

*Forbes Field, Topeka, KS  
190<sup>th</sup> Air Refueling Wing  
Collision Avoidance  
Pamphlet*



*Mid-Air Collision Avoidance  
Program*

The enclosed material is for information purposes only. It is not to be used for flight planning except as a reference on Midair Collision Avoidance

*PR: 190<sup>th</sup> ARW/SE*

We wish to recognize Metropolitan Topeka Airport Authority, Midwest ATC, McConnell AFB Flight Safety Office and the 157<sup>th</sup> ARW Pease Air National Guard Flight Safety Office, for their sharing of information, pictures, data and statistics with the 190<sup>th</sup> ARW. They were of great help in the production of this pamphlet.

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## **A Word From the 190<sup>th</sup> Air Refueling Wing Commander**

Aviation Enthusiasts: Welcome to Forbes Air National Guard Base's Mid-Air Collision Avoidance (MACA) program. We applaud and encourage your interest in making the skies around Forbes ANGB, Topeka, Kansas, a safer place to fly. The 190<sup>th</sup> ARW MACA program will provide you with valuable information to help you make your journey through our Midwest airspace safe and mishap free.

Forbes ANGB is home for the KC-135E Stratotanker. Included in this pamphlet is information to make you more familiar with our aircraft, its appearance, and the routes and altitudes we fly. Also provided, is information on other military aircraft that frequent our airspace. "Familiarity" with other aircraft and their standard flight procedures makes operations in a collective airspace the safest it can possibly be.

If after reviewing this pamphlet you have any questions or concerns do not hesitate to contact our Safety Office at (785) 861-4400. The Flight Safety representatives will provide guidance to help resolve any problems. Thank you for your cooperation, time, and concern. FLY SAFE!!

Gregg Burden, Col, KSANG  
Commander, 190<sup>th</sup> Air Refueling Wing



# 1. Mid-Air Collision Avoidance (MACA) Program Overview

In simplest terms, the goal of the MACA program is: *To make the skies in the vicinity of Forbes Field/Air National Guard Base as safe a flying environment as possible.* Prepared jointly by the 190<sup>th</sup> ARW/Safety Office, MTAA and Midwest traffic controllers, this pamphlet contains valuable information to manage flying in and around our traffic area.

Recent aviation studies have highlighted the expanding use of private aircraft and the significant increase in air traffic. As our airspace becomes more congested the possibility of a mid-air collision increases respectively. Therefore, operation in our crowded airspace requires extra vigilance and increased awareness to effectively manage the increased risk associated with air traffic density.

The MACA program provides vital information to both military and civilian aviators to promote an environment of shared expectations and understanding. Communication with air traffic control agencies, aggressive clearing by aviators, and knowledge of the uses of Forbes Field's airspace will help us safely operate together. Within these pages you will find the necessary facts on our airspace, restricted areas, flight patterns, and military aircraft.

Please heed the advice and pass our recommendations on to your fellow aviators.

Robert M. Morse, LTC, KSANG  
190<sup>th</sup> ARW/ Chief of Safety

## **2. Forbes Fld Flying Mission and Flight Operations**



### **Flying Mission**

The Federal mission of the 190<sup>th</sup> Kansas Air National Guard is to: Staff, equip and maintain combat flying and combat support units to augment the Air Force. The majority of our flight operations are in direct support of this Federal mission.

Another facet of supporting the Air Force includes using Forbes Fld to host other Units and participate in Joint operations. These types of flight operations frequently include supporting several types of military aircraft from all over the world.

### **Flight Operations**

The 190<sup>th</sup> Air Refueling Wing is responsible for worldwide aerial refueling, as well as, movement of cargo and troops throughout the world. One of the National Guard's busiest bases, Forbes Field ANGB is located in east central Kansas approximately 60 miles west of Kansas City and 150 miles northeast of Wichita Kansas. Our flight activities include numerous Joint Chiefs of Staff exercises, State Department missions, deployment/redeployment of aircraft overseas, and daily readiness training. We also provide Presidential and Vice Presidential support for the White House.

