Sandro Berndt
BASt – Bundesanstalt für Straßenwesen
(Federal Highway Research Institute)

Cooperative ITS Corridor – Joint Deployment

@ IEEE webinar
What Experience Is Teaching Us About V2V and V2I Communication for Safety and Traffic Management

October 19th, 2016
• Challenge: from silos to cooperation

• Bringing different data sources together means...
  → ...various improved services & new services
  → ...(external) interfaces must be specified & secured
  → ...complex value chains

cooperation = enable exchange of information
On 10 June 2013, the Ministers of Transport of the Netherlands, Germany and Austria signed the Memorandum of Understanding on the setting up of the C-ITS Corridor.
The C-ITS corridor provides an international basis for standardized and forward-looking cooperative ITS services

- Safe and efficient mobility through cooperative services
- Implementation of first cooperative applications in the C-ITS Corridor
- Joint approach pursued by road operators, the automotive industry and mobility service providers
- Basis for the gradual introduction of cooperative systems and services in Europe
1. Preliminary development and "proof-of-concept"
   - In Hesse around Frankfurt/Main with roadworks warning trailers,
   - Extending the Dutch test environment DITCM,
   - Austrian project ECO-AT

2. Introduction of the two first applications in the Cooperative ITS Corridor (NL – DE – AT)
   - Road Works Warning
   - Improved traffic management by cooperative vehicle data

3. Introduction at national level

The corridor is the basis for the further development of cooperative services.
Common Basis of the C-ITS Corridor

V2I and I2V
- Two initial services

Message formats
- CAM [ETSI EN 302 637-2] – Cooperative Awareness Message
- DENM [ETSI EN 302 637-3] – Decentralized Environmental Notification Message
C-ITS Corridor / Common Services

- Cellular (ETSI G5)
- GPS
- WLAN “Broadcast” (ETSI ITS G5)
- Cellular (GSM/UMTS/LTE)
- Wired (Ethernet/Internet)
- DAB+ “Broadcast”

*Mobilitäts Daten Marktplatz
www.mdm-portal.de

Sandro Berndt, @IEEE webinar 19.10.2016
• **Backend systems (wired/fibre)**
  – DATEX II as „language“ of European traffic centres
  – Service Provider (proprietary)

• **Cellular networks**
  – No specific language

• **ETSI ITS G5**
  – CAM [ETSI EN 302 637-2], DENM [ETSI EN 302 637-3] and other specific message formats
Sandro Berndt, @IEEE webinar 19.10.2016

“Cooperative“ Traffic Centre

Traffic Lights
OCIT-O

Cars, trailer, equipment
ETSI G5

Control units, subcentres
TLS...

Babylonic cooperative traffic centre

Service Provider

TPEG...

Roadworks Management System

OCIT-C

DATEX II

Urban Traffic Centre

DATEX II

TCC

Traffic Lights

DATEX II

Mobilitäts Daten Marktplatz

DATEX II
• Many different (external) systems
• Many different interfaces
• Many different data models
• Many different protocols used

• Cooperative central station connects all these elements
  → How to ensure „transl‌ations“ from/to all systems?
• **Data**
  – Data description
    „Platform Independent Model“ - „PIM“
  – Data model
    „Platform Specific Model“ - „PSM“
  – Data encoding

• **Protocols**
  – Application protocol
  – Transmission protocol

• **Data ↔ languages**
  • German
  • English
  • Chinese

• **Protocols ↔ communication type**
  • Talk
  • Call
  • Letter
  • Email

• „Data“ is crucial for understanding, „Protocols“ are not!
Stacks used in the C-ITS Corridor

“Stack” of data exchange layers

Data
- Data description
- Data model
- Data encoding

Protocols
- Application protocol
- Transmission protocol

DATEX II
- DATEX II UML
- DATEX II XSD
- DATEX II XML

ICS
- ICS UML
- ICS XSD
- ICS XML

NEW
- STOMP
- Websockets

ETSI-G5
- ETSI TS PDF
- ETSI ASN.1
- ASN.1 UPER
- ITS G5
- ITS Transport

NEW

ETSI
- Transport

New additions in the diagram.
1. Collect data models (PSMs) used in the various systems
2. Derive canonical data model (PIM)
3. Create mapping onto every PSM

Data model available: [www.c-its-corridor.de](http://www.c-its-corridor.de) → „Info“
Thank you for your kind attention
Suggestions or Questions?

Project lead Cooperative ITS Corridor
Federal Ministry of Transport and Digital Infrastructure
Dipl.-Ing. Konstantin Sauer
Robert-Schuman-Platz 1, 53175 Bonn
Ref-StB12@bmvi.bund.de

Project office Cooperative ITS Corridor
c/o K&S GmbH Projektmanagement
Dr. Andreas Kreutzer
Fon +49 (241) 160 1959,
Fax +49 (241) 160 1963,
office@c-its-corridor.de

www.c-its-corridor.de