

# CZECH ITS 2020 Vision

## Current stage and future development of ITS in the Czech Republic



### Roman Srp

presentation associated to the EU-00722 technical paper  
at 19<sup>th</sup> ITS World Congress

## Contents

- Preconditions of the right future transport development
- ITS and “its” potential
- ITS in the CZ, topical questions and problems
- User’s approach to ITS:
  - ITS on Czech D1 highway by the eyes of users
- Easyway list of ITS services for the EU core network as an inspiration

## IRE (Institute of Radio Engineers)

in 1962 on traffic in 2012:

Cars do not run on gasoline but on electricity,  
because there is more oil on the planet.

Cars have their own communication system,  
so they do not need such as brake lights.

Drivers do not need to drive:  
precision satellite navigation system leads cars in  
streets.

*Aktualne.cz, 01/05/2012, Zuzana Kleknerová*

Rok 2912







D1 , Humpolec, accident

**CZ in 2012 ...  
Future  
development?  
= 4 major aspects**



Praha, busy hours

# 1 / 4 Evolution of clean vehicles

Škoda Octavia Green E Line, 115 HP, in 2011



Škoda 15T, traction vehicle, 980 HP, in 2010



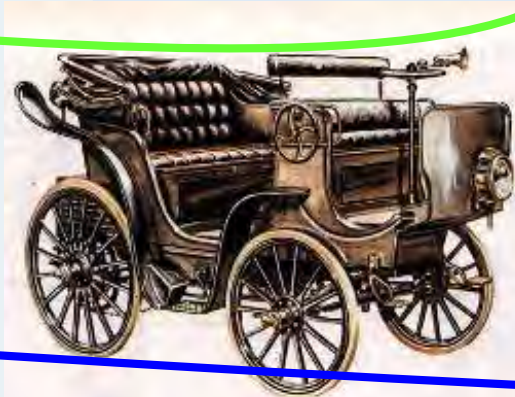
Segway, in 2010, 4 HP



před in 1900, 2 HP, horse + el. lightning



Křižík electrovehicle, 5 HP, in 1900



Ford Model T, combustion engine, 20 HP, in 1910





Politics,  
Directives,  
Norms

Interactions  
with cities,  
multimodality

Economy  
competitiveness

Infrastructure  
planning  
(range,  
density)

