Permian addresses HLA user needs

AN AUSTRALIAN SME'S SUCCESS IN DEVELOPING SMART MESSAGE FORMAT CONVERTERS AND SIMULATORS FOR AUSTRALIAN SURVEILLANCE PROGRAMS HAS HIGHLIGHTED A LOOMING, CRITICAL PROBLEM FOR AUSTRALIA'S SIMULATION INDUSTRY.

GREGOR FERGUSON | ADELAIDE

When Paul Johnson, the managing director of JORN prime contractor RLM Systems, paid tribute to the Defence and Industry team members and stakeholders who'd played a key role in getting JORN across the line, one of the companies he named was a local SME, Permian Pty Ltd.

The company, which has systems and software engineers in Adelaide and Melbourne, is a simulation and communications specialist. In a couple of key Defence projects – JORN, and the interim upgrade of 2 and 3 CRU with the Solipsys multi-source correlator tracker – these specialisations have converged usefully, according to managing director Dr Stephen Mabbs.

The company has teamed with RLM, DSTO and the JORN Project Office to develop a message format converter for JORN. While a relatively small program in dollar terms it is critical to the integration of JORN into Defence's wider surveillance and response architecture: JORN is designed to generate contact reports using Defence's ADFORMS format; the team's format converter translates this data into a Link-16 format for dissemination to other ADF assets, including 2 and 3 CRU and their Solipsys-based display systems, and to the Australian Theatre Joint Intelligence Centre in Sydney.

Permian started developing the message format converter under a DSTO contract. In related work RLM Systems contracted Permian to develop the External Defence Agency Test Harness, the 'golden standard' by which all JORN external messaging is now verified. To achieve this, Permian had to write its own software applications to simulate the features and behaviour of JORN, 1 Radar Surveillance Unit (1 RSU) and some of the external defence agencies with which JORN and 1 RSU are required to interface.

RLM Systems then contracted Permian under the JORN Air Defence Integration Project (JADIP) to help develop the message format converter as a commercial product to translate ADFORMS-compliant JORN messages into Link-16 format.

Permian helped RLM Systems develop the product and was given sole responsibility for developing the systems test and simulation functionality which supports it.

That led in turn to another message data converter contract to support the RAAF's Surveillance and Control Group. Australia's civil air traffic control system, TAAATS, has a Link-16 feed to 3 CRU at RAAF Base Williamtown: Permian developed the message format converter which translates TAAATS data into a Link-16 message which is intelligible to the Solipsys multi-source correlator-tracker at 3 CRU, which then shares the data with 2 CRU at Tindal. The Link-16 connection between TAATS and 3 CRU is actually located in Permian's Melbourne office.

This exposure to JORN, 3 CRU, the SCG and its various operators has led in turn to the development of a prototype computer-based training system for JORN operators – the OTA 1, or OTHR Training Aid 1. This builds on Stephen Mabbs' long experience of JORN – a former DSTO HF Radar Division research scientist, he has been a software consultant to Telstra and RLM Systems since 1994.

The company's simulation expertise has led it down an interesting path. Late last year it developed an interface for DSTO's Virtual Ship simulation with an open-source man-in-the-loop flight simulator called Flight Gear. Permian has developed an interface between DSTO's HLA-based Virtual Maritime Systems Architecture and Flight Gear and modified Flight Gear to allow a multi-player interface and extra aircraft and ship entities within the simulation. It also built interfaces between VMSA, Flight Gear and Defence's ADFORMS and Link-16 messaging formats.

Permian has done lots of work developing HLA interfaces for different simulator types such as between Microsoft Flight Simulator and the Real-Time Platform Reference Federated Object Model (RPR-FOM), which is one of the core elements of HLA, the Higher-Level Architecture for distributed simulation. Stephen Mabbs believes Permian is the first company to achieve this – it's a significant achievement, not least ▶

because RPR-FOM is a worldwide defence simulation standard.

There is potentially a global market for this interface, Mabbs told *ADM*, pointing to US Navy research which demonstrated that flight training students who had used PC-based simulators such as MS Flight Simulator during their initial and basic flying training were 54 percent more likely to receive above-average scores in flight checks and tests.

In achieving this, however, he has identified what may become a significant issue for Australia's simulation companies, most of which are SMEs. HLA was developed by the Pentagon's Defense Modelling and Simulation Office, but DMSO has commercialised the technology and no longer provides support for HLA developers. Four companies have been identified by DMSO to market the HLA code – SAIC; MAK; Pitch and Mitsubishi Space Software Company.

