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# **Standing Committee on Transport, Infrastructure and Communities**

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**EVIDENCE**

**Tuesday, November 22, 2016**

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**Chair**

**The Honourable Judy A. Sgro**



## Standing Committee on Transport, Infrastructure and Communities

Tuesday, November 22, 2016

• (0945)

[English]

**The Chair (Hon. Judy A. Sgro (Humber River—Black Creek, Lib.)):** We will convene our meeting today.

Pursuant to Standing Order 108(2) we move into a study of unmanned aerial vehicle, UAV, regulations. We have with us from the Air Line Pilots Association International, Dan Adamus, president of the Canadian board. From the Canadian Owners and Pilots Association, we have Bernard Gervais, president and chief executive officer, and on video conference from Halifax, Nova Scotia, we have David Fraser, partner, McInnes Cooper.

Welcome to you all. Thank you very much for coming today and giving us some additional information on this subject. We've been looking forward for some months to finding time in our schedule to look at it.

Mr. Adamus, would you like to start?

**Captain Dan Adamus (President, Canada Board, Air Line Pilots Association International):** Thank you very much.

My name is Captain Dan Adamus. I'm the president of the Air Line Pilots Association International's Canada board. I am an airline pilot, and I have been for 34 years.

The Air Line Pilots Association International represents just over 54,000 pilots who fly for 31 Canadian and U.S. airlines. We are also the largest non-governmental safety and security agency in the world.

We appreciate the opportunity to provide our perspective on the critical importance of safely integrating unmanned air vehicles, UAVs—or, as I will refer to them today, unmanned aircraft systems, UAS—into the Canadian national airspace system, the NAS.

I think you see a bit of a theme here. There are lots of acronyms in aviation, and I'll refer to some of these acronyms in my notes today.

The airspace in North America is the most dynamic and diverse such system in the world. ALPA fully supports the safe integration of UAS operations into the NAS. This is not a new issue, and our support for the future of UAS in the NAS as well as our perspective on the issues associated with safe integration are reflected in this statement.

The safety of the NAS must be maintained to deliver the safest and most efficient air transportation services in the world. Although the focus today is the Canadian NAS, we must point out that the safety issues highlighted are independent of any national airspace

boundary and are faced by ALPA's pilots as we operate around the globe.

In August 2015, the FAA published a list of pilot reports of UAS encounters. ALPA reviewed the 764 events, which cover only the period from November 2014 through August 2015. Canada has also seen a rapid rise in reported occurrences of UAS, with a tenfold increase in drone encounters year over year. Both the volume of events and many of the event descriptions are sobering reminders to the industry that the risk of a collision between a UAS and an aircraft has increased significantly. ALPA believes that a significant step toward the eventual solution to safely integrating UAS into the NAS includes four fundamental elements.

The first is education. Anyone who plans to fly UAS must understand the aircraft, the airspace, and the other aircraft that could be encountered while flying. In the case of UAS that might be commercially flown for compensation or hire, the pilot must hold a commercial pilot certificate to ensure that he or she possesses the appropriate skill and experience to meet safety standards designed to protect the flying public. Those flying UAS for recreational purposes must adhere to the guidelines, keeping the UAS within line of sight, at heights under 90 metres, and at least nine kilometres from airports. ALPA urges Parliament to provide definitive authority and remove any ambiguity about the extent to which Transport Canada has the authority to regulate UAS operated for recreation, modelling, and hobby purposes.

Based on what Transport Canada has documented to date, the ongoing educational efforts under way by Transport Canada and the recreational UAS segment of the industry are still inadequate.

With the holiday season on the horizon, UAS operations will likely increase. ALPA recommends that Transport Canada expand their outreach initiative, encouraging manufacturers, businesses, and volunteer organizations with a vested interest in safe UAS operations to aggressively promote safe UAS operations, which include avoiding encounters with airline aircraft.

The second element is registration. ALPA endorsed the FAA's rapid implementation of a UAS registration requirement for all but the smallest aircraft. Gathering basic information about the identity of the individual purchasing the UAS not only allows law enforcement authorities to identify the owner if the UAS were to encounter a problem, but it helps make clear the serious nature of operating a UAS in the NAS and the responsibility to safeguard public safety. ALPA encourages Transport Canada to implement a registration system as soon as possible. Additionally, ALPA recommends that Transport Canada implement registration of UAS at the point of sale. This method will ensure the greatest possible compliance with the registration requirements.

The third element is technology. If UAS are operated either intentionally or unintentionally in airspace that aircraft use, pilots need to be able to see them on the cockpit displays, controllers need the ability to see them on their radar scopes, and the UAS must be equipped with active technologies that ensure that the UAS is capable of avoiding collision with manned aircraft.

● (0950)

In these types of operations, technology must enable the pilots to control and interact with them in the same manner as if the pilots were on board. If a UAS is restricted by regulations from operating in a particular geographic area and/or altitude, it must have technology that cannot be overridden that limits the geographic areas and altitude in which it can operate. This may include permanent locations, such as Parliament and all public airports, as well as temporary restrictions, such as for wildfires or natural disaster areas.

Transport Canada should expand its ongoing evaluation of technologies that are capable of identifying UAS and operator locations. Transport Canada should ensure that resources are available for the development of UAS-centric collision avoidance technologies, with standards in place for their adoption as soon as possible.

Number four is penalties and enforcement. UAS pilots must be properly trained and must understand the consequences of possible malfunctions. Anyone flying a UAS that is a hazard to other aircraft in the airspace, especially anyone who chooses to do so recklessly near airports, must be identified and appropriately prosecuted. We support the criminalization of intentionally unsafe operation of UAS and penalties for unintentional unsafe UAS operations.

