Trimble Positioning for Automotive Applications
Trimble at a Glance

Core Markets:
- Agriculture
- Construction
- Building Construction
- Geospatial
- Transportation

Emerging Markets:
- Automotive
- Rail
- Forestry
- Field Service
- Water & Electric Utilities

A MARKET LEADER IN DELIVERING ACCURATE ABSOLUTE POSITIONING
- A world leader in transforming how work is done across multiple industries and professions
- Founded in 1978
- 8,500 employees
- Customers in 150 countries
- 36 R&D sites in 11 countries
- Over 1,100 patents issued

EXISTING INDUSTRIAL APPLICATIONS
- Providing driver assist technologies to the Agriculture & Construction industry for 15+ years
- Fully autonomous mining haulage trucks
- Delivering accuracy ranging from <30cm to just a few centimeters in driver assist applications
- 250,000+ tractors equipped with Trimble driver assist technology

OVER 20 YEARS EXPERIENCE IN AUTOMOTIVE
- From the earliest aftermarket in-car navigation products to licensing DR technology for robust factory-installed systems
- Automotive class quality systems – TS 16949
- Trimble – ALK Technologies is a transportation technology company dedicated to defining the optimal route to success through innovative routing, mileage, mapping and mobile navigation solutions

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Our Experience in Autonomy & Driver Assist

Emerging Automotive Applications

- What road am I on? 2–5m
- What lane am I in? <1m
- Where in the lane am I? <0.5m

TECHNOLOGY ENABLERS:
- GPS + Mapping
- Accurate absolute positioning, HD maps, relative positioning,
  (digital camera, radar, lidar, etc.)
- High accuracy absolute positioning, advanced image
  processing, V2X

AUTONOMOUS VEHICLE ENGAGEMENT

- Activity working with Tier 1 suppliers and OEM’s
  - Research
  - Truthing/validation
- Active in automotive development programs tied to
  submeter accuracy

Vehicle Navigation
Wherever you’re going we help you get there. Trimble provides GPS boards, modules, chipsets and technology licenses, professional services and software to major tier-one automobile and electronics manufacturers for a variety of applications from simple navigation to high accuracy positioning for autonomous driving.

TECHNOLOGY AND SERVICE OFFERINGS

- Trimble Advanced Positioning
  - Trimble RTX™ Libraries
  - Precise Positioning Engines
  - Correction Services
- Trimble Applanix provides systems used in benchmarking for autonomous vehicle testing and mapping, as well as affordable high precision systems in production vehicles
- Trimble Embedded Technologies offers software-focused solutions that leverage existing technology in the vehicle to simultaneously support customer’s quality, performance and financial goals

Our Proposal: Deliver proven technology elements to enable absolute positioning

1. Combine Trimble’s precise positioning IP with automotive-qualified GNSS components from an experienced and respected GNSS industry partner.

2. Deliver an existing global streaming corrections service to support automotive applications.

Benefits of this approach:

- Solves the precise positioning problem for automated driving applications
- Meets automotive quality, cost and support requirements
- Extendable architecture supporting multiple geographies and needs

- One global correction service
- Proven performance in autonomous applications in other industries (agriculture and construction)
- Redundant Systems
Trime RTX solves an important positioning problem for automotive applications. To achieve the desired level of absolute positioning required, ADAS solution needs high precision GNSS that is accurate, reliable and converges quickly. Trimble RTX services is the best performing satellite-delivered correction service on the market today when measuring horizontal accuracy together with speed of convergence. A global network is supported by redundant servers that are monitored 24/7, offering the reliability and assurance required for automated driving applications.

**Proven Technology to Enable Absolute Positioning**

**Trimble RTX**

- Real Time eXtended service introduced in 2011
- Real-time, centimeter-level positioning anytime and nearly anywhere on earth
- PPP-like service without the need for a local base station/RTK or VRS Network
- Static and kinematic applications
- True Multi-GNSS service: GPS, GLONASS, BeiDou, QZSS, Galileo
- Pre and post broadcast data INTEGRITY checks for optimal reliability
- Quality-assured network operations
- Monitored 24/7
- Trimble RTX is not dependent on hardware platform

**Trimble RTX: Transforming the way the world drives**
About Trimble RTX Technology

Trimble RTX technology utilizes data from a global reference station network to compute high accuracy positions based on satellite orbit and clock information. Trimble RTX supports a suite of real-time correction services delivering a range of accuracies from better than 4 centimeter to sub-meter performance in as fast as one minute.

Trimble RTX-based positioning innovations are available via convenient, easy to access satellite delivery or via cellular/IP communication, providing users with flexible options to obtain high accuracy positions in nearly any environment. Trimble RTX correction services are available throughout most of the world.

For more information visit [www.trimble.com/RTX_auto](http://www.trimble.com/RTX_auto), or contact us by emailing trimbldrtx_auto@trimble.com