2 / 4

Safety of  
transport

Planning & deployment  
Smart & Safe  
Infrastructure & Services

Environmental  
friendly

Financing

Construction,  
grounds,  
estate  
preparation

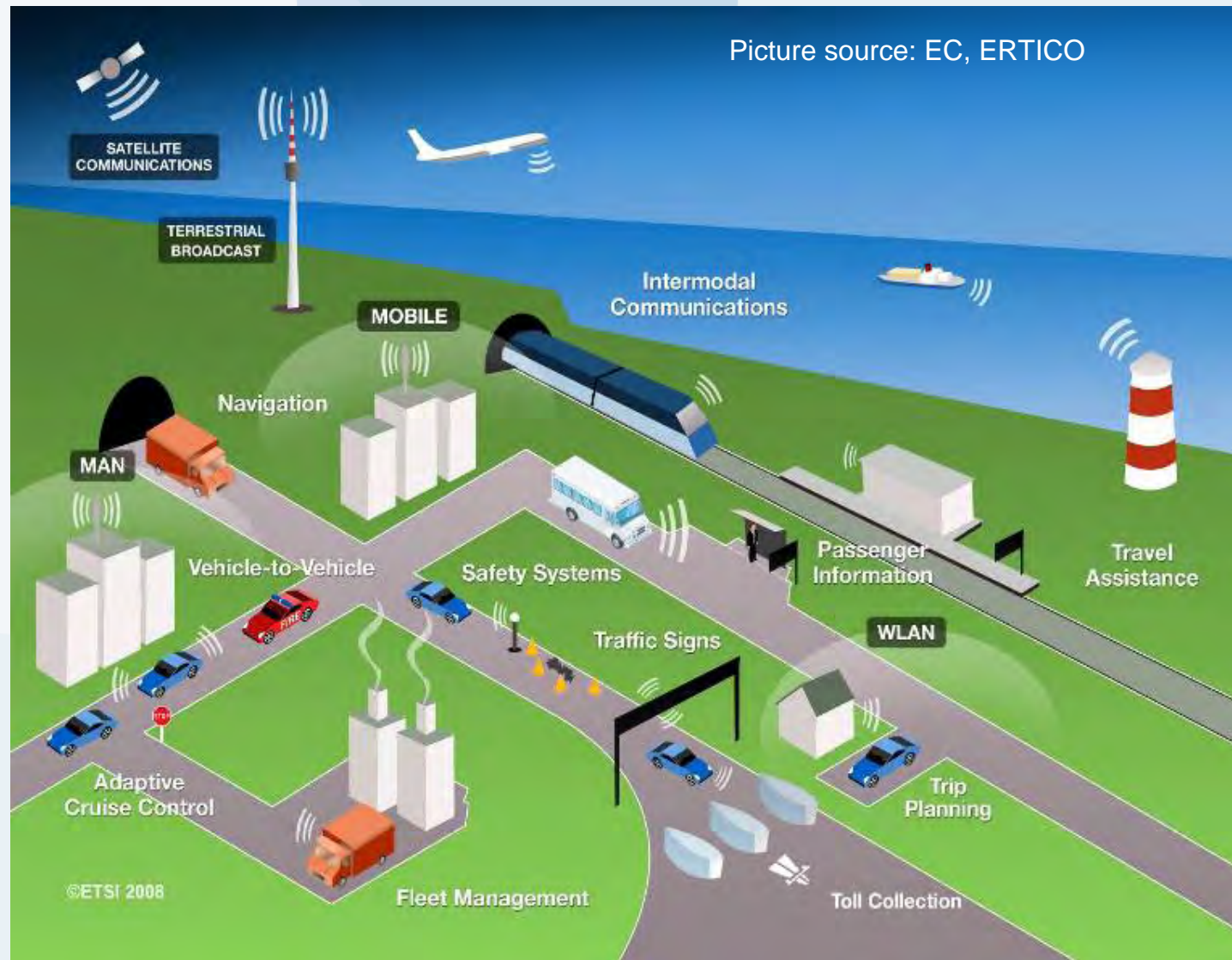
Military  
interest,  
disaster  
management

Energy, related  
safety, security

# 3 / 4 Changing citizens and users behavior



# 4 / 4 Intelligent Transport Systems & Services





# Transport telematics (ITS)

## acc. ITS&S

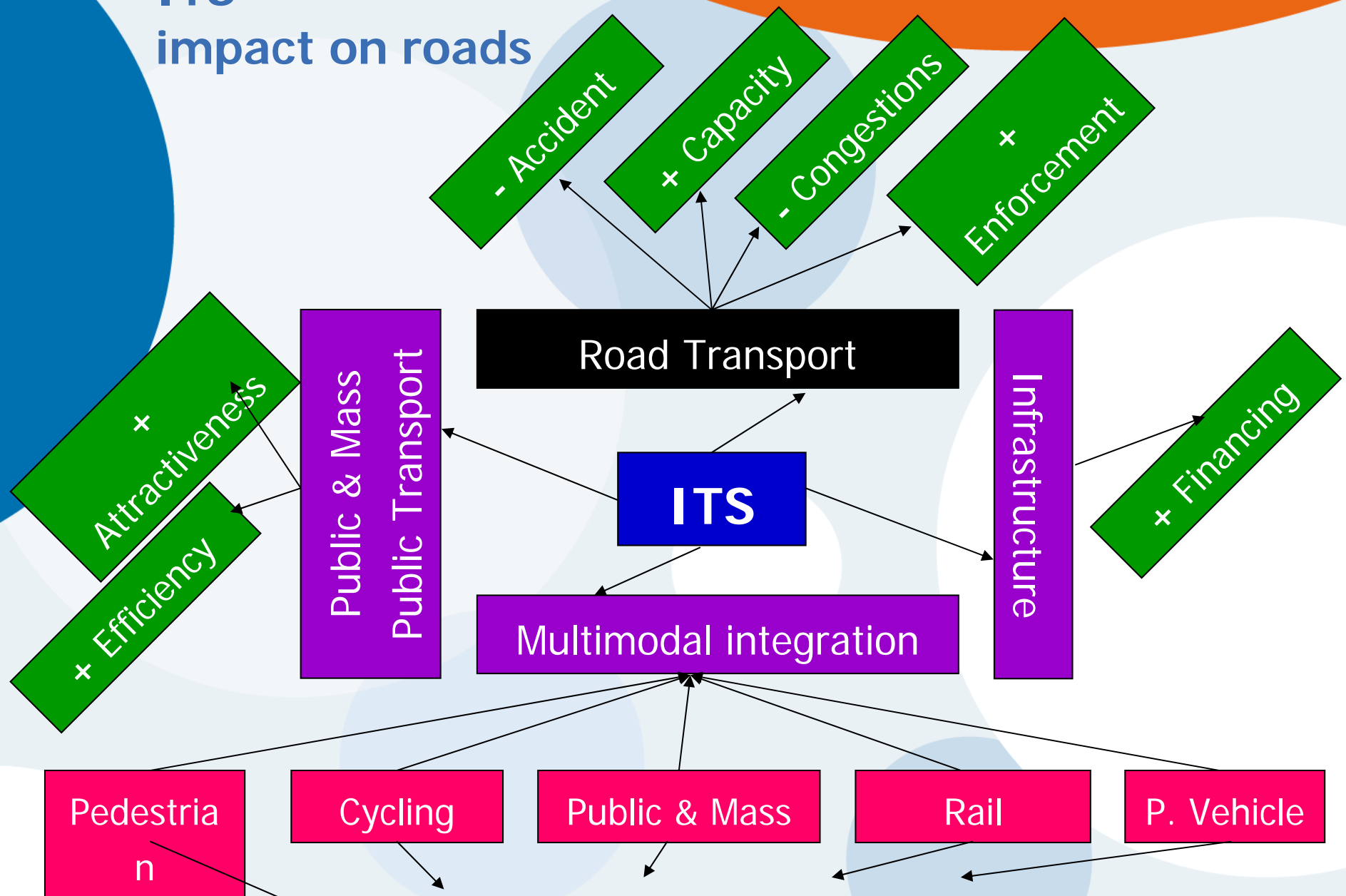
- ITS integrates electronic communications and information technologies (ICT) with transport engineering in order to optimize transport and forwarding processes.
- It is an instrument of a sustainable transport helping to better economy, ecology and safety (= smart, safe & clean).

