

Logis Advantech

Optimized Logistics Drive Smart Fleets

2015 **Special**

Telematics Help Fleets Improve Supply Chain Management



Fully Rugged
Vehicle-Mounted Terminal



Fleet Management
Terminal



Rugged Tablet with
Peripherals



Contents

Viewpoint

04 Telematics Help Fleets Improve Supply Chain Management

Application Stories

06 Swire Coca-Cola Taiwan Adopts Efficient Warehousing Solutions for Error-Free Operation

08 eBus Solution Increases Safety and Convenience in South America

10 Optimizing IT for Improved Cargo Management

14 Behavior Management for Truck Drivers

16 Not a Second Wasted in Rescue and Relief Efforts

18 Optimized Logistics Drive Smart Fleets

20 Smart Applications Enable Easy Warehousing Logistics Upgrades

22 Intelligent Logistics Management Boosts Efficiency

24 Supply Chain Management in the Automotive Industry

28 Coping with Harsh Operating Environments

30 Smart Fleets Improve Safety in Mine Operations

32 Munich Airport Intelligent Transportation Optimizes Fleet Dispatch

Published by
Advantech Co., Ltd.

Address
No.1, Alley 20, Lane 26,
Rueiguang Road, Neihu District,
Taipei, Taiwan 11491
Tel +886-2-2792-7818
Email
iService@advantech.com.tw

Editorial Committee
Eva Wang
Ashley Wu
Van Lin

All rights reserved. Reproduction
without permission is strictly
prohibited.

Digital Logistics

Enhancing the Efficiency of Goods Delivery



ADVANTECH

Enabling an Intelligent Planet

One-Stop Shopping For All Your Needs

Advantech is the first company to provide a comprehensive product portfolio that covers harbor, warehousing, logistics and fleet management applications. With the integration of mobile data capture technology and partner supply chain software, our products enable customers to better control their supply chains and inventories, save time by moving products faster and effectively increase productivity.

Rugged-Design Industrial Mobile Computers

Advantech offers integrated systems that are suitable for a wide range of temperatures and feature certified power systems, a full suite of RF protocols, as well as vibration and shock resistance. Our comprehensive software developer kit facilitates application development, thereby accelerating the time-to-market for system integrators while reducing costs.



DLT-V83xx
for warehousing



TREK-7xx series
for fleet management



Rugged tablet PC
for field workers



Vehicle docking cradle
paired with a rugged tablet PC



In-vehicle camera



Mounting kit

www.advantech.com/digital-logistics/



Advantech

No.1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei, Taiwan 114, R.O.C.
Tel: +886-2-2792-7818
Email: iService@advantech.com.tw

Telematics Help Fleets Improve Supply Chain Management

The Internet of Things (IoT) is changing the face of cities of the future, bringing intelligent technologies and adding convenience. An important facet of intelligent city is digital logistics and efficient fleet management. Fleets use telematics to monitor the location, movement, and status of vehicles, building a comprehensive view of their networks. This advanced approach not only allows warehousing and logistics to correctly receive and deliver goods, it also eliminates blind spots in the business. Fleet vehicles are difficult to manage without an investment in technology as they are often on the road and out of touch with the rest of the inventory chain. Not only logistics, another segment that benefits from technology is emergency fleet management, police car, fire engine and ambulance operators can take advantage of instant communications to improve efficiency and enhance safety.

A key use of IT tools and intelligent applications is to improve business efficiency and reduce operating costs. To achieve the goal, how to transform large amounts of data into meaningful information becomes very important. Many examples come to mind: In warehousing, using 3D-positioning techniques can be used to convert static data into instructions to guide warehouse forklifts indoors as they move inventory. In traffic applications, gathering the speed and position of cars can alleviate traffic jams. Through software analysis, in-vehicle video systems can be used for anti-collision, lane deviation, and other safety warnings, or it can even be used to automatically adjust a car's speed based on the official speed limit. In delivery applications, the use of electronic signatures ensures the safe delivery of goods, and keep logistics' operators informed about shipping schedules in real-time. For disaster relief,

personnel can speed up operations and improve critical rescue times by real time data capture. On an accident scene, injury assessment and initial rescue information can be uploaded to hospitals accelerating the process of first aid treatment. Emergency crew safety is also enhanced by vehicle telematics systems as they rush to an accident site, and handheld devices operated by crews further enhance task efficiency and personal safety.

IT tools also help manage people and their behavior. An example is installing video surveillance equipment to monitor improper driving habits and reduce collisions in cold storage areas. Personnel are protected, food safety is ensured, and employers are further protected against employee theft or other malicious behavior. In law enforcement, optimal routes for police patrols can be calculated, increasing public safety and decreasing criminal activity.

In addition to providing comprehensive in-vehicle computers for warehousing and logistics, long-haul fleet, local fleet, public transportation, emergency rescue and other applications, Advantech has introduced expert-level support to the eco-system, which delivers a richer project experience for downstream vendors and participating third party suppliers. System integrators will also find perfect, one-stop solutions, resulting in a win-win situation for all parties.

We believe that by sharing our expertise, we add value. Leveraging digital information in a meaningful way greatly contributes to the success of fleet management solutions, and enhances our products and services.



Van Lin,
Director, Advantech iService Business Group

10" Fully Rugged Tablet PC for Field Services



PWS-870

ADVANTECH

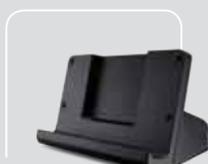
Enabling an Intelligent Planet

PWS-870 is a 10.1" fully rugged tablet PC with optimized performance, outdoor readability and durability, rapid data collection capabilities, and rich accessories. PWS-870 is specifically designed for field service markets and applications related to public safety, utilities, inspection, and construction.

- Intel® Core™ i3/i5/i7 processor
- 10.1" HD high-brightness, multi-touch, Gorilla Glass panel display
- Built-in dual cameras, 1D/2D barcode scanner, and NFC RFID
- Hot-swappable 2nd battery for up to 11 hours operation
- MIL-STD-810G and IP65 certified, and can withstand drops of up to 4 ft.



Vehicle Docking Station



Desk Docking Station



Handle



Case
Universal Cover



Stand

www.advantech.com/digital-logistics/



Advantech
No.1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei, Taiwan 114, R.O.C.
Tel: +886-2-2792-7818
Email: iService@advantech.com.tw



Swire Coca-Cola Taiwan Adopts Efficient Warehousing Solutions for Error-Free Operation

Throughout its illustrious more than 100-year history, Coca-Cola has consistently pursued premium quality. Accordingly, Swire Coca-Cola, its bottling partner in Taiwan, recently adopted an innovative warehouse management system that uses next-generation technology to enable real-time inventory data management, increasing the efficiency of all warehouse operations.

**By Hsiao-jing Yu with pictures from Swire Coca-Cola Taiwan
Interview with Hong-yi Zhong, Logistics Director of Swire Coca-Cola Taiwan**

From humble beginnings more than 100 years ago, when only nine drinks were sold per day, to its outstanding performance of approximately 1.9 billion daily drink sales today, Coca-Cola has expanded its market coverage from the United States to more than 200 countries around the world. To ensure the timely distribution of its various beverage products, Coca-Cola's bottling partner in Taiwan, Swire Coca-Cola, has established production plants in northern and southern Taiwan, as well as warehouses in Taoyuan, Wang Tien, and Kaohsiung that serve as supply centers. In addition to sodas (Coca-Cola, Fanta, Sprite etc.), the company produces a range of beverage products, including fruit juices, teas, and sports drinks (Minute Maid, Sokenbicha, Original Essence, AQUARIUS, etc). However, sufficiently managing warehouse operations and logistics while producing a variety of beverages, and ensuring timely and accurate deliveries can be challenging.

“The food industry is sensitive to production dates. Products produced first should be shipped first to ensure that customers receive fresh products. As the production volume increases, warehousing management becomes more challenging. Moreover, demands for channel-specific packaging have increased in recent years. For example, Coca-Cola has launched yearly signature bottles, whereby year 2015 bottles will only be sold in 7-11. Thus, products of the same brand and capacity but different packaging should be accurately identified in the warehouse for sales in different channels,” asserted Hong-yi Zhong, Logistics Director of Swire Coca-Cola Taiwan. These reasons prompted Swire Coca-Cola Taiwan to replace their previous manual operation and paper-based processes with Advantech's warehouse management system (WMS) to increase the efficiency of warehouse operations management.



