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Your Established Partner

TeleCommunication Systems, Inc. (TCS) (NASDAQ: TSYS) is a world leader in highly reliable and secure mobile communication technology. TCS infrastructure forms the foundation for market leading solutions in E9-1-1, text messaging, commercial location and deployable wireless communications. TCS is at the forefront of new mobile cloud computing services providing wireless applications for navigation, hyper-local search, asset tracking, social applications and telematics. Millions of consumers around the world use TCS wireless apps as a fundamental part of their daily lives. Government agencies utilize TCS' cyber security expertise, professional services, and highly secure deployable satellite solutions for mission-critical communications. Headquartered in Annapolis, Maryland, TCS maintains technical, service and sales offices around the world. To learn more about emerging and innovative wireless technologies, visit www.telecomsys.com.

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Location-Based Services (LBS) Overview



Global Leader of end-to-end location-based services

TeleCommunication Systems provides a comprehensive LBS solution that includes applications and infrastructure.

TeleCommunication Systems, Inc. (TCS) offers location-based services (LBS) solutions to start or enhance your LBS business. Our Location Solutions support the generation and distribution of location information and provide state-of-the-art LBS applications. Both consumers and enterprise users can benefit from the functionalities included in TeleCommunication Systems' location solution, because we provision all aspects of the LBS value chain backed by two decades of LBS experience.

We offer both active and passive location solutions, designed to optimize your location results while reducing network impact. Our application interface modules provide location information to requesting applications while maintaining critical privacy controls.

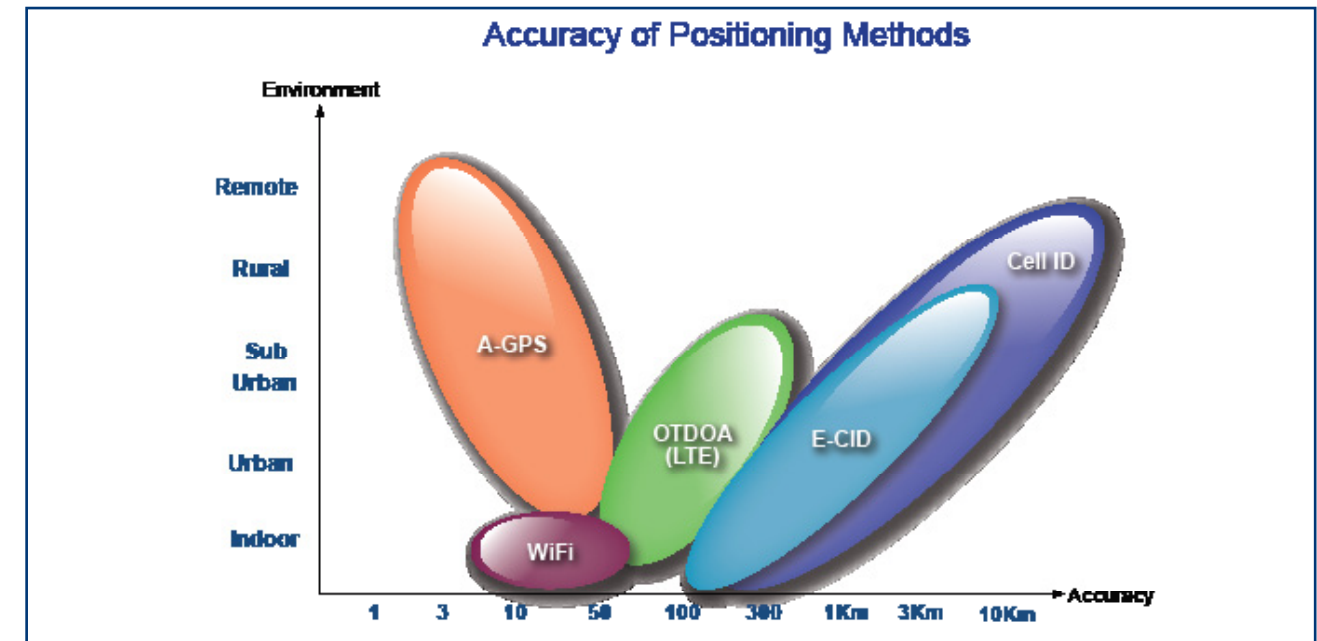
The LBS application solutions support both legacy devices and smart phones and are easily deployed. With these innovative solutions you receive revenue-producing application opportunities suitable for different market and customer needs.

TCS was recognized by Frost & Sullivan as the only true end-to-end LBS provider globally.

- Scalable & flexible solutions
- Years of experience
- Uncompromised quality



- Precise location available
- Interconnected positioning methods
- Meeting budget requirements
- Customizable solutions



Location Accuracy

Uncompromised quality – wherever you go.

A strength of the TCS Location Solution is our accuracy and precision, which is obtained with various interconnected location methods and technologies.

We support 2G, 3G and LTE networks in the control plane as well as SUPL (Secured User Plane Location) over GPRS connection. The positioning determination can be done by terminal (user plane), radio network (3GPP control plane)

or by XLP (ATI, SUPL). Different position determination methods can be used simultaneously, according to your needs.

Whether Cell ID, Wi-Fi, hybrid, or A-GPS Location, our available methods also reflect different network configurations and business environments. Our solution supports both legacy phones without LBS capabilities and new terminals that support various location features and enhancements.

