

MidAir Collision Avoidance (MACA)



**Warfield Air Base at Martin State Airport
Baltimore, Maryland**



March 2019

Dear Fellow Aviators,

Welcome to the Maryland Air National Guard Base's Mid-Air Collision Avoidance (MACA) program. We applaud and encourage your interest in making the skies around the greater Baltimore/Washington area a safer place to fly. The 175th Wing MACA program will provide you with valuable information to help make your journey through our shared airspace safe and mishap free.

Midair collisions are an area of vital concern to everyone who flies an airplane. The actual number of midair collisions between Air Force aircraft and general aviation aircraft is relatively low; however, 80 percent of reported Air Force near misses occur with general aviation aircraft. Because of increasing general aviation traffic and heavy concentrations of military aircraft involved in training, we want to inform you about the flying activity at the Maryland Air National Guard.

The purpose of this pamphlet is to alert you to the many areas of high midair collision potential in the skies of the local flying area of the Maryland Air National Guard, provide recognition tools for our aircraft, and to discuss ways to make our shared flying environment safer. It provides information regarding midair collisions and ways we can all help avoid them. Please keep in mind that this pamphlet is **not** intended as a flight planning tool. This safety office program is designed as an informational tool to help prevent accidents.

The members of the Maryland Air National Guard are committed to maintaining a valid and active midair collision avoidance program. We hope this pamphlet will serve to increase your understanding of the Maryland Air National Guard's flying activities so we may continue to safely share the skies. If you need any additional information from the Maryland Air National Guard concerning our operations, please contact the 175th Wing Safety Office at (410) 918-6278/6339/6524. Our e-mail address is USAF.MD.175-WG.LIST.SE@MAIL.MIL.

Additional copies of this pamphlet can be obtained by calling the Maryland Air National Guard Safety Office at the above numbers.

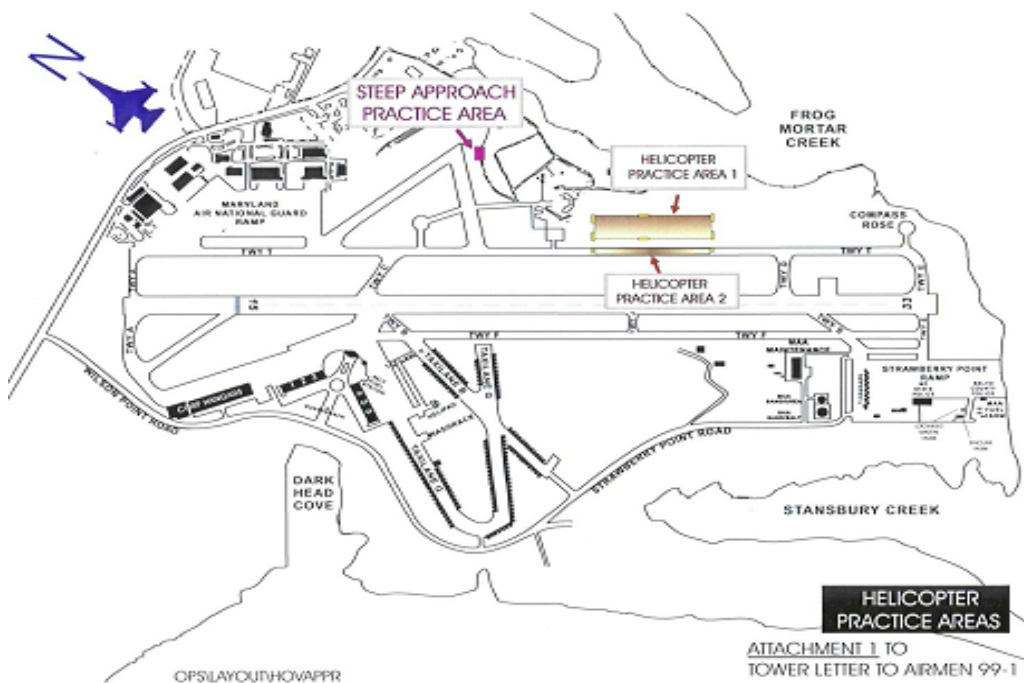
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Warfield Air Base

Martin State Airport, Baltimore, Maryland

Base Location: 8 miles northeast of Baltimore, MD
Airfield Identifier: KMTN
Coordinates: N39 20.000, W075 25.000 (20 ft)
Operating Hours: Military Aircraft fly from sunrise to as late as 10:00 pm.



