Aviation Case Studies

For government users

EXTENDING C130 CAPABILITY

Global Xpress 'exceeds expectations' in Royal Australia Air Force trials

In December 2017, The Royal Australian Air Force (RAAF) completed a successful trial of the Global Xpress (GX) service as part of their ongoing mission to develop new ways for air mobility aircraft to support their embarked forces.

During the six-month trial the RAAF utilised GX via a Honeywell JetWaveTM Ka-band satellite communication system on board a C-130J Hercules transport aircraft. The trial culminated with an in-air VIP demonstration where the service was demonstrated using a number of applications including secure, live video streaming and encrypted file transfer.

'Performed flawlessly'

Following the demonstration, Air Vice Marshal Warren McDonald, Australian Defence Force Chief of Joint Capabilities, commented on GX performance: **"This exceeds expectations, is future and customer-focused, and performed flawlessly."**

The RAAF is transforming itself for the information age, working with the Australian Army and Navy to ensure they deliver a networked future joint force across the spectrum of air, space, electromagnetic and cyber. Under the RAAF's Plan Jericho, opportunities are being pursued to bring integrated and networked systems to the defence workforce.

Todd McDonell, President of Viasat International Government, said: "This project has been in the works for a long time and is testament to the power of industry and defence working together to ensure that communications are an effective tool for delivering greater operational capability."

Transformative technology

Global Xpress was designed with government users in mind and was the first end-to-end high-throughput commercial wideband network to deliver worldwide service. It is gratifying to hear that we have delivered upon the expectations of the RAAF. We are proud to be able to play an important role in helping the RAAF in their goal of establishing a Fifth Generation Air Force.

The trial was conducted with support from industry partners Airbus Group Australia Pacific, Honeywell, and L3 Communications, as well as the Australian Government Defence Department's Capability Acquisition and Sustainment Group.

GLOBAL XPRESS
for government airborne operations

Applications enabled by Global Xpress

- Manned/unmanned Airborne
- Intelligence, Surveillance and Reconnaissance (AISR)
- Live full-motion video
- Operational theatre backhaul
- Tactical communications
- Video teleconferencing
- Command and control (C2)
- Situational awareness
- Battlefield information systems
- IP multicast
- Disaster recovery
- Emergency respons

Global Xpress benefits

- Worldwide wideband coverage
- Seamless mobile roaming
- Interoperable with government military Ka-band systems
- Steerable beams for flexible network capacity
- Redundant terrestrial infrastructure
- Smaller, easy-to-use terminals
- Customized solutions

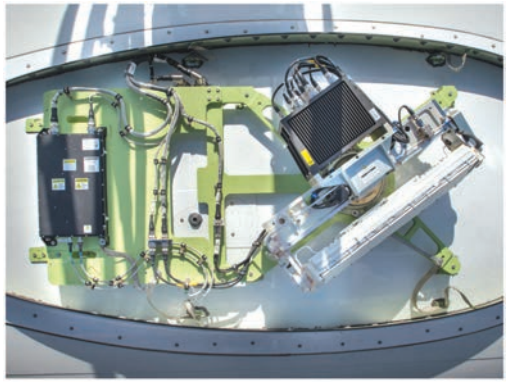
JetWave MCS-8200

Honeywell's JetWave MCS-8200 aeronautical satellite communication terminal enables Global Xpress connectivity for large aircraft

The MCS-8000 is designed to provide broadband-class data connectivity and the hardware and network are optimised for mobility to provide a consistently outstanding passenger experience all over the world.

Standard FR and antenna controller

Both variants of the MCS terminals share the same RF and antenna controller, modem and router hardware, with this Fuselage-mounted antenna (MCS-8200) optimised for larger air transport sized aircraft.



Radome Hardware Overview

MCS 8200

AIM Kit

- Platform agnostic skirt and fitting
- Reduced part type count
- Improved accessability for install

LAIM Kit

- Aircraft specific skirt and fitting
- Standard RF kit and associated bracket
- Lighter weight
- Lower cost

PREVENTING OIL SPILLS

Transport Canada's Marine Program is the lead federal department responsible for preventing pollution from ships transiting waters under Canadian jurisdiction. Through its National Aerial Surveillance Program (NASP), the surveillance aircraft keep a watchful eye over marine traffic and their presence also acts as a deterrent by discouraging illegal discharges of pollution at sea.

