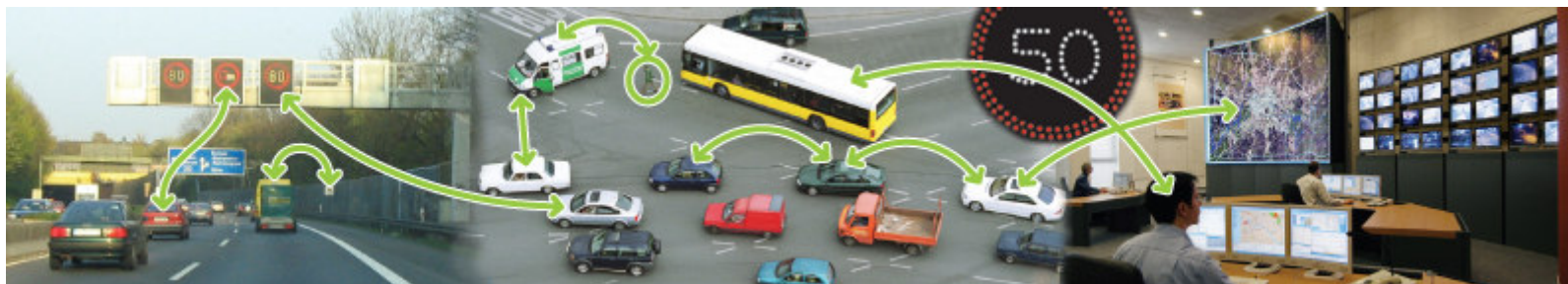




**VOLVO**

# Cooperative Freight & Fleet Applications

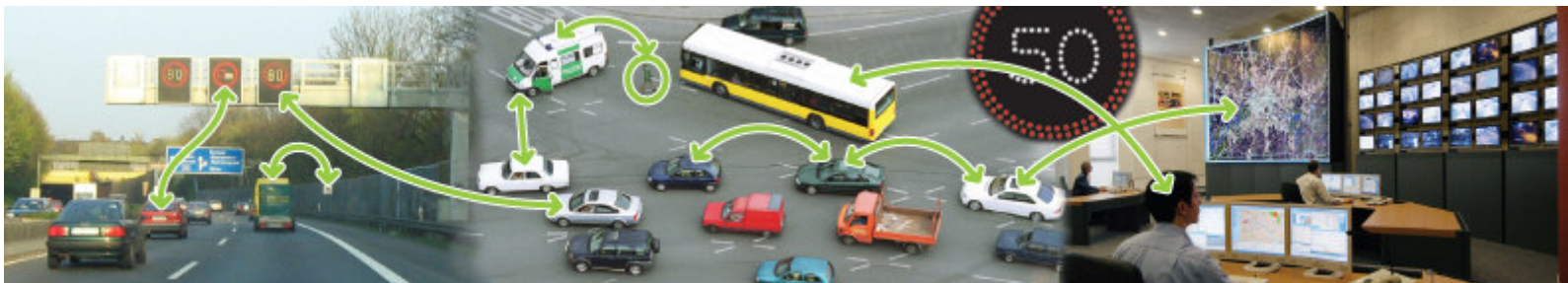
Niclas Nygren  
Volvo Technology





# Break-out session Cooperative Freight & Fleet

October 19, 2006





# Workshop Agenda

## *Day 2 – Thursday 19 October*

### **09:00 – 12:30 Requirement validation – Breakout sessions**

- Communication/network (AK)
- Positioning/maps/location referencing (BS)
- Open application/service management (AS) + Cooperative monitoring (PM)
- Urban + Interurban applications (SH/FvW, ZJ)
- Freight & fleet applications (NN)

### **12:30 – 14:00 LUNCH**

### **14:00 – 16:00 Closing Session (PK)**

- Breakout session summaries (Session rapporteurs)
- Requirement validation (discussion PK/ZJ + guests)
- Conclusion & next steps (PK): Next Forum open workshop suggested for April 2007, presentation of CVIS architecture, cooperative system validation, deployment enabling issues





# Aims of breakout sessions



- Validate CVIS use cases & requirements
- Agree basis for CVIS work on architecture, system specifications
- Initiate discussion with wider stakeholder community – identify interested members
- Raise questions to be answered within the project



# Breakout session approach



- Short sub-project overview
- Review user needs
- Review use cases
- Review system requirements
  - Which are the **most important** to satisfy???
  - Are they **complete**? any **missing**?
  - Are they **feasible**? **affordable**?  
**implementable**?
  - Do they **reflect the user needs**?
  - Do they **conflict** with other requirements?



