

## Passenger Safety

Compact, wide dynamic range security cameras promote safety aboard thousands of buses in Shenzhen, China



Case Study:  
**Coship Shenzhen Buses**



### Buses pose serious challenges for security cameras

Choosing the right security camera for a bus requires balancing a number of challenging criteria, including:

- › The camera must be compact enough to fit on the ceiling of the bus without getting in the way of passengers' heads.
- › The camera must be sturdy enough to withstand the vibrating motion of the bus as well as physical bumps, both accidental and intentional.
- › Perhaps most important, the camera must be able to capture clear and accurate images under ever-changing lighting conditions, both during the day and at night, and including direct sunlight, strong glare or backlight, reflections off windows and metal (including on the bus itself), and other high-contrast situations.

Security cameras on buses can be powerful deterrents against crime – but only if people know that the camera can produce identifiable images of individuals at any time and under any lighting conditions.

Shenzhen, China, is a coastal city in Guangdong Province situated just across the border from Hong Kong. Nearly 8.5 million people live in Shenzhen, which also boasts a 230 km coastline, more than 160 rivers and streams, and more than 400 parks, scenic zones and forest parks. Although the region has been inhabited for more than 5,000 years, the city of Shenzhen was established only in 1980 and includes China's first special economic zone.

It is estimated that 70 percent of the city's residents use buses to travel within the city. To ensure the comfort of passengers and drivers alike, the Public Transit Branch of Shenzhen Public Security Bureau decided to install security cameras on all the buses in Shenzhen, to promote safety and discourage thieves, including pickpockets.

### Pixim-Powered Coship cameras meet the challenges

After evaluating available video cameras for on-bus security, the Public Transit Branch of Shenzhen Public Security Bureau chose Coship™ CS66-52CT WDR [Wide Dynamic Range] Dome Cameras, powered by Pixim® Digital Pixel System® technology.

Traditional CCD video cameras are unable to "see" well when lighting conditions are less than optimal. But Pixim-Powered cameras such as the Coship Wide Dynamic Range Dome Camera perform well regardless of changes in lighting, making them ideal for providing security aboard buses.

Pixim's patented Digital Pixel System technology revolutionizes the way video cameras capture and process images. Pixim's is the only video image capture technology that employs hundreds of thousands of pixels, each of which acts like an individual self-adjusting camera. Using this all-digital system, Pixim-Powered cameras can efficiently capture the whole picture, regardless of lighting condition or location. Pixim-Powered cameras offer the

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highest total resolution, natural color and clarity available, and they accurately capture highlights and lowlights in the same scene.

The Shenzhen bus project uses the Pixim D1400 Mobile chipset, which is specially designed for embedded and hidden security applications, where it is not possible or desirable to adjust camera settings. The new Pixim Orca chipset also brings Pixim's award-winning image quality to environments that experience vibration, such as buses.

The uncomplicated "fix, focus, forget" operation of cameras using the cost-effective D1400 makes this new Orca chipset ideal for use in solid-state wide dynamic range cameras in environments where moving parts, such as a DC Iris and other auto-iris lenses, would be impractical or cost-prohibitive. In fact, Pixim has the only wide dynamic range chip technology that does not require a DC Iris lens.

In addition to using the Pixim technology, the Coship cameras chosen by Shenzhen Transit Group offer the compact dome shape, vibration tolerance and anti-vandal, hard plastic shell needed to operate effectively on board Shenzhen's buses.

## **Clear identification means peace of mind**

So far, approximately 2,000 Shenzhen buses have Pixim-Powered Coship security cameras installed facing the front door, to capture images of everyone who gets on and off the bus. Passengers can be clearly identified as they step onto the bus, pay the fare and move to a seat – and again as they exit the bus at the end of their journey.

As the buses move throughout Shenzhen, day and night, the Pixim-Powered security cameras automatically adjust to whatever lighting conditions are present. If someone misbehaves – for instance, tries to board without paying



the proper fare, or tries to steal from another passenger – authorities will have an accurate picture of the person, which can be used for identification and, if appropriate, prosecution.

In addition, the Shenzhen Transit Group believes that by knowing security cameras are recording accurate pictures of them, potential misbehavers will be deterred from their actions. In either case – as a deterrent or as evidence – the Pixim-Powered Coship security cameras are providing valuable security services for the bus-riding people of Shenzhen.

Due largely to the success of the Shenzhen bus installation, Coship also is providing Pixim-Powered security cameras for various buildings and banks around the city of Shenzhen, and the camera company plans to install Pixim-Powered wide dynamic range dome cameras on more than 10,000 buses in other cities in China.

#### Transportation Poses Unique Image Capture Challenges

- › Lack of detail in backlight, high-contrast light, or outdoors, including at bus doorways and windows
- › Low clarity in shadows, such as inside the bus
- › Image washes out due to glare and reflections from glass and metal
- › Color inaccuracies in varying lighting conditions, such as while the bus is moving or at transit stations
- › Vibration of buses threatens anything that moves mechanically, including auto-iris lenses
- › Physical constraints inside buses demand compact security cameras that require no adjustments to operate

#### Pixim's Image Technology

Pixim's Digital Pixel System® ultra-wide dynamic range technology, a true breakthrough in imaging technology, delivers unprecedented image quality in all lighting conditions. Cameras powered by Pixim's specialized image processing chipsets can significantly enhance security on buses through the following capabilities:

- › Widest dynamic range: Captures highlight and shadow detail in the same scene.
- › Highest total resolution: Makes it easy to distinguish image features and details, even in highly variable lighting conditions.
- › Superior color rendering: Accurately displays color even in difficult lighting such as backlight, high-contrast scenes, glare and reflection.
- › No "camera blindness": Eliminates the vertical smear, pixel blooming and other image artifacts commonly encountered in high-contrast scenes.

#### Advantages of the Pixim Orca D1400 Mobile chipset

- › Does not require an auto-iris lens, so it is ideal for high-vibration environments such as moving buses.
- › Is compact and designed ideally for embedded and hidden security applications, where it is either impossible or impractical to adjust camera settings.
- › Enables uncomplicated "fix, focus, forget" operation of cameras.



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