U.S. Department
of Transportation
**Federal Aviation
Administration**

# Advisory Circular

**Subject:** RECOMMENDED STANDARD TRAFFIC PATTERNS AND PRACTICES FOR AERONAUTICAL OPERATIONS AT AIRPORTS WITHOUT OPERATING CONTROL TOWERS

**Date:** 8/26/93 **AC No. 90–66A**
**Initiated by:** ATP–230

## 1. PURPOSE.

This advisory circular (AC) calls attention to regulatory requirements and recommended procedures for aeronautical operations at airports without operating control towers. It recommends traffic patterns and operational procedures for aircraft, lighter than air, glider, parachute, rotorcraft, and ultralight vehicle operations where such use is not in conflict with existing procedures in effect at those airports.

## 2. CANCELLATION.

AC 90–66, Recommended Standard Traffic Patterns for Airplane Operations at Uncontrolled Airports, dated February 27, 1975, is cancelled.

## 3. PRINCIPAL CHANGES.

This AC has been updated to reflect current procedures at airports without operating control towers. Principal changes include: adding on "Other Traffic Pattern" section, amending appendix charts to remain consistent with the Airman's Information Manual (AIM), expanding the "Related Reading Material" section from "airplane" to "aeronautical" operations, adding definition and references to Common Traffic Advisory Frequency (CTAF), acknowledging straight–in approaches are not prohibited but may be operationally advantageous, and adding a paragraph on wake turbulence.

## 4. DEFINITIONS.

**a.** Airports Without Operating Control Towers. Airports without control towers or an airport with a control tower which is not operating. These airports are commonly referred to as non–towered, uncontrolled, or part–time towered airports.

**b.** Common Traffic Advisory Frequency (CTAF). A frequency designed for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The CTAF may be a UNICOM, MULTICOM, flight service station, or tower frequency and is identified in appropriate aeronautical publications.

## 5. RELATED READING MATERIAL.

**a.** Airport/Facility Directory (AFD).

**b.** Airman's Information Manual (AIM).

**c.** Fly Neighborly Guide, Helicopter Association International.

**d.** Aviation USA, Aircraft Owners and Pilots Association (AOPA).

**e.** State aviation publications.

**f.** Various pilot guides.

**g.** Pilot Operations at Nontowered Airports, AOPA Air Safety Foundation pamphlet.

**h.** Guidelines for the Operation of Ultralight Vehicles at Existing Airports, United States Ultralight Association.

**i.** Facts for Pilots, United States Parachute Association.

**j.** The latest addition of the following AC's also contain information applicable to operations at airports without operating control towers:

(1) AC 90–23, Aircraft Wake Turbulence.

(2) AC 90–42, Traffic Advisory Practices at Airports Without Operating Control Towers.

(3) AC 90–48, Pilot's Role in Collision Avoidance.

(4) AC 91–32, Safety In and Around Helicopters.

(5) AC 103–6, Ultralight Vehicle Operations–Airports, Air Traffic Control, and Weather.

(6) AC 105–2, Sport Parachute Jumping.

## 6. BACKGROUND AND SCOPE.

**a.** Regulatory provisions relating to traffic patterns are found in Parts 91, 93, and 97 of the Federal Aviation Regulations (FAR). The airport traffic

patterns contained in Part 93 relate primarily to those airports where there is a need for unique traffic pattern procedures not provided for in Part 91. Part 97 addresses instrument approach procedures. At airports without operating control towers, Part 91 requires only that pilots of airplanes approaching to land make all turns to the left unless light signals or visual markings indicate that turns should be made to the right.

**b.** The Federal Aviation Administration (FAA) believes that observance of a standard traffic pattern and the use of CTAF procedures as detailed in AC 90–42 will improve the safety and efficiency of aeronautical operations at airports without operating control towers.

