

157th Air Refueling Wing
Flight Safety



Mid-Air Collision Avoidance
Program

PR: 157 ARW/SEF
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A Word From the 157th Air Refueling Wing Commander

Aviation Enthusiasts: Welcome to Pease Air National Guard Base's Mid-Air Collision Avoidance (MACA) program. We applaud and encourage your interest in making the skies around Pease ANGB a safer place to fly. The 157th ARW MACA program will provide you with valuable information to help you make your journey through our Seacoast airspace safe and mishap free.

Pease ANGB is home for the KC-135R 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 Risk Management Office at (603) 430-3487. The Flight Safety representatives will provide guidance to help resolve any problems. Thank you for your cooperation, time, and concern. FLY SAFELY!

//signed//

PAUL HUTCHINSON, Col, NHANG
Commander, 157th Air Refueling Wing



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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 Pease Air National Guard Base as safe a flying environment as possible.* Prepared jointly by the Flight Safety Office and Pease ANGB air traffic controllers, this pamphlet contains valuable information to manage flying in the Seacoast 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 Portsmouth Airport'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.

//signed//

JAMES E RAMSEY, Lt Col, NHANG
Chief of Risk Management

//signed//

JASON R. DENTON, Maj, NHANG
Flight Safety Officer

Pease ANGB Flying Mission and Flight Operations



Flying Mission

The Federal mission of the New Hampshire 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 Pease Air National Guard Base 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 157th Air Refueling Wing, Air Mobility Command's "North East Gateway," 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, Pease ANGB is a tenant on the Portsmouth International Airport at Pease in southeast New Hampshire, approximately 60 miles north of Boston, Massachusetts and 45 miles south of Portland, Maine. Our flight activities include homeland defense support missions, Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) missions, 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 Pease ANGB are particularly proud of their ability to respond to any tasking, worldwide. In order to maintain our readiness the 157th ARW flies a wide range of mission profiles at all hours. Our responsibilities also include the airfield providing support to other organizations and their aircraft. These circumstances create a dynamic flight environment with all types of aircraft and various flight profiles. Pease ANGB is active nearly every hour of every day supporting flight operations, and our aircrews are airborne almost every day of the year providing the type of quality mobility service customers have come to expect.



ATC Facilities and Services

FAA Boston Approach Control provides the overall approach/departure service to Portsmouth, 24 hours a day. The 260th Air Traffic Control Squadron (ATCS), NHANG, operates the Portsmouth Control Tower on a 24 hour basis and the Portsmouth Ground Controlled Approach (GCA) Monday through Friday from 0800-1700, and on UTA weekend Saturdays. The GCA can provide Precision Approach Radar (PAR) approaches to Runway 34 only, and Airport Surveillance Radar (ASR) approaches to either runway. They also provide vectors for all instrument and visual approaches. Aircraft requesting GCA services should request those services from Boston Approach Control or Portsmouth Tower.

Automatic Terminal Information Service (ATIS) is broadcast on frequencies 132.05 VHF and 273.5 UHF. The ATIS is normally turned off from 2400 to 0600 unless mission launches require it. Portsmouth Ground Control on 335.8 UHF or more commonly on 120.95 VHF provides clearance Delivery.

Navigational Aids available at Portsmouth include a VOR with DME, and ILS to either RWY. Only one ILS can be on at a time. The tower can select the opposite direction runway's ILS upon pilot request and traffic permitting.

