



## **2iC CASE STUDY**

# **AUSTRALIAN DIGITAL COMBAT HELMET SYSTEM PHASE #1**

### **MISSION SCOPE**

**In both military and civil aircraft, 'heads-up' displays are becoming ubiquitous, providing critical data and situational awareness without requiring pilots to alter their direction of vision.**

In 2019, Canberra-headquartered Australian defence firm Spearpoint Solutions & Technology, a specialist in high end personal protective equipment for defence applications, including helmets and combat body armour, recognised that a number of emerging technologies—including heads-up displays and augmented reality—had potential applications in combat helmet design.

Accordingly, it put forward a business case to Australia's Defence Innovation Hub for development funding to explore these augmented reality technologies, in the context of combat helmet design, utilising a concept helmet with a limited subset of these technologies.

## CHALLENGE

With approval received, Spearpoint began work, already being aware that the technical complexity of the challenge exceeded its internal capabilities.

Not only were the technologies in question very much at the bleeding edge of development and innovation, but deployment within a helmet required high levels of miniaturisation and integration. Compounding the challenge, the requirement was not to simply passively display static information, but to allow the soldier to actively manage and control the display of information, with regard to their requirement within the battlespace at that particular point in time.

Moreover, soldiers don't operate in isolation. Communication was also an important part of the requirement, both in terms of soldiers communicating to other soldiers, as well as soldiers communicating with command-and-control centres, vehicles and aircraft.

And it wasn't just people that needed to communicate: systems, too, needed to communicate, so as to deliver the complex coordination called for in the modern battlespace. Should helmet-contained technology detect a threat, for instance, relevant targeting information needed to be seamlessly communicated to command-and-control, so as to—for example—trigger close-support interventions.

Finally, all of this had to reliably operate in a battlespace context characterised by potential difficulties such as multiple radio networks, little or no communications infrastructure, intermittent loss of signal, and enemy jamming.

Recognising these various challenges, Spearpoint turned to Southampton, UK-based 2iC, a specialist global defence software provider and integration expert.

## WHY 2iC?

2iC, Spearpoint knew, was the inventor and author of the Lean Services Architecture, an open schema based request/response and event message protocol and supporting architecture designed for the mobile platforms and low powered environments that are common in the operational and tactical military environment.

Established in 2010, its customers included the UK Ministry of Defence, the Royal Navy, US Department of Defense, US SOFWERX, the Australian Department of Defence and the New Zealand Defence Force. More to the point, perhaps, Spearpoint was also aware that 2iC had undertaken several successful projects for the Australian Defence Force, including an interoperability project for military vehicles.

In short, 2iC was the perfect partner to work with, sums up Dan Skinner, Spearpoint's Managing Director.

"When it comes to integrating disparate military systems, 2iC have a global reputation. For the Digital Combat Helmet System, they were the logical choice."

---

*"All of the helmet's advanced capabilities had to operate in a battlespace context characterised by potential difficulties such as multiple radio networks, little or no communications infrastructure, intermittent loss of signal, and enemy jamming."*

---

## WHAT 2iC DELIVERED

When fully developed, the Digital Combat Helmet System will allow integration of a rich feature-set of capabilities, including sensors for image recognition, electronic warfare sensors to detect and report the direction and type of radio signals, and advanced battlefield situational awareness capabilities.

For phase #1, though, the goals were more prosaic: using a proof-of-concept physical helmet developed in conjunction with a specialist military helmet manufacturer, conduct research and provide plans for integrating six core technologies: military GPS; electronic surveillance of radio signals; an “in the mouth” microphone and speaker capability; a physiological data monitoring device to report body temperature, blood oxygen levels and pulse; colour night vision capabilities; and a link to command-and-control centres via a combination of in-helmet systems, on-harness systems and remote systems accessed over the radios.

As the project partner with the relevant expertise in interoperability and connecting devices and systems, 2iC worked with Spearpoint to understand the Australian Army’s requirements, holding a series of workshops to jointly identify the vignettes and scenarios in which the Digital Combat Helmet System was expected to operate.

2iC then consolidated these requirements by developing a landscape of all the required devices, systems and information flows required to interoperate. This was contained in a formally-specified Information Blueprint and architecture, complete with sequence diagrams showing the information exchanges in order to achieve the functionality required by the high-level vignettes and scenarios under consideration.

As a spin-off, 2iC was able to develop a generic soldier architecture, defining interoperability standards for linking together the various technologies typically found on a soldier’s harness or helmet. This will be forwarded for use by both the Australian Defence Force and the UK’s Ministry of Defence.

## MISSION ACHIEVED

Close to completion, phase #1 looks set to be yet another success for 2iC and its specialist military systems integration and interoperability capabilities.

By working with 2iC, and leveraging the interoperability of its technology, Spearpoint was able to reduce project risk, meet an aggressive development timetable and optimise budget spend—important and commercially valuable objectives in any defence technology project.

“Technologically challenging, the Digital Combat Helmet System calls for advanced skills in systems integration and interoperability,” sums up Nick Peach, Chief Technical Officer and co-founder of 2iC. “Our experience and architecture has formed the template for the next phase of the helmet’s development, as Spearpoint work towards a fully-functioning working demonstrator of the helmet.”

---

*“By working with 2iC, and leveraging the interoperability of its technology, Spearpoint was able to reduce project risk, meet an aggressive development timetable and optimise budget spend —important and commercially valuable objectives in any defence technology project.”*

---

## ABOUT 2iC: GLOBAL LEADERS IN DIGITAL INTEROPERABILITY IN THE BATTLESPACE

2iC's unique software layer liberates human capability in the battlespace by digitally automating the exchange of mission-critical and actionable information between commanders, operators and equipment across land, sea and air.

Designed for the very leanest of digital conditions in the modern battlespace, 2iC's solution delivers two-way communications in environments with low-power computing, low-bandwidth connections, physical landscape challenges or interrupted communications. It effectively delivers the benefits of IoT (the Internet of Things) when there is no viable internet.

Find out more at [www.2iCworld.com](http://www.2iCworld.com)

## GET IN TOUCH NOW

[www.2iCworld.com](http://www.2iCworld.com)

Email: [info@2iCworld.com](mailto:info@2iCworld.com)

Tel: +44 (0)208 1237479

**2iC Limited**  
Southampton  
United Kingdom

2iC Limited, registered in England number 7183164

© 2021 2iC Limited. All rights reserved.

