



# **National Strategy for the Operational Use of Public Safety and Emergency Management Remotely Piloted Air Systems**

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## Acknowledgment of Supporters



## Participating Agencies

The following stakeholder agencies participated in the development of this Strategy:

- Province of Saskatchewan, Ministry of Government Relations
- Correctional Services Canada
- Province of Saskatchewan, Ministry of Environment
- Saskatchewan Urban Municipalities Association
- Department of National Defence / Defence Research & Development Canada
- Alberta Emergency Management Agency, Municipal Affairs
- Swift Current Fire Department
- Niagara Regional Police Service
- University of Regina
- Prince Albert Police Service
- Regina Police Service
- Ontario Provincial Police
- Saskatchewan Emergency Management and Fire Safety
- Royal Canadian Mounted Police
- University of Toronto Police
- York Regional Police
- SaskPower
- SaskPower / UTC Canada
- TransGas

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## Section 1: Background

### 1.1 Introduction

The use of Remotely Piloted Air Systems (RPAS) or Unmanned Air Vehicles (UAVs) in support of public safety and emergency management operations is on the increase. Current uses focus on accident reconstruction, search and rescue, monitoring of natural disasters and critical infrastructure; however, the full potential of RPAS in support of public safety and emergency management has yet to be realized.

#### The Use of Remotely Piloted Air Systems In Canada (Source Transport Canada)

The rising sales and evolving technology of RPAS make them a rapidly growing part of the aviation industry. However, as their popularity increases, so does interference with manned aircraft. This presents unique challenges in developing regulations to safely integrate RPAS into Canada's airspace.

Transport Canada regulates the use of all aircraft, manned or unmanned, to keep the public, the aviation community, and Canada's airspace safe. RPAS users are considered pilots and as such, are legitimate airspace users. With this privilege comes responsibilities. The *Canadian Aviation Regulations* establishes the framework in which they can operate: *they* currently have separate definitions and requirements for model aircraft and unmanned air vehicles:

- **A model aircraft** is “an aircraft, the total weight of which does not exceed 35kgs (77.2 pounds), that is mechanically driven or **launched into flight for recreational purposes**”. However, for a large model aircraft with a maximum take-off weight of over 35kgs, users need an SFOC.
- **A UAV/RPAS** is “a power-driven aircraft, **other than a model aircraft**, that is designed to fly without a human operator on board” and is required to operate in accordance with an SFOC”. Under the current framework, Transport Canada makes the distinction between recreational and non-recreational operations. An SFOC gives non-recreational pilots permission to fly and spells out when, where, and how. The SFOC process has been an effective way for Transport Canada to:
  - accommodate RPAS operations in Canada, and
  - assess the risks of individual RPAS operations on a case-by-case basis.

The growth of the RPAS industry has resulted in growing numbers of SFOC applications to Transport Canada. In 2014, the department issued 1,672 SFOCs for RPAS, whereas it issued 945 SFOCs in 2013 and 345 SFOCs in 2012; this represents an overall increase of 485% over two years

There are hundreds of known models of RPAS available on the market by a variety of retailers and manufacturers, including custom kits and modified RPAS.

Currently, two organizations represent the RPAS industry and model aircraft community:

- [Unmanned Systems Canada](#) (USC) is a not-for-profit association that has about 500 members, working to facilitate the growth and integration of RPAS in the Canadian economy.

- The [Model Aeronautics Association of Canada](#) (MAAC) is the governing body of model aircraft in Canada with established guidelines for its 13,000 members, and has a proven safety record.

In 2014, the USC update of the [Canadian Civil UAS Study](#) indicates that the dollar value of the Canadian RPAS market can vary, but could range from \$100 million to \$260 million in procurement and operations over a 10 year period. USC's report also noted a threefold increase in the number of Canadian companies conducting RPAS operations since 2008 in an extensive range of applications in a number of economic sectors across the country:

- Agriculture surveys, cinematography and film, and police investigations are the leading and most mature market applications of RPAS in Canada.
- Meteorology/oceanography, search and rescue, urban planning/surveying, and disaster relief are the sectors requiring increased airspace access to facilitate growth.

Canada has also seen an increase in the number of academic institutions with RPAS research and development activities, as well as a growing number of training schools offering courses in RPAS piloting skills influenced by Transport Canada guidance material and industry needs. Canadian universities currently focus on exploring new RPAS applications as part of distinct aerospace or engineering programs. Comparatively, the United States has a mature community of academic institutions and training schools offering formal programs in RPAS engineering and pilot training. Transport Canada recognizes the role of academic institutions as an additional area of growth for the RPAS industry.

A lack of aviation knowledge may lead to operating an RPAS in a situation or environment where it would pose a higher risk to aviation safety. In addition, an RPAS pilot may not have an aviation background to know to give way to manned aircraft, recognize aerodrome and aviation markings, or identify weather conditions, to name a few. Transport Canada recognizes that lack of knowledge is a common risk between non-recreational and recreational pilots. There have been several reports of reckless and negligent RPAS use (for example near airports or at high altitudes). Since 2010, Transport Canada has launched 50 investigations across the country into incidents involving RPAS.

Transport Canada applies the principles of risk management to maintain an effective level of oversight over its civil aviation activities. The risks involved in RPAS operations are defined by the likelihood and severity of an RPAS accident causing harm to persons and property on the ground, or to other airspace users. The department, to the greatest extent possible, seeks to reduce the risk of a catastrophic incident involving an RPAS through appropriate regulation of the RPAS pilot, aircraft, and operating environment.

Applications for SFOCs require a high degree of technical complexity and level of detail as Transport Canada assesses the risks involved in each RPAS operation on a case-by-case basis before issuing a certificate. The applications themselves create a challenge for a timely and efficient review and approval, and create frustration for the industry. Applying a risk management approach to the new regulatory framework will allow Transport Canada to focus its resources on the RPAS operations with the highest level of risk.

## **Communications Interoperability**

Communications is the fundamental capability within disciplines and jurisdictions that practitioners need to perform the most routine and basic elements of their work functions.

Agencies must be operable, meaning they must have a radio communications solution sufficient to meet their everyday internal and emergency communication requirements before they place value on being interoperable, i.e., able to work with other agencies.

Communications interoperability is the ability of public safety agencies (police, fire, EMS) and service agencies (public works, transportation, hospitals, etc.) to talk within and across agencies and jurisdictions via radio and associated communications systems, exchanging voice, data and/or video with one another on demand, in real time, when needed, and when authorized. It is essential that public safety has the intra-agency operability it needs, and that it builds its systems biased toward interoperability.

