

Unmanned Aircraft Systems

Regulatory Engagement Session

Presented by the UAS Task Force | Summer 2017





Purpose

- Introduce Transport Canada's (TC) Task Force and forward plan for Unmanned Aircraft Systems (UAS).
- Provide an overview of TC's regulatory proposal for small UAS, 25 kilograms (kg) or less operated within visual line-of-sight (VLOS).
- Solicit feedback on the proposed regulations, continue dialogue with the UAS industry, and raise awareness of the 90 day consultation period to provide written comments.
 - Engagement sessions are not intended to be a replacement for written comments on the regulations.
- Communicate next steps to implement the proposed regulations.





Context – Opportunities for Innovation

- **Economic importance is growing:** UAS is becoming an important part of aerospace R&D, key local economic generators, and creating new **market opportunities and business models**.
- **Cheaper, Faster, Better:** UAS offer an alternatives to conventional methods of doing business; a **disruptive technology**.
- **Technology is outpacing regulation:** Regulators, including TC, are facing increased demands from industry stakeholders to **foster opportunities and address challenges**.
- **UAS starts with innovation, not regulation.** TC seeks to establish **safe regulatory environment** where the industry can **continue to innovate**.





Context – Growth of the UAS Sector in Canada

- Year-over-year, TC has observed exponential demand for SFOC authorizations:

2010: **66**

2011: **159**

2012: **353**

2013: **945**

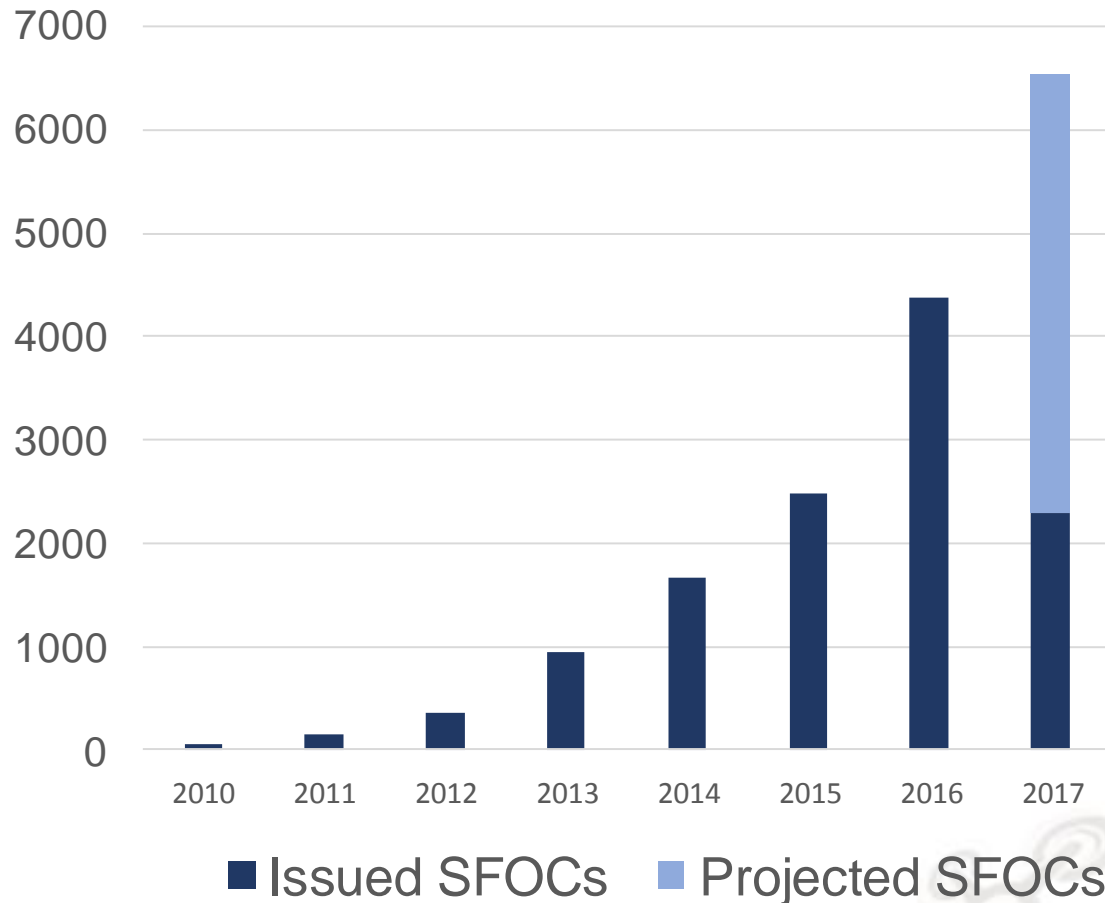
2014: **1672**

2015: **2480**

2016: **4381**

2017: **2229** (to date)

