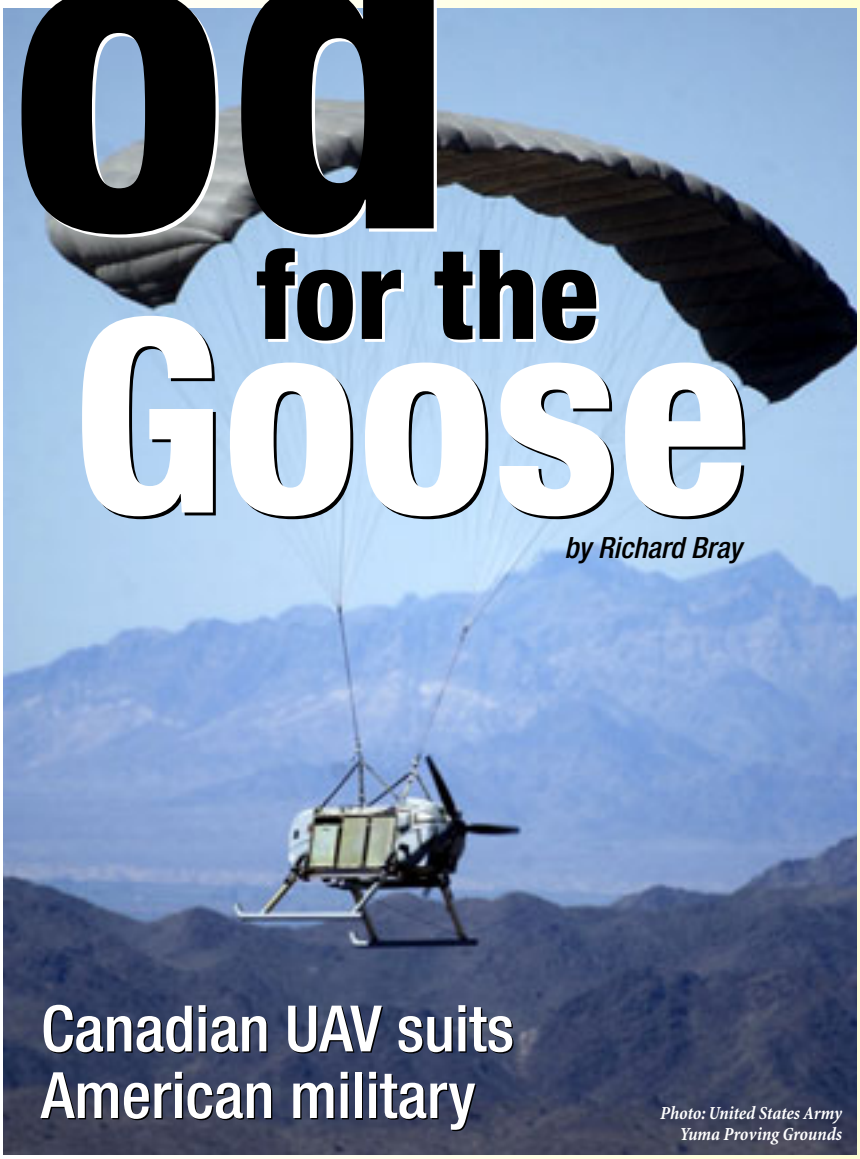
Good for the Goose

by Richard Bray



The Canadian-made SnowGoose is a cargo container equipped with an engine and a parachute.

AN OTTAWA-BASED COMPANY has come up with an innovative solution for a long-standing US military requirement – delivering leaflets in hostile areas without endangering pilots' lives. The MMIST SnowGoose is an innovative unmanned aerial vehicle (UAV) that makes precise deliveries while human beings "stand off" at a safe distance.

The SnowGoose is a cargo container with an engine, suspended from a rectangular, ram-air parachute. It can be launched hundreds of kilometers from its destination at an altitude of 25,000 feet, fly to its target, drop a payload of leaflets, continue flying to the recovery location and land. It can also take off from a specially equipped HUMMV on a short 250-yard stretch of straight road.

The US$250,000 SnowGoose looks like a bargain for many applications besides delivering leaflets because it can carry up to 600 pounds of fuel and cargo – 100 pounds is already considered a heavy payload for many conventional UAVs.

Sean McCann, MMIST's president, said "The cost ratio and just the overall effectiveness really changes when you start to get high payloads into a UAV." McCann has seen program costs of up to US$50 million, simply to miniaturize systems to fit in a UAV payload bay.

The SnowGoose can get advanced sensor or communications capability into service quickly. "Right now, when new technology comes out, it is usually big, clunky, heavier than you'd like and draws more power than you'd like. You can wait three, four or five years for that technology to miniaturize and that's where we see a real niche," McCann explained. "There are lots of great UAVs that can carry a five-pound camera and do a good job, so we're kind of focusing on the big clunky payloads."

The SnowGoose procurement process is almost as interesting as the UAV itself. For years, the US military's Special Operations Command (SOCOM) had an open Operational Requirements Document (ORD) for a Leaflet Delivery System, but no viable candidates.

McCann said the SnowGoose owes its existence to a well-written document. "They set their threshold requirements very low in order to not eliminate things that might be cheap but still get the job done. And then they clearly said what their desired requirements were, and what would be a best case – if they could have anything, what would they want?"

