Driving development of the Internet of Vehicles industry with Intel® Quark™ processor

Intel® Quark™ Processor X1000 Series
Internet of Things
Transportation

Shenzhen Star Course Information Technology Co., Ltd. (Star Course), founded in 2011, is devoted to research and development (R&D) of intelligent vehicle information terminals based on Beidou* satellite positioning. To meet increasingly complex demands for commercial vehicle monitoring, fleet management, and driver behavior analysis from the cloud computing system at the Internet of Vehicle (IoV) back-end, Star Course and Beijing Sinoiov Information Technology Co., Ltd. (Sinoiov), China’s leading commercial vehicle IoV service provider, combine efforts to develop Intel® Quark™ processor X1000 series-based vehicle information terminals and end-to-end commercial vehicle IoV solutions.

CHALLENGES

• **Improved computing performance:** The IoV platform required computing and analyzing a growing amount of information from the Beidou satellite positioning system (GPS) and vehicle condition sensors.

• **Reduced terminal costs:** To accelerate the adoption of the vehicle information terminal and promote the development of the IoV industry, Star Course was looking for a lower-cost terminal solution.

• **Shortened development cycle:** Star Course needed a stable, flexible, and scalable hardware and software platform to shorten time to market and gain a competitive advantage.

SOLUTIONS

• **Intel Quark processor:** With a high degree of integration and low power consumption, the Intel Quark processor X1000 series has fully satisfied the requirements of vehicle information terminals from Star Course for performance and cost.

• **Open-source platform:** The Intel Quark processor supports open-source Linux and provides a complete development suite, which helps to reduce development workload and technological risks, improve system quality, speed up the development process, and shorten product time-to-market.

IMPACTS

• **End-to-end solutions:** The Intel Quark processor X1000 series-based vehicle information terminals and Intel® architecture-based back-end IoV cloud computing platform offer a comprehensive, end-to-end IoV solution.

• **Lower total cost of ownership (TCO):** Based on the Intel Quark processor and a software development platform from Intel, Star Course has shortened its product R&D cycle from nine to 10 months to just six months. A shorter R&D cycle has helped Star Course to lower TCO, gain competitive advantages, and provide cost-effective vehicle information terminals.

• **Enhanced driving safety, energy conservation, and emissions reduction:** Driving experience is improved and driving safety is enhanced through real-time monitoring of vehicle location and speed, and by warning before any potential vehicle problem or accident. Fuel consumption data and driver behaviors are also analyzed in real time to reduce fuel consumption and vehicle emissions.
**Intel® Quark™ processors enable Star Course to develop an Internet of Vehicles vehicle information terminal solution with a high cost-performance ratio and shortened time to market**

### Computing performance challenges

The continued support and investment from the Chinese government in the transport industry, and growing demand for deployment of vehicle information terminals on commercial vehicles, plus their access to the national supervisory platform, have all contributed to fast development of the IoV industry in China. Vehicle information terminals play a crucial role in information exchanges between vehicles and the backend computing platform of IoV, and among vehicles. They collect dynamic and static vehicle information via the Global Navigation Satellite System (GNSS), vehicle sensors in real time, perform local computation and analysis and transmit the resulting data to the IoV system.

Star Course general manager Liu Bo said, "These require vehicle information terminals with both high computing performance and rich external interfaces to support more vehicle sensors."

### Reduced terminal costs and shortened product time-to-market

The price of vehicle information terminals is a significant factor for the adoption of IoV solution and cost-performance ratio is a crucial consideration as Star Course chose a platform. "In addition, we also have to consider the software development platform and technical support for the hardware platform. A longer software development cycle will also lead increased terminal costs," Liu Bo added.

Star Course also needed to consider operational stability in relation to the operating environment in the vehicle, physical space restrictions, and power consumption.

**LESSONS LEARNED**

- The IoV platform targeted for commercial vehicles requires stable, secure, and reliable data from vehicle information terminals. Intel® architecture-based vehicle information terminals can fulfill this requirement.
- The Intel® Quark™ processor X1000 series features outstanding computing performance, rich I/O interface capabilities, a high degree of integration, and lower power consumption, making it an ideal hardware platform for vehicle information terminals.
- The Intel architecture-based platform can help to shorten the product R&D cycle, improve product quality, and reduce development costs for IoV systems.

### Vehicle Terminal Communication Protocol and Data Format (JT/T 808).

**End-to-end IoV solutions for commercial vehicles**

The combination of vehicle information terminals from Star Course with the cloud computing platform for commercial vehicle-targeted IoV from Sinoiov delivers an end-to-end IoV solution. Vehicle information terminals from Star Course collect data via micro control units (MCUs), and then send the data to the Intel Quark processor X1000 series for computations and analyses. Finally, they exchange data with Sinoiov’s Intel-architecture-based back-end cloud computing platform for commercial vehicle IoV.

Liu Bo concluded, "This is the first Intel-architecture-based, end-to-end commercial vehicle solution in China’s IoV for commercial vehicles. We are delighted with the brilliant achievements it has made so far. Looking ahead, we are hoping we can go further with Intel and other industrial collaborators and jointly promote improvement and development of China’s IoV ecosystem."

Find the solution that’s right for your organization. Contact your Intel representative, visit Intel’s Business Success Stories for IT Managers, and check out IT Center, Intel’s resource for the IT industry.