DEPARTMENT OF COMMERCE

CIVIL AERONAUTICS ADMINISTRATION

WASHINGTON

AIR TRAFFIC RULES

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MANUAL 60

UNITED STATES DEPARTMENT OF COMMERCE

Jesse H. Jones, Secretary

CIVIL AERONAUTICS ADMINISTRATION

Charles I. Stanton, Administrator

INTRODUCTION

Manual 60 has been issued as a supplement to Part 60 of the Civil Air Regulations. The issuance of the Part in simplified form makes it no longer necessary to publish a summary of the miscellaneous air traffic rules. The emergency regulations, as contained in Section 60.95 of the Civil Air Regulations are not covered in this manual. Consequently this manual deals only with those sections of Part 60 which pertain directly to air traffic control. It outlines, in easily understandable form, the procedures and phraseologies for both airport and airway traffic control.

It should be understood that while the procedures and phraseologies in this manual are not regulations in themselves, they have been set up as recommended practices which will provide for safety in the operation of aircraft.

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AIR TRAFFIC RULES

SECTION I

AIRPORT TRAFFIC CONTROL

GENERAL

All aeronautical activities at any airport, or landing area, and all flying of aircraft departing from or arriving at an airport in the air space which constitutes the control zone of the airport, shall be conducted in conformity with the current pertinent provisions of the Civil Air Regulations. (Note: The attention of pilots is invited to the provisions of Section 60.900 of the Civil Air Regulations, which explains under what circumstances non-observance of air traffic rules is not considered an infraction.)

Pilots should bear in mind that they have the privilege of asking for a change in instructions if in their opinion a course of action other than that requested by an air-traffic control-tower operator appears more desirable in the interest of safety.

When flying in contact flight rule weather conditions, it is considered the direct responsibility of the pilot to avoid collision with other aircraft. Under such conditions, the information and instructions issued by the control tower are intended to aid pilots to the fullest extent in avoiding collisions. In this connection a clearance issued by an airport traffic control tower (such as "CLEARED TO LAND") by either radio or visual signal is permissive in nature and does not relieve the pilot from exercising a reasonable degree of caution in executing the provisions of the clearance. However, such clearances will not be issued unless, in the opinion of the tower, the anticipated action can be safely completed from a collision standpoint if reasonable caution is exercised by the pilot.

Taxying

No person should taxi an aircraft until he has ascertained that there will be no danger of collision with any person or object in the immediate area and, when available, through information furnished by airport attendants.

No aircraft not equipped with adequate brakes should be taxied near buildings or parked aircraft unless an attendant is at a wing of the aircraft to assist the pilot.

At airports where a control tower is in operation, pilots should not taxi on to or across the runway in use until specifically cleared to do so by radio or visual signal.

At airports where a control tower is in operation, it is the duty of the pilot of an aircraft equipped with functioning two-way radio to initiate radio contact before starting to taxi and to maintain a continuous guard on the control tower frequency while on the landing area proper.

At airports where a control tower is in operation, pilots of aircraft not equipped with functioning two-way radio should not taxi without a clearance by radio or visual signal, provided, however, that this shall not prohibit sufficient movement of an outbound aircraft not equipped with a functioning transmitter to attract the attention of the airport traffic controller.

Landing and Take-Off

Pilots of aircraft shall not land or take-off at a landing area where an airport traffic control tower is in operation without a clearance by radio or visual signal from the tower.

Traffic and Taxi Patterns

Airport traffic control tower personnel are guided by certain standards in the control of air traffic to insure the orderly flow of traffic on the landing area and in the airspace surrounding the landing area. These standards take the form of definite patterns for the landing area concerned, and all follow the same general form. The airport traffic controllers issue such specific instructions to individual aircraft as are necessary to insure that the aircraft generally follow the desired flow of aircraft flying contact below 1500 feet above the ground in the control zone during specified wind conditions (traffic patterns), and the flow of aircraft on the ground at the landing area during specified wind conditions (taxi patterns).

The traffic and taxi patterns are prepared by the Civil Aeronautics Administration in collaboration with local representatives of the airport management, the military services, the air carriers concerned, and with any other aircraft operator concerned. These patterns, on which the controller will base his instructions to obtain the desired flow of aircraft, are made known to the local aviation interests concerned who follow them as a matter of safety and good practice.

It is not expected that itinerant pilots (either military or civil) will be fully familiar with all the details of all the traffic patterns at each individual airport, and every effort is made to eliminate instructions to itinerant aircraft which would require unusual procedures by the itinerant aircraft.

For uniformity of interpretation the symbols in Figure 1 are used on all Civil Aeronautics Administration charts of traffic and taxi patterns.

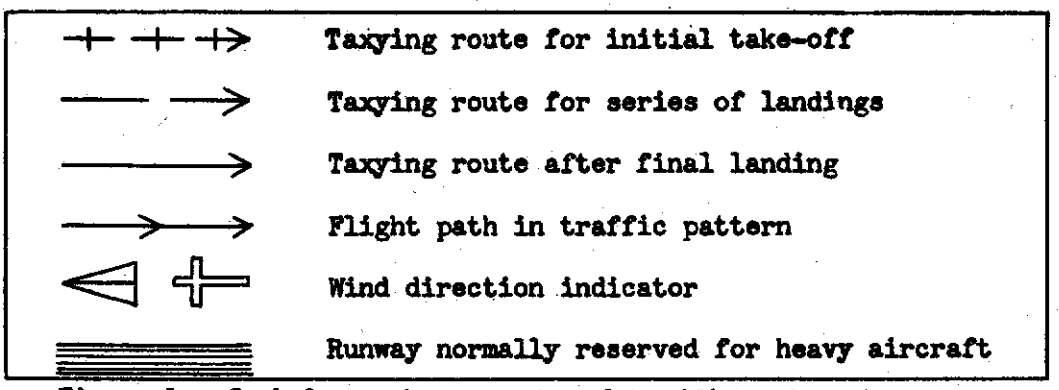

Figure 1. Symbols used on charts of traffic and taxi patterns.

