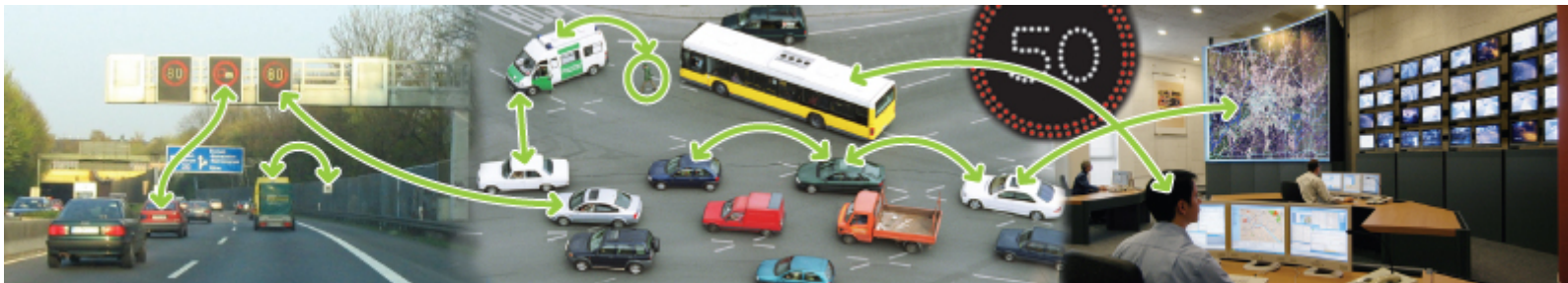




ITS World Congress – Stockholm
TS111: CALM in Europe
How CALM standards enables European Interoperability



Knut Evensen
CALM Architecture Convenor



Motivation

- Global Standards are needed for:
 - Reduced costs and delays
 - Working Safety and Efficiency services
- Global cooperation is therefore needed:
 - Between standardisation organisations
 - Between R&D projects
- And we are getting there!

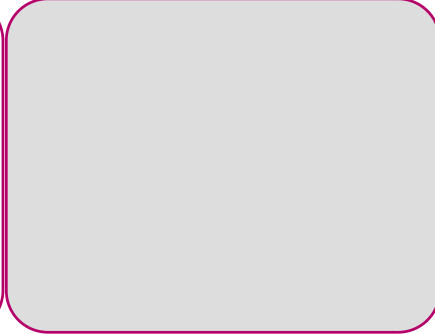
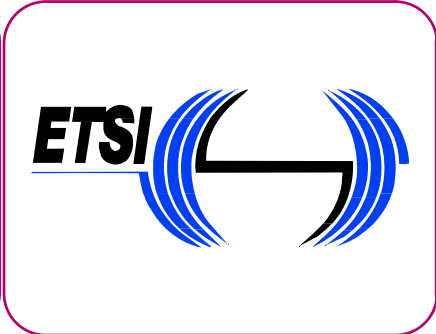
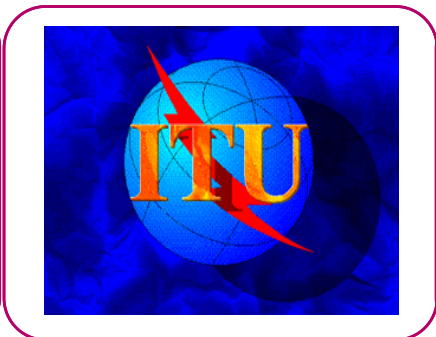
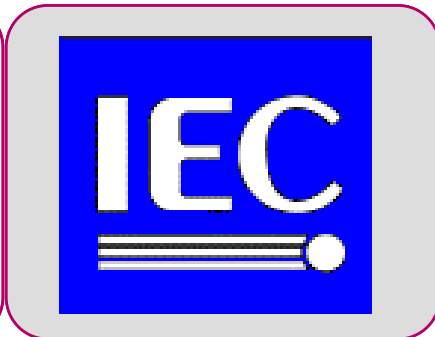
Standards Organisations

General

Electro

Comm.

IT



ISO/CEN Work Programme (1)

ISO/TC204 CEN/TC278

Systems Architecture	WG1	WG 13
Data Bases	WG 3	WG 8
Automatic Vehicle Identification (AVI)	WG 4	WG 12
Electronic Fee Collection (EFC)	WG 5	WG 1
Fleet and Freight Management Systems	WG7	WG 2
Public Transport + Emergency vehicles	WG 8	WG 3
Integrated Traffic Information	WG 9	
Travel and Traffic Information Systems	WG10	WG 4
Route Guidance and Navigation Systems	WG 11	



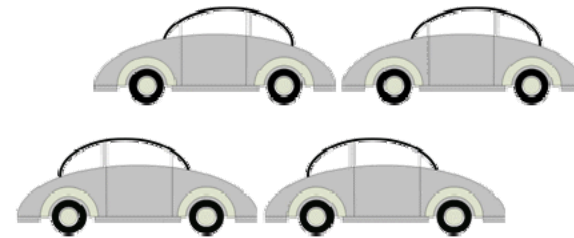
ISO/CEN Work Programme (2)

