TC 278 WG3 SG 7
Preliminary Work Item Proposal /draft version 1, May 2021

Title
Additional service dedicated to CONTROL ACTIONs for Server-to-server Interface for Real time Information (SIRI)

CEN/TS 15531-6

Short description

SIRI is an exchange protocol dedicated to real time public transport data based on Transmodel V6 (EN12986), a harmonised to be used as a complement to NeTEx (CEN/TS 16614-1 to 5 for exchange of scheduled information). SIRI support information exchange of relevance to public transport services for passenger information and operational systems.

The SIRI 15531 series consists of the following parts:

- Part 1: Context and framework
- Part 2: Communications
- Part 3: Functional service interfaces
- Part 4: Functional service interfaces: Facility Monitoring
- Part 5: Functional service interfaces - Situation exchange

This work item proposal presents a possible Part 6 of SIRI dedicated to CONTROL ACTIONs.

Proposed Scope

A CONTROL ACTION is a decision made about the management of the operation of a transport system, for example to cancel or alter a planned journey. Such decisions are typically made by controllers in the control rooms of AVMS (Automated Vehicle Monitoring Systems), but may also be made automatically by the monitoring processes of the AVMS itself. In a computer system, a CONTROL ACTION can be explicitly represented by data objects with standardised data structures.

The existing SIRI Situation Exchange Service provides a comprehensive description of events, disruptions, as well as general-purpose information, but is specifically dedicated to exchanging messages for passenger information, and does not provide any structured description of CONTROL ACTIONs themselves, even in situations where the CONTROL ACTION is the main cause of the Situation . Furthermore some CONTROL ACTIONs are purely internal and don’t have an external cause or a consequent SITUATION of interest to passengers.

In the context of the Delegated Act for Multimodal Information Services from the European Commission the number of SIRI implementations is increasing every day. A common feedback comment from such implementations is the need to be able to exchange information to describe CONTROL ACTIONs. The controllers of AVMS (Automated Vehicle Monitoring Systems), who are the main source of real-time information for public transport, typically manage the system using CONTROL ACTIONs prior to deriving passenger information from them.

As is the case for SITUATIONs in the SIRI-SX Service, CONTROL ACTIONs are often exchanged in real time but may also be planned in a long time in advance of the start of vehicle journeys. Both use cases are to be managed through a single SIRI-CA service, Also note that certain SIRI functional services (such as SIRI Estimated Timetable) can already be used in effect to communicate some type of journey updates such as creation/ cancellation – however the expected time window for CONTROL ACTION is usually longer than the one expected for Passing Times and can include additional operation information..

Main use cases and needs

The main use cases to be handled by a SIRI service are the following

- The primary CONTROL ACTIONs to be exchanged are as follows (but this list can, of course, be extended)
  - Vehicle replacement / change / cancellation
  - Spacing and passing time updates
  - Journey creation, cancellation and change
  - Route changes
  - The blocking of use of stops,

- In most cases, it is the AVMS that must provide this data for aggregation and distribution:
  - To a situation management system => complementing SIRI-SX
  - To an aggregator that will use it and interpret it to generate passenger information (when necessary)
  - Directly to a Passenger Information System
  - To an operational/control centre (for information), usually also managing other modes (road…)
  - To online/digital services

- The CONTROL ACTION's structured description will, for example, be used to:
  - Provide information to the operating subsystem,
  - Create corresponding disruption and associated information
  - Disseminate the consequences to Passenger Information System (via SIRI services but also possibly directly to displays, web sites, etc.)
  - Provide the CONTROL ACTION information to a concentrator/aggregator which redistributes it to the other systems.
  - Provide the CONTROL ACTION information to a journey planner.

