



TRANSPORT CANADA'S DRONE STRATEGY To 2025



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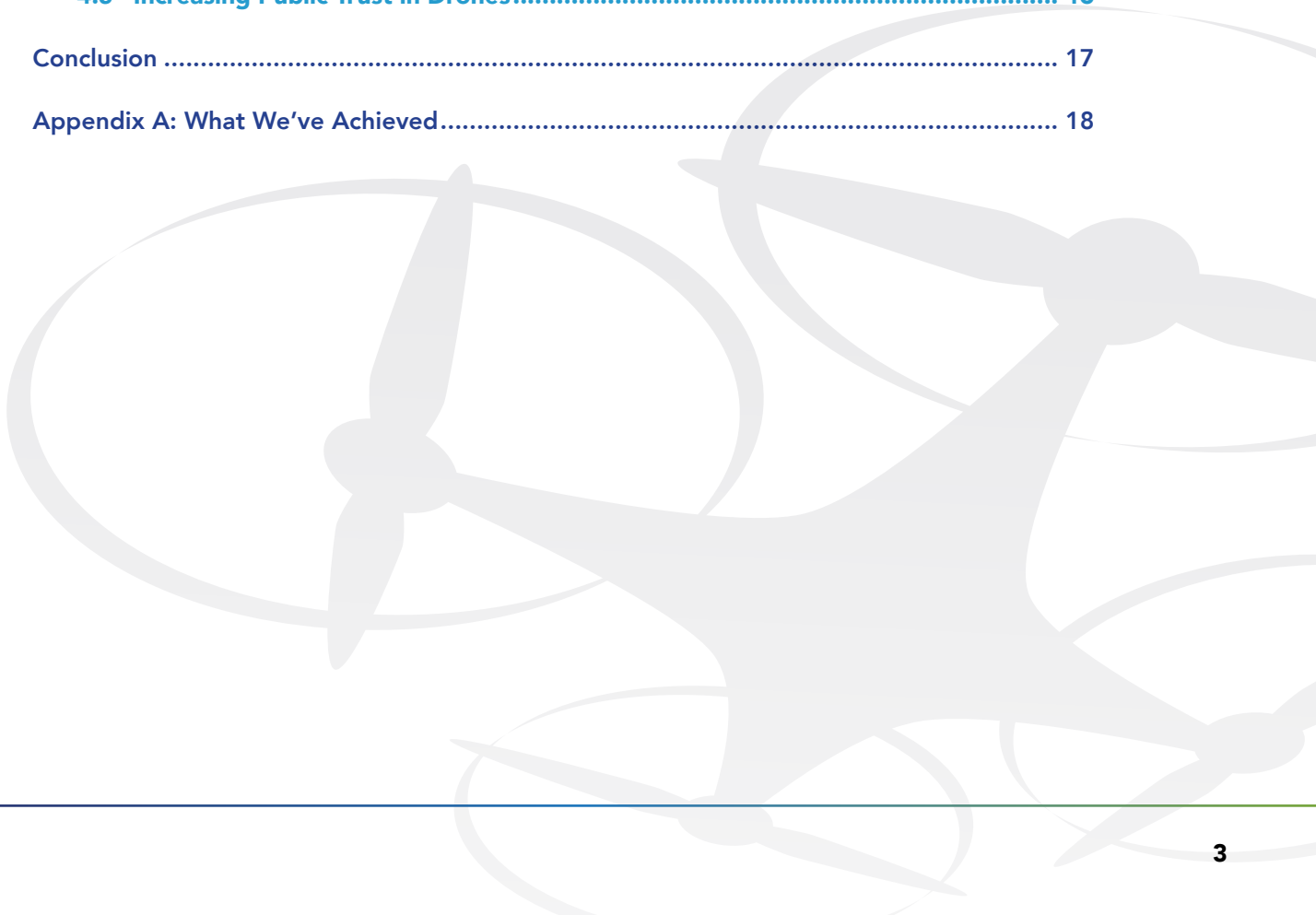
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Foreword	4
Executive Summary.....	5
Section 1 – Drones are Transforming Society.....	6
Section 2 – The Canadian Drone Landscape	7
Section 3 – Our Role and Vision.....	8
Section 4 – What We’ve Learned: Challenges, Opportunities, and Priorities.....	9
4.1 Safety Regulations to Support Innovation.....	9
Safety is key	9
Promoting aeronautics and innovation.....	11
4.2 Managing Drone Traffic	11
4.3 Drone Security Risks.....	12
Understanding cybersecurity	13
4.4 Innovation Enabling Economic Growth	13
R&D Activities Supporting Industry Success.....	13
Clear Pathways for Bringing Drones to Market.....	14
Air Carrier Licensing Rules.....	15
4.5 Increasing Public Trust in Drones.....	16
Conclusion	17
Appendix A: What We’ve Achieved.....	18



Drones are profoundly transforming the transportation sector, re-defining aviation with ground-breaking technologies, both creating new industries and completely altering existing ones, and exponentially increasing the number of both recreational and commercial drone pilots sharing the airspace. Safely and securely integrating these technologies within the aviation system provides an opportunity to improve the lives of Canadians while also addressing some of the challenges of living in the second-largest country in the world.

