Austrian Elementary Profile Traffic travel times
Operational Version 2.0

A.1 Introduction

ASFINAG provides DATEX II traffic information of Austrian motorways and highways for service providers and other interested institutions. This document describes the Austrian Elementary Profile Traffic travel times Profile.

A.2 Data description

ASFINAG provides the current or near-realtime travel times and also predicted travel times for predefined motorway and expressway sections in Austria. It is important to note that the predefined road sections for the current travel times are different from those of the predicted travel times. Along with travel times, average velocity of cars and trucks, and the traffic status (e.g. congested, heavy, free flow, etc. See Section **A.2.1.1**) are also provided. Location referencing is done using linear elements in the form of coordinates, ALERTC, ASFINAG road kilometres, and GIP[1] (Graph Integration Platform). The GIP is a common reference graph for public authorities in Austria. For providing linear referencing using points the level B extension "**LinearByCoordinates**" is used, and for providing the GIP location referencing the level B extension "**ExtendedLinearForGipLink**" is used. Chapter **A.3** and **A.4** give more details about the location referencing.

The location data of the travel times is provided in a separate file for both the current and predicted travel times. For providing the location data the package "**PredefinedLocationPublication**" is used, whereas for providing travel times data the package "**ElaboratedDataPublication**" is used.

A.2.1 Current or near-realtime travel time data

ASFINAG estimates the travel times for cars and trucks based on a number of detection technologies (or data sources)[2]. An intelligent data fusion is applied to harmonize and combine these data sources in the best possible way, and thereby a comprehensive travel time estimation is calculated for the entire motorway and expressway network in Austria. For near-realtime data, the road network is divided into 200 meter segments (these are about 22000 segments of the entire Austrian motorway network). The update interval of the travel time estimation is 1 minute.

For data delivery the travel time content is split in two DATEX II files:

1. **TrafficTravelTimesStatic**: This file contains location data of the road sections for which the travel times are computed. Each section is 200m in length and has a unique id. This file uses the DATEX II package "PredefinedLocationsPublication"
2. **TrafficTravelTimesDynamic**: This file contains travel time data of the road sections with a reference to the sections described in the "TrafficTravelTimesStatic" file. This file uses the DATEX II package "ElaboratedDataPublication".

Example 1 shows an extract of TrafficTravelTimesStatic file and Example 2 shows an extract of TravelTravelTimesDynamic file.

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[1] GIP - http://www.gip.gv.at/

[2] ARMS – Asfinag Traveltime Management System: https://zenodo.org/record/1486434#.XADZV02Wwis

```xml
<ns:predefinedLocationContainer d2p1:type="ns:PredefinedLocation" id="A02_2_299200_v1_1" version="1">
  <ns:location d2p1:type="ns:Linear">
    <ns:alertCLinear d2p1:type="ns:AlertCMethod4Linear">
      <ns:alertCLocationCountryCode>A</ns:alertCLocationCountryCode>
      <ns:alertCLocationTableNumber>1</ns:alertCLocationTableNumber>
      <ns:alertCLocationTableVersion>3.1</ns:alertCLocationTableVersion>
      <ns:alertCDirection>
        <ns:alertCDirectionCoded>negative</ns:alertCDirectionCoded>
      </ns:alertCDirection>
      <ns:alertCMethod4PrimaryPointLocation>
        <ns:alertCLocation>
          <ns:specificLocation>36131</ns:specificLocation>
        </ns:alertCLocation>
        <ns:offsetDistance>
          <ns:offsetDistance>1</ns:offsetDistance>
        </ns:offsetDistance>
      </ns:alertCMethod4PrimaryPointLocation>
      <ns:alertCMethod4SecondaryPointLocation>
        <ns:alertCLocation>
          <ns:specificLocation>36131</ns:specificLocation>
        </ns:alertCLocation>
        <ns:offsetDistance>
          <ns:offsetDistance>1</ns:offsetDistance>
        </ns:offsetDistance>
      </ns:alertCMethod4SecondaryPointLocation>
    </ns:alertCLinear>
    <ns:linearWithinLinearElement>
      <ns:directionRelativeOnLinearSection>opposite</ns:directionRelativeOnLinearSection>
      <ns:linearElement>
        <ns:roadNumber>A02</ns:roadNumber>
      </ns:linearElement>
      <ns:fromPoint d2p1:type="ns:DistanceFromLinearElementStart">
        <ns:distanceAlong>299200</ns:distanceAlong>
      </ns:fromPoint>
      <ns:toPoint d2p1:type="ns:DistanceFromLinearElementStart">
        <ns:distanceAlong>299000</ns:distanceAlong>
      </ns:toPoint>
    </ns:linearWithinLinearElement>
    <ns:linearExtension>
      <ns:extendedLinear>
        <ns:linearByCoordinates>
          <ns:roadNumber>A02</ns:roadNumber>
          <ns:start>
            <ns:latitude>46.63828</ns:latitude>
            <ns:longitude>14.445734</ns:longitude>
          </ns:start>
          <ns:end>
            <ns:latitude>46.637825</ns:latitude>
            <ns:longitude>14.4483175</ns:longitude>
          </ns:end>
        </ns:linearByCoordinates>
      </ns:extendedLinear>
    </ns:linearExtension>
```

```xml
<ns:extendedLinearForGipLink>
  <ns:gipLinkLinearLocationReference version="GIPAT1802" name="GIP AT Stand Februar 2018">
    <ns:gipLink index="1">
      <ns:gipLink>
        <ns:linkId>461000889</ns:linkId>
        <ns:linkPercentageFrom>
          <ns:percentageDistanceAlong>0.765</ns:percentageDistanceAlong>
        </ns:linkPercentageFrom>
        <ns:linkPercentageTo>
          <ns:percentageDistanceAlong>1</ns:percentageDistanceAlong>
        </ns:linkPercentageTo>
        <ns:referenceDirection>toFrom</ns:referenceDirection>
      </ns:gipLink>
    </ns:gipLink>
  </ns:gipLinkLinearLocationReference>
</ns:extendedLinearForGipLink>
</ns:linearExtension>
</ns:location>
</ns:predefinedLocationContainer>
```

Example 1: Location referencing of road section "A02_2_299200_v1_1"

```xml
<ns:payloadPublication d2p1:type="ns:ElaboratedDataPublication" lang="de-at"
                        xmlns:d2p1="http://www.w3.org/2001/XMLSchema-instance">
  <ns:publicationTime>2018-12-04T11:24:49+01:00</ns:publicationTime>
  <ns:publicationCreator>
    <ns:country>at</ns:country>
    <ns:nationalIdentifier>ASFINAG</ns:nationalIdentifier>
  </ns:publicationCreator>
  <ns:headerInformation>
    <ns:confidentiality>noRestriction</ns:confidentiality>
    <ns:informationStatus>real</ns:informationStatus>
  </ns:headerInformation>
  <ns:elaboratedData>
    <ns:basicData d2p1:type="ns:TrafficStatus">
      <ns:measurementOrCalculationTime>2018-12-04T11:23:52+01:00</ns:measurementOrCalculationTime>
      <ns:pertinentLocation d2p1:type="ns:LocationByReference">
        <ns:predefinedLocationReference id="A02_2_299200_v1_1" version="1" targetClass="PredefinedLocation" />
      </ns:pertinentLocation>
      <ns:trafficStatus>
        <ns:trafficStatusValue>freeFlow</ns:trafficStatusValue>
      </ns:trafficStatus>
    </ns:basicData>
  </ns:elaboratedData>
  <ns:elaboratedData>
    <ns:basicData d2p1:type="ns:TrafficSpeed">
      <ns:measurementOrCalculationTime>2018-12-04T11:23:52+01:00</ns:measurementOrCalculationTime>
      <ns:pertinentLocation d2p1:type="ns:LocationByReference">
        <ns:predefinedLocationReference id="A02_2_299200_v1_1" version="1" targetClass="PredefinedLocation" />
      </ns:pertinentLocation>
      <ns:forVehiclesWithCharacteristicsOf>
        <ns:vehicleType>car</ns:vehicleType>
      </ns:forVehiclesWithCharacteristicsOf>
      <ns:averageVehicleSpeed>
        <ns:speed>112.046524</ns:speed>
      </ns:averageVehicleSpeed>
    </ns:basicData>
  </ns:elaboratedData>
  <ns:elaboratedData>
    <ns:basicData d2p1:type="ns:TravelTimeData">
      <ns:measurementOrCalculationTime>2018-12-04T11:23:52+01:00</ns:measurementOrCalculationTime>
      <ns:pertinentLocation d2p1:type="ns:LocationByReference">
        <ns:predefinedLocationReference id="A02_2_299200_v1_1" version="1" targetClass="PredefinedLocation" />
      </ns:pertinentLocation>
      <ns:vehicleType>car</ns:vehicleType>
      <ns:travelTime>
        <ns:duration>6.42590237</ns:duration>
      </ns:travelTime>
      <ns:freeFlowTravelTime>
        <ns:duration>6.4788723</ns:duration>
      </ns:freeFlowTravelTime>
    </ns:basicData>
  </ns:elaboratedData>
  <ns:elaboratedData>...</ns:elaboratedData>
  <ns:elaboratedData>...</ns:elaboratedData>
</ns:payloadPublication>
```

Example 2: Travel time values for computed for the road section "A02_2_299200_v1_1"

A.2.1.1 Traffic status calculation

Travel time and mean velocity are calculated using two data sources

- Cross Section data measured by overhead traffic sensors
- Travel time calculated from toll transactions

For every 200 meter segment, the data fusion algorithm calculates a weighted average of all available data sources. The weighting function takes into account the spatial distance and temporal distance (age) of the input data. For cross section data the algorithm uses the mean velocity of all lanes.

Furthermore, the algorithm also provides an estimate for the traffic status, aka LOS (level-of-service).

The traffic status is calculated from the road availability which represents a percentage value between 0 (blocked road) and 100 (free flow) that indicates the traffic state.

