

CUUUWI: UNDERWATER SEARCH AND EMERGENCY COMMUNICATIONS

Enabling shore-to-subsea detection and communications

CUUUWi is a communications gateway which enables voice and text-based data communication between above-water mobile phone and SATCOM users to underwater users or platforms.

FINDING THE UNDETECTABLE

Military submarines are designed with low signature, to roam the oceans undetected by the adversary, rarely surfacing, except to detect and establish communications with the command headquarters. They are engineered to suppress signals emitting from the vessel and absorb sonar signals to avoid detection.

In the case of an emergency, when a submarine goes off navigation, this

makes locating it near impossible. When the crew cannot reach the surface to send an SOS signal, they must rely on underwater distress signals to make their location known.

Developed under an Australian government funded research and development project, L3Harris' CUUUWi system is autonomous surface gateway, providing an air to subsea communication interface.



The CUUUWi system can provide communications for a stricken submarine, or encrypted, secure communications for when the submarine is operating at speed and depth.



Equipment such as the L3Harris C-Enduro autonomous surface vehicle provide a pervasive, remotely navigated gateway platform to deploy the CUUUWi system.



**ACTIONABLE
INTELLIGENCE**

KEY FEATURES

- > Communications at speed and depth
- > No local storage of data
- > Persistent
- > Remote controlled
- > Long life

WHAT'S IN A NAME?

The name comes from the Australian 'cooee' call – a sound traditionally shouted to indicate someone's own location to attract help or find missing people if lost in the outback, and in this application it helps find and establish communications with stricken submarines.

A MULTI-ROLE PLATFORM

SUBMARINE DETECTION AND EMERGENCY COMMUNICATIONS

When CUUUWi is fitted to a fleet of unmanned surface vessels (USVs), the system can be rapidly launched and set on a search pattern to scan the oceans to detect the emergency pulses of a lost submarine.

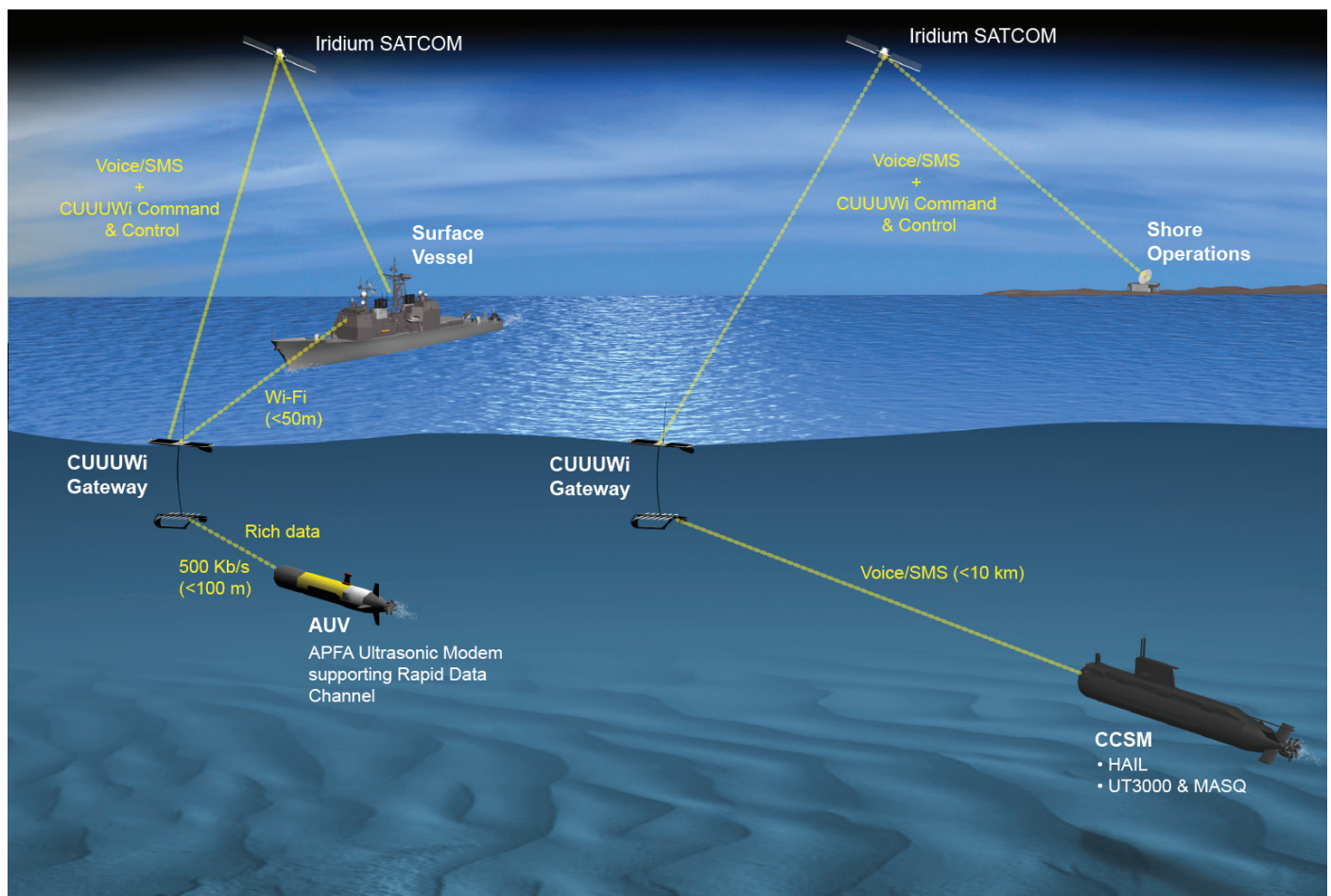
The multi-role CUUUWi, with its long life ability to search and detect underwater signals, provides an efficient method to establish a communications link between submarines at depth and their command HQ. This can be maintained while search and rescue equipment is deployed, effectively improving the search and recovery operations.

