Position Paper

The Traveller Information Services Association (TISA) wishes to provide advisory information to all concerned with Traffic and Travel Information services and products. TISA will issue Position Papers to cover and explain the Membership's agreed policy, as required, in areas of business and technology.

TISA operates within the following Mission:

TISA offers an environment where the values and needs of service and content providers, broadcasters, public authorities and industry meet.
TISA creates and maintains global, open traffic and traveller information standards and guidelines that increase the safety and efficiency of travelling.

TISA coordinates the concerns and contributions of its global membership with the aim of fostering business, customer and society value from TISA standards-based services and products.

Provision of a Free Minimum Universal Traffic Information service

Introduction

The "ITS Directive"[1] of the European Commission has defined Priority Actions for the development and use of specifications and standards (Article 3).

Within the next years, the European Commission will define specifications for each of the priority actions that shall include one or more of the following types of provisions (see Article 6):

- functional provisions that describe the roles of the various stakeholders and the information flow between them;
- technical provisions that provide for the technical means to fulfil the functional provisions;
- organisational provisions that describe the procedural obligations of the various stakeholders;
- service provisions that describe the various levels of services and their content for ITS applications and services.

TISA has the technical, as well as business and operational, expertise to give inputs into the process of defining these specifications for all issues relevant to Real Time Traffic Information (RTTI).

This TISA Position Paper makes proposals on issues that need to be dealt with, in a specification for Priority Action (c):

> "data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users"

…continued

[1] Directive 2010/40/EU: "Directive of the European Parliament and of the Council on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes transport"

Position Paper

TISA Recommendation for the Minimum Set of Safety Related Messages

The list of safety related messages reflects the general categories of information which should be made available on Inter-Urban Roads; given below in a random (non-prioritised) order.

- Category: Ghost Driver
- Category: Dangerous road surface
- Category: Reduced visibility
- Category: Animal / people / debris on the road
- Category: Unmanaged road blockage
- Category: Unprotected accident area
- Category: Short term roadworks

And as a potential future category:

- Category: Unexpected End of queue

(Note: the TISA viewpoint on this category is that significant development work must be undertaken before adequately accurate information can be delivered to end-users.)

For more explanation - see Annex 1

TISA Proposal for a Definition of "Free of Charge"

- "Free of charge" should refer to the point of use: even though there may be a cost related to the purchase of a device
- "Free of charge" should refer to the access to the safety messages: even though there may be a cost related to radio license or telephone line
- "Free of charge" should refer only to the end-user and that safety related information should be made available at no extra cost to the end-user: even though - of course - any service has a cost to detect, generate and provide the service, regardless of charges to the end-user

For more explanation - see Annex 2

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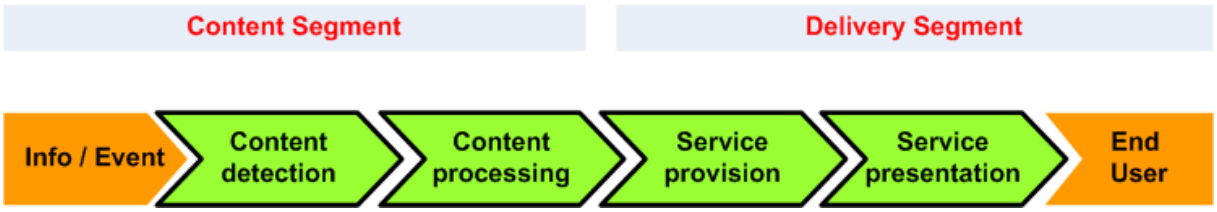
Position Paper

TISA View on the Traffic Information Value Chain and Stakeholder Roles

It is the TISA viewpoint that all traffic information services are deployed along the same value chain, in principle, with varying degrees of complexity:



Along this, diagrammatically simplified, value chain of traffic information services, the different stakeholders take a role in detecting, collecting, processing and presenting traffic information.

There is no common model of co-operation between the stakeholders in all European Countries. In some countries public authority and commercial partners act in parallel in the Content Segment as well as in the Service Segment. In other countries the tasks are fulfilled by commercial partners only or public authority partners only.

