

ARTES Applications Workshop



Safety, Security and Transport
related applications

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Safety, Security and Transport related applications



Safety is the state of being "safe" (from French *sauv*), the condition of being protected against physical, social, spiritual, financial, political, emotional, occupational, psychological, educational or other types or consequences of failure, damage, error, accidents, harm or any other event which could be considered non-desirable. wikipedia

Security is the degree of protection against danger, damage, loss, and criminal activity. Security as a form of protection are *structures and processes that provide or improve security as a condition.* wikipedia

Preliminary remark

The perception of a topic depends on the interests of those involved:

My view is that of a rulemaker who, for more than 15 years, has been involved in shaping the mandatory dangerous goods regulations.

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- **Safety** during transport means the creation of a situation which, on the assumption of normal conditions of transport, ensures that passengers and goods are carried from one place to another without causing damage to persons or the environment.

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- **Security** during transport means the provision of suitable measures to eliminate, to the extent which is reasonably possible, deliberate detrimental action usually by third parties against the traffic environment and the goods carried.

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- **Safety provisions are:**
 - physical, operational and organizational measures
 - great number of detailed international and national rules
- **Security provisions are**
 - physical, operational and organizational measures
 - few international and national rules

■ Safety and Security aims

- can not 100% achieved by using traditional measures
- if more far-reaching safety and security requirements are to be complied with, other more intelligent measures have to be included

Transport of Dangerous Goods

- The basic parameters:
 - The carriage of dangerous goods makes up an essential part of freight transport.
 - The carriage of dangerous goods must be handled safely in a normal traffic environment.
 - Dangerous goods transport often is intermodal transport.
 - Dangerous goods transport often is international transport, and
 - many different enterprises are involved as participants in the carriage of dangerous goods.

Transport of Dangerous Goods

- The consequences:
 - The regulations governing normal freight transport also apply to the carriage of dangerous goods.
 - Additional "dangerous goods legislation" prevents risks associated with the intrinsic properties of the substances and articles carried.
 - Binding rules for the carriage of dangerous goods are stipulated at the international level.
 - In the European Union, special national or regional rules are only admissible to a very limited extent.

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Bundesministerium für Verkehr, Bau und Stadtentwicklung

Structure of dangerous goods regulations



EUROPE

Transport of Dangerous Goods legislation

- The transport of dangerous goods legislation:
 - contains all the necessary provisions for ensuring transport safety.
 - The technical and other requirements are laid down in international regulations only.
 - Requests for the legislation to be updated must be submitted to international bodies for decision.
 - The entire legislation is subject to a biennial revision process, and
 - it is to a large extent harmonized in both structure and content world-wide.

Transport of Dangerous Goods legislation

- Conclusions for all those who want to introduce binding provisions for the application of telematics in dangerous goods transport:
 - Requirements must be incorporated into the international dangerous goods legislation.
 - National or regional projects can only serve as demonstration projects.
 - All questions regarding the issue of "dangerous goods telematics" must be discussed at the international level.

Expected advantages of telematic

- Cost benefit for carriage and handling
- Cost benefit for the use of vehicles / wagons
- Prevention of mistakes during preparation for carriage and handling
- Simplification und acceleration of administrative checks
- Reduction of theft and misuse
- Reduction of incidents and accidents
- Achieving more safety for emergency services

Current situation

- Following a number of national and international research projects concerning "dangerous goods telematics", Germany and others requested that an international working group be set up to examine all relevant questions.
- The RID/ADR/ADN Joint Meeting approved this request and decided on a mandate for the working group.
- The working group has been working since 2008.

Mandate of the Joint Meeting **TELEMATICS- WG**

1. Consider what information provided by telematics enhances the safety and security of the transport of dangerous goods and facilitates such transport. In particular, consider who might benefit from the provision of such information and in what way, having regard, inter alia, to: consignors, transport operators, emergency responders, enforcers, regulators.
2. Consider necessary parameters for telematics systems. Examine if existing systems meet these parameters and what further developments might be necessary.
3. Consider the cost/benefit analysis of utilising telematics for the purposes identified above.
4. Consider what procedures/responsibilities might be necessary to monitor the information captured by telematics and how access to data should be controlled.
5. Consider interfaces and synergy with other systems.

