DoD
FLIGHT INFORMATION PUBLICATION
(ENROUTE)

FLIGHT INFORMATION HANDBOOK

EFFECTIVE 0001L **1 MAR 2018**
TO 0001L 11 OCT 2018

Consult NOTAMS for latest information
U.S. AND CANADA AIRSPACE EFFECTIVE 0901Z

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Published by
NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY
ST. LOUIS, MISSOURI

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NSN 7641014109531
NGA REF. NO. ENRXXFLTIHBK

EFF. DATE 18060

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A Special Notice section concerning NEW FLIP FEATURES appears below and contains notices of new requirements or major modifications of existing FLIPs. New notices appearing for the first time will be shown first. New feature notices will be carried for three issues and then dropped. In the event there are no NEW FLIP FEATURES, the word "NONE" will be centered within the NEW FLIP FEATURES box.

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NEW FLIP FEATURES

NONE

ELECTRONIC FLIP NOTICE

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01 MARCH 2018

REMOVAL OF "K" FROM SOME US AERODROME IDENTIFIERS

Beginning effective 26 April 2018 (cycle 1805) and continuing over subsequent cycles until complete, the listings for some US aerodromes in DoD FLIP products will revert back to the correct FAA-assigned three-letter identifier (DWG item 15-01-12, approved DWG 17-01). The update will ensure the associated DAFIF™ product, which permits both three and four-letter identifiers, conforms to Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) requirements. US aerodromes with four-letter identifiers (see ICAO Document 7910) will be unaffected.

02 APRIL 2015

REMOVAL OF ELECTRONIC DATE STAMPS

Beginning Effective 2 April 2015, all Terminal, Supplement, and Planning electronic products available on the ACES and Aerospatial websites, Aeronautical FLIP DVD, and the Aeronautical Mobile Application will no longer be stamped with the RED effective date stamps located at the bottom of the electronic pages. This is to prepare for EFB applications in change detection. Please utilize hard-copy cover page, DVD label covers, or website banners for effective dates.

21 AUGUST 2014

COUNTRY CODE MIGRATION FROM FIPS TO GENC

Beginning effective 21 August 2014, the FIPS country codes annotated at the top of the terminal procedures in parenthesis will be replaced by "CIV" for civil and "MIL" for military on an as revised basis. During this transition both FIPS and (CIV/MIL) will be intermixed throughout the FLIP Terminal publications. For translation between FIPS and GENC country codes during this transition reference page A-4, Item 3 of the FLIP Enroute Supplement.

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GENERAL INFORMATION

1. GENERAL

a. The Flight Information Handbook is a DoD Flight Information Publication (FLIP) issued every thirty-two weeks by the National Geospatial-Intelligence Agency (NGA). The Flight Information Handbook contains aeronautical information which is required by DoD aircrews in flight, but which is not subject to frequent change. This publication is intended for U.S. Military use, and procedures herein may not be applicable to other users.

b. The Flight Information Handbook may be amended to disseminate informational changes between FLIP publication cycles by NGA STL publication of a textual or graphic Urgent Change Notice (UCN) as required or by the regular NOTAMs issued via the FAA/DoD Integrated NOTAM System.

c. NEW OR CHANGED INFORMATION: To alert users of new information or changes to information from the previous issue, a vertical line will be portrayed to the left of and extending the full length of the new and/or revised data. This symbol will not apply to the front cover.

2. REVISIONS, QUALITY REPORTS, REQUISITIONS, DISTRIBUTION AND SCHEDULES - See FLIP General Planning, Chapter 11.

3. INTERNET - DAFIF™; Enroute and Planning Charts, Planning Documents and Planning Change Notices (PCN); Enroute Supplements, Enroute Change Notices (ECN) and Terminal Procedures are available at https://www.geointel.nga.mil

4. CUSTOMER HELP - For questions concerning NGA aeronautical products or services, please phone the NGA Aeronautical Help Desk at 1-877-817-9134 or DSN 312-846-0684. Email aeronautical questions to aerohelp@nga.mil.

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SECTION A

EMERGENCY PROCEDURES

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A-2 EMERGENCY PROCEDURES

1. RECOMMENDED PROCEDURES FOR ANY EMERGENCY PHASE (UNCERTAINTY, ALERT, DISTRESS, URGENCY, LOST)

(ICAO ANNEX 10)

a. Activate IFF to EMERGENCY; if equipped with SIF, set the master control switch to EMERGENCY and proceed with the appropriate step listed below:

(1) If under positive radar control (or in an environment that requires a specific squawk) maintain codes as previously set.

(2) In situations other than (1) above: Switch to Mode 3/A, code 7700.

b. Transmit the following message to any agency on the air-ground frequency in use at the time. If unable to establish communication attempt contact on any of the following emergency frequencies:

UHF/VOICE	VHF/VOICE	MF/VOICE	HF/CW	MF/CW
243.0 MHz	121.5 MHz	2182 kHz	8364 kHz	500 kHz

c. DISTRESS or URGENCY CALL and MESSAGE

(1) Transmit as many of the following elements as necessary:

(a) *Distress, MAYDAY (3 times) or **Urgency, PAN PAN (3 times).

(b) Name of station addressed.

(c) Aircraft identification and type.

(d) Nature of distress or urgency.

(e) Weather.

(f) Pilot's intention (bailout, ditching, crash landing, etc.) and request (fix, steer, escort, etc.)

(g) Present position and heading. If unknown, last known position, time and heading since that position.

(h) Altitude or Flight Level.

(i) Fuel in hours and minutes.

(j) Numbers of persons on board.

(k) Any other information that might be helpful.

(2) When in *DISTRESS CONDITION with bailout, crash landing imminent, transmit the above information (time and circumstances permitting) plus:

(a) ELT status.

(b) Landmarks.

(c) Aircraft color.

(d) Emergency equipment available on board.

(3) Set radio for continuous transmission for bailout and for crash landing or ditching (if risk of fire is not a consideration.

* DISTRESS - Call MAYDAY \voice) or SOS (CW): When you are threatened by serious and or imminent danger and require immediate assistance (e.g., ditching, crash landing or abandoning aircraft).

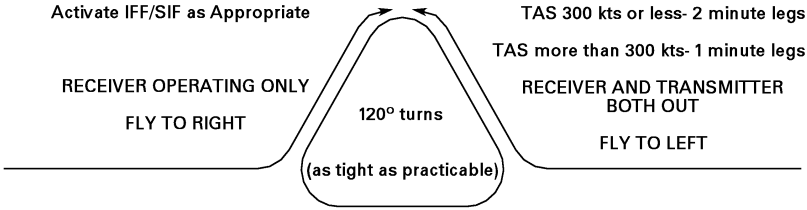
** URGENCY - Call PAN PAN (voice) or XXX (CW): When a condition concerning the safety of an aircraft or other vehicle, or of some person on board or within sight but does not require immediate assistance (e.g., lost, fuel shortage, partial engine failure, etc)

d. CANCELLATION - When an aircraft is no longer in distress, a cancellation message shall be immediately transmitted on the same frequency or frequencies used for the distress message.

e. RADAR DISTRESS SIGNAL PROCEDURE FOR NATO OPERATIONAL AIR TRAFFIC (OAT) FLIGHTS

(NATO STANAG 3530 ED 3)

(1) If able to fly a pattern which could be identified by a ground radar station, NATO OAT flights which experience radio and or navigational aid failure may initiate the following procedure:



(2) Fly two patterns, resume course, repeat at 20 minute intervals. Guard emergency frequencies.

f. EMERGENCY PROCEDURES UNITED KINGDOM

(UK CIV AIP COM GEN 3.2.5)

(1) Within the United Kingdom FIR's/UIR's, the Royal Air Force is responsible for the provisions of assistance on the International Aeronautical Emergency frequencies. Autotriangulation (DF) coverage on the UHF International Aeronautical Emergency frequency is available over most of the London FIR above 5000 ft and the Scottish FIR above 8500 ft. At the ARTCC's autotriangulation data is supplemented in certain areas by CAA/MATO remote radar coverage. An emergency communications and aid service is continuously available on 121.500 MHz from two Distress and Diversion (D & D) sections, one located in the London Air Traffic Control Centre (Mil) (LATCC Mil) at Swanwick and the other in the Scottish Area Control Centre (ScACC) at Prestwick. Operational control is exercised, south of 55°N, from the LATCC D & D, callsign 'LONDON CENTER' and north of 55°N, from the ScACC at Prestwick, callsign 'SCOTTISH CENTER'. The service provides coverage over the greater part of the United Kingdom above 3000 ft. Pilots of aircraft in emergency and using 121.500 MHz should broadcast the initial 'MAYDAY' or 'PAN PAN' call; it is not necessary to address the call to any specific Center or Station. The Air Traffic Controller at Swanwick or Prestwick will answer the call depending on the location of the aircraft, and initiate appropriate action.

(2) An Emergency communications and aid service is continuously available on 243.0 MHz and 121.5 MHz from a number of military and civil airports and ATC units.

(3) States of emergency are internationally classified as being of two standards -

(a) Distress: The aircraft is threatened by serious and imminent danger and is in need of immediate assistance.

(b) Urgency: The calling station has a very urgent message to transmit concerning the safety of an aircraft, or persons on board or within sight.

(4) An emergency transmission consists of two parts, a preliminary emergency call and the emergency message. The preliminary emergency call should be followed as soon as possible by the message. At the discretion of the aircraft captain the preliminary emergency call may be omitted, but its use is strongly recommended in order to ensure the appropriate reaction from ground control agencies.

(a) The emergency call is one of the following -

1. Distress - MAYDAY, MAYDAY, MAYDAY, Aircraft Call sign (3 times).

2. Urgency - PAN PAN, PAN PAN, PAN PAN, Aircraft Call sign (once).

(b) The emergency message is the emergency call plus as much of the following information as is relevant and as time permits -

1. Estimated position and time.

2. Heading true and airspeed indicated.

3. Flight level or altitude.

4. Type of aircraft.

5. Nature of emergency and assistance required.

6. Intention of captain.

7. Endurance remaining.

(5) After the R/T transmissions the aircraft may be requested to transmit suitable signals followed by its call sign to permit DF stations to determine its position.

(6) An aircraft in an emergency should use ATS frequency in use at the time. If not in contact with an ATS agency use either 243.0 or 121.5 MHz. Subject to national procedures, military pilots should use 243.0 MHz as the primary and 121.5 MHz as the secondary frequency; civil and non-UHF equipped aircraft should call on 121.5 MHz. Within Continental Europe the Emergency Call should be addressed to the controlling or nearest suitable agency.

(7) SSR - The pilot of an aircraft encountering a state of emergency and who has previously been directed by ATC to operate the transponder on a specified code, must maintain this code setting unless otherwise advised by ATC. In all other instances, including the case where the pilot has specific reason to believe it to be the best course of action, the transponder should be set to MODE A Code 7700.

(8) FINAL TRANSMISSION - When ditching, crash landing or bailing out is imminent, transmit the aircraft call sign and, if possible, leave the control switch in transmit position.

(9) CANCELLATION - Should the emergency conditions cease to exist, the pilot must immediately transmit a message on the frequency or frequencies on which the emergency transmission was made.

(10) PRACTICE URGENCY CALLS - To exercise both aircrew and air traffic control staffs in emergency recovery procedures, aircrew are encouraged to initiate practice emergencies. These may be either on 243.0 MHz or the frequency in use. Practice on 243.0 MHz are particularly welcome within the Scottish FIR.

(a) Initial Contact - If in receipt of a radar control service from an Air Traffic Control Radar Unit while in a MRSA, a pilot wishing to carry out a practice urgency call should normally use

the discrete frequency in use at the time to ensure continuity of control. In other situations, the aircraft captain should consider using the ATC frequency in use at the time, unless the nature of the simulated emergency precludes such a course of action, or the captain wishes to make use of the UHF Emergency Fixer Service.

(b) SAROPS ON/EMERGENCY ON - It is usually necessary to cancel practice urgency calls during search and rescue incidents or actual emergency recoveries. The unclassified codewords "SAROPS ON" and "EMERGENCY ON" are broadcast by the D and D Sections to denote the need to cease or delay practice urgency calls.

(c) R/T PROCEDURES - Practice urgency calls may be initiated using the following procedure.

1. The pilot should transmit "PRACTICE PAN" (3 times) and call sign once and then break transmission, awaiting the D and D controllers reply.

2. The D and D controller will respond with either "(Aircraft call sign), this is (Name) center. Your position is _____, continue PRACTICE PAN." or "Aircraft call sign), this is (Name) center. Your position is _____, negative PRACTICE PAN. SAROPS ON/EMERGENCY ON".

3. In the event of a negative reply the pilot should leave the emergency frequency and allow at least 10 minutes to elapse before checking whether the restriction still applies. If permission has been given for the practice, the pilot should broadcast "PRACTICE PAN" (once) followed by "Aircraft call sign (once) followed by as much of the standard emergency message as is relevant.

(11) RADIO FAILURE - Pilots losing two-way communication shall switch the IFF/SIF to Mode 3 code 7600 and see para 1.e. above.

g. UK AIRMISS REPORTING - As soon as possible after being involved in an AIRMISS, the pilot of a military aircraft is to make an initial report by radio to the controller providing the ATC/ Air Defense Radar Service, or to any ATC agency when not in receipt of a service.

(RAF ES)

2. RECOMMENDED PROCEDURES FOR AIRCRAFT IN DISTRESS WHEN INTERCEPTED

a. Attempt radio contact, if possible.

b. If able to maintain a minimum of 210 knots, get in trail formation and the interceptor will lead you to the nearest suitable airport.

c. If unable to maintain a minimum of 210 knots, the interceptor will fly in the direction you should fly, circle to the left and again fly in the proper direction. This procedure will be repeated until the area for descent is reached. The interceptor will circle to the right over the area where you should descend. The distressed aircraft should let down in a descending turn at minimum rate of descent.

3. RECOMMENDED PROCEDURES FOR THE INTERCEPTOR AFTER INTERCEPTION

a. Reduce speed for formation flight or maximum endurance, as required.

b. Attempt radio contact, if possible.

c. Inform controller of contact and follow instructions.

d. If distressed aircraft can maintain minimum of 210 knots, lead to suitable airport as directed by the controller.

e. If distressed aircraft cannot maintain minimum of 210 knots, lead the aircraft, as recommended in 3.c. above, to the location directed by the controller.

f. If the interceptor must leave the distressed aircraft.

(1) If the interceptor turns its lights from steady to blinking for 15 seconds, then breaks formation with lights blinking (night) or wings rocking (day), the distressed aircraft should continue on course.

(2) If the interceptor turns its lights from steady to blinking for 30 seconds, then back to steady and breaks formation with lights on steady (night) or fishtails (day), the distressed aircraft should resume distress orbit.

4. TWO-WAY RADIO FAILURE

a. FAA PROCEDURES

(AIM, FAR 91.185)

(1) IFR FLIGHT PLAN

(a) During two-way radio communications failure, when confronted with a situation not covered in the regulation, pilots are expected to exercise good judgment in whatever action they elect to take. Should the situation so dictate, they should not be reluctant to use the emergency actions contained in flying regulations.

(b) In areas of FAA jurisdiction, should the pilot of an aircraft equipped with a coded radar beacon transponder experience a loss of two-way radio capability, the transponder should be adjusted to reply on Mode 3/A, Code 7600.

(c) Pilots can expect ATC to attempt to communicate by transmitting on guard frequencies and available frequencies of navaids.

(d) VMC - If able to maintain flight in VMC continue flight under VFR and land as soon as practicable and notify ATC. It is not intended that the requirement to "land as soon as practicable" be construed to mean "as soon as possible". The pilot retains his prerogative of exercising his best judgment and is not required to land at an unauthorized airport, at an airport unsuitable for the type of aircraft flown, or to land only minutes short of his intended destination. The primary objective of this provision is to preclude extended IFR operations in the air traffic control system in VMC. When operating "on top" and unable to descend VMC prior to destination, the procedures contained in paragraph (e) below apply.

(e) IMC - If VMC is not encountered, continue the flight according to the following:

1. ROUTE

(FAR 91.185)

a. By the route assigned in the last ATC clearance received;

b. If being radar vectored, by the direct route from the point of radio failure to the fix, route, or airway specified in the vector clearance;

c. In the absence of an assigned route, by the route that ATC has advised may be expected in a further clearance; or

d. In the absence of an assigned route or a route that ATC has advised may be expected in a further clearance, by the route filed in the flight plan.