For more explanation - see Annex 3

It has to be made clear under which conditions / following which regulation private partners that collect safety related information in parallel to public partners should provide this content for a free end user service.
Often this question is connected to the question of a minimum quality (coverage, precision, latency) a free service should have.
For more explanation - see Annex 7

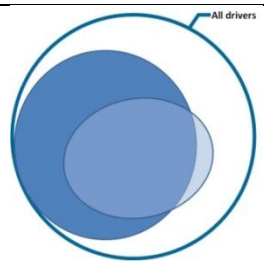
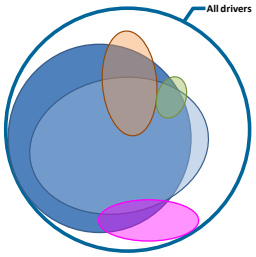
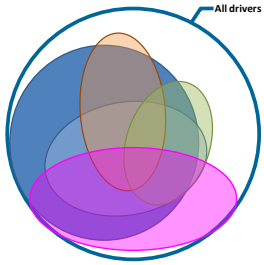
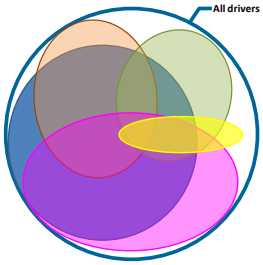
In the case of parallel commercial and public partners, it has to be made clear under what conditions and following which regulation the commercial service operates. For example, what obligation to include the safety relevant information in their service?
More challenging is the situation in countries where there are only commercial services in place. Usually these services are provided by B2B agreements with lifetime licenses and they may or may not deploy encryption. At the moment there is no obvious dominant technical solution for commercial service delivery to all drivers, even if there was a business model to tackle this.

…continued

Position Paper

TISA proposal for necessary technical decisions

To achieve the aim of informing the European travellers about safety related events, such a service can be realized by *different* delivery channels, with *different* message formats and for *different* receiver devices.

The Past	The Present	The foreseeable Future	The far Future ("reading tea leaves")
			

TISA recommends a "hybrid delivery" concept that allows the coverage of most travellers in the short term but enabling innovative, standardized technology to find its way to the market at the same time.

Short term *constrained by existing technologies*	**Medium term** *not constrained by existing technologies* (but allowing gradual market migration to significantly improved service detail)
Using VHF/FM broadcast delivered RDS-TMC (in accordance with ISO EN 14819-series) to provide standardized, but "coarse" messages to the end-user [Maintenance status only]	
EU to support and push the introduction of DAB/DAB+/DMB broadcast in Europe for ITS services. [Deployment & Developing status]	Using DAB/DAB+/DMB broadcast delivered TPEG based services (in accordance with ISO/TS 21219-series) to provide standardized safety messages with finer content detail and significantly improved location referencing resolution for end-user devices (inherently provides significant enhancements)
Using "IP delivered TTI" (many widely variant solutions), typically giving non-standardized messages to the end-user but based principally on the same content sources	

Quality is an issue in all cases. Therefore, TISA is working on a certification concept that shall guarantee that the device fulfils and follow the standards.

For more explanation - see Annexes 5 to 7

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Position Paper

Content of Annexes

Position Paper

Annex 1: TISA recommendation for the minimum set of Safety Related Messages

The list of safety related messages reflects the general categories of information which should be made available. The list does not go into detail with regards to content availability or technical solution availability to deliver messages.

- Category: Ghost Driver

  The category “Ghost Driver” refers to any vehicle driving on the wrong side of the carriage way and thereby driving in the wrong direction (e.g. against the upcoming traffic).

- Category: Dangerous road surface

  The category “dangerous road surface” refers to any condition of the road surface which makes it exceptionally slippery: whether the low adherence is caused by an oil spillage, by black-ice or any other reason which one might not expect.

- Category: Reduced visibility

  The category “reduced visibility” refers to any atmospheric condition (fog, heavy rain, heavy snow…) causing the sight range of drivers to fall below that required by safety at a normal driving speed.