Transportation is the lifeblood of the Canadian economy and drones are part of the future of transportation. Drones can improve the efficiency and reach of Canada's transportation system, connect

our communities, and modernize our supply chain networks. The economic benefits for Canada are substantial as drones are rapidly becoming part of the business operations of key commercial sectors. Canada's existing strengths position us well for capitalizing on the economic potential of the global drone industry and to contribute to the success of the Canadian drone sector.

Transport Canada's Drone Strategy to 2025 is the first of its kind in Canada and provides our strategic vision for drones, with a focus on raising awareness of the significance of drones, the untapped economic potential of the sector, and the priorities that will drive Transport Canada going forward. Drones are part of a broader digital technology ecosystem that is dynamic and ever-changing and requires flexibility in how Transport Canada responds to these changes. We are modernizing how we regulate this new technology, deliver services to the public, collaborate with stakeholders, and communicate with Canadians.

This strategy aims to lay the foundation for our approach to drones in Canada. With a growing drone industry and innovations on the horizon such as Advanced Air Mobility (AAM) or "air taxis" as part of the transportation system of tomorrow, we know we have more work to do. Fundamental to the success of new drone technologies is public trust and social acceptance. Increasing societal confidence in drones will require our continuing to mitigate the risks and engaging with all levels of government to ensure a sustainable future for Canadians.

This strategy sets an initial direction for Canada, as the technology and its uses continue to evolve. As we move forward in this new space, however, Transport Canada will continue to engage stakeholders across all spectrums, remain open to the opportunities drones present, continually assess our work against our vision, and focus our efforts on fostering safe innovation, drone security, and supporting economic growth of the transportation sector.

Nicholas Robinson

Director General, Transport Canada Civil Aviation



Drones are a new generation of aircraft in a growing part of the aviation industry. As drones become more commonplace, it has become clear they are a game-changing technology not only within the transportation network but for society at large. Drones are modernizing the way industries work, improving people's lives, and providing public benefits to communities. Most recently, drones have been used to conduct deliveries to remote communities and have helped respond to COVID-19.

Our vision is for drone operations to be safely and securely integrated into Canadian skies as part of a modern national civil aviation system. Since 2015, we have been working towards this vision by collaborating with industry and other partners on Research & Development (R&D) activities, pilot projects to test technologies, and developing regulations and standards to ensure drones are used safely.

Through this work, we identified challenges and opportunities that will inform five key priorities:

Supporting Innovation Through Safety Regulations –

Our top priority is developing regulations for lower-risk Beyond Visual Line Of Sight (BVLOS) operations in rural and remote areas. We will also be conducting technology R&D, testing, and authorizing pilot projects that will inform our policies and rules for medium-risk drone operations.

Managing Drone Traffic –

Establishing a drone traffic management system in Canada is a long-term effort. Building on the first phase of traffic management trials launched in 2020, in the medium-term we will launch additional operational trials. This includes exploring options to remotely identify drones to ensure accountability of drone operators.

Understanding and Addressing Drone Security

Risks – We are at the early stages of collectively understanding the security threats and risks posed by drones at airports and other critical infrastructure. Our activities will first focus on the aviation sector and include:

- collaborating with stakeholders to clarify security responsibilities
- exploring counter-drone technologies to effectively address unauthorized drone incursions at airports
- introducing security regulations and standards to detect and remove drones

Supporting Economic Growth – Unlocking the economic potential of the drone sector depends on continued rapid progress in technology development and testing. We will continue to pursue partnerships to advance drone R&D both in Canada and globally, and will prioritize those projects relevant to the Canadian environment. Our activities include:

- developing strategies to enable cutting-edge drone technologies prepare for international markets
- working with stakeholders to develop an economic strategy to modernize the current framework, including air carrier licensing rules
- supporting the growth of the drone sector in Canada

Increasing Public Trust in Drones –

Building public trust in drone technology is essential to success. This will involve:

- increasing our own understanding of public perception and acceptance of drones
- continuing to communicate with the public and encouraging engagement by Indigenous communities
- work with different levels of government to plan for urban operations
- expand partnerships with the law enforcement community to enforce drone safety rules

DRONES ARE TRANSFORMING SOCIETY

Remotely Piloted Aircraft Systems (RPAS), or drones as they are more commonly known, are often seen in the skies and are becoming more popular every year. First used by the military, today they are used by the public and businesses thanks to technological advances and lower costs.

