



CANADIAN AVIATION REGULATIONS ADVISORY COUNCIL (CARAC)

**NOTICE OF PROPOSED AMENDMENT (NPA):
UNMANNED AIR VEHICLES**

EXECUTIVE SUMMARY

- The rising sales and evolving technology of unmanned air vehicles (UAVs) 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 UAVs into Canada's airspace.
- Transport Canada has a permissive regulatory framework that accommodates UAV operations by issuing Special Flight Operation Certificates (SFOCs). In 2010, Transport Canada established a joint industry and federal government working group to develop recommendations for regulatory changes, many of which are among the proposed changes of this document. The working group continues to develop regulatory recommendations for beyond visual line-of-sight operations.
- Transport Canada seeks a balanced approach to both safely integrate UAVs into Canadian airspace and encourage innovation within this important new subsector of civil aviation. At the same time, it is important to recognize the unique risks UAVs and UAV users of varying degrees of aviation expertise, pose to other airspace users. Transport Canada must develop Canada's future regulatory framework to be risk-based, flexible, and consistent with international partners, where appropriate.
- In 2016, Transport Canada intends to introduce regulatory requirements for UAVs 25kgs or less that are operated within visual line-of-sight. The proposed regulatory amendments are intended to ensure the safe and reliable operation of UAVs in Canadian airspace and will:
 - establish classifications including a proposal for the possibility of having a very small (lower threshold) category of aircraft;
 - clarify terminology;
 - establish aircraft marking & registration requirements;
 - address personnel licensing & training; and
 - create flight rules
- Transport Canada also intends to preserve the SFOC process to focus on higher risk operations, including UAVs larger than 25kgs and those operated beyond visual line-of-sight.

BACKGROUND

Note: While manufacturers and media may use different terms when describing a remotely controlled aircraft, this document uses the term Unmanned Air Vehicles (UAVs).

- Transport Canada regulates the use of all aircraft, manned or unmanned, to keep the public, the aviation community, and Canada's airspace safe. UAV users are considered pilots and as such, are legitimate airspace users. With this privilege come responsibilities. The *Canadian Aviation Regulations* establishes the framework in which they can operate. The *Canadian Aviation Regulations* 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),



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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 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 UAV operations in Canada, and
 - assess the risks of individual UAV operations on a case-by-case basis.

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

- To accommodate the industry's exponential growth, Transport Canada adopted an interim strategy. In November 2014, Transport Canada issued two exemptions to the SFOC requirements and guidance material for lower risk UAVs operating within specific conditions and weighing 25kgs or less.

Note: Individuals wishing to operate a UAV weighing more than 25kgs, or operate in higher risk environments must still apply through the SFOC process.

- These exemptions are valid until December 2016, as they are meant to be a temporary solution, while Transport Canada works to:
 - introduce more rigorous safety requirements,
 - create greater awareness of the legal responsibilities of UAV operators and
 - mitigate the risks these UAVs could pose to other airspace users, as well as people and property on the ground.
- This new and rapidly evolving industry introduces regulatory challenges. This is why Transport Canada:
 - may have to adjust new regulations in a few years to account for new technologies and market demands.
 - will use both regulatory and non-regulatory instruments to enhance awareness, and
 - collaborate with key industry partners.

Additional Public Environment Analysis

- A growing number of people in Canada are flying aircraft that, by design, are flown without a pilot on board and controlled using remote control devices such as a phone or a tablet. There are hundreds of known models of UAVs available on the market by a variety of retailers and manufacturers, including custom kits and modified UAVs.



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- Currently, two organizations represent the UAV 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 UAVs 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 Unmanned Systems Canada (USC) update of the [Canadian Civil UAS Study](#) indicates that the dollar value of the Canadian UAV 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 UAV 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 UAVs 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 UAV research and development activities, as well as a growing number of training schools offering courses in UAV piloting skills influenced by Transport Canada guidance material and industry needs. Canadian universities currently focus on exploring new UAV 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 UAV engineering and pilot training. Transport Canada recognizes the role of academic institutions as an additional area of growth for the UAV industry.
- There have been several reports of reckless and negligent UAV use (for example near airports or at high altitudes). Since 2010, Transport Canada has launched 50 investigations across the country into incidents involving UAVs.
- Transport Canada will continue to work with the Office of the Privacy Commissioner to emphasize the applicability and role of Canada's privacy laws to the operations of UAVs by public and private sector organizations. The Privacy Commissioner's March 2013 report titled "[Drones in Canada: will the proliferation of domestic drone use in Canada raise new concerns for privacy?](#)" indicates that as more people buy and use UAVs, it will be important to:
 - balance the use of UAVs within an accountability structure; and
 - put the necessary checks and balances in place.

In October 2014, Transport Canada launched a national safety awareness campaign for UAVs, which helps Canadians better understand the risks and responsibilities of flying UAVs.



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STATEMENT OF THE PROBLEM, POLICY CONSIDERATIONS AND ANALYSIS

- Under the current framework, model aircraft are:
 - excluded from most Canadian Aviation Regulations that Transport Canada applies to manned aircraft; and
 - required to operate in a manner that is not a risk to aviation safety.
- Greater availability of UAVs, widespread public recreational use, and growing numbers of commercial users from outside of the traditional aviation industry, has created a growing community of novice pilots who:
 - might not be aware of the requirements when flying a UAV;
 - think they are modellers; and/or
 - may not have the requisite knowledge to operate a UAV safely.
- A lack of aviation knowledge may lead to operating a UAV in a situation or environment where it would pose a higher risk to aviation safety. In addition, a UAV 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.
- Transport Canada applies the principles of risk management to maintain an effective level of oversight over its civil aviation activities. The risks involved in UAV operations are defined by the likelihood and severity of a UAV 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 a UAV through appropriate regulation of the UAV 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 UAV 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 UAV operations with the highest level of risk.
- There is growing potential for UAV's in a variety of commercial activities. As such, Transport Canada will need to consider trade-related implications of UAV use.

INTERNATIONAL CONTEXT

- Canada will adopt minimum civil aviation standards established by the International Civil Aviation Organization (ICAO). ICAO established the Unmanned Aircraft Systems (UAS) Study Group (UASSG) in 2007 as a first step in developing an international regulatory framework for the unmanned aviation sector. ICAO serves as a focal point for Canada and other countries to develop a consistent and strategic



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approach to regulatory development for international UAS operations. In 2011, ICAO published [Circular 328](#) on the operational and technical issues with respect to UAV operations in non-segregated airspace and near aerodromes. In March 2015, ICAO published a Manual on Remotely Piloted Aircraft Systems (Doc 10019), which will help Canada and its international partners in ongoing regulatory development.