Portsmouth Instrument Departures and Arrivals

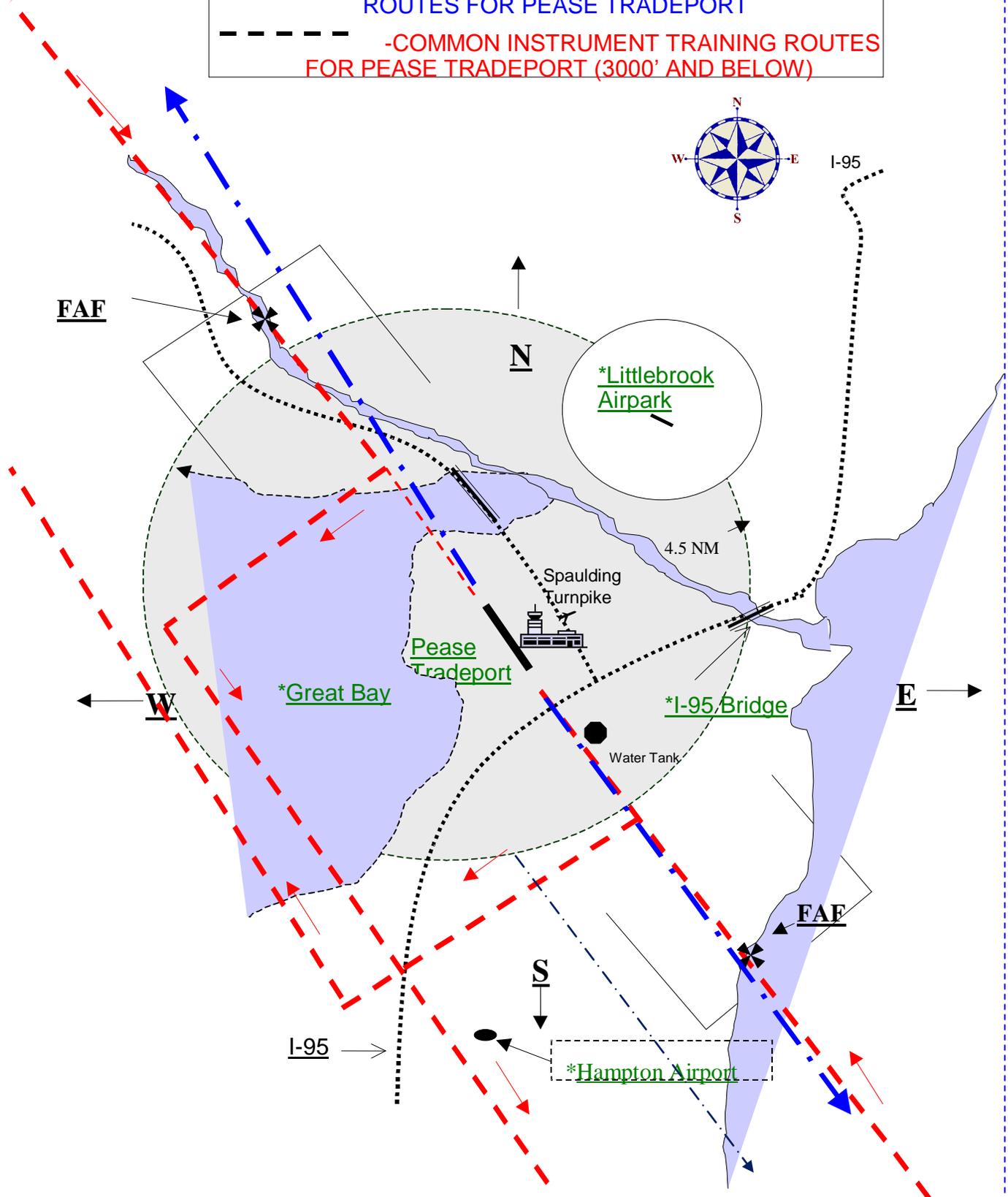
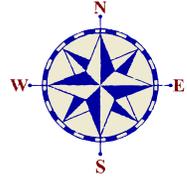
The Pease Two Departure is the primary departure path out of the Portsmouth airport. From RWY 34 the departure is RWY HEADING to 3000 feet MSL. From RWY16, a right turn to heading 220 at 1.5 DME is required. This turn occurs right over the I-95 highway. Pilots have the option of flying runway heading if they can not make the initial turn. VFR aircraft flying along the path of I-95 should use caution in the area because the pilots on the departure procedure are paying close attention to their instruments. Pilots who reject or can not fly the Pease Two Departure will be given the unpublished departure procedure, which is to fly runway heading, and maintain three thousand feet MSL for either RWY. Standard procedure for 157ARW and Tanker Task Force aircraft is to utilize the Tanker One Departure, which is basically RWY HEADING to 3000 feet MSL for RWY 34 and RWY 16.

There are a number of instrument arrival procedures to Portsmouth, but from a traffic standpoint, they follow two basic scenarios. The Precision Approach Radar and ILS approaches have a final approach course which runs straight to the runway, while the VOR and GPS approaches have a final approach course which is offset a little to the East. Again, these procedures require intense instrument work, and VFR pilots should use caution when traversing these final approach courses.



