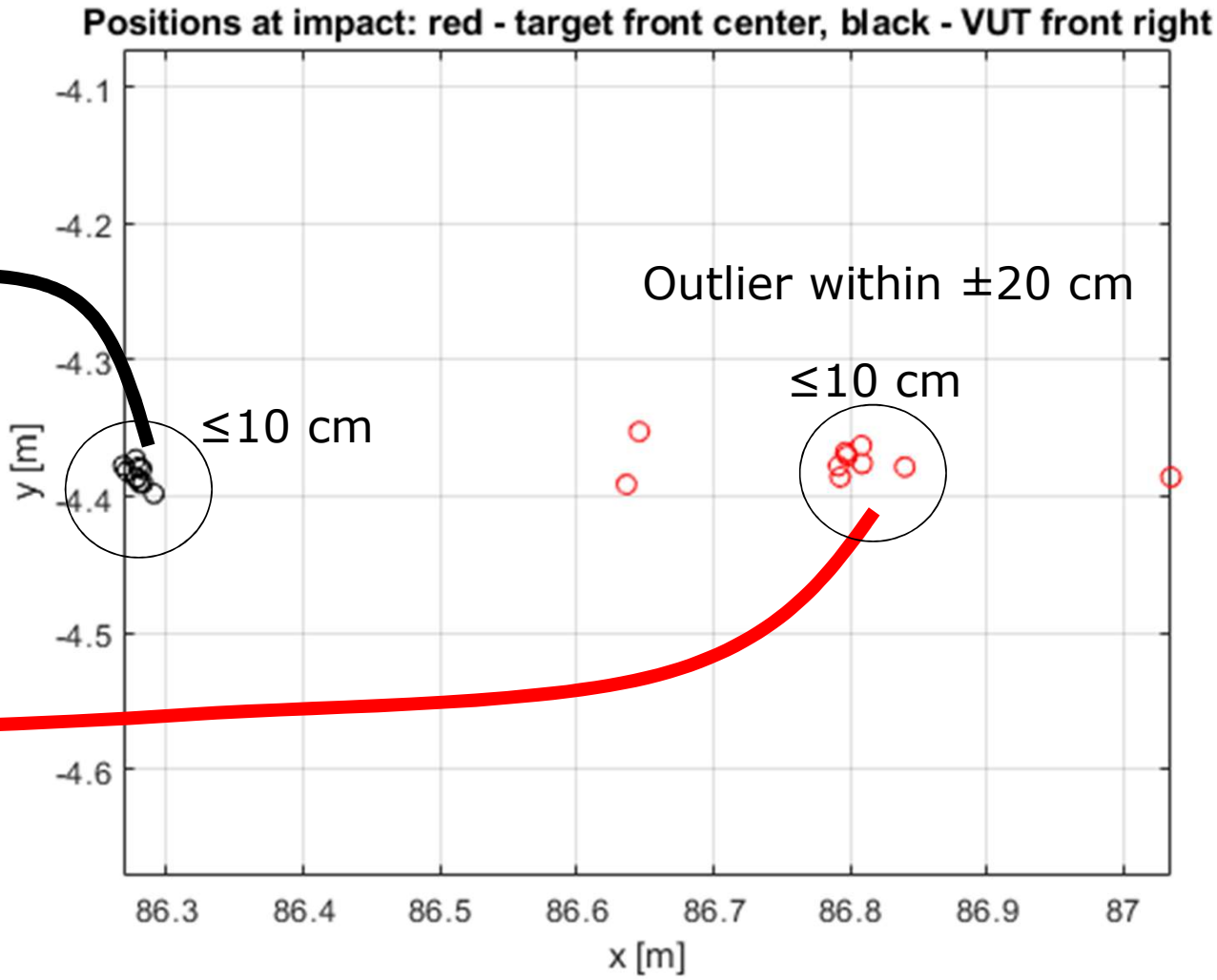




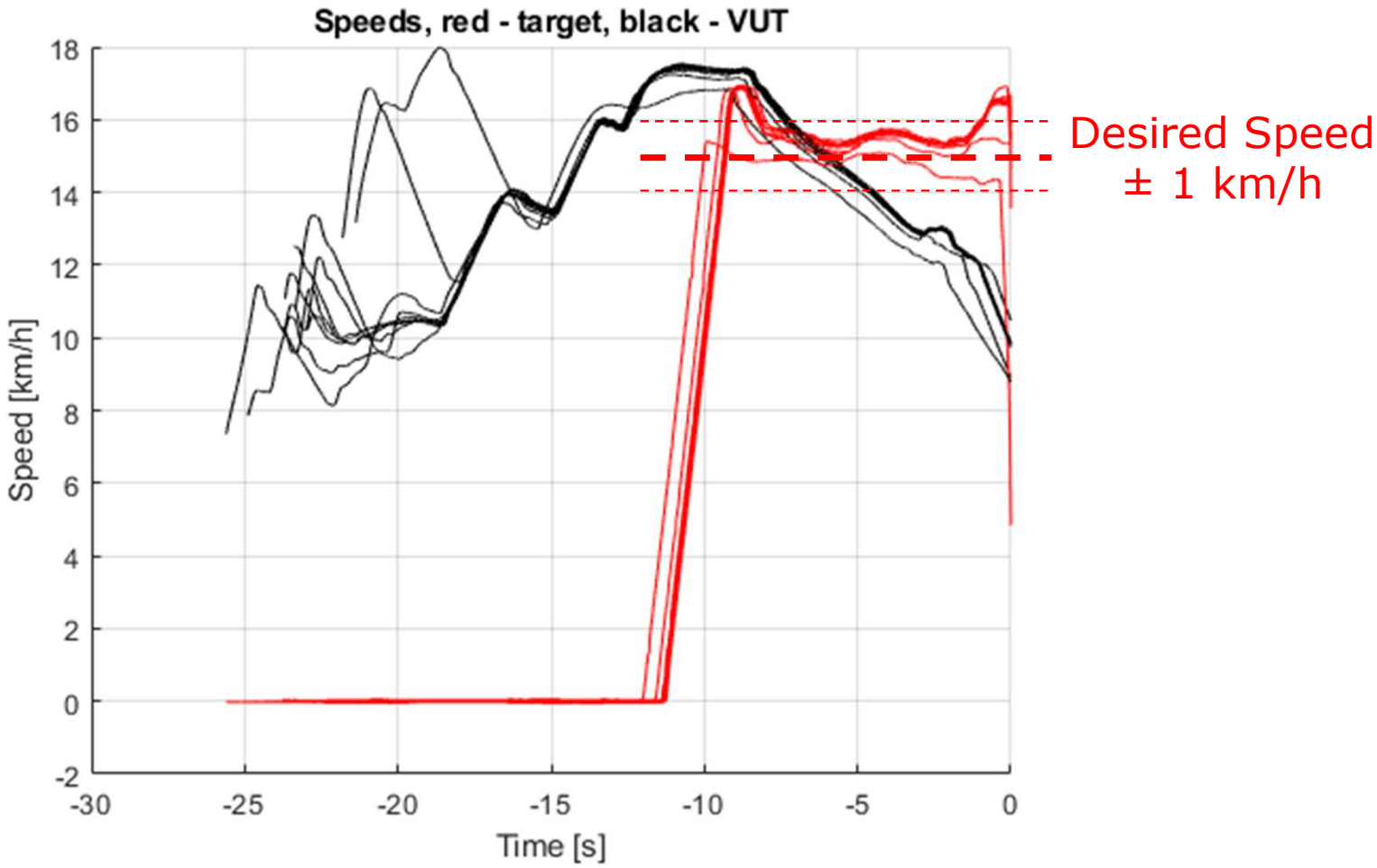
Measurement Data







Speed Profiles – Vehicle (recorded) & Dummy (sync'ed)



Equipment

- Daimler Actros (last generation), driven in automatic transmission mode
- ABD „SR60“ + „CBAR“ Driving robots
- Genesys „ADMA-G“ Version 3 DGPS-IMU
- 4active Systems „FreeBoard Small“ self-driving dummy platform
- Syncronisation via ADMA protocol and WiFi network

- Question: Is this possible with ABD hardware as well?

Procedure Efficiency

- Vehicle equipment: 2-4 hours depending on experience
- Preparation on track: 1 hour (comfortable)
- Record + Re-record of trajectory: 10 min
- Test conduction: 10 repeats in 20 min

- Learning how to do it: some days to go through all possible errors

Conclusion

- Robot testing allows a robust assessment of Blind Spot Assist Systems
- Robot testing could allow assessment of Blind Spot AEB systems as well (R151 test procedure does not!), sync tuning needed
- Repeatability and accuracy with sync is sufficient
- Suggested procedure
  - Record [multiple?] trajectories,
  - replay them with driving robots,
  - add a dummy platform and verify test setup (without dummy),
  - finally perform test (with/without actual dummy impact)

Proposed next steps

- All interested parties please reproduce our experiments!

- How to specify the expected turn procedure?
- How many test cases should be done?
- Are multiple repetitions needed?