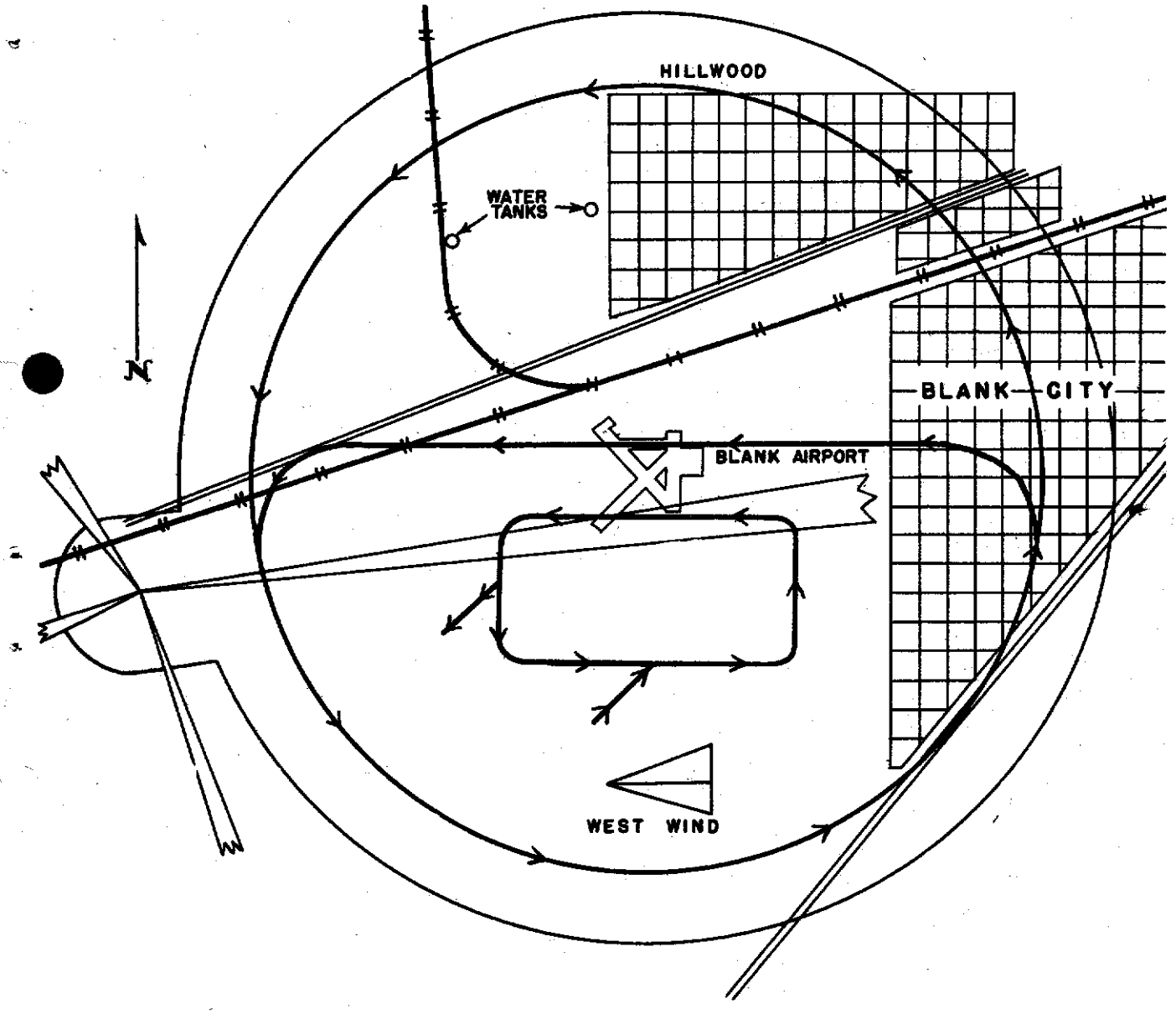

Figure 2. Example of traffic pattern for west wind in Blank Control Zone

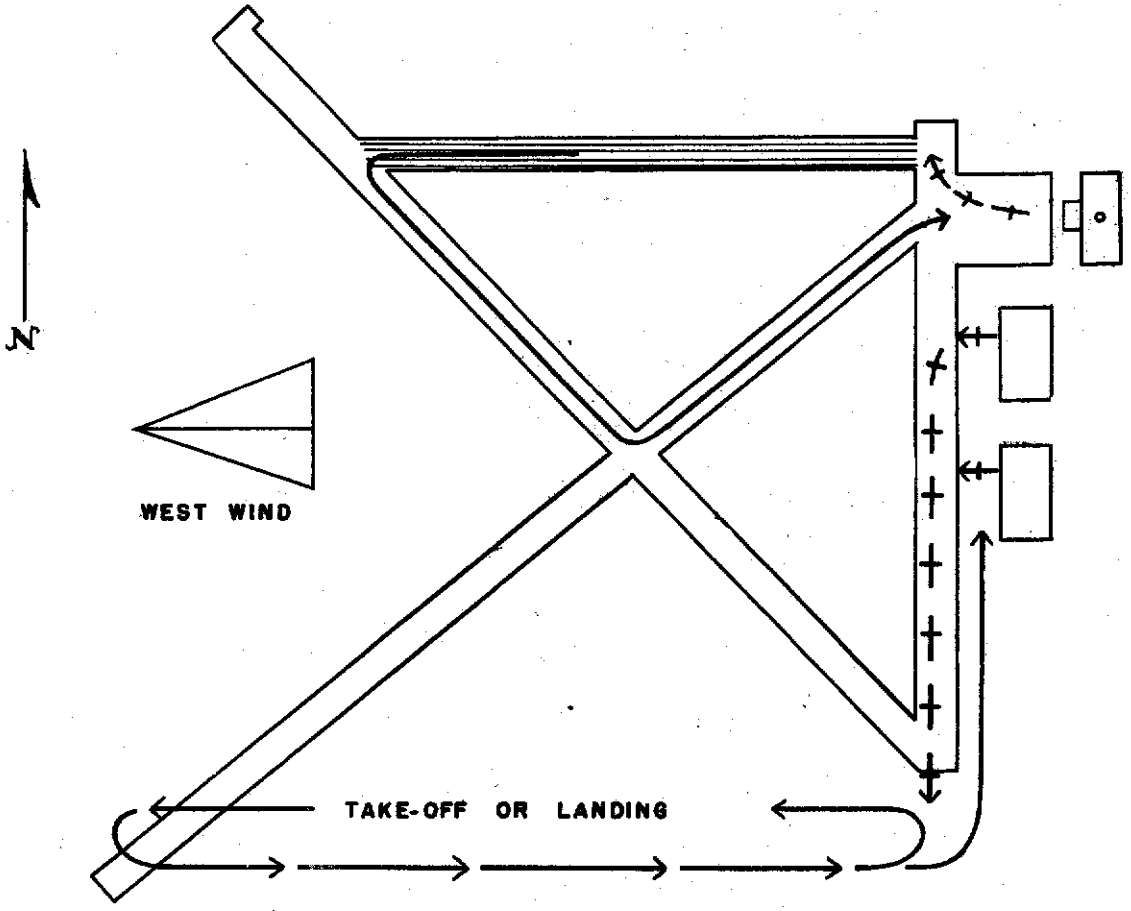

Figure 3. Example of taxi pattern for west wind

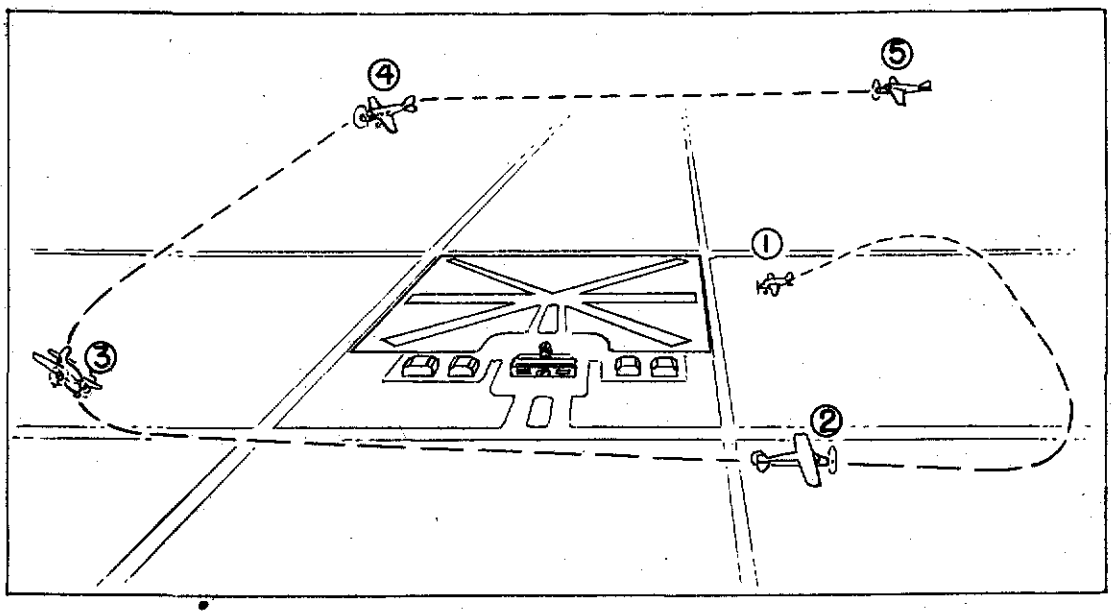

Figure 4. Position of aircraft operating in a traffic pattern

LIGHT SIGNAL PROCEDURES FOR AIRPORT TRAFFIC CONTROL

The following procedures are observed by airport traffic control towers in the control of aircraft not equipped with radio. These same procedures will be used to control aircraft equipped with radio if radio contacts cannot be established. (Note: It should be understood that pilots may proceed in a conventional manner if no signals are displayed.)

Airport traffic control personnel use a small, portable, directive traffic control signal which emits an intense narrow beam of a selected color (either red or green) when controlling traffic by light signals. The normal range of the signal in ordinary weather is ten miles in daytime and fifteen miles at night and is readily discernible to the pilot of any aircraft that is visible to the controller.

Although the portable traffic signal light offers the advantage that some control may be exercised over non-radio equipped aircraft, all pilots should be cognisant of the disadvantages which are:

(1) The pilot may not be looking at the control tower at the time a signal is directed towards him.

(2) The instructions transmitted by a light signal are very limited since only approval or disapproval of a pilot's anticipated actions may be transmitted. No supplementary or explanatory information may be transmitted except by the use of the "General Warning Signal" which advises the pilot to be on the alert."

Aircraft Inbound

When an aircraft is in flight:

A green light from a directed traffic control light will mean. "CLEARED TO LAND."

A red light from a directed traffic control light will mean, "GIVE WAY TO OTHER AIRCRAFT AND CONTINUE CIRCLING."

During the hours of darkness, a pilot wishing to land should turn on a landing light as he approaches the airport unless he has already been given a green light.

A series of flashes of a landing light by a pilot intending to land will mean:

(a) If the floodlight is on, the pilot wants it turned off.

(b) If the floodlight is off, the pilot wants it turned on.

Pilots should acknowledge light signals by rocking their wings during the hours of daylight, or by blinking their landing lights during the hours of darkness.

Aircraft on the Airport

During the hours of darkness, a pilot wishing to attract the attention of the air-traffic control-tower operator should turn on a landing light and taxi the aircraft in position so that the light is visible to the tower operator. The landing light should remain on until appropriate signals are received from the tower.

When a pilot is taxying:

A red light from a directed traffic control light will mean, "STOP".

A series of red flashes from a directed traffic control light will mean that the pilot is to taxi back to the hangar line.

A series of green flashes from a directed traffic control light will mean, "CLEARED TO CONTINUE TAXYING."

When a pilot is in position for take-off:

A red light from a directed traffic control light will mean, "CLEAR THE RUNWAY IMMEDIATELY, AND WAIT."

A green light from a directed traffic control light will mean, "CLEARED FOR TAKE-OFF."

Pilots should acknowledge light signals by moving the ailerons or rudder during the hours of daylight or by blinking the landing lights during the hours of darkness.

General Warning Signal

A series of alternating red and green flashes from a directed traffic control light will be used as a general warning signal to advise a pilot to be on the alert for hazardous or unusual conditions.

Suspension of Contact Flight Rule Operations

During the hours of daylight or darkness, flashing lights outlining the traffic direction indicator (tetrahedron, wind tee or other device) will mean that flying in accordance with contact flight rules has been suspended. At landing areas not equipped with a traffic direction indicator, the lighting of the rotating beacon, during the hours of daylight, will mean that flying in accordance with contact flight rules has been suspended.

Clockwise (to the right) Flow of Traffic in the Airport Zone

A flashing amber light on the control tower will mean that a clockwise flow of traffic is required.

Forced Landing Signal

When an aircraft is forced to land at night at an airport, it shall signal its forced landing by making a series of short flashes with its navigation lights, if practicable to do so.

RADIOTELEPHONE COMMUNICATION PROCEDURE AND TECHNIQUE

The following phraseologies and procedures shall be used in all radiotelephone communications with aeronautical ground stations.

A uniform flow of language without hesitation is necessary in order that each word may be heard distinctly. The position and distance of the speaker from the microphone should not be changed during the transmission. Pilots should endeavor to prevent any break in the continuity of the message. Each syllable of each word should be enunciated clearly and distinctly.

It is suggested that pilots observe and adopt the speech rate of ground operators whose messages are most easily understood.

Identification of Ground Stations

Control towers shall be identified during radiotelephone communications by the name of the station followed by the word "TOWER" as, for example, "CHICAGO TOWER," "WASHINGTON TOWER," etc.

Civil Aeronautics Administration airways communication stations shall be identified by the name of the station followed by the word "RADIO" as, for example, "CLEVELAND RADIO," "PITTSBURGH RADIO," etc.

United States Army airways communication stations shall be identified by the name of the station followed by the term "ARMY AIRWAYS" as, for example "PITTSBURGH ARMY AIRWAYS," "LANGLEY ARMY AIRWAYS," etc., to avoid confusion with civil airway stations.

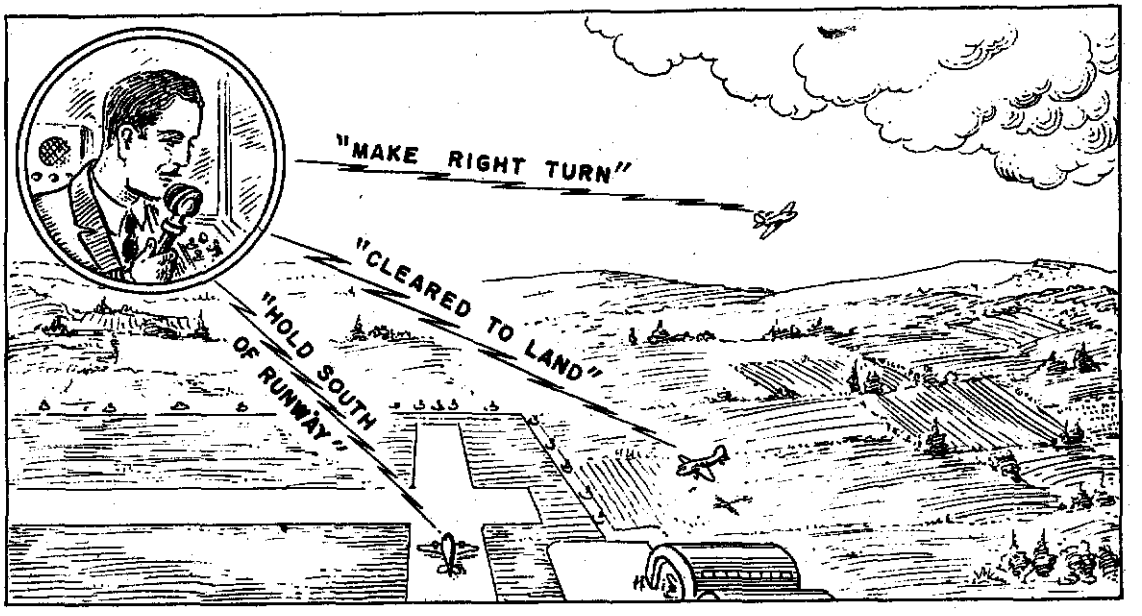

Figure 5. Airport traffic controller issues instructions (traffic clearances) to prevent collisions

Identification of Aircraft

Aircraft shall be identified during radiotelephone communications in the following manner:

Itinerant civil - (Make) - (certificate number) e.g.,
"STINSON ONE, TWO THREE, SIX, FIVE"
"WACO SIX, EIGHT, FOUR, SEVEN, FOUR"

Air carrier - (Abbreviated name of company) - (flight or trip number) e.g.,
"UNITED FIFTEEN"
"AMERICAN SIX"
"EASTERN TWENTY FIVE"

(Note: Air carrier flight or trip numbers are spoken as a group figure instead of a serial number as in the case of other aircraft identification numbers.)

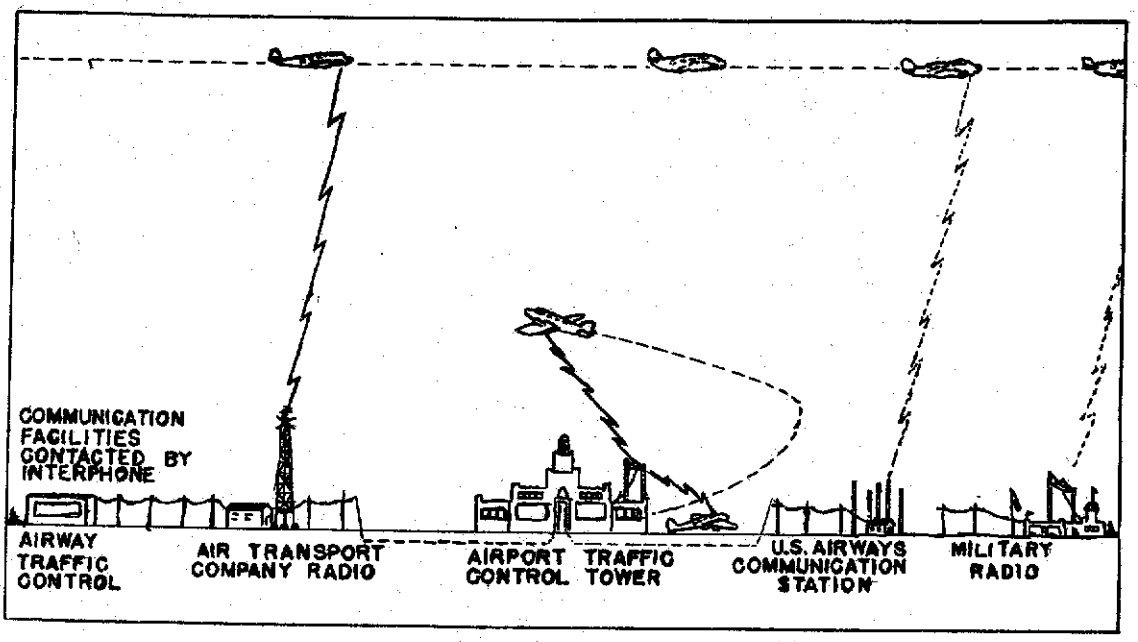

Figure 6. Radio and land line communications facilities

Army - (Army) - (Army serial number) e.g.,
"ARMY SIX SEVEN TWO THREE"
"ARMY EIGHT ONE FIVE NINE"

Navy - (Navy) - (Navy serial number) e.g.,
"NAVY EIGHT, THREE, FOUR, FIVE"
"NAVY ZERO, FOUR, TWO, ONE"

(Note: The name of the pilot should not ordinarily be utilized in routine two-way communication.)