PWS-770 with vehicle docking station

The reinforced PWS-770 tablet PC comes with an vehicle docking station and supports mobile operations, satisfying Swire Coca-Cola Taiwan's various requirements and ensuring highly efficient warehousing and logistics management.

Adequate Tools are Essential for Successful Job Execution

The effectiveness of the WMS depends on the use of appropriate software and hardware in the warehouse. Hong-yi Zhong also explained, "Onsite staff must keep records of stock inflows and outflows for inventory control. Initially, our WMS was compatible with standard commercial tablet PCs. However, we began using the WMS in February, when the weather was cold, rainy, and humid. This affected our PCs, causing frequent instability. Consequently, in March, we elected to replace our commercial PCs with industrial-grade tablet PCs in an effort to resolve this issue."

According to Li-jian Yu, the Advantech sales engineer responsible for this project, Swire Coca-Cola Taiwan required PCs that could not only cope with the challenging operation environment caused by the warehouse temperature and humidity, but also be installed in a holder at the front of the forklifts. The PCs needed to be able to withstand the constant vibration of a moving forklift and any potential shaking when loading and unloading stock. Additionally, the PCs had to be able to be recharged in the forklifts to support 24-hour operation. Moreover, each PC needed the ability to connect to the company's ERP system regardless of location. These criteria could not be fulfilled by standard commercial tablet PCs, which was the primary reason for Swire's selection of Advantech's industrial-grade reinforced tablet PCs.

Furthermore, the positive customer service and support provided by Advantech was another factor that motivated Swire Coca-Cola Taiwan to select them as a supplier. Jin-hui Lin, system analyst at Swire Coca-Cola Taiwan stated, "During our assessment of various industrial computer products, Advantech was the most responsive vendor. They were not only the fastest to respond to our requests, but they also provided us with two computers for testing. After conducting tests for one

and a half months, we were confident in the products' stability so decided to use Advantech's industrial tablet PCs for our operations." Swire Coca-Cola Taiwan chose the PWS-770 tablet from Advantech's various product lines. This system was designed specifically for harsh environments and is equipped with excellent drop and shock resistance, as well as anti-vibration, waterproof, and dustproof characteristics. Advantech's PWS-770 also features a high-capacity lithium battery and supports battery replacement without system shutdown. In addition, the wide variety of wireless communication functions enable high-quality data transmissions. More importantly, besides being operable when docked in the vehicle docking station, PWS-770 can be used independently in tablet mode. Thus, the tablet is portable, providing staff with greater flexibility and mobility when conducting inventory checks. Currently, Swire Coca-Cola Taiwan has installed several PWS-770 devices on forklifts in its Taoyuan, Kaohsiung, and Wang Tian warehouses. To date, no incidents of system instability have been reported.

Quality Assurance to Ensure Optimum Products

Hong-Yi Zhong mentioned, "Effectiveness and efficiency are extremely important in warehousing and logistics management. Therefore, besides implementing our WMS in all our warehouses in Taiwan, we will also consider integrating appropriate technological products into our transportation, distribution, and asset management systems in the future. Our ultimate objective is to provide our customers with the optimum service and quality beverages."

Visitors to Swire Coca-Cola Taiwan's headquarters are welcomed with a bottle of Coca-Cola chilled to the optimal temperature to provide the best taste experience. This demonstrates the company's commitment to quality, which is a major reason why the brand has endured and even flourished for over a century. ○

eBus Solution Increases Safety and Convenience in South America

By Ying-Zhen, Chen

Interview with Van Lin, Director, Digital Logistics & Fleet Management Sector

In recent years, urbanization has become a global trend. The resulting increase in urban populations has generated public transportation problems. In many South American cities, the provision of adequate public transportation that facilitates urban mobility has become a critical issue. Van Lin, Director of Advantech's In Vehicle Computing division, pointed out that South America's continued development and economic prosperity have made urban construction a significant focus. Furthermore, many South American countries are actively striving to host large scale international events. Regarding urban humanities, the most important aspect of city planning, besides the building architecture, is public transportation. Resolving urban transportation issues is a big focus for South America; specifically, how governments will ensure the provision of adequate inter-city public transportation? Thus, the implementation of a comprehensive public transportation solution is an essential part of their transportation infrastructure development plans.

According to Van's analysis, the construction of a mass rapid transit (MRT) network would be extremely expensive for South America. The MRT carriages and rail equipment alone were estimated to cost at least US\$100 million, with most local residents being unable to afford the travel fares. By contrast, an eBus system offers a more convenient and economical transit option that suits South America's current economic situation. Considering intelligent traffic systems, Advantech's eBus system provides the ideal solution for municipal and inter-city public transportation.

Much like the investment in an eBus system, road construction is relatively simple and easy to implement. Thus, local bus fleets have been developed into bus rapid transit (BRT) systems. Because of the challenges to public safety and security that exist in South America, buses are typically connected to two or three additional compartments. However, without a monitoring system,

bus companies cannot ensure the safety of the driver or passengers, which increases the risk to public safety. To address the need for enhanced safety, Advantech's South American office developed an eBus monitoring solution. The system design was focused on three important considerations: crime prevention, backend monitoring (including vehicle speed and fleet dispatch), and safety (including environmental and in-video surveillance). Additional features, such as advertising, bus positioning, and ticketing and fare collection, were also considered.

From a hardware perspective, the eBus solution is an intelligent system for monitoring driver behavior. Regarding the video recording with backend control function, because of cost considerations and communication networks in South America, the eBus system is designed to transmit videos converted into images to a backend control room every 5 to 10 seconds for monitoring. In the event of an incident occurring, the eBus system automatically begins real-time streaming of high-resolution video to the backend control center. In addition to the system hardware, driver behavior is an important aspect of fleet management. Driver behavior and vehicle diagnostics monitoring allows fleet managers to know the loss rate and overall status of each vehicle in a fleet. They can also use the recorded data to improve driver behavior and conduct real-time management.

Van Lin stated that "Advantech's eBus solution can provide a detailed record of vehicle driving operation, such as engine speed, improper braking, throttle position, and other urgent reminders; this monitoring not only provides a record of inappropriate driving behavior, but also facilitates real-time coaching. For example, when the system detects inappropriate driving behavior, a warning message immediately appears. If drivers do not adjust their behavior within 10 seconds, relevant information is transmitted to the backend control room. Control center staff can then contact the driver to ensure their behavior is rectified."



In addition, for drivers attempting to avoid monitoring (e.g., by deliberately removing the GPS antenna or tampering with the background tracking system), Advantech's eBus system is equipped with features for preventing acts of sabotage and avoidance. These monitoring functions and security features are aimed at monitoring the incidence of inappropriate driving behavior and reducing human error. For emergency preparedness, the eBus system is also fitted with an emergency detection device. In the event of an accident or during critical moments, a distress signal can be sent to the backend control room, ensuring a prompt emergency response.

Regarding the development of intelligent transport systems in cities, if intelligent transport systems are implemented, they are likely to become the primary method of transport for local residents. In South America, the number of buses servicing a city center can reach as high as 10,000. Considering a city of approximately 10 million people, if roughly 30% of the population uses the bus system, any external or in-vehicle advertising has the potential to reach up to 3 million people (30% of 10 million). Because such advertising is extremely effective, it has become the preferred method for many vendors. Revenue from advertising accounts for 20% to 30% of the total public transportation revenue and is one of main sources generated by the eBus system.

In-vehicle entertainment is no longer merely a one-

way dissemination of advertising messages; instead, interactive apps have been incorporated to increase passenger engagement with advertising messages. These apps can be downloaded to smart phones. The interactive functions include allowing passengers to adjust the volume of advertisements and send response messages. By increasing passengers' engagement and reading and listening to advertising messages, interactive advertisements can achieve good advertising effects.