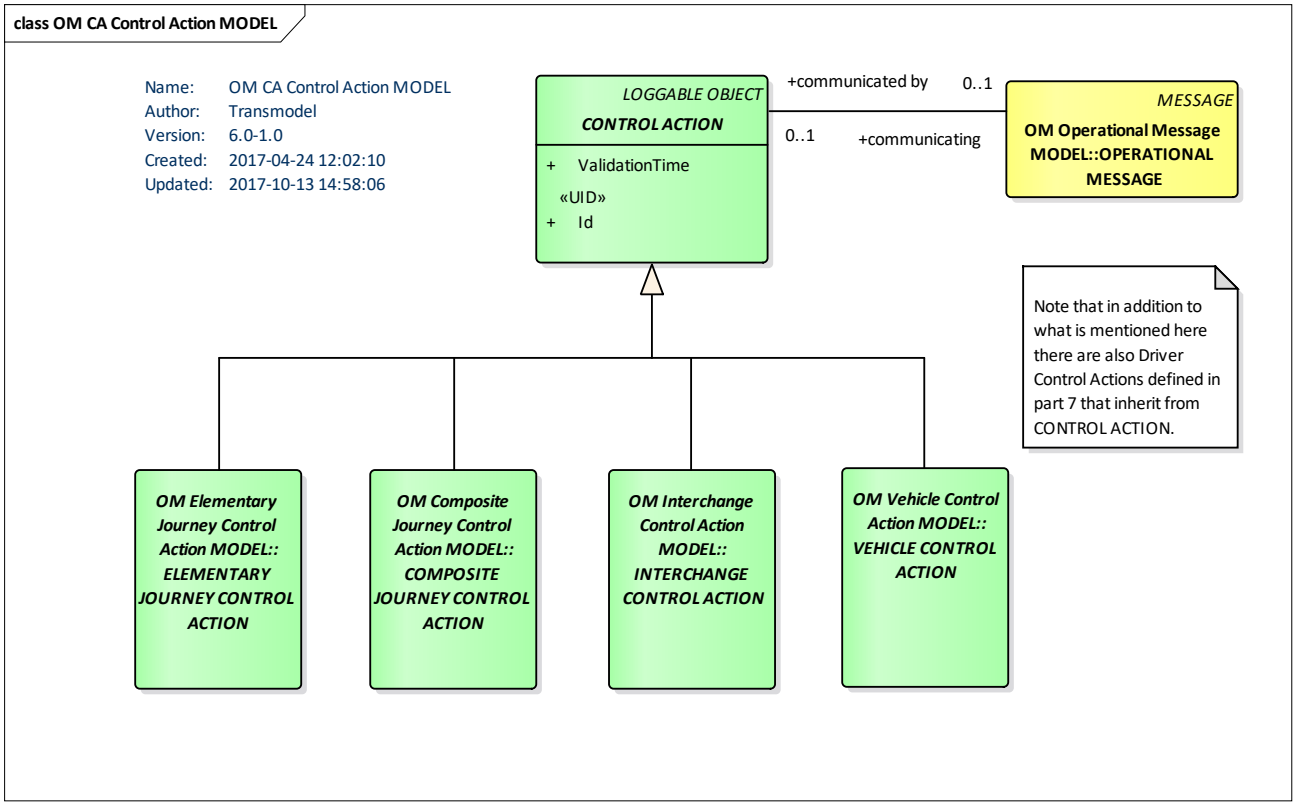
Relation with Transmodel Concepts

The CONTROL ACTIONs in SIRI are, of course, expected to be fully based on Transmodel.

Transmodel describes all the necessary scheduled information (exchanged using NeTEx) that may be variously referenced by CONTROL ACTIONs, such as VEHICLE JOURNEYs, VEHICLE ASSIGNMENTs, TIMING POINTs, RUN TIMEs, BLOCKs and VEHICLE SERVICEs, DUTies and DUTY STRETCHs, etc. and more generally the detailed production plan.

