



GNSS & The European Vehicle Markets

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Where? When? What?....

- Driving the market
- Technology
- Applications & markets
- Case studies



Drivers

- Management Information
- Benefits
 - Productivity
 - Efficiency
 - Compliance
- Security
- Regulatory



Developing Technology



CORE GPS COMPONENT TECHNOLOGY

FirstGPS

Flexible Integration Real-Time Software Tasks

- Leaves Host CPU to calculate PVT
- Low power
- 8 or 12 channel continuous tracking
- Fast acquisition
 - <45 seconds warm start
 - <180 seconds cold start
- Re-acquisition <2secs after 15 seconds blockage
- Accuracy <10m (50% CEP)



Applications



ENGINEERING &
CONSTRUCTION



AGRICULTURE



FLEET & ASSET
MANAGEMENT



GPS COMPONENTS

GPS + WIRELESS COMMUNICATION +
INFORMATION TECHNOLOGY

CORE GPS COMPONENT TECHNOLOGY

GPS CORE TECHNOLOGY



- GPS technology marketed through OEMS:

- Modules
- IC's/Firmware
- Licensing

- Applications by 2005 include:

- Timing products >100 mu/yr
- In-vehicle navigation systems > 25 mu/yr
- Cellular phone handsets >200 mu/yr
- Mobile network appliances >100 mu/yr

Market opportunity \$1B in 2005



Engineering & Construction



- Transforming the survey & construction process
- Interoperability of GPS, data collection mgt. and wireless communication
- Machine control and guidance
- Strategic Alliance: Caterpillar
- Market opportunity \$1.5B in 2005

AGRICULTURE



- Agriculture & machine guidance
- Yield monitoring / improvement
- Modulated application of fertilizer/chemicals
- Data collection and management
- Strategic Alliance: Case
- Market opportunity >\$1B in 2005

ASSET MANAGEMENT

Mobile & Stationary Assets



- Integrated wireless, GPS & information technology
- Asset tracking, fleet management, intelligent transportation systems, cargo tracking
- Public safety, long-haul trucking, distribution, shipping markets
- Productivity, operating cost, safety & security benefits
- Market opportunity \$2.5B in 2005

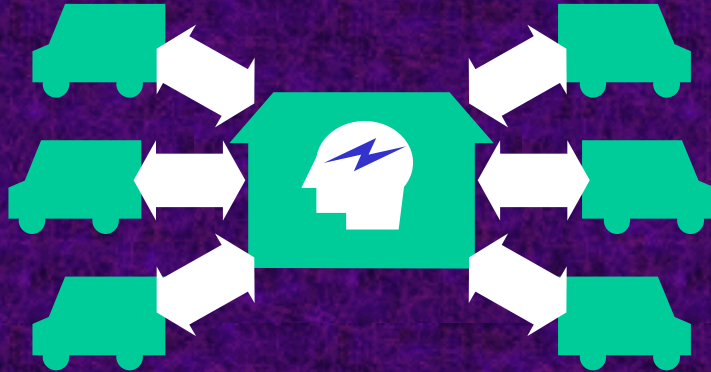
GPS + Communications + IT

Improves....

- Productivity
- Efficiency
- Compliance
- Security
- Management Information

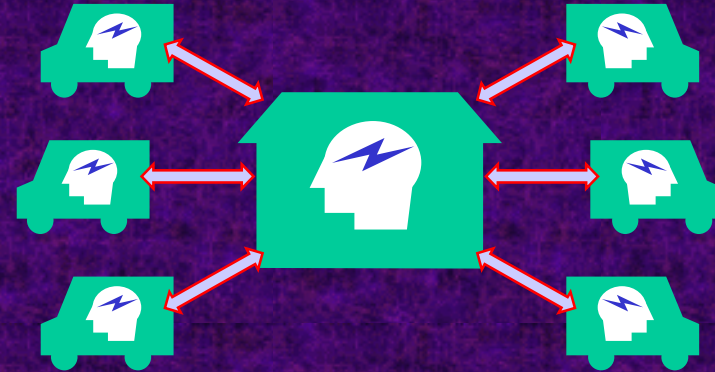


Intelligent Mobiles



“Dumb mobiles”

- Little or no intelligence
- Report at intervals or when polled
- Base application base determines if a significant event has occurred
- Extensive communications required



“IQ Event Engine”

- On-board intelligence
- Recognizes the events
- Reports when event occurs or when polled