Drones come in many sizes and shapes ranging from nano-scale to those capable of carrying people. The most common type of small drones are “quadcopters” equipped with high-definition cameras, and flight battery times of 20-35 minutes. Most drone operators flying for fun use quadcopters.

Drones can perform missions similar to other aircraft, but they can also reach areas where traditional aircraft can’t operate. They are versatile; they carry data collection technologies on board often including

a stabilized video camera, making them useful for different operations. Drones are introducing new and exciting possibilities for both commercial operators and everyday consumers.

Drones are transforming society in fundamental ways – the way we “fly”, work, and live. Drones are aircraft and their operators are pilots, sharing the skies with traditional commercial and private pilots. Drones are not just fun to fly! They are also revolutionizing the way industries work, from saving lives, accessing hard-to-reach areas, and performing dangerous tasks, to crop monitoring, land surveying, and delivery of goods.¹ Drones are used to gather data and help businesses make decisions.

These advances in drone technologies are reminiscent of a futurist society – one where the promise of possibilities offered by technology brings to mind visions of flying cars, robots taking on tasks previously done by humans, and all things “smart”. Drones are an emerging form of the Internet of Things, with capabilities growing in automation, artificial intelligence, and connectivity via intelligent transportation systems, including automated and connected vehicles and [smart cities](#).²

With companies already [delivering coffee in Australia](#),³ and innovations in next generation drone technologies opening up opportunities for passenger travel via “air taxis”, the potential impacts of drones are far-reaching. It is against this larger backdrop that Canada’s innovative drone sector is emerging, and the benefits go beyond the transportation sector and extend to Canadian society at large.



¹ Remotely Piloted Aircraft Systems Environmental Scan prepared for Transport Canada, Avascent. April 2019.

² Smith, Phillip. “Drones and Smart Cities: A Crucial Link for the Future.” June 2018. <https://dronebelow.com/2018/06/25/drones-and-smart-cities-a-crucial-link-for-the-future/>

³ Google Drones Can Already Deliver You Coffee In Australia: <https://www.youtube.com/watch?v=prhDrfUgpB0>

THE CANADIAN DRONE LANDSCAPE

Canada is a large country. Our population is spread out, with a handful of cities close to the US border. The infrastructure to support drone flights (like cell networks, ground-based radar) is concentrated around urban areas. This means that most of Canada's lower-level airspace has limited air traffic control services, and low levels of air traffic due to low population density.

Canada relies on a service and resource-based economy, its developed trade networks and partnerships with the US and other countries. Our economy also benefits from its highly respected [aerospace sector](#)⁴ and a skilled workforce.

Drones provide both a business solution to address Canada's geographic and economic realities, and unique commercial opportunities where drones can be used to collect data in areas such as:

- monitoring wildlife
- surveys of pipelines
- search and rescue missions
- delivering goods to remote areas

While more densely populated countries are testing urban transportation systems that move people by air such as AAM, we are starting with a focus on connecting communities, improving our supply chain networks to help move goods so they can reach the consumer.

The economic impact of the drone sector can't be ignored. The global commercial drone market is estimated to be [over \\$6B today](#) with the Canadian

A MATURING COMMERCIAL SECTOR

Over 1000 companies with

- 22,000 Canadian employees
- 44% of companies less than 5 years
- 70% based in Ontario, Alberta and BC
- 15 different Canadian industries

"RPAS in Canada" Avscent Report 2019

commercial market expected to grow by more than [17% by 2027](#).⁵ Our strong aerospace sector and expert workforce can help build a robust drone sub-sector and contribute to Canada's economic growth and reputation as an international leader in aviation.

The evolution of the drone sector over the last five years has been significant. Drones have emerged as a disruptive technology that cut across numerous industries. Drones are:

- driving innovation
- changing the way industries operate
- increasing the efficiency and effectiveness of our transportation system
- helping our transportation system reach more people, communities and businesses

Transport Canada is continuing to develop modern regulations for larger drone platforms with more sophisticated operations and to leverage opportunities to support the economic growth of this sector.

⁴ State of the Canadian Aerospace Industry 2019 Report, Innovation, Science and Economic Development Canada and AIAC

⁵ "Global Commercial Drones Industry." September 2020. <https://www.globenewswire.com/news-release/2020/09/08/2089976/0/en/Global-Commercial-Drones-Industry.html>

OUR ROLE AND VISION

Under the *Aeronautics Act*, Transport Canada has a dual role: to ensure aviation safety and security as part of Canada's transportation system and to promote aeronautics. Our vision is to integrate drones safely and securely into Canadian skies as part of a modern aviation system.

