**Manage Track Conditions**

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**Reviewers:**

TODO

**Date and version:**

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**Input documents:**

* Subset26 §3.12.1
* Subset26 §5.18
* Subset26 §7
* Subset34 §2.4

**Description**

In the following files, there are the SysML model which contains the IBD of “EVC”, the sub-functions “Other Functions” and “Manage Track Conditions”.

The aim of this model is to present the origin and the distribution of the inputs/outputs of the function “Manage Track Conditions”.







**DesignChoices**

1. We assume information on Train (localisation) are provided by other functions

**Functions**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Track Conditions** |
| Definition | 1 | T\_Definition | The global function in charge of the management of track conditions |
| *Input* | *0..n* | *T\_Variable* | *See file Other\_Functions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file Other\_Functions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *See sub-functions* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* |  |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Powerless Section Lower Pantograph** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “Powerless Section Lower Pantograph” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.2.1.3 (min safe front end), SRS-3.12.1.3, SRS-3.12.1.5.a,  SRS-3.12.1.5.b, SRS-3.12.1.6*  *SRS-A.3.1*  *SRS-5.18.2*  *Subset34-2.4.2* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Powerless Section Main Power Switch** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “Powerless Section Main Power Switch” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.2.1.3 (min safe front end), SRS-3.12.1.3, SRS-3.12.1.5.a,  SRS-3.12.1.5.b, SRS-3.12.1.6*  *SRS-A.3.1*  *SRS-5.18.3*  *Subset34-2.4.7* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Air Tightness** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “Air Tightness” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.3,  SRS-3.12.1.5.a, SRS-3.12.1.5.b, SRS-3.12.1.6*  *SRS-A.3.1*  *SRS-5.18.6*  *Subset34-2.4.4* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Sound Horn** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “Sound Horn” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.2.1.4 (estimated front end), SRS-3.12.1.3, SRS-3.12.1.5.a, SRS-3.12.1.6*  *SRS-A.3.1*  *SRS-5.18.9* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

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| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Non Stopping Area** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “Non Stopping Area” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.3,  SRS-3.12.1.5.a, SRS-3.12.1.6*  *SRS-5.18.4* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Tunnel Stopping Area** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “Tunnel Stopping Area” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.2.1.4 (estimated front end), SRS-3.12.1.3, SRS-3.12.1.5.a, SRS-3.12.1.6*  *SRS-5.18.8* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

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| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Change Traction System** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “Change Traction System” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.3,  SRS-3.12.1.5.a, SRS-3.12.1.5.b, SRS-3.12.1.6*  *SRS-A.3.1*  *SRS-5.18.10*  *Subset34-2.4.1* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Change Current Consumption** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “Change Current Consumption” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.3,  SRS-3.12.1.5.b, SRS-3.12.1.6*  *Subset34-2.4.10* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

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| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Big Metal Masses** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “Big Metal Masses” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2.1.2 (antenna position), SRS-3.12.1.3, SRS-3.12.1.6* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

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| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Radio Hole** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “Radio Hole” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.3, SRS-3.12.1.5.a, SRS-3.12.1.6*  *SRS-5.18.5* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

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| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Station Platforms** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “**Station Platforms**” |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.3,  SRS-3.12.1.5.b, SRS.3-12.1.6*  *Subset34-2.4.6* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text | **Manage Inhibition Brake** |
| Definition | 1 | T\_Definition | Called at each cycle, to manage the track condition “**Inhibition Brake**”   * Switch off regenerative brake * Switch off eddy current brake for SB * Switch off eddy current break for EB * Switch off magnetic shoe brake |
| *Input* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Output* | *0..n* | *T\_Variable* | *See file ManageTrackConditions.pdf* |
| *Local* | *0..n* | *T\_Variable* |  |
| *Parameter* | *0..n* | *T\_Constant* |  |
| *Requirement* | *0..n* | *T\_Requirement* | *SRS-3.12.1.1, SRS-3.12.1.2, SRS-3.12.1.3,  SRS-3.12.1.5.a, SRS-3.12.1.5.b, SRS-3.12.1.6*  *SRS-5.18.7* |
| *Block* | *1 (optional)* | *T\_FunctionalBlock* |  |
| *Parent* | *0..1* | *T\_Function* | **Manage Track Conditions** |
| *Allocation* | *1* | *T\_System* | Kernel |
| Safety | 1 | Boolean |  |