# Breakout session summary



- How was the discussion?
- Which are the highest priority user needs/ use cases/requirements?
- Which use cases/requirements are not feasible?
- Has CVIS “got it right”? if not, how?
- Do we need more input to the process? from whom? how?



# Topics for Freight and Fleet

- **Dangerous goods monitoring & route guidance**
- **Parking Zones reservation**
- **Access Control in sensitive areas**





# User Needs Dangerous Goods



- Road Operator: Dangerous goods transportation needs to be directed onto suitable and safe roads.
- Road Operator: Needs to monitor whole trip in order to react quickly in case of changing traffic situations.
- Road Operator: The monitoring of dangerous goods transports must be handed over efficiently between various regions
- Road Operator: Enforcement of regulations must be efficient (selected road, legal speed, educated driver)
- Road Operator: Need to change network in case of accident
- Driver: Driver wants to have driving guidance at all times: updated route recommendation, suggestion of route change or parking areas in case of accident, fog, snow, ...
- Fleet Operator: The Fleet manager needs an always updated preferred network for DGs in order to perform pre-tip route optimisation and/or real-time monitoring
- Emergency Rescue operator / Traffic Police: In case of an accident, the emergency rescue services need information about DG accident (position, kind of DG, condition, surrounding traffic situation) to perform a timely and well-equipped rescue, as well as securing the vehicle/goods.



# User Needs Parking Zones



- The Road Operator needs to be able to manage the competing demands for street space and resting areas, to ensure efficient routing of freight vehicles and to reduce congestion around scarce parking resources.
- Road Operators and Parking Zone Operators need to ensure that no vehicles park in unsafe / illegal areas.
- The Parking Zone Operator needs information about the vehicles position and ETA to maximise the use of the Parking Zone
- Enforcement Operators need to be able to clearly identify legally parked vehicles
- Fleet managers and Drivers need to be able to request a Parking Zone of the appropriate type / size, near the required location and at the required time for a required duration.
- The Driver needs local micro-routing information for guidance to the Parking Zone and / or a Holding Zone.
- Goods receivers in cities need reliable and predictable deliveries



# User Needs Access Control



- Public Authorities want to define sensitive zones by issuing specific access policies in order to enhance the level of road safety in special situations by preserving the traffic efficiency and respecting the environment. Sensitive zones might be special inner city areas (i.e. urban pedestrian areas, school and hospital surroundings,...), freight villages, ports, road sensitivity infrastructure (bridges, tunnels, ...). Public Authorities are required to publish the access rules and the restriction policy.
- Public Authorities need to have access to suitable tools for the enforcement of the published access rules to restricted/dangerous areas
- Road Operators need to monitor vehicles and collect information on vehicles type, size, weight, status, condition and driving style in order to properly manage and grant access to critical areas. Suitable tools for enforcement must be made available.
- Driver needs to know the regulations in the area, the rules for entering the restricted area.
- Fleet Operators need to know the regulations and the rules for entering the zone in order to plan the route or to re-route, in case of access denial by the road operator.
- Fleet Operators need tools to show evidence of rule compliance



# Use Cases



- CV-UC-SP3.3-0101 DG vehicle route guidance including registration and deregistration
- CV-UC-SP3.3-0102 DG vehicles monitoring
- CV-UC-SP3.3-0103 DG vehicle hand-over
- CV-UC-SP3.3-0104 DG preferred network management
  
- CV-UC-SP3.3-0201 Urban Parking Zones
- CV-UC-SP3.3-0202 Highway Resting Areas
  
- CV-UC-SP3.3-0301 Approaching Access Control Area
- CV-UC-SP3.3-0302 Decision making and information feedback



# Use Case example 1



## CV-UC-SP3.3-0101 DG vehicle route guidance including registration and deregistration

- **Goal:** The goal of this use case is to provide a route guidance service to DG vehicles in order to ensure efficient and safe routes. DG vehicles need to register at the regional TMC/NSP (traffic management centre/navigation service provider) and are then guided by the TMC/NSP to their final destination. At their destinations DG vehicles are deregistered.
- **Actors:** Driver, vehicle, traffic management centre/navigation service provider (TMC/NSP) and traffic supervisor.



