Small Autonomous Vehicle

# Small Autonomous Vehicle

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | uml:Model |

## 1. Requirements

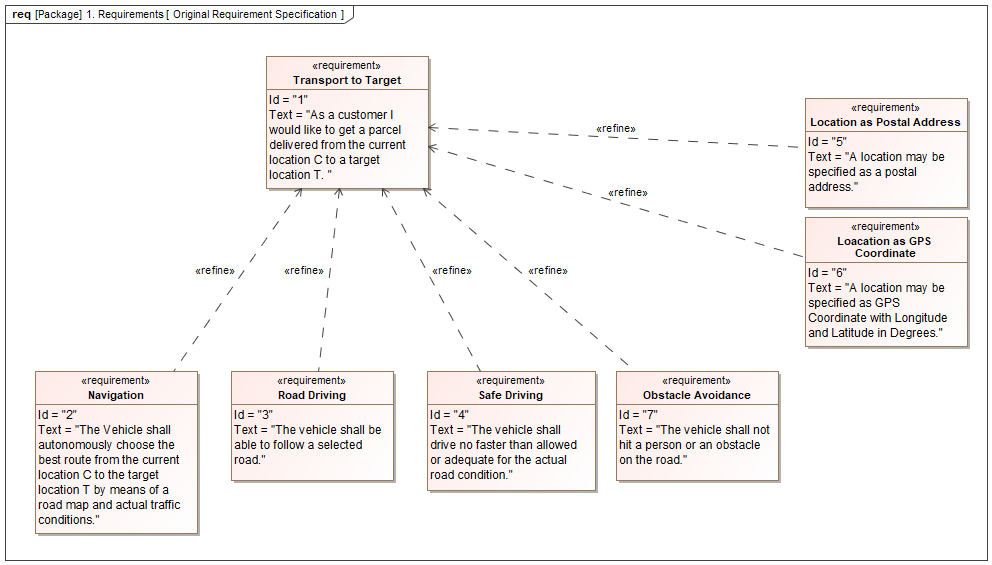
#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Package |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| 1. Requirements | *enthält* | [▣  Original Requirement Specification](#N-9217718610) |

### ▣  Original Requirement Specification



#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Diagramm |
| *Notation* | UML Requirement Diagram |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [1. Requirements](#N-9977762942) | *enthält* | ▣  Original Requirement Specification |
| ▣  Original Requirement Specification | *zeigt* | [↯  Location as Postal Address](#N-11994701793)  [↯  Loacation as GPS Coordinate](#N-10225131950)  [↯  Transport to Target](#N-10744889577)  [↯  Obstacle Avoidance](#N-9601311473)  [↯  Navigation](#N-9147807467)  [↯  Safe Driving](#N-9763303196)  [↯  Road Driving](#N-9470522249) |

### ↯  Navigation

The Vehicle shall autonomously choose the best route from the current location C to the target location T by means of a road map and actual traffic conditions.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Navigation | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [☆  Navigate](#N-8954653965) | *erfüllt* | ↯  Navigation |
| [▣  Functional Decomposition](#N-8951569513)  [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Navigation |

### ↯  Road Driving

The vehicle shall be able to follow a selected road.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Road Driving | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [☆  Follow the Road](#N-9003435268) | *erfüllt* | ↯  Road Driving |
| [▣  Functional Decomposition](#N-8951569513)  [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Road Driving |

### ↯  Transport to Target

As a customer I would like to get a parcel delivered from the current location C to a target location T.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [↯  Road Driving](#N-9470522249)  [↯  Loacation as GPS Coordinate](#N-10225131950)  [↯  Obstacle Avoidance](#N-9601311473)  [↯  Location as Postal Address](#N-11994701793)  [↯  Safe Driving](#N-9763303196)  [↯  Navigation](#N-9147807467) | *verfeinert* | ↯  Transport to Target |
| [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Transport to Target |

### ↯  Location as Postal Address

A location may be specified as a postal address.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Location as Postal Address | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Location as Postal Address |

### ↯  Obstacle Avoidance

The vehicle shall not hit a person or an obstacle on the road.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Obstacle Avoidance | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Obstacle Avoidance |

### ↯  Safe Driving

The vehicle shall drive no faster than allowed or adequate for the actual road condition.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Safe Driving | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [☆  Select an adequate Speed](#N-9198148295) | *erfüllt* | ↯  Safe Driving |
| [▣  Functional Decomposition](#N-8951569513)  [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Safe Driving |

### ↯  Loacation as GPS Coordinate

A location may be specified as GPS Coordinate with Longitude and Latitude in Degrees.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Loacation as GPS Coordinate | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Loacation as GPS Coordinate |