2. ALTITUDE - At the highest of the following altitudes or flight levels for the route segment being flown:

a. The altitude or flight level assigned in the last ATC clearance received;

b. The minimum altitude (converted, if appropriate, to minimum flight level) for IFR operations (see Section B, Altimeter Changeover Procedures); or

c. The altitude or flight level ATC has advised may be expected in a

further clearance.

NOTE - The intent of the rule is that a pilot who has experienced two- way radio failure should select the appropriate altitude for the particular route segment being flown and make the necessary altitude adjustments for subsequent route segments. If the pilot received an "expect further clearance" containing a higher altitude to expect at a specified time or fix, maintain the highest of the following altitudes until that time/fix:

(1) the last assigned altitude, or

(2) the minimum altitude/flight level for IFR operations.

Upon reaching the time/fix specified, the pilot should commence climbing to the altitude advised to expect. If the radio failure occurs after the time/fix specified, the altitude to be expected is not applicable and the pilot should maintain an altitude consistent with a. or b. above.

If the pilot receives an "expect further clearance" containing a lower altitude, the pilot should maintain the highest of 1 or 2 above until that time/fix specified in paragraph 3. LEAVE CLEARANCE LIMIT, below.

3. LEAVE CLEARANCE LIMIT.

a. When the clearance limit is a fix from which an approach begins, commence descent or descent and approach as close as possible to the expect further clearance time if one has been received, or if one has not been received, as close as possible to the expected time of arrival as calculated from the filed or amended (with ATC) estimated time enroute.

b. If the clearance limit is not a fix from which an approach begins, leave the clearance limit at the expect further clearance time if one has been received, or if none has been received, upon arrival over the clearance limit, and proceed to a fix from which an approach begins and commence descent or descent and approach as close as possible to the estimated time of arrival as calculated from the filed or amended (with ATC) estimated time enroute.

4. RADAR APPROACHES - initiate lost communications procedures if no transmissions are received for approximately one minute while being vectored to final, 15 seconds while on ASR final approach, or five seconds while on PAR final approach.

(AIM 51-37, FAA 7110.65)

a. Attempt contact on a secondary frequency, the previously assigned frequency, the tower frequency, or guard.

b. If unable to re-establish communications and unable to maintain VMC, proceed with a published instrument approach procedure or previously coordinated instructions. Change transponder to appropriate codes.

c. Maintain the last assigned altitude or the minimum safe/sector altitude (emergency safe altitude if more than 25 NM from the facility), whichever is higher, until established on a segment of the published approach.

5. AERIAL REFUELING

(FAA 7610.4)

a. Squawk Code 7600 for at least 2 minutes prior to exiting the Track or Anchor. After exit, continue squawk in accordance with "Procedures for Two-way Radio Failure IFR/VFR".

b. Tanker aircraft which have not received altitude instructions beyond the exit point shall exit the Track or Anchor at the highest altitude in the clearance for the refueling portion of the flight and proceed in accordance with "Procedures for Two Way Radio Failure IFR-VFR".

c. Receiver aircraft which have not received altitude instructions beyond the exit point shall exit the Track or Anchor at the lowest altitude specified in the clearance for the refueling portion of the flight and proceed in accordance with "Procedures for Two Way Radio Failure IFR-VFR".

d. Tanker aircraft enroute to an anchor aerial refueling pattern, which have not received ATC clearance to conduct aerial refueling, should proceed to the anchor point, then proceed direct to the A/R Exit Point (AREX) without delay and then follow lost communications procedures outlined in this section.

b. ICAO PROCEDURES

(ICAO ANNEX 2)

(1) If in visual meteorological conditions, the aircraft shall:

(a) Continue to fly in visual meteorological conditions;

(b) Land at the nearest suitable aerodrome and;

(c) Report its arrival by the most expeditious means to the appropriate air traffic control unit.

(2) If in instrument meteorological conditions or when conditions are such that it does not appear feasible to complete the flight in accordance with paragraph (1) above (see Note 1 below), the aircraft shall:

(a) Unless otherwise prescribed on the basis of regional air navigation agreement, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 20 minutes following the aircraft's failure to report its position over a compulsory reporting point and thereafter adjust level and speed in accordance with the filed flight plan;

(b) Proceed according to the current flight plan route to the appropriate designated navigation aid serving the destination aerodrome and, when required to ensure compliance with (c) below, hold over this aid until commencement of descent;

(c) Commence descent from the navigation aid specified in (b) above at, or as close as possible to, the expected approach time last received and acknowledged; or, if no expected approach time has been received and acknowledged, at, or as close as possible to, the estimated time of arrival resulting from the current flight plan;

(d) Complete a normal instrument approach procedure as specified for the designated navigation aid; and

(e) Land, if possible, within thirty minutes after the estimated time of arrival specified in (c) above or the last acknowledged expected approach time, whichever is later.

NOTE 1. - As evidenced by the meteorological conditions prescribed therein, paragraph (1) above relates to all controlled flights, whereas paragraph (2) relates only to IFR flights.

NOTE 2. - The provision of air traffic control service to other flights operating in the airspace concerned will be based on the premise that an aircraft experiencing communication failure will comply with the rules in paragraph (2) above.

(SPEC/ICAO ANNEX 2; 3.6.5.2)

(3) UNDER RADAR CONTROL - ATC will attempt to communicate by transmitting on all suitable air ground frequencies as well as on the voice features of all available radio navigational or approach aids, requesting pilot acknowledge by executing suitable turns or IFF/SIF response. The required separation between such aircraft and other aircraft in the area will be predicated on the pilot's course of action as indicated by radar monitor. If a flight is departing or enroute, and a radar vector has taken it off the route specified in the ATC clearance which was delivered before vectors were issued, the pilot will return to the route by the most direct course possible. An aircraft following approach control instructions which has departed from the outer fix under radar control will proceed by the most direct course possible to the appropriate approach facility and execute approach.

(ICAO DOC 4444)

(4) RECEIVER FAILURE - If only airborne receiver trouble is suspected, transmit on UHF or VHF (as appropriate) and request a reply on 121.5 or 108.3 MHz. Reports must be transmitted at the scheduled times or positions on the frequency in use, preceded by the words "TRANSMITTING BLIND DUE TO RECEIVER FAILURE". The pilot will transmit his intended message following this by a complete repetition. During this procedure, the pilot will also advise the time of next intended transmission.

(ICAO ANNEX 10)

(5) EMERGENCY DESCENT

(ICAO DOC 4444)

(a) Upon receipt of advice that an aircraft is making an emergency descent through other traffic, all possible action will be taken immediately to safeguard all aircraft concerned. When deemed necessary, air traffic control units will immediately broadcast by means of the appropriate radio aids, or if not possible, request the appropriate communications stations to immediately broadcast an emergency message: EMERGENCY DESCENT AT (place) ALL AIRCRAFT BELOW (level) WITHIN (distance) OF (place or navigation aid) LEAVE IMMEDIATELY, (followed as necessary by specific instructions as to heading or track, etc).

(b) ACTION BY THE PILOT-IN-COMMAND - It is expected that aircraft receiving such a broadcast will clear the specified areas and stand-by on the appropriate radio frequency for further clearances from the air traffic control unit.

(c) SUBSEQUENT ACTION BY THE AIR TRAFFIC CONTROL UNIT - Immediately after such an emergency broadcast has been made the ACC, the approach control office, or the airport control tower concerned will forward further clearances to all aircraft involved as to additional procedures to be followed during and subsequent to the emergency descent.

c. VISUAL SIGNALS WHEN RADIO INOPERATIVE

(AFI 11-205)

NOTE - Signals which have been standardized with NATO and used by Air Force are marked with an asterisk (*).

(1) DAY VISUAL SIGNALS

(a) DESCEND TO LOWER ALTITUDE - Hold hand at top of canopy, palm down, fingers extended and joined, move hand forward and down.

(b) SYSTEM FAILURES: HEFOE System - Clench fist and hold it at top of canopy, then hold up the required number of fingers to denote which system is involved (see 1. through 5. below). If the clenched fist signal is seen but no finger signal is received or the intercepting pilot is unable to understand the signal given, the pilot will assume that the aircraft in distress has one or more systems inoperable and should proceed with extreme caution. The receiving pilot acknowledges the signal by repeating it. (*)

1. Hydraulic - one finger.

2. Electrical - two fingers.

3. Fuel - three fingers.

4. Oxygen - four fingers.

5. Engine - five fingers.

(c) I MUST LAND ON YOUR WING - Pat shoulder, palm down; to prevent confusion with other signals, use right hand for left shoulder and vice versa. To acknowledge, other pilot must give an OK signal; the basic signal indicates a jet approach speed of 130 knots. If the distress aircraft desires a higher approach speed, the pilot must raise one finger for each 10-knot increase desired. The distressed aircraft lands and the escort executes a go-around.

(d) LAND IMMEDIATELY - Close fist and hold it to top of canopy with thumb extended downward, then move arm up and down rapidly. (Do not confuse signal with "GEAR DOWN" signal, which is generally not used at altitude.)

(e) RADIO INOPERATIVE LANDING (NO ASSIST AIRCRAFT AVAILABLE) - Fly aircraft along the side of landing runway, 1000 feet above the field elevation, rocking wings until reaching end of the runway. Turn to downwind and check mobile control or tower for green light on base leg and final approach.

(f) RADIO FAILURE - Tap microphone or earphone and signal as appropriate. (*)

1. RECEIVER FAILURE - With palm of hand over ear position, move hand forward and backward.

2. TRANSMITTER FAILURE - With palm of hand toward and in front of the face, move hand up and down.

(g) COMPLETE ELECTRICAL FAILURE LANDING (NO ASSIST AIRCRAFT AVAILABLE) - Distressed aircraft will fly 500 feet over mobile control or tower, then continue to the far end of the runway and pull up into a wide downwind leg. Proceed with a pattern and landing appropriate for the type aircraft being flown, while watching mobile or tower for signals. The control tower will clear the area of other aircraft and will call the emergency crash equipment to scene.

(h) BAILING OUT OR EJECTION - One or both clenched fists pulled downward across the face to simulate pulling the ejection face curtain. (*)

(i) DESIRE TO LAND - Movement of the hand, flat, with palm down, forward and downward, finishing the movement in a simulated roundout. As an alternate signal, lower the landing gear. (*)

(j) INTERCEPTING SIGNALS - The intercepting aircraft positions itself in front of and usually to the left of the intercepted aircraft and rocks its wings. This is a signal that the interceptor wishes the other aircraft to follow it. The responding porpoising signal in this case indicates distress. (*)

(k) APPROACH END BARRIER ENGAGEMENT:

1. Escorted - Extended tail hook.

2. Unescorted - Fly parallel to active runway at 1000 feet above ground level (AGL) with tail hook extended. Rock wings until reaching departure end of runway, turn to downwind and check mobile control or tower for light signal. If a straight-in barrier engagement must be flown, flash landing light on final.

(2) NIGHT VISUAL SIGNALS

(a) ATTENTION - Attention should first be attracted by switching on the landing light, or other means of illumination.

(b) AIRCRAFT EMERGENCY (MUST LAND AS SOON AS POSSIBLE) - Signal escort aircraft by repeated intermittent flashes with a flashlight, then assume the wing position. This signal indicates a jet approach speed of 130 knots. If a higher approach speed is desired, the pilot must pause after the basic signal, and then blink flashlight at the top of the canopy, once for each 10-knot increase desired. The escort pilot will lead to the nearest suitable field, declare an emergency with the controlling agency, then fly a straight-in approach with the distressed aircraft on the wing. The distressed aircraft lands and escort executes a go-around. (*)

NOTE - On a straight-in approach, the escort aircraft turns the position lights to bright and steady to alert the wingman to prepare to lower flaps and landing gear. The corresponding signal of execution will be for the lead escort aircraft to return position lights to dim and steady. However, if the aircraft is equipped only with a steady-bright light position, the lead escort will blink lights for the alerting signal of execution.

(c) CHANGE LEAD - Pilot of distressed aircraft holds flashlight parallel with canopy rail and sends a steady light while making a straight line from rear toward the front of the canopy.

(d) COMPLETE ELECTRICAL FAILURE LANDING (NO ASSIST AIRCRAFT AVAILABLE) - Procedure same as prescribed for day visual signal. (*)

(e) DESCEND TO LOWEST PRACTICAL ALTITUDE - The pilot makes a rapid vertical movement with a flashlight.

(f) RADIO INOPERATIVE LANDING - Same as day signal procedure.

(g) SIGNAL ACKNOWLEDGMENT - Point a steady light from the flashlight at the signaling aircraft.

(h) APPROACH END BARRIER ENGAGEMENT - Fly parallel to active runway at 1000 feet AGL with gear down and flash landing light. Turn downwind and check mobile control or control tower for light signal. If a straight-in barrier engagement must be flown, flash landing light on final.

(3) INFORMATION SIGNALS

(a) FUEL CHECK - Close fist with the thumb extended, and perform drinking motion with thumb touching the oxygen mask.

(b) FUEL REMAINING - Extend one finger for each 1000 pounds of fuel on board. Extend finger(s) vertically for 1000-5000 pounds; horizontally for 6000-9000 pounds. After signaling 1000 pound increments, pull hand downout of sight then signal 100 pound increments in the same manner. Signal zero with closed fist.

EXAMPLE 1 - To signal 6600 pounds, extend one finger horizontally (indicating 6000 pounds); pull hand down out of sight (indicating a change from thousands to hundreds) extend one finger horizontally (indicating 600 pounds).

EXAMPLE 2 - To signal 13,800 pounds extend one finger vertically, then three fingers vertically (indicating 13,000 pounds); pull hand down out of sight (indicating change from thousands to hundreds), then extend three fingers horizontally (indicating 800 pounds).

EXAMPLE 3 - If the pilot has been briefed to signal gallons, extend finger(s) vertically for 100-500 gallons; horizontally for 600-900 gallon increments. (After signaling 100 gallon increments, pull hand down out of sight; then signal 10 gallon increments in the same manner as above.)

(4) AIRPORT TRAFFIC CONTROL LIGHT SIGNALS - Aircraft without radio equipment should observe the tower for light signals. Acknowledge signals in the daytime by movement of ailerons or rudder on the ground and by rocking wings in the air. Acknowledge signals at night by flashing aircraft lights. Signals from an airport traffic control light gun have the following meanings:

(ICAO ANNEX 2)

COLOR & TYPE OF SIGNAL	ON THE GROUND	IN FLIGHT
STEADY GREEN	Cleared for take-off	Cleared to land
FLASHING GREEN	Cleared to taxi	Return for landing (to be followed by steady green at proper time)
STEADY RED	Stop	Give way to other aircraft and continue circling.
FLASHING RED	Taxi clear of landing area (runway) in use	Airport unsafe - do not land.

COLOR & TYPE OF SIGNAL	ON THE GROUND	IN FLIGHT
FLASHING WHITE	Return to starting point on airport.	① Land at this airport and proceed to apron. Clearance to land and to taxi will be given in due course.
ALTERNATING RED & GREEN	General Warning Signal - Exercise Extreme Caution	
RED PYROTECHNIC (RED FLARE)		Notwithstanding any previous instructions, do not land for the time being.

① ICAO-Procedure. FAA not applicable.

d. COUNTRY/THEATER EXCEPTIONS TO STANDARD PROCEDURES

(1) **ICAO AIR-GROUND COMMUNICATIONS FAILURE EUROPE**

As soon as it is known that two-way communication has failed, ATC shall maintain separation between the aircraft having the communication failure and other aircraft based on the assumption that the aircraft will operate in accordance with the subparagraphs (a) and (b) below.

(a) Visual Meteorological Conditions (VMC) - Except as provided for in paragraph (b) below, a controlled flight experiencing communication failure in VMC shall:

1. Set transponder to Code 7600

2. Continue to fly in VMC

3. Land at the nearest suitable aerodrome

4. Report its arrival time by the most expeditious means to the appropriate ATS unit

(b) Instrument Meteorological Conditions (IMC) - A controlled IFR flight experiencing communication failure in IMC, or where it does not appear feasible to continue in accordance with paragraph (a) above shall:

1. Set transponder Code 7600

2. Maintain for a period of 7 minutes the last assigned speed and level or the minimum flight altitude, if the minimum flight altitude is higher than the last assigned level. The period of 7 minutes commences:

a. if operating on a route without compulsory reporting points or if instructions have been received to omit position reports:

(1) At the time the last assigned level or minimum flight altitude is reached, or

(2) At the time the transponder is set to Code 7600 whichever is later, or

b. If operating on a route with compulsory reporting points and no instructions to omit position reports has been received:

(1) At the time the last assigned level or minimum flight altitude is reached, or

(2) At the previously reported pilot estimate for the compulsory reporting point, or

(3) At the time of a failed report of position over a compulsory reporting point, whichever is later;

NOTE: The period of 7 minutes is to allow the necessary air traffic control and coordination

measures.

