62d Airlift Wing
McChord Field, Washington

MID-AIR COLLISION AVOIDANCE

June 2010

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U.S. AIR FORCE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 62D AIRLIFT WING (AMC)

MEMORANDUM FOR PACIFIC NORTHWEST AVIATORS

FROM: 62 AW/CC
100 Col Joe Jackson Blvd
Ste. 3095
JBLM – McChord Field, WA 98438

SUBJECT: Mid-Air Collision Avoidance

1. **Safe mission accomplishment is our #1 priority**. The Wing Commander at McChord Air Force Base (AFB) is responsible for the operation of the second largest C-17 wing in the Air Force. To perform our mission, we must integrate military flight operations with commercial and general aviation traffic of all types and sizes. We need your help in this dynamic process.

2. MACA is a subject that is gaining heightened awareness among both civilian and military aviation communities. With increasing numbers of aircraft taking flight and many airports approaching gridlock, knowledge of air traffic and airfield operating procedures becomes more vital for pilots and aircrew. The airspace above and around McChord AFB and our auxiliary training field is incredibly busy. Each year the local airspace becomes more saturated. The key to avoiding hazards associated with this high traffic volume is awareness. Military flight operations are unique because the type aircraft, operating areas, flight environment and the times flown are different from any others. As a result, the more knowledge you have and apply regarding military flight operations, the greater your chances of avoiding a midair collision or near midair collision with a military aircraft.

3. This brochure was designed to familiarize you with where and how our aircraft operate in this area. It also summarizes available radar services and provides tips to help you see and avoid others who share the sky. Although the information you'll read here is specific to assigned aircraft and its activities, the principles apply to any area where military aviators operate. I encourage you to become familiar with the location of our Military Training Routes and practice areas depicted inside. Also included are telephone numbers and agencies to contact if you have any questions, suggestions, or encounter problems with the operations at McChord Field. Through awareness, vigilance, and teamwork, we can make the Pacific Northwest a safer place to fly.

// SIGNED //
KEVIN J. KILB, Colonel, USAF
Commander

McCHORD FIELD
WASHINGTON

With a scenic view of Mount Rainier in the backdrop, Joint Base Lewis-McChord, McChord Field displays the beauty of the Pacific Northwest. McChord Field is part of the Air Mobility Command, a worldwide network of bases transporting people and equipment at a moment's notice in support of peacetime and wartime taskings. The base is located 10 miles south of Tacoma, Washington.

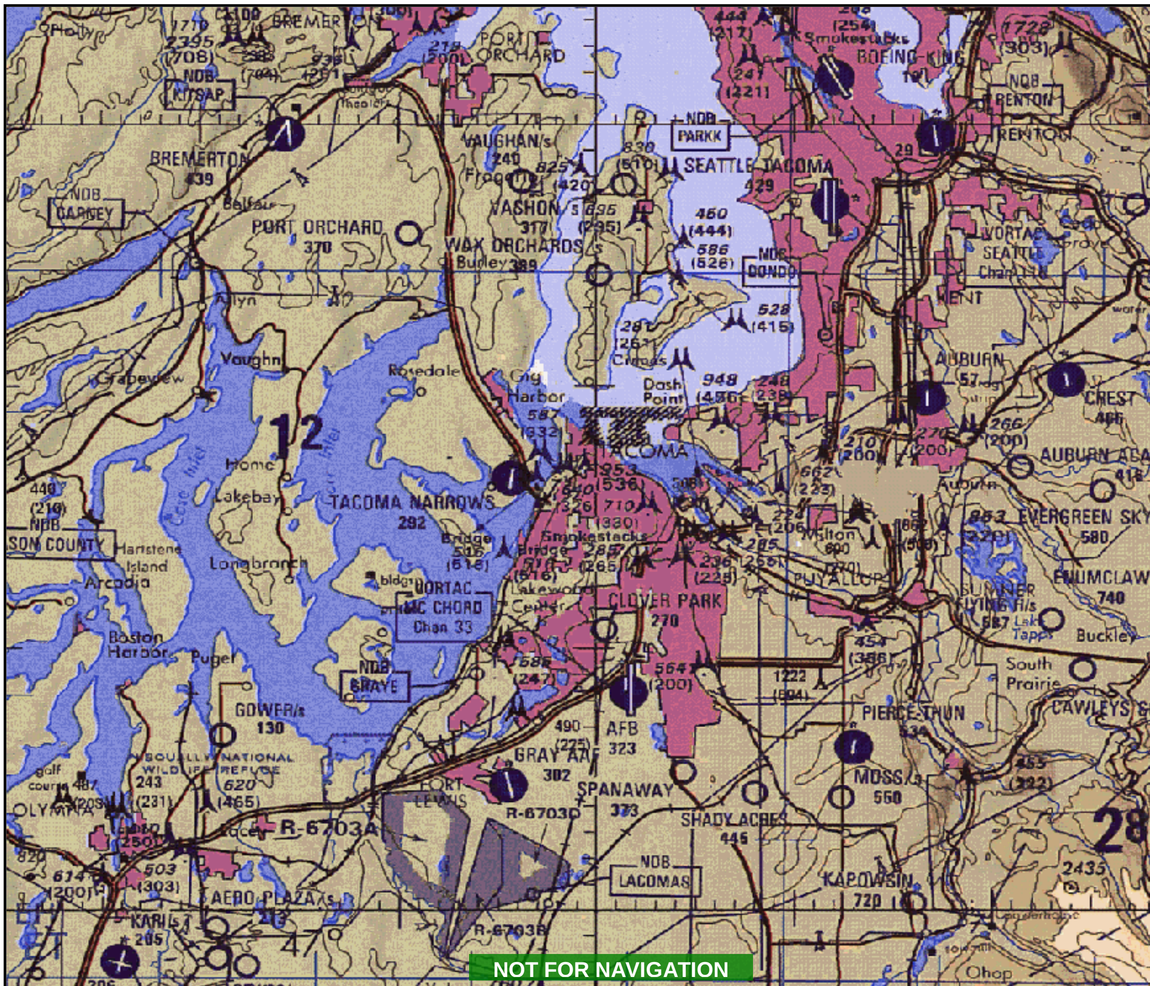
The base is home to the 62d Airlift Wing (AW) and the 446th Airlift Wing (USAF Reserve). These are strategic airlift units with 51 assigned C-17A Globemaster III aircraft.

