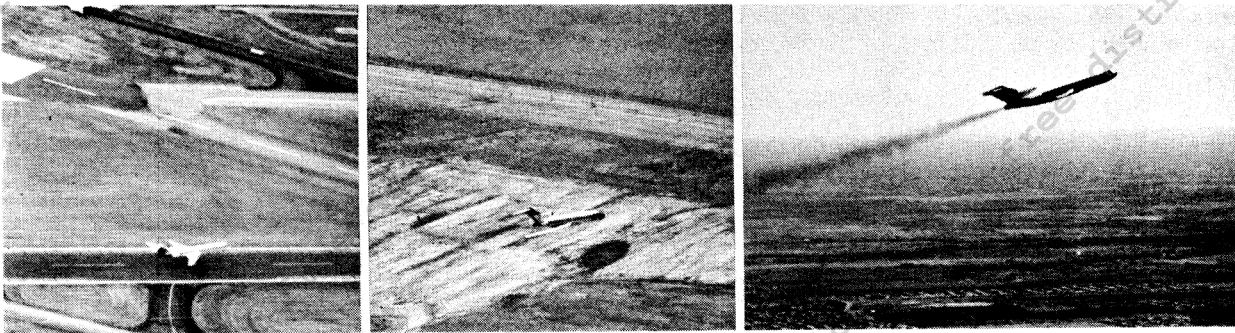


**DEPARTMENT OF TRANSPORTATION**  
**Federal Aviation Administration**  
**VFR PILOT EXAM-O-GRAM® NO. 48**  
**MIDAIR COLLISIONS (Series #3)**



JET ON ROTATION

15 SECONDS LATER

60 SECONDS AFTER TAKEOFF AND  
 PASSING THROUGH 2,000' AGL

Compliance with Flight Rules prescribed in FAR Part 91 and adherence to Good Operating Practices listed in the Airman's Information Manual, will materially reduce the possibility of pilots becoming involved in mid-air collisions. General Aviation Written Tests contain test items on FARs that are related to mid-air collisions. Unfortunately, too many pilots look upon the FARs merely as a disagreeable requirement for passing a written test and do not associate FARs with their everyday flying.

In 1968, 2,230 incidents were reported under the FAA "Near Midair Collision Study Program." Of these, 1,128 were "Hazardous" in that the aircraft missed only by chance or after one or both pilots took evasive action. The present phenomenal growth in number of aircraft and hours flown in U. S. Civil Aviation, is rapidly increasing the midair collision problem.

The National Transportation Safety Board special accident prevention study entitled "Midair Collisions in U. S. Civil Aviation - 1968," lists 38 midair collisions involving 76 aircraft. In preparing this Exam-O-Gram, a study was made of 31 of the General Aviation accident reports of midair collisions that occurred in 1968 and 23 reports of midairs which occurred prior to October in 1969.

This Exam-O-Gram attempts to show pictorially, where and how some midairs have occurred, as well as other places where the midair hazard may strike again. All pilots should become aware of and exercise every precaution against, the midair collision potentials at controlled high density terminal arrival and departure areas. The photographs above show how rapidly a jet on takeoff can become a real hazard to another airplane cruising at 2,000 feet above the ground near a busy airport.

○○○

WHAT COLLISION PRECAUTIONS SHOULD YOU TAKE FOR CROSS COUNTRY FLIGHTS? In preflight planning, check the Special Operations, Area Notices, and Graphic Notices of AIM and the aeronautical charts to determine if the proposed route passes through a Restricted Area, Olive Branch Route, Intensive Student Jet Training Area, etc.

Have any fatal mid-air happened as depicted in the illustration to the right? The answer is YES!

Even though the formation of jets is in a steep climb, they are climbing at 365 knots IAS (420 mph).

