MAAC ADVISORY PUBLICATION - TUTORIAL (MAP-T)

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 - 1 (MAP01-T-1) – Flying Field Requirements

2.0 Purpose. To provide MAAC Clubs and members an expanded plain language step by step guide on how to determine the various Exemption requirements contained in ***MAP01 – Outdoor Flying Field Guidelines***.

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 MAAC flying field requirements – expanded version

As outlined in **MAP01 Outdoor Flying Field Guidelines** the **Transport Canada exemption** places new burdens on MAAC Clubs and members. Before we fly, the Exemption requires us to determine whether our flying site/area is in controlled or restricted airspace.

> *3. Prior to sanctioning a field in Class C, D, E, F, or any other type of restricted airspace, MAAC shall obtain an authorization through a written agreement from the appropriate controlling agency or user agency for the area. The agreement shall include operational boundaries, maximum altitudes, and communication protocols to facilitate the safe operation of RPAS at the field;*

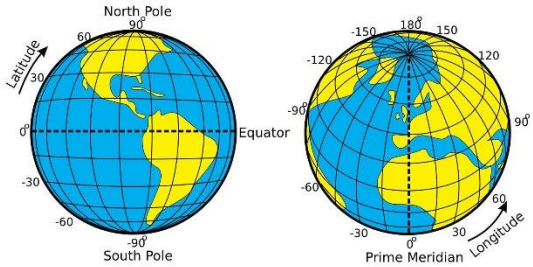
The following topics expand on that first exemption step – how to acquire the information we need to determine where we are relative to controlled or restricted airspace:

A. How to determine or define your pilot station coordinates

B. "Flying Area" - expanded
- How to determine flying area distances – lateral and vertical
- How to determine flying area coordinates – if required
- Complex flying areas

A – How to Determine or define your "coordinates"

You may recall from school the globe is divided into a grid like system. This consists of horizontal lines called "*parallels of Latitude*", which in Canada measure the distance North of the Equator. The vertical lines are called "*lines of longitude*" and in Canada measure our distance West of the Prime Meridian. Note that in some coordinate formats, measurements West of the Prime Meridian are expressed as a negative value.

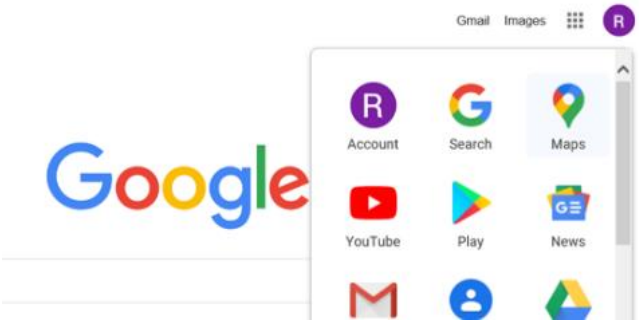


To meet our regulatory requirements, we need to determine where we are flying from – using the aviation coordinate system. **Not all personal GPS or internet-based coordinate systems use the aviation reference grid** – quite often the reference "datum" is vastly different. Members should **not** rely solely on coordinate information derived from portable or hand-held GPS devices. That type of information can however be used as the starting point in the following process. While there are many geo format/platforms available online, **only Google Map**/Earth has been tested and verified to supply correct and extremely accurate aviation coordinates, when using the following steps.

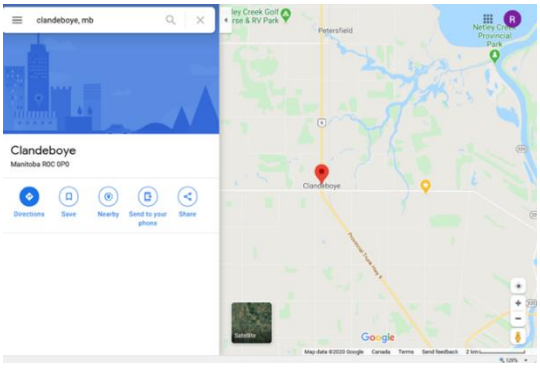
Our example flying field can be found using this non-aviation internet based decimal format:

Copy/paste and search these coordinates as written (50.238397, -96.909421) into Google Maps/Earth. This example is used throughout these tutorials.

1.0 Open www.google.ca and left click on the box of dots on the top right corner. A drop-down window will appear allowing you to select "Maps". The default map will be a location based on the address of your ISP (internet service provider).

