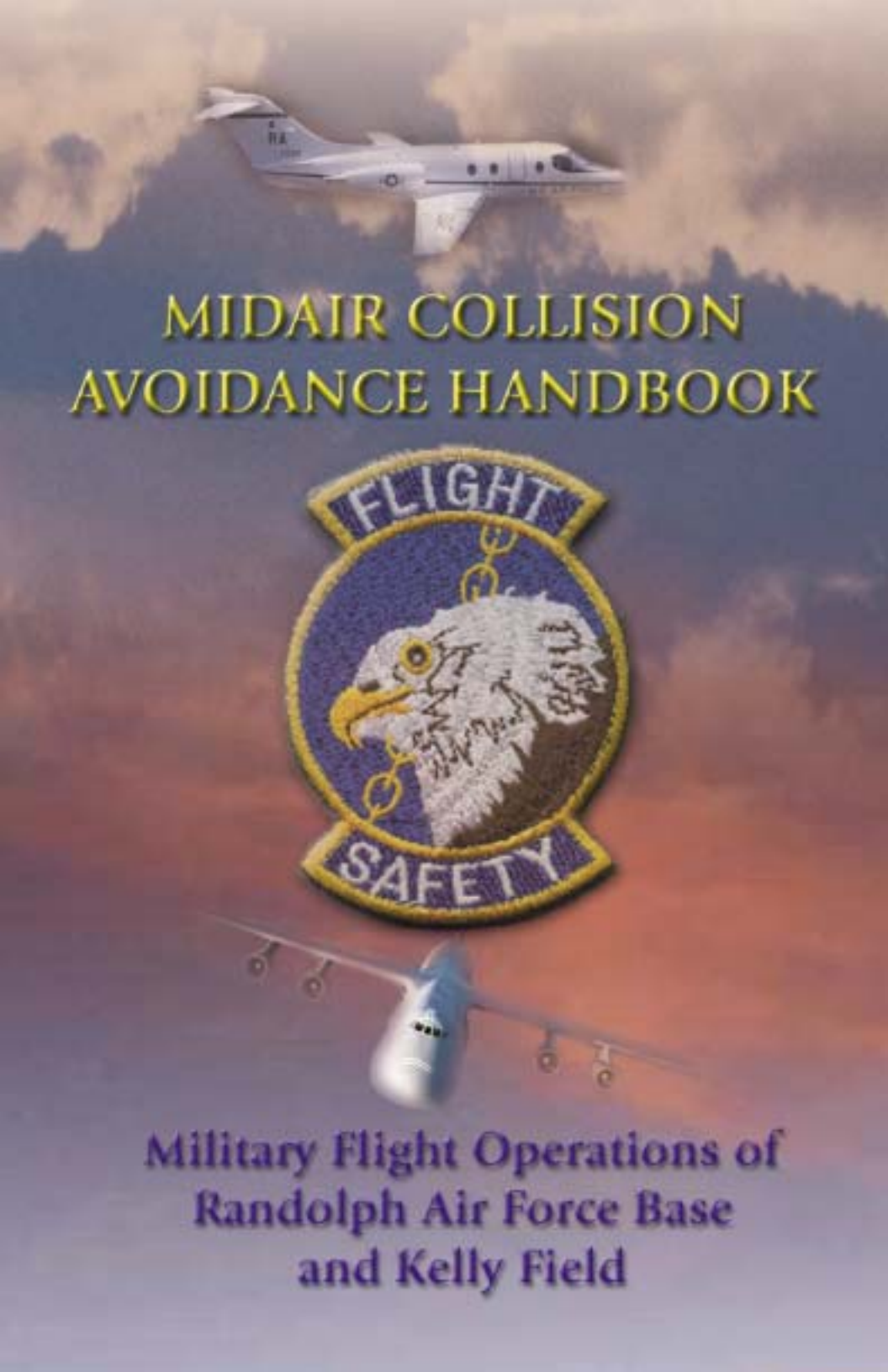
MIDAIR COLLISION
AVOIDANCE HANDBOOK
FLIGHT
SAFETY
Military Flight Operations of
Randolph Air Force Base
and Kelly Field

MIDAIR COLLISION AVOIDANCE (MACA) HANDBOOK

December 2002

WRITTEN AND COMPILED BY

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(210) 652- 2224

GRAPHICS BY

Multi-Media Center
Graphics Section
Randolph AFB

Additional information and the MACA Handbook (in PDF format) can be viewed at:

https://www-r.randolph.af.mil/12ftw/wing/safety/maca.htm

INFORMATION CONTAINED IN THIS HANDBOOK IS SUBJECT TO CHANGE, AND IS NOT TO BE USED FOR NAVIGATIONAL PURPOSES. CONSULT CURRENT FLIGHT PLANNING DOCUMENTS FOR THE LATEST INFORMATION.

TABLE OF CONTENTS

I. MIDAIR COLLISION AVOIDANCE

Military flight operations are unique because the type aircraft, operating areas, and missions flown are unique. As a result, the more you know regarding military flight operations, and the more you apply that knowledge, the greater your chances of avoiding a midair collision with a military aircraft.

The purpose of this booklet is to provide you a solid foundation of knowledge regarding military flight operations of aircraft based at Randolph Air Force Base (AFB) and Kelly Field. Although the information you'll read here is specific to the aviation activities of these airfields in the San Antonio area, the principles will apply to virtually any area that has a military flying unit present.

The information contained in this booklet summarizes the type aircraft, operating areas, and missions flown by the aircraft based at Randolph AFB and Kelly Field. It also summarizes available radar services and tips to help you see and avoid others who share the sky with you.

Randolph AFB is located approximately 10 miles east of the San Antonio International Airport. Aircraft based here include the T-1,T-6, T-37, T-43 and C-21. Randolph AFB also operates out of the **Seguin Auxiliary Airfield** (southeast of the city of Seguin) for T-38 and T-6 training and **Hondo Municipal Airport** (northwest of the city of Hondo) for T-6 training.

Kelly Field is located approximately 10 miles southwest of the San Antonio International Airport and bases F-16 and C-5 aircraft. Also, C-17, KC-135, and KC-10 transient aircraft fly in on a regular basis. The Randolph AFB aircraft also use Kelly Field for extensive instrument and VFR training.

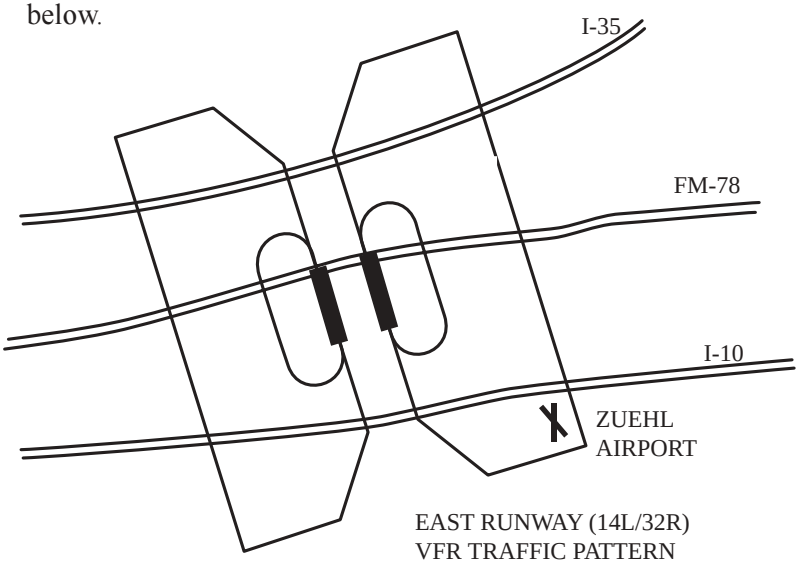
Randolph and Kelly both have Class D airspace. In addition, Randolph, Seguin, and Hondo all have Alert Areas depicted on VFR sectional charts, indicating concentrated military flight training in these areas.

This booklet is provided free of charge as a service to those who are willing to take the time and effort to learn about the flying activities of Randolph AFB and Kelly Field. Additional copies can be provided by calling or writing the 12th Flying Training Wing Flight Safety Office (12 FTW/SEF) at:

12 FTW/SEF (MACA)
225 A Street East, Suite 3
Randolph AFB, TX 78150-4416
(210) 652-2224/3308

II. RANDOLPH AFB OPERATIONS

Randolph AFB is home to the 12th Flying Training Wing, which conducts extensive flight training in numerous aircraft, including the T-1, T-6, T-37, T-38, T-43, and C-21. In addition, numerous military transient aircraft fly in and out of Randolph AFB on a regular basis. As a result, the flying activity in and around this area can be extremely congested. Much of this traffic is high speed--further reducing the ability to see and avoid. Instrument approaches and VFR traffic patterns are conducted simultaneously on both runways, weather permitting. The T-37s and T-6s operate a VFR traffic pattern on the west runway (14R/32L), and the T-38s, T-43s and T-1s operate a VFR traffic pattern on the east runway (14L/32R). These VFR traffic patterns are as depicted below.



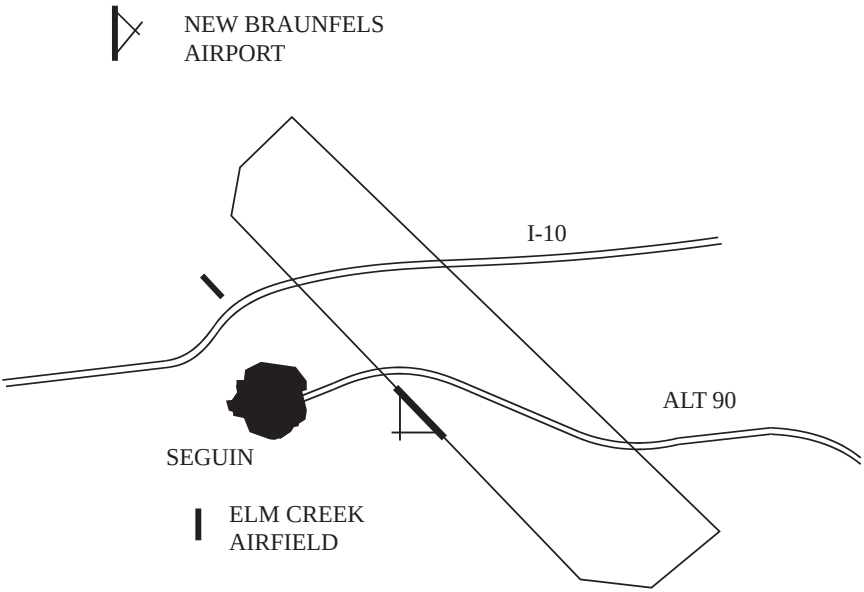
EAST RUNWAY (14L/32R)
VFR TRAFFIC PATTERN
(T-1s, T-38s, T-43s:
100-300 KIAS; SFC-3300 MSL)

WEST RUNWAY (14R/32L)
VFR TRAFFIC PATTERN
(T-37s, T-6s: 100-200 KIAS;
SFC-3300 MSL)

*NOTE: ALERT AREA A-635, AS DEPICTED ON THE VFR SECTIONAL CHART, ENCOMPASSES BOTH TRAFFIC PATTERNS

Seguin Auxiliary Airfield

Randolph T-38s also fly VFR patterns at Seguin Auxiliary Airfield. Depicted below is the VFR traffic pattern flown at Seguin.



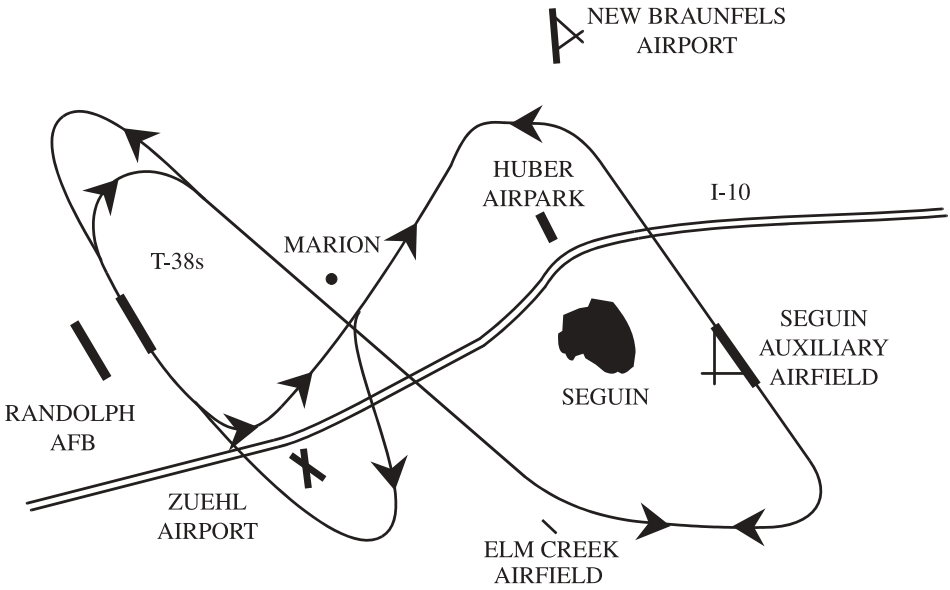
NOTE: ALERT AREA A-638,
AS DEPICTED ON THE VFR SECTIONAL
CHART, ENCOMPASSES THE ENTIRE
TRAFFIC PATTERN

CHARLIE BROWN
(SEGUIN ADVISORY)
122.95
271.20

SEGUIN AIRFIELD
VFR TRAFFIC PATTERN
RUNWAYS 13/31; SFC TO 3000 MSL;
T-38s: 155-300 KIAS;

Randolph-Seguin
Departure/Arrival Routing
T-38

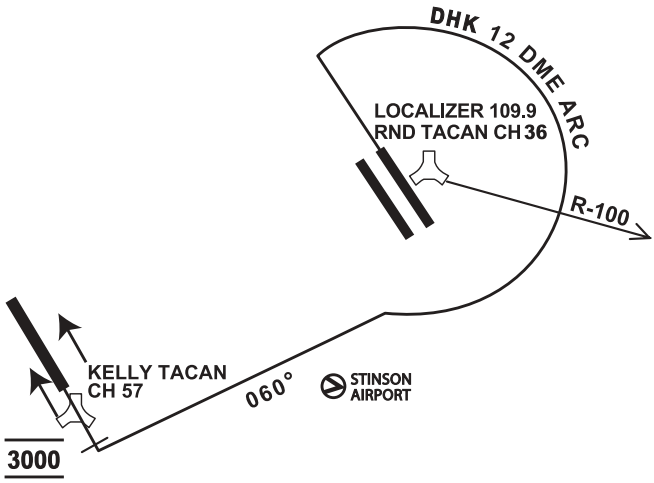
“Charlie Brown”



NOTE: AIRCRAFT OPERATING BETWEEN RANDOLPH AFB AND SEGUIN AUXILIARY AIRFIELD WILL BE FLYING BETWEEN 2000-3000 FEET MSL. T-38s FLY 300 KIAS.

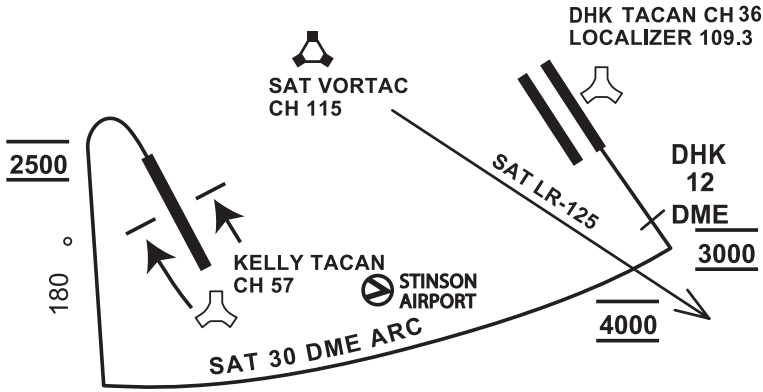
Randolph-Kelly
Departure/Arrival Routing

SEENO RECOVERY



T-37 & T-6 Aircraft use Stinson Airport for instrument approach training.

SUTHERLAND RECOVERY



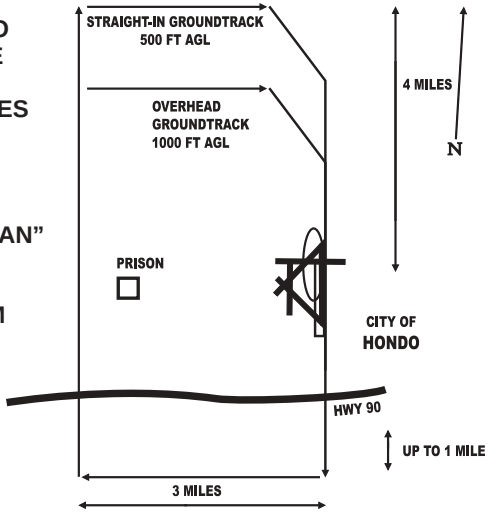
Hondo Municipal Airport

The 12th Flying Training Wing uses the Hondo Municipal Airport area for extensive T-6 training (depicted below). A **CAUTION** on the San Antonio Sectional Chart next to Hondo brings this to your attention.

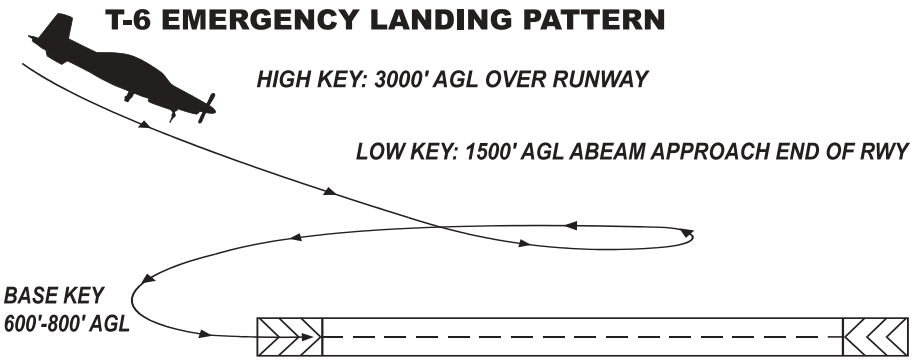
RWY 17 LEFT PATTERN AT HONDO
(RWY 35 RIGHT EXTENDS TO THE SOUTH 4 MILES)
T-6 AIRCRAFT WILL BE AT ALTITUDES FROM SURFACE TO 3000' AGL

RUNWAY SUPERVISORY UNIT "TINCAN" MONITORS 122.8

PLEASE CONTACT WITHIN 10 NM



T-6s fly military overheads patterns at 1000 Ft AGL and visual straight-ins at 500 Ft AGL. Additionally T-6s practice Emergency Landing Patterns (ELP) starting at 3000 Ft AGL. This Pattern is flown frequently at local military fields and Hondo Municipal Airport. Occasionally this pattern will be flown at New Braunfels, San Marcos and Karnes County airports. ELPs simulate the failure of the aircraft's one (and only) engine. Typically the patterns starts at approximately 3000 Ft AGL over the runway and spirals down using a relatively high rate of decent.

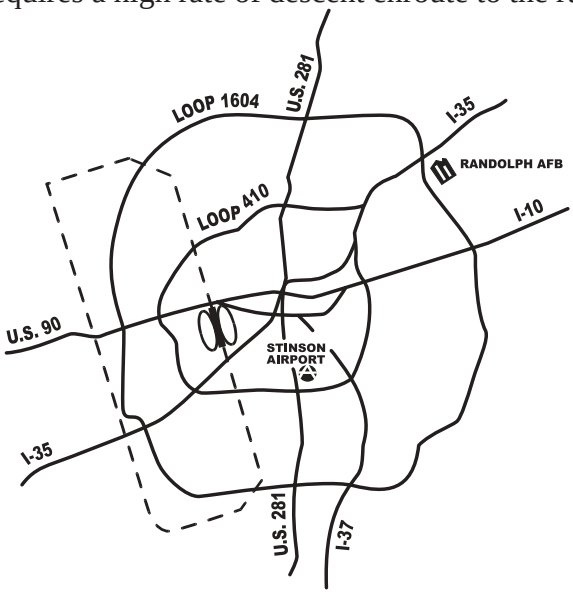


III. KELLY FIELD OPERATIONS

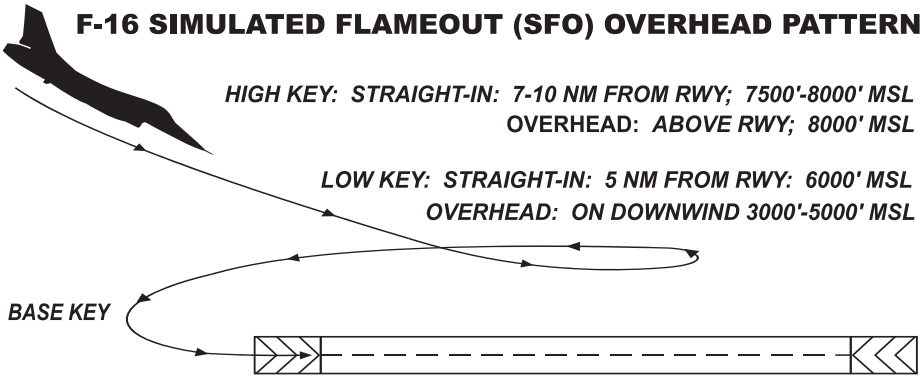
Kelly Field is home to the 149th Fighter Wing (Texas Air National Guard F-16 unit) and the 433rd Air Wing (Air Force Reserve C-5 unit). In addition, Kelly Field has many other military aircraft transiting the airport and is home to a Boeing Depot Repair Facility for KC-135, KC-10 and C-17 aircraft. As a result, this area has the potential for a large amount of flying activity.

Kelly Field, as with other military bases, operates instrument approaches and VFR traffic patterns simultaneously, weather permitting. The VFR pattern is normally flown on the west side of the runway. The VFR pattern flown by the C-5 is a box pattern between 2200-2700 feet MSL flown to a visual straight-in (depicted below).

The F-16s operate a military overhead pattern (see page14), flown at 2700 feet MSL. In addition, the F-16s practice simulated flameout (SFO) patterns at Kelly, either by means of a visual straight-in or an overhead pattern (depicted below). This pattern simulates the failure of the aircraft's one (and only) engine, starts at a high altitude, and requires a high rate of descent enroute to the runway.



F-16 SIMULATED FLAMEOUT (SFO) OVERHEAD PATTERN



FOR USE BY 149AW ONLY, DAYLIGHT HOURS.
NOTE: THE STRAIGHT-IN AND OVERHEAD SFO PATTERNS WILL NOT BE AUTHORIZED WHEN THE
SAN ANTONIO INTERNATIONAL AIRPORT IS USING RWY 03/21.

NOTE: T-6 AIRCRAFT FROM RANDOLPH AFB FLY A SIMILAR PROCEDURE CALLED AN EMERGENCY LANDING PATTERN (ELP). THE T-6 HIGH KEY IS AT 3700' MSL WITH NO LOW KEY. THEY MAY FLY THEM AT KELLY FIELD, HONDO AIRPORT, RANDOLPH AFB (WEST RUNWAY), AND SEGUIN AUXILIARY FIELD.

IV. AIR TRAFFIC CONTROL SERVICES

Houston Center

In the San Antonio area, Military Operations Areas (MOAs) are controlled by Houston Center, except for Randolph 1B MOA, which is controlled by San Antonio Approach. When flying on an IFR flight plan, the controlling agency will only allow you to transit a MOA if traffic conditions permit and IFR separation can be provided between you and the aircraft in the MOA.

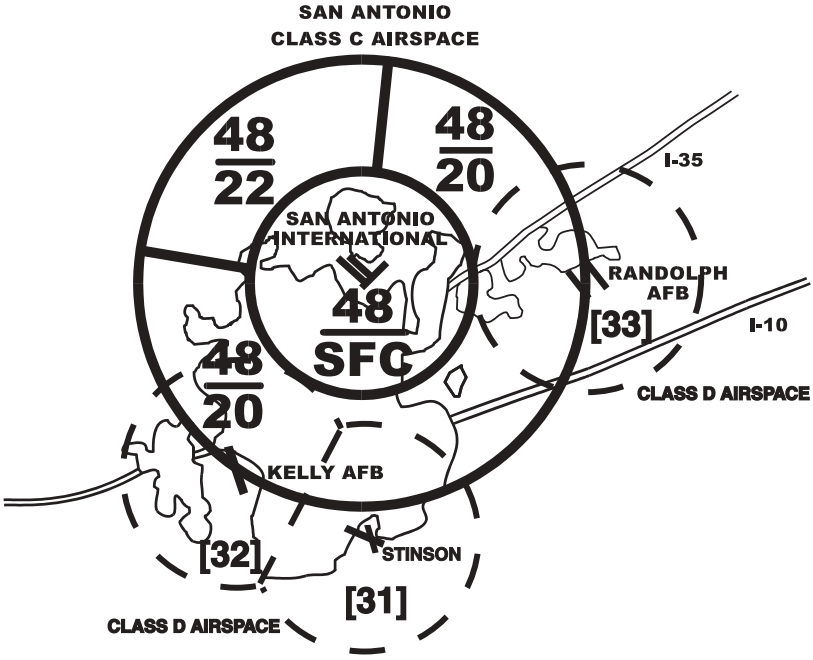
When flying on a VFR flight plan, it is strongly recommended that you **not** transit an active MOA due to the maneuvers, high speeds, and high closure rates of the military aircraft operating in these areas (see MOAs, page 12). It is possible for spins, aerobatics, stalls, and formation flying to be performed in these areas, making it highly unlikely to "see and avoid" such traffic. However, should you decide to transit an active MOA while flying on a VFR flight plan, please contact the controlling agency for traffic advisories.

San Antonio Approach Control

The San Antonio area contains Class C airspace and is centered on San Antonio International Airport. The inner ring of this airspace extends 5 nautical miles from the airport and the outer ring extends10 nautical miles. In addition to the Class C airspace, there exists an outer area with a radius of 20 nautical miles. Pilots must establish radio contact with approach control before entering the charted Class C airspace (5/10 nautical mile rings).

The San Antonio approach controllers are invaluable to assist you with traffic separation and traffic advisories. If you are transponder equipped, make sure it is on, to include altitude-encoding (Mode C). In VFR conditions, keep your head out of the cockpit, clear all the airspace around you, remain situationally aware, squawk the appropriate transponder code and use these radar services to the max extent possible!!!!!

The frequencies to contact San Antonio approach will vary depending on the direction you approach the city from. These frequencies are as depicted on the VFR sectional chart and indicate that arriving aircraft should contact approach control within 20 nautical miles of the San Antonio International airport. This insures an appropriate safety margin in case of frequency congestion, allowing you time to attempt contact and stay out of the Class C airspace should difficulties be encountered and you are not able to contact the controller.



V. MILITARY TRAINING AND OPERATIONS

Military Operations Areas (MOAs)

A MOA is an airspace of defined vertical and lateral limits used for military flight training. It's purpose is to separate these flight training activities from IFR traffic. Numerous types of flight training occur within a MOA, to include acrobatic maneuvers, spins, formation flying, air combat training (ACT), basic fighter maneuvers (BFM), traffic pattern stalls and instrument training maneuvers.

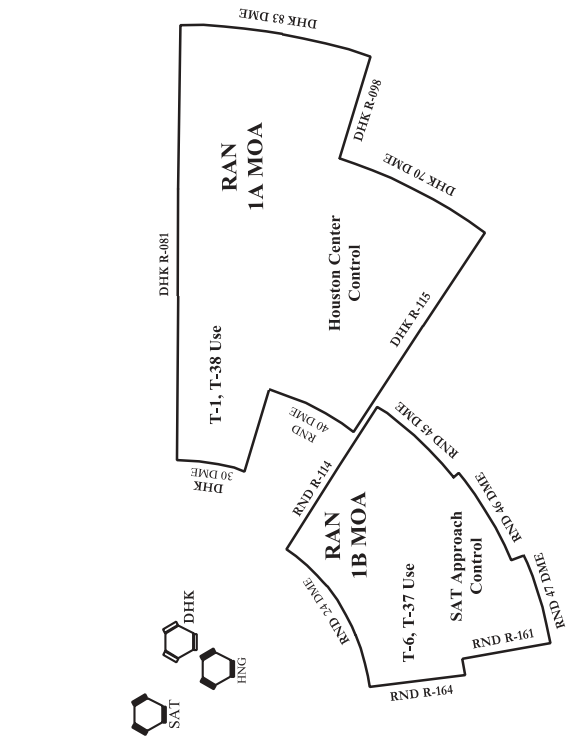
IFR traffic can be cleared through a MOA when traffic conditions permit and standard IFR traffic separation criteria can be met by the controlling agency. VFR traffic can legally transit a MOA at anytime. However, sound judgment dictates you do otherwise. Here's why. Consider a simple loop performed by a T-38. Lowering the nose, the pilot accelerates to 500 knots indicated airspeed (approximately 0.9 mach - almost supersonic!). When reaching this airspeed, a 5-6 G pull-up is performed, topping out 10,000 feet (almost 2 vertical miles!) above the point at which the loop was begun. This occurs in a matter of seconds. This is followed by an inverted pull-through back down, losing the 10,000 feet that was gained and re-accelerating back to 500 knots as the loop is completed.

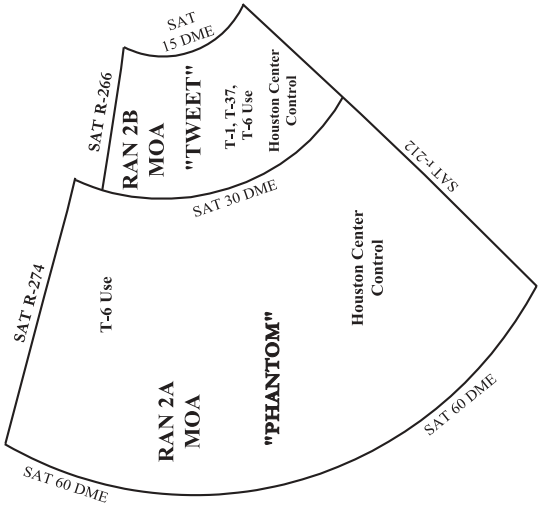
Therefore, it should be obvious that when transiting a MOA VFR, military aircraft could potentially approach your aircraft at extremely high rates of closure from virtually any angle. As a result, the ability to "see and avoid" such traffic is reduced to almost nil.

Information regarding the Randolph MOAs (depicted on page 12) should be consulted during your preflight mission planning. This can be obtained from sectional charts, enroute low altitude charts and VFR terminal area charts. The operating times and altitudes will be as reflected in these publications unless changed by NOTAM. If you need information concerning a MOA during your flight, contact the agency that controls the MOA, usually the Air Route Traffic Control Center (ARTCC) or the nearest Flight Service Station (FSS).

Airspace Classification

San Antonio Area MOAs



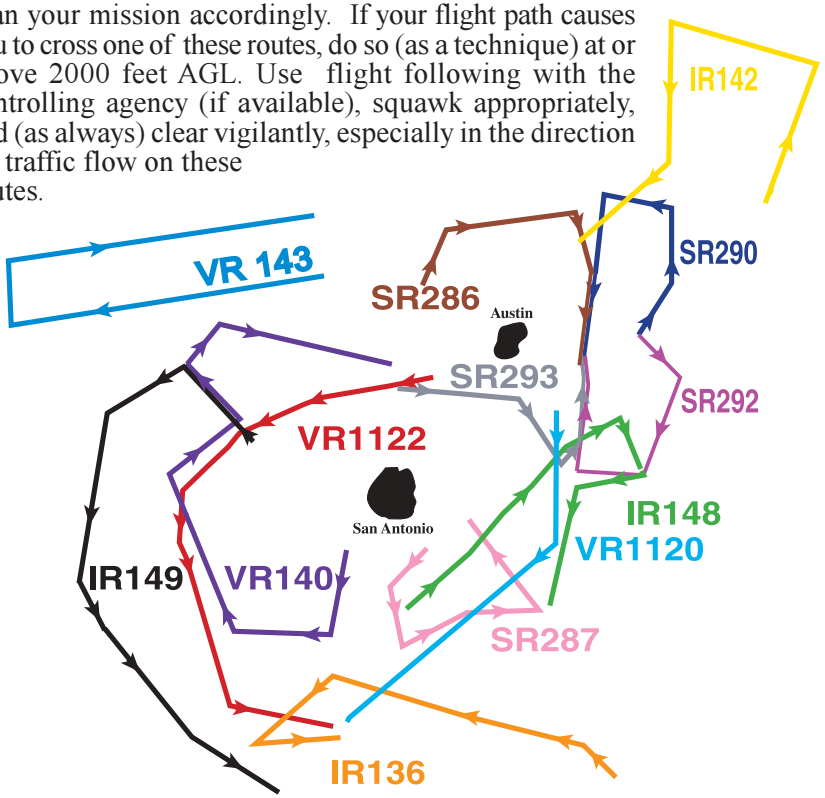


Military Training Routes (MTRs) and Slow Speed Low Altitude Training Routes (SRs)

MTRs are low altitude routes of defined vertical and lateral dimensions established for the conduct of military flight training at airspeeds in excess of 250 knots. They are normally flown between 300 - 400 knots and 500 - 1500 feet AGL, but can be flown at higher speeds and lower altitudes depending on operational requirements. There are two types of MTRs: IR (IFR Military Training Route) - pilot operates on an IFR flight plan; and VR (VFR Military Training Route) - pilot operates on a VFR flight plan. IFR low altitude enroute charts depict all IRs, but only depict VRs with route segments above 1500 feet AGL. VFR Sectional charts depict all IRs and VRs. Be advised that depicted routes only indicate route centerline - the width of each route can extend several miles on either side of route centerline.

SRs are also low altitude routes of defined vertical and lateral dimensions established for the conduct of military flight training. The difference is that SRs are flown at 250 knots or less and are always at or below 1500 feet AGL. SRs are not depicted on IFR or VFR charts.

Depicted below are the most frequently used MTRs and SRs in the San Antonio/ Austin area. Since military aircraft fly MTRs at very high speeds and low altitudes, it is **critical** to have an awareness of the location of these routes. Plan your mission accordingly. If your flight path causes you to cross one of these routes, do so (as a technique) at or above 2000 feet AGL. Use flight following with the controlling agency (if available), squawk appropriately, and (as always) clear vigilantly, especially in the direction of traffic flow on these routes.

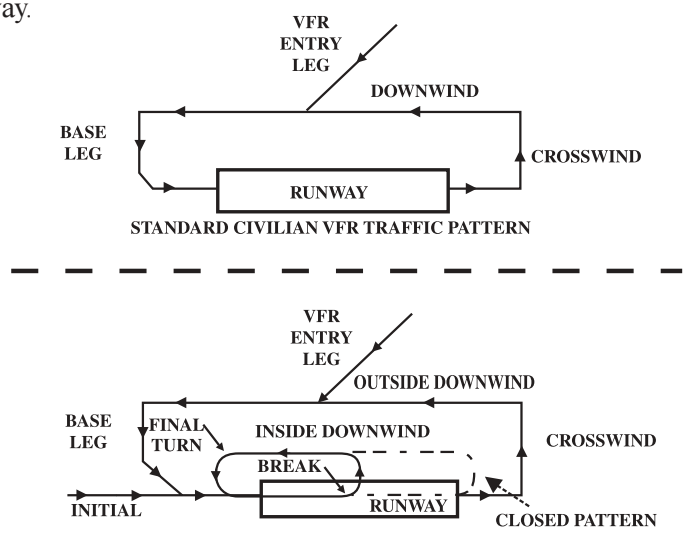


Military VFR Traffic Pattern

The military VFR traffic pattern differs from the standard civilian VFR traffic pattern. It's important to have an understanding of how it operates because military aircraft fly this pattern at both civilian and military airfields.

The military VFR traffic pattern differs from its civilian counterpart in two primary ways: it has two entry points instead of one (a VFR entry point and initial), and it has two downwind legs instead of one (an inside downwind and an outside downwind). The military VFR traffic pattern is referred to as an overhead traffic pattern, because the aircraft will come up initial overhead the runway at 1000 - 2000 feet AGL (depending on aircraft type) in a "clean" configuration. While over the runway (usually within the first 3000 feet), the pilot will enter a 180 degree level turn (referred to as the break), and begin slowing down. Once the turn is complete, the pilot is established on inside downwind and will begin to configure the aircraft for landing. At approximately 1 mile past the approach end of the runway on inside downwind, the pilot begins a descending, configured, 180 degree turn in order to line up with the runway and land. This is referred to as the final turn. The turn is normally made to roll out lined up with the runway at approximately 1 mile and 300 - 400 feet AGL.

After a touch-and-go, the pilot may request a closed pattern by saying "Call sign, request closed." If approved, the pilot begins a 180 degree climbing turn back up to pattern altitude on inside downwind, and accomplishes the same pattern. If the closed is not approved, the pilot turns crosswind and flies to outside downwind in order to establish the aircraft on initial to begin another overhead pattern. Inside downwind is displaced approximately 1 mile from the runway, and outside downwind is displaced approximately 3 miles from the runway.



MILITARY VFR TRAFFIC PATTERN

VI. RANDOLPH AFB AIRCRAFT

T-37 TWEET

Mission

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

General Characteristics

Manufacturer: Cessna Aircraft Co.
Power Plant: Two Continental J69-T-25 turbojet engines
Thrust: 1,025 pounds per engine
Length: 29 feet, 3 inches
Height: 9 feet, 2 inches
Wingspan: 33 feet, 8 inches
Maximum Takeoff Weight: 6,625 pounds
Speed: 315 mph (Mach 0.4 at sea level)
Ceiling: 35,000 feet
Range: 460 miles
Crew: Two, student pilot and instructor pilot

T-6 TEXAN II

Mission

The T-6A Texan II is a single-engine turboprop airplane used by both the Air Force and the Navy for training undergraduate pilots in fundamentals of aircraft handling and instrument, formation, and night flying. The T-6 will eventually replace all T-37 aircraft.

General Characteristics

Manufacturer: Raytheon Corporation
Power Plant: One Pratt &Whitney PT6A-68
Thrust: 1,100 Shaft Horsepower
Length: 33 feet, 4 inches
Height: 10 feet, 6 inches
Wingspan: 33 feet, 3 inches
Maximum Takeoff Weight: 6,500 pounds
Speed: 300 mph
Ceiling: 31,000 feet
Range: 900 NM high level; 450 NM low level
Crew: Two, student pilot and instructor pilot

T-38A

Mission

The T-38 Talon is a twin-engine, high-altitude, supersonic jet trainer used primarily for undergraduate pilot and pilot instructor training.

General Characteristics

Manufacturer: Northrop Corp.
Power Plant: Two General Electric J85-GE-5 turbojet engines with afterburners
Thrust: 2,900 pounds with afterburners
Length: 46 feet, 4 1/2 inches
Height: 12 feet, 10 1/2 inches
Wingspan: 25 feet, 3 inches
Maximum Takeoff Weight: 12,500 pounds
Speed: 812 mph (Mach 1.08 at sea level)
Ceiling: 50,000 feet
Range: 1,000 miles (870 nautical miles)
Crew: Two, student pilot and instructor pilot

T-1 JAYHAWK

Mission

The swept wing T-1A is a version of the Beech 400A. The T-1 is a medium-range, twin-engine jet trainer. It is used during undergraduate pilot training to train student pilots to fly airlift or tanker aircraft.

General Characteristics

Manufacturer: Raytheon Corp.
Power Plant: Two Pratt and Whitney JT15D-5 turbofan engines
Thrust: 2,900 pounds each engine
Length: 48 feet, 5 inches
Height: 13 feet, 11 inches
Wingspan: 43 feet, 6 inches
Speed: 538 miles per hour (Mach .78)
Ceiling: 41,000 feet
Maximum Takeoff Weight: 16,100 pounds
Range: More than 2,100 nautical miles
Crew: Three (pilot, co-pilot, instructor pilot) and observer

T-43 GATOR

Mission

The T-43A is the Air Force version of the Boeing 737 transport. The T-43A is a medium-range, swept-wing jet aircraft used in the Air Force's Joint Specialized Undergraduate Navigator Training (JSUNT) program.

General Characteristics

Manufacturer: Boeing Co.
Power Plant: Two Pratt & Whitney JT8D-9A engines
Thrust: 14,500 pounds each engine
Length: 100 feet
Height: 37 feet
Wingspan: 93 feet
Maximum Takeoff Weight: 115,000 pounds
Speed: 535 mph (Mach 0.72) at 35,000 feet
Ceiling: 37,000 feet
Range: 2,995 miles
Crew: 12 navigator students, six instructor navigators, pilot and co-pilot

C-21

Mission

The C-21A is a twin turbofan engine aircraft used for cargo and passenger airlift. The aircraft is the military version of the Lear Jet 35A business jet. It also is capable of transporting litters during medical evacuations.

General Characteristics

Manufacturer: Learjet, Inc.
Power Plant: Two Garrett TFE-731-2-2B turbofan engines
Thrust: 3,500 pounds each engine
Length: 48 feet, 7 inches
Height: 12 feet, 3 inches
Wingspan: 39 feet, 6 inches
Maximum Takeoff Weight: 18,300 pounds
Maximum Speed: 530 mph (Mach 0.81, 461 knots at 41,000'
Ceiling: 45,000 feet
Maximum Range: 2,306 miles
Maximum Load: Eight passengers and 3,153 pounds of cargo
Crew: Two (pilot and co-pilot)

VII. KELLY FIELD AIRCRAFT

F-16 FIGHTING FALCON

Mission

The F-16 Fighting Falcon is a compact, multi-role fighter aircraft. It is highly maneuverable and has proven itself in air-to-air combat and air-to-surface attack.

General Characteristics

Manufacturer: Lockheed Martin Corp.
Power Plant: One Pratt and Whitney F100-PW-200/220/229 or General Electric F110-GE-100/129
Thrust: 27,000 pounds
Length: 49 feet, 5 inches **Height:** 16 feet
Wingspan: 32 feet, 8 inches
Speed: 1,500 mph (Mach 2 at altitude)
Ceiling: Above 50,000 feet
Maximum Takeoff Weight: 37,500 pounds
Range: More than 2,000 miles (1,740 nautical miles)
Armament: 20mm multi-barrel cannon; air-to-air missiles, air-to-surface munitions, and electronic countermeasures pods.
Crew: F-16C: one pilot; F-16D: one or two pilots

C-5 GALAXY

Mission

With its tremendous payload capability, the gigantic C-5 Galaxy, an outsized-cargo transport, provides inter-theater airlift. The C-5 is one of the largest aircraft in the world. It can carry outsized cargo intercontinental ranges and can take off or land in relatively short distances.

General Characteristics

Manufacturer: Lockheed Georgia Co.
Power Plant: Four General Electric TF-39 engines
Thrust: 41,000 pounds, each engine
Wingspan: 222.9 feet
Length: 247.1 feet **Height:** 65.1 feet (at tail)
Cargo Compartment: height, 13.5 feet; width, 19 feet; length, 143 feet, 9 inches
Takeoff/Landing Distances: 8,300 feet takeoff fully loaded; and 4,900 feet land fully loaded
Pallet Positions: 36
Speed: 518 miles per hour (.68 Mach)
Range: 6,320 nautical miles (empty)
Crew: 7 (pilot, co-pilot, 2 flight engineers and 3 loadmasters)

C-17 GLOBEMASTER III

Mission

The C-17 Globemaster III is capable of rapid strategic delivery of troops and all types of cargo to main operating bases or directly to forward bases in a deployment area. The aircraft is also able to perform tactical airlift and airdrop missions when required.

General Characteristics

Prime Contractor: Boeing Company
Power Plant: 4 Pratt & Whitney F117-PW-100 turbofan engines
Thrust: 40,440 pounds, each engine
Wingspan: 169 feet 10 inches (to winglet tips)
Length: 174 feet **Height:** 55 feet 1 inch
Cargo Compartment: length, 88 feet; width, 18 feet; height, 12 feet 4 inches.
Speed: 450 knots at 28,000 feet (Mach .74)
Service Ceiling: 45,000 feet at cruising speed
Range: Global with in-flight refueling
Load: 102 troops/paratroops; 48 litter and 54 ambulatory patients; 170,900 pounds of cargo (18 pallet positions)
Crew: Three (two pilots and one loadmaster)

KC-10 EXTENDER

Mission

The KC-10A Extender is a modified Boeing DC-10. It is an advanced tanker and cargo aircraft. Although the KC-10's primary mission is aerial refueling, it can combine the tasks of a tanker and cargo aircraft by refueling an aircraft and carry that aircraft's support personnel and equipment simultaneously.

General Characteristics

Manufacturer: Douglas Aircraft Co., division of Boeing Co.
Power Plant: Three General Electric CF6-50C2 turbofans
Thrust: 52,500 pounds, each engine
Length: 181 feet, 7 inches **Height:** 58 feet, 1 inch
Wingspan: 165 feet, 4.5 inches
Speed: 619 mph (Mach 0.825)
Ceiling: 42,000 feet
Maximum Takeoff Weight: 590,000 pounds
Range: 4,400 miles (3,800 nautical miles) with cargo; 11,500 miles (10,000 nautical miles) without cargo
Maximum Cargo Payload: 170,000 pounds
Pallet Positions: 27
Maximum Fuel Load: 356,000 pounds
Crew: Four (2 pilots, flight engineer and boom operator)

KC-135 STRATOTANKER

Mission

The KC-135 Stratotanker is a modified Boeing 707. Its principal mission is air refueling, although it is used heavily as a cargo transport aircraft. Its newest version, the KC-135R, has new engines that make it quieter and give it greater range.

General Characteristics

Manufacturer: Boeing Co.
Power Plant: KC-135R/T, Four CFM-International CFM-56 turbofans; KC-135E, Four Pratt and Whitney TF-33-PW-102 turbofans
Thrust: KC-135R, 21,634pounds each engine; KC-135E, 18,000 pounds each engine
Wingspan: 130 feet, 10 inches
Length: 136 feet, 3 inches **Height:** 41 feet, 8 inches
Speed: 530 mph at 30,000'
Ceiling: 50,000 feet
Range: 1,500 miles; ferry mission up to 11,015 miles
Maximum Takeoff Weight: 322,500
Maximum Transfer Fuel Load: 200,000 pounds
Maximum Cargo Capability: 83,000 pounds
Crew: Four (2 pilots, flight engine, boom operator)

VIII. MACA TIPS

Statistics indicate the majority of midair collisions occur during the day, in VFR weather conditions, in controlled airspace, at lower altitudes (5000 feet AGL or less), and close to an airport (within 5 miles). The reasons are obvious: these are the times, locations and conditions in which the heaviest flying activity occurs.

Because of the congested airspace the pilot operates in and the limitations of the human eye, it becomes readily apparent that midair collision avoidance is a concern that must be addressed **before** stepping in the cockpit. Here are some concise tips that should always be reviewed before each and every flight:

1. KNOW HOW TO CLEAR. Many times it is emphasized that the pilot should clear, but little is said on **how** to clear. Many guidebooks cover scanning techniques and instructor pilots have a wealth of experience in scanning. What's important is that you know and practice your scanning pattern before you fly. Some aircraft have large blind spots, requiring extra effort for a complete scan. The best scan pattern usually involves dividing the windscreen into separate segments and allowing your eyes to clear each segment momentarily before moving to the next segment. Use a momentary wingrock to help clear a blind spot created by the wing. If you receive a traffic call from the controller, and you don't immediately spot the traffic, look at a cloud or a point on the ground that approximates the distance from the traffic to help your eyes adjust to the proper focal range, then resume the traffic search. Also, if you get a call for traffic (for example, at 10 o'clock) and don't spot it, always check the opposite side (in this case, the two o'clock position) because it is easy for a busy controller to transpose the positions in the heat of battle. If you do spot traffic, you're on a collision course if the traffic does not move in the windscreen. If it does move in the windscreen, you will pass by it. This brings out an important safety tip: **Traffic on a collision course is hard to see because it does not move in the windscreen!** Finally, use the radios to help you clear. When other aircraft make position reports, listen up and clear for them appropriately.

2. MISSION PLAN WITH AN AWARENESS OF POTENTIAL CONFLICTS. Know where high-density traffic areas are. This is where your knowledge of military flight operations becomes important. Review the location of military airfields, MOAs, low level routes and alert areas. Plan your flight to avoid potential conflicts to the greatest extent possible. Insure you fly the correct altitude for direction of flight. In addition, review the airfield layout and ground references associated with your destination-- this will help you when other aircraft make position reports at that airport.

3. USE ALL AVAILABLE RADAR SERVICES. When operating in controlled airspace, always maintain flight following for traffic advisories, even when not in radar contact. Transponder equipped aircraft should always set the appropriate codes. Ensure the altitude-encoding (Mode C) feature is on and operable. Though you may not be in radar contact with the controller, some aircraft have TCAS (Traffic Collision Avoidance System) equipment and can monitor your position and avoid you, but only if your transponder is on and operable.

4. PRIORITIZE COCKPIT DUTIES AND REMAIN SITUATIONALLY AWARE. Review approach plates, enroute charts, and other inflight materials as much as possible on the ground to reduce the amount of time you are reviewing them in the cockpit during flight. When it does come time to review such materials inflight, hold them just below the glare shield, if possible, so the periphery of your vision remains outside. This will minimize the "heads down" syndrome. Always make several clearing scans during your review of inflight materials, and never keep your eyes inside the cockpit for an extended length of time. Prioritize your cockpit duties: **maintain aircraft control and clear FIRST!** Everything else is secondary. Stay situationally aware by monitoring your position and the position of other aircraft around you (both visually and on the radios). As instructors, don't get complacent! Many mid-air collisions occur during periods of instruction.

5. "SEE AND AVOID" procedures are critical for VFR traffic. Air traffic controllers are not required to provide separation between VFR aircraft outside of Class C airspace. They may provide traffic advisores for VFR aircraft if time and workload allow. Remember, there is no guarantee that everyone is flying by the rules, or that anyone is where they are supposed to be.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