



This document contains information and suggestions that while not mandatory are never-the-less important advice for all MAAC members. To ensure that you have the latest version always check the MAAC [Web Site](#).

1.0 Title. MAP01 - Tutorial 2 (MAP01-T-2) – Airspace Classification Systems

2.0 Purpose. To provide MAAC Clubs and members an expanded plain language guide on the North American Airspace Classification system. This information is essential for members who are not familiar with the aviation system as they navigate the new regulatory realities.

3.0 Definitions Glossary of Terms.

The following new definitions were added to as they are related specifically to this topic. References, expansion and examples of meaning will be provided in the text of this document.

NONE

4.0 Contents

The following topics will inform a MAAC member on the relevant parts of the North American Airspace system needed to comply with the exemption:

A. Overview of North American Air Space

- NAV CANADA and its basic structure
- FAA and its role with Canadian Airspace
- Other “controlling agencies”

B. Relevant parts of the Canadian Airspace system

- Airspace types and classifications
- Controlled Airports & Aerodromes & Airspace
- Alert and Restricted Airspace

C. General Aviation concepts MAAC members need to know:

- ACC versus Tower
- IFR versus VFR

A. Overview of North American Air Space

One big picture distinction a MAAC member should know is who owns what and who controls whom – how does the aviation system work? In layman’s terms the hierarchy is as follows:

1. All sovereign Canadian airspace is technically “owned” by her Majesty the Queen. She in turn has given the Department of National Defense (DND) sole purview to oversee Canadian airspace.
2. The Canadian military takes whatever airspace it needs for its operations and allows the civilian government via Transport Canada (TC) to manage the balance. Transport Canada is **the** regulator of Canadian Airspace – they set and enforce **all** airspace rules. TC does not operate any part of the airspace system, but they do have **sole authority** over who gets airspace access or not – that is how MAAC obtained our exemption to PART IX of the new RPAS rules.
3. By acts of Parliament or TC permission, various other pieces of airspace (controlled, restricted or otherwise) have been further “sub-let” to other parties to “use” in various fashions. The biggest airspace users are called “Air Navigation Service Providers” and the biggest one in Canada is called NAV CANADA. The smallest airspace “owner” is a company that develops military UAV – Micropilot - they have their own small piece of restricted airspace in Manitoba. There are a handful of others across the country. All of these are the “controlling agencies” referred to in the exemption.