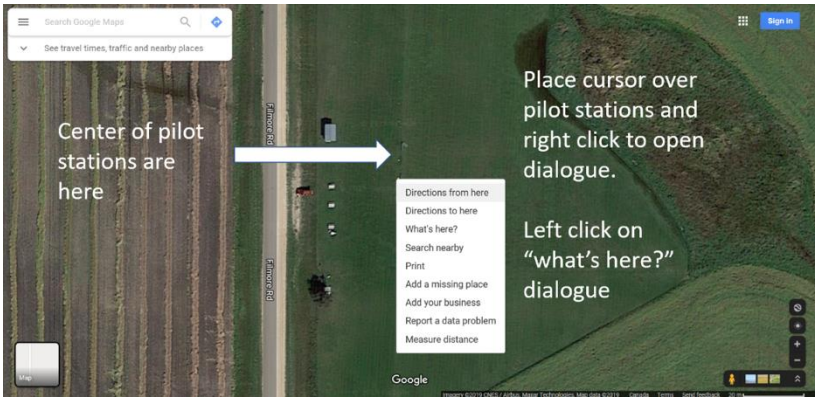


2.0 Locate your general flying field area (or proposed field) in satellite mode or earth mode. ("Satellite" mode works best for this purpose.) You can use the search feature to type in the civic address if known, search for a nearby address/prominent feature or just click and drag the map around until you find your flying site.



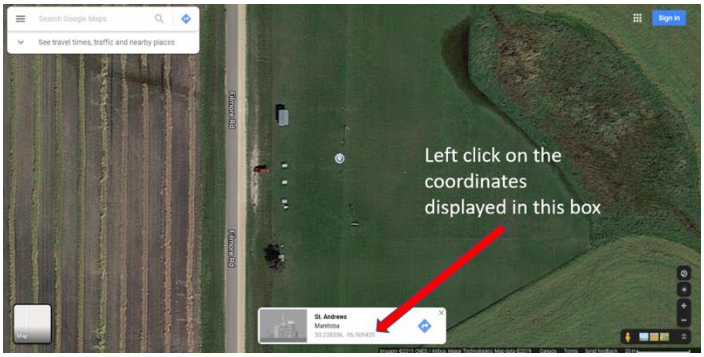
3.0 Zoom in enough to see the pilot station(s) or approximately where you plan the pilot stations to be. We need a singular reference point of the center of the area where pilots will most often/likely stand when flying (see questions below). Accuracy is important. We

will be using the resultant coordinates for a variety of important purposes so take the time to get this as accurate as possible (+/- 5' is acceptable).



4.0 Place your cursor over the desired pilot location and click the right mouse button. This will open a dialogue box on the screen – left mouse button click on "*What's here?"*

5.0 A new box will open at the bottom of the screen showing the name and coordinates in decimal format. Left mouse button click on the coordinates – not the name.



6.0 A new sidebar will open showing more detailed information, specifically the coordinates in both aviation format and decimal format. Record the coordinates, **exactly as displayed (**50°14'18.1"N 96°54'33.9"W), for use in all future assessments and paperwork.

This location information will suffice for about 90% of our MAAC flying sites. There are however instances where you may need to provide more detailed location information. Those instances will be obvious and additional information is found at the end of "Flying Areas – Expanded" in this document.

Common questions or problems

1. *What if my Club has multiple pilot stations or uses both sides of the field? Which one do we use/submit? An average?*

   The main purpose of defining a singular coordinate for pilot stations is to have a starting point to determine our **flying area** proximity to controlled/restricted airspace and full-scale aerodromes. In the case of multiple pilot stations, choose the more commonly used one, or if used equally, pick one and start the process using those coordinates:

   - If you determine the first **flying area** is wholly in uncontrolled airspace and not near any full-scale aerodromes, the exact location of the secondary pilot stations is likely moot.
     - Use one location on the MAAC form and make a note of the other pilot station locations.

   - If you determine you are "near" controlled/restricted airspace and/or full-scale aerodromes, then you should asses the other pilot station location(s) to determine if any resultant **flying area** is closer or further from controlled/restricted airspace and aerodromes.

     - In this instance you should clearly indicated your club has multiple pilot stations and submit your assessment for each pilot station location. The MAAC form has room for 6 – additional paper is acceptable.