● **HEAVY TRAFFIC AROUND MILITARY FIELDS**

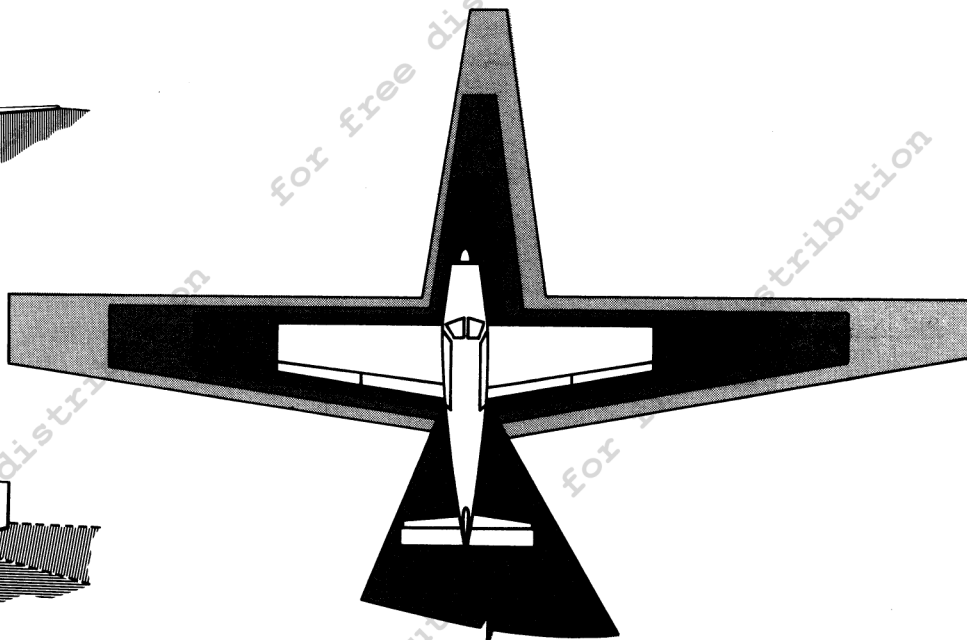
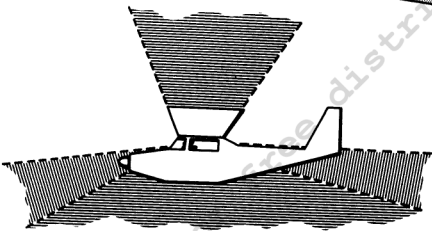
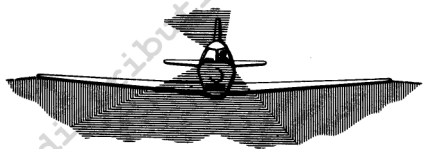
Pilots are advised to exercise vigilance when in close proximity to most military airports. These airports may have jet aircraft traffic patterns extending up to 2500 feet above the surface. In addition, they may have an unusually heavy concentration of jet aircraft operating within a 25 nautical mile radius and from the surface to all altitudes. This precautionary note also applies to the larger civil airports.



FLYING NEAR A MILITARY AIRFIELD.

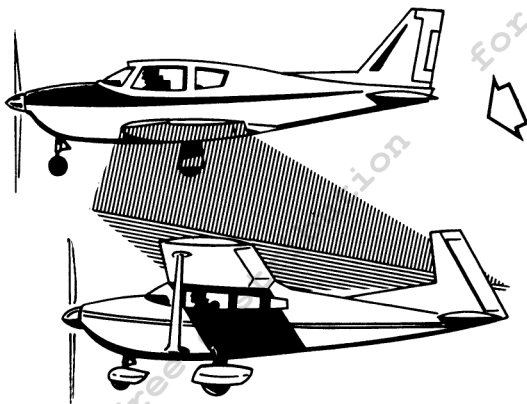
• Exam-O-Grams are non-directive in nature and are issued solely as an information service to individuals interested in Airman Written Examinations.

Rev. 1/74



**THE BLIND SPOTS WIDEN AND EXTEND TO INFINITY AS SHOWN ABOVE**

**NOTE:** When turning a high-wing airplane the pilot lowers the wing and thus hides the area into which he is turning. In a low-wing airplane, the cabin roof hides the area into which the pilot is turning--especially in right turns.



**BLIND SPOT OVERLAP**

Pilots of high-wing and low-wing airplanes can be in each other's blind spots. Collisions of this type have happened most frequently in the traffic patterns at uncontrolled airports. Collisions like this can occur: (a) on the entry leg of the pattern when the low-wing airplane descends on top of the other airplane; (b) on the downwind leg of the pattern with one of the airplanes flying at an improper pattern altitude--that is, the high-wing airplane climbs or the low-wing airplane descends to return to the desired altitude; (c) on final approach or just before touchdown.