To realize this vision and build on previous research and development activities, Transport Canada established dedicated teams of multi-disciplinary experts in 2017 and 2019 to:

- develop drone safety and security policies, strategies, and regulations in consultation with stakeholders and partners
- collaborate with industry, intergovernmental and international partners to conduct R&D activities and share research results
- create pilot projects to test technologies and gain operational knowledge
- develop standards, certifications, and airworthiness policies industry needs to safely use drones



DID YOU KNOW?

Transport Canada is also contributing to the integration of drone technology into Canadian airspace, increasing what we know about BVLOS operations to help develop regulations for BVLOS through drone projects:

Drones in the Canadian Arctic

Drones could soon be used to monitor Northern Canada's safety, security and environment as part of the [Arctic Remotely Piloted Aircraft System Initiative](#). To prepare for this, we've conducted several flight trials since 2017.

Drones, Whales and Highways

We have used drones to help with [Atlantic Right Whale monitoring](#) in Gaspé and a Beluga whale survey in Mackenzie Bay. We also used drones to help make a map of the [Inuvik Tuktoyaktuk Highway](#) and [the Dempster highway](#) from Inuvik to the Yukon border.

- assess applications for special flight operations
- oversee the use of drones to ensure compliance with the safety rules (and enforce them when necessary)

Drones are here to stay. As we continue developing drone regulations and programs, our teams will evolve to reflect the knowledge and skills needed for the future of a highly-connected and innovative sector.

WHAT WE'VE LEARNED: CHALLENGES, OPPORTUNITIES, AND PRIORITIES

Transport Canada has made significant progress over the last few years in creating a safe environment for the lowest risk drones flown largely by consumers – drones weighing less than 25kg flying within visual line-of-sight (VLOS). Today, we have over 53,000 drones registered alongside almost 37,000 registered traditional aircraft, and more than 51,000 pilot certificates have been issued.⁶

The drone sector is growing quickly – drones are getting larger, travelling further, and at higher altitudes. With these new platforms, the industry is also shifting to using drones for more complex operations: product deliveries, high-value cargo and eventually passenger travel in urban areas. While operations are currently focussed within the country, Canadian trade networks with the US and abroad offer the potential for international operations. The [International Civil Aviation Organization \(ICAO\)](#) is working on [developing model regulations for international drone flights](#).

The evolution of the drone sector brings challenges and opportunities for Transport Canada and the drone community in achieving our vision. We've identified five challenges that cut across our mandate of safety, innovation and sustainability, security, and enabling efficiency and economic growth of the transportation system.

4.1 Safety Regulations to Support Innovation

Safety is key – Understanding drone technologies and the operations they are suited for help inform how

HOW WE ARE ADDRESSING CHALLENGES:

- ▶ Introduced new [VLOS drone rules](#) in 2019 under Part IX of the [Canadian Aviation Regulations \(CARs\)](#)
- ▶ Launched an [on-line Drone Management Portal](#) for pilot exams, certificates and drone registration
- ▶ Established a manufacturers' [safety assurance declaration](#) process
- ▶ Partnered with law enforcement agencies to ensure compliance with the safety rules
- ▶ Worked with international partners to share research results and lessons learned
- ▶ Developed a BVLOS strategy
- ▶ Issued 52 Special Flight Operations Certificates (SFOCs) to support lower-risk BVLOS operations (2018-October 2020)

safety regulations are developed. Before any new technology can be embraced for extensive commercial use, similar to traditional aviation, the risks – especially from bigger drones/aircraft and more complex operations – need to be identified, and strategies to mitigate them developed. We need to continue conducting R&D and testing and validating these quickly emerging technologies in real-world conditions.

⁶ Transport Canada Civil Aviation Statistics. October 2020.

SECTION 4

OUR PRIORITIES TO 2025:

Transport Canada is working with key partners and stakeholders including [NAV CANADA](#), industry associations, drone manufacturers, training providers, commercial and recreational operators, and the traditional aviation community to continue developing modern and agile drone regulations for BVLOS operations.

We will focus on:

- ▶ Developing lower-risk BVLOS rules for operations in rural and remote areas
- ▶ Issuing SFOCs for medium-risk BVLOS operations to test technologies in operational settings to gain insights (focus on public benefit operations)
- ▶ Supporting R&D projects and trials that will inform the development of policies and rules for BVLOS regulations for medium-risk operations



Regulating quickly changing technologies requires a “crawl-walk-run” approach: from testbeds and pilot projects first, to Special Flight Operations Certificates (SFOCs) and finally, to regulation. We are developing drone regulations in stages, starting with the 2019 VLOS regulations under Part IX of the CARs, followed by a plan to regulate lower-risk BVLOS operations in the coming years, and looking ahead to regulating increasingly complex operations over the longer-term.