## Macro functions

- Electronic payments
- Rescue services
- Traffic management
- Public transport management
- Intelligent vehicle
- Journey planning & information provision
- Fleet and freight management
- Enforcement



# ITS impact on roads



**Safe & secure, effective, economical,  
sustainable and green transport system**



## ITS Potential for users: travelers, drivers

**On-line + pocket + 100% reliable, on click + quick look information about:**

- Traffic density
- Parking capacity
- Navigation advice
- Seamless ticketing & Tolling
- Time tables



- Departures and arrivals of public transport means
- Power for electro vehicles
- Stands of bicycles

Multimodal integration

Walk

Cycling

Public mass tr.

Railways

Cars

## ITS Potential: for governments

**On-line + effective + 100% reliable + secure + relatively cheap information, influence and regulation:**

- Traffic management
- Transport regulation
- Electronic payments
- Revenues from users



- Optimal use of parking places
- Municipality services optimization
- More Attractive & Efficient public transport

Multimodal integration

112

C. Logistic

Public mass tr.

Railways

Cars



# Czech ITS Report 2011

acc. 40/2010/EU

## Obsah

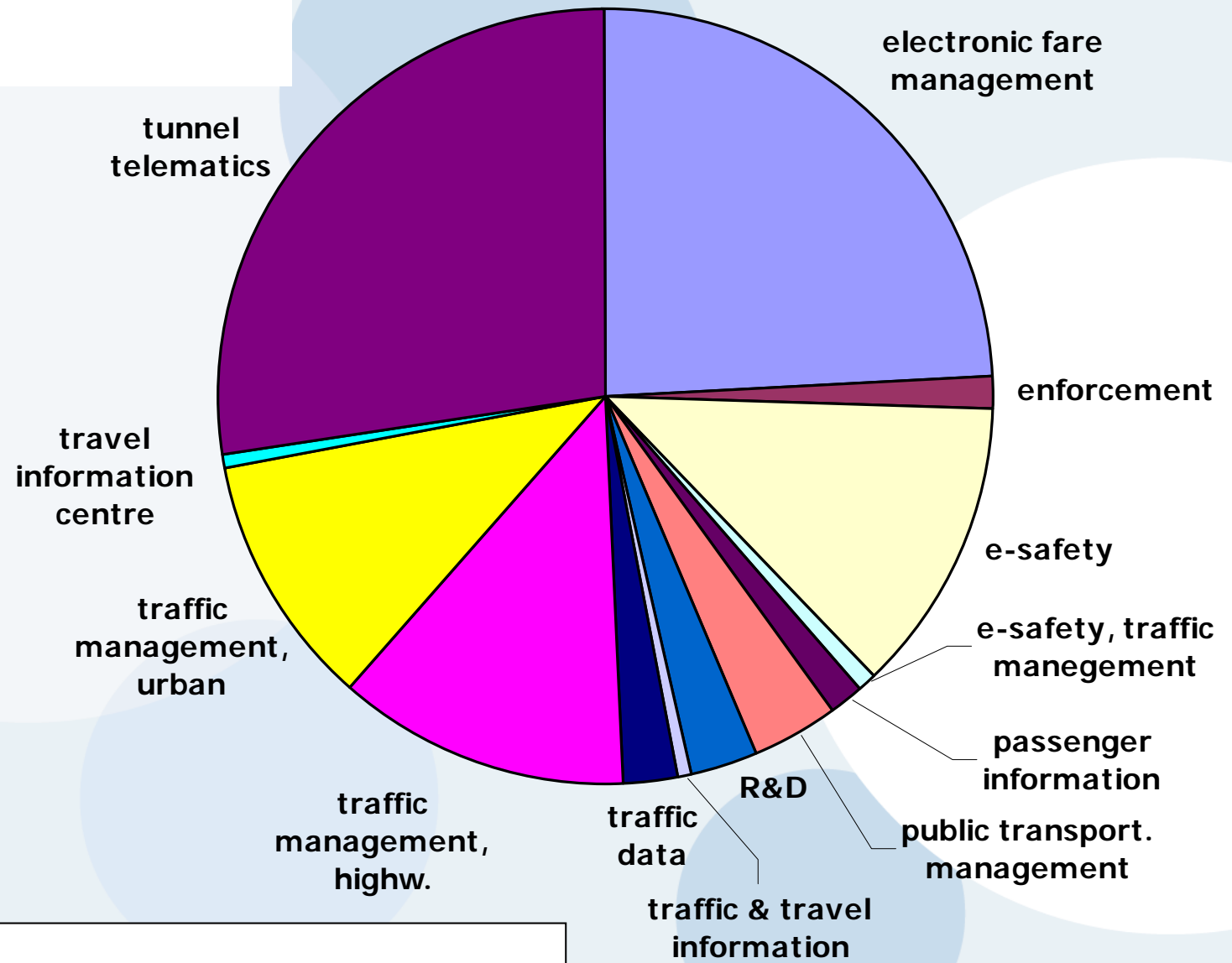
Poř. č. projektu	Název projektu	Zaměření projektu	Územní pokrytí	Prioritní oblast	Související priorit. akce	Str. číslo
1	Národní standard elektronického odbavení cestujících ve veřejné osobní dopravě	elektronické odbavení cestujících	národní	2	0	6
2	Jednotná čipová karta ve veřejné dopravě, jednotný odbavovací systém	elektronické odbavení cestujících	Karlovarský kraj	2	0	8
3	Dopravní telematika pro město Brno 2010 - 2013	řízení dopravy ve městech	město Brno	1	A,B,C	10
4	Zpracování národního pilotního projektu eCall na území ČR, 2007	bezpečnost silničního provozu	národní	3	D	12
5	Výzkum a návrh systémové architektury pro rozšíření systému ecall	bezpečnost silničního provozu	národní	3	D	14
6	Harmonised eCall European Pilot (HEERO)	bezpečnost silničního provozu	národní	3	D	16
7	Vyhledávání odcizených vozidel pomocí zemské rádiové sítě a národním pokrytím	zabezpečení vozidel proti odcizení	národní	3	0	19
8	Elektronické odbavovací systémy v ČR	elektronické odbavení cestujících	národní	2	0	21
9	Celostátní informační systém o jízdních řádech (CIS ČR)	informace pro cestující	národní	1,2	A	25
10	Datové zdroje Floating Car Data dostupné v ČR	data a informace o provozu	národní	1,2,3	A,B,C,E,F	27
11	Dopravní dispečnický ÚAMK - VIA	dopravní informační centrum	národní	1,2	A,C	29
12	Systém řízení a regulace silničního provozu v hl. m. Praze	řízení dopravy ve městech	Hl. město Praha	1,3	A,B	31
13	Dopravní informační centrum (DIC) Praha	řízení dopravy ve městech	Hl. město Praha	1	A,B,C	33
14	Telematika v městských automobilových tunelech v ČR	řízení a bezpečnost tunelových staveb	různá města	3	0	35
15	Telematika v dálničních a silničních tunelech v ČR	řízení a bezpečnost tunelových staveb	národní	3	0	39
16	Liniové řízení dopravy na SOKP a D1	řízení dopravy na dálnicích	Hl. město Praha	1,3	B	41
17	Operátorské pracoviště na SSÚD Rudná, investiční akce	řízení dopravy na dálnicích	Hl. město Praha	2,3	0	43
18	Inteligentní dopravní systémy pro město Ostrava - II. etapa pilotního projektu	řízení dopravy ve městech	město Ostrava	1	A,B,C	45
19	Projekt RODOS	věda a výzkum	národní	1	A,B,C	47
20	Systém SOS hlásek na sítí dálnic a rychl. silnic	bezpečnost silničního provozu	národní	3	0	50