SECURE COMMUNICATIONS

The secondary role of CUUUWi is to provide encrypted secure communications for a submarine to communicate with the outside world when in stealth mode at depth and speed.

CUUUWi acts as a low-signature surface-based communications gateway, enabling voice and text-based data communication between above water mobile phone and SATCOM to underwater users or platforms, operating within a range of 10 km of the gateway (environment dependent).

The systems extend the potential for through-water communications for a range of subsea platforms including autonomous underwater vehicles (AUVs), seabed sensors, submarines, ships and divers.



TECHNICAL SPECIFICATION

COMPATIBILITY

CUUUWi is compatible with NATO standard underwater telephones (UQC, STANAG 1074) including the ELAC UT2200 systems – the compact, military standard emergency underwater telephone system, and the ELAC UT3000 digital system which is commonly fitted onto military submarines and ships, as well as the HAIL digital underwater communications systems fitted to Royal Australian Navy (RAN) submarines.

The system is capable of detecting and locating an 8.8 kHz underwater locator beacon and 37 kHz emergency locator pulses, as commonly fitted to submarines, and soon to be included on commercial and military airframes, black boxes and maritime voyage data recorders.

The new JANUS protocol, designed and tested by the NATO Centre for Maritime Research and Experimentation (CMRE), will provide a digital underwater acoustic communications capability, enabling more effective command and control to escape and rescue operations.

JANUS is in the process to become a NATO standard, and if adopted globally, can make military and civilian, NATO and non-NATO devices interoperable, providing them all with a common language with which to communicate and arrange to cooperate.

KEY ENABLING TECHNOLOGY

L3Harris low probability of intercept spread spectrum acoustic signalling enables text messaging to be received reliably, at long ranges in challenging acoustic conditions.

The integration of Iridium and Thuraya SATCOM communications enables global coverage.

The Liquid Robotics Wave Glider provides a pervasive, remotely navigated gateway platform.