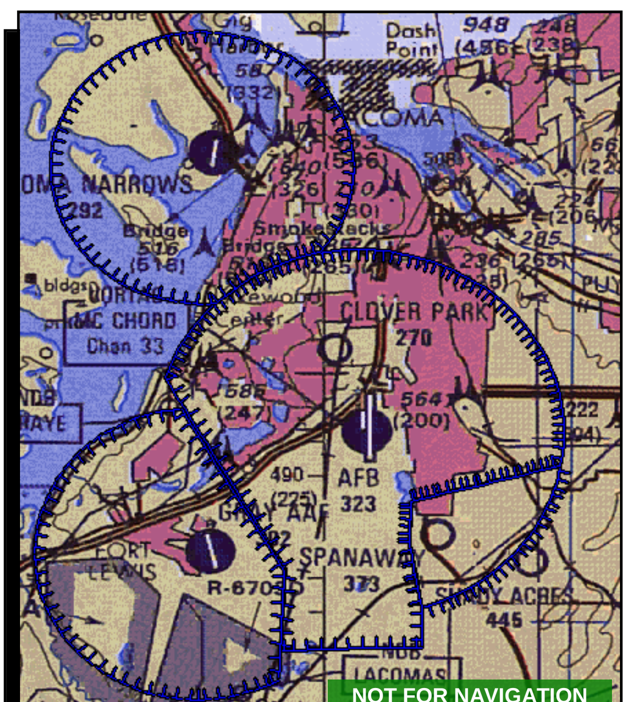
McChord's Class D airspace lies beneath Seattle Tacoma International Airport's Class B airspace veil. Additionally, there are multiple civilian airfields in the immediate area. Commercial air carriers, executive aircraft, and general aviation aircraft extensively use the airspace around McChord. The aircraft found in the local airspace range from ultra-light aircraft to supersonic fighters to heavy airlifters.

Callsigns assigned to McChord C-17s: REACH, SONIC, HUSKY, COHO, SKAGIT, DANDA, RAWLY, HIRE, HARD, STORK, KITSAP, & MISTY

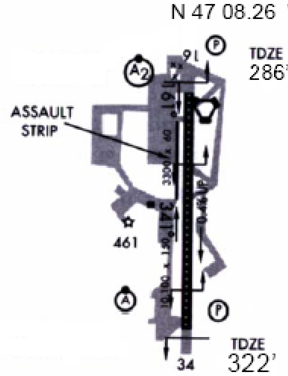
The potential for a mid-air collision is high!

McCHORD'S CLASS D AIRSPACE





N 47 08.26 W 122 28.59



RUNWAYS
- Elev: 322'
- **16-34**: 10,108' x 150' (TRT 585)

APPROACHES
- ILS 16: 109.9 (I-MAR)
- ILS Z 34: 108.5 (I-TCM)
- ILS Y 34: 108.5
- TCN (ILS X): 108.5
- TCN 16: CH 33

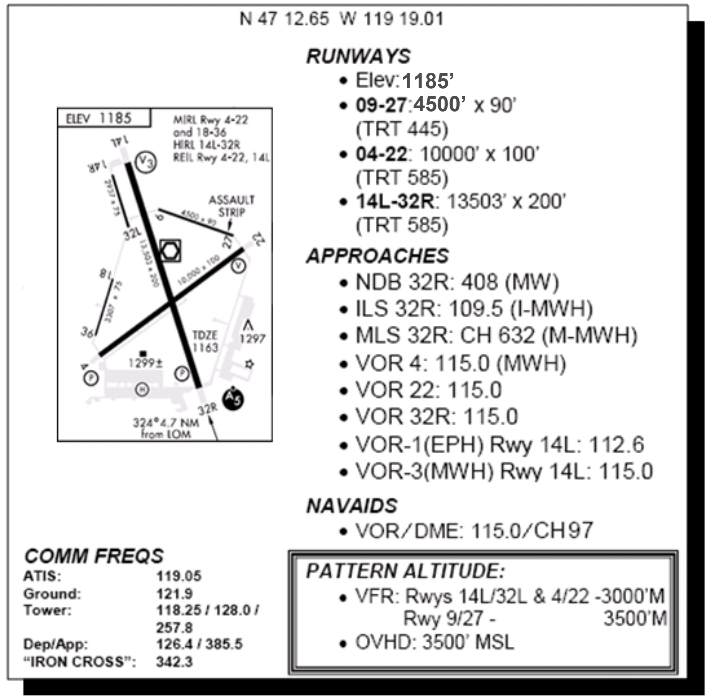
NAVAIDS
- TACAN: CH 33

COMM FREQS

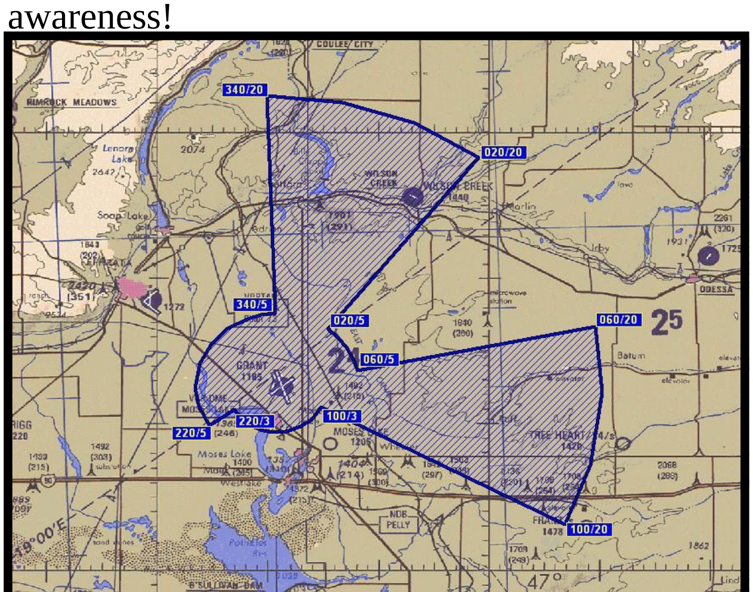
ATIS:	270.1
Ground:	125.15 / 279.65
Tower:	124.8 / 259.3
Dep/App:	126.5 / 391.9
Cmnd Pst:	349.4
PMSV:	342.5

PATTERN ALTITUDE:
- VFR: 1800' MSL
- OVHD: 2300' MSL (break East)

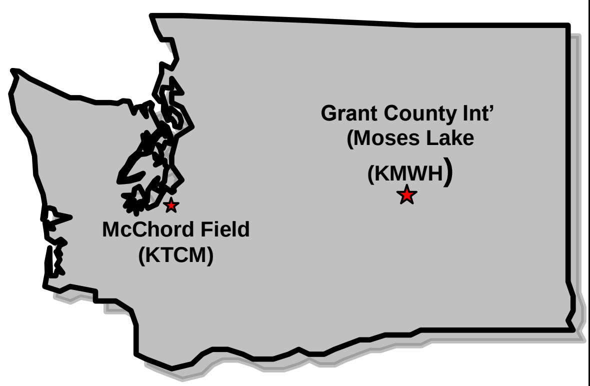
GRANT COUNTY INTERNATIONAL AIRPORT (MOSES LAKE, WA.)