## 7. GENERAL OPERATING PRACTICES.

**a.** Use of standard traffic patterns for all aircraft and CTAF procedures by radio–equipped aircraft are recommended at all airports without operating control towers. However, it is recognized that other traffic patterns may already be in common use at some airports or that special circumstances or conditions exist that may prevent use of the standard traffic pattern.

**b.** The use of any traffic pattern procedure does not alter the responsibility of each pilot to see and avoid other aircraft. Pilots are encouraged to participate in "Operation Lights On," which is a voluntary pilot safety program described in the AIM designed to enhance the "see–and–avoid" requirement.

**c.** As part of the preflight familiarization with all available information concerning a flight, each pilot should review all appropriate publications (AFD, AIM, Notices to Airmen (NOTAM), etc.), for pertinent information on current traffic patterns at the departure and arrival airports.

**d.** It is recommended that pilots utilize visual indicators, such as the segmented circle, wind direction indicator, landing direction indicator, and traffic pattern indicators which provide traffic pattern information.

**e.** The FAA encourages pilots to use the standard traffic pattern. However, for those pilots who choose to execute a straight–in approach, maneuvering for and execution of the approach should be completed so as not to disrupt the flow of arriving and departing traffic. Therefore, pilots operating in the traffic pattern should be alert at all times to aircraft executing straight–in approaches.

**f.** Pilots who wish to conduct instrument approaches should be particularly alert for other aircraft in the pattern so as to avoid interrupting the flow of traffic. Position reports on the CTAF should include distance and direction from the airport, as well as the pilot's intentions upon completion of the approach.

**g.** Pilots of inbound nonradio–equipped aircraft should determine the runway in use prior to entering the traffic pattern by observing the landing direction indicator or by other means. Pilots should be aware that procedures at airports without operating control towers generally do not require the use of two–way radios; therefore, pilots should be especially vigilant for other aircraft while operating in the traffic pattern.

**h.** Wake turbulence is generated by all aircraft. Therefore, pilots should expect to encounter turbulence while operating in a traffic pattern and in proximity to other aircraft. Aircraft components and equipment can be damaged by wake turbulence. In flight, avoid the area below and behind the aircraft generating turbulence especially at low altitude where even a momentary wake encounter can be hazardous. All operators should be aware of the potential adverse effects that their wake, rotor or propeller turbulence has on light aircraft and ultralight vehicles.

## 8. RECOMMENDED STANDARD TRAFFIC PATTERN.

Airport owners and operators, in coordination with the FAA, are responsible for establishing traffic patterns. However, the FAA encourages airport owners and operators to establish traffic patterns as recommended in this AC. Further, left traffic patterns should be established except where obstacles, terrain, and noise–sensitive areas dictate otherwise. Appendix 1 contains diagrams for recommended standard traffic patterns.

**a.** Prior to entering the traffic pattern at an airport without an operating control tower, aircraft should avoid the flow of traffic until established on the entry leg. For example, wind and landing direction indicators can be checked while at an altitude above the traffic pattern. When the proper traffic pattern direction has been determined, the pilot should then proceed to a point well clear of the pattern before descending to the pattern altitude.

**b.** Arriving aircraft should be at the appropriate traffic pattern altitude before entering the traffic pattern. Entry to the downwind leg should be at a 45–degree angle abeam the midpoint of the runway.

**c.** It is recommended that airplanes observe a 1000-foot above ground level (AGL) traffic pattern altitude. Large and turbine-powered airplanes should enter the traffic pattern at an altitude of 1,500 feet AGL or 500 feet above the established pattern altitude. A pilot may vary the size of the traffic pattern depending on the aircraft's performance characteristics.

**d.** The traffic pattern altitude should be maintained until the aircraft is at least abeam the approach end of the landing runway on the downwind leg.

**e.** The base leg turn should commence when the aircraft is at a point approximately 45 degrees relative bearing from the runway threshold.

**f.** Landing and takeoff should be accomplished on the operating runway most nearly aligned into the wind. However, if a secondary runway is used, pilots using the secondary runway should avoid the flow of traffic to the runway most nearly aligned into the wind.