3. Thereafter, adjust level and speed in accordance with the filed flight plan;

NOTE: With regard to changes to levels and speed, the filed flight plan, which is the flight plan as filed with an ATS unit by the pilot or a designated representative without any subsequent changes, will be used.

4. If being radar vectored or proceeding offset according to RNAV without a specified limit, proceed in the most direct manner possible to rejoin the current flight plan route no later than the next significant point, taking into consideration the application minimum flight altitude;

NOTE: With regard to the route to be flown or the time to begin descent to the arrival aerodrome, the current flight plan, which is the flight plan, including changes, if any, brought about by subsequent clearances, will be used.

5. Proceed according to the current flight plan route to the appropriate designated navigation aid serving the destination aerodrome and, when required to ensure compliance with paragraph 6. below, hold over this aid until commencement of descent;

6. Commence descent from the navigation aid specified in paragraph 5. above at, or as close as possible to, the expected approach time last received and acknowledged or, if no expected approach time has been received and acknowledged, at, or as close to as possible to, the estimate time of arrival resulting from the current flight plan;

7. Complete a normal instrument approach procedure as specified for the designated navigation aid; and

8. Land, if possible, within thirty minutes after the estimated time of arrival specified in paragraph 6. above or the last acknowledged expected approach time, whichever is later.

NOTE: Pilots are reminded that the aircraft may not be in an area of secondary surveillance radar coverage.

(SPEC/ICAO 7030/4 Amdt 201)

(2) **DENMARK**

(a) RADIO COMMUNICATION FAILURE PROCEDURES

1. Reference DOC 7030/4-ER Part 1.

2. IFR departure and IFR arrival: Two way radio communication failure procedures of DOC 7030 are in force for airports except SID and STAR for Copenhagen/Kastrup and IFR DEP for Copenhagen/Roskilde airports where local procedures have been established.

(SPEC/CIV ENR 1.8-1)

a. From aerodromes where Standard Instrument Departures or other departure procedures are not established, and where no radio communication failure procedures are established, the following procedure shall be applied by departing controlled IFR-flights operating in IMC in the event of two-way radio communication failure:

(1) If the flight has acknowledged an initial or intermediate clearance to climb to a level other than the one specified in the current flight plan for the en-route phase of the flight shall, if no time limit or geographical limit was included in the climb clearance, maintain for a period of three minutes the level to which it was cleared and then continue its flight in accordance with the current flight plan.

(2) A departing controlled IFR flight being vectored by radar away from the route specified in its current flight plan and experiencing two-way radio communication failure should proceed in the most direct manner to the route specified in the current flight plan.

2. IFR arrival

a. At some aerodromes, local procedures are in force for arriving IFR aircraft experiencing two-way radio communication failure to be observed in addition to the procedures of Annex 2. Local procedures and designated navigational aids are shown, for each individual aerodrome in AIP Volume-II.

b. If two-way radio communication fails while an aircraft is under radar control during the approach phase, the aircraft shall continue the approach to the runway in use by other radio aids or visually.

c. If this procedure is not possible, the aircraft should climb/descend to the transition altitude for the aerodrome concerned and perform the approach to the most suitable runway.

(3) **FRANCE**

(a) IFR GAT FLIGHT RADIO COMMUNICATION PROCEDURES: France follows the ICAO AIR-GROUND COMMUNICATIONS EUROPE procedures with the following exceptions:

1. In IMC, instead of proceeding according to the current flight plan route to the appropriate designated **navigation aid** serving the destination aerodrome and holding over the aid, flights are to proceed to the appropriate **initial approach fix (IAF),** hold over this fix, and commence descent from this fix.

2. Pilots are to complete the normal instrument approach as specified for the IAF.

(SPEC/AIP ENR 1.3-4)

(b) OAT FLIGHT RADIO COMMUNICATION FAILURE PROCEDURES

1. OAT TYPE V - Maintain VMC to land at an appropriate airport (destination or alternate). Squawk Mode 3/A 7600 at 10 NM from airport.

(SPEC/MIL ENR 1.2-3)

2. OAT TYPE I - If continuation of flight to destination is possible using independent navigation and fuel is sufficient, squawk Mode 3/A, Code 7600, continue the flight in accordance with last instructions received then the flight plan in effect. Carry out arrival, approach, and landing procedures. Otherwise, squawk EMERGENCY Mode 3/A, Code 7700. Use an appropriate OAT traffic level, in VMC if possible, and use a speed that allows for maximum flight endurance. Continue to the nearest appropriate airport with all navigation and anti-collision lights on. Fly 2 radar distress triangular patterns and then a left-hand racetrack pattern with 5-minute legs. Alternate triangular distress pattern and racetrack pattern until intercepted. Avoid flying over airports and airways as much as possible. If not intercepted by escort aircraft at the end of fuel endurance, carry out arrival, approach and landing procedures. If in VMC with sight of the ground, the pilot may elect to fly OAT V. In this case, the pilot should leave the upper airspace, squawk the OAT V code, maintain sight of ground and follow the OAT V instructions.

(SPEC/MIL ENR 1.3-1)

(4) **GERMANY**

(a) RADIO COMMUNICATIONS FAILURE PROCEDURES-GPS/FMS RNAV 1 in special cases General regulations.

1. After receiving a "TRANSITION" or "TRANSITION AND PROFILE" clearance: Immediate setting of transponder code to Mode A 7600 and continuation of the flight in accordance with the lateral and vertical description of the procedure, including speeds with subsequent final approach of a published Standard Instrument Approach Procedure.

2. After receiving a "DIRECT TO WAYPOINT" or "VIA WAYPOINT..." clearance without follow-up clearance: Immediate setting of transponder code to Mode A 7600 and continuation of the flight via the cleared waypoint(s) and the subsequent part of a GPS/FMS route adjoining it (them), including the charted speed and level instructions, followed by a final approach segment of a published Standard Instrument Approach Procedure.

3. Flights on area navigation arrival routes with arc trajectory (Point Merge): Immediate setting of transponder code to Mode A 7600 and continuation of the flight along the cleared arrival route maintaining the last assigned level. Initiation of descent to the initial approach level after intercepting the course to the initial approach fix. Conduct of an established instrument approach procedure. This radio communication failure procedure is indicated in the relevant publications of the procedures.

(AIP AMDT 02/17, GEN 3.4-42/43)

(b) WIESBADEN AAF:

1. In case of radio communication failure switch immediately to code 7600 and maintain flight planned cruising level or minimum levels as given below (whichever is higher) until reaching METRO (MTR) (RWY 25) or TAUNUS (TAU) (RWY 07). If unable to comply, SQUAWK 7700 and continue at the appropriate level. Note: when MTR, TAU or GEDERN (GED) are N/A, RNAV 1 GPS is authorized to navigate to the respective NAVAIDS, hold and fly the transition for the charted instrument procedures. (GPS is NOT authorized in lieu of the NAVAID defining the final or missed approach track nor WIB/I-TOU DME.)

2. Flights to Wiesbaden AAF from the North and North-East are expected to file via, and have a clearance limit of KERAX. In case of radio communication failure proceed:

a. FOR RUNWAY 25: From KERAX via GED (altitude 5000 ft or above) to MTR. Hold overhead MTR. Descend in MTR holding and commence a standard instrument arrival procedure.

b. FOR RUNWAY 07: From KERAX via GED (altitude 5000 ft or above) to TAU. Hold overhead TAU. Descend in TAU holding and commence a standard instrument arrival procedure.

3. Flights to Wiesbaden AAF from the West are expected to file via and have clearance limit of RAMOB. In case of radio communication failure proceed:

a. FOR RUNWAY 25: From RAMOB (altitude 5000 ft or above) via ROKIM FFM to MTR. Descend in MTR holding and commence a standard instrument arrival procedure.

b. FOR RUNWAY 07: From RAMOB (Altitude 5000 ft or above) to TAU. Hold overhead TAU. Descend in TAU holding and commence a standard instrument arrival procedure.

4. Flights to Wiesbaden AAF from the South and South-East are expected to file via and have a clearance limit of PSA. In case of radio communication failure proceed:

a. FOR RUNWAY 25: From PSA (altitude 5000 ft or above) via GED to MTR. Hold overhead MTR. Descend in MTR holding and commence a standard instrument arrival procedure.

b. FOR RUNWAY 07: From PSA (altitude 5000 ft or above) via GED to TAU. Hold overhead TAU. Descend in TAU holding and commence a standard instrument arrival procedure.

5. Flights to Wiesbaden AAF from the North-West are expected to file via and have a clearance limit of ROLIS. In case of radio communication failure proceed:

a. FOR RUNWAY 25: From ROLIS via TAU (altitude 5000 ft. or above) to MTR. Hold overhead MTR. Descend in MTR holding and commence a standard instrument arrival procedure.

b. FOR RUNWAY 07: From ROLIS (Altitude 5000 ft or above) to TAU. Hold overhead TAU. Descend in TAU holding and commence a standard instrument arrival procedure.

(USA/USA FIL 17-826)

(5) **HONG KONG**

(AIP ENR 1.5-24)

(a) IMC

1. Maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 20 minutes following the aircraft's failure to report its position over a compulsory reporting point and thereafter adjust level and speed in accordance with the filed flight plan;

2. Should a specific entry beacon have been designated and acknowledged prior to the occurrence of communication failure, proceed according to the current flight plan route to the entry beacon, descend to minimum holding altitude in the holding procedure, then carry out published approach for the designated entry beacon;

3. Should no specific entry beacon have been designated and acknowledged prior to the occurrence of communication failure, proceed according to the current flight plan route to the initial approach fix for the appropriate runway and carry out an ILS approach in accordance with the Standard Terminal Arrival Route (STAR) procedure.

4. The flight shall be arranged to arrive over the approach facility as close as possible to the ETA as indicated in the filed plan and revised in accordance with the current flight plan; and

5. Descent shall be commenced as nearly as possible to the EAT last received and acknowledged; or, if no EAT has been received and acknowledged, as nearly as possible to the EAT specified in 4 above.

(6) **ISRAEL**

(AIP ENR 1.6-1)

(a) SDE DOV - Communication failure:

1. Arriving aircraft shall:

a. In VMC: Fly over the runway and join the circuit upon light signal from the TWR.

b. In IMC:

(1) From J14, J15, H14 - fly to VOR NAT 5,000' and hold once (061/241 left turn) before executing cloud break procedure.

(2) From J11 - follow J11 while descending 4,000' to VOR NAT and hold once (190/010 right turn) before executing cloud break procedure.

Note: Holding is required to allow ATM units to clear the required path.

(USAASA/AIP AD 2.6-7 - 2.6-8)

(b) Except when encountering a state of emergency, pilots shall operate transponders and select modes and codes in accordance with ATC instructions. In particular, when entering Tel-Aviv FIR, pilots who have already received specific instructions shall maintain that setting until otherwise instructed.

(c) Pilots of aircraft about to enter Tel-Aviv FIR who have not received specific instructions from ATC concerning the setting of the transponder shall operate the transponder on Mode A/3, Code 6400 before entry and maintain that code setting until otherwise instructed.

(d) If the pilot of an aircraft encountering a state of emergency has previously been directed by ATC to operate the transponder on a specific code, this code setting shall be maintained until otherwise advised.

(e) In all other circumstances, the transponder shall be set to Mode A/3, Code 7700. Notwithstanding the procedure in (a) above, a pilot may select Mode A/3, Code 7700 whenever the nature of the emergency is such that this appears to be the most suitable course of action.

NOTE: Continuous monitoring of responses on Mode A/3, Code 7700 is provided.

(f) In the event of an aircraft radio receiver failure, a pilot shall select Mode A/3, Code 7600 and follow established procedures: subsequent control of the aircraft will be based on those procedures.

(g) Pilots of aircraft in flight subjected to unlawful interference shall endeavor to set the transponder to Mode A, Code 7500 to make the situation known, unless circumstances warrant the use of Mode A/B, Code 7700.

NOTE: Mode A, Code 7500 is permanently monitored in the Tel-Aviv FIR/UIR.

(7) **ITALY**

(a) If an en-route IFR flight operating in IMC experiences an air-ground communications failure, the pilot shall comply with the ICAO two-way radio failure procedures on p. A-8 unless noted below.

(b) If a departing controlled IFR flight operating in IMC experiences an air-ground communication failure and no definite cruising level has been assigned to the pilot, he shall, after having set transponder to code 7600, maintain the level assigned by ATC for a period of 3 minutes and then continue his climb to the cruising level indicated in the field flight plan.

(ENR 1.1-8)

1. If, during the above mentioned 7 minutes of flight, the minimum IFR en-route level is higher than the level assigned by ATC, the pilot shall climb to the minimum IFR en-route level.

2. If the departing aircraft has been vectored by radar away from the route specified in its current flight plan, the pilot shall proceed in the most direct manner to the route specified in the current flight plan.

(c) AVIANO AB - Lost communications procedures are as follows:

1. If no transmissions received for 30 seconds in the pattern or 5/15 seconds on final approach, attempt contact on 362.3 and proceed VFR.

2. If unable, maintain 3000 feet until established on final and proceed with TACAN RWY 5 approach.

(31 OSS-OSA/31 OSS-OSA FIL 07-542)

(d) MILANO TCA Radio Failure/Lost Communication

1. In the event of radio failure, the radio aid designated to descent for landing is NOV/NDB to get via VOG NDB/VOR or SRN L/VOR. In case of NOV/NDB unavailability the fix designated for descent is VERCE or RIGON according to the planned arrival route.

(AD 2 LIMC 1-18)

(e) ROMA TCA Radio Failure/Lost Communication

1. Roma/Fiumicino (LIRF) - In the event of radio failure, the radio aid designated for descent is TAQ NDB/VOR, CMP NDB/VOR or ROM VOR depending on the STAR flown entering Roma TMA. In addition, when parallel ILS approaches are in progress for RWY 16C (parallel taxiway) and RWY 16R, or RWY 16L and RWY 16R, an aircraft experiencing radio failure arriving via TAQ must land on RWY 16R; an aircraft experiencing radio failure arriving via CMP must land on RWY 16L or RWY 16C (parallel taxiway), whichever is in use.

(AD 2 LIRF 1-22)

2. Roma/Ciampino (LIRA) - In the event of radio failure, the radio aid designated for descent is URB NDB. In the event URB NDB is unavailable the radio aid designated for descent is ROM VOR. When the radio failure occurs after the aircraft has left IAF URB NDB (or ROM VOR in case of URB NDB unavailability), for the approach, if in IMC, the pilot shall act as follows:

a. if no radar vector has been received and the aircraft is performing the instrument approach procedure it shall proceed according to the cleared approach.

b. if a radar vector has been received so as to be carried out of the published instrument approach procedure it shall resume the above route by the shortest way and comply with the mentioned procedure.

c. if radio failure happens before the aircraft has been cleared to IAF, it shall proceed according to published STAR and implement a V procedure if URB NDB is efficient or a Z procedure in case of URB NDB unavailability.

(AD 2 LIRA 1-15)

(f) CAPODICHINO CTLZ Radio Failure/Lost Communication

(AD 2 LIRN 1-12)

1. Arriving aircraft:

a. If they are following the standard inbound routes, they shall perform the ICAO radio failure procedures;

b. If a radar vector has been received which took them off the standard inbound routes, and they are in IMC, they shall maintain the last level assigned and proceed with the shortest route to POM VOR DME/NDB.

2. Departing aircraft:

a. If they are following the standard route assigned in the procedural clearance, they shall perform the ICAO radio failure procedures;

b. If they have received a radar vector which took them off the standard route specified in the procedural clearance, they shall regain such route in the shortest way and then them shall adopt the ICAO radio failure procedures.