The men and women assigned at Forbes Field ANGB are particularly proud of their ability to respond to any tasking, worldwide. In order to maintain our readiness the 190<sup>th</sup> ARW flies a wide range of mission profiles at all hours. Our responsibilities also include the airfield providing support to other Unit's and their aircraft. These circumstances create a dynamic flight environment with all types of aircraft and various flight profiles. Forbes Field ANG is active nearly every hour of every day supporting flight operations, and our aircrews are airborne almost every day of the year providing the types of quality mobility service customers have come to expect.

### **3. YOUR ROLE IN COLLISION AVOIDANCE**

Recent studies of midair collisions by the National Transportation Safety Board (NTSB) determined that in most cases the aircraft involved were:

- Engaged in recreational flying, and NOT on any type of flight plan.
- In VFR/VMC weather conditions during weekend daylight hours.
- At or near non-towered airports and at altitudes below 1,000 feet
- In daylight with visibility greater than 3 miles.

#### **Additionally**

Involved all experience levels---from pilots on their first solo to 20,000 hours veterans.

Flight instructors were on board the aircraft in 37% of the accidents in the study.

**Here is how YOU can contribute to professional flying and reduce the odds of being involved in a midair collision:**

1. **Know your high-density traffic areas, and avoid them** if possible.
2. **Practice the “see and avoid” concept at all times.**
3. **Participate in flight following whenever possible.**
4. **Make yourself as visible as possible;** turn on exterior lights-especially at low altitudes and near airports!
5. **Understand the limitations of your eyes** and use proper visual scanning techniques (See page XX) Remember that 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! As your eyes become fatigued, they become less efficient at seeing aircraft.
6. **Execute appropriate clearing procedures** before all climbs, descents, turns, or acrobatics.
7. **Be aware of the type of airspace** in which you intend to operate and comply with the applicable rules.
8. **Use a transponder** and adjust it to reply on both mode 3/A and mode C.
9. **Request traffic advisories**, when available, to assist the pilot’s own visual scanning.
10. **Monitor the appropriate frequencies** at all times.
11. **Make frequent position reports** and broadcast your position/intentions at all non-towered airports—announce your intentions on Unicom and use standard patterns. Present a “predictable target”.

12. If IFR **do not blindly trust ATC**-They are also human and can make a mistake.
13. Use the **appropriate hemispheric altitudes**, and do not let your altimeter “Wander”
14. **Clear constantly for other aircraft, both visually and over the radio.**
15. **Keep your windscreen clean and clear.**
16. **Learn proper task management in the air.** A cockpit can really get busy, learn the proper methods to help you reduce workload demands and timing crunches—“plan ahead”.
17. **Do not get complacent during instruction**, many midair collisions occur during periods of instruction or supervision.
18. When flying at night, **do not use bright lights in your cockpit.** White light disrupts your night vision, even if only momentarily.
19. **If you see military aircraft, scan ahead and behind, they frequently fly loose formation (often separated by a mile or more).**
20. **AVOID COMPLACENCY!** There is no guarantee that everyone is flying by the rules.



21. **BEWARE of WAKE TURBULENCE.**

## **4. ATC Facilities and Services**

Kansas City Center (ATCC) provides the overall approach/departure service to Forbes Field, 24 hours a day. Midwest Air Traffic Control contractor operates the Forbes control tower seven days a week from 0500 to 2200. Midwest also operates the Forbes Field Ground Controlled for the facility. Kansas City ATCC provides flight following to civilian aircraft on VFR flight plans upon request. VFR aircraft should consider requesting flight following or coordinate with Forbes Field Tower. All civilian and commercial aircraft are allowed to perform multi practice approaches, touch and goes or full stop loadings. Forbes Field hosts several FBO and a terminal with jet ways and a restaurant.

Automatic Terminal Information Service (ATIS) is broadcast on frequencies 128.25 VHF. The ATIS is normally turned off from 2400 to 0600 unless mission launches require it. Forbes Field Ground Control on 290.2 UHF or more commonly on 121.7 VHF provides clearance Delivery.

Navigational Aids available at Forbes Field include a VOR/DME/TAC to Runway 21 and ILS to runway 31, TAC to runway 13, NDB to runway 13 and VOR/DME to runway 03. Runway 31/13 is 12819 feet long and xxx feet wide, runway 03/21 is 7002 feet long and xxx feet wide.

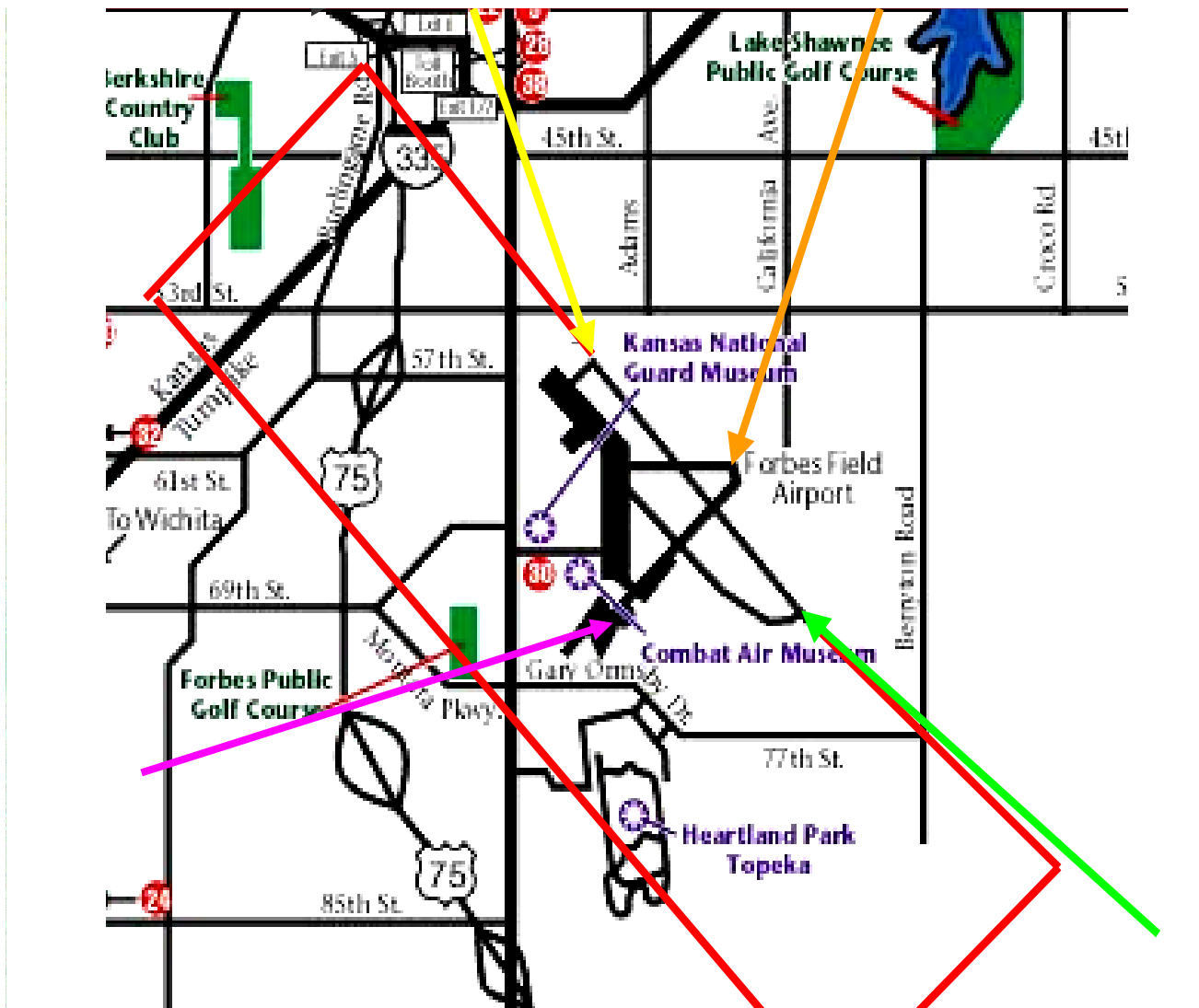







## **5. Forbes Field Instrument Departures and Arrivals**

For the KC-135 single ship the departure is usually runway HEADING to 5000 feet MSL on all runways. Cell departure (two or more KC-135s in non-standard formation) departure is usually runway heading to 6 DME, then right or left turn on courses, blocking 4000 through 5000 MSL. VFR aircraft flying along the path of I-70 should use caution in the area because the military pilots on the departure procedure are paying close attention to their instruments and formation lead. (non-standard formation for the KC-135 is half mile to one mile in trail, stacked up/down 500 feet from lead aircraft.)

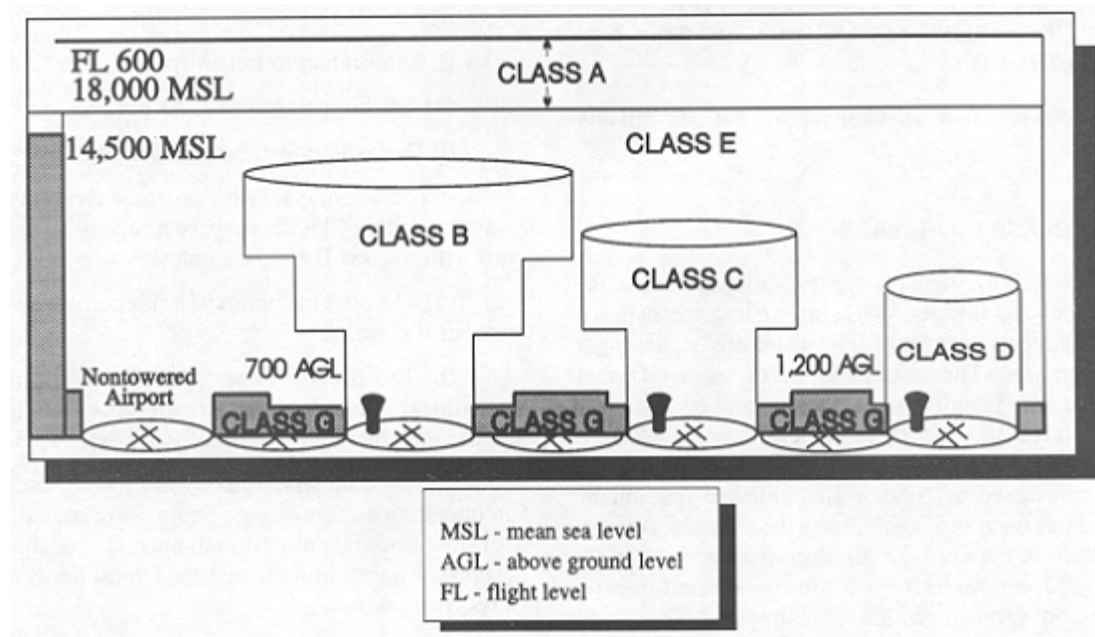
There are a number of high instrument penetrations procedures to Forbes Field, mostly used by military traffic. For the most part radar vectors to final or the IAP are the standard scenario. The Precision ILS approach has a final approach course, which runs straight to the runway, while the VOR, TACAN, and GPS approaches have a final approach course, which are offset a little. Again, these procedures require intense instrument work, and VFR pilots should use caution when traversing these final approach courses.





-  ILS Runway 31 Approach Corridor
-  Tacan Runway 13 Approach Corridor
-  VOR/DME Runway 21 Corridor
-  VOR Runway 03 Corridor
-  VFR Traffic Pattern

## 6. Airspace Classification and Requirements

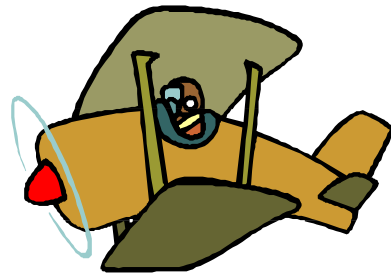
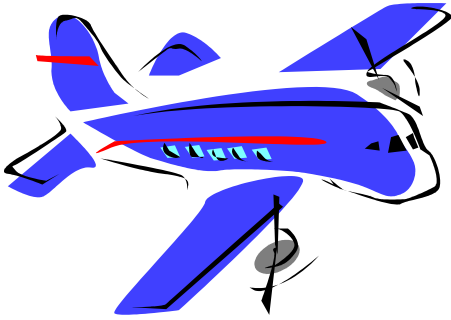


### Class D Airspace

**a. Definition.** Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument procedures are published, the airspace will normally be designed to contain the procedures.

