Unmanned Aerial Vehicle Systems and the Defence Program Review

Global Trends

We are living in a time of transformative change when it comes to unmanned aerial vehicles (UAV). Over one million drones were sold in North America within the last year. This shift from Scarcity to Abundance, and what lies behind it, presents both a challenge and an opportunity for DND. As with radios, radars, GPS, and computers before them, when the technology shifts and adapts to the commercial market; innovation accelerates, global adoption follows, and military doctrine, concepts and procurement systems are left behind often trying to buy yesterday's technology tomorrow. This challenge of abundance has been seen before in recent years with the societal adoption of the iPhone and its ilk. What soldier has not wished that the easy access to information that he enjoys outside of the military environment could be part of his everyday job. Drones bring that same expectation in the third dimension.

> ***McKinsey: Disruptive technologies: Advances that will transform life, business, and the global economy***
> *Twelve emerging technologies—including the mobile Internet, autonomous vehicles, and advanced genomics—have the potential to truly reshape the world in which we live and work. Leaders in both government and business must not only know what's on the horizon but also start preparing for its impact.*
> May 2013

UAVs are driven by two of these advances; Advanced Robotics and Autonomous/Near Autonomous Vehicles, and indirectly by three more; Energy Storage, 3D Printing, and Advanced Materials. That predicted future is upon us now.

> ***Goldman Sachs: Drones Flying into the Mainstream***
> *The Age of the Drone is about to enter a new era. Having already made the leap from military to consumer use, Unmanned Aerial Vehicles (UAVs) are poised to see their next leg of growth from commercial and civil government applications. Whether performing construction surveys, inspecting pipelines, aiding in surveillance or helping farmers enhance yields, drones are developing into powerful business tools. In the latest in our Profiles in Innovation series, we examine how these new markets will add to growing defence demand to create a $100 billion market opportunity.*
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It is this convergence of everything from low cost sensors, computation platforms, additive printing, etc. that is bringing these autonomous systems to the masses and challenge the existing frameworks for dealing with things that fly. While autonomous cars and trucks are now driving on Ontario roads, both Canadian civil and military authorities are struggling to keep up and are left wondering how to deal with drones. Taken in aggregate, robotic aircraft already have the ability to fly autonomously, and increasingly, accomplish mission objectives without human interaction beyond high-level task supervision. A consequence of this global disruptive technology shift in drones is that DND must consider persuasive use of drones across the spectrum of its operations now.

Moore's Law and the failure to procure

There is little argument that DND's procurement system is flawed. UAVs as a disruptive technology illustrate this more clearly than most technologies. L1225, Unmanned Aerial Surveillance Target Acquisition System (UASTAS) was the longest standing requirement on the Army's books in the late 1990's with over 20 years as an unfulfilled project until it was bundled within the LF ISTAR omnibus project. That was then… Today the Joint Uninhabited Surveillance and Target Acquisition System (JUSTAS) Project, established in 1999, has been a project for 17 years and is not close to providing a result.

Innovation in Procurement

In the commercial/industrial world, new business models such as Drone-as-a-Service (DaaS) are flourishing. The Canadian Army pioneered this model in Afghanistan (2008-2011) when it formed the first industry/military team to provide UAV ISR services. Industry provided the flight critical launch, recovery, maintenance, and on-scene help desk while the military focused on warfighting tasks. This model was successfully extended to RCN operations as part of the NATO CTF 150 counter-drug mission in the Indian Ocean (2011-2014). This operational/business model broke the procurement mold and proved both operationally and cost effective. By focusing on and contracting for outcomes/capabilities, low density but high value capabilities like UAV ISR can be deployed and evolved rapidly as technology drives forward. An example of this success was the move from uncooled to cooled thermal camera technology while conducting combat operations in Afghanistan - something that from the military perspective happened over a two day period but was a quantum increase in UAV ISR capability.

Buy Canadian

Put simply, the Canadian government should "Buy Canadian" in this sector. With over an US 100 billion dollar global market at stake - much of it military/civil in the near term, investing in this market in Canadian firms, where we have the best and brightest folks to compete globally, is also an excellent innovation move for the Government of Canada. Consider where the RCAF would be if it had invested its nominal JUSTAS budget of $1 billion dollars at a rate of $50 million per year in Canada and where the program and DND would be in Year 17 of such a program.

Counter-UAV

It is no surprise that with 1 million drones flying today in North America (over 70% of which are Chinese), there is clear and present danger posed by drones. Canada's industry and academia have the capability to develop effective counter-UAV systems.

Opportunities

Like the iPhone, drones are ready for ubiquitous use in the military. While consumer drones are not sufficiently robust for military missions, industrial/commercial drones are now available that can greatly enhance the operational effectiveness of units at the lowest level. Bringing with them Civil Aviation Authority (i.e. Transport Canada) regulatory compliance, these UAVs allow much easier operation not only within domestic operations but also when deployed on international aid and peacekeeping missions. The opportunities presented by pervasive use of drones that provide access to the third dimension at the lowest operational level are limited only by the imagination. They broadly include any aerial monitoring, inspection, or mapping tasks. From the SEARCH in Search and Rescue to enhancing surveillance in Canada's Arctic to equipping our reserve forces to respond to disasters locally, there are many possibilities for integral UAV uses today and going forward. Procurement remains a challenge but flexibility and a shift in mindset that reflects ubiquity versus scarcity that challenge can be overcome.