Martin State Airport operates in a very unique way. The airport is basically divided in half. The west side incorporates the general aviation aspect which most civilian pilots are familiar with. However, on the east side, flying operations are quite different. This is the location of Warfield Air Base, home of the 175th Wing. The wing is the base of the A-10C “Warthog”. This is where military aviation operations occur.

Safe operations between civilian and military aircraft is a top priority for the 175th Wing Safety Office. We hope the general information provided about the daily operation of these aircraft will help promote safe flying integration between military and civilian aircraft.

MARYLAND AIR NATIONAL GUARD OPERATING INFORMATION

The 175th Wing oversees the flying operations of the 104th Fighter Squadron. The 104 FS “Fightin O’s” employ the Fairchild A-10C Thunderbolt, better known as the “Warthog.”



A-10C “WARTHOG”



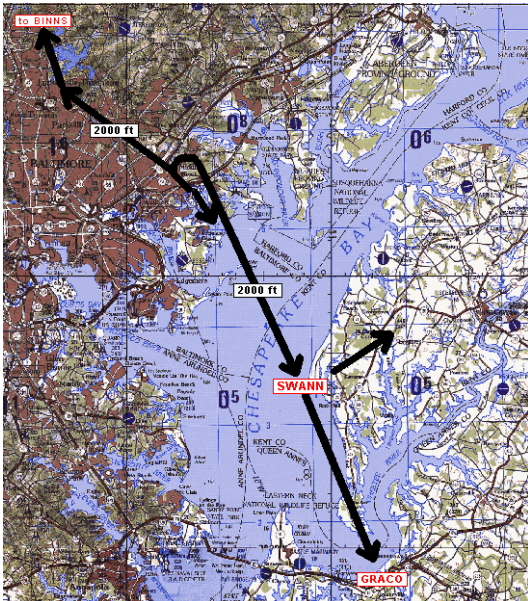
The A-10C is a multi-role fighter. While flying training missions from Martin State Airport, it can be found flying anywhere from 500 AGL to FL180. Airspeeds range from 140 knots while flying instrument approaches to 300+ knots flying on military training routes. Most training flights consist of 2, 3 or 4 aircraft. So if

you see one, chances are there are more! The majority of flying takes place in one of three places: Bollen Range (northeast of Harrisburg, PA), Warren Grove Range (north of Atlantic City, NJ) and the Patuxent Restricted Areas (adjoining Patuxent NAS, MD). Flying training includes low level flights at 500 ft, Military Training Routes (VR Routes), air-to-air refueling in MOA’s and aggressive vertical/horizontal maneuvering in the restricted areas. These areas are depicted in more detail later in this pamphlet. So if you fly in Maryland, Delaware, S. New Jersey or SE Pennsylvania, chances are you have come across the “WARTHOG.” Unfortunately, you may have never even known they were there! Keep in mind, we’re pack’n a big gun but we don’t have a radar. The A-10C relies on advisories from ATC, limited datalink of surrounding aircraft, and above all-- see and avoid!