Road availability RA is calculated from free-flow velocity v_c and the actual mean velocity v as follows:

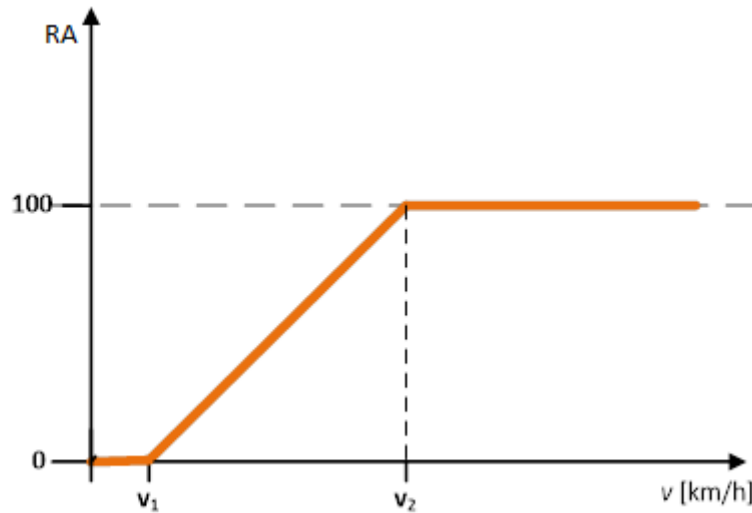**Figure A2.2.1.1: Road availability (RA) is calculated from mean velocity**

$$v_1 = v_{factor1} \cdot v_c$$

$$v_2 = v_{factor2} \cdot v_c$$

$$RA = \begin{cases} 0 & for \quad v < v_1 \\ 100 \cdot \left(\dfrac{v}{v_2 - v_1} - \dfrac{v_1}{v_2 - v_1} \right) & for \quad v_1 \leq v < v_2 \\ 100 & for \quad v \geq v_2 \end{cases}$$

Parameter	Value
$v_{factor1}$	0.2
$v_{factor2}$	0.8

Based on the *RA*, the LOS value is calculated as below:

RA range	LOS value	DATEX II TrafficStatusEnum
RA = -1	5	Unspecified
0 <= *RA* < 25	4	Congested
25 <= *RA* < 50	3	Heavy
50 <= *RA* < 75	2	Heavy
75 <= *RA* <= 100	1	Freeflow

Table A.2.2.1.1 — Calculation of LOS and TrafficStatus based on the RA (road availability)

The LOS value is further mapped to the enumeration literal of the DATEX II TrafficStatusEnum as shown in the above table.

A.2.2 Predicted travel time data

The travel times for passenger cars and trucks are predicted using the historical traffic data of the entire Austrian motorway and expressway network[3]. The predicting system uses all available data sources such as the historic near-realtime traffic data, roadworks, weather warnings, time series, and traffic messages to calculate travel time predictions (or prognosis) with 10 different time horizons. The predictions are calculated for junction-to-junction segments.

The below table summarizes the expected amount of predictions data:

#	Prediction type	Update interval	Data count
1	**15 min**	**5 min**	**866**
2	**30 min**	**5 min**	**866**
3	**45 min**	**5 min**	**866**
4	**60 min**	**5 min**	**866**
5	**90 min**	**5 min**	**866**
6	**120 min**	**5 min**	**866**
7	**150 min**	**5 min**	**866**
8	**180 min**	**5 min**	**866**
9	**210 min**	**5 min**	**866**
10	**240 min**	**5 min**	**866**

Table A.2.2.1 — Amount of expected data from travel time predictions

For data delivery the predicted travel time content is split into two DATEX II files:

1. **TrafficTravelTimesPrognosisStatic**: This file contains location data of the road sections (junction-to-junctions) for which the travel times are computed. Each section has a unique id. This file uses the DATEX II package "PredefinedLocationsPublication".
2. **TrafficTravelTimes240minDynamic**: This file contains predictions data (*15min < prediction <= 240min*) of the road sections with a reference to the sections described in the "TrafficTravelTimesPrognosisSatic" file. This file uses the DATEX II package "ElaboratedDataPublication".

Example 3 shows an extract of TrafficTravelTimesPrognosisStatic, example 4 shows an extract of TravelTravelTimes240minDynamic.

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[3] VORAB Prognosis - https://ieeexplore.ieee.org/document/7297598

```xml
<ns:payloadPublication d2p1:type="ns:PredefinedLocationsPublication" lang="de-at"
                        xmlns:d2p1="http://www.w3.org/2001/XMLSchema-instance">
  <ns:feedType>PrognosisStaticData</ns:feedType>
  <ns:publicationTime>2018-11-29T14:08:59+01:00</ns:publicationTime>
  <ns:publicationCreator>
    <ns:country>at</ns:country>
    <ns:nationalIdentifier>ASFINAG</ns:nationalIdentifier>
  </ns:publicationCreator>
  <ns:headerInformation>
    <ns:confidentiality>noRestriction</ns:confidentiality>
    <ns:informationStatus>real</ns:informationStatus>
  </ns:headerInformation>
  <ns:predefinedLocationContainer d2p1:type="ns:PredefinedLocation" id="geo_8" version="1">
    <ns:location d2p1:type="ns:Linear">
      <ns:alertCLinear d2p1:type="ns:AlertCMethod4Linear">
        <ns:alertCLocationCountryCode>A</ns:alertCLocationCountryCode>
        <ns:alertCLocationTableNumber>1</ns:alertCLocationTableNumber>
        <ns:alertCLocationTableVersion>3.1</ns:alertCLocationTableVersion>
        <ns:alertCDirection>
          <ns:alertCDirectionCoded>positive</ns:alertCDirectionCoded>
        </ns:alertCDirection>
        <ns:alertCMethod4PrimaryPointLocation>
          <ns:alertCLocation>
            <ns:specificLocation>31181</ns:specificLocation>
          </ns:alertCLocation>
          <ns:offsetDistance>
            <ns:offsetDistance>0</ns:offsetDistance>
          </ns:offsetDistance>
        </ns:alertCMethod4PrimaryPointLocation>
        <ns:alertCMethod4SecondaryPointLocation>
          <ns:alertCLocation>
            <ns:specificLocation>31180</ns:specificLocation>
          </ns:alertCLocation>
          <ns:offsetDistance>
            <ns:offsetDistance>0</ns:offsetDistance>
          </ns:offsetDistance>
        </ns:alertCMethod4SecondaryPointLocation>
      </ns:alertCLinear>
      <ns:linearWithinLinearElement>
        <ns:directionRelativeOnLinearSection>aligned</ns:directionRelativeOnLinearSection>
        <ns:linearElement>
          <ns:roadNumber>A01</ns:roadNumber>
        </ns:linearElement>
        <ns:fromPoint d2p1:type="ns:DistanceFromLinearElementStart">
          <ns:distanceAlong>58572</ns:distanceAlong>
        </ns:fromPoint>
        <ns:toPoint d2p1:type="ns:DistanceFromLinearElementStart">
          <ns:distanceAlong>74500</ns:distanceAlong>
        </ns:toPoint>
      </ns:linearWithinLinearElement>
```

```xml
<ns:linearExtension>
  <ns:extendedLinear>
    <ns:linearByCoordinates>
      <ns:roadNumber>A01</ns:roadNumber>
      <ns:start>
        <ns:latitude>48.1770821</ns:latitude>
        <ns:longitude>15.6161108</ns:longitude>
      </ns:start>
      <ns:end>
        <ns:latitude>48.18804</ns:latitude>
        <ns:longitude>15.4104986</ns:longitude>
      </ns:end>
    </ns:linearByCoordinates>
  </ns:extendedLinear>
  <ns:extendedLinearForGipLink>
    <ns:gipLinkLinearLocationReference version="GIPAT1802" name="GIP AT Stand Februar 2018">
      <ns:gipLink index="1">
        <ns:gipLink>
          <ns:linkId>461000502</ns:linkId>
          <ns:linkPercentageFrom>
            <ns:percentageDistanceAlong>0</ns:percentageDistanceAlong>
          </ns:linkPercentageFrom>
          <ns:linkPercentageTo>
            <ns:percentageDistanceAlong>0.357</ns:percentageDistanceAlong>
          </ns:linkPercentageTo>
          <ns:referenceDirection>fromTo</ns:referenceDirection>
        </ns:gipLink>
      </ns:gipLink>
      <ns:gipLink index="2">
        <ns:gipLink>
          <ns:linkId>461005719</ns:linkId>
          <ns:linkPercentageFrom>
            <ns:percentageDistanceAlong>0</ns:percentageDistanceAlong>
          </ns:linkPercentageFrom>
          <ns:linkPercentageTo>
            <ns:percentageDistanceAlong>1</ns:percentageDistanceAlong>
          </ns:linkPercentageTo>
          <ns:referenceDirection>fromTo</ns:referenceDirection>
        </ns:gipLink>
      </ns:gipLink>
      <ns:gipLink index="3">...</ns:gipLink>
      <ns:gipLink index="4">...</ns:gipLink>
      <ns:gipLink index="5">...</ns:gipLink>
      <ns:gipLink index="6">...</ns:gipLink>
      <ns:gipLink index="7">...</ns:gipLink>
      <ns:gipLink index="8">...</ns:gipLink>
    </ns:gipLinkLinearLocationReference>
  </ns:extendedLinearForGipLink>
</ns:linearExtension>
</ns:location>
</ns:predefinedLocationContainer>
</ns:payloadPublication>
```