Anybody wanting to develop an HLA-based simulation must now pay as much as US$8,000 for a five-federate Real-Time Infrastructure (RTI) to run an HLA-based simulation. That's far too much for developers such as universities and Australian SMEs, says Mabbs, and Permian has begun an initiative to develop an open-source RTI requiring no licensing fees.

Mabbs told *ADM* that he hopes bodies like the Australian Defence Simulation Office will get behind the initiative: it's in their best interests to keep HLA affordable and so lower the barriers to entry into this sector for smart Australian SMEs and developers.

The company has already commenced its development of its own prototype RTI and has demonstrated these to both DSTO's Maritime Platforms Division and the University of Ballarat, providers of academic HLA training.

It's early days yet, says Mabbs. But his company's own self-interest is clear. Permian is an R&D company - despite having doubled its turnover every 18 months for the last three years, like its peers and competitors it needs to reduce the barriers to participation in what promises to be a steady market for simulation products and expertise in Australia in years to come. This is an issue which affects every company in Australia's simulation industry. ■

Future Surveillance through the eyes of an Australian SME

AN AUSTRALIAN SME IS ABOUT TO LAUNCH A NEW SURVEILLANCE PRODUCT WHICH EXPLOITS AUSTRALIA'S WORLD LEAD IN WARM AND SHALLOW WATER SONAR TECHNOLOGY AS WELL AS AUSTRALIAN SMARTS IN AEROSPACE AND INFORMATION TECHNOLOGY.

BERNIE McGEORGE | SYDNEY

Sydney-based Sonacom Systems Pty Ltd expects to launch its Sea-Watch SW1 acoustic remote surveillance system on the global market by the end of this month. The launch is a significant milestone for the company which used an AusIndustry grant to help develop the technology behind the Sea-Watch system and, in August last year, was taken over by fellow Sydney-based technology firm Zylotech Ltd.

Originally, Zylotech's core focus was on purely commercial applications of video streaming and video conferencing technology but recent world events have seen this focus shift to the surveillance solutions market, exploiting the company's strengths in IP (Internet Protocol) based digital video surveillance and acoustic sonobuoy surveillance technology.

The company recognised that post-September 11 protection of both commercial and government assets as well as populations would be high on everyone's agenda and technology-based surveillance solutions would play a critical role. In August 2002 Zylotech took over Sonacom, which was in the process of developing a range of sonobuoy related technologies, with some assistance through Aus Industry grants.

In October Zylotech / Sonacom completed delivery of its first small order of 20 special application sonobuoys to DSTO. During the current quarter of 2003 it will launch the first commercial version of Sea-Watch SW1.

Sea-Watch is a flexible and scalable system; the core solution includes the Sea-Watch Sonobuoy, which can be anchored in shallow as well as deep water, with an on-buoy hydrophone system for detecting and processing man-made sounds such as boat engines, which are then transmitted over a communications network to the shore-based Sonasurv Geographical Display and Warning units. Other systems, such as Vessel Monitoring Systems (VMS) may be integrated with the Sea-Watch solution, according to the needs of individual users, to identify authorised vessels.

The on-buoy processor analyses the data to determine its frequency components, processing the acoustic signals which are then transmitted to the Sonasurv unit on shore using radio / satellite links. Contacts can then be displayed on a PC in nautical chart form. This incoming data may also be saved for later display. A number of Sea-watch sonobuoys can be linked to a base station Sonasurv Geographical Display and Warning System to erect an acoustic surveillance fence around the assets or areas being monitored.

The Sonasurv Geographical Display and Warning System presents a nautical chart upon which is displayed the locations of sonobuoys, status of each buoy and a history of the targets. The system can be configured and linked to communications networks to send text messages to nominated individuals to inform them that alarms have been raised.

The end user can then decide if a closer look by a surface ship or aircraft is required. Countries and organisations with large coastlines and sea based assets to protect will face a heavy cost in mounting and maintaining more regular coast watch air and / or sea patrols and the Sea-Watch system will assist in reducing these costs by allowing the users to be more selective as to when a closer look is needed.

Sea-Watch SW1 sonobuoys are designed for long life, use solar energy to recharge battery power and maintenance depends on the exigencies of each location, but is estimated at around the 3 to 4 months mark on average.

The Sea-Watch SW1 solution is being launched into a growth market worldwide as nations grapple with the complex civil and national defence challenges inherent in securing coastal borders and ports. Threats from terrorism, transnational crime and trafficking in illegal immigrants and prohibited substances are growing as main airports tighten security and become more difficult as entry points.

Government agencies and commercial organisations alike also need a means of detecting and preventing illegal fishing, incursions into environmentally sensitive areas such as reefs, and interference with sea-based economic assets such as oil and gas platforms, pearl beds and fish farms.

The company has received expressions of interest from a number of possible ▶