Call-up and Replies

The call-up procedure to be used in air traffic control radiotelephone communications shall consist of the following:

Item		Example
(a)	Designation of the station called	WACO ONE EIGHT ONE FOUR THREE
(b)	THIS IS	THIS IS
(c)	Designation of the calling station	CLEVELAND TOWER
(d)	Invitation to reply	OVER

The reply to an initial call-up shall consist of:

	Item	Example
(a)	Designation of the station called	CLEVELAND TOWER
(b)	THIS IS	THIS IS
(c)	Designation of the answering station	WACO ONE EIGHT ONE FOUR THREE
(d)	Invitation to reply	OVER

Communication shall be initiated by call-up and reply when:

(a) Communication has not been established
(b) Previous contact has been terminated

After contact has been established in accordance with the above a second call-up, followed immediately by the message, should be made in accordance with the following:

	Item	Example
(a)	Designation of the station called	WACO ONE EIGHT ONE FOUR THREE
(b)	THIS IS	THIS IS
(c)	Designation of the calling station	CLEVELAND TOWER
(d)	Body of the communication	(Message)
(e)	Invitation to reply	OVER

(Note: When no chance of mistaking the identity of the ground station is likely, the "THIS IS" and the name of the ground station may be omitted after the original contact has been made.)

If it is reasonably certain that the aircraft will receive the initial call-up, an airport traffic control tower may follow the first call-up with the message without waiting for a reply from the aircraft. However, pilots of aircraft should remember that an airport traffic control tower may be receiving messages from several aircraft simultaneously, and therefore the pilot should always receive an "invitation to reply" (OVER) from the tower before proceeding with a message.

After communication has been definitely established continuous intercommunication may be conducted without further call-up or identification other than preceding message with the aircraft identification of the aircraft concerned until termination of the contact.

Termination of Communication

An aircraft shall acknowledge receipt of a radiotelephone message by transmitting the AIRCRAFT IDENTIFICATION followed by the word "ROGER". The word "OUT" shall also be used when a conversation is ended and no response is expected.

Examples: "STINSON FOUR TWO THREE ONE FIVE, ROGER, OUT".
"ARMY SIX SEVEN TWO FIVE, ROGER, OUT."

(Note: It is usually unnecessary to identify the ground station concerned as no mistake in ground station identity is likely, but the aircraft concerned should be identified in every instance to prevent any possible mistake in aircraft identity.)

The phrase contraction "WILCO" (will comply) shall be utilized to indicate that the receiving station (aircraft or ground station) will comply with the instructions or requests contained in a message received from the sending station. When utilized, this phrase contraction will take the place of the acknowledgement "ROGER."

Example: "FAIRCHILD THREE SIX SEVEN ZERO ONE, WILCO, OUT".

The phrase "SAY AGAIN" to indicate that instructions or information has not been received, and the word "WAIT" to indicate that a return call will be made as soon as practicable, may be utilized instead of the word "ROGER" when appropriate.

Statement of Figures in Radiotelephone Transmissions

Figures utilized to indicate ceiling heights, flight levels, and upper air levels in numbers smaller than 12,000 shall be spoken in even hundreds and thousands of feet. These figures in the number 13,000 and larger numbers shall be spoken as, for example, "ONE THREE THOUSAND."

Number	Statement
500	FIVE HUNDRED
1,300	ONE THOUSAND THREE HUNDRED
4,500	FOUR THOUSAND FIVE HUNDRED
10,000	TEN THOUSAND
12,000	TWELVE THOUSAND
13,000	ONE THREE THOUSAND

All serial figures, such as aircraft identification numbers (except air carrier flight numbers), shall be spoken individually as follows:

Number	Statement
18143	ONE EIGHT ONE FOUR THREE
26075	TWO SIX ZERO SEVEN FIVE

The figure "0" shall be spoken "ZERO" when it occurs alone or in a group of serial figures.

Statement of Time

Time shall be stated in exactly four figures utilizing the twenty-four hour clock basis. The hour shall be stated by the first two figures and the minutes by the last two figures as follows:

Time	Statement
0000 (Midnight)	ZERO ZERO ZERO ZERO
0920 (9:20 AM)	ZERO NINE TWO ZERO
1200 (Noon)	ONE TWO ZERO ZERO
1643 (4:43 PM)	ONE SIX FOUR THREE

Time may be stated in minutes only (two figures) in airport traffic control radiotelephone communications when no misunderstanding of the hour is likely to occur.

The twenty-four hour clock day begins and ends at 0000 (midnight). The last minute of the last hour begins at 2359 and ends at 0000, which is the beginning of the first minute ending at 0001 of the first hour of the next day.

Statement of Field Elevations

Field elevations shall be stated in feet in accordance with the following examples:

10 ft. - FIELD ELEVATION ONE ZERO
75 ft. - FIELD ELEVATION SEVEN FIVE
583 ft. - FIELD ELEVATION FIVE EIGHT THREE
600 ft. - FIELD ELEVATION SIX HUNDRED
1,850 ft. - FIELD ELEVATION ONE EIGHT FIVE ZERO
2,500 ft. - FIELD ELEVATION TWO THOUSAND FIVE HUNDRED

Aircraft Departing

The pilot shall call the control tower when ready to taxi out. The body of this message should include:

"READY TO TAXI. DEPARTING FOR (destination or nature of flight)" or

"HERE IS MY FLIGHT PLAN" (if flight plan has not been previously submitted)

Example:

Aircraft: "TULSA TOWER THIS IS WACO ONE, THREE, ONE, FIVE, NINE. READY TO TAXI, DEPARTING FOR ST. LOUIS. OVER."

Tower: "WACO ONE, THREE, ONE, FIVE, NINE CLEARED TO RUNWAY THREE SIX. WIND NORTH EIGHT. ALTIMETER THREE, ZERO, ZERO, FOUR. TIME ZERO NINE FIVE SIX."

If an airway traffic control clearance is necessary, the airport traffic controller will relay the clearance to the pilot as follows:

Tower: "WACO ONE, THREE, ONE, FIVE, NINE, ATC CLEARS YOU TO NEOSHO TO CRUISE AT FIVE THOUSAND FEET. OVER."

Aircraft: "WACO ONE, THREE, ONE, FIVE, NINE, CLEARED TO NEOSHO TO CRUISE AT FIVE THOUSAND. WILCO. OVER".

Tower: "WACO ONE, THREE, ONE, FIVE, NINE, ROGER."

After the airway traffic control clearance has been issued and acknowledged, and the aircraft is ready to take-off, the airport traffic controller will issue the take-off clearance:

Tower: "WACO ONE, THREE, ONE, FIVE, NINE, LOCAL TRAFFIC AMERICAN DOUGLAS THREE MILES EAST AT SEVEN HUNDRED LANDING TULSA. CLEARED FOR TAKE-OFF. OVER."

Aircraft: "WACO ONE, THREE, ONE, FIVE, NINE, ROGER. OUT."

After the take-off the pilot normally has no occasion to use his transmitter again except to acknowledge receipt of further information or instructions from the control tower.

The pilot should continue to guard the control tower frequency until a clearance to leave control tower frequency has been issued by the airport traffic controller. In case such a clearance is not received, the pilot may change over to radio range frequency when he leaves the airport control zone.

Aircraft Arriving

A pilot of an arriving aircraft should call the control tower for local traffic information and landing instructions when approximately 15 miles from the airport of destination if contact at this point. If not contact, the pilot should call the tower as soon thereafter as ground contact is established.

The body of the message should include:

(a) Geographical position
(b) Time (Optional)
(c) Flight altitude of the aircraft
(d) Contemplated course if flight is not being conducted in accordance with approved flight plan
(e) Request for information or instructions - if pertinent

Example:

Aircraft: "CLEVELAND TOWER THIS IS STINSON ONE, FOUR, ONE, FIVE, SEVEN, ELYRIA TWO FIVE AT THREE THOUSAND LANDING AT CLEVELAND. OVER."

The airport traffic control tower will then acknowledge this message and issue a "clearance to enter traffic pattern". This clearance informs the pilot that traffic exists in the traffic pattern (otherwise the aircraft would have been "cleared to land"), authorizes the entry into the traffic pattern, but does not constitute landing authority. Wind information and number of runway in use is included in this clearance to assist the pilot in making his approach for entry into the traffic pattern, but clearance to land is ordinarily withheld until the aircraft is in sight of the control tower and no conflicting traffic will interfere with the landing.

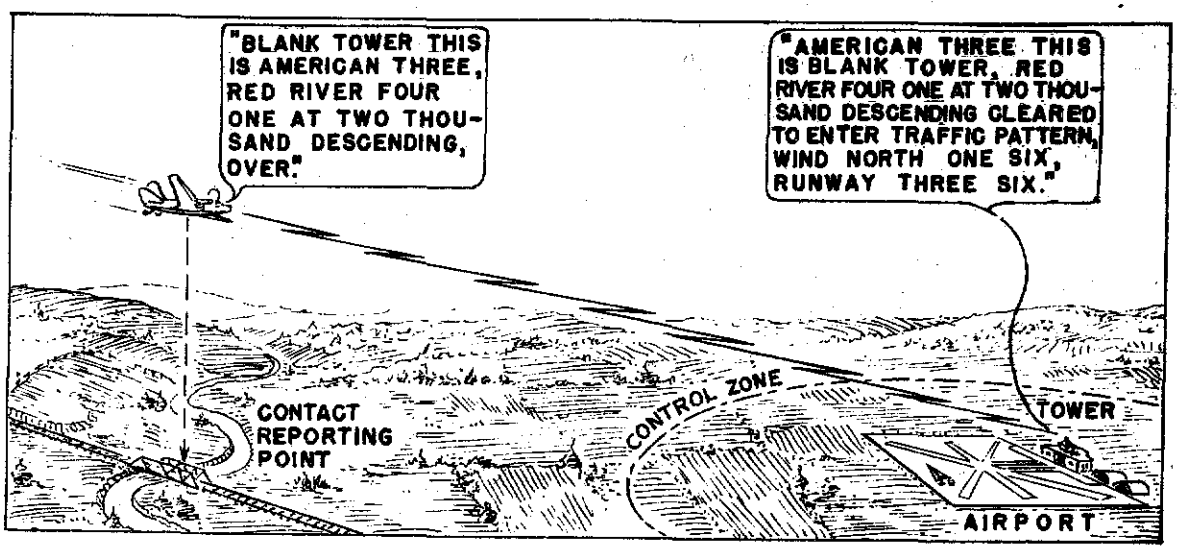

Figure 7. Pilot reports to the tower when approximately 15 miles from the airport

Example:

Tower: "STINSON ONE, FOUR, ONE, FIVE, SEVEN, ELYRIA TWO FIVE AT THREE THOUSAND. CLEARED TO ENTER TRAFFIC PATTERN. WIND SOUTH ONE FOUR, RUNWAY ONE EIGHT. OVER."

Aircraft: "STINSON ONE, FOUR, ONE, FIVE, SEVEN, ROGER."

A clearance to land is given after a pilot reports in the control zone or when he is sighted from the control tower. The pilot should report to the control tower immediately on entry into the traffic pattern if the control tower has not previously sighted the aircraft and issued landing instructions. The pilot reports:

"CLEVELAND TOWER THIS IS STINSON ONE, FOUR, ONE, FIVE, SEVEN, THREE MILES WEST OF FIELD AT EIGHT HUNDRED, OVER."

The tower replies by issuing landing clearance if practicable, or suitable instructions:

"STINSON ONE, FOUR, ONE, FIVE, SEVEN, THREE MILES WEST OF FIELD AT EIGHT HUNDRED. CLEARED TO LAND. MAKE RIGHT TURN IN."

Wind information and runway number have again been supplied if a revision to the information previously given had been necessary. The aircraft acknowledges and indicates compliance with instructions to make right turn by:

"STINSON ONE, FOUR, ONE, FIVE, SEVEN, WILCO."

If one or more preceding aircraft are approaching for a landing, or are in the traffic pattern waiting for landing instructions, the airport traffic controller will issue a landing sequence number in lieu of the instruction "CLEARED TO LAND", as follows:

"STINSON ONE, FOUR, ONE, FIVE, SEVEN, THREE MILES WEST OF FIELD AT EIGHT HUNDRED. YOU ARE NUMBER TWO TO LAND. MAKE RIGHT TURN IN. ARMY TRANSPORT MAKING RIGHT TURN INTO FIELD FROM NORTHWEST."

After the preceding aircraft completes landing, the airport traffic controller will then issue clearance to land, as follows:

"STINSON ONE, FOUR, ONE, FIVE, SEVEN, CLEARED TO LAND."

After a pilot has landed, the airport traffic controller will furnish any necessary information on other aircraft landing or taking off and will issue any necessary instructions relative to taxying. This control will be continued until the pilot has parked his aircraft.

Example:

Tower: "STINSON ONE, FOUR, ONE, FIVE, SEVEN CLEARED TO GATE THREE."