   - If either pilot station and resultant **flying area** is in controlled/restricted airspace, you **may** need to provide the coordinates of the center of each pilot station location to the controlling agency. Be clear about your layout with the controlling agency and they will advise on how to proceed.
     - In this instance you are advised to treat each pilot station as an independent flying site and submit your assessment for each pilot station location

2. *Our club flies from various sod farms that change all summer – we don't have a defined location never mind a defined pilot station. What do we use?*

   You **must** define a starting point – choose the first *likely* sod farm site with the most *likely* place pilots will stand to fly from and start the process. As in the first question, once you determine where your **flying area** is relative to controlled/restricted airspace and aerodromes, you will know with certainty how much latitude you have for seasonal adjustments/moving.

   - If your first **flying area** is wholly in uncontrolled airspace, be mindful of how near any controlled/restricted airspace is – you don't want to inadvertently move into it.
     - If any of your likely **flying areas** are in controlled/restricted airspace, the agreement with the controlling agency will likely need to contain a mechanism to adjust for your movements, or it may need to restrict those movements. Each situation will be unique – contact your Zone Director for assistance.

3. *What do I submit to MAAC in either of the above circumstances?*

Provide a single set of coordinates for the average pilot station coordinates, or the one you used for the initial survey, or submit each pilot station as an individual flying site. Also submit a plain language explanation of why there are so many locations.

4. *I plan to fly from my cottage, at 2 different docks. Which one do I use/measure?*

As in the questions above, pick one site and start from there. You are legally responsible to ensure you do not fly in controlled or restricted airspace without permission – be diligent.

5. *I want to fly beside a country road, but not a specific point on it. What do I use?*

As in the questions above, pick one spot and start from there. You are legally responsible to ensure you do not fly in controlled or restricted airspace without permission – be diligent.

- Common sense can prevail – if you are diligent using this process and determine the "road" or location is 50+ miles from the nearest controlled/restricted airspace, obviously moving a few miles up or down the road will not matter.

- If you are "near" controlled/restricted airspace, your site location and accuracy of coordinates and location will matter more. Use your discretion.

Flying Area – expanded

As outlined in **MAP01 Outdoor Flying Field Guidelines, flying area** sizes should be based on the chart and diagrams below. It is recommended to use the larger distances or whatever combination thereof for what is possible to be flown at a location as this allows more varied aircraft types.

Chart 1: Flying Distance

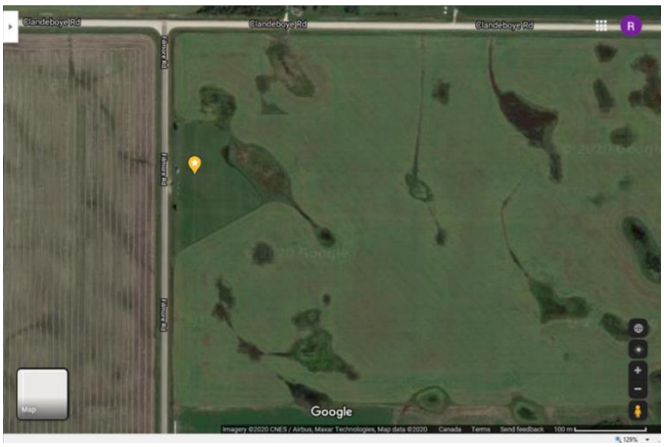
MAAC Suggested Distance	Turbines/Large / High Performance	Sport Flying	Small Aircraft	Park Flyer	Multi-rotor/ Helicopter
A- Depth	500m/1500'	225m/750'	150m/500'	45m/150'	90m/300'
B- Length	900m/3000'	450m/1500'	300m/1000'	90m/300'	90m/300'
C- Altitude	300m/1000'	210m/700'	120m/400'	120m/400'	120m/400'

How to determine flying area distances - lateral

If you are building a new club from scratch, or possibly a personal flying site, it may be possible to use the exact distances from the charts. Unfortunately, life doesn't always come in tidy boxes and neither do our existing flying fields. Most clubs will have to reverse engineer to determine the size of their existing **flying areas** based on what they actually use. While Clubs could go out and physically measure these distances with a long tape measure or phone app, Google Maps/Earth has some built in features to help with this from the comfort of your home.