(8) **JAPAN** - LOST COMMUNICATIONS PROCEDURE FOR ARRIVAL AIRCRAFT UNDER RADAR CONTROL

(a) FUKUOKA - If radio communications with Fukuoka Approach/Radar are lost for 30 seconds after radar contact, squawk Mode A/3 Code 7600 and contact Fukuoka Tower, or

(AIP MINIATURE ED., 14-13)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable, proceed to Fukuoka VORTAC/NDB at the last assigned altitude or 5000 feet, whichever is higher, and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(b) HIROSHIMA - If radio communications with Hiroshima Approach/Radar are lost for 30 seconds, squawk Mode A/3 Code 7600 and attempt to contact Hiroshima Tower, or

(AIP, MINIATURE ED., 22-60)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable, proceed to Hongo VOR/DME at the last assigned altitude or 4000 feet, whichever is higher, and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(c) KAGOSHIMA - If radio communications with Kagoshima Approach/Radar are lost for 30 seconds after radar contact, squawk Mode A/3 Code 7600 and attempt to contact Kagoshima Tower, or

(AIP, MINIATURE ED., 35-9)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable, proceed to Kokubu VOR at the last assigned altitude or 3500 feet,

whichever is higher, and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(d) KUMAMOTO - If radio communications with Kumamoto Approach/Radar are lost for 30 seconds after radar contact, squawk Mode A/3 Code 7600 and attempt to contact Kumamoto Tower, or

(AIP, MINIATURE ED., 45-15)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable, maintain the last assigned altitude or 5200 feet, whichever is higher, proceed to Kumamoto VOR/NDB and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(e) MIYAKO - If radio communications with Shimoji Approach/Radar are lost for 1 minute after radar contact, squawk Mode A/3 Code 7600 and attempt to contact Shimoji Tower, or

(AIP, MINIATURE ED., 62-12)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable, proceed to Miyako-Jima VORTAC/NDB or Shimoji-Shima VOR at the last assigned altitude or 2000 feet, whichever is higher, and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(f) MIYAZAKI - If radio communications with Miyazaki Approach/Radar are lost for 30 seconds, squawk Mode A/3 Code 7600 and contact Miyazaki Tower, or

(AIP, MINIATURE ED., 63-10)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable, proceed to Miyazaki VOR/NDB at last assigned altitude or 4500 feet, whichever is higher, and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(g) NAGASAKI - If radio communications with Nagasaki Approach/Radar are lost for 30 seconds after radar contact, squawk Mode A/3 Code 7600 and attempt to contact Nagasaki Tower, or

(AIP, MINIATURE ED., 65-15)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable, proceed to Nagasaki VOR/DME (Omura NDB) at last assigned altitude or 4000 feet, whichever is higher, and execute instrument approach.

3. Procedures other than above will be issued when the situation requires.

(h) NYUTABARU - If radio communications with Miyazaki Approach/Radar are lost for 1 minute, squawk Mode A/3 Code 7600 and contact Nyuta Tower, or

(AIP, MINIATURE ED., 74-5)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable, proceed to Nyutabaru TACAN NR.1 IAF at last assigned altitude or 4000 feet, whichever is higher, and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(i) OITA - If radio communications with Oita Approach/Radar are lost for 30 seconds, squawk Mode A/3 Code 7600 and contact Oita Tower, or

(AIP, MINIATURE ED., 76-12)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable unable, proceed to Musasi VOR/DME at last assigned altitude or 3500 feet, whichever is higher, and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(j) SENDAI - If radio communications with Sendai Approach/Radar are lost for 1 minute after radar contact, squawk Mode A/3 Code 7600 and attempt to contact Sendai Tower, or

(AIP, MINIATURE ED., 93-15)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable, proceed to Sendai VOR-DME/NDB at last assigned altitude or 3000 feet, whichever is higher, and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(k) SHIMOJI-SHIMA - If radio communications with Shimoji Approach/Radar are lost for 1 minute after radio contact, squawk Mode A/3 Code 7600 and attempt to contact Shimoji Tower, or

(AIP, MINIATURE ED., 95-13)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable, proceed to Miyako-Jima VORTAC/NDB or Shimoji- Shima VOR at last assigned altitude or 2000 feet, whichever is higher, and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(l) TOKYO INTERNATIONAL (HANEDA) - If radio communications with Tokyo Approach/Radar are lost for 1 minute after radar contact, squawk Mode A/3 Code 7600 and attempt to contact Tokyo Tower, or

(AIP, MINIATURE ED., 104-43)

1. If unable, proceed in accordance with visual flight rules, or

2. If unable,

a. When Rwy 34L or Rwy 34R in use proceed to TOMAS, MICKY, Kisarazu VOR/DME or CL NDB at last assigned altitude or 3000 feet, whichever is higher, and execute the instrument approach or

b. When Rwy 22, Rwy 16L or Rwy 16R in use, proceed to DREAM at last assigned altitude or 2000 feet, whichever is higher, and execute the instrument approach.

3. Procedures other than above will be issued when the situation requires.

(9) **NORWAY**

(a) ORLAND DEPARTURES

1. RADIO COMMUNICATIONS FAILURE: Squawk A7600.

a. In case of RCF after departure, ACFT shall maintain last cleared and acknowledged level until passing DME 20 OL, then climb to the cruising level stated in the CPL. After completion of SID, proceed the most direct route to join the cleared ATS-route.

b. ACFT under radar vectoring shall, after setting the transponder to A7600, continue on heading last cleared and acknowledged for 2 minutes, then proceed the most

direct route to join the cleared ATS-route.

(SPEC/AD 2 ENOL 4-2, AD 2 ENOL 4-4)

(10) **OMAN**

(AD 2.OOMS-7)

(a) MUSCAT INTL ARRIVALS

1. VMC, continue flight in VMC.

2. IMC:

a. At or above 9000' QNH, proceed direct to Muscat VOR/DME at last assigned level and comply with ICAO procedure referened in ENR 1.6. If unable to land, climb in the VOR/DME holding pattern and depart controlled airspace at applicable minimum en-route level, proceed to alternate.

b. Below 9000' QNH, climb immediately to the applicable minimum safe altitude, proceed direct to the Muscat VOR/DME and comply with ICAO procedure referenced in ENR 1.6. If unable to land, climb in the VOR/DME holding pattern and depart controlled airspace at applicable minimum en-route level, proceed to alternate. When on a heading to intercept RWY 08/26 extended centerline and a failure is experienced or suspected, make the shortest turn onto a heading of 020 MAG, climb to 5000 ft QNH, proceed to Muscat VOR/DME and comply with ICAO procedure referenced in ENR 1.6. If unable to land, climb in the VOR/DME holding pattern and depart controlled airspace at applicable minimum en-route level, proceed to alternate.

(b) SALALAH ARRIVALS

(AD2.OOSA22)

1. VMC, continue flight in VMC.

2. IMC:

a. At or above 6000', proceed direct to Salalah VOR-DME or LOM at last assigned level and comply with ICAO Procedures. If unable to land, depart controlled airspace on heading 180°, climb to 6000', and proceed to alternate.

b. Below 6000', make the shortest turn to heading 180°, climb to 6000', proceed to Salalah VOR-DME or LOM and comply with ICAO Procedures. If unable to land, depart controlled airspace on heading 180°, climb to 6000', and proceed to alternate.

(11) **PHILIPPINES**

(AIP SUP A005/01)
FOR NINOY AQUINO/MACTAN/SUBIC BAY INTL ARPT

The following lost communications procedure phraseology is standard in radar ATC clearance and shall not be given by the controller unless otherwise requested by the pilot concerned:

"IF NO TRANSMISSIONS ARE RECEIVED FOR ONE MINUTE MAKE A VISUAL APPROACH, IF UNABLE PROCEED TO THE VOR, MAINTAIN 4000 FEET OR LAST ASSIGNED ALTITUDE WHICHEVER IS HIGHER AND CONTACT THE TOWER IMMEDIATELY."

(12) **SINGAPORE**

(a) LOST COM PROCEDURES FOR SINGAPORE CHANGI IFR ARRIVALS

1. Proceed according to the last acknowledged clearance received from Singapore ATC, or

2. If no specific instructions or clearance has been received from Singapore ATC:

a. Maintain the last assigned alt or FL and proceed via airways thereafter

the appropriate Transition and STAR for Rwy 02L/02C to SAMKO Hldg Area (SHA) except for the following STARs:

(1) LAVAX 1A and PASPU 1A shall proceed to SHA after SANAT

b. Commence descent from SHA at or as close as possible to the ETA as indicated on the flt plan.

c. Carry out the appropriate IAP from SHA to land on Rwy 02L/02C.

3. If unable to effect a landing on:

a. Rwy 02L

Carry out missed approach procedure to AKOMA (PU R356/20 DME). Leave AKOMA at 4,000 ft to NYLON Hldg Area (NHA) and execute the appropriate IAP from NHA to land on Rwy 20R or Rwy 20C, as appropriate.

b. Rwy 02C

Carry out missed approach procedure to NYLON Hldg Area (NHA) and execute the appropriate IAP from NHA to land on Rwy 20R or Rwy 20C, as appropriate.

c. Rwy 20R

Carry out missed approach procedure to SAMKO Holding Area (SHA) and execute the appropriate IAP from SHA to land on Rwy 02L or Rwy 02C, as appropriate.

d. Rwy 20C

Carry out missed approach procedure to EXOMO (VTK R158/22 DME). Leave EXOMO at 4,000 ft to SAMKO Hldg Area (SHA) and execute the appropriate IAP from SHA to land on Rwy 02L or Rwy 02C, as appropriate.

(AIP SUP 43/06)

(13) **SYRIA**

(a) Action in case of radio communications failure (RCF) air ground failure. ATC shall maintain separation between the aircraft having the communication failure and other aircraft based on the assumption that the aircraft will operate in accordance with 1 or 2 of the following:

1. In case of Visual Meteorological Conditions (VMC) - Except as provided for in paragraph 2 hereafter, a controlled flight experiencing communication failure in VMC shall:

a. Set transponder to Code 7600.

b. Proceed to the planned destination at the last assigned altitude or the Minimum Enroute Altitude (MEA) whichever is higher.

c. Maintain the last assigned altitude or the MEA whichever is higher except where a change in altitude is required to maintain VMC.

d. If VMC conditions are encountered, maintain VMC and land at the nearest suitable VFR aerodrome.

e. Report its arrival time by the most expeditious means to the appropriate ATS unit.

2. Instrument Meteorological Conditions (IMC) - A controlled IFR flight experiencing communication failure in IMC, or where it does not appear feasible to continue in accordance with paragraph (a) above shall:

a. Set transponder to Code 7600

b. Maintain for a period of 5 minutes the last assigned speed and altitude

or the MEA whichever is higher.

NOTE: The period of 5 minutes commences:

1. If operating on a route without compulsory reporting points or if instructions have been received to omit position reports:

A. At the time the last assigned level or MEA is reached, or

B. At the time the transponder is set to Code 7600 whichever is later, or

2. If operating on a route with compulsory reporting points and no omit position reports has been received:

A. At the time the last assigned level or MEA is reached, or

B. At the Previously reported pilot estimate for the compulsory reporting point, or

C. At the time of a failed report of position over a compulsory reporting point, whichever is later;

NOTE: The period of 5 minutes is to allow the necessary air traffic control and coordination measures.

c. Thereafter, adjust level and speed in accordance with the filed flight plan.

NOTE: With regard to the route to be flown or the time to begin descent to arrival aerodrome, the current flight plan, which is the flight plan, including changes, if any, brought about by subsequent clearances, will be used.

d. Proceed according to the current flight plan route to the appropriate designated navigation aid serving the destination aerodrome and, when required to ensure compliance with Paragraph 2.e., hold over this aid until commencement of descent;

e. Commence descent from the navigation aid specified in paragraph 2.e. at, or as close as possible to, the expected approach time last received and acknowledged or, if no expected approach time has been received and acknowledged, at, or as close to as possible to, the estimate time of arrival resulting from the current flight plan;

f. Complete a normal instrument approach procedure (IAP) as specified for the designated navigation aid; and

g. Land, if possible, within thirty minutes after the estimated time of arrival specified in paragraph 2.e., or the last acknowledged expected approach time, whichever is later.

NOTE: With regard to departing controlled IFR flight IMC:

Departing controlled flight in IMC having acknowledged an initial or intermediate clearance to climb to a level other than the one specified in the current flight plan for the enroute phase of the flight, and experiencing two-way RCF should, if no time limit or geographical limit was included in the climb clearance, maintain for a period of three minutes, the level to which it was cleared and continue its flight in accordance with the current flight plan. The level specified in the current flight plan means the level contained in the enroute ATC clearance acknowledged by the pilot.

NOTE: Where the pilot in command (PIC) of an aircraft encounters conditions not covered by the above procedures, the PIC will be expected to use his or her best judgment in action to be taken.

(14) **UNITED KINGDOM**

(ENR 1-1-3-2/1-1-3-3)

(a) IMC

1. A flight experiencing communication failure in IMC shall:

a. Operate secondary radar transponder on Mode A, Code 7600 with Mode C.

b. Maintain, for a period of 7 minutes, the current speed and last assigned level or minimum safe altitude, if this higher. The period of seven minutes begins when the transponder is set to 7600 and this should be done as soon as the pilot has detected communications failure.

(1) If failure occurs when the aircraft is following a notified departure procedure such as a Standard Instrument Departure (SID) and clearance to climb, or re-routing instructions have not been given, the procedure should be flown in accordance with the published lateral track and vertical profile, including any stepped climbs, until the last position, fix, or waypoint, published for the procedure, has been reached. Then, for that part of the period of 7 minutes that may remain, maintain the current speed and last assigned level or minimum safe altitude, if this higher.

(2) Thereafter, adjust the speed and level in accordance with the current flight plan and continue the flight to the appropriate designated landing aid serving the destination aerodrome. Attempt to transmit position reports and altitude/flight level on the appropriate frequency when over routine reporting points.

c. If being radar vectored, or proceeding offset according to RNAV, without a specified limit, continue in accordance with ATC instructions last acknowledged for 3 minutes only and then proceed in the most direct manner possible to rejoin the current flight planned route. Pilots should ensure that they remain at, or above, the minimum safe altitude.

(1) If being radar vectored by an Approach Control Radar Unit (call sign DIRECTOR/RADAR/APPROACH), comply with the loss of communications procedures notified on the appropriate Radar Vectoring Chart as detailed in the AD 2 section of the UK AIP.

d. Arrange the flight to arrive over the appropriate designated landing aid serving the destination aerodrome as closely as possible to the ETA last acknowledged by ATC. If no such ETA has been acknowledged, the pilot should use an ETA derived from the last acknowledged position report and the flight-planned times for the subsequent sections of the flight.

(1) Arrange the flight to arrive over the appropriate designated landing aid serving the destination aerodrome at the highest notified Minimum Sector Altitude taking account of en-route terrain clearance requirements.

(2) If following a notified Standard Arrival Route (STAR), after the seven minute period detailed in paragraph (b) has been completed, pilots should arrange descent as close as possible to the published descent planning profile. If no descent profile is published, pilots should arrange descent to be at the minimum published level at the appropriate designated Initial Approach fix.

e. On reaching the appropriate designated landing aid serving the destination aerodrome, begin further descent at the last acknowledged EAT. If no EAT has been acknowledged, the descent should be started at the ETA calculated in (d), above, or as close as possible to this time. If necessary, remain within the holding pattern until the minimum holding level, published for the facility, has been reached. The rate of descent in holding patterns should not be less than 500 ft per minute. If 'Delay not determined' has been given, do not attempt to land at the destination aerodrome, divert to the alternate destination specified in the current flight plan or another suitable airfield.

f. Carry out the notified instrument approach procedure as specified for the designated navigational aid and, if possible, land within 30 minutes of the EAT or the calculated ETA. When practical, pilots should take account of visual landing aids and keep watch for instructions that may be issued by visual signals from the ground.

g. If communications failure occurs during an approach directed by radar, continue visually, or by using an alternative aid. If this is not practical, carry out the missed approach procedure and continue to a holding facility appropriate to the airfield of intended landing for which an instrument approach is notified and then carry out that procedure.

5. HIJACKED AIRCRAFT

(ICAO DOC 4444 RAC/501/11)

a. U.S. and ICAO ATC facilities recognize Mode 3/A, Code 7500, as meaning that the aircraft is being hijacked/forced to a new destination. Use Code 7500 to indicate a hijacking threat when under ATC radar control. When the situation precludes Code 7500 replies, the spoken words indicating such a squawk will receive similar ATC interpretation and action. Air traffic controllers will acknowledge and confirm receipt by asking the pilot if the code is intentionally being used. If the pilot replies in the affirmative or does not reply, the controller will not ask further questions but will flight follow, respond to pilot's requests, and notify appropriate authorities.

b. The aircraft will be flight followed with normal hand-off procedures used. The receiving facility will be advised of the actions that have been taken to safeguard the hijacked aircraft, i.e., escort aircraft, search and rescue facilities, etc.

c. If aircraft are dispatched to intercept and escort the hijacked aircraft, all possible assistance should be provided the intercepting aircraft to aid in placing it in a position behind the hijacked aircraft.