If Transport Canada intends to rely on first responders to ensure UAS regulatory compliance, it should better inform local, regional, state, and national law enforcement officials. Providing law enforcement officials with information that defines unlawful operations, provides peer-to-peer contact information, and clarifies the regulatory authority, as well as other pertinent information, is critical for an effective use of first responders to ensure UAS regulatory compliance.

In closing, ALPA supports the ongoing efforts to safely integrate UAS into the North American airspace system. We realize that UAS create many opportunities to benefit society. However, the integration needs to be done in a way that ensures that aviation safety is not compromised and that the target level of safety for commercial air travel in the NAS is proactively, not reactively, protected.

We are fully aware that there is a strong desire by UAS proponents and those who wish to become UAS operators to begin flying in the NAS as quickly as possible. Clearly, there are commercial, social, business, and international competitive advantages to a strong UAS industry. However, government and industry must take a longer view of this present state of technology to ensure that robust safety systems, in tandem with Transport Canada-certified redundant systems of UAS, are developed that completely integrate with commercial airline operations and, above all, do so safely. An imprudent rush to create and implement minimum standards will not only harm safety, but potentially produce a setback for the future expansion of UAS operations for years to come.

On behalf of the 54,000 airline pilots whose top priority is safe transportation, we thank the committee for the opportunity to appear before you today, and we look forward to working together to ensure the safety of our air transportation system.

● (0955)

**The Chair:** Thank you very much, Mr. Adamus.

Mr. Gervais, go ahead.

**Mr. Bernard Gervais (President and Chief Executive Officer, Canadian Owners and Pilots Association):** Thank you for the opportunity.

The Canadian Owners and Pilots Association, or COPA, represents general aviation in the country. It has 17,000 members across the country. It's not the organization of the airlines or of the scheduled air transportation system, but anything other than that. It is general aviation. That's who we represent. It's the smaller aircraft. It could be business or it could be outfitters up north or in different places. It's the general aviation portion of what's happening in the transportation system in Canada.

We're also part of the 75-member International Council of Aircraft Owner and Pilot Associations around the world. We have a seat at the International Civil Aviation Organization, or ICAO, representing general aviation, so we have someone in Montreal in this context.

We have done some representation at ICAO already concerning general aviation and what we feel about what are called remotely piloted aircraft, or RPAs, or UAVs, or UAS, as they take all these different acronyms. We've done some lobbying with ICAO already, saying that there are some items we're really pushing for. We have four of these items.

One is that we should be able to share the sky without added equipment in our aircraft in the present fleet. In other words, manned aircraft should not have to get some new stuff on board to avoid and to be able to fly with the RPAs or the UAVs.

Another one is that we shouldn't have any NOTAM, which is a notice to airmen. It's sort of a memo out there. We shouldn't have any NOTAMed airspace. Doing so signifies that general aviation and UAVs together are a danger. A NOTAM is a notice for something specific happening. If the airspace is NOTAMed, saying we should watch out, that there's a UAV there, there are going to be NOTAMs all over the country. We couldn't live with this. There has to be no specific NOTAM.

No additional airspace should be set aside in the country for UAVs, except obviously for training and testing purpose, such as the one in Alberta right now. I know there's one in Alma, near Lac Saint-Jean, in Quebec. There are some areas, but there should be no additional airspace set aside for that. We have to cohabit.

Obviously UAVs and RPAs are getting big. In a few years they may be even more numerous than aircraft themselves. We will have to share the skies.

Also, we put the onus and the responsibility to detect and avoid— or sense and avoid, as we may call it—on the RPAs. We have eyeball one and two to see outside, and we have onboard systems in the aircraft with which we can see, with collision avoidance systems of some type. However, the RPAs or UAVs themselves have to be able to detect and avoid.

Those are the four points that we have given to ICAO.

COPA has already responded to a notice of proposed amendment for UAVs that Transport Canada put out last year, in 2015. We do have a few proposals. My colleague mentioned a few that were put out by ALPA. We also put out a few. Obviously we agree on many of them.

One is that we should link all the UAVs out there to someone through a registration. It cannot be anonymous. Whoever has one, whether it's a small toy or a bigger one, should be linked to it. It should be registered.

Education is also an important part. Everyone has to be educated on what they can do with their UAV or RPA. We're also asking that there be no sales out there without a proof-of-competency card. We're asking that the Best Buys and the Future Shops of the world do not sell any of them without one. Even over the counter, there should be a competency proof. Someone has to show that they know what the rules are. We will be living together in that world.

Right now, we feel at COPA that there's a lack of information out there. Even with over-the-counter sales, we've tested a few, and people say, "No, just go on the Transport website." That's not enough. I even have a magazine here saying that you should be looking at the Transport website, but it doesn't say more than that. There's a lack of information out there.

Right now, we have to see the UAV. Obviously before we move to going beyond the visual line of sight, the technology will have to be foolproof. We're asking for that, and we agree with ALPA on that.

• (1000)

**The Chair:** Thank you very much, Mr. Gervais.

Go ahead, Mr. Fraser.

**Mr. David Fraser (Partner, McInnes Cooper, As an Individual):** Good morning.

Thank you very much for your very kind invitation to appear before this committee on what I think is a very important topic.

For some background, I'm a lawyer, a partner with McInnes Cooper here in Halifax. My practice focuses entirely on privacy and technology law, with 15 years of experience in dealing with disruptive new technologies.