The NASP uses the SwiftBroadband multi-channel service, through our Distribution Partner, Satcom Direct, for its daily surveillance operations in order to communicate with government officials and/or first responders. Internationally, aerial surveillance is widely adopted and considered to be the most effective method for the detection of oil spills.

Viasat satellite services are used to send images and screen captures in near real time as well as streaming video in real time. The service is also used for flight-following and tracking of aircraft and to send data—received from the Automatic Identification System of ships in the area—to Canada's Marine Security Operations Centres in near-real time (transmitted every 15 minutes during the flight). The Viasat SwiftBroadband service enables the NASP aircrew to communicate with government officials and first responders on the ground.

Depending on the nature of the incident, imagery is sent from the aircraft to responders, investigators, and command centres. to expedite the response to the incident. The Viasat service is essential in providing situational awareness to Transport Canada senior government officials and to other government departments as well. Surveillance officers in the aircraft are electronically enabled to transmit information that has been observed in near real time. In the case of an incident such as an oil spill, the data observed by the surveillance officers is transmitted via email to senior management and first responders. Live video stream is also a popular means of providing situational awareness during critical situations to enable accurate and timely decision making.

The NASP has three surveillance aircraft which are strategically located across Canada for effective monitoring and rapid response to incidents.

380 Million gallons of oil per year enter our oceans

55% of illegal dumping of fuel occurs by ships in transit

50% of large spills occurred while vessels were underway in open water over the last 40 years

They are all equipped with Maritime Surveillance Systems (MSS6000), which were all purchased from the Swedish Space Corporation, now called S&T Airborne Systems. This state-of-the-art remote sensing equipment includes the following:

SwiftBroadband Satellite Communications System.

This permits the flight crews to stream video, or to transmit data they collect during patrols, to ground crews in real time. Consequently, incident command teams located in command centres can view the same image as the flight crew at the same time. (Communication to the ground)

Side Looking Airborne Radar (SLAR).

This helps detect irregularities on the ocean's surface— even when visibility is poor or during the night. The SLAR extends the aircraft's sight from two nautical miles (surveillance with the naked eye) to 45 nautical miles on each side. (Anomaly detection)

Infrared - Ultraviolet Line Scanner (IRUV).

This helps experts analyse oil slicks and provides high-resolution imagery of marine pollution incidents. It can also observe temperature differences on the ocean surface and map out spills of oil and other substances. (Oil analysis)

Electro-optical Infrared Camera System (EOIR).

This is also known as an MX15; it helps aircrews identify ships and collect evidence over a wide range—even in reduced visibility. (Source identification)

Automatic Identification System (AIS).

This provides vessel identity and voyage information, which helps aircrews digitally link the vessels with positions on the map. (Evidence support)

Geo-coded Digital Camera System.

These cameras enable the aircrews to take digital photos and videos that can be used as evidence. All pictures and video are geo-tagged with GPS data such as date, time, longitude and latitude. Transport Canada can use these photographs and videos as evidence in court. (Evidence support)

Statistics sourced from:
OIL IN OUR OCEANS: The Xerces Society, Blackburn, Mazzacano, Fallon, Hoffman Black, 2014

Australian Customs CoastWatch

Needing to police one of the world's longest coastlines, Australian customs requires the very best in airborne data communications.

With its immense 30,000km coastline and reputation for prosperity, opportunity and stability, Australia is a magnet for illegal immigration. To cope with the problem, the country's federal government launched its 'Protecting our borders' programme - a multi -million-dollar drive to apply high technology to the huge task of keeping watch over Australian territorial waters.

The first line of defence is a fleet of aircraft equipped with the very latest in air-to-surface surveillance systems. Viasat SwiftBroadband aeronautical data solution has been chosen as the best way to deliver the information gleaned by the eyes in the sky back to commanders on the ground.

Australia's Border Protection Command operates 15 aircraft carrying advanced radar and electro-optical sensors to scan the coast and economic exclusion zone for intruders. Flying up to 1,800km offshore, the aircraft cover a maritime area larger than Australia itself, recording over 1,300 missions and 20,000 hours a year.

Prior to the adoption of the Eye in the Sky solution, it sometimes took several hours for the results of their patrols to get back to the decision makers in the Customs National Surveillance Centre. This delay could make the difference between a successful interception and letting an illegal vessel slip through.