6. IN-FLIGHT TECHNICAL ASSISTANCE

(AFFSA/AFFSA)

a. ANY U.S. MILITARY AIRCRAFT requiring in-flight technical assistance may use the communications and/or command and control facilities listed below.

b. Air National Guard (ANG) Operations Center at Andrews AFB may be contacted by phone patch through any Global HF System Station. Request the ANG Operations Center (call sign MINUTEMAN) DSN 858-6001 or C301-981-6001.

c. Air Mobility Command (AMC) Operations Centers may be contacted as described in Global HF System Stations, Section B.

d. The Air Combat Command (ACC) Command Center may be contacted at DSN 574-1555, C757-764-1555 by phone patch through any Global HF System Station.

(AFFSA-XOS/AFFSA-XOS FIL 16-295)

7. DISTRESS AND URGENCY SIGNALS - ICAO

(ICAO ANNEX 2)

NOTE - None of the provisions in this section shall prevent the use, by an aircraft in distress, of any means at its disposal to attract attention, make known its position and obtain help.

a. DISTRESS SIGNALS - The following signals, used either together or separately, mean that grave and imminent danger threatens, and immediate assistance is requested:

(1) A signal made by radiotelegraphy or by any other signaling method consisting of the group SOS in the Morse Code;

(2) A signal sent by radiotelephony consisting of the spoken word MAYDAY;

(3) Rockets or shells throwing red stars, fired one at a time at short intervals;

(4) A rocket parachute flare or a hand flare showing a red light;

(5) The two-flag signal corresponding to the letters NC of the international Code of Signals (Fig 1).

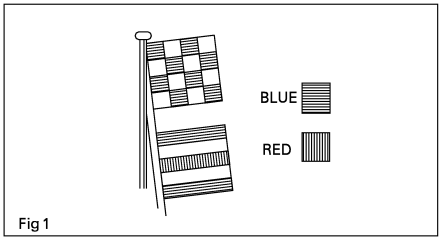


Fig 1

(6) A signal consisting of a square flag having above it or below it a ball or anything resembling a ball (Fig 2).

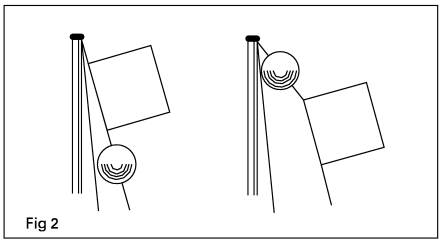


Fig 2

(7) A gun or other explosive signal fired at intervals of about 1 minute.

(8) A continuous sounding with a fog-signaling apparatus.

(9) Flames on a vessel (as from a burning tar barrel, oil barrel, etc.).

(10) A smoke signal giving off a volume of orange-colored smoke.

(11) Slowly and repeatedly raising and lowering arms outstretched to each side.

(12) Another well recognized National Distress signal is the displaying of the American Flag upside down.

(13) Flashes from a signal mirror.

NOTE - The radio telegraph alarm signal consists of a series of twelve dashes sent in 1 minute, the duration of each dash being 4 seconds, and the duration of the interval between 2 consecutive dashes being 1 second. (This may precede the distress signal SOS.)

NOTE - The radio-telephone alarm signal consists of 2 tones transmitted alternately over periods of from 30 seconds to 1 minute. (This may precede the distress call "MAYDAY").

b. URGENCY SIGNALS

(1) The following signals, used either together or separately, mean that an aircraft wishes to give notice of difficulties which compel it to land without requiring immediate assistance:

(a) The repeated switching on and off of the landing lights; or

(b) The repeated switching on and off of the navigation lights in such a manner as to be distinct from flashing navigation lights.

(2) The following signals, used either together or separately, mean that an aircraft has a very urgent message to transmit concerning the safety of a ship, aircraft or other vehicle, or of some person on board or within sight:

(a) A signal made by radiotelegraphy or by any other signaling method consisting of the group XXX;

(b) A signal sent by radiotelephony consisting of the spoken word PAN PAN.

8. AIRCRAFT WITNESSING DISTRESS

(ICAO ANNEX 2)

a. When a pilot in command observes that another aircraft or a surface craft is in distress, pilot will, unless unable to do so, or in the circumstances of the case considers it unreasonable or unnecessary:

NOTE - Each ICAO contracting state shall ensure that wreckage resulting from aircraft accidents within its territory is removed, obliterated, or charted to prevent subsequent confusion.

(1) Keep distressed craft in sight until its presence is no longer necessary or no longer able to remain in the vicinity.

(2) If the position is not known with certainty, take such action as to determine it.

(3) Report to the rescue coordination center or air traffic services unit, as much of the following information as possible.

(a) Type of craft in distress, its identification and condition.

(b) Position in lat/long or distance/bearing from a landmark or NAVAID.

(c) Time of observation expressed in UTC on the 24 hour system.

(d) Number of persons observed.

(e) Whether persons have been seen to abandon distressed craft.

(f) Number of persons observed to be afloat.

(g) Apparent physical condition of survivors.

(4) Act as instructed by the rescue coordination center.

b. The pilot in command of the first aircraft to reach the place of the accident will, if unable to establish communication with the rescue coordination center or air traffic services unit, take charge of activities of all other aircraft to arrive until such time as by mutual agreement, responsibility is handed to that aircraft best able to provide communication under the prevailing circumstances.

c. Whenever a distress call and/or message is intercepted on the radiotelegraphy or radiotelephony by a pilot in command of an aircraft, other than a search aircraft, he will:

(1) Plot the position of the craft in distress, if given.

(2) If possible, take a bearing on the transmission.

(3) At the pilot's discretion, while awaiting instructions, proceed to the position given in the distress signal.

NOTE - In addition, compliance is required with communications procedures.

d. When it is necessary for an aircraft to direct a surface craft to the place where an aircraft or surface craft is in distress, the aircraft will do so by transmitting precise instructions by any means at its disposal. When this is not possible, the following procedure will be used:

(1) Circle the surface craft at least once.

(2) Cross the projected course of the surface craft close ahead, at a low altitude, opening and closing the throttle or changing the propeller pitch.

(3) Heading in the direction in which the surface craft is to be directed.

e. Crossing the wake of the surface craft, close astern, at a low altitude, opening and closing the throttle or changing the propeller pitch means that the assistance of the surface craft to which the signal is directed is no longer required.

f. Current maritime signaling procedures include:

(1) For acknowledgment of receipt of signal:

(a) Hoisting of the "Code Pennant" (vertical red and white stripes) close up, (meaning understood).

(b) The flashing of a succession of "T's" by signal lamp in Morse code.

(c) The changing of heading.

(2) For indicating the inability to comply:

(a) Hoisting of the international flag "N" (a blue and white checkered square).

(b) The flashing of a succession of "N's" in the Morse code.)

g. Upon receiving a signal from an Emergency Position Indicating Radio Beacon (EPIRB)/ Emergency Locating Transmitter (ELT) on 121.5 or 243.0 MHz, report the following information:

(1) Position/bearing and time first heard.

(2) Position/bearing and time last heard.

(3) Position/bearing at maximum signal strength.

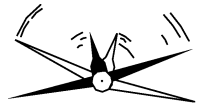
(4) Flight level/frequency.

9. AIR/GROUND EMERGENCY PROCEDURES

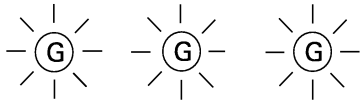
(ICAO DOC 7333)

a. STANDARD AIRCRAFT ACKNOWLEDGMENTS

MESSAGE RECEIVED AND UNDERSTOOD: Aircraft will indicate that ground signals have been seen and understood by -



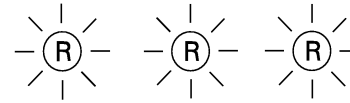
DAY OR MOONLIGHT: Rocking from side to side.



NIGHT: Making green flashes with signal lamp.

MESSAGE RECEIVED AND NOT UNDERSTOOD: Aircraft will indicate that ground signals have been seen but not understood by -

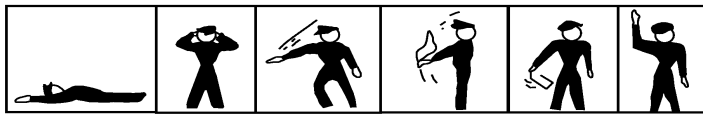
DAY OR MOONLIGHT: Making a complete right hand circle.

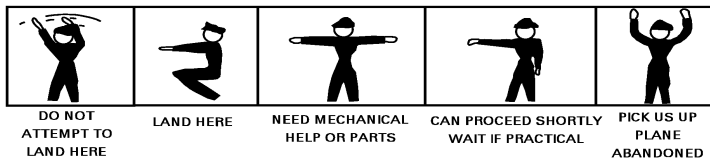


NIGHT: Making red flashes with signal lamp.

b. BODY SIGNALS

INSTRUCTIONS: If you are able to attract the attention of the pilot of a rescue airplane, the body signals illustrated below can be used to transmit messages to him as he circles over your location. Stand in the open when you make the signals. Be sure that the background, as seen from the air, is not confusing. Go through the motions slowly and repeat each signal until you are positive that the pilot understands you.





c. INTERNATIONAL GROUND/AIR EMERGENCY CODE

(1) INSTRUCTIONS

(a) Lay out symbols by using strips of fabric or parachutes, pieces of wood, stones, or any available material.

(b) Provide as much color contrast as possible between material used for symbols and background against which symbols are exposed.

(c) Symbols should be at least 8 feet high or larger. Care should be taken to lay out symbols exactly as shown.

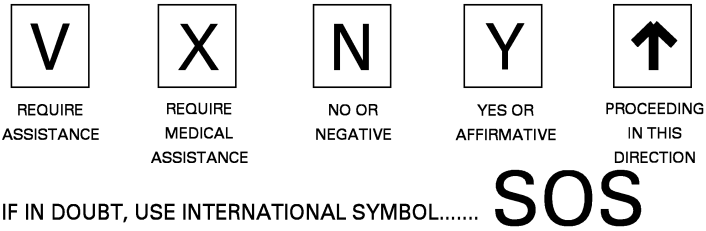
(d) In addition to using symbols, every effort is to be made to attract attention by means of radio, flares, smoke, or other available means.

(e) On snow covered ground, signals can be made by dragging, shoveling or tramping. Depressed areas forming symbols will appear black from the air.

(f) Pilot should acknowledge message by using signals described in paragraph 8.a. DISTRESS SIGNALS.

d. GROUND/AIR VISUAL CODE FOR USE BY SURVIVORS

(ICAO ANNEX 12, ICAO DOC 7333)

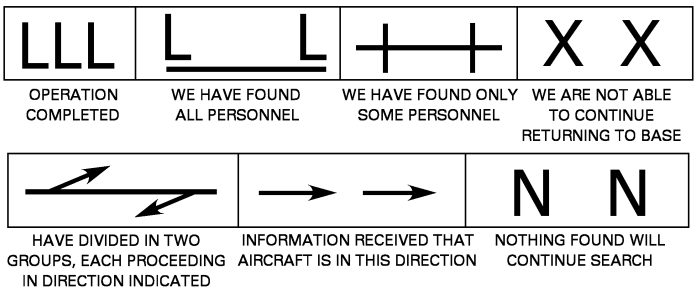


IF IN DOUBT, USE INTERNATIONAL SYMBOL..... SOS

Direction of your aircraft approach may cause difficulty in proper recognition.
Draw signal as you see it to fit the symbols as outlined here.

e. GROUND/AIR VISUAL CODE FOR USE BY SEARCH PARTIES

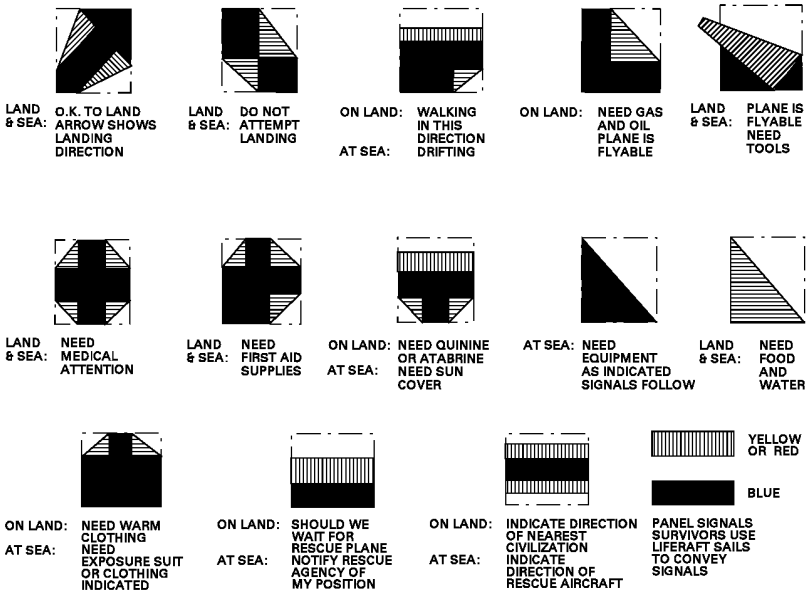
(ICAO ANNEX 12, ICAO DOC 7333)



f. PAULIN SYMBOLS

(ICAO DOC 7333)

INSTRUCTIONS: Either USAF or USN paulins may be used to form signals. The paulins are blue on one side and yellow or red on the other. They are held down in wind with rocks, stones, or pegs. In life rafts, lines are tied to grommets to facilitate holding. Wood may be tied to edge and floated in center of small lakes or slow rivers.



NOTE - (1) It is preferable to use the International Ground Air Emergency Code. The symbols can be made larger and hence more recognizable from the air.

(2) Paulins should be folded to form the signals shown on this page. A paulin is an extremely valuable shelter, poncho, floor cloth, sleeping bag cover, sunshade, or rain collector.

10. INTERCEPTION SIGNALS

INTERCEPTION SIGNALS

COUNTRY EXCEPTIONS TO ICAO STANDARD ARE LISTED BELOW
(ICAO STANDARD IS ON BACK COVER OF FIH)

INTERCEPTION SIGNALS - ALGERIA

(AIP ENR 1-12-1 & 1-12-2)

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
1	DAY - Rocking aircraft and passing left of intercepted aircraft then proceeding on course. (Weather & terrain may require right positioning instead.)	You have been intercepted. Follow me.	Rocking wings.	Understood. Will comply.
	NIGHT - Same maneuver while blinking lights.		Rocking wings while blinking lights.	

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
			HELICOPTERS: DAY & NIGHT - Alternate left/right roll with blinking lights.	
	NOTE: If intercepted aircraft is unable to keep pace with the intercepting aircraft, the latter is expected to fly a series of race-track patterns and rock the aircraft each time it passes the intercepted aircraft.			
2	DAY & NIGHT - Rapid breakaway maneuver from intercepted aircraft, climbing turn of 90 degrees or more without crossing line of flight of intercepted aircraft.	You may proceed.	Lower gear. Follow intercepting aircraft. If after overflying runway it appears safe to land, proceed to land.	Understood. Will comply.
3	DAY - Execute horizontal circuits around the airport, lower landing gear, and overfly landing runway in the landing direction. If intercepted aircraft is a helicopter, overfly the space for landing it.	Land at this airport.	Lower gear. Follow intercepting aircraft. If after overflying runway it appears safe to land, proceed to land. If at night, turn on landing lights.	Understood. Will comply.
4	If intercepted aircraft cannot comply retract landing gear and send Series 1 signals. Or if disengaging from intercepted aircraft, use Series 2 signals.	Roger. Follow me.	Retract landing gear while overflying landing runway at greater than 1000 ft. Continue to execute circuits around and above the airport while blinking all lights.	Unable to comply. Cannot land at this airfield.
DISTRESS INTERCEPTION SIGNALS				
	Use Series 2 signal	You may proceed.	DAY OR NIGHT: Blink all lights in an irregular fashion.	In Distress.