# Use Case example 1, main flow



1. The driver wants to start his journey and sends a request to the TMC/NSP asking to be guided to its next destination.
2. The request contains following information:
  - current position and destination,
  - vehicle characteristics,
  - goods characteristics,
  - driver characteristics.
3. A confirmation is sent from TMC/NSP to the vehicle. The vehicle (DG transport) is now registered and the navigation can start.
4. The DG vehicle is guided and routed by the TMC/NSP (this means there is a long distance communication between the vehicle and the TMC/NSP, and the driver is following the advice by the vehicle).
5. After reaching the final destination, the driver or the vehicle itself deregisters and the guidance and routing between the DG vehicle and the traffic management centre stops.



# Use Case example 2



## CV-UC-SP3.3-0201 Urban Parking Zones

- **Goal:** The goal with this Use Case is to support the driver, fleet manager and road operator (including parking zone operator) in the booking, monitoring and management of the urban parking zones for freight driver activities. These activities can be loading/unloading of both heavy vehicles and for parcel operators' smaller vehicles.
- For the road operator, it describes the possibility to optimise the management of parking zones through better knowledge of the delivery time period and duration in order to:
  - improve the flow of vehicles;
  - make better use of existing street space;
  - reduce congestion;
  - reduce urban environmental impacts;
  - collect information on parking usage, delivery frequency and other patterns, to support future planning.
- For the fleet operator, it describes the possibility to optimise the delivery time to its customer, reduce driver stress and anticipate congestions problem.
- **Actors:** Driver / Vehicles / Fleet operator / Road Operator incl. Parking Operator incl. Traffic management centre, Enforcement agency / Public Authority / Goods receiver (retailer)



# Use Case example 2, main flow



1. The Fleet operator plans the journey (including one or more deliveries for the vehicle). The loading/unloading information is prepared. The format of the request for a parking zone reservation and the fields associated with the request have to be defined. The request will include delivery time, delivery duration, vehicle type and any flexibility in the schedule.
2. All the requests (one or several) are sent to the Parking Operator.
3. The Parking Operator allocates some spaces and associated slots to the Fleet operator (that can be directly forwarded to the driver through its own fleet management system).
4. The vehicle approaches within a defined time/distance (e.g. 15 mins or 2km geofence) the urban parking zone. The ETA is calculated, using information from the Road Operator traffic management system and/or CVIS system. The Vehicle announces its ETA to the Parking Operator (vehicle's position and ETA can be updated regularly for better accuracy, in real time). The Parking Operator confirms the booking of the urban parking zone (and delivers any up to date micro-routing information if needed).
5. The vehicle arrives to the spot at the scheduled time and the Parking Operator allows the vehicle to park (activating access control / signage, if any).
6. The vehicle leaves the urban parking zone and reports to the Parking Operator that the bay is free.



# Requirements Dangerous Goods



- CVIS on board system is able to register/deregister at a TMC/NSP for DG monitoring and routing
- CVIS on board system is navigating the driver by following the preferred DG network as given by the TMC/NSP
- DG monitoring service is actively informing about important DG vehicles status changes (accident) and DG preferred network violations
- The TMC/NSP hands over the responsibility for DG vehicles crossing borders to neighbouring TMC/NSP
- Application for the traffic supervisor is able to edit and change the DG preferred network



# Requirements Parking Zones



- The Fleet Operator must have the ability to make requests for "Parking Slots", specifying the time of day required, the duration required, the type of vehicle to be used, and possible dangerous goods transported in a Parking Zone / premise
- The driver, during its trip must have the ability to make request for a "parking slot", specifying the vehicle type, the duration required, the time of day required, the delivery address/motorway section , and driving time remaining/ETA
- The Parking System must be able to process the parking request and to generate a list of possible parking zone with indication of available parking slot or an error response indicating that no Slot in the Parking Zone is available
- The Vehicle should identify when it is within a defined perimeter/ distance of the Parking Zone and inform the parking system
- On receiving a Vehicle ETA, the Parking System should determine if the Parking Zone is free at the given time
- The Vehicle should be able to process updated Parking or Holding Zone bookings and micro-routing information from the Parking System and present the information to the Driver
- The Parking System should identify the arrival of the Vehicle at the Parking Zone and activate any access mechanism to allow the Vehicle to park
- The Parking System should detect when the Vehicle leaves the Parking Zone and note that the Parking Zone is now free