When there is a slower airplane ahead of you in the pattern flying about 100 feet lower than your altitude, it is possible to overtake and never see the slower airplane hidden beneath the nose of your aircraft. Remember, the silhouette of an airplane below the horizon tends to blend with, and be lost in, the surrounding landscape features.

**WHEN HAS THIS TYPE COLLISION OCCURRED?**

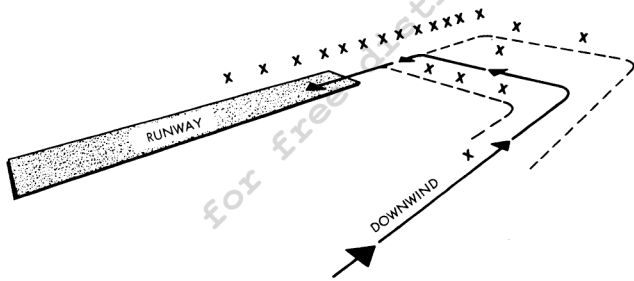
It usually happens when one pilot is flying the traffic pattern in an unauthorized direction. Of the cases studied, there were 3 midairs involved with one of the pilots in each incident flying a right hand pattern while a left hand pattern was in use--and still another midair involved a pilot flying a left hand base leg in noncompliance with the published right hand traffic. The use of UNICOM at uncontrolled airports can make flying around them safer. Even though there is no UNICOM station or Flight Service Station in operation at some of these airports, you can alert other pilots of your presence by announcing your position in the pattern on appropriate frequencies. This subject is covered in Part 1 of AIM under "Traffic Advisories at Nontower Airports."



Of the accident reports studied, there were 8 midairs elsewhere in the pattern (entry, exit, downwind, etc.). One fatal accident occurred when a student and his instructor in a light aircraft were leaving the pattern and collided with a multi-engine aircraft on the downwind leg (as represented by airplanes B and C).

This illustration also shows how an airplane making a pattern entry to the downwind leg could collide head-on with another airplane that has flown a long crosswind leg before making the exit turn. (See airplanes A and C).

**X MARKS THE SPOT**



APPROXIMATE POSITION OF MID-AIR COLLISIONS THAT OCCURRED DURING 1968 IN THE DOWN-WIND, BASE-LEG AND FINAL APPROACH.

○ ○ ○

**OTHER ACTUAL MIDAIRS**

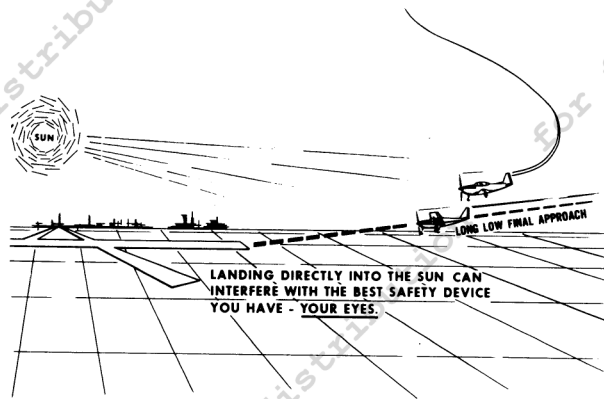
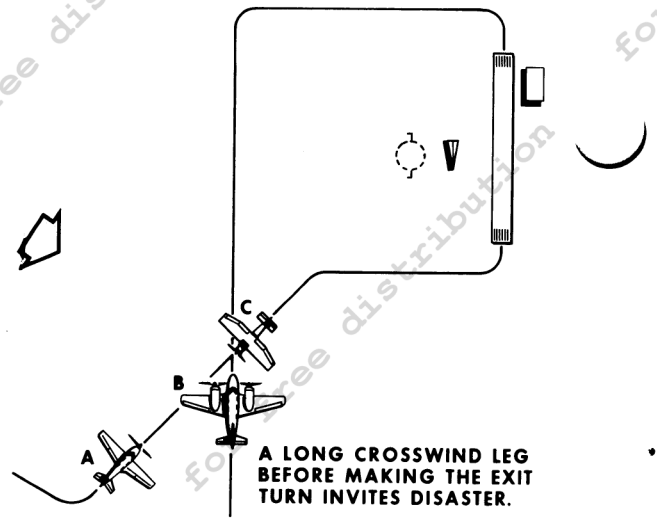
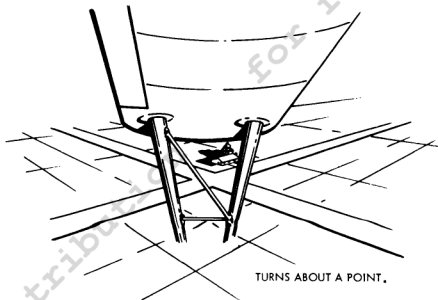
- 1- Two solo students departed on the same cross-country flight and ran together while looking at their charts.
- 2- One airplane descended on top of a white colored airplane which blended with the snow covered terrain.