Grant County International Airport (Moses Lake) is the primary tactical training field for McChord Field C-17s. Extensive C-17 activities are conducted 24 hours a day, seven days a week at this airfield. When flying in the local area, you can expect to see McChord Field C-17's perform maneuvers at FL200 descending at a high rate of speed (310 kts). These maneuvers require that the aircraft execute a high angle of descent in a short amount of time. Grant County is Class D airspace surrounded by Class E. McChord C-17s use the field to conduct instrument and tactical approaches from high altitude as well as ingress and egress from surrounding low-level military training routes. It is not uncommon to see multiple heavy aircraft in addition to military transports conducting training there as well. At 2200L the tower closes and the field is uncontrolled. Extra vigilance and radio awareness is vital for situational awareness!



KMHW High Speed Airspace



MID-AIR COLLISION AVOIDANCE

Every aircraft must have Mode C transponders operating within 30 miles of SeaTac, and make radio contact with McChord's Tower to cross its airspace (VHF 124.8). Crossings are not a problem as long as they are coordinated! The McChord VFR traffic pattern is between 1,800' MSL and 2,300' MSL.

McChord Field does not have a dedicated military radar approach control facility. To use approach control radar service, and to hear IFR and participating VFR traffic, contact Seattle Approach control on 126.5. Our aircraft normally operate between 3,000' MSL and 4,000' MSL when under radar control.

The best way to avoid a mid-air collision is to stay alert. It helps to know where to look for traffic and what to look for. We're monitoring the same frequencies you are and we'll be looking and listening for you!

Pilots should be especially alert for C-17 jet traffic when flying within 15 nautical miles of McChord Field since training is conducted 24 hours a day throughout the year. Additionally, while conducting night vision goggle training, McChord's airfield will be blacked out (covert lighting) while our aircraft are still operating on it! When in the local area, you can expect to see our aircraft frequently at altitudes of 4,000 ft MSL and below conducting visual and instrument procedures.

A later section in this guide explains and graphically depicts C-17 low-level military training routes (MTRs). At various times of the day and night you may see up to nine of our large aircraft in formation at your altitude on these routes.

MID-AIR COLLISION
CAUSES AND CONDITIONS

1. Generally occurred during daylight hours.

2. Most occurred in weather conditions when the visibility was acceptable, i.e., three miles or more.

3. Fatigue was not a major factor. The average flight time prior to collision was 45 minutes.

4. No pilot is immune. Experience levels ranged from initial solo to 15,000 hour veteran.

5. The majority occurred below 8,000 feet MSL and near airports, NAVAIDS, and other high-density traffic areas.

6. Flight instructors were aboard at least one of the aircraft in 37% of cases.

PSA Flt 182 after colliding with a Cessna 172.
All aboard both aircraft and seven on the ground were killed.

Let's look at some factors involved while preventing two aircraft from occupying the same space at the same time:

- Conditions that influence the eye's detection of objects.
- Physiological factors that affect clearing for other aircraft.
- ATC environmental factors.

DETECTION OF OBJECTS

Detection of objects while airborne depends on six conditions:

1. Image size - the portion of the visual field filled by the object
2. Luminance - the amount of brightness of the object
3. Contrast - the difference between object and background brightness, color, and shape
4. Adaptation - the degree to which the eyes adjust to surrounding illumination
5. Motion - the velocity of the object, the observer, or both
6. Exposure time- the length of the time the object is exposed to view.

IMAGE SIZE

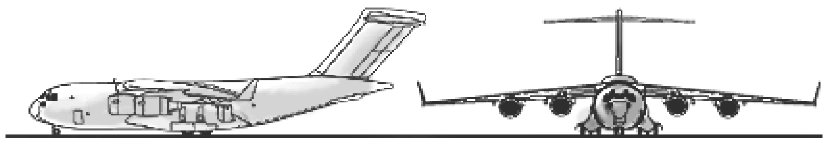
An aircraft seen at long range appears not as an identifiable shape but rather as a dark dot. Aircraft detection is different depending on whether it is day or night. During the day, the further the object falls from the fovea (center of vision), the larger the image must be to be noticed. At night, detection is sometimes superior if the target image falls on the peripheral retina (off center), rather than the fovea. An example is the phenomenon of dim light disappearing as the observer looks directly at it and reappearing when looked at peripherally.

LUMINANCE AND CONTRAST

Luminance and contrast are basically one and the same. An object is more visible when it is sufficiently brighter or darker than its background – in other words, there is contrast.

In addition to brightness and contrast, color and shape differences offer clues to the presence of aircraft. When an object and background are contrasting colors (yellow and blue, green and red, black and white), detection becomes easier.

Similarly, when objects are long and thin as opposed to round and flat, they are easier to detect. An aircraft seen in profile is easier to notice than a head-on aircraft of equal area.



ADAPTATION

The eye requires at least 30 minutes in darkness, maybe longer, to distinguish objects under low illumination. Conversely, when the eyes have been accustomed to darkness, they need to adapt to bright light.

MOTION

Against a stationary irregular background, an aircraft needs only to move a few minutes of arc-per-second to reveal its presence to an alert observer. However, against a featureless background, like a cloudless blue sky, the aircraft's perceived motion must be 10 times faster to be noticed. What complicates the detection of relative motion is the fact that while flying, your eyes are also constantly moving.

EXPOSURE TIME

An aircraft that darts in and out of clouds presents a special challenge to the viewer. When an aircraft is not continuously exposed to view, the pilot has to judge its speed and direction in order to follow its path behind a cloud or the horizon. A small, slow-moving object that presents little contrast against its background can be easily lost during intermittent observation.

PHYSIOLOGICAL FACTORS

As they become fatigued, your eyes grow less efficient at the task of seeing airborne aircraft. Only well-rested eyes can assure good vision. Structural parts, windshield/canopy distortion, poor cockpit lighting, dirty windshield, and instrument glare can limit a pilot's vision even further.

