62D AIRLIFT WING

Joint Base Lewis-McChord, WA

MIDAIR COLLISION AVOIDANCE (MACA)

5 February 2025

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https://www.mcchord.af.mil/About-Us/Mid-Air-Collision-Avoidance/

Contents

Introduction

Mid-Air Collision Avoidance, or 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 Field and our auxiliary training field at Moses Lake 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 aircraft types, 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 mid-air collision or a near miss with a military aircraft.

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 herein. 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.

McChord Field

McChord Field is home to a wide variety of units and missions. The 62nd Airlift Wing is the active-duty wing on McChord Field at Joint Base Lewis-McChord.

The 62nd AW is joined by its Reserve partner, the 446th Airlift Wing. Together, they operate the C-17A Globemaster III aircraft to provide combat airlift for America.

Additionally, JBLM also hosts the Western Air Defense Sector, an Air National Guard unit; the 22nd Special Tactics Squadron; the 361st Recruiting Squadron and several other units across the installation.

Safe mission accomplishment is our #1 priority. The 62nd Airlift Wing Commander is responsible for the operation of the second largest C-17A wing in the Air Force. To perform our mission, we must integrate military flight operations with commercial and general aviation traffic of all types. We need your help in this dynamic process.

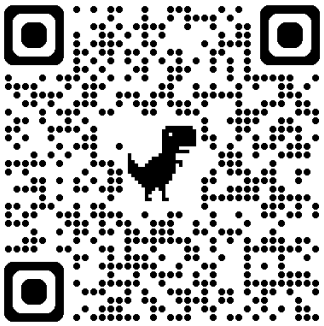
The potential for a mid-air collision is high!

Profile of a Mid-Air Collision

During a three-year study of midair collisions involving civilian aircraft, the National Transportation Safety Board (NTSB) determined that:

- Most of the aircraft involved in collisions are engaged in recreational flying, not on any type of flight plan.
- 90% midair collisions occur in VFR weather conditions with visibility greater than 3 miles.
- Most accidents occurred at or near uncontrolled airports and at altitudes below 3000' AGL.
- Pilots of all experience levels were involved in midair collisions, from pilots on their first solo ride, to 20,000-hour veterans.
- Flight instructors were on board the aircraft 37% of the accidents in the study.
- Many collisions were the result of faster aircraft overtaking and hitting a slower aircraft.

NTSB Safety Alert SA-058, *Prevent Midair Collisions: Don't Depend on Vision Alone:*



A Few Tips in Collision Avoidance

- **Plan Ahead.** Review your intended route of flight prior to departure. Review NOTAMS and charts to identify possible conflict areas. Is there anything that can be done on the ground to reduce your workload in the air?
- **See and Avoid.** Practice the "see and avoid" concept at all times regardless of whether the operation is conducted under Instrument (IFR) or Visual (VFR) Flight Rules.
    - Under IFR control, don't always count on ATC to keep you away from other aircraft. IFR separation only exists between you and other IFR traffic. There may be VFR traffic that ATC is unaware of in your flying area.
    - Understand the limitations of your eyes and use proper visual scanning techniques. Remember, if another aircraft appears to have no relative motion, but is increasing in size, it is likely to be on a collision course with you.
- **Clear.** Execute appropriate clearing techniques before climbs, descents, and other maneuvering. Consider the blind spots created by the design of your aircraft that may inhibit your line of sight during execution.
    - Request flight following or traffic advisories to assist in visual scanning.
    - Always monitor the appropriate frequency for the area you are transiting and include position reports when able.
- **Communicate.** Broadcast intentions frequently and when appropriate on Common Traffic Advisory Frequency (CTAF).
- **Be Seen.** Make your aircraft as visible as possible by turning on exterior lights below 10,000 MSL and turn on your landing lights within 10 miles of any airport or in conditions of reduced visibility where any bird activity is expected or under special VFR clearance.
- **Squawk.** If the aircraft is equipped with a transponder, turn it on and adjust it to reply on both Mode 3/A and Mode C (if installed). Transponders substantially increase the capability of radar to see all aircraft and the MODE C feature enables the controller to quickly determine where potential traffic conflicts exist. Even

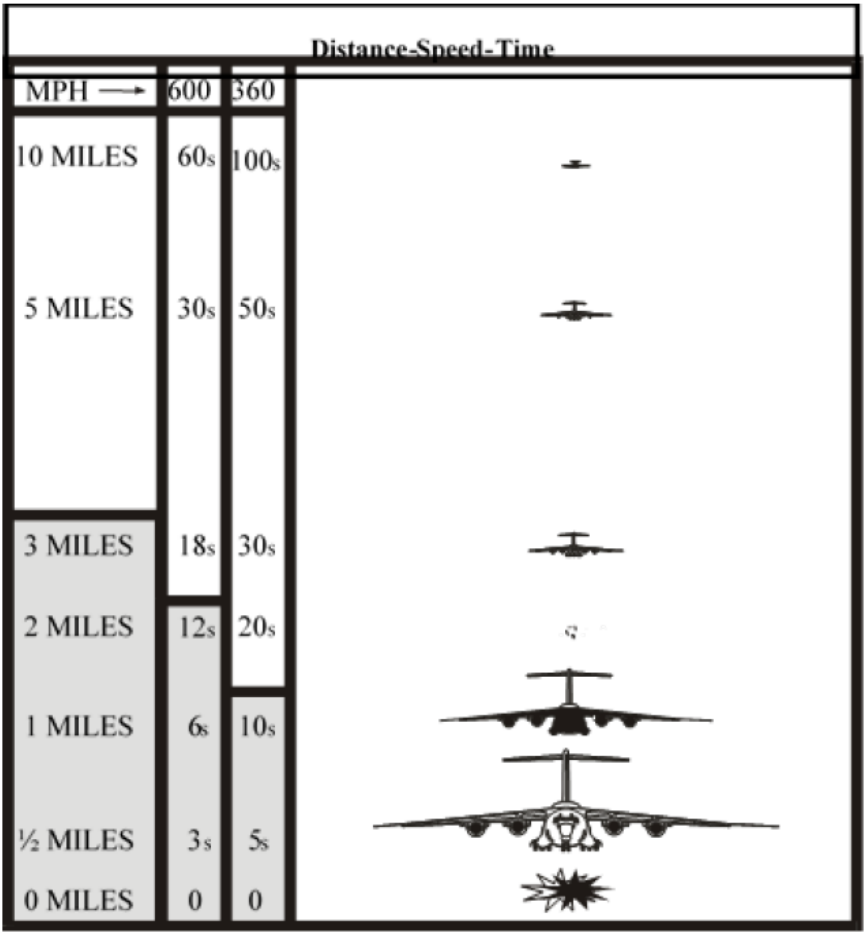
VFR pilots who are not in contact with ATC will be afforded greater protection from IFR aircraft receiving traffic advisories.
    - "*Traffic alert and collision avoidance system, operation required*. Each person operating an aircraft equipped with an operable traffic alert and collision avoidance system shall have that system on and operating." -14 CFR 91.221(b)
- Be aware of the type of airspace where you operate and comply with the applicable rules.
- AVOID COMPLACENY. No one is immune to a midair collision; but by working together we can avoid it.