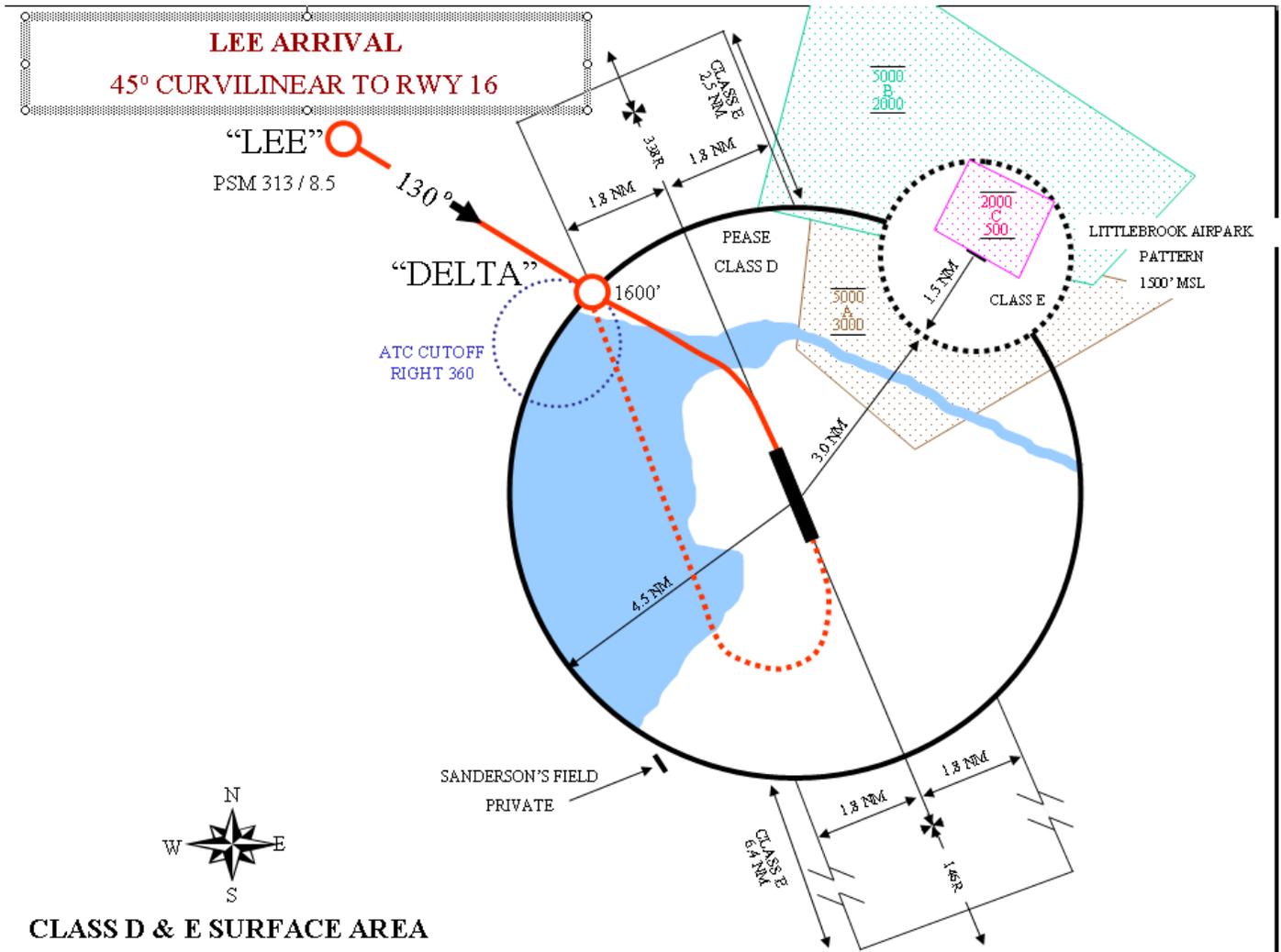
- - - - - -STANDARD INSTRUMENT DEPARTURE
ROUTES FOR PEASE TRADEPORT

- - - - - -COMMON INSTRUMENT TRAINING ROUTES
FOR PEASE TRADEPORT (3000' AND BELOW)