NAV CANADA and its basic structure

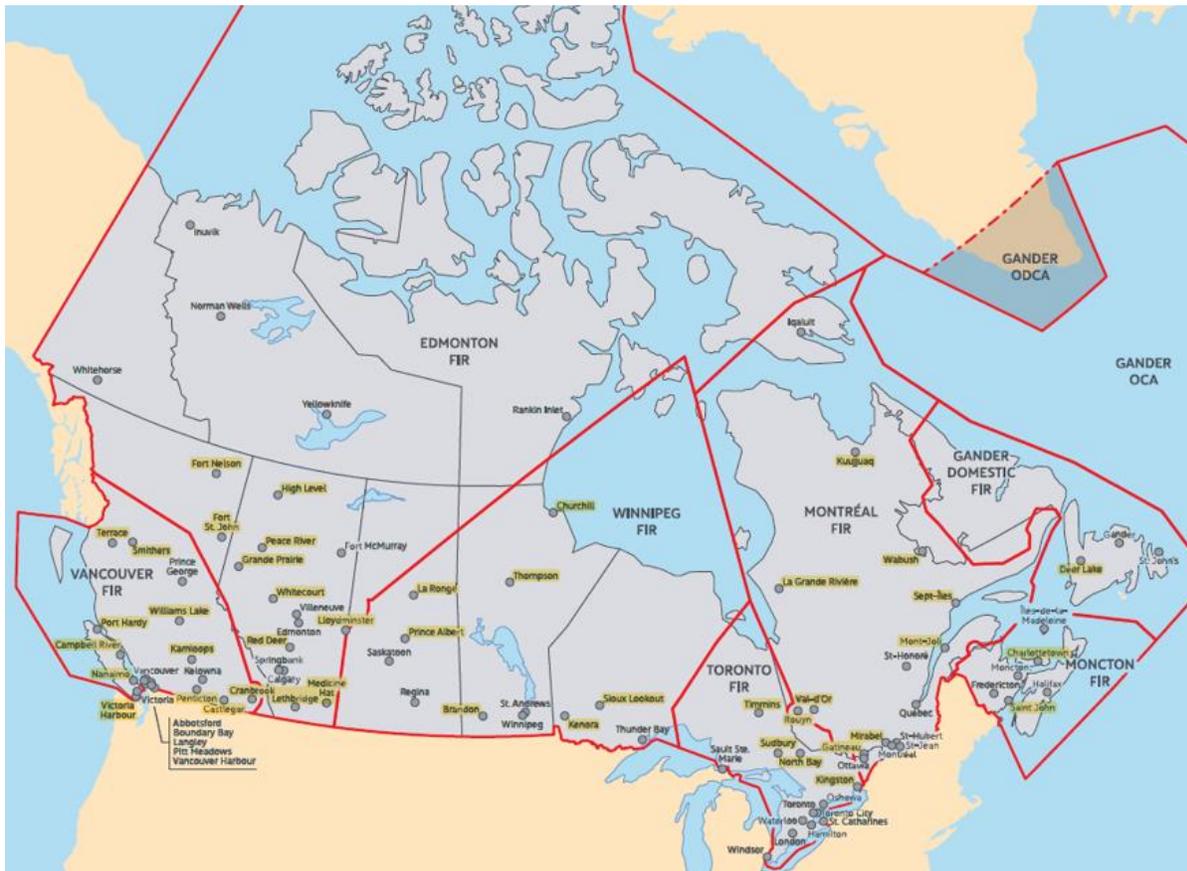
Because NAV CANADA runs the national Air Traffic Control system, they will be our most common point of contact for MAAC airspace issues. However, MAAC members **should not** be calling the local “Control Tower” for permissions – that isn’t how they structure their system. As briefly as possible and using the map below:

1. NAV CANADA is a **private not for profit company**. It is not owned by the airlines or funded by the government of Canada – operating costs are covered by charging “users” a fee for service. The biggest users (customers) are the airlines and they pay the most, while general aviation pilots pay the least. MAAC pays nothing – we generate no revenue for the company.
2. NAV CANADA’s head office is in Ottawa. Our MAAC president and other high level MAAC officials do have meetings with NAV officials in Ottawa – these are very broad topic meetings/discussion and generally not about Club XX wanting to fly at ZZZZ.
3. NAV CANADA organizes the country into 7 administrative regions called “Flight Information Regions” (FIR’s). Much like our MAAC zones, you should know what NAV CANADA FIR you are in as this will determine who you might need to submit forms to or possibly speak with directly.
4. Each FIR is administered from a building called an Area Control Center (ACC) – there is one in every FIR. Each ACC has a General Manager responsible for that FIR. Each ACC also has airspace experts called Unit Procedures Specialists (UPS) or Airport Operations

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Specialists (AOS) that are familiar with all RPAS rules and regulations – these are the folks that deal with most MAAC zone issues and might speak with members or Zone Directors directly.

5. Some FIR's also use other NAV support staff to manage RPAS operations. Another building located in each FIR is called the "Flight Information Center" – FIC. These facilities handle non-control type issues – often the first contact point for RPAS operators. MAAC may be directed to contact these folks as well.
6. What about the control tower? There are 42 Towers in Canada and an individual MAAC member should **not** need to contact any of them directly. Where that is the agreed upon process, the affected Club or member will have very clear direction. Please - **do not** call ATC Towers on your own initiative.