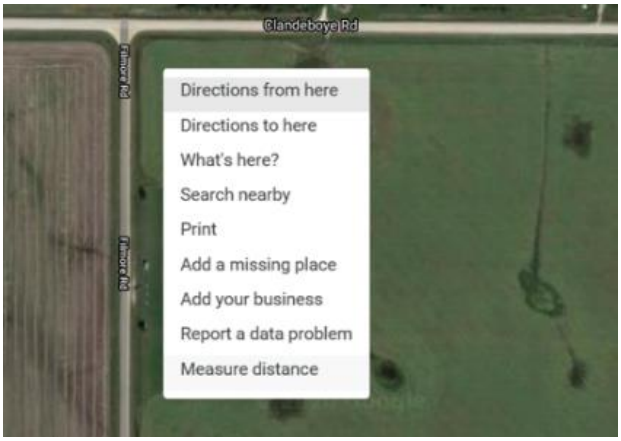
1. Open **www.google.ca** and left click on the box of dots on the top right corner. A drop-down window will appear allowing you to select "Maps". The default map will be a location based on the address of your ISP (internet service provider).

2. Locate your general flying field area (or proposed field) in satellite mode or earth mode. ("Satellite" mode works best for this purpose.) Zoom in just enough so your entire **flying area** is visible. You will need to be able to visualize how far out you normally fly. If you have no idea that's fine – we can reverse engineer that as well.

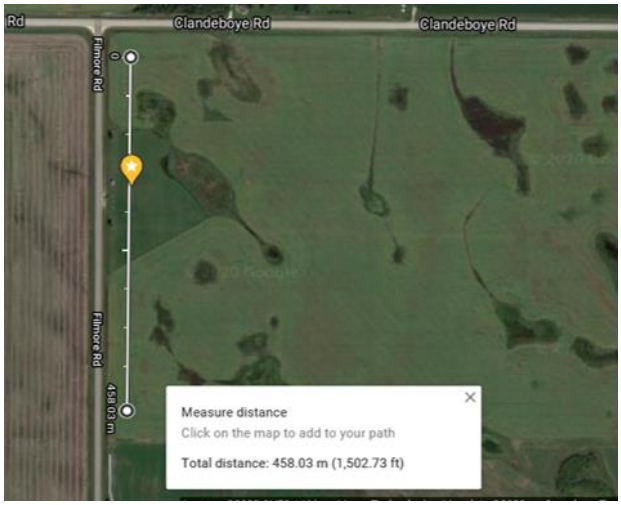


3. **Start measuring**. If you have a defined flight line, or "length" of the flying area, that is the easiest place to start. In our example the runways are North/South and so is the flight line. There is a road to the North that defines that limit, as well as a crop to the south – this forms the North and south limits of our example "length". To measure that distance:

   A. Place the cursor over the spot on the map that forms your starting point and right button click the mouse. A pop-up window will appear – select "*Measure Distance*". The window will disappear, and a white dot will appear on the map where your cursor was. If the spot is good, go to step B. If you are not satisfied with the location, you can click and drag it, or click on it to remove it and start over.



B. Place the cursor over the **next** spot on the map you want to measure to. Right button click will open a pop-up window – select "Distance to here". The window will close, and you will be shown a line with measurements in meters and feet. You can click and drag the end points to get a "better" line – more parallel or more representative of where you fly. Once done record the distance (ex 1502' rounded to 1500').



C. You can also click and drag the ends until you get a desired measurement. For instance, if you want to see what 2500' looks like, drag one end until the readout is 2500'.

D. Repeat these steps to determine the "depth" of our flying area. Measure from either corner of the flying area outward, or simply from the pilot station outward. Unfortunately, Google maps only allows one measurement on the screen at a time. You can add segments to an existing line/measurement, but that results in a circumference or total measurement – not what we need right now.

E. It can be visually difficult to determine exactly how far "out there" we normally fly. Using previous "crash" locations is one way to be more accurate. Having a spotter safely determine a geographic reference while actually flying is another. The distances provided in the table above are instructive however. Remember we must maintain line of sight – the smaller the model the less distance away we can see it. 1500' away laterally in a direct line is quite far away – especially once we add in altitude.

F. The flying area "length" is not always centered on the pilot stations. In our example the North segment is 500' long, the south 1000', for a total length of 1500'.

How to determine flying area distances - vertically

How high can we really fly?