In the end, McCann explained, "It was the ingenuity of one major who had this orphaned program with no money, a stated requirement and no solution. And he came up with a picture of one way that just may work, and yet the ORD was written in such a way that it didn't eliminate ideas – it was very open."

MMIST already owned a guided – but not powered – parachute system called the Sherpa. To meet the SOCOM requirement, the company had to develop the concept much further, adding an engine and better guidance systems, among other features.

"There were huge risks for us as a contractor," McCann said, "because essentially we had agreed without any real R+D funds to do a lot of work and supply them with

Ready, set, go! Crew of four launch from HUMMV.

Photo: United States Army Yuma Proving Grounds

hardware – and that's all they were buying, hardware for government test and evaluation. Failure to accept the product meant we were in breach of contract, and of course, all the money that would have been spent up to that date would have been expected back."

MMIST strove to give SOCOM greater performance than their desired requirements and voluntarily signed a contract that exceeded them. "Our best chance of gaining this business was to give them something that was better than what they expected," he said. "The company bet its existence."

Because it was a sole source contract, McCann said the contract personnel realized, "'Hey, we need the contractor as much as they need us,' so it was in everybody's best interest to put a deal together that was workable. If we ever felt we had to build 'risk money' into our price, we would tell them, so we would say, 'listen, if you write it this way, we have to pad our price, because we are bearing this risk and that risk.'"

An incentive structure paid a bonus for performance above and beyond a minimum threshold, which was deliberately set above many threshold requirements. By early 2004, SOCOM had purchased nine UAVs. Beyond demonstrating their leaflet delivery capability, two of the vehicles are part of a program designed to demonstrate an air vehicle concept called ALERT – Air Launched Extended Range Transporter.

"Under ALERT, they are showing that you can take many of the other platform payloads and just put them on the Goose without large amounts of development. Just slide them into the rack," McCann said. "You've got 600 pounds per Goose to play with but you've got to include your fuel in that. Depending on how long you want to fly, that tells you how much other stuff you can carry, or vice versa."

Looking ahead to public sector applications for the SnowGoose, McCann believes it could help to patrol Canada's borders, map roads and mineral resources, perform wildlife surveys and help law enforcement as an eye in the sky.

While he is careful not to oversell his system as the one and only UAV customers will ever need, McCann believes that the SnowGoose will occupy a special category for price and performance.

"There are too many people involved in unmanned aircraft, so to date there are very few systems that actually compete on price compared to any manned aircraft," he explained.

To his mind, organizations only pay the full operating costs of UAVs when human life is at risk, because it is usually much less expensive to use a manned aircraft.

"We're not trying to sell our system as a cheap system. That's not the point," McCann said. "We're trying to say, 'If you've got $10 million to spend, what are you going to get for that?' You can get 40 air vehicles, so your rate of coverage is going to be 40 times greater than if you buy one air vehicle. We're trying to say, 'spend the same amount of money and get a lot more.'"

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UAVS: from battlefield to backyards

Unmanned aerial vehicles (UAVs) can be almost any size, from thumbnail to small airliner, and all shapes, from conventional-appearing airplanes and helicopters to weird combinations of fins, wings and engines. They are usually designed to replace human beings doing work that is dull, dirty or dangerous.

That is certainly true in Afghanistan, where the Canadian army is using four French-made Sperwer UAVs for surveillance missions. Although two crashed early in their deployment (both returned to service), the military was reporting successful operations by February 2004. "It is one of the most challenging environments any air vehicle could operate in," LCol Dana Clarke explained from Kabul. "The only way we cannot suffer damage is to not fly."

Efforts are underway to make UAVs realistic, reliable and routine for civilian applications. Mostly employed in intelligence, surveillance, reconnaissance (ISR) military roles today, their use is expected to grow in homeland security, law enforcement, surveying, geophysical exploration, wildlife studies and dozens of other civilian applications.

Rapidly developing sensor technology and better guidance systems mean more UAVs could soon be in the sky over Canada. Today, one of the biggest obstacles to the widespread use of robot aircraft is not technological but regulatory, according to Ian Glenn of Ottawa's ING Engineering.

Glenn said human pilots must be confident that the unmanned airplanes will never, ever stray into their path. The burden of proof is on UAV operators. "There is a parallel effort here to look at airspace management and how smart the system is. How robust is your datalink; how robust is the autopilot; how are you commanding the aircraft from your control station?"

The hope is unmanned missions will soon become standard operating procedure.

Once that challenge is surmounted, UAVs will find their way into applications as down to earth as counting potholes along major highways and as advanced as locating hot spots that could become forest fires and extinguishing them before they start.

Rather than using human pilots to count moose, Glenn said, unmanned vehicles could capture data for later analysis. "You can take pictures and do what the pilot does – identify them visually and count them," he said. "But we have really sophisticated digital processing algorithms that can tell a moose from 'not a moose.'"

Beyond the technological, Glenn believes there must be a change in attitudes before UAVs become a standard information-gathering tool for public sector managers. "The biggest issue is to show them that this is a non-threatening change," he said, "that they will be able as public servants to do whatever they feel is necessary for them to be in control, to be guardians of the public purse."