



kapsch >>>
challenging limits

Kapsch TrafficCom

Proyecto Eco-AT

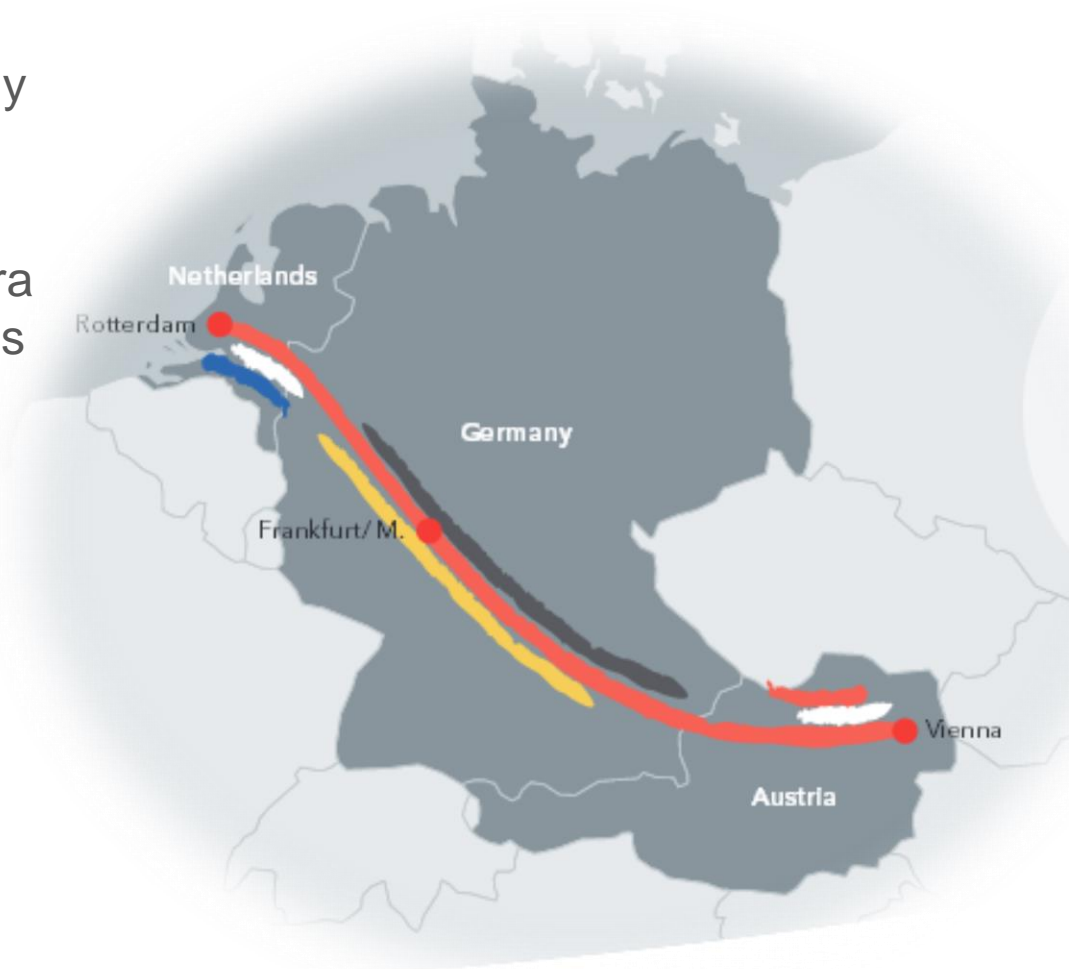
ITS Catalunya

C-ITS Corridor NL-DE-AT



Proporcionar una base para servicios ITS cooperativos estandarizados, internacionales y orientados al futuro

- Una hoja de ruta conjunta para la introducción de los primeros servicios ITS cooperativos
- Descripción funcional común para Servicios C-ITS y especificaciones técnicas
- Implementación real de los servicios C-ITS



European Corridor – Austrian Testbed for Cooperative Systems



- ECo-AT es el proyecto austriaco para crear aplicaciones C-ITS armonizadas y estandarizadas conjuntamente con socios en Alemania y Holanda
- El Proyecto está liderado por el operador austriaco ASFINAG
- Project partners:



ECo-AT: Objetivos del proyecto



- Reducir el espacio entre el I+D y la aplicación para un despliegue armonizado de C-ITS en el corredor
 - Definir, en cooperación con partners de la industria, todos los elementos en la cadena de valor para C-ITS
 - Adaptar los productos de partners industriales y los procedimientos internos de ASFINAG
 - Probar el Sistema en un entorno real 'living lab'
 - Desplegar servicios 'Day One' en un corredor en Austria