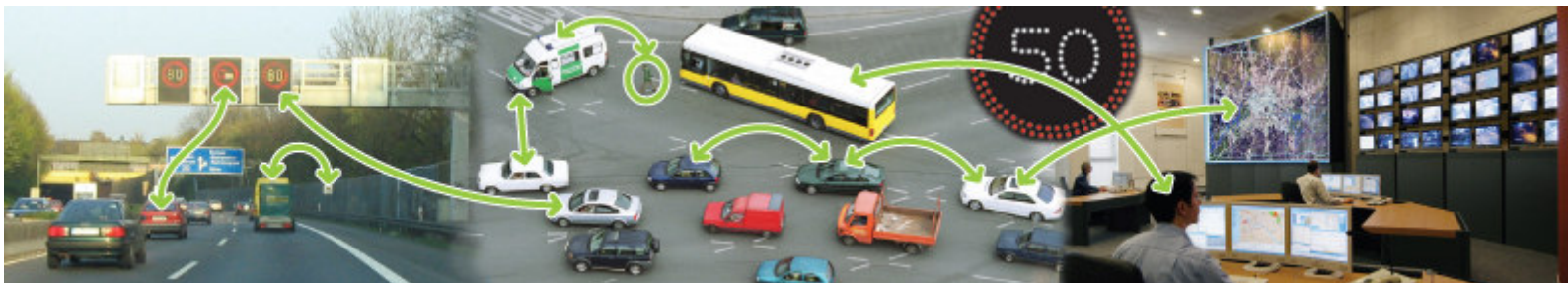
# Requirements Access Control



- CVIS on board system should be connected to OEM device/platform in order to acquire vehicle characteristics, operating data and diagnostic parameters
- The infrastructure near the monitoring zone should alert all approaching vehicles about the sensitive zone limits and characteristics
- The vehicle should transmit to the road side infrastructure the information on vehicle characteristics immediately when a vehicle approaches the monitoring area surrounding a sensitive zone