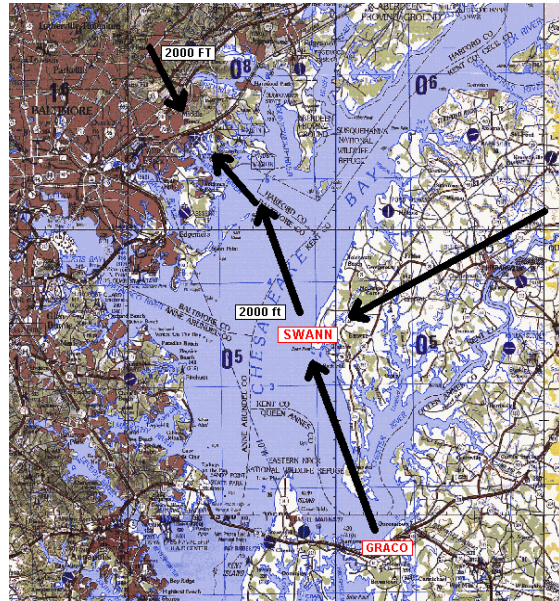




A-10C Primary Areas of Operation

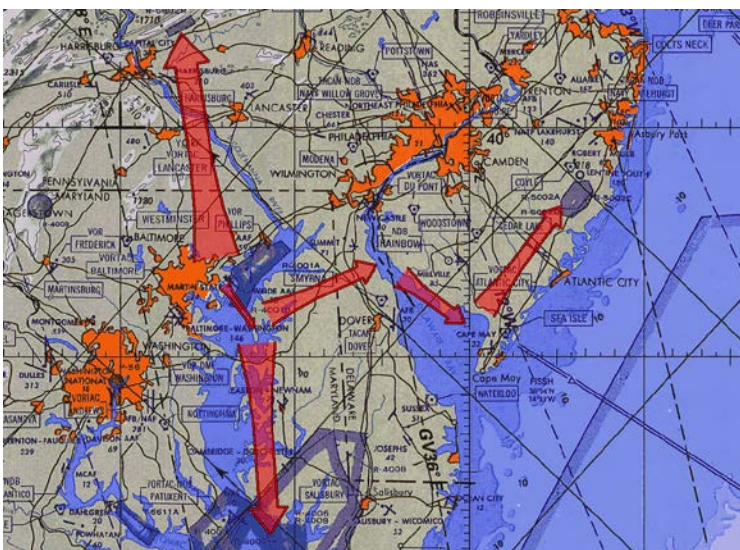


Departures



Arrivals

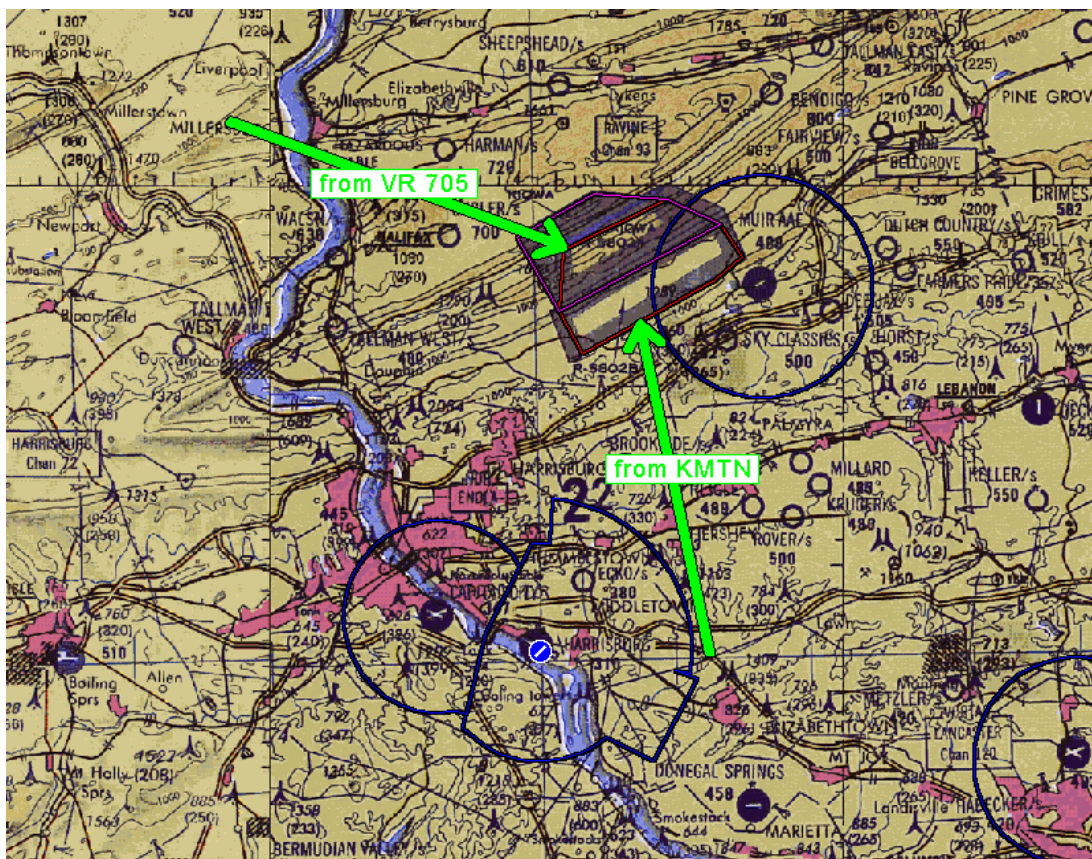
Departures / Arrivals: The majority of the A-10C flight plans have the planes departing toward SWANN / GRACO (east / south) or BINNS (north). The initial altitude is almost always 2000 ft. Likewise, arrivals are flown at 2000 ft. when approaching Martin State Airport for a straight-in or overhead approach.