Aircraft: "STINSON ONE, FOUR, ONE, FIVE, SEVEN, ROGER."

The control tower operator will initiate calls to inbound aircraft which have not called the tower as soon as such aircraft are observed.

SECTION II

AIRWAY TRAFFIC CONTROL

CONTACT FLIGHT RULES

Whenever an aircraft is being operated in weather conditions equal to or better than the minimums prescribed in Part 60 of the Civil Air Regulations for contact flight rules as illustrated in Figures 9 and 10, the flight shall be considered to be operating in "Contact Flight Rule" weather conditions.

Flight Plan

A Contact Flight Rule flight plan may be submitted to the nearest airway traffic control center, airport traffic control tower or airway communications station either by person, by telephone or radio, and shall contain the following items:

(1) Identification of aircraft and pilot.

Example: WACO NC1234; Pilot Smith.

(2) Time and point of departure.

Example: Departed St. Louis at 1405.

(3) Proposed cruising altitude or altitudes.

Example: Contact Flight Rules (CFR); or 4000 Contact Flight Rules (4000/CFR).

(4) Proposed route to be followed.

Example: Via Kansas City.

(5) Destination and estimated time of arrival.

Example: Wichita at 1655.

(6) Usable radio equipment carried in aircraft.

Example: 3105 (transmitter frequency); receiver only; no radio.

(7) Number of aircraft making the flight if the aircraft are to be flown in formation.

In connection with item (3), proposed cruising altitude or altitudes, a pilot may submit two types of altitude information in a contact flight rule flight plan, as follows:

> A contact flight rule flight plan may contain "CFR" (contact flight rules) or specific altitude levels followed by "CFR" indicating that the pilot proposes to conduct flight at all times in accordance with the contact flight rules prescribed in Part 60 of the Civil Air Regulations (see Figures 9, 10, 11 and 12 inclusive). No traffic clearances for the exercise of control will be issued by an airway traffic control center to a pilot submitting this type of altitude information. The only report required of a pilot submitting this type of flight plan is an arrival report, unless the pilot indicates at the time of filing the flight plan that an arrival report will not be filed. Arrival reports will be forwarded by CAA communication channels when available.
>
> (Note: It should be noted that an airway traffic control center may for reasons of safety restrict or suspend contact flight operation within the airway traffic control area of such center.)

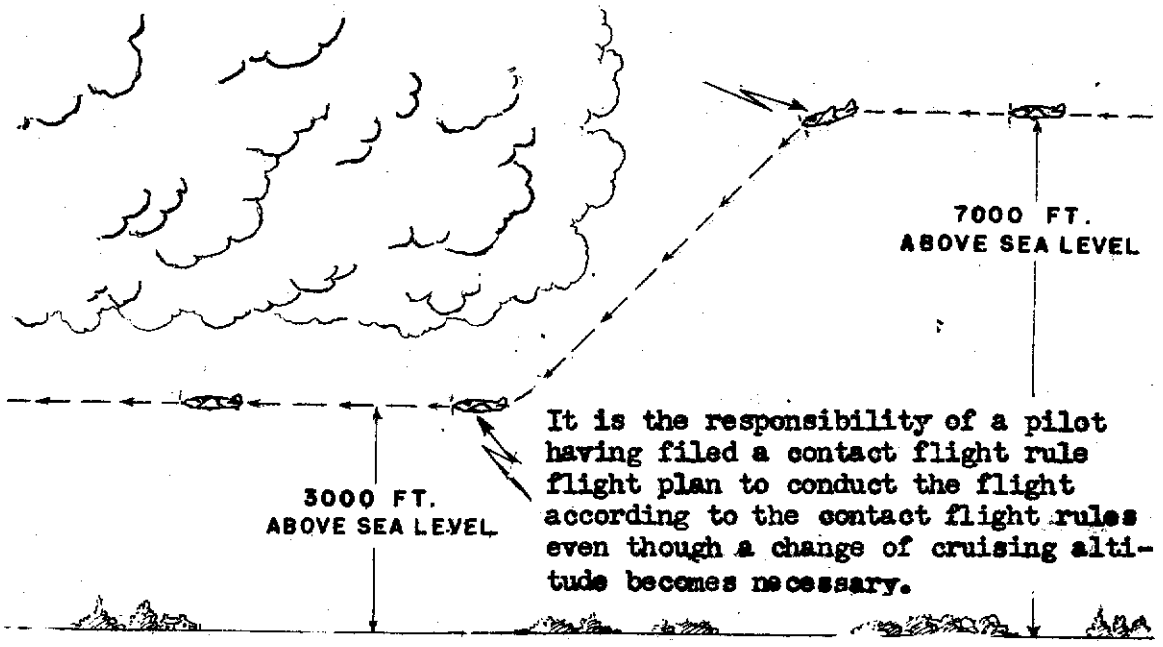

Figure 8. Change of altitude under contact flight rule flight plan

Ceilings

Since aircraft must be flown at least 500 feet above the terrain and at least 500 feet below an overcast, a minimum ceiling of 1000 feet is required at all times. (See Figure 9)

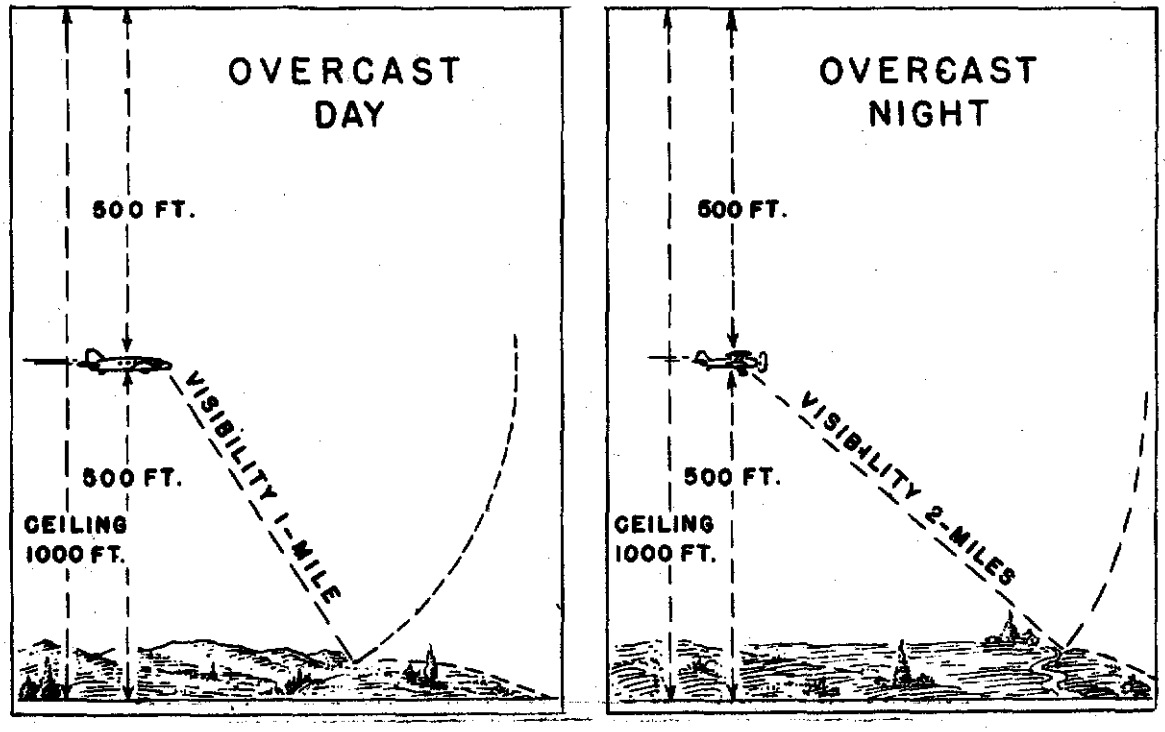

Figure 9. Ceiling and visibility minimums for contact flight rules flight below 1000 feet above the ground or water

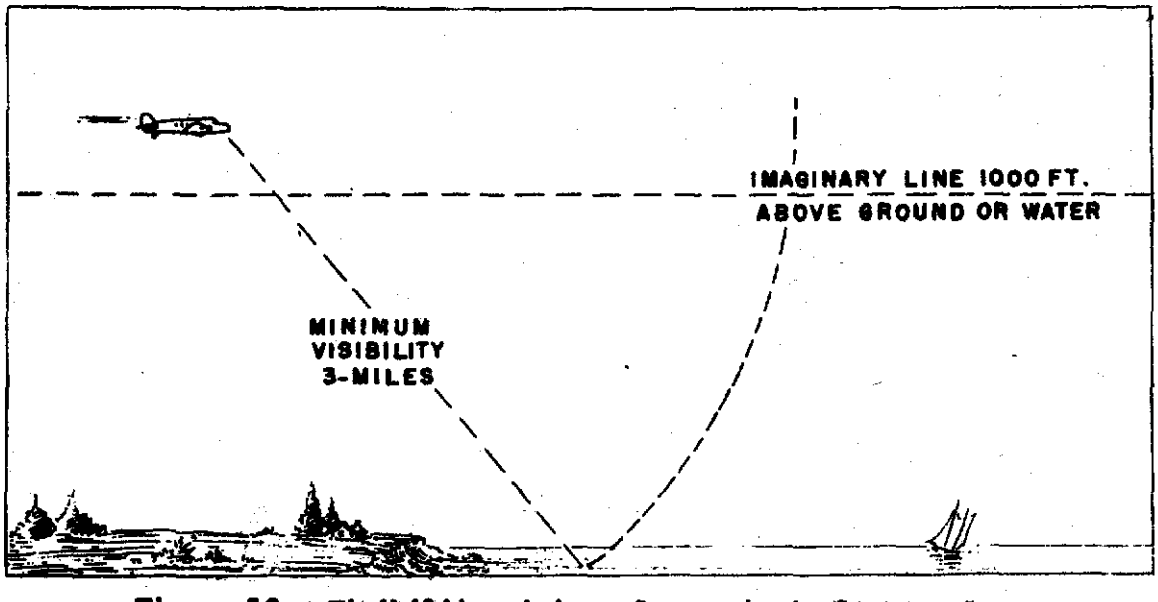

Figure 10. Visibility minimum for contact flight rules flight above 1000 feet above the ground or water at flight altitudes.