Ideally, communications interoperability ensures that a continuous flow of critical information is maintained as needed among multi-jurisdictional and multi-disciplinary emergency responders, command posts, agencies, and the governmental officials for the duration of the emergency response and recovery operation in compliance with the incident management system.

## 1.2 Purpose

The purpose of this Strategy is to help optimize RPAS-related investments in technology and capabilities to support an increasingly diverse range of uses and operations to include:

- Collision Reconstruction
- Search and Rescue
- Border Integrity
- Natural Disaster and Damage Assessments
- Mapping and Modelling (3D/4D capabilities)
- Fire Incident Identification and Monitoring
- Nano Systems
- Stealth Systems
- Safe Operation of Mixed RPAS Fleet
- Longer Flight Times
- Tethered/Airborne Advanced Communications
- Forensic Analysis and Investigative Support
- Environmental Monitoring and Assessment
- Transport and Delivery
- Rescue Extraction
- Infrastructure and Facility Security
- Drug Eradication
- In Building Use
- Beyond Visual Line of Sight (BVLOS) Operations
- Remote First Aid and Medical Assessment



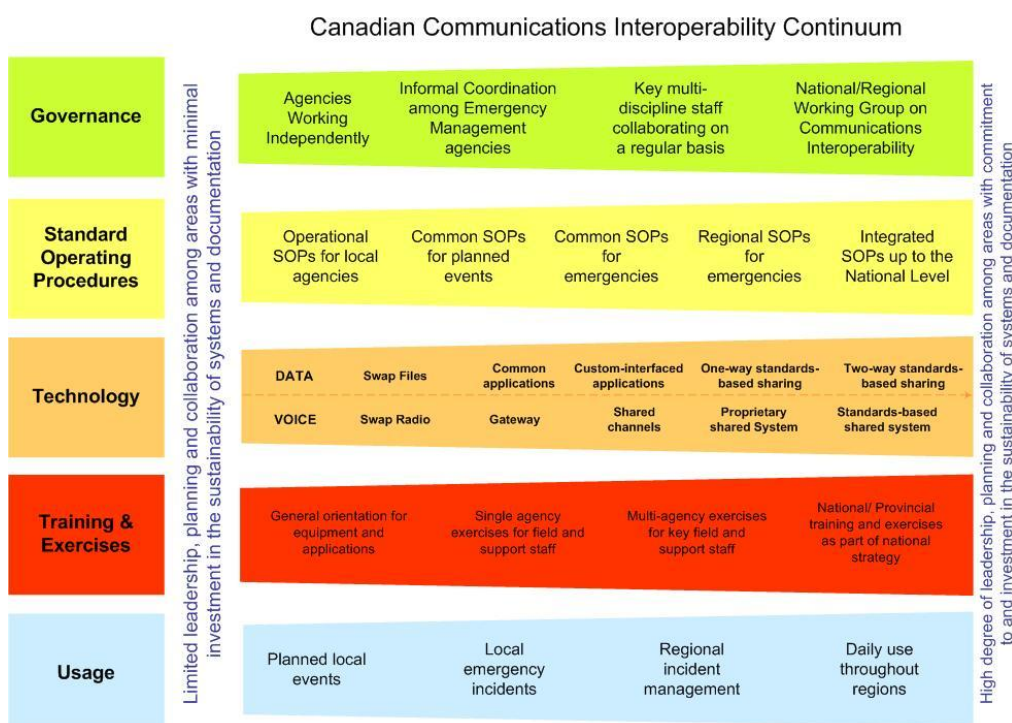
### 1.3 Scope

The Strategy sets forth the strategic and operational conditions necessary to deploy and use RPAS in support of the full spectrum of public safety and emergency management operations from normal day-to-day activities to major incidents, to ultimately increase responder and citizen safety and overall security. Given the central nature of data and communication-related elements associated with RPAS use, this Strategy is aligned with and/or guided by the Communications Interoperability Strategy for Canada (CISC) and the emerging Canadian Community Safety Information Management Strategy (CCSIMS).

## 1.4 Canadian Communications Interoperability Continuum

The stakeholders have endorsed the Canadian Communications Interoperability Continuum as a guide for the development of the RPAS Strategy. The Canadian Communications Interoperability Continuum is derived from the SAFECOM Interoperability Continuum developed by the U.S. Department of Homeland Security’s SAFECOM program. The Continuum is a multi-faceted approach to emergency communications, which identifies five interrelated elements that are essential to a foundation for effective and seamless interoperability:

- **Governance:** leadership, decision making groups, agreements, interoperability funding, strategic planning
- **Standard Operating Procedures:** policies, practices and procedures, agreements, guidance, command and control
- **Technology** - Data and Voice: approaches, implementation, maintenance and support
- **Training and Exercises:** operator training, joint training and joint exercises
- **Usage:** frequency of use and familiarity of interoperability solutions



As the Interoperability Continuum graphic suggests, proficiency in all five of these elements is desirable to achieve the best possible levels of interoperability and compatibility. Furthermore, the Continuum should not only be read horizontally, but vertically as well. At the lower end of the Continuum there is:

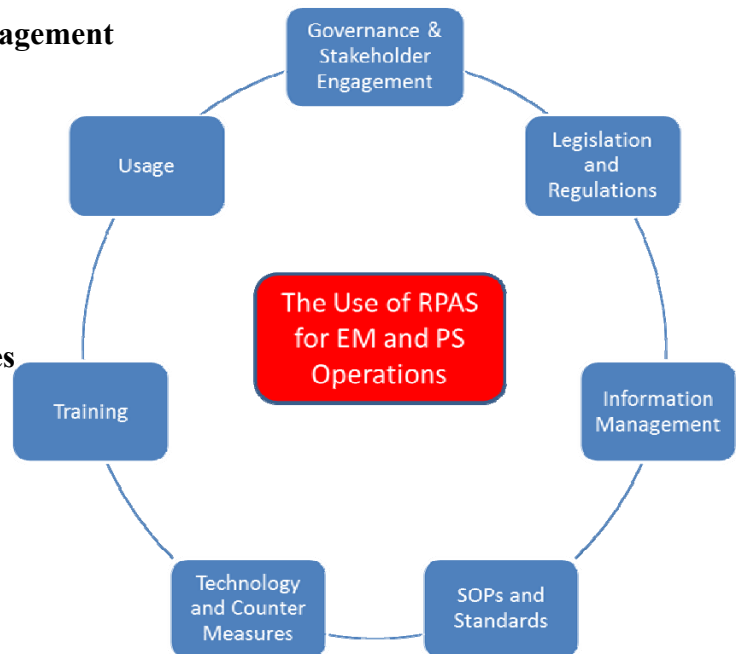
*“Limited leadership, planning and collaboration among areas with minimal investment in the sustainability of systems and documentation”*

while at the optimal end there is a:

*“High degree of leadership, planning and collaboration among areas with commitment to and investment in the sustainability of systems and documentation”*

For the purposes of this strategy, the following elements (lanes) are viewed as central to realizing the vision and future state objectives for RPAS use:

- **Governance and Stakeholder Engagement**
- **Legislation and Regulations**
- **Information Management**
- **SOPs and Standards**
- **Technology and Counter Measures**
- **Training**
- **Usage**





## Section 2: Strategy

### 2.1 Vision

Public Safety and Emergency Management stakeholders have defined their vision for the use of Remotely Piloted Air Systems as follows:

***Canada is a leader in the use of increasingly capable Remotely Piloted Air Systems (RPAS) in support of public safety and emergency management. Secure, safe and widespread use of RPAS is common in all regions and is enabled by collaboration, regulations, standards, ongoing research and technical innovation, and public confidence.***

### 2.2 Current State Assessment

The current state of RPAS use in Canada provides a start point for the development and implementation of the RPAS strategy. The following table summarizes the key findings from the current state assessment.

**Table 1 : Summary of Current State Assessment**

Element	Current State
Governance and Stakeholder Engagement	<ul style="list-style-type: none"> <li>Limited formal governance exists to promote and address RPAS related concerns and requirements and as a result RPAS use is not standardized or being optimized</li> <li>Key stakeholders (to include Transport Canada) are working collaboratively (albeit informally in many cases) to address RPAS related issues and opportunities</li> <li>There is no shared vision amongst all stakeholders for the use of RPAS, nor is there a shared understanding of the benefits and impacts of their use (security, privacy, capabilities).</li> <li>RPAS related knowledge and education is largely by word of mouth.</li> <li>Unmanned Systems Canada is a recognized voice on RPAS related issues</li> </ul>
Legislation and Regulations	<ul style="list-style-type: none"> <li>RPAS operations adhere to the established legislative and regulatory framework established by Transport Canada (SFOC Process), NavCan and Industry Canada.</li> <li>Amendments are pending to the framework for the use of RPAS/Unmanned Air Vehicles (See Transport Canada Notice of Proposed Amendment)</li> <li>Legislation and regulations struggle to keep pace with technical changes, PS/EM stakeholder requirements/expectations, and security, privacy and safety requirements</li> <li>Overall, many within the PS/EM RPAS community lack a comprehensive understanding of the applicable legislation, regulations and associated processes</li> <li>There are few regulations/enforceable limitations governing the appropriate use of personal RPAS</li> </ul>
Information Management	<ul style="list-style-type: none"> <li>Data formats are not standardized</li> <li>Information sharing and access is limited and influenced by real and perceived constraints associated with security and privacy</li> <li>RPAS information management and sharing practices are not being addressed at a PS/EM community level (agencies working in isolation)</li> <li>Real time/near real time data access capabilities are limited but improving</li> </ul>

Standard Operating Procedures and Standards	<ul style="list-style-type: none"> <li>• There are no national/standardized SOPs for RPAS use</li> <li>• Transport Canada has issued hundreds of SFOCs that can serve as templates for new users and future requirements</li> <li>• RPAS use and technology development is not currently guided by established standards (technology, data, use, training)</li> <li>• There is a general lack of knowledge and experience in the development and application of RPAS SOPs and standards</li> </ul>
Technology and Counter Measures (CM)	<ul style="list-style-type: none"> <li>• Highly capable technology exists and is available for Public Safety and Emergency Management functions</li> <li>• Current RPAS technology does not fully meet PS/EM requirements i.e. sensors, payload, range, 3D awareness, data formats</li> <li>• RPAS are vulnerable to environmental factors which limits their reliability for operations</li> <li>• Current battery life limits RPAS operations and flight time</li> <li>• RPAS technology development is not being directly influenced by a common set of PS/EM community requirements</li> <li>• Current RPAS counter measures are limited and present a very real threat to PS/EM RPAS operations and increase the risk of misuse and illegal activities associated with RPAS operations</li> <li>• Lack of strong regulations/limitations on personal use of RPAS adds to the CM challenge</li> <li>• Counter measure research is ongoing</li> </ul>
Training	<ul style="list-style-type: none"> <li>• There are no formal national standards for RPAS training for users and support personnel</li> <li>• The lack of training is compounded by the lack of national SOPs and standards</li> <li>• Flight planning practices for RPAS use are weak</li> <li>• The RCMP has established a ground school and training program for internal (RCMP) RPAS operations</li> <li>• Training is currently focused on Line of Sight operations. Training is required to support the anticipated approval for BVLOS Operations</li> </ul>
Usage and Familiarity	<ul style="list-style-type: none"> <li>• Current uses include collision reconstruction, search and rescue, monitoring and forensic analysis support</li> <li>• RPAS use (rotary and fixed wing platforms) is gaining in popularity as a highly capable and affordable technology in support of Public Safety and Emergency Management operations (to include use in the Critical Infrastructure sectors)</li> <li>• Use is governed by Transport Canada, however, current restrictions limit the potential of RPAS capabilities (use near airports, BVLOS)</li> <li>• RPAS users are committed to deploying safe and secure BVLOS systems in support of PS and EM operations</li> </ul>

## 2.3 Future State Objectives

Overall, there is a broad-based consensus amongst all key stakeholders on the need to enhance RPAS use in Canada for Public Safety and Emergency Management. The following table summarizes defined future state objectives for the use of RPAS in Canada based on the seven (7) defined lanes:

Table 2 : Summary of Future State Objectives

Element	Future State Objectives
Governance and Stakeholder Engagement	<ul style="list-style-type: none"> <li>• A formal, representative and sustainable governance structure exists to support the RPAS stakeholder community and common interests; the structure is supported by first responders, emergency management partners, academia and industry</li> <li>• The governance framework is viewed as a recognized champion and leader for RPAS matters</li> <li>• Effective communications and outreach practices are in place to facilitate the sharing of information related but not limited to policies, guidelines, legislation, procedures, training, and research and development</li> <li>• The RPAS governance structure promotes and supports stakeholder outreach (regional and national forums)</li> <li>• The RPAS governance structure has a well-established network of strategic partners (CACP Tri-Services Emergency Management Committee, Unmanned Systems Canada, CITIG, CATA, etc.)</li> </ul>
Legislation and Regulations	<ul style="list-style-type: none"> <li>• RPAS legislation and regulations align with user requirements with due regard for security, safety and privacy</li> <li>• RPAS users and key stakeholders are knowledgeable of all RPAS related legislation and regulations</li> <li>• The PS/EM RPAS community is well informed and actively participates in the Transport Canada Notice of Proposed Amendment process</li> <li>• Legislation and regulations support safe, secure and appropriate use for personal RPAS (Personal use RPAS include clear guidelines related to authorized use)</li> <li>• RPAS related legislation and regulations are readily available to stakeholders and enforced for both operational and personal use</li> <li>• Users of operational and personal RPAS are well informed and comply with established legislation and regulations</li> </ul>
Information Management	<ul style="list-style-type: none"> <li>• RPAS information management initiatives align with the Canadian Community Safety Information Management Strategy (CCSIMS)</li> <li>• RPAS data and information sharing is guided by standards (e.g. Meta data, time/date stamps, GIS referencing), national policies, and best practice based procedures</li> <li>• RPAS data can be shared and accessed by authorized stakeholders in all regions</li> <li>• RPAS data is securely stored, accessed and shared</li> <li>• A robust infrastructure is in place to support the availability and integrity of data</li> </ul>
Standard Operating Procedures and Standards	<ul style="list-style-type: none"> <li>• RPAS stakeholders collaborate in the development of standards and SOPs</li> <li>• RPAS operations are guided by standards, national policies, and best practice-based SOPs</li> <li>• SOPs and related documents (e.g. checklists, emergency procedures, SFOC application examples, training material) are available to authorized stakeholders through a central portal/repository</li> <li>• RPAS research and development is based on established standards (data, technical specifications, security, information management/sharing, airspace management)</li> </ul>

Technology and Counter Measures (CM)	<ul style="list-style-type: none"> <li>• Canada is a leader in the use of increasingly capable RPAS technology (3D/4D solutions) in support of PS and EM operations</li> <li>• RPAS stakeholder requirements are well defined and guide academic and industry research &amp; development efforts</li> <li>• Appropriate and tailored technologies are available to meet user needs/requirements</li> <li>• RPAS technology development efforts and solutions are standards-based and support information sharing</li> <li>• RPAS are capable of operating in harsh and adverse environmental conditions</li> <li>• Appropriate, effective and approved counter measures are available to PS/EM stakeholders to mitigate risks from unauthorized and illegal use of RPAS within a tiered and layered defence strategy</li> <li>• Appropriate forums exist to facilitate RPAS stakeholder, industry and academia consultations and collaboration on RPAS technology and counter measure related issues</li> </ul>
Training	<ul style="list-style-type: none"> <li>• Minimal training standards exist and evolve in support of RPAS operations</li> <li>• RPAS training is standards and best practices-based and is affordable and available to all regions</li> <li>• Training standards, requirements and courses are tailored to the usage of RPAS by diverse stakeholders</li> </ul>
Usage and Familiarity	<ul style="list-style-type: none"> <li>• Secure, safe and widespread use of RPAS is common in all regions</li> <li>• Harsh environmental conditions have minimal impact on RPAS operations</li> <li>• BVLOS Operations are approved and regulated</li> <li>• RPAS data is expected and accepted for evidence in legal proceedings</li> <li>• PS/EM stakeholder knowledge and acceptance of RPAS is high</li> <li>• Industry and academia RPAS research and development is guided by stakeholder use cases and requirements</li> <li>• RPAS technologies allow for extended flight times, increased payloads and a full range of capabilities</li> </ul>

## Section 3: Case for Change and Action Plan

### 3.1 Case for Change

The commitment of Public Safety and Emergency Management Stakeholders to optimize the use of RPAS in Canada is motivated by the following case for change:

- RPAS technology offers a very useful set of capabilities that can fill current capability gaps;
- RPAS use will further increase public safety, enhance emergency response and help optimize the use of personnel (avoid unnecessary “dull, dirty and dangerous” work), and regulate to avoid misuse/illegal use;
- There is significant scope to reduce costs for complex and large area operations and investigations; and
- PS/EM stakeholders are well positioned to influence research/development of RPAS to meet their needs.

### 3.2 Action Plan

An initial Action Plan reflecting defined priority initiatives is captured in Table 3. Key stakeholders will provide the necessary leadership to initiate the Action plan however resourcing the full Action Plan may prove a considerable challenge. Accordingly, the overall Action Plan will be fluid and flexible and progress will be contingent on the availability of the necessary resources to address established priorities.

**Table 3 : RPAS Action Plan**

Strategy Element	Action Items
<b>Governance and Stakeholder Engagement– Outcome:</b> A formal, representative and sustainable governance structure exists to support the RPAS stakeholder community and common interests.	
Governance and Stakeholder Engagement	1.1. Present the RPAS Strategic Framework to the Canadian Tri-Services Emergency Management Committee for support moving forward
	1.2. Apply for funding to build awareness, support & organizational champions
	1.3. Identify a national RPAS coordinator
	1.4. Develop an outreach program to reach key stakeholders
	1.5. Establish an RPAS governance: structure to support and coordinate RPAS related activities. (Seek initial guidance from the Canadian Tri-Services Emergency Management Committee and explore the CITIG model)
<b>Legislation and Regulations – Outcome:</b> RPAS legislation and regulations align with user requirements with due regard for security, safety and privacy	
Legislation and Regulations	2.1 Coordinate and provide feedback to the Transport Canada Notice of Proposed Amendment (NPA) relating to RPAS
	2.2 Establish clearly defined requirements for national EM and PS RPAS use (privacy, use, etc.)
	2.3 Establish a central repository for information and templates (SFOC, applications, training, etc.) (Consider Unmanned Systems Canada and CITIG models)
	2.4 Establish a national policy for RPAS and related guidelines