- In February 2015, the U.S. Federal Aviation Administration (FAA) published its [Notice of Proposed Rulemaking \(NPRM\) for small UAS](#). Similar to Canada, the NPRM proposes a low category weight threshold for UAVs with less restrictive operating rules that are consistent with the lower risk of this weight category to airspace users and persons and property on the ground. Transport Canada intends to work with the FAA to align, to the extent practical, their respective regulatory frameworks to facilitate cross border trade for the UAV industry.
- The [Association for Unmanned Vehicle Systems International](#) commissioned a report titled [The Economic Impact of Unmanned Aircraft Systems Integration in the United States](#). The study concluded that the economic impact of integrating UAVs into the United States (U.S.) national airport system between 2015 and 2025 will likely contribute \$82.1 billion to the U.S. economy through agriculture, public safety and other activities. In addition, this emerging industry will likely lead to creating 103,776 new jobs, with 844,741 job years worked over the time period.
- Canada is engaged with the United States on ongoing regulatory development and the coordination of UAV activities through the Regulatory Cooperation Council (RCC). A Joint Forward Plan announced in August 2014 contains a specific commitment related to UAVs. Specifically, both countries committed to establishing a mechanism to share experiences on regulations related to unmanned aircraft systems, with a view to aligning regulatory approaches, to the extent practical. Following the release of the U.S. NPRM and this NPA, Transport Canada will continue to share with the FAA how we:
 - develop UAV regulations,
 - promote UAV research & development
 - address enforcement and compliance challenges, and
 - collaborate on UAV activities in the Arctic. The Arctic collaboration includes the continued sharing of information through the Arctic Council’s Arctic Monitoring and Assessment Programme UAS Expert Working Group who are working on defining minimum safety and operational requirements and best practices for scientific UAS operations across Arctic countries.
- In March 2015, the European Aviation Safety Agency (EASA) published its proposed new regulatory approach for UAVs or Remotely Piloted Aircraft (RPAS). The report indicated that there are 2,495 operators and 114 RPAS manufacturers of very small to small RPAS with a maximum take-off mass up to 150kgs. Called ‘[Concept of Operations](#)’, the European regulatory approach proposes three categories of operations.
 1. The first category “**open**” would not require an authorisation for the flight but require users to remain within defined boundaries similar to the Canadian exemptions currently in place (for



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example: within visual line-of-sight, at safe distance from aerodromes and from people).

- 2. The second operation category of “**specific**” will require a risk assessment that will lead to an authorisation with specific limits. The EASA specific operations category for UAVs is similar to the current Canadian SFOC process.
- 3. The third operations category is “**certified**” and required for operations with a higher associated risk or might be requested on a voluntary basis by organisations providing services such as remote piloting or equipment such as “detect and avoid”. EASA’s upcoming regulations will not only address safety but also privacy concerns.

- Australia has had a regulatory framework for UAVs in place since 2002; but is moving to align its regulations with international partners and its terminology with ICAO, with a Notice of Proposed Rulemaking. Its current regulatory framework:

- distinguishes between model aircraft and remotely pilot aircraft (RPA, or UAVs).
- requires model aircraft to operate in visual line-of-sight, and in day visual meteorological conditions, and
- restricts model aircraft from flying higher than 400 feet (120 metres), or over populous areas.

Australia defines a UAV as a remotely piloted aircraft of any size for commercial reward, and requires a UAV controller's certificate and an unmanned operator's certificate.

- The United Kingdom’s Civil Aviation Authority (CAA) introduced regulations in 2010 that requires operators of small UAVs used for aerial work, data acquisition, or surveillance to obtain permission before operation. The CAA reviews its permission every 12 months, and requires an assessment of the pilot’s knowledge and ability to operate the UAV; but is not based on a civilian pilot’s licence.

TRIAGE

- The triage statement is still being developed in accordance with the Treasury Board Triage Statement criteria.

RECOMMENDED CONSULTATION STREAM

- In 2006, Transport Canada led a joint industry / government Unmanned Air Vehicle Working Group to review existing legislation and make recommendations for a regulatory framework. The working group published a final report to develop the scope of UAV regulations in Canada with recommendations on:
 - terminology and definitions;
 - aircraft registration & marking;



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- flight crew and maintainer licensing; and
- aircraft maintenance, airworthiness and operations.
- Using the recommendations from the first working group, a second joint industry/government working group was established in 2010. The UAV Systems Program Design Working Group is making recommendations for regulations and standards for the safe integration of UAVs into Canadian airspace. Members are representatives with specialized technical knowledge from:
 - the aviation community;
 - professional associations;
 - system developers;
 - operators;
 - academia; and
 - provincial and federal governments.

The working group was divided into a main working group and three sub-working groups to specifically look at people, products and operations & airspace access. A [Phase I final report was published in March 2012](#) and is available online.

- The UAV Systems Program Design Working Group is still active and will soon complete work on phase II, the operation of small UAVs beyond visual line-of-sight.

Recommended Consultation Stream

- In recognition of the extensive work, efforts and membership of the UAV Systems Program Design Working Group, a Preliminary Issue and Consultation Assessment is not required.
- Transport Canada invites stakeholder comments through this Notice of Proposed Amendment that the department will share with members of the Canadian Aviation Regulation Advisory Council comprised of approximately 570 representatives of aviation associations, airlines, manufacturers, maintenance organizations, airports, provincial and federal departments, foreign aviation safety authorities and unions.
- In recognition that the target audience for this consultation is broader than the aviation industry, Transport Canada also invites members of the public to comment. Transport Canada will:
 - publicize this NPA on its social media channels (Twitter and Facebook).
 - consider comments as it proceeds with drafting the amendments to the regulations and standards.
- Transport Canada will then publish proposed regulations in the *Canada Gazette*, where stakeholders and Canadians will have the opportunity to provide additional comments.



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OBJECTIVE

- The primary objective of these proposed amendments is to establish a more rigorous risk-based framework that is consistent with Canada’s international partners, where appropriate, for the safe integration of UAVs 25kgs or less in Canada’s airspace for within visual line-of-sight operations.

PROPOSED CHANGES

Note: the intent of this section is not to present suggested wording for the regulations but to present proposed concepts.

ACRONYMS USED IN THIS SECTION

ATC	Air Traffic Control
CARs	<i>Canadian Aviation Regulations</i>
FPV	First Person View
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
KM	Kilometer
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



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DEFINITIONS

The following definitions may help readers understand this Notice of Proposed Amendment (NPA) and could be included in the *Canadian Aviation Regulations*.