Enroute

Enroute: Once enroute to the local training areas, A-10C flight training takes place at altitudes from 500 ft. up to FL180. The map indicates the relative direction of the flights. Keep in mind, where there is one "HOG" there are probably more!

BOLLEN RANGE (R-5802) Primary Training Area to the Northwest



Bollen Range falls under the responsibility of the U.S. Garrison located at Fort Indiantown Gap. Fort Indiantown Gap is located approximately 14 miles northeast of Harrisburg, PA. This is the primary training area to the north for the A-10s. Entry on to the range is generally via VR 705 from the northwest or direct from Martin State Airport (KMTN) from the south. The primary navigational fix for reference is the Ravine VORTAC (CH 93). The A-10s utilize Harrisburg Approach Control (KMDT) for traffic advisors from civilian traffic. While operating in the restricted area, a discrete UHF frequency is used. The range boundaries are depicted on the map. Vertical boundaries are surface to 13,000 feet MSL. Departure from the range usually involves radar contact with Harrisburg with a handoff to Potomac Approach Control back to KMTN. **The best planning aid for flights in this area is to be in contact with Harrisburg Approach. At a minimum, squawk VFR 1200 so you may be seen by radar.** Remember, the A-10C has no radar and relies on ATC, limited datalink, and see and avoid!

WARREN GROVE RANGE (R-5002)