Complete darkness, fog, total overcast, and cloudless blue skies all present the viewer with a monotonous field. In such conditions, normal eyes constantly try to focus on infinity by actually focusing on a point 1 to 2 meters away. This is called search myopia and reduces the pilot's chances of seeing a distant aircraft.

Try to focus on objects at the maximum range you expect to see aircraft-focus on the ground at about 4 to 8 NM and move your gaze up to the sector of the sky to be searched. Attempt to avoid frequent re-focusing in and out of the cockpit. About one-third of a second is required for the eyes to focus at each fixation. Your airborne searching scan should be slow and methodical. Learn to scan the visual field by dividing the area up into sectors, about 30 degrees each. Fix your gaze in that sector for a second or two. Investigate any movement, and then move to the next sector. If you have trouble focusing at long ranges, try squinting. Squinting compresses the eyeball and changes its focal length allowing long-range aircraft to come in focus.

At lower altitudes the easiest aircraft to see is on the horizon. Shadows sometimes help pilots to detect another aircraft. To spot the aircraft, look from the shadow to the sun. The lower the aircraft, the closer it is to its shadow.

LOCATING YOUR BLIND SPOT

a. With the right eye closed, look at the right of the upper figure. Move the paper back and forth about one foot from the eyes; the circle on the left will disappear. At that point it is projected on the blind spot.

b. With the right eye closed, look at the cross at the right of the lower figure. When the white space falls in the blind spot, the black line appears to be continuous. This phenomenon helps us understand why we are not ordinarily aware of the blind spot.

It is important to realize that all of us have blind spots. The potential for a mid-air collision lies within this blind area. At one mile this area could be 800 feet by 500 feet and at 5 miles the area may be 4/5 of a mile. The blind spot will vary depending on aircraft type and different face structures. A way to compensate for the blind spot is to move the head around while looking and look more than once in a given direction.

AIR TRAFFIC CONTROL ENVIRONMENT

We will end the mid-air collision avoidance discussion by examining characteristics of the ATC environment with respect to mid-air collisions.

RADAR

The continuing development of more sophisticated and automated equipment has given rise to the notion among some airmen that controllers are watching their every move en route and will always be able to warn other aircraft, particularly those flying IFR, of their presence. This misconception is deadly.

The adoption of radar for air traffic control brought with it a series of increased capabilities. Radar's added capability encourages some of us to overlook the fact that current radar is not all encompassing in its coverage, radar does not pick up all aircraft at all times, and radar is primarily concerned with the separation of IFR traffic.

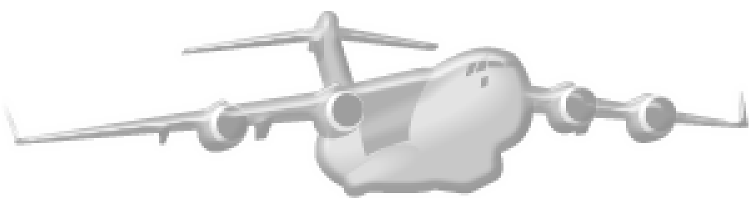
As radar found its way into air traffic control, ground clutter became an increasingly serious problem for terminal radar. Some of today's most sophisticated black box circuitry is aimed at reducing this phenomenon. Modern radar does a magnificent job compared to the old days, but clutter is still there. One way of reducing ground clutter to a minimum is to weaken radar's sensitivity to distant aircraft targets. The person affected in this trade-off is the pilot flying an airplane with the weakest radar-reflecting properties. This group includes many small general aviation airplanes flying IFR without active transponders. In some situations, these aircraft are not "painted" on the radarscope even though they are within range of the transmitter.

SECURITY BLANKET

Some pilots think of IFR as a security blanket. They say to themselves, "I'm on an IFR flight plan, the air traffic services will tell me about all the traffic I might encounter." So they settle back in their seat feeling safe. There are examples of mid-air collisions involving IFR and VFR aircraft and even between IFR aircraft to dispel this myth.

WHO IS RESPONSIBLE?

The fact is that when operating in VFR conditions, regardless of the type of flight plan you're on, the responsibility for seeing and avoiding other traffic rests with the pilot, not the controller. Civilian radar was developed primarily for the separation of IFR traffic from other IFR traffic. That is still the controller's primary responsibility although they will assist VFR traffic as much as time and facilities permit and call the pilot's attention to any known potential problem or immediate hazard. Radar advisory service for aircraft is specifically designated as a duty that follows the priorities of separation, safety advisories, and other required controller actions, and will be performed on a workload permitting basis only.



What about the VFR day when you were level at 4,500 feet-certainly high enough to be in coverage-but Center missed telling you about the aircraft that nearly hit you! Traffic was light so you know the controller should have had time to help you.

There are days when the weather is "good" for flying but maybe not so good as far as the radar is concerned. Winds, temperatures aloft (particularly when inversions are present), narrow dew-point spreads, and clouds all affect the amount of radar clutter and/or reduce radar efficiency. This may occur where you or your traffic is located. In addition, the angle at which the radar antenna is tilted can result in some traffic not being seen at certain altitudes. Statistics show that the bulk of IFR traffic, the kind Center radar is primarily interested in, spends most of its time at relatively high altitudes while en route. This is the traffic that the en route radar is designed to monitor.

In terminal areas, the heaviest traffic is within 30 miles of the airport at altitudes varying with the location; again, the radar is focused for the area of greatest use. At 40 miles out you are in all likelihood within range of the radar signals, but the controller's scope may only be displaying targets closer in. Another factor to keep in mind is that there is virtually always a cone of non-coverage directly over radar antennae. All these things leave wide-open air spaces where there may be no radar coverage at your altitude.

Certain kinds of aircraft are difficult to detect on radar. Smaller airplanes, those made in great part of materials other than metal, aircraft without propellers, and slow moving craft all have less reflective properties than others, resulting in less return of energy to the radar antenna. Consequently, the primary targets they produce are weak or nonexistent. An airplane also presents less of a target to the controller when it is flying directly toward or directly away from the radar antenna.

100 PERCENT CONCEPT

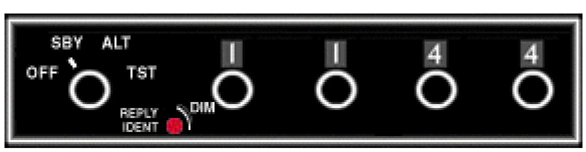
The concept of 100 percent radar coverage has to be understood in terms of stated goals, present and future. Questions asked at FAA “Listening Sessions” reveal that some pilots believe any time they hear “Radar Contact” the controller has taken over all separation responsibilities. At the very least, these pilots believe all air traffic in the area is shown on the controller’s scope. This assumption can be fatal. Radar does not protect from unidentified aircraft or those that may not show up clearly on the radar scope; for example, unannounced VFR traffic that has entered into an IFR environment.