**g.** Airplanes on takeoff should continue straight ahead until beyond the departure end of the runway. Aircraft executing a go-around maneuver should continue straight ahead, beyond the departure end of the runway, with the pilot maintaining awareness of other traffic so as not to conflict with those established in the pattern. In cases where a go-around was caused by an aircraft on the runway, maneuvering parallel to the runway may be required to maintain visual contact with the conflicting aircraft.

**h.** Airplanes remaining in the traffic pattern should not commence a turn to the crosswind leg until beyond the departure end of the runway and within 300 feet below traffic pattern altitude, with the pilot ensuring that the turn to downwind leg will be made at the traffic pattern altitude.

**i.** When departing the traffic pattern, airplanes should continue straight out or exit with a 45-degree left turn (right turn for right traffic pattern) beyond the departure end of the runway after reaching pattern altitude. Pilots need to be aware of any traffic entering the traffic pattern prior to commencing a turn.

**j.** Airplanes should not be operated in the traffic pattern at an indicated airspeed of more than 200 knots (230 mph).

**k.** Throughout the traffic pattern, right-of-way rules apply as stated in FAR Part 91.113. Any aircraft in distress has the right-of-way over all other aircraft. In addition, when converging aircraft are of different categories, a balloon has the right-of-way over any other category of aircraft; a glider has the right-of-way over an airship, airplane, or rotorcraft; and an airship has the right-of-way over an airplane or rotorcraft.

## 9. OTHER TRAFFIC PATTERNS.

Airport operators routinely establish local procedures for the operation of gliders, parachutists, lighter than air aircraft, helicopters, and ultralight vehicles. Appendices 2 and 3 illustrate these operations as they relate to recommended standard traffic patterns.

**a.** Rotorcraft.

**(1)** In the case of a helicopter approaching to land, the pilot must avoid the flow of fixed-wing aircraft and land on a marked helipad or suitable clear area. Pilots should be aware that at some airports, the only suitable landing area is the runway.

**(2)** All pilots should be aware that rotorcraft may fly slower and approach at steeper angles than airplanes. Air taxi is the preferred method for helicopter ground movements which enables the pilot to proceed at an optimum airspeed, minimize downwash effect, and conserve fuel. However, flight over aircraft, vehicles, and personnel should be avoided.

**(3)** In the case of a gyrocopter approaching to land, the pilot should avoid the flow of fixed-wing aircraft until turning final for the active runway.

**(4)** A helicopter operating in the traffic pattern may fly a pattern similar to the airplane pattern at a lower altitude (500 AGL) and closer to the airport. This pattern may be on the opposite side of the runway with turns in the opposite direction if local policy permits.

**(5)** Both classes of rotorcraft can be expected to practice power-off landing (autorotation) which will involve a very steep angle of approach and high rate of descent (1,500-2,000 feet/minute).

**b.** Gliders.

**(1)** A glider, including the tow aircraft during towing operations, has the right-of-way over powered aircraft.

**(2)** If the same runway is used by both airplanes and gliders, the glider traffic pattern will be inside the pattern of engine driven aircraft. If a "Glider Operating Area" is established to one side of a powered-aircraft runway, the glider pattern will normally be on the side of the airport closest to the "Glider Operating Area." This will allow gliders to fly the same direction traffic pattern as powered aircraft in one wind condition and necessitate a separate opposing direction traffic

pattern in the opposite wind condition. (See examples in Appendix 2, Glider Operations).

(3) Typically, glider traffic patterns have entry points (initial points) from 600 to 1,000 feet AGL.

c. Ultralight Vehicles.

(1) In accordance with FAR Part 103, ultralight vehicles are required to yield the right-of-way to all aircraft.

(2) Ultralight vehicles should fly the rectangular pattern as described in Appendix 2. Pattern altitude should be 500 feet below and inside the standard pattern altitude established for the airport. An ultralight pattern with its own dedicated landing area will typically have a lower traffic pattern parallel to the standard pattern with turns in the opposite direction.