**Variables**

**List of variables :**

***DataInBTM:***

* Packets 39, 40, 67, 68 and 69 (in level lesser than 2)

***DataInRADIO:***

* Packets 39, 40, 67, 68 and 69 (in level 2 and 3)

***DataInODO:***

* Description not required for this function

***DataDMI****:*

* DataInDMI
  + To “Advance display of route related information” function :
    - DriverRequestToDisplayInformations (cf. Subset26 §3.15.10.1)
  + To “Manage Track Conditions” function :
    - TunnelStoppingAreaDisplayToggle (cf. Subset26 §5.18.8)
    - It’s not clearly specified if the driver has others particular actions?
* DataOutDMI (cf. Subset26 §5.18)
  + From “Advance display of route related information” function :
    - DistanceRemaining
  + From “Manage Track Conditions” function :
    - LowerPantograhAnnouncement
    - LoweredPantograph
    - RaisePantograph
    - NeutralSectionAnnouncement
    - NeutralSection
    - EndOfNeutralSection
    - NonStoppingAreaAnnouncement
    - NonStoppingArea
    - RadioHole
    - CloseAirConditioningIntakeAnnouncement
    - AirConditioningIntakeClosed
    - OpenAirConditioningIntake
    - InhibitionOfRegenerativeBrakeAnnouncement
    - InhibitionOfRegenerativeBrake
    - TunnelStoppingAreaAnnouncement
    - TunnelStoppingArea
    - SoundHorn
    - ChangeOfTractionSystemAnnouncement
    - NewTractionSystem

***DataTIU:***

* DataInTIU
  + It’s not clearly specified if TIU sub-system returns the state of commands?
* DataOutTIU
  + It’s not clearly specified if commands (e.g. CommandPantograph) shall be activated by the ERTMS/ETCS on board equipment and therefore by this function?
  + CommandPantograph (cf Subset34 § 2.4.2)
  + CommandMainPowerSwitch (cf Subset34 § 2.4.7)
  + CommandAirTightness (cf Subset34 § 2.4.4)
  + CommandChangeTractionSystem (cf Subset34 § 2.4.1)
  + CommandChangeAllowedCurrentConsumption (cf Subset34 § 2.4.10)
  + CommandPassengerDoor (cf Subset34 § 2.4.6)
  + In Subset34 §2.4, I don’t see commands for the following TrackConditions :
    - CommandBrakes
    - CommandSoundHorn

***TrainInfo:***

* EstimateFrontEndLocation
* MaxSafeFrontEndLocation
* MinSafeFrontEndLocation
* MinSafeRearEndLocation
* MaxSafeAntennaLocation
* MinSafeAntennaLocation
* TrainSpeed
* TrainDirection

***TrackConditions:***

Note: Data of TrackConditions are extracted of packets 39, 40, 67, 68 and 69.

* Track Condition Change of traction system (packet 39)
  + D\_TRACTION *(Distance to change of traction)*
  + M\_VOLTAGE *(Traction System voltage)*
  + NID\_CTRACTION *(Country identifier of the traction system)*
* Track Condition Change of allowed current consumption (packet 40)
  + D\_CURRENT *(Distance to change of allowed current consumption)*
  + M\_CURRENT *(Allowed current consumption)*
* Track Condition Big Metal Masses (packet 67)
  + D\_TRACKCOND *(Track condition distance)*
  + L\_TRACKCOND *(Length for which the defined track condition   
    is valid )*
  + Possibility to have several “Track Condition”
* Track Condition (packet 68)
  + Q\_TRACKINIT *(Qualifier for resuming the initial states of the related  
    track description of the packet)*
  + D\_TRACKINIT *(Distance to start of empty profile)*
  + D\_TRACKCOND *(Track condition distance)*
  + L\_TRACKCOND *(Length for which the defined track condition   
    is valid )*
  + M\_TRACKCOND *(Type of track condition)*
  + Possibility to have several “Track Condition”
* Track Condition Station Platforms (packet 69)
  + Q\_TRACKINIT *(Qualifier for resuming the initial states of the related  
    track description of the packet)*
  + D\_TRACKINIT *(Distance to start of empty profile)*
  + D\_TRACKCOND *(Track condition distance)*
  + L\_TRACKCOND *(Length for which the defined track condition   
    is valid )*
  + M\_PLATFORM *(Type of platform)*
  + Q\_PLATFORM *(Platform position (relative to direction of authorised movement))*
  + Possibility to have several “Track Condition”