I have had the opportunity to provide advice to UAV operators and legal advice to companies that look to use UAVs in their operations, but I need to be clear that this morning I'm speaking in my own personal capacity—not on behalf of my firm, not on behalf of its clients, not on behalf of any associations.

Perhaps what informs my view the most is that I am a recreational UAV operator and have been for more than a year now. My interest stems not from the aviation side but from being an avid amateur photographer and videographer. We live in a beautiful country, and it's even more amazingly beautiful when viewed from the air.

I had a photography teacher who told me that 99% of photographs are taken from eye level and suggested going up or going down to get a different perspective. I can tell you, and I'm sure the pilots in the room can tell you, that from 100 or 200 feet, this is an absolutely amazing country, and I enjoy recording it from that perspective.

For these remarks, then, I'm mostly talking from the perspective of a recreational user whose UAV weighs under two kilograms. It's a very small UAV.

I don't think there's any doubt that UAVs are a disruptive new technology spawning an entire new industry that is creating a whole host of new opportunities, both industrial and economic. I'm sure you'll hear from industry experts about the amazing work that UAVs enable, particularly in industries such as agriculture, in areas of forestry, in areas related to transportation of goods, etc.

I hope you'll also hear from some of the many small operators I've heard a lot from, people who have spent the last number of years putting together businesses based on this technology and who have a bit of unease about the next couple of years ahead from the regulatory standpoint. As often happens, this new disruptive technology has been accompanied by something that's often characterized as a bit of a technopanic.

As a privacy lawyer, I hear about privacy concerns all the time. Most of these concerns are actually misplaced, since most of the drones or UAVs that you find in the airspace have wide-angle lenses and aren't useful for surveillance.

There's also, of course, been a lot of concern and discussion about safety. In any time of technopanic, I often espouse taking a step back to take a deep breath and try to deal with facts rather than feelings and fears.

If you do a search in news sites for "drone" and "collision" or "near miss", you'll see an example of what I perceive to be a level of technopanic. Many of the reports—and I've seen many of them registered in the Canadian airspace—don't bear a whole lot of scrutiny, at least in terms of the sort of UAV drone technology that one is concerned about being sold at Best Buy or appearing under Christmas trees.

The most recent incident is an interesting case in point. It occurred off the Toronto Islands airport and is currently being investigated. The encounter occurred at 9,000 feet over Lake Ontario near the U.S. border. That border is 28 kilometres from the airport and in fact 28 kilometres from land. That's simply beyond the capability of a drone that anybody would purchase at Best Buy. Unless the operator was in a boat, it simply would have been beyond the range and capabilities of most UAVs. Initial reports simply said it was an unidentified object, which could have been a floating bag or something else like that, but the media ran with using the exciting word "drone" in all the headlines, and that's what grabs the attention.

I'm of the view that any approach to regulating drones should prioritize the encouragement of growth and development of this industry in Canada—this industry is here, and it's here to stay—and also, of course, focus on mitigating risks in a realistic way.

If you want a good model to follow, I think we should adopt the very same system as in the U.S. It is very simple. This new approach for drones under 55 pounds is straightforward and much simpler than the proposed Transport Canada regulations. The aircraft has to be marked with a registration number; I can advocate for that. It must make no flights higher than 400 feet, and I can get on board with that. All of it has to be, of course, within visual line of sight, and flights within controlled airspace have to be done with notice to the relevant air traffic control. They've actually implemented a relatively simple system to give that notice.

We should be following this lead; otherwise the U.S. and Europe will dominate this industry, and Canadians will be left behind.

•(1005)

We already have a sensible approach to regulating the use of our waterways. I'm a pleasure craft operator with a small boat that I enjoy using along the harbours and coastlines of beautiful Nova Scotia. In order to operate my boat, I needed to have passed a test

and obtained a pleasure craft operator card. The test covered the rules of the road, the international collision regulations, safety rules, and how to operate safely. I also had to register my boat and put its register number on the hull, and I have insurance.

Pleasure crafts coexist with working boats in a lot of ways, and I think UAVs can coexist, and will have to, with existing users of the skies in the same way.

I do also advocate for one of the provisions that I believe Transport Canada is going along with. Those who use model aircraft or small drones within the auspices of a recognized association, under their safety rules and with the benefit of their insurance, should be able to operate within that sphere rather than in a more complicated regulatory environment. However, if you take it outside of that strip, then of course all the rules come to bear.

We need to be sensible, proportional, and consistent in the manner in which UAV activities are regulated, and it needs to have a nuanced view of all the risks involved.

We also have to be mindful—this was alluded to in some ways by the previous speakers—that the technology is moving very quickly in this area. Within five years, I expect that we will have very good sense-and-avoid technologies. We'll have very good fail-safes on these devices and we'll likely have relatively inexpensive transponders that will be able to alert air traffic control and other users of the airspace of the presence of UAV activities, which will enable smarter, intelligent, sense-and-avoid capabilities.

We already have laws related to privacy, trespass, nuisance, and other things like that, so I'm not sure we necessarily need to be coming up with new laws related to any particular technology. Those laws of general application work.

If you regulate from the point of view of technopanic, we would be doing Canada a disservice and baking in regressive rules that will be hard to fix in the future.

I do believe that we should follow the four points that were advocated that relate directly to what the FAA is doing in the United States with a very sensible, straightforward approach. If you're out of the ambit of the 55-pound rule or if you want to go above 400 feet, then you'd be subject to a much more stringent regulatory structure because, obviously, that introduces a different degree of risk.