- Category: Animal / people / debris on the road

  The category “Animal / people / debris on the road” covers all types of animals, debris and people which are standing on a road where one would not expect to find them and where their presence may require an emergency manoeuvre to avoid collision.

- Category: Unmanaged road blockage

  The category “unmanaged road blockage” refers to any blockage of a road, partial or total which has not been adequately secured and sign-posted

- Category: Unprotected accident area

  The category “Unprotected accident area” refers to the timeframe following the actual occurrence of an accident and the timing when the police has managed to secure the location of the accident (by adequate signage, isolation of debris and oil spillages, removal of disabled vehicles, ...)

- Category: Short term roadworks

  The category “short term roadworks” refers to any temporary work being carried-on the road or on the side of the road under a minimal signage because of the short-term nature of the work. An obvious example would be the moving works required to cut trees and bushes along the highways.

The following category is considered by TISA to be important to include; however it requires the description of a highly dynamic situation with precise location referencing. Consequentially it is difficult to deliver accurate and timely messages that lead to enhanced safety for drivers. We do not believe that this category can be delivered with currently deployed content and service technologies, so it has to be seen as a future category and will remain under discussion within TISA.

- Category: Unexpected End of queue

Position Paper

Annex 2: TISA proposal for a definition of "free of charge"

Any service has a cost to detect, generate and provide the service regardless of charges to the end-user! We consider in this annex, three definitions for: Receiver, Access to the Service (to be aware of both Conditional Access and Un-conditional Access) and Transmission.

- Receiver

  "Free of charge" should refer to the point of use: even though there may be a cost related to the purchase of a device, the information shall be available at no extra costs for any end-user in possession of a compatible device. It is however not intended that devices shall be made available for free to everyone.

- Access to the Service

  TISA understands the concept of "free of charge" as referring only to the end-user and that safety related information should be made available at no extra cost to the end-user. Commercial services often use conditional access mechanisms which puts a constraint upon the inclusion of free of charge safety related information. (There is considerable concern from commercial service providers that the technology and their business model would not allow the concept of "free of charge" to be achieved within a commercial service).

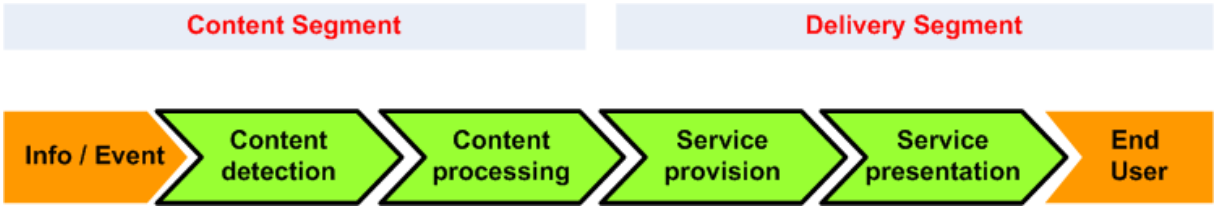
- Transmission

  "Free of charge" should refer to the access to the safety messages: free access to safety related messages would not exempt the end-user from the cost of a radio license (if required in a particular nation) or from the cost of the telephone line rental if used to access a service.

Due to technical and business issues, we believe an impact assessment of the free-of-charge concept is important to clarify what will be practically achievable.

Annex 3: The traffic information value chain and stakeholder roles

All traffic information services undergo the same principle value chain:



In a first step the safety related event needs to be detected. These raw data must be pre-processed (e.g. aggregated over time or location) to a usable content. Then the content is used to generate a message and transmit it (Info-Service Provision). The message is received by a device and presented to the end user.

To achieve the aim of informing the European travelers, such a service can be organized in different constellations throughout the Union. Depending on the local framework (organizational, technical, legal) in the different Member States a subset of the following stakeholders is affected by the service provision.

Along the value chain of traffic information services these different partner take a role in detecting, collecting, processing and presenting traffic information.