Example 3: Location referencing of a road section with id "geo_8"

```xml
<ns:payloadPublication d2p1:type="ns:ElaboratedDataPublication" lang="de-at"
                        xmlns:d2p1="http://www.w3.org/2001/XMLSchema-instance">
  <ns:publicationTime>2018-12-03T15:50:59+01:00</ns:publicationTime>
  <ns:publicationCreator>...</ns:publicationCreator>
  <ns:forecastDefault>true</ns:forecastDefault>
  <ns:headerInformation>...</ns:headerInformation>
  <ns:elaboratedData>
    <ns:forecast>true</ns:forecast>
    <ns:validity>
      <ns:validityStatus>definedByValidityTimeSpec</ns:validityStatus>
      <ns:validityTimeSpecification>
        <ns:overallStartTime>2018-12-03T16:45:00+01:00</ns:overallStartTime>
        <ns:overallEndTime>2018-12-03T16:50:00+01:00</ns:overallEndTime>
      </ns:validityTimeSpecification>
    </ns:validity>
    <ns:basicData d2p1:type="ns:TrafficStatus">
      <ns:measurementOrCalculationTime>2018-12-03T15:45:00+01:00</ns:measurementOrCalculationTime>
      <ns:pertinentLocation d2p1:type="ns:LocationByReference">
        <ns:predefinedLocationReference id="geo_8" version="1" targetClass="PredefinedLocation" />
      </ns:pertinentLocation>
      <ns:trafficStatus>
        <ns:trafficStatusValue>freeFlow</ns:trafficStatusValue>
      </ns:trafficStatus>
    </ns:basicData>
  </ns:elaboratedData>
  <ns:elaboratedData>
    <ns:forecast>true</ns:forecast>
    <ns:validity>
      <ns:validityStatus>definedByValidityTimeSpec</ns:validityStatus>
      <ns:validityTimeSpecification>
        <ns:overallStartTime>2018-12-03T16:45:00+01:00</ns:overallStartTime>
        <ns:overallEndTime>2018-12-03T16:50:00+01:00</ns:overallEndTime>
      </ns:validityTimeSpecification>
    </ns:validity>
    <ns:basicData d2p1:type="ns:TrafficSpeed">
      <ns:measurementOrCalculationTime>2018-12-03T15:45:00+01:00</ns:measurementOrCalculationTime>
      <ns:pertinentLocation d2p1:type="ns:LocationByRe">...</ns:pertinentLocation>
      <ns:forVehiclesWithCharacteristicsOf>
        <ns:vehicleType>car</ns:vehicleType>
      </ns:forVehiclesWithCharacteristicsOf>
      <ns:averageVehicleSpeed>
        <ns:speed>116</ns:speed>
      </ns:averageVehicleSpeed>
    </ns:basicData>
  </ns:elaboratedData>
  <ns:elaboratedData>
    <ns:forecast>true</ns:forecast>
    <ns:validity>
      <ns:validityStatus>definedByValidityTimeSpec</ns:validityStatus>
      <ns:validityTimeSpecification>
        <ns:overallStartTime>2018-12-03T16:45:00+01:00</ns:overallStartTime>
        <ns:overallEndTime>2018-12-03T16:50:00+01:00</ns:overallEndTime>
      </ns:validityTimeSpecification>
    </ns:validity>
    <ns:basicData d2p1:type="ns:TravelTimeData">
      <ns:measurementOrCalculationTime>2018-12-03T15:45:00+01:00</ns:measurementOrCalculationTime>
      <ns:pertinentLocation d2p1:type="ns:LocationByRe">...</ns:pertinentLocation>
      <ns:vehicleType>car</ns:vehicleType>
      <ns:travelTime>
        <ns:duration>494</ns:duration>
      </ns:travelTime>
    </ns:basicData>
  </ns:elaboratedData>
</ns:payloadPublication>
```

Example 4: Predicted travel time values for road section the road section with id "geo_8"

A.2.2.1 Differentiating between different forecasts

Since the dynamic data file (TravelTravelTimes240min_dynamic) contains data from different time horizons (15m, 30min, 45min, 60min…), it is important to differentiate between each of them. This can be done using the following DATEX II elements:

1) **validity**: The validity element describes the duration for which the prediction is valid. It contains "**overallAllStartTime**" and "**overallEndTime**" that gives the exact begin and end date times of the prediction.
2) **measurementOrCalculation**: Date time at which the prediction is calculated.

Below example shows a 30 minute prediction which is calculated at 15:45 CEST. The validity of the prediction is between 16:15 CEST and 16:20 CEST. Actually, there is no real validity end time for a prediction. Since, the next prediction (or calculation) is in 5 minutes, the validity end time is provided as "validity start time + 5 minutes". Therefore: *overallEndTime = overallStartTime + updateInterval*.

```xml
<ns:elaboratedData>
  <ns:forecast>true</ns:forecast>
  <ns:validity>
    <ns:validityStatus>definedByValidityTimeSpec</ns:validityStatus>
    <ns:validityTimeSpecification>
      <ns:overallStartTime>2018-12-03T16:15:00+01:00</ns:overallStartTime>
      <ns:overallEndTime>2018-12-03T16:20:00+01:00</ns:overallEndTime>
    </ns:validityTimeSpecification>
  </ns:validity>
  <ns:basicData d2p1:type="ns:TravelTimeData">
    <ns:measurementOrCalculationTime>2018-12-03T15:45:00+01:00</ns:measurementOrCalculationTime>
    <ns:pertinentLocation d2p1:type="ns:LocationByReference">
      <ns:predefinedLocationReference id="geo_8" version="1" targetClass="PredefinedLocation" />
    </ns:pertinentLocation>
    <ns:vehicleType>car</ns:vehicleType>
    <ns:travelTime>
      <ns:duration>494</ns:duration>
    </ns:travelTime>
    <ns:freeFlowTravelTime>
      <ns:duration>0</ns:duration>
    </ns:freeFlowTravelTime>
  </ns:basicData>
</ns:elaboratedData>
```

Now for the same calculated time 15:45 CEST, a 60 minute prediction would look like:

```
<ns:elaboratedData>
  <ns:forecast>true</ns:forecast>
  <ns:validity>
    <ns:validityStatus>definedByValidityTimeSpec</ns:validityStatus>
    <ns:validityTimeSpecification>
      <ns:overallStartTime>2018-12-03T16:45:00+01:00</ns:overallStartTime>
      <ns:overallEndTime>2018-12-03T16:50:00+01:00</ns:overallEndTime>
    </ns:validityTimeSpecification>
  </ns:validity>
  <ns:basicData d2p1:type="ns:TravelTimeData">
    <ns:measurementOrCalculationTime>2018-12-03T15:45:00+01:00</ns:measurementOrCalculationTime>
    <ns:pertinentLocation d2p1:type="ns:LocationByReference">
      <ns:predefinedLocationReference id="geo_8" version="1" targetClass="PredefinedLocation" />
    </ns:pertinentLocation>
    <ns:vehicleType>car</ns:vehicleType>
    <ns:travelTime>
      <ns:duration>494</ns:duration>
    </ns:travelTime>
  </ns:basicData>
</ns:elaboratedData>
```

The below table summaries all possible predictions calculated at the same time. Note that the date is removed for simplicity, but in the feed the complete date time value is provided.

Prediction type	measurementOr CalculationTime	oveallStartTime	overallEndTime
15 min	15:45:00+1:00	16:00:00+1:00	16:05:00+1:00
30 min	15:45:00+1:00	16:15:00+1:00	16:20:00+1:00
45 min	15:45:00+1:00	16:30:00+1:00	16:35:00+1:00
60 min	15:45:00+1:00	16:45:00+1:00	16:50:00+1:00
90 min	15:45:00+1:00	17:15:00+1:00	17:20:00+1:00
120 min	15:45:00+1:00	17:45:00+1:00	17:50:00+1:00
150 min	15:45:00+1:00	18:15:00+1:00	18:20:00+1:00
180 min	15:45:00+1:00	18:45:00+1:00	18:50:00+1:00
210 min	15:45:00+1:00	19:15:00+1:00	19:20:00+1:00
240 min	15:45:00+1:00	19:45:00+1:00	19:50:00+1:00

Now the same table for the next calculation 15:50:00+1:00 would like:

Prediction type	measurementOr CalculationTime	oveallStartTime	overallEndTime
15 min	15:50:00+1:00	16:05:00+1:00	16:10:00+1:00
30 min	15:50:00+1:00	16:20:00+1:00	16:25:00+1:00
45 min	15:50:00+1:00	16:35:00+1:00	16:40:00+1:00
60 min	15:50:00+1:00	16:50:00+1:00	16:55:00+1:00
90 min	15:50:00+1:00	17:20:00+1:00	17:25:00+1:00
120 min	15:50:00+1:00	17:50:00+1:00	17:55:00+1:00
150 min	15:50:00+1:00	18:20:00+1:00	18:25:00+1:00
180 min	15:50:00+1:00	18:50:00+1:00	18:55:00+1:00
210 min	15:50:00+1:00	19:20:00+1:00	19:25:00+1:00
240 min	15:50:00+1:00	19:50:00+1:00	19:55:00+1:00

A.3 Location Referencing

ASFINAG provides a number of location referencing methods for locating the 200m road sections for which the travel times are computed. These methods are described in Table 2.1. All locations except the GIP are provided as linear by two points (start point and end point). The GIP may contain one or more GIP nodes, where each node is called as a GIP link.

Location Referencing	DATEX II element	Description
AlertC location codes	alertCLinear	The *alertCLinear* element contains the primary location code, secondary location code, AlertC direction, and offset distances of the corresponding primary and secondary location.
ASFINAG road km	directionRelativeOnLinearSection	The *directionRelativeOnLinearSection* element contains the road km location as referenced by ASFINAG. Any point on the ASFINAG road network is described by road number, direction and road km provided in meters.
WGS84	linearByCoordinates	The *linearByCoordinates* element contains the latitude/longitude values of start and end points.
GIP	GIPLink	Location reference of GIP (Graph Integration Platform). GIP provides a digital map of Austria's transport network to all authorities.

Table A.3.1 — Location referencing

A.4 Extensions for additional Location Referencing methods

In addition to the standard location referencing methods supported by the DATEX II Core, ASFINAG also provides location referencing using linear by coordinates and the GIP. They are provided using the level B extensions. These extensions are summarised in this chapter.

A.4.1 GipLinkLinearExtension

To add the GIP location referencing the DATEX II class **Linear** is extended. The GIP location referencing method is composed of one or more GIP nodes. Each GIP node is represented as a GIPLink, which contains an id, reference direction, a begin offset (in percentage) and an end offset (in percentage). Note that the GIP is a proprietary standard used by multiple stake holders within Austria. In addition to these details clients also require the shape files of the GIP digital map to interpret the location.