Primary Training Area to the South

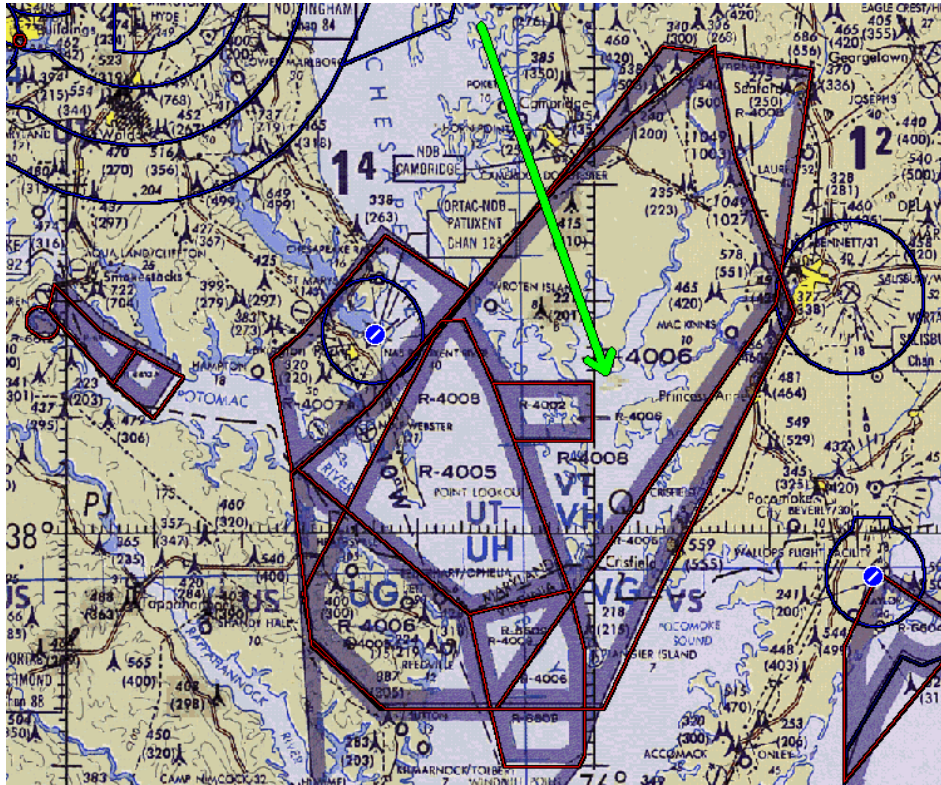


Warren Grove Range falls under the responsibility of the 177th Fighter Wing located at Atlantic City IAP, NJ. Warren Grove Range is located approximately 17 miles northeast of Atlantic City IAP, NJ. This is the primary training area to the east for the A-10s. Entry on to the range is generally via VR 1709 from the south. The primary navigational fix for reference is the Atlantic City VORTAC (CH 23). The A-10s utilize Atlantic City Approach Control (KACY) for traffic advisors from civilian traffic. While operating in the restricted area, a discrete UHF frequency is used. The range boundaries are depicted on the map. Vertical boundaries are surface to 14,000 feet MSL. Departure from the ranges usually involves radar contact with Atlantic City with a handoff to Dover ATC then to Potomac Approach Control back to KMTN. Range control can be contacted at (800) 283-6550. **The best planning aid for flights in this area is to be in contact with Atlantic City Approach. At a minimum, squawk VFR 1200 so you may be seen by radar and datalink.** Fighters fly in groups of 2 to 4 aircraft. If you observe one, then be alert for more.

PATUXENT RESTRICTED AREAS

R-4005 / R-4006 / R-6609

Primary Training Area to the South

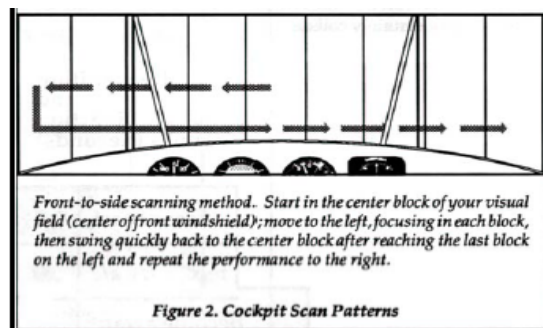
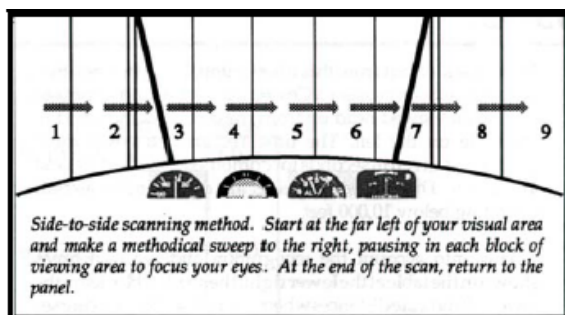