Public Partners	Private Partners
• Road operators (as content collectors and/or service providers) • Operators of control centers • Police (e.g. operations control center) • Public broadcast providers • By order of the authorities acting private companies/institutions And quasi public partners such as: • Automobile clubs as content and service providers (e.g. ADAC, ÖAMTC)	• Commercial provider of traffic relevant data (e.g. Traffic data, events and weather) (Content Provider) • Commercial provider of traffic information services (Service Provider) • Device manufacturers • Automotive industry • Private broadcast providers • Map Makers

Furthermore there is a need for a:

- Certification body for data and information[2] (e.g. National / Regional “Trusted Third Party”)
- Certification body for services and devices[2]

…continued

[2] Trusted Third Party: to perform and/or certify the fusion of different information sources, the verification of information and distribution of messages towards service providers; ensuring undiscriminating access, etc.

Position Paper

Usually the public and private partners prefer different operating environments (detection methods, used delivery channels, message formats etc.) that are listed in Annex 4. For example, public authorities tend to use broadcast for delivery whilst private partners prefer mobile networks (besides private broadcast) in recent times. Private Partners prefer detection in the vehicle as public partners usually have road side equipment.

This means that the organization model that reflects who is in charge of the service has a strong influence on the technology chosen – and vice versa.

There is no common model of co-operation between the stakeholders in all European Countries. With regards to the detection and provision of messages in the 8 categories of safety related events, in principle, the following models are practicable today. For the sake of simplicity the process steps are aggregated into the two major task areas: Content Segment and Delivery Segment.

Category of messages	Detection → Content Pre processing (Content Segment)			Info-Service provision → Info-Service presentation (Delivery Segment)		
	Public mainly	**Commercial mainly**	**Public and Commercial in parallel**	**Public mainly**	**Commercial mainly**	**Public and Commercial in parallel**
Ghost Driver	DE SE FR DK		GB		GB FR	DE SE DK
Dangerous road *surface*	FR DK		DE SE GB		GB	DE SE FR DK
Reduced visibility	FR SE DK		DE GB		GB FR	DE SE DK
Animal / people / debris on the road	DE SE FR DK		GB		GB FR	DE SE DK
Unmanaged road blockage	DE SE FR		GB		GB FR	DE SE
Unprotected accident area	FR SE		DE GB		GB FR	DE SE
Short term roadworks	DE SE FR DK		GB		GB FR	DE SE DK
Unexpected End of queue			DE SE GB DK FR		GB FR	DE SE DK

NOTE for France: Public Sector includes private operator of roads on behalf of Government

Table 1: Stakeholder Roles on example Countries within a timeframe of 3-5 years

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Position Paper

Content Segment:

Looking at the Content Segment there seems to be mainly public or parallel private sources for safety related content information available. None of the categories has an only private source.

Often private partners have complementary content to the public partners when they collect in parallel. For example, private partners could cover more parts of the network than public. Or because of in vehicle detection systems, the precision and latency of the detected event is of more quality as of the public partners.

It has to be made clear under which conditions / following which regulation private partners that collect safety related information in parallel to public partners should provide this content for a free end user service. Often this question is connected to the question of a minimum quality (coverage, precision, latency) a free service should have.

Delivery Segment:

Looking at the delivery segment the situation in Europe is more complex. Most of the countries have public and private services in parallel. But there are major countries where there is only a private service running.

In case of parallel services, it has to be made clear under which conditions / following which regulation private partners that run a commercial service are obliged to include the safety relevant information into their service. In this discussion commercial service providers point at the necessity of a reliable quality of the information as their customers connect the messages to them as providers. Therefore authentication and certification is needed here, too, to avoid manipulation.

More challenging is the situation of countries where there is only a commercial service in place. Usually these services are encrypted which means that only registered (and paying) customers of the service provider get the key to receive the service. At the moment there does not appear to be a technical solution to offer such a commercial service to *all* drivers, even if there would be a business model to tackle this.

So, one solution for those countries with commercial services only is that service providers include the safety relevant information into their service and provide this to their customers, but their customers only. In this case only those drivers get the safety service that receive a service in this country anyway.

The other solution is to establish a new public service in parallel to address all drivers which often means a change of a political decision, which was formally not to offer information services on an “air” channel from a public side.