We supported short-range BVLOS search and rescue projects in 2017-18, BVLOS service delivery projects in 2018-19, and R&D projects including those on Detect and Avoid (DAA) collision avoidance systems and standards in drones design to minimize injury from a falling drone. These pilot projects supported the development of our proposal for the first

Transport Canada will continue overseeing its implementation of the VLOS rules, ensure oversight and enforcement activities are standardized across the country, and that efforts continue to increase drone registration rates. Our future engagement approach will involve:

- ▶ Launching the Drone Advisory Council – a Transport Canada-led national forum to identify strategic drone issues and inform regulations, and made up of members from Transport Canada, the aviation industry, academia and other levels of government
- ▶ Working with ICAO, the Joint Authorities for Rulemaking on Unmanned Systems, and other international partners to create harmonized standards
- ▶ Working with provincial/territorial/municipal partners on integrating drones into the urban airspace and drone traffic management
- ▶ Continuing safety awareness campaigns for consumer and commercial drone operators

generation BVLOS rules which focus on lower-risk operations. We completed our initial consultations with industry groups in June 2020.

Promoting aeronautics and innovation – Building a predictable regulatory environment where the rules are clear for an industry where change is constant challenges us to take different approaches to the way we regulate. The drone industry has voiced concerns on the pace of regulations relative to the speed of innovation.

We've taken a "safe innovation" approach to regulating, by developing a BVLOS strategy that prioritizes common types of drone applications that are lower-risk and provide direct benefits to Canadians while maximizing access to airspace. We've focused on developing rules that are risk and outcome-based, to enable innovation by the drone industry in providing solutions that accommodate the fast-changing technologies.

4.2 Managing Drone Traffic

Drones already outnumber traditional aircraft in our skies, and more drones are expected as both commercial and consumer sectors continue to grow. Canada's existing Air Traffic Management (ATM) system was not designed to handle this volume and variety of traffic, nor are the majority of drones today equipped to seamlessly integrate into the existing airspace. The small size of drones, the lower levels at which they fly, the urban environments in which they would like to

operate (major airports are generally located close to cities), combined with their ability to take off and land anywhere, are all factors requiring a re-think of how our airspace is managed.

Drones today are required to fly below 400 feet to mitigate the risk of interfering with other aviation operations. Operators wishing to fly their drones at higher altitudes must first obtain special permission from Transport Canada (for flights in uncontrolled

OUR PRIORITIES TO 2025:

Safety in the airspace over Canada is a responsibility shared by Transport Canada, NAV CANADA, and the [Department of National Defense \(DND\)](#). NAV CANADA and Transport Canada (given the focus on civilian aviation), have engaged a team of experts from DND, the [National Research Council \(NRC\)](#), [Innovation, Science and Economic Development, Defence Research Development Canada](#), telecommunications companies, and drone industry stakeholders.

Together we are focusing on:

- Creating a drone traffic management system in Canada that includes mobile drone flight planning and airspace access request systems, communication, navigation, and airspace surveillance systems
- Conducting the first phase of drone traffic management trials in rural areas starting in 2021, with additional trials in later years
- Exploring options for the remote identification of drones, which serves as a "digital license plate", as a foundational part of the drone traffic management system

HOW WE ARE ADDRESSING CHALLENGES:

- Established a Transport Canada-NAV CANADA-led multi-disciplinary team
- Developed a Drone Traffic Management Roadmap (2019)
- Launched 2020 drone traffic management trials

SECTION 4

airspace), and an authorization from NAV CANADA for those in controlled airspace. As drone flights increase, we are exploring ways to effectively manage air traffic and successfully integrate drones in Canadian airspace over the long-term.

Managing drone traffic is not only a Canadian issue – it is a challenge recognized by other countries and ICAO. The solution – a drone traffic management system (or systems) – is highly complex and will require the ability to manage remotely piloted, and ultimately autonomous, drones operating in Canadian controlled and uncontrolled airspace.

This requires supporting infrastructure including surveillance and communication links and fixed or mobile traffic management services in remote areas. It may also include transforming the airspace systems to allow drones to be tracked, remotely identified, and have DAA systems in place to avoid collisions. Transport Canada, NAV CANADA, and industry stakeholders have been working together since 2019 to develop a multi-year plan to develop a drone traffic management system in Canada. This involves launching specific trials to produce information that will help determine:

- what Canada’s drone traffic management system will look like;
- what the minimum requirements for each part of the system will be; and
- determining the equipment drones in Canada may need to carry for them to function safely within the overall system.