PERFORMANCE AND COVERAGE

Above water, CUUUWi automatically routes using the terrestrial phone network where available (3G/4G) and otherwise uses Iridium or Thuraya SATCOM networks, providing global connectivity.

Below water communications ranges of 10 km can be expected in typical ocean conditions, and up to 20 km in good conditions.

COMMUNICATIONS MODES

- > Above-water
- > SATCOM
- > 4G/3G/GSM
- > VHF
- > Underwater
- > Underwater telephone
- > HAIL
- > MASQ

OPTIONS / FUTURE CAPABILITY

- > Encryption
- > Scuttling
- > Commercial acoustic modems
- > High speed modems (induction/light)
- > Air deployment
- > JANUS compliance



GPM300 – FULL OCEAN DEPTH MASQ ACOUSTIC MODEM

This L3Harris-developed acoustic modem has been proven to successfully provide communications from the deepest point of the ocean.

300-DAY 8.8 KHZ EMERGENCY LOCATOR PINGER

Once fitted to subsea system, the emergency pinger will allow detection and location of subsea objects using the CUUUWi systems. The frequency will provide greater than 10 times detection range over traditional subsea locator systems.

TECHNOLOGY LEADERS

A GLOBAL NETWORK

L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs. The company provides advanced defence and commercial technologies across air, land, sea, space and cyber domains.

L3Harris has provided advanced technology solutions to government and commercial customers across Australia and New Zealand for more than 25 years. As well as the facilities in Fremantle, Cairns and Brisbane, L3Harris has facilities in major cities including Melbourne, Canberra, Sydney and Adelaide – and employs approximately 520 professionals who understand the unique needs and challenges of customers in the region.

SPECIALISTS IN UNDERWATER COMMUNICATIONS

As experts in intelligence, surveillance and communications solutions for maritime (above and below the water) and land systems, L3Harris specialises in undersea surveillance, network and acoustic communications, maritime domain awareness from harbours to coastlines, and the provision and sustainment of electronic mission systems.

We have a strong research and development focus, with funded projects by the Australian Defence Science & Technology Group, with whom we hold a strategic alliance agreement.

DEEP WATER ACOUSTIC COMMUNICATIONS SYSTEMS

As well as CUUUWi, L3Harris provides further leading-edge systems in the maritime domain.

Hydro Acoustic Information Link (HAIL) is a reliable, robust, doppler tolerant long range underwater communication system. The system is fitted to the RAN Collins Class submarine and Air Warfare Destroyer and is used by the U.S. Navy.

Our GPM 300 MASQ acoustic modems are fitted to Triton's Hadal Exploration System – the world's first manned submersible commercially certified for repeatable exploration to the deepest point in the ocean.

In 2019, the Hadal system was used for the 'Five Deeps Expedition,' an around-the-world journey to dive to the deepest point in each of the world's five oceans, and broke the world record for the deepest ever dive at 10,927m in the Marianas Trench. The modems were also used in James Cameron's Deepsea Challenge Expedition in 2012, again, providing communications and enabling a record-breaking 'tweet' from the deepest point of the ocean.

TEST AND EVALUATION SYSTEMS

We provide and support fixed and deployable tracking ranges to the RAN for weapons firing testing exercises. Our ranges include:

- > PASOR (portable acoustic sonobuoy range) – a cooperative system that utilises sonobuoys or persistent surface sensors to collect signature data in open waters.
- > MTR (mobile tracking range) – shallow to deep tracking solution for multi-use and operational support aspects, includes persistent surface based sensors.
- > SAR (South Australian range) – a fixed range used to capture the signature of the Collins Class submarine.

QUALITY STANDARDS

- > AS/NZS ISO 9001:2008 certified management system
- > AS/NZS 4801:2001 certified Occupational Health and Safety (OH&S) Management System
- > Authorised Engineering Organisation (AEO) with TRAMM-L and Navy status

SECURITY

- > ITAR compliance
- > Secure facilities and systems accredited with the Australian Department of Defence