## 2. Functional Layer

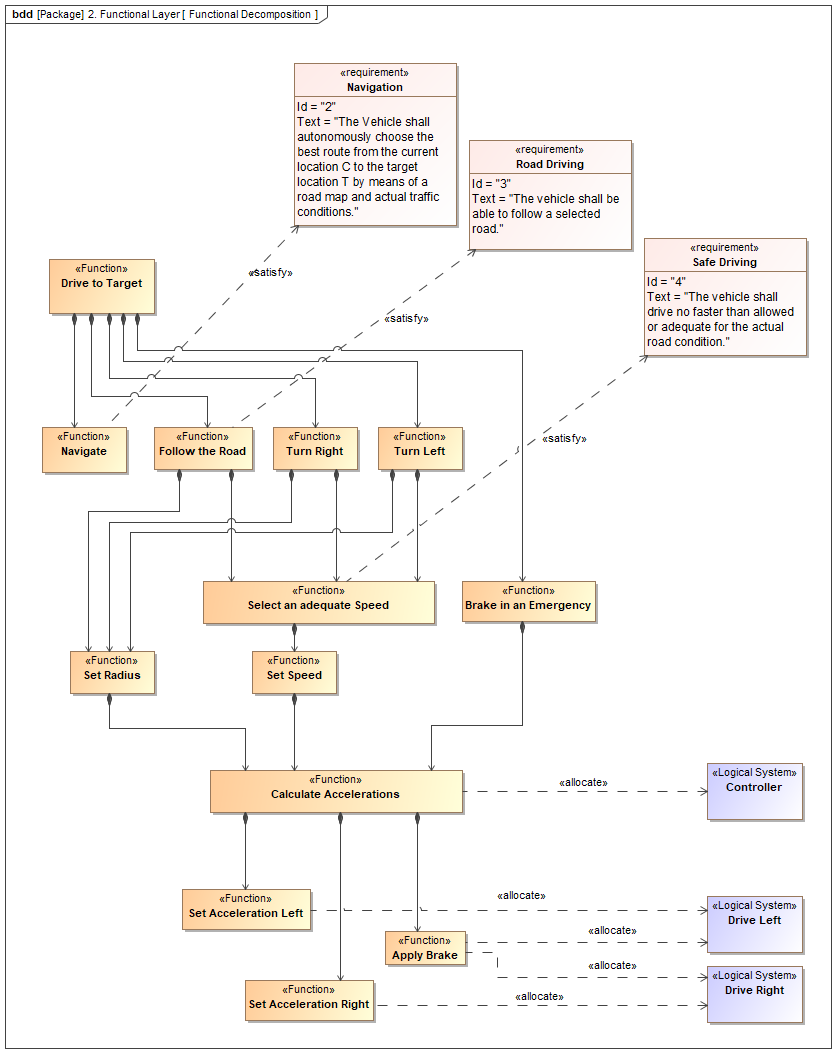
#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Package |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| 2. Functional Layer | *enthält* | [☆  Apply Brake](#N-8713292222)  [☆  Follow the Road](#N-9003435268)  [☆  Set Acceleration Right](#N-10606297356)  [☆  Select an adequate Speed](#N-9198148295)  [☆  Set Acceleration Left](#N-9487370416)  [☆  Drive to Target](#N-11529470390)  [☆  Turn Left](#N-10278096463)  [☆  Calculate Accelerations](#N-11933213455)  [☆  Navigate](#N-8954653965)  [☆  Set Radius](#N-10716749671)  [☆  Turn Right](#N-8394287897)  [☆  Set Speed](#N-8966476478)  [☆  Brake in an Emergency](#N-9857486555)  [▣  Functional Decomposition](#N-8951569513) |

### ▣  Functional Decomposition



#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Diagramm |
| *Notation* | SysML Block Definition Diagram |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [2. Functional Layer](#N-10598743616) | *enthält* | ▣  Functional Decomposition |
| ▣  Functional Decomposition | *zeigt* | [☆  Apply Brake](#N-8713292222)  [☆  Drive Left](#N-11997645350)  [☆  Select an adequate Speed](#N-9198148295)  [☆  Set Speed](#N-8966476478)  [↯  Road Driving](#N-9470522249)  [☆  Drive Right](#N-8433932798)  [☆  Set Acceleration Left](#N-9487370416)  [☆  Set Radius](#N-10716749671)  [☆  Turn Left](#N-10278096463)  [↯  Navigation](#N-9147807467)  [↯  Safe Driving](#N-9763303196)  [☆  Brake in an Emergency](#N-9857486555)  [☆  Navigate](#N-8954653965)  [☆  Drive to Target](#N-11529470390)  [☆  Turn Right](#N-8394287897)  [☆  Calculate Accelerations](#N-11933213455)  [☆  Set Acceleration Right](#N-10606297356)  [☆  Follow the Road](#N-9003435268)  [☆  Controller](#N-12044109204) |

### ☆  Brake in an Emergency

Take the vehicle to a full stop in the shortest time possible without loosing control over the trajectory.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Drive to Target](#N-11529470390)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Brake in an Emergency |
| ☆  Brake in an Emergency | *enthält* | [☆  Calculate Accelerations](#N-11933213455) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Brake in an Emergency |

### ☆  Set Speed

The (autonomous) driver's speed command (gas pedal position).

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Select an adequate Speed](#N-9198148295)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Set Speed |
| ☆  Set Speed | *enthält* | [☆  Calculate Accelerations](#N-11933213455) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Set Speed |

### ☆  Turn Right

Take a right turn at a road intersection. Observe the traffic entering the same lane and avoid a collision, if another vehicle does not observe the priority rules.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Drive to Target](#N-11529470390)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Turn Right |
| ☆  Turn Right | *enthält* | [☆  Select an adequate Speed](#N-9198148295)  [☆  Set Radius](#N-10716749671) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Turn Right |

### ☆  Set Radius

The (autonomous) driver's steering command (steering wheel position).

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Turn Right](#N-8394287897)  [☆  Turn Left](#N-10278096463)  [☆  Follow the Road](#N-9003435268)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Set Radius |
| ☆  Set Radius | *enthält* | [☆  Calculate Accelerations](#N-11933213455) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Set Radius |

### ☆  Navigate

Select a path to get from the current position to the target.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Drive to Target](#N-11529470390)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Navigate |
| ☆  Navigate | *erfüllt* | [↯  Navigation](#N-9147807467) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Navigate |

### ☆  Calculate Accelerations

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Set Radius](#N-10716749671)  [☆  Set Speed](#N-8966476478)  [☆  Brake in an Emergency](#N-9857486555)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Calculate Accelerations |
| ☆  Calculate Accelerations | *enthält* | [☆  Set Acceleration Left](#N-9487370416)  [☆  Apply Brake](#N-8713292222)  [☆  Set Acceleration Right](#N-10606297356) |
| ☆  Calculate Accelerations | *zugeordnet zu* | [☆  Controller](#N-12044109204) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Calculate Accelerations |

### ☆  Turn Left

Take a left turn in a road intersection. Observe the priority rules and avoid traffic on the two lanes you are crossing.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Drive to Target](#N-11529470390)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Turn Left |
| ☆  Turn Left | *enthält* | [☆  Select an adequate Speed](#N-9198148295)  [☆  Set Radius](#N-10716749671) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Turn Left |

