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Michael Weng, Volkswagen

12 MAY 22

FINAL EVENT



IMAGinE

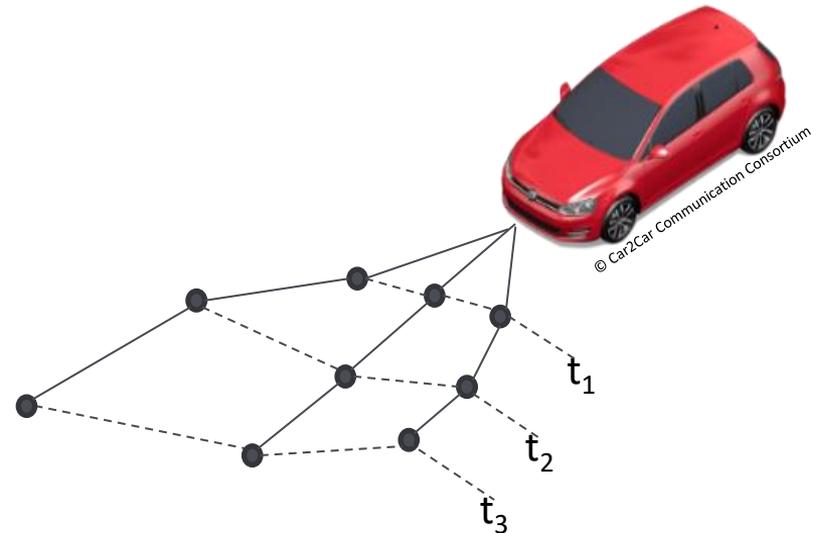


Continuous Cooperation  
Base Concept

# Continuous Cooperation

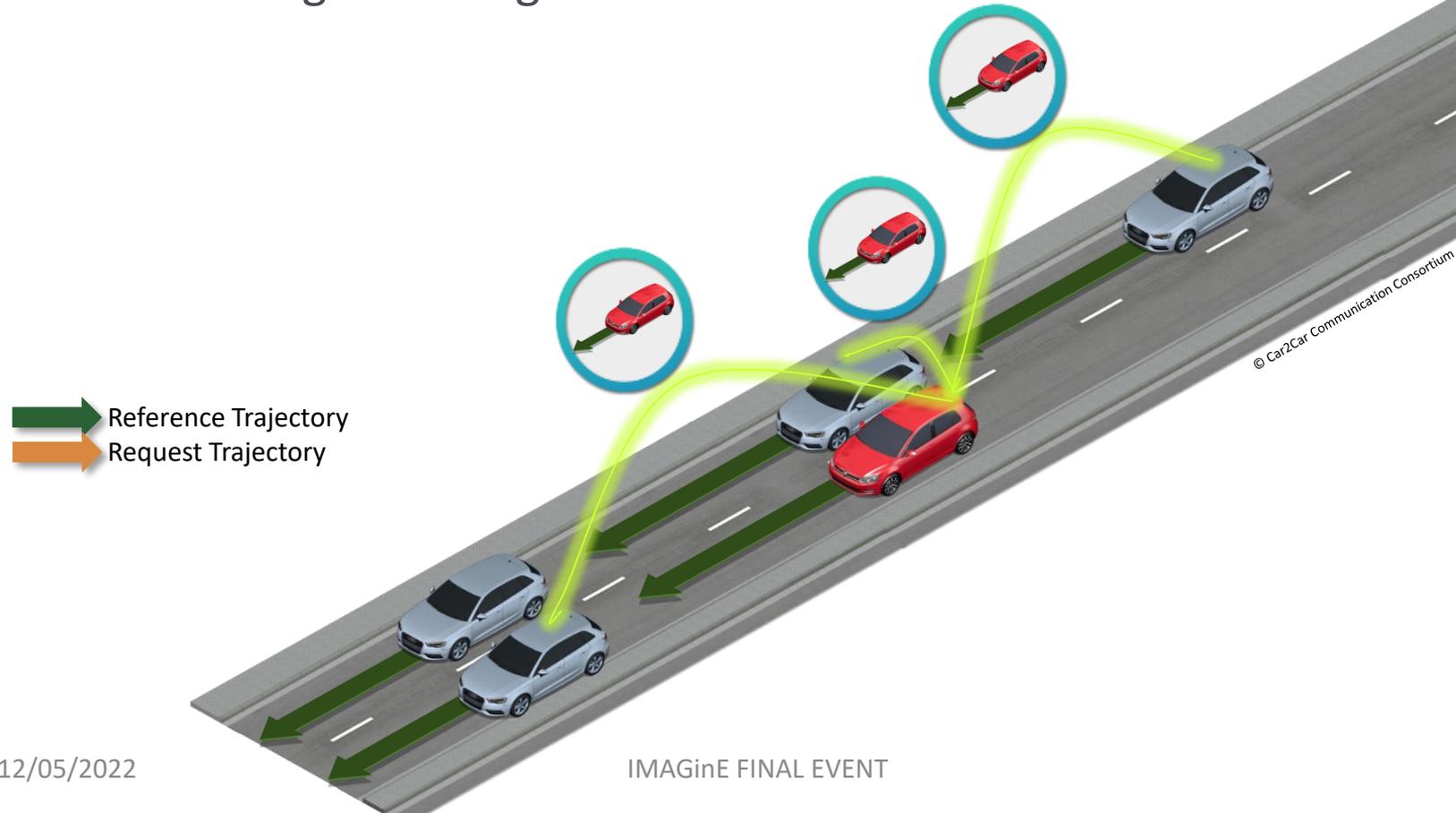
## Definition and Basic Ideas

- “Continuous Cooperation” means
  - continuously attentive
  - cooperation on demand
- mutual message exchange
  - **new IMAGinE-Message “MCM”**  
(Maneuver Coordination Message)
- exchange of trajectories
  - generic space-time information
  - explicit driving intention
  - representation of conflicts