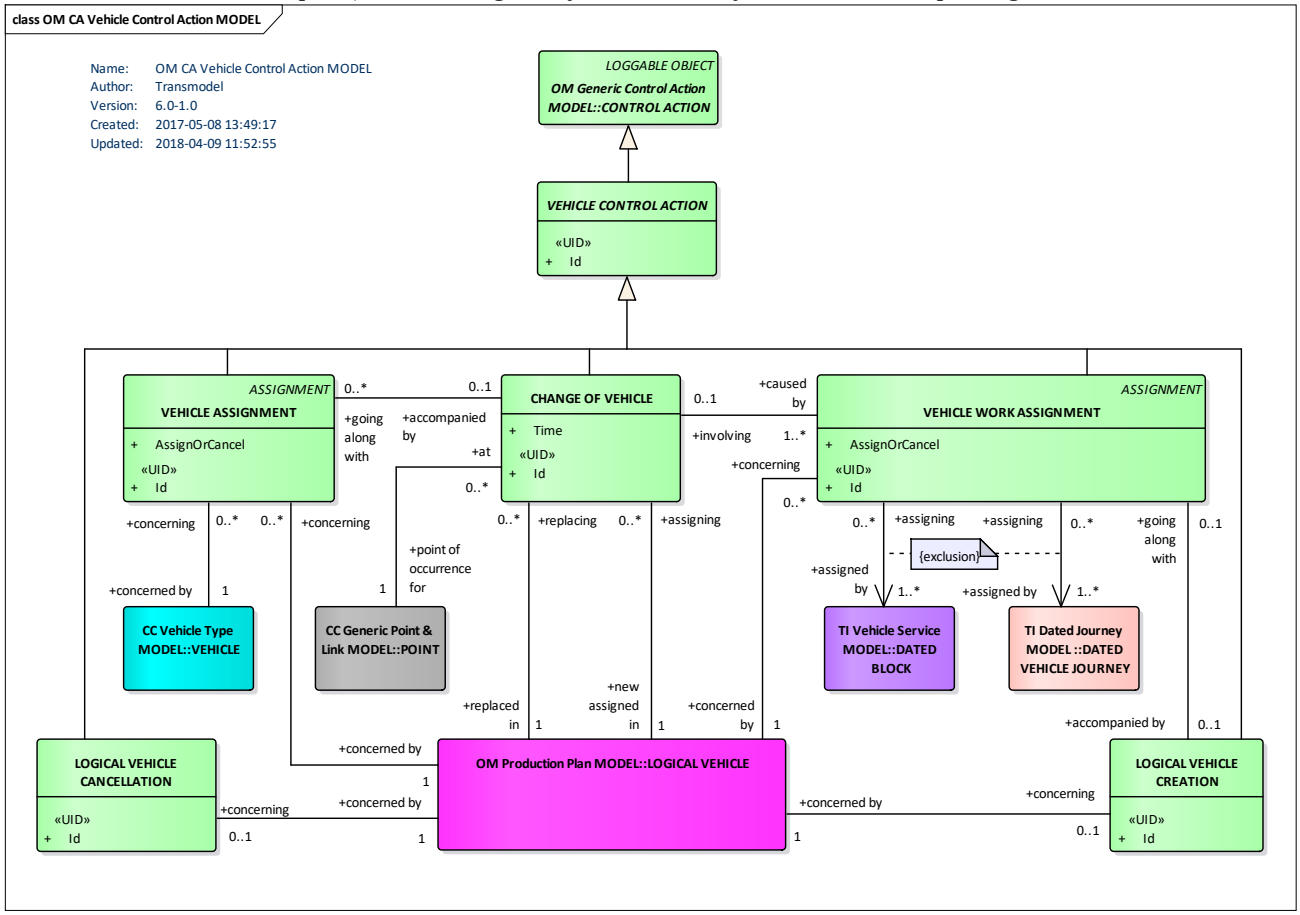
The SIRI CONTROL ACTION Service will complement this with real-time information, mainly based on the concepts described by Transmodel.