ECo-AT: puntos clave

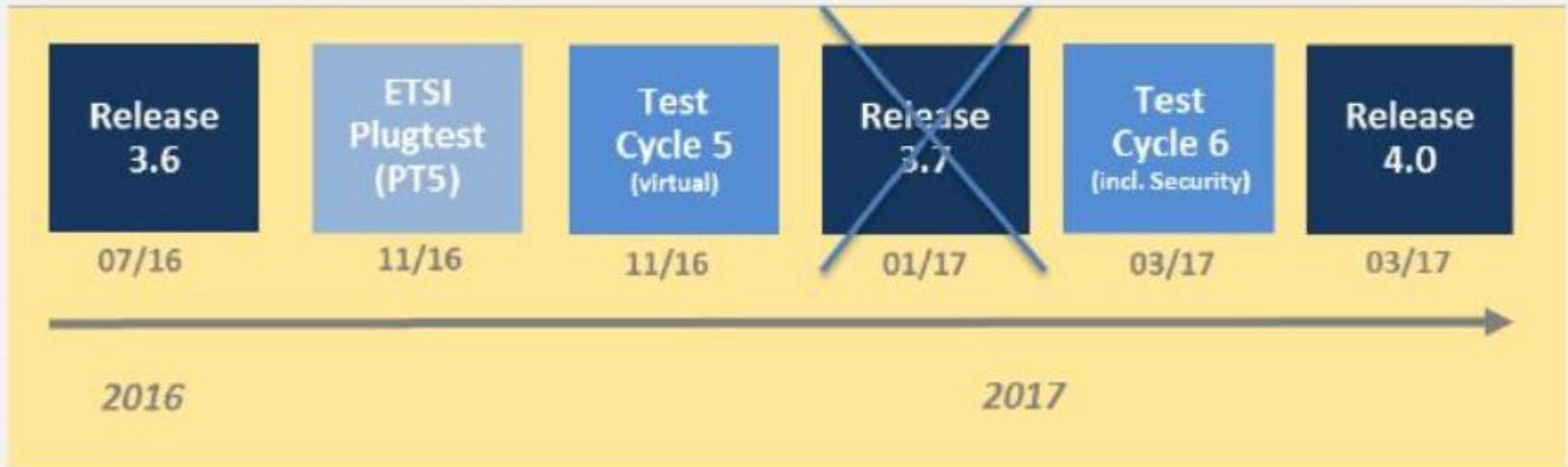


- Casos de uso
- Roles & Responsabilidades
- Arquitectura del Sistema en toda su vertical
- Central ITS station (C-ITS-S)
- Roadside ITS station (R-ITS-S)
- Seguridad
- Co-Existence (5,8 / 5,9 GHz)
- Convergencia (5,9 GHz con cellular systems)
- Upwards Compatibility
- Definición y despliegue de 'Living Lab'
- Pruebas de conformidad
- Puesta en marcha y operación

