Telematics Help Emergency Fleets
Optimize Efficiency

Fully Rugged Vehicle-Mounted Terminal
Fleet Management Terminal
Rugged Tablet with Peripherals
Out of all the types of vehicles, emergency vehicles perform the tasks associated with natural disasters, and the slightest mistakes would cause unthinkable consequences. Therefore, the fleet management solutions provided to ambulances, police vehicles, fire engines, and engineering rescue vehicles cannot make the slightest error. Imagine if "no GPS signal" or "unresponsive button" problems were to occur during critical rescue or fire response moments, lives would be lost. Therefore, the key requirement for emergency vehicle fleet management solutions is a high degree of stability. In addition, immediate vehicle dispatch is also critical to achieve rapid relief.

Van Lin, Director, Digital Logistics & Fleet Management Sector, stressed that "you must first know exactly each vehicles' location in order to immediately schedule and dispatch vehicles." However, the reality is that there will always be vehicles missing from the dispatch center's monitor screen. "These 'disappeared' vehicles may have been driven near high-rises or areas where the GPS cannot function, which mean the control center cannot detect the vehicles' whereabouts. This is detrimental to the accuracy of scheduling." To perform rescue and disaster relief without wasting a single second, emergency vehicle dispatch must emphasize accuracy and precision.

Support a Collective Intelligence Model and Issue Optimal Directives

Based on this idea, Advantech's ambulance solution can even be integrated with medical devices. Therefore, when a patient enters the ambulance and connects with all of the medical equipment, the in-vehicle computer can transmit data remotely, thus allowing the emergency room doctors to understand the patient's conditions in advance, and be able to implement medical treatment immediately after the patient has reached the hospital.

The Advantech solutions adopted by several hospitals in Australia can even provide live feeds from the
ambulance site as well as transmit and display the images of the injured patients on the hospital's monitoring wall. The severity of the injuries for patients retrieved by ambulances can vary widely. The monitor would display a red box around the images of the most serious injuries, to notify the doctors that this case should receive immediate priority. Integrating ambulances with this remote medical model can enable ambulances to perform more than just transportation. Instead, the ambulance would become part of the treatment process, which would greatly accelerate the time required for injured patients to receive medical treatment.

This collective intelligent decision-making model is also commonly seen in firefighting. In this model, the backend control center can remotely control the onsite camera system equipped in the vehicles, and video the onsite conditions from every angle. The images are transmitted and displayed at the backend monitoring wall. The backend staff would provide instructions and recommendations to the fire-fighting team captain based on the information received, such as cutting off power for certain areas.

**Offer Powerful Processing Capabilities to Meet Immediate Processing Needs**

Because rescues are time-sensitive, in-vehicle computers for emergency vehicles must be equipped with a certain level of processing power, or else the requirement for “instant processing” cannot be satisfied. Most of the in-vehicle computers on the market are just data acquisition devices and do not have enough computing power. As a result, they cannot compute, analyze, and make decisions based on the calculated data resources. Instead, the data must be transmitted to the backend, where the calculations are done by the resources there, and then the results are transmitted back to the scene. These back and forth exchanges may cause missed opportunities to save lives. Van stated that, "Although numerous cities claim that they have sufficient network bandwidth and smooth networks that is not necessarily the case. So you cannot totally rely on the backend to processing everything during emergency relief operations."

From this viewpoint, the in-vehicle computers of emergency vehicles must have data collection, calculation, and analysis capabilities. Compared to the most in-vehicle computers on the market, with 400 MHz RISC architecture and 16 MB RAM without operating system, Advantech provides "real computers" with high-end 1 GHz RISC architecture and reliable operating systems that use Intel low-power consumption automotive grade chipsets. The system provides rich I/O expansion and powerful communication capabilities that can perform calculations and analyze the collected data. Its powerful processing capabilities can even run software such as simulations, databases, etc.

"It is worth mentioning that the fleet management equipment installed in emergency vehicles often require highly conflicting specifications. In terms of police video evidence collection capabilities, a police car must be equipped with four remote controlled cameras with high definition, high resolution, and large storage conditions. In addition, the system must be strong enough to perform video encoding and decoding, storage, streaming, and instantly transmit the data to the backend."

For these requirements, the solution must have high computing power and a large storage capacity, and these requirements would make the system generate more heat and become more susceptible to vibrations. These problems are not easy to overcome, and form an entry threshold for the fleet management solutions industry. Van stated, "This is exactly why Advantech decided to enter this field. We believe we are the vendor most capable of crossing the threshold for this industry, and make contributions to emergency relief efforts."
Improve service quality and reduce operating costs are objectives that all logistics service providers try to reach. Now, many products and solutions, such as vehicle mount computers, wireless mobile devices, GPS, vehicle diagnostics and monitoring, are used in the management of fleets, carrying out all requests in the intelligent application of logistics and providing multiple functions such as fleet dispatching and scheduling, vehicle location tracking, and real-time management for freight, driver behavior management, and more. They allow logistics service providers to effectively manage their fleet using regular IT tools such as mobile and real-time systems. Police vehicles and fire engines for emergency rescue at the front line can use fleet management to promote the efficiency and execution of their service, and ensure the security of their officers on duty.