Radar advisories are very useful aids in helping the VFR pilot maintain separation. However, they are not to be regarded as evidence that a controller has taken over responsibility for such separation.

INCREASE AVAILABLE PROTECTION

How can radar best help you? Much of the problem could be solved by purchasing and using a transponder. The difference on the scope between a non-transponder equipped aircraft and one with a transponder would surprise you. Transponders make the size of the airplane irrelevant because transponder replies are the same size for a 747 or for a Piper Cub.

If you have a transponder, particularly with “MODE C” altitude reporting—use it. Many pilots turn the transponder off when leaving the terminal areas to “save” it or lengthen its operating life. There are two dangers in this practice. One danger is you become less visible on the controller’s scope and the other is the possibility of forgetting to turn it back on at your destination. What good is saving component life while losing your own?



You can help the radar controller help you by not adding to his workload unnecessarily while he identifies your target. Remember that the controller may be looking at many unidentified blips on the scope. Always knowing where you are simplifies the task of establishing radar contact and shortens the time you are displayed as an “unknown.”

VFR and IFR flight use similar concepts. Maintaining IFR means adhering to IFR altitudes and airspeeds while remaining within defined airspace such as the en route structure or terminal area and making the most of any traffic separation service available. When flying VFR, aircraft must remain within certain airspeed, altitude and area parameters such as the traffic pattern and VFR hemisphere altitudes.

Aircraft operating in visual meteorological conditions under IFR should be aware that they are in a “see and avoid” environment. Separation is provided only from other known aircraft operating within controller airspace.

Use extreme caution in the terminal area. This is where traffic density is greatest and where the mix of IFR and VFR traffic creates the greatest hazard. Flying a practice instrument approach in VFR conditions is fine, but it’s not the time to keep your eyes glued to gauges. Even a radar monitor may not help; there are a lot of non-transponder equipped aircraft around that may not appear on the controller’s scope. Don’t get complacent, not even on final.

LISTEN

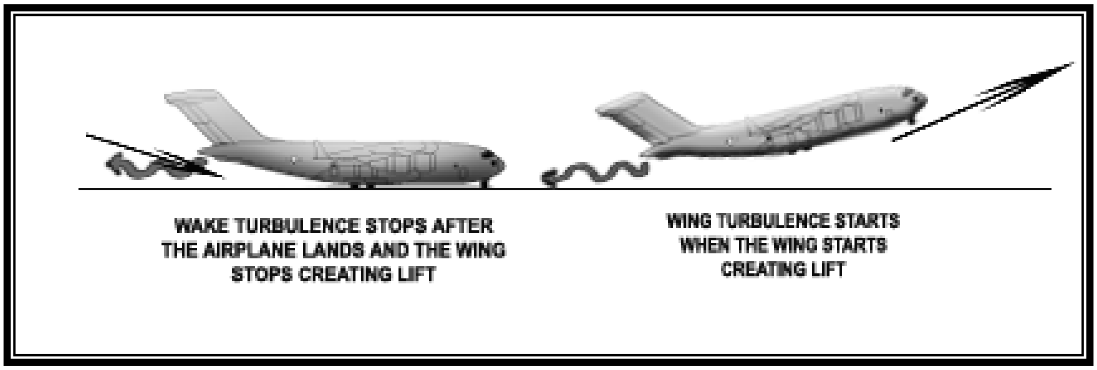
Along with looking, you need to listen. Improvements in radar systems as well as innovations such as Traffic Alert & Collision Avoidance Systems (TCAS) have made flying a little safer for everyone but any system has flaws. In instrument meteorological conditions, pay attention to the radios and keep up with the traffic situation in your area.

IN SUMMARY

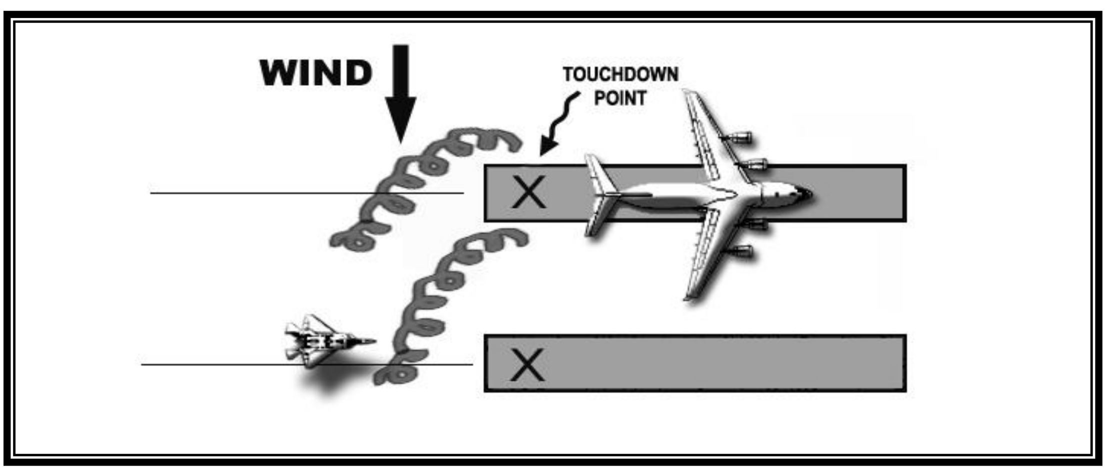
MID-AIR COLLISION AVOIDANCE is the responsibility of everyone who flies aircraft. The advances in radar technology have reduced the likelihood of mid-air collisions but the system is not foolproof. Situational awareness and knowing who and where potential mid-air collisions can happen is a huge step in flying safe and mishap free.

CAUTION: WAKE TURBULENCE!

Wake vortices are formed any time an airfoil is producing lift. The pressure differential between the upper and lower wing surfaces triggers the rollup of the airflow aft of the wing resulting in swirling air masses trailing downstream of the wingtips. Viewed from behind the generating aircraft, the left vortex rotates clockwise and the right vortex rotates counterclockwise. The intensity of the vortex is a function of aircraft weight and configuration (flap setting etc.). The strongest vortices are produced by heavy aircraft, flying slowly, in a clean configuration. For example, a large or heavy aircraft that must reduce its speed to 250 knots below 10,000 feet and is flying in a clean configuration while descending, produces a very strong wake.