# Continuous Cooperation

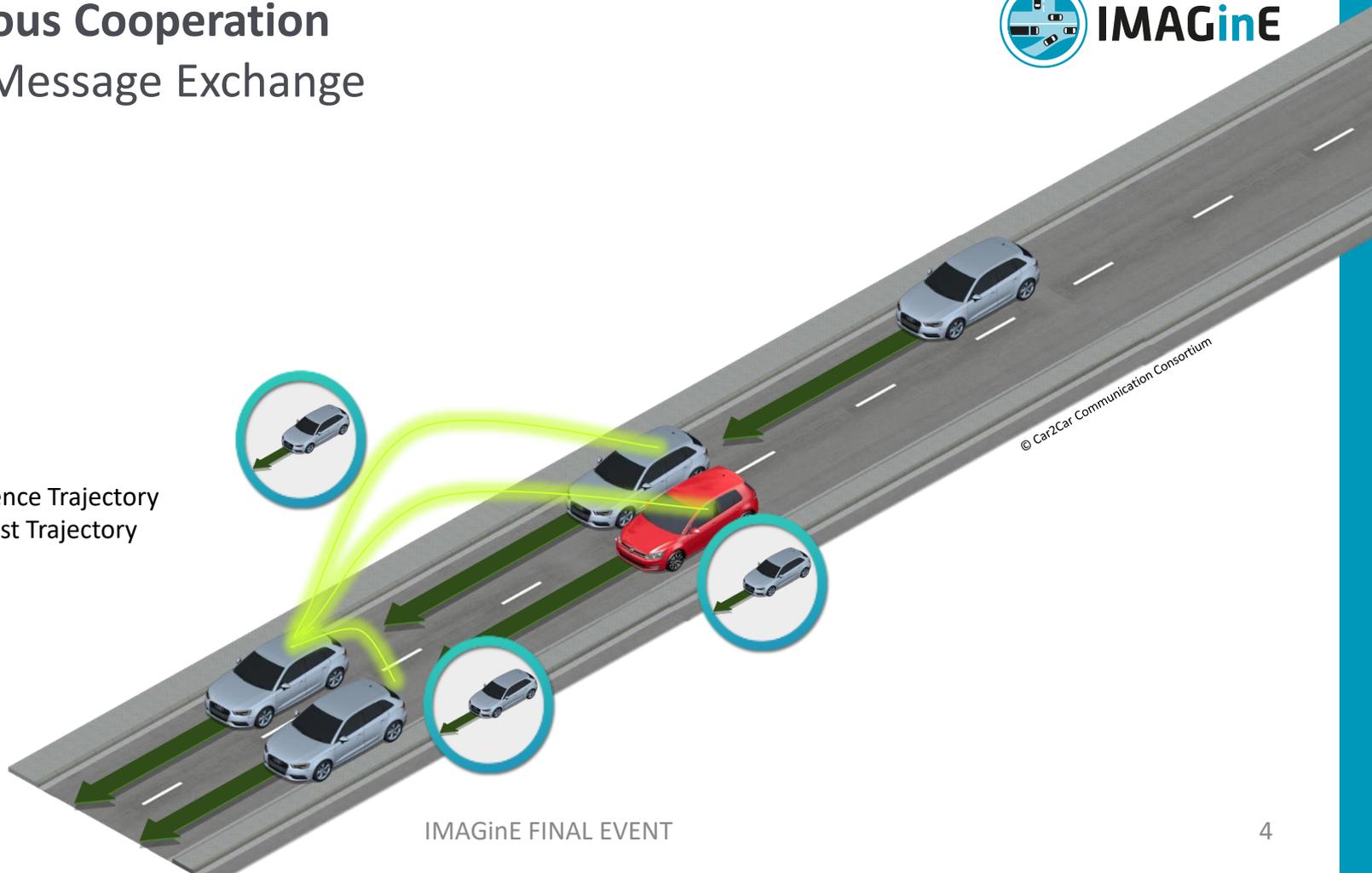
## Mutual Message Exchange



# Continuous Cooperation

## Mutual Message Exchange

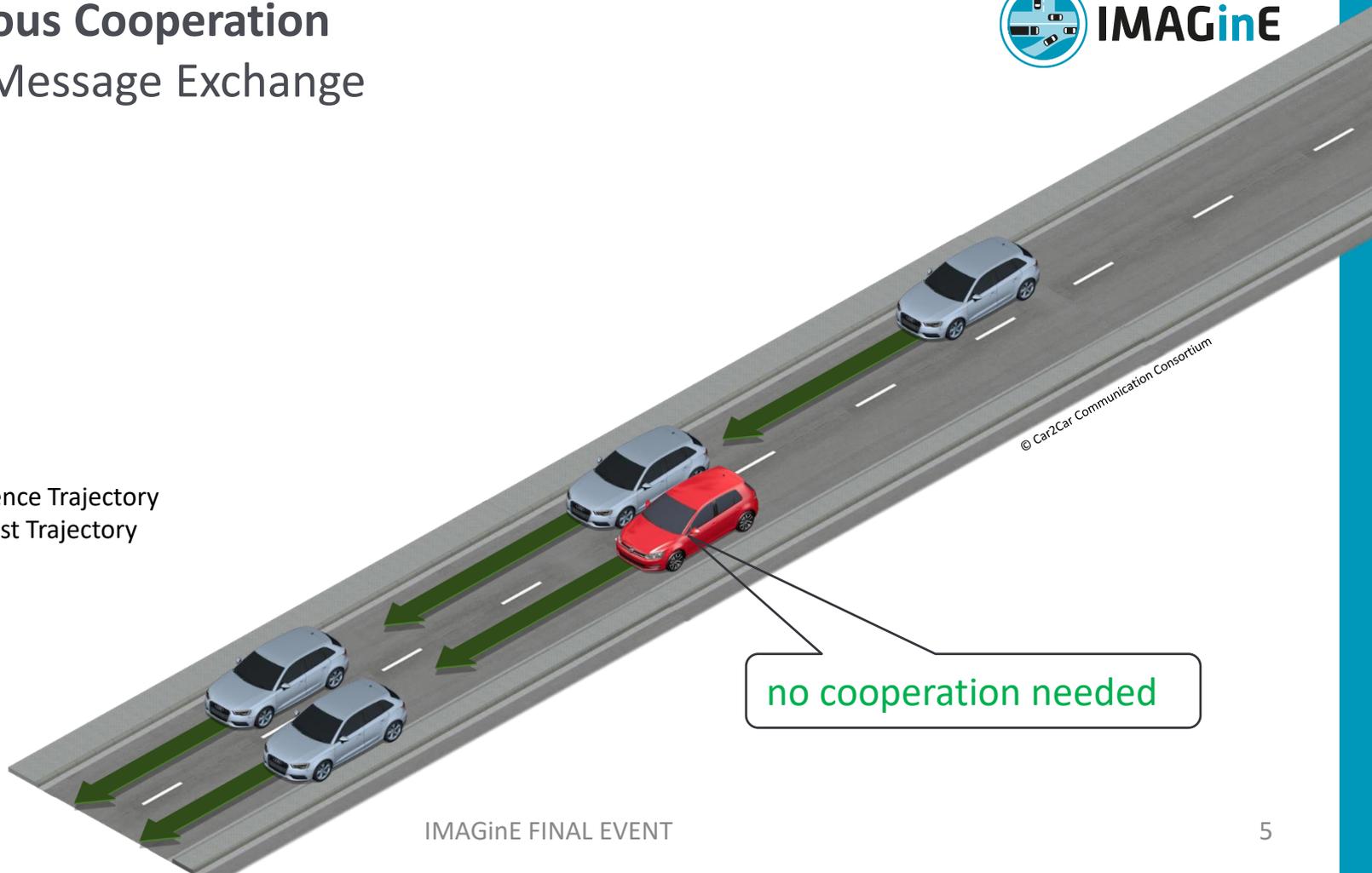
➔ Reference Trajectory  
➔ Request Trajectory



# Continuous Cooperation

## Mutual Message Exchange

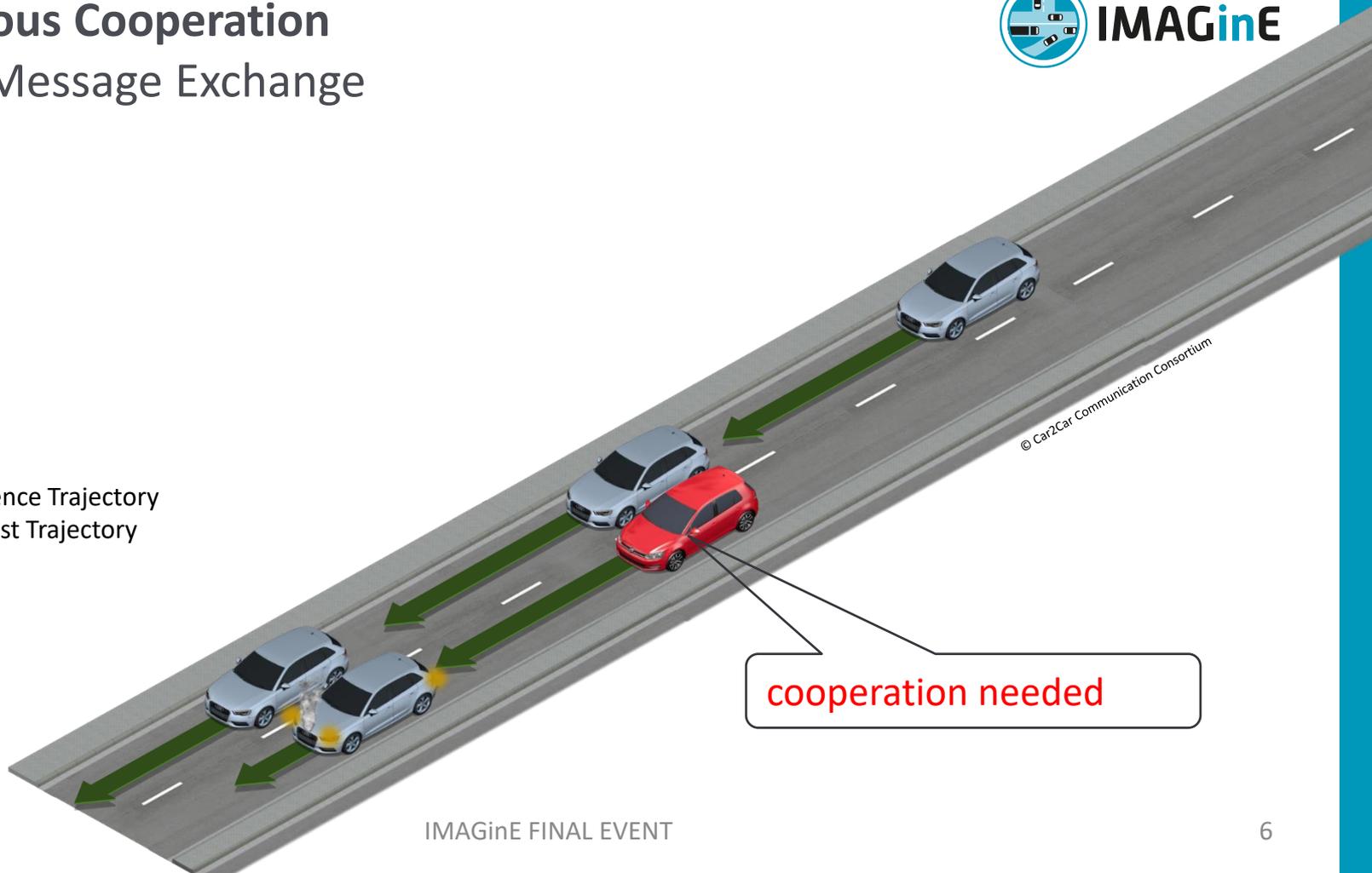
 Reference Trajectory  
 Request Trajectory