<b>Information Management – Outcome:</b> RPAS data and information sharing is guided by standards, national policies, and best practice-based procedures, RPAS data can be shared and accessed by authorized stakeholders		
Information Management	3.1	Establish a more formal Linkage/representation with CITIG re: 700 MHz opportunities
	3.2	Establish national RPAS standards/benchmarks for data collection and use (report, record, sharing, format, metadata, etc.)
	3.3	Establish a central brokerage/portal for sharing information between different RPAS users and stakeholders
<b>Standard Operating Procedures and Standards – Outcome:</b> RPAS operations are guided by standards, national policies, and best practice-based SOPs		
SOPs and Standards	4.1	Establish a committee/group to collect, process & produce procedures and standards based on best practices
	4.2	Establish an agreement(s) between key RPAS stakeholders for sharing information
	4.3	Establish a competition for RPAS teams/operators to support SOP/standard development
	4.4	Establish a multi-stakeholder group to build the framework for RPAS use standardization
	4.5	Identify resource/funding sources to develop common standards
	4.6	Share available frameworks, tools & updates for comment, feedback & upgrades
<b>Technology and Counter Measures – Outcome:</b> Canada is a leader in the use of increasingly capable RPAS technology in support of PS and EM operations. Appropriate, effective and approved counter measures are available to PS/EM stakeholders		
Technology and Counter Measures	5.1	Strive towards secure, efficient, real-time HD streaming capability
	5.2	Establish a “voice” to communicate RPAS needs/requirements to industry (UAV/RPAS)
	5.3	Support R&D at the university/college level and facilitate a “discussion group” for researchers
	5.4	Establish an RPAS research forum to help researchers become more aware of and connected with others doing research
	5.5	Conduct formal and targeted Counter Measure (CM) research, development & testing
	5.6	Define the CM problem to help guide research & development efforts



<b>Training – Outcome:</b> Minimal training standards exist and evolve in support of RPAS operations. RPAS training is standards and best practices based and is affordable and available to all regions.		
Training	6.1	Establish training programs and material based on best practices and safe operations for public safety & EM use
	6.2	Encourage end users to continue with upgrading training once available through formal and accredited training institutions
	6.3	Establish a database/list of endorsed/accredited training providers
<b>Usage and Familiarity – Outcome:</b> Secure, safe and widespread use of RPAS in support of PS and EM operations is common in all regions		
Usage	7.1	Catalogue current systems and capabilities
	7.2	Identify private service providers who are authorized and can deploy RPAS in support of EM and PS operations
	7.3	Engage stakeholders & forums to encourage regulators to act on policy recommendations that support increasingly capable RPAS usage
	7.4	Adopt regulations for BVLOS operations
	7.5	Encourage industry to focus R&D on increased flight times (e.g. consider the size and life of batteries for ease of transport)

For ease of reference, an RPAS-based “gameboard” is depicted at Annex A and the RPAS Strategy at a Glance is provided at Annex B. All RPAS related action items are captured in Annex C in an Action Plan Management Table.

## Section 4: Strategy Maintenance

This Strategy is considered a living document that will be updated annually as part of a continuous cycle of strategic business planning by the PS and EM RPAS stakeholders. It will evolve on an annual basis in step with the stakeholder priorities and operational requirements to contribute to achieving and maintaining the RPAS vision for public safety and emergency management usage.

***Canada is a leader in the use of increasingly capable Remotely Piloted Air Systems (RPAS) in support of public safety and emergency management. Secure, safe and widespread use of RPAS is common in all regions and is enabled by collaboration, regulations, standards, ongoing research and technical innovation, and public confidence.***