	ISO/TC204	CEN/TC278
ITS Warning & Control Systems	WG14	
Short Range Communication (DSRC)	WG 15	WG 9
”Wide area” Comm. Systems 	WG 16	
Nomadic Devices	WG 17	
Human Machine Interaction(HMI)	ISO TC22	WG 10
Recovery of stolen Vehicles		WG 14
eSafety	WG16	WG 15
Nomadic Devices	WG17	
ITS Cooperative Systems	WG18	WG16





Communications Access for Land Mobiles



- CALM is the ISO approved framework for heterogeneous packet-switched communication in mobile environments
- CALM also refers to the set of international standards being developed by ISO TC204/WG16 – Wide Area Communications - to support this framework.
- The CALM framework supports user transparent continuous communications across various interfaces and communication media

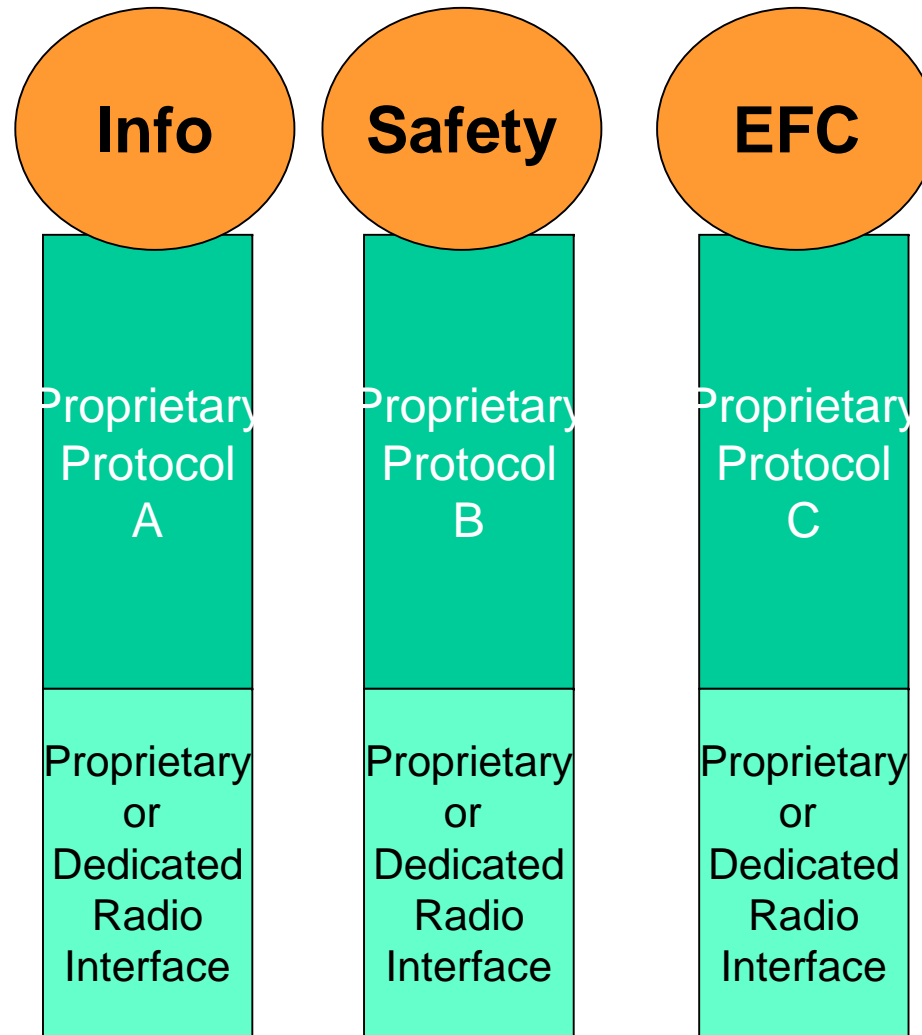


Standards Cooperation

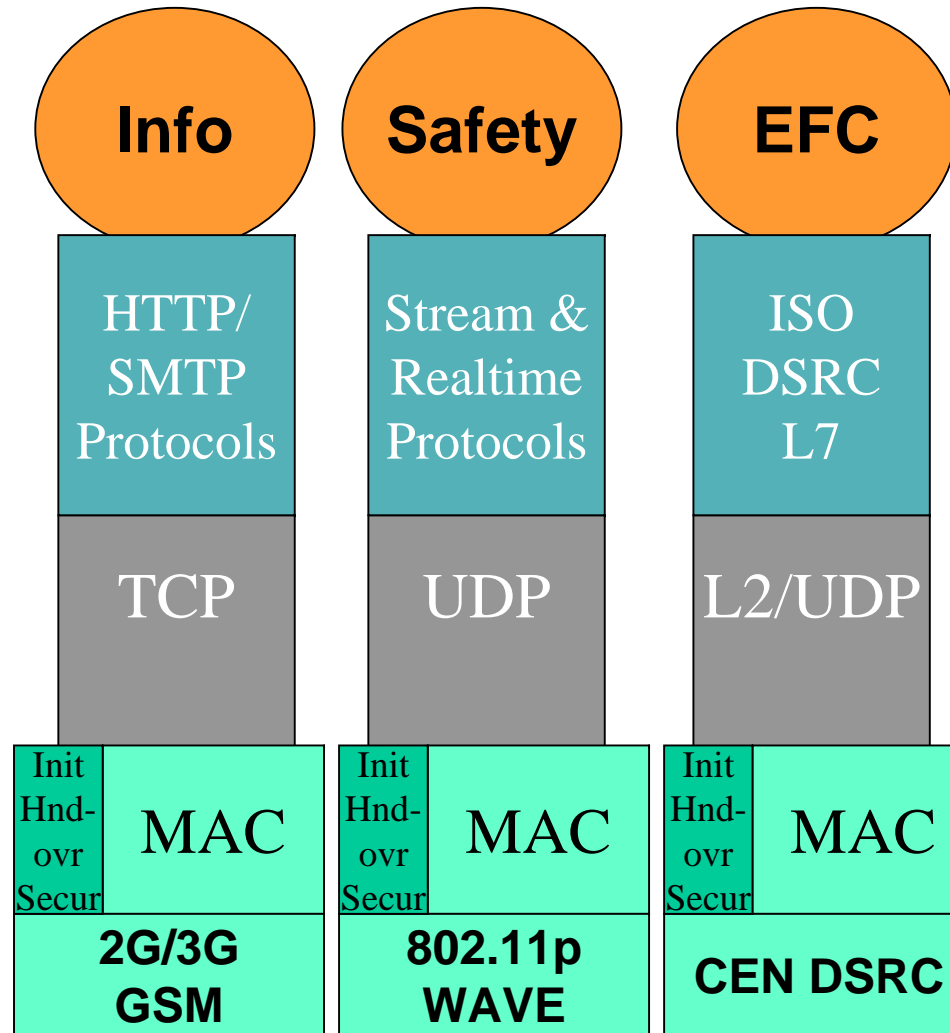
- **CALM effort started with TC 204 WG16**
- **IEEE 802.11p and P1609 – Wireless Access in Vehicular Environments (WAVE)**
 - **Cooperative relationship with WG16 and ETSI TC ITS**
- **ETSI TC ITS – new actor for 2G/3G standards, European spectrum and test standards,...**
- **IETF – Internet - IPv6 - Network Mobility (NEMO/MONAMI → MEXT)**