Control Station – the facilities and/or equipment remote from the unmanned air vehicle 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 UAV pilot who is viewing this video, the illusion of actually flying the UAV 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 UAV not operating in a predictable or planned manner.

Lost Link – the loss of command and control link contact with the UAV 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.

1. APPLICABILITY

The proposed rules would apply to all operations of unmanned air vehicle (UAV) systems, where the UAV maximum take-off weight (MTOW) is 25kgs or less, hereafter referred to as small UAVs, and the UAV is operated within visual line-of-sight (VLOS). This rulemaking is limited in scope to operations conducted entirely within Canadian domestic airspace. This includes:

- UAVs operated for any purpose, including but not limited to recreational, commercial, business and academia purposes*; and



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- UAVs that are physically tethered (versus electronic tether)**.

NOTES:

**The definition of UAV would change so that it no longer depends on the purpose of the operation. Therefore, this rule would apply to all UAV operations.*

*** These UAVs would also need to meet lighting and marking rules for obstacles found under section [601.23](#) of the Canadian Aviation Regulations.*

This proposed rule encompasses the widest possible range of operations for the proposed UAV categories and this approach uses a regulatory structure similar to manned aircraft operations. It is not intended to be an incremental set of rules that targets a narrow set of operations as was the case in Transport Canada's November 2014 UAV exemptions. Specifically, UAV operations would see a regulation related to risk level.

For example, while:

- a UAV that could cause very limited damage to people, property, and other aircraft in case of incident, would be subject to **lesser regulations**;
- the operation of a heavier, more complex, UAV operations that could cause a greater amount of damage to people, property, and other aircraft in case of incident, would see **additional restrictions** to mitigate the greater risks associated with these operations.

This proposed rule will not apply to the following activities:

- UAV operations that fall outside the scope of the proposed rule (e.g. UAVs greater than 25kgs, UAVs operated beyond visual line-of-sight, etc)*;
- indoor or underground UAV operations;
- autonomous UAVs, where the ability to alter the mission and decisions on the conduct of the mission are made by the UAV system without pilot involvement; and
- kites, rockets or unmanned free balloons

UAVs operated under the authority of the Minister of National Defence, in accordance with the *Aeronautics Act* are also excluded from this proposed rule because these operations do not fall under the jurisdiction of the Minister of Transport.

*UAVs larger than 25kgs are outside of these rules but could continue to be operated with a Special Flight



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Operations Certificate.

2. MODEL AIRCRAFT

The objective of this portion of the proposed rulemaking activity is to define a regulatory approach that will allow traditional modellers to continue to conduct safe flight activities.

While the proposed rule is intended to establish requirements for safely operating UAV systems in Canadian airspace, there is a model aircraft component to this rulemaking activity. The rule proposes to address UAVs used for any and all purposes and intends to provide a “carve-out” for modellers operating within an aeromodelling organization that allows the continued activities (sport/ recreation and competition) that model aircraft enthusiasts have enjoyed for decades. As such, the proposal is to only better define what constitutes a model aircraft and to that end Transport Canada is inviting feedback on the following proposed solutions.

Approach 1: To provide a means to recognize aeromodelling organizations, such as the Model Aeronautics Association of Canada (MAAC), that have a proven safety record, a mature piloting community and provide a well established set of safety guidelines.

For example, persons

- launching model aircraft for recreational purposes who are members in good standing of an aeromodelling organization and operate under its safety guidelines would not be required to meet the requirements of the proposed rule.
- not participating in the safety program established by an aeromodelling organization would no longer be considered to be operating model aircraft and would have to comply with the proposed rule for UAV operations.

Approach 2: Transport Canada may consider model aircraft equipped with a camera payload, excluding first person view (FPV) devices to no longer be a model aircraft, but a UAV, and subject to the UAV rules. The rationale is that persons using the aircraft to take pictures or videos would in fact be conducting surveillance or collecting data, so launching the aircraft for a secondary purpose (e.g. as a flying camera) other than recreational flying only.

Transport Canada is seeking comments on the two proposed options, to include alternative recommendation or a combination of the two approaches listed above.

It remains the objective of this portion of the proposed rulemaking activity to define a regulatory approach that



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will allow the continued safe conduct of the flight activities currently undertaken by traditional modellers.

3. TERMINOLOGY AND DEFINITIONS

The proposed rule would create a new set of terminology and definitions to address the unique aspects of UAVs. This will include amendments to existing terms already in regulation to capture the fact that the pilot is not on-board the aircraft and that the UAV is a system with the physical aircraft being only one component of that system.

The international community is no longer using the term unmanned air vehicle or the acronym, UAV. Therefore, it is proposed that the new terms and definitions will be harmonized, to the extent possible, with the International Civil Aviation Organization (ICAO) Standards and Recommended Practices.

The new terms introduced by ICAO include:

- UA (unmanned aircraft);
- UAS (unmanned aircraft system);
- RPA (remotely-piloted aircraft); and
- RPAS (remotely-piloted aircraft system).

These terms are more appropriate since they designate these “vehicles” as aircraft and recognize that the UAS/RPAS includes not only the airframe but also the associated elements required for flight, such as the control station and command and control links.

Transport Canada proposes to define the term UAS and use the term RPAS for the proposed set of rules. In keeping with the ICAO approach, the term UAS would be an overarching term with RPAS and autonomous unmanned systems being subsets, thereof. RPAS are the focus of this NPA and specifically identify those UAS that permit pilot intervention while autonomous systems capture the notion of those aircraft that do not permit any pilot interaction. Autonomous UAS would be the subject of future regulations.

4. CATEGORIZATION OF THE REGULATORY STRUCTURE

The intent of the proposed regulatory effort is to provide a risk-based regulatory regime that encompasses the widest possible range of small UAV operations. To this end, Transport Canada is seeking comments on establishing categories for various types of operations and/or UAVs, as follows:

Complex Operations with Small UAVs

Operating small UAVs under this category would be considered to be the most challenging as it would occur in and around urban or built-up areas and allow operations close to aerodromes. This category would have the



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most comprehensive set of regulatory requirements which, in turn, would provide for the greatest level of safety and operational flexibility.

Limited Operations with Small UAVs

This category would have less regulatory requirements than complex operations due to their lower-risk profile although would be limited to remote areas. This would result in:

- defining specific geographic limitation around where this category of UAV could operate (e.g. specific distances from aerodromes or built-up areas).
- adding restrictions on the operation to ensure that these UAVs would not encroach on areas where the operation would create a greater risk.