Priority area	Projects Qty.	Invest. mil. €
1	9	45
2	8	131
3	10	188
4	1	3
1 2	9	21
1 3	6	80
2 3	1	6
2 4	1	2
1 2 3	4	60
Total	49	533

## Priority area

- 1 = Optimal use of road, traffic and travel data
- 2 = Continuity of traffic and freight management ITS services
- 3 = ITS road safety and security applications
- 4 = Linking the vehicle with the transport infrastructure

# Czech Investments into ITS

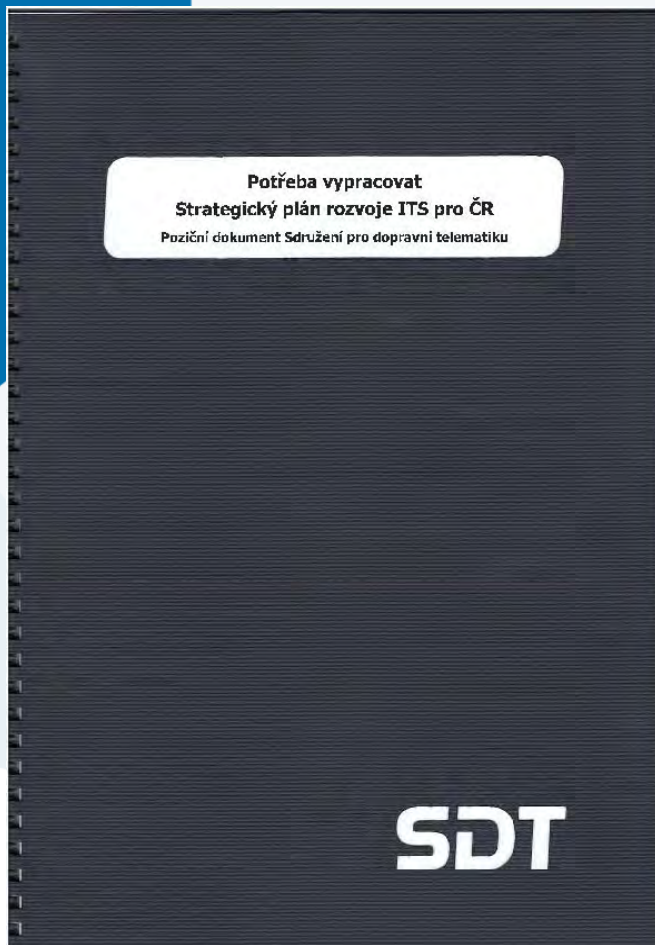


Total > 500 mil. €

Remark:  
**ETC extra.** Total investment and operational costs,  
10 years = 0,68 bil. EUR = 22% of revenue



# ITS&S: Support solving of unsolved and insoluble problems



Via definition of one consensual opinion  
of ITS community on a topic

Result of a workgroup and ass. office

Each opinion is written and requires an  
explicit approval of ITS&S Presidium

= POSITION PAPERS

## Position papers

**ITS 2020 Vision**

**Public procurement in ITS**

**Strategy of sustainable financing of road infrastructure**

**Interoperability in Electronic Fare Management**

Systems in public transportation and for Door/to/Door Seamless Ticketing

**The need of a strategic plan**

**Traffic and travel data:**

necessary condition of an effective transport system in the CZ

**ITS planning and deployment**

in a connection with D1 highway modernization

## Topical questions and problems in 2012

Strategic and implementation plan

Public procurement

Consequence of the CZ membership in EU

Travel and traffic data

Systematic development of ITS for traffic management and traffic/transport influence

Interoperability of EFC systems in public transportation

Introduction of multimodal tickets in the CZ

Future of electronic tolling



# ITS and D1

## highway by the eyes of users (travelers)

**“I am going to  
Brno / Ostrava/  
Praha  
tomorrow,  
because ...”**



### Basic questions

Stay over night ?  
Meeting?  
Alone?  
Wetter?  
How to get there?  
Do I really have to be there?