Transmodel identifies four main groups of CONTROL ACTIONs, as summarised in the following figure.


class OM CA Control Action MODEL
Name: OM CA Control Action MODEL
Author: Transmodel
Version: 6.0-1.0
Created: 2017-04-24 12:02:10
Updated: 2017-10-13 14:58:06
LOGGABLE OBJECT
CONTROL ACTION
+ ValidationTime
«UID»
+ Id
+communicated by
0..1
0..1
+communicating
MESSAGE
OM Operational Message MODEL::OPERATIONAL MESSAGE
Note that in addition to what is mentioned here there are also Driver Control Actions defined in part 7 that inherit from CONTROL ACTION.
OM Elementary Journey Control Action MODEL:: ELEMENTARY JOURNEY CONTROL ACTION
OM Composite Journey Control Action MODEL:: COMPOSITE JOURNEY CONTROL ACTION
OM Interchange Control Action MODEL:: INTERCHANGE CONTROL ACTION
OM Vehicle Control Action MODEL:: VEHICLE CONTROL ACTION

Vehicle Control Actions

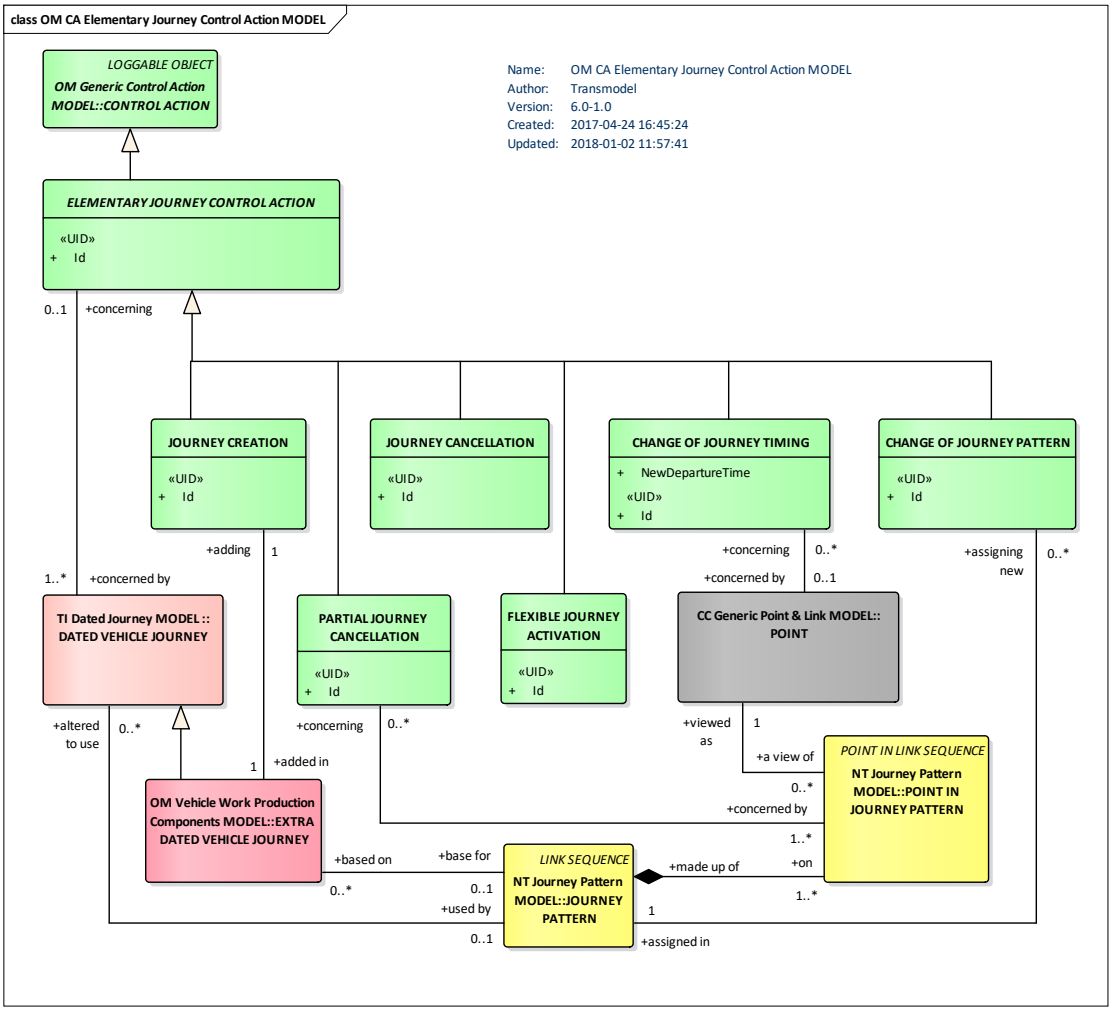
Vehicle Control Actions specify modifications to resources used to provide a journey, such as the VEHICLE or crewing or BLOCK allocation. The following figure describes the VEHICLE CONTROL ACTIONS (refer to Transmodel for a full description). Such changes may not necessarily be of interest for passenger information.