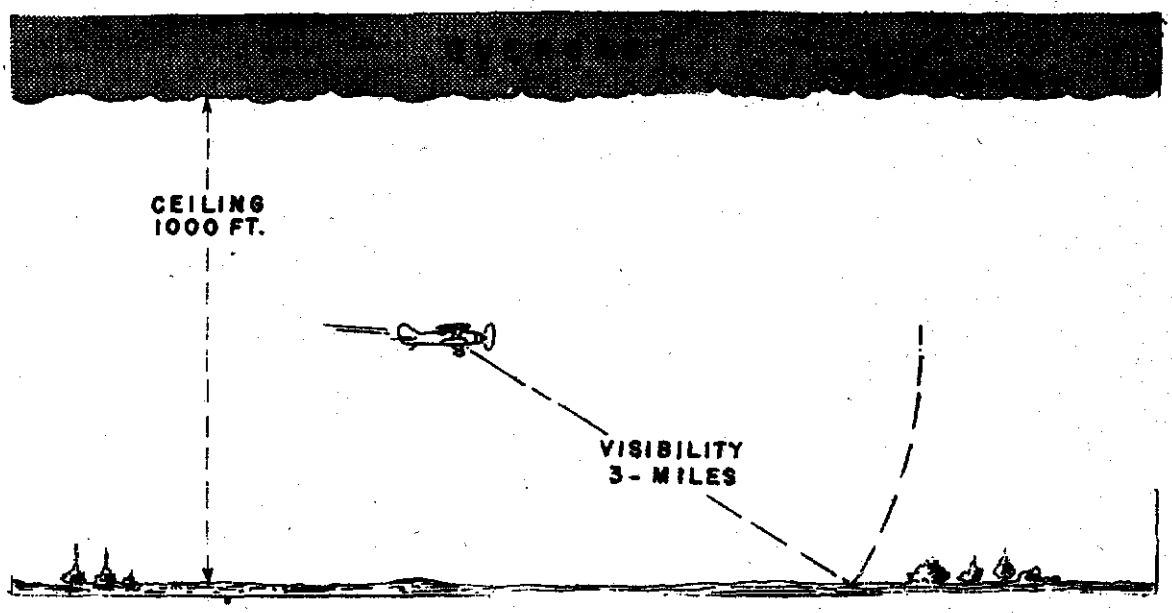

Figure 11. Control zone weather minimums

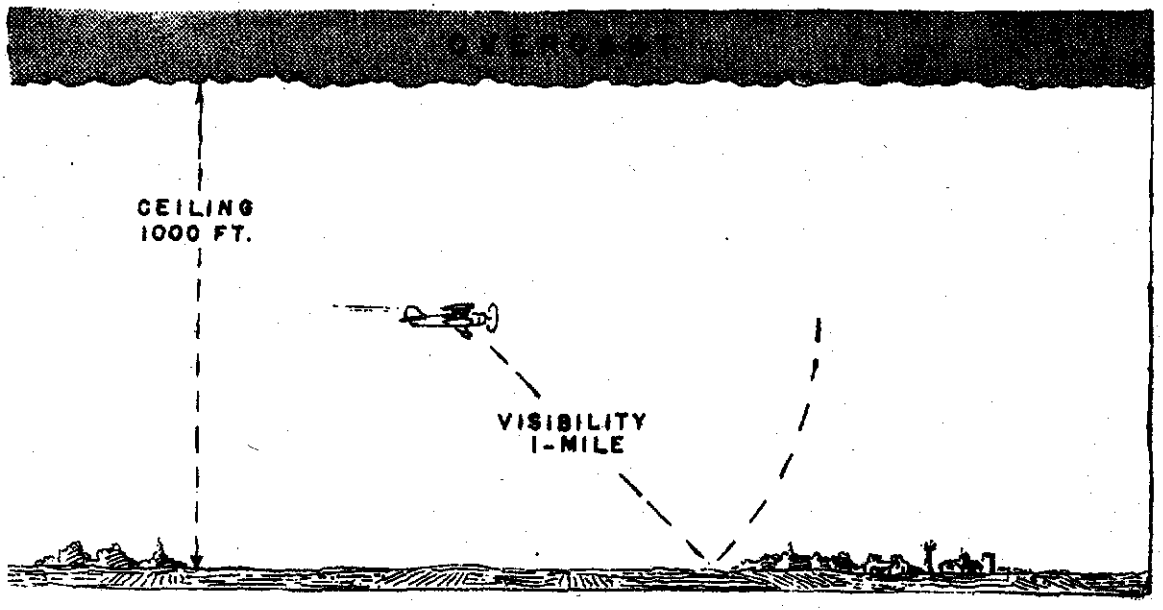

Figure 12. Control zone weather minimums by authority of certificated air-traffic control-tower operator

Visibilities

For flight below 1000 feet above the terrain a minimum visibility of at least one mile day and two miles night is required. (See Figure 9.) For flight above 1000 feet above the terrain a visibility of at least three miles is required at all times. (See Figure 10.) For flight conducted within the control zone of a designated control airport a visibility of at least three miles is required at all times unless a certificated control tower operator has authorized flight under conditions of lower visibility.

(See current Air Navigation Radio Aids publication for list of control airports.)

The filing of a contact flight rule flight plan is required whenever a night flight or a formation flight is to be made within an airway traffic control area and also when specified by emergency defense regulations.

Except for necessary ascent and descent, aircraft flying along or across the civil airways under contact flight rules are required to maintain proper flight altitudes relative to the direction of flight and the color of the airway involved.

INSTRUMENT FLIGHT RULES

The preceding portion of this part of Civil Aeronautics Manual 60 has portrayed the "Contact Flight Rules" which apply to flight of aircraft when pilots "can see and be seen." The following section of the Manual explains how a flight is made under "Instrument Flight Rules" when a pilot cannot "see and be seen" sufficiently to proceed under "Contact Flight Rules."

Requirements Prior to Departure

Each airway traffic control center has under its jurisdiction, certain portions of the civil airways known as its "Control Area", and before an aircraft can depart from within, or enter an airway traffic control area, certain requirements must be met. (For information as to location of airway traffic control areas, see current issue of Air Navigation Radio Aids.)

For flight subject to the "Instrument Flight Rules", pilot and aircraft must be properly rated and equipped for flight by instruments, one of these requirements being that the aircraft be equipped with properly functioning two-way radio. (For complete requirements, see Part 60 of the Civil Air Regulations.)

Prior to departure from within, or prior to entering an airway traffic control area, a pilot must submit to an airway traffic control center either in person, by telephone, or by radio, a flight plan (proposed time of departure, proposed altitude, point of first intended landing and other pertinent information), and obtain approval therefor.

Flight Plan

The filing of an instrument flight plan indicates that the pilot is qualified and the aircraft equipped for flight in accordance with the instrument flight rules as prescribed in Part 60 of the Civil Air Regulations, and further, that the pilot will conform to all provisions of the instrument flight rules. Instrument Flight Plans may be submitted to the nearest airway traffic control center, airport traffic control tower or airway communication station either in person, by telephone or radio, and shall contain the following items:

(1) The aircraft identification mark, or name of governmental service and call numbers of aircraft, or name of air carrier operator and trip number. When one flight plan is being filed for a formation flight, the flight commander's aircraft identification only is required.

Examples: "NC12345;" "Army 8386;" "United Trip 7."

(2) The number of aircraft making the flight, if the aircraft are in formation, the overall area to be occupied by the formation, and the type of aircraft.

Example: "3 B18," "Stinson."

(3) The name of the pilot, or of the flight commander if aircraft are in formation.

Example: "Jones;" "Smith."

(4) Point of departure, or position of aircraft if flight plan is filed enroute.

(5) The proposed cruising altitude or altitudes above sea level and route of flight. When altitude over a fix will be different than the cruising altitude, such information also should be included.

Example: "Cruising 5000 via Philadelphia, crossing Newark at 2000."

(6) Point of first intended landing.

(7) The proposed cruising airspeed (the speed of the aircraft without reference to wind conditions) in miles per hour.

(8) Radio transmitting frequency to be used on the flight.

Example: 3105; 4495.

(9) The proposed time of departure. (The time of departure shall be considered as the time when the aircraft leaves the ground.)

(10) The estimated elapsed flying time in hours and minutes until arrival on the ground at the point of first intended landing.

Example: "Estimated elapsed time 3 hours 35 minutes."

(11) The alternate airport, if the operation is to involve instrument flight.

(12) Any other pertinent information which the pilot deems useful for control purposes or which may be requested by an airway traffic control center. In connection with item (5) under Instrument Flight Plans, proposed cruising altitude or altitudes, a pilot may submit two types of altitude information in an Instrument Flight Rule Flight Plan as follows:

(a) An instrument flight rule flight plan may contain specified altitude levels above sea level depending upon the color of the airway to be flown and the direction of flight.

(b) Altitude information specified in (1) above may be supplemented by use of the words "contact or" as, contact or 3000. This type of altitude information indicates that the pilot desires to maintain contact flight as long as possible and when such contact flight is no longer possible because of weather and minimum altitude restrictions, he will climb to the alternate instrument altitude specified in the flight plan. The altitude level specified in this type of flight plan shall normally be the minimum safe instrument flight altitude for the terrain over which flight will be made.

Approval of Flight Plan

Approval of flight plan by an airway traffic control center will be in the form of a traffic clearance indicating the extent of the control area over which the flight plan is approved, including any necessary amending traffic control instructions, and accompanied by essential traffic information, if specifically requested by the pilot. (Traffic information normally will not be given to a pilot unless specifically requested by the pilot or an aircraft operator.) Such traffic clearances are always issued in standard phraseology commencing with "ATC clears you," or "ATC advises," etc.

Flight plans cannot be considered as approved unless the clearance is preceded by this prefix. Prior to or upon reporting over the clearance point to which a traffic clearance has been issued, the pilot of such aircraft must receive further traffic clearance to another point if flight is to continue on approved flight plan.

The pilot of an aircraft leaving one airway traffic control area and entering an adjacent airway traffic control area will be "cleared from (specified location) to__miles__(direction of)__(location)" indicating the control boundary between the two airway traffic control centers. Further clearance must be secured prior to entering the adjacent airway traffic control area.

Approval of a flight plan by an airway traffic control center is an approval only insofar as known air traffic conditions are concerned, and such approval does not constitute authority to violate any provision or provisions of the Civil Air Regulations. A flight plan implying a violation of the Civil Air Regulations may be approved by an airway traffic control center if warranted by existing traffic conditions, but the pilot submitting the flight plan will be responsible for any violation subsequently committed.

Flight Plan Change

Pilots must keep in mind the fact that once a flight has entered an airway traffic control area no change can be made in the approved flight plan, unless an emergency exists, without first obtaining approval for such change from the airway traffic control center having jurisdiction. Such requests and approvals are relayed through appropriate communication facilities to and from the airway traffic control center.

In addition to the altitude and course changes, increasing or decreasing the speed of an aircraft by increasing or decreasing power constitutes a change in flight plan, and the pilot of an aircraft making a flight subject to instrument flight rules within an airway traffic control area prior to effecting such change in flight plan shall obtain approval from the airway traffic control center within whose area flight is being conducted.

An approach clearance issued by an airway traffic control center is an approval for one approach only, and additional approaches also are considered as constituting a change in flight plan.

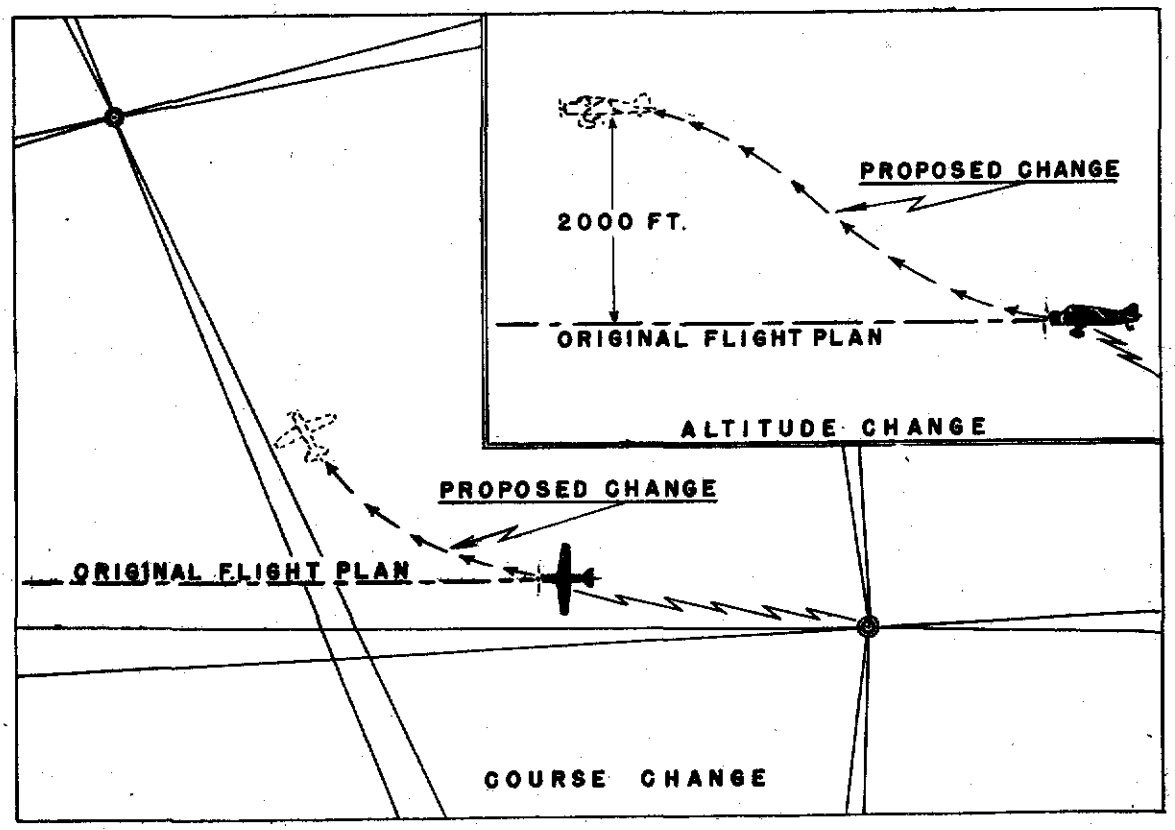

Figure 13. Flight plan change

Altimeter Settings

Part 60 of the Civil Air Regulations prescribes that flight altitudes shall be in feet above sea level. Accordingly, altimeters should be set to the current setting of the nearest station reporting official altimeter settings along the route of flight. It should be understood that all sea level altitudes used in connection with the control of air traffic are based on the indicated altitude, since any temperature error will affect all altimeters in the same vicinity to the same extent and relative separation between aircraft will be maintained. Pilots should consider temperature error only with respect to insuring that the actual altitude of the aircraft permits ample clearance of terrain and obstructions.

Altimeter setting is defined as the setting to be made to the barometric scale of an altimeter, such that upon landing, the pointers of the instrument will indicate very closely the actual elevation of the airport above sea level.

Altitude Requirements

Aircraft on instruments (in the overcast) must be flown at least 1000 feet above the terrain. (See Figure 14.)

Aircraft must be flown at prescribed even or odd thousand foot levels above sea level depending upon the color designation of the civil airway being flown, the direction of flight, unless other altitudes are assigned or approved by an airway traffic control center. (See Figure 16.)