### ☆  Drive to Target

Manoevre the vehicle from the current position to the selected target.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Drive to Target |
| ☆  Drive to Target | *enthält* | [☆  Follow the Road](#N-9003435268)  [☆  Navigate](#N-8954653965)  [☆  Brake in an Emergency](#N-9857486555)  [☆  Turn Right](#N-8394287897)  [☆  Turn Left](#N-10278096463) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Drive to Target |

### ☆  Set Acceleration Left

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Calculate Accelerations](#N-11933213455)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Set Acceleration Left |
| ☆  Set Acceleration Left | *zugeordnet zu* | [☆  Drive Left](#N-11997645350) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Set Acceleration Left |

### ☆  Select an adequate Speed

Taking into account road condition and weather, select a safe speed.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Follow the Road](#N-9003435268)  [☆  Turn Left](#N-10278096463)  [☆  Turn Right](#N-8394287897)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Select an adequate Speed |
| ☆  Select an adequate Speed | *enthält* | [☆  Set Speed](#N-8966476478) |
| ☆  Select an adequate Speed | *erfüllt* | [↯  Safe Driving](#N-9763303196) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Select an adequate Speed |

### ☆  Set Acceleration Right

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Calculate Accelerations](#N-11933213455)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Set Acceleration Right |
| ☆  Set Acceleration Right | *zugeordnet zu* | [☆  Drive Right](#N-8433932798) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Set Acceleration Right |

### ☆  Follow the Road

Keep the vehicle on the selected road.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Drive to Target](#N-11529470390)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Follow the Road |
| ☆  Follow the Road | *enthält* | [☆  Select an adequate Speed](#N-9198148295)  [☆  Set Radius](#N-10716749671) |
| ☆  Follow the Road | *erfüllt* | [↯  Road Driving](#N-9470522249) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Follow the Road |

### ☆  Apply Brake

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Calculate Accelerations](#N-11933213455)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Apply Brake |
| ☆  Apply Brake | *zugeordnet zu* | [☆  Drive Right](#N-8433932798)  [☆  Drive Left](#N-11997645350) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Apply Brake |

## 3. Logical Layer

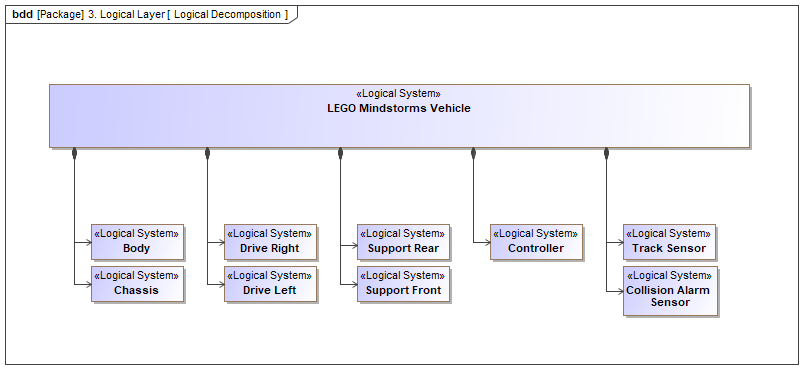
#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Package |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| 3. Logical Layer | *enthält* | [♢  re-navigate!](#N-11732168003)  [♢  new\_target!](#N-9290036964)  [♢  navigate!](#N-9177870088)  [♢  emergency\_brake!](#N-11531716479)  [♢  halt!](#N-9656450799)  [♢  continue\_driving!](#N-10288916115)  [♢  switch\_off!](#N-9846796697)  [♢  switch\_on!](#N-8304008149)  [♢  turned\_left!](#N-10991945887)  [♢  turn\_left!](#N-10653620373)  [♢  turned\_right!](#N-10075124872)  [♢  turn\_right!](#N-11538245371)  [♢  start\_driving!](#N-9248030319)  [☆  Collision Alarm Sensor](#N-9559172511)  [☆  Chassis](#N-9565488638)  [☆  Support Rear](#N-11778315812)  [▣  Controller State Machine](#N-8932838652)  [□  Controller State Machine](#N-8645243699)  [☆  Controller](#N-12044109204)  [☆  Support Front](#N-11528707940)  [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [☆  Drive Left](#N-11997645350)  [☆  Body](#N-8138219853)  [☆  Track Sensor](#N-10695738210)  [☆  Drive Right](#N-8433932798)  [▣  Logical Decomposition](#N-11777609043) |

### ▣  Logical Decomposition



#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Diagramm |
| *Notation* | SysML Block Definition Diagram |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [3. Logical Layer](#N-12046813692) | *enthält* | ▣  Logical Decomposition |
| ▣  Logical Decomposition | *zeigt* | [☆  Drive Left](#N-11997645350)  [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [☆  Support Rear](#N-11778315812)  [☆  Track Sensor](#N-10695738210)  [☆  Chassis](#N-9565488638)  [☆  Body](#N-8138219853)  [☆  Collision Alarm Sensor](#N-9559172511)  [☆  Drive Right](#N-8433932798)  [☆  Support Front](#N-11528707940)  [☆  Controller](#N-12044109204) |

### ☆  Drive Right

The wheel with motor and brake on the right side. The motor can accelerate and decelerate. The motor controller is "4-quadrant" and can supply electrical current for recharging the batteries.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Drive Right |
| [☆  Apply Brake](#N-8713292222)  [☆  Set Acceleration Right](#N-10606297356) | *zugeordnet zu* | ☆  Drive Right |
| [▣  Logical Decomposition](#N-11777609043)  [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Drive Right |

### ☆  Track Sensor

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Track Sensor |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Track Sensor |

### ☆  Body

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Body |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Body |