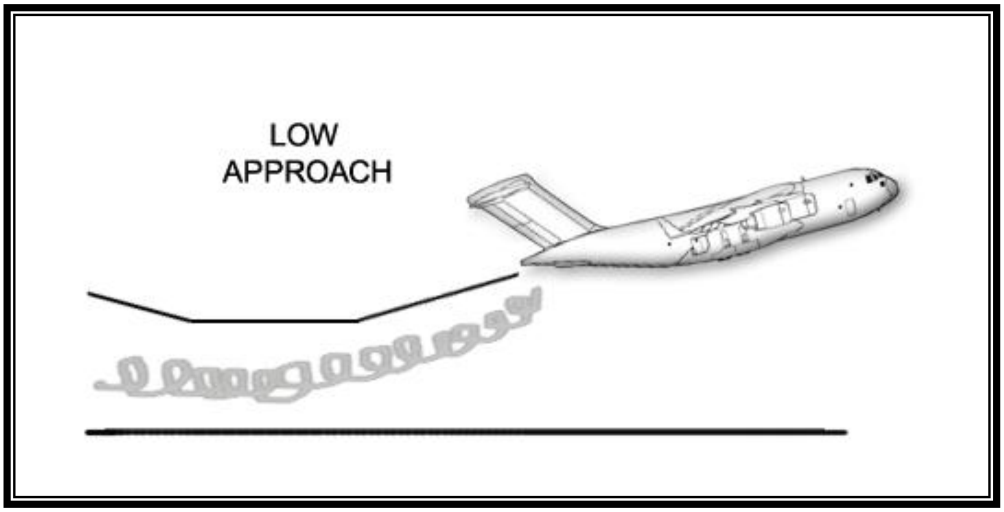


Crosswind blows wake turbulence from upwind runway into the approach path of the parallel runway. Smaller planes should cross above the possible area of turbulence and land well beyond the threshold.



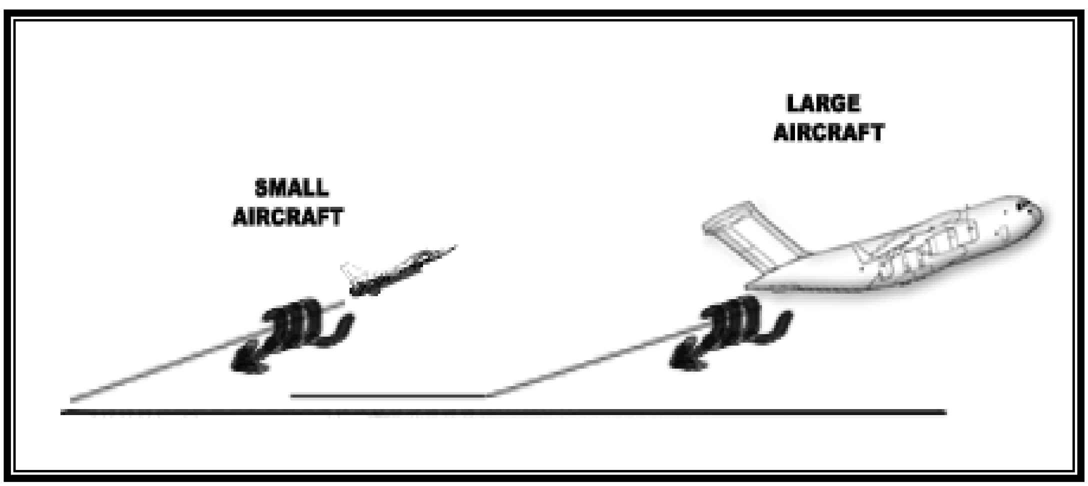
LOW MISSED APPROACH

A large or heavy aircraft making a low missed approach or a touch-and-go-landing leaves significant wake turbulence at low level all along the runway surface. Monitor communications carefully to know when larger aircraft are going around.



SAME RUNWAY DEPARTURE

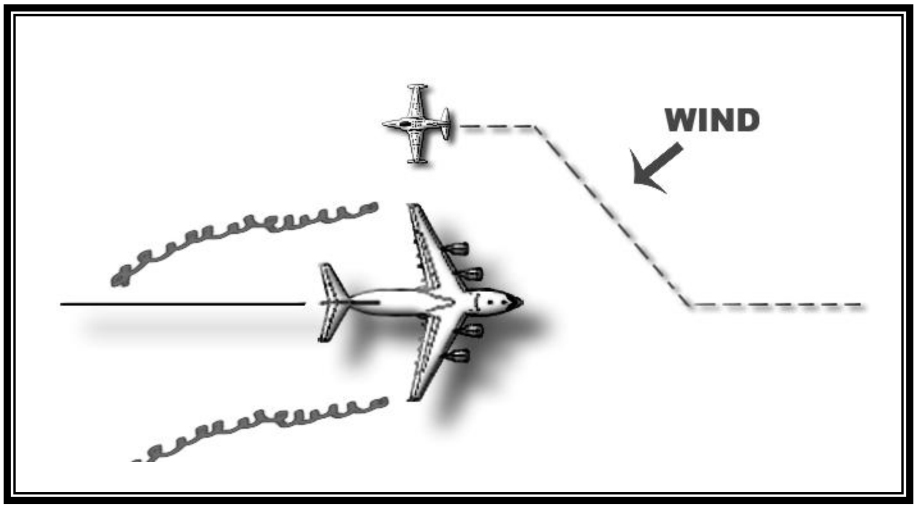
A small aircraft departing the same runway as a large or heavy airplane should lift off before the point of the other's rotation and stay above the other aircraft's flight path; something to remember if your aircraft cannot out climb the preceding aircraft or if considering an intersection takeoff.