Position Paper

Annex 4: Delivery Channel, Message Formats and Receiver Devices available for safety messages

In this annex the potential delivery channels, the message formats and examples of receiver devices available for safety messages are analyzed to find an initial best choice and perhaps point towards a future choice. This is firstly shown in a table as follows:

Delivery channels	Message Format	Reception devices	Pro	Con
VHF/FM radio - **DAB Radio**	Spoken travel info	• Built-in Radios • In-house radios (pre-trip info) • A few smart phones but they require earpiece use (for antenna)	• Operational in many countries and on many radio stations (locally) per country • Ubiquitous in vehicles • DAB : Less ubiquitous than FM	• Not language independent. Not immediate: timing of voice travel announcements depends on event-type: safety hazards are put on air ASAP, other events are put in a suitable slot in the radio-program. • Needs user knowledge of routes/maps • Technical constraints for commercial and free access services • No specific message protocols
VHF/FM radio	RDS-TMC	• Navi systems in vehicles • PNDs	• Usually nationwide coverage • Inherent inter-urban location info from system embedded map • Structured message set • Negligible end-user set-up required • Best suited for safety messages in Europe • Language independent	• Near service end • In some countries problems with the reception of messages in the end user device due to bad position of antenna in the vehicle or insufficient FM coverage. • No practicing of updating maps in the end user device therefore a number of outdated maps in existing devises.
Mobile Networks (e.g. GSM, UMTS, LTE)	• Many pro-prietary message protocols • TPEG over IP	• Mobile phones • Embedded Devices	• International coverage • Ubiquitous among many users • Vicarious mapping…	• Several application platforms (e.g. Android, iPhone) • Not necessarily timely / latency not guaranteed • End-user choice to not connect (roaming charges) • Significant end-user set-up required
DAB Radio	TPEG	Currently in development	• Detailed message capability • Structured message constructs • Inherent on-the-fly detailed location info with embedded map • Negligible end-user set-up required • Best candidate as RDS-TMC successor • Language independent • Chance to establish certification procedure and quality management	• Near service beginning

…continued

In summary, in the short and medium term there are 3 distribution scenarios to be considered:

a) RDS-TMC service via VHF/FM

An RDS-TMC service via VHF/FM is a service running according to the current ISO EN 14819-series standards.

In the current conditions, RDS-TMC services via VHF/FM can give satisfaction to some propositions covered by the ITS Action Plan:

1. Many existing services and terminal devices (probably greater than 100 million) can provide basic service capability to deliver safety messages of adequate but low precision for end-users.
2. Guidelines are needed to guarantee harmonized behavior between services and in-vehicle terminal devices. In part this may be covered already by existing documents; however modifications and extensions may be necessary.
3. Certification of services and terminals devices needs to be developed with the Guidelines as reference.
4. A back-up solution needs to be found for Member States that switch-off RDS-TMC service via VHF/FM, when Digital Radio is initiated.
5. The majority of RDS-TMC services via VHF/FM use location tables specifically designed for inter-urban information. However TMC precise location referencing will increase location accuracy from tenths of kilometres to orders of 100 metres. This will have significant consequence on both future services and terminal devices. Two services have addressed these issues: ASFINAG and BE-Mobile. Nevertheless issues of geographical message filtered services need to be implemented to compensate for message rate loss and to increase the safety message repetition rate.

How realistic is this scenario?

The technical risk for existing services within the EU and terminal devices is low, with medium utility for safety messages. Some potential exists for service and terminal device enhancements for the remaining lifetime of RDS-TMC service via VHF/FM. The future risk of terminal devices becoming ‘silent’ when VHF/FM is switched-off is large. Consequentially for in-vehicle use a compatible ITS terminal station approach is required to become ubiquitous a number of years before switch-off happens to provide a smooth transition experience for the end-user.