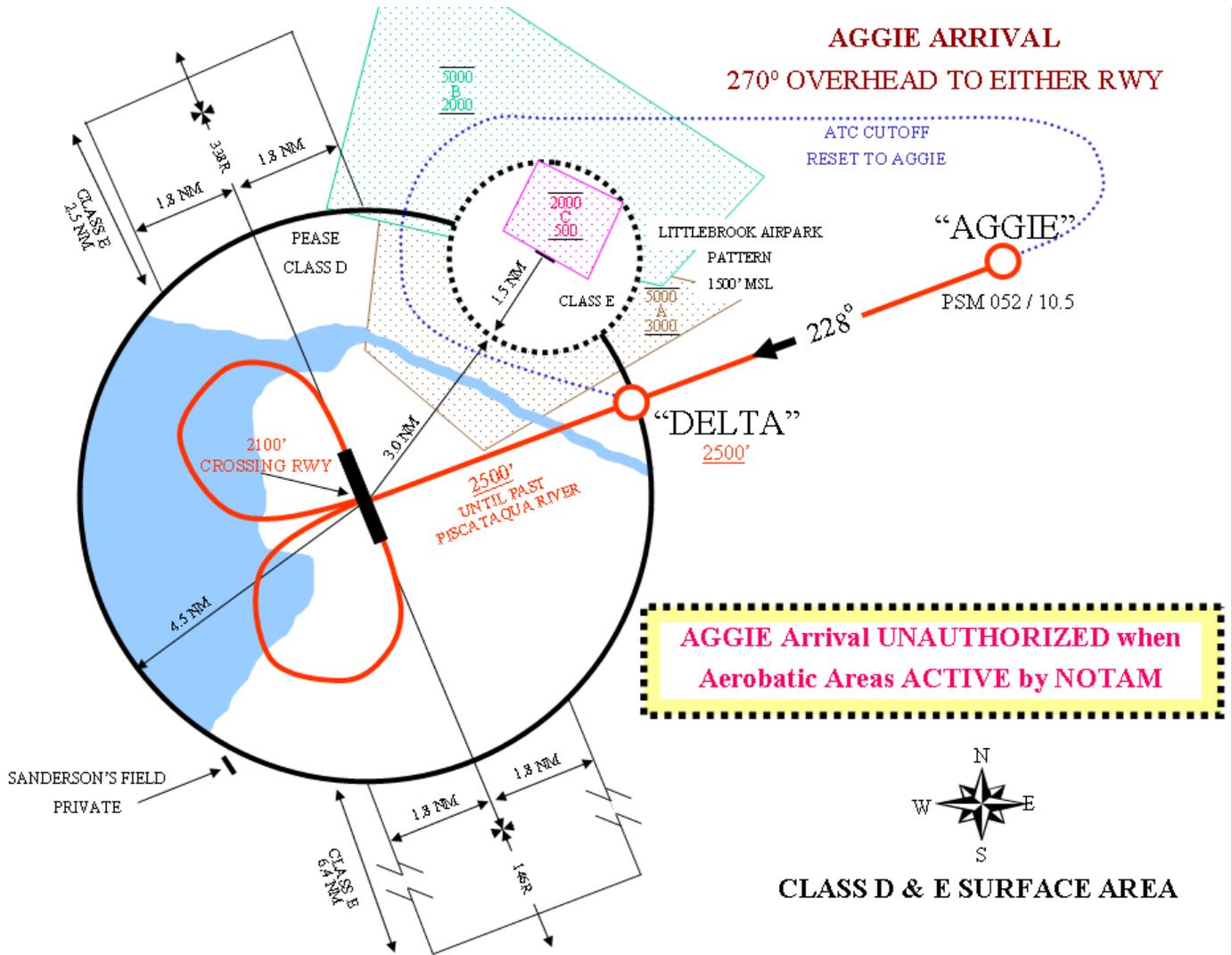


TACTICAL ARRIVALS USED AT PORTSMOUTH

The 157 ARW aircrews use the following arrivals into Portsmouth Airport as part of their required tactical training. All are flown under VFR conditions and will be called in to the Portsmouth Tower using their respective name. The point DELTA is used by the Portsmouth Tower to either clear the aircraft inbound or keep it outside the Class D airspace until spacing can be assured.



The LEE ARRIVAL is flown starting at the LEE, NH traffic circle and proceeding inbound on a 130 degree heading at 1600 ft AGL. Be aware that the KC-135R will be flying an arcing pattern close to the traffic circle to be properly aligned when heading inbound.