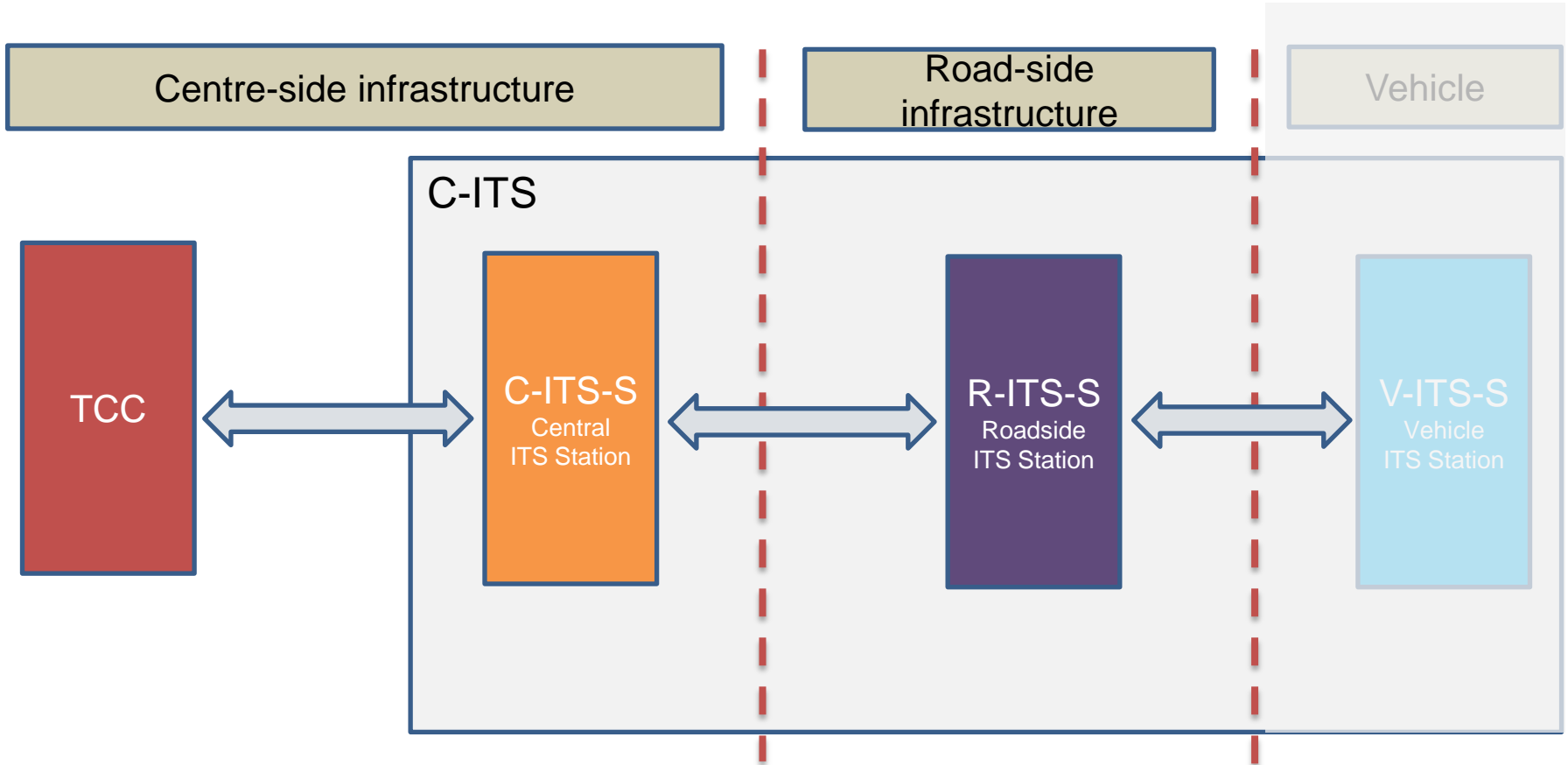
Progreso del proyecto



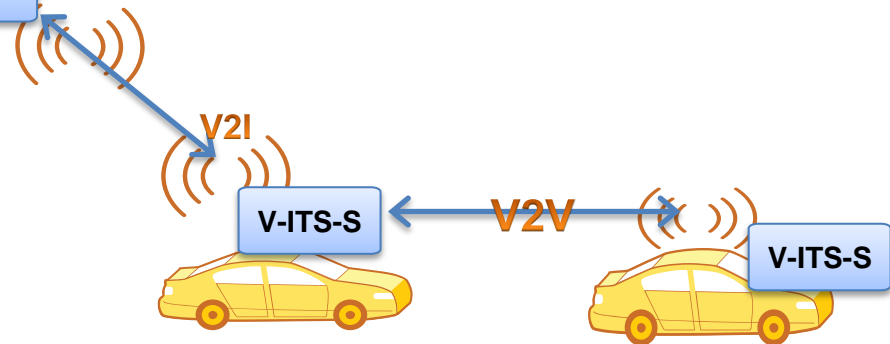
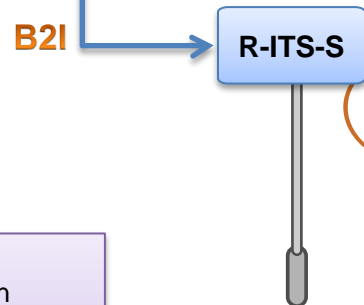
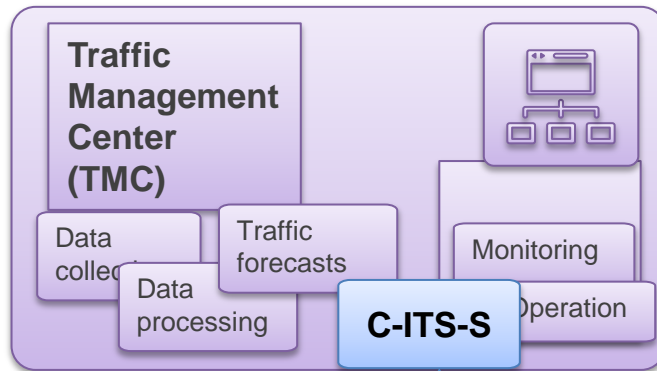
ECo-AT Phase 1+



