




Munich Satellite Navigation Summit
Galileo and ITS

The potential for satellite navigation in ITS

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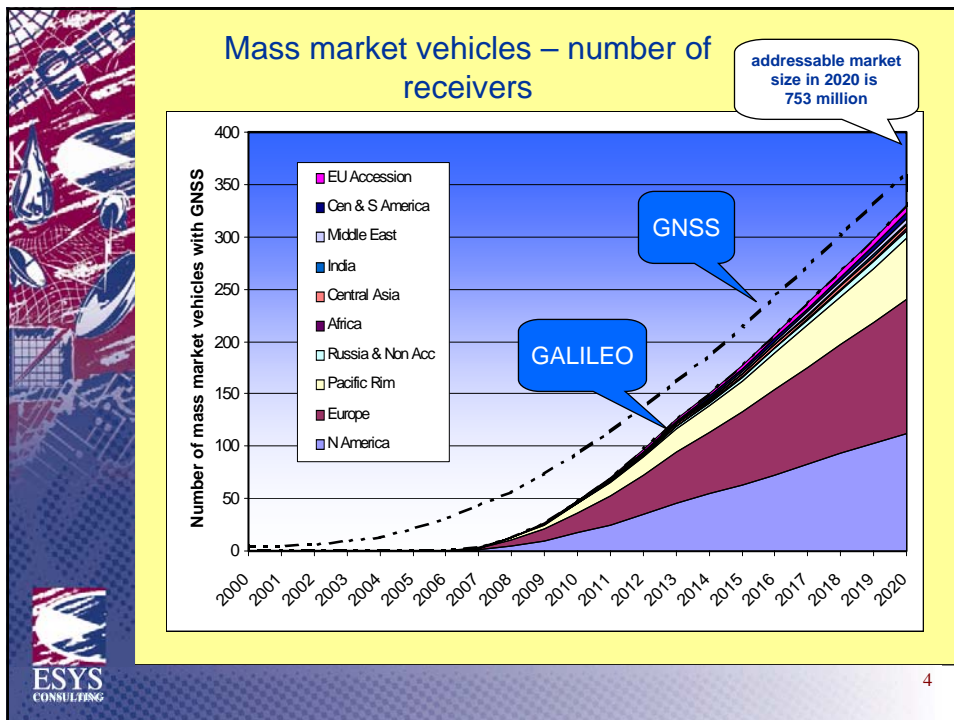
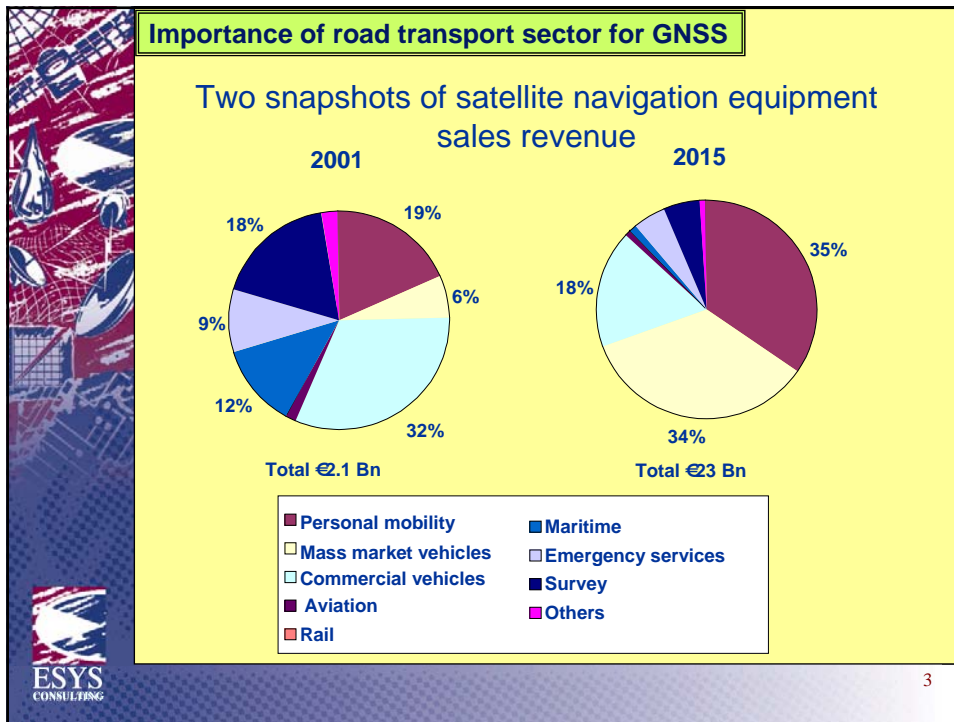