# Application details





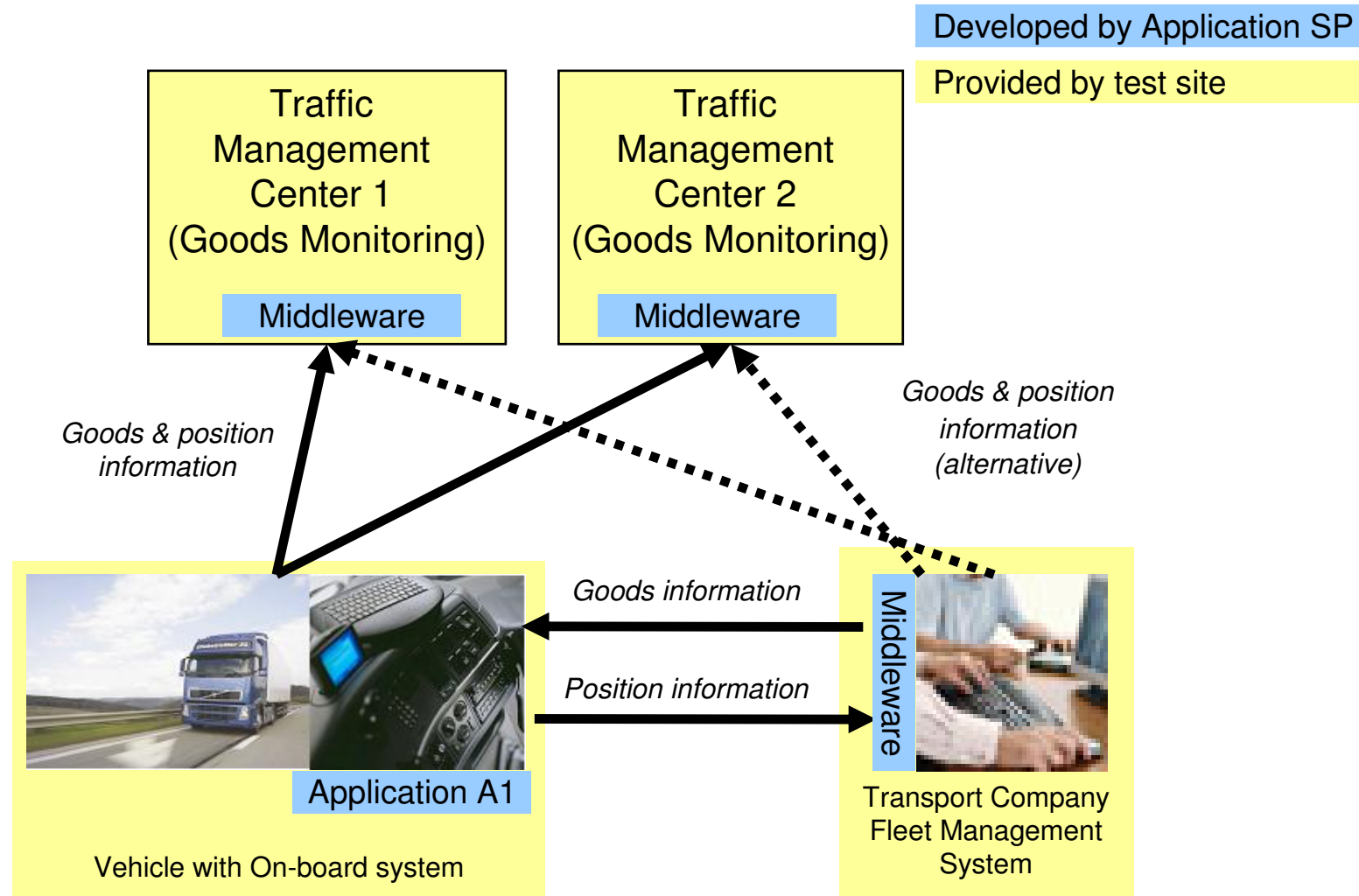
# Applications



- **Monitoring and guidance of dangerous goods**
  - Reporting and monitoring system, GIS-based
  - Handing over supervision responsibilities between regions and countries
  - Off-board route guidance, preferred dangerous goods road network defined by local authorities
  - Real-time Traffic Management influence over route choice
- **Urban loading zone and highway parking slot management**
  - Advanced booking
  - Monitoring availability, informing on delays
  - Local identification and access control (short range communication / physical barrier)
- **Access control to sensitive infrastructures**
  - Geofence / physical barrier
  - Identification of vehicles, allow or deny access
  - Driving style monitoring and driving style history evaluation