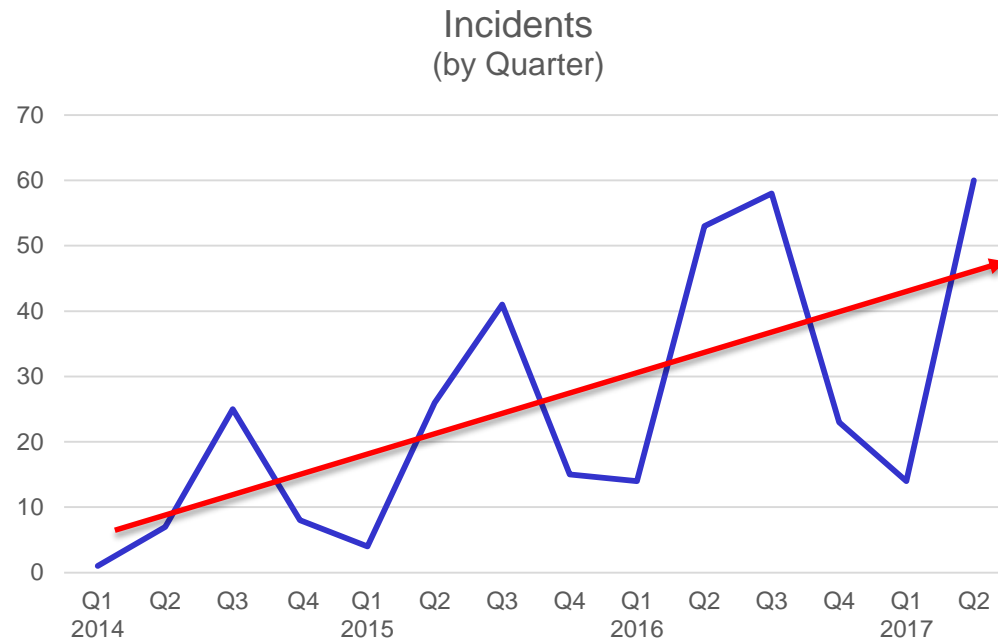
Projected 2017: **6539**





Context – Risk to Aviation

- Since 2014, the number of reported unmanned aircraft incidents has risen over 200%.
- Incidents have included UAS near flight paths, airports and other aircraft
- Reports from law enforcement agencies, provinces, territories, and municipalities with respect to privacy issues or risks to public safety have also been on the rise.



2014: **41** incidents

2015: **86** incidents

2016: **148** incidents

2017: **74** incidents (to date)



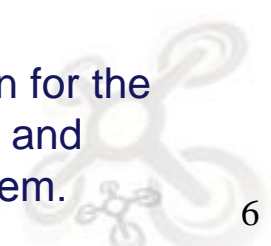


Introduction to the Task Force

- Budget 2017 committed to modernize Canada's transportation system, with funding for UAS to:
 - *“Develop regulations for the safe adoption of connected and autonomous vehicles and unmanned air vehicles... Work with industry, provinces, territories and municipalities to establish pilot projects... [and] Provide the standards and certifications that industry will need to safely use these new technologies”*



- TC will implement Budget 2017 commitments through a dedicated UAS Task Force.
 - Mandated to address safety and regulatory gaps, proactively address UAS as a disruptive technology, and foster economic success for the industry.
 - Will deliver regulations, certifications, and standards to lay the foundation for the future of UAS in Canada, support innovative pilot projects and test sites, and work with industry to integrate UAS into Canada's air transportation system.

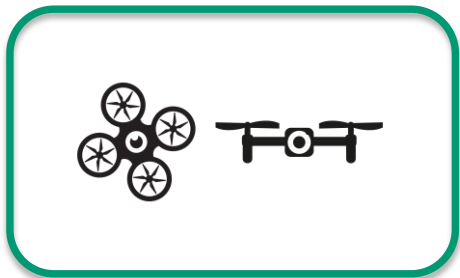




Summary of the Regulatory Project

- **2012:** Government-Industry working group report finalized with recommendations for small UAS, 25 kgs or less, operated in VLOS.
- **May 2015:** A Notice of Proposed Amendment laid out a concept for a regulatory framework, with stakeholder consultations.
- **July 2017:** 59 Pages of regulatory amendments detail the proposed regulatory language for this class of unmanned aircraft.