United States and its role with Canadian Airspace

Canada and the United States share the longest undefended border in the world – and the sentiments of joint cooperation extend into our airspace system as well

1. The US airspace classification system largely mirrors the Canadian system.
2. The operation of the US Air Navigation System however is completely different in that the federal Government owns, operates and controls all US airspace with a single governmental department called the FAA – Federal Aviation Authority. Some airspace is

given to the American Military to control. Most smaller airports have privately run Air Traffic Control towers – there are literally hundreds of different contact points.

3. As described in the media, the FAA has not taken a very friendly approach towards “drones”, model aviation in general or worked very well with the Academy of Model Aeronautics (AMA). The AMA is the US equivalent to MAAC.
4. Some Canadian airspace over sovereign Canadian land is “lent/delegated” to the FAA and vice versa. MAAC operations in delegated FAA airspace require extremely careful handling – explained in [MAP01-T-3 – Airspace Determinations and Permissions](#).

Other controlling agencies in Canada

After NAV CANADA, the next biggest controlling agency is the DND. Because Canada is not very densely populated, it is much easier for our military to establish numerous bases across the country each having large pieces of airspace. While some are in unpopulated areas like the Prairies (CFB Moose Jaw, Sk, Cold Lake, AB) some are surprisingly close to major urban population areas (CFB Trenton, near Toronto, ON). For our purposes all Military flying areas operate under the same rules as civilian airspace. The Canadian military has an Air Traffic Control liaison department stationed in NAV CANADA’s head office in Ottawa and are familiar with civilian RPAS operations.

The military uses airspace for more than just flying operations. Restricted airspace volumes are a special type of airspace of varying size and are established all over the country around other military special use areas such as firing ranges.

The US Military often comes to Canada to participate in war games and other preparedness drills. Because of our close ties via NORAD, it is not entirely uncommon to have a Canadian restricted airspace volume controlled by the US Military. These exercises can last months but are rarely permanent airspace volumes.

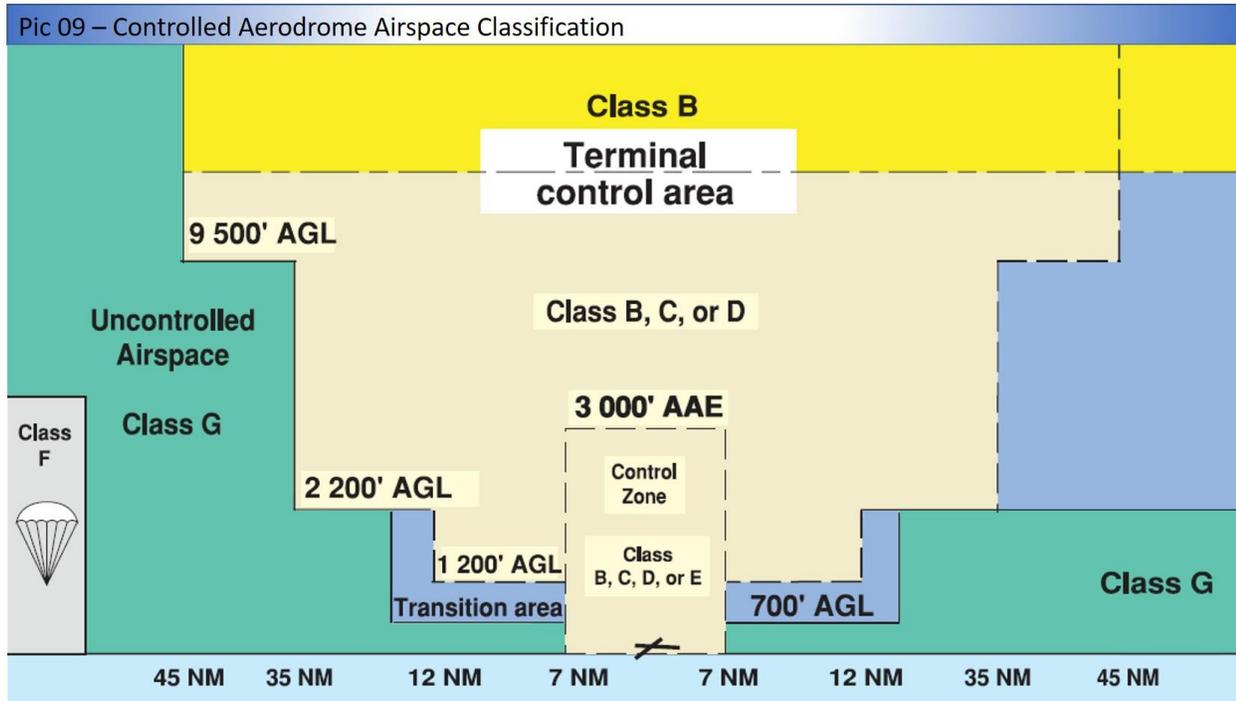
There are 2 Air Traffic Control Towers operated by a private company called SERCO. They are at North Bay Ontario and Portage La Prairie, Manitoba.