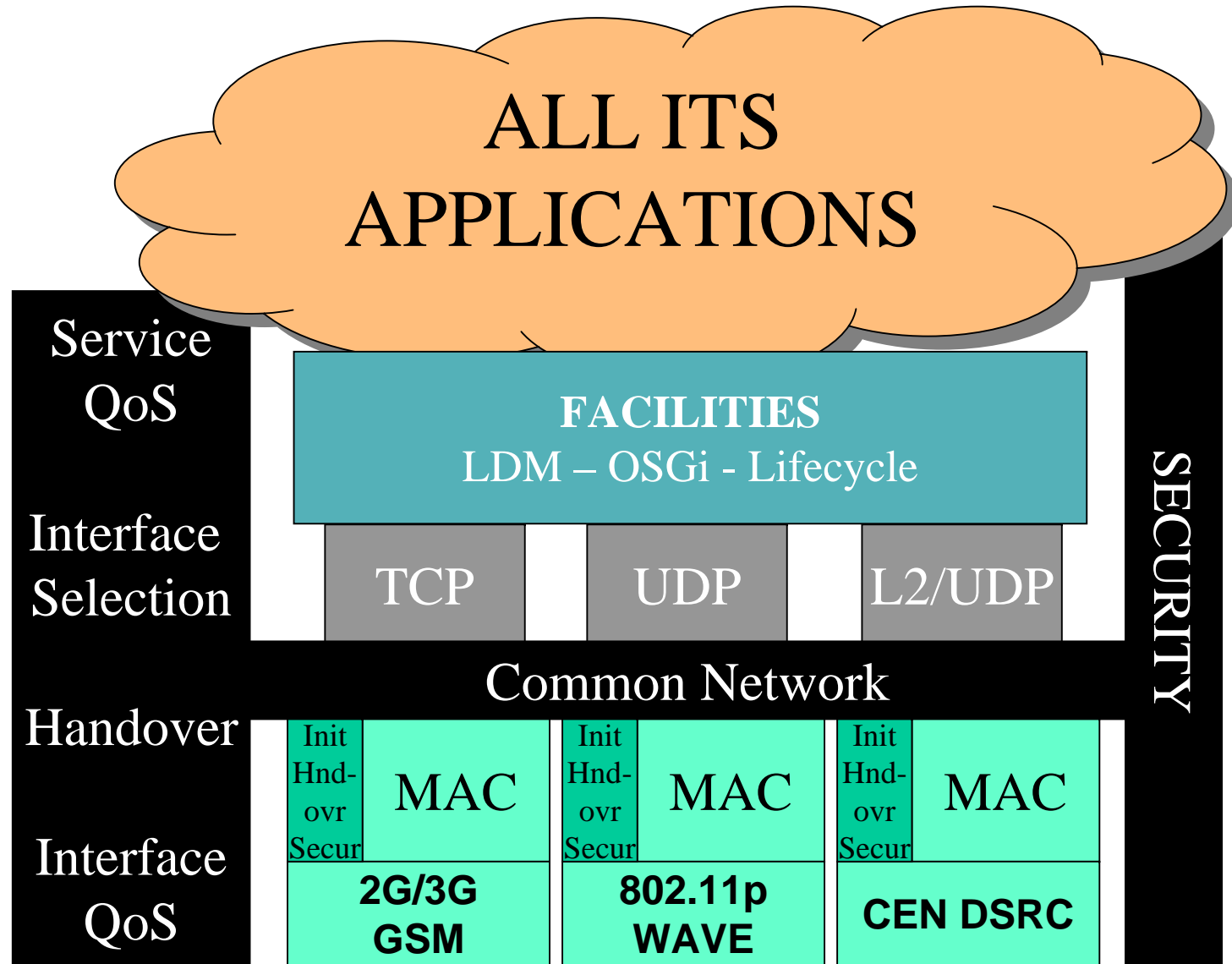
ITS Communications – Phase 1

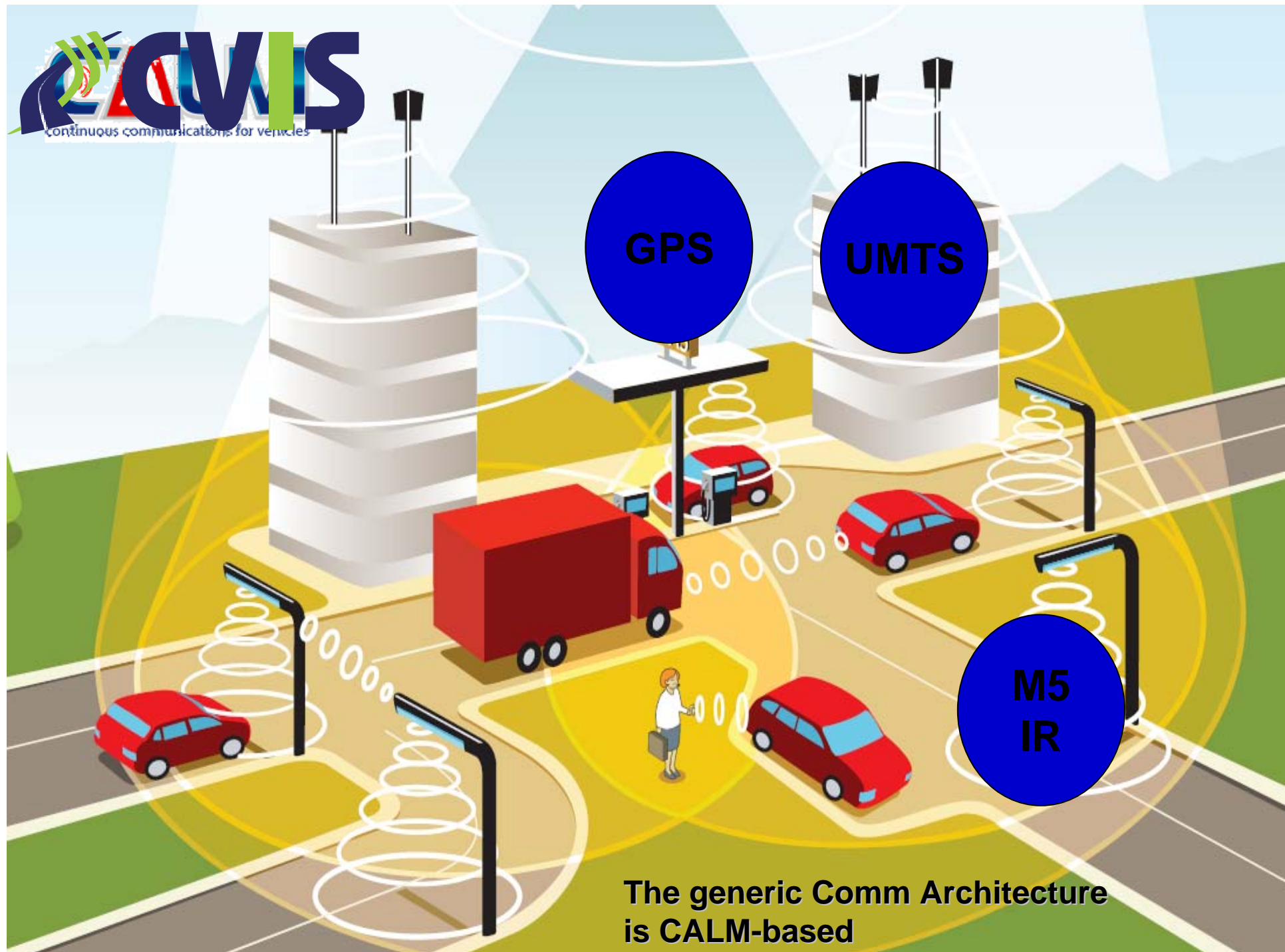


ITS Communications – Phase 2