This extension specifies the linear location of a traffic message by one or more GIP links. There must be at least one GIP link.
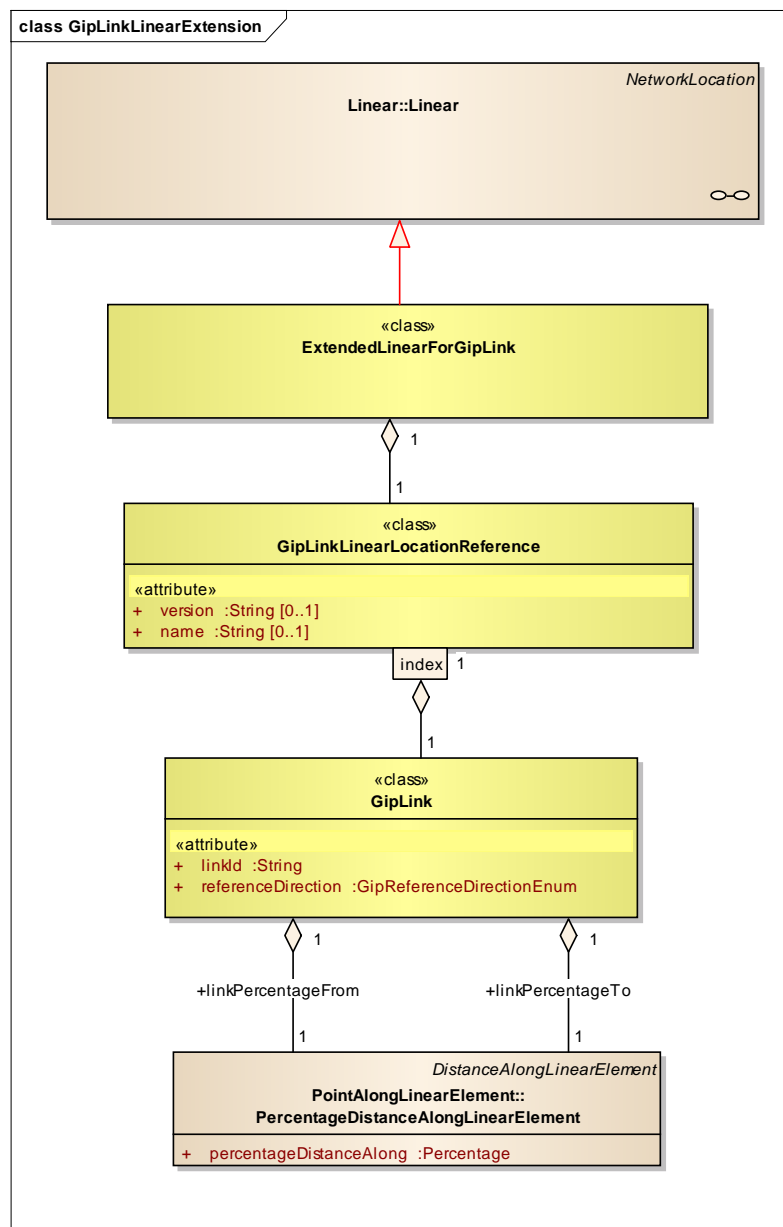
Figure A.4.1 ExtendedLinearForGipLink extension

A.4.2 LinearByCoordinates

The linearByCoordinates extension is not a proprietary extension from ASFINAG. It has been available on the datex2.eu[4] platform. This extension has been imported into this profile. This extension allows you to specify linear locations by a number of points represented by coordinates. There must be a start and an end point with an arbitrary number of intermediate points. The provision of intermediate points are optional.
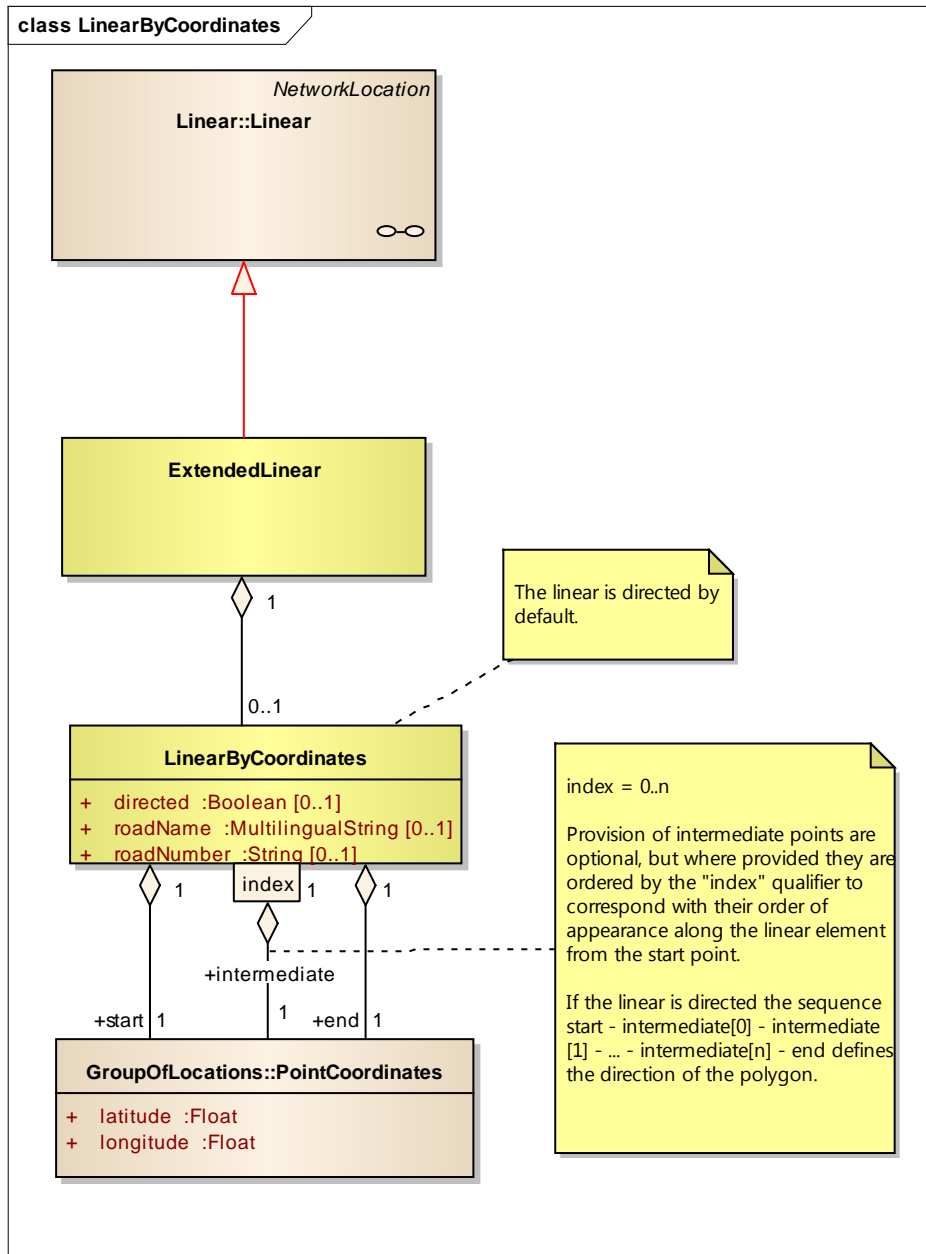
Figure A.4.2 LinearByCoordinates extension

A.5 Data Dictionary for "AustrianTrafficTravelTimesProfile"

From this chapter all the data elements that are provided by the ASFINAG Content interface are marked in green colour. Other elements, attributes, enumeration and enumeration literals are left open for future use.

A.5.1 "BasicData" package

A.5.1.1 "BasicData" package classes

Class name	Designation	Definition	Stereotype	Abstract
BasicData	Basic data	Data that is either measured or calculated (elaborated) at the same time or over the same time period.		yes

Table 1— Classes of the "BasicData" package

A.5.1.2 "BasicData" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
BasicData	pertinentLocation	Pertinent location	The location (e.g. the stretch of road or area) to which the data value(s) is or are pertinent/relevant. This may be different from the location of the measurement equipment (i.e. the measurement site location).	0..1	GroupOfLocations

Table 2— Associations of the "BasicData" package

A.5.1.3 "BasicData" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
BasicData	measurementOrCalculatedTimePrecision	Measurement or calculated time precision	The precision to which the time of measurement or calculation is given.	0..1	TimePrecisionEnum
	measurementOrCalculationPeriod	Measurement or calculation period	The time elapsed between the beginning and the end of the sampling or measurement period. This item may differ from the unit attribute; e.g. an hourly flow can be estimated from a 5-minute measurement period.	0..1	Seconds
	measurementOrCalculationTime	Measurement or calculation time	Point in time at which this specific value or set of values has been measured or calculated. It may also be a future time at which a data value is predicted.	0..1	DateTime

Table 3— Attributes of the "BasicData" package

A.5.2 "ElaboratedData" package

A.5.2.1 "ElaboratedData" package classes

Class name	Designation	Definition	Stereotype	Abstract
ElaboratedData	Elaborated data	An instance of data which is derived/computed from one or more measurements over a period of time. It may be a current value or a forecast value predicted from historical measurements.		no
Source	Source	Details of the source from which the information was obtained.		no

Table 4— Classes of the "ElaboratedData" package

A.5.2.2 "ElaboratedData" package association roles

There are no defined association roles in the "ElaboratedData" package.

A.5.2.3 "ElaboratedData" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
ElaboratedData	forecast	Forecast	Indication of whether this elaborated data is a forecast (true = forecast).	0..1	Boolean
Source	reliable	Reliable	An indication as to whether the source deems the associated information to be reliable/correct. "True" indicates it is deemed reliable.	0..1	Boolean
	sourceCountry	Source country	ISO 3166-1 two character country code of the source of the information.	0..1	CountryEnum
	sourceIdentification	Source identification	Identifier of the organisation or the traffic equipment which has produced the information relating to this version of the information.	0..1	String
	sourceName	Source name	The name of the organisation which has produced the information relating to this version of the information.	0..1	MultilingualString
	sourceType	Source type	Information about the technology used for measuring the data or the method used for obtaining qualitative descriptions relating to this version of the information.	0..1	SourceTypeEnum

Table 5— Attributes of the "ElaboratedData" package

A.5.3 "ElaboratedDataPublication" package

A.5.3.1 "ElaboratedDataPublication" package classes

Class name	Designation	Definition	Stereotype	Abstract
ElaboratedDataPublication	Elaborated data publication	A publication containing one or more elaborated data sets.		no
ReferenceSettings	Reference settings	Specification of the default value for traffic status on a group of predefined locations on the road network. Only when traffic status differs from this value at a location in the group need a value be sent.		no

Table 6— Classes of the "ElaboratedDataPublication" package

A.5.3.2 "ElaboratedDataPublication" package association roles

There are no defined association roles in the "ElaboratedDataPublication" package.