## Annex A – Gameboard

<p><b>Background Information/Influencers</b></p> <ul style="list-style-type: none"> <li>Transport Canada Regulations</li> <li>Privacy Requirements and Studies</li> <li>Canadian Community Safety Information Management Strategy &amp; data standards</li> <li>Recent operational success with the use of RPAS for investigative support and search and rescue operation</li> <li>Ongoing research &amp; development leading to increasingly capable RPAS solutions</li> <li>Unmanned Systems Canada and CITIG support</li> </ul>	<p><b>Current State</b></p> <p><b>Governance and Stakeholder Engagement</b></p> <ul style="list-style-type: none"> <li>Limited formal governance exists to promote and address RPAS related concerns and requirements and as a result RPAS use is not standardized/optimized</li> <li>Key stakeholders (to include Transport Canada) are working collaboratively (albeit informally in many cases) to address RPAS related issues/opportunities</li> <li>Unmanned Systems Canada is a recognized voice on RPAS related issues</li> </ul> <p><b>Legislation and Regulations</b></p> <ul style="list-style-type: none"> <li>RPAS operations adhere to the established legislative and regulatory framework established by Transport Canada (SFOC Process), NavCan and Industry Canada.</li> <li>Amendments are pending to the framework for the use of RPAS/Unmanned Air Vehicles (See Transport Canada Notice of Proposed Amendment)</li> <li>Legislation and regulations struggle to keep pace with technical changes, PS/EM requirements/expectations, and security, privacy and safety requirements</li> <li>There are few regulations/enforceable limitations governing the appropriate use of personal RPAS</li> </ul> <p><b>Information Management</b></p> <ul style="list-style-type: none"> <li>Data formats are not standardized</li> <li>Information sharing and access is limited and influenced by real and perceived constraints associated with security and privacy</li> <li>RPAS information management and sharing practices are not be addressed at a PS/EM community level</li> <li>Real time/near real time data access capabilities are limited but improving</li> </ul> <p><b>Standard Operating Procedures and Standards</b></p> <ul style="list-style-type: none"> <li>There are no national/standardized SOPs for RPAS use</li> <li>RPAS use and technology development is not currently guided by established standards (technology, data, use, training)</li> </ul> <p><b>Technology and Counter Measures (CM)</b></p> <ul style="list-style-type: none"> <li>Highly capable technology exists and is available for Public Safety and Emergency Management functions</li> <li>Current RPAS technology does not fully meet PS/EM requirements i.e. sensors, payload, range, 3D awareness, data formats</li> <li>Current RPAS counter measures are limited and present a very real threat to PS/EM RPAS operations</li> </ul> <p><b>Training</b></p> <ul style="list-style-type: none"> <li>The are no formal national standards for RPAS training for users and support personnel</li> </ul> <p><b>Usage and Familiarity</b></p> <ul style="list-style-type: none"> <li>Current uses include collision reconstruction, search and rescue, monitoring and forensic analysis support</li> <li>RPAS use (rotary and fixed wing platforms) is gaining in popularity as a highly capable and affordable technology in support of Public Safety and Emergency Management operations (to include use in the Critical Infrastructure sectors)</li> <li>Use is governed by Transport Canada however current restrictions limit the potential of RPAS capabilities (use near airports, BVLOS/RPAS Users are committed to deploying safe and secure BVLOS systems in support of PS and EM operations)</li> </ul>	<p><b>National Strategy for the Operational Use of Public Safety and Emergency Management Remotely Piloted Air Systems</b></p> <p><b>Case for Change</b> – What are the risks of the status quo? Why should we make this a priority?</p> <ul style="list-style-type: none"> <li>RPAS technology offers a very useful set of capabilities that can fill current capability gaps</li> <li>RPAS use will further increase public safety, enhance emergency response and help optimize the use of personnel - avoid unnecessary “dull, dirty and dangerous” work and regulate to avoid misuse/illegal use</li> <li>Significant scope to reduce costs for complex and large area operations and investigations</li> <li>PS/EM stakeholders are well positioned to influence research/development of RPAS</li> </ul>	<p><b>Vision</b></p> <p>Canada is a leader in the use of increasingly capable Remotely Piloted Air Systems (RPAS) in support of public safety and emergency management.</p> <p>Secure, safe and widespread use of RPAS is common in all regions and is enabled by collaboration, regulations, standards, ongoing research and technical innovation, and public confidence.</p>	<p><b>Strategy – How will we get there? 2015 to 2020.....</b></p> <p><b>Governance and Stakeholder Engagement</b></p> <ul style="list-style-type: none"> <li>Present the RPAS Strategic Framework to the Canadian Tri-Services Emergency Management Committee</li> <li>Establish a RPAS governance: structure to support and coordinate RPAS related activities.</li> </ul> <p><b>Legislation and Regulations</b></p> <ul style="list-style-type: none"> <li>Coordinate and provide feedback to the Transport Canada NPA relating to RPAS</li> <li>Establish a national policy for RPAS and related guidelines</li> </ul> <p><b>Information Management</b></p> <ul style="list-style-type: none"> <li>Establish national RPAS standards/ benchmarks for data collection and use</li> <li>Establish a central brokerage/portal for sharing information between different RPAS users and stakeholders</li> </ul> <p><b>Standard Operating Procedures and Standards</b></p> <ul style="list-style-type: none"> <li>Establish a committee/ group to collect, process &amp; produce procedures and standards based on best practices</li> <li>Establish a multi-stakeholder group to build the framework for RPAS use standardization</li> </ul> <p><b>Technology and Counter Measures (CM)</b></p> <ul style="list-style-type: none"> <li>Strive towards secure, efficient, real-time HD streaming capability (UAV/RPAS)</li> <li>Establish a “voice” to communicate RPAS needs/requirements to industry</li> <li>Support R&amp;D at the university/college level</li> <li>Conduct formal and targeted Counter Measure (CM) research, development &amp; testing</li> </ul> <p><b>Training</b></p> <ul style="list-style-type: none"> <li>Establish training programs and material based on best practices and safe operations for PS/EM use</li> <li>Establish a database/list of endorsed/accredited training providers</li> </ul> <p><b>Usage and Familiarity</b></p> <ul style="list-style-type: none"> <li>Catalogue current systems and capabilities</li> <li>Adopt regulations for BVLOS operations (BVLOS)</li> <li>Encourage industry to focus R&amp;D on increased flight times</li> </ul>	<p><b>Future State Objectives</b></p> <p><b>Governance and Stakeholder Engagement</b></p> <ul style="list-style-type: none"> <li>A formal, representative and sustainable governance structure exists to support the RPAS stakeholder community and common interests.</li> <li>The governance framework is viewed as a recognized champion and leader</li> <li>The RPAS governance structure promotes and support stakeholder outreach</li> <li>The RPAS governance structure has a well-established network of partners</li> </ul> <p><b>Legislation and Regulations</b></p> <ul style="list-style-type: none"> <li>RPAS legislation and regulations align with user requirements with due regard for security, safety and privacy</li> <li>The PS/EM RPAS community is well informed and actively participates in the Transport Canada Notice of Proposed Amendment process</li> <li>Legislation and regulations support safe, secure and appropriate use for personal RPAS</li> </ul> <p><b>Information Management</b></p> <ul style="list-style-type: none"> <li>RPAS data and information sharing is guided by standards, national policies, and best practice based procedures</li> <li>RPAS data can be shared and accessed by authorized stakeholders</li> <li>RPAS data is securely stored, accessed and shared</li> </ul> <p><b>Standard Operating Procedures and Standards</b></p> <ul style="list-style-type: none"> <li>RPAS operations are guided by standards, national policies, and best practice based SOPs</li> <li>SOPs and related documents are available through a central portal/repository</li> </ul> <p><b>Technology and Counter Measures (CM)</b></p> <ul style="list-style-type: none"> <li>RPAS research and development is based on established standards</li> <li>Canada is a leader in the use of increasingly capable RPAS technology in support of PS and EM operations</li> <li>Appropriate and tailored technologies are available to meet user requirements</li> <li>RPAS development efforts are standards based/support information sharing</li> <li>RPAS are capable of operating in harsh and adverse environmental conditions</li> <li>Appropriate, effective and approved counter measures are available to PS/EM stakeholders to mitigate risks from unauthorized and illegal use of RPAS within a tiered and layered defence strategy</li> <li>Appropriate forums exist to facilitate RPAS stakeholder, industry and academia consultations and collaboration on RPAS technology and counter measure related issues</li> </ul>	<p><b>Challenges (What will make this difficult?)</b></p> <p><b>Barriers (What can get in our way?)</b></p> <p><b>Challenges</b></p> <ul style="list-style-type: none"> <li>Lack of stakeholder consensus on needs and standards (Stakeholder resistance)</li> <li>Pace of technical change and ability for regulations to keep pace (timely and informed contributions to the NPA process)</li> <li>Establishing and maintaining effective security and privacy</li> <li>Establishing and maintaining public confidence and support</li> </ul> <p><b>Barriers</b></p> <ul style="list-style-type: none"> <li>Resources for sustainable governance and program support</li> <li>New and/or sustainable funding for RPAS operations</li> <li>Limited Canadian market for PS/EM RPAS use (industry responsiveness)</li> <li>Balancing operational use with public safety (risk and mitigation use cases)</li> <li>Approval for BVLOS operations</li> </ul>	<p><b>Training</b></p> <ul style="list-style-type: none"> <li>Minimal training standards exist and evolve in support of RPAS operations</li> <li>RPAS training is standards and best practices based and is affordable and available to all regions</li> </ul> <p><b>Usage and Familiarity</b></p> <ul style="list-style-type: none"> <li>Secure, safe and widespread use of RPAS is common in all regions</li> <li>Harsh environmental conditions have minimal impact on RPAS operations</li> <li>BVLOS operations are approved and regulated</li> <li>RPAS technologies allow for extended flight times, increase payloads and a full range of capabilities</li> </ul>
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## Annex B - Strategic Framework

## National Strategy for the Operational Use of Public Safety and Emergency Management Remotely Piloted Air Systems

## VISION

Canada is a leader in the use of increasingly capable Remotely Piloted Air Systems (RPAS) in support of public safety and emergency management.

