



## French C-ITS Deployment Coordination committee

# Common technical specifications for use cases – Traffic information about snow on the road (TISR)

## 2.4.1.2\_M\_E1

### Activity 2: Studies

### Sub Activity 2.4 > Specifications

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## Information on the document

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## Publication history

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26/09/2023	0.07	A. LE CALVEZ	Integrating COCSIC-Studies remarks: Message profile as a reference to 2.4.1.2_M_C3. Specificities for E1 message profile described in 4 new requirements: <ul style="list-style-type: none"> <li>• <b>2.4.1.2_M_E1-IVIType</b></li> <li>• <b>2.4.1.2_M_E1-RoadSignCodes</b></li> <li>• <b>2.4.1.2_M_E1-TextContentVMSPublication</b></li> <li>• <b>2.4.1.2_M_E1-TextSituationPublication</b></li> </ul>	COCSIC études
29/09/2023	0.08	A. LE CALVEZ	Minor changes following COCSIC studies remarks.	COCSIC études

02/10/2023	0.10	Thiwiza BELLACHE	Integration of C-Roads PF 2.0. Version approved following COCSIC studies of september.	COCSIC-Studies
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Black highlighted text are problem with standards.

The following legend is used on the document tables:

Standard / Field: if status is mandatory in standard: **bold**, If optional: *italic*.

Profile / Status:

- If mandatory: **v**
- If optional in standard:
  - Used (**U**) when always used.
  - Not used (**x**) when never used.
  - Sometimes (**S**) when it depends.

Profile / Content: important settings or information are in ***bold italic red underline***.

## Quality rules

### Reference to the version administration

Version number to be composed of 3 digits > vR.XY

- **R** corresponds to the release number: it is upgraded each time SC Studies validates the diffusion of a new release,
- **X** is the major version number: it is upgraded each time SC Studies validates the deliverable,
- **Y** is the minor version number: it is upgraded each time a contributor changes anything.

Once the deliverable is approved, its version number is upgraded from vR.XY to vR.(X+1)0

Once the deliverable is release, its version number is upgraded from vR.XY to v(R+1).00

As illustration:

- 0.03 > Work in progress version
- 0.10 > Del. Approved by SC Studies but not released
- 2.00 > Del. approved & released (in release 2)
- 2.05 > Del. Updated - in progress version

### Requirements identification & traceability

In this document, the following verbal forms are used to indicate requirements: **Shall / Shall not**

Recommendations shall be indicated by the verbal forms: **Should / Should not**

Permissions shall be indicated by the verbal forms: **May / May not**

Possibility and capability shall be indicated by the verbal forms: **Can / Cannot**

Inevitability used to describe behaviour of systems beyond of the scope of this del. shall be indicated by: **Will / Will not**

Facts shall be indicated by the verbal forms: **Is / Is not**

In the table here below:

2.4.X.XX > is the number given to the deliverable (e.g. 2.4.4.8)

YYYY > for digit are given to identifying which component/entity the requirement is addressing (e.g. LTCA for long term certificate authority)

ZZZ > is the numeration of the requirement

ID	2.4.X.XX-YYYY-ZZZ
Component(s)	(e.g.) Vru-ITS-S, Vro-ITS-S, R-ITS-S, PKI
Requirement	(e.g.) An ITS station SHALL be able to request and get a Long-Term Certificate (LTC) from the SCOOP Public Key Infrastructure (PKI).
Acceptance	(e.g.) CA1: Vru-ITS-S sends a LTC request to the LTCA CA2: R-ITS-S relays the LTC request CA3: The LTCA verifies the request and sends a response CA4: The R-ITS-S relays the response CA5: The response is received by the Vru-ITS-S and is valid
Additional information	

## Acronyms & abbreviations

<b>HMI</b>	Human-Machine Interface
<b>I2V</b>	Infrastructure To Vehicle
<b>IVIM</b>	Infrastructure to Vehicle Information Message
<b>ITS-G5</b>	ITS-G5 is a European standard for ad-hoc short-range communication of vehicles among each other (V2V) and with Road ITS Stations (V2I). ITS-G5 refers to the approved amendment of the IEEE 802.11 (standard IEEE 802.11p). This technology (possibly others) uses the 5.9 GHz frequency band to support safety- and non-safety ITS applications. In this document ITS-G5 stands for IEEE802.11p/ETSI ITS-G5.
<b>Nfr-ITS-S</b>	French National ITS Station
<b>N-ITS-S</b>	National ITS Station
<b>PF</b>	Platform
<b>PFro</b>	Road operator Platform
<b>R-ITS-S</b>	Roadside ITS Station
<b>TCC</b>	Traffic Control Center
<b>TISR</b>	Traffic Information about Snow on the Road
<b>TMS</b>	Traffic Management System
<b>UC</b>	Use Case
<b>V-ITS-S</b>	Vehicle ITS Station
<b>VMS</b>	Variable Message Sign