I very much look forward to this discussion and speaking with you further about this.

Thank you.

**The Chair:** Thank you very much, Mr. Fraser.

You have the floor for six minutes, Mr. Berthold.

[Translation]

**Mr. Luc Berthold (Mégantic—L'Érable, CPC):** Thank you very much, Madam Chair.

Thank you very much to the witnesses for being here today.

My first question is for Mr. Gervais.

Mr. Fraser has just explained the U.S. drone regulations, which are very simple. Have you had an opportunity to review them? Until the drones are technologically more advanced, could those regulations make it possible to act quickly on the issue?

**Mr. Bernard Gervais:** I don't know enough about the U.S. regulations to give you an answer. All I know is that there are changes to the Canadian regulations that we are trying to put in place. There are some small differences: we are talking about 300 feet instead of 400 feet and kilos rather than pounds. Aside from that, I have not done a study.

The Americans have caught up quickly in the last few months. They did not know where they were going with the regulations. Are they final for them? I don't know that either. Instead, I'm looking at how the Transport Canada issue has evolved.

**Mr. Luc Berthold:** Okay.

Mr. Adamus, have you had a chance to review the U.S. regulations? Mr. Fraser said that they were simple and are at least allowing us to wait until the drones are technologically better equipped, as mentioned earlier.

• (1010)

[English]

**Capt Dan Adamus:** I am somewhat familiar with what's going on in the U.S. We have members on a working group with the FAA right now.

The regulations are still under development. There are a lot of ideas being thrown around. Certainly the line of sight is one to look at, as well as collision avoidance systems.

It's the drones in the national airspace system that are most concerning to us, because that's the airspace we would share with these drones and that's the area on which we are concentrating our efforts most.

[Translation]

**Mr. Luc Berthold:** That's great.

I really like the term "technopanic" that Mr. Fraser used. In recent years, whenever a new technology or application has reached as many people as possible, we have actually witnessed a technopanic.

In the case of drones, I believe there is legitimate concern when it comes to the safety of airline passengers or small aircraft users. We are in fact seeing more and more drones.

Mr. Gervais, I was a little surprised that you're asking Best Buy stores not to sell drones to people who don't have a certificate or a licence.

We are just starting our study on drones, and I expect we will be learning a lot about this in the coming weeks.

The last time I walked into a Best Buy store, I saw drones the size of my coffee mug, but also bigger ones. Mr. Fraser uses drones to do photography at 200 or 300 feet altitude.

Of the drones being used right now, which are the most threatening for the airline industry?

The question is first for Mr. Gervais and then for Mr. Adamus.

**Mr. Bernard Gervais:** Right now, Transport Canada grants exemptions for drones weighing less than 250 grams. Clearly, we are talking about energy that can strike an aircraft. A drone weighing less than 250 grams can cause damage, but drones weighing more than 250 grams are the most dangerous.

The Canadian Owners and Pilots Association suggested that an operator competency card be required, much like the pleasure craft operator card. I have a boat and I had to get my card and register my boat before I was allowed to use it. We are proposing a similar system: to buy a drone, people will need to have taken a course and obtained their competency card. The course, which would be a few hours long, could even be offered online. That could work.

We need to educate people about the use of drones. You can't just go out in your backyard with your drone when you are, say, in the approach path of Rockcliffe Airport. Even a drone of only 500 grams can be dangerous. When you hit an object of 500 grams at 150 kilometres an hour, there will be damage.

We are stressing the importance of educating people so that they know that even a small drone weighing less than 250 grams can be dangerous. People should be familiar with the rules and regulations. Right now, there is no evidence that people are aware of that. We should just take this a step further by requiring drone users to have the necessary skills, as in the case of pleasure craft.

**Mr. Luc Berthold:** Mr. Adamus, are you of the same opinion?

[English]

**Capt Dan Adamus:** Your question was about which is more dangerous, the large or the small.

A loonie being ingested into an engine can cause severe damage. There is drone technology involving clusters. They're really small and they fly in formation. Even the smallest drones can cause some damage.

To me, they're all the same risk. They have to be flown with the proper education, with the knowledge of the risk they could potentially pose if they're doing something they're not supposed to. They especially have to stay out of the national airspace.

We encourage flying for recreational purposes. I agree with that, but you cannot fly over built-up areas or over crowds or over sporting events. Those are all guidelines currently on the Transport Canada website saying you should not do that. We have to look at all of this.

**The Chair:** Thank you very much.

Mr. Sikand, you have six minutes.

**Mr. Gagan Sikand (Mississauga—Streetsville, Lib.):** Mr. Fraser, I read a report that stated Facebook is trying to bring wireless technology to remote areas via drones.

Let's say this becomes a possibility. You have aerial infrastructure and increased Internet capabilities. How do we protect Canadian interests in firewalls, metadata, and the like?

•(1015)

**Mr. David Fraser:** I think that's an interesting perspective and an interesting question. I think it probably is completely outside the ambit of transportation regulation and moves into broadcast and telecommunications regulation.

As far as I know, we currently don't have prohibitions in place that would deal with that, but we certainly do have foreign ownership rules that relate to certain portions of our telecommunications sector. I think that would be where the question would be properly addressed.

**Mr. Gagan Sikand:** Thank you.

Let us assume that in 10 years there's a prolific use of UASs, and not unlike resources or commodities, there's only a finite, limited amount of airspace. Also, let us assume that recreational users, not commercial, don't follow the guidelines, so our legislation is highly ineffective. How do we address the situation? Do we limit the technology available to the public, or do we just increase the penalties?