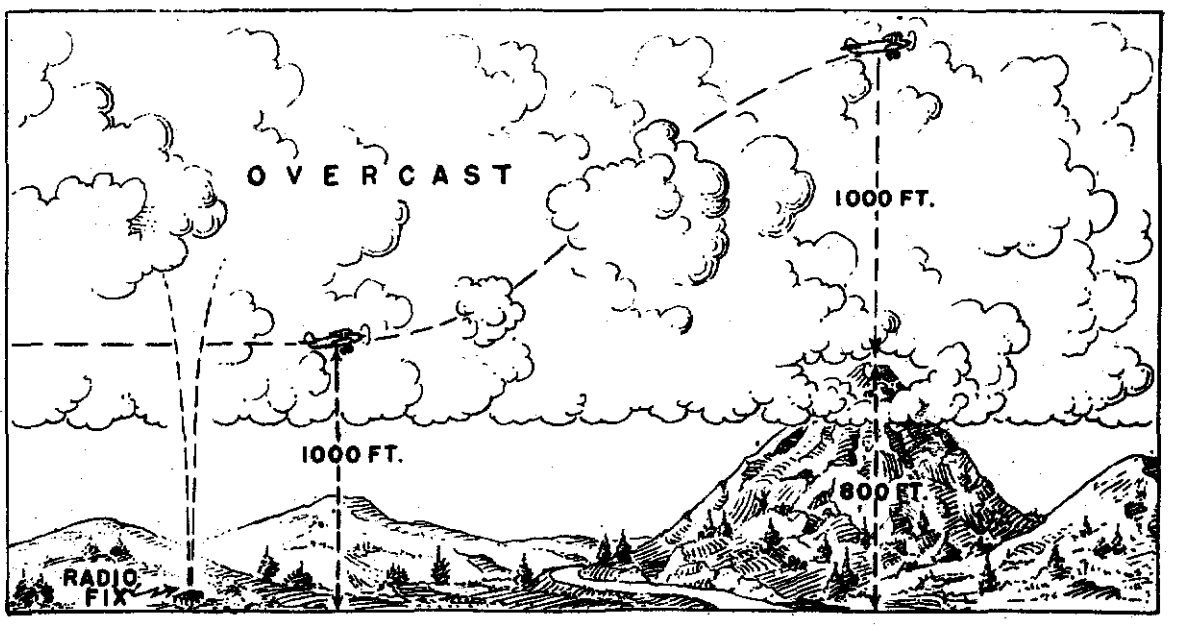

Figure 14. Minimum instrument flight altitude

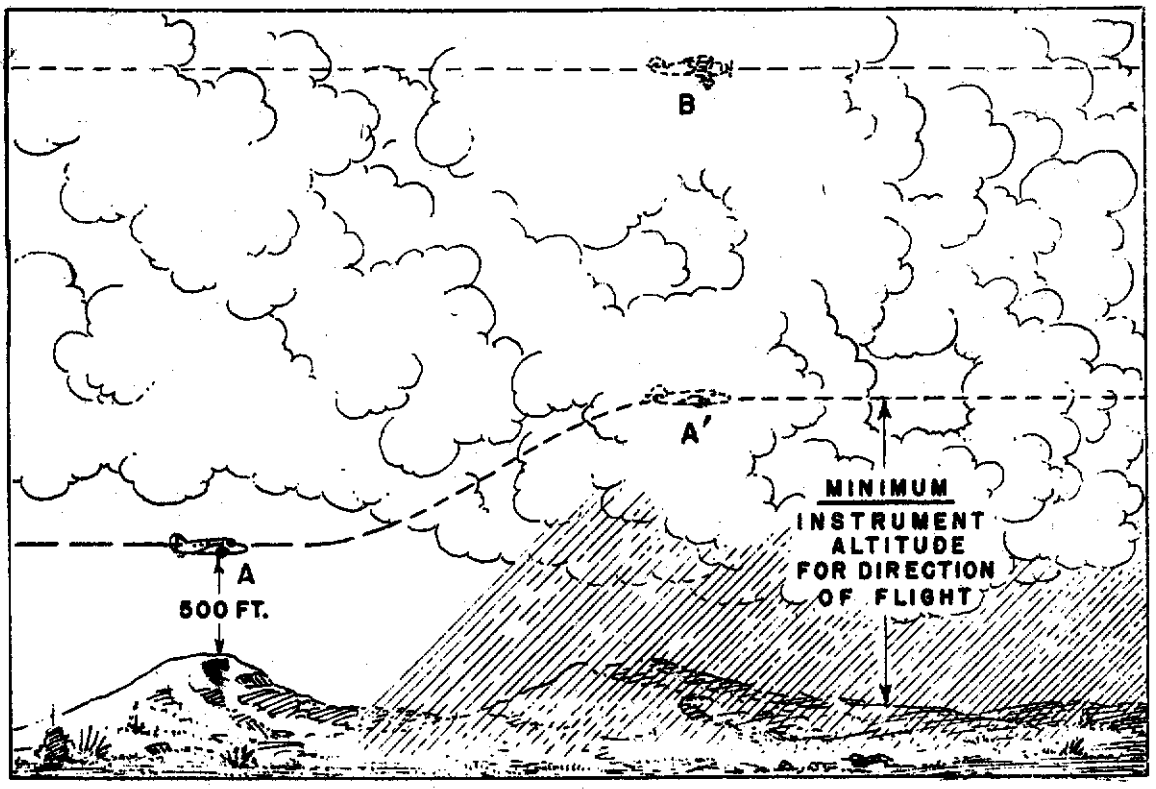

Figure 15. "CTC"-Minimum altitude flight

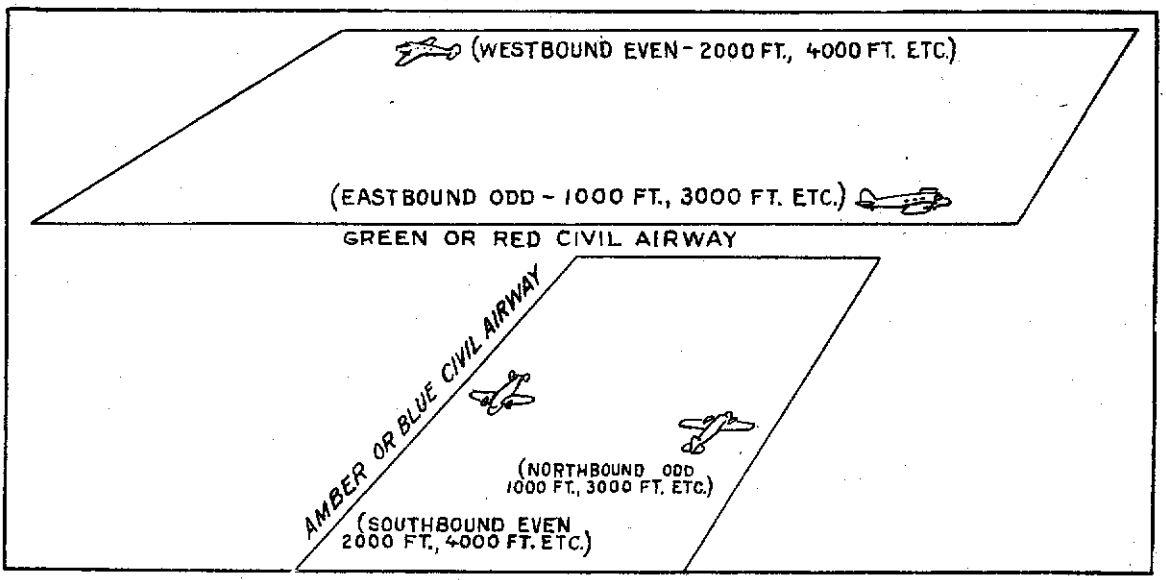

Figure 16. Flight altitudes

Airway Communications

All aircraft (including any air carrier aircraft), maintaining communication through airway communication stations of the Administrator are required to maintain continuous listening watch on the voice channel of the simultaneous radio range feature of such stations.

Aircraft maintaining communication through air transport company radio or military radio are required to maintain continuous listening watch on such radio facilities.

It is considered the responsibility of an aircraft operator handling communications through its facilities to advise a center promptly if it has been unable to deliver a message within 5 minutes of the expected delivery time. Unless specific acknowledgment of receipt by pilot has been requested by a center, it is assumed that a message has been delivered satisfactorily to a pilot unless the aircraft operator otherwise advises the center. Likewise, it is considered the responsibility of an aircraft operator to advise a center promptly in the event of two-way communication failure with one of its aircraft.

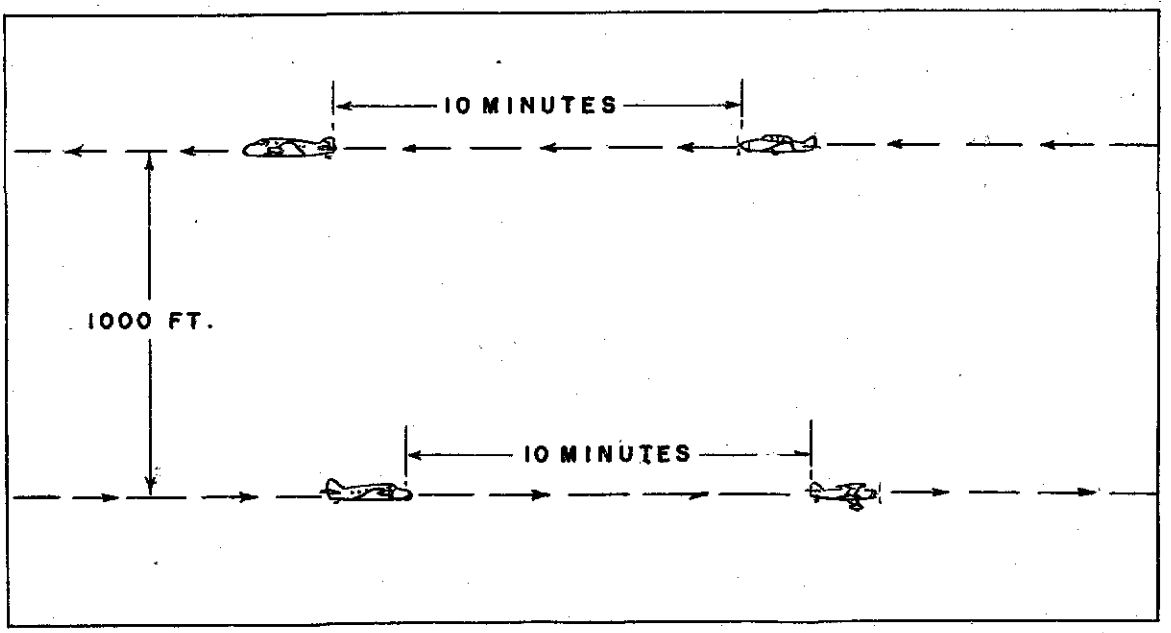

Figure 17. Horizontal separation over a course with adequate radio fixes (Note: Otherwise 15 minutes separation is required)

Control Procedures

In controlling air traffic, airway traffic control centers effect separation of aircraft, vertically, by assigning different altitude levels; horizontally, by prescribing a minimum amount of flying time between aircraft; and laterally, by providing for different flight paths. (See Figures 17, 18, and 19.) All instructions from an airway traffic control center are transmitted through radio range stations, airport traffic control towers and radio stations of aircraft operators.

It should be understood by a pilot that he always has the privilege of requesting control procedures other than those which may be imposed by a center if he feels that he has information available which would make such other procedures more practicable. Airway traffic control centers attempt to furnish alternate procedures whenever possible and will give every consideration to pilots' requests for a change in control procedures.