Manage Vehicles, Freight and Employees

Van Lin, the Director of Advantech, indicates that fleet management is a very important part of intelligent logistics, and its prime directive is to optimize management costs. In the past, prior to modern logistics and fleet management systems, administrators found it difficult to determine the status of their vehicles when they left with freight, and it was impossible to re-assign new tasks on-the-fly before vehicles had returned to the dispatch center. Now with wireless networks and GPS satellite positioning, fleet management systems are capable of tracking the locations of several vehicles simultaneously, and indirectly determining whether freight has been delivered to the

Optimized Logistics
Drive Smart Fleets

The application of an intelligent fleet can not only optimize cost control management for the logistics and transportation industry, but can also be applied to emergency services such as ambulance and fire services to improve the efficiency and execution of their tasks as well as ensuring the security of all staff whilst engaging in official duties at the front line.

By Sharlene Yu and Pictures from Fotolia
Interview with Van Lin, Director; Brian Hsieh, Assistant Manager; HC Lee, Project Manager; Irene Cheng, Product Manager of Advantech iService Business Group
assigned location on time; all this is good but it still does not optimize cost control management. But now, via vehicle mount computers and network systems, administrators can not only can manage vehicles and freight, but can also manage employees. Inappropriate driver behavior can be monitored, such as over speeding or over braking which can rack up costs on fuel, tire replacements, oil consumption and vehicle damage. Tire pressure detection means vehicles can send warning messages to drivers before a breakdown occurs, and this also assures the security of the freight delivery, and decreases insurance and maintenance fees on vehicles. Furthermore, a vehicle mounted system can accurately calculate gas and oil quantities and consumption and prevent drivers from stealing fuel and other malicious activity. In addition, drivers can immediately upload all information to the system in the logistics center as soon as freight has been delivered to the assigned location, and the administrator can accurately control delivery schedules to prevent fines due to delayed freight delivery.

**Dedicated Soft/Hardware Overcomes Challenges**

In order to achieve real-time management for a fleet, a vehicle mount system requires several peripheral devices, such as wireless communication, satellite positioning, CAN BUS vehicle control systems, sensors and cameras. Plus, the power supply, shock resistance and temperature of its core computer should be able to overcome harsh environments so it can work normally.

Van Lin indicates that in-vehicle computers should conform to several special requirements. For instance, unstable power supplies and excessive noise often occur in old trucks, and insufficient voltages cannot activate its system. Sometimes, when connecting to peripheral devices, an instant high voltage may burn the motherboard, and bumpy countryside roads mean trucks can experience power drop offs or have their computers crash. What’s more, systems which fail to conform to wide-temperature operation cannot work normally in extremely hot or cold weather. All these factors can mean dispatches fail, and in the worse-case scenarios, the system has to be sent back to the factory to be repaired.

Advantech systems not only overcome these through their advanced and rugged in-vehicle hardware technologies, but also transform all the complex data collected by intelligent software into useful information. For example, images with high resolution can be uploaded to headquarters for real-time monitoring, and images can be further analyzed to perform multiple functions, such as obstacle avoidance, automatic speed limiting, driver behavior monitoring, and anti-theft. Regarding connectivity, Advantech vehicle-mounted computers can make the most of Wi-Fi bandwidth and select the cheapest system capable of transmitting the most data over long distances which significantly saves network communication fees for logistics service providers.

**Security and Efficiency Enhances Fleet Applications**

The application of fleet management can achieve profit maximization for logistics service providers. Moreover, with an advanced vehicle mount tablet computer, it can improve the efficiency of police and fire services who need to maintain social order, prevent fires and provide emergency medical service. The emergency work of the police and fire services can be classified into two broad categories; patrolling, spot checking and maintaining order; and an emergency response service for accidents and disasters. A logistics fleet dispatch system can be used to perform standard vehicle dispatch operations for the former, and for rescue missions which often occur in harsh outdoor environments in poor weather conditions like storms with high winds and heavy rains, special designs are needed. Not long ago, we used to use paper maps to search locations; now we use smart phones and tablet computers with satellite positioning built in. However, these kind of commercial products are not designed for special tasks and they can only be used in 0~40 °C environments, which means they may not receive signals reliably or suffer interference, plus their poor shock resistance makes them tend to crash or malfunction.

Advantech rugged tablet computers have passed MIL-STD-810G four feet drop tests, IP54, and EN50155 vibration tests, and are designed for harsh environments. They are suitable for multiple applications, including field services, manufacturing, warehousing, factory equipment maintenance, emergency services, and transportation, to name a few. Current customers not only demand that vehicle mount products should be rugged, but they also demand that they should be special-purpose. For example, logistics storage, long-distance container transportation, urban courier service, public transportation, and emergency rescue vehicles—all require unique designs and solutions. Advantech logistics solutions are the smart choice for many different kinds of fleets and logistics industries.