Lastly, there are a myriad of other agencies that “own” special use airspace. These can be as small as a 1-mile circle around a prison where the Prison Warden is the “controlling agency”, or irregular shapes to prevent airplanes from flying over specialty farms like Mink or Chinchilla.

How to determine who controls what and how to obtain permission is explained in [MAP01-T-3 – Airspace Determination and Permissions](#).

B. Relevant parts of the Canadian Airspace System

People will often refer to **airspace** structure like an upside-down wedding cake and that is an accurate description. There are two main versions of “wedding cakes” MAAC members need to be aware of – those near **controlled** airports/aerodromes and those near **uncontrolled** airports/aerodromes. Each has unique considerations for our compliance with the Exemption.



Airspace near Controlled airports/aerodromes.

Picture 09 shows a sideview of the typical airspace layout around a **controlled** airport/aerodrome (represented by the x shaped runway). Simply put a **controlled** airport/aerodrome will always have an Air Traffic Control Tower **and** controlled **airspace** (Class B, C, D or E “*Control Zone*”) immediately around it. In this picture there are other various names associated with varying types of airspace which really don’t matter to MAAC operations. The information we are most concerned with is whether the **airspace** is **controlled airspace**, which is determined **by the classification letter**:

Class “G”- (Green colour) the only **uncontrolled airspace** class in Canada and starts at the surface and extends upward – no **airspace** permission required for MAAC operations located in class G airspace. We can see from the example picture 09, that unless we are close (within 7nm in the example) to the controlled airport/aerodrome, we are in Class G uncontrolled airspace. Unfortunately, we cannot rely solely on distance from **controlled** aerodromes/airports for our airspace classification determinations as airspace is not always tidy circles or squares.

Class “E” – (Blue colour – labeled as “transition area”) this is controlled airspace and in Canada the lowest base starts at 700’ above ground level (AGL). **Class E based at 700’AGL is very prevalent near built up areas. The MAAC concern here is entering this controlled airspace from below.** For example, in picture 09 a flying field located

12nm away from the airport is in Class G airspace **under** the blue Class E. If the Club/member wants to fly higher than 700' above ground level, they would enter Class E controlled airspace from below. Permission is required for MAAC operations in Class E airspace – regardless whether we enter vertically or laterally.

Class “B, C, D or E” Control Zone – (Yellow Colour) – Controlled airspace defined around a controlled aerodrome/airport which starts **at the surface** up to a prescribed height. MAAC flying areas located within or infringing here will require permission from the controlling agency – which may or may not come from the Control Tower and may or may not be civilian. Across Canada there are MAAC Clubs and Fields located in airspace owned by the Department of National Defense (DND).