FAA Document, *Reducing the Risk of Midair Collisions in VFR Practice Areas:*

See and Avoid Techniques

Blossom Effect (FAA Safety)

This limitation is compounded by the fact that at a distance, an aircraft on a collision course with you will appear to be motionless. It will remain in a seemingly stationary position, without appearing either to move or to grow for a relatively long time, and then suddenly bloom into a huge mass filling one of your windows. This is known as "blossom effect."



Since we need motion or contrast to attract our eyes' attention, this effect becomes a frightening factor when you realize that a large bug smear or dirty spot on the windshield can hide a converging plane until it is too close to be avoided. Considering the recognition and reaction times shown in the table; the shaded blocks in the chart above indicate distances where aircraft on a collision course would surely collide.

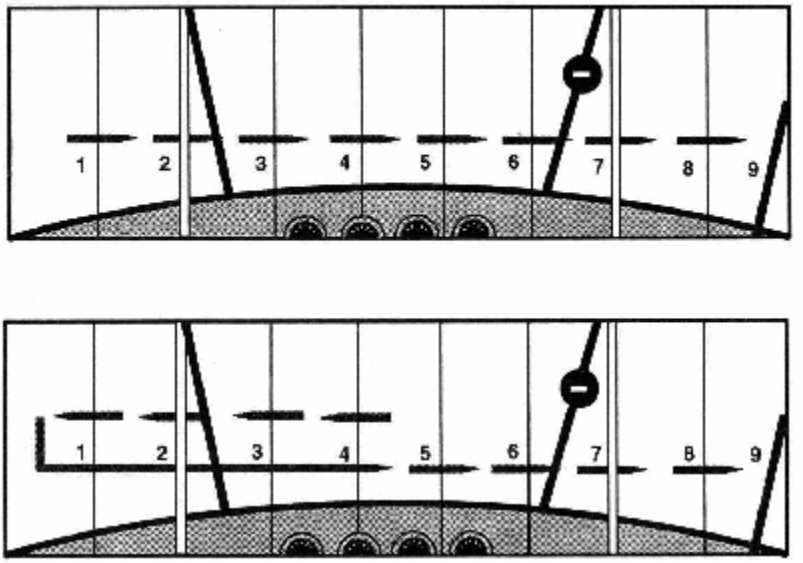
Scan Patterns

The scan that works best for most pilots is called the ‘block’ system. This type of scan is based on the theory that traffic detection can be made only through a series of eye fixations at different points in space. By fixating every 10-15 degrees, you should be able to detect any contrasting or moving object in each block. This gives you 9-12 blocks in your scan area, each requiring a minimum of one to two seconds for acclimation and detection.

One method of block scanning is the ‘side-to-side’ motion (top picture). Start at the far left of your visual area and make a methodical sweep to the right, pausing in each block to focus. At the end of the scan, return to the instrument panel. A second form of block scanning is the ‘front-to-side’ version (bottom picture). Start with a fixation in the center block of your visual field. Move your eyes to the left, focusing in each block, swing quickly back to the center block, and repeat performance to the right.

There are other methods of scanning, but unless some series of fixations are made, there is little likelihood that you will be able to detect all targets in your scan area. When the head is in motion, vision is blurred, and the mind will not register targets as such.

Developing an efficient scan takes a lot of work and practice, but it is just as important as devel-oping good landing techniques. The best way is to start on the ground, in your own airplane, or the one you usually fly, and then practice your scan during every flight.



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 can be 800 feet by 500 feet in area; at five miles the area may be as much as 4/5 of a mile wide. This 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.

Locating Your Blind Spot

- 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.

- 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.

FAA Document P-8740-51, *How to Avoid a Mid Air Collision:*

Near Mid-Air Collisions (NMAC)

Definitions

A Near Mid-Air Collision is defined in the Aeronautical Information Manual (AIM): an incident associated with the operation of an aircraft in which a possibility of collision occurs as a result of proximity of less than 500 feet to another aircraft, or a report is received from a pilot or a flight crew member stating that a collision hazard existed between two or more aircraft.

Department of the Air Force Manual 91-223 defines a Near Mid-Air Collision: Aircrew took abrupt evasive action or would have taken such action if circumstance allowed, or another aircraft was within 500' or inside "well clear" and presented a hazard to flight safety.