INTEROPERABILITY

In-Vehicle Platform

- Communications
- GPS
- Event monitoring
- Data logging



Wireless Communications

Data Center

- Web hosting
- 24x7
- Applications

Internet

Customer Benefits

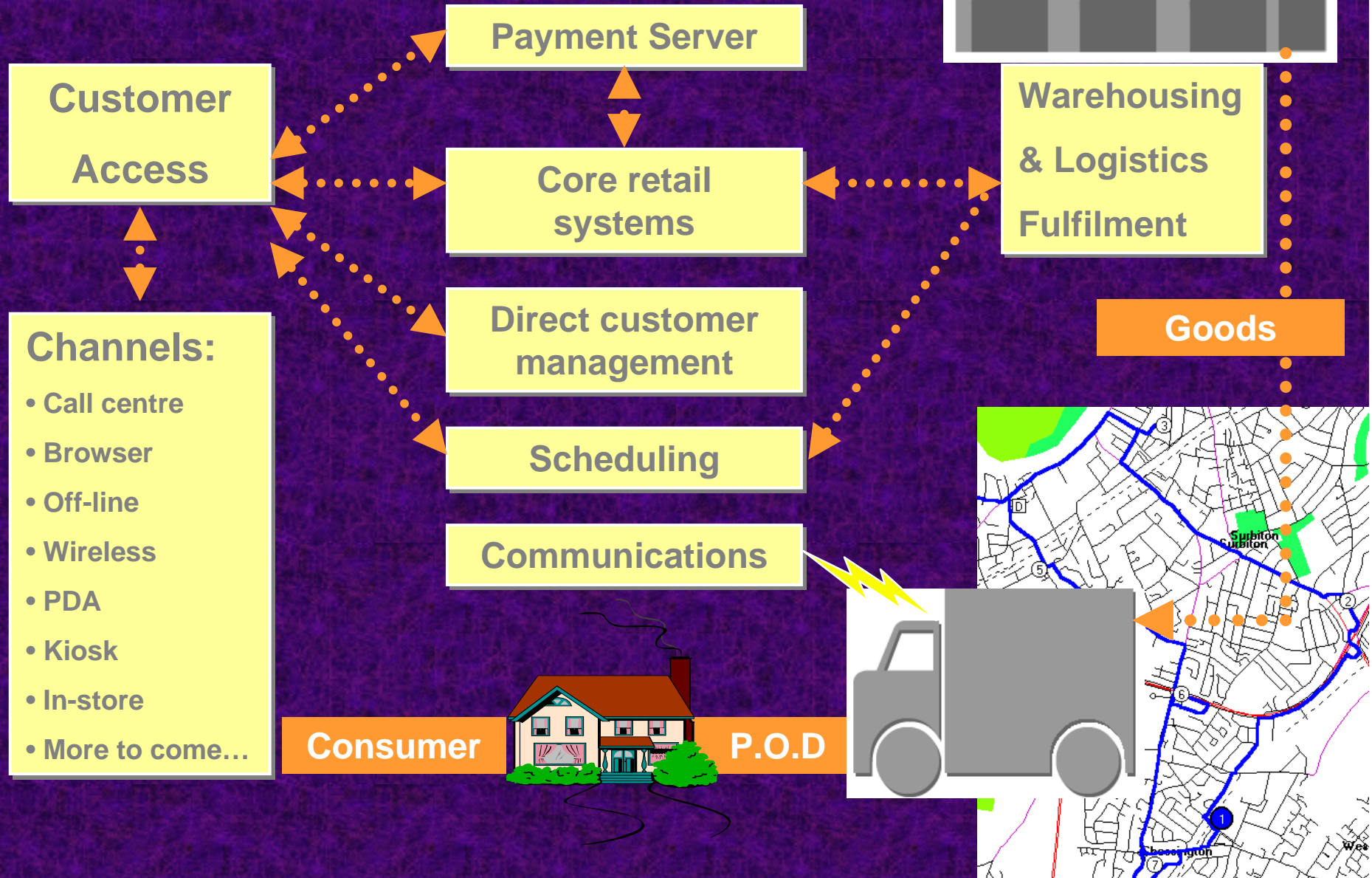
- Productivity
- Driver Compliance
- Safety/Security

Data/Reports

- Location
- Engine Hours
- Speed Violations
- Zones
- Low Battery
- Stops/duration