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TELEMATICS- WG Matrix

No.	INFORMATION	WHO IS IT FOR?													WHAT IS IT FOR?	WHEN IS IT NEEDED? ³⁾	HOW IS IT PROVIDED?	AVAILABILITY		USE OF					
		Driver / Crew	Shipper/Consignor/ Sender ¹⁾	Freight forwarder	Consignee	Loader	Carrier	Tank-wagon operator	Packer	Filler	Tank-container operator	Infrastructure manager ²⁾	Competent authority	Emergency responders				Enforcement bodies	Security bodies		Public authorities	Operational	In case of incident/accident	Technical feasibility	
A. Entry in the transport document or documents attached to the transport document																									
1	UN number 5.4.1.1.1 (a) [+ 5.2.1 + 5.3.2] R: see also item 47	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Identify DG	Initial incident, initial enforcement, initial security	Transport document [, package markings, plates]	Y	P R: Y	Y
2	Proper Shipping Name 5.4.1.1.1 (b) [, 5.2.1.5, 5.2.1.6, 5.2.1.7]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Identify DG	Later in incident, clean-up, later enforcement	Transport document [, package markings Class 1 & 7, sometimes Class 2]	Y	P	Y
3	Technical name (if req) 5.4.1.1.1 (b)		X	X	O	X	X		X	X					X	X	X			Further characterize generic or N.O.S. PSNs	Later as incident/enforcement develops	Transport document	Y	P	Y
4	Class (for Class 7) 5.4.1.1.1 (c) [+ 5.2 + 5.3.1]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Identify nature of hazard	Initial incident, initial enforcement, initial security	Transport document [, package labels, placards, [HINs]]	Y	P	Y
5	Code (for Class 1) 5.4.1.1.1 (c) [+ 5.2 + 5.3.1]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Identify nature of hazard	Initial incident, initial enforcement, initial security	Transport document [, package labels, placards]	Y	P	Y
6	Danger labels (class and subsidiary risks) 5.4.1.1.1 (c) [+ 5.2 + 5.3.1]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Identify additional hazard(s)	Initial incident, initial enforcement, initial security	Transport document [, package labels, placards]	Y	P	Y

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44	Driver/ADN-expert training certificate 7.5.1.2 and 8.2.1	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	Indicates qualification for carrying dangerous goods	Before and throughout journey	Certificate, on board	A/A/N: Y P	Y	A/A/N: Y	Not relevant	A/A/N: Y		
45	Certificate of approval for vehicles/inland waterway vessels 9.1.3.5 ADR / 8.1.8. ADN	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	Indicates suitability for carrying dangerous goods	Before and throughout journey	Certificate, on board	A/A/N: Y P	Y	A/A/N: Y	A/A/N: Y	A/A/N: Y			
46	Tunnel category (road) 1.9.5.3.1, 1.9.5.3.7 (ADR)	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	A/A A X	Indicates tunnel restrictions	Before and throughout journey	Road sign (for ADR) and Website UNECE	Y	Y	Y	Y	Y			
47	DG wagon number and position in the train 1.4.2.2.5 + 1.4.3.6 (RID)	R/A R X	R/A R X	R/A R X	R/A R X	R/A R X	R/A R X	R/A R X	R/A R X	R/A R X	R/A R X	R/A R X	R/A R X	Indicates location of dangerous goods in a train	Before and throughout journey in case of incident/accident	Access to a data base or information	Y	Y	Y	Y	Y			
C. New information ⁶⁾																								
48	Alert-system for incident/accident - fire	S	O	O	O	O	O	O	O	S	S			Various	During loading, throughout journey, in case of incident/accident	Fire detector; automatic alert transmission system	A/R: N A/N: E	N	Y	Y	Y			
49	Alert-system for road traffic incident/accident (e.g. stability, shock) (ADR)	A/O O 8)	O	O	O	O	O	O	A/S	A/S				Automatic emergency call	In case of an accident	Tilt/shock sensor; automatic alert transmission system	A: E	N	Y	Y	Y			
50	Alert-system for rail incident/accident (derailment) (RID)	R/S	O	O	O	R/S	O	O	R/S	R/S				Automatic emergency call. Information for the driver	In case of an accident	Derailment detector; automatic alert transmission system	N	N	Y	Y	Y			
51	Alert-system for incident/accident - axle-bearing temperature detection	S				S	S							Alert before an accident happens	Throughout journey	Temperature sensor; R: automatic alert transmission system	A: N R: N ⁶⁾	N	Y	Y	Y			