Very Small (250 g – 1 kg)



Small Limited (1 kg – 25 kg)



Small Complex (1 kg – 25 kg)



- Three separate categories have unique requirements that apply to the aircraft (product), the person operating (pilot), and the environment (operating rules) being operated in.





The Canadian Aviation Regulations – The UAS Regulatory Project

The Canadian Aviation Regulations

Principles

- Applying a **risk-based** approach to regulation
- Minimizing the **regulatory burden**
- Increasing the **delegation** of regulatory authorities
- Increasing **communication** with the aviation community

Regulatory Structure

- **Parts I** – General Provisions
- **Part II** – Aircraft Identification and Registration
- **Part III** – Aerodromes, Airports and Heliports
- **Part IV** – Personnel Licensing and Training
- **Part V** – Airworthiness
- **Part VI** – General Operating and Flight Rules
- **Part VII** – Commercial Air Services
- **Part VIII** – Air Navigation Services

The UAS Regulatory Project

Principles

- A **Risk-based approach** to ensure the safety of aviation
- **Clear, predictable** requirements for pilots
- Provide a regulatory environment conducive to **innovation**
- Promoting **engagement** and dialogue

Regulatory Structure – New Part IX

- **Subpart 0**
 - Division I – Definitions and applicability
 - Division II – General Operating and Flight Rules
- **Subpart 1 – Very Small UAS**
- **Subpart 2 – Small UAS**
 - Division I – Applicability
 - Division II – Limited Operations - Operating and Flight Rules
 - Division III – Complex Operations
 - Division IV – Manufacturer Requirements
- **Subpart 3 – Reserved for future use**
- **Subpart 4 – SFOCs**



Subparts 0 – General Provisions

- Division II – General Operating and Flight Rules provide a baseline of operating rules for all three UAS categories.
 - Comply with manufacturers operating limitations
 - Only in Canadian Airspace
 - Yield right-of-way to manned aircraft
 - Visual Line-of-Sight
 - Minimum altitude – able to glide clear
 - Crew fit for flight
 - No living creatures on Unmanned Aircraft (UA)
 - Use of Portable Electronic Devices
 - No radio interference for UAS or for others (i.e pyro's)
 - No autonomous UAS
 - Can only use First Person View (FPV) if there is a Visual Observer
 - Hazardous payloads or lasers*
 - Can't operate from a moving vehicle, vessel or aircraft*
 - No Special Aviation Events*

* Means could be approved with an SFOC





Very Small UAS– Proposed Requirements

- Defined as a UAS 250g - 1 kg, with minimum distances to people and aerodromes..

Pilot



- Minimum Age of 14
- Successfully complete written knowledge exam (5 year renewal)
- Have liability insurance of at least \$100,000

Product



- Identification: Name, address and telephone number clearly visible on the UAS
- UAS is properly maintained to manufacturer's instructions

Operating Rules



- Must be fit to fly – not suffering from fatigue, under the influence of alcohol or drugs
- Stop operating if there is an accident, damage, injury, collision
- Do not operate in a reckless or negligent manner

Safe Distances



- Maximum Altitude of 300ft
- Max visual distance of 0.25nm
- No flights within 3nm of an aerodrome / 1nm of a heliport

- 100ft minimum (lateral/height) from people, vehicles and vessels
- No night operations



Very Small UAS – Subpart 1 Requirements

- In addition to Subpart 0, Subpart 1 contains additional requirements for Very Small UAS:
 - Only in Class G airspace
 - Max speed 25 knots
 - No flight over open air assembly of persons
 - Weather – clear of cloud and 2 statute miles vis

Very Small: Operating Environment



Class C, D, E or F

Allowed to operate in urban areas, but away from people and aerodromes



Limited UAS Operations – Proposed Requirements

- Defined as a UAS 1 kg – 25 kg, and at least 0.5nm from a built-up area, specified distance from aerodromes and not in controlled airspace.

Pilot



- Minimum Age of 16
- Successfully complete written knowledge exam (5 year renewal)
- Have liability insurance of at least \$100,000

Product



- Identification: Name, address and telephone number clearly visible on the UAS
- UAS is properly maintained to manufacturer's instructions
- Maintain technical records: air time of flight, maintenance actions, modifications, repairs, etc.