Operations with Very Small UAVs

Transport Canada has considered whether to establish a “*lower threshold*” or very small UAV category that would be regulated to a lesser extent due to its nature and operating environment, and the lowered risk of damage that the aircraft would cause to a person and property on the ground and other airspace users in case of incident.

Transport Canada invites comments on whether it should consider introducing a category for operations with very small UAVs (*lower threshold*) and whether it should base such a category only on weight or consider an alternative approach, such as kinetic energy. Transport Canada issued an Exemption from Sections 602.41 and 603.66 of *Canadian Aviation Regulations*, on November 26, 2014, that addressed persons conducting flight operations using UAVs with a maximum take-off weight not exceeding 2kgs, operated within visual line-of-sight.

Another potential alternative for classifying a Very Small (*lower threshold*) UAV could include the use of a basic table/grid that would compare the UAVs maximum weight and maximum airspeed to determine the lethality of such a *lower threshold* UAV.

The Canadian Aviation Regulations Advisory Council’s UAV Systems Program Design Working Group recommended rulemaking that would separately address a “low energy” category, specifically a UAV that has been analyzed and/or demonstrated, for the case of an uncontrolled impact, to not impart a peak energy of more than $12\text{J}/\text{cm}^2$ on a stationary person or object in the most unfavourable of circumstances. Transport Canada invites stakeholders to submit data that validates this “low energy” classification and outlines a repeatable method to evaluate these aircraft to ensure that they meet the additional criteria of:



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- (a) low mass;
- (b) low maximum speed;
- (c) frangible or energy-absorbing deformable structure;
- (d) small footprint;
- (e) "soft" flight termination recovery;
- (f) no hard massive components; and
- (g) protection against fire.

***Please note:** While Transport Canada would not eliminate a set of operational rules for this lower threshold category of UAV, they would be less burdensome. For example, Transport Canada would not apply the requirement to hold a pilot permit and to mark and register the UAV of this category. Instead, Transport Canada would require pilot training and an aeronautical knowledge test, but would not issue a pilot permit. Additionally, while the aircraft would require identification, it would not be subject to the marking and registration requirements of a small UAV.*

The following proposed regulatory requirements are broken down based on the categories described above.

5. SMALL UAV (COMPLEX OPERATIONS)

UAV Operator Certificate Requirements

Transport Canada proposes to permit the operation of a complex small UAV system without issuing a UAV Operator Certificate. However, to ensure that larger UAV operators with a large span of control and complex operations have an adequate management structure and can conduct a safe operation, some additional regulations may be required. Transport Canada is seeking comments on the following proposal.

UAV operators meeting certain criteria would need to register with Transport Canada before conducting operations. Transport Canada would require these UAV operators to have, consistent with the nature of its operation and commensurate with the size, structure and complexity of the organization:

- an adequate management organization;
- a method of control and supervision of flight operations;
- pilot training programs;
- security procedures;
- a maintenance control system;
- a company operations manual; and
- standard operating procedures.



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Transport Canada is seeking comment on the appropriate criteria for a UAV operator. Criteria it is considering include:

- the number of employees (e.g. more than 3);
- companies who hire persons in commercial UAV enterprises;
- companies with a large scope of operation (i.e. multi-region, across Canada, or large numbers and /or types of aircraft); or
- a combination of the above.

Such a proposal would include rules describing UAV operator responsibilities within the following areas:

- Flight Operations
- Documentation
- Flight Time and Flight Duty Time Limitations
- Emergency Equipment
- Maintenance Requirements
- Personnel Requirements
- Training Programs
- Operations Manual

Aircraft Marking and Registration

For the Small UAV (Complex Operations) category, Transport Canada is proposing:

- to require the aircraft to be marked and registered. Given the diversity of size and configuration of these UAVs, marking specifications (e.g. size of lettering) will be flexible so that the size of the marks will be as large as practical consistent with the size and configuration of the UAV.
- to require persons wanting to register an aircraft to meet the qualifications to be a registered owner of a Canadian aircraft as outlined in section [202.15](#) of the *Canadian Aviation Regulations*.

Note: The Certificate of Registration would not be carried on-board the aircraft, rather the documentation would be accessible by the pilot-in-command during flight operations.

- a unique series of 4 letter registration marks, starting with a specific letter. This will address a variety of unique reporting requirements and provide an easy way to differentiate between manned and unmanned aircraft to support Air Traffic Control (ATC) concerns and practices.



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- to **not require** this category of UAVs to have an aircraft identification plate.

Personnel Licensing and Training

Transport Canada proposes that UAV pilots be considered pilots as defined by the *Aeronautics Act* and the *Canadian Aviation Regulations*. Their responsibilities include ensuring that they obtain proper training and experience in order to safely operate their aircraft within Canadian airspace.

The following additional requirements are being proposed:

Pilot Permit

For the Small UAV (Complex Operations), Transport Canada proposes:

- to require UAV pilots to be properly trained and licensed to assure safe integration within Canadian airspace and hold a pilot permit.
- to issue a pilot permit, versus a pilot licence, as the privileges of the permit would only apply to flight within Canadian domestic airspace.

Specifically, Transport Canada proposes that the following criteria for obtaining a pilot permit:

- **Age** – A minimum age requirement of 14 while under adult supervision and 16 without adult supervision. Transport Canada is seeking comments on whether this proposal is considered appropriate for this type of UAV operation.
- **Medical Fitness** - A Category 4 Medical Certificate would be required, based on a Self-declaration process. It would be valid for 60 months. This is consistent with other Canadian pilot permits.
- **Knowledge** - Pilots would be required to complete a course of instruction in specific aviation knowledge areas and pass a Transport Canada written examination that would be developed specifically for this category of UAV. Training could be provided by a flight training school, a UAV training provider, a third party or be self administered.
- **Experience** - Pilots would need to acquire practical training on the category of UAV, including UAV system-specific training. This training may be provided to the pilot by the manufacturer, operator or by a third party, providing the person providing such training held a UAV pilot permit.
- **Skill** - Pilots would be required to demonstrate competency in the ability to perform normal and emergency procedures appropriate to the particular type of UAV. Skill tests/proficiency checks would be conducted by qualified UAV operators, manufacturers or third parties.
- **Currency** – UAV pilots would be required to maintain currency and proficiency.
- **Privileges** – meeting these criteria and the issuance of a permit, would allow a person to be a pilot-



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in-command of a UAV 25kgs or less, operated within visual line-of-sight within Canadian domestic airspace.

