HAFB Midair Collision Avoidance Handbook

September 2017

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Holloman App 120.6 / 269.225

Holloman Tower 119.3 / 255.9

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I. Introduction

The more you know about military flight operations, and the more you apply that knowledge, the greater your chances of avoiding a midair collision with a military aircraft.

The information in this pamphlet is focused on reducing the risk of a mid-air collision between civil and military aviators. The purpose of this handbook is to provide you with knowledge of military flight operations around Holloman Air Force Base (AFB). Although the information you'll read here is specific to the aviation activities of this airfield and the Alamogordo 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 of aircraft, operating areas, and missions flown by the aircraft based at Holloman AFB. It summarizes available radar and air traffic control services, highlights other local aircraft operators, and provides tips to help you see and avoid others with whom you share the sky.

Holloman AFB is located approximately six miles west of the Alamogordo-White Sands Regional Airport in the heart of Restricted Airspace and Military Operating Areas. MQ-9, F-16, T-38, C-12, QF-16, and HH-60 aircraft are based here. Frequent transient aircraft include other transport, fighter, & bomber aircraft.

This booklet is provided as a service to those who are willing to take the initiative to learn about the flying activities of Holloman AFB. Additional copies can be provided upon request.

II. Holloman AFB Aircraft

Holloman AFB is home to several training and test squadrons, making it a very busy airfield on a daily basis. It is home to the Air Force's only training location for the rapidly expanding Remotely Piloted Aircraft (RPA) fleet. Four F-16 training squadrons are busy training new fighter pilots. Additionally, the Test Group aircraft include QF-16s, T-38s, and C-12s. The QF-16s can be flown with a pilot or remotely from a ground control station. Lastly, Army HH-60 helicopters provide military range support functions. It is a location full of diverse activity to include Army Training Operations to the South and White Sand Missile Range Tests daily.

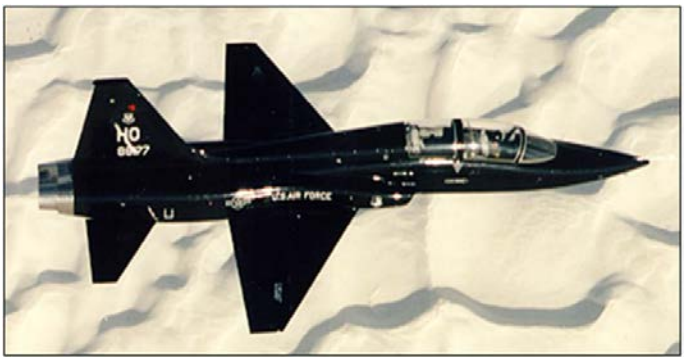
MQ-9 Reaper

MQ-9s frequently operate in R-5107A, R-5107K, R-5103C, R-5103B, R-5107B, & R-5107D. To transit to and from these Restricted Areas the UAVs fly South out of Holloman AFB along the eastern boarder of R-5107B. The UAVs are small in size (wing span of ~66 Ft), fly at slower speeds (100-160 KTS) and are difficult to see. MQ-9s do not have the ability consistently clear their flight path and may not visually detect other aircraft.

F-16 Fighting Falcon

The F-16s frequently operate within the Restricted airspace 5107B and 5103C, Beak, Talon, and Pecos Military Operating Areas as well as Military Training Routes. These Fighters carry an onboard radar that can detect other aircraft beyond visual range. This enhances the pilot's ability to see and avoid other aircraft, but this technology does not allow the pilot to detect all aircraft. These fighters are small in size (wing span=33-45 feet) and fly at high speed (normal operating speeds at low level = 400 to 550 KTS), which can make them difficult to see.

T-38 Talon



The T-38's frequently operate within the Restricted airspace above Holloman AFB as well as low level Military Training Routes. The T-38 does not have a radar to search for traffic and is smaller than the F-16 which makes them very difficult to see. Normal operating speeds are 300-500 KTS.

QF-16 Drone

The supersonic QF-16 is a reusable full-scale target drone modified from the F-16 Fighting Falcon. This aircraft can be manned or unmanned and provides a realistic full-scale target for air-to-air weapons system evaluation.

UH-60 BlackHawk

The UH-60 is part of an Army Air contingent at Holloman AFB. They primarily fly in support of testing operations within the Restricted Range.

Transient Military Aircraft

Due to Holloman AFB's remote location, the base also hosts various military aircraft in support of testing operations and military exercises. It is common for all types of Air Force fighter, bomber, and cargo aircraft to temporarily stage at Holloman AFB and use the nearby military airspace. In addition, Army, Marine, and Navy air assets will come to Holloman AFB for joint testing and exercises.