According to Van Lin's observation, South America has undergone numerous changes following the implementation of the eBus transport system. Data for several operational performance factors evidence the benefits provided by this system. Specifically, the on-time bus arrival rate increased by 50%, fare collection errors declined to less than 2%, oil consumption was reduced by 20%, traffic accidents involving buses declined by 50%, insurance costs were reduced by 20% to 30%, tire wear rates declined by 10% to 20%, and the number of customer complaints declined considerably. Furthermore, the reduced attrition rate can be attributed to the real-time monitoring of driver behavior and vehicle status enabling fleet managers to promptly implement adjustments and avoid unnecessary waste. Van also found that although the initial cost of implementing the eBus system was fairly high, the total investment over the long term makes it the ideal public transportation solution for city residents. ○



Optimizing IT for Improved Cargo Management

By M. D. Wang and Pictures from Advantech
Interview with Jamie Bai, General Manager of Pacific Star Technologies Corporation

Throughout history, water transport has been the primary channel for moving cargo, and about 90% of the world's goods are still transported in this way. Massive container yards form a modern feature of this business, and they require sophisticated IT systems to efficiently manage container storage. Pacific Star Technologies built an optimal IT system for Kaohsiung Harbor by leveraging their rich experience with Advantech-DLoG vehicle-mount terminals.

When one enters the Kaohsiung Harbor container yard, one sees various cranes weaving between piled containers. If you pay attention to these cranes, you will find they are very busy, but they are still in good order. The transfer and piling of all these containers is extremely accurate; the cranes seldom make a mistake. Huo-Wang Bo, the general manager of Pacific Star Technologies Corporation, says, “The containers in a harbor are similar to a general storage operation. It’s just another kind of storage management and the key indicator of its performance is precision”.

Specialized IT for Specialized Port

A fairly high level of technical expertise is required to undertake the creation of a port IT system, with its associated container storage fields. Without a lot of practical experience, it is difficult to enter this market. The port environment is highly specialized, with sea wind, high vibration, and innumerable steel containers, all of which pose challenges to the operation and maintenance of IT equipment. However, these are exactly the reasons why Pacific Star Technologies installed more than 100 Advantech-DLoG vehicle mounted products in the harbor.

MTC6 vehicle mounted computer is mainly used to send instructions as well as information. The size of a shipping container is quite big; in general, standard containers usually run either 20 or 40 feet long, and container yards are huge. Currently, there are five distinct container yards in Kaohsiung Harbor, with a total area of 2.94 million square meters. Container management is similar to general storage management; both of them involve the placing or removal of goods. Container management involves huge areas and usually in harsh environments; thus, IT systems appropriate to the two applications are completely different.

Huo-Wang Bo said, “We already built the IT system for transmitting instructions in the harbor ten years ago. The harbor area is very broad, so wireless communication is the most appropriate IT technology for this type operation. As in other container yards, Kaohsiung Harbor used a handheld transceiver system before. Each crane driver was assigned a wireless handheld transceiver and instructions were sent to drivers via these transceivers. However, pure manual mode had lower accuracy and depended highly on paper processes. Drivers and operators in the background



had to record a lot of data; also, management could not accurately control situations because they could not get overall data results until a month or even a season later, which wasted a lot of time and manpower. Since the MTC6 vehicle mounted computer was introduced at Kaohsiung Harbor, drivers receive the latest instructions via touch screens and then report their status. Operators in the office can immediately track the locations of drivers and transportation schedules to adjust task allocation, and managers obtain analysis reports right away which significantly improves the whole operation.”

High Quality Technology Forges Good Relationships

Pacific Star Technologies has used Advantech-DLoG products for a long time. Huo-Wang Bo says, “I have been very familiar with these products even before DLoG merged with Advantech.” Does he ever try any other products? Huo-Wang Bo said that in fact he had tried other products in an effort to save money, but results were not good. He says specifications of those products were similar. And when used for a short time, two weeks or a month, the comparative performances were very close. But if they used them over longer times, differences in quality were evident.

Therefore, when installing vehicle-mounted computers on container stackers at Kaohsiung Harbor, the first choice of Pacific Star Technologies was MTC6.

Good products cost more, but their higher qualities satisfy customers. This is a win-win situation for both buyer and seller. If you sell cheap products of poor quality, your customer can only obtain fulfillment in the short term. However, customers will blame you later, when products malfunction over and over, and this ultimately hurts the relationship between buyer and seller. Advantech-DLoG products are rugged and stable; ideal for port settings. MTC6 passes many standards tests, such as IP65, IP66. The products perform reliably even in harsh environments with serious vibration. All I/O ports have covers to prevent ingress of dust and water, and the anti-shatter touchscreen is tough. Experiments have proved that it can sustain the impact of a 500 gram metal ball dropped from a height of 100 meters. That's the kind of toughness needed in a cargo port environment.

Assured German Quality with Local Service

We need not only stable equipment, but also follow-up maintenance. Generally speaking, the service life and replacement time for a harbor IT system is about

8 years. This is an outdoor, seaside environment, and operation involves a great deal of vibration. In this situation, maintenance is very important. Huo-Wang Bo indicates that “DLoG are a German brand, and German brands impress everyone because their products are rigorous and reliable.” On the other hand, Huo-Wang Bo also indicates that Germany is so far away from us. With a support center in Germany, it takes a lot of time to maintain equipment and replace components. But since Advantech partnered with DLoG that problem was solved. Now maintenance and component replacement is accomplished in a short time. With assured German quality and local service; it really is a perfect combination!

As global marine transport centers, the cargo throughputs of the three biggest harbors in Taiwan are quite constant, and their requirements for IT equipment keep constantly growing. Huo-Wang Bo says that Pacific Star Technologies will keep focusing on the market, integrating Advantech products and solutions to provide optimal IT systems for harbor transport service providers. ○



Fleet Management × Intelligent Video Analytics



FCWS (Forward Collision Warning System)



PDS (Pedestrian Detection System)



LDWS (Lane Departure Warning System)



TREK-674

ADVANTECH **DLOG**

Digital Logistics & Fleet Management

TREK-674, a compact in-vehicle, dual-core computing box aimed at fleet management and vehicle surveillance applications. Equipped with an integrated MRM SDK software package, TREK-674 is a robust and highly customizable computing platform that provides the ideal in-vehicle solution for law enforcement agencies, emergency services, and public transportation.

- Intel® Atom™ E3827 dual-core processor (1.75 GHz)
- Embedded Stretch S7 video encoder, supports up to eight analog video input channels and four audio input channels
- Vehicle diagnostics interface with configurable protocols that support CAN (J1939, OBD-II/ISO-15765) and J1708 (J1587)
- Built-in GNSS, WLAN, Bluetooth, and WWAN modules (with dual SIM card ports)
- Rugged design for harsh in-vehicle environments - Wide operating temperature (-30 ~ 70 °C), 12/24 V vehicle power compliant (ISO-7637-2), and shock/vibration tolerant (MIL-STD-810G and 5M3)



TREK-674
Compact in-vehicle computer



TREK-30x Series
In-vehicle smart display



In-vehicle camera



MRM SDK- Intelligent video analysis



MRM SDK- Voice recognition

www.advantech.com/digital-logistics/



Advantech

No.1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei, Taiwan 114, R.O.C.
Tel: +886-2-2792-7818
Email: iService@advantech.com.tw



Behavior Management for Truck Drivers

Unlike previous fleet management systems which only offered vehicle tracking and dispatching features, new systems now emphasize real-time management, which relies on powerful computing capabilities in the vehicle to process real-time data collected by its sensing system, so that immediate feedback and responses are achieved to further enhance operational efficiency and safety—not to mention significantly reducing operating costs.

By Sunny Chen and Pictures from Advantech
Interview with Van Lin, Director of Advantech iService Business Group

Looking at December's monthly figures, the sales rep frowned at the report in his hands which showed all the speeding tickets that the entire team received that month, and which had exceeded more than last month's tickets. What's worse, the team even had five car accidents. The report also showed total mileage was reduced but fuel consumption actually increased by 10% compared to last month. Mike, the sales guy immediately knew that all of these problems had to do with driving behavior, but was there a better way to manage driving behavior? This is a question many fleet owners ask.

On the U.S. highway, one often sees many huge trucks roaring by. These truckers are out on the road all day long, and seldom return to their dispatch centers. For example, one main provider of B2B interstate transportation services, known to be one of the best in U.S. transportation industry, owns up to 16,000 vehicles located in different dispatch centers across the country. In the past, this company used to have a fleet management system that could only provide GPS tracking and scheduling, but as far as "people management" was concerned, an effective behavior management system for truckers was not available. So, if there was a driver behavior violation that broke agreed company rules, fleet managers could only punish an individual driver afterwards, such as docking their salary. A real-time system could have provided warnings with corrective advice, action, and even penalties.