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		Driver / Crew	Shipper/Consignor/ Sender ¹⁾	Freight forwarder	Co-recipient	Loader	Carrier	Tank wagon or portable tank	Packer	Filler	Tank-containers	Trucks	Trains	Public				Security bodies	Operational	In case of incident/accident	Technical feasibility	Incident/accidents	Ball or availability in case of incidents/accidents	Passenger operators, authorities or other stakeholders				
52	Alert-system for vehicle brake (temperature and other malfunction)	S				S	S									S				Alert before an accident happens	Throughout journey	Temperature sensor; brake monitoring sensor; R: automatic alert transmission system	R: N ²⁾ A: E	N	Y	Y	Y	R: Y A: N
53	Alert-system for load - pressure	S	O	O	S		S	S								S				Information / alert before an incident/accident happens	Before and throughout journey	Pressure sensor; automatic alert transmission system	E	N	Y	Y	Y	
54	Alert-system for load - temperature control [2.2.41.1.17 + 2.2.52.1.16 + 7.2.4 (V8) + 8.5 (S4) (ADR)]	S	O	O	S	S	S									S				Information / alert before an incident/accident happens	Before and throughout journey	Temperature sensor; automatic alert transmission system	E	N	Y	Y	Y	
55	Alert-system for load - gas leakage (load compartment)	S	O	O	S	S	S									S				Alert in case of an incident/accident	Before and throughout journey	Gas sensor; automatic alert transmission system	N	N	Y	Y	Y	
56	Alert-system for load - gas leakage (tank and battery vehicles)	S	O	O	S											S				Alert in case of an incident/accident	Before and throughout journey	Gas sensor; automatic alert transmission system	N	N	Y	Y	Y	
57	Alert-system for unauthorised opening of load compartment	S	S	S	S											S	S			Alert in case of an incident/accident	Before and throughout journey	Anti-theft device; automatic alert transmission system	E	N	Y	Y	Y	
58	Alert-system for unauthorised use of vehicles (ADR/ADN)	A/A A/S N/S	A/AN: A/S	A/A A/A N/N: S/S	A/A A/A N/N: S/S											A/A A/A N/N: S/S	A/A A/A N/N: S/S			Alert in case of an incident/accident	Before and throughout journey	Anti-theft device; automatic alert transmission system	E	N	Y	Y	Y	
59	Alert-system for routing for DCS [1.9.1 - 1.9.4]	S	O	S												S	S			e.g. Use of defined routes (e.g. motorways), no environmentally sensitive areas	Before and throughout journey	Navigation system for the driver; automatic alert transmission system	E	N	Y	Y	Y	

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		Driver / Crew	Shipper/Consignor/ Sender ¹⁾	Freight forwarder	Consignee	Loader	Carrier	Tank wagon operator	Packer	Filter	Traffic controller	Truck-boards operator	Public	Security bodies				Environment	Emergency	Competent	Operational	In case of incident/accident	Technical feasibility	In case of incidents/accidents
60	Alert-system for position control (geolencing)	S	S	S		S						S			S	S	Position monitoring by a control unit	Throughout journey	GSM / GPS; automatic alert transmission system	E	N	Y	Y	Y
61	Tunnel restrictions: selection of an optimal route 1.9.5 + 9.6 (ADR)	A: S	A: S	A: S		A: S						A: S	A: S		Selection of an optimal route in consideration of the tunnel restrictions	Before and throughout journey	Navigation system for the driver	A: Y	A: Y	A: Y	A: N	A: Y		
62	Transport unit / containment system identifier	S	S	S	S	S	S	S	S	S	S	S	S	S	Identify DG and their status	During loading, throughout journey, in case of incident/accident	Smartboxes or Monitoring Units with different kinds of sensors	E	N	Y	Y	Y		
63	Relevant traffic / weather conditions	S		S		S						S	S	S	Routing / e.g.: Parking when icy	Throughout journey	Radio, TV, Internet, navigation systems	E	Y	Y	Y	Y		
64	Automatic calculation of the total maximum quantity per transport unit 1.1.3.6 (ADR/ADN)	A/AN: X	A/AN: X	A/AN: X		A/AN: X						A/AN: X	A/AN: X	A/AN: X	Automatic calculation of the total maximum quantity per transport unit	During loading, throughout journey	e.g. RFID reader	N	N	Y	N	Y		
65	Amount of dangerous goods in limited quantities 3.4.9	X	X	X		X	X					X	X		Establishing the need for an LQ mark	Before and throughout journey	Various traceable means	Y	N	Y	Y	Y		
66	Amount of dangerous goods in excepted quantities 3.5.6	X	X	X		X	X					X	X		Establishing the need for an EQ limit	Before and throughout journey	Various traceable means	Y	N	Y	Y	Y		
67	Special provisions 3.3 et al.	X	X	X		X	X	X	X	X	X	X	X	X	Various	Various	Various	Place-holder	Place-holder	Place-holder	Place-holder	Place-holder		
68	Required information regarding national derogations	X	X	X	X	X	X	X	X	X	X	X	X	X	Various	Various	Various	Place-holder	Place-holder	Place-holder	Place-holder	Place-holder		