# Continuous Cooperation

## Mutual Message Exchange

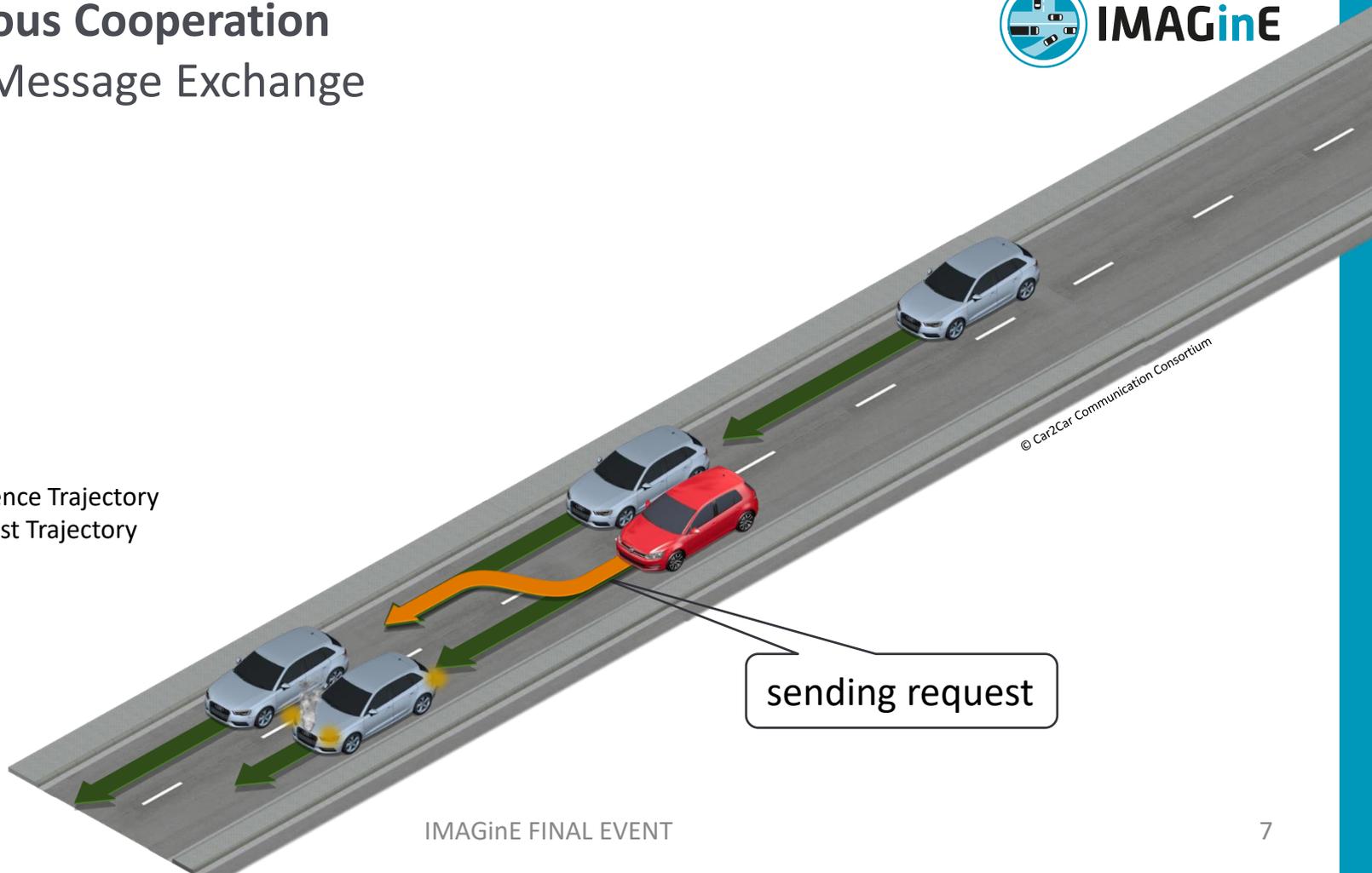
 Reference Trajectory  
 Request Trajectory



# Continuous Cooperation

## Mutual Message Exchange

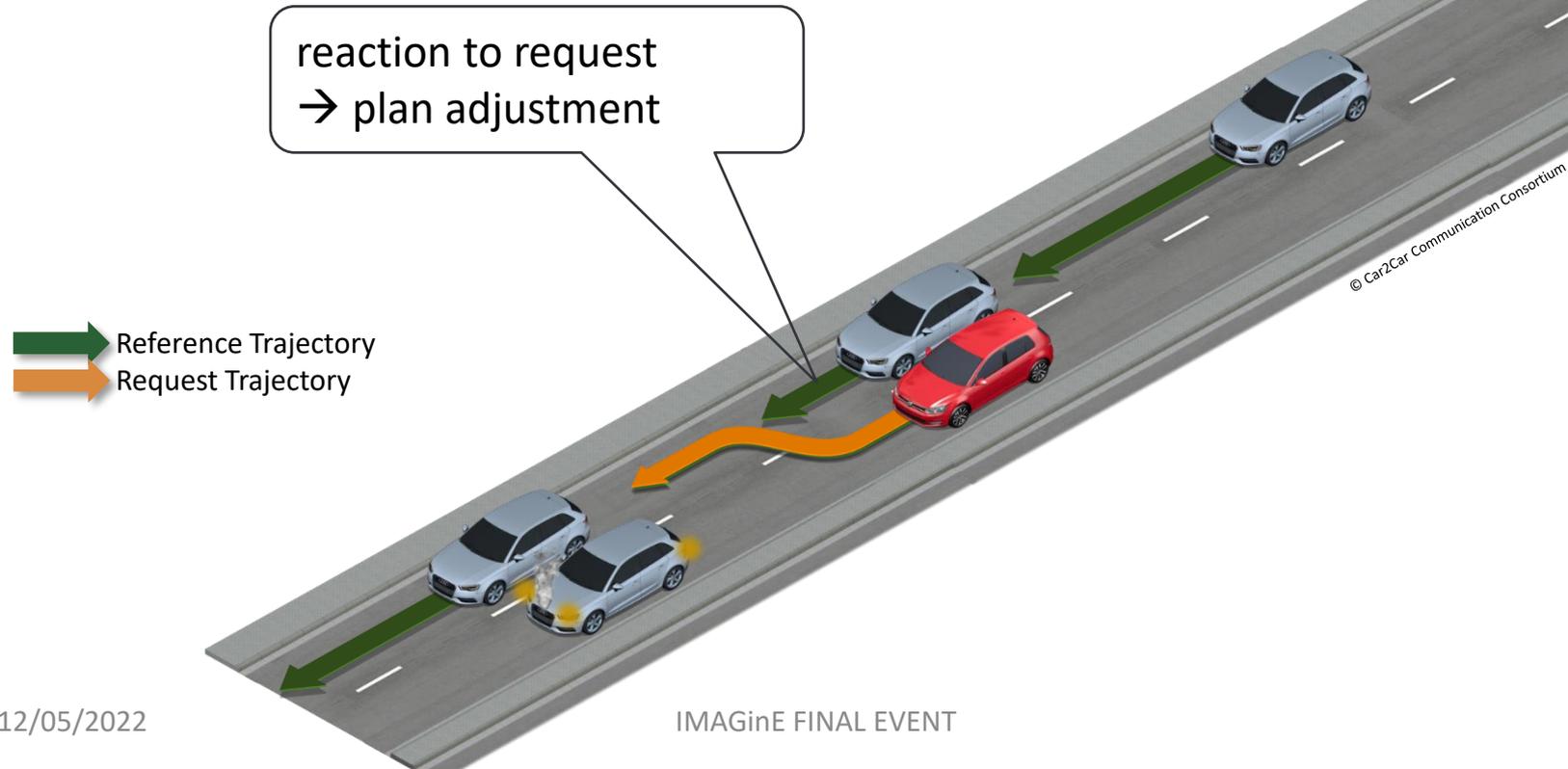
 Reference Trajectory  
 Request Trajectory