III. Local Air Traffic Control

Albuquerque Center

In the Alamogordo area, Military Operations Areas (MOAs) are controlled by Albuquerque Center or Holloman RAPCON. 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. It is possible for aerobatic basic fighter maneuvers (BFM), and formation flying to be performed in these areas, making it highly unlikely for the military to "see and avoid" you. However, should you decide to transit an active MOA while flying VFR, please contact the controlling agency for traffic advisories.

For the most current information regarding MOAs in the Alamogordo area including contact frequencies, altitudes and times, reference the current Albuquerque VFR sectional chart and/or call Flight Service.

When arriving in the Alamogordo area, expect Albuquerque Center or El Paso Approach/Departure to pass aircraft off to Holloman Approach/Departure Control.

Holloman Approach/Departure Control

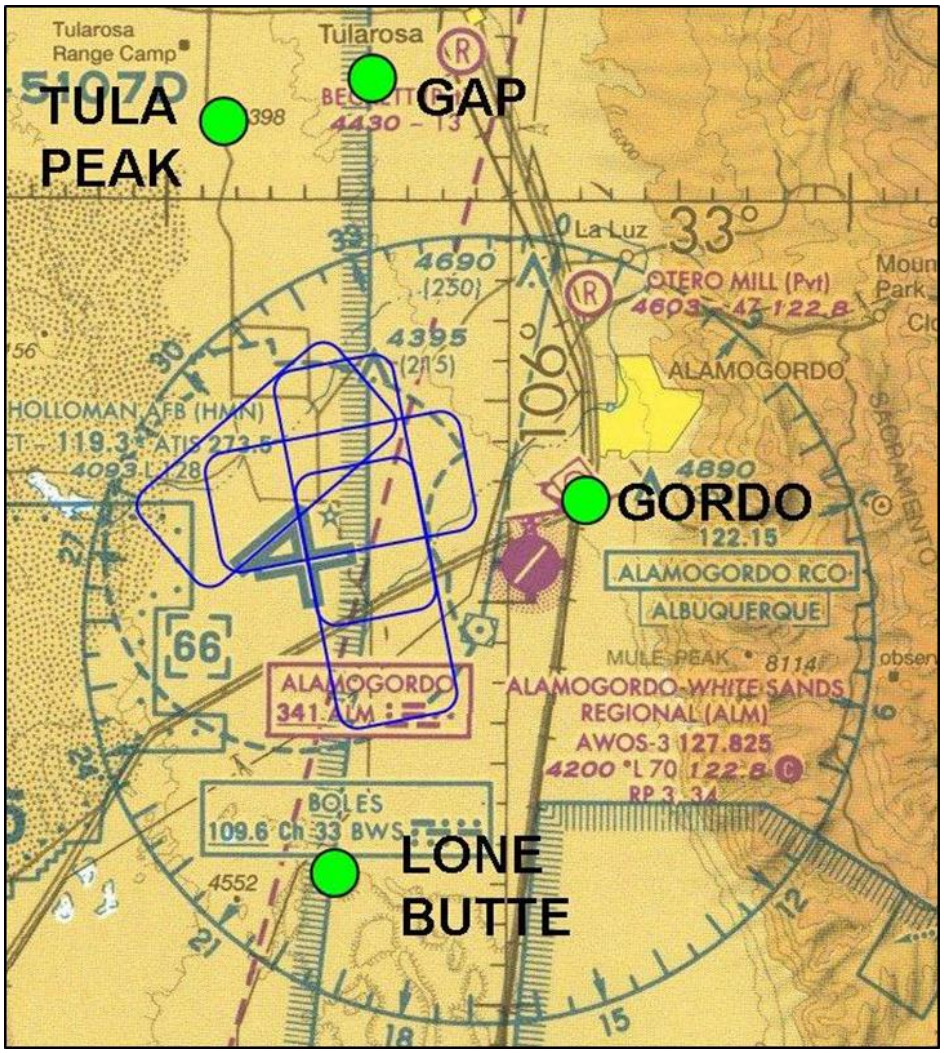
Holloman Approach Control provides IFR radar services to Holloman AFB and the Alamogordo White Sands Regional Airport. Holloman Approach/Departure Control operating times vary, but can operate 24/7 with at least one hour prior notification or flight plan filing. Traffic advisories are provided to VFR aircraft upon request and workload.

Holloman Tower

Holloman's Class D Airspace extends from the surface up to and including 6,600' MSL (2,500' AGL) within a 4.8 NM (Nautical mile) radius of HAFB.

Within 1 NM each side of the HMN ILS localizer northwest course extending from the 4.8 NM radius to 5.4 NM northwest of the airport excluding a 2 NM radius of the Alamogordo White Sands Regional Airport.

Extensive flight operations can be expected and all pilots should be extremely vigilant when flying near this area. Traffic patterns at Holloman vary with the runway in use. Traffic pattern altitudes vary with aircraft, but in general, fighter aircraft will fly at 6100' MSL while RPAs will fly between 5100-6600' MSL. VFR reporting points are utilized for the safe, efficient flow of Military traffic.