Proposed Content of Knowledge Subject Areas

Below are the proposed knowledge subject areas Transport Canada and industry have developed that a person operating a UAV would require. These include:

- air law and procedures relevant to the permit (e.g. general provisions, general operating and flight rules, air traffic control services and procedures, aviation occurrence reporting);
- airspace (e.g. structure, classification; reporting requirements);
- flight instruments (e.g. altimetry, GPS, airspeed and heading indicators);
- navigation (e.g. aeronautical charts, pre-flight preparation);
- flight operations (e.g. wake turbulence causes, effects and avoidance; data and command links);
- meteorology (e.g. required for visual line-of-sight operations);
- human factors (e.g. aviation physiology, the operating environment, aviation psychology); and
- theory of flight (e.g. basic principles).

Or, as an alternative to the knowledge subject areas above, TP15263E "[Recommended Knowledge Requirements for Pilots of Small Unmanned Air Vehicle Systems, Restricted to Visual Line-of-Sight](#)" could be used as the basis for the knowledge requirements for the pilot of a small UAV.

Transport Canada invites comments on:

- the proposed areas of knowledge to be tested; and
- whether there should be additional knowledge areas added to the proposed list above or whether TP15263E provides the appropriate knowledge areas required for this category of UAV. Candidate testing would follow the examination rules in section [400.02](#) of the *Canadian Aviation Regulations*.

Persons applying for a pilot permit would need to meet the proof of age and citizenship requirements as outlined in section [421.06](#) of the *Personnel Licensing and Training Standards Respecting Flight Crew Permits, Licences and Ratings*.

Transport Canada also proposes that:

- credits for some of the permit provisions would be provided for other holders of permits and licences, including active and retired Canadian Armed Forces pilots. Additionally, documented experience gained through operations with small (limited category) or very small UAVs could be recognized towards the



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requirements for the pilot permit.

- operators of launch systems and arresting hooks, visual observers, payload operators and mission planners will not need licensing certification.

Flight Training

It is proposed that Transport Canada not certify flight training units or schools that provide theoretical or flight training to UAV operators and their crews. This would include schools for any UAV position to include pilots, visual observers and maintenance personnel.

Aircraft Maintenance Engineers

It is proposed that Aircraft Maintenance Engineer licensing would not be required for this category of UAV operating within VLOS. The skill set of an Aircraft Maintenance Engineer is not suited for aircraft of this size.

Airworthiness

It is also proposed that manufacturers of a small UAV (complex operations) system be required to declare that the UAV system meets a design standard for UAV systems for this category. The content of this Standard represents a balance between prescriptive requirements and statements of best design practice. The guiding principle of such a standard would be that the probability of a hazardous failure condition (i.e. one that may result in no more than a single fatality) must not be greater than extremely remote.

The Transport Canada UAV System Program Design Working Group developed a design standard for UAVs, 25kgs or less, operated within visual line-of-sight. For small UAVs (complex operations), it is proposed that the design standard would detail requirements for the following areas:

- Flight Performance
- Structure
- Design and Construction
- Propulsion System
- Systems and Equipment
 - General Function and Installation
 - Flight and Navigation Information
 - High Intensity Radiated Fields Protection
 - Equipment, Systems and Installations
- Navigation Systems
- Sense and Avoid Systems



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- UAV Control
- Launch and Recovery Systems
- Payloads
- Manuals and Documentation

Transport Canada invites comments, particularly from UAV manufacturers, whether compliance with this standard would be achievable and commensurate with the risk posed to people and property on the ground and other airspace users for operations under this proposed rule. Transport Canada is willing to consider that there may be other validated consensus standards from recognized Standards' groups that may be acceptable, so welcomes feedback that identifies any such standards.

While Transport Canada is proposing a design standard for this category of UAV, Transport Canada **would not**:

- require type certificates or production approvals; or
- issue a flight authority (i.e. Certificate of Airworthiness).

***Please note:** The intent of a design standard is to provide an increased level of assurance in the safety of the UAV system. If such a design standard is not published as part of the proposed rulemaking efforts, Transport Canada would need a more restrictive regulatory regime to mitigate the increased risk of operating UAVs, that have not been built to any safety standard, near or over persons and near other aviation activities.*

Aircraft Maintenance Requirements

Transport Canada is proposing that small UAVs be maintained by the owner/operator of the UAV system. General maintenance of these UAV systems would be performed by a person possessing the relevant experience and training on the maintenance of the specific UAV system and authorized by the owner/operator. This approach would be consistent with the risk associated with this category of aircraft.

General Operating and Flight Rules

Transport Canada proposes to impose specific operating limitations to reduce or minimize potential encounters between manned and unmanned aircraft and to protect people and property on the ground. Such limitations would reflect the level of risk associated with a small UAV system (complex operations).

For Small UAVs (complex operations), it is proposed that general **operating rules** covering the following areas would be incorporated;

- always operate within visual line-of-sight through unaided visual contact with the UAV.
- always give way to manned aircraft.



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- never operate in a reckless or negligent manner.
- operate in visual meteorological conditions.
- never operate:
 - within Class A and Class B airspace,
 - within Class F Restricted airspace without required permission,
 - within, or in the vicinity of, a forest fire area,
 - at an air show, or
 - at an aerodrome.

- advance coordination with the air traffic control.
- never operate when suffering from fatigue or under the influence of alcohol or drugs.
- only one UAV operated in flight by a single pilot.
- operate in accordance with the published UAV operating limitations.
- do not allow the use of a portable electronic device at the control station.
- never carry any explosive, corrosive or bio-hazard payloads on a UAV or create a hazard by dropping an object from the UAV.
- ensure visual observers have reliable communication with the pilot and can perform observation duties for only one (1) UAV.
- do not allow visual observers to function from a moving surface vehicle.
- ensure that the UAV System is in an airworthy condition before flight.
- there must be a means of: controlling and monitoring the UAV, navigating, avoiding other aircraft, terrain and obstacles, lighting the aircraft for night operations, remaining clear of clouds.
- require liability insurance.
- always follow a physical and command and control link security plan.
- the need for the UAV to be properly equipped for the area of operation and the type of operation (e.g. radios, transponders, etc)
- get permission from the owner(s) of the property on which the UAV intends to take-off from and/or land on.
- assess the lost link risk before the flight.
- never operate in areas of high electromagnetic interference.
- never take off with snow or ice on the aircraft.
- be familiar with the available information required for the intended flight.
- comply with Air Traffic Control instructions.
- remain clear of the take-off, approach and landing routes and the pattern of traffic formed by manned aircraft operating at the aerodrome.