Secure, safe and widespread use of RPAS is common in all regions and is enabled by collaboration, regulations, standards, ongoing research and technical innovation, and public confidence.

## Strategic Objectives and Initiatives

Governance and Stakeholder Engagement	Legislation and Regulations	Information Management	SOPs and Standards	Technology and Counter Measures	Training	Usage and Familiarity
<ul style="list-style-type: none"> <li>Present the RPAS Strategic Framework to the Canadian Tri-Services Emergency Management Committee for support moving forward</li> <li>Apply for funding to build awareness, support &amp; organizational champions</li> <li>Identify a national RPAS coordinator</li> <li>Develop an outreach program to reach key stakeholders</li> <li>Establish an RPAS governance structure to support and coordinate RPAS related activities. (Seek initial guidance from the Canadian Tri-Services Emergency Management Committee and explore the CITIG model)</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate and provide feedback to the Transport Canada Notice of Proposed Amendment (NPA) relating to RPAS</li> <li>Establish clearly defined requirements for national EM and PS RPAS use (privacy, use, etc.)</li> <li>Establish a central repository for information and templates (SFOCs, applications, training, etc.) (Consider Unmanned Systems Canada and CITIG models)</li> <li>Establish a national policy for RPAS and related guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Establish a more formal linkage/representation with CITIG re: 700 MHz opportunities</li> <li>Establish national RPAS standards/benchmarks for data collection and use (report, record, sharing, format, metadata, etc.)</li> <li>Establish a central brokerage portal for sharing information between different RPAS users and stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>Establish a committee/ group to collect, process &amp; produce procedures and standards based on best practices</li> <li>Establish an agreement(s) between key RPAS stakeholders for sharing information</li> <li>Establish a competition for RPAS teams/operators to support SOP/standard development</li> <li>Establish a multi-stakeholder group to build the framework for RPAS use</li> <li>Identify resource/funding sources to develop common standards</li> <li>Share available frameworks, tools &amp; updates for comment, feedback &amp; upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Strive towards secure, efficient, real-time HD streaming capability</li> <li>Establish a "voice" to communicate RPAS needs/requirements to industry (UAV/RPAS)</li> <li>Support R&amp;D at the university/college level and facilitate a "discussion group" for researchers</li> <li>Establish an RPAS research forum to help researchers become more aware of and connected with others doing research</li> <li>Conduct formal and targeted Counter Measure (CM) research, development &amp; testing</li> <li>Define the CM problem to help guide research &amp; development efforts</li> </ul>	<ul style="list-style-type: none"> <li>Establish training programs and material based on best practices and safe operations for PS &amp; EM use</li> <li>Encourage end users to continue with upgrading training once available through formal and accredited training institutions</li> <li>Establish a database/list of endorsed/accredited training providers</li> </ul>	<ul style="list-style-type: none"> <li>Catalogue current systems and capabilities</li> <li>Identify private service providers who are authorized and can deploy RPAS in support of EM and PS operations</li> <li>Engage stakeholders &amp; forums to encourage regulators to act on policy recommendations that support increasingly capable RPAS usage</li> <li>Adopt regulations for BVLOS operations</li> <li>Encourage industry to focus R&amp;D on increased flight times (e.g. consider the size and life of batteries for ease of transport)</li> </ul>

## Annex C - Management Table

### National Strategy for the Operational Use of Public Safety and Emergency Management Remotely Piloted Air Systems

#### Action Plan Management Table

**Vision:** Canada is a leader in the use of increasingly capable Remotely Piloted Air Systems (RPAS) in support of public safety and emergency management. Secure, safe and widespread use of RPAS is common in all regions and is enabled by collaboration, regulations, standards, ongoing research and technical innovation, and public confidence.

Strategy Element	Action Plan	Status	Lead	Milestones	Notes
<b>Governance and Stakeholder Engagement</b>	Present the RPAS Strategic Framework to the Canadian Tri-Services Emergency Management Committee (CTSEMC) for support moving forward	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Governance and Stakeholder Engagement</b>	Establish an RPAS governance structure to support and coordinate RPAS related activities. (Seek initial guidance from the CTSEMC and explore the CITIG model)	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Governance and Stakeholder Engagement</b>	Apply for funding to build awareness, support & organizational champions	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Governance and Stakeholder Engagement</b>	Identify a national RPAS coordinator	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Governance and Stakeholder Engagement</b>	Develop an outreach program to reach key stakeholders	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Legislation and Regulations</b>	Coordinate and provide feedback to the Transport Canada Notice of Proposed Amendment (NPA) relating to RPAS	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	

# National Strategy for the Operational Use of Public Safety and Emergency Management Remotely Piloted Air Systems

Strategy Element	Action Plan	Status	Lead	Milestones	Notes
Legislation and Regulations	Establish clearly defined requirements for national EM and PS RPAS use (privacy, use, etc.)	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
Legislation and Regulations	Establish a central repository for information and templates (SFOCs, applications, training, etc.) Consider Unmanned Systems Canada and CITIG models	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
Legislation and Regulations	Establish a national policy for RPAS and related guidelines	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
Information Management	Establish a more formal linkage/representation with CITIG re: 700 MHz opportunities	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
Information Management	Establish national RPAS standards/ benchmarks for data collection and use (report, record, sharing, format, metadata, etc.)	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
Information Management	Establish a central brokerage/portal for sharing information between different RPAS users and stakeholders	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
Standard Operating Procedures and Standards	Establish a committee/ group to collect, process & produce procedures and standards based on best practices	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
Standard Operating Procedures and Standards	Establish an agreement(s) between key RPAS stakeholders for sharing information	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
Standard Operating Procedures and Standards	Establish a competition for RPAS teams/ operators to support SOP/standard development	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
Standard Operating Procedures and Standards	Establish a multi-stakeholder group to build the framework for RPAS use standardization	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/>	TBD	TBD	

