436th Airlift Wing
Dover AFB,
Delaware

MID-AIR COLLISION AVOIDANCE

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This pamphlet was designed to spark interest in the subjects of mid-air collision avoidance, wake turbulence, and to familiarize you with the operations at Dover AFB. If you have questions concerning these topics, call us or e-mail us at 436aw.se@Dover.af.mil.

INTRODUCTION

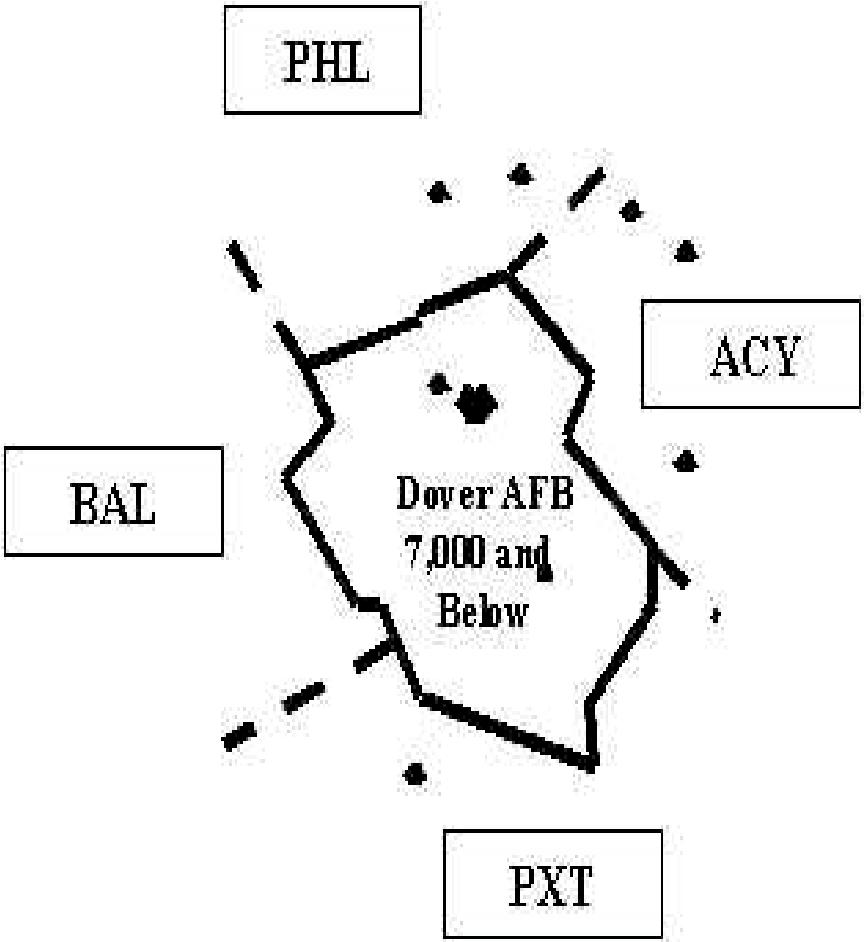
Dover Air Force Base is part of Air Mobilty Command, a worldwide network of bases whose primary mission is transporting people and equipment. Our base is located 60 miles east of the Baltimore/Washington area, and 60 miles south of Philadelphia.

The base is home to the 436th Airlift Wing (AW) and the 512th Airlift Wing (Reserves). Together, the wings operate over 30 jumbo strategic airlift C-5 Galaxy aircraft.

There are over 50 civilian airfields within a 60 mile radius of Dover AFB. Since Dover is the largest military aerial port on the East Coast, local air traffic is often congested. The types of aircraft transiting the Delmarva airspace range from home-built ultra lights to huge jumbo-jets to supersonic fighter aircraft.

BOTTOM LINE….The potential for a mid-air collision is extremely high!

DOVER RADAR APPROACH CONTROL AIRSPACE



COLLISION AVOIDANCE TIPS

1. Clear constantly for other aircraft, both visually and over the radios.
2. Know where high-density traffic areas are.
3. Obtain an IFR clearance or participate in radar flight following whenever possible and continue to practice “see and avoid” at all times.
4. Use landing lights at lower altitudes, especially when near airports.
5. Announce your intentions on UNICOM and use standard traffic pattern procedures at uncontrolled airfields…. Be predictable!
6. Always use your Mode C transponder.
7. Use the appropriate hemispherical altitudes and don’t let your altitude “wander.”
8. Fly as high as possible.
9. Keep your windscreen clean. A bug on the windscreen can obstruct other airborne aircraft coming your way.
10. Don’t get complacent during instruction! Instructors make mistakes too. Many mid-air collisions occur during periods of instruction or supervision.
11. When flying at night, avoid white light in the cockpit. White light disrupts your night vision, even when used momentarily.
12. Beware of wake turbulence.
13. Understand the limitations of your eyes and use proper visual scanning techniques. If an aircraft appears to have no relative motion but is increasing in size, you are on a collision course.
14. Practice appropriate clearing procedures before and during all climbs, descents, and turns.
15. Avoid complacency. SEE AND BE SEEN!