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- meet specific communications requirements as detailed in the *Canadian Aviation Regulations*.
- notify Air Traffic Control in the case of a UAV fly-away.
- comply with minimum lateral distance requirements from person, animals, buildings, vehicles, etc.
- comply with maximum altitude requirements – not above 400 feet above ground level.
- comply with accident/incident reporting requirements.

6. SMALL UAV (LIMITED OPERATIONS)

UAV Operator Certificate Requirements

Transport Canada proposes to permit the operation of a limited small UAV system without issuing a UAV Operator Certificate. However, to ensure that larger UAV operators with a large span of control and complex operations have an adequate management structure and can conduct a safe operation, some additional regulations may be required. As such, Transport Canada is seeking comments on the following proposal.

UAV operators meeting certain criteria would need to register with Transport Canada before conducting operations. Transport Canada would require these UAV operators to have, consistent with the nature of its operation and commensurate with the size, structure and complexity of the organization:

- an adequate management organization;
- a method of control and supervision of flight operations;
- pilot training programs;
- security procedures;
- a maintenance control system;
- a company operations manual; and
- standard operating procedures.

Transport Canada is seeking comment on the appropriate criteria for a UAV operator. Criteria it is considering include:

- the number of employees (e.g. more than 3);
- companies who hire persons in commercial UAV enterprises;
- companies with a large scope of operation (i.e. multi-region, across Canada, or large numbers and /or types of aircraft); or
- a combination of the above.



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Such a proposal would include rules describing UAV operator responsibilities within the following areas:

- Flight Operations
- Documentation
- Flight Time and Flight Duty Time Limitations
- Emergency Equipment
- Maintenance Requirements
- Personnel Requirements
- Training Programs
- Operations Manual

Aircraft Marking and Registration

Transport Canada is proposing:

- to require small UAVs for limited operations to be marked and registered. Given the diversity of size and configuration of these UAVs, marking specifications (e.g. size of lettering) will be flexible so that the size of the marks will be as large as practical, consistent with the size and configuration of the UAV.
- to require persons wanting to register a small UAV for limited operations to meet the qualifications to be a registered owner of a Canadian aircraft as outlined in section [202.15](#) of the *Canadian Aviation Regulations*.

Note: The Certificate of Registration would not be carried on-board the aircraft, rather the documentation would be accessible by the pilot-in-command during flight operations.

- a unique series of 4 letter registration marks, starting with a specific letter. This will address a variety of unique reporting requirements and provide an easy manner to differentiate between manned and unmanned aircraft to support Air Traffic Control (ATC) concerns and practices.
- to **not require** this category of UAVs to have an aircraft identification plate.

Personnel Licensing and Training

Transport Canada proposes that UAV pilots be considered pilots as defined by the *Aeronautics Act* and the *Canadian Aviation Regulations*. Their responsibilities include ensuring that they obtain proper training and



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experience to safely operate their aircraft within Canadian airspace.

The following is specific to limited operations with small UAVs (Limited Operations) category:

Pilot Permit

Transport Canada proposes:

- to **not require** pilots of the proposed Small UAV (limited operations) category to obtain a pilot permit or medical certificate.
- **to not set a minimum age requirement** for pilots of small UAVs (limited operations), provided they are operating with adult supervision. A minimum age of 16 years is proposed to allow operations without adult supervision. However, these pilots would be required to demonstrate aeronautical knowledge in specific subject areas, such as airspace classification and structure.

Note: This could, for example, be an on-line self-study program and test that is fashioned after existing models used by government agencies that require a demonstration of knowledge as a prerequisite to conducting specific activities.

Proposed Content of Knowledge Subject Areas

Below are the knowledge subject areas, both Transport Canada and industry believe a person operating a small UAV (limited operations) would need. These include:

- air law and procedures relevant to the permit (e.g. general provisions, general operating and flight rules, air traffic control services and procedures, aviation occurrence reporting);
- airspace (e.g. structure, classification; reporting requirements);
- flight instruments (e.g. altimetry, GPS, airspeed and heading indicators);
- navigation (e.g. aeronautical charts, pre-flight preparation);
- flight operations (e.g. wake turbulence causes, effects and avoidance; data and command links);
- meteorology (e.g. required for visual line-of-sight operations);
- human factors (e.g. aviation physiology, the operating environment, aviation psychology); and
- theory of flight (e.g. basic principles).

Or, as an alternative to the knowledge subject areas above, TP15263E “[Recommended Knowledge Requirements for Pilots of Small Unmanned Air Vehicle Systems, Restricted to Visual Line-of-Sight](#)” could be the basis for the knowledge requirements for the pilot of a small UAV (limited operations).



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Transport Canada invites comments on:

- the proposed areas of knowledge; and
- whether there should be additional knowledge areas added to the proposed list above or whether TP15263E provides the appropriate knowledge areas required for this category of UAV.

Transport Canada also proposes **to not require** licensing certification of operators of launch systems and arresting hooks, visual observers, payload operators and mission planners.

Flight Training

It is proposed that Transport Canada **not** certify flight training units or schools that provide theoretical or flight training to UAV operators and their crews. This would include schools for any UAV position to include pilots, visual observers and maintenance personnel.

Aircraft Maintenance Engineers

It is proposed that Aircraft Maintenance Engineer licensing would not be required for this category of UAV operating within VLOS. The skill set of an Aircraft Maintenance Engineer is not suited for aircraft of this size.

Airworthiness

It is also proposed that manufacturers of UAV systems for the Small UAV (limited operations) category be required to declare that the UAV system meets a design standard for UAV systems for this category. The content of this Standard represents a balance between prescriptive requirements and statements of best design practice. The guiding principle of such a standard would be that the probability of a hazardous failure condition (i.e. one that may result in no more than a single fatality) must not be greater than extremely remote.

The Transport Canada UAV System Program Design Working Group developed a design standard for UAVs, 25kgs or less, operated within visual line-of-sight. For small UAVs (limited operations), it is proposed that the design standard would detail requirements for the following areas:

- Flight Performance
- Structure
- Design and Construction
- Propulsion System
- Systems and Equipment



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- General Function and Installation
- Flight and Navigation Information
- High Intensity Radiated Fields Protection
- Equipment, Systems and Installations

- Navigation Systems
- Sense and Avoid Systems
- UAV Control
- Launch and Recovery Systems
- Payloads
- Manuals and Documentation

Transport Canada invites comments, particularly from UAV manufacturers, whether compliance with this standard would be achievable and commensurate with the risk posed to people and property on the ground and other airspace users for operations under this proposed rule. Transport Canada is willing to consider that there may be other validated consensus standards from recognized Standards' groups that may be acceptable, so welcomes feedback that identifies any such standards.