Driving Behavior Sensor - Helps Drivers Follow the Rules

Fleet operators want to have a solution that can help them further manage driver behavior so as to reduce their insurance costs, accident probability, and wear & tear on tires and parts, all aiming towards the overall goal of the punctual delivery of goods. Driving Coach is an instant fleet management device that combines Vnomics' software and Advantech's hardware, and perfectly meets fleet owners' expectations.

Through sensing mechanisms, the device is able to detect any actions that truck drivers take with their vehicle. As soon as there is a behavior that is prohibited, against the rules or just dangerous, the Driving Coach system will immediately send reminders and alerts.

Some drivers park their trucks at the roadside to eat their food in the vehicle and enjoy the free air conditioning - sometimes for hours. Some drivers have a habit of pressing the gas pedal or the brake pedal suddenly. Some drivers don't use their turn signals and some drivers even wait until the last second to shift gears, resulting in their vehicles running at a high speeds in low gears. All of these behaviors result in a significant increase in fuel consumption, maintenance costs, and even safety problems. All of these events can be sensed, and if they violate the rules, the system will sound an alarm and display a message asking drivers to rectify the situation.

Advantech's in-vehicle computer can also read any error codes from the engine, including temperature abnormality,



low oil levels etc. Not only will drivers be informed of this information, but also back-end management. Depending on the circumstances, the system will enforce the mandatory or non-mandatory policy to deal with a problem immediately. For example, a message might appear on the display requiring the driver to go to any nearby service station to check the oil level within 30 minutes. If driver fails to respond after that time, then the back-end management staff will be notified to ask the driver to explain why he or she was unable to follow the command.

Fleet Efficiency Reduces Operating Costs

As long as drivers follow all the instructions, each vehicle can save up to about \$ 3,000 USD a year including fuel, and maintenance fees. In fact, through the TPMS (Tire Pressure Monitoring System), one can avoid car accidents, and file for compensation from the tire company under the product warranty. There is up to 20% fuel consumption difference “before and after” using this system. All of these savings will be reflected on the monthly report and fleet owners are satisfied with the improvement.

Advantech’s TREK-550 is the real-time fleet management’s in-vehicle computer and the display uses the TREK-303. Advantech’s Director from In-Vehicle Computer Division, Van Lin said, “Vnomics’ fleet management software solution is 100% compatible with Advantech’s in-vehicle computer.

In order to avoid frequent recalls of vehicles for system repairs, the equipment used in fleet management must be highly stable and reliable, and must have a high capability to integrate with additional modules in order to meet customer demands for expansion. These are the reasons why Vnomics continues to collaborate closely with Advantech.”

Unlike other in-vehicle computers that can only collect data to send to the back office for further processing, Advantech’s in-vehicle computer has a powerful chipset that can perform real-time calculations so it can provide immediate information and instructions to truck drivers. Van Lin also said, “Real-time is the core concept behind Vnomics’ Driving Coach solution. In-vehicle computers must be able to handle large and complex amounts of data while the vehicle is in motion, in hot or cold environments—now that’s a challenge!”

By combining Vnomics’ software and Advantech’s hardware, the Driving Coach fleet management solution can monitor and correct truck driver behavior, thereby enhancing road safety and reducing operating costs. Focusing on these goals, Vnomics and Advantech will pay close attention to customer needs, continue to strengthen the integration of hardware and software technologies, and develop more solutions that help fleet operators to effectively improve their management. ○





Not a Second Wasted in Rescue and Relief Efforts

Specifically Designed for Emergency Vehicle Management to Effectively Take Advantage of Key Moments

Tasks performed by emergency vehicles are closely related to natural disasters, and no errors can be permitted. Not only can Advantech's emergency vehicle management solution perform calculations and analyses based on the information collected, it can also integrate with medical equipment so that no opportunity to save lives would be missed.

By Yu-Feng Chen
Interview with Van Lin, Director, Digital Logistics & Fleet Management Sector

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 received 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." ○





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

Improving service quality and reducing 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

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 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. ○

Smart Applications Enable Easy Warehousing Logistics Upgrades

Effectively Reduce Cost and Time through Advantech's Help

Next generation intelligent warehouse and logistics system can achieve real-time information and command transmissions through the help of technologies to accelerate the flow of cargo through immediate and flexible operation practices, and reduce the industry's logistics costs and operation time under a paperless management method.

By Xiao-Jing Yu

Interview with June Hsieh, Sales Manager, Digital Logistics & Fleet Management Sector

Mr. Xie has just arrived at the 3,000 square meter logistics center at the new company to attend his new staff training. As he looks at the thousands of products neatly stacked on the shelves in the giant warehouse, he realized that staffs are able to operate the stackers, forklifts, and cargo removers methodically to complete the cargo storage or pickup operations. There is no hint of rush or confusion because of time pressures during the process as he had witnessed in the previous warehousing company that he had worked for. This makes Mr. Xie wonder about the differences between the methods adopted by the two companies.

After observation, Mr. Xie discovered that in the previous company, staffs are always running to and fro from the office with stacks of cargo pickup orders. In the new logistics center, cargo pickup orders are already directly transmitted to the in-vehicle computers or the staff's tablet PCs from the control center's computers network. With the help of barcode readers, staffs no longer need to memorize a bunch of code numbers in order to pick up the correct number of cargos from the right shelves. After cargo retrieval has completed, the warehouse management system would instantly and automatically update the inventory data while informing delivery staff to deliver the cargo to the right exit and right pallet. The system can even automatically arrange for cargo with closer delivery locations to be loaded onto the same truck. At this time, the vehicle fleet can quickly deliver the cargo to their destinations based on the optimal routes arranged by the computer.

This set of comprehensive digital and paperless workflow

not only replaces the manpower based operation model in the past, it can also significantly reduce the cargo pickup error rate and improve efficiency. Mr. Xie thought that the state of panic and anxiety of the previous warehouse as well as receiving notices of missing items or misdelivered cargo after the cargo has reached their client destinations should not occur anymore.

New Generation Warehouse and Logistics System Emphasizes on Immediacy and Flexibility

In fact, a complete logistics process is extremely lengthy. The process from the raw materials to the production site, the warehousing and distribution, and eventually the retail stores only include the distribution part. However, regardless of parts or material access for the factory production lines, general product shipments for warehouse centers, or point to point cargo shipments with the vehicle fleet; the traditional pen and paper records or oral telephone contact methods are no longer appropriate. June Hsieh, Sales Manager, Digital Logistics & Fleet Management Sector, indicated that next generation intelligent warehouse applications can achieve real-time information and command transmission objectives through the help of technologies such as wireless transmissions, cloud services, GPS positioning technologies, in-vehicle computers, barcode readers, or handheld devices. This allows administrators to accelerate the flow of goods with immediate and flexible operation methods and effectively reduce the industry's logistics costs and operating time.

She also took warehousing operations as an example, and

explained that fixed region cargo pickup or replenishment operations must highly rely on staff familiarity with cargo. In addition to lacking flexibility for the warehouse space utilization, the warehouse would also appear to have insufficient space for storage when the market demand has significantly spiked. Staff leaves or vacations would also affect the smooth operation of the entire process. "Intelligent warehouse applications can record the shipping center storage spaces instantly in warehouse management systems, enabling more flexible storage space planning, which surpassing the traditional fixed storage space practices. When the in-vehicle computers and the indoor positioning software can perform the indoor navigation, the system can correctly guide the staff to replenish or pickup cargo."

In addition, the system can also dynamically select and plan the optimal route. When a certain cargo mover has completed a task, the system can calculate the optimal route as well as the next most efficient task item. Therefore, warehousing operations would no longer be limited by the experiences of the staff, and the system can enhance the efficiency of the space and time as well as ensure the correct implementation of the operations.