<u>When in doubt – WAIT IT OUT.</u>

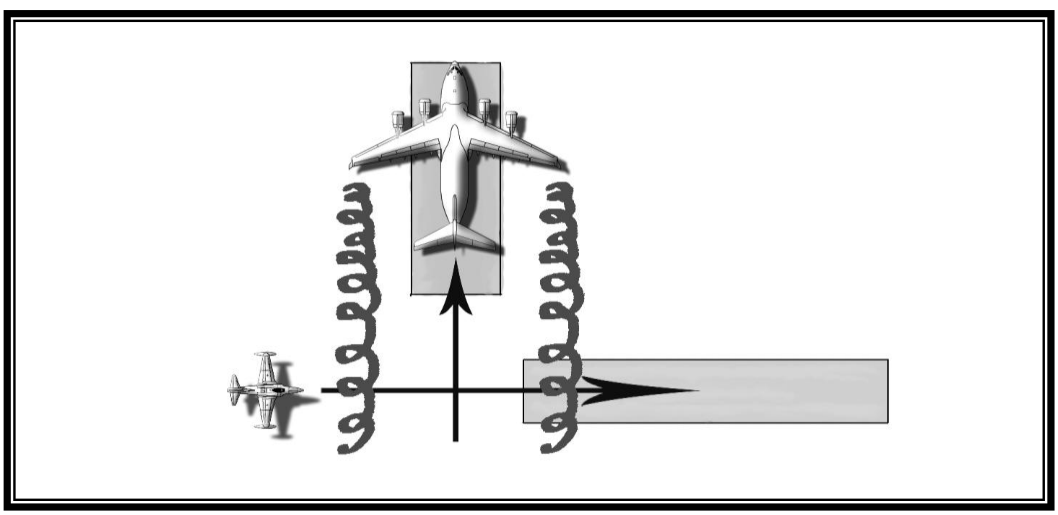
TRACKING BELOW TURBULENCE

Small aircraft beneath larger aircraft on the same track should have at least 1000 feet vertical separation. Otherwise, the pilot of a smaller aircraft should adjust course upwind of track.



INTERSECTING RUNWAY CENTERLINES

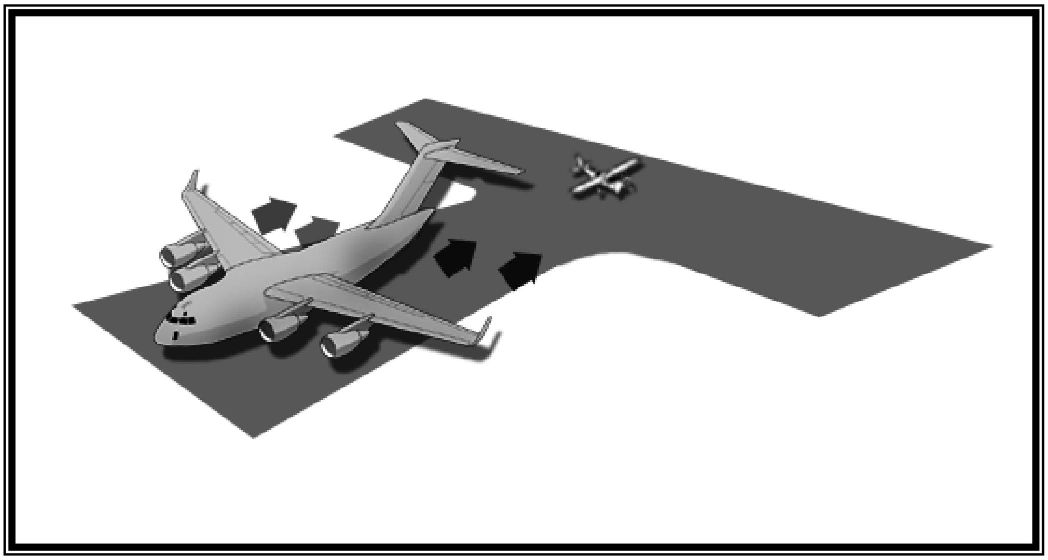
Operations on runways where centerlines intersect may cause wake turbulence from one runway to trail into the approach path of the other. A pilot should cross above the turbulence and land further down the runway.



<u>2 minutes between aircraft (same direction) and 3 minutes for opposite direction (reference FAAO 7110.65R)</u>

WATCH OUT FOR JET BLAST!

Along with aircraft wake turbulence, jet blast can also create a great deal of danger. Jet blast can up-root trees, flatten building structures, shatter windows, lift and propel heavy objects, weathercocked airplanes, blow over lift trucks, and create other problems on airport ramps, taxiways, and runways.



What to consider:

1. Almost half of reported jet blast incidents occurred on taxiways, in run-up areas, and adjacent to or on runways—all relatively uncongested airport areas. The other half occurred on ramps, where many more such incidents might be expected because of close aircraft parking and tight maneuvering conditions.

2. 85% of the damage inflicted by jet blast was to the wings, props, flaps, and rudders of other aircraft, **especially to light aircraft weighing five-thousand pounds or less.**

3. An aircraft initiating movement from a full stop requires more power to overcome inertia and tire friction than an aircraft already in motion. Additional breakaway thrust is needed if the aircraft must also turn during the initial movement. Unless carefully managed, these power applications can result in jet blast damage.

MILITARY TRAINING ROUTES

National security largely depends on the deterrent effect of our airborne military forces. To be proficient we practice a wide range of airborne tactics. One phase of this training involves "low level" combat tactics. The required maneuvers and high speeds make the see-and-avoid aspect of VFR flight much more difficult and require increased vigilance when flying through these operating areas. In an effort to ensure the greatest practical level of safety for all flight operations, military and civilian, the Military Training Route (MTR) program was developed.

Generally, MTRs are established below 10,000 feet MSL for operations at speeds in excess of 250 knots. Multiple aircraft fly these routes and operate either VFR or IFR at speeds up to 500 KIAS and altitudes from 300 feet AGL to several thousand feet. McChord Field C-17A aircraft most commonly use the following MTRs: **IR324**, **IR325**, **IR326**, **IR327**, **IR328**, **IR329**, **IR330**, and **VR331**. Each of these MTRs except VR331 is centered around Grant County International Airport and are often used in combination with tactical approach training there. You can see these on the following map.