(3) All pilots should be aware that ultralights will fly significantly slower than airplanes. In addition, ultralights may also exhibit very steep takeoff and approach angles. Turns may be executed near the end of the runway in order to clear the area expediently.

d. Lighter Than Air Aircraft.

(1) A balloon has the right-of-way over any other category of aircraft and does not follow a standard traffic pattern.

(2) Due to limited maneuverability, airships do not normally fly a standard traffic pattern. However, if a standard traffic pattern is flown, it will be at an airspeed below most other aircraft.

e. Parachute Operations.

(1) All activities are normally conducted under a NOTAM noting the location, altitudes, and time or duration of jump operations. The Airport/Facility Directory lists airports where permanent drop zones are located.

(2) Jumpers normally exit the aircraft either above, or well upwind of, the airport and at altitudes well above traffic pattern altitude. Parachutes are normally deployed between 2,000 feet and 5,000 feet AGL and can be expected to be below 3,000 feet AGL within 2 miles of the airport.

(3) Pilots of jump aircraft are required by Part 105 to establish two-way radio communications with the air traffic control facility or Flight Service Station which has jurisdiction over the affected airspace prior to jump operations for the purpose of receiving information in the aircraft about known air traffic in the vicinity. In addition, when jump aircraft are operating at or in the vicinity of an airport, pilots are also encouraged to provide advisory information on the CTAF, i.e., "Chambersburg traffic, jumpers away over Chambersburg.

(4) When a drop zone has been established on an airport, parachutists are expected to land within the drop zone. At airports that have not established drop zones, parachutists should avoid landing on runways, taxiways, aprons, and their associated safety areas. Pilots and parachutists should both be aware of the limited flight performance of parachutes and take steps to avoid any potential conflicts between aircraft and parachute operations.

(5) Appendix 3 diagrams operations conducted by parachutists.