3. When flying in close proximity to MTRs, contact the nearest Flight Service Station (FSS) for current flight activity along the route.
4. If you must operate near or through an MTR, do so above 1,500 feet AGL, and maintain a vigilant watch for aircraft.
5. When crossing an MTR, plan on crossing perpendicular to the route.
6. If you see a military aircraft, assume he does not see you.
7. Wake turbulence from heavy, high-speed aircraft is severe!

SUMMARY

MACA is the responsibility of everyone who flies an aircraft. Advances in technology have reduced the likelihood of mid-air collisions, but "the system" is not foolproof. Situational awareness and knowing who and where potential mid-air collisions are likely to occur is a huge step in flying safely and mishap free.

DOVER CLASS "D" AIRSPACE

Dover Air Force Base (Dover AFB) is surrounded by Class D airspace. Every aircraft should contact Dover Tower (126.35) before entering the airspace.

Since we all share the same sky, it is our duty to know about your flying operations and stay out of your way while letting you know about our activities.

The best way to avoid a mid-air collision is to stay alert and communicate your intentions to Dover Approach Control (132.425) and request flight following. Help us know where you are and where you're going. We monitor the same frequencies you do and we'll be looking and listening for you! If you intend on traversing the Class D airspace, establish and maintain two-way radio contact with Dover Tower (126.35) prior to entering the airspace.

Pilots should be especially alert for heavy C-5 jet traffic when flying within 15 nautical miles of Dover AFB since extensive operations are conducted 24 hours a day, 7 days a week, every day of the year. Our normal traffic pattern is 3,000 feet MSL and below. However, we occasionally fly non-standard VFR approaches to the airfield from altitudes as high as 5,000 feet MSL.

When flying training sorties, our crews use special call signs. Expect to hear "BOLAR" or "HAGAR" when flying in Dover's airspace. Our mission crews use the "REACH" callsign.

Our traffic pattern is flown east of the airfield. IFR radar pattern altitude is usually 3,000 feet MSL, while our VFR traffic pattern is flown at 1,800 feet MSL.

The most congested area in our airspace is north of the base. Most VFR traffic passes north of Dover and south of Philadelphia. Arriving traffic landing runway 19 intercept the localizer at 1,700 feet MSL. Traffic departing runway 01 initially climb to 3,000 feet MSL. Be cautious for arriving and departing traffic!

ATC "RADAR CONTACT"

Many pilots believe any time they hear "Radar Contact" the controller has taken over all separation responsibilities. Never are pilots exempt from seeing and avoiding traffic conflicts. When under radar contact, the controller will share the responsibility with the pilot to resolve traffic conflicts. In the air, pilots are expected to pay attention to their surroundings. Anticipate what might happen by scanning the sky and listening to ATC frequencies. Know where traffic is and where you are. Most conflicts can be avoided by knowing where traffic is and where they are headed. Don't put all your trust in ATC when it comes to traffic avoidance! However, use radar services to the maximum extent possible. ATC is responsible to resolve traffic conflicts and can help you safely traverse controlled airspace. VFR pilots are highly

MILITARY TRAINING ROUTES (MTRs)

Occasionally you may see one of our huge C-5 aircraft flying extremely low at high speeds. National security largely depends on the ability of our military forces to safely deliver troops and equipment in a combat environment. One method we use while penetrating unfriendly airspace involves low-level flying. Being low-level proficient requires use of nationally-organized low-level Military Training Routes (MTRs). High-speed combined with low altitude make see-and-avoid much more difficult. Be vigilant when crossing a published MTR as any type of military aircraft could be on the route. Generally, the MTRs are established below 10,000 feet MSL for military operations at speeds in excess of 250 knots. Various aircraft use these routes from our large C-5 Galaxy to the small F-16 fighter jets. There are four operational MTRs within 50 miles of Dover AFB: SR-800, SR-844, SR-847, and VR-1709.

Route widths can vary along the MTR and extend several miles on either side of the charted MTR centerline depicted on sectional charts. Military aircraft conducting low level training can be anywhere within a MTR's structure. Seldom will aircraft be on the centerline or at a constant altitude when VFR conditions exist.

When requesting MTR information, give the FSS your position, route of flight, and destination in order to permit the FSS specialist to identify the MTRs along your intended flight path. When you are operating along or near an MTR, the only means of separation between you and military aircraft is "SEE AND AVOID."