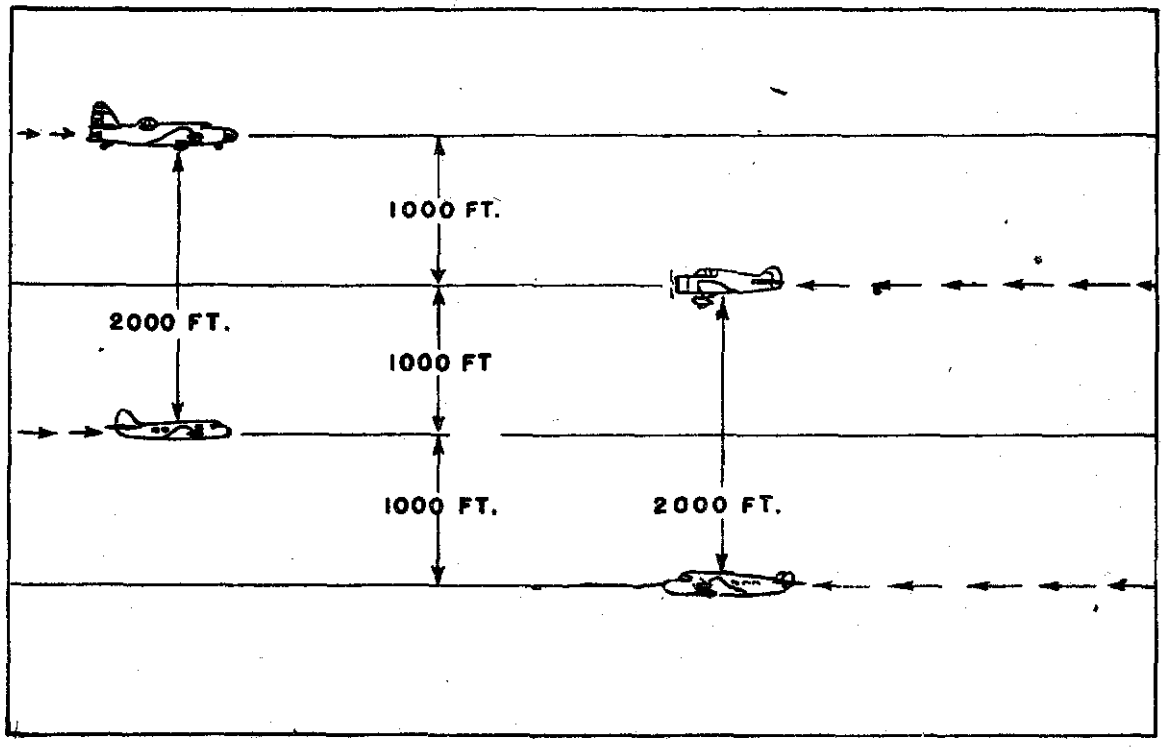

Figure 18. Vertical separation for instrument flight rules flight plan

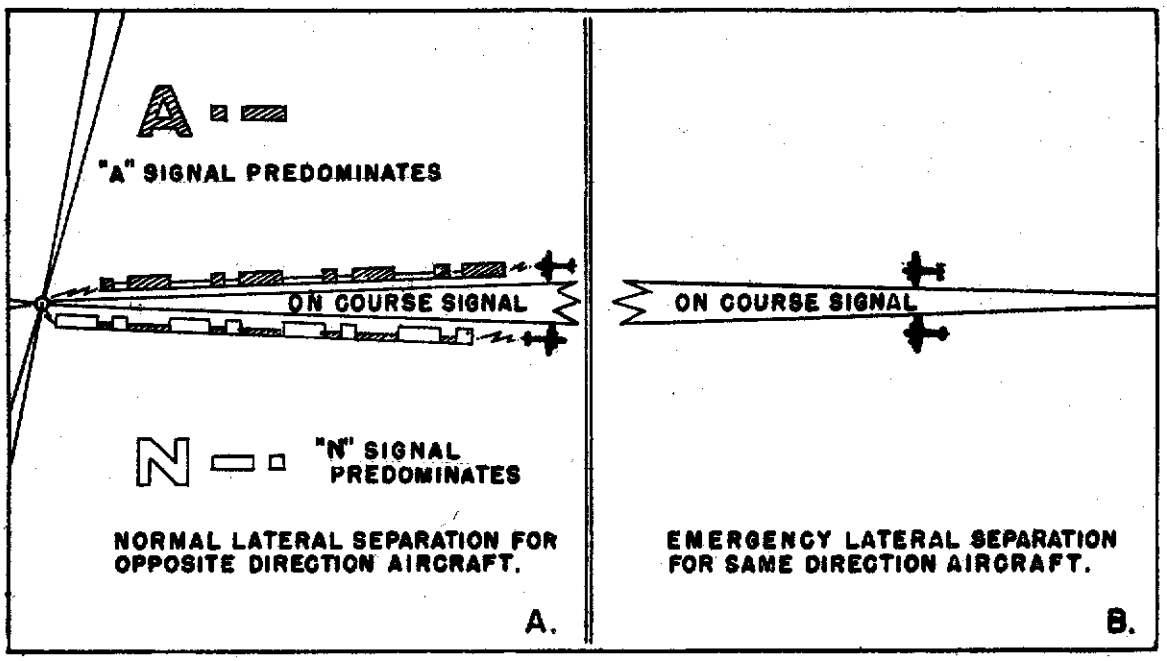

Figure 19. Lateral separation for instrument flight rules flight plan

Enroute Reports

During the course of a flight, pilots are required to make "flight progress reports" which include time and altitude of the aircraft over designated radio fixes on the route being flown. These reports should be made as soon as possible after aircraft has passed the fix. (See airway and radio facility charts contained in current tabulation of Air Navigation Radio Aids.)

In addition to the flight progress reports, pilots are required to observe the following reporting procedures when flying within an airway traffic control area:

Estimates - Pilots should if possible, include in each report an estimated time of arrival over the next designated radio fix. In any event, however, pilots should forward an estimated time of arrival and requested altitude over the radio fix preceding the airport of intended landing, and an estimated time of arrival over such airport when reporting over the second fix preceding such airport.

(Note: If, after reporting over a radio fix, it becomes apparent that the estimate as previously submitted for time of arrival at the airport of intended landing or the estimated time over the next fix is in error in excess of three minutes, corrected estimate should be made and forwarded to the center.)

Weather Reports - Weather reports made by the pilot of an aircraft need be forwarded to an airway traffic control center only when so requested by such center, or when pilot encounters unanticipated or unusual weather conditions, such as icing conditions, turbulence, etc.

Other Communications Reports - The following communications contacts are required by the pilot under instrument flight rule conditions in addition to enroute reports:

(1) Report the time and altitude of reaching a specified holding point or fix to which cleared.

(2) Report when vacating any previously assigned flight level for a new assigned level.

(3) Report when leaving any assigned holding point.

(4) Report, on request, when making procedure turn on final approach.

(5) Report, on request, when over range station on final approach.

(6) Report, on request, when ground contact is established.

(7) Report when an approach for landing has been missed; advise that landing has been missed and request further instructions.

(8) Report, on request, while passing through 1000 foot levels while descending or climbing.

(9) Report, on request, when attaining cruising altitude.

Two-way Radio Failure

In the event of failure of two-way radio communications between an aircraft and the ground, the airway traffic control center concerned will issue appropriate instructions to be broadcast "blind" over air carrier radio facilities (for air carrier aircraft), over military radio facilities (for military aircraft), and over suitable radio range facilities. Note: Instructions shall not be broadcast "blind" unless an airway traffic control center authorizes such broadcast.

If the pilot does not continue flight in accordance with contact flight rules or effect an emergency landing and if instructions to the contrary broadcast "blind" are not received, the following procedures shall govern such flight:

(a) If expected approach clearance time has not been received and acknowledged, pilot shall continue flight in accordance with flight plan and make landing at point of intended landing as closely as possible to estimated time of arrival.

(b) If expected approach clearance time has been received, and acknowledged, pilot shall comply with current traffic clearance and instructions and maintain last assigned altitude to the point of intended landing, starting approach at the acknowledged approach clearance time.

(c) If holding instructions have been received, pilot shall comply with those instructions until such time as it will be necessary to continue flight so as to arrive at the point of intended landing at expected approach clearance time and approach then shall be started at that time. After leaving holding point, initial approach altitude shall be obtained as quickly as practicable.

Emergency Descent

Upon receipt of advice that an aircraft in flight under the control of an airway traffic control center has encountered an emergency which may affect other air traffic, the airway traffic control center concerned will take such action as will afford the aircraft encountering the emergency priority over any other aircraft involved.

Should it become necessary for an aircraft holding to make an emergency descent for a landing through other traffic, the pilot of that aircraft should so advise the airway traffic control center concerned through appropriate communications facilities.

Upon receipt of advice that an aircraft is making an emergency decent through traffic at assigned altitudes over the airport, the airway traffic control personnel concerned will immediately broadcast, or cause to be broadcast, on radio range frequency the following:

EMERGENCY TO ALL CONCERNED
EMERGENCY LANDING AT____AIRPORT
ALL AIRCRAFT BELOW____THOUSAND FEET
WITHIN____MILES OF____RADIO RANGE
LEAVE____LEG/S IMMEDIATELY

Upon receipt of such a broadcast, pilots of aircraft affected should clear specified areas in accordance with the emergency instructions. The airway traffic control personnel will issue further instructions through appropriate communications facilities immediately following the emergency broadcast.

In Figure 20, Aircraft A, B, C, D, E, and F are holding on the east and west legs of the Blank Radio Range when A encounters an emergency, such as low oil pressure on one engine, and has to descend for a landing at the Blank Airport immediately. The following instructions would then be transmitted:

"EMERGENCY TO ALL CONCERNED:
EMERGENCY LANDING AT BLANK AIRPORT.
ALL AIRCRAFT BELOW SEVEN THOUSAND FEET
WITHIN RADIUS OF 25 MILES OF BLANK
RADIO RANGE LEAVE EAST AND WEST LEGS
IMMEDIATELY."

Aircraft B, C, D, E, and F would immediately proceed to the north or south legs (without crossing the east and west legs) maintain their last assigned altitudes, and wait for further instructions.

In the event terrain, traffic, or other reasons would make it impractical for an aircraft to maintain its last assigned altitude, the ATC center would issue specific instructions to that aircraft.

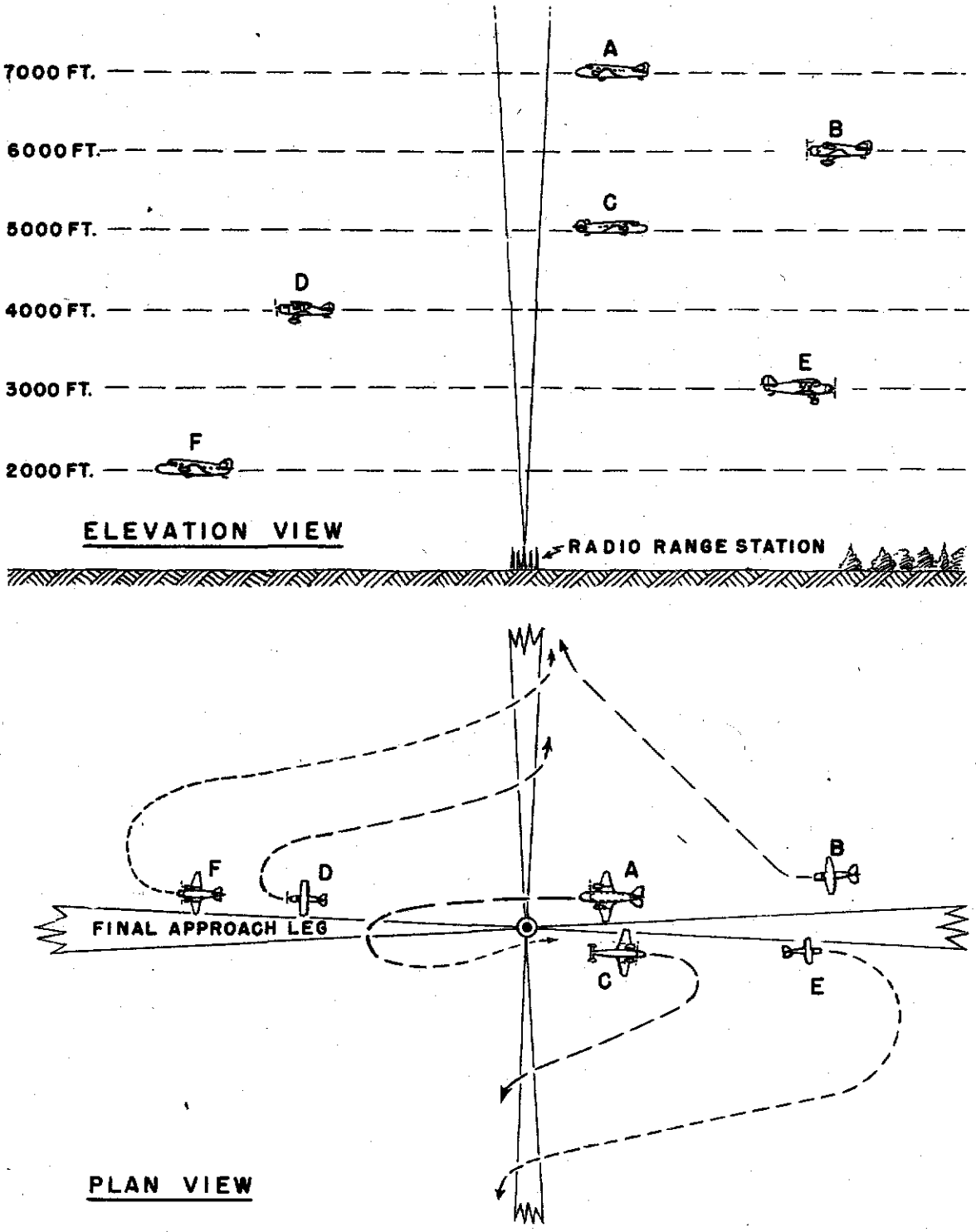

Figure 20. Emergency descent

Range Approach Channel

A range approach channel is the airspace above the ground or water below 17,000 feet above sea level located within two miles of either side of the center line of the on course signal of any leg or legs designated by the Administrator of a radio range station serving a control airport, and extending along such leg or legs from such radio range station for a distance of 15 miles; provided, that such range approach channels may be modified or extended by the Administrator when he deems it necessary in the interest of safety.

