

Learning to Walk Before We Run with ALIX



Altair CU-163301 takes flight over Goose Bay, Newfoundland & Labrador.

PHOTO: CPL ROBERT BOTTRILL, CF COMBAT CAMERA

Navy Captain Kevin Laing strikes you as a man happy in his work. On a recent visit to the Canadian Forces Experimentation Centre (CFEC) at Shirley's Bay near Ottawa, *FRONTLINE* had the opportunity to chat with the Commandant about the Atlantic Littoral ISR Experiment (ALIX), the latest major undertaking in the ongoing CFEC program. He revels in the experience of telling the story.

CFEC is a product of the Canadian Forces (CF) efforts to make sense out of the post Cold War world. Gone was the relatively simplistic procedure for combat development, the guidance for the bottom-up development of tactics, procedures and equipment that had been prevalent in the CF since the mid 20th Century.

No longer was it possible to seek new concepts solely by studying what your anticipated enemy was up to, or based on well-understood territory, airspace or ocean sectors. The new world order, especially since the attacks of 9/11, means more research and top-down direction.

While some efforts had been underway to look at what the individual services might need in the future, CFEC was formed and tasked to look at Joint CF needs, to identify opportunities for inter-service synergy. Using the powerful tools of simulation and modeling, it has established itself as the 'honest broker' to support the development of the concepts, and

the acquisition of equipment for our future Forces, working on behalf of the CF staff with the decision making responsibility. The Centre is hooked up internationally via Battle-Lab networks to exploit the work of others too.

So it is, that among other activities over the past three years, the CFEC has conducted a series of simulated and live experiments with "uninhabited aerial vehicles" (UAVs) and the information environment that supports their use. According to background information, CFEC has based this work on a fundamental need:

"In order to improve situational awareness and obtain a more timely, informative common operational picture, the CF needs a better intelligence, surveillance and reconnaissance (ISR) and command-and-control capability, as well as processed information and intelligence."

Such an improved capability would enhance not only the operational capabilities of the CF and its contributions to multinational operations, but also its ability to support other federal government institutions and other levels of government in domestic defence and security missions.

"X" is for "Experiment"

Note the use of the term, "experiments." Capt(N) Laing takes pains to point out that these activities are not 'exercises' in the normal military meaning of the term. The aim is not to train or 'exercise' a known capability, but rather to experiment to find the best way to accomplish any given aim. In an experiment, it is possible to take greater risks, to make mistakes in order to learn what not to do, for example. If an experiment is properly conducted and fails, that's OK: the longer-term risk may well be reduced. And there is a special fund set up to ensure

that the experiments don't unnecessarily lumber other ongoing activities with a further financial burden.

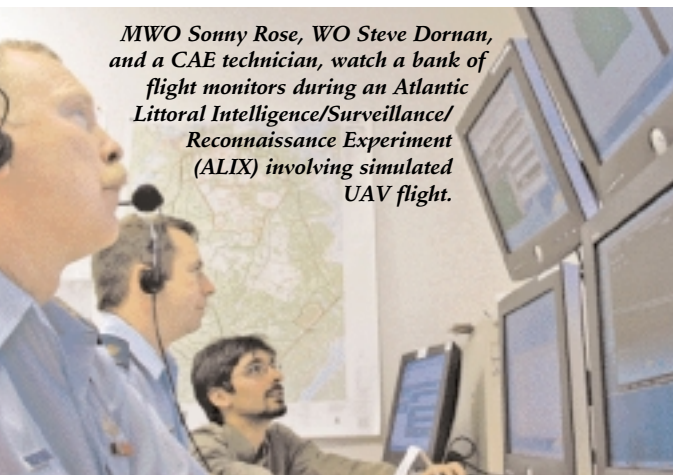
The ALIX was designed to gain an understanding of the implications of acquiring and employing medium- and high-altitude long-endurance UAVs and to understand the requirements for an integrated ISR architecture that would increase force effectiveness, particularly in the joint operations context. It also provided an opportunity to explore the principles of "network-enabled operations", intended to increase military combat power by networking sensor arrays to decision-makers and operational forces.

The Plan for ALIX

Just how does one go about preparing such a mammoth experiment? Capt Laing describes the process as hard work by a number of very dedicated people. But it doesn't start with a clean sheet of paper. In this case the CFEC had the advantage of a number of previous experiments and operational use of UAVs. The 'discovery phase' took place over two years ago on the Army Exercise Robust RAM. Some tentative steps were taken, with results clear enough to support the operational use of a UAV, the General Atomics-ASI I-Gnat in support of the G8 summit in Kananaskis. Last year, the focus shifted to the Pacific coast where the P(acific) LIX was held to employ an Israeli Aircraft Industries Eagle 1 in support of maritime surveillance work out of Tofino, BC. No doubt, there has also been some feedback from the Army's operational employment of a tactical UAV (the SPERWER) in Afghanistan.

Capt. Laing notes that a key lesson from early work with UAVs indicated that the actual platform is less important than the command and information system that connects the platform to its associated weapons systems, decision makers and additional sensors.

Take this considerable fund of knowledge and look around to see what else is



MWO Sonny Rose, WO Steve Dornan, and a CAE technician, watch a bank of flight monitors during an Atlantic Littoral Intelligence/Surveillance/Reconnaissance Experiment (ALIX) involving simulated UAV flight.

PHOTO: SGT FRANK HUDEC, CANADIAN FORCES COMBAT CAMERA

going on, what existing activities or planned exercises are coming up that can be linked without compromise to a new experiment, and voila (some two years later): the ALIX.

Conducting the Experiment

ALIX officially lasted from August 10 to September 16, 2004 and was based on a number of scenarios.

Initially an ALTAIR UAV leased from General Atomics and equipped with cameras, radar, redundant sensors and control arrangements, flew out of Goose Bay, with control being passed to a remote operating centre at Telesat Canada in Ottawa. During a flight of some 23 hours, the ALTAIR was directed North to the Arctic, tasked to help find the crash site satellite crash of a foreign satellite (sound familiar?). The UAV was integrated into Exercise Narwhal, a Canadian Forces Northern Region exercise on Baffin Island. Support was provided there to an on-site Joint Force Commander.

The second flight (the peace-support scenario) called for a maritime surveillance and targeting mission in the Gulf of St. Lawrence, in which the ALTAIR UAV transmitted beyond-line-of-sight data and imagery via the Ottawa Remote Operating Centre across the integrated ISR architecture to a Joint Force Commander at MARLANT HQ. It also flew over the Gagetown training area in New Brunswick (coinciding with ARCON 2004, the annual concentration exercise for Army Reserve units in Land Forces Atlantic Area), providing reconnaissance and targeting information to the local ground force commander. Over Gagetown, the ALTAIR operated with another joint forces asset, a Silver Fox Mini UAV flown by a Coyote reconnaissance team. And the info was shared with a Canadian warship en route.

During the third flight (the defence of Canada scenario), the UAV conducted a maritime surveillance, reconnaissance and targeting mission over the Grand Banks. Again, the UAV transmitted the data collected in flight to a Joint Force Commander at MARLANT HQ to enhance his situational awareness and to improve his ability to deploy the forces under his command.

More than Just UAVs

Having described what the UAV did during this experiment, Capt Laing went on to



PHOTO: CPL ROBERT BOITRILL, CF COMBAT CAMERA

re-emphasize the ISR aspects. All the information collected by the UAV, and from a number of other sensors (such as Radarsat, HF surface radar, ships and aircraft) was shared over an integrated ISR architecture with the CF agencies noted earlier, and also with many other government departments who work together in the Atlantic littoral.

As described in the ALIX background information, the over-arching goal of improving CF operational effectiveness is complemented by the broader approach taken to joint operations; specifically, how improved situational awareness can enhance the missions of other Canadian government institutions and our allies. Consequently, the ALIX attracted the attention of several allied nations, and featured the participation of such other federal organizations as the RCMP, Transport Canada, Fisheries & Oceans Canada and Environment Canada.

According to Capt Laing, this aspect of the experiment was designed to test and demonstrate concepts of 'network-enabled operations'. If everyone involved is seeing the same information, this collaborative environment speeds up decision-making and promotes self-synchronization. So everything was hooked up via satellite communications and carried on CF networks. A sanitized version of the outputs was also carried via a portal on the CAN-MARNET so that it was available to any agency of the Canadian government who could play a role.

The gurus talk about the 'need to share' versus the 'need to know', a contrast in management styles and cultures that is at the heart of network enabled operations. Direct participants included over 100 different agencies, with some 200 participants being coordinated by the core team from CFEC. With ongoing bulletin boards, chat

LCol Stephen Newton, ALIX Director (left), and Col (ret) Richard K. Bowes, ALIX UAV Project Manager, inspect the Electrical Optical Infrared (EOIR) Payload Pod on the Altair CU-163301.

rooms and lessons learned, the ALIX network was a very powerful demonstration to other government departments of the value of sharing information

So What Happened?

With some 100 Gigabytes of data to be analyzed, Capt Laing expects to have a high level digest of the results by the end of September. This "Quick Look" will deal with the most obvious conclusions and the areas requiring further analysis. It is to be noted that the challenge to afford the time to get all possible results available is significant. With limited resources, it is important to get as much right as possible.

Review of the initial analysis of last year's PLIX results indicates that weather, real world events, system architecture and the relative inexperience of CF personnel in UAV ops adversely impacted on the platform's and team's performance. No doubt some of these will be better this time.

There will certainly be lessons regarding the UAVs themselves: suitability, cost and infrastructure requirements come to mind immediately. There are will also no doubt be some basic points on flying UAVs in the Arctic, airspace deconfliction and the like. The cost, flexibility, security and survivability of the communications networks also bear close examination. The assembly and administration of such a multi-level information system is a superb joint experiment in itself.

From the command and control point of view, did the Commanders get the info they wanted? With so many participants,

will we ever get a definitive answer? The challenge of distilling the results will continue for some months, but in the meantime, one can only imagine the eventual benefits of the extensive information sharing that has occurred. Quite an experiment!

What's Next?

ALIX is the last of the "X's" in this area for now, and the results will be handed over to a project team to oversee the next stages. Capt Laing notes that the transition from concept development and experimentation to operational capability implementation is expected to occur gradually over the next few years and is forecasted to include the establishment of a UAV test-bed and battle lab under a Joint Program Office with responsibility to coordinate all CF UAV programs. There are approximately \$250 Million dollars allocated in the Strategic Capability Investment Plan (SCIP) over the next dozen years towards developing an operational UAV capability for the CF.

As for the CFEC itself, it's on to the next challenge. Continuing to focus on areas such as ISR and its components, attention could also be directed to other logistics and support issues. Whatever the pursuit, it will no doubt include more 'experiments' and enhanced use of modeling and simulation. It's a good use of tax dollars, allowing us to challenge our people and pursue the leading edge to ensure we get a Canadian view and concept.

Those most closely involved note that this series of experiments to date has clearly demonstrated the potential benefits that will accrue through networking, a key element in future success. The limited investment to date has provided immediate operational benefits both on site and through the lessons learned. The ALIX itself has attracted much attention as a sort of proof of concept for the future of North American surveillance.

Bravo to all involved. It looks safe to say that we now understand walking, and can get flying!! **FL**



MGen (Ret) John Leech, former GM of AFCEA Canada, is FrontLine's Defence Information Technology Editor.

New Eurocopter Facility Broadens EADS North America's US Presence

20 Oct 04 – COLUMBUS, MISSISSIPPI – **EADS North America** (www.eads.com) formally opened its first new industrial site since the company's establishment two years ago, marking a major step in its strategy to further expand the U.S. presence through investment in facilities and the insourcing of jobs.

The new facility, located in Columbus, Mississippi, is a manufacturing and helicopter production center for American Eurocopter – an EADS North America business unit and the U.S. affiliate of EADS Eurocopter, the world's largest rotary-wing manufacturer.

"This is a symbol that reflects our dedication to building our presence in America. We are investing in facilities, and also are investing in the future of our work force,"

According to Ralph D. Crosby, Jr., CEO of EADS North America, the facility is to play an important role in the business development of American Eurocopter and Eurocopter, in the United States and worldwide. It will be the primary center for outfitting and completion of helicopters sold to U.S. local and federal government agencies and for homeland security missions. It will handle the assembly of all 55 EC 120 helicopters recently ordered by the Department of Homeland Security (DHS) for the U.S. Customs and Border Protection Agency.

L-3 Communications Acquires CAE's Marine Controls

01 Nov 04 – **L-3 Communications** has announced (www.L-3Com.com) that it has entered into an agreement to acquire the **Marine Controls** division of **CAE** for approximately \$225 million USD. Subject to regulatory approval, the acquisition should be completed by 31 Dec 04, and is expected to contribute approximately \$110 million USD to L-3's sales in 2005.

Headquartered in Montreal, Canada, and with business operations in Canada, the U.S., the UK, Norway, Italy, India and Malaysia, Marine Controls is a leading global supplier of integrated marine control systems and products for warships, submarines and commercial vessels.

Marine Controls, a pioneer in the integration of military shipboard control systems, has systems installed on approximately 600 active ships for 18 navies worldwide.

"Marine Controls, a well-respected business in the defense industry, brings key products to L-3's existing businesses," said Frank C. Lanza, chairman and CEO of L-3 Communications. "The company is well positioned for new platforms and life-cycle upgrades worldwide, and when combined with L-3's existing products, we could play a larger role as a subsystems supplier to navies globally."

Headquartered in New York City, L-3 Communications is a leading provider of Intelligence, Surveillance and Reconnaissance (ISR) systems, secure communications systems, aircraft modernization, training and government services, and a supplier of a broad array of high technology products.

Northrop Grumman Unmanned Program Demonstration

02 Nov 04 – SAN DIEGO – Test flights of an unmanned helicopter surrogate were used by **Northrop Grumman Corporation** to demonstrate technologies for its proposed concept for a new U.S. Army unmanned armed rotorcraft program.

The test flights of the Yamaha RMAX unmanned helicopter, which is being used as a surrogate for the company's concept for the Army's Unmanned Combat Armed Rotorcraft (UCAR) program, included a remote-control flight and the RMAX's first autonomous flight. The flights are the latest in a series of activities designed to demonstrate how unmanned systems can increase the effectiveness of Army ground- and helicopter-based units.

Northrop Grumman is competing for Phase III of the UCAR demonstration program. The company has conducted more than 60 flight tests of the RMAX UCAR surrogate involving more than 35 flight-hours to refine its UCAR concept.

In the RMAX's first autonomous flight (lasting approximately eight minutes), the air vehicle was piloted remotely to an altitude of 200 feet, then transitioned to a fully autonomous flight, and safe landing. All software tests and predicted vehicle responses were achieved with success. **FL**