SOME FEDERAL AVIATION REGULATIONS RELATED TO MIDAIR COLLISIONS WITH WHICH PILOTS SHOULD BE THOROUGHLY FAMILIAR AND ADHERE TO, INCLUDE: 91.9, Careless and Reckless Operation; 91.11, Liquor and Drugs; 91.65, Operating Near Other Aircraft; 91.67, Right-of-Way Rules; 91.70, Aircraft Speed; 91.87, Operation at Airports with Operating Control Towers; 91.89, Operation at Airports Without Control Towers; and 91.73, General Limitations.

● ● ● ●

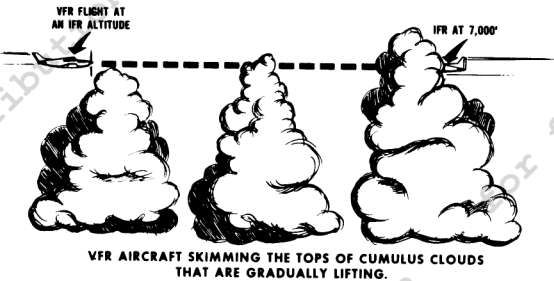
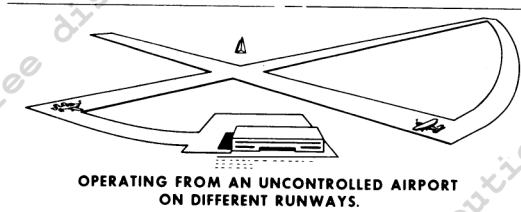
**SITUATIONS CONDUCTIVE TO MIDAIR COLLISIONS**

Constant vigilance is a must when practicing pylon 8's, low level ground track maneuvers like "turns about a point," or "S turns across a road."



HOW SAFE ARE YOU WITH A SLEEPY SAFETY PILOT ?

Situations Conducive to Mid Air Collisions (continued)



VFR - No. 48

ARE CLEARING PROCEDURES HELPFUL IN REDUCING AIRCRAFT COLLISION POTENTIAL? Yes, pilots should execute gentle banks, left and right, when climbing or descending, rather than spending long periods of time climbing and descending straight ahead. The AIM Good Operating Procedures state in part: "Appropriate clearing procedures should precede the execution of all turns including chandelles, lazy eights, stalls, slow flight, climbs, straight-and-level, spins, and other combination maneuvers." Personnel of the FAA Flight Instructor Refresher Unit, are recommending that trainees of the Flight Instructor Refresher Clinics teach the use of clearing turns prior to the execution of certain maneuvers. They suggest: 90° clearing turns, 180° clearing turns, or whatever clearing is deemed necessary to ascertain that the area is clear before performing any maneuver. They also stress that there should be no delay in entering a maneuver upon completion of the clearing turns. This can be accomplished by performing the necessary conditions of flight (reducing airspeed, adding carburetor heat, etc.) while in the clearing turns.

For several decades military flying schools have taught their pilots to perform at least one 180° clearing turn in each direction before entering such maneuvers as spins, Cuban 8's, Immelmans, etc., where considerable altitude changes are involved.

FAA Aeronautical Center  
 Flight Standards Technical Division, Operations Branch  
 P. O. Box 25082  
 Oklahoma City, Oklahoma 73125

11/69

Exam-O-Grams available free of charge--single copy only per request. Permission is hereby granted to reproduce this material.