© Car2Car Communication Consortium

# Continuous Cooperation

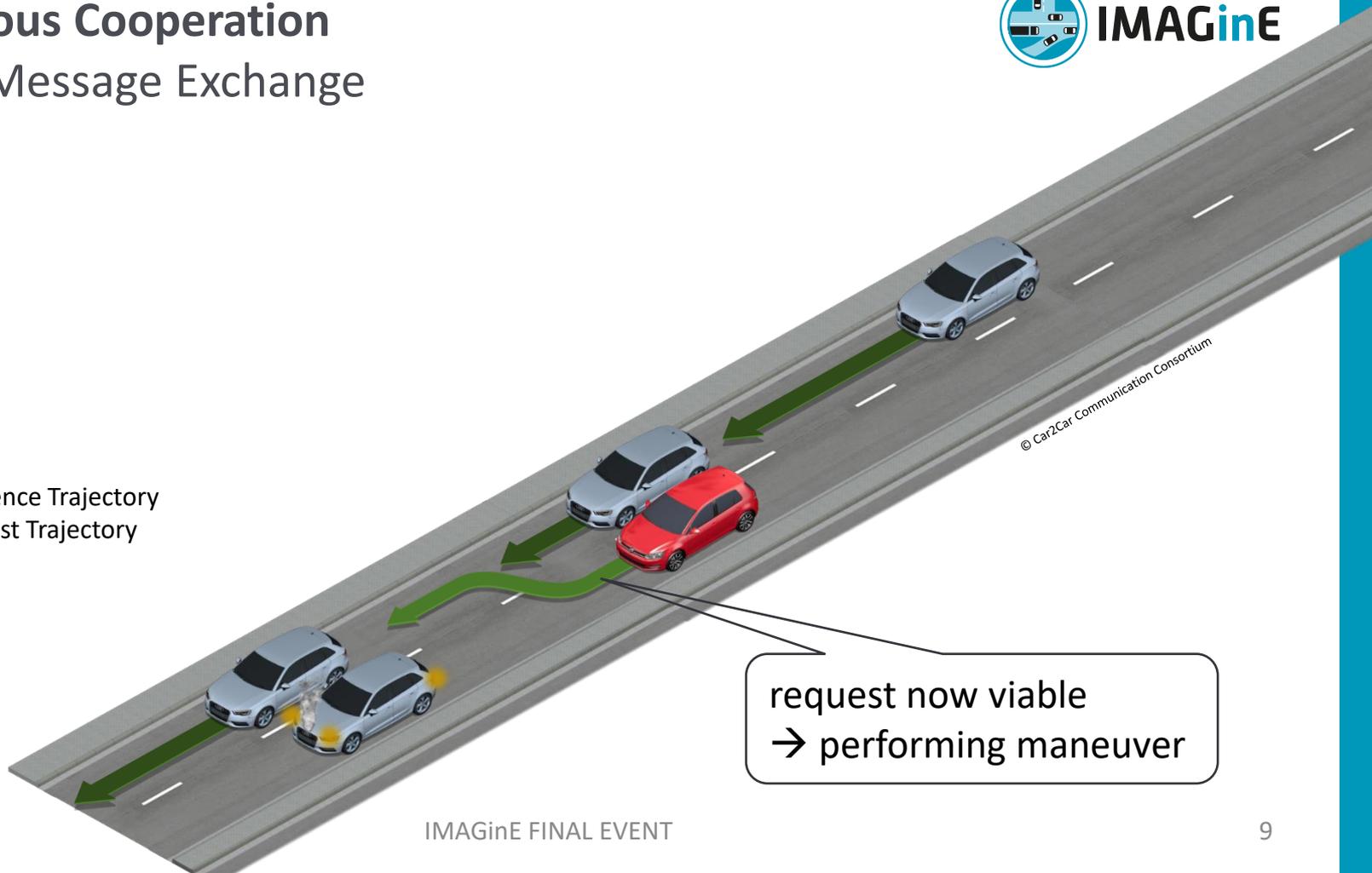
## Mutual Message Exchange



# Continuous Cooperation

## Mutual Message Exchange

 Reference Trajectory  
 Request Trajectory



# Cooperative Maneuver Coordination



Concept: „Continuously cost based communication“

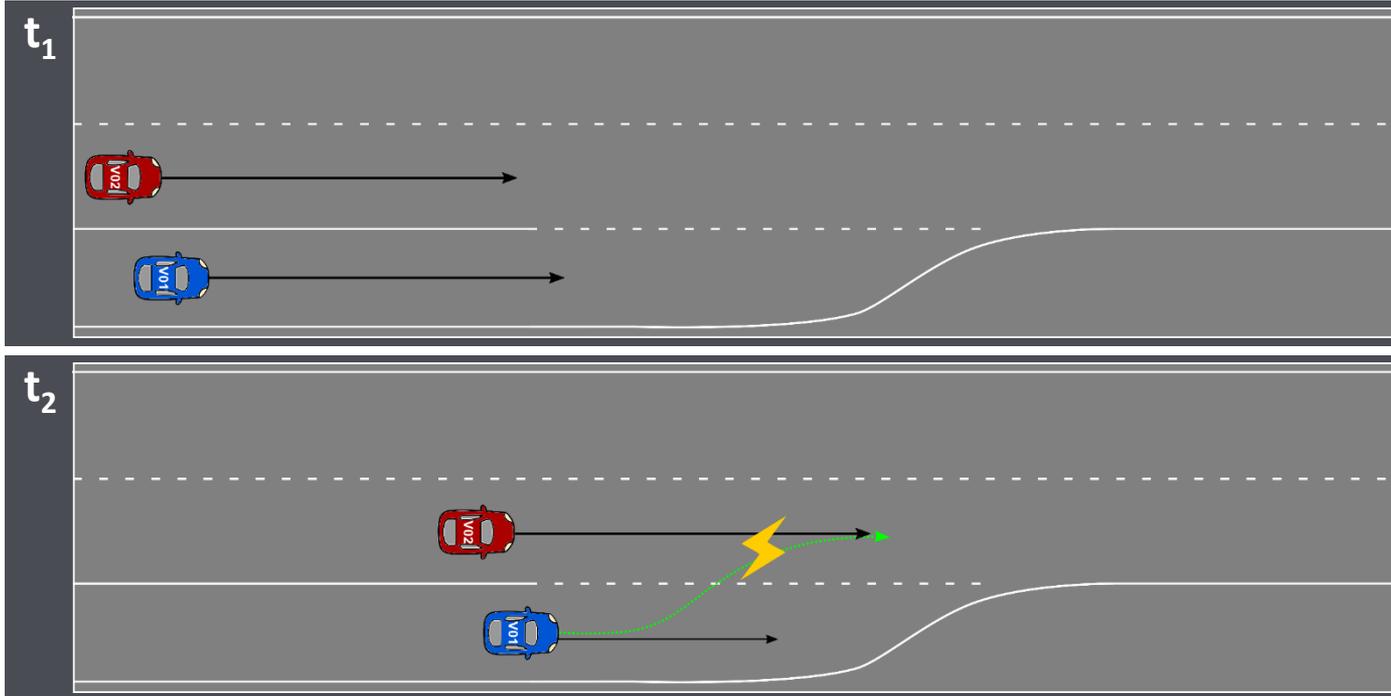
**Challenge:** How do autonomous vehicles know how a request trajectory should look like, when to send it and whether they should accept an incoming request?

**Possible solution:** Evaluate a variety of possible regular and request trajectories with a cost based function. Send request trajectories to minimize your own cost. Accept incoming requests only if own cost increase is acceptable.

**Cost based trajectory generation:** Trajectories planner generates a set of trajectories and weights them with a cost function. Costs are incurred, for example, due to unsafe driving behavior, violation of traffic rules, strong turning, acceleration, breaking, etc.