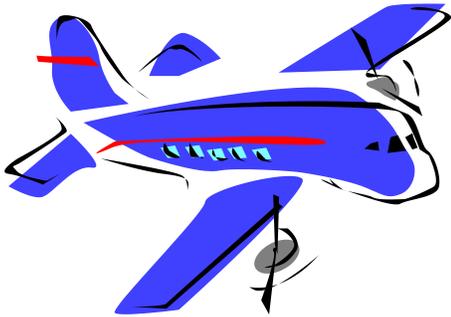


The AGGIE ARRIVAL begins over the top of Mount Agamenticus in York, Maine. The aircraft will proceed inbound on a 228 degree heading. It will remain at 2500 ft AGL until crossing over the Portsmouth Airport Runway. If the aircraft is not cleared in at Point DELTA it will make a right-hand turn and proceed back to Point AGGIE. This approach will not be authorized when the Littlebrook Aerobatic Area is hot.

Airspace Classification and Requirements

The Portsmouth Delta Surface Area includes the airspace within 4.5 NM of Portsmouth Airport, up to and including 2600 feet MSL. VFR aircraft flying through the area at 2400 feet and below must be in two-way radio communication with Portsmouth tower. VFR aircraft transiting the Class D at 2500 feet or 2600 feet should be in communication with Boston approach control. Separation services are not provided within the Class D to VFR aircraft and the "See and Avoid" principal is vital.

The area above and around the Portsmouth Delta Surface Area is all Class E airspace, until you reach the Surface Areas of Portland Maine (Class C), Manchester New Hampshire (Class C), or Boston (Class B). Located 4.4 NM Northeast of Portsmouth Airport is Littlebrook Airpark (uncontrolled). A 1.5 NM arc that intrudes into the Portsmouth Class D has been drawn around the Airpark. This airspace is Class E. Other uncontrolled airports in the area include Hampton Airfield, 200 Radial @ 7 miles, and Skyhaven 356 Radial @ 13 miles.



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 coastline. The coastline provides a major visual reference for anyone traveling up/down the New England states. The second condition is a "straight line" highway (I95) that provides guidance for the shortest distance between any North-South points. Both routes provide some of the most beautiful scenery in New England, however, both routes also cross perpendicular to Portsmouth Airport's primary runway final approach. 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 that 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 that 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 Portsmouth airspace at VFR altitudes above 3000 ft MSL to avoid the traffic pattern. If unable, plan to fly at 1500 ft or 2500 ft MSL to avoid co-altitude conflicts.

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, is now 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 you're 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 OUTSIDE!!!**

INTERNET SOURCES FOR MID-AIR AVOIDANCE: The Air National Guard Flight Safety Directorate has fielded a great website (<http://www.seeandavoid.org>) primarily designed for the General Aviation (GA) pilot community to increase situational awareness on military operations around the country. This site offers satellite map details of military airspace to include military airfields, low levels, special use airspace, Military Operations Area (MOAs), and historical data on midair/near midair collisions.

For more information on Pease Air National Guard Base and its flying environment, please go to www.seeandavoid.org and select PSM in NH.

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

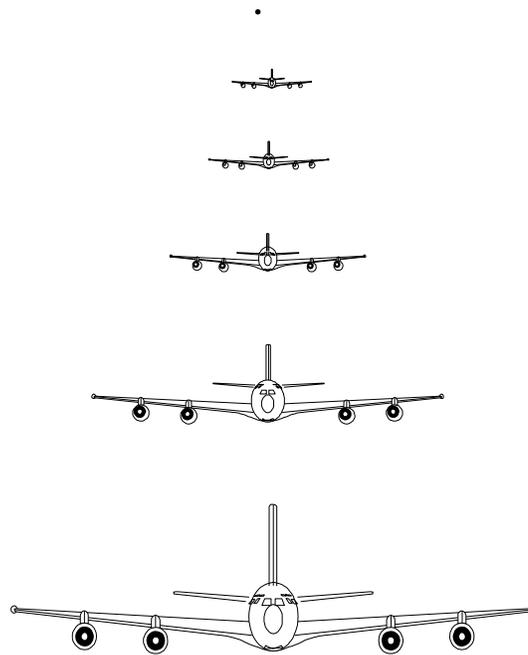
Take a good look!!