ACTIONS TO REMEMBER

1. When planning a flight, especially below 1,500 feet AGL, carefully crosscheck available charts for the presence of MTRs and avoid them when possible. Only VR routes are depicted on sectional charts. SR and IR routes are not shown!
2. MTR corridors are not depicted on sectional charts, only the centerline of the route is shown. The actual corridor along the route is normally 5 NM on either side of the centerline.


C-5 at less than ½ mile

WAKE TURBULENCE

Wake turbulence is created when a wing is producing lift. It begins at rotation and ceases at touchdown. If landing on an adjacent runway where another aircraft has landed, keep in mind a crosswind might blow the wake turbulence toward you. When following an aircraft to touchdown, make note where the other aircraft landed. If continuing the approach, plan on touching down beyond the previous aircraft's landing point to avoid wake turbulence. Likewise, if taking off after another aircraft, delay takeoff unless you can liftoff at a point prior to the other aircraft, and can climb at a greater rate. Wake turbulence can linger for several minutes. The best policy is to delay takeoff or landing until wake turbulence is no longer a factor. Typically, the larger the size difference between aircraft, the more significant the wake turbulence hazard becomes.

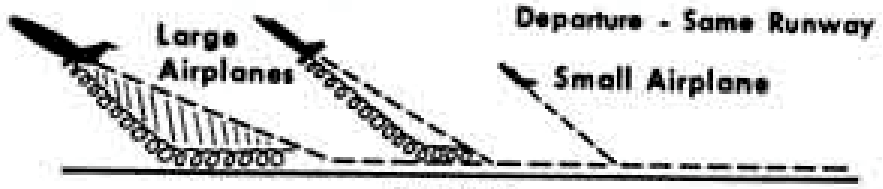


Figure 16

encouraged to communicate with ATC and tell them your intentions.

100% CONTROL MISCONCEPTION

Do you believe all air traffic in the radar-controlled airspace is shown on the controller's scope? It is not! This assumption can be fatal. Radar cannot protect you from unidentified aircraft. Most radars have "blind spots." Just because you are under radar contact does not mean the controller can keep you away from 100% of air traffic. ATC can only control participating aircraft.

TRANSPONDERS

Private pilots can help ATC by installing a transponder in their aircraft. The difference between a non-transponder equipped aircraft and one with a transponder is substantial. Transponders make the radar signature "size" of a Piper Cub the same as a C-5 Galaxy. If you have a transponder (preferrably with "MODE C" altitude encoding), USE IT. Many pilots turn the transponder off when leaving terminal areas to "save" its useful life. There are two dangers in this practice. One danger is you become less visible on the controller's radar scope, and the other is the possibility of forgetting to turn it back on at your destination. A final thought…your operative altitude-encoding transponder can help Traffic Alert and Collision Avoidance System (TCAS) equipped C-5 aircrews see and avoid you.

MID-AIR COLLISION STATISTICS

Almost 50 percent of mid-air collisions result in at least one death. Naturally, mid-air collision avoidance (MACA) is an important aviation safety topic. With the sky becoming more and more congested, the threat of a mid-air collision is increasing. According to the NTSB, the most probable cause of mid-air collision is the "pilot in command failed to see and avoid other aircraft." Aircraft speeds today challenge our ability to "see and avoid."

Here are a few facts about mid-air collision:

1. Mid-air collisions generally occur during daylight hours
   - ✈ 56% of the accidents occurred in the afternoon.
   - ✈ 32% of the accidents occurred in the morning.
   - ✈ 12% of the accidents occurred at night, dusk, or dawn.

2. Most mid-air collisions occur under good visibility.

3. Flight fatigue (fatigue resulting directly from flight related operations) was not a major factor in mid-air collisions.
   - ✈ The average flight time prior to the collision is 45 minutes. This time varies from takeoff to over seven hours.
   - ✈ 60% of the pilots on the mishap flight had been airborne thirty minutes or less.
   - ✈ Only 6% had been flying longer than two hours.

DETECTING TRAFFIC

The detection of airborne object depends on six conditions:
1. Image size – size of the object relative to visual field-of-view
2. Contrast – difference between object and background brightness, color, and shape
3. Adaptation – degree to which your eyes adjust to surrounding illumination
4. Motion – velocity of the object relative to you
5. Exposure – length of time object is in view

C-5 ILLUSIONS

Since the C-5 is so huge, it may appear to be hanging in the sky and traveling quite slowly. Don't be deceived! A typical C-5 final approach speed with flaps down is around 125 knots!

Another illusion involves our flight path. When flying at slower airspeeds, the high deck angle of the airplane gives the illusion the airplane is climbing. We've had airplanes at higher altitudes descend toward us thinking the C-5 was climbing toward them! If you doubt the altitude of the C-5 traffic, ask the controller…or even the C-5.