The purpose of these range approach channels is to provide an entrance and an exit from a control airport so that air traffic may be segregated to provide areas for specialized flying.

Pilots of aircraft desiring to cross a range approach channel may do so during contact flight rule weather conditions without obtaining prior approval of the flight plan. However, due caution should be exercised when so doing and right of way must be given to aircraft proceeding along and within the range approach channel. Further, aircraft crossing the range approach channel must do so at an angle of not less than 45 degrees with reference to the center line of the channel and at a constant flight altitude.

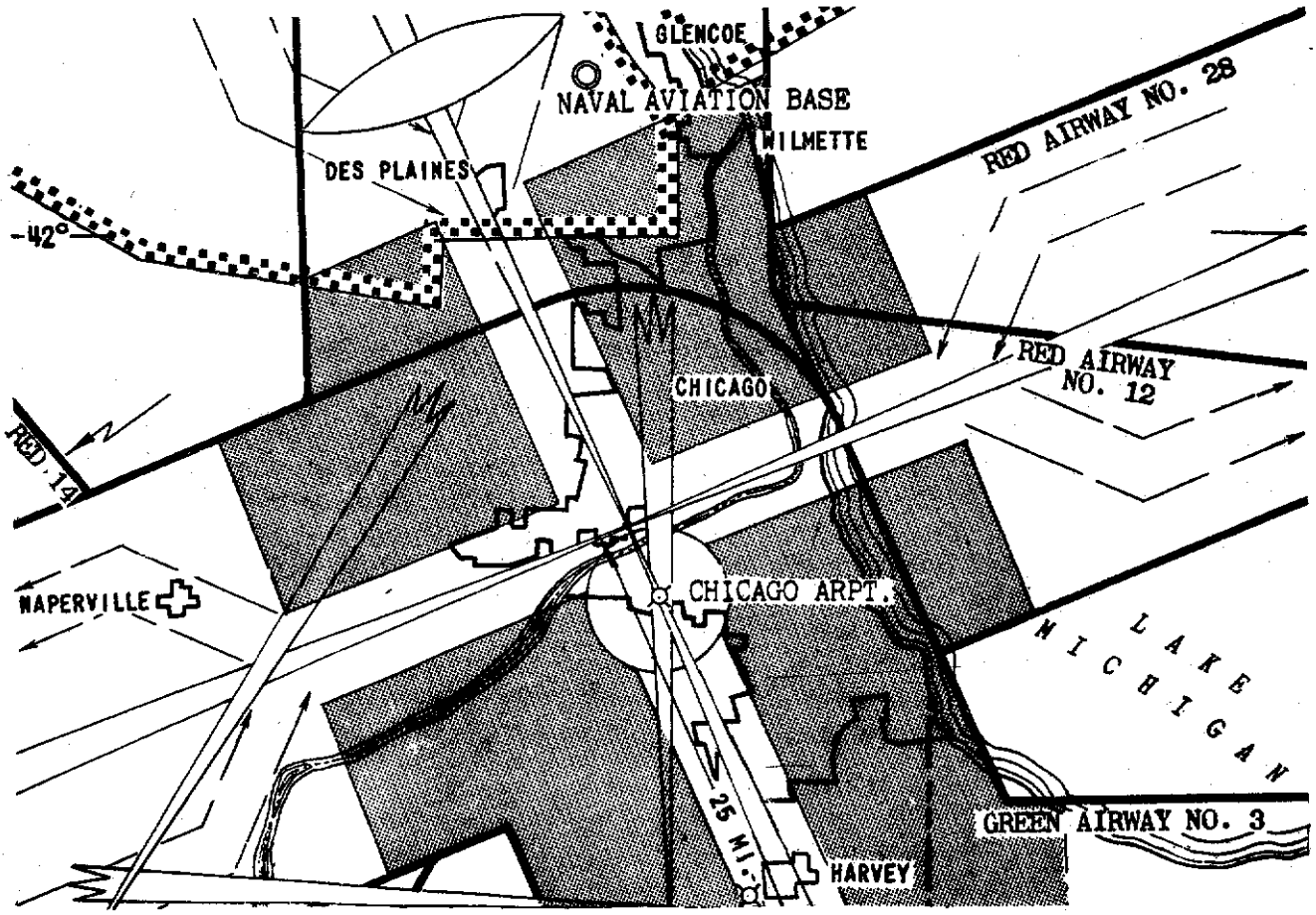

Figure 21. Range approach channel.

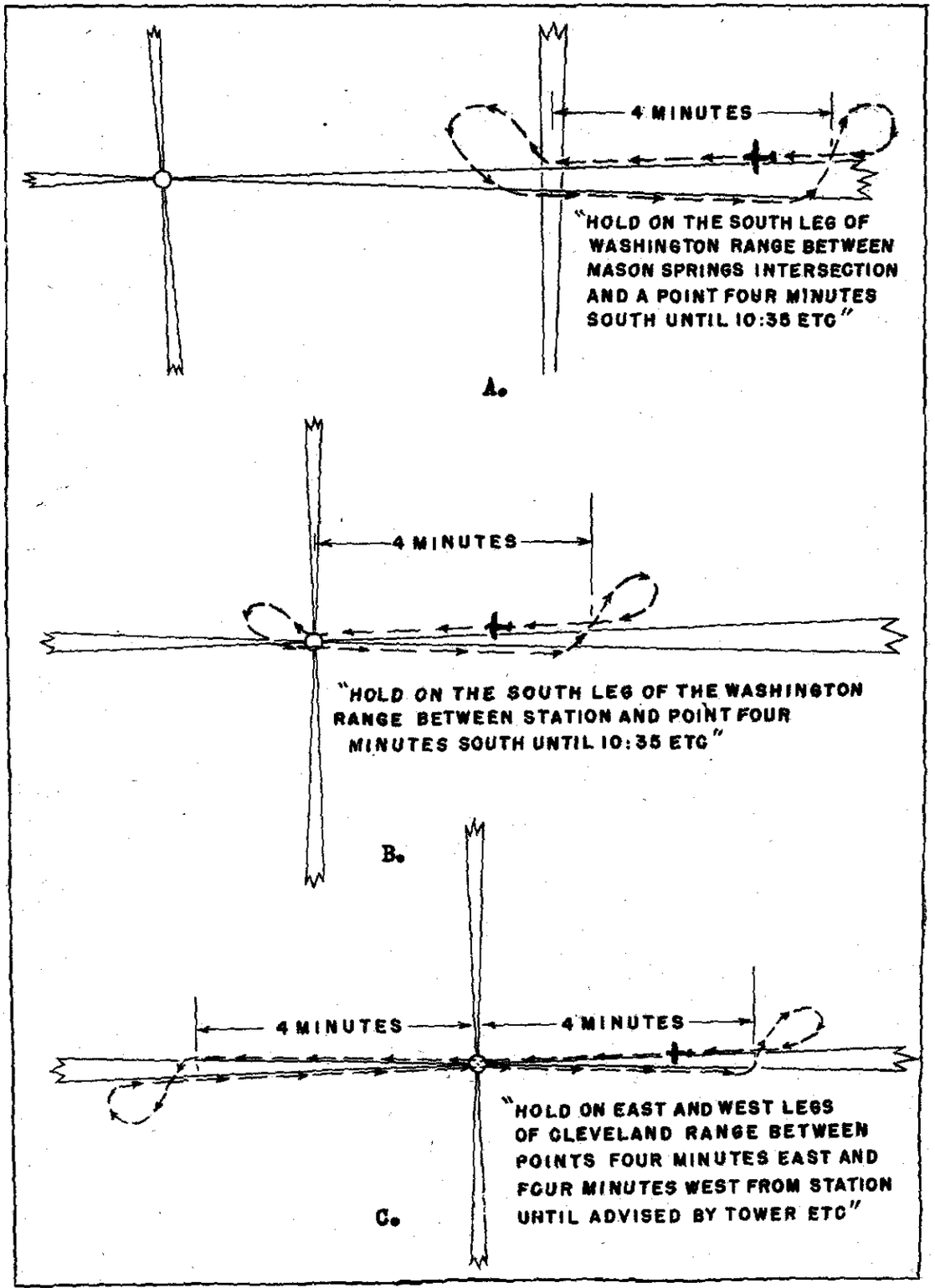

Figure 22. Aircraft holding

Aircraft Holding

Holding instructions issued by an airway traffic control center will specify the limits thereof as shown in the preceding examples. Holding aircraft shall follow the right edge of the on course signal of the appropriate leg of the radio range. Turns may be made as desired unless specifically instructed by the airway traffic control center to make turns in a specified quadrant. (See Figure 22.)

Aircraft Landing

In the event landing is not completed within 15 minutes (or the time allowed for a standard instrument approach) after passing over the radio range station on the initial approach, or within 15 minutes after being issued approach clearance under conditions of approach sequence assignment, a pilot under such circumstances shall obtain further instructions from the airway traffic control center in the control area in which flight is being made. Such airway traffic control center then will determine whether the pilot will be allowed another immediate attempt or instruct him to stand by on a designated leg of the range at a certain altitude until other aircraft in line have landed or taken off. This decision will be based upon existing conditions such as remaining fuel, weather trend, etc. A decision to route an aircraft to an alternate airport will be made by the pilot or aircraft operator involved after conferring with the airway traffic control center concerned.

Arrival Report

As specified in Part 60 of the Civil Air Regulations the pilot of a flight is responsible for filing an arrival report on a flight for which a flight plan has been filed. The arrival report should be filed with the communication station at point of destination or at point of landing if flight has been terminated at an intermediate point. If Civil Aeronautics Administration facilities are not available commercial wire or telephone should be utilized.

If a required report of the arrival of an aircraft or of cancellation of the flight at an intermediate point has not been received within a reasonable time after the estimated time of arrival of the aircraft, steps will be taken to trace the aircraft by inquiry of intermediate stations. An unreported aircraft is maintained on the flight progress boards in an airway traffic control center or Civil Aeronautics Administration airport traffic control tower for a period of at least thirty minutes after estimated time of arrival at point of destination, during which time other aircraft movements may be restricted or suspended in an effort to prevent possibility of collision between the unreported aircraft and other air traffic. Should the aircraft still be unreported after the thirty minute period, the airway traffic control center may resume normal traffic after all concerned have been appropriately notified. Failure to complete flight plan with an arrival report may subject the pilot to a civil penalty.

APPENDIX

GLOSSARY

APPROACH CLEARANCE - The clearance issued to the pilot of an aircraft making a flight subject to instrument flight rules authorizing an approach for landing by such aircraft.

APPROACH SEQUENCE - A priority schedule specifying the sequence of approach of aircraft at a given point.

APPROACH TIME - The time at which the approach may be commenced.

ATC - An abbreviation used in radiotelephone, interphone or other conversation to mean an airway traffic control center of the Administrator of Civil Aeronautics.

ESSENTIAL TRAFFIC INFORMATION - Information on aircraft which are expected to be overtaken, passed, or approached within a distance of less than 15 minutes in actual flying time when such aircraft are within a level of 2000 feet or less vertically above or below the aircraft being cleared.

FLIGHT PLAN, CONTACT FLIGHT RULE - A flight plan containing the information specified in Part 60 when filed for a flight in accordance with contact flight rules.

FLIGHT PLAN, INSTRUMENT FLIGHT RULE - A flight plan containing the information specified in Part 60 when filed for a flight in accordance with instrument flight rules.

LOCAL TRAFFIC - Aircraft operating in the traffic pattern of the landing area concerned.

RUNWAY IN USE - The runway currently in use by aircraft landing and taking off with the existing wind conditions, or as indicated by the airport traffic controller if calm wind conditions exist.

SEPARATION, ALTITUDE - The method of effecting spearation of aircraft in flight, accomplished by the assignment of different altitude levels.

SEPARATION, LATERAL - The method of effecting separation of aircraft flying in opposite directions, along a well-defined radio range course, and on opposite sides of such course.

SEPARATION, TIME - The method of effecting separation of aircraft in flight, accomplished by requesting the pilot of aircraft either to lose time so that he will arrive over a specified fix at a specified time or to hold over a specified fix for a specified time.

TOWER - An airport traffic control tower; i.e., an establishment properly situated and equipped to allow an operator thereof to adequately control air traffic in the immediate vicinity of an airport on or adjacent to which such tower is located.

TAXI PATTERNS - The desired movement of aircraft on the ground at the landing area during specified wind conditions.

TRAFFIC CLEARANCE - An authorization issued by an airway traffic control center or an airport traffic control tower to fly an aircraft solely with respect to known air traffic conditions, including flight plan approval and traffic control instructions (flight plan amendments).

TRAFFIC PATTERNS - The desired flow of aircraft flying contact below 1500 feet above the ground in the vicinity of an airport, or other landing area, during specified wind conditions.

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