System Architecture

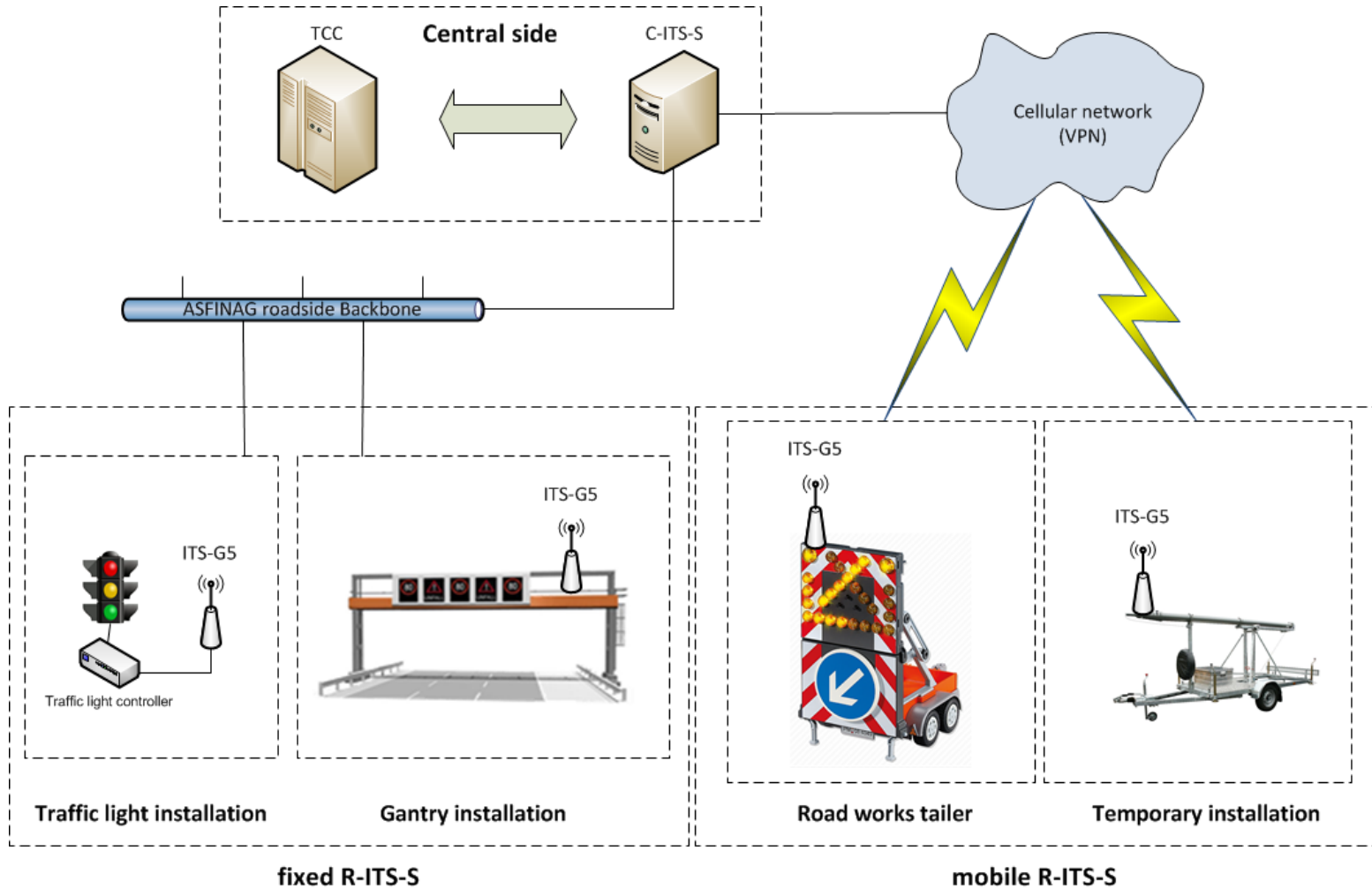


Integración de C-ITS-S en TMC

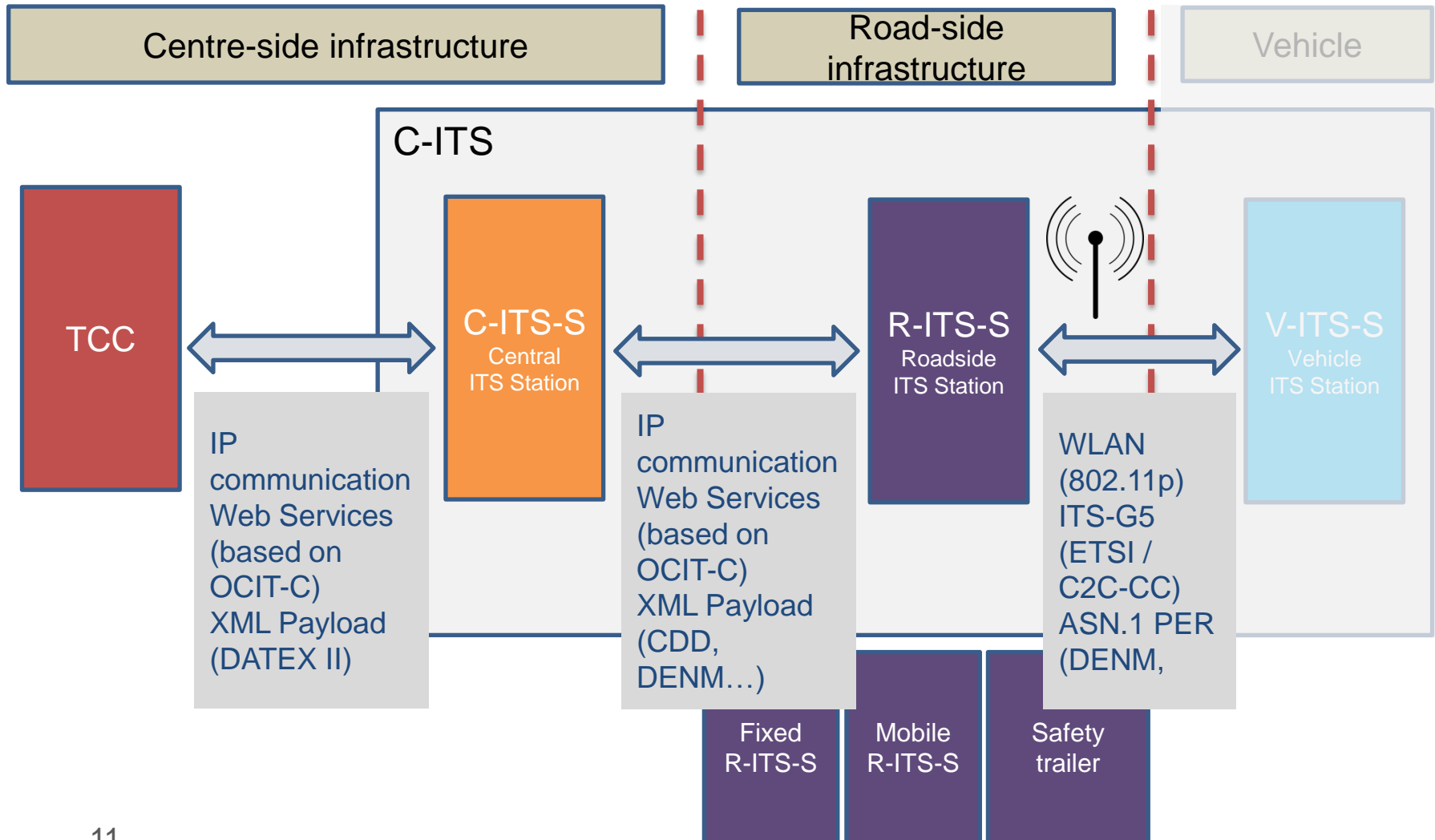


C-ITS-S	Central ITS Station
R-ITS-S	RoadSide ITS Station
I-ITS-S	In-vehicle ITS Station
V2I	Vehicle to Infrastructure
V2V	Vehicle to Vehicle
B2I	Back Office to Infrastructure

Type of R-ITS-S



Communication Model in ECo-AT



C-ITS tipos de mensajes

Cooperative awareness message
periodical triggered

CAM

vehicle information:
location, speed, heading,
station type, exterior lights, ...



In-vehicle information
information triggered

IVI

road information:
fixed road signs, dynamic
message signs, text, ...



Decentralized environmental notification message
event triggered

DENM

event information:
type (e.g. RW, accident, adverse
weather), location, duration, ...



Signal phase and timing / map
periodical triggered

SPaT / MAP

traffic light information:
signal phase, timing,
road topology, ...