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# 1. Documents

## 1.1 Reference documents

Id.	Reference	Version	Title / Content
[DR1]	2.4.3.2_M-road operator platform	4.60	Detailed functional specifications of PFro
[DR2]	2.4.1.4_M_Specification of DATEX II 2.3 messages	4.70	Specification of DATEX II v2.3 messages in conjunction with C-ITS messages
[DR3]	2.4.1_M Common specifications	0.30	Functional and technical hybrid architecture – Common specification
[DR4]	2.4.1.2_C3 EVMS	4.50	C3 Use case specifications

## 1.2 Applicable documents

Id.	Reference	Version	Title / Content
[DA1]	2.4.1.2_M_Master_I2V	4.90	Master technical specifications for I2V use cases

## 2. Figure and example of IVI message

This use case describes the conditions on the road about the snow.

Note : If the use case is about specific regulations for some vehicles see the specific use cases :

Ex : Traffic ban to heavy good vehicles is covered by H6

Ex : Speed limit is covered by the C2 use case

The figure below is made to clarify some data elements description for the TISR use case.







Figure 2: Example 2 : "C3-Conditions difficiles"



Figure 3: Example 1 : "C2 - Situation delicate"

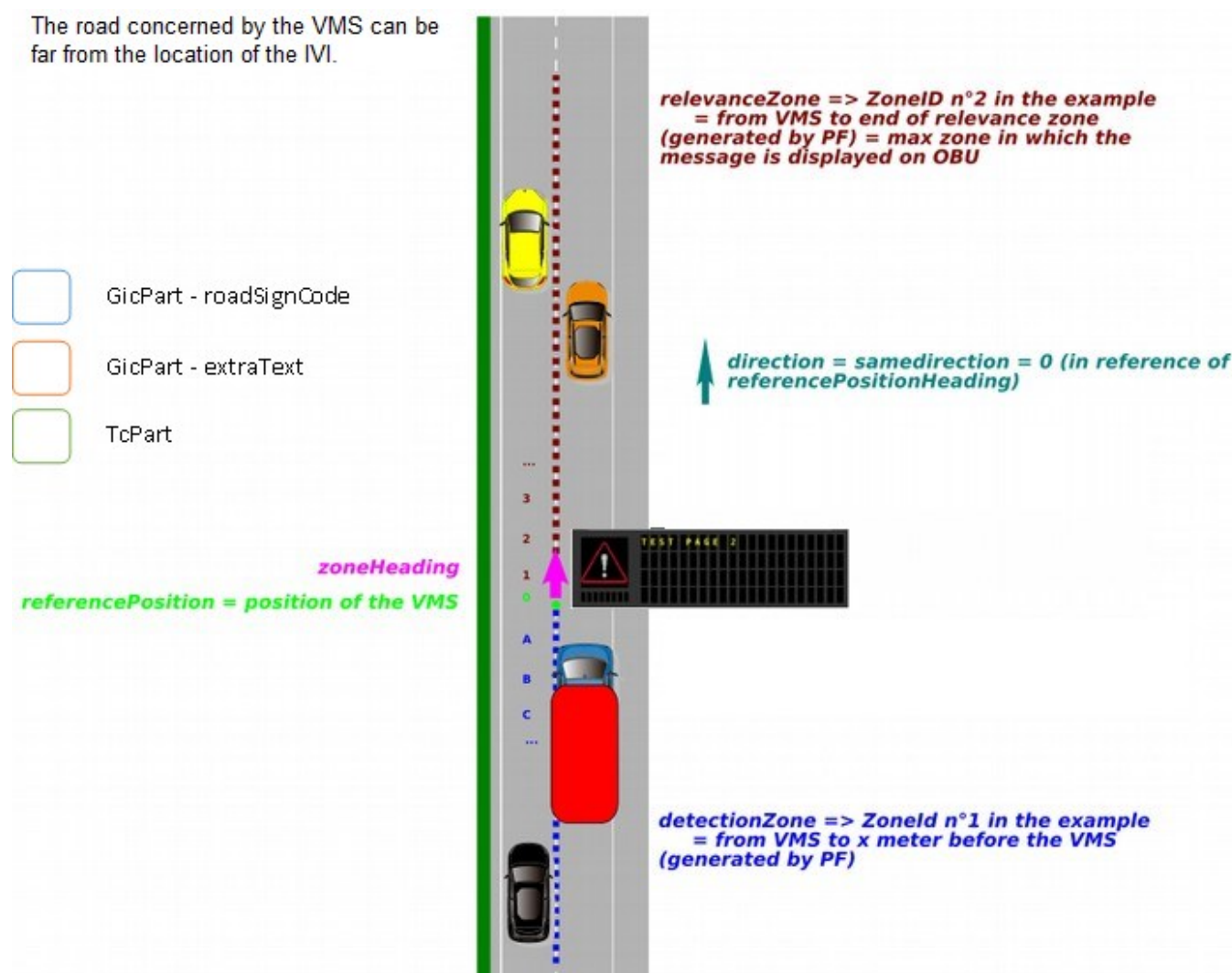
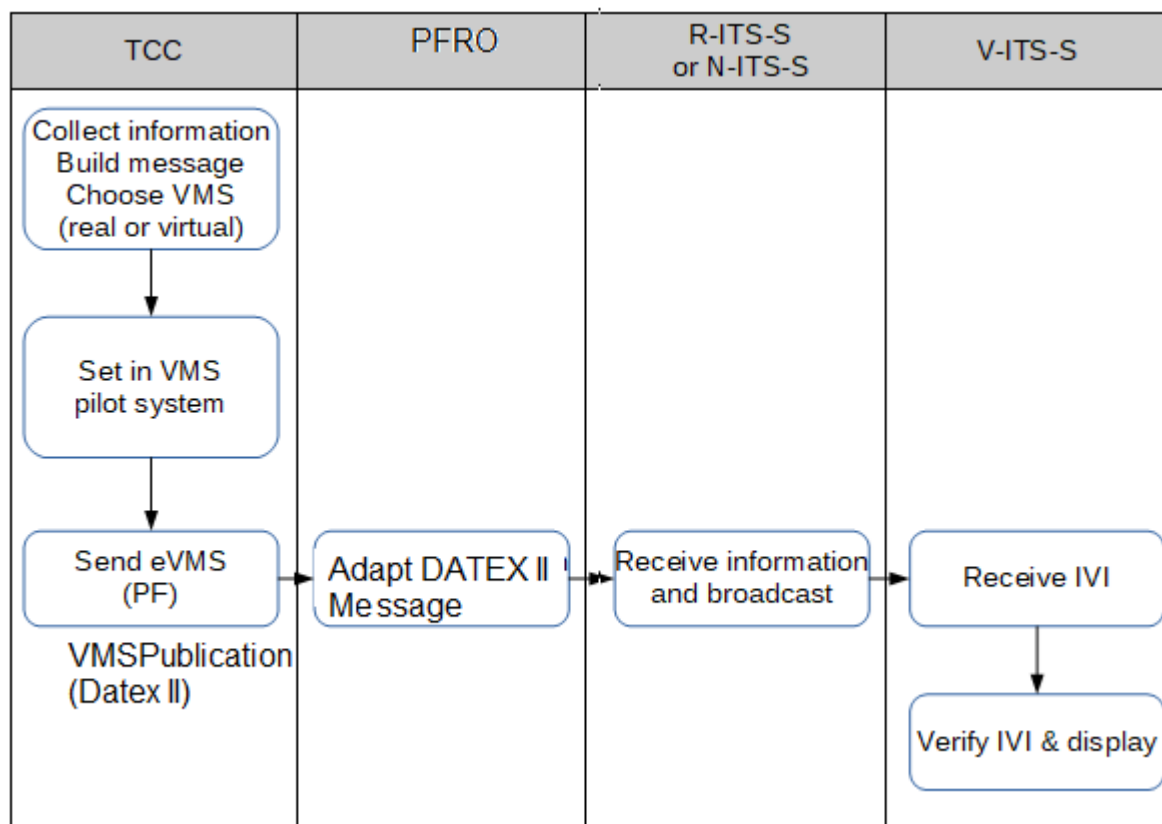


Figure 4 : example illustration with only one "detectionZone" and "relevanceZone"

### 3. Step by step diagram



#### Collect information - Build message - Choose VMS (real or virtual):

Road operators have a common way of defining the driving conditions of roads in winter. 4 different levels are defined:

- C1 – Normal conditions: no snow or ice on driving lanes.
- C2 – Delicate conditions: localised ice possible or/and thin fresh snow or melting snow covering driving lanes, risk of blockage for heavy vehicles.
  - If roads is closed to specific category of vehicles, another use case can be sent: "Heavy good vehicles Forbidden"
- C3 – Difficult conditions: icy road or/and thick snow covering driving lanes, risk of blockage for all vehicles.
- C4 – Impossible conditions: thick ice on the road or/and quantity of snow making driving lanes only accessible for special vehicles.
  - If a deviation is possible, another use case can be sent, either E2 – Rerouting or D9a - Alert temporary mountain pass route closure.