While Transport Canada is proposing a design standard for this category of UAV, Transport Canada **would not**:

- require type certificates or production approvals; or
- issue a flight authority (i.e. Certificate of Airworthiness).

***Please note:** The intent of a design standard is to provide an increased level of assurance in the safety of the UAV system. If such a design standard is not published as part of the proposed rulemaking efforts, Transport Canada would need a more restrictive regulatory regime to mitigate the increased risk of operating UAVs, that have not been built to any safety standard, near or over persons and near other aviation activities.*

Aircraft Maintenance Requirements

Transport Canada is proposing that small UAVs (limited operations) be maintained by the owner/operator of the UAV system. General maintenance of these UAV systems would be performed by a person possessing the relevant experience and training on the maintenance of the specific UAV system and authorized by the owner/operator. This approach would be consistent with the risk associated with this category of aircraft.

General Operating and Flight Rules

Transport Canada proposes to impose specific operating limitations to reduce or minimize potential encounters



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between manned and unmanned aircraft and to protect people and property on the ground. Such limitations would reflect the level of risk associated with a small UAV system (limited operations).

For UAVs falling under the proposed small UAV (limited operations) category, in addition to some of the rules proposed in the Small UAV (complex operations) section, Transport Canada proposes to incorporate operational restrictions addressing the following areas:

- operate only during the day.
- comply with a maximum airspeed limit of 87knots.
- never operate in Class C, D, E or F airspace.
- comply with a specified minimum distance from aerodromes*.
- comply with the minimum distance of 5nm (9 km) from built-up areas (cities, towns or villages).
- comply with maximum altitude requirements – not above 300 feet above ground level.

*Transport Canada is considering two (2) options with regard to the minimum distance from aerodromes that small UAVs (limited operations) should be permitted to operate.

Approach 1 would mirror the current exemptions that were provided for lower-risk UAV operations and established a minimum distance of 5nm (9 km) from any aerodrome.

Approach 2 is based on the principal of prohibiting the operation of small UAVs (limited operations) within controlled airspace, including control zones. To accommodate the largest control zones in Canada, this proposal would be to restrict operations within 11 nm (20 km) of any aerodrome.

Transport Canada is seeking comment on the above approaches.

7. VERY SMALL UAV (LOWER THRESHOLD)

UAV Operator Certificate Requirements

Transport Canada proposes to permit the operation of a *lower threshold* UAV system without issuing a UAV Operator Certificate. However, to ensure that larger UAV operators with a large span of control and complex operations have an adequate management structure and can conduct a safe operation, some additional regulations may be required. As such, Transport Canada is seeking comments on the following proposal.

UAV operators meeting certain criteria would need to register with Transport Canada before conducting



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operations. Transport Canada would require these UAV operators to have, consistent with the nature of its operation and commensurate with the size, structure and complexity of the organization:

- an adequate management organization;
- a method of control and supervision of flight operations;
- pilot training programs;
- security procedures;
- a maintenance control system;
- a company operations manual; and
- standard operating procedures.

Transport Canada is seeking comment on the appropriate criteria for a UAV operator. Criteria it is considering include:

- the number of employees (e.g. more than 3);
- companies who hire persons in commercial UAV enterprises;
- companies with a large scope of operation (i.e. multi-region, across Canada, or large numbers and /or types of aircraft); or
- a combination of the above.

Such a proposal would include rules describing UAV operator responsibilities within the following areas:

- Flight Operations
- Documentation
- Flight Time and Flight Duty Time Limitations
- Emergency Equipment
- Maintenance Requirements
- Personnel Requirements
- Training Programs
- Operations Manual

Aircraft Marking and Registration

Transport Canada proposes to **not require** the owner of a UAV falling under the proposed Very Small UAV (*lower threshold*) category to register their aircraft as would be the case with the small UAVs. They would instead be required to have permanent marking for identification (e.g. pilot name and contact information) on their UAV operating in this category. This identification would help Transport Canada officials during



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oversight activities.

Personnel Licensing and Training

Transport Canada proposes that UAV pilots be considered pilots as defined by the *Aeronautics Act* and the *Canadian Aviation Regulations*. UAV pilots in turn have responsibilities, including ensuring that they obtain proper training and experience in order to safely operate their aircraft within Canadian airspace.

The following is specific to the Very Small UAV (*lower threshold*) category:

Pilot Permit

For this lower threshold category, Transport Canada proposes:

- to **not require** pilots to obtain a pilot permit or medical certificate.
- **to not set a minimum age requirement** for pilots operating Very Small UAVs, provided they are operating with adult supervision. A minimum age of 16 years is proposed to allow operations without adult supervision. However, these pilots would be required to demonstrate aeronautical knowledge in specific subject areas, such as airspace classification and structure.

Note: This could, for example, be an on-line self-study program and test that is fashioned after existing models used by government agencies that require a demonstration of knowledge as a prerequisite to conducting specific activities.

Proposed Content of Knowledge Subject Areas

Below are the knowledge subject areas both Transport Canada and industry believe a person operating a very small UAV (*lower threshold*) would need. These include:

- air law and procedures relevant to the permit (e.g. general provisions, general operating and flight rules, air traffic control services and procedures, aviation occurrence reporting);
- airspace (e.g. structure, classification; reporting requirements);
- flight instruments (e.g. altimetry, GPS, airspeed and heading indicators);
- navigation (e.g. aeronautical charts, pre-flight preparation);
- flight operations (e.g. wake turbulence causes, effects and avoidance; data and command links);
- meteorology (e.g. required for visual line-of-sight operations);



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Transport Canada invites comments:

- on the proposed areas of knowledge; and
- whether there should be additional knowledge areas added to the proposed list for this category of UAV.

Transport Canada also proposes **to not require** licensing certification of operators of launch systems and arresting hooks, visual observers, payload operators and mission planners.

Flight Training

It is proposed that Transport Canada **not certify** flight training units or schools that provide theoretical or flight training to UAV operators and their crews. This would include schools for any UAV position to include pilots, visual observers and maintenance personnel.

Aircraft Maintenance Engineers

It is proposed that Aircraft Maintenance Engineer licensing would not be required for this category of UAV operating within VLOS. The skill set of an Aircraft Maintenance Engineer is not suited for aircraft of this size.

Airworthiness

Transport Canada is proposing to **not require** UAVs that fall under the proposed Very Small UAV (*lower threshold*) to meet a design standard.

