

The One-Box concept of the British Police



Abstract

The One Box Concept is much more than just technology; it is a criteria (Standard), owned by CAST, which aims to standardize the architecture, fitment and functionality of all additional equipment fitted to police vehicles, to provide a technology platform, on which existing and future systems can operate. The team has additionally developed a new approach to managing emergency services vehicles and drivers, the DVDMS. This replaces the current incident/journey data recorders, to better manage both police drivers and vehicles, improving safety and driving down costs.

The “One Box” Single Vehicle Architecture (SVA) is transferable across all the emergency services but also into any vehicles that contain additional technology, beyond that fitted by the manufacturer. It should be stated from the outset that “One Box” is a concept name only and does not intend that all the functionality is fitted into one box. The key to the project is in the integration of technology into and connecting with the architecture of police vehicles of today and into the future.

The project began in 2008 and consists of two phases of work, Phase one (Single Vehicle Architecture) and Phase two (Driver and Vehicle Data Management System).

Phase 1 - The Single Vehicle Architecture (SVA) criteria

The SVA is a criteria set and owned by CAST and describes a standardized technology platform or architecture for the equipment fitted to emergency service vehicles, which has been designed to work and integrate with the equipment in-

stalled by the vehicle manufacturers.

The SVA provides a standardized specification for all vehicle manufacturers and suppliers to adhere to. This is an enabler to a true “plug and play” solution for all emergency equipment fitted to vehicles, thereby reducing the time required to equip and decommission vehicles, whilst at the same time increasing reliability and reducing cost through the reduction of wiring complexity.

The main areas that the SVA specifies include:

- ◆ Power management
- ◆ Cabling
- ◆ Controls and switches
- ◆ Wired LAN for data transfer around and off the vehicle
- ◆ Human machine interface (HMI)

The introduction of the Emergency Services Controller Area Network (esCAN), which links directly to the vehicle's own CAN systems (with support from the vehicle manufacturers), maintains functionality and allows for seamless integration of future technology.

Having developed the architecture, ACPO ITS were struggling to find a common CAN code to develop a data dictionary that could be used to allow the transfer of data between the vehicle CAN systems and the newly developed esCAN, to allow the functionality detailed below. They had even considered writing their own data dictionary.

At this point, CiA was able to assist. Having had initial discussions with

Vauxhall/Opel and had CiA 447 identified as a potential option, a telephone conversation took place, where it became clear that CiA 447 would meet the vast majority of the ACPO team's needs. As a result, ACPO then joined CiA and a meeting took place in Nuremberg to discuss further areas of commonality and highlight areas where the ACPO team required assistance from CiA to develop new code to meet the UK requirements.

Following assistance from CiA, a data dictionary has been developed for the police service, to allow the transfer of data between the esCAN and in-vehicle networks and allow interoperability between the vehicle and after market emergency service systems. In addition, it has also allowed vehicle manufacturers, across the EU, most of whom are members of CiA, to recognize and work with this CAN standard in the development of standardized police vehicles.

The importance of the HMI between the driver and the vehicle's additional equipment, in line with the EU guiding Principles of HMI was also recognized by the team and has led to the integration of equipment, ensuring the driver is able to work in the vehicle in the safest and least distracting environment. It also includes a common panel of five of the most safety critical emergency equipment switches, which are operated via the esCAN. These switches are fitted in the same general area and in the same order in every vehicle and were agreed with the users, to ensure commonality across vehicle types and forces in the UK. One vehicle manufacturer has suggested that savings of £250 to £600 per vehicle across the vehicle life are achievable by fitting SVA.

At the recent HOSDB Exhibition in March 2011, Vauxhall demonstrated an

Insignia, the first SVA-compliant vehicle to be produced by a manufacturer in the UK. ACPO ITS are continuing to work with other vehicle manufacturers to assist them achieve SVA compliance.

A recent meeting in Paris has generated significant interest within the French Police, who are keen to adopt SVA for their vehicles. The ACPO ITS team is working closely with the French Interior Ministry to assist implementation and have met with police counterparts in Germany.

Phase 2 – Driver and Vehicle Data Management System (DVDMS) criteria

The second part of the project focuses on the development of a DVDMS system that is able to manage both vehicles and drivers by comparing driving behavior against specific profiles, utilizing CAN data from the vehicle and esCAN, via a CiA 447 conversion protocol, then turning it into easily understood information via a back office system. This information is tailored to the needs of each respective user for example driver, police supervisor, fleet manager, to both improve driving standards, reduce costs and manage the vehicle fleet in a more efficient way.

The development of the data dictionary, using CiA 447 is crucial to the development of these systems, allowing proprietary vehicle manufacturer code to be translated, via an interface into CiA 447, thereby protecting the proprietary information of the OEM.

Field trials of these systems are due to take place in a number of Forces across the UK in summer of 2011, with results of the trials being reported in early 2012. Early indications suggest that there are potentially significant savings to be made across the UK police service. ◀

The team

The Association of Chief Police Officers Intelligent Transportation Systems (ACPO ITS) working group, supported by Home Office – Centre for Applied Science and Technology (CAST), has led a public private partnership, including the Police Federation of England & Wales, OEM's and third party suppliers to develop the "One Box" Single Vehicle Architecture (SVA) and Driver and Vehicle Data Management System (DVDMS) concept and functional requirements. The ACPO ITS working group is a research organization in the UK, established under the Association of Chief Police Officers (ACPO) Roads Policing Business Area. The team currently consists of five full-time police officers; who are seconded to the team to undertake research and development projects on behalf of the police and emergency services, both in the UK and across Europe. The ACPO ITS working group are committed to making police vehicles a safer place to work, assisting in the cost effective measures that need to be implemented across the UK, working with European colleagues and supporting all police employees through technological advances to achieve the maximum performance possible.

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