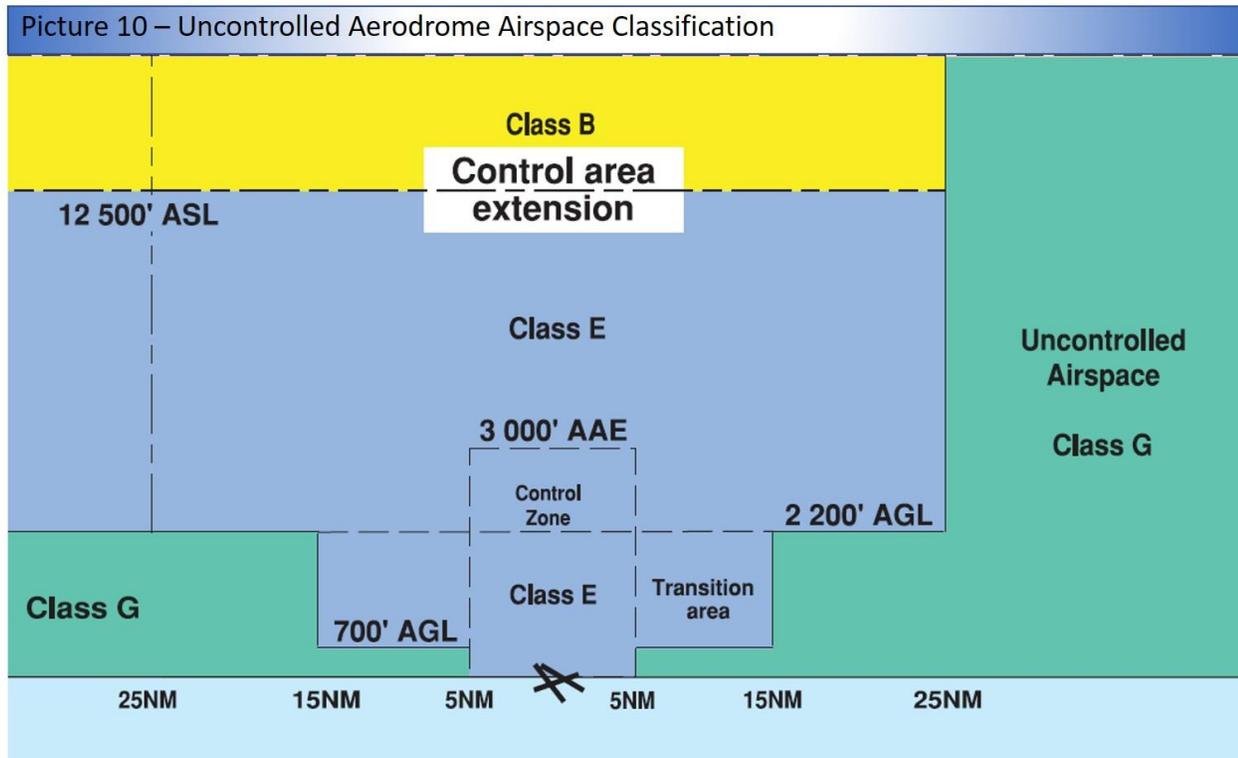
Class B, C or D – Other Areas – (Yellow Colour) – Controlled airspace with varying lower limits but normally never lower than 1200'AGL near controlled airports/aerodromes **or** 2200'AGL away from airports/aerodromes. It is almost impossible to enter Class B, C or D airspace based at 1200'AGL from below without first entering the “blue” Class E based at 700'AGL.

NOTE – there is a “highway in the sky” system in Canada connecting various points such as aerodromes which is comprised of various types of routes. Most of these are Class D or E controlled airspace and if so, will be and based at 2200'AGL. **The MAAC concern here is entering this controlled airspace from below.** While that may seem too high for line of sight operations, in hilly or mountainous areas **if** the MAAC field is located a significant distance above ground level relative to the adjacent surrounding area – that **could** place the **flying area** into controlled airspace above it vertically.