### **b. Operating Rules and Pilot/Equipment Requirements:**

- 1. Pilot Certification.** No specific certification required.
- 2. Equipment.** Unless otherwise authorized by ATC, an operable two-way radio is required.
- 3. Arrival or Through Flight Entry Requirements.** Two-way radio communication must be established with the ATC facility providing ATC services prior to entry and thereafter maintain those communications while in the Class D airspace. Pilots of arriving aircraft should contact the control tower on the publicized frequency and give their position, altitude, destination, and any request(s). Radio contact should be initiated far enough from the Class D airspace boundary to preclude entering the Class D airspace before two-way radio communications are established.



## **7. Collision Avoidance and Aircraft Recognition**

### **Collision Avoidance**

The primary responsibility of VFR pilots is to "see and avoid" other aircraft. When in VMC, IFR pilots must also continually scan for other aircraft. VFR and IFR pilots need to be aware of two significant conditions that contribute to our local "air traffic count." The first is the close proximity to Phelp Billard Airport. Phelp Billard airport is located 4 miles N.E. of Forbes Fld. and is an excellent general aviation facility. The second condition is a "straight line" highway (I70) that provides guidance for the shortest distance between any West-East points. With these conditions it becomes increasingly important to "see and avoid." Enjoy the scenery but stay vigilant. Another factor to consider is visibility. See and avoid capabilities are often reduced due to weather factors like fog, rain, snow, haze, etc. and unnatural phenomena such as smoke and smog. Remember, if it is difficult for "you to see them," it is just as difficult for "them to see you."

### **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. The human eyes tend to focus somewhere, even in a featureless sky. 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 which 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. Apparent movement is almost always the first perception of collision threat and probably the most important, because it is the discovery of a threat which triggers the event leading to proper evasive action. 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.

## ***LOOK OUTSIDE !!***

Collision avoidance involves much more than proper eyeball techniques. You can be the most conscientious scanner in the world and still have an in-flight collision if you neglect other important factors in the over all see-and-avoid picture. It might be helpful to use a collision avoidance checklist as religiously as you do the takeoff and landing checklists. Such a checklist might include the following items:

**CHECK YOURSELF:** Start with a check of your own condition. Your safety depends on your mental and physical condition.

**PLAN AHEAD:** Plan your flight ahead of time. Have charts folded in proper sequence and within handy reach. Keep your cockpit free of clutter. Be familiar with headings, frequencies, distances, etc. ahead of time so you spend minimum time with your head down in the charts. Some pilots even jot these things down on a flight log before takeoff. Check your maps and the special, general, and area notices in the AIM in advance for restricted areas, jet training areas, military training routes, and other high density areas.

**CLEAN WINDOWS:** During the walk around, make sure your windshield is clean. If possible, keep all windows clear of obstructions. Even little bug spots can block your view of an approaching aircraft in your flight path.

**ADHERE TO S.O.P.'s:** Stick to standard operating procedures and observe the regulations of flight, such as correct altitudes and proper pattern practices. In most in-flight collisions, at least one of the pilots involved was not where he or she was supposed to be.

**AVOID CROWDS:** Avoid congested airspace enroute. You can navigate on VFR days just as accurately by passing slightly to the right of VOR stations rather than directly overhead. Pass over airports at a safe altitude, being particularly careful within a 25 mile radius of busy military or civilian fields. Plan to transit Forbes Fld. airspace at VFR altitudes above 3000 ft MSL to avoid the traffic pattern.

**COMPENSATE FOR DESIGN:** Compensate for your aircraft's design limitations. All planes have blind spots -- know yours! A mid-air potential is a fast low-wing plane overtaking a slow high-wing plane on final approach.