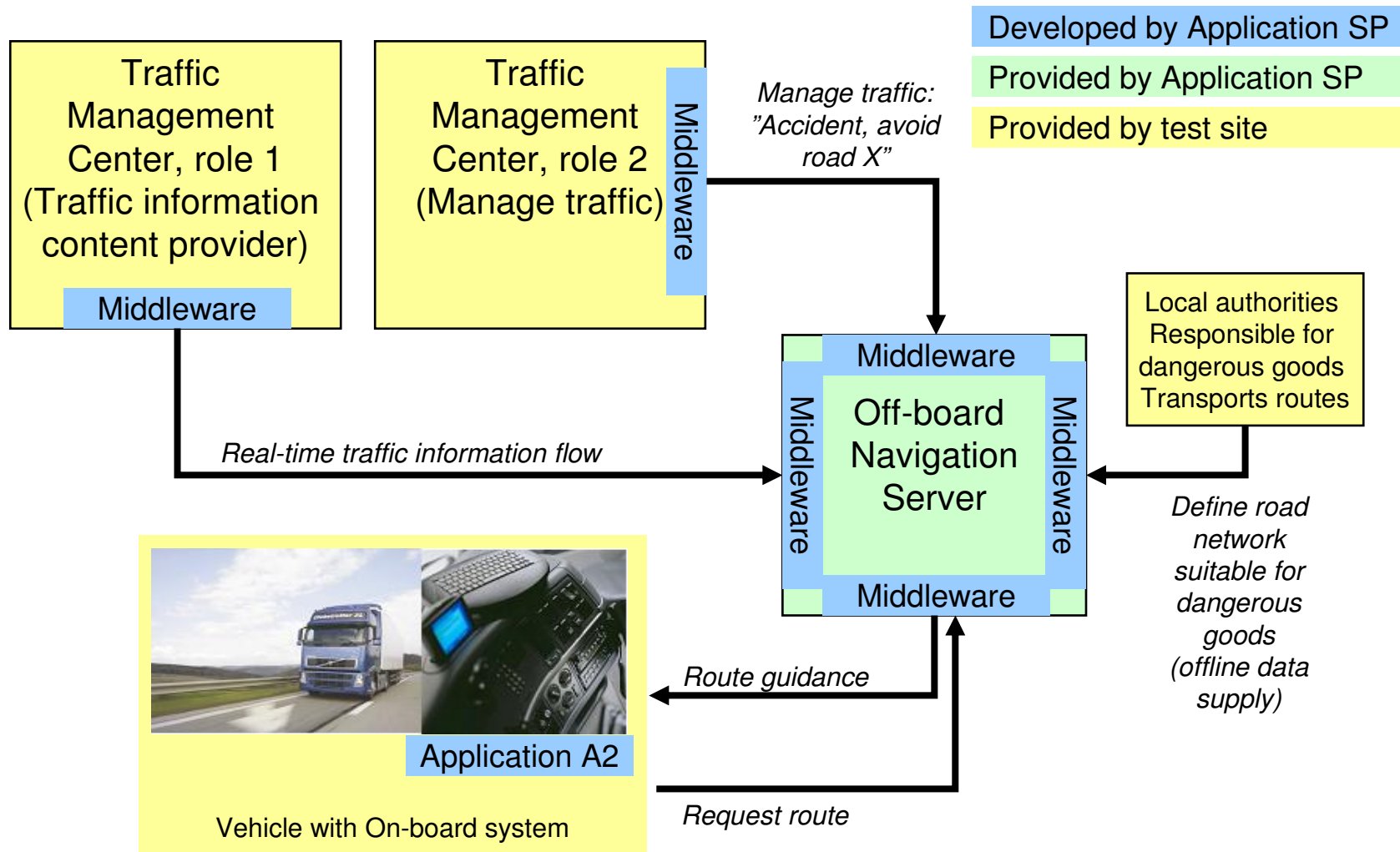


# Monitoring of dangerous goods



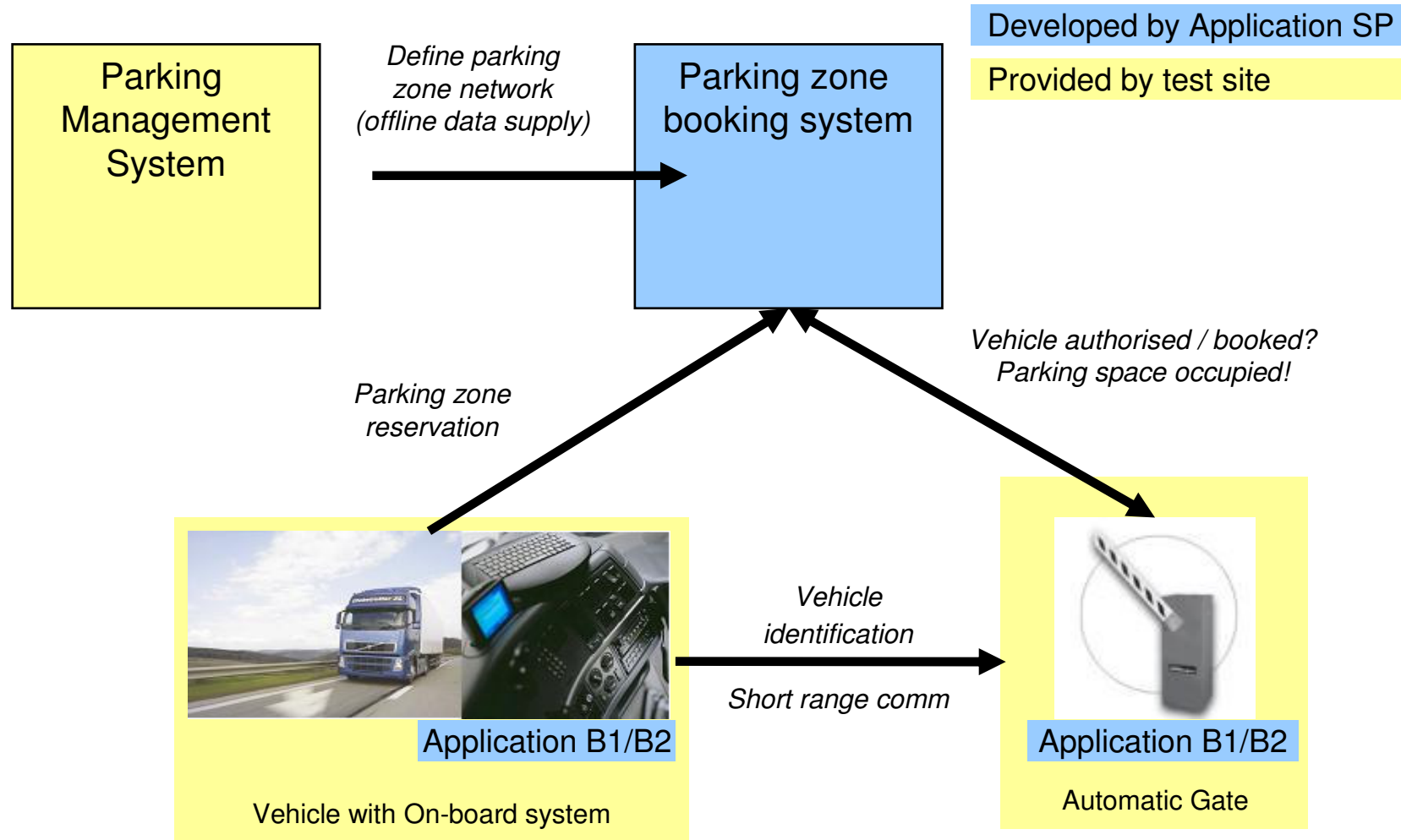


# Guidance of dangerous goods



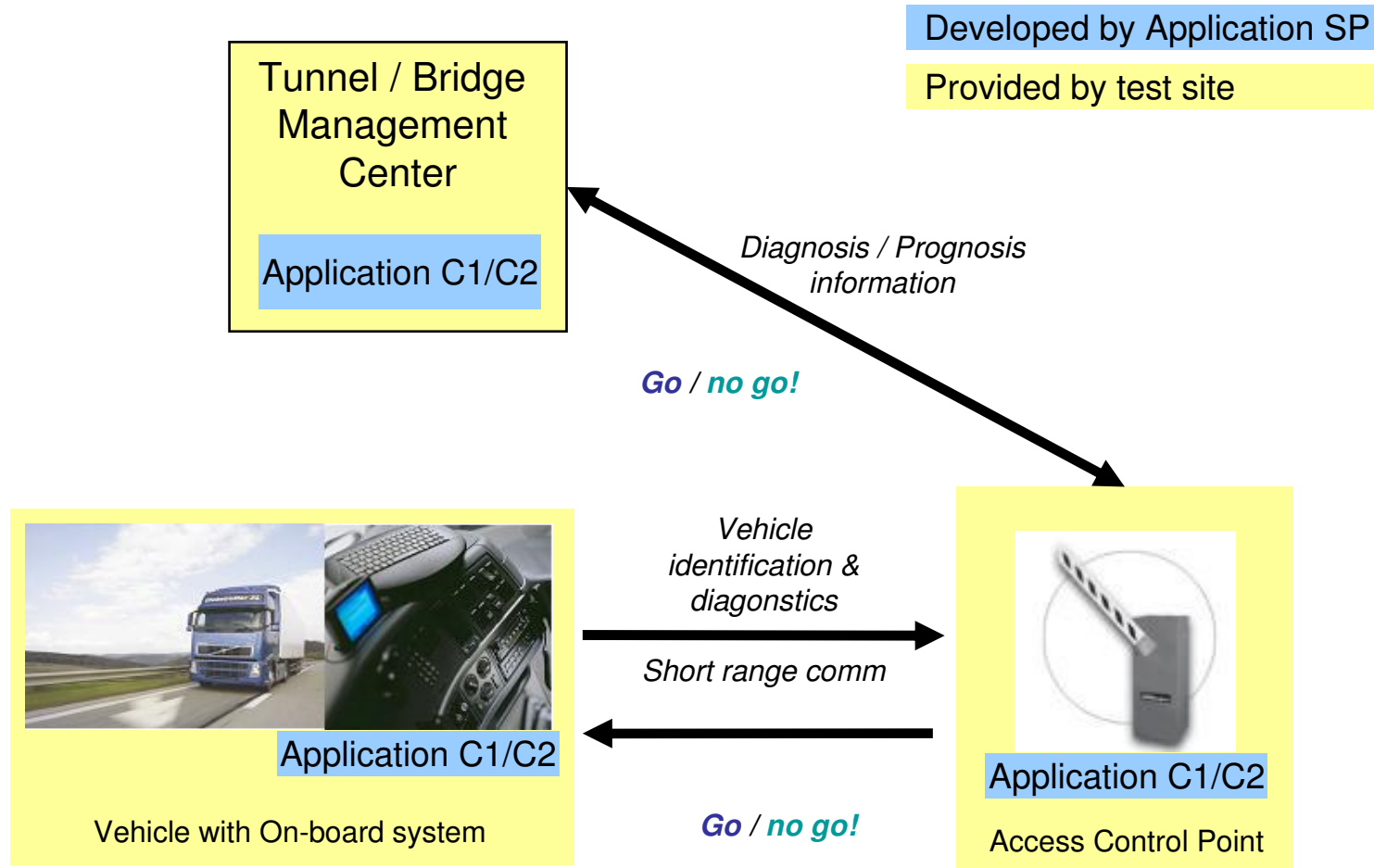


# Parking Zones





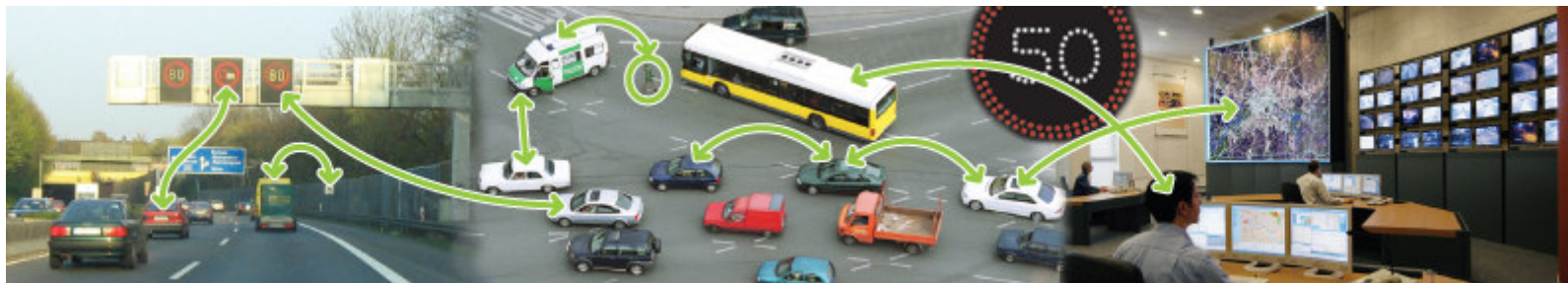
# Access control to sensitive infrastructures





# Comments from break-out session

*Only the User Needs for the three  
applications were discussed*





# User Needs

## Dangerous goods



- Some of the UN are really for the road authorities (public authorities) rather than the road operator (e.g. Cofiroute)
- Enforcement: road operator is not responsible for this.
- Enforcement: should be put "It must be possible to enforce..."
- Is there a user need for the road authorities / operators needing to know where are HGV are, in order to identify aggregation of vehicles of different goods types that might be dangerous to mix.
- User need: identify and enforce required escorting of a certain transport