Quick Material Pickup, Accelerated Production Line Efficiency

In addition to retail warehousing, the same concepts apply to factory production lines. For example, an automobile assembly plant that requires thousands of parts and dozens of execution steps can best highlight the advantages provided by the intelligent warehouse applications. June indicated that, "The automotive industry commonly adopts the Just In Time sequence processes. Different parts must be delivered to each production line based on the different interior configurations for the various car models, such as different seat colors, materials, manual or automatic car. How to correctly supply the parts and accessories from the warehouse for each production line is the key to ensure the smooth operation. The production line would be interrupted if parts are delivered too late, and the operating spaces would be cluttered if parts are delivered too early and piled at the site."

Advantech's intelligent warehouse and logistics system can perfectly satisfy the demands described above



and collaborate with the factory production schedule to automatically notify the factory staff to deliver the appropriate components to the various production and assembly stations at the perfect time, thereby satisfying the demand to enable the assembly personnel to obtain the required materials during the immediate sequence procedures.

June stated an example, "Four years ago, BMW's automobile factory in Germany adopted Advantech's in-vehicle computers to perform the production line parts distribution operations. At present, the few hundreds of forklifts or pallet carts in this factory are installed with our computer systems, allowing the factory to achieve the objective of producing one car per minute. In the future, BMW also intends to incorporate our system into its various factories in China in order to improve their current production capabilities of producing one care per every five to six minutes. In addition to BMW, factories for the VW group, General Motors, Continental Tire, Yokohama Tire, and Goodyear have all adopted Advantech's solutions in order to enable their production lines to operate more smoothly."

June also emphasized that regardless whether it is warehousing operations or material access in manufacturing plants, the in-vehicle computers used must be sturdy enough to cope with a variety of environmental tests in order to ensure the stable operations of the systems incorporated. In addition, different storage patterns require different process flows to achieve the optimal operational efficiency.

Therefore, when Advantech plans the intelligent or automation applications for the industry, it would consider the customer's demands, perform on-site assessment, establish a smooth workflow, and then propose an appropriate program in order to make the new operation upgrade methods as painless for the workers as possible.

Advantech has been active in the intelligent warehouse applications field for approximately two decades and its successful industry application integration cases have spread across countries worldwide. Advantech has also accumulated a significant number of software systems and system integration partners. Under these advantages, June believes that Advantech can assist the traditional warehousing and logistics industry to plan the most sophisticated intelligent applications as quickly as possible. ○



Intelligent Logistics Management Boosts Efficiency

For the purpose of effective management, cost reduction and fast delivery, logistics systems should integrate all information, automation and networking into system applications. Advantech provides all products and services needed to provide more transparent and intelligent management systems for the logistics supply chain.

By Sharlene Yu and Pictures from Fotolia
Interview with Van Lin, Director of Advantech iService Business Group

Logistics is now a huge business, both mature yet complex. According to a definition from the logistics management association: “Logistics is the physical distribution of objects, whereby it integrates multiple functional activities, including transportation, storage, load and discharge, packaging, distribution, processing and information. And through management processes, it creates value and satisfies the requirements of both customers and society.” Over the whole supply chain, there are many companies capable of providing raw materials, semi and finished products and services, and several operational requirements such as information flow and capital flow, which means logistics has become a multifaceted and complicated business. So, to achieve effective management, cost reduction and fast delivery, it is a necessary to integrate information, automation and networking into logistics, or even develop it further as an intelligent management component through the Internet of Things (IoT).

Vehicles are the Key Carriers

Van Lin, the Director of Advantech, indicates that it is the most important and basic element of a logistics system to promote efficiency and reduce cost. Intelligent logistics management should make the most of information collected from multiple sources to achieve real-time and effective monitoring. This way, suppliers can provide faster services for customers with lower cost. What’s more, he further points out that, “Vehicles are the key carrier in any logistics system. Ships carry freight into the harbor, cranes are used for unloading containers, trucks are needed for carrying containers to storage, and forklift trucks are used for carrying goods from storage to 18-wheeler semi-trailer rigs for carrying goods between storage and retailers—different cargo points need different kinds of vehicles to carry goods.”

Advantech defines logistics as the information and control management systems that cover the whole process. From harbors to storage centers and retail points,

Advantech provides a wide range of products and solutions to satisfy all these different application requirements. Van Lin explains that if we want the harbor cargo throughput to run smoothly, the gantry crane should use a rugged and stable vehicle mounted terminal (VMT). We also need a good dispatch and management system for the trucks in the harbor to collect information, such as loading times, harbor schedules, and container and storage locations in order to efficiently transport cargo from the harbor to the customer. After goods are put into storage, we then need to use forklift trucks with RFID and barcode scanners to accurately locate items from storage and pass on to assigned points or trucks for delivery to their final destination.

Rugged Vehicle Mount Systems are Essential

Because we need to monitor goods throughout the whole process, logistics systems for all vehicles should be highly stable. Van Lin explained that it is easy to manufacture a personal computer for consumers, but it is very hard to design a reliable vehicle mounted computer because the specifications are very strict. For example, a vehicle mounted computer should take battery endurance, wide temperature ranges, network transmission, shock and vibration, and humidity resistance into consideration. Professional software techniques and advanced hardware designs are needed to provide high-quality vehicle mount computers for these vehicles. Van Lin said that, “General products can only sustain shock and vibration of less than 10G, but the durability of our products can sustain vibrations of up to 20G. And of course, wide-temperature operation is always a basic requirement of Advantech’s products. Plus, all the screens of our touch computers use reinforced glass with high shock resistance. The water and dust proof capabilities of our products are designed according to the requirements of working in storms or other extreme environments.”

Roaming, Indoor Navigation and 3D Positioning

For large storage facilities of thousands of square meters, Wi-Fi has a fatal shortcoming because it can only provide wireless transmission within 100-200 meters. As a moving forklift truck may frequently move between one hot spot and another, a vehicle mount system on the truck may often lose connection to the network. However, a roaming function provided by Advantech can provide an optimized switch operation to make the system always connect to the network. Likewise, general GPS cannot position a vehicle

indoors, but Advantech provides an indoor navigation application for current high-end positioning systems, it can guide forklift trucks in the storage facility to correctly take goods from a rack by RFID and Wi-Fi hot spots. In another aspect of 3D positioning, forklift trucks can move to a stereoscopic rack with the height of several meters to easily find and take a designated pallet or container; storage centers for Heineken and BMW in Germany, and IKEA in Sweden are successful examples. Also, a truck with an Advantech vehicle mounted computer can serve as an autonomous vehicle; the Auto Guided Vehicle (AGV) can move along a designated route after receiving instructions from the system to take goods from a rack and then automatically move to another rack only by different color stripes on the floor without any rails. After all designated goods are taken from the racks, the vehicle will carry these goods to a truck.

One-stop Shopping with Expert Sales Advice

In addition to all these vehicle mount systems for different types of vehicles, Advantech also provides corresponding rugged tablet computers or handheld devices for equipment that storage management personnel use to perform stocktaking or picking for couriers who send or receive goods. Van Lin stated that, “Regarding logistics storage applications, in addition to computer equipment and network devices, we provide a one-stop shopping service. That is to say, we not only provide our own products, but also provide our best suggestions about wiring, power distribution, software interfaces, network installation and barcode selections depending on the requirements of our customers. Partners in the Advantech ecosystem can also provide support services for the peripheral requirements for our customers.”

Van Lin says that Advantech can solve problems that customers do not even know they might have in the future. When thinking about the logic of project assessment in order to replace the old sales model that only introduces the project specifications to customers, Advantech shares professional knowledge accumulated from a large number of successful cases of vehicle mount applications to system integrators to help compensate for their shortcomings. Thus, they can provide better system planning to build advanced logistics systems for their end customers. Finally, we can achieve a win-win situation for end customers, system integrators and Advantech. ○

Supply Chain Management in the Automotive Industry

By Advantech iService Business Group and Pictures from Advantech



The automotive industry is not only one of the world's most important economic sectors by revenue, it also takes up a leading role in terms of quality expectations, product variety and process complexity. Driven by globalization and increasing customer requirements, car manufacturers are forced to offer a large range of vehicle models and options. Just for example, one single model series of a premium German automobile brand can reach 1017 possible automobile

variations! The enormous product variety-induced complexity and the pressure of tough international competition make it hard to ensure efficient logistics. That is the reason why industrial computing plays a major role throughout the entire automotive supply chain, from allocation and storage of raw materials and components to production and delivery to timely spare parts procurement.