ECo-AT: Casos de uso



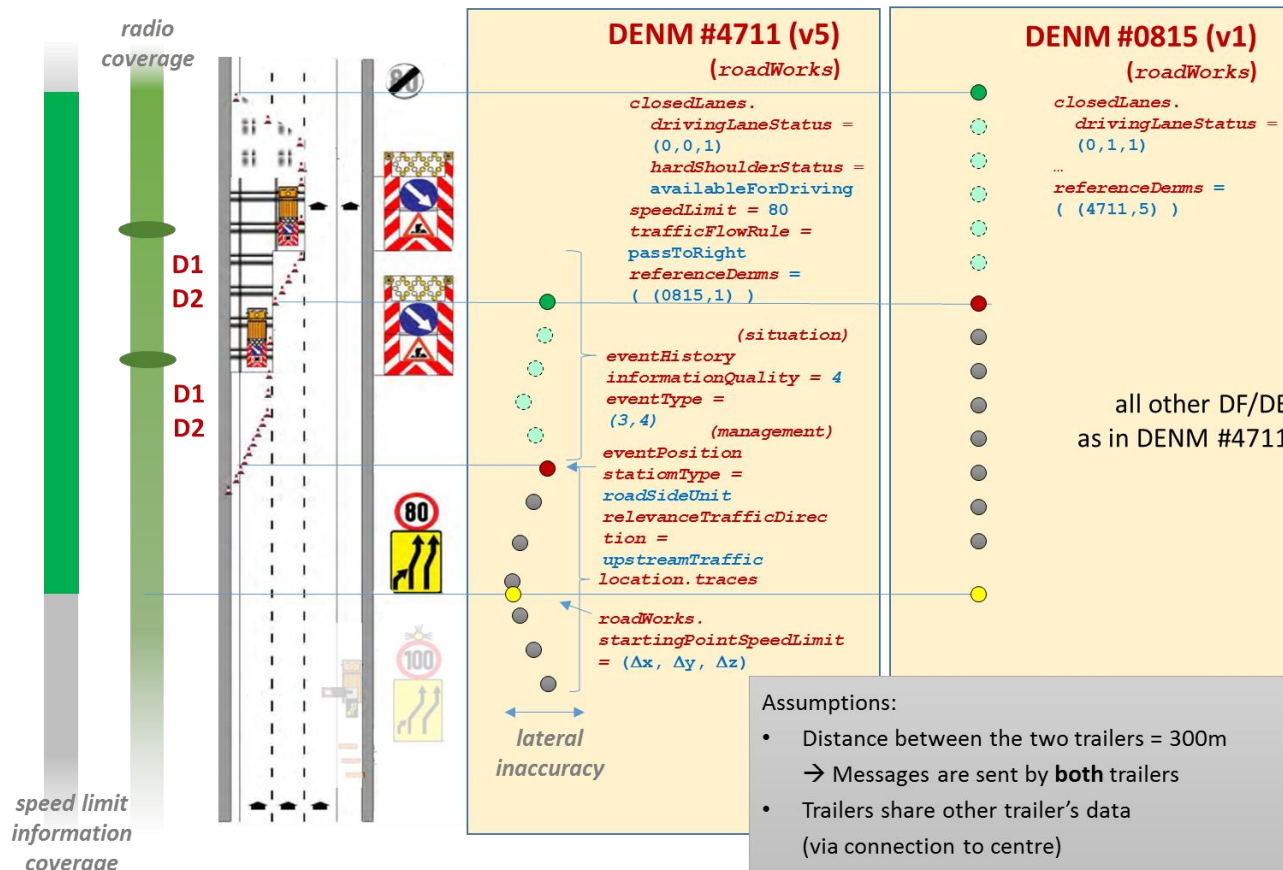
- Road works warning (RWW)
 - Probe vehicle data (PVD) / CAM aggregation
 - In-vehicle information (IVI)
 - Intersection safety (ISS)
 - Otras aplicaciones DENM
- } C-ITS Corridor
- } ECo-AT / Austria

ECo-AT: Casos de uso

Road Works Warning (RWW)