- > Teeth brush, skirt?  
- > Presentation, notebook?  
- > ?  
- > Umbrella, coat??  
- > Car? Train? Bus?  
- > ?

# Weather?

The screenshot shows a web browser window displaying a weather website. The top part features a map of the Czech Republic with radar data overlaid, showing precipitation intensity in shades of blue and purple. Below the map, there is a weather forecast for the Czech Republic on April 10, 2012, at 15:00 SELČ. The forecast includes a map of the country with temperature and weather icons for various regions, and a table of the forecast for the following days.

**Počasí v České republice 10.4.2012 15:00 SELČ**

14	12	9
13	16	15
17	12	11
14	14	14
15	14	14

**Předpověď pro ČR**

Středa	
Ráno	Odpoledne
5/1	12/16

Čtvrtek	
Ráno	Odpoledne
6/2	9/13 / 15

Pátek	
Ráno	Odpoledne
4/0	11/15 / 1

Additional information at the bottom of the page includes links for "Dědnošič pro ČR", "Numerický model Aladin", "Aktuální radarová data", and "Webová kamera".

Picture source: www print-screen







Day before journey	Morning at breakfast before journey	On the way to D1 highway	Driving on D1 highway	At the destination
<p><b>On-line forecast:</b></p> <ul style="list-style-type: none"> <li>• Weather forecast</li> <li>• Traffic forecast</li> </ul>	<p><b>On-line info:</b></p> <ul style="list-style-type: none"> <li>• Travel time</li> <li>• Accident information</li> <li>• Weather info</li> </ul>	<p><b>On-line info:</b></p> <ul style="list-style-type: none"> <li>• Travel times</li> <li>• Delays</li> <li>• Congestion info</li> <li>• Alternative suggestion</li> </ul>	<p><b>On-line info:</b></p> <ul style="list-style-type: none"> <li>• Travel time</li> <li>• Delay info</li> <li>• Congestion warning</li> <li>• Alternative suggestion</li> <li>• Weather info</li> </ul>	
<p><b>ITS tools:</b></p> <ul style="list-style-type: none"> <li>• PC + internet</li> <li>• Smartphones + internet</li> </ul>	<p><b>ITS tools:</b></p> <ul style="list-style-type: none"> <li>• PC + internet</li> <li>• Smartphones + internet</li> <li>• Radio broadcasting</li> <li>• Hot line</li> </ul>	<p><b>ITS tools :</b></p> <ul style="list-style-type: none"> <li>• Portable signs</li> <li>• RDS-TMC</li> <li>• Navigation</li> <li>• Smartphones</li> <li>• Hot line</li> </ul>	<p><b>ITS tools:</b></p> <ul style="list-style-type: none"> <li>• Traffic signs</li> <li>• Portable signs</li> <li>• Alternative routing</li> <li>• RDS-TMC</li> <li>• Navigation</li> <li>• Smartphones</li> <li>• Hot line</li> </ul>	