Completely Knocked Down: The CKD Principle

Instead of shipping whole cars to overseas markets, automotive manufacturers prefer to ship vehicle components to be assembled on-site in local manufacturing plants. The reason: Import duties for “completely knocked down” (CKD) products are often considerably lower than for finished end products, and the components occupy less freight volume, reducing the freight costs as well.

Some parts and components are produced at company-owned production facilities, while others are supplied by international sub-contractors. Ensuring that this enormous variety of car components supplied by various sources in different countries is delivered to the production plant bang on time is a logistic tour de force. This calls for well-engineered mobile computing solutions.

All German car manufacturers use Advantech-DLoG forklift terminals, for instance for production logistics processes, in-house transport, scanning transport goods, and purchase order processing.

Inbound Production Logistics

The model and options variety in automobile production requires flexible manufacturing, optimal sequencing and individual allocation of parts and components. This production principle is called just-in-sequence, or “string of pearls”. Each “string of pearls” describes the predefined sequence of individual production steps each single car runs through in different manufacturing areas, from body-making to painting to final assembly.

The challenge is to deliver the correct individual automotive parts to every workplace in the production line, and that in the exact sequence in which the vehicles are being assembled on the production line. If a necessary component is not supplied in time, the pre-planned work sequence of all subsequent workplaces in the production line has to be changed accordingly.

Advantech-DLoG’s extremely robust vehicle terminals like XMT 5, MTC 6 and the brand-new DLT-V8310, mounted on forklifts and tugger trains, ensure that parts and components are delivered to the production line on time and in sequence.

Operator and Tool Management

The workers at each assembly station have to know exactly which individual parts and components they have

to mount on every single, individually configured car.

The rugged information terminals of the UTC series can display these important production data on the shop floor, as well as changes to production steps and components. Moreover, they can inform workers about the correct use of their tools, such as presetting the correct torque for every single screw.

Spare Parts Logistics

The prompt supply of spare parts is very important for an efficient after-sales service, and an essential aspect for customer satisfaction. In the automotive industry, though, the variety of parts and components to be kept in stock is extremely large because of the vast range of car models and individual configuration options. Moreover, replacement parts must be available for car owners for a long time – some German car companies actually can supply original spare parts for historic cars that are well over 30 years old.

A German car manufacturer has launched an extensive project in order to advance the company’s spare parts logistics. Starting in 2003, this SAP based after-sales parts program has been introduced at many international warehouse locations. The project is supposed to improve parts held availability throughout the network, reduce operating cost and parts inventory levels and increase overall parts business productivity. It standardizes and integrates the spare parts logistics process throughout the entire supply chain, comprising:

- The complete supply process from the car dealers’ orders all the way to full payment
- Forecast and planning of future spare part demands
- Connecting all partners to the spare parts logistics system
- Warehouse management from incoming goods to outgoing goods, including stock transfer and annual stocktaking
- In this area, for instance Advantech-DLoG MTC 6 vehicle mount terminals with 10“ und 12” displays on forklifts or order pickers ensure precise and flexible management of original parts logistics.

Maximum Durability for Uninterrupted Production

Advantech-DLoG mobile computing solutions support said processes, reduce error and failure rates, and facilitate uninterrupted production. This increases the



ROI, guarantees consistently high product quality, and ensures that deliveries and deadlines are met. That's why automobile manufacturers set great value on reliable and fail-safe industry computers.

However, automotive manufacturing is a very demanding environment for computing hardware. The terminals are exposed to substances that are very hurtful for electronic devices. One example is carbon, a material that is growing more and more popular in automobile design. Carbon dust is highly electrically conducting and prone to cause short circuits if settling on a CPU. Still, this causes no trouble for Advantech-DLoG's XMT 5, MTC 6 and DLT-V8310 vehicle mount terminals. They are completely sealed against dust and water in line with the IP67 protection class, guaranteeing flawless operation even in moist or polluted environments.

Furthermore these vehicle mount terminals are well protected against shock and vibration. That's important, given that warehouse floors often are quite uneven, with potholes, railway rails etc. Most forklifts or tugging trains do not feature any suspension or shock absorbers, so every impact caused by going over a bump is directly passed on to the vehicle mount terminal. Advantech-DLoG terminals are impervious to this strain. In addition, the touch screen displays are very tough and highly durable when it comes to mechanical impact and wear. The high-quality displays are easy to read even in direct sunlight and bright, reflective environments.

As a weak mount can be the weak point of a tough terminal, Advantech-DLoG offers a wide selection

of tested and certified brackets and mounts for their terminals, keyboards and scanners, including custom-developed options. It is even possible to mount the terminals without leaving a mark - a perfect solution for vehicle leases.

Reliable WLAN Connectivity

Moreover, Advantech-DLoG's XMT 5, MTC 6 and DLT-V8310 terminals feature WLAN diversity for maximum availability. Optimized antennas and individually customizable wireless cards ensure a safe and reliable data connection even in difficult conditions. The design of the antenna of a mobile terminal is crucial for optimum roaming behavior. Its mechanical stability is just as important as its balanced radiation behavior.

Advantech-DLoG has designed a solution in collaboration with leading antenna manufacturers. The antennas are tailored optimally to the housing of the vehicle mount terminals. This makes them extremely resilient and provides an optimum transmission compared to off-the-shelf antennas. If the vehicle's driver cabin is bound to interfere with the WLAN radio connection, we can supply remote antennas that can be mounted on the vehicle's driver cabin.

Think Global – Act Local

Service structures and levels vary from company to company and location to location. Advantech-DLoG uses various services resources in order to provide their automotive industry customers with comprehensive local service, from mounting or installation to logistical service ticket handling. In many countries, we already work with our own network of recommended local service partners. If an auto manufacturer prefers certain service providers, we will fully support them and integrate them into our network.

The value of our global presence and the durability and reliability of our industrial terminals has been recognized in the automotive sector for years. This is why all German car manufacturers and many other international car companies and automotive suppliers have chosen to use our products in important areas worldwide. ○



Global Digital Logistics - Supporting Your Entire Supply Chain!

ADVANTECH **DLOG**

Competence in Mobile Computing

Application-oriented Engineering

Our dedicated product development teams design mobile computing solutions for every step of your supply chain. Our experience for your service.



TREK-722/723 RISC-based Mobile Data Terminal for Fleet Management

- 5" & 7" LCD with resistive touchscreen
- Op. temperature -20 ~ 60° C / -4 ~ 140° F
- Built-in GPS with AGPS feature, BT, CDMA/GPRS/HSXPA
- Vehicle grade ISO 7637-2, SAE J1113, SAE J1455 compliant
- Rich I/O capabilities (CAN, COM, USB, DI/DO,SD)



DLT-V83-series Vehicle Mount Terminal for Warehouses, DCs and Ports

- 10" SVGA, 12" XGA touch display
- Op. temperature -30 ~ 50° C / -22 ~ 122° F
- Intel® Atom™ 1.66 GHz / Dual Core 1.8 GHz
- Diversity WLAN, WWAN, Bluetooth, CAN, GPS
- IP66/IP67
- Uninterruptable power supply
- Shock&Vibration 5M3



MTC-6 Industrial PCs for the Manufacturing Environment

- 10" SVGA, 12" & 15" XGA touch display
- Op. temperature -30 ~ 50° C / -22 ~ 122° F
- 802.11 a/b/g/n with diversity antenna
- IP66/IP67
- Galvanically isolated power supply
- Shock&Vibration 5M3

www.advantech-dlog.com



Advantech Headquarters

No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei, Taiwan 114, R.O.C.

Tel: +886-2-2792-7818

Email: sales@advantech.com.tw

Coping with Harsh Operating Environments

Heavy Industry Fleet Management is the Key

Heavy industrial work environments are different from roads in general, and the heavy industry vehicles face harsh working conditions. This is a huge challenge for the in-vehicle system vendors. By incorporating an intelligent fleet management system, work efficiency and safety for the heavy industry vehicles can be dramatically increased.

By Yu-Feng Chen

Interview with Van Lin, Director of Digital Logistics & Fleet Management Sector, Advantech



Heavy industry vehicles, such as mining vehicles, farming machines, and cranes, do not travel on general roads. These vehicles often have to operate in extremely harsh conditions such as dusty mines or bumpy terrain, and must withstand extremely severe vibrations when traveling and performing mine drilling operations. Furthermore, if the operation is underground salt mine excavation, vehicles must also be able to resist salt corrosion. Overall, the harsh working conditions faced by the heavy industry vehicles also pose great challenges for the in-vehicle system vendors.