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 21,000 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 Pease'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

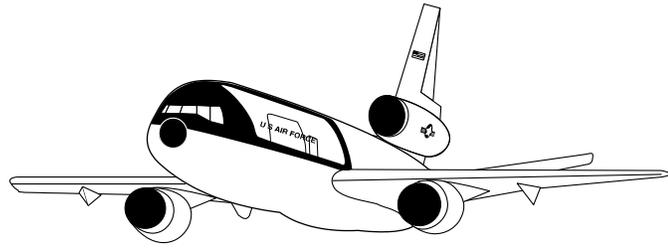
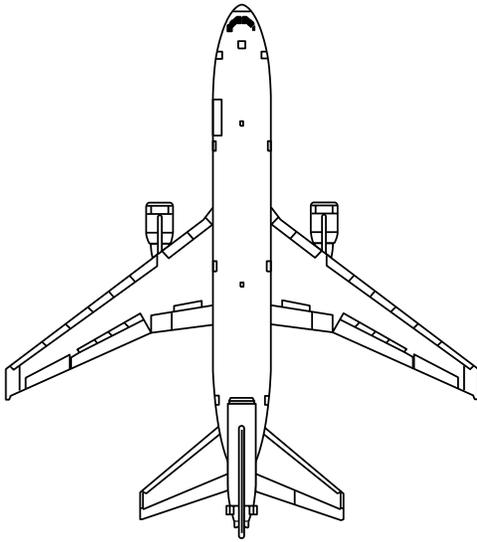
Max takeoff Weight: 300,000 lbs

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

Approach Speed: 120-180 KIAS

VHF radio: yes

TCAS: Yes



McDonnell Douglas KC-10 Extender

The KC-10 is a long range, high speed, three engine, jet tanker/transport aircraft. A KC-10 can cross the Atlantic Ocean loaded with 150,000 Lbs of cargo, offload 50,000 Lbs (7350 gallons) of fuel to airborne receivers, and still land in Europe with 20,000 Lbs of fuel remaining! The KC-10 can easily be identified by its vertical stabilizer mounted engine and large air refueling boom below the horizontal stabilizer. KC-10s can frequently be seen in Pease's IFR and VFR patterns. They fly at altitudes and airspeeds similar to KC-135s.

Wing Span: 165 Feet

Length: 182 Feet

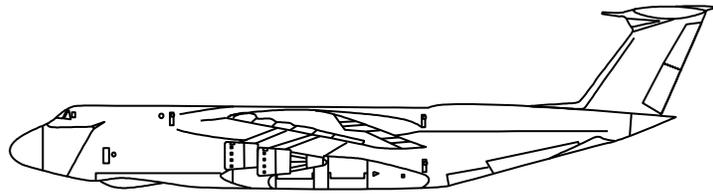
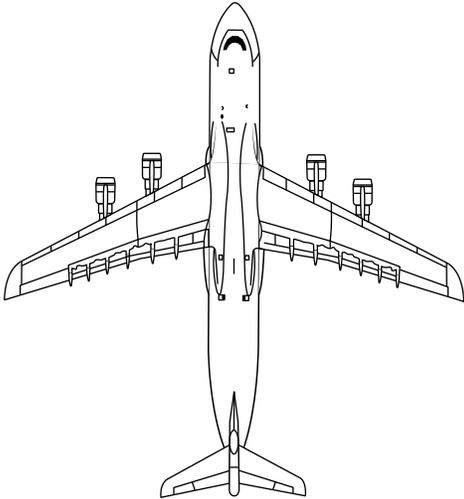
Maximum Takeoff Weight: 590,000 Lbs

Maximum Cruise Speed: 520 MPH at 42,000 Feet

VHF radio: yes

Approach Speed: Approx. 125-150 KIAS

Color: Dark grey, or green camouflage with white underbelly



Lockheed C-5 Galaxy

The C-5 is a long range, high speed, four engine jet transport aircraft. With takeoff weights in excess of 800,000 Lbs, the C-5 is similar in size to the Boeing 747. Like the 747, the C-5 is categorized as a heavy aircraft. With its large "T" tail and high wing configuration, its shape is similar to that of the C-141. Although not assigned to Pease, C-5's from neighboring Stewart ARB in New York, and Westover ARB in Massachusetts transit Pease ANGB frequently. The C-5 flies at altitudes and airspeeds similar to the KC-10 and C-141 but appears to move more slowly due to its large size.