Operating Rules



(In addition to Very Small rules)

- Conduct a physical site survey prior to operations
- Procedures for system assembly, pre-flight checks and tests, take-off and landing
- Emergency procedures are in place: pilot, engine, structural, equipment, controls failures, fly-aways

Safe Distances



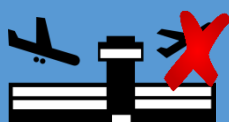
- Maximum Altitude of 300ft
- Visual distance of 0.50 NM
- No flights within 3nm of an aerodrome / 1nm of a heliport
- 250 ft. minimum (lateral/height) from people, vehicles and vessels
- 500 ft. from assemblies of people
- No night operations



Limited UAS Operations – Division II Requirements

- In addition to Subpart 0, Division II contains requirements specific to Limited Operations:
 - All crew must be trained proficient and competent
 - Only in Class G airspace
 - Above 300 feet if within 200 feet of building or structure – then max 100 feet above
 - Max speed 87 knots
 - No flight over open air assembly of persons
 - Weather – clear of cloud and 2 statute miles vis
 - Assess risk from lost link
 - Have/follow normal, emergency, lost link, fly-away procedures
 - No towing, formation, aerobatics*
 - UAS capability requirements (control, monitor, navigate UA, etc.)
 - Icing/De-icing limitations/requirements

Small Limited: Operating Environment



Class C, D, E or F

Allowed to operate in rural areas, but away from people cities, and aerodromes



Complex UAS Operations – Proposed Requirements

- Defined as a UAS 1 kg – 25 kg operating less than 0.5nm from, or within, built-up area, within controlled airspace and in proximity to aerodromes.

Pilot



- Minimum Age of 16
- Complete written knowledge exam
- Flight review by UAS pilot permit holder
- Obtain TC Pilot Permit
- Complete a recurrent training program in last 2 years
- Liability insurance of at least \$100,000

Product



- UAS registered with TC and marked with TC marks
- Complies with design standard w/ declaration of compliance and a statement of conformity
- UAS maintained to manufacturer instructions
- Position and anti-collision lights for night operations

Operating Rules



(In addition to General and Limited rules)

- Prior coordination with Air Traffic Control (ATC) for operations in controlled airspace.
- Maintain two-way communication with ATC.
- Comply with ATC instructions and clearances

Safe Distances



- Maximum Altitude of 400ft
- Maintain visual distance of 1 NM
- Flight permitted within: 3nm of an aerodrome/1nm of a heliport, subject to notifying ATC
- 100 ft. minimum (lateral/height) from people, vehicles and vessels
- 500 ft. from open-air assemblies of people (unless at a minimum height of 300ft)
- Night operations permitted with lighting



Complex UAS Operations – Division III Requirements

- In addition to Subpart 0 and Subpart 2 - Division II, Division III contains provisions specific to Complex Operations:
 - Class C, D, E, F and G airspace (includes military coordination requirement)
 - No night vision goggles (NVGs) unless using a visual observer (not using NVGs)
 - Flight over open air assembly of persons only above 300ft and UA can glide clear
 - Over or within built up area – must assess hazards and set up a take-off/landing area
 - Weather (Controlled airspace) – 500 vertically/1nm horizontally from cloud – 3 miles ground visibility