Aircraft Maintenance Requirements

Transport Canada proposes that Very Small UAV systems that fall into the *lower threshold* category:

- will **not be required** to meet any design standard or have any specific maintenance requirements.
- will be required to follow any maintenance instructions provided by the manufacturer.
- will be required to conduct a pre-flight check to ensure that the aircraft is in a fit and safe state for flight before take-off.

General Operating and Flight Rules

Transport Canada proposes to impose specific operating limitations to reduce or minimize potential encounters between manned and unmanned aircraft and to protect people and property on the ground. Such limitations would reflect the level of risk associated with a Very Small (*lower threshold*) UAV system.

For UAVs falling under the proposed Very Small UAV (*lower threshold*) category, in addition to some of the



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rules proposed in the Small UAV (complex operations) category, Transport Canada proposes to incorporate operational restrictions addressing the following areas:

- operate only during the day.
- never operate in Class C, D, E or F airspace.
- comply with the minimum distance from aerodromes of 5nm (9 km).
- comply with maximum altitude requirements – not above 300 feet above ground level

Currently, in accordance with section [606.02](#) of the *Canadian Aviation Regulations*, all aircraft owners are required to subscribe for public liability insurance coverage. Transport Canada is proposing that there be no public liability insurance requirement for the *lower threshold* category of UAV.

The department is seeking comment on this proposal.

8. SPECIAL FLIGHT OPERATIONS CERTIFICATE

Since the proposed rule does not abolish the Special Flight Operations Certificate (SFOC) process, the existing requirement for an SFOC for UAV operations will be retained. The SFOC will be available to UAV operators for all other types of UAV operations that are not captured by the proposed rule (e.g. testing and development flights in restricted airspace test sites, UAVs larger than 25kgs, beyond visual line-of-sight operations, etc). There may also be individual cases where a UAV operator meets the proposed rule in every respect, but because the operation is so specialized, they would need operational approval through an SFOC. Examples of such operations could include participating in an air show, operating at aerodromes, etc.

9. FOREIGN OPERATORS

As UAVs are considered aircraft, this proposal would maintain consistency with current rules pertaining to aircraft registration eligibility by limiting operation to Canadian citizens/corporations, except through an SFOC. This could affect foreign UAV operators operating small UAVs. However, it is also proposed that this restriction would not apply to UAVs within the Very Small (*lower threshold*) UAV category, allowing a foreign UAV operator to operate a very small UAV in Canada. In light of the global context in which there is a growing potential for UAVs in a variety of applications, Transport Canada will need to consider trade-related implications of UAV operations.



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**UNTIL AUGUST 28, 2015, COMMENTS ON THIS NOTICE MAY BE ADDRESSED, IN WRITING,
TO: carrac@tc.gc.ca**

Note: after this date, Transport Canada will not consider comments for further revisions to the regulations and standards.



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**ANNEX A:
PROPOSED REGULATORY FRAMEWORK**

In 2016, Transport Canada intends to introduce regulatory requirements for UAVs 25kgs or less that are operated within visual line-of-sight. The proposed regulatory amendments to the *Canadian Aviation Regulations* (CARs) are intended to ensure the safe and reliable operation of UAVs in Canadian airspace. Transport Canada also intends to preserve the SFOC process to focus on higher risk operations that are not covered by the proposed regulations, including UAVs larger than 25kgs and those operated beyond visual line-of-sight.

	Very Small UAVs	Small UAVs (Limited Operations)	Small UAVs (Complex Operations)
Aircraft Requirements			
Identification	✓	X	X
Marking and Registration	X	✓	✓
Design Standard	X	✓	✓
Pilot Requirements			
Age Restrictions	X	✓	✓
Knowledge Test	✓ <i>(Basic)</i>	✓ <i>(Basic)</i>	✓ <i>(Advanced)</i>
Pilot Permit	X	X	✓
Respect for Privacy and Other Laws	✓	✓	✓
Permission to Fly			
At night	X	X	✓
In proximity to an aerodrome	X	X	✓
Within 9 km of a built-up area	✓	X	✓
Over people	X	X	✓
Liability Insurance	X	✓	✓
Operator Certificate *	✓	✓	✓

*Operator certificates are reserved for larger operators with numerous employees, employees involved in commercial enterprises, or companies with a larger scope of operations.



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Operations with Very Small UAVs / Lower threshold

Transport Canada is considering whether to establish a “lower threshold” or very small UAV category that would be regulated to a lesser extent due to its nature and operating environment, and the lowered risk of damage that the aircraft would cause to a person and property on the ground and other airspace users in case of incident.

It is expected that the vast majority of recreational users would be captured under this category, as well as aerial photography operations for real estate and other small business purposes. As TC expects that all pilots have the requisite knowledge to operate safely, a basic knowledge test would be required, as well as basic identification requirements to assist in accident and enforcement investigations.

Limited Operations with Small UAVs

This category would have less regulatory requirements than complex operations due to their lower-risk profile however they would be limited to more remote areas, resulting in:

- defining specific geographic limitation around where this category of UAV could operate (e.g. specific distances from aerodromes or built-up areas).
- adding restrictions on the operation to ensure that these UAVs would not encroach on areas where the operation would create a greater risk.

The limited operation category is intended to allow operations in remote areas, and would be applicable to agricultural operations, rural aerial surveys, or research in remote and Northern regions.

Complex Operations with Small UAVs

Operating small UAVs under this category would be considered to be the most challenging as it would occur in and around urban or built-up areas and allow operations close to aerodromes. This category would have the most comprehensive set of regulatory requirements which, in turn, would provide for the greatest level of safety and operational flexibility.

The complex operation category is intended to integrate mature UAV pilots into Canadian airspace by allowing operations in more complex environments with comparable requirements to manned aircraft.

Model Aircraft Operations (under a recognized association)

The framework proposes a provision similar to CAR 602.45, which requires operators to use their model aircraft in a way that does not put aviation safety at risk. Operators would be required to fly their model aircraft under a valid membership and guidelines of a national community-based association recognized by Transport Canada whose members have a proven safety record, and follow strong and established safety guidelines.

An alternative approach is also proposed that is based on camera payload, and would require such aircraft to be regulated as UAVs and not model aircraft.



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CARAC ACTIVITY REPORTING NOTICE #2015-012

Date: May 28, 2015

CANADIAN AVIATION REGULATIONS ADVISORY COUNCIL (CARAC)

**NOTICE OF PROPOSED AMENDMENT (NPA):
UNMANNED AIR VEHICLES**