# Easyway ITS Deployment Road Map

## List of ITS services for the EU „core“ network

<b>Forecast and Real-time Event Information Services</b>	S1	<b>Forecast and Real Time Event Information Services</b> are defined as the provision of information about both expected and unexpected events to road users on identified road segments of the TENT-T network and interfaces. This predictive or real-time information could be provided on-trip and pre-trip using different information channels, accessible by the road user via different end-user devices. The service may comprise common information as well as individual (personalised, on-demand) information. “Events” are defined as - expected or unexpected – abnormal situations which may lead to adverse effects on the road as regards to traffic safety, efficiency and environmental effects.
<b>Predictive and Real-time Traffic Condition Information</b>	S2	<b>Traffic condition information service</b> means, both pre-trip and on-trip, the provision of traffic condition on identified road segments, thus enabling road users to optimize and better anticipate their journey ahead. This predictive or real-time information should be using different information channels, accessible by the road user via different end-user devices. The service may comprise common as well as individual (personalised, on-demand) information.
<b>Speed Limit Information Services</b>	S3	<b>Speed limit information</b> is a service which dynamically informs road users about prevailing speed limits. Static speed limits as well as variable speed limit information related to special conditions, such as bad weather, road work sites, congestion, etc. should be provided where appropriate.
<b>Travel Time Information Services</b>	S4	<b>Travel time information service</b> means, both pre-trip and on-trip, the provision of information on expected travel time on identified road segments, thus enabling road users to optimize and better anticipate their journey ahead. This predictive or real-time information should be using different information channels, accessible by the road user via different end-user devices. The service may comprise common as well as individual (personalised, on-demand) information.
<b>Weather Information Services</b>	S5	The provision of <b>Weather Information Services</b> cover in most cases the following dynamic information: <ul style="list-style-type: none"> <li>• common weather information/data such as temperature or wind direction/wind speed for regional areas, road traffic related weather messages</li> <li>• special forecast information leading to weather warnings about fog, ice and heavy rain</li> <li>• infrastructure specific information on weather sensitive parts of the network such as bridge (which can be closed due to special wind conditions). This information assumes particular significance in areas (negative influence on road safety) which experience extreme climatic conditions, for example, the Baltic area or the alpine countries.</li> </ul>

<b>Co-modal Traveller Information</b>	S6	<b>Co-modal traveller information services</b> offer in parallel comparative information of different modes/means of transport (multi-modal) and/or the combination of different modes/means of transport within the same route (inter-modal). The services offer information for at least public transport incl. pedestrian information, car and bicycle information.
<b>Dynamic Lane Management</b>	S7	<b>Dynamic lane management</b> service enables a temporally modifiable allocation of lanes by means of traffic guidance panels, permanent light signals, multiple-faced signs, LED road markers, closing and directing installations, etc. Fundamental applications of this service are: tidal flow systems, lane allocation at intersections, lane allocation at tunnels, hard shoulder running.
<b>Variable Speed Limits</b>	S8	<b>Variable speed limits</b> use variable speed signs, mandatory or advisory, as a means to help drivers to travel at an appropriate speed considering the prevailing traffic or weather conditions, in some cases supported by Speed Enforcement (SE), which mostly use cameras to identify speeding vehicles and/or drivers.
<b>Ramp Metering</b>	S9	<b>Ramp metering</b> is implemented via the installation of traffic signals on the on-ramps which regulate the flow of traffic joining the motorway during peak or congested periods. It does this by controlling the discharge of vehicles from the on-ramp, holding vehicles back and breaking up platoons of vehicles, thus reducing the interference of merging vehicles and helping maintain the flow of traffic on the main carriageway. The traffic signals are generally operated in dependence of the currently prevailing traffic conditions on both the main carriageway and the on-ramp.
<b>Hard Shoulder Running</b>	S10	<b>Hard shoulder running</b> enables dynamic temporary use of hard shoulders at road sections including junctions with the aim to increase road capacity, when needed. Hard shoulder running could be considered similar to the creation of an extra lane, but with specific safety issues due to the fact that it is still a hard shoulder where users can stop if they breakdown. Hard shoulder running is triggered by traffic demand, at fixed times or due to manual request and applied for bottlenecks or black spots with recurrent - but not constant - lack of capacity.