A.5.3.3 "ElaboratedDataPublication" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
ElaboratedDataPublication	forecastDefault	Forecast default	The default value for the publication of whether the elaborated data is a forecast (true = forecast).	0..1	Boolean
	periodDefault	Period default	The default value for the publication of the time elapsed between the beginning and the end of the sampling or measurement period. This item may differ from the unit attribute; e.g. an hourly flow can be estimated from a 5-minute measurement period.	0..1	Seconds
	timeDefault	Time default	The default for the publication of the time at which the values have been computed/derived.	0..1	DateTime
ReferenceSettings	predefinedNonOrderedLocationGroupReference	Predefined non ordered location group reference	A reference to a versioned instance of a predefined non ordered location group as specified in a PredefinedLocationsPublication.	0..1	VersionedReference
	trafficStatusDefault	Traffic status default	The default value of traffic status that can be assumed to apply to the locations defined by the associated predefined location set.	0..1	TrafficStatusEnum

Table 7— Attributes of the "ElaboratedDataPublication" package

A.5.4 "Exchange" package

A.5.4.1 "Exchange" package classes

Class name	Designation	Definition	Stereotype	Abstract
Exchange	Exchange	Details associated with the management of the exchange between the supplier and the client.		no

Table 8— Classes of the "Exchange" package

A.5.4.2   "Exchange" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
Exchange	supplierIdentification	Supplier identification		1..1	InternationalIdentifier

Table 9— Associations of the "Exchange" package

A.5.4.3   "Exchange" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type

Table 10— Attributes of the "Exchange" package

A.5.5 "GipLinkExtensions" package

A.5.5.1   "GipLinkExtensions" package classes

Class name	Designation	Definition	Stereotype	Abstract
ExtendedLinearForGipLink	Extended linear for gip link	An extension for GipLink linear location reference		no
GipLink	Gip link	A GIPLink object		no
GipLinkLinearLocationReference	Gip link linear location reference	Contains one or more gip links that are part of a linear location		no

Table 11— Classes of the "GipLinkExtensions" package

A.5.5.2   "GipLinkExtensions" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
GipLink	linkPercentageFrom	Link percentage from	From offset	1..1	PercentageDistanceAlongLinearElement
	linkPercentageTo	Link percentage to	To offset	1..1	PercentageDistanceAlongLinearElement

Table 12— Associations of the "GipLinkExtensions" package

A.5.5.3   "GipLinkExtensions" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
GipLink	linkId	Link id	Identifier of the GipLink	1..1	String
	referenceDirection	Reference direction	Reference direction	1..1	GipReferenceDirectionEnum
GipLinkLinearLocationReference	name	Name	Name of the provided GIP	0..1	String
	version	Version	Version of the provided GIP links.	0..1	String

Table 13— Attributes of the "GipLinkExtensions" package

A.5.6 "GroupOfLocations" package

A.5.6.1   "GroupOfLocations" package classes

Class name	Designation	Definition	Stereotype	Abstract
AffectedCarriagewayAndLanes	Affected carriageway and lanes	Supplementary positional information which details carriageway and lane locations. Several instances may exist where the element being described extends over more than one carriageway.		no
AlertCDirection	ALERT-C direction	The direction of traffic flow along the road to which the information relates.		no
AlertCLocation	ALERT-C location	Identification of a specific point, linear or area location in an ALERT-C location table.		no
AlertCMethod2PrimaryPointLocation	ALERT-C method2 primary point location	The point (called Primary point) which is either a single point or at the downstream end of a linear road section. The point is specified by a reference to a point in a pre-defined ALERT-C location table.		no
AlertCMethod2SecondaryPointLocation	ALERT-C method2 secondary point location	The point (called Secondary point) which is at the upstream end of a linear road section. The point is specified by a reference to a point in a pre-defined ALERT-C location table.		no
AlertCMethod4PrimaryPointLocation	ALERT-C method4 primary point location	The point (called Primary point) which is either a single point or at the downstream end of a linear road section. The point is specified by a reference to a point in a pre-defined ALERT-C location table plus a non-negative offset distance.		no
AlertCMethod4SecondaryPointLocation	ALERT-C method4 secondary point location	The point (called Secondary point) which is at the upstream end of a linear road section. The point is specified by a reference to a point in a pre-defined Alert-C location table plus a non-negative offset distance.		no
GroupOfLocations	Group of locations	One or more physically separate locations. Multiple locations may be related, as in an itinerary (or route), or may be unrelated. It is not for identifying the same physical location using different Location objects for different referencing systems.		yes
Location	Location	The specification of a location either on a network (as a point or a linear location) or as an area. This may be provided in one or more referencing systems.		yes
LocationByReference	Location by reference	A location defined by reference to a predefined location.		no
NetworkLocation	Network location	The specification of a location on a network (as a point or a linear location).		yes
OffsetDistance	Offset distance	The non negative offset distance from the ALERT-C referenced point to the actual point.		no
PointCoordinates	Point coordinates	A pair of coordinates defining the geodetic position of a single point using the European Terrestrial Reference System 1989 (ETRS89).		no

Class name	Designation	Definition	Stereotype	Abstract
SupplementaryPositionalDescription	Supplementary positional description	A collection of supplementary positional information which improves the precision of the location.		no

Table 14— Classes of the "GroupOfLocations" package

A.5.6.2   "GroupOfLocations" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target

Table 15— Associations of the "GroupOfLocations" package

A.5.6.3   "GroupOfLocations" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
AffectedCarriagewayAndLanes	carriageway	Carriageway	Indicates the section of carriageway to which the location relates.	1..1	CarriagewayEnum
	footpath	Footpath	Indicates whether the pedestrian footpath is the subject or part of the subject of the location. (True = footpath is subject)	0..1	Boolean
	lane	Lane	Indicates the specific lane to which the location relates.	0..*	LaneEnum
	lengthAffected	Length affected	This indicates the length of road measured in metres affected by the associated traffic element.	0..1	MetresAsFloat
AlertCDirection	alertCDirectionCoded	ALERT-C direction coded	The direction of traffic flow to which the situation, traffic data or information is related. Positive is in the direction of coding of the road.	1..1	AlertCDirectionEnum
	alertCDirectionNamed	ALERT-C direction named	ALERT-C name of a direction e.g. Brussels -> Lille.	0..1	MultilingualString
	alertCDirectionSense	ALERT-C direction sense	Indicates for circular routes (i.e. valid only for ring roads) the sense in which navigation should be made from the primary location to the secondary location, to avoid ambiguity. TRUE indicates positive RDS direction, i.e. direction of coding of road.	0..1	Boolean
AlertCLocation	alertCLocationName	ALERT-C location name	Name of ALERT-C location.	0..1	MultilingualString
	specificLocation	Specific location	Unique code within the ALERT-C location table which identifies the specific point, linear or area location.	1..1	AlertCLocationCode
LocationByReference	predefinedLocationReference	Predefined location reference	A reference to a versioned predefined location.	1..1	VersionedReference
OffsetDistance	offsetDistance	Offset distance	The non negative offset distance from the ALERT-C referenced point to the actual point. The ALERT-C locations in the Primary and Secondary locations must always encompass the linear section being specified, thus Offset Distance is towards the other point.	1..1	MetresAsNonNegativeInteger

Class name	Attribute name	Designation	Definition	Multiplicity	Type
PointCoordinates	latitude	Latitude	Latitude in decimal degrees using the European Terrestrial Reference System 1989 (ETRS89).	1..1	Float
	longitude	Longitude	Longitude in decimal degrees using the European Terrestrial Reference System 1989 (ETRS89).	1..1	Float
SupplementaryPositionalDescription	locationDescriptor	Location descriptor	Specifies a descriptor which helps to identify the specific location.	0..*	LocationDescriptorEnum
	locationPrecision	Location precision	Indicates that the location is given with a precision which is better than the stated value in metres.	0..1	MetresAsNonNegativeInteger
	sequentialRampNumber	Sequential ramp number	The sequential number of an exit/entrance ramp from a given location in a given direction (normally used to indicate a specific exit/entrance in a complex junction/intersection).	0..1	NonNegativeInteger

Table 16— Attributes of the "GroupOfLocations" package

A.5.7 "Linear" package

A.5.7.1   "Linear" package classes

Class name	Designation	Definition	Stereotype	Abstract
AlertCLinear	ALERT-C linear	A linear section along a road defined between two points on the road by reference to a pre-defined ALERT-C location table.		yes
Linear	Linear	A linear section along a single road with optional directionality defined between two points on the same road.		no

Table 17— Classes of the "Linear" package

A.5.7.2   "Linear" package association roles

There are no defined association roles in the "Linear" package.