The following figure describes the JOURNEY CONTROL ACTIONS (refer to Transmodel for a comprehensive description of these CONTROL ACTIONs).

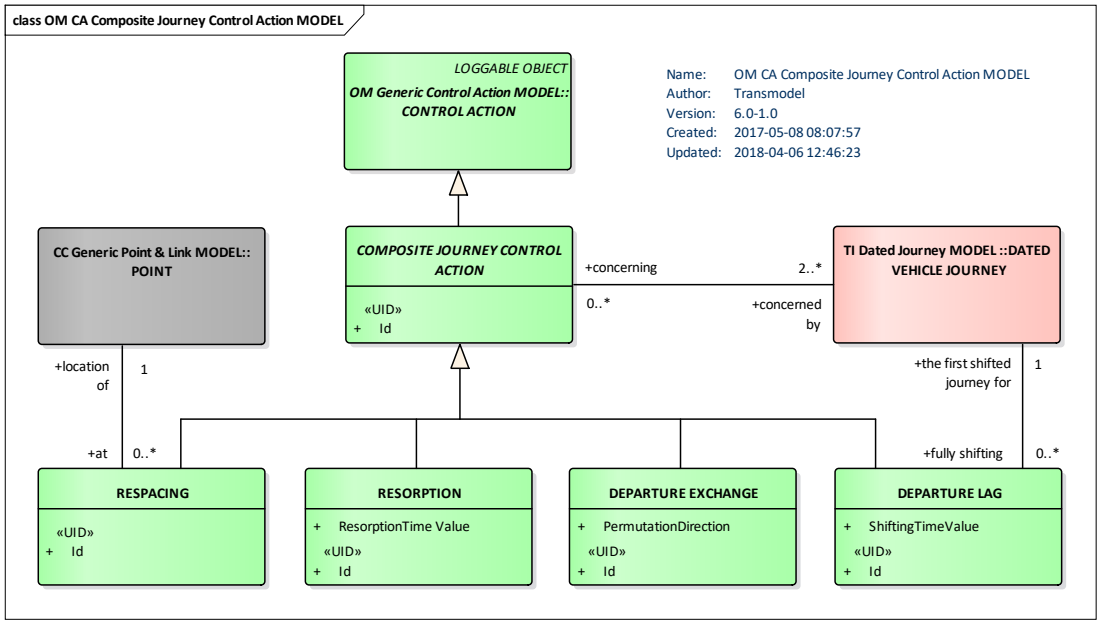
Elementary Journey Control Actions

Elementary Vehicle control Actions specify modifications to a specific journey such as cancellation, short-running, delays, as shown in the following figure (See Transmodel 6.0 for details)