We will use the data gathered from these trials to develop performance standards and regulations.

4.3 Drone Security Risks

While drones have introduced new and exciting opportunities, they also present an emerging security risk to airports and other critical infrastructure. This was highlighted by the 2018 drone incidents at Gatwick airport in the United Kingdom. These resulted in airspace closure, disrupted travel for over 140,000 passengers, and a projected loss of more than [\\$85M](#).⁷ Following this incident, reports of drones in and around airports not only increased; their use by terrorist and criminal organizations has also been identified as a threat.

Drone capabilities developing quickly at lower costs, easy access to drones, and drone platforms vulnerable to hacking and malicious modification contribute to the security risks posed by drones. The potential for adding dangerous payloads or drones being used for spying is a prevalent concern. Tactics used in conflict zones and other criminal activity could similarly be used for disruption or attack against Canada’s aviation system, critical infrastructure, or the public.

The possibility of drones being used by criminals or terrorists and the potential impact of an attack demonstrate the need for a greater understanding of the security vulnerabilities at Canadian airports and other critical infrastructure. The 2019 [Final Report of the Blue Ribbon Task Force on UAS Mitigation](#) at Airports called for a national counter-drone program at airports. International partners have recognized

⁷ “Estimating the costs for the airport operator and airlines of a drone-related shutdown: an application to Frankfurt international airport.” National Centre for Biotechnology Information. July 2020.



HOW WE ARE ADDRESSING CHALLENGES:

- Issued guidance to airports on Incident Response Protocols (2020)
- Conducted exercises at airports to identify security gaps and mitigations
- Engaged international partners to share “best practices”
- Began trials of counter-drone detection technologies with key partners
- Transport Canada-Public Safety Canada-industry engagement on the drone threat to critical infrastructure

this challenge and are moving ahead in assessing the risks and implementing mitigation strategies to address them.

Understanding cybersecurity. Drone cybersecurity is an increasing concern. Transport Canada has been working both nationally and internationally to develop drone cybersecurity practices to counter cyber risks such as drone hacking - a topic of discussion from drone manufacturers and operators, to regulators and security agencies. A holistic approach to cybersecurity is needed to ensure vulnerabilities are addressed throughout the aviation system.

4.4 Innovation Enabling Economic Growth R&D Activities Supporting Industry Success

Transport Canada has been investing in drone R&D activities to understand the technology challenges including:

- DAA systems for drones
- maintaining safe distances
- icing and cold weather effects on drones in our Canadian climate

OUR PRIORITIES TO 2025:

Transport Canada has partnered with Canada’s law enforcement, security, and military communities, including Defence Research and Development Canada, NAV CANADA, and the aviation industry. Our goal is to increase our collective understanding of the risks posed by drones in Canada and develop a national drone security strategy to strengthen our resiliency to respond to drone incidents at airports and resume operations post-incident.

We are focusing on:

- Engaging stakeholders to clarify security roles/responsibilities at airports, communication protocols, and coordination of efforts during incident response
- Assessing airport threats and vulnerabilities to better understand the risks and gain operational insights
- Exploring counter-drone technologies available to effectively detect, track and mitigate against unauthorized drone incursions
- Introducing a security framework for detecting and removing unauthorized drones

In partnership with Public Safety Canada, Transport Canada is also turning its attention to the threats drones posed beyond airports, more broadly to the different critical infrastructure sectors in Canada, and to explore ways to protect critical assets.

SECTION 4

HOW WE ARE ADDRESSING CHALLENGES:

- Partnered with the National Research Council on multi-year R&D initiatives to support innovation and gather data for regulatory development
- Private sector test ranges are in place to support R&D
- Authorized BVLOS Pilot Projects with industry partners since 2017
- Advanced our working relationship with key international partners and their Civil Aviation Authorities such as the [Federal Aviation Administration](#) and its Alliance for System Safety of UAS through Research Excellence ([ASSURE](#))

Understanding the capabilities and limitations of state-of-the-art technologies provides important information in developing sound safety rules.

We have also:

- supported exploratory trials at test ranges in Quebec and Alberta
- authorized innovative drone operations that provide economic benefits
- contributed to international standards development organizations on emerging technology requirements
- developed international research and cooperation agreements with key partners

Transport Canada is continuing to support the development of Canadian drone operating experience and expertise via its research and testing activities, its advancement of trials, and technology applications to help nurture the innovative drone ecosystem and the early adoption of this technology to generate economic benefits for the country.

