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Manual

Official Guide to
Basic Flight Information and ATC Procedures

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pilot for accuracy. (To be valid for separation purposes by ATC, the accuracy of Mode C readouts must be verified. This is usually accomplished upon initial entry into the radar system by a comparison of the readout to pilot stated altitude, or the field elevation in the case of continuous readout being received from an aircraft on the airport.) When necessary to issue traffic advisories containing unverified altitude information, the controller will issue the advisory in the same manner as if it were verified due to the accuracy of these readouts. The pilot may upon receipt of traffic information, request a vector (heading) to avoid such traffic. The vector will be provided to the extent possible as determined by the controller provided the aircraft to be vectored is within the airspace under the jurisdiction of the controller.

2. Not radar identified

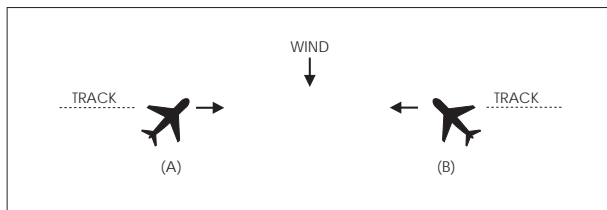
- (a) Distance and direction with respect to a fix;
- (b) Direction in which the target is proceeding; and
- (c) Type of aircraft and altitude if known.

EXAMPLE-

Traffic 8 miles south of the airport northeastbound, (type aircraft and altitude if known).

d. The examples depicted in the following figures point out the possible error in the position of this traffic when it is necessary for a pilot to apply drift correction to maintain this track. This error could also occur in the event a change in course is made at the time radar traffic information is issued.

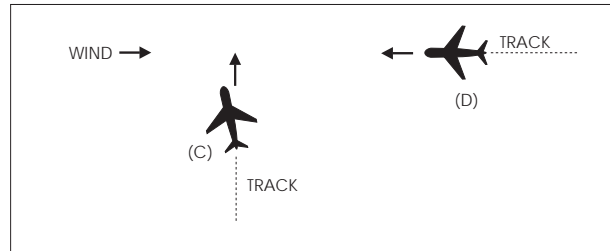
**FIG 4-1-1
Induced Error in Position of Traffic**



EXAMPLE-

In FIG 4-1-1 traffic information would be issued to the pilot of aircraft "A" as 12 o'clock. The actual position of the traffic as seen by the pilot of aircraft "A" would be 2 o'clock. Traffic information issued to aircraft "B" would also be given as 12 o'clock, but in this case, the pilot of "B" would see the traffic at 10 o'clock.

**FIG 4-1-2
Induced Error in Position of Traffic**



EXAMPLE-

In FIG 4-1-2 traffic information would be issued to the pilot of aircraft "C" as 2 o'clock. The actual position of the traffic as seen by the pilot of aircraft "C" would be 3 o'clock. Traffic information issued to aircraft "D" would be at an 11 o'clock position. Since it is not necessary for the pilot of aircraft "D" to apply wind correction (crab) to remain on track, the actual position of the traffic issued would be correct. Since the radar controller can only observe aircraft track (course) on the radar display, traffic advisories are issued accordingly, and pilots should give due consideration to this fact when looking for reported traffic.

4-1-16. Safety Alert

A safety alert will be issued to pilots of aircraft being controlled by ATC if the controller is aware the aircraft is at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain, obstructions or other aircraft. The provision of this service is contingent upon the capability of the controller to have an awareness of a situation involving unsafe proximity to terrain, obstructions and uncontrolled aircraft. The issuance of a safety alert cannot be mandated, but it can be expected on a reasonable, though intermittent basis. Once the alert is issued, it is solely the pilot's prerogative to determine what course of action, if any, to take. This procedure is intended for use in time critical situations where aircraft safety is in question. Noncritical situations should be handled via the normal traffic alert procedures.

a. Terrain or Obstruction Alert

1. Controllers will immediately issue an alert to the pilot of an aircraft under their control when they recognize that the aircraft is at an altitude which, in their judgment, may be in an unsafe proximity to terrain/obstructions. The primary method of detecting unsafe proximity is through Mode C automatic altitude reports.

EXAMPLE–

Low altitude alert Cessna Three Four Juliet, check your altitude immediately. And if the aircraft is not yet on final approach, the MVA (MEA/MIA/MOCA) in your area is six thousand.

2. Terminal Automated Radar Terminal System (ARTS) IIIA, Common ARTS (to include ARTS IIIE and ARTS IIE) (CARTS), Micro En Route Automated Radar Tracking System (MEARTS), and Standard Terminal Automation Replacement System (STARS) facilities have an automated function which, if operating, alerts controllers when a tracked Mode C equipped aircraft under their control is below or is predicted to be below a predetermined minimum safe altitude. This function, called Minimum Safe Altitude Warning (MSAW), is designed solely as a controller aid in detecting potentially unsafe aircraft proximity to terrain/obstructions. The ARTS IIIA, CARTS, MEARTS, and STARS facility will, when MSAW is operating, provide MSAW monitoring for all aircraft with an operating Mode C altitude encoding transponder that are tracked by the system and are:

- (a) Operating on an IFR flight plan; or
- (b) Operating VFR and have requested MSAW monitoring.

3. Terminal AN/TPX-42A (number beacon decoder system) facilities have an automated function called Low Altitude Alert System (LAAS). Although not as sophisticated as MSAW, LAAS alerts the controller when a Mode C transponder equipped aircraft operating on an IFR flight plan is below a predetermined minimum safe altitude.