IV. Holloman AFB Operations

Local Flying Area

Holloman AFB local flying area is defined as a 200 NM radius from the Holloman TACAN, excluding Mexican airspace.

Departure Routes

At Holloman AFB, a number of departures exit restricted airspace enroute to MOAs. Common departures route military aircraft over the Sacramento Mountain range enroute to the MOAs.

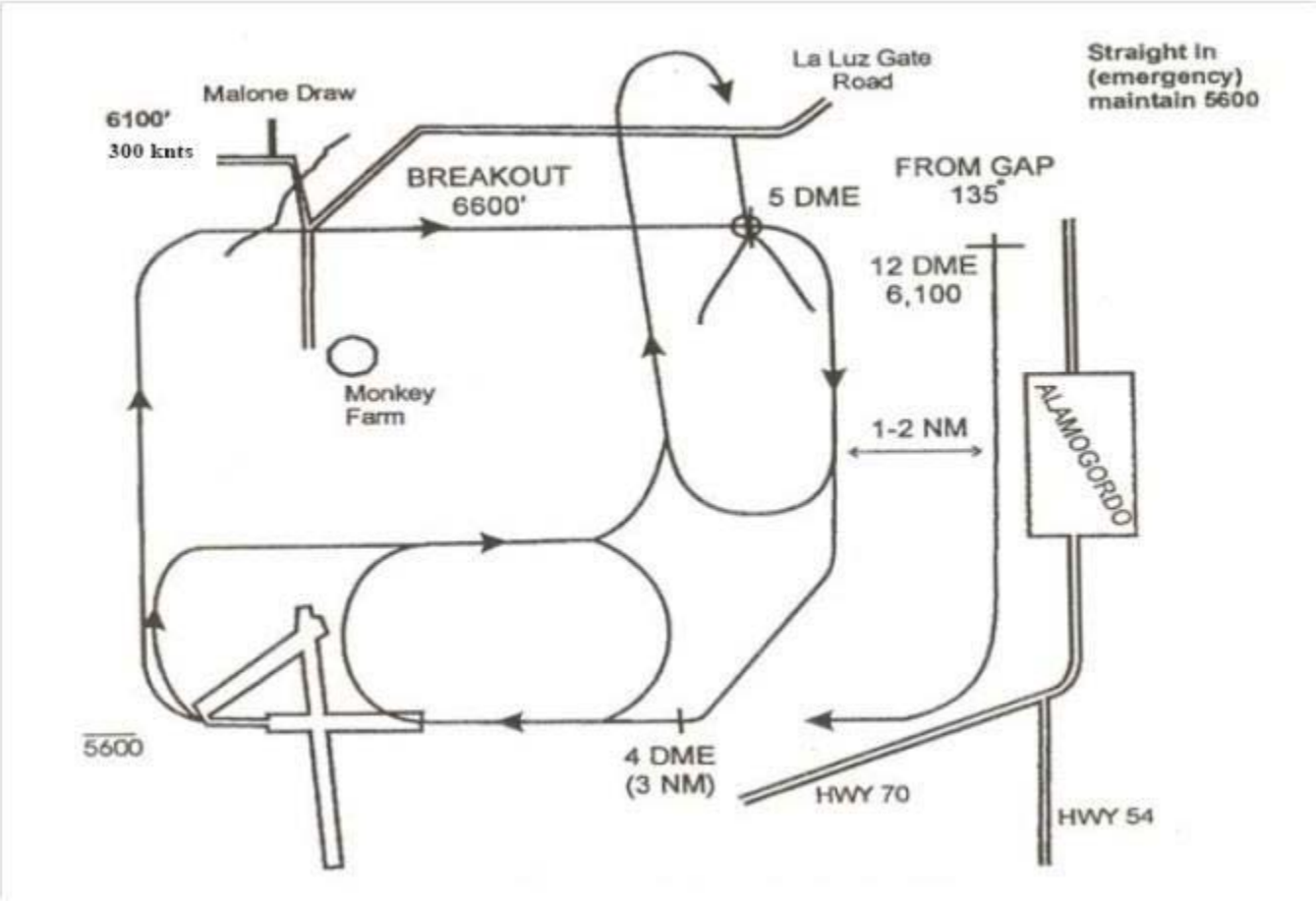
Arrival Routes

Holloman assigned aircraft normally arrive via VFR reporting points. The VFR corridor north of Holloman and Alamogordo poses a particular threat to aircraft as this area has numerous military aircraft entering and exiting restricted airspace in order to set up for recovery back to Holloman.