The exemption does **not** state an altitude limit but does provide some altitude related guidance

> *3. Prior to sanctioning a field in Class C, D, E, F, or any other type of restricted airspace, MAAC shall obtain an authorization through a written agreement from the appropriate controlling agency or user agency for the area. The agreement shall include operational boundaries, maximum altitudes, and communication protocols to facilitate the safe operation of RPAS at the field;*

If your **flying area** is in controlled airspace, how high you can fly is **determined by the controlling agency** (it's called controlled airspace for a reason – its controlled) – up to a

reasonable line of sight limit. There are many factors that go into their decision making, but it is ultimately the controlling agencies decision.

The second exemption "restriction" on "*how high can we fly*" is based on how far you can safely see and control your model – we are not talking "spec in the sky" here either.

> *6. The member of MAAC shall not operate a RPAS unless the pilot or a visual observer has the aircraft in visual line-of-sight at all times during flight;*

The MAAC chart provides altitudes above ground (AGL) that are based on the simple principle the bigger the model the further we can **safely see and control** it. We must be realistic with these altitudes – can you actually see what the model is doing?

The highest altitude the chart suggests is 1000' and that is not accidental. Not only is that very high even for 30% models, but that is one of the lower altitudes used by full-scale airplanes as they fly cross country or conduct circuits near aerodromes. At and above 1000'AGL we are operating where an encounter with a full-scale airplane is much more possible – even in uncontrolled airspace. Making matters somewhat worse, full-scale pilots operating above 1000'AGL are generally not looking for or expecting RPAS operations – Part IX RPAS are restricted to 400'agl without additional safety protocols.

The next altitude on the charts is 700' – again not chosen by accident. 700'AGL is the most common base of controlled airspace away from aerodromes. If your flying area is not laterally located with the confines of controlled airspace that touches the ground, the next nearest opportunity to enter controlled airspace is likely vertically above you – and that **requires permission**. Larger Sport aircraft are easily capable of flight above 700'AGL, but you have a legal responsibility to know what airspace you might be entering. Making matters somewhat worse, full-scale pilots operating above 700'AGL are generally not looking for or expecting RPAS operations – Part IX RPAS are restricted to 400'agl without additional safety protocols.

The last suggested altitude is 400'AGL – again not chosen by accident. 400'AGL is the "normal" maximum altitude used by the actual CARS PART IX compliant RPAS community. If your **flying area** is in controlled airspace and near an aerodrome, the controlling agency will often want to restrict your operations to the blanket RPAS 400'AGL. See the tutorial on "Airspace Permissions" for more explanation.

How can we determine how high we are flying?

The short answer is there is no officially recognized Model Aircraft altitude determination method – and MAAC is not required to use Aviation Certified and calibrated barometric altimeters on our models.

The longer answer is to exercise sound judgement and prudence – location and scenario dependent. For instance, if your flying site is a location where your **flying area** airspace survey indicates no full-scale aviation is likely (not near controlled airspace/aerodromes/airways) then it is probably not as critical to ensure you remain **exactly** below 700'/1000'/2200'AGL.

Conversely, if you are flying near a major/minor airport in controlled airspace and the controlling agency has restricted your operation to below 400'AGL – then we need to be able to meet that with a higher degree of certainty.

Some members have used various electronic means such as telemetry or even model rocket altitude loggers. All of this technology should be used with common sense and a few cross checks.

NOTE – do **not** use GPS derived altitude information. There is no internationally agreed upon datum or reference point. We need to know altitude above ground at our location – not height above a random GPS datum.

Simple barometric altitude devices are available from a wide range of sources including hobby stores.

The other tried and trusted method to determine model aircraft altitude with a reasonable degree of accuracy uses the **flying area** measurement process you used for your specific flying field. The process is as follows:

1. Use Google maps to make/find a measurement on your flying field for the distance you require.

    a) In this case let's say you need to determine what 400'AGL looks like – measure 400' laterally out from the pilot station on the flying field surface.
    b) Note the geography – look for markers etc.

2. Go to the flying field and have an assistant walk out onto the field and hold your airplane(s) at the distance (400') mark – in various attitudes.

    a) There are phone apps that will measure distance while you walk.
    b) Note the relative size of the model to your eye.