Wingspan: 223 Feet

Length: 248 Feet

Maximum Takeoff Weight: 840,000 Lbs

Maximum Cruise Speed: 571 MPH at 25,000 Feet

Approach Speed: approx. 130-170 KIAS

VHF radio: yes

Color: Dark Grey



Sikorsky UH-60 Blackhawk

The UH-60 Blackhawk is a light lift utility helicopter utilized by all the US armed services. Locally, the UH-60 is flown by the New Hampshire Army National Guard. Blackhawks fly a variety of missions including search and rescue and distinguished visitor airlift. The Blackhawk has a four bladed main rotor. UH-60s often fly at altitude below 1000 feet AGL and are often seen in formation with other helicopters. They operate occasionally at Pease ANGB.

Main Rotor Diameter: 60 feet

Length: 80 feet

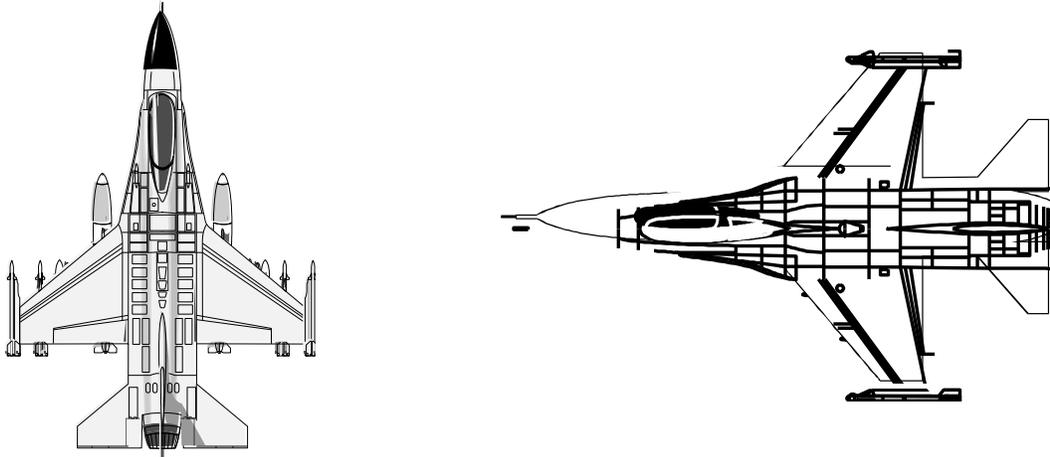
Maximum Takeoff Weight: 23,500 Lbs

Maximum Cruise Speed: 140 KIAS

Approach Speed: 120 KIAS

VHF radio: yes

Color: Dark or light Grey



General Dynamics F-16 Fighting Falcon

The F-16 is an all weather, single engine, single seat, multi-role fighter capable of speeds of MACH 2 +. It has a mid-wing configuration and a very tight turn radius. The 158 Fighter Wing (VTANG) flies F-16s out of Burlington International Airport. They usually fly in formation so if you see one, look for others! At certain times, these fighters can be seen in the Pease Class D airspace or performing training missions in and out of R-5002.