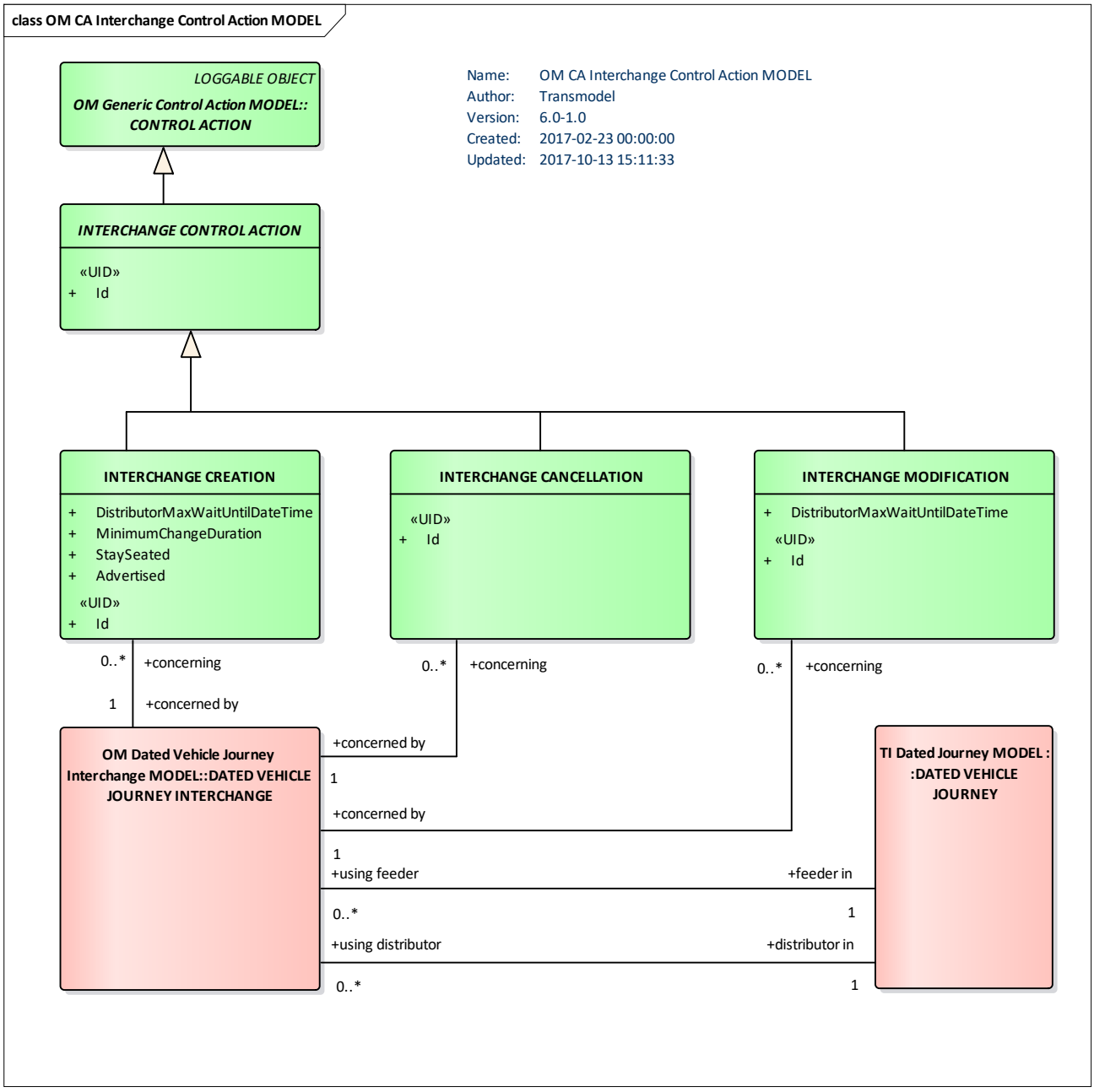
Composite Control Actions

Composite Control Actions specify modifications affecting groups of journeys such as a respacing to keep a balanced interval period. The following figure describes the COMPOSITE JOURNEY CONTROL ACTIONS (refer to Transmodel for a full description).