VFR TRAFFIC PATTERNS

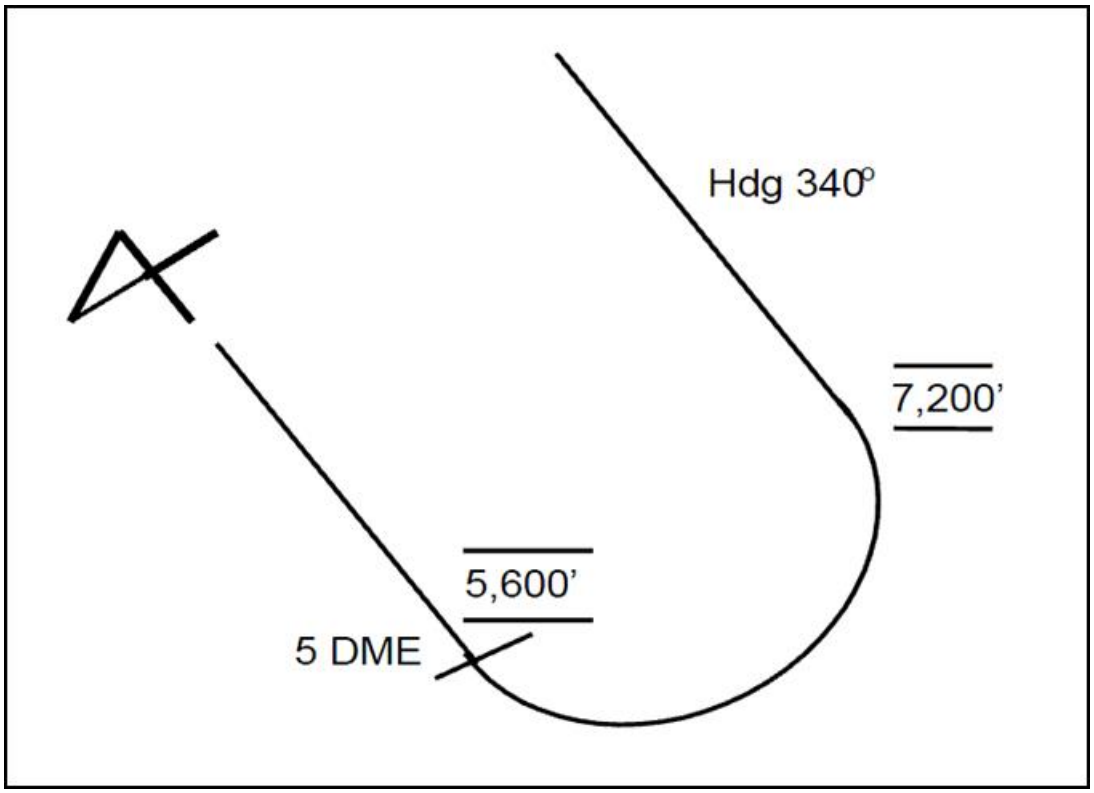
VFR approaches for manned military aircraft are flown at 6100' MSL and 300-350 KIAS. Aero Club aircraft traffic patterns are flown at 5100' MSL. The MQ-9 pattern is flown at 5600'-6600' MSL. The Runway 25 traffic pattern poses the greatest traffic conflict potential near the VFR corridor and Alamogordo-White Sands Regional Airport (ALM). Aircraft utilizing ALM should remain vigilant for high speed military traffic utilizing the VFR traffic patterns. Aircraft planning to overfly the Class D airspace, should add at least 500 ft to the Class D 6600 MSL airspace for safety.

