Advanced Location Based Services
Applications using existing technology
Agenda

- Introduction
- Physical technologies
- Positioning technologies
- Applications and services
- Conclusions
Introduction

Location Based Services (LBS) have been looked as “killer” applications by communications service providers with advanced cellular networks (2G/3G).

Eco-system of LBS is complex:
- Physical technologies for LBS (GPS or A-GPS)
- Positioning technologies (Cell-based, triangulation-based or satellite-based)
- Applications
  - Navigation
  - GMS (Geographic Message Services)
  - ....
MEMS-Micro Electrical Mechanical Mechanical Systems

Devices with small (< µm) and movable structures fabricated with integrated circuit technology

MEMS for Location Based Services (LBS)

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Ultra Sensitive Nano Magnetometer

Sensitivity~nanoGauss

An Integrated Solution to Supplement GPS

- MEMS Magnetometers to provide heading and tip/tilt information
- Inertial sensors to detect device movement
- All integrated onto a single silicon die to be robust, low cost, low power, small, light,.....

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Positioning Technologies

<table>
<thead>
<tr>
<th>Technologies</th>
<th>Accuracy</th>
<th>Rapidity</th>
<th>Availability</th>
<th>Cost</th>
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<tr>
<td>Cell-id</td>
<td>Very low</td>
<td>High</td>
<td>Very high</td>
<td>Low</td>
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<td>Enhanced cell-id</td>
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<td>High</td>
<td>Very High</td>
<td>Low</td>
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<td>High</td>
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<td>A-GPS</td>
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<td>High</td>
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<td>Alcatel Enhanced A-GPS</td>
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<td>Medium</td>
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<tr>
<td>A-GNSS</td>
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<td>High</td>
<td>Medium</td>
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LBS Services for Remote Workforce

GPS Satellite

Agent locates, alarms, people or vehicles

Automatic location of persons or vehicles

Network Activity

Correlation

GPRS Network

Workforce with direct access to database information

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Geofencing / Push LBS Definition

Kylie opts-in

Mike leaves a GMS message for Kylie around a location

Kylie enters the zone and gets the message

GMS: Geographic Messaging Service

Messages automatically triggered by subscriber entering or leaving location - a “GMS”
Geofencing / Push LBS (relevant) application

Current:
There is a change of arrival
time or platform.

Travelers are informed via PA

- Users arrive at the platform
- Users try to listen and understand the PA
- Users run to the appropriate platform
- Good for the health
- Not so good for the spirit
Geofencing / Push LBS (Scheduling) application

A geofence can be defined around the train station (large area)

Kylie enters the geofence zone and gets the message before event coming onto the platform.

She knows what decision to take

Messages automatically triggered by subscriber entering or leaving location - a “GMS”

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Geofencing / Push LBS (Work Safety) application

- Employees are signing on for various activities
- Some employee will be allowed to work on track
- Alerts can be sent and monitored when employees reach the work geofence
- Non-allowed employees will automatically be warned that they are not supposed to be there
- Employees that do leave the “safe” geofence will be warned that they could be in danger.
- Train Drivers can be alerted to reduce speed - Track work is in the area
Geofencing / Push LBS (Level Crossing) application

Message deposited by Train Entering the GMS
Automatically triggered for delivery by subscriber entering the “GMS”

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Location Based Services Can Add Value to Existing Safety Systems

- Location Based Services can be used to supplement existing safety systems
  - Utilise existing technologies (Off the shelf)
  - Implementation can be tailored to specific customers/applications

- Road Users
  - Signals can be sent to warn of approaches to hazardous zones/events
  - Vehicle/Driver behaviour can be collected for
    - Ongoing Safety Training
    - Accident Investigation

- Rail Operators
  - Parallel system to existing technology to increase safety
    - Failed crossings
    - Maintenance or track work
  - Emergency ahead
Questions?

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