It should be noted that in-vehicle interfaces are currently developed to support the car industry and that care is now needed to ensure that the interface supports the ITS Action Plan requirements. TISA has taken action to co-operate with GENIVI to study these transition issues more fully in the coming months.

b) TPEG service via DAB/DMB

A TPEG service via DAB/DMB is a TPEG service using specified applications including SNI (e.g. TPEG Automotive Profile using TEC and specific Location Referencing methods, TPEG Public Service Media Profile –under development within TISA- or other Profile using specified TPEG Applications and Location Referencing methods) – it is important to note that DAB, DAB+ and DMB use the same transparent data features, thus they are for TTI delivery synonymous.
Main steps to taken:

1. A European wide DAB/DMB network is needed. This network has to cover at least the road network (TERN) – this is not necessarily the same coverage area that audio broadcasters would focus upon, due to their population-centre coverage requirements for cities and towns, so remote parts of the TERN may well not have coverage in the early stages of Digital Radio roll-out.
2. There needs to be a strong regulatory push for DAB/DMB transmission coverage across Europe to provide for TTI services capability, including bandwidth set aside within multiplexes for ITS delivery. There has been some legislation regarding embedded data services capacity reserved but not specifically for ITS; this needs to be addressed for the future.
3. Guidelines are needed to guarantee a harmonized behavior between services and in-vehicle client devices. This will be a major task; guidelines need to be drafted from scratch.
4. Field tests are needed to prove feasibility and seamless roaming between Member/Federal States.
5. A synchronized implementation scenario is needed to open the (mass market) for universal traffic information.
6. Dynamic location referencing must be included from the first generation products onwards. This will enable the replacement of legacy TMC location referencing by dynamic location referencing in the future without making existing navigation products ‘silent’.

How realistic is this scenario?

Introduction of TPEG services to deliver safety messages will bring many new opportunities to improve message location resolution and message detail – thus significantly improving the capability of services providers to deliver safety information for in-vehicle use.

The ‘compatible ITS equipment’ approach for in-vehicle use is vital for the inevitable gradual transition that will occur throughout the EU-27. However as noted in-vehicle interfaces are currently developed to support the car industry and that care is now needed to ensure that the interface supports the ITS Action Plan requirements. TISA has taken action to co-operate with GENIVI to study these transition issues more fully in the coming months.

c) TPEG service via IP (mobile internet scenario)

TPEG service via IP refers to various TPEG Applications (e.g. TPEG Automotive Profile using TEC and specific Location Referencing methods or other Profile using specified TPEG Applications and Location Referencing methods)
Main issues:

1. The mobile internet cannot push messages; so client devices have to be informed that there is relevant safety information available on a server. Nevertheless TPEG service via IP is an important delivery method due to already many possibilities in the market place. Unfortunately they have been "mushroom" developments with little or no standardization and therefore their suitability for safety related messages is currently in some doubt.
2. A client notification system is needed to enable safety relevant content distribution via the mobile internet. Cell-Broadcast can be used for this purpose (available in both GPRS and LTE); it is technically available but deployment for ITS involves new partners in the value chain and may have significant cost implications as well as connection logistics challenges in the service delivery segment.
3. Guidelines are needed to guarantee a harmonized behavior between services and in-vehicle devices. This will be a major task as the guidelines need to be drafted from scratch.

How realistic is this scenario?

Hybrid delivery of TTI services has many advantages for speedy and transitional deployments for safety messages but significant issues have to be managed if EU-wide seamless service is to be the goal. One major advantage of hybrid delivery is that for areas where broadcast delivery is poor there may be an IP delivery opting using GSM or Wi-Fi hotspot. But the challenge is that for the safety manager there is far less certainty that the client device will be properly connected and capable of rendering the safety message to the end-user. Furthermore manual intervention by the end-user to ensure that their IP device (e.g. Smart Phone) is connected to a safety messaging service may well unfortunately add to the hazard environment of the end-user through driver distractions.

This is another reason that a compatible ITS terminal station approach for in-vehicle use is considered important so that it could take over the 'service following' needed by a plug-in IP device (e.g Smart Phone, PND) to give hands-free experience for the end-user.

Overall Conclusions for the Delivery Segment

As soon as possible deploy low resolution safety messages using current service and client technology (i.e. RDS-TMC service via VHF/FM broadcast channels)

Define detailed IP strategies for parallel (with RDS-TMC service) implementation of safety messages and deploy as soon as possible; perhaps leading to some standardisation of message delivery methods

Develop and deploy high resolution safety messages using TPEG services via DAB/DMB broadcast channels giving high priority to 'compatible ITS equipment' approach development and deployment to be capable of using broadcast service provision as well as mobile IP service provision via mobile devices or in-vehicle systems.