Airspace near uncontrolled aerodromes or airports

There is no material difference to MAAC operations whether a flying location is located near an “airport” or an “aerodrome”. For completeness, airports or aerodromes can be controlled or uncontrolled – meaning there can be a Control Tower (ATC) at an Airport or at an Aerodrome. What matters to MAAC is the **airspace** classification – is it controlled or uncontrolled **airspace**?

- If there is an ATC Tower present, the **airspace** will always be controlled airspace
 - Airspace classification letter does not matter to MAAC (E, D, C etc)
 - 42 locations in Canada have an ATC Tower – listed at the end of this document.
- If there is no ATC Tower, the **airport/aerodrome** is uncontrolled, but the **airspace** may still be controlled. Confused? See picture 10:



Centered in picture 10 is an example diagram of an **uncontrolled** airport/aerodrome located in **Class E Control Zone controlled airspace**. While there is no ATC Control Tower controlling the airport/aerodrome, there is controlled **airspace** within 5nm of the aerodrome from the surface upwards. MAAC clubs or members flying inside or infringing on this airspace require permission to operate.

The last permutation is MAAC Clubs or members that operate directly from uncontrolled airports or aerodromes in uncontrolled airspace (Class G). Per the Exemption they do not require **airspace permission** (not to be confused with an absolute “no” permission) – operating from any aerodrome regardless of airspace classification is addressed in [MAP01-T-5 – Flying from full scale aerodromes](#).

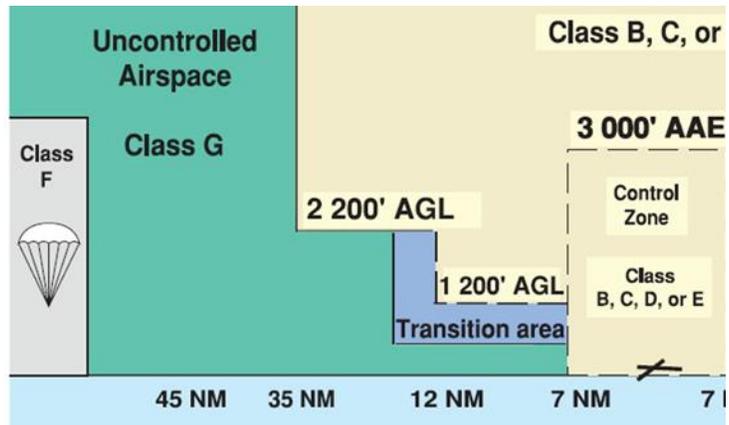
As per the explanation with Controlled airports/aerodromes, if the MAAC flying area is located wholly in Class G airspace no **airspace** permission is required. We do however have the same concerns about operating underneath the other various types of controlled airspace – in this case normally only Class E based at 700’AGL or 2200’AGL.

NOTE – in both our airspace pictures the example listed many lateral dimensions in Nautical Miles centered on the airport/aerodrome. Those distances are for illustrative purposes only and are not always the case. Control Zones at controlled airports/aerodromes all across Canada have many varied shapes and sizes – extreme care must be taken to ensure a MAAC Club or individual **flying area** is not inadvertently operating in a Class E, D or C Control Zone without permission.

Alert and Restricted Airspace

Another type of airspace classification that requires MAAC attention is called “restricted” airspace, or in aviation terms a CYR (the “R” means restricted). From our previous airspace sideways example picture restricted airspace is represented in this case by a parachute symbol (there are other symbols), and is classified by the letter “F”:

Class F – (Grey colour) a **restricted** airspace volume which usually starts at the surface and extends upwards. “Restricted” as the name applies is literally restricted from use without permission – that applies to **everyone**. Restricted airspace can be located anywhere and of any size or shape. Some CYR airspace volumes are permanent while others are temporary.