A.5.7.3 "Linear" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
AlertCLinear	alertCLocationCountryCode	ALERT-C location country code	EBU country code.	1..1	String
	alertCLocationTableNumber	ALERT-C location table number	Number allocated to an ALERT-C table in a country. Ref. EN ISO 14819-3 for the allocation of a location table number.	1..1	String
	alertCLocationTableVersion	ALERT-C location table version	Version number associated with an ALERT-C table reference.	1..1	String

Table 18— Attributes of the "Linear" package

A.5.8 "LinearByCoordinates" package

A.5.8.1 "LinearByCoordinates" package classes

Class name	Designation	Definition	Stereotype	Abstract
ExtendedLinear	Extended linear	Extension point for linear Locations.		no
LinearByCoordinates	Linear by coordinates	A linear location defined by coordinates.		no

Table 19— Classes of the "LinearByCoordinates" package

A.5.8.2 "LinearByCoordinates" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
LinearByCoordinates	end	End	End point of a LinearByCoordinates	1..1	PointCoordinates
	intermediate	Intermediate	Points of a LinearByCoordinates object that are neither start or end point.	1..1	PointCoordinates
	start	Start	Start point of a LinearByCoordinates	1..1	PointCoordinates

Table 20— Associations of the "LinearByCoordinates" package

A.5.8.3 "LinearByCoordinates" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
LinearByCoordinates	directed	Directed	Whether this linear is directed or not. Default is directed=true	0..1	Boolean
	roadName	Road name	Name of the road of which the linear element forms a part.	0..1	MultilingualString
	roadNumber	Road number	Identifier/number of the road of which the linear element forms a part.	0..1	String

Table 21— Attributes of the "LinearByCoordinates" package

A.5.9 "LinearWithinLinearElement" package

A.5.9.1 "LinearWithinLinearElement" package classes

Class name	Designation	Definition	Stereotype	Abstract
LinearWithinLinearElement	Linear within linear element	A linear section along a linear element where the linear element is either a part of or the whole of a linear object (i.e. a road), consistent with ISO 19148 definitions.		no

Table 22— Classes of the "LinearWithinLinearElement" package

A.5.9.2 "LinearWithinLinearElement" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
LinearWithinLinearElement	fromPoint	From point	A point on the linear element that defines the start node of the linear section.	1..1	DistanceAlongLinearElement
	toPoint	To point	A point on the linear element that defines the end node of the linear section.	1..1	DistanceAlongLinearElement

Table 23— Associations of the "LinearWithinLinearElement" package

A.5.9.3 "LinearWithinLinearElement" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
LinearWithinLinearElement	administrativeAreaOfLinearSection	Administrative area of linear section	Identification of the road administration area which contains the specified linear section.	0..1	MultilingualString
	directionBoundOnLinearSection	Direction bound on linear section	The direction of traffic flow on the linear section in terms of general destination direction.	0..1	DirectionEnum
	directionRelativeOnLinearSection	Direction relative on linear section	The direction of traffic flow on the linear section relative to the direction in which the linear element is defined.	0..1	LinearReferencingDirectionEnum
	heightGradeOfLinearSection	Height grade of linear section	Identification of whether the linear section that is part of the linear element is at, above or below the normal elevation of a linear element of that type (e.g. road or road section) at that location, typically used to indicate "grade" separation.	0..1	HeightGradeEnum

Table 24— Attributes of the "LinearWithinLinearElement" package

A.5.10 "PayloadPublication" package

A.5.10.1 "PayloadPublication" package classes

Class name	Designation	Definition	Stereotype	Abstract
PayloadPublication	Payload publication	A payload publication of traffic related information or associated management information created at a specific point in time that can be exchanged via a DATEX II interface.		yes

Table 25— Classes of the "PayloadPublication" package

A.5.10.2 "PayloadPublication" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
PayloadPublication	publicationCreator	Publication creator		1..1	InternationalIdentifier

Table 26— Associations of the "PayloadPublication" package

A.5.10.3 "PayloadPublication" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
PayloadPublication	defaultLanguage	Default language	The default language used throughout the payload publication.	1..1	Language
	feedDescription	Feed description	A description of the information which is to be found in the publications originating from the particular feed (URL).	0..1	MultilingualString
	feedType	Feed type	A classification of the information which is to be found in the publications originating from the particular feed.	0..1	String
	publicationTime	Publication time	Date/time at which the payload publication was created.	1..1	DateTime

Table 27— Attributes of the "PayloadPublication" package

A.5.11 "PredefinedLocationsPublication" package

A.5.11.1 "PredefinedLocationsPublication" package classes

Class name	Designation	Definition	Stereotype	Abstract
PredefinedLocation	Predefined location	An identifiable versioned instance of a single predefined location.	versionedIdentifiable	no
PredefinedLocationContainer	Predefined location container	A container which may comprise the definition of a predefined itinerary, non ordered group of locations or single location.		yes
PredefinedLocationsPublication	Predefined locations publication	A publication containing one or more groups of predefined locations organised either as litineraries, non ordered groups or as individual locations.		no

Table 28— Classes of the "PredefinedLocationsPublication" package

A.5.11.2 "PredefinedLocationsPublication" package association roles

There are no defined association roles in the "PredefinedLocationsPublication" package.

A.5.11.3 "PredefinedLocationsPublication" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
PredefinedLocation	predefinedLocationName	Predefined location name	A name assigned to the predefined location (e.g. extracted out of the network operator's gazetteer).	0..1	MultilingualString

Table 29— Attributes of the "PredefinedLocationsPublication" package

A.5.12 "TrafficData" package

A.5.12.1 "TrafficData" package classes

Class name	Designation	Definition	Stereotype	Abstract
TrafficData	Traffic data	Measured or derived values relating to traffic or individual vehicle movements on a specific section or at a specific point on the road network.		yes

Table 30— Classes of the "TrafficData" package

A.5.12.2 "TrafficData" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
TrafficData	forVehiclesWithCharacteristicsOf	For vehicles with characteristics of	Used to define the vehicle characteristics to which the TrafficValue is applicable primarily in Elaborated Data Publications, but may also be used in Measured Data Publications to override vehicle characteristics defined for the measurement site.	0..1	VehicleCharacteristics

Table 31— Associations of the "TrafficData" package

A.5.12.3 "TrafficData" package attributes

There are no attributes for the package "TrafficData"

A.5.13 "TrafficStatus" package

A.5.13.1 "TrafficStatus" package classes

Class name	Designation	Definition	Stereotype	Abstract
TrafficStatus	Traffic status	The status of traffic conditions on a specific section or at a specific point on the road network.		no

Table 32— Classes of the "TrafficStatus" package

A.5.13.2 "TrafficStatus" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
TrafficStatus	trafficStatus	Traffic status	Status of traffic conditions on the identified section of road in the specified direction.	0..1	TrafficStatusValue

Table 33— Associations of the "TrafficStatus" package

A.5.13.3 "TrafficStatus" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
TrafficStatus	trafficTrendType	Traffic trend type	A characterization of the trend in the traffic conditions at the specified location and direction.	0..1	TrafficTrendTypeEnum

Table 34— Attributes of the "TrafficStatus" package

A.5.14 "TrafficSpeed" package

A.5.14.1 "TrafficSpeed" package classes

Class name	Designation	Definition	Stereotype	Abstract
SpeedPercentile	Speed percentile	Details of percentage (from an observation set) of vehicles whose speeds fall below a stated value.		no
TrafficSpeed	Traffic speed	Averaged measurements or calculations of traffic speed.		no

Table 35— Classes of the "TrafficSpeed" package

A.5.14.2 "TrafficSpeed" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
SpeedPercentile	speedPercentile	Speed percentile	The speed below which the associated percentage of vehicles in the measurement set are travelling at.	0..1	SpeedValue
	vehiclePercentage	Vehicle percentage	The percentage of vehicles from the observation set whose speeds fall below the stated speed (speedPercentile).	0..1	PercentageValue
TrafficStatus	averageVehicleSpeed	Average vehicle speed	An averaged measurement or calculation of the speed of vehicles at the specified location.	0..1	SpeedValue

Table 36— Associations of the "TrafficSpeed" package

A.5.14.3 "TrafficSpeed" package attributes

There are no attributes for the package "TrafficSpeed".

A.5.15 "TravelTimeData" package

A.5.15.1 "TravelTimeData" package classes

Class name	Designation	Definition	Stereotype	Abstract
TravelTimeData	Travel time data	Derived/computed travel time information relating to a linear section of the road network; forecast = true means a forecast for a vehicle at the start of the specified location, forecast = false means calculation/measurement at the end.		no

Table 37— Classes of the "TravelTimeData" package

A.5.15.2 "TravelTimeData" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
TravelTimeData	freeFlowSpeed	Free flow speed	The free flow speed expected under ideal conditions, corresponding to the freeFlowTravelTime.	0..1	SpeedValue
	freeFlowTravelTime	Free flow travel time	The travel time which would be expected under ideal free flow conditions.	0..1	DurationValue
	normallyExpectedTravelTime	Normally expected travel time	The travel time which is expected for the given period (e.g. date/time, holiday status etc.) and any known quasi-static conditions (e.g. long term roadworks). This value is derived from historical analysis.	0..1	DurationValue
	travelTime	Travel time	Derived/computed travel time information relating to a specific group of locations.	0..1	DurationValue

Table 38— Associations of the "TravelTimeData" package

A.5.15.3 "TravelTimeData" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
TravelTimeData	travelTimeTrendType	Travel time trend type	The current trend in the travel time between the defined locations in the specified direction.	0..1	TravelTimeTrendTypeEnum
	travelTimeType	Travel time type	Indication of the way in which the travel time is derived.	0..1	TravelTimeTypeEnum
	vehicleType	Vehicle type	Vehicle type.	0..*	VehicleTypeEnum

Table 39— Attributes of the "TravelTimeData" package

A.5.16 "Validity" package

A.5.16.1 "Validity" package classes

Class name	Designation	Definition	Stereotype	Abstract
DayWeekMonth	Day week month	Specification of periods defined by the intersection of days, weeks and months.		no
OverallPeriod	Overall period	A continuous or discontinuous period of validity defined by overall bounding start and end times and the possible intersection of valid periods (potentially recurring) with the complement of exception periods (also potentially recurring).		no
Period	Period	A continuous time period or a set of discontinuous time periods defined by the intersection of a set of criteria all within an overall delimiting interval.		no
Validity	Validity	Specification of validity, either explicitly or by a validity time period specification which may be discontinuous.		no

Table 40— Classes of the "Validity" package

A.5.16.2 "Validity" package association roles

Class name	Role name	Designation	Definition	Multiplicity	Target
Validity	validityTimeSpecification	Validity time specification	A specification of periods of validity defined by overall bounding start and end times and the possible intersection of valid periods with exception periods (exception periods overriding valid periods).	1..1	OverallPeriod

Table 41— Associations of the "Validity" package

A.5.16.3 "Validity" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
OverallPeriod	overallEndTime	Overall end time	End of bounding period of validity defined by date and time.	0..1	DateTime
	overallStartTime	Overall start time	Start of bounding period of validity defined by date and time.	1..1	DateTime
Validity	overrunning	Overrunning	The activity or action described by the SituationRecord is still in progress, overrunning its planned duration as indicated in a previous version of this record.	0..1	Boolean
	validityStatus	Validity status	Specification of validity, either explicitly overriding the validity time specification or confirming it.	1..1	ValidityStatusEnum

Table 42— Attributes of the "Validity" package

A.5.17 "VehicleCharacteristics" package

A.5.17.1 "VehicleCharacteristics" package classes

Class name	Designation	Definition	Stereotype	Abstract
VehicleCharacteristics	Vehicle characteristics	The characteristics of a vehicle, e.g. lorry of gross weight greater than 30 tonnes.		no

Table 43— Classes of the "VehicleCharacteristics" package

A.5.17.2 "VehicleCharacteristics" package association roles

There are no defined association roles in the "VehicleCharacteristics" package.

