QINETIQ

QinetiQ Uncrewed Autonomous System Architecture (QUASAR)

With a resurgent threat from state and non-state players the armed forces are looking to innovative solutions to maintain the tactical and technical advantage over potential threats.

The use of autonomous systems offers the potential for increased presence, reach, tempo and agility with reduced operational risk.

The provision of a 'next generation' autonomous vehicle command and control capability is essential in supporting our customers ambitions to accelerate the adoption of robotic and autonomous systems into operational service.

Developed with QinetiQ internal investment and agile software development processes, QUASAR is a suite of software applications developed against the requirements of the Dstl MAPLE (Maritime Autonomous PLatform Exploitation) research programme. The key principles of MAPLE are to allow the seamless integration of multiple heterogeneous un-crewed vehicles, their payloads and additional available sensor feeds with a warship Combat Management System. QUASAR enables the efficient planning, tasking, management of these assets by the ships command team enabling full integration of operations with the ships mission through the Combat System.

Equally relevant for land and air applications, QUASAR benefits from QinetiQ's extensive cross-domain experience and leadership of a range of MOD robotic/autonomous research programmes as well as more recently invaluable experience gained from our support of prototype warfare activities where QUASAR has been deployed in the hands of the war fighter in operationally realistic conditions.

Specifically designed for 'evergreening', QUASAR is built on a MAPLE compliant open architecture that is tailorable, scalable and upgradable. Implementation of the MAPLE Interface Protocols provides the end user with the freedom of action to select, integrate and operate the most appropriate mix of mission specific hardware (vehicles and payloads) without the need to change the software. The open architecture design additionally provides the end user with agility to change and increase the set of software applications, including integration of third-party applications, to best fulfil the user requirements and Concept of Operation (CONOPS).

The integration of uncrewed vehicles (UxVs) and payloads is achieved via a series of software 'plug ins' that enable communication with the vehicle in question without requiring changes to the core software. Use of MAPLE compliant protocols such as STANAG 4586 means a number of vehicles can use the same plug-in, significantly reducing integration time and costs.

QUASAR has been designed to be straightforward to operate and fully configurable to enable the operator to control the layout of the user interface, the applications and level of detail required for the mission in hand. One of the key attributes of the system is that control, tasking, and monitoring of all the connected assets e.g. platform or a payload, can be achieved by a single operator. The user is provided with a simple and intuitive interface supporting the conduct of military operations through a multi-panelled, multi-screened system. The number of screens is configurable and can be tailored to accommodate the facilities, available operators and space of the end user environment.

QUASAR is built upon a client-server network solution that is ideally suited to support multiple users each with different access platforms. Figure 2 shows a multiscreen setup, but all facilities can be accessed through a single screen and a subset of the functions accessed through portable devices such as a tablet. Designed for a military environment the system provides failover capability and full system redundancy.

Additional user requested capabilities include the NATO Levels of Interoperability, whereby users can request access to or control of all payloads and vehicles within the QUASAR network. This feature enables forward deployed personnel with handheld/ portable devices to access information from or control local vehicles through a controlled handover process.

QUASAR has a development roadmap shaped by user feedback through an ongoing user-driven experimentation plan that prioritises the addition of new features and functionality on an ongoing basis.

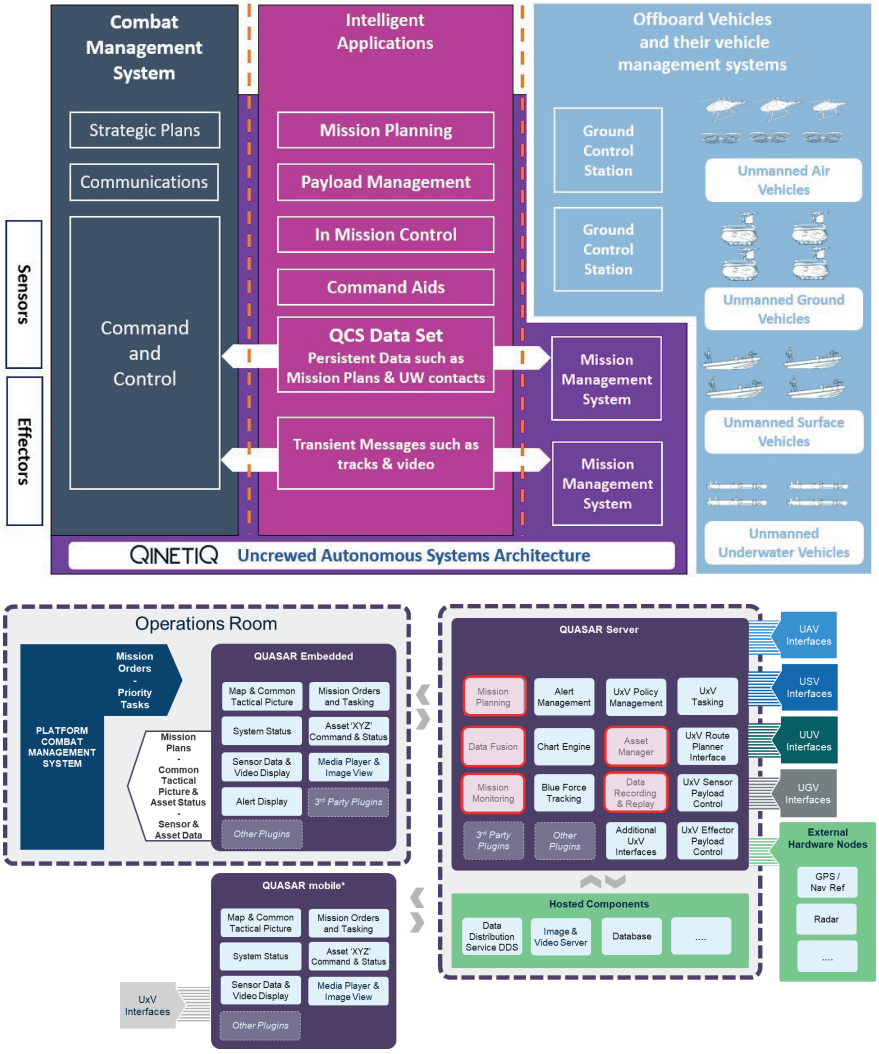

Figure 1 – High level system architecture

Figure 2 – Three screen based deployment of QUASAR

Collaborating with QinetiQ

At QinetiQ we bring organisations and people together to provide innovative solutions to real world problems, creating customer advantage.

Working with our partners and customers, we collaborate widely, working in partnership, listening hard and thinking through what customers need. Building trusted partnerships, we are helping customers anticipate and shape future requirements, adding value and future advantage.

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For further information please contact:

Cody Technology Park
Ively Road, Farnborough
Hampshire, GU14 0LX
United Kingdom

+44 (0)1252 392000
customercontact@QinetiQ.com
www.QinetiQ.com