3. When flying, keep the model at that reference size – or larger.

    a) Logically the smaller the model appears the further away (or higher) it is.
    b) Because we also fly "out" and away from the flight line (which is at least 7m from our pilot position/station) we can be assured the size reference will be somewhat below our target altitude.

4. This measuring process can be done by each individual member, as part of the Club joining process or as part of Club Training night – whatever the Club or members deem appropriate.

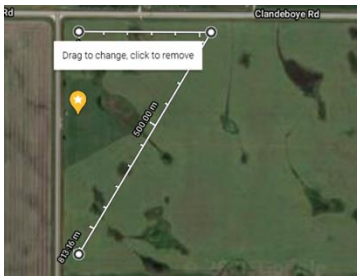
As with everything, each Club or member needs to determine what is required for their operation and carefully ensure they meet the Exemption requirements.

How to determine detailed flying area coordinates – if required

As previously noted, some Clubs or members may be required to define their flying area with greater precision. The suggested process to do so is a merger of that we used to determine pilot station coordinates and how we measured **flying area** distances.

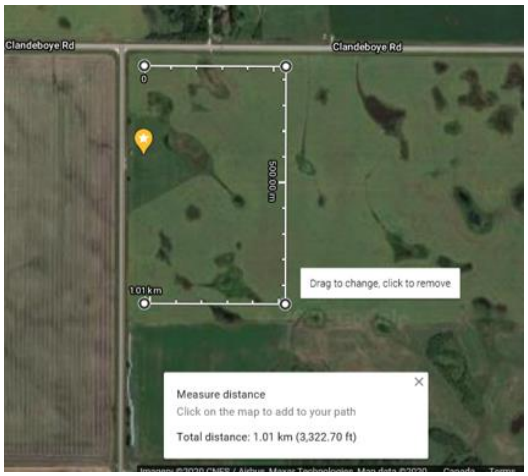
1. Open www.google.ca and click on the box of dots on the top right corner. A drop-down window will appear allowing you to select "Maps". The default map will be a location based on the address of your ISP (internet service provider).

2. Locate your general flying field area (or proposed field) in satellite mode or earth mode. ("Satellite" mode works best for this purpose.) Zoom in just enough so your entire **flying area** is visible. You will need to be able to visualize the lateral flying area measurements you made earlier.



3. Use the "*measure distance*" tool to re-draw your flight line (or any other easy reference line). Once you are satisfied with the line position, move your cursor over the midpoint of the line – a dot and text will appear. Left click and hold the mouse button down while dragging the dot to the approximate location of one corner of your flying area. It need not be exact.

4. Repeat the process on the middle of the other line(s) to form an open box that represents your flying area. You can click and drag the "dots" around to get the actual sizes and distances you determined earlier. NOTE the line "measurement" is a total distance and can be useful with a little math. Using references on the ground is likely an easier method to plot the flying area box.



5. To obtain the coordinates of each point, right button mouse click over each point, and select "What's here?". A pop-up will appear at the bottom of the screen again – left click on the coordinates.

6. A new window will appear with the coordinates of the spot we choose just as we did for pilot stations. Record those coordinates and repeat the process for each point that defines the flying area. When done correctly, the Aviation Controlling Agencies will be able to input these coordinates into their plotting systems and even their Air Traffic Control systems - providing them exact knowledge of the "box" where you are operating

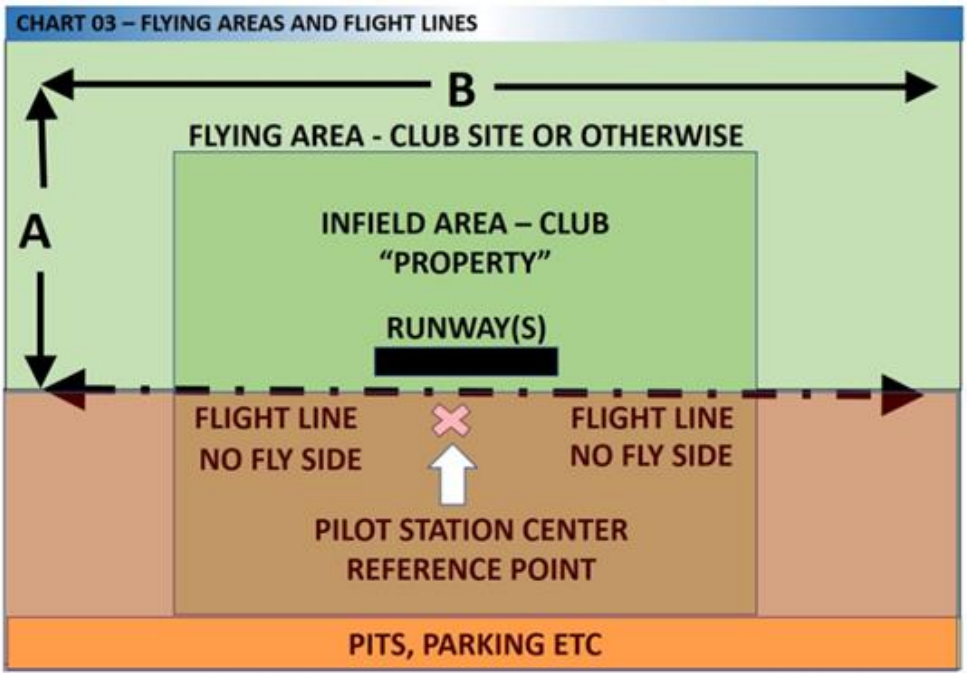
7. Of course, if the controlling agency needs this accurate of information, there is an obligation for you to STAY inside whatever you defined as your flying area! Physical markers on the ground or other means to inform/orient pilots is highly advisable.

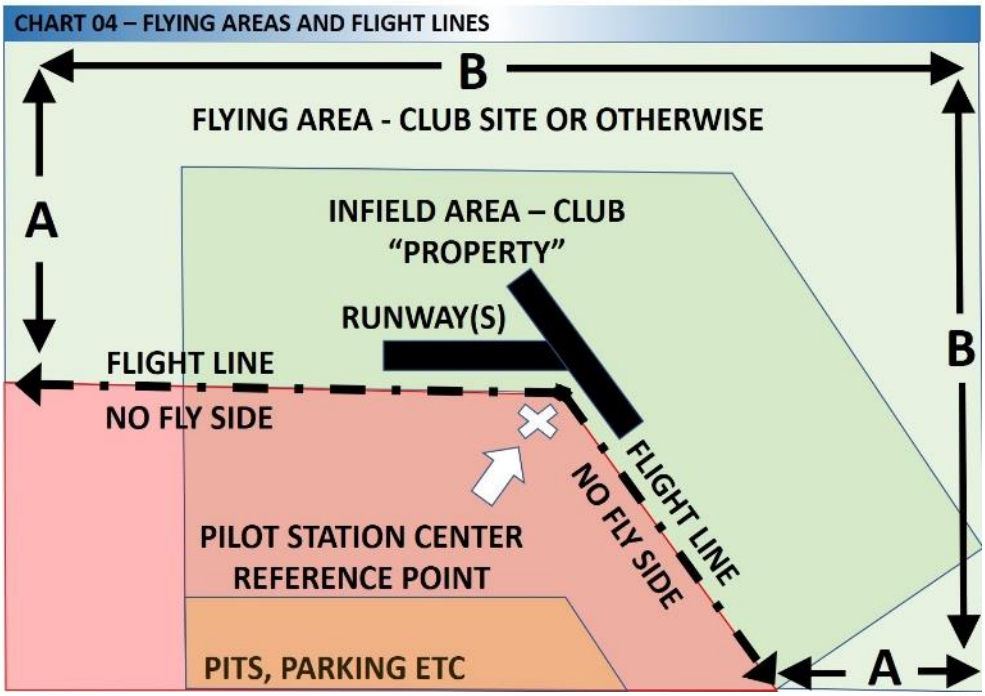
Complex Flying Fields and reverse calculations

Not every flying area will be a box, rectangle or square. Whether you need to precisely plot and measure every angle and distance is going to be determined case by case. The following guidelines should ease this process.

1. If you have determined your pilot station coordinates are quite literally in the middle of nowhere (not within 10+nm of controlled airspace, not near any aerodromes/waterdromes), then it really serves no purpose to precisely plot a polygon flying area. A simple drawing on your Club application diagram with best guess distances of an approximate rectangle or polygon will suffice.

2. If your flying area is in controlled airspace, and if the controlling agency requires a detailed plotting of your polygon flying area, complete with accurate measurements, then you should contact your Zone Director for assistance. MAAC has members who can complete this task with far more ease and accuracy than any tutorial can provide.





5.0 Current Version.

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

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