# Cooperative Maneuver Coordination

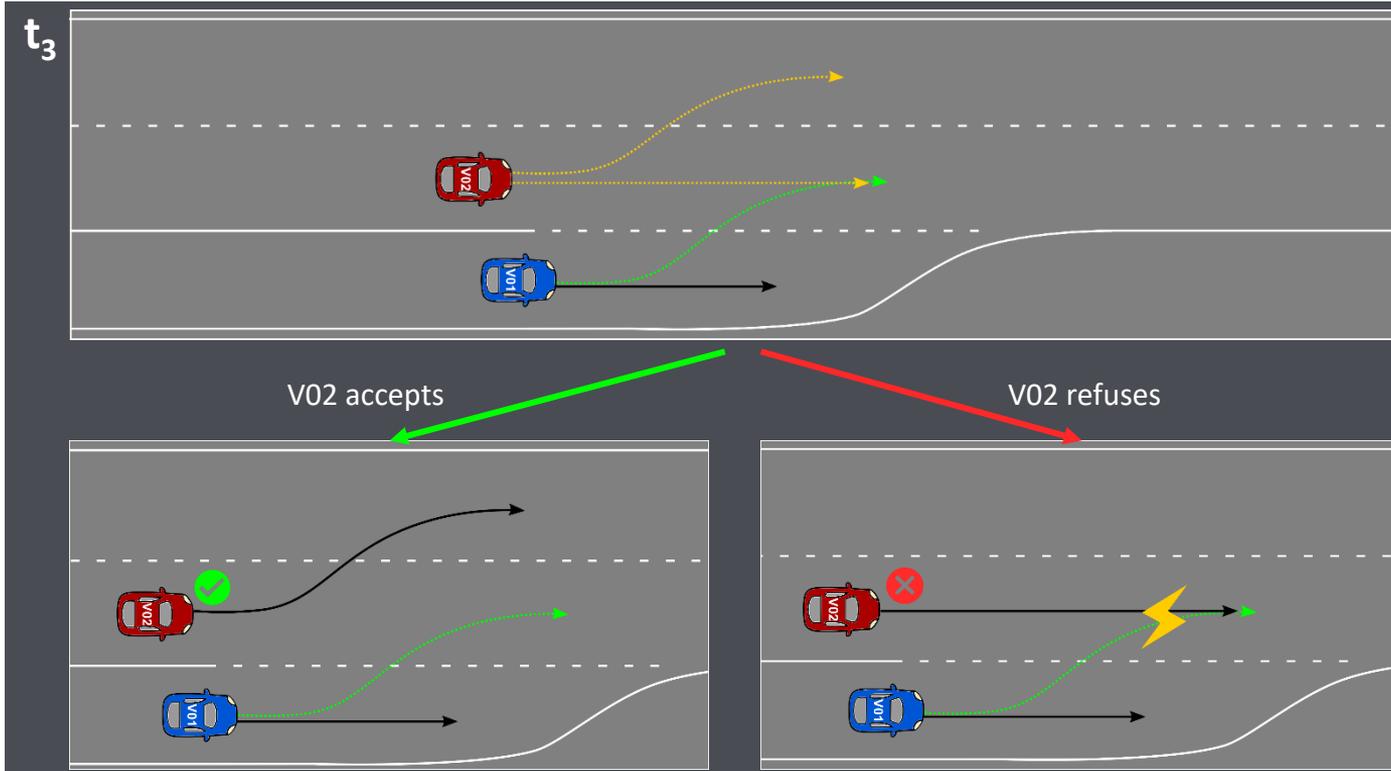
## Example „Continuously cost based communication“ (F1)



- cheapest trajectories are free of conflicts
- V01 & V02 are using this trajectories as regular trajectory
- cheapest trajectory of V01 is not free of conflicts
- V01 evaluates if cost reduction is worth sending a request
- V01 uses conflict free trajectory as regular and sends cheapest trajectory as request

# Cooperative Maneuver Coordination

## Example „Continuously cost based Communication“ (F1)



- cheapest trajectory of V02 is now in conflict with request of V01

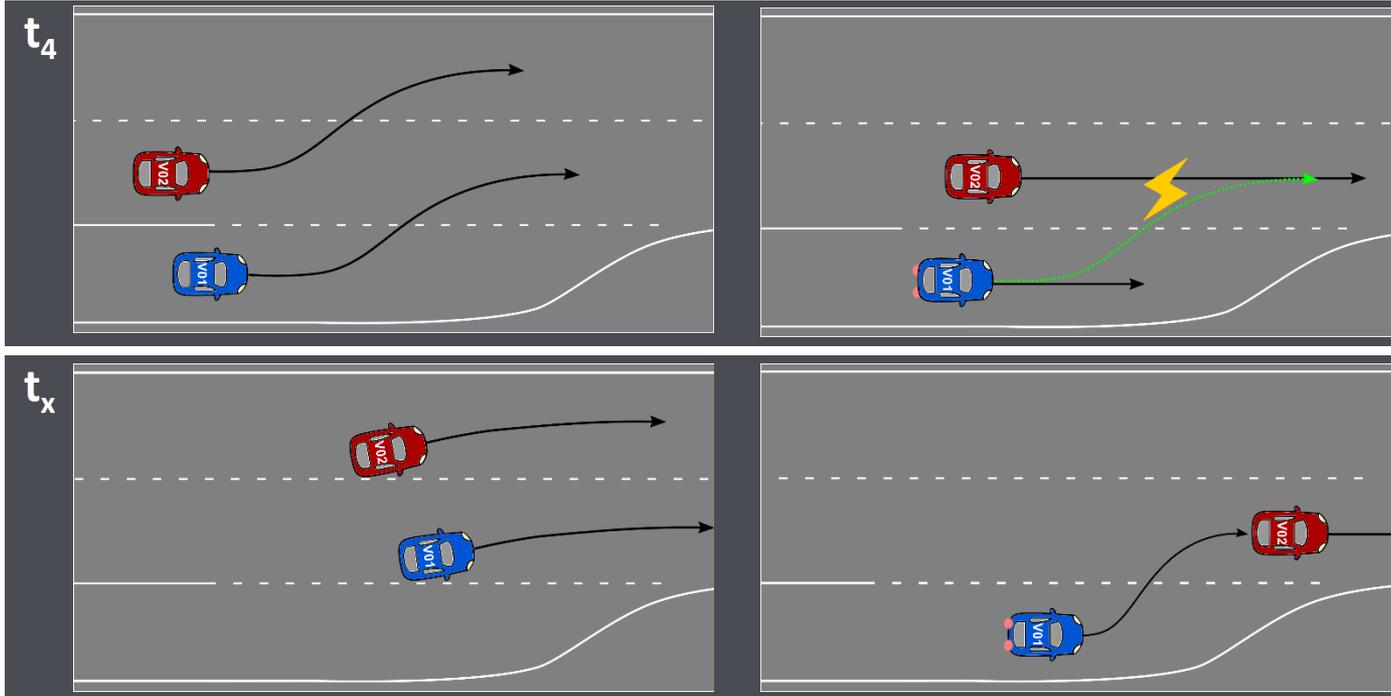
- V02 evaluates whether the increase in costs is acceptable

- if yes: V02 uses the trajectory that is not in conflict with the request of V01

- if no: V02 uses the cheaper trajectory that is in conflict with the request of V01

# Cooperative Maneuver Coordination

## Example „Cost based Communication“ (F1)



- In the first scenario: V01 can now use his request as regular trajectory and change the lane
- In the second scenario: A trajectory for changing lanes is still not free of collision. V01 generates again a request trajectory while it starts to break on the right lane
- Subsequent V01 will merge in parallel or behind V02 depending on the cooperative behavior of V02



ADTF Control

00:00:08.150 SimCmV01

C-C-Output-AutoPlot\_StatusDisplay

CudaDP [Running]

built on Dec 2 2021

CARMAKER\_CAR // Type CarMaker\_Car // Ctrl HAD AC  
 Runtime : #31 1#0 | 81 < 81 < 107 | 96.22ms  
 Transitions : 623 < 665 < 665 | 647.91k, 33072 < 378  
 35940.65k/sec  
 States : 8 < 9 < 9 | 8.91k  
 Result : **HAPPY** | lat:28.6% 0.06 | costs 1.23e+13 |  
 Ego : v 0.5 m/s (30.5 km/h) | yaw 0.11° | wheelAngle |  
 Init : v 8.2 m/s (29.4 km/h) | yaw 0.55° | wheelAngle |  
 LocalInit : x 59.87 y 0.29  
 LocalEgo : x 58.31 y 0.30 | GlobalEgo : x 460099.34 y 55  
 Error : t 0.0 | lat 0.0 | long 0.0 | yaw 0.0 | corr.  
 EPS : 1 < 1 < 1 | 1.10  
 Survivors : 2.76% < 2.77% < 2.93% | 2.83%  
 StateSpace : 1.22% < 24.17% < 46.48% < 58.87%  
 Mask : 6 < 6 < 8 | 7.06ms  
 Grid : 0 < 0 < 1 | 0.61ms  
 Objects : 0 < 0 < 0 | 0.79ms  
 Road E65 : 1 < 1 < 1 | 1.27ms  
 Road Magic Flood : 1 < 1 < 2 | 1.56ms  
 Road Distance : 0 < 0 < 1 | 0.50ms  
 Upload : 1 < 1 < 1 | 1.64ms

top [Running]

built on Dec 2 2021

Overall runtime is 0.94 ms

Timer : Intention(0.05 ms), Interpretation(0.04 ms)  
 OnRoad(0.02 ms), Postprocess(0.28 ms), PredPatf  
 PredPed(0.03 ms), PredVelProf(0.09 ms), Predictor  
 Timer : Preprocessing(0.02 ms), Stabilization(0.11 m  
 Inputs : GlobalEgo(22.50 Hz), FpsObjects(10.00 Hz  
 Hz), Rg(2.00 Hz), MonObjects(5.00 Hz)

CudaInputCheck [Running]