Clear Pathways for Bringing Drones to Market

The growth of a strong drone sector in Canada depends on a clear path to the global market for Canadian manufacturers. Transport Canada is taking a risk-based approach to assure the safety of drone platforms, beginning with declarations from manufacturers that their lower-risk drones can safely be used for advanced VLOS operations.

Developing harmonized international design, airworthiness, and certification standards for drones with key international partners will be essential so that there is, where possible, mutual recognition and acceptance of each other's drones or drone products. This reciprocal acceptance will not only make it easier for Canada to validate foreign-made drones (and drone products) entering the Canadian marketplace, it will also open foreign markets to Canadian-manufactured drones.

While Transport Canada works to align with international trends on airworthiness, we will continue to work with industry stakeholders in developing an approach to assuring the safety of drones at the design and manufacturing level through to the end of the aircraft

OUR PRIORITIES TO 2025:

- Advancing on our near- and medium-term R&D projects including DAA systems, Command and Control (C2) link integrity, drone collision, cold weather research, human performance factors, and certifying autonomous systems
- Continuing to pursue partnerships and collaboration opportunities to advance drone R&D in Canada and globally
- Continuing to identify and prioritize R&D projects that provide data relevant to the Canadian environment and operations

OUR PRIORITIES TO 2025:

- ▶ Developing strategies to make it easier for novel drone technologies to be accepted in international markets

lifecycle. This will enable new and innovative aircraft to be ready for international markets and put into operation in a timely way.

Air Carrier Licensing Rules

The drone industry is subject to both aviation safety and entry-to-market commercial licensing rules overseen by Transport Canada and the [Canadian Transportation Agency](#) (CTA). The CTA's role includes issuing air carrier licenses to companies seeking to operate an air service carrying passengers or goods in the Canadian market, as per the *Canada Transportation Act*. Only a few drone operators, to date, have begun to apply for a commercial air carrier license, due to limitations in drone sizes and capabilities to carry out these complex operations.

Most of the industry's focus until recently, has been providing specialty air services such as aerial photography, which do not require a license. However, with the evolution of drone technology including larger platforms and more powerful propulsion systems, companies will soon begin expanding services to cargo delivery and passenger travel and will require an air carrier license under the CTA's current rules to deliver these services.

The existing licensing rules were designed with the traditional air carrier model in mind and did not foresee the arrival of this new type of aircraft. From the reliance on Air Operator Certificates to foreign ownership limitations in place (both requirements for traditional air carriers), these rules could create unintended barriers for a young Canadian drone industry. Drone start-ups are seeking out new funding sources to grow their businesses

and may have non-traditional business models, compared to companies in the conventional aerospace and aviation sectors with more established governance structures.

We need to assess whether a distinct economic framework is needed for drones, one that takes into account the economic objectives, realities, and needs of this emerging sector. This assessment would also explore the approach taken by Canada's key trading partners to ensure the Canadian drone industry is not placed at an economic disadvantage, and that Canada's drone industry is provided with reciprocal market access to advance Canadian industry competitiveness in emerging markets.

OUR PRIORITIES TO 2025:

- ▶ Engaging stakeholders to identify and manage barriers that would prevent industry compliance with Canada's economic framework for aviation
- ▶ Working with the CTA and Canada's drone industry to develop an economic strategy to modernize the current framework and help Canada's drone sector grow



SECTION 4

4.5 Increasing Public Trust in Drones

Addressing public perceptions of privacy and safety is needed for Canadian society to accept continued growth in drone use. Opportunities presented by the technology can only be fully realized if Canadians see its value and understand its potential benefit to society.

This potential exists with the use of drones “for good” in disaster-relief efforts, search and rescue missions, and from the consumer’s perspective with services ranging from drone delivery of goods, “last-mile delivery” (delivery of goods from the warehouse to doorstep), and, in the future, the possibility of air taxis.

Building social acceptance will require working with different levels of government to address local issues including unsafe drone practices, privacy issues, noise and visual pollution issues, airspace management, and urban planning and infrastructure.

HOW WE ARE ADDRESSING CHALLENGES:

- ▶ Launched the [Know Before You Go!](#) Safety campaign
- ▶ Co-developed and promoted the National Research Council’s [Drone Site Selection Tool](#)
- ▶ Held “*Drone Talks: Planning for Success*” in 2019 for operators and industry to help shape Transport Canada priorities
- ▶ Conducting public opinion research on social perceptions and acceptance of drones
- ▶ Supporting the use of inclusive gender-neutral terminology (RPAS)

OUR PRIORITIES TO 2025:

- ▶ Increasing our understanding of public perception and acceptance of drones and developing an action plan to address concerns
- ▶ Working with municipal governments to plan for urban operations (e.g. the Drone Advisory Council will include representation from local governments)
- ▶ Encouraging greater community engagement, including with Indigenous communities
- ▶ Continuing partnerships with law enforcement agencies to enforce rules on safe drone practices



We have continued our education and outreach activities to raise awareness of the safety and privacy rules with all stakeholders including the Canadian public and the traditional aviation community.