The Patuxent Restricted Areas fall under the responsibility of the Patuxent River NAS, MD. The restricted areas overlay a large portion of the Chesapeake Bay region from Cambridge, MD to the north extending south of Tangier Island to the south. This is the primary training area to the south for the A-10s. Entry into the restricted areas is generally via a flight path along Maryland's eastern shore from Kent Island toward Cambridge, MD. The primary navigational fix for reference is the Patuxent VORTAC (CH 123). The A-10s utilize Patuxent Approach Control (KNDH) for traffic advisors from civilian traffic. While operating in the restricted area, a discrete UHF frequency is used. The range boundaries are depicted on the map. Vertical boundaries vary from surface or 3,500 ft. MSL to 25,000 ft. MSL. Departure from the range usually involves radar contact with Patuxent with a handoff to Potomac Approach Control back to KMTN. **The best planning aid for flights in this area is to be in contact with Patuxent or Potomac Approach. At a minimum, squawk VFR 1200 so you may be seen by radar and datalink.** Remember, the A-10C has no radar and relies on ATC and see and avoid!

Scanning

To aid you in “see and avoid” practices we have included some helpful clearing techniques.










1. Pilots should look in all directions and periodically scan the entire visual field. Remember that the performance capabilities of many aircraft, in both speed and rates of climb/descent, result in high closure rates limiting the time available for detection, decision, and evasive action.
2. The probability of spotting a potential collision threat increases with the time spent looking outside, but certain techniques may be used to increase the effectiveness of the scan time. In order to be most effective, the pilot should shift glances and re-focus at intervals. Most pilots do this in the process of scanning the instrument panel, but it is also important to focus outside to set up the visual system for effective target acquisition.
3. Effective scanning is accomplished with a series of short, regularly spaced eye movements, which bring successive areas of the sky into the central visual field. Each movement should not exceed 10-15 degrees, and each area should be observed for at least one second to enable detection. Although horizontal back and forth eye movements seem preferred by most pilots, each pilot should develop a scanning pattern that is most comfortable and then adhere to it to assure optimum scanning.
4. Peripheral vision can be most useful in spotting collision threats from other aircraft. It is important to remember that the human eye is more perceptive to the movement of an object rather than the size of it. Visual search at night depends almost entirely on peripheral vision. In order to perceive a very dim light in a certain direction, the pilot should not look directly in this direction but scan the area adjacent to it. Short stops of a few seconds will help detect the light.



Critical Seconds

Move away from this A-10C illustration about 3 feet. The A-10C silhouette represents the aircraft as it would appear from the distance indicated on that page. The time required for two aircraft to cover these distances is given in seconds for the combined closure speed of 360 mph. Use the reaction chart on the left and the closure rates on the right to understand the importance of collision avoidance.

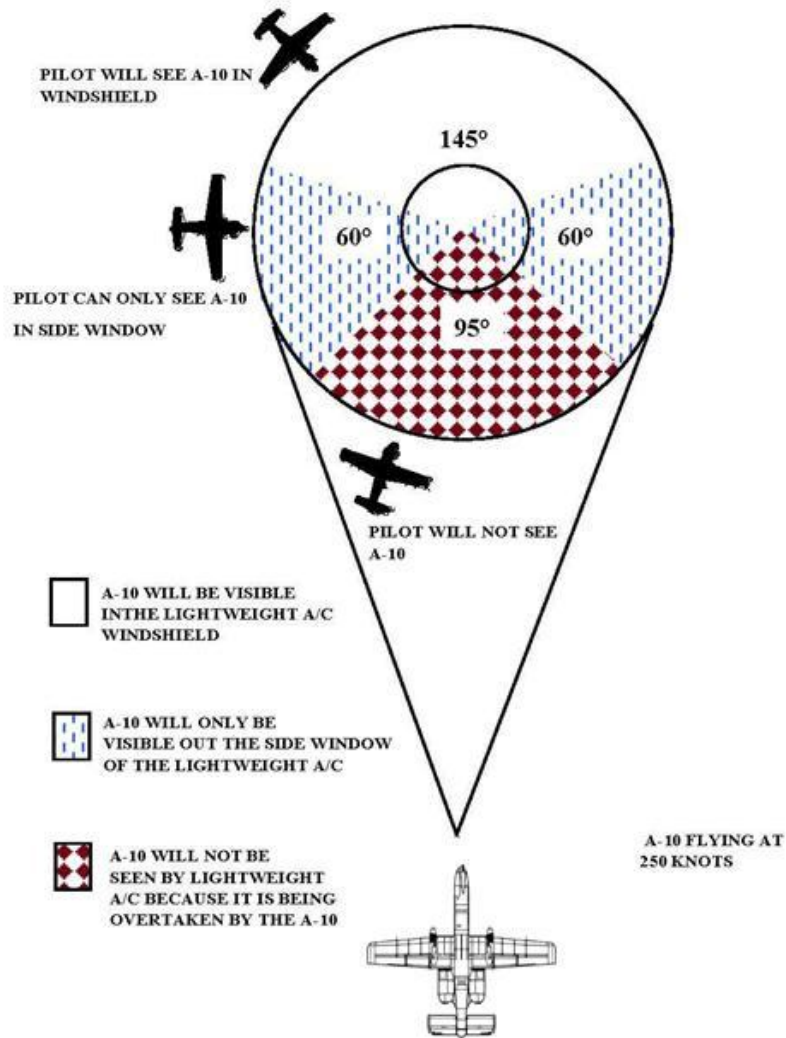
Event	time in seconds
See object	0.1
Recognize aircraft	1.0
Become aware of a collision course	5.0
Decision to turn	4.0
Muscular reaction	0.4
Aircraft lag time	2.0
TOTAL	12.5