How to Report

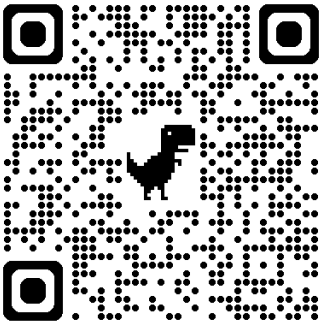
Be specific, state "I wish to report a near midair collision." To ATC and provide them with the following information:

- Date and time (UTC) of incident.
- Location of incident and altitude.
- Identification and type of reporting aircraft, aircrew destination, name and home base of pilot.
- Identification and type of other aircraft, aircrew destination, name and home base of pilot.
- Type of flight plans; station altimeter setting used.
- Detailed weather conditions at altitude or flight level.

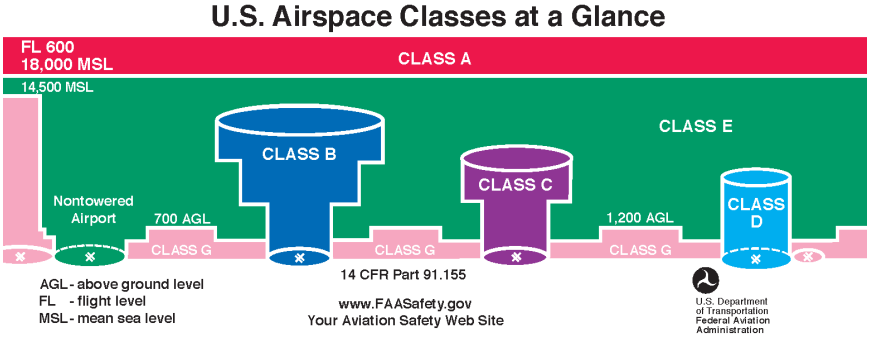
- Approximate courses of both aircraft: indicate if one or both aircraft were climbing or descending.
- Reported separation in distance at first sighting, proximity at closest point horizontally and vertically, and length of time in sight prior to evasive action.
- Degree of evasive action taken, if any (from both aircraft, if possible).

Your participation in the reporting process is highly encouraged and essential for improvements in the air traffic system and mishap prevention.

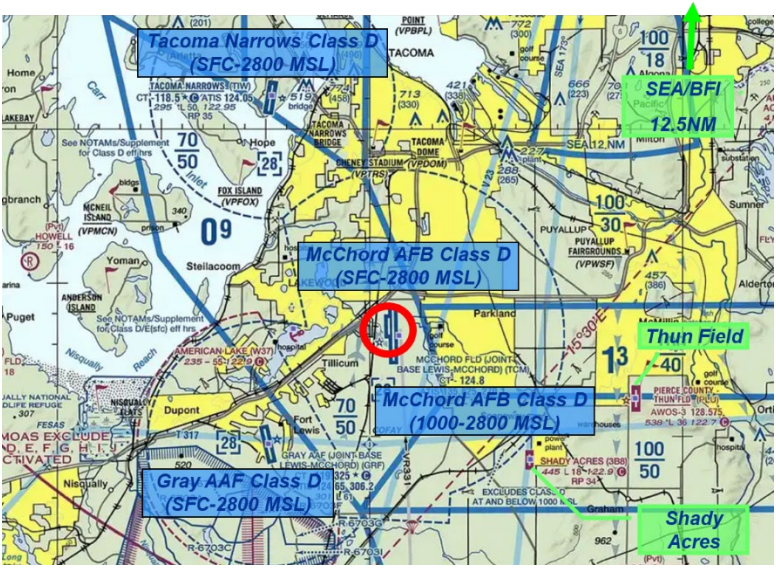
Aviation Safety Reporting System:



McChord (KTCM) Airspace

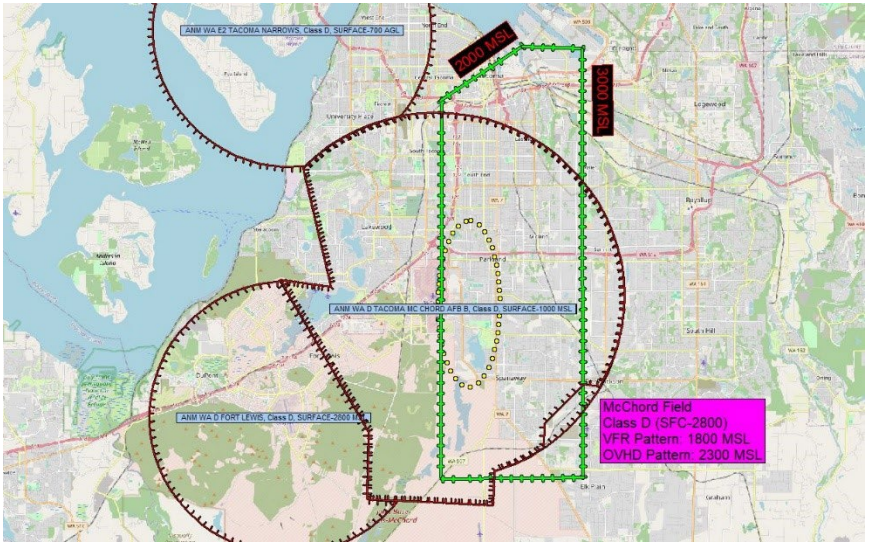


McChord's Class D airspace lies beneath Seattle Tacoma International Airport's Class B airspace veil. Additionally, there are multiple civilian airfields in the immediate area. Commercial air carriers, executive aircraft, and general aviation aircraft extensively use the airspace around McChord. The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