### ☆  Drive Left

The wheel with motor and brake on the left side. The motor can accelerate and decelerate. The motor controller is "4-quadrant" and can supply electrical current for recharging the batteries.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Drive Left |
| [☆  Set Acceleration Left](#N-9487370416)  [☆  Apply Brake](#N-8713292222) | *zugeordnet zu* | ☆  Drive Left |
| [▣  Logical Decomposition](#N-11777609043)  [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Drive Left |

### ☆  LEGO Mindstorms Vehicle

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [3. Logical Layer](#N-12046813692) | *enthält* | ☆  LEGO Mindstorms Vehicle |
| ☆  LEGO Mindstorms Vehicle | *enthält* | [☆  Drive Left](#N-11997645350)  [☆  Support Rear](#N-11778315812)  [☆  Support Front](#N-11528707940)  [☆  Track Sensor](#N-10695738210)  [☆  Body](#N-8138219853)  [☆  Drive Right](#N-8433932798)  [☆  Chassis](#N-9565488638)  [☆  Collision Alarm Sensor](#N-9559172511)  [☆  Controller](#N-12044109204) |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  LEGO Mindstorms Vehicle |

### ☆  Support Front

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Support Front |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Support Front |

### ☆  Controller

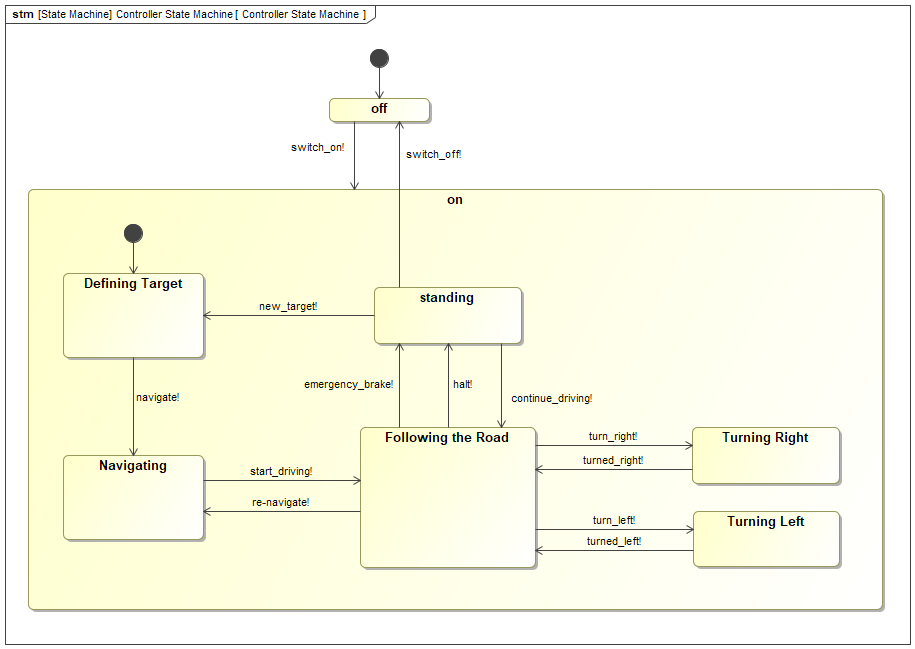
#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Controller |
| ☆  Controller | *has Behavior* | [□  Controller State Machine](#N-8645243699) |
| [☆  Calculate Accelerations](#N-11933213455) | *zugeordnet zu* | ☆  Controller |
| [▣  Logical Decomposition](#N-11777609043)  [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Controller |

### ▣  Controller State Machine



#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Diagramm |
| *Notation* | SysML State Machine Diagram |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [3. Logical Layer](#N-12046813692) | *enthält* | ▣  Controller State Machine |
| [□  Controller State Machine](#N-8645243699) | *has Diagram* | ▣  Controller State Machine |
| ▣  Controller State Machine | *zeigt* | [♢  switch\_on!](#N-8304008149)  [♢  switch\_off!](#N-9846796697)  [♢  new\_target!](#N-9290036964)  [♢  continue\_driving!](#N-10288916115)  [♢  emergency\_brake!](#N-11531716479)  [♢  halt!](#N-9656450799)  [♢  turned\_left!](#N-10991945887)  [♢  turn\_left!](#N-10653620373)  [♢  turned\_right!](#N-10075124872)  [♢  turn\_right!](#N-11538245371)  [♢  re-navigate!](#N-11732168003)  [♢  start\_driving!](#N-9248030319)  [♢  navigate!](#N-9177870088)  [□  unnamed uml:Region](#N-9833691313)  [□  Controller State Machine](#N-8645243699)  [○  Turning Left](#N-10766068453)  [□  unnamed uml:Region](#N-11161326633)  [□  Following the Road→standing](#N-8148046078)  [□  standing→off](#N-9398927032)  [○  Defining Target](#N-9690941989)  [□  Following the Road→Navigating](#N-8181074752)  [□  Navigating→Following the Road](#N-10681552864)  [□  Following the Road→standing](#N-10029447649)  [□  standing→Following the Road](#N-10758876760)  [○  Following the Road](#N-10602393645)  [□  entry→Defining Target](#N-9981343075)  [□  standing→Defining Target](#N-9064602334)  [○  on](#N-9558460655)  [○  entry](#N-8608788267)  [□  entry→off](#N-10354607200)  [□  Following the Road→Turning Left](#N-8920286089)  [□  off→on](#N-10118593315)  [○  off](#N-12120214384)  [○  Turning Right](#N-11888780067)  [○  standing](#N-12049828038)  [□  Turning Right→Following the Road](#N-10045694210)  [□  Following the Road→Turning Right](#N-10624172563)  [□  Defining Target→Navigating](#N-10642183799)  [○  entry](#N-11718877640)  [□  Turning Left→Following the Road](#N-9495030237)  [○  Navigating](#N-10885042918) |

### ♢  switch\_on!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  switch\_on! | *triggers* | [□  off→on](#N-10118593315) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  switch\_on! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  switch\_on! |

### ♢  switch\_off!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  switch\_off! | *triggers* | [□  standing→off](#N-9398927032) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  switch\_off! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  switch\_off! |

### ♢  navigate!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  navigate! | *triggers* | [□  Defining Target→Navigating](#N-10642183799) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  navigate! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  navigate! |

### ♢  new\_target!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  new\_target! | *triggers* | [□  standing→Defining Target](#N-9064602334) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  new\_target! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  new\_target! |

### ♢  start\_driving!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  start\_driving! | *triggers* | [□  Navigating→Following the Road](#N-10681552864) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  start\_driving! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  start\_driving! |

### ♢  re-navigate!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Call-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  re-navigate! | *triggers* | [□  Following the Road→Navigating](#N-8181074752) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  re-navigate! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  re-navigate! |

### ♢  emergency\_brake!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  emergency\_brake! | *triggers* | [□  Following the Road→standing](#N-10029447649) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  emergency\_brake! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  emergency\_brake! |

### ♢  halt!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  halt! | *triggers* | [□  Following the Road→standing](#N-8148046078) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  halt! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  halt! |

### ♢  continue\_driving!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  continue\_driving! | *triggers* | [□  standing→Following the Road](#N-10758876760) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  continue\_driving! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  continue\_driving! |

### ♢  turn\_right!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  turn\_right! | *triggers* | [□  Following the Road→Turning Right](#N-10624172563) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  turn\_right! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  turn\_right! |

### ♢  turned\_right!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  turned\_right! | *triggers* | [□  Turning Right→Following the Road](#N-10045694210) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  turned\_right! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  turned\_right! |

### ♢  turn\_left!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  turn\_left! | *triggers* | [□  Following the Road→Turning Left](#N-8920286089) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  turn\_left! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  turn\_left! |

### ♢  turned\_left!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  turned\_left! | *triggers* | [□  Turning Left→Following the Road](#N-9495030237) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  turned\_left! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  turned\_left! |

### ☆  Support Rear

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Support Rear |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Support Rear |

### ☆  Chassis

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Chassis |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Chassis |

### ☆  Collision Alarm Sensor

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Collision Alarm Sensor |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Collision Alarm Sensor |

# Model Elements (Glossary)

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Model Elements (Glossary) |

### ☆  Apply Brake

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Calculate Accelerations](#N-11933213455)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Apply Brake |
| ☆  Apply Brake | *zugeordnet zu* | [☆  Drive Right](#N-8433932798)  [☆  Drive Left](#N-11997645350) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Apply Brake |

### ☆  Body

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Body |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Body |

### ☆  Brake in an Emergency

Take the vehicle to a full stop in the shortest time possible without loosing control over the trajectory.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Drive to Target](#N-11529470390)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Brake in an Emergency |
| ☆  Brake in an Emergency | *enthält* | [☆  Calculate Accelerations](#N-11933213455) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Brake in an Emergency |

### ☆  Calculate Accelerations

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Set Radius](#N-10716749671)  [☆  Set Speed](#N-8966476478)  [☆  Brake in an Emergency](#N-9857486555)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Calculate Accelerations |
| ☆  Calculate Accelerations | *enthält* | [☆  Set Acceleration Left](#N-9487370416)  [☆  Apply Brake](#N-8713292222)  [☆  Set Acceleration Right](#N-10606297356) |
| ☆  Calculate Accelerations | *zugeordnet zu* | [☆  Controller](#N-12044109204) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Calculate Accelerations |

### ☆  Chassis

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Chassis |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Chassis |

### ☆  Collision Alarm Sensor

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Collision Alarm Sensor |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Collision Alarm Sensor |

### ♢  continue\_driving!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  continue\_driving! | *triggers* | [□  standing→Following the Road](#N-10758876760) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  continue\_driving! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  continue\_driving! |

### ☆  Controller

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Controller |
| ☆  Controller | *has Behavior* | [□  Controller State Machine](#N-8645243699) |
| [☆  Calculate Accelerations](#N-11933213455) | *zugeordnet zu* | ☆  Controller |
| [▣  Logical Decomposition](#N-11777609043)  [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Controller |

### □  Controller State Machine

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML State Machine |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Controller](#N-12044109204) | *has Behavior* | □  Controller State Machine |
| [3. Logical Layer](#N-12046813692) | *enthält* | □  Controller State Machine |
| □  Controller State Machine | *enthält* | [□  unnamed uml:Region](#N-9833691313) |
| □  Controller State Machine | *has Diagram* | [▣  Controller State Machine](#N-8932838652) |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  Controller State Machine |

### ○  Defining Target

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML State |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  unnamed uml:Region](#N-11161326633) | *enthält* | ○  Defining Target |
| [□  standing→Defining Target](#N-9064602334)  [□  entry→Defining Target](#N-9981343075) | *ends at* | ○  Defining Target |
| [□  Defining Target→Navigating](#N-10642183799) | *starts from* | ○  Defining Target |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ○  Defining Target |

### □  Defining Target→Navigating

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  Defining Target→Navigating | *starts from* | [○  Defining Target](#N-9690941989) |
| □  Defining Target→Navigating | *ends at* | [○  Navigating](#N-10885042918) |
| [♢  navigate!](#N-9177870088) | *triggers* | □  Defining Target→Navigating |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  Defining Target→Navigating |

### ☆  Drive Left

The wheel with motor and brake on the left side. The motor can accelerate and decelerate. The motor controller is "4-quadrant" and can supply electrical current for recharging the batteries.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Drive Left |
| [☆  Set Acceleration Left](#N-9487370416)  [☆  Apply Brake](#N-8713292222) | *zugeordnet zu* | ☆  Drive Left |
| [▣  Logical Decomposition](#N-11777609043)  [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Drive Left |

### ☆  Drive Right

The wheel with motor and brake on the right side. The motor can accelerate and decelerate. The motor controller is "4-quadrant" and can supply electrical current for recharging the batteries.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Drive Right |
| [☆  Apply Brake](#N-8713292222)  [☆  Set Acceleration Right](#N-10606297356) | *zugeordnet zu* | ☆  Drive Right |
| [▣  Logical Decomposition](#N-11777609043)  [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Drive Right |

### ☆  Drive to Target

Manoevre the vehicle from the current position to the selected target.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Drive to Target |
| ☆  Drive to Target | *enthält* | [☆  Follow the Road](#N-9003435268)  [☆  Navigate](#N-8954653965)  [☆  Brake in an Emergency](#N-9857486555)  [☆  Turn Right](#N-8394287897)  [☆  Turn Left](#N-10278096463) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Drive to Target |

### ♢  emergency\_brake!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  emergency\_brake! | *triggers* | [□  Following the Road→standing](#N-10029447649) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  emergency\_brake! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  emergency\_brake! |

### ○  entry

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | uml:Pseudostate |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  unnamed uml:Region](#N-9833691313) | *enthält* | ○  entry |
| [□  entry→off](#N-10354607200) | *starts from* | ○  entry |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ○  entry |

### ○  entry

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | uml:Pseudostate |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  unnamed uml:Region](#N-11161326633) | *enthält* | ○  entry |
| [□  entry→Defining Target](#N-9981343075) | *starts from* | ○  entry |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ○  entry |

### □  entry→Defining Target

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  entry→Defining Target | *starts from* | [○  entry](#N-8608788267) |
| □  entry→Defining Target | *ends at* | [○  Defining Target](#N-9690941989) |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  entry→Defining Target |

### □  entry→off

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  entry→off | *starts from* | [○  entry](#N-11718877640) |
| □  entry→off | *ends at* | [○  off](#N-12120214384) |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  entry→off |

### ☆  Follow the Road

Keep the vehicle on the selected road.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Drive to Target](#N-11529470390)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Follow the Road |
| ☆  Follow the Road | *enthält* | [☆  Select an adequate Speed](#N-9198148295)  [☆  Set Radius](#N-10716749671) |
| ☆  Follow the Road | *erfüllt* | [↯  Road Driving](#N-9470522249) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Follow the Road |

### ○  Following the Road

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML State |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  unnamed uml:Region](#N-11161326633) | *enthält* | ○  Following the Road |
| [□  standing→Following the Road](#N-10758876760)  [□  Turning Left→Following the Road](#N-9495030237)  [□  Turning Right→Following the Road](#N-10045694210)  [□  Navigating→Following the Road](#N-10681552864) | *ends at* | ○  Following the Road |
| [□  Following the Road→standing](#N-10029447649)  [□  Following the Road→standing](#N-8148046078)  [□  Following the Road→Turning Left](#N-8920286089)  [□  Following the Road→Turning Right](#N-10624172563)  [□  Following the Road→Navigating](#N-8181074752) | *starts from* | ○  Following the Road |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ○  Following the Road |

### □  Following the Road→Navigating

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  Following the Road→Navigating | *starts from* | [○  Following the Road](#N-10602393645) |
| □  Following the Road→Navigating | *ends at* | [○  Navigating](#N-10885042918) |
| [♢  re-navigate!](#N-11732168003) | *triggers* | □  Following the Road→Navigating |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  Following the Road→Navigating |

### □  Following the Road→standing

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  Following the Road→standing | *starts from* | [○  Following the Road](#N-10602393645) |
| □  Following the Road→standing | *ends at* | [○  standing](#N-12049828038) |
| [♢  halt!](#N-9656450799) | *triggers* | □  Following the Road→standing |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  Following the Road→standing |

### □  Following the Road→standing

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  Following the Road→standing | *starts from* | [○  Following the Road](#N-10602393645) |
| □  Following the Road→standing | *ends at* | [○  standing](#N-12049828038) |
| [♢  emergency\_brake!](#N-11531716479) | *triggers* | □  Following the Road→standing |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  Following the Road→standing |

### □  Following the Road→Turning Left

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  Following the Road→Turning Left | *starts from* | [○  Following the Road](#N-10602393645) |
| □  Following the Road→Turning Left | *ends at* | [○  Turning Left](#N-10766068453) |
| [♢  turn\_left!](#N-10653620373) | *triggers* | □  Following the Road→Turning Left |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  Following the Road→Turning Left |

### □  Following the Road→Turning Right

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  Following the Road→Turning Right | *starts from* | [○  Following the Road](#N-10602393645) |
| □  Following the Road→Turning Right | *ends at* | [○  Turning Right](#N-11888780067) |
| [♢  turn\_right!](#N-11538245371) | *triggers* | □  Following the Road→Turning Right |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  Following the Road→Turning Right |

### ♢  halt!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  halt! | *triggers* | [□  Following the Road→standing](#N-8148046078) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  halt! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  halt! |

### ☆  LEGO Mindstorms Vehicle

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [3. Logical Layer](#N-12046813692) | *enthält* | ☆  LEGO Mindstorms Vehicle |
| ☆  LEGO Mindstorms Vehicle | *enthält* | [☆  Drive Left](#N-11997645350)  [☆  Support Rear](#N-11778315812)  [☆  Support Front](#N-11528707940)  [☆  Track Sensor](#N-10695738210)  [☆  Body](#N-8138219853)  [☆  Drive Right](#N-8433932798)  [☆  Chassis](#N-9565488638)  [☆  Collision Alarm Sensor](#N-9559172511)  [☆  Controller](#N-12044109204) |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  LEGO Mindstorms Vehicle |

### ↯  Loacation as GPS Coordinate

A location may be specified as GPS Coordinate with Longitude and Latitude in Degrees.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Loacation as GPS Coordinate | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Loacation as GPS Coordinate |

### ↯  Location as Postal Address

A location may be specified as a postal address.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Location as Postal Address | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Location as Postal Address |

### ☆  Navigate

Select a path to get from the current position to the target.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Drive to Target](#N-11529470390)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Navigate |
| ☆  Navigate | *erfüllt* | [↯  Navigation](#N-9147807467) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Navigate |

### ♢  navigate!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  navigate! | *triggers* | [□  Defining Target→Navigating](#N-10642183799) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  navigate! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  navigate! |

### ○  Navigating

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML State |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  unnamed uml:Region](#N-11161326633) | *enthält* | ○  Navigating |
| [□  Following the Road→Navigating](#N-8181074752)  [□  Defining Target→Navigating](#N-10642183799) | *ends at* | ○  Navigating |
| [□  Navigating→Following the Road](#N-10681552864) | *starts from* | ○  Navigating |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ○  Navigating |

### □  Navigating→Following the Road

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  Navigating→Following the Road | *starts from* | [○  Navigating](#N-10885042918) |
| □  Navigating→Following the Road | *ends at* | [○  Following the Road](#N-10602393645) |
| [♢  start\_driving!](#N-9248030319) | *triggers* | □  Navigating→Following the Road |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  Navigating→Following the Road |

### ↯  Navigation

The Vehicle shall autonomously choose the best route from the current location C to the target location T by means of a road map and actual traffic conditions.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Navigation | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [☆  Navigate](#N-8954653965) | *erfüllt* | ↯  Navigation |
| [▣  Functional Decomposition](#N-8951569513)  [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Navigation |

### ♢  new\_target!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  new\_target! | *triggers* | [□  standing→Defining Target](#N-9064602334) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  new\_target! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  new\_target! |

### ↯  Obstacle Avoidance

The vehicle shall not hit a person or an obstacle on the road.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Obstacle Avoidance | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Obstacle Avoidance |

### ○  off

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML State |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  unnamed uml:Region](#N-9833691313) | *enthält* | ○  off |
| [□  entry→off](#N-10354607200)  [□  standing→off](#N-9398927032) | *ends at* | ○  off |
| [□  off→on](#N-10118593315) | *starts from* | ○  off |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ○  off |

### □  off→on

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  off→on | *starts from* | [○  off](#N-12120214384) |
| □  off→on | *ends at* | [○  on](#N-9558460655) |
| [♢  switch\_on!](#N-8304008149) | *triggers* | □  off→on |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  off→on |

### ○  on

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML State |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  unnamed uml:Region](#N-9833691313) | *enthält* | ○  on |
| ○  on | *enthält* | [□  unnamed uml:Region](#N-11161326633) |
| [□  off→on](#N-10118593315) | *ends at* | ○  on |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ○  on |

### ♢  re-navigate!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Call-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  re-navigate! | *triggers* | [□  Following the Road→Navigating](#N-8181074752) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  re-navigate! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  re-navigate! |

### ↯  Road Driving

The vehicle shall be able to follow a selected road.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Road Driving | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [☆  Follow the Road](#N-9003435268) | *erfüllt* | ↯  Road Driving |
| [▣  Functional Decomposition](#N-8951569513)  [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Road Driving |

### ↯  Safe Driving

The vehicle shall drive no faster than allowed or adequate for the actual road condition.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ↯  Safe Driving | *verfeinert* | [↯  Transport to Target](#N-10744889577) |
| [☆  Select an adequate Speed](#N-9198148295) | *erfüllt* | ↯  Safe Driving |
| [▣  Functional Decomposition](#N-8951569513)  [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Safe Driving |

### ☆  Select an adequate Speed

Taking into account road condition and weather, select a safe speed.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Follow the Road](#N-9003435268)  [☆  Turn Left](#N-10278096463)  [☆  Turn Right](#N-8394287897)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Select an adequate Speed |
| ☆  Select an adequate Speed | *enthält* | [☆  Set Speed](#N-8966476478) |
| ☆  Select an adequate Speed | *erfüllt* | [↯  Safe Driving](#N-9763303196) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Select an adequate Speed |

### ☆  Set Acceleration Left

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Calculate Accelerations](#N-11933213455)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Set Acceleration Left |
| ☆  Set Acceleration Left | *zugeordnet zu* | [☆  Drive Left](#N-11997645350) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Set Acceleration Left |

### ☆  Set Acceleration Right

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Calculate Accelerations](#N-11933213455)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Set Acceleration Right |
| ☆  Set Acceleration Right | *zugeordnet zu* | [☆  Drive Right](#N-8433932798) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Set Acceleration Right |

### ☆  Set Radius

The (autonomous) driver's steering command (steering wheel position).

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Turn Right](#N-8394287897)  [☆  Turn Left](#N-10278096463)  [☆  Follow the Road](#N-9003435268)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Set Radius |
| ☆  Set Radius | *enthält* | [☆  Calculate Accelerations](#N-11933213455) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Set Radius |

### ☆  Set Speed

The (autonomous) driver's speed command (gas pedal position).

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Select an adequate Speed](#N-9198148295)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Set Speed |
| ☆  Set Speed | *enthält* | [☆  Calculate Accelerations](#N-11933213455) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Set Speed |

### ○  standing

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML State |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  unnamed uml:Region](#N-11161326633) | *enthält* | ○  standing |
| [□  Following the Road→standing](#N-10029447649)  [□  Following the Road→standing](#N-8148046078) | *ends at* | ○  standing |
| [□  standing→off](#N-9398927032)  [□  standing→Defining Target](#N-9064602334)  [□  standing→Following the Road](#N-10758876760) | *starts from* | ○  standing |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ○  standing |

### □  standing→Defining Target

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  standing→Defining Target | *starts from* | [○  standing](#N-12049828038) |
| □  standing→Defining Target | *ends at* | [○  Defining Target](#N-9690941989) |
| [♢  new\_target!](#N-9290036964) | *triggers* | □  standing→Defining Target |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  standing→Defining Target |

### □  standing→Following the Road

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  standing→Following the Road | *starts from* | [○  standing](#N-12049828038) |
| □  standing→Following the Road | *ends at* | [○  Following the Road](#N-10602393645) |
| [♢  continue\_driving!](#N-10288916115) | *triggers* | □  standing→Following the Road |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  standing→Following the Road |

### □  standing→off

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  standing→off | *starts from* | [○  standing](#N-12049828038) |
| □  standing→off | *ends at* | [○  off](#N-12120214384) |
| [♢  switch\_off!](#N-9846796697) | *triggers* | □  standing→off |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  standing→off |

### ♢  start\_driving!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  start\_driving! | *triggers* | [□  Navigating→Following the Road](#N-10681552864) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  start\_driving! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  start\_driving! |

### ☆  Support Front

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Support Front |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Support Front |

### ☆  Support Rear

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Support Rear |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Support Rear |

### ♢  switch\_off!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  switch\_off! | *triggers* | [□  standing→off](#N-9398927032) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  switch\_off! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  switch\_off! |

### ♢  switch\_on!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  switch\_on! | *triggers* | [□  off→on](#N-10118593315) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  switch\_on! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  switch\_on! |

### ☆  Track Sensor

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Logical\_System |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  LEGO Mindstorms Vehicle](#N-11774574242)  [3. Logical Layer](#N-12046813692) | *enthält* | ☆  Track Sensor |
| [▣  Logical Decomposition](#N-11777609043) | *zeigt* | ☆  Track Sensor |

### ↯  Transport to Target

As a customer I would like to get a parcel delivered from the current location C to a target location T.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Klasse |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [↯  Road Driving](#N-9470522249)  [↯  Loacation as GPS Coordinate](#N-10225131950)  [↯  Obstacle Avoidance](#N-9601311473)  [↯  Location as Postal Address](#N-11994701793)  [↯  Safe Driving](#N-9763303196)  [↯  Navigation](#N-9147807467) | *verfeinert* | ↯  Transport to Target |
| [▣  Original Requirement Specification](#N-9217718610) | *zeigt* | ↯  Transport to Target |

### ☆  Turn Left

Take a left turn in a road intersection. Observe the priority rules and avoid traffic on the two lanes you are crossing.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Drive to Target](#N-11529470390)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Turn Left |
| ☆  Turn Left | *enthält* | [☆  Select an adequate Speed](#N-9198148295)  [☆  Set Radius](#N-10716749671) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Turn Left |

### ☆  Turn Right

Take a right turn at a road intersection. Observe the traffic entering the same lane and avoid a collision, if another vehicle does not observe the priority rules.

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | RFLP:Function |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [☆  Drive to Target](#N-11529470390)  [2. Functional Layer](#N-10598743616) | *enthält* | ☆  Turn Right |
| ☆  Turn Right | *enthält* | [☆  Select an adequate Speed](#N-9198148295)  [☆  Set Radius](#N-10716749671) |
| [▣  Functional Decomposition](#N-8951569513) | *zeigt* | ☆  Turn Right |

### ♢  turn\_left!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  turn\_left! | *triggers* | [□  Following the Road→Turning Left](#N-8920286089) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  turn\_left! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  turn\_left! |

### ♢  turn\_right!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  turn\_right! | *triggers* | [□  Following the Road→Turning Right](#N-10624172563) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  turn\_right! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  turn\_right! |

### ♢  turned\_left!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  turned\_left! | *triggers* | [□  Turning Left→Following the Road](#N-9495030237) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  turned\_left! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  turned\_left! |

### ♢  turned\_right!

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | Signal-Event |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| ♢  turned\_right! | *triggers* | [□  Turning Right→Following the Road](#N-10045694210) |
| [3. Logical Layer](#N-12046813692) | *enthält* | ♢  turned\_right! |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ♢  turned\_right! |

### ○  Turning Left

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML State |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  unnamed uml:Region](#N-11161326633) | *enthält* | ○  Turning Left |
| [□  Following the Road→Turning Left](#N-8920286089) | *ends at* | ○  Turning Left |
| [□  Turning Left→Following the Road](#N-9495030237) | *starts from* | ○  Turning Left |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ○  Turning Left |

### □  Turning Left→Following the Road

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  Turning Left→Following the Road | *starts from* | [○  Turning Left](#N-10766068453) |
| □  Turning Left→Following the Road | *ends at* | [○  Following the Road](#N-10602393645) |
| [♢  turned\_left!](#N-10991945887) | *triggers* | □  Turning Left→Following the Road |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  Turning Left→Following the Road |

### ○  Turning Right

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML State |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  unnamed uml:Region](#N-11161326633) | *enthält* | ○  Turning Right |
| [□  Following the Road→Turning Right](#N-10624172563) | *ends at* | ○  Turning Right |
| [□  Turning Right→Following the Road](#N-10045694210) | *starts from* | ○  Turning Right |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | ○  Turning Right |

### □  Turning Right→Following the Road

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Transition |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| □  Turning Right→Following the Road | *starts from* | [○  Turning Right](#N-11888780067) |
| □  Turning Right→Following the Road | *ends at* | [○  Following the Road](#N-10602393645) |
| [♢  turned\_right!](#N-10075124872) | *triggers* | □  Turning Right→Following the Road |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  Turning Right→Following the Road |

### □  unnamed uml:Region

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Region |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [□  Controller State Machine](#N-8645243699) | *enthält* | □  unnamed uml:Region |
| □  unnamed uml:Region | *enthält* | [○  on](#N-9558460655)  [○  off](#N-12120214384)  [○  entry](#N-11718877640) |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  unnamed uml:Region |

### □  unnamed uml:Region

#### Attribute

|  |  |
| --- | --- |
| *Element-Typ* | UML Region |

#### Aussagen

|  |  |  |
| --- | --- | --- |
| [○  on](#N-9558460655) | *enthält* | □  unnamed uml:Region |
| □  unnamed uml:Region | *enthält* | [○  standing](#N-12049828038)  [○  Turning Left](#N-10766068453)  [○  Turning Right](#N-11888780067)  [○  Following the Road](#N-10602393645)  [○  Defining Target](#N-9690941989)  [○  Navigating](#N-10885042918)  [○  entry](#N-8608788267) |
| [▣  Controller State Machine](#N-8932838652) | *zeigt* | □  unnamed uml:Region |