Runway 25 VFR Traffic Pattern



Local Climbout Procedures

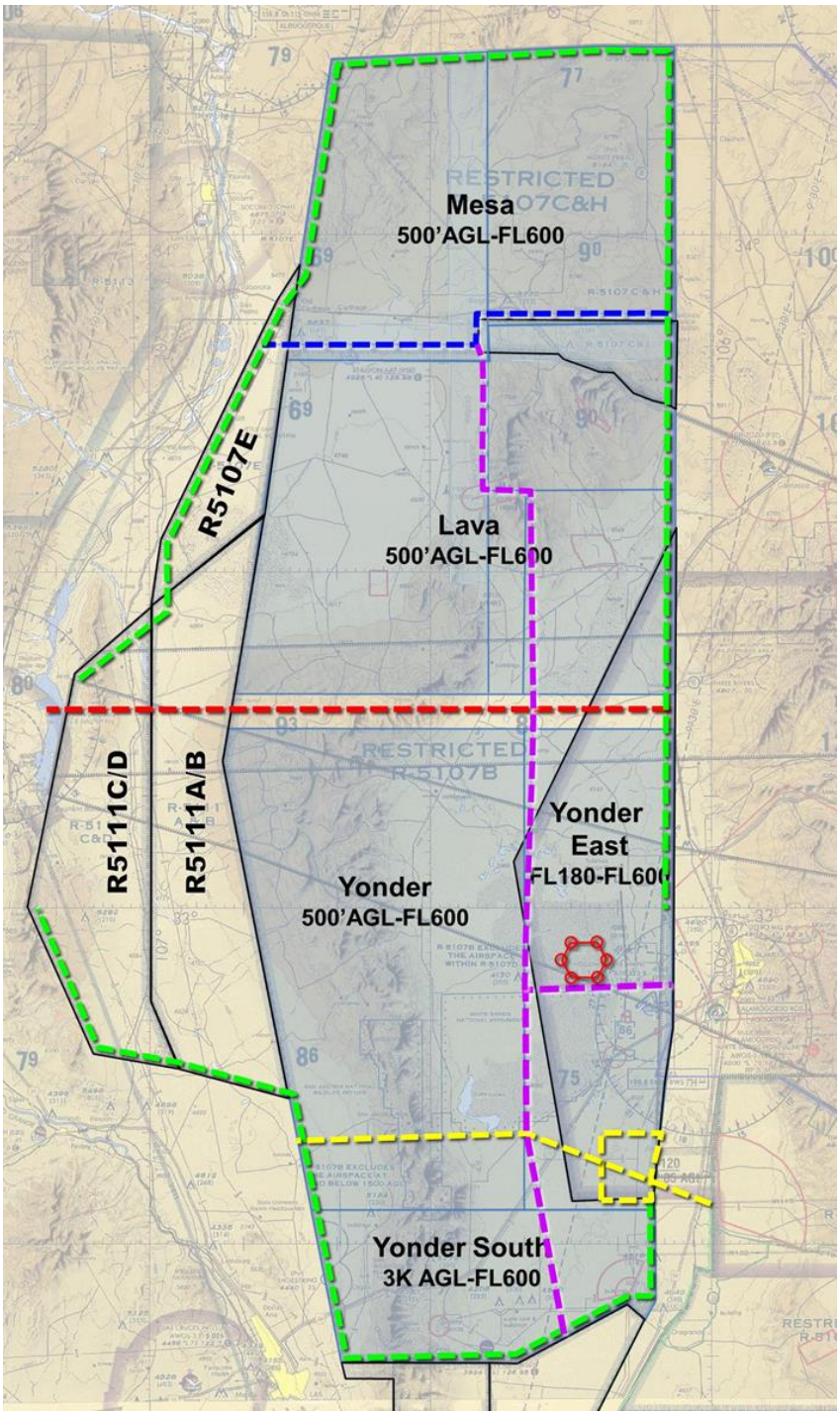
Aircraft flying multiple approaches to Holloman Runway 16 will fly runway heading and at 5 DME turn left to a 340° heading. They will cross 5 DME at or below 5600' MSL, then climb and maintain 7200' MSL. This procedure rarely creates a conflict but the potential is there. Holloman aircraft flying over ALM will do so at or above 3000' AGL in order to remain above the normal ALM traffic pattern altitude.



RPA Departure/Arrival Routes

MQ-9 aircraft are unable to accept "see and avoid" clearances. RPAs are required to remain inside restricted airspace. RPA departure routes differ from those of manned aircraft as they are assigned a color coded route from Clearance Delivery. Aircrew will fly the corresponding route to and from their working airspace on the range. Below is a map depicting the different RPA routes. The yellow square indicates the area set aside for RPAs to climb/descend during departures and arrivals. The RPA Departure and Arrival corridor is direct from Holloman to the yellow climb container.

NOTE: RPA routes fly ½ NM inside WSMR airspace.



V. Airspace Information

Valmont ATCAA (VFR Corridor)

The VFR corridor is provided for aircraft to transit from El Paso, TX to Alamogordo, NM. The corridor follows a ground track along Highway 54 through Orogrande, NM. Pilots should fly VFR at the appropriate altitude for direction of flight and should remain below 12,500' MSL for deconfliction.

El Paso Approach: **124.25 / 298.85 North**

119.15 / 353.50 South

Holloman Approach: **120.6 / 269.225**

RPAs and the Wiley East ATCAA

Holloman RPA squadrons are provided a Certificate of Authorization by the FAA to operate above the Beak MOAs within the confines of Wiley East ATCAA between FL190-FL300.

Restricted Airspace

Restricted areas denote the existence of unusual hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Penetration of a restricted area without permission of the using or controlling agency may be extremely hazardous to aircraft and its occupants and is legally prohibited. The majority of flying conducted from Holloman occurs within the restricted airspace of White Sands Missile Range, including R5107C, R-5107J, R-5107H, R-5107f, R5107G, R-5107B, R-5107D, R-5107A, R-5107K, R-5111A/B, R5111C/D, R-5111E, R-5103B/C. See map at back of pamphlet for reference.

Military Operating Areas

MOAs are established for the purpose of separating certain military training activities such as air combat maneuvers, air intercepts, aerobatics, etc., from instrument flight rules (IFR) traffic. Nonparticipating IFR traffic may be cleared through a MOA when in use if IFR traffic separation can be provided. Otherwise, air traffic control will reroute IFR traffic around the MOA.

