

# **Drones for Good**

### Transport Canada's Approach to Drones in Transport Logistics









Transport Transports Canada Canada



# **Background: Introduction to RPAS**

- Remotely Piloted Aircraft Systems (RPAS/drones) are a growing subsector in civil aviation and aerospace in Canada and worldwide.
- In 2017 Transport Canada (TC) established a dedicated multidisciplinary Task Force to address the emergence of drones.
- In 18 months, the RPAS Task Force has lead a diverse range of activities:





### **Context: VLOS and Beyond**

#### Current Operations and Platforms

#### Visual Line-of-Sight

- VLOS operations are conducted when the RPAS can be seen by the pilot or a visual observer.
- Most regulators worldwide, including TC Civil Aviation, limit RPAS operations to VLOS.





DJI Phantom Consumer / "Pro-sumer"







700g eBee Sensefly Precision Agriculture

### **Near-Term Innovation**

#### Beyond Visual Line-of-Sight

- BVLOS is when the RPAS cannot be seen by the pilot or visual observer and detect and avoid is done through technology and/or procedures.
- BVLOS greatly increases the economic value of an RPAS operation by introducing greater efficiencies, range, and speed:



#### **THE NEXT GENERATION** Future Market Disruptors

#### Next-Generation Technology

- Aerospace manufacturers and new entrants are proposing game-changing designs and operations
- Proposed applications include longrange cargo delivery, Urban Air Mobility (air taxis), and delivering telecommunications services.





Intel Volocopter Passenger Transportation

Airbus Zephyr S High Altitude





Uber Air Taxi / Bell Helicopter Passenger Transportation

#### **Google** High Altitude Operations

### **The Global Context**



### Switzerland

- Swiss Port has partnered with Matternet on drone delivery in three cities since 2017.
- Delivery service flies lab samples between hospitals, labs, and clinics, reducing times to within 30 minutes.
- 3000 successful deliveries.



- United States
- Google's Project Wing and UPS are now authorized air carriers for drone delivery flights under Part 135.
- · FAA authorizes a limited amount of BVLOS operations, with only a few organizations operating for utility and rail surveys, and precision agriculture.
- Ongoing rulemaking for remote identification to track RPAS in airspace, deploying a low altitude aircraft notification system



- Project Wing is approved by the CASA for drone delivery in Canberra, with restrictions (i.e. daytime ops only).
- Variety of goods being delivered -• including food/drink, coffee and chocolate.
- Ongoing efforts to seek community feedback on issues and opportunities for drone delivery.



- Zipline performing BVLOS drug deliveries between remote communities.
- One flight can deliver up to 3 units of blood (1.8 kg payload) from a 80 kilometer service radius from each (two) distribution centre.
- Up to 500 deliveries/day up to one ton of medical and blood products/day.
- 60 % of the Rwandan blood supply outside of Kigali is now delivered by an RPAS.



International Civil Aviation Organization

Developing Standards and Recommended Practices for certified platforms operating internationally within controlled airspace under instrument flight rules.

Creating standards for RTCA Command and Control links and detect and Radio Technical Commission for avoid system Aeronautics



ASTM

International

Multilateral Forums: International Standards Development

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Committees on RPAS design. quality acceptance. and safety monitoring, as well as autonomy and RPAS traffic management.



Joint Authority for Rulemaking of **Unmanned Systems** 





#### Influencing Economic **Use-Case** Geographic Factors **Opportunities Characteristics Isolated Areas of** Wildlife Wilderness Monitoring Strong Service and Uncontrolled Linear Aerospace **Resource based** Airspace **Surveys** Sector Economy **Remote & Rural** Q. Drone Geographic **Developed Trade** Communities Delivery **Clusters of Use-**Networks and Cases and Commercial **Diverse Weather** Wildfire Capabilities **Partnerships** and Topography **Operations** Low Population Search and State of the RPAS Sector: **Densities** Rescue 44% of companies are Over **1000** companies • • employing 22,000 0-5 years old Canadians 70% based in Alberta, B.C. and Ontario

### **Canadian Context for Drones**

# **BVLOS Strategy**

 The department is pursuing a three-phaseds BVLOS strategy, beginning with activities to stimulate innovation and allow operations.





### **Drones in Delivery and Logistics**



### **RPAS are positioned to be market disruptors**

in the delivery of goods, with a \$13.0 billion (USD) market potential (PricewaterhouseCoopers 2016)



### Market confidence is

*lacking:* most operators and manufacturers are testing new concepts and prototypes, but perceive low near-term growth potential.



### *Opportunities with Canada's geography* and

low population density, but this can also complicate logistics.

Additional work to be done by Transport Canada and industry to build market confidence, and strategically address outstanding technological and regulatory issues...



# **Addressing Technology Challenges**





### **Addressing Regulatory Challenges**

Do we have the right skillsets Are our provincial, territorial, and Is the public ready to accept to become a regulator of the municipal partners ready (and willing) to drone delivery or riding an air future? deal with additional airspace users? taxi? Are our privacy laws sufficient to deal Do we have to think different about how with the collection of data by drones? we regulate and legislate air traffic services? Is public policy adequately responding to industry How do we safely accommodate a trends and market interests? growing and diverse number of new airspace users? Do we have the right regulatory instruments to How will Air Service provisions manage risk without stifling apply under the Canada innovation? **Transportation Act?** Dialogue **Partnerships** Evidence Conducting Public Opinion Research Risk Assessments with Industry Interdepartmental information sharing • Provincial, Territorial, Municipal **Engaging International Partners**  Delegating enforcement powers to law Engagement Applying Operational lessons to enforcement authorities Monitoring Industry Trends Rulemaking



# **Moving Forward**

- Draft regulations to allow lower risk BVLOS operations in 2020.
- Seek out opportunities for dialogue and engagement with the logistics and transport sector.
- Advance research and development with industry and federal partners.
- Consider additional trials for air traffic management in various environments to inform policy and regulatory frameworks
- Ensure Canada's regulatory framework remains flexible to enable innovation and allow for future delivery operations.