Perhaps you could speak to that, starting with you, Mr. Adamus.

**Capt Dan Adamus:** I think events have already overtaken us with the technology that's out there. I don't think it's going to go backwards. You're going to have a tough time to limit the capabilities of these—

**Mr. Gagan Sikand:** I don't mean the capabilities, but the accessibility to recreational use. Do we not allow the general public to fully access the capabilities that UASs will have?

**Capt Dan Adamus:** If it's done properly, we can do that, but it all starts with education and understanding. A very good place to start is that all UAV users should have to register their UAVs.

As I said in my opening remarks, this will, first of all, give the authorities the ability to track somebody down if their UAV is used in the wrong way. It also sends a message to the user that this is a serious event going on when you're operating one of these UASs, and you have to do so appropriately and get the proper training and understand the regulations.

**Mr. Gagan Sikand:** Thank you. I agree with you as well.

Mr. Gervais, would you comment?.

**Mr. Bernard Gervais:** You were saying that the options would be limited technology or more penalties...?

**Mr. Gagan Sikand:** No. I am actually trying to get your take on it.

I'm just operating under the assumption that whatever legislation we put in place is not being followed. If it's not being followed, I don't want an airline to have to crash because somebody didn't follow the rules. How do we as legislators address that situation?

**Mr. Bernard Gervais:** We can't go back. What's going to be out there will be very prolific. I think it's training at the onset, before we even allow the sales of these things. Technology has to be somehow.... If it doesn't work out, eventually it could be limited in some way.

As I was saying also, and as COPA is saying, it's making sure people have the competency and that whoever they are, they are linked to their UAV someplace so that we can do the tracing. It cannot be a free-for-all thing out there in the airspace.

**Mr. Gagan Sikand:** You're saying it should be highly regulated. Okay.

Those are the only two questions I had. Thank you.

**The Chair:** You still have two minutes.

Go ahead, Mr. Fraser.

**Mr. Sean Fraser (Central Nova, Lib.):** Sure. I may get another crack at this, I hope, before we're done.

Mr. Fraser, for you initially, you mentioned the existing laws in place for privacy purposes, for example, and for nuisance and otherwise, and that we don't need to adopt an entirely new legal regime. Where I have some consternation is around the enforcement of those laws. Is the answer to best protecting privacy interests really the registration phase, to make sure we know who the owner is of any drone that might be used for an improper purpose?

**Mr. David Fraser:** Certainly that information would be much more accessible in the event of an investigation. I don't think there's any doubt. I don't see significant defects in our existing laws.

I also see a problem from a big-picture public policy perspective in regulating activities of one particular technology. It's not focused on the mischiefs; it's focused on the means. Theoretically, I could hover a helicopter 500 feet above your house, with a very long lens, and commit a worse mischief than flying my small Phantom drone 100 feet over your house. We should focus on what the mischief is rather than the means by which it's carried out, and be consistent across technologies.

•(1020)

**Mr. Sean Fraser:** One area with which I struggle conceptually is that with a helicopter that's well marked, you could presumably see that from the ground and identify the owner through just a visual confirmation. Again focusing on the means, as you've suggested I shouldn't, I have trouble conceiving of how you would identify a small drone if it doesn't crash. If there's an incident and it falls to the ground, you can pick it up, find the code, and identify the owner. Are there any tools that law enforcement would need to identify someone who is being mischievous with a UAS?



**The Chair:** Someone can give a short answer to that question.

**Mr. David Fraser:** I think marking will help, but obviously it's going to depend largely on the size of the drone and the size of the marking on it.

I don't know whether, for example, Transport Canada or others are working on technology to use triangulation to find the controller. That is, in fact, one of the challenges with UAVs generally. If you see something flying up there, you don't necessarily know where the person is who's controlling it. I think that is going to be one of the regulatory challenges.

However, registration and marking would take us a significant step forward compared with where we are now.

**The Chair:** Thank you.

Mr. Aubin is next.

[*Translation*]

**Mr. Robert Aubin (Trois-Rivières, NDP):** Thank you, Madam Chair.

Gentlemen, thank you for your participation.

My first question is for Mr. Adamus.

In your opening remarks, you mentioned 764 incidents that have occurred over a relatively short period of time.

What are the criteria for an incident to be considered an incident?

Among those incidents, could you give me an example of the least and most serious situations? For example, I imagine that seeing a drone while flying is already an incident, but not necessarily a risk of an accident.

[*English*]

**Capt Dan Adamus:** The 764 reported incidents are reports from aircraft to the air traffic controller that a drone is in their sight. It doesn't necessarily mean there's a risk of collision, but they're close enough that they can see them. Whenever it's close enough to see, that's a significant event.

For example, when aircraft are flying above each other, there has to be a 1,000-foot separation, or three nautical miles horizontally, so you have to be a long way apart. If you can see a drone, that's a significant event. That would be categorized as a near miss with another aircraft.

As an example that I was involved in, I was getting ready to depart out of, I believe, Atlanta. The aircraft in front of me, just as it was climbing out through a couple of hundred feet, reported a drone, and they actually had to turn to avoid it. When we were given takeoff clearance, we were given a turn right away to avoid it. That's the closest I've come to a drone, and I didn't see it.

The incident that was reported over Lake Ontario last week or the week before—again, we don't know what it was—would be the most severe type of case, where pilots have to take drastic action to avoid hitting a drone. We all know what birds can do to aircraft. We are all very familiar with the Hudson River incident. A drone is a lot more dense. If it's ingested into an engine, it's likely to take out the engine. If it hits a control surface, control of the aircraft could be in jeopardy.