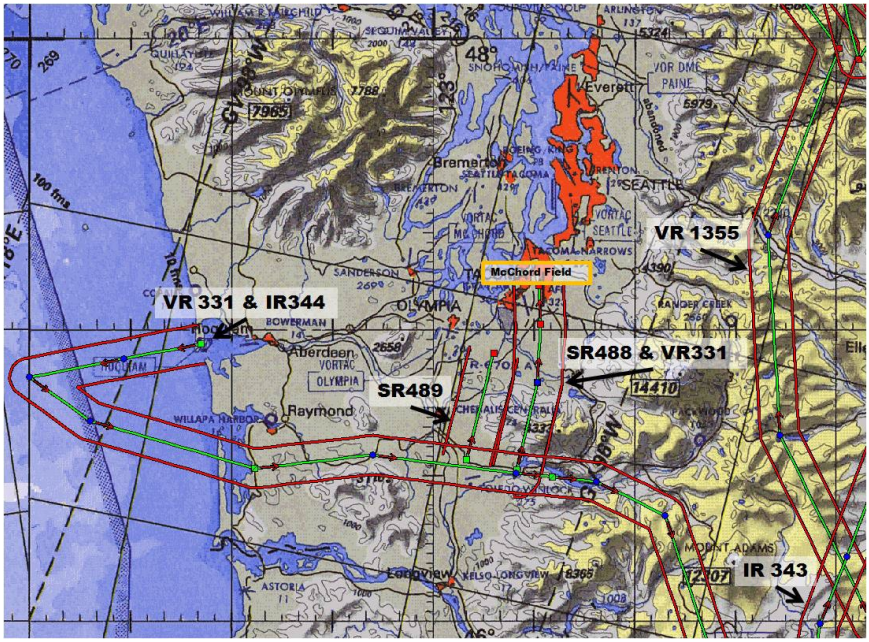
Seattle Approach can provide VFR traffic advisories within their area of primary control. However, remember that traffic advisories are given on a workload permitting basis. In order to receive flight following service, simply establish communication with Seattle Approach and wait for a reply. After the controller acknowledges you by call sign, give your position with respect to a NAVAID or airport, altitude, and destination. The controller will identify your aircraft through use of the transponder, use of turns, or position relative to a fix or NAVAID. Once identified, the controller will direct you around heavy traffic areas as able.

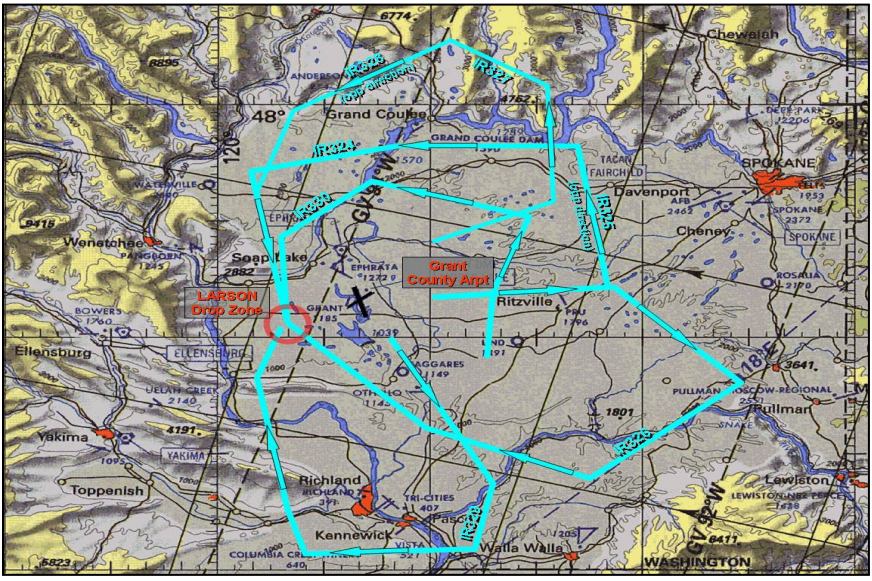
McChord Field Patterns



- Military aircraft avoid overflying Spanaway Lake, Brown's Point and Point Defiance
- Circling airspace is at 940' to the West of the field and East of I-5
- Consult FLIP for a depiction of TCM instrument approaches
- High speed Ops (>250 kts within Class D) -published by NOTAM