Suministro de avisos de obras en la vía en entornos interurbanos

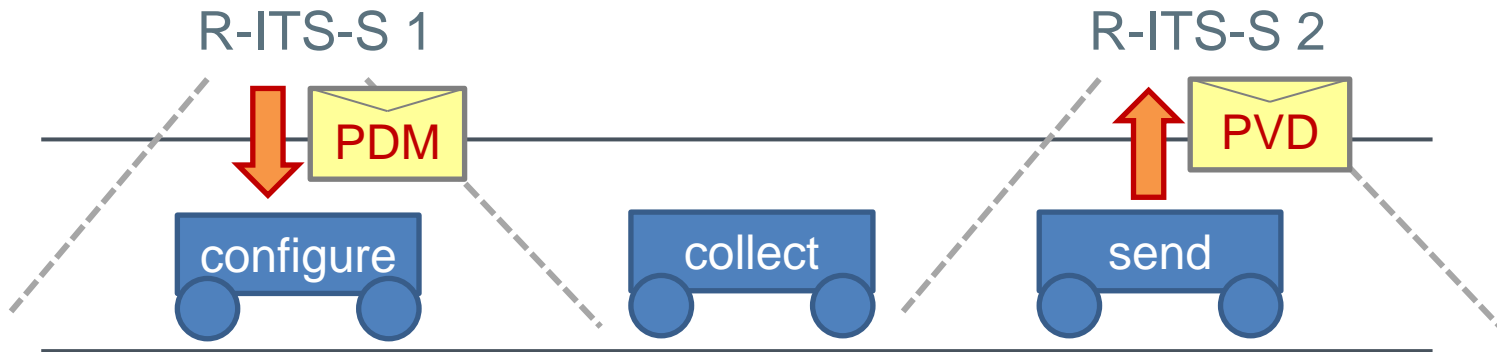


ECo-AT: Casos de uso

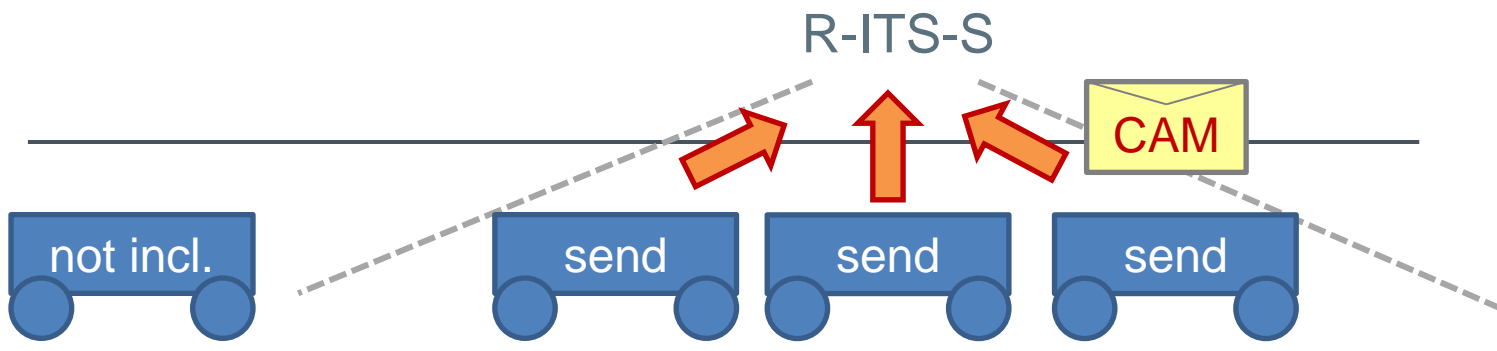
CAM Aggregation



PVD (Day 2)



Basic PVD method for Day 1: CAM aggregation



ECo-AT: Casos de uso

In-vehicle Information (IVI)

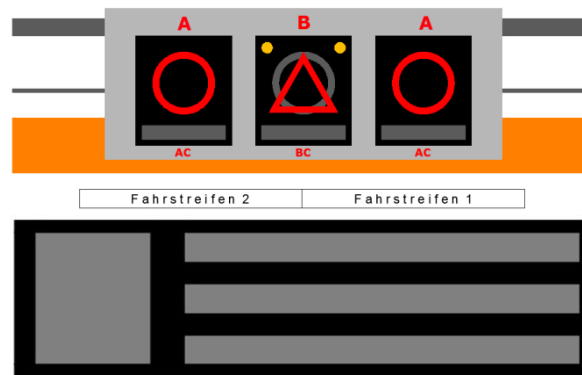


Suministro de señalización estática a los vehículos en entornos interurbanos

Static road sign



Variable message signs (VMS)



Variable direction signs (VDS)



Variable text panels (VTP)

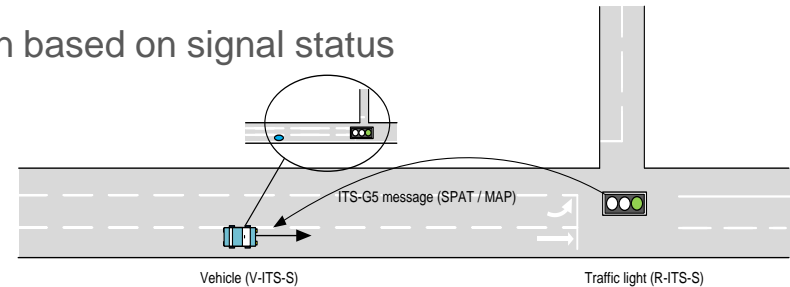
ECo-AT: Casos de uso

Intersection Safety (ISS)

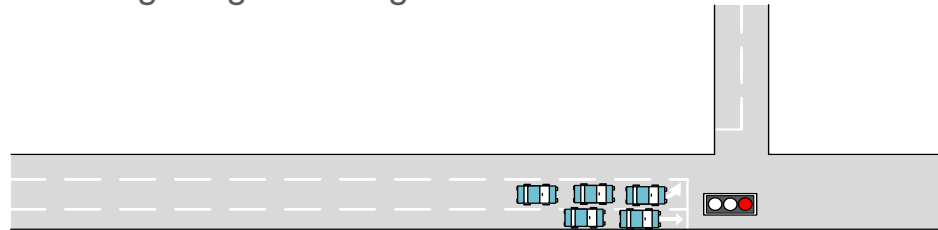


Introduce también casos de uso 'Day one' para entornos urbanos

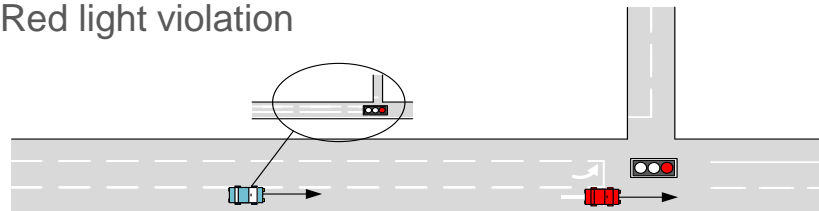
- Vehicle speed optimization approaching an intersection based on signal status