Harold W Becker

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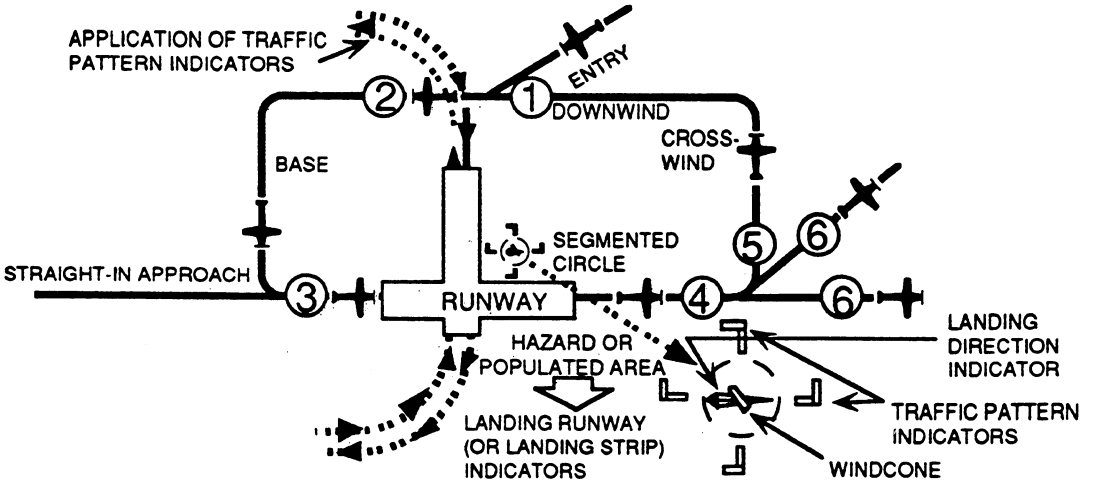
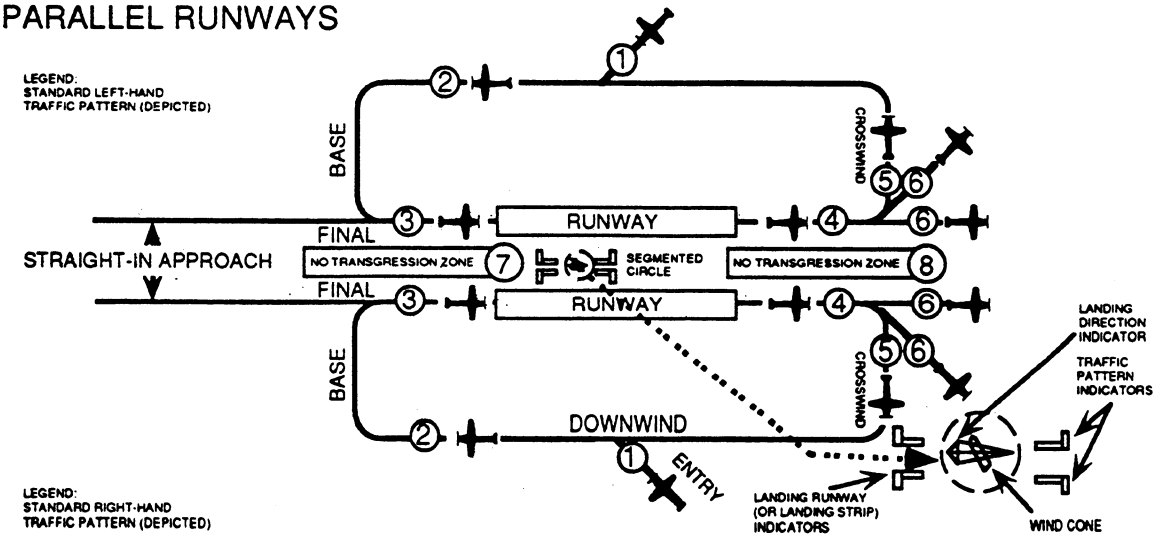
# AIRPORT OPERATIONS

## SINGLE RUNWAY




## PARALLEL RUNWAYS




## KEY

(1) Enter pattern in level flight, abeam the midpoint of the runway, at pattern altitude. (1000' AGL is recommended pattern altitude unless established otherwise).

(2) Maintain pattern altitude until abeam approach end of the landing runway, or downwind leg.

(3) Complete turn to final at least 1/4 mile from the runway.

(4) Continue straight ahead until beyond departure end of runway.

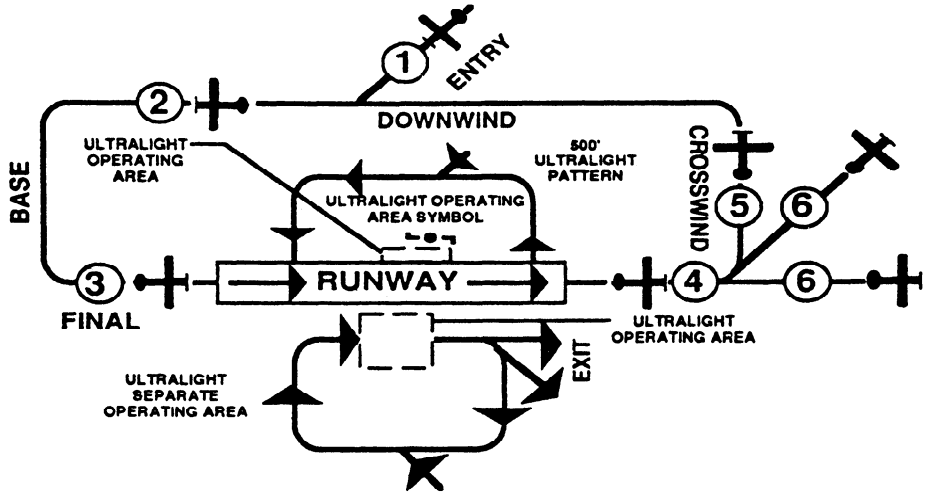
(5) If remaining in the traffic pattern, commence turn to crosswind leg beyond the departure end of the runway, within 300 feet of pattern altitude.