INTERCEPTION SIGNALS - CUBA

(AIP RAC 8-1)

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
1	DAY - Rocking wings from a position in front and, normally, to the left of intercepted aircraft and, after acknowledgment, a slow level turn, normally to the left, on to the desired heading.	You have been intercepted. Follow me.	AIRPLANES: DAY - Rocking wings and following.	Understood, will comply.
	NIGHT - Same and, in addition, flashing navigational lights at irregular intervals.		NIGHT - Same and, in addition, flashing navigational lights at irregular intervals.	
	Note 1. - Meteorological conditions or terrain may require the intercepting aircraft to take up a position in front and to the right of the intercepted aircraft and to make the subsequent turn to the right.		HELICOPTERS: DAY or NIGHT - Rocking aircraft, flashing navigational lights at irregular intervals and following.	
	Note 2. - If the intercepted aircraft is not able to keep pace with the intercepting aircraft, the latter is expected to fly a series of race-track patterns and to rock its wings each time it passes the intercepted aircraft.		**NOTE -** Additional action required to be taken by intercepted aircraft is prescribed in "ACTION BY INTERCEPTED AIRCRAFT."	
2	DAY or NIGHT - An abrupt breakaway from the intercepted aircraft consisting of a climbing turn of 90 degrees or more without crossing the line of flight of the intercepted aircraft.	You may proceed.	AIRPLANES: DAY or NIGHT - Rocking wings.	Understood, will comply.
			HELICOPTERS: DAY or NIGHT - Rocking aircraft.	

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
3	DAY - Circling airport, lowering landing gear and overflying runway in direction of landing or, if the intercepted aircraft is a helicopter, overflying the helicopter landing area.	Land at this airport.	AIRPLANES: DAY - Lowering landing gear, following the intercepting aircraft and, if after overflying the runway landing is considered safe, proceeding to land.	Understood, will comply.
	NIGHT - Same and, in addition, showing steady landing lights.		NIGHT - Same and, in addition, showing steady landing lights (if carried). HELICOPTERS: DAY or NIGHT - Following the intercepting aircraft and proceeding to land, showing a steady landing light (if carried).	
4	AIRPLANES: DAY - Raising landing gear while passing over landing runway at a height exceeding 300 m (1000 ft) but not exceeding 600 m (2000 ft) above the airport level, and continuing to circle the airport.	Airport you have designated is inadequate.	DAY or NIGHT - If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate airport, the intercepting aircraft raises its landing gear and uses the Series 1 signals prescribed for intercepting aircraft.	Understood, follow me.
	NIGHT - Flashing landing lights while passing over landing runway at a height exceeding 300 m (1000 ft) but not exceeding 600 m (2000 ft) above the airport level, and continuing to circle the airport. If unable to flash landing lights, flash any other lights available.		If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood, you may proceed.

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
5	AIRPLANES: DAY or NIGHT - Regular switching on and off of all available lights but in such a manner as to be distinct from flashing lights.	Cannot comply.	DAY or NIGHT - Use Series 2 signals prescribed for intercepting aircraft.	Understood.
6	AIRPLANES: DAY or NIGHT - Irregular flashing of all available lights. HELICOPTERS: DAY or NIGHT - Irregular flashing of all available lights.	In distress.	DAY or NIGHT - Use Series 2 signals prescribed for intercepting aircraft.	Understood.

INTERCEPTION SIGNALS -

REPUBLIC OF SOUTH AFRICA

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
1	DAY - Rocking wings while in front and to left of intercepted aircraft, and after acknowledgment a slow level turn on to desired course.	Follow me away from a prohibited area.	Rocking wings.	Understood, will comply.
	DAY - Rocking wings while in front and to right of intercepted aircraft, and after acknowledgment a slow level turn on to a desired course.	Follow me to a landing area.	Rocking wings.	Understood, will comply.
	NIGHT - As for day and in addition flashing navigational and, if available, landing lights at irregular intervals.		Rocking wings and showing steady landing light.	
2	DAY or NIGHT - An abrupt break away upwards of 90° or more without crossing the line of flight of the intercepted aircraft.	You may proceed.	Rocking wings if considered safe, at night showing steady landing light.	Understood, will comply.
3	DAY - Circling landing area, lowering landing gear and overflying the direction of landing.	Land on this landing area.	Same as interceptor and proceed to land if considered (safe, at night showing steady landing light.	Understood, will comply.
	NIGHT - As for day and showing steady landing light.			
4	DAY - Rocking wings (if fixed landing gear) or raising landing gear while passing over landing area at a height feet between 1000 feet and 2000.	Landing area unsuitable.	First or second series dependent on intercepting aircraft intent.	Understood, will comply.

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
	NIGHT - Flashing light or any other light available while passing over landing area at a height between 1000 feet and 2000 feet and continue circling landing area.			

INTERCEPTION SIGNALS - SWEDEN

(AIP RAC 8-1)

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
1	DAY - Rocking wings three times from a position in front and, normally, to the left of intercepted aircraft and, after acknowledgment, a slow turn, normally to the left, on to the desired heading.	Caution! You have been intercepted. Follow me.	AIRPLANES: DAY - Rocking wings and following.	Understood. Will comply.
	NIGHT - Same and, in addition, flashing navigational lights at irregular intervals.		NIGHT - Same and, in addition, flashing navigational lights at irregular intervals.	
	If not acknowledged: DAY - Rocking wings several times (10-20).	Follow my instructions, otherwise your safety cannot be guaranteed.	HELICOPTERS: DAY or NIGHT - Rocking aircraft, flashing navigational lights at irregular intervals and following.	
	NIGHT - Same and, in addition, flashing navigational lights at irregular intervals during an extended period.		**NOTE:** Additional action required to be taken by intercepted aircraft is prescribed in para 4.	
	NOTE 1 - Meteorological conditions or terrain may require the intercepting aircraft to take up a position in front and to the right of the intercepted aircraft and to make the subsequent turn to the right.			

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
	NOTE 2 - If the intercepted aircraft is not able to keep pace with the intercepting aircraft, the latter is expected to fly a series of the race-track patterns and to rock its wings each time it passes the intercepted aircraft.			
2	DAY or NIGHT - An abrupt breakaway maneuver from the intercepted aircraft consisting of a climbing turn of 90 degrees or more without crossing the line of flight of the intercepted aircraft.	You may proceed.	AIRPLANES: DAY or NIGHT Rocking wings. HELICOPTERS: DAY or NIGHT Rocking aircraft.	Understood. Will comply.
3	DAY - Circling airport, lowering landing gear and overflying runway in direction of landing or, if the intercepted aircraft is a helicopter, overflying the helicopter landing area. NIGHT - Same and, in addition, showing steady landing lights.	Land at this airport.	AIRPLANES: DAY - Lowering landing gear, following the intercepting aircraft and, if after overflying the runway landing is considered safe, proceeding to land. NIGHT - Same and, in addition, showing steady landing lights (if carried). HELICOPTERS: DAY or NIGHT - Following the intercepting aircraft and proceeding to land, showing a steady landing light (if carried).	Understood. Will comply.

Signals initiated by intercepted aircraft and responses by intercepting aircraft.

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
4	AIRPLANES: DAY - Raising landing gear while passing over landing runway at a height exceeding 1000 ft (300 m) but not exceeding 2000 ft (600 m) above the airport level, and continuing to circle the airport.	Airport you have designated is inadequate.	DAY or NIGHT - If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate airport, the intercepting aircraft raises its landing gear and uses the Series 1 signals prescribed for intercepting aircraft.	Understood. Follow me.
	NIGHT - Flashing landing lights while passing over landing runway at a height exceeding 1000 ft (300 m) but not exceeding 2000 ft (600m) above the airport level, and continuing to circle the airport. If unable to flash landing lights, flash any other lights available.		If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood. You may proceed.
5	AIRPLANES: DAY or NIGHT - Regular switching on and off of all available lights but in such a manner as to be distinct from flashing lights.	Cannot comply.	DAY or NIGHT - Use Series 2 signals prescribed for intercepting aircraft.	Understood.
6	AIRPLANES: DAY or NIGHT - Irregular flashing of all available lights. HELICOPTERS: DAY or NIGHT - Irregular flashing of all available lights.	In distress.	DAY or NIGHT - Use Series 2 signals prescribed for intercepting aircraft.	Understood.

INTERCEPTION SIGNALS - TAIWAN

(AIP ENR1.12)

1. If interception by CAF aircraft is imminent, the intercepted aircraft will:

a. Respond to visual signals from interception aircraft, and do not perform any maneuvers which maybe construed as hostile; fly straight and level.

b. Notify, if possible, appropriate air traffic services unit.

c. Attempt to establish communications with interceptor aircraft or appropriate intercept control unit on 243.0 MHz, 121.5 MHz.

d. Unless otherwise instructed by the appropriate air traffic service unit, set transponder code on 7700.

e. Safety of aircraft under interception will not be secure if they fail to obey any instruction given by the interceptor.

f. Taiwan will not be responsible for any damage caused to aircraft by the interceptors or other devices due to non-compliance with the Air Defense Identification or Air Traffic Control Regulations and Procedures.

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
1	DAY - Rocking wings three times from a position in front and to the left (or right) of the intercepted aircraft. NIGHT - As day with the addition of flashing navigation lights three times.	Use caution you are violating this nation's airspace.	DAY - Rocking wings. NIGHT - Same as day with the addition of flashing navigation lights.	Roger, wings.
2	DAY - The interceptor intends to lead intercepted aircraft away from an area or to an intended airport. The interceptor will rock his wings several times from a position in front of intercepted aircraft and after acknowledgment a slow level turn on to the desired course. NIGHT - Same as day with the addition of a series of flashing lights at irregular intervals by any means available.	Follow me.	DAY or NIGHT - Rocking wings and following.	Roger, wilco.
3	An abrupt break away upwards of 90 degrees or more.	You may proceed.	DAY or NIGHT - Rocking wings and following.	Roger, wilco.

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
4	Circling airport and lowering landing gear.	Land at this airport.	Following the interceptor lowering landing gear and proceed to land.	Roger, wilco.
			DAY - Rocking wings while passing over landing runway at a height exceeding 1,000 feet above the level of the airport.	Airport that you have designated is inadequate.
			NIGHT - Same as day with the addition of flashing landing lights, if unable to flash landing lights flash any lights available.	
5	If it is desired that the intercepted aircraft follow the interceptor or other aircraft to an alternative airport, the interceptor use the series 2 signals.	Follow me.	Rocking wings and following.	Roger, wilco.
6	DAY - Pull up and down several times from a position abreast the intercepted aircraft.	If you do not obey our instructions your safety will not be secured.	DAY - Rocking wings.	Roger, wilco.
	NIGHT - Same as day with the addition of flashing navigation lights several times.		NIGHT - Same as day with the addition of flashing navigation lights.	

INTERCEPTION SIGNALS - SERBIA

(AIP RAC 1)

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
1	DAY - Approach (at least to 100 meters) to the left side in the direction and at level of the intercepted aircraft and multiple wing wags.	Follow me.	DAY - Mild rocking of wings to each side.	Understood and will follow you.
	NIGHT - The same as during day adding multiple switch on and off navigation lights.	Follow me.	NIGHT - Multiple switch on and off navigation lights.	Understood and will follow you.
2	DAY or NIGHT - An abrupt break away of 90 degrees or more from the direction of the flight.	You may proceed.	DAY - Mild rocking of wings to each side. NIGHT - Multiple switch on and off navigation lights.	Understood.
3	DAY - Circling of airport and lowering of landing gear.	Land at this airport.	Same as interceptor and proceed to land.	Understood and will land.
	NIGHT - Circling of airport and switch on landing lights.	Land at this airport.	Same as interceptor and proceed to land.	Understood and will land.
4	DAY - Approach (at least to 100 meters) to the left side in the direction and at the level of the intercepted aircraft and two short bursts fired.	Follow me this is the last warning; your safety is not guaranteed.	DAY - Mild rocking of wings to each side.	Understood and will follow you.
	NIGHT - The same as during day adding multiple switch on and off navigation lights.	Follow me this is the last warning; your safety is not guaranteed.	NIGHT - Multiple switch on and off navigation lights.	Understood and will follow you.

NOTE - Interceptor aircraft signal under series number 1 has to be used before the interceptor uses the procedure under series number 4.

A-44 EMERGENCY PROCEDURES

11. PROCEDURES FOR THE PREVENTION OF DANGEROUS MILITARY ACTIVITIES BETWEEN THE US AND RUSSIA -

(JCS J-S/AFFSA A3IF FIL 10-047)

a. An agreement between the United States and Russia seeks to ensure the safety of the personnel and equipment of each country's armed forces by avoiding certain dangerous military activities and expeditiously and peacefully resolving related incidents.

b. When in the proximity to one another, the armed forces of each country are to refrain from:

(1) dangerous use of lasers.

(2) dangerous interference with command and control systems.

(3) certain activities in mutually agreed upon Special Caution Areas.

c. The US and Russia have also agreed to follow special procedures when the armed forces of one country enters, either unintentionally or as a result of force majeure, into the national territory of the other country.

d. See CDRNORAD CONPLAN 3310-07 (23 Jan 07), Appendix 34 to Annex C, Page C-34-1, for more specific guidance on procedures regarding Dangerous Military Activities.

e. COMMUNICATIONS - The following frequencies will be used to establish radio communications.

(1) between US and Russian aircraft, or between an aircraft and air traffic control or monitoring facility of the two armed forces, on 243.0 MHz (International Distress and Emergency frequency) or 121.5 MHz (International Aeronautical Emergency frequency), or on HF band frequency 4125.0 kHz AM (alternate 6215.5 kHz AM), both agreed International Distress and Safety Calling/Reply frequencies for contact beyond line of sight. After the phrase "Radio Contact" is exchanged, use frequencies 278.0 MHz, 130.0 MHz, or 4125 kHz, respectively, for sustained radio communications.

(2) between a US or Russian ship and an aircraft of the opposite force: on 243.0 MHz (International Distress and Emergency frequency) or 121.5 MHz (International Aeronautical Emergency frequency). After initial contact is made and the parties agree, they will move to 278.0 MHz or 130.0 MHz respectively when sustained communications are required.

NOTE: The sustained radio communications frequencies are not dedicated to Dangerous Military Activities. At times, these frequencies may be unusable.

(3) Although the frequencies above are intended for communications involving aircraft, attempts to contact Russian Forces can be made, should the capability exist, using the frequencies designed for ship or ground communications, as appropriate.

(a) Ship-to-Ship and Ship-to-Shore Communications: VHF band (Channel 16) frequency 156.8 MHz FM (International Distress and Calling frequency), or on HF band frequency 2182.0 kHz AM (International HF Distress and Calling frequency).

(b) Ground Communications: VHF band frequency 44.0 MHz FM (alternate 46.5 MHz FM), or on HF band frequency 4125.0 kHz USB (alternate 6215.5 USB) (International HF Distress and Calling frequencies).

COMMUNICATIONS FREQUENCIES

OPERATION	PRIMARY INITIAL CONTACT	ALTERNATE① FREQUENCIES	SUSTAINED COMMUNICATIONS
AIR-RELATED			
VHF	121.5 MHz		130.0 MHz
UHF	243.0 MHz		278.0 MHz
HF (AM)	4125.0 kHz	6215.5 kHz	4125.0 kHz
SEA-REALATED			
VHF	156.8 MHz		156.8 MHz
HF (AM)	2182.0 kHz		2182.0 kHz
GROUND-RELATED			
VHF	44.0 MHz	46.5 MHz②	44.0 MHz②
HF (USB)	4125.0 kHz	6215.5 kHz	4125.0 kHz

①Contact will be initiated on the primary frequency. If contact cannot be made, personnel will attempt contact on the alternate frequency (where available). The sustained communications frequency will be used when extended communications are required and after the phrase "Radio Contact" is exchanged.

②Radio equipment to be set in the "Old" squelch position.

f. RADIO CALL SIGNS - For expeditious identification of an aircraft, ship ground control station, or ground unit, the call signs below will be used:

RADIO CALL SIGNS

Platform	Call Sign	
	Russian	US
Ship	"Bugel" (phonetic - BOO-gel)	"Port Mast"
Aircraft	"Sedlo" (phonetic - Sed-LOW)	"Ivory Eagle"
Air Traffic Control or Monitoring Facility	"Zemlya" (phonetic - Zem-le-YAW)	"Electric Light"
Ground Force or Unit	"Polya" (phonetic - POLE-yaw)	"Post Pounder"

g. RADIO PROCEDURES -

(1) Communications procedures for initial contact will use full, not abbreviated, radio telephone procedures, bearing in mind that the Russian operator who will be initiating the call or responding may not speak or fully understand English. To initiate radio contact, the following procedure should be used.