Interchange Control Actions

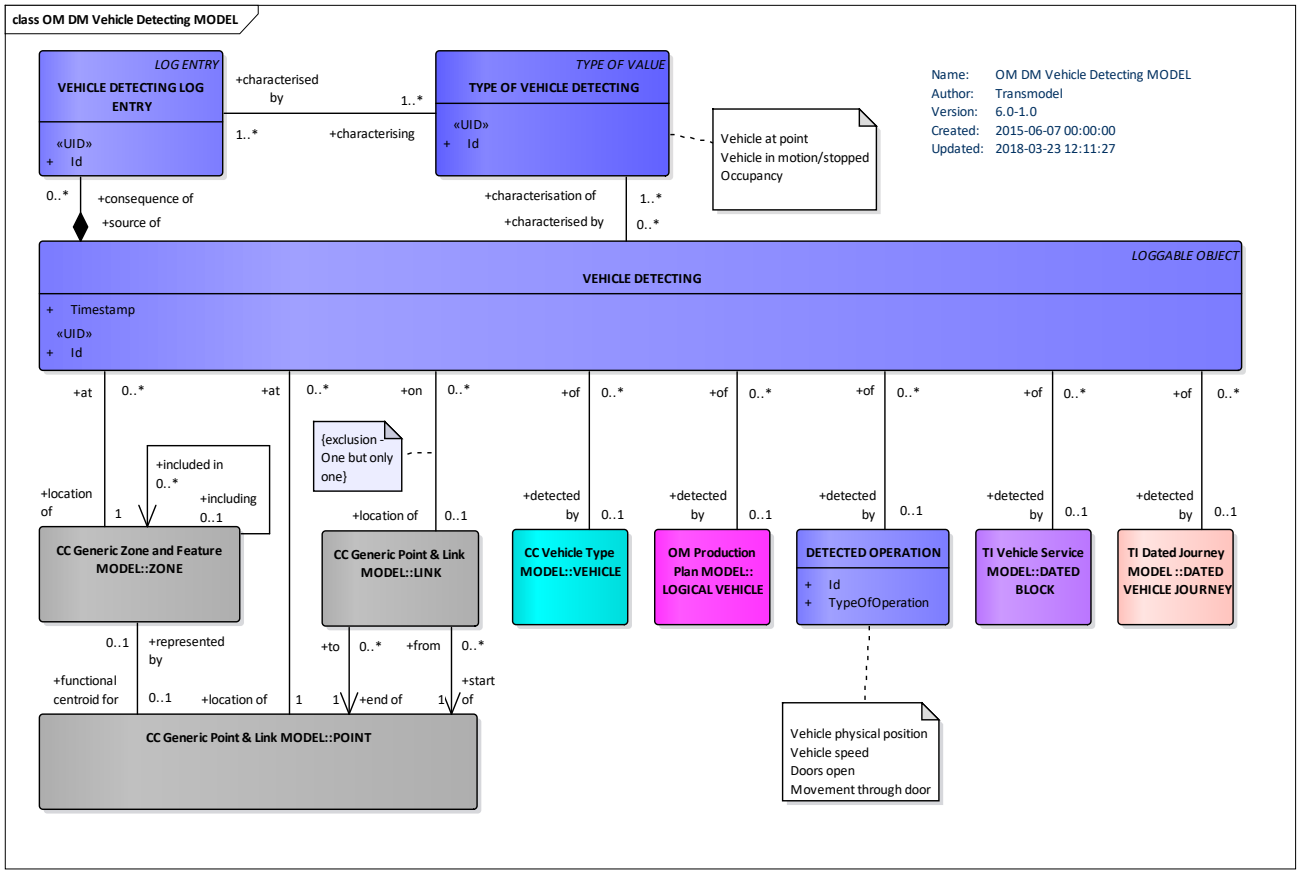
Interchange Control Actions specify modifications affecting planned interchange between of journeys The following figure describes the INTERCHANGE CONTROL ACTIONS (refer to Transmodel for a full description).