- Fast clearing of intersection due to traffic light signal change



- Red light violation



ECo-AT: Casos de uso

Otras aplicaciones DENM



Suministro/recogida de información de eventos/incidentes a/desde los vehículos

UseCases from [ETSI-BSA] clause 4.1	events	UseCases from [ETSI-BSA] clause 4.1	events	
UC006 Wrong way driving warning	vehicle on wrong carriageway	UC009 Traffic condition warning	danger of ice	
UC008 Stationary vehicle - vehicle problem	broken down vehicle(s)		snowfall	
	broken down heavy lorr(y/ies)		dense fog	
UC009 Traffic condition warning	abnormal load(s)		heavy rain	
	accident		hazardous driving conditions	
	secondary accident		overheight warning system triggered	
	multi-vehicle accident		bridge maintenance work	
	accident involving bus(es)		vehicle fire(s)	
	accident involving heavy lorr(y/ies)		avalanches, danger	
	accident(s) involving hazardous materials		people on roadway	
	shed load(s)		accident(s) in roadworks area	
	serious accident(s)		stationary traffic due to X earlier accident(s)	
	stationary traffic		slow traffic due to X earlier accident(s)	
	slow traffic		accident cleared	
	roadworks, stationary traffic		all accidents cleared, no problems to report	
roadworks, slow traffic	rescue and recovery work in progress			
black ice				
			UC011 Roadwork warning	maintenance work

ITS-G5 : beneficios



- Comunicaciones de corto alcance
 - Los mensajes pueden ser distribuidos en el área de localización del evento
 - Soporte para broadcast
 - No se requiere información sobre la ubicación del vehículo
 - Sin costes (canales ITS-G5 sin costes asociados C-ITS)
 - Comunicación vehicle-to-vehicle (V2V) y vehicle-to-infrastructure (V2I)
 - Baja latencia (requerido para determinados casos de uso)
-
- **EU: ITS G5 Standard (ETSI)**
 - **USA: WAVE Standard (IEEE 802.11p)**

ITS-G5 : beneficios

WWAN (UMTS, HSPA, LTE) > 1000 metros

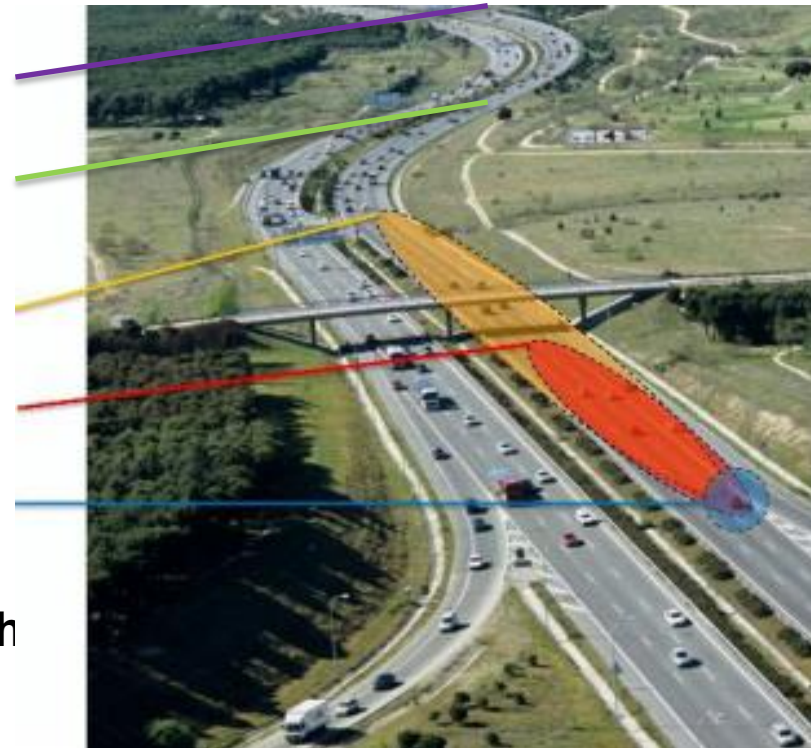
V2X (IEEE 802.11p, DSRC) < 1000 metros NLOS

Radar (200 metros)

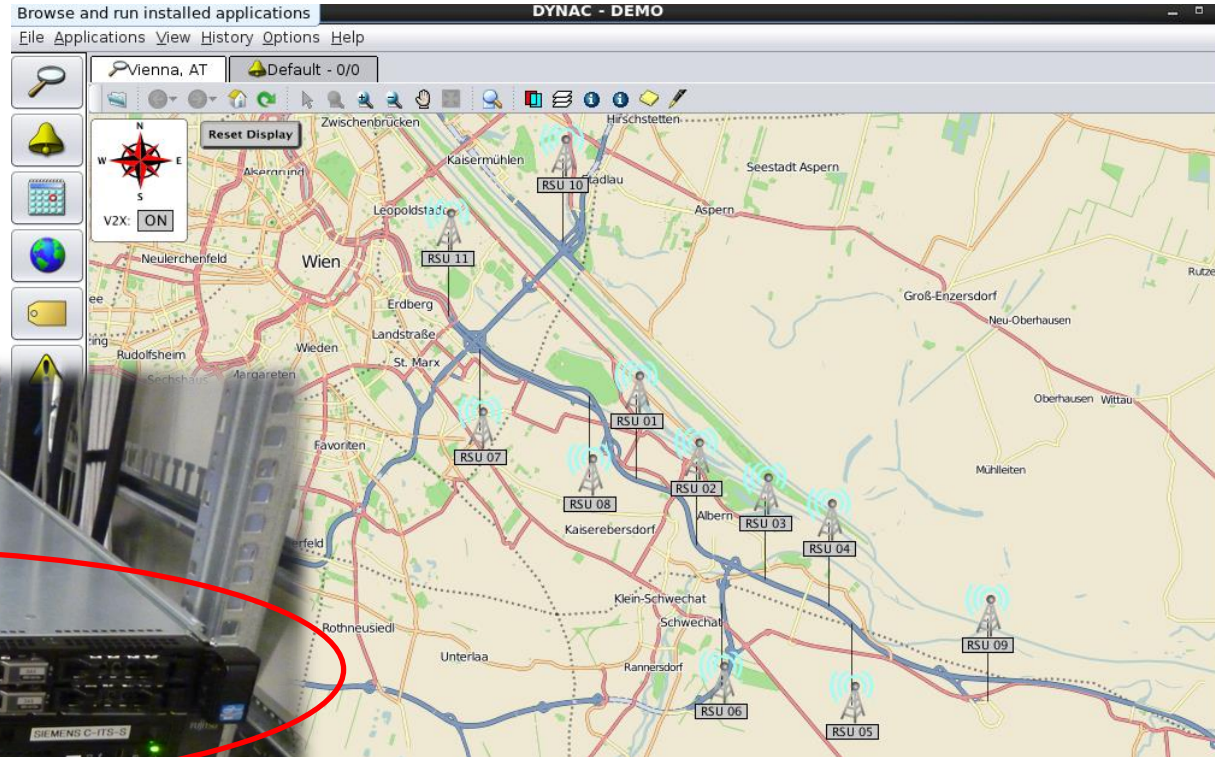
Camara (80 metros)