A MAAC **flying area** located within or infringing on a restricted area will require **very specific permission** from the controlling agency responsible for the airspace volume. Sometimes the owners don’t mind model airplanes and it can also be good for us if no full-scale airplanes are permitted in there either. However, one needs to be careful because some **restricted** airspace volumes are not human friendly at all (blasting areas, military ranges, biological research etc.).

A source of confusion for new full-scale pilots is another similar special use aviation term called a CYA – in this case the “A” stands for Alert. They are depicted on aviation maps in a similar fashion to a CYR. There are CYA airspace volumes of varying size and location across Canada and the designation is used to warn pilots of activities that **may** be hazardous to full-scale aviation. A CYA can be located inside or outside of controlled airspace – MAAC permission will still be based on the controlled airspace determination as before. A CYA located outside of controlled airspace is **not** a restricted airspace volume and does **not** require permission.

C. General Aviation concepts MAAC members need to know:

IFR versus VFR

“**IFR**” means the pilot is operating the aircraft according to the instrument flight rules. Any type of airplane can be operated IFR, but generally these are airliners and other higher performance airplanes. To fly in cloud, the aircraft must be operated under IFR – and that applies in controlled and uncontrolled airspace.

NOTE: IFR aircraft can and do fly IFR in clear blue sky – in controlled and uncontrolled airspace - that has implications for MAAC.

Very simply put, regardless of the weather conditions (cloud, visibility) the pilot of an IFR aircraft operating in controlled airspace, is **relying** on Air Traffic Control (ATC) for:

- providing collision avoidance from other IFR aircraft; and
- providing obstacle clearance from terrain and other items (antenna, windmills, etc); and
- ensuring they do not enter unsafe (CYA) or restricted (CYR) airspace; and
- providing alerts on **known** airborne hazards such as reported bird activity, adverse weather, known [Special Flight Operations Certificate](#) authorized part IX RPAS locations, including known MAAC operations.

In uncontrolled airspace, the pilot of an IFR aircraft becomes responsible for all the above.

Except for landing and take-off, IFR aircraft will not normally be operating at an altitude lower than 1000' above the highest obstacle. This reinforces why our location within 3nm of aerodromes is important.

Summed up – the pilot of an IFR aircraft is generally **not** looking out the window for collision avoidance from **unknown** model airplanes. ATC is not responsible for that either.

“**VFR**” means the pilot is operating the aircraft according to visual flight rules. This means the pilot is supposed to be looking out the window to:

- see and avoid other aircraft,
- avoid obstacles like terrain, antenna, birds etc and
- remain clear of clouds and stay within certain visibility limits.
- They must also use reference maps to remain clear of CYR or CYA as required.

In controlled airspace, the VFR pilot needs certain permissions and must follow ATC instructions – but the pilots are ultimately responsible for the above items. In uncontrolled airspace the pilot is responsible for all the above.

Except for landing and take-off, VFR aircraft will not normally be operating at an altitude lower than 1000' AGL over any **built up or populous area**. This reinforces why our location within 3nm of aerodromes is important. Outside of populous areas, VFR aircraft can fly as low as they like – down to the tree tops. MAAC pilots must always be vigilant for full-scale aircraft regardless of airspace classification or aerodrome locations.

ACC versus Tower

As previously mentioned, Canadian airspace is divided into Flight Information Regions (FIR) and each FIR has an Area Control Center (7 across Canada). There are also 42 ATC Towers across the country.

Each ATC tower is primarily responsible for their controlled airport/aerodrome:

- controlling IFR and VFR aircraft to provide a safe landing and takeoff environment (runways)
- controlling aircraft and vehicles on the airport surface, and
- other required advisories related to the airport/aerodrome

Each ATC tower is also responsible for other ATC functions in the **airspace** around their airport/aerodrome, in an area called the “control zone”. This is normally out to 5 miles centered on the airport, normally up to 3000’AGL and normally a circle. However, the Control Zone airspace can be as small as 3nm, or as large as 15nm and of any shape. Outside of that area however, all controlled airspace is controlled by the ACC.