If it hits the windscreen, it could crack the windscreen. There's a lot of damage these drones can do to aircraft.

[*Translation*]

**Mr. Robert Aubin:** Thank you.

You have the opportunity to take off and land in a number of countries all over the world. In your opinion, which country is the most advanced in terms of regulations and should therefore be used as a model? Do you have an idea? Earlier, we talked about the United States, but I assume there are other models. Drones are now everywhere. Which country could we use as a regulatory model?

[*English*]

**Capt Dan Adamus:** That's a very good question.

I'm not that familiar with what other countries are doing. I know ICAO is working on some guidance material for the member states, but I don't have any specifics on which country is ahead of the game. I'm sorry.

[*Translation*]

**Mr. Robert Aubin:** Mr. Gervais, did you want to add a comment?

**Mr. Bernard Gervais:** Actually, I was taking notes for the model.

The person representing us at the International Civil Aviation Organization is a member of our association. I was able to talk to him a little earlier. As Mr. Adamus said, all member countries are working together. Everyone is trying to figure out how to do this. We are in the very early stages. That's where we are. We will do this together.

●(1025)

**Mr. Robert Aubin:** Thank you.

I have a question for Mr. Fraser.

You are clearly an amateur photographer and now a videographer. You said that 90% of the photos were taken at eye level. We understand the phenomenon, but once you go up in height with a drone, how will privacy be protected? If my neighbour takes a picture at eye level, he may well not see what is going on in my backyard. However, when he takes photos and images with a drone, what recourse do people have in terms of the possible publication of those images?

[*English*]

**Mr. David Fraser:** Thank you for the question.

In my own experience, I generally do landscape photography, so I'm not looking in anybody's backyard. Certainly when it comes to these sorts of questions, I think we have to ask, do we need additional rules? Is it justified?

You can currently get very high-resolution satellite images of every single square foot or square metre of Canada. Already, if I was curious about whether you had a pool or a hot tub in your backyard, I could publicly go and buy that information. Does the fact of using a different technology change that dramatically?

One thing that I am mindful of is that most of the drones that are out there.... You often hear about what will be under the Christmas tree. There are going to be millions of them under Christmas trees this Christmas. Most of them have wide-angle lenses, and they are intended for landscape—to take in the vista, the amazing view that you have from up there. In most cases, you are not actually close enough. I've flown near people. I've obviously flown near myself, and when you get up to a certain level, I am unrecognizable.

Privacy law is about personal information, identifiable individuals. Most drones or UAVs that you find in *Consumer Reports* for recreational purposes really don't have all that big an impact on privacy. It's more a perception than a reality.

However, I've certainly heard from people who feel that having a drone fly over their neighbourhood or their house is, in and of itself, an intrusion. I'm not sure there is a whole lot more that could be said about that.

**The Chair:** Thank you, Mr. Aubin.

Mr. Fraser, go ahead.

**Mr. Sean Fraser:** One of the things you mentioned, Mr. Gervais—and a few of the witnesses touched on this—was the need for a licensing process, to some degree.

One of my concerns is that we have this tremendous new industry that could be a breeding ground for innovation, whether it's gas leak detection, package delivery, or a thousand things I've never even dreamed up. How can we design a licensing process that isn't so cumbersome that it prevents people from going and seeking to become a drone owner?

**Mr. Bernard Gervais:** The way Transport Canada has already prepared some of the draft legislation seems fine to me. It depends on the operation that you are going to be doing and on what the need is. If you're going to be doing a complex commercial operation, then you would need a pilot permit somewhat similar to what I have, which is what we are doing right now in aviation. If you're just going to be doing a recreational portion, then you would need the basic information, something like a competency card.

It's a tiered approach. It depends on what you are going to be doing and on the UAV that you are going to be using. That's entirely possible.

**Mr. Sean Fraser:** I'll open this up to the other witnesses. Maybe we'll start with you, Mr. Gervais, since you have the microphone.

Do you envision this as a sort of Government of Canada weekend training course, or would you license someone to sell these things at point of sale? Would Best Buy or whoever it might be say, "I guarantee that the purchaser has qualified to operate what I've just sold them"?

**Mr. Bernard Gervais:** I wouldn't put the responsibility on Transport Canada or.... Obviously there would be a fee to get that little competency card. It could be a possibility, but I haven't really thought about it. It could also be done on a third party website or through third party schooling.

There is some official training for complex operations, that's for sure, depending on the operation, but if it's just the weekend doing a recreational portion, it could be anything, really.

**Mr. Sean Fraser:** Sure.

Mr. Adamus, do you have any suggestions on what an appropriate licensing process would look like?

• (1030)

**Capt Dan Adamus:** Yes. Our position is that if you are going to be flying the UAS for commercial purposes, you must be a licensed pilot. You are in the airspace, so you have to adhere to the rules of the airspace. You have to understand it. You have to understand that there is a risk with this UAS if there are malfunctions. For commercial purposes, they are going way beyond the line of sight, so we believe you absolutely must be trained, just like other commercial users.

Just to be clear, a commercial pilot's licence means you can get paid to fly. That's what a commercial licence means. A flight instructor is a commercial pilot. Somebody towing banners is a commercial pilot. Sometimes that's misunderstood, so I had to make sure.

**Mr. Sean Fraser:** Should I take it, then, that if I want to go buy a drone at Best Buy so that Mr. Fraser and I can go back to Nova Scotia and take pictures of each other's drones for recreational purposes, there is no licensing process that you think would be required?