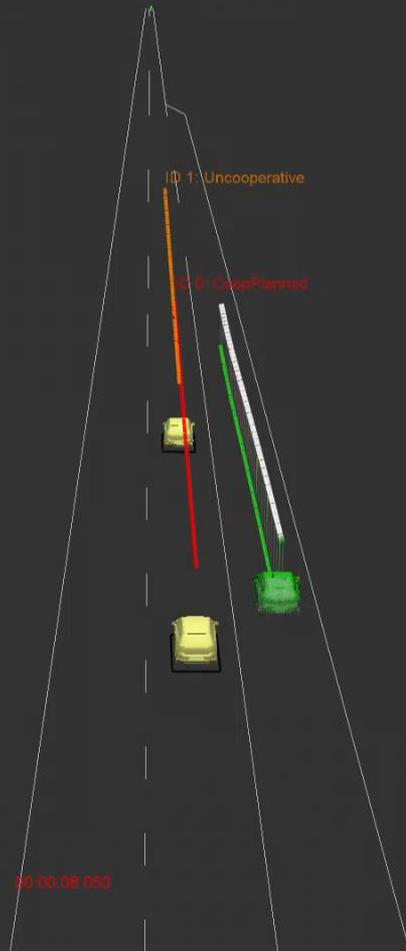
CoopScenarioSelection

CarMaker Scenario: F151\_2ego\_SimNet  
 Results Folder:  
 Planner Config:  
 Coop Params: accept0 (50.00), create0 (30.00)  
 Target Velocity: 8.33 m/s  
 MCM Tx-Delay: 0 ms

Merging-F15-3lane  Manual Selection

Plan: Valid, CMR = (8s, 0s)

Request: NO SOLUTION



ADTF Control

00:00:08.200 SimCmV02

C-C-Output-AutoPlot\_StatusDisplay

CudaDP [Running]

built on Dec 2 2021

CARMAKER\_CAR // Type CarMaker\_Car // Ctrl HAD AC  
 Runtime : #31 1#0 | 78 < 78 < 82 | 80.05ms  
 Transitions : 734 < 788 < 817 | 778.86k, 35040 < 350  
 37714.33k/sec  
 States : 8 < 9 < 9 | 9.55k  
 Result : **HAPPY** | lat:71.4% 0.88 | costs 1.06e+11 |  
 Ego : v 8.2 m/s (29.6 km/h) | yaw 0.11° | wheelAngle |  
 Init : v 8.3 m/s (29.8 km/h) | yaw 0.53° | wheelAngle |  
 LocalInit : x 60.12 y 0.31  
 LocalEgo : x 58.52 y 0.32 | GlobalEgo : x 460094.56 y 5  
 Error : t 0.0 | lat 0.0 | long 0.0 | yaw 0.0 | corr.  
 EPS : 0 < 0 < 0 | 0.61  
 Survivors : 2.42% < 2.60% < 2.66% | 2.54%  
 StateSpace : 1.21% < 29.74% < 50.33% < 61.15%  
 Mask : 5 < 7 < 8 | 6.76ms  
 Grid : 0 < 0 < 0 | 0.45ms  
 Objects : 0 < 0 < 0 | 0.71ms  
 Road E65 : 1 < 1 < 1 | 1.22ms  
 Road Magic Flood : 1 < 1 < 1 | 1.35ms  
 Road Distance : 0 < 0 < 1 | 0.57ms  
 Upload : 1 < 1 < 1 | 1.63ms

top [Running]

built on Dec 2 2021

Overall runtime is 1.30 ms

Timer : Intention(0.05 ms), Interpretation(0.03 ms)  
 OnRoad(0.39 ms), Postprocess(0.28 ms), PredPatf  
 PredPed(0.03 ms), PredVelProf(0.08 ms), Predictor  
 Timer : Preprocessing(0.02 ms), Stabilization(0.13 m  
 Inputs : GlobalEgo(22.50 Hz), FpsObjects(10.00 Hz  
 Hz), Rg(2.00 Hz), MonObjects(5.00 Hz)

CudaInputCheck [Running]

CoopScenarioSelection

CarMaker Scenario: F151\_2ego\_SimNet  
 Results Folder:  
 Planner Config:  
 Coop Params: accept1 (60.00), create0 (50.00)  
 Target Velocity: 8.33 m/s  
 MCM Tx-Delay: 0 ms

Merging-F15-3lane  Manual Selection

Plan: Valid, CMR = (0s, 7s)

Request: NO SOLUTION



ADTF Control

00:00:13.499 SimCmV01

C-C-Output-AutoPlot\_StatusDisplay

CudaDP [Running]

built on Dec 2 2021

CARMAKER\_CAR // Type CarMaker\_Car // Ctrl HAD AC  
 Runtime : #58 1#0 | 21 < 97 < 107 | 87.57ms  
 Transitions : 623 < 668 < 689 | 667.73k, 33072 < 354  
 36136.86k/sec  
 States : 8 < 9 < 9 | 9.08k  
 Result : HAPPY | lat 44.1% 0.06 | costs 2.31e+18 |  
 Ego : v 8.1 m/s (29.0 km/h) | yaw 0.10° | wheelAngle |  
 InIt : v 8.0 m/s (28.9 km/h) | yaw 0.53° | wheelAngle |  
 LocalInIt x 103.53 y 0.74  
 LocalEgo x 102.30 y 0.75 | GlobalEgo x 460143.75 y  
 Error : t 0.0 | lat 0.0 | long 0.0 | v 0.0 | yaw 0.0 | corr.  
 EPS : 1 < 1 < 1 | 1.12  
 Survivors : 2.66% < 2.76% < 2.93% | 2.79%  
 StateSpace : 1.21% < 24.61% < 46.87% < 56.75%  
 Mask : 5 < 6 < 11 | 7.05ms  
 Grid : 0 < 0 < 1 | 0.46ms  
 Objects : 0 < 0 < 1 | 0.79ms  
 Road E65 : 1 < 1 < 1 | 1.25ms  
 Road Magic Flood : 0 < 1 < 3 | 1.47ms  
 Road Distance : 0 < 0 < 1 | 0.63ms  
 Upload : 1 < 1 < 1 | 1.64ms

top [Running]

built on Dec 2 2021

Overall runtime is 0.99 ms  
 Timer : Intention(0.05 ms), Interpretation(0.04 ms)  
 OnRoad(0.02 ms), Postprocess(0.29 ms), PredPatf  
 PredPed(0.03 ms), PredVelProf(0.09 ms), Predictor  
 Timer : Preprocessing(0.02 ms), Stabilization(0.12 m  
 Inputs : GlobalEgo(18.00 Hz), FpsObjects(10.00 Hz  
 Hz), Rg(2.00 Hz), MonObjects(5.00 Hz)

CudaInputCheck [Running]

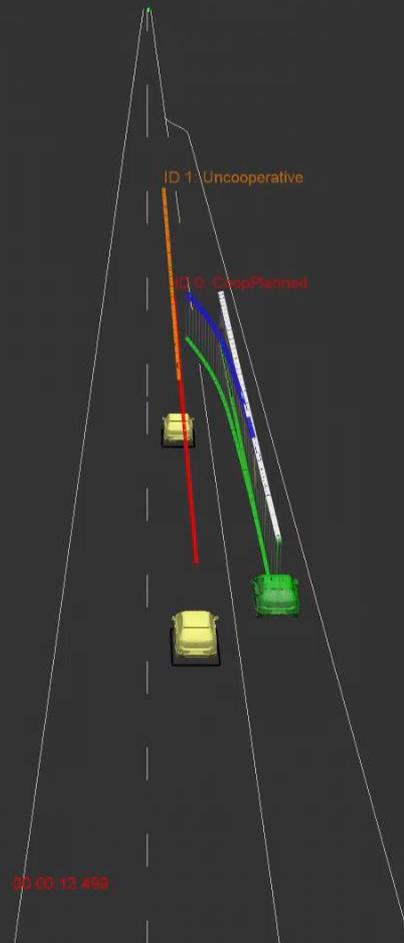
CoopScenarioSelection

CarMaker Scenario: F151\_2ego\_SimNet  
 Results Folder:  
 Planner Config:  
 Coop Params: accept0 (50.00), create1 (30.00)  
 Target Velocity: 8.33 m/s  
 MCM Tx-Delay: 0 ms

Merging-F15-3lane  Manual Selection

Plan: Valid, CMR = (8s, 0s)