***StopSupervisionOfInputs:***

* RadioHoleToSupervision (to stop radio supervision)
* BigMetalMassesToSupervision (to stop balises supervision)

***DistanceToBeginTrackConditions (cf. Subset26 §3.12.1.5.1):***

* DistanceToBeginOfPowerlessSection
* DistanceToBeginOfAirTightnessArea
* DistanceToBeginOfBrakeInhibitionArea
* DistanceToChangeOfTractionSystem
* DistanceToChangeOfAllowedCurrentConsumption
* DistanceToStationPlatforms

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text |  |
| Definition | 1 | T\_Definition |  |
| Source | 1 | T\_SourceDocument |  |
| Nature | 1 | T\_VariableNature |  |
| MinimalValue | 0..1 | T\_Text |  |
| MaximalValue | 0..1 | T\_Text |  |
| SpecialValue | 0..n | T\_Text |  |
| Allocation | 1 | * Interface * Packet * Internal |  |
| *Requirement* | *1..n* | *T\_Requirement* | *The set of requirement which defined the variable (at least one)* |
| Store | 0..1 | T\_Variable |  |
| Resolution | 0..1 | T\_VariableNature |  |
| Safety | 1 | Boolean |  |

**Requirements**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text |  |
| Definition | 1 | T\_Definition |  |
| Nature | 1 | * Structural * Functional * Definition |  |
| Source | 1 | T\_SourceDocument |  |
| Discussion | 1 (Optional) | T\_Text |  |
| Parent | 0..1 | T\_Requirement |  |
| Allocation | 0..1 | T\_System |  |
| Safety | 1 | Boolean |  |

#### **Exported Requirements :**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Name | 1 | T\_Text |  |
| Definition | 1 | T\_Definition |  |
| Source | 1 | T\_SourceDocument |  |
| Allocation | 0..1 | T\_System |  |
| Safety | 1 | Boolean |  |

**Type:**

* Boolean
* Integer
* Floating point
* T\_text: textual description
* T\_ident: based on a textual description
* T\_Version = {3.0.0, 3.3.0}
* T\_VariableNature = {Acceleration, Distance, Gradient, Length, Miscellaneous, Number, ClassNumber, IdentityNumber, Qualifier, TimeDate, Speed, Text}
* T\_SourceDocument = {subset-26, subset-34}
* T\_Definition : a textual and graphical description (all kind of picture, table and diagram are allowed)

**Constant: T\_Constant**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Definition | 1 | T\_Definition | Time between minimum safe rear end of the train leaving a track condition area and on-board deleting the applicable indication |
| Source | 1 | T\_SourceDocument | SRS |
| Nature | 1 | T\_VariableNature | time |
| Value | 1 | T\_Text | 5 s |
| Allocation | 1 | * Interface * Packet * Internal | Functions :  “Manage Powerless Section Lower Pantograph”  “Manage Powerless Section Main Power Switch”  “Manage Air Tightness”  “Manage Change Traction System” |
| *Requirement* | *1..n* | *T\_Requirement* | *SRS-A.3.1* |
|  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Occurrence** | **Type** | **Description** |
| Definition | 1 | T\_Definition | Driver reaction time before sounding the horn |
| Source | 1 | T\_SourceDocument | SRS |
| Nature | 1 | T\_VariableNature | time |
| Value | 1 | T\_Text | 4 s |
| Allocation | 1 | * Interface * Packet * Internal | Function “Manage Sound Horn” |
| *Requirement* | *1..n* | *T\_Requirement* | *SRS-A.3.1* |
|  |  |  |  |

**Functional Block: T\_FunctionalBlock**

Not necessary for this function