**Capt Dan Adamus:** No, there wouldn't be for that; however, I still believe there should be some sort of course that the user should take—a simple course, an online course, as for a boater's licence, for example.

**Mr. Sean Fraser:** Madam Chair, do I have much time remaining?

**The Chair:** You have two and a half minutes.

**Mr. Sean Fraser:** Very quickly, Mr. Fraser, do you have feedback on how we can implement a licensing process that won't stifle innovation?

After that, I'll turn it over to my colleague Mr. Sikand.

**Mr. David Fraser:** I think we already have the model with the boating cards. It's a program that implements a curriculum approved by Transport Canada. It's in the hands of third parties, and as long as they deliver it up to the standard, then it can be done.

I don't agree with the distinction between commercial and non-commercial; it should be entirely based on risk. If a hobbyist wants to go up 500 feet, they are incurring the exact same risk as a commercial person going up to 500 feet. The level of training and the level of licensing needs to be proportional to the risk of the operation, not whether somebody is getting paid.

**Mr. Sean Fraser:** Thank you.

I'll pass my remaining time to Mr. Sikand.

**Mr. Gagan Sikand:** Thank you.

Please forgive me if you find this question strange. I'm not a pilot. I'm thinking about this as if it were a lake and I were somebody who was boating.

We were speaking about a UAS's potential negative impacts from hitting an engine and whatnot. Do you see any positives? I know that planes are very sophisticated, but I'm equating this with a lighthouse or buoy markers. Do you think we can have positive benefits from using UASs to help and facilitate pilots in their operations?

**Mr. Bernard Gervais:** My first thought is no, but down the line when everything.... Let's think science fiction. They could be seen as lighthouses, if we could just keep them there, but that's in 30, 40, or 50 years. Certainly we could find something positive, but that would be science fiction, really, and then it would become reality at some point. Right now, at the point the technology has reached, we're not even close to that. It's more of a risk. If we can cohabit safely.... It's a risk.

**Capt Dan Adamus:** I agree with Bernard. Right now, no, the technology is not there.

There is a lot of stuff. We haven't talked about geofencing for UASs that are equipped with GPS. You could program them so that if they go to within, say, nine kilometres of an airport, they're just going to stop and hover; they're not going to go any further. You could build that geofencing around the Parliament Buildings; it's the same sort of thing. You could build it so that there's a maximum height.

That technology is there, but it's not being used everywhere.

**The Chair:** Okay.

Thank you very much, Mr. Adamus.

Go ahead, Mr. Iacono.

[Translation]

**Mr. Angelo Iacono (Alfred-Pellan, Lib.):** Thank you, Madam Chair.

Gentlemen, thank you for your participation this morning. I have a few quick questions. You can provide a yes or no answer with a brief explanation of the reasoning behind your answer.

In your opinion, is the recreational use of drones the most problematic, yes or no, and why?

**Mr. Bernard Gervais:** Yes, recreational use is the most problematic. The other uses are regulated and people are trained. They have insurance for drones and they know that they have to get a special flight operations certificate. They are familiar with the process.

**Mr. Angelo Iacono:** Mr. Adamus, what is your opinion?

[English]

**Capt Dan Adamus:** I'm sorry; can you repeat the question?

[Translation]

**Mr. Angelo Iacono:** In your opinion, is the recreational use of drones the most problematic?

[English]

**Capt Dan Adamus:** Yes.

[Translation]

**Mr. Angelo Iacono:** Why?

•(1035)

[English]

**Capt Dan Adamus:** The reason is that most users do not understand the risks of flying a drone, especially in airspace that other aircraft are using and also over built-up areas and over people.

**Mr. Angelo Iacono:** Thank you.

Mr. Fraser, would you comment?.

**Mr. David Fraser:** Currently, yes, it's a problem. I think these constitute the majority of UAVs that are out there, and they are being operated by people who have limited knowledge of how to safely operate them.

[Translation]

**Mr. Angelo Iacono:** So we can agree that the use of drones for recreational purposes should also be regulated or supervised, as in the case of drones used for commercial purposes.

**Mr. Bernard Gervais:** The regulations should be tailored to the type of use, but also according to what we have been talking about since—

**Mr. Angelo Iacono:** Should there be a distinction between the two, yes or no, or should the same sort of regulations apply to both?

**Mr. Bernard Gervais:** We think the same type of regulations should apply.

[English]

**Mr. Angelo Iacono:** Go ahead, Mr. Adamus.

**Capt Dan Adamus:** I say yes, with the slight distinction that in the case of those being operated for commercial purposes, the operator should have a commercial pilot's licence.

**Mr. Angelo Iacono:** Please comment, Mr. Fraser.

**Mr. David Fraser:** I am of the view that they should be regulated in the same way, in a way that's proportional to the risk that they present.

[Translation]

**Mr. Angelo Iacono:** Okay, but if we regulate drones based on their use and the risks involved, does that not compromise safety? After all, we want to make sure that drones are safe and we want to avoid disasters.

Who will be able to distinguish between a drone used for commercial purposes and a drone used for recreational purposes?

**Mr. Bernard Gervais:** From what I see at Transport Canada, the distinction between recreational and commercial use is hard to make. As Mr. Fraser mentioned, the regulations depend on the risk. It is the weight of the device and the type of device that determine the risk that it poses, not the way it is used. It is the device itself that determines the risk.

Someone can use a drone to take pictures, get paid to take them or just take them to admire the landscape. In any case, the device and the risk are the same. It can be the same operator, depending on the day of the week.

So we regulate based on the type of device and the way it is used.