Van, Director of Digital Logistics & Fleet Management Sector at Advantech, emphasized that, "Ruggedness and stability are critical for in-vehicle computers. They must be able to operate normally under dusty environments and during strong vibrations, and withstand rougher handling by the heavy industry vehicle drivers."

The degree of ruggedness for the in-vehicle devices in heavy industry vehicles not only must exceed that for the general industry, it is also 3 to 5 times higher than that required in military standards. Therefore, in addition to the whole machine being waterproof and dustproof, Advantech also provides impact and shatter resistance solutions for the most vulnerable part of the computer, namely the LCD panel. Van stated that, "During the tests, we dropped a 500 gram iron ball from 1.3 meters high onto the LCD panel, which emerged unscathed."

Function Modules can Improve Safety for Dangerous Mine Environments

The work environments for heavy industry do not have general roads, and the vehicle fleet may face unpredictable conditions during operations. However, a vehicle fleet management system can help to monitor the relevant data



and provide warnings on a variety of unusual conditions, in order to improve safety for the onsite operators and reduce the risk of property damage. For example, after a gold mine in South Africa implemented Advantech's mine fleet real-time dispatching management system, the mine started to use the integrated functions of Advantech's in-vehicle computers to add different management modules such as collision avoidance systems, oil level monitoring systems, weighing systems, and tire-pressure monitoring system. The relevant data would be transmitted through the in-vehicle computer to the backend management platform, where it would be displayed on a monitor in the truck, thus enabling onsite operators to obtain the latest information.

Van illustrated the importance of tire pressure detection and stated that, "If a tire chain on a mining vehicle breaks, the vehicle may be taken out of commission for one or two months. Because mines are mostly located in remote and desolate places, it would take a long time to deliver a tire."

Through this mine fleet real-time dispatching management system, instructions for the dispatching and scheduling of vehicles can instantly be transmitted and displayed on the in-vehicle computer screen for the drivers. Furthermore, the in-vehicle computer platform can also collect the login and logout times, engine initiation times, the number of mine carts pulled, the quality of the ores carried, and etc. In addition to being displayed on the monitor in the vehicle, the data would also be transmitted to the back-end management.

Moreover, if emergency situations such as road collapses are occurred, the driver only needs to touch the in-vehicle computer screen to transmit the distress and location signals to the platform in order to request immediate assistance. This is a very useful function for the mining environment because drivers could only yell for help in the past, but their yells may be drowned out by other noises at the site. Speed monitoring is also a major issue. Drivers tend to accept the risks of driving faster in order to deliver more loads and get higher returns, but the monitoring function can now effectively manage and warn drivers of illegal operation behaviors.

Self-propelled Farming Machines Emphasize Positional Accuracy

In terms of farming machinery, the current fleet management system is primarily applied to the "self-propelled" farming machines. The demand for such equipment is huge, particularly in the vast farmlands of China. For the farming machine leasing industry, the integration of an

intelligent fleet management solution can enable managers to have a full picture of the usage statistics in the few months that the machines are rented, the distance and area of farm cultivation, and whether the lessee has shortened the service lifetime of equipment due to incorrect usage.

For lessors and lessees, the biggest requirement for self-propelled agricultural machines is "accurate position." High-accuracy GPS devices and local positioning systems can help to improve output efficiency. The range of error for the general consumer GPS devices are approximately 10 meters, which is very far from the error range of within 1.5 meter required by self-propelled agricultural machines.

To achieve higher accuracy, Advantech has adopted a differential GPS technology solution. Van explained that Advantech currently has two types of fleet management solutions that have error ranges of 0.7 meters to 1 meter and 0.3 meters to 0.5 meters, and stated that, "Indeed, the self-propelled farming machine positioning solutions provided by us and our partners have an error range that is definitely less than 1 meter."

At present, the primary requirement for cranes, the other main type of heavy industry vehicle, is to enable the operator to receive partial or full images of the surroundings of the crane through the monitors in the operating cabin. This would mean that the operator would no longer need to rely on other personnel to provide directional guidance, which can further enhance efficiency.

By integrating the intelligent fleet management system into heavy industry vehicles, their operation efficiency and safety can both be improved dramatically. However, because of the special nature of such working environments, heavy vehicles have more stringent ruggedness, stability, and accuracy requirements compare to vehicles used in other fields. Relevant companies must choose their solution carefully, to prevent possible risks and achieve the desired results. ○

Smart Fleets Improve Safety in Mine Operations

Mine environments are different from regular roads, so fleets moving in a mine will encounter more hazardous situations. Fleet management systems can help us monitor all relevant data and warn us of abnormal conditions to increase the security of operators and decrease property losses.

By Sharlene Yu and Pictures from Advantech
Interview with Lu-Bin Zhang, Project Manager of Micromine

In an open-pit mine in Ghana in South Africa we can see dust and smoke floating over rough ground and machines and equipment everywhere. Roaring excavators dig out crushed ore, where the so-called “king of metal”- gold is hidden. On the ground, truck drivers keep their eyes on the weight of their loads to prevent exceeding the maximum load of 200 tons. The management personnel in the dispatching room also pays attention to the data, because heavy loads will result in failure of engines, heavy wear on tires and increased safety risks, alternatively light loads fail to conform to production efficiency.

At the mine site, a lot of mining trucks move in and out, rushing through the roads to transit ore to the

treatment plant from 2~3 kilometers away. For each monster truck, worth tens of millions of dollars, is concerned, a collision means a serious accident or asset loss. But now, with their vehicle mounted intelligent management system’s Collision Avoidance System installed, truck drivers can carefully traverse routes to avoid collisions when receiving messages that other vehicles and machines are approaching, ensure workers’ safety and reducing maintenance costs.

This gold mine belongs to Gold Fields of South Africa Ltd. (GFSA). In fact, 50% of known global gold resources, totally 89000 tons, are in South Africa. The open-pit mine uses a mine fleet management system that Micromine and Advantech co-developed in 2012. The system has been installed on about 40 loaders and trucks totally. Micromine is a mining industry software developer, established in 1986 in Australia. The company’s Pitram mine production real-time control and report/decision system has been successfully applied to various kinds of mines in North America, Canada and Australia.

Real-time Monitoring for Instant Command

Micromine’s Pitram software system, Advantech’s TREK-743 vehicle mount computer and MESH Network’s wireless transmission constitute a complete mine fleet real-time dispatching management system. To the platform, Advantech will add different modules via the integration function of Advantech’s vehicle mount computer according to the requirements of customers, such as an anti-collision system, oil-level monitoring system, weighing system and tire management system. And all related data will be transmitted to the back end management platform via vehicle mount computers





and displayed on the screens of the trucks to inform operators on the spot.

With the mine fleet management system, task dispatching and vehicle dispatching commands can be immediately transmitted to, and shown immediately on the screens of, Advantech's vehicle mount computers for drivers to execute. The vehicle mount computer will also collect login and logout times of drivers, engine starting times, daily vehicle usage times, mine loading amounts etc, and display them on the screens of vehicles or for management at the back end.

For emergencies, such as road collapses, drivers can send distress and position messages directly to ask for immediate help. In the past, drivers could only ask for help by shouting loudly, but a drivers' voice can easily be drowned out by noise. Speed monitoring is also necessary because drivers may exceed the speed limit so as to earn more money. Nevertheless, the system can effectively manage all these unforeseen events and warn these drivers against these.

Soft/Hardware Integration for Platform Stability

Lu-Bin Zhang, the project manager of Micromine, said that, "Over the past 20 years, we tried to introduce mine fleet management systems from various hardware suppliers without much success. However, we decided to completely use Advantech's products finally because Advantech's vehicle terminal has better price/performance ratio, stability and lower maintenance cost."

If vehicle mount computers crashed frequently, maintenance teams need to move between different mine sites to repair them, which is extremely hazardous, and suspension of work will cause losses. Therefore, stability



is Micromine's top priority when selecting a vehicle terminal.

"With this mine fleet management system, we can increase mine production efficiency by about 10%. For example, we need 10 billion CNY to dig out a hundred thousand tons of gold ore; however, with the new system, we only need 9 billion CNY. In Nevada, United States, the director of a dispatching room having the same management system also stated that, "With the system, we can immediately acquire reports and avoid unnecessary cost because the management digitization and informatization are significantly enhanced." Due to its high performance, another mine fleet, also belonging to GFSA in Ghana, will also introduce the mine fleet management system and Advantech's TREK series products to their 40 truck fleets in 2014.

Considering the requirements of China's mine fleets, Micromine has started to pro-actively run the business in China from 2012. Their fleet management solutions co-developed with Advantech have grabbed much attention from mine companies. It is anticipated that some further achievements will be made in 2014 to help China's mining industry management be even more intelligent. ○

Munich Airport Intelligent Transportation Optimizes Fleet Dispatch



In 2013, Germany's Munich Airport implemented Advantech's fleet scheduling system and TREK-550 industrial in-vehicle computer terminals to optimize fleet dispatching and resolve passenger shuttle bus scheduling problems.

By Liao, Pei-Chun
Interview with Van Lin, Director of Digital Logistics & Fleet Management Sector, Advantech

Germany's Munich Airport started operations in 1992, and currently has the second highest passenger volume among airports in Germany. It has a passenger throughput of more than 38 million people per year, second only to Frankfurt Airport. As Munich Airport has a high take-off and landing volume, it sometimes runs out of airplane parking spots and jet bridges. Hence, Munich Airport set up another apron outside Terminal 1, and fetches passengers by shuttle bus to the apron for boarding.

However, as Munich Airport sees a spike in number

of passengers during public holidays, buses shuttling passengers between terminals, boarding gates and aprons become insufficient for the passenger volumes. This frequently results in situations where passengers are unable to board a shuttle bus and have to wait for the next one, or there being no shuttle buses available even when it's close to the passengers' boarding times.

To address these situations, in 2013 Munich Airport implemented a fleet scheduling system, and installed Advantech's TREK-550 in-vehicle computer in every shuttle bus. The scheduling system is in charge of scheduling the best route for every shuttle bus each day, while the in-vehicle computers communicate with the control center through radio transmissions to receive information, thus significantly increasing vehicle scheduling efficiency.

Implementing TREK-550 to optimize vehicle management

Van Lin, Director of Digital Logistics & Fleet Management Sector, Advantech, said that before implementing the TREK-550, Munich Airport had great difficulty in dispatching passenger shuttle buses. Service quality suffered without perfect passenger shuttle bus dispatching, as did flight take-offs and landings, which subsequently impacted airport operation as a whole. Slow passenger boarding results in





delays to flights taking off, which means it takes more time to clear the airplane's parking bay, thus affecting the parking of the next incoming flight.

To resolve such problems, most people would think of purchasing additional passenger shuttle buses or hiring additional drivers. However, airport operation also emphasizes efficiency and cost. It is actually more cost effective to procure IT equipment to improve vehicle dispatch efficiency than to purchase a passenger shuttle bus and hire a driver.

In the past, the control center could only track the vehicle's location but was unable to know the actual passenger transportation status of the vehicles, because the old system only used GPS. In the event that a shuttle had to be dispatched in an emergency, control center personnel had to rely on walkie-talkie communications with the drivers. Today, after implementing the TREK-550, they communicate through information technology, which not only saves time, but also increases efficiency, and also optimizes vehicle scheduling management.

In addition, as the TREK-550 supports dual monitor displays, one monitor is installed in front of the driver's seat to inform the driver of the route planned for the bus, and the time to fetch passengers from specific terminals. The other is installed at the passenger waiting area to display flight information. This satisfies the information

requirements for both drivers and passengers. Van said that this feature is one of the reasons why Munich Airport selected Advantech products. There are two other reasons, the first being the high product reliability and high quality, and the second is that Advantech has service centers all over the world, and is able to reproduce their implementation experience at other airports.

Advantech has comprehensive in-vehicle product lines to enable intelligent airport transportation

Apart from passenger shuttle buses, airports also have other types of transport vehicles, such as fuel and water trucks, baggage trucks and forklifts. These airport transport vehicles only operate upon receiving dispatch orders from the control center, with some differences in their applications.

Van said that fuel and water trucks emphasize dispatch efficiency. With the number of flights and limited parking time, fuel and water trucks have to complete their tasks very quickly. Therefore, the fleet dispatch logic has to be very clear in order to make the best arrangements, including the time of arrival of flights, the tarmac they will land on, and the number of vehicles required to top up fuel and water. These are factors to be considered when scheduling. Some planes

are bigger and require 2 to 3 trucks to refuel and top up water, but the airport cannot dispatch 3 fuel trucks and 3 water trucks to the same plane at a time. The second or third truck can only set off after the first truck has completed its task, instead of waiting by the side of the plane for the first to finish. Hence, dispatching information is a very important. The focus of baggage trucks is quite similar to fuel and water trucks, except that it also incorporates a barcode reader to ensure luggage is transported correctly.

As for warehouse forklifts, they need to know which cargo aircraft plane to deliver the cargo to, and will normally be equipped with RFID technology. RFID tags are installed on the storage racks, and RFID readers are included on the in-vehicle computers on the forklifts, so that when the driver prepares to retrieve goods based on the in-vehicle computer's commands, its RFID sensor will read the RFID tag on the racks to ensure the correct

goods are retrieved. After confirming the goods, it will then inform the driver to deliver them to the correct cargo aircraft, and indicate the location where the aircraft is parked.

The different applications and vehicle types lead to different requirements for in-vehicle computers. For example, as baggage delivery trucks are roofless, their in-vehicle computer needs to be waterproof, and the monitor must be readable in direct sunlight. Van Lin said that Advantech has a comprehensive range of in-vehicle computer products equipped with features such as wide temperature tolerances, power stability, wireless communication (supports Wi-Fi, 3G, 4G LTE), GPS, etc. They are able to satisfy different types of airport fleet management requirements, and make use of transportation fleet information to establish an intelligent airport. ○





One-Stop Shopping for Public Transportation

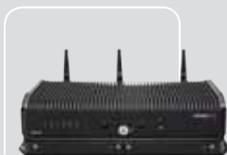
ADVANTECH

Enabling an Intelligent Planet

Advantech's rugged design in-vehicle computers are suitable for bus fleet applications. By equipping buses with onboard computers, our customers can proactively monitor vehicle diagnostics and maintain real-time communication between administrators, central dispatch, and driving staff. These systems dramatically increase the safety of public transportation for both drivers and passengers.



TREK-674
compact in-vehicle computer



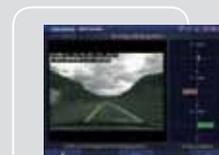
TREK-668
luxury in-vehicle computer



**In-vehicle
smart display**



In-vehicle camera



**Intelligent video
analysis**



Voice recognition

www.advantech.com/digital-logistics/



Advantech
No.1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei, Taiwan 114, R.O.C.
Tel: +886-2-2792-7818
Email: iService@advantech.com.tw

Partnering for Smart City & IoT Solutions

驅動智慧城市創新 共建物聯產業典範

Industrial Cloud
& Cloud Networks

Private Cloud

iConnectivity

Transportation IoT Devices Computer On Modules Video and RFID
Power & Energy Environmental & Facility Monitoring Embedded Software
iBuilding/BEMS Industrial HMI Embedded Design-in Services Intelligent Display
Intelligent Systems iRetail & Hospitality iHospital Image & Video Processing
Machine Automation WebAccess+ Digital Healthcare Digital Logistics Industrial PCs

ADVANTECH

Enabling an Intelligent Planet

Partnering for Smart City and IoT Solutions

Advantech holds “Enabling an Intelligent Planet” as our corporate vision, and “Partnering for Smart City & IoT Solutions” is our concrete goal; we will continue collaborating with various partners to build new paradigms in each vertical field. Advantech will consistently follow our LITA (Altruistic) spirit, positively cooperating with partners and engaging in innovation to develop every Smart City opportunities.

研華科技 推動智慧城市創新 共建物聯產業典範

研華以「智能地球的推手」作為企業願景，將「驅動智慧城市創新」作為具體目標，並與各產業夥伴協同合作深耕各垂直領域，共建各式物聯產業典範，期望能持續以利他的精神，積極創新並與夥伴共創智慧城市的每一個可能。