Complex Small: Operating Environment

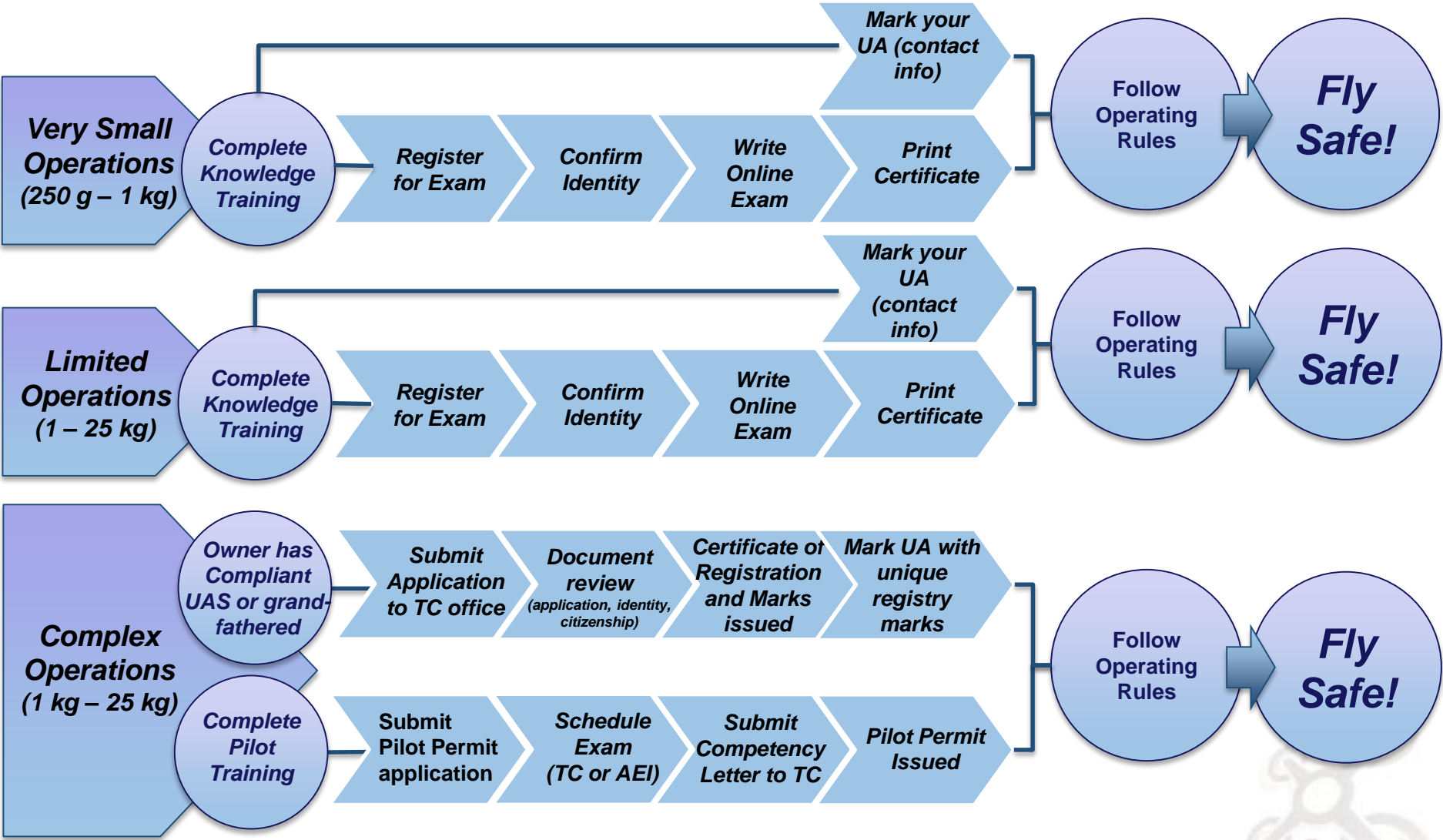


Class C, D, E or F

Allowed to operate in rural areas, but away from people cities, and aerodromes



Implementation Plan – UAS Regulatory Project





Enforcement and Compliance of the Regulations

- TC is working with law enforcement partners to enforce the regulations and is increasing its enforcement capacity.
 - Proposed rules will be designated offenses; non-compliance could result in issuance of administrative monetary penalties(AMP) ranging from up to \$3000 for individuals and \$15,000 for organizations/companies.
 - TC will look to strengthen enforcement efforts and will consider targeted enforcement activities in areas where reports of unmanned aircraft incidents are at the highest frequency
- As of May 2017, the Royal Canadian Mounted Police have been granted the authorization to issue AMPs for non-compliance of the Interim Order.
 - Other law enforcement agencies will also be authorized in the enforcement of the Interim Order and the future regulations.
- TC will continue to identify opportunities to collaborate with law enforcement agencies on the enforcement of the new regulations once they come into force.





Summary

Transport Canada seeks to safely integrate UAVs into Canadian airspace while encouraging innovation within this important new subsector of civil aviation. The future regulatory framework will be risk-based, flexible, and consistent with international partners, where appropriate.

Ensuring Safety

- Integrate UAS in the wider aviation community and air transportation system
- Address safety challenges collaboratively with partners

Creating Predictability

- More predictable processes for users
- Reduce the administrative burden for users and TC
- SFOCs focusing on exceptions

Recognizing Innovation

- A regulatory environment conducive to innovation
- Supporting the development of next-generation UAS technology with regulatory expertise





Next Steps

- Continue national stakeholder engagement sessions across the country to provide an opportunity for discussion with those affected by the new regulatory framework.
- 90 days of consultation to allow for formal feedback on the new regulations, ending October 13, 2017.
 - In-person commentary does not substitute written submissions.
 - Submit formal written comments to carrac@tc.gc.ca
- Plan for the implementation for coming-into-force of the regulations in 2018.
- Continue education and awareness efforts to prepare for and support the coming-into-force of the new regulations.
- Continue to develop the Task Force and plan for future activities.





Questions and Comments





Canada



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Canada



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