Vehicle Detection

CONTROL ACTIONs are closely related to the processes of VEHICLE DETECTING which are often used by AVMS to detect the need for a CONTROL ACTION.

The following figure describes the VEHICLE DETECTION (refer to Transmodel for a comprehensive description). The VEHICLE DETECTION is not by itself a CONTROL ACTION but is also part of the request received from SIRI users (CONTROL ACTIONs are often strongly connected, or triggered by VEHICLE DETECTIONs).



Further improvements to Transmodel

An examination of well-established operational systems that exchange CONTROL ACTIONs, for example such as those using the NOPTIS format in Sweden, shows that there are likely to be a few further use cases and requirements that will give rise to some small extensions to the current model present in Transmodel 6.0 for CONTROL ACTIONs. For example.

- Actions to block or unblock all journeys using a STOP PLACE or QUAY within a STOP PLACE.
- The ability to cross-reference extensively, for example to indicate on a CONTROL ACTION the journey that are being replaced

Integration with other SIRI services

The CONTROL ACTION description will, of course, need to be articulated with other SIRI services. For example, CONTROL ACTIONs will have to be referenced by Situations provided by SIRI SX in order to complement the cause of the Situation (a CONTROL ACTION may even be the only cause of a Situation).

It will also be useful to be able to reference CONTROL ACTION from a service like Estimated Timetable (and more generally all descriptions of Monitored Journeys) in order to provide a list of control actions currently applied on specific Journeys.

The CONTROL ACTION service will, of course, also refer to information from other services, mainly Monitored Journeys and Monitored Interchanges

Articulation with NeTEx and other working groups

The SIRI CONTROL ACTION Service should be coherent with NeTEx whenever this is possible. As a natural complement to the network topology and that timetables, a specific care should be taken to properly relate to relevant elements in NeTEx.

- **TimingPoint**
- **RunTime**
- **Block** and **VehicleService** for operation.
- **Duty** and **DutyStretch** describing the driver work assignments.

The new work item will therefore **consider the work of**

- other subgroups pf WG3:
    - SG4 Data Base Model for Public Transport (TRANSMODEL)
    - SG9 Network and Timetable Exchange (NeTEx)
- National Mirror Groups
- AVMS (Automated Vehicle Monitoring and Control) system providers

Justification

AVMS often manage the system using CONTROL ACTIONs which, being concerned with internal operational details, often have quite different requirements and characteristics from the passenger facing information about disruptions (such as that which can be exchanged with the Situation Exchange Service). CONTROL ACTIONs can be related to passenger information (for example a DEPARTURE LAG) and, in such case needs to be related to the information provided by Situation Exchange Service, but may also not trigger any passenger information (for example DRIVER ASSIGNMENT changes).

Preliminary work plan

Work will start by June 2021 and last for 12 months, with the objective to issue a first document by 2022.

The proposed work organisation is expressed by the following actions :

- To collect and analyse the national requirements,
- To produce a data dictionary (based on Transmodel 6.01) and describe the basic use cases,
- To produce relevant UML data model extracts from Transmodel 6.0
- To identify any enhancements to Transmodel needed to underpin a SIRI Control Action service.
- To harmonise the extracted data models and to complete them according to the requirements expressed (e.g. by other domains such as demand responsive systems),
- To produce an XML (XSD) implementation based on the UML data model, accompanied by examples,
- To produce a description of data access services (XML and WSDL), written according to CEN's guidelines, and being a SIRI Part 5 Document
- To ensure the compatibility with the other NeTEx and SIRI services,

Starting in summer 2021 a draft of the new Part 6 of **CEN/TS 15531** shall be prepared within one year.