NOTE–

Pilots operating VFR may request MSAW or LAAS monitoring if their aircraft are equipped with Mode C transponders.

EXAMPLE–

Apache Three Three Papa request MSAW/LAAS.

b. Aircraft Conflict Alert.

1. Controllers will immediately issue an alert to the pilot of an aircraft under their control if they are aware of another aircraft which is not under their control, at an altitude which, in the controller's judgment, places both aircraft in unsafe proximity to each other. With the alert, when feasible, the controller will offer the pilot the position of the traffic if time permits and an alternate course(s) of action.

Any alternate course(s) of action the controller may recommend to the pilot will be predicated only on other traffic being worked by the controller.

EXAMPLE–

American Three, traffic alert, (position of traffic, if time permits), advise you turn right/left heading (degrees) and/or climb/descend to (altitude) immediately.

4-1-17. Radar Assistance to VFR Aircraft

a. Radar equipped FAA ATC facilities provide radar assistance and navigation service (vectors) to VFR aircraft provided the aircraft can communicate with the facility, are within radar coverage, and can be radar identified.

b. Pilots should clearly understand that authorization to proceed in accordance with such radar navigational assistance does not constitute authorization for the pilot to violate CFRs. In effect, assistance provided is on the basis that navigational guidance information issued is advisory in nature and the job of flying the aircraft safely, remains with the pilot.

c. In many cases, controllers will be unable to determine if flight into instrument conditions will result from their instructions. To avoid possible hazards resulting from being vectored into IFR conditions, pilots should keep controllers advised of the weather conditions in which they are operating and along the course ahead.

d. Radar navigation assistance (vectors) may be initiated by the controller when one of the following conditions exist:

- 1. The controller suggests the vector and the pilot concurs.
- 2. A special program has been established and vectoring service has been advertised.
- 3. In the controller's judgment the vector is necessary for air safety.

e. Radar navigation assistance (vectors) and other radar derived information may be provided in response to pilot requests. Many factors, such as limitations of radar, volume of traffic, communications frequency, congestion, and controller workload could prevent the controller from providing it. Controllers have complete discretion for determining if they are able to provide the service in a particular case. Their decision not to provide the service in a particular case is not subject to question.

2. Be aware that this service is not always available and that many factors affect the ability of the controller to be aware of a situation in which unsafe proximity to terrain, obstructions, or another aircraft may be developing.

b. Controller.

1. Issues a safety alert if aware an aircraft under their control is at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain, obstructions or another aircraft. Types of safety alerts are:

(a) **Terrain or Obstruction Alert.** Immediately issued to an aircraft under their control if aware the aircraft is at an altitude believed to place the aircraft in unsafe proximity to terrain or obstructions.

(b) **Aircraft Conflict Alert.** Immediately issued to an aircraft under their control if aware of an aircraft not under their control at an altitude believed to place the aircraft in unsafe proximity to each other. With the alert, they offer the pilot an alternative, if feasible.

2. Discontinue further alerts if informed by the pilot action is being taken to correct the situation or that the other aircraft is in sight.

5-5-8. See and Avoid

a. **Pilot.** When meteorological conditions permit, regardless of type of flight plan or whether or not under control of a radar facility, the pilot is responsible to see and avoid other traffic, terrain, or obstacles.

b. Controller.

1. Provides radar traffic information to radar identified aircraft operating outside positive control airspace on a workload permitting basis.

2. Issues safety alerts to aircraft under their control if aware the aircraft is at an altitude believed to place the aircraft in unsafe proximity to terrain, obstructions, or other aircraft.

5-5-9. Speed Adjustments

a. Pilot.

1. Advises ATC any time cruising airspeed varies plus or minus 5 percent or 10 knots, whichever is greater, from that given in the flight plan.

2. Complies with speed adjustments from ATC unless:

(a) The minimum or maximum safe airspeed for any particular operation is greater or less than the requested airspeed. In such cases, advises ATC.

NOTE-

It is the pilot's responsibility and prerogative to refuse speed adjustments considered excessive or contrary to the aircraft's operating specifications.

(b) Operating at or above 10,000 feet MSL on an ATC assigned SPEED ADJUSTMENT of more than 250 knots IAS and subsequent clearance is received for descent below 10,000 feet MSL. In such cases, pilots are expected to comply with 14 CFR Section 91.117(a).

3. When complying with speed adjustment assignments, maintains an indicated airspeed within plus or minus 10 knots or 0.02 Mach number of the specified speed.

b. Controller.

1. Assigns speed adjustments to aircraft when necessary but not as a substitute for good vectoring technique.

2. Adheres to the restrictions published in FAA Order JO 7110.65, Air Traffic Control, as to when speed adjustment procedures may be applied.

3. Avoids speed adjustments requiring alternate decreases and increases.

4. Assigns speed adjustments to a specified IAS (KNOTS)/Mach number or to increase or decrease speed using increments of 10 knots or multiples thereof.

5. Terminates ATC-assigned speed adjustments when no longer required by issuing further instructions to pilots in the following manner:

(a) Advises pilots to "resume normal speed" when the aircraft is on a heading, random routing, charted procedure, or route without published speed restrictions.

(b) Instructs pilots to "comply with speed restrictions" when the aircraft is joining or resuming a charted procedure or route with published speed restrictions.

CAUTION-

The phraseology "comply with restrictions" requires compliance with all altitude and/or speed restrictions depicted on the procedure.