Course ID
POSLOC
Course Duration
3 days

Course Title
Positioning and Location Workshop

Related Courses

- Advanced Workshop on Positioning and Location (ADVPL, 2 days)
- IP, Location and Geo-Location Technologies for Law Enforcement, Intelligence, and Public Safety (IPGEOLOC, 2-3 days)
- 4G LTE & UMTS/HSPA Location Based Services to Support E911 Requirements (E911-3G4G, 2 days)
- Voice Communications and Technologies for 911 Call Takers, Supervisors, and Trainers (VOICE-911, 2-3 days)
- VoIP for 911 Administrators, Managers, Directors, and Regulators (VOIP-911, 2-3 days)
- 911 for IP Professionals (911-IP, 2-3 days)
- Communications Assistance to Law Enforcement Act (CALEA): Technologies and Compliance for TDM and Packet Voice Services (CALEA, 2-3 days)

Aimed At

This course is aimed at those interested in the commercial, homeland security, or national defense application of positioning and location technologies.

Group Size

5-25

Prerequisites

Background in the underlying telecommunications technologies.

Course in a Nutshell

There is no other attribute that better defines mobile communications than mobility and no better asset than location. Effectively leveraging this asset is based on the ability to determine the position of the target mobile device, obtain the position data from cellular network, and resolve the data into useful and context specific location information.

This course will equip you with the basics of mobile positioning and location management as well as a firm understanding of positioning systems, location management infrastructure, standards, technologies, Location Based Service (LBS) applications, and various vendor solutions. You will learn about the relationship of positioning technologies to network infrastructure and geographic information systems. The session includes a workshop involving network planning and LBS application design.

Customize It!

This course can be extended or shortened as required. It can also be revised to cover the positioning and location methods or applications of particular interest to your group.

Course Outline

Part 1: Introduction to Positioning

- Radio Access Operations
  - Handset to Base Station
  - GSM vs. CDMA
- Mobility Management
  - Roaming
  - Databases
  - Network Elements
- Network Signaling
  - SS7 vs. IP
  - SS7 Trunk Signaling
  - SS7 Database Signaling
- Network Elements
  - Review of GSM Network
- History of Mobile Positioning
  - FCC Order for Phase 0, 1, and 2
  - Carrier Decisions to Comply
  - Evolution of GPS Deployment and Usage
- History and Direction of LBS Applications
  - Location-based Applications
  - Location-enabled Applications
  - Location Is Part of Everything

Part 2: Overview of Cellular Positioning Methods

- Cell Site Location
  - Gross-level Location
  - Cell Site vs. other Methods
- Terrestrial Methods
  - Time Division of Arrival (TDOA)
  - Angle of Arrival (AOA)
  - Pattern Matching and others
- Satellite Methods
  - Autonomous GPS
  - Assisted GPS
- Non-cellular Methods
  - RFID
  - WiFi
  - WiMAX
  - Bluetooth
  - Others
- Discussion of Advantages and Disadvantages

- Handset vs. Network Issues
- Accuracy Issues
- Fitness for Use

Part 3: Geographic Information Systems (GIS)

- Data Representation
  - Vector
  - Rastor
- Provisioning and Administration
  - Geo-coding
  - GIS Systems Overview
  - Administration and Management
- GIS Data Processing of Location
  - Point in Polygon
  - Radius Search
  - Other Methods
- GIS Solutions and Providers
  - NAVTEQ
  - Others

Part 4: Location Management

- Different Architectures
  - User Plane
  - Control Plane
- Standardized Architectures
  - CDMA vs. GSM
  - Standard GSM Architecture
  - Protocols and Procedures
- Location Management Issues
  - Pull vs. Push Location
  - Trusted vs. Non-trusted
  - Quality of Service (QoS)
  - Location Gateway Function

Part 5: Location-based Applications

- Different Types of Applications
  - Voice vs. Non-voice Applications
  - Commercial vs. Non-commercial Services
- Wireless E 9-1-1 (E911)
  - J-STD-36
  - Call Flows

- Commercial Control Plane Applications
  - Application Discussion
  - Network Elements
  - Messaging and Call Flows
- Commercial User Plane Applications
  - Application Discussion
  - Network Elements
  - Messaging and Call Flows

Part 6: LBS Application Challenges

- Privacy and Security
  - Commercial Issues: Google and your Carrier Knows your Location !
  - Legal and Regulatory: Laws and Industry Rules
  - Law Enforcement and Other Special Cases: Lawful Intercept and Location
- Working with Operators and Third-party Companies
  - Mediation and Brokering
  - Service Level Agreements (SLA)
  - Activation and Provisioning
  - Billing and Settlement
- Application Integration
  - Two or More Applications
  - Integration with Non-LBS Systems

Part 7: Workshop: Designing an LBS Application/System*

- Application Design
  - Commercial vs. Non-commercial
  - Unique Requirements for Application
- System Design
  - Positioning Requirements
  - Location Management Requirements
  - GIS Requirements
  - Other Requirements

* Instructor-provided choices of applications are provided

Part 8: Positioning and LBS Ecosystem

- Ecosystem and Value-chain
  - Ecosystem Review
  - Value Chain in Service Delivery
- Hot and Emerging Areas

- Location Brokering/Mediation
- Advertising/Marketing
- Social Networking
- Personal Safety

- Discussion of Major Players
  - Wireless Carriers
  - Positioning System Providers
  - Service Bureau Companies
  - Application Companies
  - Content Companies

Part 9: Introduction to Advanced Topics

- Advanced Topics
  - Presence vs. Location
  - Next Generation Networks (NGN)
  - NGN Applications: 9-1-1, Personal Safety and More
  - Context Aware NGN

Part 10: The Future of LBS

- Latest FCC Order
  - New Accuracy Requirements
  - Implications for Industry
- Trusted-party Mediation
  - Automatic Opt-in and Trusted Location
  - Implications for Uses and Providers
- Everything Is Geo-coded
  - Google and others are Geo-coding the World
  - Implications for Society
- Location and Social
  - Manual “Check-in” goes Autonomous
  - Location Monetizes Social
- User Generated LBS Content
  - Virtual “Post-it Notes”
  - Social Networking, Gaming, Commerce, and More
- LBS and Augmented Reality
  - Taking Notes and Geo-coding to a Whole New Level
  - Implications for Industry and Society
- End-user Services Customization
  - Location-enabling your Personal World

Part 11 - Workshop: Designing Your Own Application*

- Type of Application and Assumptions
  - Voice, Non-voice, or Both
  - Application Goals
- Determine Use Cases
  - How Shall Users Use the System?
- Determine Positioning Systems
- Determine Location Management Systems
- Identify Messaging and/or Call Flows
- Identify Potential Regulatory and Business Issues
- Wrap-up
  - Course recap
  - Discussion
    Participant evaluation of the course

* Participants design their own system and applications from the ground up

How You Will Learn

- An expert on geo-location and location based technologies and their applications will conduct this course in workshop format.
- Along with the lecture, we will use examples and hands-on exercises to enrich the instruction and drive home the essential points.
- If you already know something about the subject technologies, we will build on that knowledge base. We'll compare and contrast what's familiar with what's new, making the new ideas easier to learn as well as more relevant.
- If your background is less technical, we will use examples and analogies to simplify the complex subject matter.
- You will receive a printed Participant Handbook which will help you remember and retain what you learned in class and apply it on your job.

Revised *April 30, 2011*