Australian Customs Border Protection Command decided to find a system that would deliver video and other data to the ground within seconds rather than hours. Customs called on a Sydney-based Viasat partner to provide a solution. The Sydney company TC Communications came up with an Viasat SwiftBroadband system now operating on-board several of the aircraft in the coastwatch fleet.

The Australian company worked with other Viasat partners to integrate the antenna and video into the solution.

Scanning the southern seas

The introduction of SwiftBroadband to the Coastwatch fleet

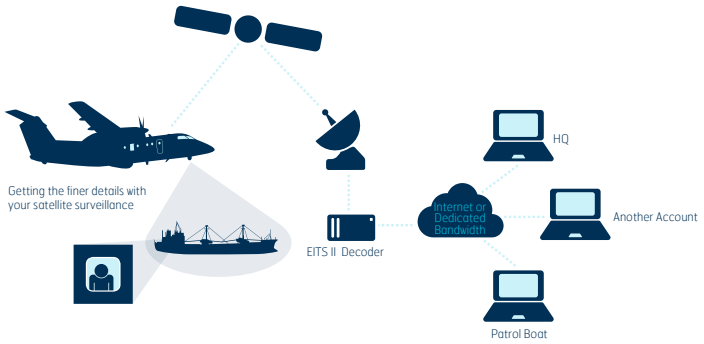
When Australian Minister for Justice and Customs, Senator the Hon Chris Ellison, formally inaugurated the new capability, two of the aircraft were on patrol hundreds of kilometres away, each supplying live video feeds to the Canberra centre.

As the minister spoke over the simultaneous voice link to the crew of one of the Dash-8's, the aircraft flashed back pictures of a large merchant ship cruising below. The images were displayed on a video wall and individual workstations around the centre. The video system also allows an aircraft returning to base at the end of a spell of duty to 'hand over' any current tasks quickly and efficiently to the crews of the aircraft coming on-station to continue the patrol.

"This system will provide the latest information and allow enhanced decision making when dealing with complex events in remote and maritime environments patrolled by Customs Coastwatch aircraft," the minister says. "This is the technology we need to look out for Australian borders."

Ellison also points out the potential use of the system by defence forces and law enforcement agencies across Australia. "That's becoming more and more important in the current security environment." The introduction of SwiftBroadband to the Coastwatch fleet promises an immediate boost to operational effectiveness, according to Coastwatch chief Rear-Admiral Max Hancock. "To those who hope to avoid detection by Coastwatch aircraft and try to mask illegal or inappropriate activities, I say the game has changed. The risk of being found are now much greater and with luck we'll put you out of business completely."