At an uncontrolled airport/aerodrome located in controlled airspace, the ACC is responsible for controlling **all** IFR aircraft. So that means an IFR aircraft flying anywhere inside the huge limits of the FIR is controlled – literally separated – by a controller inside one of 7 buildings that might be 100’s of miles away from the airplane? Yes, which also means that ATC cannot “see” your model airplane.

VFR aircraft operating at controlled airports in controlled airspace are subject to varying rules that really don’t matter to MAAC. VFR aircraft operating at **uncontrolled airports** in controlled airspace are **not** controlled. That **is** important to MAAC.

MAAC implications? We cannot “cheat” and hope the “Tower” or the pilots will see us. We need to be very diligent about our operations not only near controlled airports in controlled airspace, but also near uncontrolled airports in controlled airspace. IFR pilots are generally not looking for “drones” whether flying from controlled or uncontrolled aerodromes. In controlled airspace, there can be VFR aircraft that are not controlled – meaning there is no big brother or ATC looking out for us, or advising VFR pilots of our possible presence.

NOTE: contrary to many urban myths, ATC cannot “see” model aircraft on RADAR. Even when our operations are approved and known to ATC, ATC is not responsible for collision avoidance for IFR or VFR aircraft from MAAC operations – **YOU ARE**. Per MSD03, **the ultimate responsibility for full-scale collision avoidance remains with the MAAC pilot – at all times and in all circumstances. It is always up to us to watch out for them.**

5.0 Resources

All official Canadian airspace designations can be found online for free, in a book called the “TP1820E - Designated Airspace Handbook”, or DAH for short. The link is here:

<http://www.navcanada.ca/EN/products-and-services/Pages/aeronautical-information-products-designated-airspace-handbook.aspx>

The DAH is written for Aviation professionals and is neither a handbook at 200+ pages nor intuitive as it uses aviation shorthand. The DAH depicts all airspace in an alpha numeric system based on aviation style coordinates. Its use ultimately requires access to a geo-grid type plotting system which some members may have, although that is extremely rare.

The DAH is the final word on any airspace classification issues and MAAC has the resources to use the document should the need arise.

2020 Canadian Air Traffic Control Tower List

ATC TOWER NAMES	ICAO IDENTIFIER	ATC TOWER NAMES	ICAO IDENTIFIER
Abbotsford Tower	CYXX	Regina Tower	CYQR
Boundary Bay Tower	CZBB	Saskatoon Tower	CYXE
Calgary Tower	CYYC	Sault Ste Marie Tower	CYAM
Edmonton Tower	CYEG	Springbank Tower	CYBW
Fort McMurray Tower	CYMM	St. Andrews Tower	CYAV
Fredericton Tower	CYFC	St. Honore Tower	CYRC
Gander Tower	CYQX	St. Hubert Tower	CYHU
Halifax Tower	CYHZ	St. Jean Tower	CYJN
Hamilton Tower	CYHM	St. John's Tower	CYYT
Kelowna Tower	CYLW	Thunder Bay Tower	CYQT
Langley Tower	CYNJ	Toronto City Centre Tower	CYTZ
London Tower	CYXU	Toronto Tower	CYYZ
Mirabel Tower	CYMX	Vancouver Harbour Tower	CYHC
Moncton Tower	CYQM	Vancouver Tower	CYVR
Montreal Tower	CYUL	Victoria Tower	CYYJ
Oshawa Tower	CYOO	Villeneuve	CZVL
Ottawa Tower	CYOW	Waterloo Tower	CYKF
Pitt Meadows Tower	CYPK	Whitehorse Tower	CYXY
Prince George Tower	CYXS	Windsor Tower	CYQG
Quebec Tower	CYQB	Winnipeg Tower	CYWG
Red Deer (TBD)	CYQF	Yellowknife Tower	CYZF

6.0 Current Version.

Version 1- Approved by the BOD on June 29, 2020

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