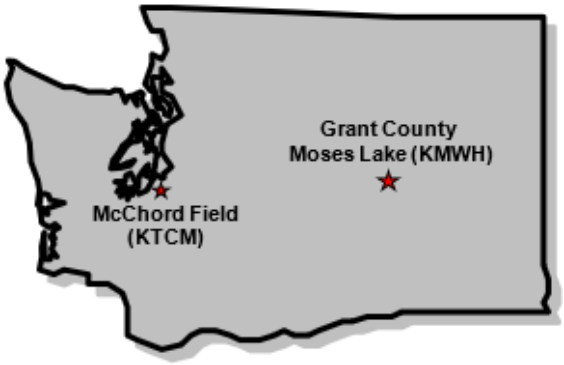
Military Training Routes & Areas



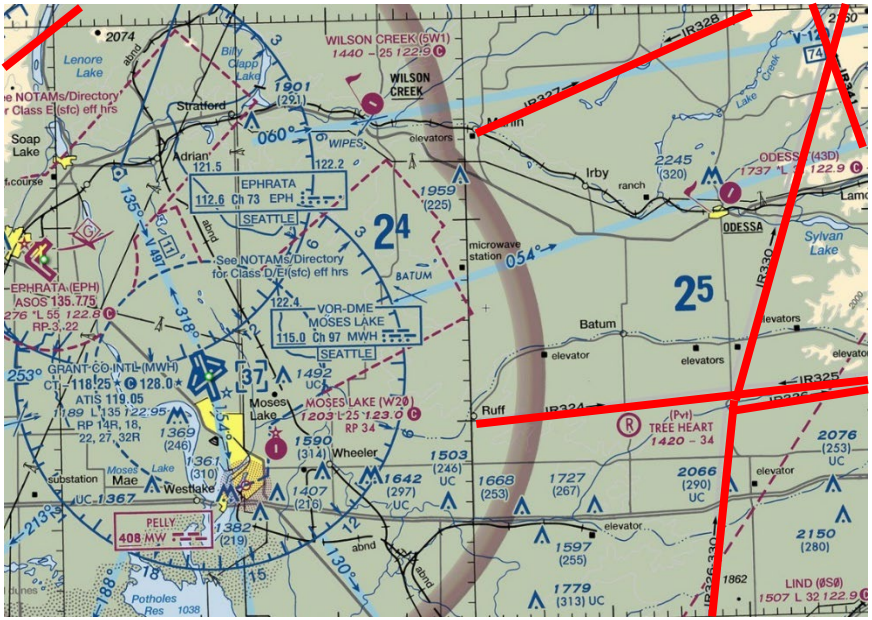


Grant County International Airport

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-17s perform maneuvers at FL200 descending at a high rate of speed (310 knots). These maneuvers require that the aircraft execute a high angle of descent in a short amount of time, up to 12,000+' per minute descent rates.

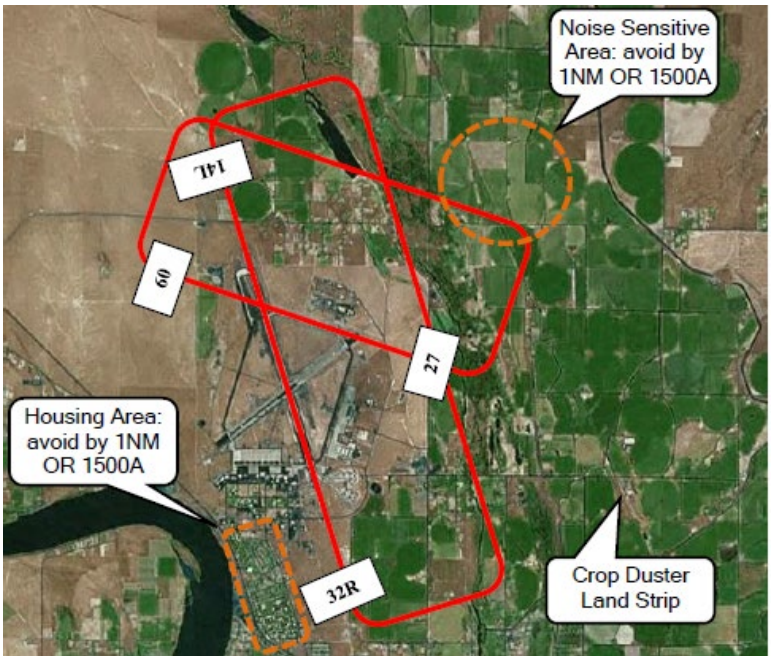


C-17s primarily operate on runway 9/27 for assault landings and use runway 14L/32R for takeoffs, landings, touch & goes, and instrument approaches. Grant County is Class D airspace surrounded by Class E. McChord C 17s use the field to conduct instrument and tactical approaches from high altitude as well 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 10:00 PM Local the tower closes and the field is uncontrolled. Extra vigilance and radio awareness is vital!

Grant County Patterns

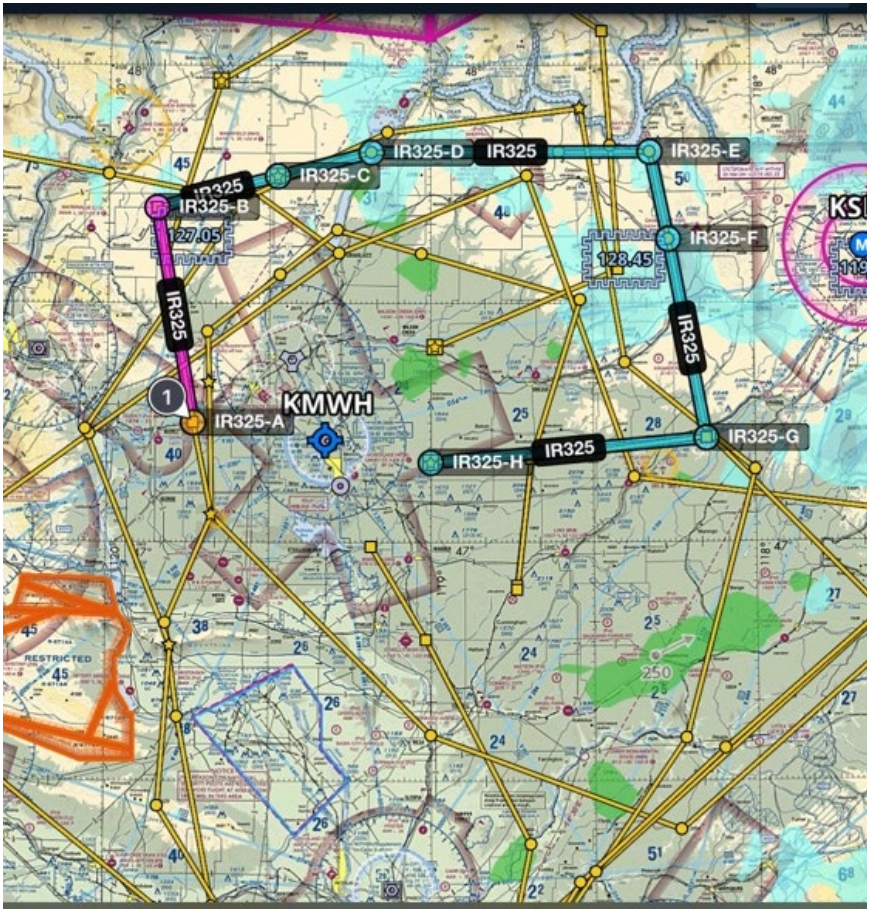


Low Level Routes:

- 3 types: *IR, VR* or *SR*
- 3 or 4 number IDs
- 4 numbers ≤ 1500’ AGL
- SOURCE DOC: AP1B (can google this DOD doc)
- All flown within confines of the block (usually 300AGL-5000MSL