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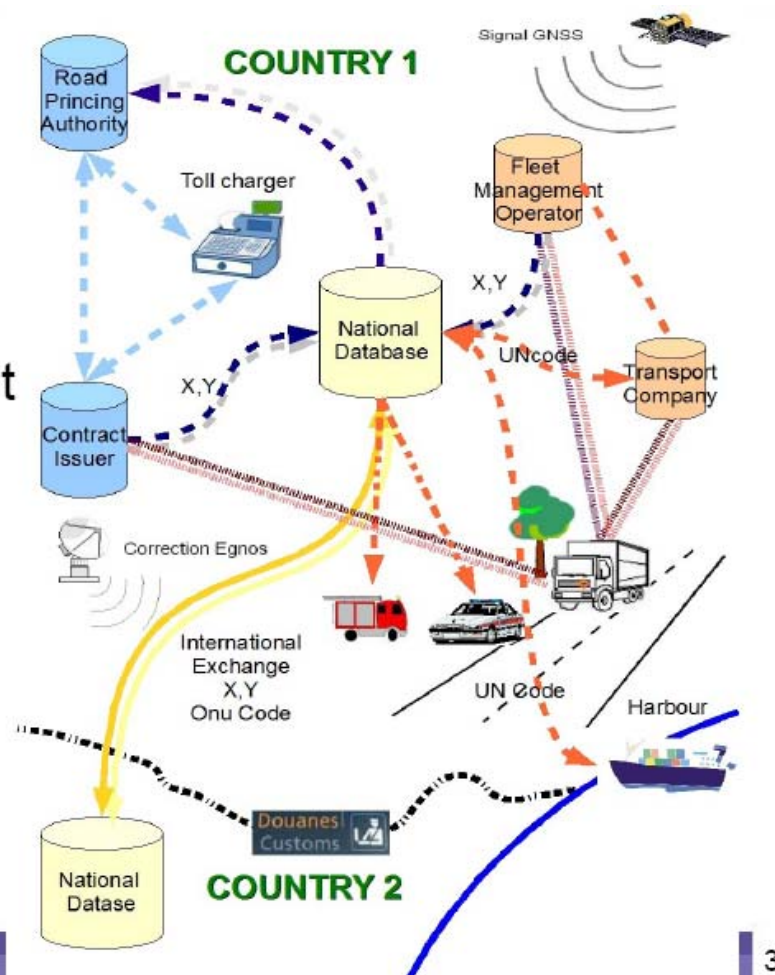
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69	Positioning information (coordinates, speed, direction, ...)	S	O	O	O	O	S	O	O	O	O	S	S	S	S	S	S	S	Knowing the position	In relation to alerts. Throughout journey.	Location reference based on OBU providing GNSS information (use of EGNOS correction and integrity) (It has to refer to the container or the transport unit and not to the package inside the container or the transport unit)	E	N	Y	Y	Y
70	Tunnel safety and access control information	S	O	O	O	O	O	O	O	O	O	S	S	O	O	O	O	O	Monitoring of vehicles approaching and traversing the tunnel	Before entering and throughout the tunnel	Link between vehicle and infrastructure management systems	N	N	Y	Y	Y

TELEMATICS- WG Ideas from France

Ideas

- Each actor transmits in the same format the data in his possession
- Capability for exchange
- Cross Border exchange



Results from the Joint Meeting WG

- Central areas of application :
 - Electronic consignment note
 - Electronic surveillance of the condition of the load, the vehicle and during incidents / accidents
 - Geo-fencing and considerations on traffic control
 - Security applications
- In addition, the integration of this initiative into general telematics systems for freight transport / the respective mode of transport is of fundamental importance.
- Problems also have to be solved regarding the necessary equipment for government agencies (police, fire brigade, other emergency services).
- The next step:
 - Carry out a research project to draft an IT system and the related legal framework based on the results of the matrix.

Conclusion

- New technologies which can enhance safety and security are available.
- They will become usable for regulated areas only if the legal outline conditions are created.
- When discussing future telematics applications in the transport sector, account has always to be taken of the complex interlinking of the transport modes and the different stakeholders.
- A critical approach has to be taken to isolated solutions with only a geographical or internal scope of application.
- The dangerous goods sector tries to implement a complex solution and for this purpose it needs your support.

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für Verkehr, Bau
und Stadtentwicklung

Thank you very much for
your attention.