Wingspan: 33 feet

Length: 49 feet

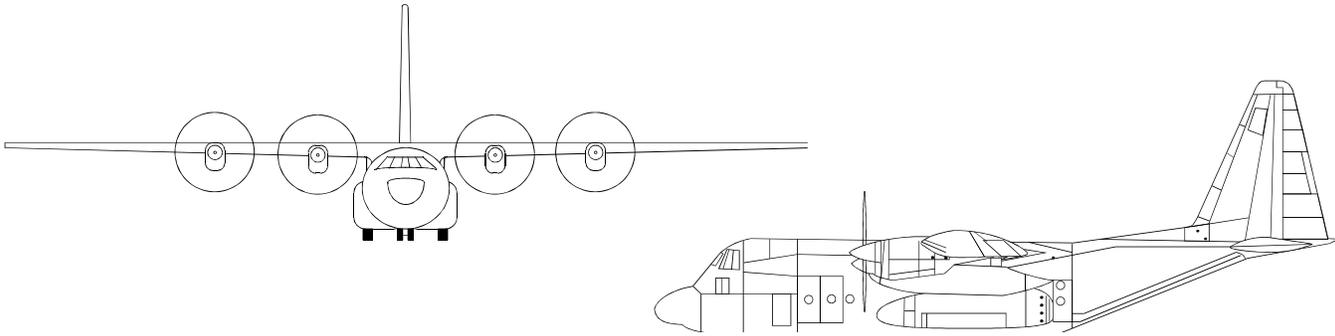
Maximum takeoff weight: 37,500 Lbs

Maximum cruise speed: 500+ MPH

Approach speed: 150 KIAS

VHF radio: yes

Color: Dark grey



Lockheed C-130 Hercules

The C-130 is a medium-range, low altitude, four engine, turboprop, transport aircraft. Although originally designed for short range tactical airlift of personnel and cargo, the C-130 has performed a wide variety of missions throughout its thirty year history. In addition to its airlift mission, the C-130 has been utilized in the tanker, airborne command post, rescue, and attack missions. The C-130 is approximately the size of the Boeing 737 and is easily recognized by its large vertical stabilizer and unique bullet shaped radome. On occasion, the C-130 will perform training missions in the local Class D airspace and along low level routes at airspeeds below 200 knots and in formation.

Length: 98 feet

Maximum Takeoff weight: 175,000 Lbs

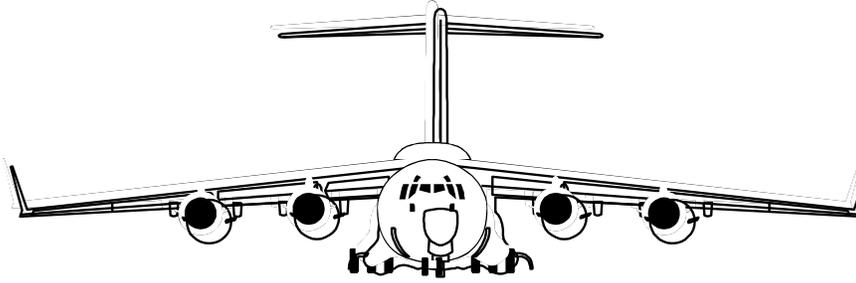
Maximum Cruise Speed: 374 MPH

Approach Speed: approx. 110-160 KIAS

VHF radio: yes

Color: Dark Grey, Dark Green Camouflage, High Gloss White/Grey,

Various other paint schemes on civilian versions



McDonnell Douglas C-17 Globemaster III

The C-17 is the Air Force's newest and most dynamic airlifter. With both strategic and tactical utility, the C-17 can deliver cargo and troops anywhere, anytime. With its high wing configuration and large "T" tail, the C-17 closely resembles the C-141 and C-5. The C-17 is currently stationed at Charleston AFB in South Carolina but may transit Pease ANGB on occasion.

Wingspan: 170 feet

Length: 166 feet

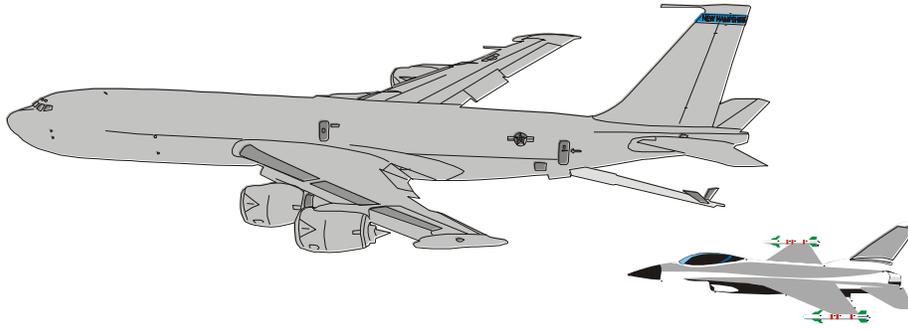
Maximum Takeoff Weight: 585,000 Lbs

Maximum Cruise Speed: 566 MPH

Approach Speed: Approx. 105 - 135 KIAS

VHF radio: yes

Color: Dark Grey



7. How to Obtain Additional Information

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

157th Air Refueling Wing Flight Safety

157 ARW/SE
Headquarters, 157th Air Refueling Wing
302 Newmarket Street
Pease ANGB, NH 0803-0157
Phone: (603) 430-3487

ATC Pilot/Controller Liaison

ATTN: Pilot/Controller Liaison
260th ATC Squadron
302 Newmarket Street, Bldg. 247
Pease ANGB, NH 0803-0157
Phone: (603) 430-3232

ATC Operations Manager

260th ATC Squadron/AT
302 Newmarket St Bldg 247
Pease ANGB, NH 0803-0157
Phone: (603) 430-3189

FAA Air Traffic Representative

FAA/AFREP
New England Region
12 New England Executive Park
Burlington, MA 01803
Phone: (DSN) 478-4447