A.5.17.3 "VehicleCharacteristics" package attributes

Class name	Attribute name	Designation	Definition	Multiplicity	Type
VehicleCharacteristics	vehicleType	Vehicle type	Vehicle type.	0..*	VehicleTypeEnum

Table 44— Attributes of the "VehicleCharacteristics" package

A.6 Data Dictionary of <<datatypes>> for "AustrianTrafficTravelTimesProfile"

This clause contains the definitions of all data types which are used in the "AustrianTrafficTravelTimesProfile".

A.6.1 The <<datatype>> "AlertCLocationCode"

A positive integer number (between 1 and 63,487) which uniquely identifies a pre-defined Alert C location defined within an Alert-C table.

A.6.2 The <<datatype>> "MetresAsFloat"

A measure of distance defined in metres in a floating point format.

A.6.3 The <<datatype>> "MetresAsNonNegativeInteger"

A measure of distance defined in metres in a non negative integer format.

A.6.4 The <<datatype>> "Seconds"

Seconds.

A.7 Data Dictionary of <<enumerations>> for "AustrianTrafficTravelTimesProfile"

This clause contains the definitions of all enumerations which are used in the "AustrianTrafficTravelTimesProfile".

A.7.1 The <<enumeration>> "AlertCDirectionEnum"

The direction of traffic flow concerned by a situation or traffic data. In ALERT-C the positive (resp. negative) direction corresponds to the positive offset direction within the RDS location table.

Enumerated value name	Designation	Definition
both	Both	Indicates that both directions of traffic flow are affected by the situation or relate to the traffic data.
negative	Negative	The direction of traffic flow concerned by a situation or traffic data. In ALERT-C the negative direction corresponds to the negative offset direction within the RDS location table.
positive	Positive	The direction of traffic flow concerned by a situation or traffic data. In ALERT-C the positive direction corresponds to the positive offset direction within the RDS location table.
unknown	Unknown	Unknown direction.

Table 45— Values contained in the enumeration "AlertCDirectionEnum"

A.7.2 The <<enumeration>> "CarriagewayEnum"

List of descriptors identifying specific carriageway details.

Enumerated value name	Designation	Definition
connectingCarriageway	Connecting carriageway	On the connecting carriageway.
entrySlipRoad	Entry slip road	On the entry slip road.
exitSlipRoad	Exit slip road	On the exit slip road.
flyover	Flyover	On the flyover, i.e. the section of road passing over another.
leftHandFeederRoad	Left hand feeder road	On the left hand feeder road.
leftHandParallelCarriageway	Left hand parallel carriageway	On the left hand parallel carriageway.
mainCarriageway	Main carriageway	On the main carriageway.
oppositeCarriageway	Opposite carriageway	On the opposite carriageway.
parallelCarriageway	Parallel carriageway	On the adjacent parallel carriageway.
rightHandFeederRoad	Right hand feeder road	On the right hand feeder road.
rightHandParallelCarriageway	Right hand parallel carriageway	On the right hand parallel carriageway.
roundabout	Roundabout	On the roundabout.
serviceRoad	Service road	On the adjacent service road.
slipRoads	Slip roads	On the slip roads.
underpass	Underpass	On the underpass, i.e. the section of road passing under another.

Table 46— Values contained in the enumeration "CarriagewayEnum"

A.7.3 The <<enumeration>> "CountryEnum"

List of countries.

Enumerated value name	Designation	Definition
at	at	Austria
be	be	Belgium
bg	bg	Bulgaria
ch	ch	Switzerland
cs	cs	Serbia and Montenegro
cy	cy	Cyprus
cz	cz	Czech Republic
de	de	Germany
dk	dk	Denmark
ee	ee	Estonia
es	es	Spain
fi	fi	Finland
fo	fo	Faroe Islands
fr	fr	France
gb	gb	Great Britain
gg	gg	Guernsey
gi	gi	Gibraltar
gr	gr	Greece
hr	hr	Croatia
hu	hu	Hungary
ie	ie	Ireland
im	im	Isle Of Man
is	is	Iceland
it	it	Italy
je	je	Jersey

Enumerated value name	Designation	Definition
li	li	Lichtenstein
lt	lt	Lithuania
lu	lu	Luxembourg
lv	lv	Latvia
ma	ma	Morocco
mc	mc	Monaco
mk	mk	Macedonia
mt	mt	Malta
nl	nl	Netherlands
no	no	Norway
other	other	Other than as defined in this enumeration.
pl	pl	Poland
pt	pt	Portugal
ro	ro	Romania
se	se	Sweden
si	si	Slovenia
sk	sk	Slovakia
sm	sm	San Marino
tr	tr	Turkey
va	va	Vatican City State

Table 47— Values contained in the enumeration "CountryEnum"

A.7.4 The <<enumeration>> "DirectionEnum"

List of directions of travel.

Enumerated value name	Designation	Definition
allDirections	All directions	All directions (where more than two are applicable) at this point on the road network.
anticlockwise	Anticlockwise	Anti-clockwise.
bothWays	Both ways	Both directions that are applicable at this point on the road network.
clockwise	Clockwise	Clockwise.
eastBound	East bound	East bound general direction.
inboundTowardsTown	Inbound towards town	Heading towards town centre direction of travel.
innerRing	Inner ring	Inner ring direction.
northBound	North bound	North bound general direction.
northEastBound	North east bound	North east bound general direction.
northWestBound	North west bound	North west bound general direction.
opposite	Opposite	Opposite direction to the normal direction of flow at this point on the road network.
other	Other	Other than as defined in this enumeration.
outboundFromTown	Outbound from town	Heading out of or away from the town centre direction of travel.
outerRing	Outer ring	Outer ring direction.
southBound	South bound	South bound general direction.
southEastBound	South east bound	South east bound general direction.
southWestBound	South west bound	South west bound general direction.
unknown	Unknown	Direction is unknown.
westBound	West bound	West bound general direction.

Table 48— Values contained in the enumeration "DirectionEnum"

A.7.5 The <<enumeration>> "GipLinkDirectionEnum"

Enumeation for GipLink digitalization direction

Enumerated value name	Designation	Definition
fromTo	From to	
toFrom	To from	

Table 49— Values contained in the enumeration "GipLinkDirectionEnum"

A.7.6 The <<enumeration>> "HeightGradeEnum"

List of height or vertical gradings of road sections.

Enumerated value name	Designation	Definition
aboveGrade	Above grade	Above or over the normal road grade elevation.
atGrade	At grade	At the normal road grade elevation.
belowGrade	Below grade	Below or under the normal road grade elevation.

Table 50— Values contained in the enumeration "HeightGradeEnum"

A.7.7 The <<enumeration>> "LaneEnum"

List of descriptors identifying specific lanes.

Enumerated value name	Designation	Definition
allLanesCompleteCarriageway	All lanes complete carriageway	In all lanes of the carriageway.
busLane	Bus lane	In the bus lane.
busStop	Bus stop	In the bus stop lane.
carPoolLane	Car pool lane	In the carpool lane.
centralReservation	Central reservation	On the central median separating the two directional carriageways of the highway.
crawlerLane	Crawler lane	In the crawler lane.
emergencyLane	Emergency lane	In the emergency lane.
escapeLane	Escape lane	In the escape lane.
expressLane	Express lane	In the express lane.
hardShoulder	Hard shoulder	On the hard shoulder.
heavyVehicleLane	Heavy vehicle lane	In the heavy vehicle lane.
lane1	Lane1	In the first lane numbered from nearest the hard shoulder to central median.
lane2	Lane2	In the second lane numbered from nearest the hard shoulder to central median.
lane3	Lane3	In the third lane numbered from nearest the hard shoulder to central median.
lane4	Lane4	In the fourth lane numbered from nearest the hard shoulder to central median.
lane5	Lane5	In the fifth lane numbered from nearest the hard shoulder to central median.
lane6	Lane6	In the sixth lane numbered from nearest the hard shoulder to central median.
lane7	Lane7	In the seventh lane numbered from nearest the hard shoulder to central median.
lane8	Lane8	In the eighth lane numbered from nearest the hard shoulder to central median.
lane9	Lane9	In the ninth lane numbered from nearest the hard shoulder to central median.
layBy	Lay by	In a lay-by.

Enumerated value name	Designation	Definition
leftHandTurningLane	Left hand turning lane	In the left hand turning lane.
leftLane	Left lane	In the left lane.
localTrafficLane	Local traffic lane	In the local traffic lane.
middleLane	Middle lane	In the middle lane.
opposingLanes	Opposing lanes	In the opposing lanes.
overtakingLane	Overtaking lane	In the overtaking lane.
rightHandTurningLane	Right hand turning lane	In the right hand turning lane.
rightLane	Right lane	In the right lane.
rushHourLane	Rush hour lane	In the lane dedicated for use during the rush (peak) hour.
setDownArea	Set down area	In the area/lane reserved for passenger pick-up or set-down.
slowVehicleLane	Slow vehicle lane	In the slow vehicle lane.
throughTrafficLane	Through traffic lane	In the through traffic lane.
tidalFlowLane	Tidal flow lane	In the lane dedicated for use as a tidal flow lane.
turningLane	Turning lane	In the turning lane.
verge	Verge	On the verge.