<b>Incident Warning and management</b>	S11	<b>Incident Management</b> is defined as the implementation of a systematic, planned and coordinated set of responsive actions and resources to prevent accidents in potentially dangerous situations and to safely and quickly handle an incident. It proceeds through a cycle of several phases: from incident detection to restoration of normal traffic conditions, including the use of immediate and advance notice of possible dangers or problems, i.e. warnings, in order to prevent accidents.
<b>Heavy Goods Vehicle overtaking ban</b>	S12	<b>HGV Overtaking ban</b> service means to channel the heavy goods vehicles onto a single lane (slow lane). The heavy goods vehicles overtaking ban implementation is one of the traffic management measures allowing traffic managers and road operators to propose solution for a better fluidity of their network during peak period. This traffic control measure constitutes one of the priority services to improve the cohabitation of heavy goods vehicles and private cars on network with high level traffic.
<b>Traffic Management Plans for corridors and networks</b>	S13	<b>Traffic Management Plan Service for Corridors and Networks</b> means the elaboration, application and quality control of Traffic Management Plans (TMP) for the management of the European network and corridors including multi-modal capacities to allow for a more efficient use of the road network in Europe (and not restricting measures to country or local basis). A TMP is the pre-defined allocation of a set of measures to a specific situation in order to control and guide traffic flows as well as to inform road-users in real-time and provide a consistent and timely service to the road user. Initial situations can be unforeseeable (incidents, accidents) or predictable (recurrent or non-recurrent events). The measures are always applied on a temporary basis.
<b>Intelligent Truck Parking</b>	S14	Two complementary services with regard to <b>intelligent truck parking</b> are considered: <ul style="list-style-type: none"> <li>• Information and guidance (on truck parking areas)</li> <li>• Reservation (of truck parking spaces)</li> </ul> Production and distribution of static and dynamic information on the truck parking situation on the TEN-T networks and access roads to manage the parking space, support the observation of rest and driving periods for drivers, reduce dangerous parking and improve cargo and goods vehicle security. This information could be provided on-trip and pre-trip using different information channels and different end-user devices. Beyond that the service can be combined with the individual reservation of a truck parking space with the help of telematics services via different devices, the parking space on site is reserved (blocked) and kept free for the pre-identified goods vehicle.
<b>Access to abnormal goods transport regulation</b>	S15	<b>Access to abnormal goods transport regulations</b> is an information service where the user gets country-specific information on the vehicle regulations and permit application procedures, contact persons, and guidelines for completing application forms for abnormal transports. This service provides access to the necessary information and procedures regarding abnormal transports standardised for all European States, in a language understandable to the haulier/applicant (English and the respective national languages), and in a time frame acceptable in modern logistics. In this service, both the necessary information and the contact details for the relevant authorities are easily accessible.

## Candidate „co-operative “ ITS services for the European „core“ network

<b>Hazardous location notification</b>	C1	Warns drivers about adverse road weather road conditions (slippery road, fog, rain, etc.) on the route ahead on the basis of vehicle to vehicle or infrastructure to vehicle communication.
<b>Traffic jam ahead warning</b>	C2	Warns drivers about the tail end of a traffic congestion or queue on the route ahead on the basis of vehicle to vehicle or infrastructure to vehicle communication.
<b>Road works warning</b>	C3	Informs drivers of ongoing road works and associated obstruction of road traffic in the vicinity on the basis of vehicle to vehicle or infrastructure to vehicle communication.
<b>Traffic information and recommended itinerary</b>	C4	Recommends a route for the vehicle navigation system to direct the drivers to their destinations around congested locations and to distribute the traffic load on alternative routes, on the basis of vehicle to vehicle or infrastructure to vehicle communication.
<b>Decentralised floating car data</b>	C5	Informs the driver with advice about the conditions along his further route based on information from other vehicles in the vicinity, on the basis of vehicle to vehicle communication.
<b>In-vehicle signage</b>	C6	Informs the driver about current valid traffic signs and the effective speed limits and recommendations along the road on the basis of infrastructure to vehicle communication.
<b>Automatic access control</b>	C7	Monitors vehicles accessing (sensitive) areas or road segments (through vehicle and cargo identification) alerts the driver on restrictions concerning access to specific areas due to vehicle and cargo characteristics.

## “Other” candidate ITS services for the European “core” network

<b>Automated speed enforcement</b>	O1	Monitors the compliance with speed limits at spots or along road links by providing information identifying the vehicle (and optionally also the driver) not complying to the speed limit for the purposes of legal consequences.
<b>Automated signal enforcement</b>	O2	Monitors the compliance with red signal at signalised junctions and other locations by providing information identifying the vehicle (and optionally also the driver) not complying to the signals for the purposes of legal consequences.
<b>Local and area-wide signal control including priorities</b>	O3	Controls the movements of road users at one or several junctions with the help of traffic signals. In area-wide control, the signals of the area are inter-connected to optimise the control of the area's road network. Priorities at signals may be given to specific road users such as public transport or emergency vehicles.
<b>eCall</b>	O4	Detects and signals vehicle accidents to PSAP and triggers rescue service when required.
<b>Interoperable Road User Charging</b>	O5	Europe-wide implementation of the EETS service. Allowing for a single in-vehicle equipment (“OBU”) and one service contract to be used across Europe.

Thank you.

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