Request: Valid, Created Request, CMR = (8s, 0s), Ignored Plan



ADTF Control

00:00:13.499 SimCmV02

C-C-Output-AutoPlot\_StatusDisplay

CudaDP [Running]

built on Dec 2 2021

CARMAKER\_CAR // Type CarMaker\_Car // Ctrl HAD AC  
 Runtime : #58 1#0 | 75 < 79 < 104 | 82.17ms  
 Transitions : 713 < 803 < 817 | 772.63k, 32438 < 406  
 37146.86k/sec  
 States : 8 < 9 < 9 | 9.45k  
 Result : HAPPY | lat 61.8% 0.88 | costs 8.81e+10 |  
 Ego : v 8.3 m/s (29.7 km/h) | yaw 0.03° | wheelAngle |  
 InIt : v 8.0 m/s (28.9 km/h) | yaw 0.46° | wheelAngle |  
 LocalInIt x 104.87 y 0.67  
 LocalEgo x 103.51 y 0.69 | GlobalEgo x 460139.97 y  
 Error : t 0.0 | lat 0.0 | long 0.0 | v 0.0 | yaw 0.0 | corr.  
 EPS : 0 < 0 < 0 | 0.61  
 Survivors : 2.42% < 2.46% < 2.66% | 2.54%  
 StateSpace : 1.19% < 30.01% < 52.21% < 59.76%  
 Mask : 5 < 6 < 9 | 6.55ms  
 Grid : 0 < 0 < 0 | 0.34ms  
 Objects : 0 < 0 < 1 | 0.75ms  
 Road E65 : 1 < 1 < 1 | 1.21ms  
 Road Magic Flood : 0 < 1 < 2 | 1.30ms  
 Road Distance : 0 < 0 < 1 | 0.52ms  
 Upload : 1 < 1 < 1 | 1.68ms

top [Running]

built on Dec 2 2021

Overall runtime is 0.97 ms  
 Timer : Intention(0.05 ms), Interpretation(0.03 ms)  
 OnRoad(0.08 ms), Postprocess(0.28 ms), PredPatf  
 PredPed(0.03 ms), PredVelProf(0.08 ms), Predictor  
 Timer : Preprocessing(0.02 ms), Stabilization(0.12 m  
 Inputs : GlobalEgo(22.50 Hz), FpsObjects(10.00 Hz  
 Hz), Rg(2.00 Hz), MonObjects(5.14 Hz)

CudaInputCheck [Running]

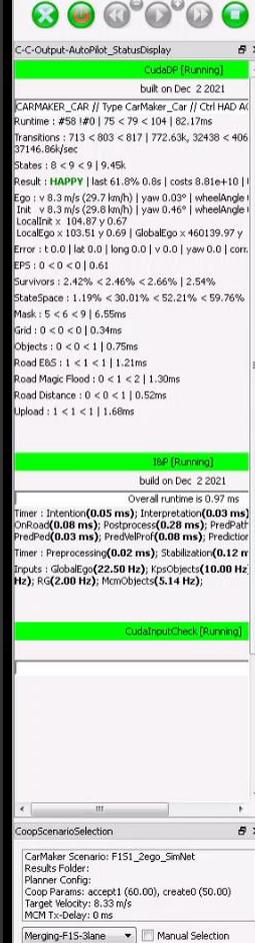
CoopScenarioSelection

CarMaker Scenario: F151\_2ego\_SimNet  
 Results Folder:  
 Planner Config:  
 Coop Params: accept1 (60.00), create0 (50.00)  
 Target Velocity: 8.33 m/s  
 MCM Tx-Delay: 0 ms

Merging-F15-3lane  Manual Selection

Plan: Valid, CMR = (0s, 1s)

Request: NO SOLUTION



ADTF Control

00:00:13.649 SimCmV01

C-C-Output-AutoPlot\_StatusDisplay

CudaDP [Running]

built on Dec 2 2021

CARMAKER\_CAR // Type CarMaker\_Car // Ctrl HAD AC  
 Runtime : #591#0 | 21 < 91 < 107 | 87.68ms  
 Transitions : 623 < 680 < 689 | 668.11k, 33072 < 366  
 36153.38k/sec  
 States : 8 < 9 < 9 | 9.09k  
 Result : HAPPY | lat: 45.7% 0.56 | costs: 2.31e+18 |  
 Ego : v 8.1 m/s (29.0 km/h) | yaw 0.10° | wheelAngle |  
 Init : v 8.0 m/s (28.9 km/h) | yaw 0.52° | wheelAngle |  
 LocalInit : x 105.14 y 0.75  
 LocalEgo : x 103.91 y 0.76 | GlobalEgo : x 460145.34 y  
 Error : t 0.0 | lat 0.0 | long 0.0 | yaw 0.0 | corr.  
 EPS : 1 < 1 < 1 | 1.12  
 Survivors : 2.66% < 2.80% < 2.93% | 2.79%  
 StateSpace : 1.21% < 25.68% < 48.65% < 59.09%  
 Mask : 5 < 9 < 11 | 7.13ms  
 Grid : 0 < 0 < 1 | 0.46ms  
 Objects : 0 < 0 < 1 | 0.79ms  
 Road E65 : 1 < 1 < 1 | 1.26ms  
 Road Magic Flood : 0 < 2 < 3 | 1.50ms  
 Road Distance : 0 < 1 < 1 | 0.66ms  
 Upload : 1 < 1 < 1 | 1.64ms

top [Running]

built on Dec 2 2021

Overall runtime is 1.06 ms  
 Timer : Intention(0.05 ms), Interpretation(0.04 ms)  
 OnRoad(0.02 ms), Postprocess(0.32 ms), PredPatf  
 PredPed(0.03 ms), PredVelProf(0.09 ms), Predictor  
 Timer : Preprocessing(0.02 ms), Stabilization(0.13 m  
 Inputs : GlobalEgo(18.00 Hz), FpsObjects(10.00 Hz  
 Hz), Rg(2.00 Hz), MonObjects(5.00 Hz)

CudaInputCheck [Running]

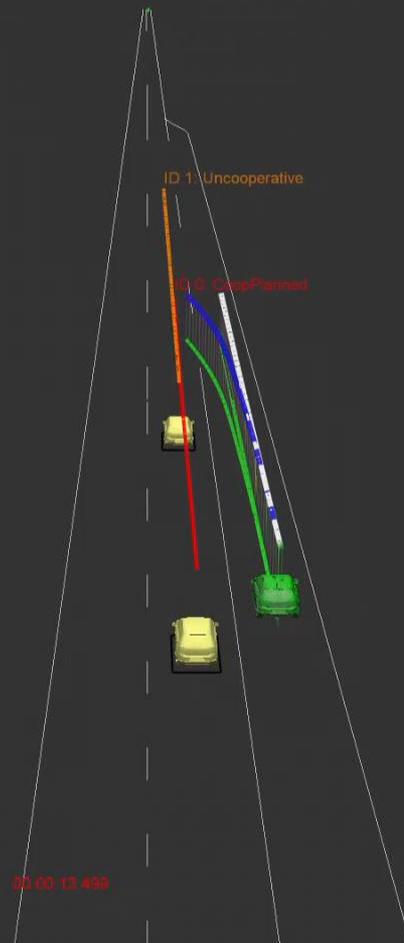
CoopScenarioSelection

CarMaker Scenario: F151\_2ego\_SimNet  
 Results Folder:  
 Planner Config:  
 Coop Params: accept0 (50.00), create1 (30.00)  
 Target Velocity: 8.33 m/s  
 MCM Tx-Delay: 0 ms

Merging-F15-3lane  Manual Selection

Plan: Valid, CMR = (8s, 0s)

Request: Valid, Created Request, CMR = (8s, 0s), Ignored Plan



ADTF Control

00:00:13.649 SimCmV02

C-C-Output-AutoPlot\_StatusDisplay

CudaDP [Running]

built on Dec 2 2021

CARMAKER\_CAR // Type CarMaker\_Car // Ctrl HAD AC  
 Runtime : #591#0 | 75 < 81 < 104 | 82.15ms  
 Transitions : 713 < 815 < 817 | 773.88k, 32438 < 386  
 37190.12k/sec  
 States : 8 < 9 < 9 | 9.46k  
 Result : HAPPY | lat: 60.0% 0.05 | costs: 7.73e+13 |  
 Ego : v 8.2 m/s (29.6 km/h) | yaw 0.03° | wheelAngle |  
 Init : v 8.3 m/s (29.8 km/h) | yaw 0.46° | wheelAngle |  
 LocalInit : x 106.52 y 0.69  
 LocalEgo : x 105.16 y 0.70 | GlobalEgo : x 460141.59 y  
 Error : t 0.0 | lat 0.0 | long 0.0 | yaw 0.0 | corr.  
 EPS : 0 < 0 < 0 | 0.61  
 Survivors : 2.42% < 2.49% < 2.66% | 2.54%  
 StateSpace : 1.44% < 30.91% < 51.55% < 60.17%  
 Mask : 5 < 6 < 9 | 6.54ms  
 Grid : 0 < 0 < 0 | 0.34ms  
 Objects : 0 < 0 < 1 | 0.75ms  
 Road E65 : 1 < 1 < 1 | 1.21ms  
 Road Magic Flood : 0 < 1 < 2 | 1.30ms  
 Road Distance : 0 < 0 < 1 | 0.51ms  
 Upload : 1 < 1 < 1 | 1.67ms

top [Running]

built on Dec 2 2021

Overall runtime is 0.97 ms  
 Timer : Intention(0.05 ms), Interpretation(0.03 ms)  
 OnRoad(0.08 ms), Postprocess(0.28 ms), PredPatf  
 PredPed(0.03 ms), PredVelProf(0.08 ms), Predictor  
 Timer : Preprocessing(0.02 ms), Stabilization(0.12 m  
 Inputs : GlobalEgo(22.50 Hz), FpsObjects(10.00 Hz  
 Hz), Rg(2.00 Hz), MonObjects(5.14 Hz)