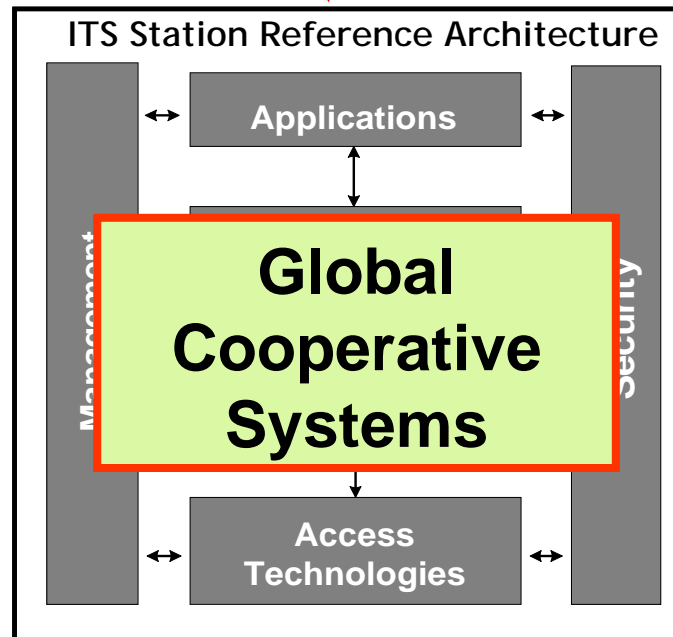
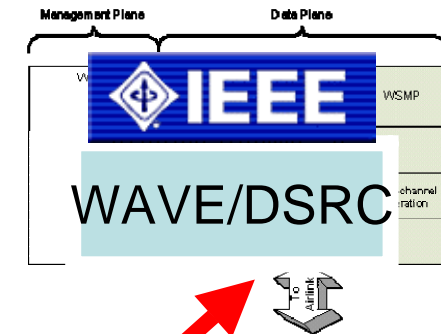
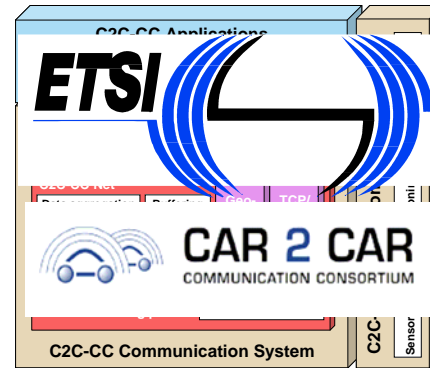
ITS Communications – Phase 3