Instrument Route (IR) 326

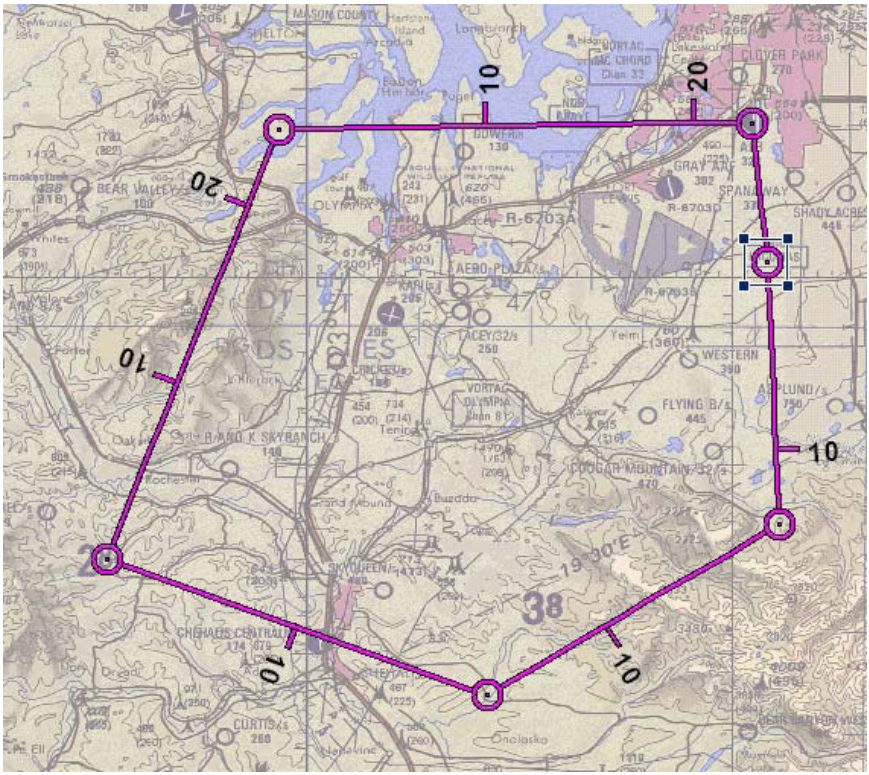
IR325


IR325-D
IR325
IR325-E
IR325-C
IR325
IR325-B
127.05
IR325-F
123.45
IR325
IR325
1
KMWH
IR325-A
IR325-G
IR325-H
IR325
RESTRICTED

Aerial Drop Zones (DZ)

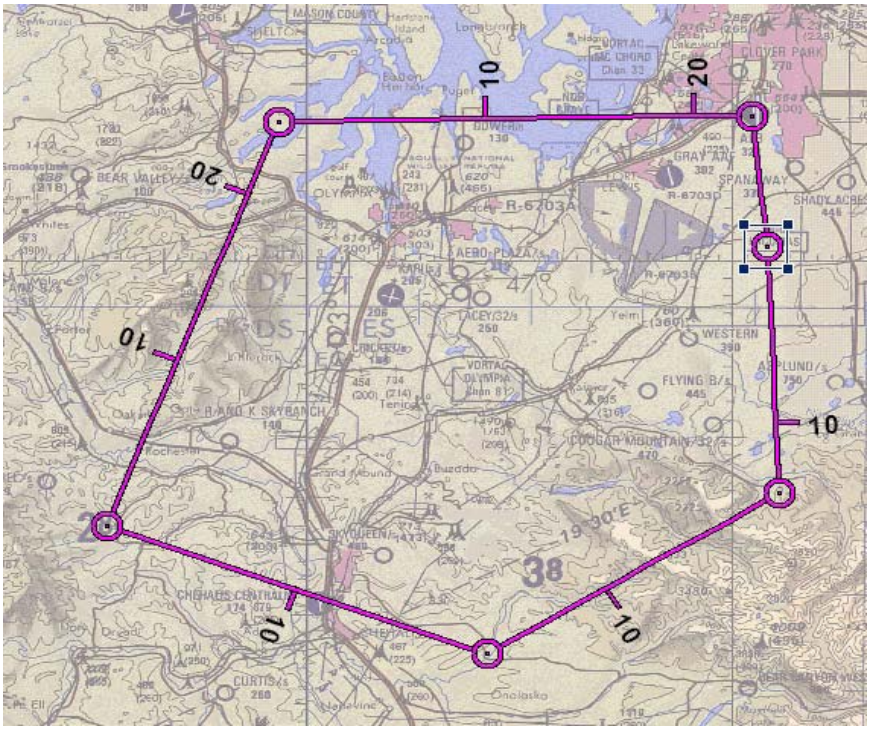
- Often use “COHO” call signs
- “Flock” of C-17s
- Could be 3 or more in non-standard formation
- Difficult to maneuver formation
- Wingmen often not squawking

Rogers DZ:



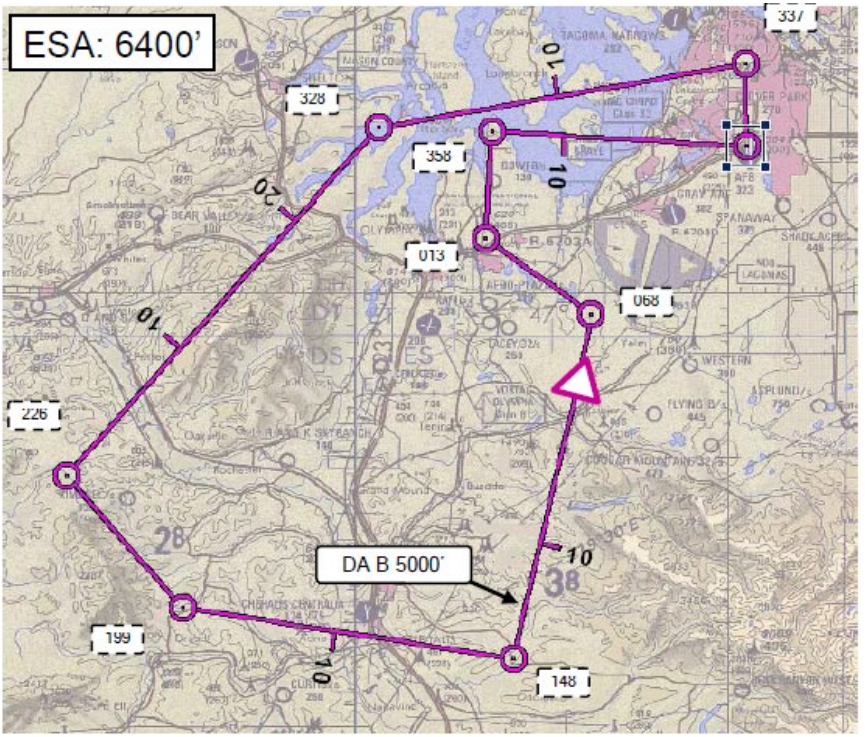
- Just South of Spanaway
- TCM 153/8
- Primarily VFR but can be IFR occasionally

Crate/Farmers DZ



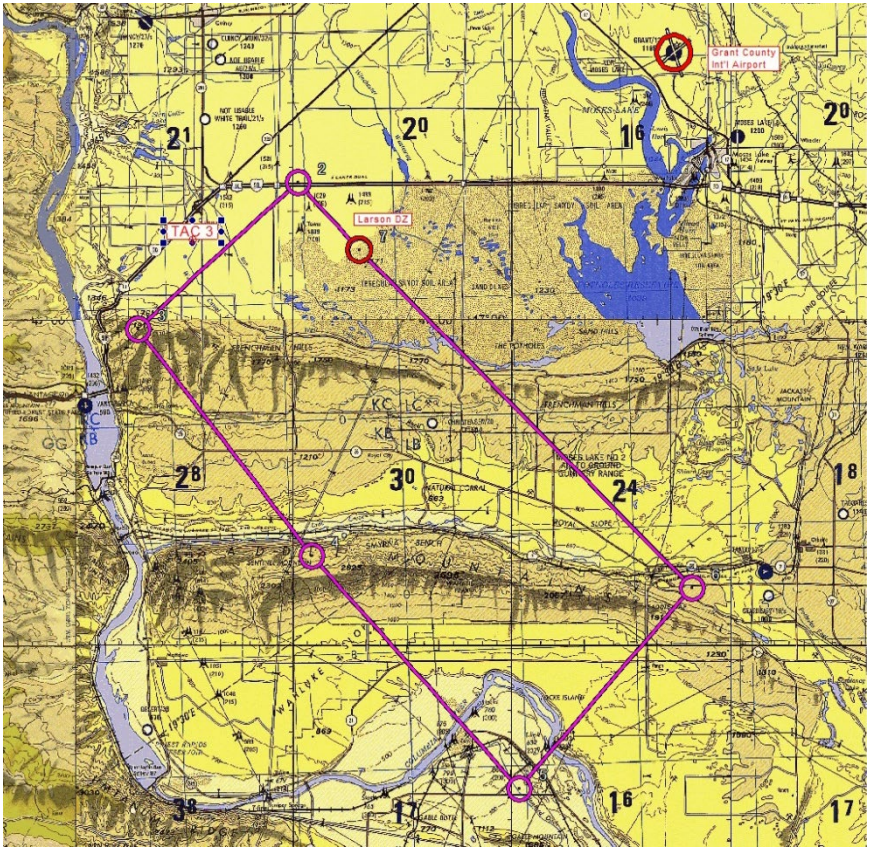
- On McChord Field – drop static line or freefall jumpers between 1,000-18,000 feet with ATC coordination

Merrill DZ



- VFR Only
- Typically drop static line troops

Larson DZ



- Most Airdrop routes terminate at Larson DZ
- Sortie profiles typically include multiple 22-min “TAC 3” routes
- Highest risk exists within 20 NM N/S corridor surrounding Larson DZ.
- Crews are task saturated during and immediately after “run in” to Larson

C-17A Overview

SPEEDS

Departure: 200 KIAS

Local Area: 250 KIAS

Low Level: 300’ AGL/340 KIAS

DIMENSIONS

Length: 174 Feet

Wingspan: 170 Feet

Height: 55 Feet

Missions

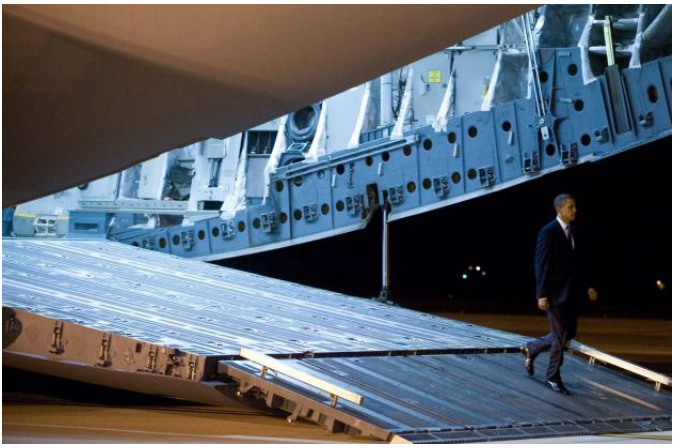
The C-17A is the Department of the Air Force's 2nd largest dedicated airlift platform after the C-5M. It sits in between smaller intra-theater platforms and large inter-theater airlift. It's capabilities were specifically designed for military application

Combat Airlift

Aerial Refueling

Aeromedical Evacuation

Presidential Support



Aerial Delivery

Supporting Scientist in Antarctica

Common Visiting Aircraft

C-130 Hercules

P-3 Orion

KC-135 Stratotanker

CH-47 Chinook

Photo taken by: Munnaf H. Joarder

HH-60 Blackhawk

P-8 Poseidon

Aviation Safety Reporting System (ASRS)

Direct from website: https://asrs.arc.nasa.gov/overview/summary.html

Summary

The ASRS is an important facet of the continuing effort by government, industry, and individuals to maintain and improve aviation safety. The ASRS collects voluntarily submitted aviation safety incident/situation reports from pilots, controllers, and others.