# National Strategy for the Operational Use of Public Safety and Emergency Management Remotely Piloted Air Systems

Strategy Element	Action Plan	Status	Lead	Milestones	Notes
		Deferred/Not Approved: <input type="checkbox"/>			
<b>Standard Operating Procedures and Standards</b>	Identify resource/funding sources to develop common standards	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Standard Operating Procedures and Standards</b>	Share available frameworks, tools & updates for comment, feedback & upgrades	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Technology and Counter Measures</b>	Strive towards secure, efficient, real-time HD streaming capability	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Technology and Counter Measures</b>	Establish a “voice” to communicate needed requirements to industry (UAV/RPAS)	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Technology and Counter Measures</b>	Support R&D at university/college level: facilitate a “discussion group” for researchers	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Technology and Counter Measures</b>	Become more aware of/connect with others doing research	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Technology and Counter Measures</b>	Conduct CM development & testing (CSSP support?)	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Technology and Counter Measures</b>	Define the problem: help to guide research & development	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Training</b>	Establish training programs and material based on best practices and safe operations for public safety & EM use	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	



## National Strategy for the Operational Use of Public Safety and Emergency Management Remotely Piloted Air Systems

Strategy Element	Action Plan	Status	Lead	Milestones	Notes
<b>Training</b>	Encourage end users to continue with upgrading training once available through formal and accredited training institutions	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Training</b>	Establish a database/list of endorsed/accredited training providers	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Usage and Familiarity</b>	Engage stakeholders & forums to push (work with) regulators to act on policy recommendations	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Usage and Familiarity</b>	Adopt regulations for BVLOS operations	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	
<b>Usage and Familiarity</b>	Encourage industry to consider the size of batteries for ease of transport	Draft/Under Review: <input checked="" type="checkbox"/> Approved: <input type="checkbox"/> Deferred/Not Approved: <input type="checkbox"/>	TBD	TBD	

## Annex D - Definitions, Acronyms and References

### RPAS Related Definitions

**Control Station** – the facilities and/or equipment remote from the remotely piloted aircraft from which the aircraft is controlled and/or monitored.

**First Person View Device** – a device that generates and transmits a streaming video image to a ground station display or monitor, giving the RPAS pilot who is viewing this video, the illusion of actually flying the RPAS from an onboard pilot perspective.

**Fly-away** – an interruption or loss of the command and control link where the pilot is unable to affect control of the aircraft and the aircraft is no longer following its preprogrammed procedures; resulting in the RPAS not operating in a predictable or planned manner.

**Lost Link** – the loss of command and control link contact with the RPAS such that the pilot can no longer manage the aircraft's flight.

**Payload** – all elements of the aircraft that are not necessary for flight but are carried for the purpose of fulfilling specific mission objectives. This may include sub-systems such as intelligence and surveillance assets, communication relay equipment, sensors, cargo and cameras.

**Sense and Avoid** – the capability to see, sense or detect, conflicting traffic or other hazards and take appropriate action.

**Visual Line of Sight (VLOS)** – unaided (corrective lenses and/or sunglasses exempted) visual contact with the aircraft sufficient to be able to maintain operational control of the aircraft, know its location, and be able to scan the airspace in which it is operating to decisively see and avoid other air traffic or objects.

### Communications Interoperability Related Definitions

**Operability** - The ability of emergency personnel to establish and sustain communications in support of mission operations (CISC January 2011)

**Interoperability** - The ability of emergency personnel to communicate between jurisdictions, disciplines, frequency bands, and levels of government, as needed and as authorized (CISC January 2011). System operability is required for system interoperability.

**Continuity of Communications** - The ability of emergency response agencies to maintain communications in the event of damage to, or destruction of, the primary infrastructure (CISC January 2011)

**Tactical Interoperable Communications** - The rapid provision of on-scene, incident based, mission critical voice and data communications among all first-responder agencies (EMS, fire and law enforcement), as appropriate for the incident, and in support of the incident command system

in place (SAFECON)

**Inter-disciplinary** - Involving emergency response providers from different disciplines (e.g., police, fire, EMS)

**Inter-jurisdiction** - Involving emergency response providers from different jurisdictions (e.g., across municipalities, regional boundaries, provincial boundaries)

**Emergency Communications** - Means and methods for transmitting and receiving information necessary for successful incident management, when needed and as authorized

### RPAS Related Acronyms

ATC	Air Traffic Control
BVLOS	Beyond Visual Line of Sight
CARs	Canadian Aviation Regulations
FPV	First Person View
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
KM	Kilometre
MAAC	Model Aeronautics Association of Canada
MTOW	Maximum Take-off Weight
NM	Nautical Mile
NPA	Notice of Proposed Amendment
RPA	Remotely Piloted Aircraft
RPAS	Remotely Piloted Aircraft System
SFOC	Special Flight Operations Certificate
UA	Unmanned Aircraft
UAS	Unmanned Aircraft System
UAV	Unmanned Air Vehicle
VLOS	Visual Line-of-Sight

## References

### Transport Canada:

[http://www.tc.gc.ca/eng/civilaviation/regserv/cars/part6-standards-623d2-2450.htm?WT.mc\\_id=1vccl](http://www.tc.gc.ca/eng/civilaviation/regserv/cars/part6-standards-623d2-2450.htm?WT.mc_id=1vccl)

[http://www.tc.gc.ca/eng/civilaviation/standards/general-recavi-uav-2265.htm?WT.mc\\_id=1zfhj#safety](http://www.tc.gc.ca/eng/civilaviation/standards/general-recavi-uav-2265.htm?WT.mc_id=1zfhj#safety)

Unmanned Systems Canada (USC): [Canadian Civil UAS Study](#)

### Privacy Commissioner:

[https://www.priv.gc.ca/information/research-recherche/2013/drones\\_201303\\_e.pdf](https://www.priv.gc.ca/information/research-recherche/2013/drones_201303_e.pdf) Drones in Canada - Will the proliferation of domestic drone use in Canada raise new concerns for privacy? Report prepared by the Research Group of the Office of the Privacy Commission of Canada March 2013

### United Nations:

<https://docs.unocha.org/sites/dms/Documents/Unmanned%20Aerial%20Vehicles%20in%20Humanitarian%20Response%20OCHA%20July%202014.pdf>