The TCC **can** define the level for the concerned road based on various types of information coming from various actors, it will then be set in the VMS management tool.

ID	2.4.1.2_M_E1-BuildMessage (1)
Component(s)	TMS
Requirement	The road operators <b>should</b> define their policy for virtual VMS localization (with virtual static location) and set it in their VMS management tool (e.g. with a virtual flag).
Acceptance	
Additional information	

#### Set in VMS pilot system:

As the information is transmitted to the road users as a virtual VMS, this information needs to be set into the VMS pilot system. It has to give a start time (if not immediate) and an end time (if known).

Some road operators have automatic system sending this message, as soon as the conditions is C2, C3 or C4.

When the conditions are operational again and if the road operator considers it relevant, a VMS can be sent to inform the user that he can drive. This VMS is not covered by this use case, but by C3-E-VMS use case.

#### Send TISR to R-ITS-S or Nfr-ITS-S:

ID	2.4.1.2_M_E1-SendTISRfromTCC (1)
Component(s)	TMS
Requirement	As the PFro will admit only Datex II format in entrance, road operators <b>shall</b> develop an appropriate interface between their existing tool (VMS pilot system) and the PFro, if needed.
Acceptance	
Additional information	

The PFro adapts the Datex II coming from the TMS for the R-ITS-S and Nfr-ITS-S. The data for IVI/detectionZone(s) and the data for IVI/relevanceZone are calculated from the relevance area of the VMS (see [DR1](#) § 3.3.4.6.3 and [DR2](#)). If the relevanceZone is longer than the maximum length of a relevanceZone, the PFro generates as many Datex II messages with relevant relevanceZone, as necessary to cover the entire area.

#### Receive information and broadcast (R-ITS-S or Nfr-ITS-S):

The R-ITS-S or Nfr-ITS-S constructs an IVI with the DATEX II data given by the PFro.

ID	2.4.1.2_M_E1-ReceiveAndBroadcast (1)
Component(s)	R-ITS-S or Nfr-ITS-S
Requirement	Canal CCH should be used (see <a href="#">DR3</a> for more details).
Acceptance	
Additional information	GeoNetwork dissemination and forwarding are described in <a href="#">DA1</a> .

#### Receive IVI (vehicle):

ID	2.4.1.2_M_E1-ReceiveIVI (1)
Component(s)	V-ITS-S
Requirement	Architecture options are not treated in this document (see <a href="#">DR3</a> ).  Whatever route the information has followed, <b>IVI must have the same serviceProviderId+ivIdentificationNumber and the same timeStamp (as presented below in profile).</b>
Acceptance	CA1: IVIidentificationNumber and timestamp do not differ when the same IVIM is following G5 and cellular paths.

#### Additional information

That allows the vehicle to treat one message or the other, but not both of them.

#### Verify IVI and display IVI:

Message is displayed on HMI at VMS position (which is referencePosition in the IVI message) or before it (pre-awareness is recommended for this UC). To classify and prioritize the information between several VMS messages, the receiving vehicle **may** use the data element IviType (see below for further details), that provides the message category.

The process of vehicle receiver **can** be as followed:

1. The vehicle checks serviceProviderID+ivIdentificationNumber and timestamp to verify if the information is already known, if it is new or if it is an update.
2. The vehicle checks validFrom and validTo to determine if the information is currently applicable.
3. The vehicle checks referencePosition to determine how far from its position the VMS is.
4. The vehicle checks detectionZone. If vehicle is following the linear described by the zone(s), it is concerned by the information (which is upstream). If not, optionally, the vehicle could compare zoneHeading with its own current heading and the way it is approaching the referencePosition by rear to know if it is concerned or not (difference between headings **should** be more or less 30°).
5. The vehicle checks presence of Text container. If true, it's an eVMS.
6. If the vehicle meets the conditions given by the vehicleCharacteristics of IVI, then HMI displays the message from referencePosition point (or before) and displays it all along the relevanceZone.
7. If the eVMS message include 2 pages (alternate information on the VMS), they **can** be displayed all together (if enough place in HMI) or through a switching routine or else (car manufacturers domain).