Ultrasonic (4 metros)

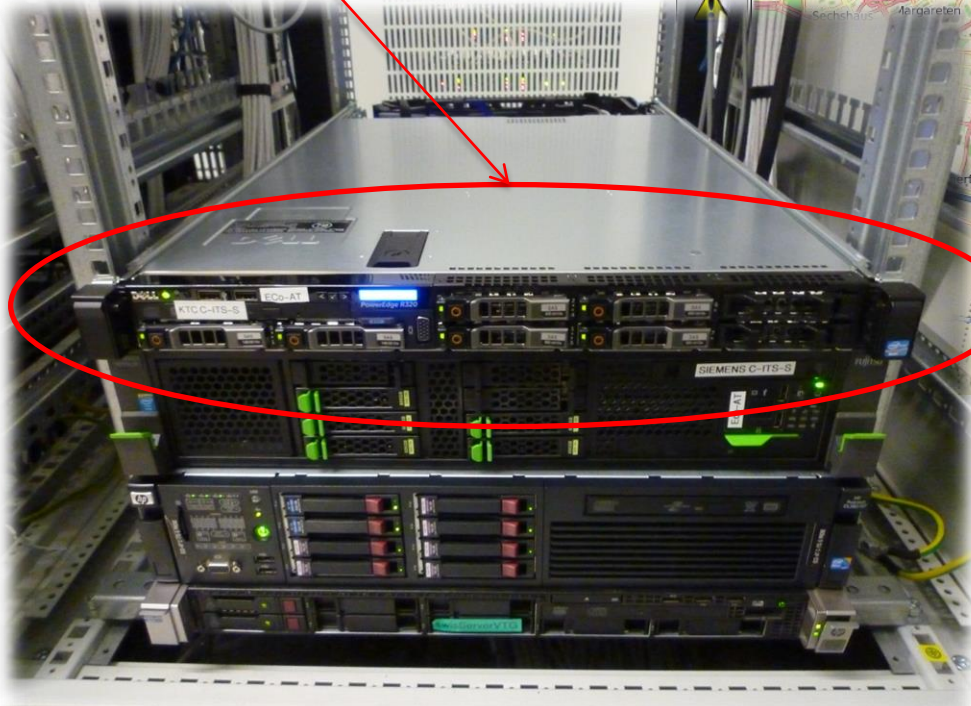
“provides safety beyond the line of sight with zero latency broadcasting technology”



Kapsch C-ITS-S



KTC C-ITS-S server

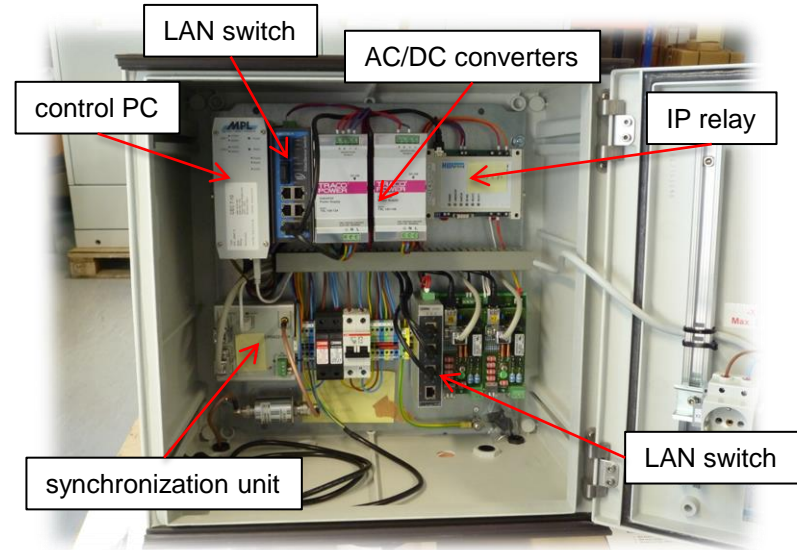


Kapsch C-ITS-S GUI

Kapsch R-ITS-S



- ITS-G5 transceiver
- 2 antenas direccionales
- Sincronización GPS
- Gestión remota via LAN



directional antenna



GPS antenna

TRX 9450

Kapsch C-ITS Components



- R-ITS-S
- MTX-9450



- R-ITS-S
- 5.9



- V-ITS-S
- TS3306



- V-ITS-S
- EVK-3300



- In-vehicle setup



Bluetooth



KTC C-ITS Demo



V2X:
V2X applications for traffic safety and real-time traffic control.

***Traffic Management
and Connected Cars.***

“Connected Vehicle”



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Gracies!

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