Canberra Times

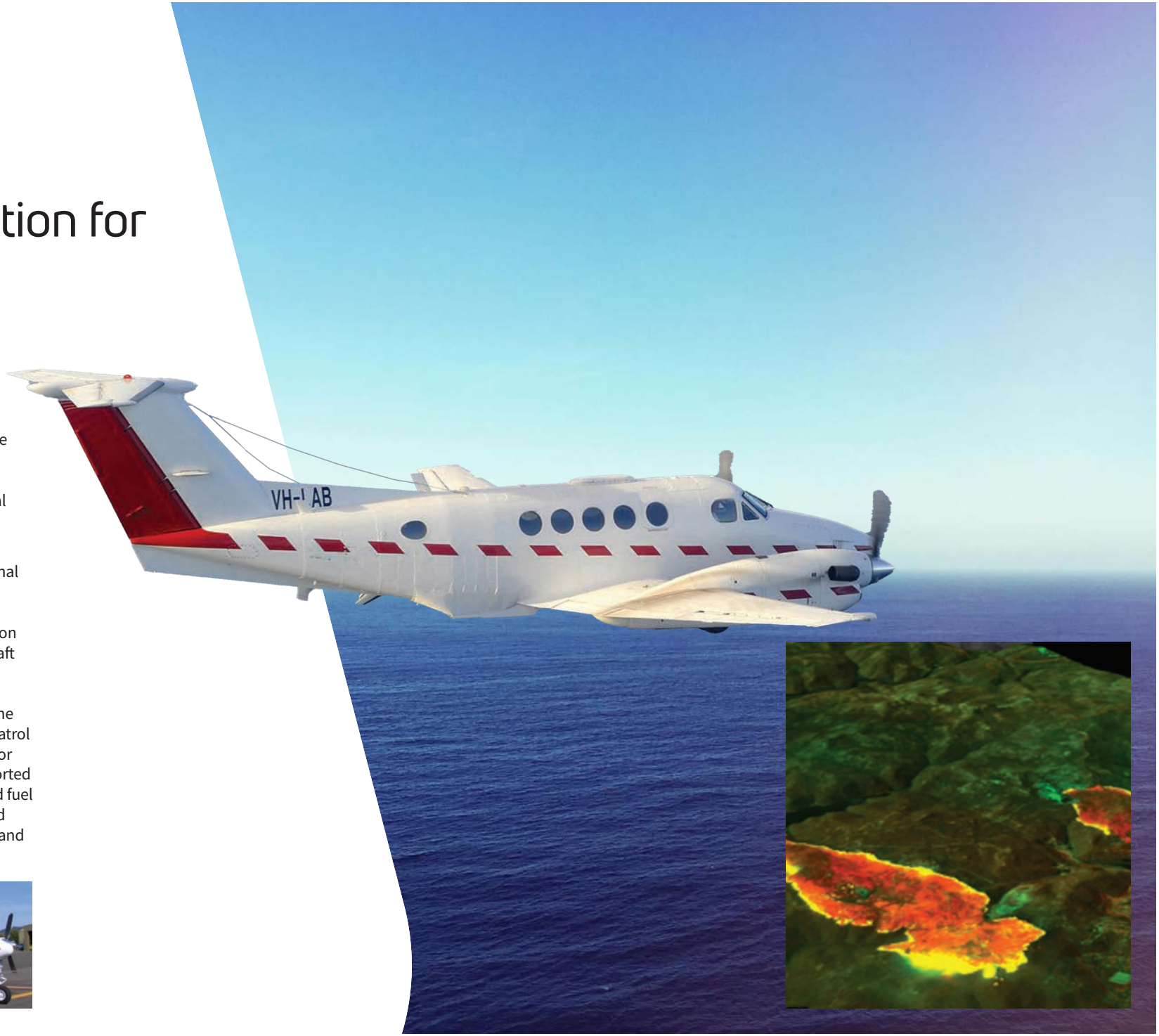


Instant information for safety heroes

Fire Fighting Observation Systems

Border Protection isn't the Australian Government's only application for Viasat. More than ever Australia is faced with the potential threat of natural disaster. Each of the nation's states maintains a highly effective professional and volunteer fire-fighting service.

The Rural Fire Service required a system that would allow critical fire scanning and situational data to be transmitted directly from a small airframe to incident control and command centres on the ground. A state of the art solution that exploited SwiftBroadband's smaller aircraft equipment allowed the Rural Fire Service to transmit fire scanning data directly to their incident control centres. This helped ensure the aircraft could continue on their mission and patrol ever-increasing areas without having to stop, or circle, to transmit information. The client reported a healthy reduction in operating expenses and fuel utilisation through the ability to fly further and longer whilst maintaining contact with command and control for mission instructions.



Live video from Rotary Wing Aircraft

The Taiwanese National Fire and Rescue Authority

The Taiwanese National Fire and Rescue Authority required a live video surveillance solution for use during floods, typhoons & earthquakes. This situational awareness capability would allow them to carry out more efficient search and rescue operations.

This installation was a world first for rotary winged aircraft and had to contend with a range of rotor interference issues as well as an existing analogue aircraft system. The communications system also needed be a roll-on/roll-off solution in order to support multi-mission requirements.

The solution saw the development of a digital navigation interface for the satcom system coupled with the provision of low cost aerial video camera as well as a roll on / roll off satcom package.

A ROLL ON/ROLL OFF SOLUTION FOR LARGER FLEETS

The Victorian State Aircraft Unit

The Victorian State Aircraft Unit had a requirement for their fleet of small aircraft to be able to transmit information back to one of 43 incident control centres on the ground. Whilst the aircraft were utilised by the Department of Sustainability and the Environment during the bushfire season, these aircraft were often redeployed for other duties in the off-season. The DSE required a satcom solution that could be taken off the aircraft when they were being used by other departments.

A Roll On/Roll Off SwiftBroadband solution was designed that involved each of the aircraft being fitted with a small, lightweight antenna that remains mounted to the aircraft throughout the year. A rack containing the communications modem and associated equipment can then be rolled on and rolled off individual aircraft as and when needed, considerably reducing the capex compared to fitting every aircraft with it's own individual system.

Aero Case Studies July 2024