## 4. Information profile – Message description

<b>ID</b>	<b>2.4.1.2_M_E1 – IVIProfile (1)</b>
<b>Component(s)</b>	R-ITS-S, Nfr-ITS-S
<b>Requirement</b>	The IVIM transmitted by the R-ITS-S or N-ITS-S <b>shall</b> respect IVI format described in 2.4.1.2_M_C3 (see [DR4]).
<b>Acceptance</b>	Referring to the “Status for the UC” column in the table: CA1: All mandatory <b>✓</b> DE and used <b>U</b> DE shall be present in the message emitted, with the defined values. CA2: All optional <b>S</b> DE can be present in the message emitted. See expected values in the table when defined. CA3: All not used <b>✗</b> DE shall be absent in the message emitted.
<b>Additional information</b>	At reception, V-ITS-S receiving a message with not used <b>✗</b> DE shall not discard the message. The table is based on 2.4.1.2 Master and on C3 use case Profile. Some Dataelements are optional, because they depends on the Datex II type chosen by the Road operator (“VMS Publication” or a “Situation Publication” of type “Conditions”)

Specific DE values for E1 use case are detailed in requirements below:

<b>ID</b>	<b>2.4.1.2_M_E1–IVIType (1)</b>
<b>Component(s)</b>	R-ITS-S, Nfr-ITS-S
<b>Requirement</b>	For E1 (TISR) the DE IviType of the GicContainer and TextContainer shall be set as: <ul style="list-style-type: none"> <li>- regulatory messages (1) if the IVI gives mandatory interdiction or rerouting, when the roadoperator send a VMSPublication in Datex II.</li> <li>- and Traffic-related information (2) if the IVI gives advisory information of the conditions of the Road, when the roadoperator send a SituationPublication in Datex II.</li> </ul>
<b>Acceptance</b>	
<b>Additional information</b>	The iViType depends on the roadsignCode sent.

<b>ID</b>	<b>2.4.1.2_M_E1–RoadSignCodes (1)</b>
<b>Component(s)</b>	R-ITS-S, Nfr-ITS-S
<b>Requirement</b>	In case of the roadoperator sends a VMSPublication in Datex, then the following list of pictograms shall be used in this use case: <ul style="list-style-type: none"> <li>- XB26: Snow chains mandatory on at least two driving wheels (or wearing winter tires according to the conditions of article D. 314-8) (regulatory, 7-96)</li> <li>- XA4: slippery road (warning, 2-54)</li> <li>- XA24: Crosswind (linked to snowdrift formation) (warning, 3-65)</li> <li>- XA25: snow on road (ambient, 1-12)</li> </ul> <p>In case of a SituationPublication (Conditions), there is no pictogram.</p>
<b>Acceptance</b>	
<b>Additional information</b>	

<b>ID</b>	<b>2.4.1.2_M_E1–TextContentVMSPublication (1)</b>
<b>Component(s)</b>	R-ITS-S, Nfr-ITS-S
<b>Requirement</b>	When the roadoperator sends a VMSPublication, the text field of TextContainer shall be set as following: First Line of text is the description of the situation: <ul style="list-style-type: none"> <li>- C1 : « Neige verglas : Retour à la normale »</li> </ul>

	<ul style="list-style-type: none"> <li>- C2 : « Neige verglas : circulation délicate »</li> <li>- C3 : « Neige verglas : circulation difficile »</li> <li>- C4 : « Neige verglas : Itinéraire bloqué »</li> </ul> <p>The next 3 lines describes, if relevant, the alternative route or driving advice, for example:</p> <ul style="list-style-type: none"> <li>- “Pour Chambéry, prendre N85”</li> <li>- “Equipements spéciaux obligatoires”</li> <li>- “Vent latéral : risque de congère”</li> </ul>
<b>Acceptance</b>	
<b>Additional information</b>	

<b>ID</b>	<b>2.4.1.2_M_E1-TextSituationPublication (1)</b>
<b>Component(s)</b>	R-ITS-S, Nfr-ITS-S
<b>Requirement</b>	When the roadoperator sends a SituationPublication, the C-ITS station shall translate the situationrecordtype given by the datex II messages, accordingly to the 2.4.1.4 deliverable.
<b>Acceptance</b>	
<b>Additional information</b>	