Table 51— Values contained in the enumeration "LaneEnum"

A.7.8 The <<enumeration>> "LinearReferencingDirectionEnum"

Directions of traffic flow relative to the direction in which the linear element is defined.

Enumerated value name	Designation	Definition
aligned	Aligned	Indicates that the direction of traffic flow affected by the situation or related to the traffic data is in the same sense as the direction in which the linear element is defined.
both	Both	Indicates that both directions of traffic flow are affected by the situation or relate to the traffic data.
opposite	Opposite	Indicates that the direction of traffic flow affected by the situation or related to the traffic data is in the opposite sense to the direction in which the linear element is defined.
unknown	Unknown	Indicates that the direction of traffic flow affected by the situation or related to the traffic data is unknown.

Table 52— Values contained in the enumeration "LinearReferencingDirectionEnum"

A.7.9 The <<enumeration>> "LocationDescriptorEnum"

List of descriptors to help to identify a specific location.

Enumerated value name	Designation	Definition
aroundABendInRoad	Around a bend in road	Around a bend in the road.
atMotorwayInterchange	At motorway interchange	At a motorway interchange.
atRestArea	At rest area	At rest area off the carriageway.
atServiceArea	At service area	At service area.
atTollPlaza	At toll plaza	At toll plaza.
atTunnelEntryOrExit	At tunnel entry or exit	At entry or exit of tunnel.
inbound	Inbound	On the carriageway or lane which is inbound towards the centre of the town or city.
inGallery	In gallery	In gallery.
inTheCentre	In the centre	In the centre of the roadway.
inTheOppositeDirection	In the opposite direction	In the opposite direction.
inTunnel	In tunnel	In tunnel.
onBorder	On border	On border crossing.
onBridge	On bridge	On bridge.
onConnector	On connector	On connecting carriageway between two different roads or road sections.
onElevatedSection	On elevated section	On elevated section of road.
onFlyover	On flyover	On flyover, i.e. on section of road over another road.
onIceRoad	On ice road	On ice road.
onLevelCrossing	On level crossing	On level-crossing.
onLinkRoad	On link road	On road section linking two different roads.
onPass	On pass	On mountain pass.
onRoundabout	On roundabout	On roundabout.
onTheLeft	On the left	On the left of the roadway.
onTheRight	On the right	On the right of the roadway.
onTheRoadway	On the roadway	On the roadway.
onUndergroundSection	On underground section	On underground section of road.

Enumerated value name	Designation	Definition
onUnderpass	On underpass	On underpass, i.e. section of road which passes under another road.
outbound	Outbound	On the carriageway or lane which is outbound from the centre of the town or city.
overCrestOfHill	Over crest of hill	Over the crest of a hill.
withinJunction	Within junction	On the main carriageway within a junction between exit slip road and entry slip road.

Table 53— Values contained in the enumeration "LocationDescriptorEnum"

A.7.10 The <<enumeration>> "SourceTypeEnum"

Type of sources from which situation information may be derived.

Enumerated value name	Designation	Definition
automobileClubPatrol	Automobile club patrol	A patrol of an automobile club.
cameraObservation	Camera observation	A camera observation (either still or video camera).
freightVehicleOperator	Freight vehicle operator	An operator of freight vehicles.
inductionLoopMonitoringStation	Induction loop monitoring station	A station dedicated to the monitoring of the road network by processing inductive loop information.
infraredMonitoringStation	Infrared monitoring station	A station dedicated to the monitoring of the road network by processing infrared image information.
microwaveMonitoringStation	Microwave monitoring station	A station dedicated to the monitoring of the road network by processing microwave information.
mobileTelephoneCaller	Mobile telephone caller	A caller using a mobile telephone (who may or may not be on the road network).
nonPoliceEmergencyServicePatrol	Non police emergency service patrol	Emergency service patrols other than police.
otherInformation	Other information	Other sources of information.
otherOfficialVehicle	Other official vehicle	Personnel from a vehicle belonging to the road operator or authority or any emergency service, including authorised breakdown service organisations.
policePatrol	Police patrol	A police patrol.
privateBreakdownService	Private breakdown service	A private breakdown service.
publicAndPrivateUtilities	Public and private utilities	A utility organisation, either public or private.
registeredMotoristObserver	Registered motorist observer	A motorist who is an officially registered observer.
roadAuthorities	Road authorities	A road authority.
roadOperatorPatrol	Road operator patrol	A patrol of the road operator or authority.
roadsideTelephoneCaller	Roadside telephone caller	A caller who is using an emergency roadside telephone.
spotterAircraft	Spotter aircraft	A spotter aircraft of an organisation specifically assigned to the monitoring of the traffic network.

Enumerated value name	Designation	Definition
trafficMonitoringStation	Traffic monitoring station	A station, usually automatic, dedicated to the monitoring of the road network.
transitOperator	Transit operator	An operator of a transit service, e.g. bus link operator.
vehicleProbeMeasurement	Vehicle probe measurement	A specially equipped vehicle used to provide measurements.
videoProcessingMonitoringStation	Video processing monitoring station	A station dedicated to the monitoring of the road network by processing video image information.

Table 54— Values contained in the enumeration "SourceTypeEnum"

A.7.11 The <<enumeration>> "TrafficStatusEnum"

List of terms used to describe traffic conditions.

Enumerated value name	Designation	Definition
congested	Congested	Traffic in the specified direction is congested making driving very slow and difficult.
freeFlow	Free flow	Traffic in the specified direction is free flowing.
heavy	Heavy	Traffic in the specified direction is heavier than usual making driving conditions more difficult than normal.
impossible	Impossible	Traffic in the specified direction is completely congested, effectively at a standstill, making driving impossible.
unknown	Unknown	Traffic conditions are unknown.

Table 55— Values contained in the enumeration "TrafficStatusEnum"

A.7.12 The <<enumeration>> "TrafficTrendTypeEnum"

List of terms used to describe the trend in traffic conditions.

Enumerated value name	Designation	Definition
trafficBuildingUp	Traffic building up	Traffic conditions are changing from free-flow to heavy or slow service levels. Queues may also be expected.
trafficEasing	Traffic easing	Traffic conditions are changing from heavy or slow service levels to free-flow.
trafficStable	Traffic stable	Traffic conditions are currently stable.
unknown	Unknown	The trend of traffic conditions is currently unknown.

Table 56— Values contained in the enumeration "TrafficTrendTypeEnum"

A.7.13 The <<enumeration>> "TravelTimeTrendTypeEnum"

List of terms used to describe the trend in travel times.

Enumerated value name	Designation	Definition
decreasing	Decreasing	Travel times are decreasing.
increasing	Increasing	Travel times are increasing.
stable	Stable	Travel times are stable.

Table 57— Values contained in the enumeration "TravelTimeTrendTypeEnum"

A.7.14 The <<enumeration>> "TravelTimeTypeEnum"

List of ways in which travel times are derived.

Enumerated value name	Designation	Definition
best	Best	Travel time is derived from the best out of a monitored sample.
estimated	Estimated	Travel time is an automated estimate.
instantaneous	Instantaneous	Travel time is derived from instantaneous measurements.
reconstituted	Reconstituted	Travel time is reconstituted from other measurements.

Table 58— Values contained in the enumeration "TravelTimeTypeEnum"

A.7.15 The <<enumeration>> "VehicleTypeEnum"

Types of vehicle.

Enumerated value name	Designation	Definition
agriculturalVehicle	Agricultural vehicle	Vehicle normally used for agricultural purposes, e.g. tractor, combined harvester etc.
anyVehicle	Any vehicle	Vehicle of any type.
articulatedVehicle	Articulated vehicle	Articulated vehicle.
bicycle	Bicycle	Bicycle.
bus	Bus	Bus.
car	Car	Car.
caravan	Caravan	Caravan.
carOrLightVehicle	Car or light vehicle	Car or light vehicle.
carWithCaravan	Car with caravan	Car towing a caravan.
carWithTrailer	Car with trailer	Car towing a trailer.
constructionOrMaintenanceVehicle	Construction or maintenance vehicle	Vehicle normally used for construction or maintenance purposes, e.g. digger, excavator, bulldozer, lorry mounted crane etc.
fourWheelDrive	Four wheel drive	Four wheel drive vehicle.
highSidedVehicle	High sided vehicle	High sided vehicle.
lorry	Lorry	Lorry of any type.
moped	Moped	Moped (a two wheeled motor vehicle characterized by a small engine typically less than 50cc and by normally having pedals).
motorcycle	Motorcycle	Motorcycle.
motorcycleWithSideCar	Motorcycle with side car	Three wheeled vehicle comprising a motorcycle with an attached side car.
motorscooter	Motorscooter	Motorscooter (a two wheeled motor vehicle characterized by a step-through frame and small diameter wheels).
other	Other	Other than as defined in this enumeration.
tanker	Tanker	Vehicle with large tank for carrying bulk liquids.
threeWheeledVehicle	Three wheeled vehicle	Three wheeled vehicle of unspecified type.
trailer	Trailer	Trailer.

Enumerated value name	Designation	Definition
tram	Tram	Tram.
twoWheeledVehicle	Two wheeled vehicle	Two wheeled vehicle of unspecified type.
van	Van	Van.
vehicleWithCaravan	Vehicle with caravan	Vehicle (of unspecified type) towing a caravan.
vehicleWithCatalyticConverter	Vehicle with catalytic converter	Vehicle with catalytic converter.
vehicleWithoutCatalyticConverter	Vehicle without catalytic converter	Vehicle without catalytic converter.
vehicleWithTrailer	Vehicle with trailer	Vehicle (of unspecified type) towing a trailer.
withEvenNumberedRegistrationPlates	With even numbered registration plates	Vehicle with even numbered registration plate.
withOddNumberedRegistrationPlates	With odd numbered registration plates	Vehicle with odd numbered registration plate.

Table 59— Values contained in the enumeration "VehicleTypeEnum"