The generic Comm Architecture
is CALM-based

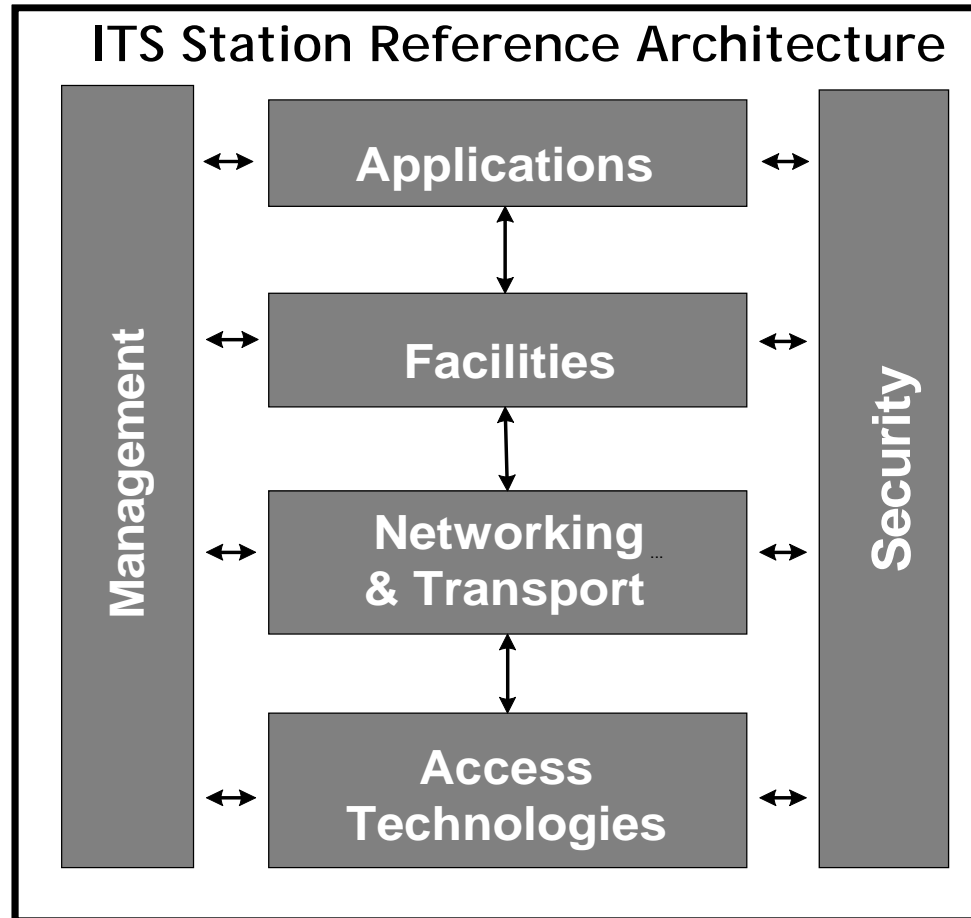
Global ITS standards are merging



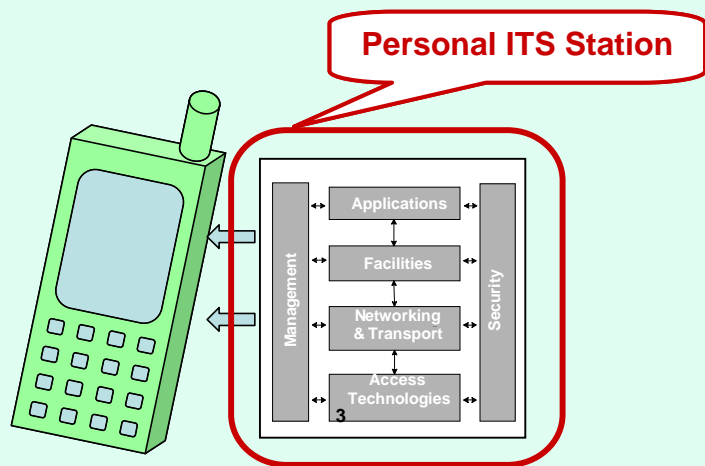
Q FREE



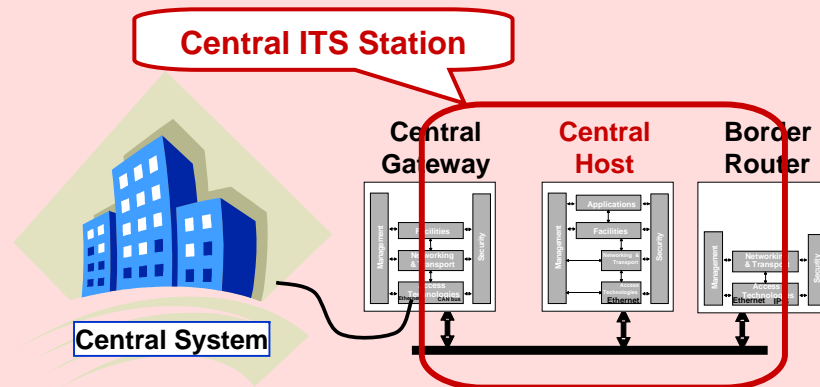
ITS Station



Personal

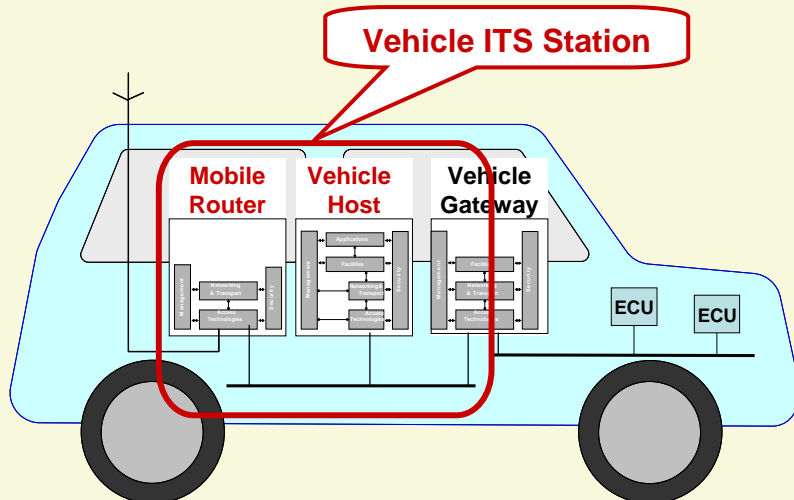


Central

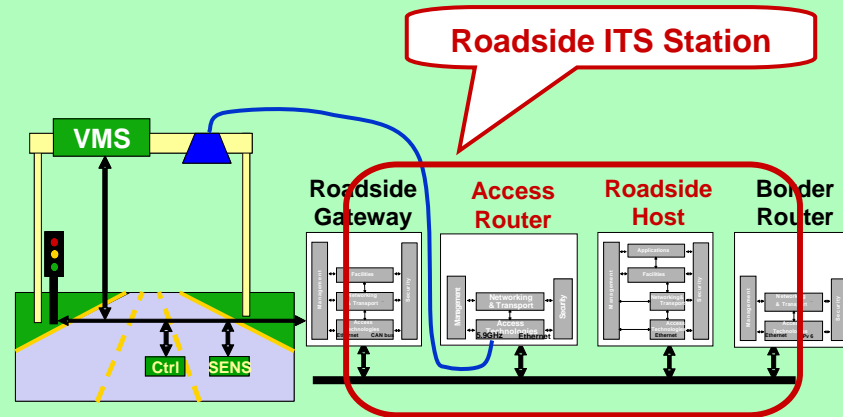


Communication Network

Vehicle



Roadside



Management

ETSI TS 102797
Test of IS 24102

ISO IS 24101
Application management

ISO IS 24102
Station and communication management

CEN TC278
ISO TC204

Access Technologies

IEEE 1609.4
WAVE

IEEE 802.11p
(802.11p)

ETSI ES 202 663
5.9 GHz European Profile of 802.11

ETSI TS 102687
Power Control

ETSI TS 102724
Channel Specification

ETSI TS 102760
Test of IS 21218

ETSI TS 102669
Test of IS 21214

ISO IS 18183
Public broadcast reception

ISO IS 21212
EDGE, GPRS

ISO IS 21213
UMTS, CDMA2K 3G

ISO IS 21214
CALM IR

ISO IS 21215
CALM IMS International profile of 802.11

ISO IS 21216
CALM MM

ISO IS 24103
MAIL

ISO IS 25111
WEB General support

ISO IS 25112
WEB WiMAX

ISO IS 25113
WEB Existing Systems

ISO IS 29281
Non-IP DSRC legacy systems