Presentation Overview

- ❑ Importance of road transport sector for GNSS
- ❑ GNSS in ITS
 - GNSS options
 - market drivers
 - horses for courses
 - uptake issues
- ❑ Summary

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GNSS in ITS - options

EGNOS

(European Geostationary Navigation Overlay Service)
being developed jointly by ESA/EC/major European Air Traffic Service providers

Benefits - better performance than GPS alone:

- Near 1 to 2 meter accuracy
- Signal status archive (continuous, 24/7)
- Differential corrections
- Integrity capability, i.e. 6 second warning of failure
- GPS receiver needs additional software - minimal cost delta though
- Signal in space is free


Constraints

- Need line of sight to geostationary satellite, or
- Alternative communications channel for EGNOS signal, e.g. 3G, DAB, Internet (SISnet), Loran C

Full system operational mid 2004

System certified for Safety of Life use in 2005

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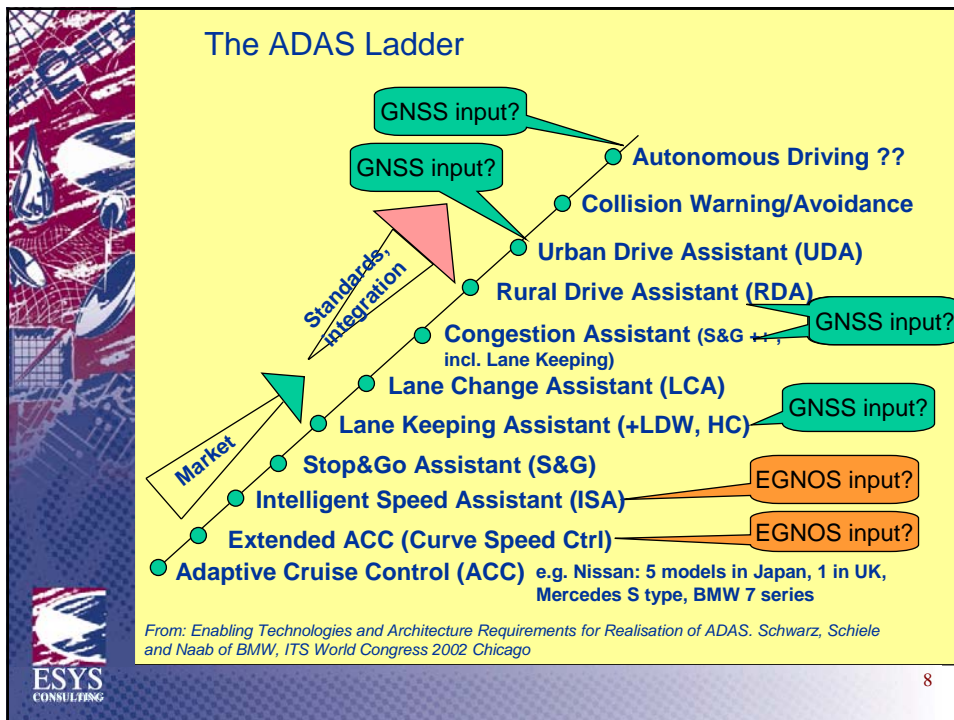
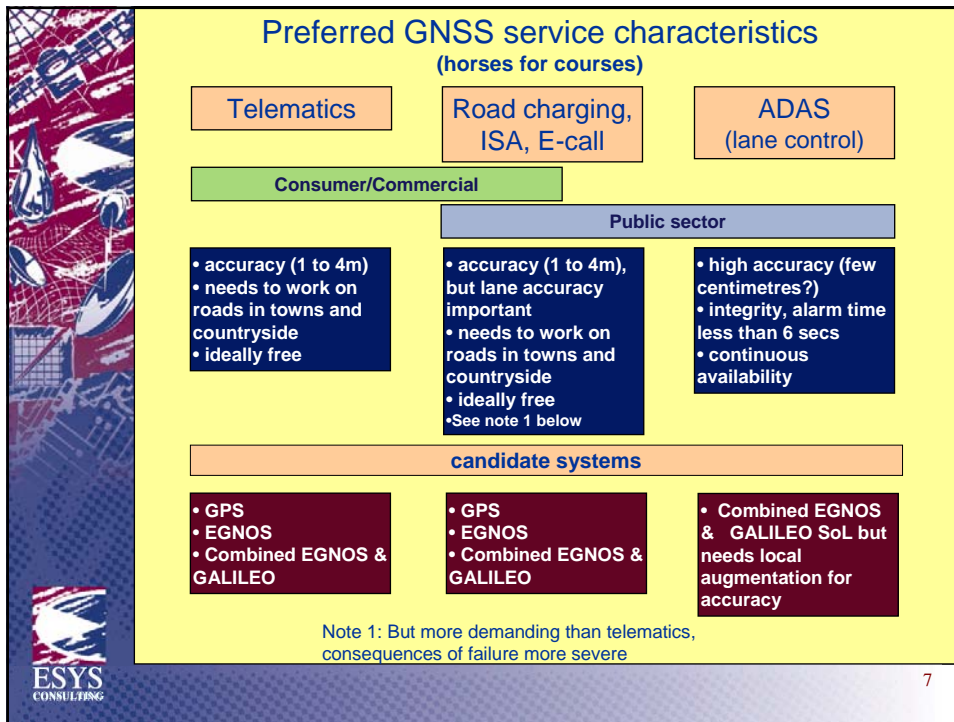