(a) The aircraft, ship air traffic control or monitoring facility, or ground unit initiating contact will transmit the call sign of the party to be contacted three times, followed by the words, "Delta Echo" (meaning "from" in the context of these procedures), and then followed by the caller's call sign one time. The word "Over" is optional at the end of each transmission.

(b) To respond to an initial radio contact, the aircraft, ship, air traffic control or monitoring facility, or ground unit being called will transmit the call sign of the party that has attempted to contact it three times, followed by the words, "Delta Echo" (meaning "from" in the context of these procedures), then followed by the respondent's call sign one time. The word "Over" is optional at the end of each transmission. Example:

INITIAL RADIO CONTACT:

SEDLO SEDLO SEDLO. DELTA ECHO. IVORY EAGLE. (OVER)

RESPONSE:

IVORY EAGLE IVORY EAGLE IVORY EAGLE. DELTA ECHO. SEDLO. (OVER)

(2) The procedures for switching to a frequency for sustained communications are as follows:

(a) the aircraft, ship, air traffic control or monitoring facility, or ground unit initiating contact will transmit the call sign of the party to be contacted (after the initial call, the call signs will be stated only once), followed by the words "Delta Echo," then followed by the caller's call sign and the words "Radio Contact," and

(b) the aircraft, ship, air traffic control, or monitoring facility being contacted will transmit the call sign of the party first initiating contact, followed by the words "Delta Echo," then followed by the respondent's call sign and the words "Radio Contact." The word "Over" is optional at the end of each transmission. Example:

SWITCHING FREQUENCIES FOR SUSTAINED COMMUNICATIONS:

SEDLO. DELTA ECHO. IVORY EAGLE. RADIO CONTACT. (OVER)

RESPONSE:

IVORY EAGLE. DELTA ECHO. SEDLO. RADIO CONTACT. (OVER)

h. SIGNALS and PHRASES - Both US and Russian armed forces recognize that the lack of communication can increase the danger to their personnel and equipment and create international incidents. Therefore, US aircrews will ensure that the guard channel (frequency 243.0 MHz or 121.5 MHz) is operational and monitored, especially whenever aircraft of the two forces are in visual contact. However, language barriers or equipment malfunctions may make radio communications impossible. Therefore, United States and Russia have agreed to a list of English phrases and visual signals that can be used to convey essential information and acknowledge instructions. If the exchange of information is necessary, but communication in English is not possible, attempts should be made to communicate by using these prearranged phrases contained in Table I. In addition, Table II contains useful English phrases that can be used. If radio communications cannot be established or understood, attempt to communicate using the visual signals contained in Table I. Aircraft-to-aircraft communications can also be conducted using visual signals for intercepting and intercepted aircraft contained in the FIH (see page , INTERCEPTION SIGNALS - RUSSIA). In addition, US personnel will attempt to communicate with their higher headquarters or their operational command, which in turn will attempt to communicate with its Russian counterpart to resolve the incident through the communications channels set forth in this agreement.

TABLE 1
ADDITIONAL SIGNALS, PHRASES AND APPROPRIATE RESPONSES

MEANING OF SIGNAL PHRASE	VISUAL SIGNALS FOR AIRCRAFT	PHRASE & PRONUNCIATION	APPROPRIATE RESPONSE
You are in close proximity to our national territory.	Day or Night - The intercepting aircraft, flying abeam and parallel to the intercepted aircraft, rocking wings, and flashing navigation lights at slow regular intervals, followed by a series of shallow bank "S" turns approximately 10 degrees either side of center.	"CLOSE TO TERR-I-TORY"	Intercepted aircraft turns away from national territory, as appropriate.
You have entered into our national territory.	Day and Night - The intercepting aircraft, flying abeam and parallel to the intercepted aircraft, rapidly flashing navigation lights while rocking wings, followed by a shallow bank (15 to 20 degrees) turn in the direction of the intercepted aircraft. The approach will be accomplished with great caution and not closer than one wing span. Repeat until intercepted aircraft acknowledges or radio contact is established.	"TERR-I-TORY EN-TERED"	Intercepted aircraft will follow the appropriate instructions of the intercepting aircraft, or exit national territory, as appropriate.
I need to land.	Day and Night - Repeated flashing of navigation lights while rocking wings, followed by a gentle porpoising of the aircraft.	"RE-QUEST LAN-DING"	Intercepting aircraft assists intercepted aircraft.
My aircraft request contact with your ship on 243.0 MHz (or 121.5 MHz, if on Civil Band).	Day or Night - Aircraft circling the ship, in a left hand turn, at a safe distance and altitude until radio contact is established.	"RA-DI-O CON-TACT"	After the ship and aircraft each exchange the phrase "RADIO CONTACT," the ship or aircraft will switch to 278.0 MHz (or 130.0 MHz, as appropriate) for further communications.

MEANING OF SIGNAL PHRASE	VISUAL SIGNALS FOR AIRCRAFT	PHRASE & PRONUNCIATION	APPROPRIATE RESPONSE
I request radio contact on 278.0 MHz or 130.0 MHz. Make initial contact on 243.0 MHz (or 121.5 MHz, if on Civil Band).	Day or Night - (for aircraft, if 121.5 MHz or 243.0 MHz is inoperative) - Intermittent flashing of anticollision lights while rocking wings.	"RA-DI-O CON-TACT"	Acknowledge requesting aircraft, ship, or air traffic control or monitoring facility with the phrase "RADIO CONTACT." After this phrase is exchanged, tune to 278.0 MHz or 130.0 MHz, if operating on Civil Bands.
I am experiencing a dangerous level of interference with my command and control network. (Transmit PHRASE on contact frequency.	None.	"STOP IN-TER-FER-ENCE"	Investigate and, as appropriate, terminate any activities that may be causing the dangerous interference.
My intended use of a laser may create danger in this area. (Transmit PHRASE on contact frequency.)	None.	"LA-SER DAN-GER"	Take appropriate measures to prevent harm to personnel or damage to equipment.
I am experiencing a dangerous level of laser radiation. (Transmit PHRASE on contact frequency.)	None.	"STOP LA-SER"	Investigate and, as appropriate, terminate any use of a laser that could cause harm to personnel or damage to equipment.

TABLE II
ADDITIONAL TERMINOLOGY

PHRASE	MEANING
"WILCO"	Understood and will comply
"CANNOT"	Understood and unable to comply
"REPEAT"	Say again
"AM LOST"	Position unknown
"MAYDAY"	Am in distress
"DESCEND"	I require descent

i. LANDING OF US AIRCRAFT IN RUSSIA - Should circumstances dictate a need for an immediate landing in Russia, accomplish the following actions:

(1) Attempt to establish radio contact with Russian air traffic control using frequencies, call signs and procedures specified in paragraphs e., f. and g.

(2) Advise the Russian controlling agency or interceptor with the phrase "Request Landing" or the appropriate visual signal from Table I. The Russian controlling agency or interceptor should provide assistance if possible.

(3) Expect to be directed or escorted to a suitable airport.

(4) Upon landing, expect to be parked on an isolated part of the airport or a separate hangar.

(5) Use the US/Russia Checklist in Table III to communicate minimum essential information to the Russian airport manager. Request billeting, messing and transportation for aircrew and passengers. US aircrews should expect assistance in arranging billeting, messing, transportation and filing flight plans.

(6) Secure the aircraft. It may be necessary to use aircrew members or passengers to provide a continuous presence at the airport.

(7) The aircraft is not subject to any inspection except in cases where the aircraft poses a clear hazard to the environment or the health of personnel. Action may be taken to terminate the hazard. Refer questions involving inspections to higher representatives of the US and Russian military for resolution.

(8) Request assistance to contact the US Defense Attaché at the US Embassy in Moscow as soon as possible. Telephone number is Direct Dial: (095)728-5317, or US Embassy Moscow primary number (095)728-5000 and after hours (095)728-5025.

(9) Determine maintenance and logistic support needed to launch the aircraft. Inform Russian officials and the US Defense Attache of the required support.

(10) Sign no documents. Request that all bills be forwarded to the US Embassy for payment. Request copies of all bills.

(11) Depart the Russian airport as soon as practical.

TABLE III
US/RUSSIAN CHECKLIST FOR AIRCRAFT LANDING
IN THE OTHER PARTY'S TERRITORY

TABLE III
US/RUSSIAN CHECKLIST FOR AIRCRAFT LANDING
IN THE OTHER PARTY'S TERRITORY

US/RUSSIAN CHECKLIST FOR AIRCRAFT LANDING IN THE OTHER PARTY'S TERRITORY	**ИНФОРМАЦИЯ О САМОЛЕТЕ РФ ИЛИ США, СОВЕРШИВШЕМ ПОСАДКУ НА ТЕРРИТОРИИ ДРУГОЙ СТОРОНЫ**
On board the aircraft:	***На борту самолета:***
• Number of crewmembers (attach crew list)	• Численностъ экипажа (приложитъ список зкипажа)
• Number of passengers (attach passenger list)	• Количество пассажиров (приложить список пассажиров)
• Hazardous cargo? Yes / No	• Опасный груз? Да / Нет
• Does anyone need medical assistance? Yes / No	• Требуется ли медицинская помощь? Да / Нет
• Does the aircraft require service/maintenance? Yes / No	• Требуется ли обслуживание/ремонт самолета? Да / Нет
Communication with respective Embassy	***Связь с соответственным посольством***
I request to telephone the American Embassy immediately. Please dial Moscow (095)728-5000. If after hours Moscow time, dial Moscow (095)728-5025.	Прошу немедленно позвонить в американское посольство. Наберите, пожалуйста, Москву (095) 728-5000. Если уже после рабочых часов в Москве, наберите Москву (095) 728-5025.
I request to telephone the Russian Embassy immediately. Please dial Washington, DC phone number (202) 965-1181.	Прошу немедленно позвонить в российское посольство в Вашингтоне. Наберите, пожалуйста, вашингтонский номер (202) 965-1181.
Completed by:	***Заполнен:***
• Surname of aircraft commander:	• Фамилия командира самолета:
• Date:	• Дата:

NOTE: All bills will be forwarded to the respective Embassies.

Примечание: Все счета направляются в соответствующие посольства.

(AFFSA-A3IF/AFFSA-A3IF FIL 10-019)

SECTION B

NATIONAL AND INTERNATIONAL FLIGHT DATA AND PROCEDURES

TABLE OF CONTENTS

B-2 NATL/INTL FLIGHT DATA/PROCEDURES

1. FAA AIR TRAFFIC CONTROL PROCEDURES

a. AIR/GROUND COMMUNICATIONS

(1) All VFR Operations except "VFR Conditions on Top" will utilize FSS frequency 255.4 MHz as primary frequency for position reporting.

(2) FLIGHT SERVICE STATION (FSS) VHF RADIO FREQUENCY PLAN - This plan establishes standards and criteria for VHF radio frequency assignment in order to reduce frequency congestion and its related problems of interference within the system. FSS UHF frequencies are not affected.

(a) The FSS VHF frequency assignment will be as follows:

1. At airports with full-time FSS and part-time towers the FSS will use the local control frequency for Airport Advisory Service (AAS) when tower is closed.

2. At non-tower airports, 123.6 will provide AAS or flight plan servicing.

3. 122.2 will be available at all FSSs to provide common enroute simplex service.

4. One or two additional enroute simplex frequencies, each protected for the service volume of the facility, will be available at most FSSs. When possible these additional frequencies are to be used instead of the common enroute simplex frequency.

5. Enroute Flight Advisory Service (EFAS) will be provided on 122.0.

6. RCO "A" service (receive only) collocated with the VOR will be available on 122.1. RCO "B" service (simplex) will be available on a frequency selected from the FSS allocation.

7. 121.5 will continue to serve as the emergency frequency. In addition, tower receive-only service, will be provided on 122.5 at qualifying terminal locations.

(b) If two-way communications cannot be established when changing frequencies, a pilot should attempt to re-contact the transferring controller for the assignment of an alternative frequency or other instructions. If, however, communications are not re-established, the pilot should then contact the appropriate communications medium as indicated below:

1. VHF FSS 122.2 or other frequencies published in enroute supplement.

2. UHF FSS 255.4 (272.7 is now available only in the Pacific and at select stations in the conterminous U.S. where it is used at the option of the pilot.)

b. COURSE CHANGES WHILE OPERATING UNDER IFR RULES BELOW 18,000' MSL

(FAA-07400.9)

(1) In the development of the two-level airspace structure the Federal Aviation Administration (FAA) considered the probability of an aircraft exceeding the airway/route boundaries while making course changes at different speeds. The normal navigational aid spacing for airways/routes below 18,000 feet MSL is 80 nautical miles and the airspace area to be protected has a total width of 8 nautical miles, 4 nautical miles each side of centerline, within 51 nautical miles of the facility. Beyond 51 nautical miles the 4.5 degree accuracy factor determines the width of the airways/routes approximately 2 NM in total width every 13 NM). It was evident that aircraft operating in excess of 290 knots true airspeed (TAS) could exceed the normal airway/route boundaries depending on the amount of course change required, wind direction, and velocity, the character of the turning fix (distance measuring equipment, overhead navigation aid, or intersection), and the pilot's technique in making a course change. For example, a flight operating at 17,000 feet MSL with a TAS of 400 knots, a 25 degree bank, and a course change of more than 40 degrees would exceed the width of the airway/route; i.e., 4 nautical miles each side of centerline. As a result, the FAA: (1) took action to assure proper obstruction clearance for all

known turning operations, and (2) provided additional instrument flight rules (IFR) separation protection for turns.

(2) In the airspace at and above 18,000 feet MSL additional IFR separation protection is provided for turns. However, in the airspace below 18,000 feet MSL, where operations in excess of 290 knots TAS are less prevalent, the provision of additional IFR separation in all course change situations for the occasional aircraft making a turn in excess of 290 knots TAS creates an unacceptable waste of airspace and imposes a penalty upon the preponderance of traffic which operate at low speeds. Pilots are reminded that special attention must be given to the matter of making course changes so as to adhere as closely as possible to the airway/route being flown.

c. ENTERING AND DEPARTING CLASS A AIRSPACE

(1) Pilots operating on IFR flight at an assigned FL require no additional clearance.

(2) Pilots operating VFR and VFR-on-top (on IFR flight plan) must obtain an ATC clearance with an assigned FL prior to entering positive control area. An abbreviated flight plan containing the following information must be provided ATC at least 30 minutes prior to estimated penetration.

(a) Identification

(b) True air speed (TAS)

(c) VFR position and altitude/flight level

(d) Estimated time and point of penetration

(e) Requested route and flight level

(3) When flight inbound to destination is VFR-on-Top above the Class A Airspace or departure from the area is to be IFR/VFR-on-Top, only the discrete frequency of the sector of arrival or departure need be pre-set.

(4) Upon departing the area, IFF/SIF should be reset to the proper Mode 3/A Code as assigned by ATC.

(5) Pilots flying aircraft without manual tuning capability should preset required frequencies prior to departure. If after pre-setting required frequencies, communications cannot be made or maintained on sector discrete frequencies, contact will be made through the nearest FSS on frequency 255.4 MHz (272.7 MHz may be available).

d. ALTIMETER CHANGEOVER PROCEDURES

(1) CLIMB - change to 29.92" upon reaching 18,000 ft MSL

(2) DESCENT - change to the local altimeter setting prior to descent through altitude as indicated on the following QNH-FL tabulation. In no case will the change be made lower than a flight level equivalent to 18,000 ft MSL.

LOCAL ALTIMETER SETTING	FLIGHT LEVEL
29.92 or higher	180
29.91 to 29.42	185
29.41 to 28.92	190
28.91 to 28.42	195
28.41 to 27.92	200
27.91 to 27.42	205
27.41 to 26.92	210

EXAMPLE: Local altimeter 28.91, pilot must change no lower than flight level 195.

(3) MINIMUM FLIGHT LEVELS - The table in paragraph d.(2) above will be used to determine the lowest usable flight level.

(4) See FLIP Area Planning documents for procedures outside of U. S. airspace.

e. ATC RADAR BEACON SYSTEM

(FAA 7110.65, FAA 7610.4)

(1) Pilots of aircraft operating IFR and equipped with a coded radar beacon transponder will be instructed by ATC to reply on a specified Mode 3/A Code. When a flight has been assigned a particular code, it will remain on that code until further advised by ATC.

(a) VFR or VFR conditions on top, or an aircraft which cancels its IFR flight plan.
Code 1200

NOTE: VFR is not authorized within CLASS A AIRSPACE.