(6) If departing the traffic pattern, continue straight out, or exit with a 45º left turn beyond the departure end of the runway, after reaching pattern altitude.

(7) Do not overshoot final or continue on a track which will penetrate the final approach of the parallel runway.

(8) Do not continue on a track which will penetrate the departure path of the parallel runway.

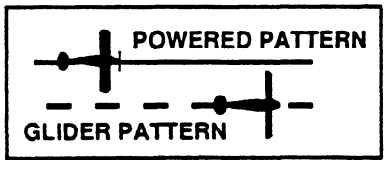
# ULTRALIGHT OPERATIONS

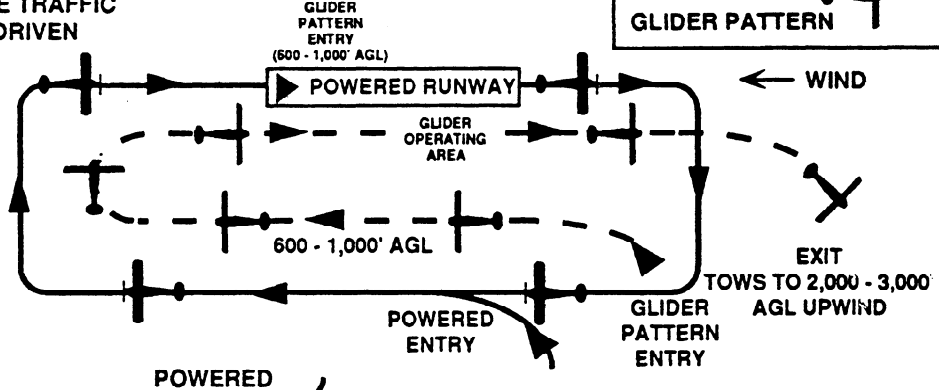