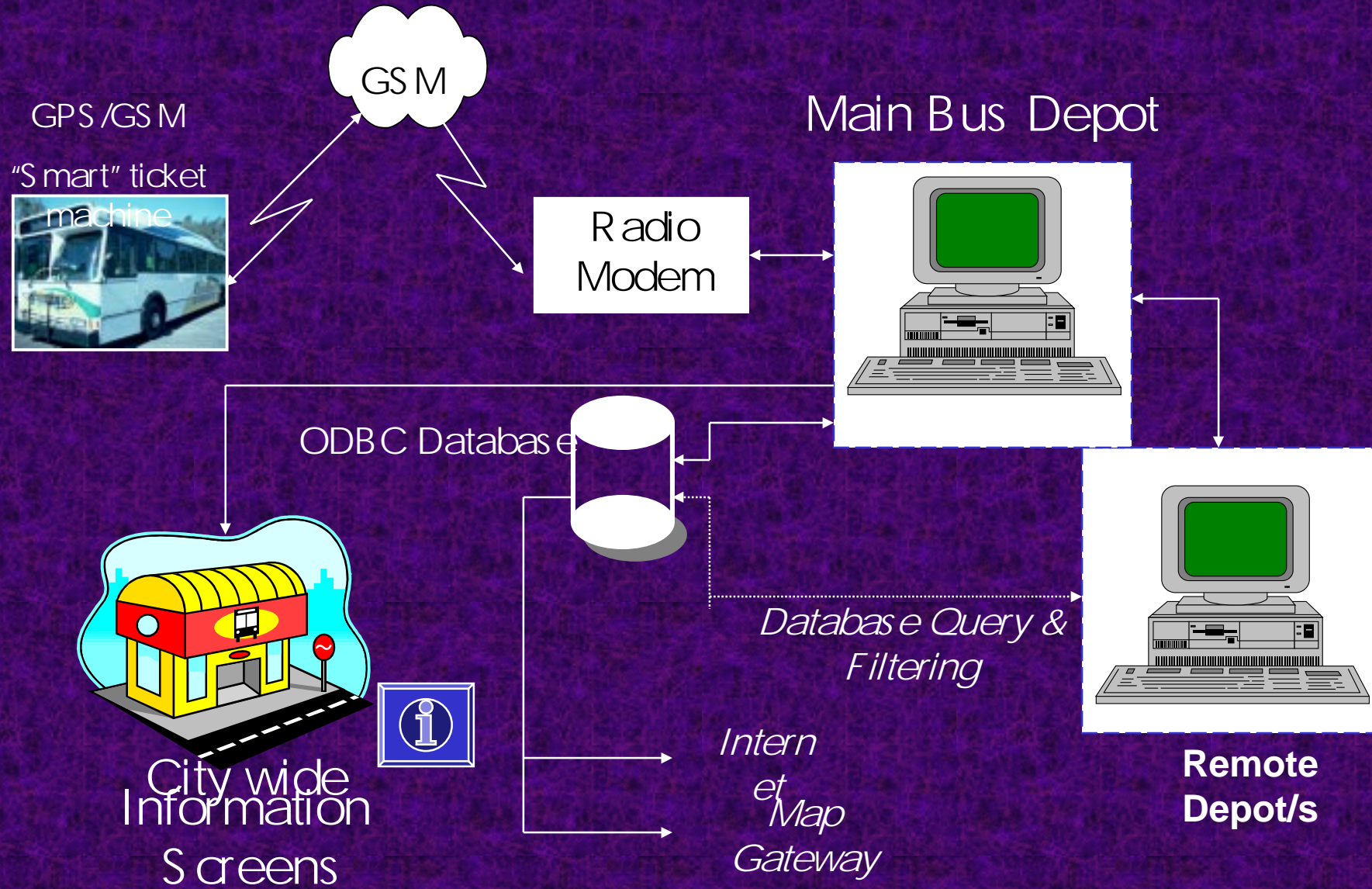
The Business Solution



GNSS on the Road



Bus System – Portugal



Summary

- Technology led
- Real, total business solutions
- Compact, integrated packages
- Cost effectiveness
- Flexibility
 - Upgradeable
 - Meeting future needs
- Accepted in the market

A scenic landscape featuring a paved road on the right, a green field in the middle ground, and trees with autumn foliage on the left. The text "Moving on to meet tomorrow's challenges" is overlaid in a 3D orange font, rotated 90 degrees counter-clockwise.

Moving on to meet tomorrow's challenges