DISTANCE – SPEED-TIME		
SPEED	360 mph	
DIST.	SEC.	
10 miles	60	
6 miles	36	
5 miles	30	
4 mile	24	
3 miles	18	
2 miles	12	
1 mile	6	
½ mile	3	
0 mile	0	

Profile of a Midair Collision

GEOMETRY OF A COLLISION COURSE

CIRCLE REPRESENTS 360 DEGREES OF POSSIBLE COLLISION COURSE BETWEEN A LIGHTWEIGHT A/C FLYING AT 80 KNOTS AND AN A-10 FLYING AT 250 KNOTS



REPORTING A NEAR MIDAIR COLLISION

A near midair collision (NMAC) is defined as an incident associated with the operation of an aircraft where a possibility of collision occurs as a result of less than 500 feet separation from another aircraft. In addition, a report received from a pilot or flight crew member stating that a collision hazard existed between two or more aircraft is also classified as a near midair collision. It is the responsibility of the pilot and/or flight crew to determine whether a near midair collision did actually occur and, if so, to initiate a NMAC report. Be specific, as ATC will not interpret a casual remark to mean a NMAC is being reported. The pilot should state, "I wish to report a near midair collision." Items that need to be reported include:

1. Date and Time (UTC) of incident
2. Location of incident and altitude.
3. Identification of type of reporting aircraft, aircrew destination, name and home base of pilot.
4. Identification and type of other aircraft, aircrew destination, name and home base of pilot.
5. Type of flight plans; station altimeter setting used.
6. Detailed weather conditions.
7. Approximate courses of both aircraft: indicate if one or both aircraft were climbing or descending.
8. Reported separation in distance at first sighting, proximity at closest point horizontally and vertically, and length of time in sight prior to evasive action.
9. Degree of evasive action taken, if any (from both aircraft, if possible).
10. Injuries, if any.

If the pilot/flight crew did not initiate a NMAC report via radio transmission to Air Traffic Control, a report may be filed by telephone or in writing to the nearest Flight Standards District Office (FSDO). The FSDO in whose area the incident occurred is responsible for the investigation. Proper NMAC reporting and investigating provides the FAA the opportunity to employ effective preventative measures. The primary purpose of the NMAC reporting program is to provide information for use in enhancing the safety and efficiency of the National Airspace System.