- Security is important, shall we have a security User Need here or on an IP level?
- Definition of Dangerous Goods and what CF&F is restricting our work to (not dangerous prisoners, not "oversized transports")
- Is there a need to inform all monitoring centers about the final destination? Shall it be possible to make a late decision about this (route choice), or just informing the monitoring center about point of exit from his area? (Alexander, AustriaTech)
- Security / integrity of the data content (e.g. only the fleet manager / driver can receive certain information, information must not be tapped or distorted)



# User Needs Parking Zones



- A Parking Zone Operator also needs to know the vehicle size in order to assess the possibility of entering / fitting in a certain parking zone.
- Links to tachograph information; working time left, driving time left in relation to ETA and planned duration of stay in the parking zone.
- "Road Operators and Parking Zone Operators need to ensure that no vehicles park in unsafe / illegal areas.": ensure =>
- control
- Give information on ETA also to the goods receivers.
- Modal shift scenario: e.g. synchronise boat/train arrival with truck arrival to a modal shift point.
- Add acceptable / preferred price of parking as a parameter when booking a highway rest area.



# User Needs Access Control



- Is the monitoring of condition and driving style really needed? And by Road operator? Yes, Safetunnel, Alcolock etc. No, not road operator, more Public Authorities / Traffic Police?
- Who is responsible for allowing vehicles onto the road network and detect vehicles / drivers violating the rules? Road authorities? Road operators?
- Security issues
- The first use case "Public Authorities want to define sensitive zones by issuing specific access policies..." is too long and in the form of an aspiration. Needs to be broken down into several User Needs and re-phrased.