The ASRS acts on the information these reports contain. It identifies system deficiencies, and issues alerting messages to persons in a position to correct them. It educates through its newsletter *CALLBACK*, its journal *ASRS Direct line* and through its research studies. Its database is a public repository which serves the FAA and NASA's needs and those of other organizations world-wide which are engaged in research and the promotion of safe flight.

Purpose

The ASRS collects, analyzes, and responds to voluntarily submitted aviation safety incident reports to lessen the likelihood of aviation accidents.

ASRS data are used to:

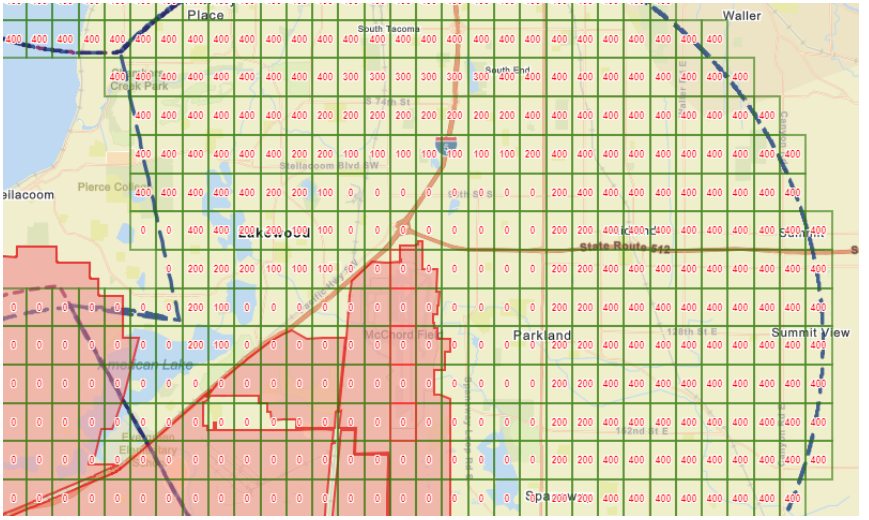
- Identify deficiencies and discrepancies in the National Aviation System (NAS) so that these can be remedied by appropriate authorities.
- Support policy formulation and planning for, and improvements to, the NAS.
- Strengthen the foundation of aviation human factors safety research. This is particularly important since it is generally conceded that over two-thirds of all aviation accidents and incidents have their roots in human performance errors.

UAS/Drone Operations

UAS/drone operations are just as dangerous to manned aircraft as bird strikes. In fact, they are of a greater hazard as birds will at least attempt to get out of the way and are made of flesh instead of plastic and metal. Additionally, FAA rules and restrictions on drone operations is rapidly changing and it is incumbent on the operator to know and be aware of those rules. Unauthorized UAS/drone activity on and around Joint Base Lewis McChord is prohibited and may result in legal penalties. Use this web address for a map of UAS ceilings and other restricted airspace around the country.

https://udds-faa.opendata.arcgis.com/

Below is an excerpt from that website around McChord Field. The red numbers are the authorized ceiling for UAS operations in feet (Ex: 0 = not authorized, 100 =100' is maximum altitude of a UAS in that area).



More Information

Visit our webpage:

https://www.mcchord.af.mil/About-Us/Mid-Air-Collision-Avoidance/

Email Us : 62.AW.SEF@US.AF.MIL

- General Aviation Safety Inquiries
- Request a MACA Briefing at Your Location
- Request Materials for Your Location (posters, pamphlets, booklets, etc.)

Call Us:

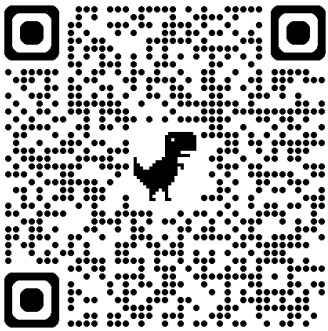
- Flight Safety Office: (253) 982-3105
- Airfield Operations: (253) 982-5215
- Aerospace Manager: (253) 982- 4057

Other Point of Contact:

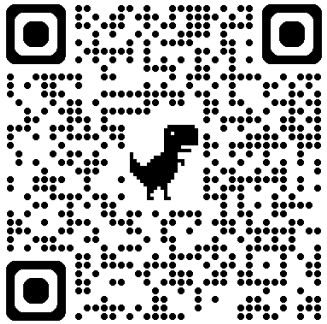
- Flight Standards District Office, Seattle, WA: (425) 287-2813

Additional Flight Safety Information:

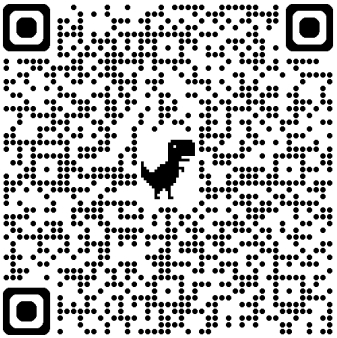
Aircraft Owners and Pilots Association, *Avoiding Midair Collisions:*



FAA Safety Team:



FAA Advisory Circular 90-48E, *Pilot's Role in Collision Avoidance:*



FAA Lessons Learned: