

Robots Everywhere

Since our column on "Robots 'R' Us" (*FrontLine*, 2004:1), we have been bombarded by more and more reports of how unmanned systems are becoming part of our lives. Take the recent headline in *The Ottawa Citizen*, for example: "Robo Soldiers Drafted for Defence" closely followed by a piece headed, "Unmanned aircraft considered to guard Britain's coast and cities." Even the summer movies are into it, with Will Smith in *"I, Robot"* tracking down an advanced robot suspected in the death of a scientist in the year 2035. Where are we going anyway?

In order to find out what's real in this business, one can look to UVS Canada*, whose second annual conference and technology showcase "*Challenges and Opportunities 2004*" opened in Ottawa in early September. A definitive porthole into this exciting sector, this conference is a great place to find out what has happened in the past year and what is in the forefront of reality versus science fiction. A quick review of the conference agenda is instructive in that regard.

The lessons learned from the deployment of the SPERWER system in support of Canadian Forces operations in Afghanistan will be one topic of interest, to be sure. Some of the media have discounted the value of this system, emphasizing the problems of operating in the Kabul area environment and the challenges faced in bringing a completely new system into service. They have even unearthed advice that describes the deployment as "risky," as if anyone ever made an omelette without breaking eggs. From what we have heard from the actual users and beneficiaries of this UAV in action, however, the system maintained 95% availability and was "useful" from an operational point of view. So let's hear about the real lessons learned, from the people who really know.

For instance, *Challenges and Opportunities 2004* highlights the challenges facing Ottawa-based UAV manufacturer, MMIST, in the story of the "SnowGoose," an intriguing blend of existing technologies applied to fill a niche in the unmanned world. The , came up with this innovative solution to a long-standing US military requirement to deliver leaflets in a hostile area without risking pilots' lives. The CQ-10 SnowGoose is described as a cargo container powered by an engine and suspended from a ram-air parachute. It can be guided to a destination hundreds of kilometres away, drop its load of leaflets and

carry on to a recovery area, all for a relatively modest price.

Another significant highlight will be the early reports from the Atlantic Littoral ISR Experiment (ALIX). The ALIX, conducted by the Canadian Forces Experimentation Center (CFEC), is an exercise involving UAVs and their potential for military applications. ALIX was held August 22 to September 3, 2004 and based out of Goose Bay, Newfoundland & Labrador.

A successor to the Pacific Littoral ISR Experiment (PLIX) conducted in July 2003 off Tofino, British Columbia, with an Eagle 1 UAV chartered from Israeli Aircraft Industries, the ALIX was significantly more extensive than the PLIX in both length and scope. The test vehicle was an "Altair" medium-altitude/high-altitude long-endurance UAV.

At last year's UVS Canada conference, the development of a UVS competition for Canadian Universities was proposed, and received with great interest. Moving forward with a competition that accommodates both UAVs and Automated Ground Vehicles (AGVs), requires the examination of current university-based projects, possible locations, required facilities and a competition framework. A start point has been proposed and the challenge issued for more ideas.

Another challenge facing the UVS world is interoperability, especially the ability for a ground station to control and exploit different UAVs. There is a NATO STANAG on the subject, and Canadian companies have performed well in this area.

We can look forward to an exciting future for UVS. According to DND reports this spring, the Canadian Forces Joint Capabilities Review Board (JCRB) is supporting the Advanced Concepts Development Team initiative to explore the use of teams of robots within a military context, in significant detail. A display organized last June at NDHQ was

designed to enhance the awareness of the non-scientific community regarding the future potential of teams of robots. Drawn from academia, industry and government, the robots, referred to as Adaptive Collaborative Autonomous Robots (ACAR), attracted a great deal of attention as they showed off their potential capabilities. Displays were presented by MMIST of Ottawa, iRobot Corp., McGill University, Carleton University, Royal Military College, UVS Canada and DRDC Ottawa, Suffield and Valcartier.

More and more, the focus of development effort will be shifting to what appears to be the biggest challenge in unmanned vehicle systems: the Autonomous Ground Vehicle.

According to the US National Research Council's report on US Army unmanned ground vehicles, the biggest problem is perception. How do these independent robotic vehicles recognize reality? Smooth, straight roads are one case, but off-road operation demands a much more complicated set of functions: obstacle detection and avoidance, concealment and cover, detection of friends or foe, be they other vehicles or dismounted troops... Multiple sensors and greatly improved processing may be part of the answer.

It will also be interesting to follow the progress in the next US Defence Advanced Research Projects Agency (DARPA) *\$1 Million Grand Challenge*. The first such event, held in 2003, was designed to engage inventors and engineers apart from traditional defence contractors, in the challenge to produce an autonomous vehicle that could travel from Los Angeles to Las Vegas. In the event, after several reductions of scope, and stringent control of who could enter, only eight vehicles made it past the starting gate, and none made it as far as eight miles. This ain't easy!

So the saga continues, and the search for these kinds of affordable, safe ways to carry out unpleasant dangerous tasks, in either the military or civilian context demands ever more thought and initiative, and is far from over. Despite the Asimov inspired "I, Robot", we aren't there yet. But we may be before 2035! ■



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* Unmanned Vehicle Systems in Canada – www.uvscanada.org