We are also working with government and industry partners to address safety concerns. We also recognize the importance of outreach with distinct communities including First Nations in building an understanding of drone opportunities and impacts on these communities.

Transport Canada continues to work with partners in government, industry and internationally to improve the lives of Canadians by modernizing our transportation system and making use of emerging technologies like drones. Our first phase of work towards full integration of drones has begun, with the introduction and implementation of VLOS rules and work towards lower-risk BVLOS regulations. In 2020, another important milestone was reached with the CTA issuing the [first air carrier license to allow the delivery of goods by drone](#).

Transport Canada's Drone Strategy to 2025 reviews the initial milestones we have achieved, and outlines our plans to continue to move forward to support growth and innovation. We will continue to build relationships with our partners and stakeholders, and communicate with Canadians to share information, lessons learned, and stay current on emerging trends and risks. As we move forward, we remain committed to our guiding principles of safety, security, innovation and collaboration and open to the possibilities of tomorrow.

The strategy will be periodically reviewed as drone technology continues to evolve, key areas of work are completed, or new areas of work emerge. We will review the entire strategy in advance of 2025 and then publish a new strategy outlining our plans from 2025-2030.



WHAT WE'VE ACHIEVED

Developing Canada's Drone Safety and Security Program	Promoting Drone Sector Innovation	Working with Stakeholders
<ul style="list-style-type: none"> ▶ Published Part IX of the Canadian Aviation Regulations (2019) for small RPAS (recreational and commercial) ▶ Established partnerships with 13 law enforcement agencies to ensure compliance with the new VLOS regulations ▶ Launched on-line Drone Management Portal (2019) to deliver drone services to Canadians <ul style="list-style-type: none"> • 77, 000 accounts created • 51, 000 pilot certificates issues • 53, 000 drones registered* ▶ Created new pilot exams, standards for RPAS flight schools and flight reviewers, and drone manufacturer safety declaration process ▶ Launched a Drone Safety Awareness campaign <ul style="list-style-type: none"> • Know before you go! • Webinar Series • Twitter Chat #DroneSafetyDay • Stakeholder Outreach ▶ Promoted the National Research Council's "Where to Fly" app ▶ Developed a Drone Traffic Management Strategy ▶ Issued guidance materials to airports on security incident response protocols 	<p>Testing, Pilot Projects and Initial Operations</p> <ul style="list-style-type: none"> ▶ Supported the establishment of two drone test ranges in Alma, QC and Foremost, AB ▶ Completed BVLOS pilot projects with industry and government partners 2018-19 ▶ Began issuing special authorizations for routine BVLOS operations in 2019 (52 special flight authorizations issued since August 2019) ▶ Supporting new BVLOS and Drone Traffic Management Trials (2020) <p>R&D Activities</p> <ul style="list-style-type: none"> ▶ Developed an R&D plan identifying priority research areas to support innovation and evidence-based regulations: <ul style="list-style-type: none"> • Air to Air Collision • Air to Ground Collision • Command & Control (C2) Link Integrity • Detect and Avoid Systems • Icing/Severe Weather Impacts • Human Factors • Certification of Autonomy ▶ Established key partnerships with other countries to share research results, and contribute to development of international drone technology standards 	<p>Domestic Collaboration</p> <ul style="list-style-type: none"> ▶ Transport Canada has fostered many cross-cutting partnerships in develop safety regulation and support drone innovation: <ul style="list-style-type: none"> • Government – Industry collaboration with NAV CANADA, Canada Aviation Regulatory Council, and the drone industry associations and community • Cross-Government partnerships – DronExchange Network, law enforcement agencies, Drone Security Working Group • Inter-Governmental partnerships via the Aviation Standing Committee, a joint Transport Canada-provincial- territorial forum <p>International Engagement</p> <ul style="list-style-type: none"> ▶ Global partnerships are integral to our regulatory work and Transport Canada has worked in multiple forums to harmonize safety rules and advance Canadian leadership: <ul style="list-style-type: none"> • The International Civil Aviation Organization (ICAO) • Radio-Technical Commission for Aeronautics (RTCA) • ASTM International • Joint Authorities for Rulemaking (JARUS) • International Transportation Forum (ITF)

* Data valid as of October 27, 2020