For years, TCS has been at the forefront of LBS implementation, and our complete suite is backed by our extensive know-how and expertise.

LBS Applications help improve your ARPU

We put our profound know-how and expertise to work for you.

By partnering with TCS, you can increase ARPU from new and existing customers while reducing customer churn. We support the integration of your existing applications and we can provide you our white label LBS applications. The TCS apps are designed for easy configuration that supports your unique content, brand, and look-and-feel.

TCS LBS applications support mobile devices that use Android™, BREW™, iPhone®, J2ME®, Palm WebOS™, BlackBerry®, Windows Mobile®, WAP™, and text messaging technologies.

Location Applications

- **Navigation and Mapping** —provides the next generation in feature-rich personal navigation for wireless mobile devices.

- **Family Finder™ and Friend Finder™**—lets friend and family subscribers share location and access a wide array of location-based information.
- **Workforce Management**—enables enterprises to locate, communicate with, and redirect mobile employees and resources in near real-time.
- **Emergency Alert**—the mobile phone panic button will send distress SMS and location information, to pre-selected emergency contacts.
- **Mobile Search**—provides location-enabled mobile search from your mobile phone.
- **Traffic**—provides subscribers with up-to-the-minute traffic maps and real-time speed and incident information.
- **Emergency Services**—enables wireless carriers to provide enhanced emergency services (E9-1-1, E1-1-2).



One system, two options

Hosted or In-network? TCS' LBS solutions are designed to meet your individual needs.

Hosted implementation – from start to success

The TCS hosted solution is designed to minimize deployment timeline, costs, and resource requirements. As part of this solution offering, TCS provides you project management, coordination, and testing support and oversees the end-to-end operation of the LBS solution after launch.

Moreover, you will have the option of acquiring the hosted solution as in-network at a later date once it makes sense – administratively, financially, and technically – to do so.

In-network implementation – scalable and flexible

Scalability is important design criterion for our in-network Location Solution; it allows you to expand the solution capacity as your business grows. Our “High Availability” system configuration can ensure your present and future operational performance requirements.

The LBS in-network solution is flexible too. It is built in a modular, extensible manner, allowing vertical (capacity) expansion with no impact to existing services. New technology modules can reuse the same physical connectivity points to your network.

According to Berg Insight 11/12, “TCS is among the few companies offering true end-to-end location solutions and hosted services.”

- Enable application integration
- White label apps available
- Increase customer retention



- Flexible solutions
- Seamless integration
- OpEx efficient

LBS infrastructure supports 2G, 3G, and LTE networks TODAY

You receive the latest products, outstanding flexibility and fully integrated solutions that meet your requirements and budget.

Fully supported and fully integrated LBS solutions, suited to you.

Our **Gateway Mobile Location Center (GMLC)** module is a 3GPP standards-based control plane system that interfaces with your core network to provide a mobile stations' location and can interface with emergency and commercial LCS clients. The TCS GMLC can support today 2G, 3G, and LTE networks, and deployed by itself can be used to provide a coarse location (Cell ID) solution. It is the most cost-effective way to add basic LBS to your Value Added Services.

The **2G Serving Mobile Location Server (SMLC)** is a standards-based application module for GSM networks that can provide Cell ID and Enhanced Cell ID (CI + Timing Advance). Our 3G and LTE SMLC solutions similarly provide Cell ID, Enhanced Cell ID (CI + Round Trip Time), and when deployed with the Satellite Reference Network,

also add UE-based Assisted Global Positioning System (A-GPS) for more precise positioning of high-end devices.

The TCS LTE SMLC further enhances your options by adding Downlink Observed Time Difference of Arrival (D-OTDOA) positioning for accurate locations where A-GPS is not available—without the need for costly Location Measurement Units (LMUs).

The **Secure User Plane Location Server (SUPL)** is the most accurate and proven server in the industry. The user plane architecture means a fast and cost-effective deployment of LBS services for any network that supports data services—no complicated SIGTRAN or SS7 integration required. The TCS SUPL server provides a state-of-the-art OMA standards-compliant A-GPS server that enables precise and sophisticated location-based services for both mobile operators and OEMs.



LBS Infrastructure built on years of experience

The **Xypoint® Location Services Gateway (XLSG)** is middleware that serves as the interface between the LBS platform components and the LBS applications using standard communication protocols (MLP). The XLSG provides authentication, authorization, privacy, and revenue assurance related to location applications and transactions.

Our **Satellite Reference Network** provides data on any satellite, for any location, at any given moment, for precision location solutions. It does so by accessing multiple networks of satellite receivers and constantly downloading data from strategically positioned receivers around the world. TCS is able to deliver reference data necessary to deploy commercial or emergency A-GNSS services.

Geo-Nexus, the latest in TCS' solution portfolio, is the flexible aggregation of all active and passive location determining technologies into a single access point. This aggregation provides you with micro or macro level location information via RESTful APIs or your use for subscriber analytics. TCS pairs standards-based technologies with bespoke system design and implementation to ensure the best intersection of accuracy, value, and economic feasibility.

- Easy to deploy
- High system uptime and reliability
- Application interface capable



- Standards compliant
- 2G, 3G, and LTE