Position Paper

Annex 5: *Technical Requirements for Location-Referencing*

Location-Referencing is considered here in the context of navigation systems with maps.

	General Comment	Technology / Protocol	Road Network Coverage	Spatial Precision
TMC Location Referencing ISO EN 14819-3	TMC Location Referencing requires the use of pre-coded tables owned and updated by Public Authorities and/or Private Organisations. These Tables must be available on the sender and on the receiver side requiring frequent updates (e.g. once a year …). Without synchronization among Member states and Industry, it may take longer to bring new updates into vehicles. The coding of the Tables follows the international standard ISO EN 14819-3. **A certification process exists within TISA to ensure compliance of all Tables worldwide.**	TMC Location Referencing Potentially compatible with any next generation protocol (TPEG …)	Location Tables now available for the whole EU-27 (but not all of them are public – see annex for details) The Road Network covered is only as wide as the coverage of the Location Table Not ideal / Not suited for urban environment. Initially designed for Inter-Urban roads.	Coarse resolution limiting the precision Loss of precision when client devices and service providers are not using the same update (version of the Table) Precise Location Referencing is available but not widely used at today's date.
Dynamic Location Referencing **Agora-C (ISO 17572-3), Open LR, TPEG-Loc (ISO/TS 18234-6), TPEG-GLR (ISO/TS 21219-21), TPEG-ULR (under dvpt)**	Dynamic Location Referencing does not rely on any pre-coded list. The location itself will be transmitted over the air.	Only compatible with next generation protocols (TPEG …)	EU 27 by private companies. No public service known today. Potentially any road	High precision

Position Paper

Annex 6: ***Data Detection / Data Quality***

As the above sections are focusing on the delivery of the minimum service this section is addressing the requirements of the detection of the event and provision of the content needed to provide the minimum service.
It is not in the main scope of TISA today to work in the field of detecting events but rather being in charge of providing the messages to the end user. Nevertheless, it has to be stated that the task of data detection is crucial to gain the full safety benefit of the messages provided.
Depending on the sources different qualities (in terms of precision, latency, coverage etc.) of the safety message can be expected. Also, the commercial requirements of each of the sources are different. The following table gives a summary of these issues:

Sources used to detect an event that shall lead to a danger warning	**Quality (in terms of precision, latency, coverage etc.)**		**Commercial Conditions / Cost coverage**	
	Pros	**Cons**	**Pros**	**Cons**
Automatic road side detection systems (of the road operator), e.g traffic flow, weather	Precise, quick detection Monitored by Road Managers	Only in equipped sections	Usually publicly available source	High public investment needed to get full coverage, even on TERN
Police patrol on site or emergency calls (e.g. calls through 112)	Can be used in areas without automatic detection, too Trusted source of information	Primary task is to secure dangerous situation, so low precision and latency. No full coverage	Usually publicly available source	High public investment needed to catch all relevant events, even on TERN
Jam busters calling in	Wide network coverage	Low precision and latency	Usually integrated in existing value chain connections, principally available	Conditions of access depending on content owner/ initiator
Broken-down vehicles and professional break-down services (e.g. Touring Clubs). In the future: e-call, b-call	Wide network coverage, no restriction More precise than Jam Busters	Represents only a sample sets of events		Conditions of access depending on content owner. In some countries, very difficult to access.
Social community approaches via Smartphone (automatic and manual input) or other dedicated nomadic devices	Depending on number of participants (seems raising) very good network coverage and sample size	Precision and latency very heterogeneous, no standards in use (so far) No official entity or organization	Has the potential of an economic solution if conditions can be solved	Conditions of access depending on content owner/ initiator, usually available amongst the community only No secure guaranteed access (so far)
Floating phone data	Full network coverage Big amount of data	Not as precise as in-vehicle system, especially with end-of-queue detection	Existing mobile phones are used as probes. No extra equipment needed, no GPS required.	Need to cooperate with cellular network providers and take their conditions.
In-vehicle detection Systems	High precision, very quick, full network coverage possible	Not all events can be detected from a technical point of view; Mobile network bandwidth required.	Cost benefit analysis will show if this might be economically attractive to provide service (in later phases). In principle high potential Opportunity for alternative business models	Fully in private hands, high investment for R&D therefore return on investment required, Conditions of public usage not yet defined.

