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Proposal for

Location Based Services for Vehicles: Technologies and Standards

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# Basic Proposal Information

Instructors:

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2. Yuedan Yi

Proposed Tutorial Length: A Half Day Tutorial.

# Motivation and Objective

Location based services (LBS) for mobile are the services supported by cellular networks providing mobile users with various location sensitive applications such as E911, Friendfinder, personalized advertisement, etc. LBS accelerate the convergence of 3C (computer, communication and consumer electronics). One key aspect of LBS market is the rapid growth of GPS (Global Positioning System) market, which is predicted to reach $28.9 billion by 2010 by GPS World. The driving force behind of the growth of LBS market includes regulator’s mandates, the development of more efficient location technologies and the expanding of LBS from network operator to third service provider. The rapid development and widely adoption of assisted GPS (AGPS) is also believed to the key to the success of LBS market, which are bringing huge revenue opportunities for wireless network operators and service providers.

# Abstract

In this tutorial, the state of art of mobile network assisted GPS and location based services (LBS) will be explored in terms of technologies, standards and implementations. There are four major parts in this proposed tutorial. Within the first part, an introduction to AGPS and LBS is presented along with an overview of the growing LBS market. Two examples of LBS, E911 and telematics, are emphasized. In the second part, after a survey of wireless location technologies, an overview of GPS history and system architecture is presented. Along the explanation of GPS positioning, the error source and signal link budget of GPS positioning are analyzed. It is then revealed that it is necessary to improve GPS positioning for ensuring the success of LBS. An overview of AGPS techniques is discussed thereafter. In the third part, the implementation of mobile network assisted GPS is presented after an overview of the location services provided by mobile networks. The architecture and operation of the network-dependent LBS control plane of cdma2000 and UMTS networks are reviewed, respectively. A survey of the related standards by OMA, 3GPP and 3GPP2 is given. Finally, the challenges, further works and standard activities for mobile network assisted GPS and LBS are presented.

In summary, this tutorial is intended to provide a comprehensive overview of mobile LBS for a wide array of audiences, including LBS services providers, application developers, marketing managers and system researchers, etc. It includes not only the background information and standards activities but also some hand-on development examples.

# Preliminary Content for a Half-Day Tutorial

1. Introduction to Location Based Services
   * The LBS definition and a historical review
   * An overview of LBS market and its development
   * LBS Examples: E911, E211 and Telematics
   * LBS in mobile standards
2. Wireless Positioning Technologies and AGPS
   * Overview of Wireless Positioning Techniques
   * GPS Architecture and Positioning
   * GPS Error Sources and Budget
   * GPS and Galileo
   * Assisted GPS
3. Mobile Network Assisted GPS and LCS
   * LCS requirements
   * LCS standards in mobile networks
   * Mobile Network Assisted GPS
4. Challenges for AGPS and Mobile Location Services
   * Regulations
   * Standardization
   * Market and Implementation

# Biography

Shu Wang

He is a staff system design engineer in VIA Telecom (USA), San Diego. He is an active contributor to 3GPP2 Technical Specification Group C Working Group 3 and 4, FLO Forum and IEEE 802.16m. Before this, he worked with LG Electronics Mobile Research (USA), LinkAir communications (USA), Harris Broadcast Corporation and UCLA wireless media Lab.

# Previous Tutorial Experience

Besides previous research and standards experience on location based services,

* Location Based Services for Mobiles. IEEE ICC 2008