Case Study

Defence forces logistics hardware and software

A large UK defence organisation required increased automation and efficiencies across several key areas of its logistics system. Alongside our partner Zebra Technologies, Nuffield Technologies delivered an Android-based solution using the Zebra TC72 ultra-rugged touch computer.

Overview

The defence organisation is responsible for a vast inventory of high value equipment, which is stored at multiple sites across the world. Ensuring that items are tracked accurately is crucial for supply assurance, safety and security.

Stores management was traditionally carried out manually, with equipment being checked against paper lists for quantities and location. It would take two people around one day to manually check equipment in an average-sized store.

Several years ago, the organisation migrated a number of legacy systems to a centralised digital approach. As part of this approach, all inventory items were marked with barcodes, allowing automatic identification of equipment. A handheld mobile computer, the Motorola MC9090, was used to capture data for the inventory management system. Nuffield Technologies developed an app that extended the inventory management system with a mobile element, removing the need for manual paper processes. This significantly reduced the time it took two people to log an inventory to three hours (compared to one day as referenced above).

Challenges

While this was a huge leap in efficiency from the previous paper-based approach, obsolescence crept in and challenges became apparent. Scanning was becoming difficult using the MC9090, because of the limited capability of the legacy scanning sensor and its large size, which made it difficult to fit into stores' racks. It also used the legacy Windows Embedded CE as an operating system. Consequently, security updates were provided under a costly extended support agreement.

The defence organisation required a technology refresh that incorporated a secure, up-to-date and user-friendly replacement, to make the process quicker and more seamless.

Our Solution

Nuffield Technologies partnered with rugged device manufacturer Zebra Technologies to deliver an Android-based solution, using the Zebra TC72 ultra-rugged touch computer.

Android was chosen because of the:

- availability of ruggedised, MIL-SPEC-rated devices
- customisability of the operating system, which made it possible to meet strict security requirements for operating mobile devices
- familiarity of this OS, reducing the need for training.

In order to operate these devices within the defence environment, Nuffield Technologies developed a security layer called ASP. This both hardened Android against unauthorised access and provided necessary features missing from the core operating system.

With ASP, personnel could use login credentials from other systems, something not supported by Android by default. Now, users of multiple different systems can share a mobile device using a common login page.

ASP can also be used without access to wireless communications. This is a crucial functionality for defence environments, where Wi-Fi and mobile networks are often not available.

The first systems deployed using the TC72 platform were built on a common app framework which could be reused to build mobile apps for the platform quickly and affordably.

The Results

The upgrades to both the hardware and software led to a transformative improvement.

The improved barcode scanner on the TC72 enabled faster and more accurate scanning – even on damaged barcodes, or on equipment stored in low-light environments. The smaller size of the device meant it could scan in small spaces, such as weapon racks. Also, the upgraded software enabled continuous scanning, so a complete rack of equipment could be recorded in one sweep rather than individually scanning each item as before.

In initial field trials, one TC72 user scanned a store in 30 minutes. This was a significant improvement on the initial paper-based process which took two people one day; and the previous M9090-based solution, which took two people three hours.

Because Zebra devices maintain backwards compatibility, Nuffield was able to reuse MC9090 accessories – such as power cables – in the TC72. This reduced costs and electronic waste.

The new devices included swappable batteries. These can be swapped out while the TC72 is being used, providing extended operation of the system as required. Furthermore, introducing the new device made it possible to modernise the user interface for mobile inventory management system, to speed up work and reduce cognitive load on the user.

Nuffield has delivered over 4000 TC72 units with their apps installed. A comprehensive support package was also delivered alongside the devices, so they could be repaired where possible and then returned to the defence organisation, further reducing electronic waste.

Nuffield Technologies was proud to have provided this cutting-edge solution for their customer, which delivered a step-change in digital capability for the defence organisation's stores management.

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