CudaInputCheck [Running]

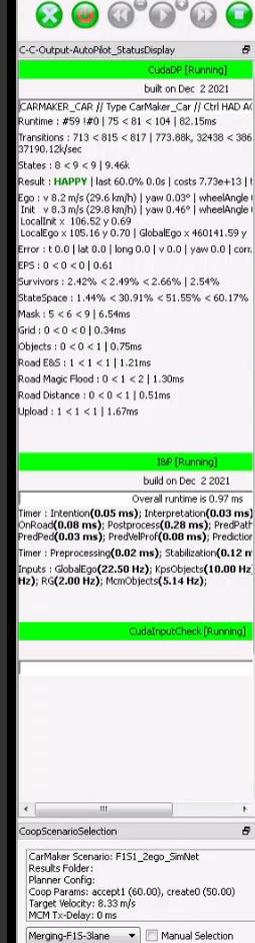
CoopScenarioSelection

CarMaker Scenario: F151\_2ego\_SimNet  
 Results Folder:  
 Planner Config:  
 Coop Params: accept1 (60.00), create0 (50.00)  
 Target Velocity: 8.33 m/s  
 MCM Tx-Delay: 0 ms

Merging-F15-3lane  Manual Selection

Plan: Valid, Accepted Request, CMR = (0s, 8s)

Request: NO SOLUTION



CM [V01]

V01 [low MinCR]

ADTF Control

00:00:13.999 SimCmV01

Plan: Valid, CMR = (8s, 0s)  
Request: NO SOLUTION

CudaDP [Running]  
built on Dec 2 2021

CARMAKER\_CAR // Type CarMaker\_Car // Ctrl HAD AC  
Runtime : #61 1#0 | 21 < 80 < 111 | 88.13ms  
Transitions : #623 < 660 < 689 | 668.32s, 33072 < 376  
36209.00/sec  
States : 8 < 8 < 9 | 9.09k  
Result : **HAPPY** | lat: 45.9% 0.4s | costs: 1.17e+14 |  
Ego : v 8.1 m/s (29.0 km/h) | yaw 0.09° | wheelAngle |  
Intr : v 8.0 m/s (28.9 km/h) | yaw 0.51° | wheelAngle |  
LocalIntr : x 108.35 y 0.78  
LocalEgo : x 107.13 y 0.79 | GlobalEgo : x 460148.56 y |  
Error : t 0.0 | lat 0.0 | long 0.0 | v 0.0 | yaw 0.0 | cor.  
EPS : 1 < 1 < 1 | 1.12  
Survivors : 2.66% < 2.80% < 2.93% | 2.79%  
StateSpace : 1.21% < 24.67% < 47.80% < 58.28% |  
Mask : 5 < 6 < 11 | 7.09ms  
Grid : 0 < 0 < 1 | 0.45ms  
Objects : 0 < 0 < 1 | 0.79ms  
Road E85 : 1 < 1 < 1 | 1.27ms  
Road Magic Flood : 0 < 1 < 3 | 1.49ms  
Road Distance : 0 < 0 < 1 | 0.64ms  
Upload : 1 < 1 < 1 | 1.64ms

top [Running]  
built on Dec 2 2021

Overall runtime is 0.94 ms  
Timer : Intention(0.05 ms), Interpretation(0.04 ms)  
OnRoad(0.02 ms), Postprocess(0.28 ms), PredPat  
PredPed(0.03 ms), PredVelProf(0.08 ms), Predictor  
Timer : Preprocessing(0.02 ms), Stabilization(0.11 m  
Inputs : GlobalEgo(22.50 Hz), FpsObjects(10.00 Hz  
Hz), Rg(2.00 Hz), MemObjects(5.00 Hz)

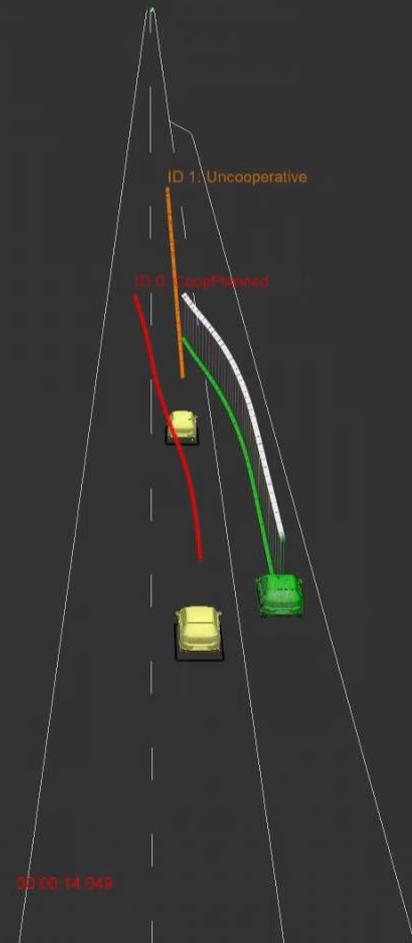
CudaInputCheck [Running]

CoopScenarioSelection

CarMaker Scenario: F151\_2ego\_SimNet  
Results Folder:  
Planner Config:  
Coop Params: accept0 (50.00), create1 (30.00)  
Target Velocity: 8.33 m/s  
MCM Tx-Delay: 0 ms

Merging-F15-3lane  Manual Selection

Plan: Valid, CMR = (8s, 0s)  
Request: NO SOLUTION



V02 [high MaxCI]

ADTF Control

00:00:14.149 SimCmV02

Plan: Valid, CMR = (0s, 8s)  
Request: NO SOLUTION

CudaDP [Running]  
built on Dec 2 2021

CARMAKER\_CAR // Type CarMaker\_Car // Ctrl HAD AC  
Runtime : #61 1#0 | 75 < 79 < 104 | 82.26ms  
Transitions : #713 < 763 < 817 | 773.16s, 32438 < 334  
36961.41/sec  
States : 8 < 9 < 9 | 9.46k  
Result : **HAPPY** | lat: 59.5% 0.0s | costs: 7.18e+13 |  
Ego : v 8.3 m/s (29.7 km/h) | yaw 0.08° | wheelAngle |  
Intr : v 8.3 m/s (29.8 km/h) | yaw 0.52° | wheelAngle |  
LocalIntr : x 109.84 y 0.72  
LocalEgo : x 108.43 y 0.73 | GlobalEgo : x 460144.88 y |  
Error : t 0.0 | lat 0.0 | long 0.0 | v 0.0 | yaw 0.0 | cor.  
EPS : 0 < 0 < 0 | 0.61  
Survivors : 2.42% < 2.55% < 2.66% | 2.54%  
StateSpace : 1.21% < 28.74% < 50.52% < 58.99%  
Mask : 5 < 5 < 9 | 6.57ms  
Grid : 0 < 0 < 0 | 0.34ms  
Objects : 0 < 0 < 1 | 0.76ms  
Road E85 : 1 < 1 < 1 | 1.21ms  
Road Magic Flood : 0 < 1 < 2 | 1.29ms  
Road Distance : 0 < 0 < 1 | 0.53ms  
Upload : 1 < 1 < 1 | 1.68ms

top [Running]  
built on Dec 2 2021

Overall runtime is 0.98 ms  
Timer : Intention(0.05 ms), Interpretation(0.04 ms)  
OnRoad(0.04 ms), Postprocess(0.27 ms), PredPat  
PredPed(0.03 ms), PredVelProf(0.08 ms), Predictor  
Timer : Preprocessing(0.02 ms), Stabilization(0.12 m  
Inputs : GlobalEgo(22.50 Hz), FpsObjects(10.00 Hz  
Hz), Rg(2.00 Hz), MemObjects(5.00 Hz)

CudaInputCheck [Running]

CoopScenarioSelection

CarMaker Scenario: F151\_2ego\_SimNet  
Results Folder:  
Planner Config:  
Coop Params: accept1 (60.00), create0 (50.00)  
Target Velocity: 8.33 m/s  
MCM Tx-Delay: 0 ms

Merging-F15-3lane  Manual Selection

Plan: Valid, CMR = (0s, 8s)  
Request: NO SOLUTION