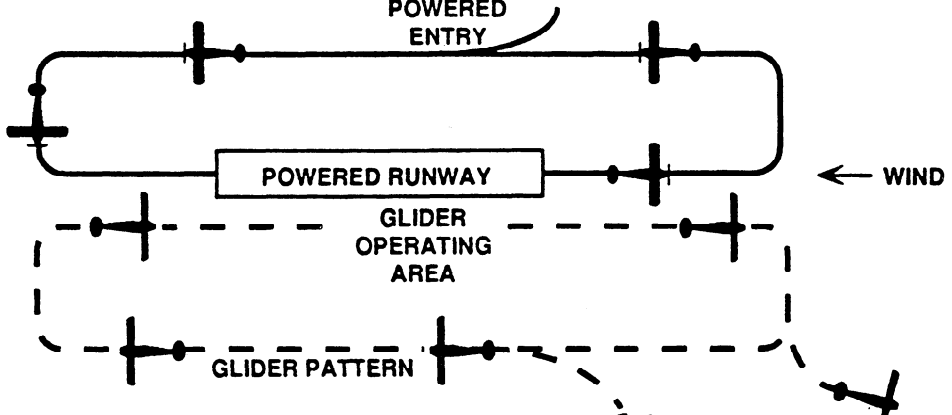

# GLIDER OPERATIONS

GLIDER PATTERN AND POWER PATTERN SAME SIDE OF RUNWAY

GLIDER PATTERN INSIDE TRAFFIC PATTERN FOR ENGINE-DRIVEN AIRCRAFT



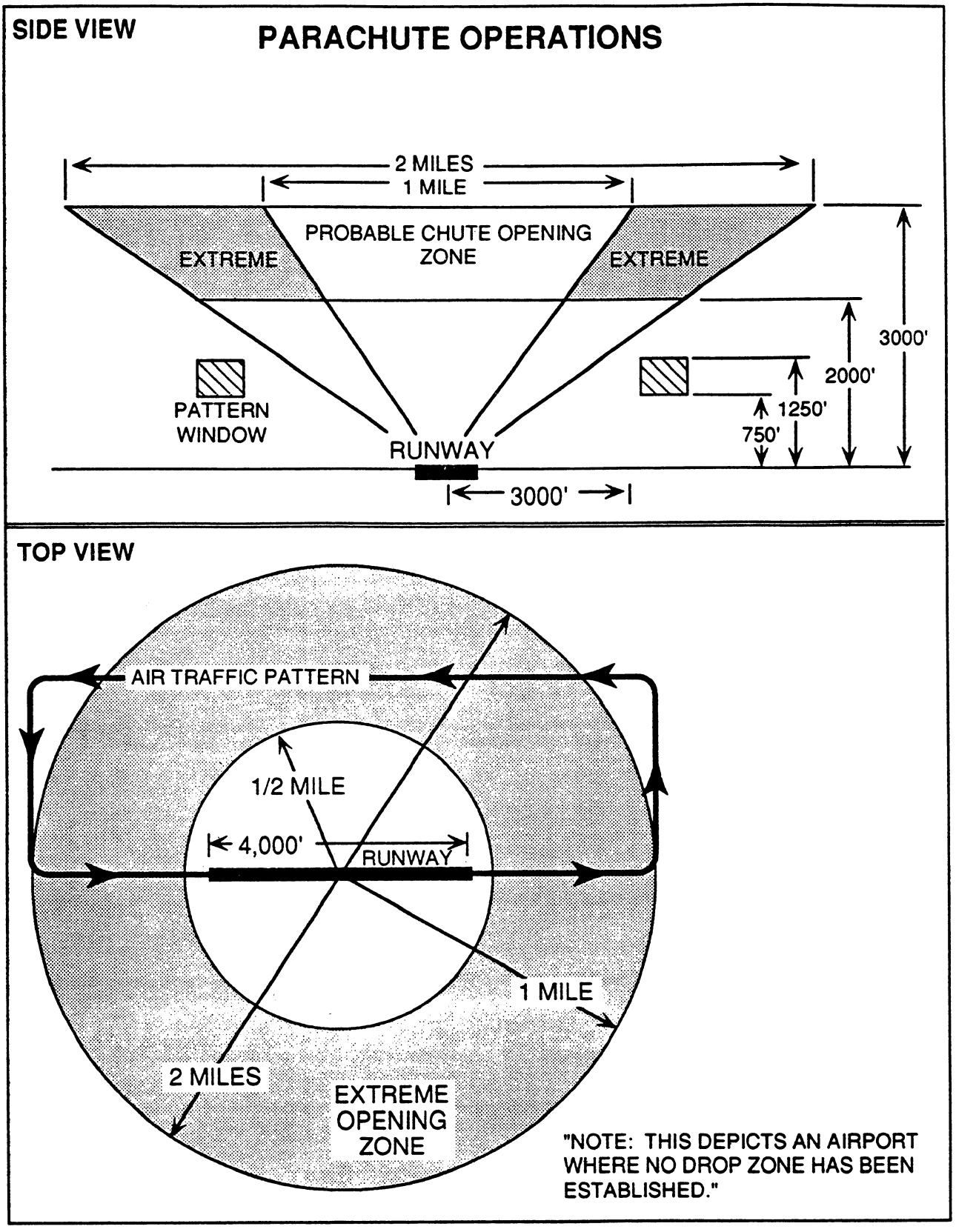

GLIDER PATTERN AND POWER PATTERN OPPOSITE SIDE OF RUNWAY

GLIDER PATTERN IS SEPARATE FROM POWERED RUNWAY

ENTRY 600 - 1,000' AGL

TOWS TO 2,000 - 3,000 FT. AGL UPWIND

# PARACHUTE OPERATIONS

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