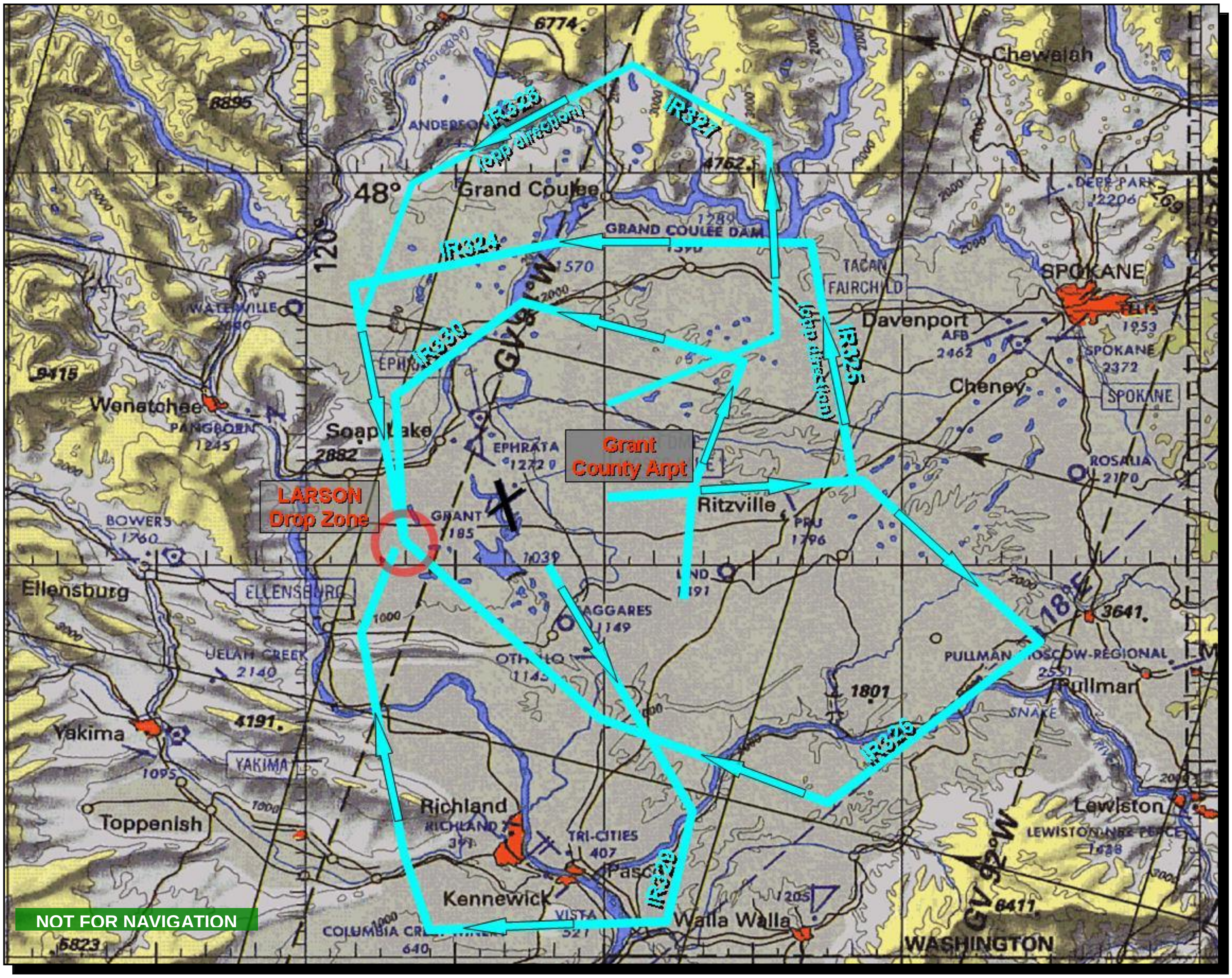
Non-participating aircraft are not prohibited from flying within an MTR but are encouraged to limit the time they operate within them. Exercise extreme caution when flying through or near these routes. Pilots should contact a Flight Service Station (FSS) within 100 NM of a MTR to obtain current information on route usage. The information available includes: time of scheduled activity, altitudes in use, and route width.

Route widths can vary along the MTR and may extend several miles on either side of the charted centerline depicted on sectional charts. Military aircraft conducting low level training can be anywhere within a MTR's structure. Aircraft will rarely be on the centerline or at a constant altitude when VFR conditions exist. MTRs with four numbers (e.g. VR1041, etc) identify MTRs with no segment above 1,500 feet AGL while MTRs identified with three numbers (e.g. IR324, VR331, etc) include one or more segments above 1,500 feet AGL. Our aircraft still follow standard FAA separation from obstacles and airfields while operating on the routes.

When requesting MTR information, give the FSS your position, route of flight, and destination. This will permit the FSS specialist to identify the MTRs along your intended flight path. When operating near an MTR, the only means of separation between you and aircraft using the route is

<u>See And Avoid!</u>

COMMONLY FLOWN MTRs



As you can see, the majority of MTRs that McChord Field C-17s fly are centrally located around Grant County International Airport and terminate at the Larson Drop Zone to the southeast of Ellensburg. C-17 entry and route times are deconflicted by ensuring at least 20 minutes separation between aircraft entering individual routes. These routes are flown in all weather, day or night, between 300' AGL and approximately 5000' MSL, but in VMC our aircraft will typically be at or below 1,500' AGL.

MILITARY TRAINING ROUTE TO-DO LIST

1. While flight planning, carefully check charts for the presence of MTRs and avoid them if possible.

2. Since only the route centerline of an MTR is depicted on sectional charts, military aircraft may be miles on either side of centerline within the route corridor. Be especially vigilant anywhere near a charted route centerline.

3. Contact the nearest Flight Service Station for planned military activity along a route.

4. Operate through an MTR above 1,500 feet AGL (verify its operating altitudes based on three or four digit identifier).

5. Cross an MTR at 90 degrees to minimize time spent within the route.

6. If you see a military aircraft, assume he does not see you. Take action to avoid coming within 500 feet of that aircraft.

COLLISION AVOIDANCE TIPS

1. Clear constantly for other aircraft, both visually and over the radio.
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
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 windows and windscreen clean and clear. A bug on the windscreen can obstruct aircraft coming your way.
10. Properly manage tasks in the air. A cockpit gets very busy. Learn the proper methods to reduce workload demands and time crunches.
11. Don’t get complacent during instruction! Instructors make mistakes too. Many mid-air collisions occur during periods of instruction or supervision.
12. When flying at night avoid white light in the cockpit. White light, even if used momentarily, disrupts your night vision. Use flashlights in the cockpit with red or green lenses.
13. Beware of wake turbulence. Especially watch out for heavy aircraft.
14. Understand the limitations of your eyes and use proper visual scanning techniques. If another aircraft appears to have no relative motion but is increasing in size, it is on a collision course with you.
15. Clear before and during all climbs, descents, and turns.
16. Above all, AVOID COMPLACENCY! There is no guarantee that everyone is flying by the rules or that everyone is where they are supposed to be, SEE AND BE SEEN!

IMPORTANT TELEPHONE NUMBERS

62 AW Wing Safety Office	**(253) 982-3105**
62 AW Base Operations	**(253) 982-5611**
Seattle, WA Flight Standards District Office	**(425) 287-2813**

This brochure contains information regarding mid-air collision avoidance, wake turbulence, jet blast awareness, and the operations at JBLM - McChord Field. If you have questions concerning these topics, contact us at McChord Field Flight Safety (253) 982-3105 or e-mail us at 62aw.sef@mcchord.af.mil.