**EQUIP FOR SAFETY:** Your airplane can, in fact, help avoid collisions. Certain equipment once priced out of the market for light aircraft owners, now is available at a reasonable cost. High intensity strobe lights and transponders are just two examples of equipment that can increase your safety margin. And make sure you have the transponder on and "squawking" your altitude.

**TALK AND LISTEN:** Use your radios as well as your eyes. When approaching an airport, whether or not your going to land, call on the appropriate frequency at least 15 miles out and relay your position, altitude, and intentions. Since detecting a small aircraft at a distance is not easy, make use of any hints you get over the radio. A pilot reporting his or her position to a tower is also reporting to you! Once you have that particular traffic in sight, don't forget the rest of the sky. If your traffic is moving in your windscreen, you're probably not on a collision course so continue your scan and watch that traffic from time to time. However, **if that traffic appears to be stationary in your windscreen, you're probably on a collision course with it.** Be prepared to take evasive action.

**SCAN! SCAN! SCAN!:** The most important part of your checklist, of course, is to keep looking where you're going and to watch for traffic. Scan continuously!!

Basically, if you use sound airmanship, keep yourself and your plane in good shape, and develop an effective scanning technique, you'll have no trouble avoiding in-flight collisions. Remember, aviation in itself is not inherently dangerous but to an even greater degree than the sea, it is terribly unforgiving of any carelessness, incapacity, or neglect so.....  
**KEEP YOUR EYES OUT SIDE!!!**

***Take a good look!!***

## ***Collision Avoidance Checklist***

- 1. Plan ahead**
- 2. Clean windscreen**
- 3. Obey the Rules**
- 4. Brief passengers and crew**
- 5. Complete checklist early**
- 6. Know your aircraft**
- 7. Talk and listen**
- 8. Scan continuously**

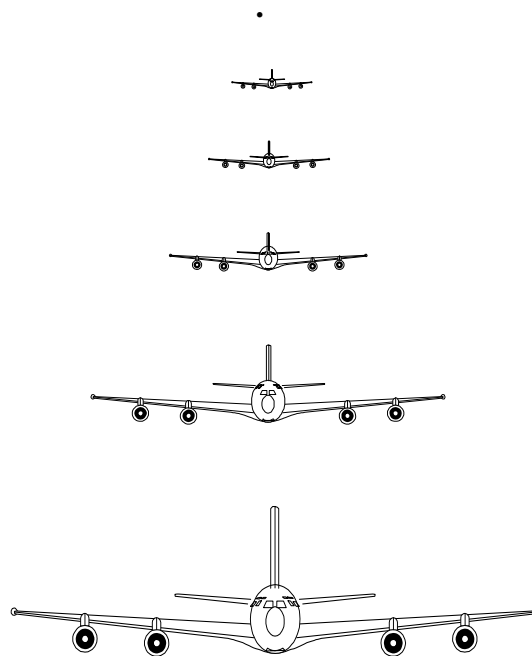
The following pages describe some of the military aircraft you may see in the Forbes Fld. ANGB local area. They are shown in order of relative frequency of flight in the local area.


# KC-135, CLOSURE RATE CHART

This is based on combined speeds of two aircraft

DISTANCE SECONDS

	AT 600 MPH	AT 210 MPH
10 MILES	60	170
5 MILES	30	85
3 MILES	18	56
2 MILES	12	38
1 MILE	6	18
0.5 MILE	3	9



 The areas in the gray box are the danger areas.  
This is based on recognition and reaction times.

The KC-135 is a long range, high speed, four engine, jet, tanker aircraft capable of takeoff weights in excess of 300,000 Lbs. With a fuel off-load capability of over 12,000 gallons, the KC-135's primary mission is to extend the range of USAF, USN, and allied military aircraft. The KC-135 is a military version of the Boeing 707 jet transport and is characterized by its swept wings and its air-refueling boom located below the horizontal stabilizer. KC-135 training missions are conducted in Forbes Fld's Class D airspace at altitudes and airspeeds up to 3000 feet MSL and 220 KIAS.

Wingspan: 131 ft

Length: 137 ft

Color: Dark Grey

Max takeoff Weight: 300,000 lbs

Max Cruise Speed: 585 MPH at 30,000 ft MSL

Approach Speed: 120-180 kias

VHF radio: yes

## T-38 Talon



### **Mission**

The T-38A Talon is a twin-engine, high-altitude, supersonic jet trainer used in a variety of roles because of its design, economy of operations, ease of maintenance, high performance and exceptional safety record. Air Education and Training Command is the primary user of the T-38A for joint specialized undergraduate pilot training. Air Combat Command, Air Force Materiel Command and the National Aeronautics and Space Administration also use the T-38A in various roles.

### **Features**

The T-38A has swept wings, a streamlined fuselage and tricycle landing gear with a steerable nose wheel. Two independent hydraulic systems power the ailerons, rudder and other flight control surfaces.

The instructor and student sit in tandem on rocket-powered ejection seats in a pressurized, air-conditioned cockpit. Critical components are waist high and can be easily reached by maintenance crews.

The T-38A needs as little as 2,300 feet (695.2 meters) of runway to take off and can climb from sea level to nearly 30,000 feet (9,068 meters) in one minute.

June 2001

## T-37 Tweet



*U.S. Air Force Photo by TSgt Fernando Serna*

### **Mission**

The T-37B Tweet is a twin-engine jet used for training joint specialized undergraduate pilot training students in fundamentals of aircraft handling, and instrument, formation and night flying.

### **Features**

The twin engines and flying characteristics of the T-37B give student pilots the feel for handling the larger, faster T-38 Talon or T-1A Jayhawk later in the JSUPT. The instructor and student sit side by side for more effective training. The cockpit has dual controls, ejection seats and a clamshell-type canopy that can be jettisoned.

The T-37B has a hydraulically operated speed brake, tricycle landing gear and a steerable nose wheel. Six rubber-cell, interconnected fuel tanks in each wing feed the main tank in the fuselage. The T-37B has improved radio navigational equipment, UHF radio and redesigned instrument panels.

Students from 12 North Atlantic Treaty Organization countries train in T-37B's at Sheppard Air Force Base, Texas.



## A-10/OA-10 Thunderbolt II



*USAF Photo courtesy Air Combat Command*

### **Mission**

The A/OA-10 Thunderbolt II is the first Air Force aircraft specially designed for close air support of ground forces. They are simple, effective and survivable twin-engine jet aircraft that can be used against all ground targets, including tanks and other armored vehicles.

### **Features**

The A-10/OA-10 have excellent maneuverability at low air speeds and altitude, and are highly accurate weapons-delivery platforms. They can loiter near battle areas for extended periods of time and operate under 1,000-foot ceilings (303.3 meters) with 1.5-mile (2.4 kilometers) visibility. Their wide combat radius and short takeoff and landing capability permit operations in and out of locations near front lines. Using night vision goggles, A-10/ OA-10 pilots can conduct their missions during darkness.

Thunderbolt IIs have Night Vision Imaging Systems (NVIS), goggle compatible single-seat cockpits forward of their wings and a large bubble canopy which provides pilots all-around vision. The pilots are protected by titanium armor that also protects parts of the flight-control system. The redundant primary structural sections allow the aircraft to enjoy better survivability during close air support than did previous aircraft.

The Thunderbolt II can be serviced and operated from bases with limited facilities near battle areas. Many of the aircraft's parts are interchangeable left and right, including the engines, main landing gear and vertical stabilizers.

## T-1A Jayhawk



*U.S. Air Force Photo by TSgt John McDowell*

### **Mission**

The T-1A Jayhawk is a medium-range, twin-engine jet trainer used in the advanced phase of specialized undergraduate pilot training for students selected to fly airlift or tanker aircraft.

### **Features**

The swept-wing T-1A is a military version of the Beech 400A. It has cockpit seating for an instructor and two students and is powered by twin turbofan engines capable of an operating speed of Mach .73. The T-1A differs from its commercial counterpart with structural enhancements that provide for a large number of landings per flight hour, increased bird strike resistance and an additional fuselage fuel tank.

## KC-10A Extender



### **Mission**

The KC-10A Extender is an Air Mobility Command advanced tanker and cargo aircraft designed to provide increased global mobility for U.S. armed forces.

Although the KC-10A's primary mission is aerial refueling, it can combine the tasks of a tanker and cargo aircraft by refueling fighters and simultaneously carry the fighter support personnel and equipment on overseas deployments. The KC-10A can transport up to 75 people and nearly 170,000 pounds (76,560 kilograms) of cargo a distance of about 4,400 miles (7,040 kilometers) unrefueled.

### **Features**

In addition to the three main DC-10 wing fuel tanks, the KC-10A has three large fuel tanks under the cargo floor, one under the forward lower cargo compartment, one in the center wing area and one under the rear compartment. Combined, the capacity of the six tanks carry more than 356,000 pounds (160,200 kilograms) of fuel - almost twice as much as the KC-135 Stratotanker.

Using either an advanced aerial refueling boom, or a hose and drogue centerline refueling system, the KC-10A can refuel a wide variety of U.S. and allied military aircraft within the same mission. The aircraft is equipped with lighting for night operations.

The KC-10A's boom operator controls refueling operations through a digital, fly-by wire system. Sitting in the rear of the aircraft, the operator can see the receiver aircraft through a wide window.

## E-3 Sentry (AWACS)



### Mission

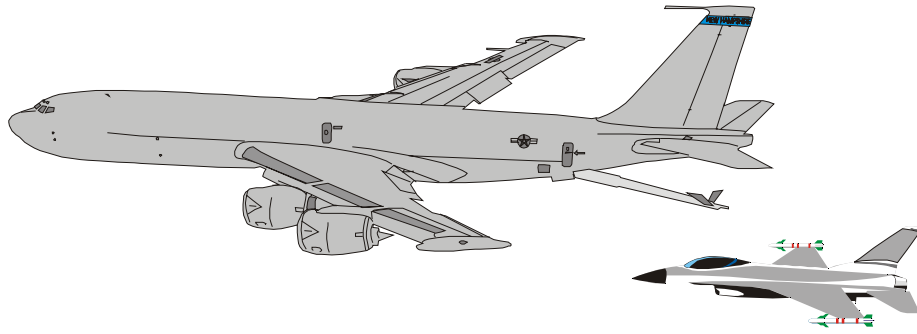
The E-3 Sentry is an airborne warning and control system (AWACS) aircraft that provides all-weather surveillance, command, control and communications needed by commanders of U.S., NATO and other allied air defense forces. As proven in Operation Allied Force, it is the premier air battle command and control aircraft in the world today.

### Features

The E-3 Sentry is a modified Boeing 707/320 commercial airframe with a rotating radar dome. The dome is 30 feet (9.1 meters) in diameter, six feet (1.8 meters) thick, and is held 14 feet (4.2 meters) above the fuselage by two struts. It contains a radar subsystem that permits surveillance from the Earth's surface up into the stratosphere, over land or water. The radar has a range of more than 250 miles (375.5 kilometers) for low-flying targets and farther for aerospace vehicles flying at medium to high altitudes. The radar combined with an identification friend or foe subsystem can look down to detect, identify and track enemy and friendly low-flying aircraft by eliminating ground clutter returns that confuse other radar systems.





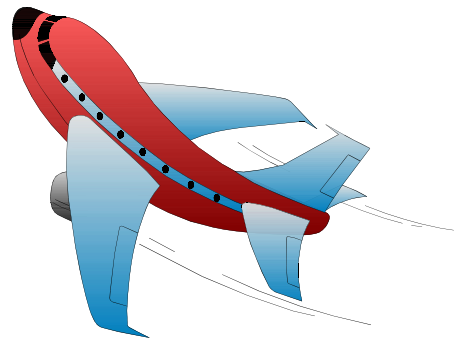


## **8. How to Obtain Additional Information**

If you have any questions concerning our services to general aviation or the use of Forbes Fld. Air National Guard Base facilities, don't hesitate to call or write us at:

### **190<sup>th</sup> Air Refueling Wing Flight Safety**

190 ARW/SE  
Headquarters, 190<sup>th</sup> Air Refueling Wing  
5920 SE Coyote Drive  
Forbes Field ANGB,  
Topeka, Kansas, 66619 Phone 785-861-4400



### **FAA Air Traffic Representative**

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