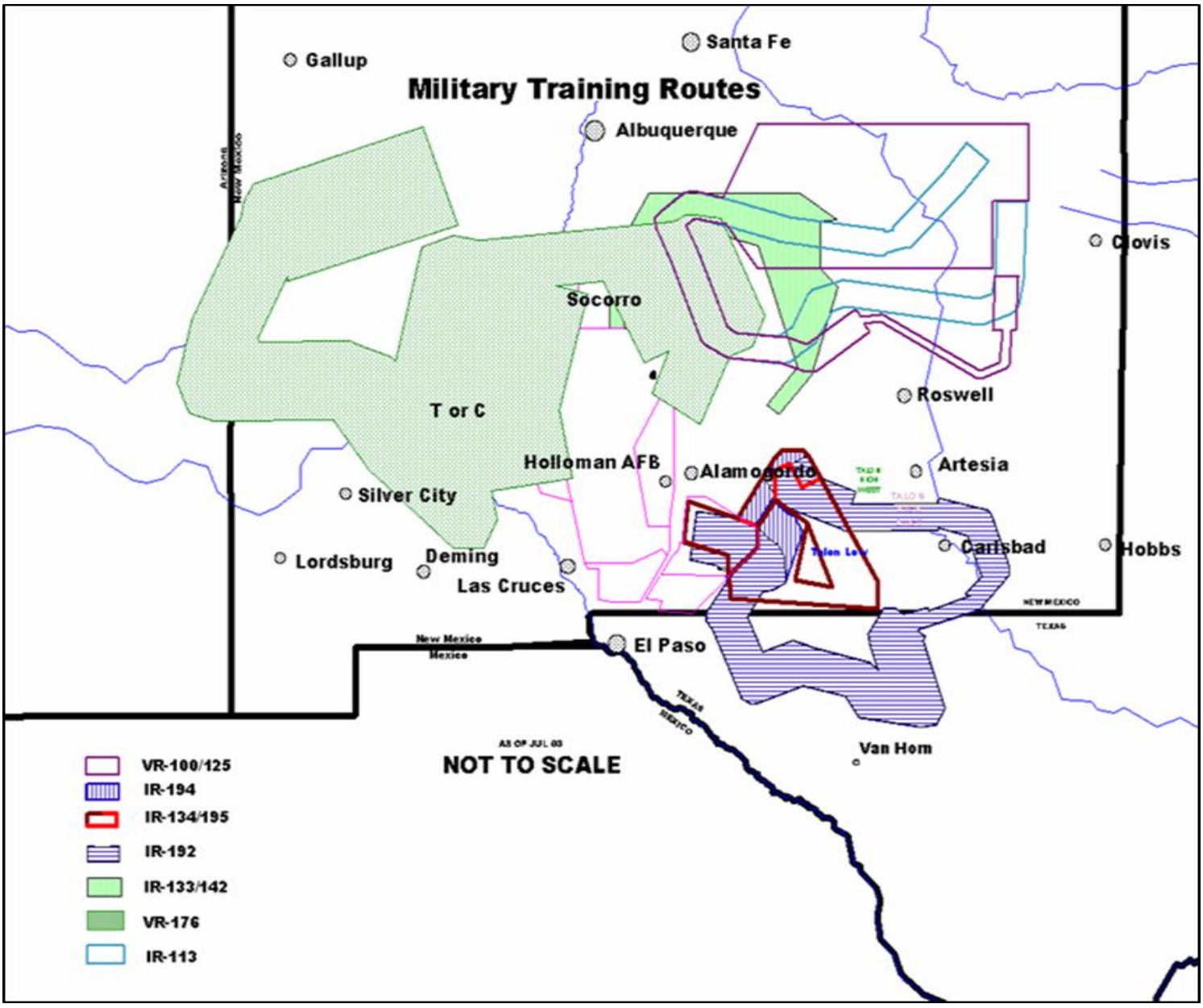
Pilots operating under VFR should exercise extreme caution while flying in a MOA during published hours of operation and at published altitudes encompassing the MOA's vertical limits. MOAs are depicted on sectional charts to alert VFR pilots of possible military activities. Information regarding a particular MOA can be found in the legend on the sectional chart. Additional information may be obtained from any flight service station within 200 miles of the area. Contact the closest FSS about military activities within a MOA whenever your flight will be in or near its boundaries.

CAUTION: Due to the nature of activities conducted in these MOAs, military aircraft could approach at extremely high rates of closure (e.g. supersonic) from virtually any angle. As a result, the ability to "see and avoid" such traffic is almost eliminated.

Military Training Routes

MTRs are established to accommodate enroute training operations that must be conducted in excess of 250 KIAS and below 10,000'MSL. MTRs can be identified several ways. A route with no segment above 1500' AGL is identified by four numbers. MTRs that include one or more segments above 1500' AGL will be identified by three numbers. Holloman-managed TRs include IR 133, 134, 142, 192, 194, 195, and VR 176.