Annex 7: ***TISA proposal for the minimum road network to be covered***

Because of content generation limitations and because of geo-referencing limitations (see Annex 5 for more information), it may not be possible to cover the whole road network. It may especially prove difficult to cover urban areas accurately. It is therefore considered that urban roads with speed limits less than 60 km/h shall be excluded from the minimum set of safety related information.

Bearing in mind the above limitations, it seems realistic to consider that the minimum set of safety relevant traffic information should cover at least the TERN, where information is available, although secondary network promise to have the most safety potential.

The long term aim is to increase the detection of events. Whenever data is available today it should be transmitted.

Position Paper

Annex 8: ***Services available in EU-27***

The Table below summarizes the standardised RTTi-services available in Eu-27 (status as of March 2012 – as available to TISA).

	RTTi Services			
	TMC		TPEG	
	Conditionnal Access	Unrestricted Access	Conditionnal Access	Unrestricted Access
Austria		ASFINAG ORF	MILE (BMW) INRIX	
Belgium	T-Mobilis	MET VO		
Bulgaria	(Testing)			
Cyprus				
Cz. Rep.		Road Adm.		
Denmark		DRD	INRIX	
Estonia	(Testing)			
Finland	MediaMobile Nordic			
France	V-Traffic Michelin	107.7 (Motorway operated service)	MILE (BMW) INRIX	
Germany	NAVTEQ	ARD DLF …	MILE (BMW) INRIX	Testing Germany: BR, DLR, WDR, SR, SWR, MDR, RBB, MDR, HR, NDR.
Greece	TrafficNav Be-Mobile			
Hungary	TrafficNav			
Ireland	i-Traffic TrafficNav		INRIX	
Italy	Infoblu	RAI	MILE (BMW), INRIX	
Latvia	(Testing)			
Lituania	(Testing)			
Luxemburg	Be-Mobile		INRIX	
Malta				
Netherlands	VIDExtra	ANWB Vialis	INRIX	
Poland	Mediamobile Nordic			
Portugal	Be-Mobile			
Romania	(Testing)			
Slovak Rep.		GeoMatika		
Slovenia	TrafficNav		INRIX	
Spain		DGT	INRIX	
Sweden	MediaMobile Nordic	STA	INRIX	
UK	INRIX (UK) TrafficMaster		MILE (BMW) INRIX	

Annex 9: ***TMC Location Tables available in the EU-27***

As explained in the section 6 above, the TMC Location Referencing method requires the use of pre-coded tables that must be implemented on the sender and on the receiver side. These Tables are owned (and updated) by Public Authorities and/or by Private Organisations. The nature of the owner will have an influence on the conditions of availability and use of the Table (generally unrestricted use in case of Public Bodies and restricted use in case of Private Organisations). The status (as of March 2012) is shown for the EU-27 in the matrix below.

	TMC Location Tables	
	Owned by a Private Organisation	Owned by a Public Body
Austria		●
Belgium		●
Bulgaria	●	
Cyprus		
Cz. Rep.		●
Denmark		●
Estonia	●	
Finland		●
France		●
Germany		●
Greece	●	
Hungary	●	
Ireland	●	
Italy	●	
Latvia	●	
Lituania	●	
Luxemburg		●
Malta		
Netherlands		●
Poland	●	
Portugal	●	
Romania	●	
Slovak Rep.	●	●
Slovenia	●	
Spain		●
Sweden		●
UK	●	

Annex 10: *TISA Membership*

The TISA Membership consists of Public and Private organizations among the whole Value-Chain. Its representation within the EU27 is as follows (note: TISA Membership is also present in North-America, Asia and Australia):

Contact Details

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