Galileo Performance Options

	Open Service OS	Commercial Service CS		Safety of Life Service SoL
Coverage	Global	Regional	Local	Global
Accuracy, 95%	H:15m V:35 m (single frequency) H:4m V:8 m (dual frequency)	H:4m V:8 m (dual frequency)	< 10 cm - 1 m (local elements)	H:4m V:8 m (dual frequency)
Availability	99.8%	99%		99-99.9%
Integrity	No	Value-added service		Yes

- Open service: equivalent to and interoperable with GPS (free service)
- Commercial service: value added service. Offering defined by service providers and concession company.
- Safety of Life: High integrity for institutionally regulated safety-critical applications (air, rail, vehicle control) (currently planned to be a free service)

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Uptake issues

Telematics	Road charging ISA / E-call	ADAS (lane control)
<ul style="list-style-type: none"> • slow (cars, new vehicles) • inhibited by price of equipment and subscription • market acceptance • lack of service quality • supply chain definition, role for key players 	<ul style="list-style-type: none"> • needs acceptance of role for road charging, i.e. it works • then acceptance that GNSS solution is best • then government implementation • EU draft directive • can be trigger for telematics • ISA & E-call need public sponsorship under E-safety initiative 	<ul style="list-style-type: none"> • alternative technologies • needs interface standards, local augmentation, funding mechanisms • communication for augmentation • lane accurate digital maps • legal aspects • electorate acceptance

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Telematics


Summary

- ❑ **Commercial vehicles**
 - primary applications are for fleet management **driven by business case**. Currently mainly after-market fit by SMEs.
- ❑ **Private (mass market) vehicles**
 - route navigation and LBS mainly as option or standard fit on new cars. Uptake down to **value for money perception of buyer, fashion and quality of service offering**.
- ❑ **Likely GNSS solutions:**
 - GPS
 - EGNOS (by default?)
 - EGNOS and Galileo combined

initiated by customer choice

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Road charging


- ❑ Commercial vehicles
 - GNSS-based schemes start with heavy commercial vehicles (Switzerland, Germany and UK). These are driven by **national policies** aimed at reducing congestion and pollution and intended to make the principle road destroyers contribute to the cost of road maintenance
- ❑ Private (mass market) vehicles
 - Schemes for mass market vehicles are likely to follow on from the commercial initiatives above. Objectives will be a combination of paying for road building & repair, controlling congestion and eliminating fixed annual road taxes.

ISA & E-call

- ❑ All vehicles
 - For maximum life saving these need to be pushed by public sector programme under the E-safety initiative, otherwise they will trickle in slowly as separate telematics applications
- ❑ Likely GNSS solutions:
 - GPS - used but not ideal
 - EGNOS - preferred solution
 - EGNOS and Galileo combined –best long term solution




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ADAS

- ❑ Commercial and mass market vehicles
 - Likely to apply to all vehicles. Where GNSS is part of the vehicle control loop, then high accuracy (few centimetres) and high integrity will be required. Overall introduction will be through EU and national policy, but there are standardisation and legal issues to solve.
- ❑ Likely GNSS solution:
 - EGNOS and Galileo combined – but with additional local augmentation to provide required accuracy and short time to alarm



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