**Mr. Angelo Iacono:** Thank you.

Do you want to answer, Mr. Adamus?

[English]

**Capt Dan Adamus:** I'll pass on this one.

**Mr. David Fraser:** The smart thing to do is just to ban recreational use of these vehicles, but the reality is that many of the people who are going to become competent commercial operators are going to start out doing it recreationally.

I think it's a valued activity, but it needs to be coupled with the steps that could be taken to prudently mitigate reasonable risk, while recognizing that no activity is ever going to get down to zero risk.

The distinction between commercial and non-commercial or commercial and recreational right now is subject to a huge number of debates. If somebody pays you later for a photo that you took today, does that make your flight commercial?

We shouldn't be arguing over that. We should be focusing on mitigating the actual risk based on the activity, which has nothing to do with whether or not somebody is being paid.

[Translation]

**Mr. Angelo Iacono:** Earlier, you talked about foolproof technology. What exactly did you mean by that?

**Mr. Bernard Gervais:** Thanks to sense and avoid technology and radiofrequency, you do not lose the connection with your drone or UAV. It is a bit like most of today's aviation systems and the aircraft that Mr. Adamus is flying. There is a double system, even a triple system, to ensure that the operation of the device is almost 99.99999% foolproof. That is what I mean by foolproof.

**Mr. Angelo Iacono:** I have one last question for all three of you.

Should UAVs be marked—you answered yes earlier—and be registered with Transport Canada, like all other types of registered vehicles, such as automobiles, motorcycles, aircraft and so on? This would allow Transport Canada to better control the types of drones used in airspace.

Should we add more details? Should we require a compulsory course so that people know how to use a drone? Should we go a little further and require a licence to operate a drone? Should we go that far?

[English]

**The Chair:** Can we have short answers, please?

[Translation]

**Mr. Bernard Gervais:** Yes, we should go further. Training for UAV users should be required to obtain a competency card. Drone registration should also be required.

• (1040)

[English]

**Capt Dan Adamus:** Yes, they should be registered and, yes, there should be a course that the user takes and a certificate issued.

**Mr. David Fraser:** I think there should be demonstrable user competence, and I think the way you do that is by operators. I think that any drone over coffee-cup size should be registered.

**The Chair:** Thank you very much.

Mr. Rayes is next.

[Translation]

**Mr. Alain Rayes (Richmond—Arthabaska, CPC):** Thank you, Madam Chair.

My thanks to the witnesses for their participation today.

At first glance, I wondered whether this matter was really an emergency, but the more I listen to you, the more I realize its importance.

We have talked a lot about air traffic safety. We are also talking about the protection of privacy. I was the mayor of a municipality with 45,000 people. Our discussions have reminded me of a situation in which I had to deal with the city's lawyers. A resident who had security cameras also used them to photograph his neighbour when she was sitting around her swimming pool in a bathing suit. We had to handle that situation.

I clearly remember the clerk of the municipality telling us about the problems that would come with drones and cameras, and the challenge of determining who would assume the responsibility. The people turn to municipalities, but these issues fall under federal jurisdiction.

Many issues will have to be addressed. For instance, we have not really talked about security issues involving terrorists and their potential use of drones. I have not seen the list with all the witnesses who will be appearing, but I suppose we'll be talking to other witnesses.

In navigation, training is provided for water craft used in leisure activities. Every person who wants to drive a motor boat must first fill out a questionnaire on the Internet. Although I have never done so, I imagine that the idea is to educate those people through the various questions and provide them with information so that they can better understand the issues. Naturally, someone might impersonate another person and pass the test, but given the way it's done, we can assume that the majority of people are following this process.

In your opinion, should all drone users be required to undergo that type of training?

[English]

**Capt Dan Adamus:** Yes. The same thing could be implemented for drones for the recreational user.

[Translation]

**Mr. Bernard Gervais:** The Canadian Owners and Pilots Association also believes that a process similar to that of the pleasure craft operator card should be followed.

[English]

**Mr. David Fraser:** I agree with that entirely.

[Translation]

**Mr. Alain Rayes:** A fairly quick measure could be implemented as a first step. We could then discuss all the other aspects, including the commercial aspect.

My understanding is that training and requirements are already in place for commercial drone users.

Mr. Adamus, earlier, you talked about some 700 cases in which drones were detected in flight paths with aircraft passing. However, have any accidents or serious cases been recorded?

My question is for all three witnesses.

[*English*]

**Capt Dan Adamus:** I'm not aware of any actual collisions. There could have been. I am aware of one drone that was a very large one, the size of a 737, which the U.S. Air Force was testing. They lost radio control, and it crashed very close to a neighbourhood. I think it was somewhere in California. That was a number of years ago. I am not aware of any actual collisions with aircraft.

[*Translation*]

**Mr. Bernard Gervais:** Members of our association have reported seeing drones on the wings of their aircraft. Those incidents are recorded in civil aviation daily reporting systems at Transport Canada. However, I have not heard of any cases of collisions.

[*English*]

**Mr. David Fraser:** I'm not aware of any either.

[*Translation*]

**Mr. Alain Rayes:** My question is for the analysts. Would it be possible to check whether there is a list of collisions at Transport Canada? It could be given to all the members of the committee so that they can see if anything like that has really happened.

Thank you, Madam Chair.

My thanks to the witnesses as well.

● (1045)

[*English*]

**The Chair:** That would be very helpful.

Thank you very much to all our witnesses.

To the committee, thank you for your co-operation—sometimes. I appreciate it very much.

The meeting is adjourned.

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