A three-year study of midair collisions involving civilian aircraft by the NTSB determined the following:

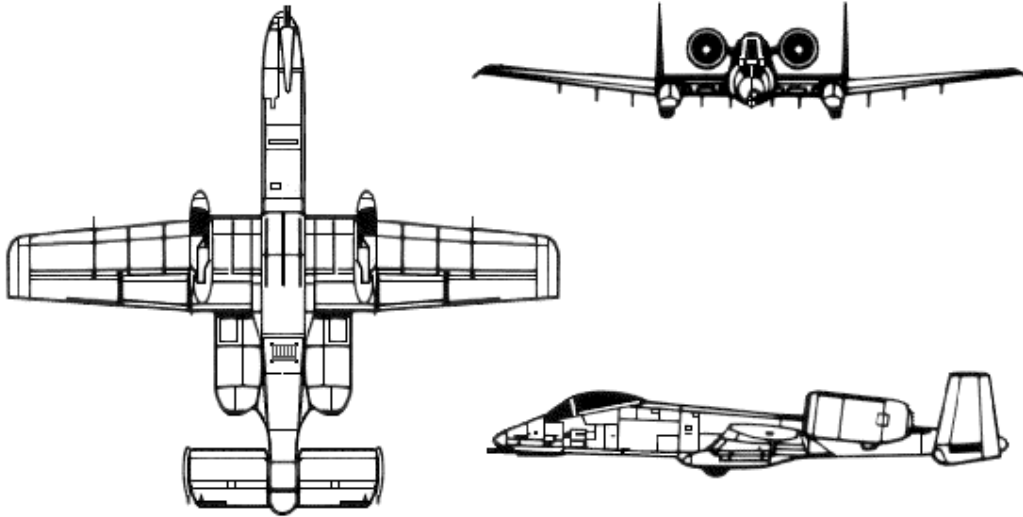
1. The occupants of most midair collisions were on a pleasure flight with no filed flight plan
2. Nearly all midair collisions occurred in VFR conditions during weekend daylight hours.
3. The majority of midair collisions were the result of faster aircraft overtaking a slower aircraft.
4. NO ONE is immune. Experience levels ranged from initial solo to the 15,000-hour veteran. Flight instructors were onboard one of the aircraft in 37% of the midair collisions.
5. The majority of midair collisions occurred at uncontrolled airports below 3,000'.
6. En-route midair collisions usually occurred below 8,000' and within 25 miles of the airport of intended landing.
7. Research indicates that the most critical times for midair collisions are the first three minutes after takeoff and the last eight minutes prior to landing.

Collision Avoidance and YOU!

Ever landed and got out of your plane with your hands sweaty and body shaking because someone nearly took your wing off? If so, you're not alone. As aviation activity increase throughout the US, the possibility of having a near midair or actual collision increases. The FAA has instituted polices to alleviate the midair collision potential, but ultimate responsibility lies with YOU! Below are several rules to live by...in order to make flying safer for all.

1. **PLAN AHEAD** – Thoroughly plan and review your intended route of flight before walking to your aircraft. If possible, plan to avoid alert areas, MTR's and MOA's. Check NOTAM's and identify potential conflict areas. Note, and avoid if possible, crowded airspace overhead VOR's and within 25 nm of busy airfields.
2. **CLEAN WINDOWS** – During the walk-around inspection, make sure your windshield is clean and clear of obstructions like sun visors.
3. **SEE AND AVOID** – Scan the airspace ahead of your flight path and to the side using a disciplined scan pattern. Also, periodically check behind your aircraft since the majority of midair collisions occur when one aircraft overtakes another.
4. **CLEAR** – Before executing a climb, turn, descent, or any other maneuver, ensure the area is clear!
5. **COMMUNICATE** – When flying into or out of uncontrolled airports, broadcast your position and intentions. Request and use all available RADAR services whenever possible. Finally, don't relax your visual scan even in a RADAR environment.
6. **SQUAWK** – if your aircraft is transponder equipped, turn it on and reply on both Mode 3/A and C.
7. **BE SEEN** – in order to enhance the see and avoid concept, you are encouraged to turn on your anti-collision lights and/or other appropriate lights whenever the engine is running. You're further encouraged to turn on you landing light (within POH recommendations) when operating below 10,000' MSL day or night, but especially within 10 miles of an airport or in areas of reduced visibility.

Maryland Air National Guard



A-10C Thunderbolt