CAUTION: Sectionals only depict the centerline of the specific MTRs. Actual route corridors may reach up to 40 NM either side of the charted centerline.



Lights-Out Training Operations

Lights-out training involves military aircraft conducting exercises at night, without exterior lighting. This training is necessary to ensure safe and efficient military operations, enabling pilots to avoid enemy detection and handle night emergencies more effectively. However, it is also GA's newest collision avoidance challenge. Participating Lights-out aircraft will come from active-duty U.S. Air Force, Air Force Reserve, and the Air National Guard. Training exercises may include fighters, transport aircraft, bombers, helicopters, and other types of military aircraft.

The U.S. Air Force (USAF) will be conducting "lights-out" training utilizing night vision goggles (NVGs) without lighted aircraft position lights in Beak Military Operations Areas (MOAs). Military personnel will continuously monitor operations conducted in Beak MOAs in order to detect all nonparticipating aircraft.

As part of the exemption granted by the FAA for military Lights-out operations near Holloman AFB, the military has agreed that:

- **Military Lights-out operations will only be conducted in select MOAs (Beak A/B/C).**
- **A local (L) NOTAM will be issued at least 48 hours before Lights-out training exercises begin.**
- **The appropriate ATC facilities will be notified upon activation and termination of Lights-out operations.**
- **Continuous radar coverage will be provided to detect all nonparticipating (civilian) aircraft.**
- **When a civilian aircraft enters the active area of a Lights-out MOA, military aircraft will be notified immediately.**
- **If a civilian aircraft presents a conflict, Lights-out training operations will be modified, suspended, or terminated.**

VI. MACA Tips

Statistics on 105 in-flight collisions show that 82 percent had convergence angles associated with one aircraft overtaking another. Specifically, 35 percent were from 0 to 10 degrees - straight from behind. Only 5 percent were from a head-on angle. These numbers, plus the fact that 77 percent occurred at or below 3,000 feet (with 49 percent at or below 500 feet) imply accurately that in-flight collisions generally occur in the traffic pattern and primarily on final approach. Collisions occurring enroute generally are at or below 8,000 feet and within 25 miles of an airport.

The vast majority of collisions occur in VFR weather conditions during weekend daylight hours. Most of these collisions occurred in daylight with visibility greater than three miles. Accidents occurred at or near uncontrolled airports and at altitudes below 1000 feet. No one is immune. Pilots of all experience levels were involved in midair collisions—from first solo to 20,000-hour veterans. 37% of these accidents had a flight instructor on board.

The reasons are easy to see: these are the times, locations and conditions in which the heaviest flying activity occurs. With the congested airspace pilots operate in, and the limitations of the human eye, it is readily apparent that midair collision avoidance is a concern that must be addressed before stepping into the cockpit. Here are some concise tips that should always be reviewed before flight.

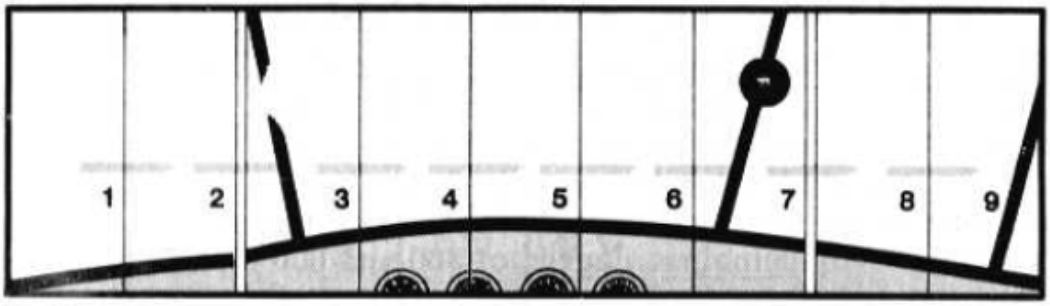
CLEARING/SCANNING TECHNIQUES

CAUTION!: A moving target is relatively easy to see. A target that is stationary (e.g., NOT moving across your windscreen) is very difficult to detect and is often the one that can result in a midair collision.