ISO IS 29282
Satellites

ISO IS 29283
IEEE 802.20

Networking & Transport

ISO IS 29281
Non-IP networking

ISO IS 24103
MAIL

ISO IS 21210
IP networking

ETSI TS 102 636
GeoNetworking

IEEE 1609.3
WAVE

Facilities

ISO IS 15662
TICS message management information

ISO IS 24101
Application management

ISO IS 24102
FAST service provision, Legacy Systems

ISO IS 29281
Legacy Systems

ETSI TS 102 637
Basic Set of Applications

IEEE 1609.1
Resource Manager

Applications

ISO IS 24978
ITS safety and emergency notification

CEN TC278
ISO TC204

• • • • • • • • •

CEN TC278
ISO TC204

IEEE 1609.11
Toll Collection

ISO CALM
ISO IS 21217
Architecture

ETSI TC ITS
ETSI TS 102665
Architecture

ETSI TS 102723
Interfaces (SAPs)

IEEE WAVE
IEEE 1609.0
Architecture

IEEE 1609.2
WAVE

ETSI TS 102731
Secure and Privacy-Preserving Vehicular Communication

ISO IS 11769
Data retention for law enforcement

ISO IS 11776
Lawful intercept

ISO IS 1318x
Security

Security

Projects based on CALM communications



- Coordinator: **ERTICO**
- Total budget: €41 Million
- Consortium: 61 partners - 12 countries
- Focus: Efficiency – V2R services



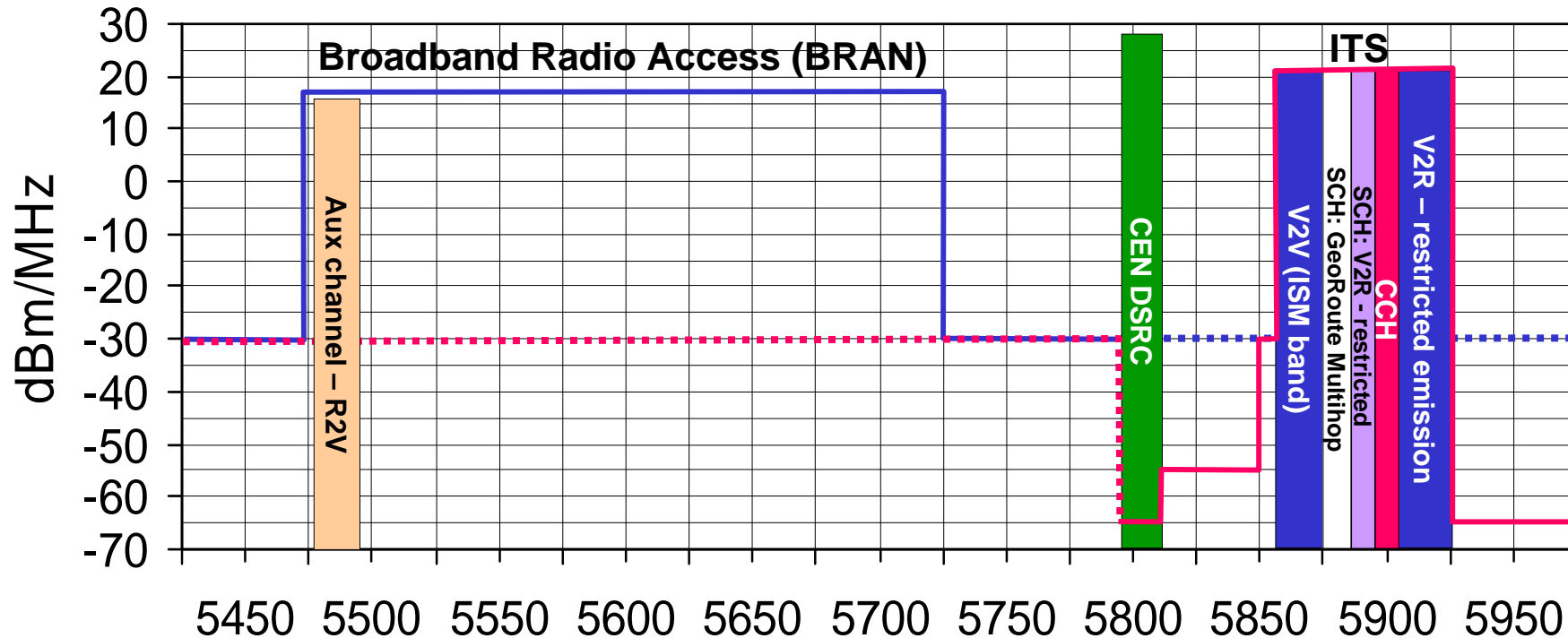
- Coordinator: **Fiat Research Centre**
- Total budget: €38 Million
- Consortium: 51 partners - 12 countries
- Focus: Safety – V2V low latency



- Coordinator: **Austria tech**
- Total budget: €16,8 Million
- Consortium: 37 partners - 14 countries
- Focus: Roadside / Infrastructure

- **There are 10 more projects starting to use CVIS/CALM platform**
- **And you can see the reality of this in the demos outside!**

European Spectrum



- Common Control Channel, Broadcast data, 10MHz@5900 (ch180) (Used by all)**
- Service Channel: GeoRoute multihopping, 10MHz@5880 (ch176) (Safespot/C2C-CC)
- Aux Channel for roadside initiated data, 20MHz @5480+ (ch96) (CVIS/COOPERS)
- Vehicle-Roadside data, 10MHz@5890 (ch178) (Safespot/C2C-CC, not used initially)

NOTE:
Channel use only valid for test period!

Blue line represent European spectrum mask for BRAN (conditional use for ITS)

Red line represents European spectrum mask for ITS 5.9



Conclusion

- **Differences between C2C-CC, CALM and IEEE are mainly fixed and joint comms architecture is stable**
 - **Further partitioning under discussion**
- **All basic comms test standards completed 2007/2008**
 - **Validated 2008-2009 by CVIS, SAFESPOT, VII and other projects – Very good results**
- **Feedback to permanent standards 2009-2010**
 - **Joint work between ISO, CEN, IEEE, ETSI, IETF and R&D**

CALM is ready for deployment now!





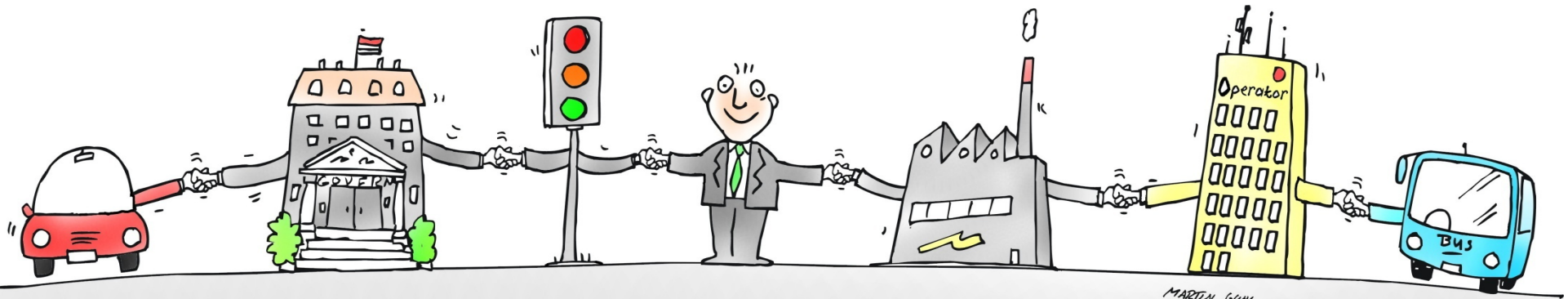
Thanks for your attention...

Knut Evensen

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www.cvisproject.org

www.calm.hu



MARTIN GÜHL