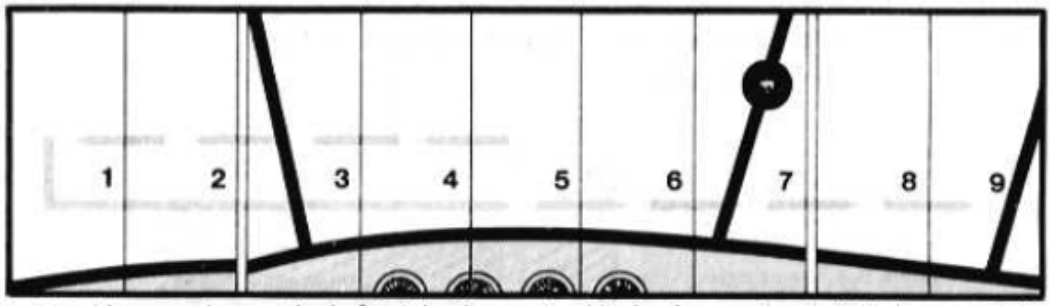
An efficient scan is very important to visual collision avoidance. Divide your field of vision into 10-15 degree blocks. Fixate on each block for 2-10 seconds to detect motion. The human eye is designed to pick up motion and this method allows you to detect any movement throughout the entire block. Some aircraft have large blind spots requiring extra effort for a complete scan. Use a momentary wing rock 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 and resume the traffic search. Also, if you get a call for traffic (for example, 10 o'clock) and don't spot it, always check the opposite side (in this case, the 2 o'clock position) because it is easy for a busy controller to transpose the positions in the heat of the moment. If you don't see the traffic, tell the controller and request traffic updates if you think the traffic will be a conflict.

Two scanning methods that have proved to be the most effective for pilots involve the "block" system of scanning, which is based on the theory that "traffic detection can be made only through a series of eye fixations at different points in space." In application, the viewing area (windshield) is divided into segments, and the pilot methodically scans for traffic in each block of airspace in sequential order.



Side-to-Side scanning method. Start at the far left of your visual area and make a methodical sweep to the right, pausing in each block of viewing area to focus your eyes. At the end of the scan, return to the panel.



Front-to-side scanning method. Start in the center block of your visual field (center of front windshield); move to the left, focusing in each block, then swing quickly to the center block after reaching the last block on the left and repeat the performance to the right.

FIGURE 2

MISSION PLAN POTENTIAL CONFLICTS

Know where high-density traffic areas are located. This is where your knowledge of military flight operations becomes important. Review the location of military airfields, MOAs, low level routes and restricted areas. Plan your flight to avoid potential conflicts to the greatest extent possible. Ensure you fly the correct altitude for the direction of flight. North East (000-179) travel should be at Odd altitudes and South West (180-359) travel should be at Even altitudes. VFR traffic should add 500' to these directions of travel. 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.

USE ALL AVAILABLE RADAR SERVICES

When operating in controlled airspace, request VFR flight following for traffic advisories, even when not in radar contact. Transponder-equipped aircraft should always set the appropriate codes and 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.

PRIORITIZE COCKPIT DUTIES AND STAY ALERT

Aviate Navigate Communicate! Review approach plates, en-route charts, and other in-flight 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 becomes time to review such materials in-flight, 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 in-flight materials and never keep your eyes inside the cockpit for an extended length of time. The time spent looking in the cockpit should be less than 3 seconds with the next 17 seconds being spent outside the cockpit. Everything

else is secondary. Stay alert by monitoring your position and the positions of other aircraft around you (both visually and on the radios). As instructors, don't get complacent! Remember, 37% of the midair collisions studied by the NTSB had instructors aboard the aircraft.

"SEE AND AVOID" procedures are critical for all traffic

Air traffic controllers are not required to provide separation between VFR aircraft or even between IFR and VFR traffic under VMC conditions. They may provide traffic advisories for VFR aircraft if time and workload allow. The bottom line is: whenever you are not in actual IMC weather conditions, it is always everyone's responsibility to clear aggressively, regardless of the type of flight plan you are on or the class of airspace you are flying in! Remember, there is no guarantee everyone is flying by the rules or is where they are supposed to be.

In summary:

1. Practice the "see and avoid" concept at all times regardless of whether the operation is conducted under Instrument (IFR) or Visual (VFR) Flight Rules.

2. Under IFR control, don't always count on ATC to keep you away from other aircraft. They're human, and can make mistakes.

3. 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, you are likely to be on a collision course.

4. Execute appropriate clearing procedures before all climbs, descents, turns, training maneuvers, or aerobatics.

5. Be aware of the type airspace in which you intend to operate and comply with the applicable rules.

6. Adhere to the necessary communications requirements.

7. Traffic advisories should be requested and used when available to assist the pilot's own visual scanning -- advisories in no way lessen the pilot's obligation to see and avoid.

8. If not practical to initiate radio contact for traffic information, at least monitor the appropriate frequency.

9. Make frequent position reports along your route and AT UNCONTROLLED AIRPORTS BROADCAST YOUR POSITION AND INTENTIONS ON THE COMMON TRAFFIC ADVISORY FREQUENCY (CTAF).

10. Make your aircraft as visible as possible – turn on exterior lights below 10,000 MSL and landing lights when operating within 10 miles of any airport, in conditions of reduced visibility, where any bird activity is expected or under special VFR clearance.

11. 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.

12. ABOVE ALL, AVOID COMPLACENCY.

(Information provided in part by the FAA Website)

HOLLOMAN AFB FLIGHT SAFETY

(575) 572-3793