(b) Special Operations:

1. Interceptor aircraft on active air defense missions without an ATC clearance.
Code 7777

2. Aircraft operations which specify frequent or rapid changes in altitude/FL (flight test, olive branch, refueling, etc.) when assigned by ATC.
Code 4000

3. Mission requirements permitting aircraft operating in restricted/warning areas unless a different code has been assigned by advance coordination or via direct communications with ATC.
Code 4000

(c) Mode 3/A - Code 4400, has been assigned for aircraft operating above FL600. This code will be preset on the ground and will not be changed in flight. However, the emergency code 7700 can be activated.

(d) U.S. and ICAO ATC facilities recognize the Mode 3/A, Code 7500 as meaning that the aircraft is being "Hijacked/forced to a new destination". Use Code 7500 to indicate a hijacking threat when under ATC Radar Control. When the situation precludes Code 7500 replies, the spoken words indicating such a squawk will receive similar ATC interpretation and action. Air traffic controllers will acknowledge and confirm receipt by asking the pilot if the code is intentionally being used. If the pilot replies in the affirmative, or does not reply, the Controller shall not ask further questions but will flight follow, respond to pilot's requests, and notify appropriate authorities.

(e) Aircraft equipped with transponders that have pressure altitude reporting capability will use this capability unless otherwise directed by ATC.

2. POSITION REPORTING PROCEDURES

a. POSITION REPORTS - FAA

(AIM)

(1) Position Reporting Points - Federal Aviation Regulations require pilots to maintain a listening watch on the appropriate frequency and unless operating under the provisions of paragraph (4) to furnish position reports passing certain reporting points. Reporting points are indicated by symbol on enroute charts. The designated compulsory reporting point symbol is the solid triangle and the "on request" reporting point symbol is an open triangle. Reports passing an "on request" reporting point are only necessary when requested by ATC.

(2) When operating in a nonradar environment:

(a) On initial contact, the pilot should inform the controller of the aircraft's present position, altitude and time estimate for the next reporting point.

Example: (Name) CENTER (aircraft identification), (position), (altitude), ESTIMATING (reporting point) AT (time).

(b) After initial contact, when a position report will be made, the pilot should give the controller a complete position report.

Example: (Name) CENTER (aircraft identification), (position), (time), (altitude), (type of flight plan), (ETA and name of next reporting point), (the name of the next succeeding reporting point), and (remarks).

(3) When operating in a radar environment:

(a) On initial contact, the pilot should inform the controller of the aircraft's assigned altitude preceded by the words "level", or "climbing to", or "descending to", as appropriate; and the aircraft's present vacating altitude, if applicable.

Examples: (Name) CENTER, (aircraft identification), AT (altitude or flight level), or if appropriate, LEAVING (exact altitude or flight level) (CLIMBING or DESCENDING) TO MAINTAIN (altitude or flight level).

NOTE: Exact altitude or flight level means to the nearest 100 foot increment. Exact altitude or flight level reports on initial contact provide ATC with information required prior to using MODE C altitude information for separation purposes.

(4) Position Reporting Requirements

(a) Flight along airways/routes - A position report is required by all flights regardless of altitude, including those operating in accordance with an ATC clearance specifying "VFR on TOP," over each designated compulsory reporting point along route being flown.

(b) Flight along a Direct Route - Regardless of the altitude or flight level being flown, including flights operating in accordance with an ATC clearance specifying "VFR on TOP," pilots shall report over each reporting point used in the flight plan to define the route of flight.

(c) Flights in a Radar Environment - ATC will inform a pilot that he is in "RADAR CONTACT":

1. When aircraft is initially identified in the ATC system; and

2. When radar identification is re-established after radar service has been terminated or radar contact lost. Subsequent to being advised that the controller has established radar contact, this fact will not be repeated to the pilot when handed off to another controller. At times, the aircraft identity will be confirmed by the receiving controller; however, this should not be construed to mean that radar contact has been lost. The identity of transponder equipped aircraft will be confirmed by asking the pilot to "IDENT,"SQUAWK STANDBY," or to change codes. Aircraft without transponders will be advised of their position to confirm identity. In this case, the

pilot is expected to advise the controller if he disagrees with the position given. If the pilot cannot confirm the accuracy of the position given because he is not tuned to the NAVAID referenced by the controller, the pilot should ask for another radar position relative to the NAVAID to which he is tuned.

(d) When informed by ATC that their aircraft are in "RADAR CONTACT," PILOTS SHOULD DISCONTINUE POSITION REPORTS OVER DESIGNATED REPORTING POINTS. They should resume normal position reporting when ATC advises "RADAR CONTACT LOST" or "RADAR SERVICE TERMINATED."

(5) Position Report Items

(a) Identification.

(b) Position.

(c) Time.

(d) Altitude or flight level (include actual altitude or flight level when operating on a clearance specifying "VFR ON TOP").

(e) Type of flight plan (not required in IFR position reports made directly to ARTC Centers or approach control).

(f) ETA and name of next reporting point.

(g) The name only of the next succeeding reporting point along the route of flight, and

(h) Pertinent remarks.

(6) Additional Reports - The following reports should be made to ATC or FSS facilities without a specific ATC request:

(a) At all times:

1. When vacating any previously assigned altitude or flight level for a newly assigned altitude or flight level.

2. When an altitude change will be made if operating on a clearance specifying "VFR ON TOP."

3. When unable to climb/descend at a rate of at least 500 feet per minute.

4. When approach has been missed. (Request clearance for specific action; i.e., to alternative airport, another approach, etc.).

5. Change in the average true airspeed (at cruising altitude) when it varies by 5 percent or 10 knots (whichever is greater) from that filed in the flight plan.

6. The time and altitude or flight level upon reaching a holding fix or point to which cleared.

7. When leaving any assigned holding fix or point.

NOTE: The reports in subparagraphs 6 and 7 may be omitted by pilots of aircraft involved in instrument training at military terminal area facilities when radar service is being provided.

8. Any loss, in controlled airspace, of VOR, TACAN, ADF, low frequency navigation receiver capability, complete or partial loss of ILS receiver capability or impairment of air/ground communications capability. Reports should include aircraft identification, equipment affected, degree to which the capability to operate under IFR in the ATC system is impaired, and the nature and extent of assistance desired from ATC.

NOTE: Other equipment installed in an aircraft may effectively impair safety and/or the ability to operate under IFR. If such equipment (e.g. airborne weather radar) malfunctions and in the pilot's judgment either safety or IFR capabilities are affected, reports should be made as above.

9. Any information relating to the safety of flight.

(b) When not in "radar contact".

1. When leaving final approach fix inbound on final approach (nonprecision approach) or when leaving the outer marker or fix used in lieu of the outer marker inbound on final approach (precision approach).

2. A corrected estimate at anytime it becomes apparent that an estimate as previously submitted is in error in excess of 2 minutes. For flights in the North Atlantic (NAT), a revised estimate is required if the error is 3 minutes or more.

(c) Pilots encountering weather conditions which have not been forecast, or hazardous conditions which have been forecast, are expected to forward a report of such weather to ATC.

b. POSITION REPORTING - ICAO

(ICAO DOC 4444)

(1) Transmission of Position Reports

(a) On routes defined by designated significant points, position reports shall be made when over, or as soon as possible after passing, each designated compulsory reporting point, except as provided in b.(1)(b). Additional reports over other points may be requested by the appropriate air traffic services unit when so required for air traffic services purposes.

(b) On routes not defined by designated significant points, position reports shall be made as soon as possible after the first half-hour of flight and hourly intervals thereafter, except as provided in b.(1)(c). Additional reports at shorter intervals of time may be requested by the appropriate air traffic services unit when so required for air traffic services purposes.

(c) Under conditions specified by the appropriate ATS authority, flights may be exempted from the requirement to make position reports at each designated compulsory reporting point or interval. In applying this paragraph, account should be taken of the meteorological requirement for making, recording, and reporting of routine aircraft observations.

NOTE: This is intended to apply in cases where adequate flight progress data are available from other sources, e.g., ground radar, and in other circumstances where the omission of routine reports from selected flights is found to be acceptable.

(d) The position reports required by b.(1)(a) and b.(1)(b) shall be made to the air traffic services unit serving the airspace in which the aircraft is operated. In addition, when so prescribed by the appropriate ATS authority in aeronautical information publications or requested by the appropriate air traffic services unit, the last position report before passing from one flight information region or control area to an adjacent flight information region or control area shall be made to the air traffic services unit serving the airspace about to be entered.

(e) If a position report is not received at the expected time, subsequent control shall not be based on the assumption that the estimated time is accurate. Immediate action shall be taken to obtain the report if it is likely to have any bearing on the control of other aircraft.

(2) Contents of Position Reports

(a) The position reports required by b.(1)(a) and b.(1)(b) shall contain the following elements of information, except that elements 4 and 5 may be omitted from position reports transmitted by radiotelephony, when so prescribed on the basis of regional air navigation agreements:

1. Aircraft identification.

2. Position.

3. Time.

4. Flight level or altitude.

5. Next position and time over.

6. Ensuing significant points.

NOTE: Omission of element 4 may be possible when flight level or altitude, as appropriate, derived from SSR Mode C information can be made continuously available to controllers in a labeled form, and when adequate procedures have been developed to guarantee the safe and efficient use of SSR Mode C information.

(3) Reporting of Operational and Meteorological Information

(a) When operational and/or routine meteorological information is to be reported by an aircraft enroute or times when position reports are required in accordance with b.(1)(a) and b.(1)(b) the position report shall be given in the form of an air-report. Special aircraft observations shall be reported as special air- reports, as soon after they have been made as is practicable.

(b) Contents of air-reports

1. Air-reports shall give information relating to such of the following elements as necessary for compliance with b.(3)(b)2.:

Section 1. - Position Information

Element 1	Aircraft identification
Element 2	Position
Element 3	Time
Element 4	Flight level or altitude
Element 5	Next position and time over
Element 6	Ensuing significant points.

Section 2. - Operational Information

Element 7	Estimated time of arrival
Element 8	Endurance

Section 3. - Meteorological Information

Element 9	Air temperature
Element 10	Wind
Element 11	Turbulence
Element 12	Aircraft icing
Element 13	Supplementary information

2. Section 1 of the air-report is obligatory, although Element 5 and 6 thereof may be omitted when prescribed in Regional Supplementary Procedures; Section 2 shall be added, in whole or in part, only when so requested by the operator or his designated representative, or when deemed necessary by the pilot-in-command; Section 3, in whole or in part, shall be added in accordance with ICAO Annex 3 and the Regional Supplementary Procedures, Part 3 - Meteorology.

NOTE: While element 4, flight level or altitude, may be omitted from the contents of a position report transmitted by radiotelephony when so prescribed on the basis of regional air navigation agreements, that element may not be omitted from Section 1 of an air-report.

3. Compilation of air-reports - Air-reports containing a Section 3 shall be

recorded on the AIREP form. Forms based on the model AIREP form shown in this publication shall be provided for the use of flight crew in compiling the reports. The detailed instructions for recording and reporting as given, shall be complied with.

NOTE: The recording and reporting instructions may conveniently be printed on the back of the AIREP form.

4. Transmission of air-reports - The formats of messages and the phraseologies or data conventions given shall be used by flight crew when transmitting air-reports and by air traffic services personnel when re-transmitting such reports.

NOTE: Increasing use of air-reports in automated systems makes it essential that the elements of such reports be transmitted in the order and form prescribed.

5. Aircraft observations during climb-out or approach - Aircraft observations made during the climb-out and approach phases of flight shall be reported as soon as is practicable.

c. POSITION REPORTING - OCEANIC

(1) Position Reports - Position Reports shall be made at designated lines of latitude or longitude.

(a) Flights whose tracks are predominately East and West shall report over each 5 degrees or 10 degrees (10 degrees will be used if the speed of the aircraft is such that 10 degrees will be traversed within 1 hr) meridian of longitude extending East and West from 180 degrees.

(b) Flights whose tracks are predominately North and South shall report over each 5 degrees or 10 degrees (10 degrees if traversed within 1 hr and 20 min) parallel of latitude extending North and South of the equator.

(c) Air Traffic Service may require specific flights to report more frequently than each 5 degrees fix (each 2 1/2 degrees) for aircraft with slow ground speeds.

(d) The Position Report shall be transmitted at the time of crossing the designated reporting line or as soon thereafter as possible.

(2) Position Report Contents

(a) Present Position - The present position shall include the following in case of East-West flights:

1. Latitude in degrees and minutes.

2. Longitude in degrees only (see note below).

3. Time.

4. Altitude (flight level).

NOTE: In case of North-South flights 1 and 2 above would change, as appropriate, by reporting latitude in degrees only and longitude in degrees and minutes.

(b) Estimated next position - the estimated next position shall include the following:

1. Latitude.

2. Longitude.

3. Estimated time at the next position line. A revision of the estimate of the next position line will be made when the original estimate is in error in excess of 3 minutes.

4. Ensuing significant points-Name only of the next succeeding fix whether compulsory or not, or if not named, latitude and longitude.

5. Late Position Reports - When normal air-ground communications have been lost by the aircraft, causing a position report to be 30 minutes overdue, and communications can be established with any radio station including Ocean Station Vessels or airborne aircraft which have communications established with any radio station, aircraft commanders shall relay through such radio stations a position report with priority precedence to the appropriate area control center.

(3) Areas of Application

(a) Fixed Line Position - Reporting will be applied by all operators in the areas of United States responsibility south of 45 degrees North Latitude in the north Pacific Region. This specifically includes all of the Oakland, Honolulu, and Guam Control Areas. Because of the lower traffic density north of 45 degrees North, Fixed Line Position Reporting will be optional with the individual operators.

(b) Special Mission Exception - Certain missions such as Search and Rescue, Anti-submarine, Weather Observations, etc., have a requirement for use of an optional reporting form. These flights shall so advise Air Traffic Service of the reporting form to be used.

NOTE: When traversing the North Atlantic Region, refer to DoD FLIP, Area Planning (AP/2), Europe, Africa, and Middle East for additional specific reporting procedures with this region.

d. AIREP EXAMPLES

(1) As spoken in telephony;

I AIREP SPEEDBIRD FIFE SIX AIT POSITION FOWer NINer NORTH ZERO FIFE ZERO WEST AT WUN TREE WUN SEVen FLIGHT LEVEL TREE WUN ZERO NEXT POSITION FIFE ZERO NORTH ZERO FOWer ZERO WEST AT WUN TREE FIFE FIFE FOLLOWING POINT FIFE ZERO NORTH ZERO TREE ZERO WEST ENDURANCE ZERO AIT TREE ZERO TEMPERATURE MINUS FOWerr SEVen WIND TOO FIFE FIFE DEGREES SIX FIFE KNOTS TURBULENCE MODERATE SCATTERED CUMULONIM- BUS TOP FLIGHT LEVEL TOO AIT ZERO

II AIREP JAPANAIR FOWer FOWer WUN OVER ORDON AT ZERO NINer TREE ZERO FLIGHT LEVEL TREE FIFE ZERO NEXT POSITION ONADE AT WUN ZERO ZERO SEVen FOLLOWING POINT OMPPA TEMPERATURE MINUS FIFE TREE WIND TREE WUN ZERO DEGREES SIX ZERO KILOMETRES PER HOUR MEAN FIFE FIFE NORTH WUN SEVen SIX WEST

III AIREP SPECIAL UNITED WUN ZERO WUN POSITION FIFE ZERO FOWer FIFE NORTH ZERO TOO ZERO WUN FIFE WEST AT WUN FIFE TREE SIX FLIGHT LEVEL TREE WUN ZERO CLIMBING TO FLIGHT LEVEL TREE FIFE ZERO NEXT POSITION FIFE WUN NORTH ZERO TREE ZERO WEST AT WUN SIX TOO WUN FOLLOWING POINT FIFE WUN NORTH ZERO FOWer ZERO WEST ENDURANCE ZERO NINer ZERO ZERO ICING SEVERE

IV AIREP SPECIAL NIUGINI TOO SEVen TREE OVER MADANG AT ZERO AIT FOWer SIX WUN NINer TOUSAND FEET TURBULENCE SEVERE

(2) As recorded by aeronautical stations and transmitted in telephony (including teletypewriting);

I ARP BAW568 49N050W 1317 F310 50N040W 1355 50N030W FUEL 0830 MS47 255/65 KT TURB MOD SCT CB TOP F280

II ARP JAL441 ORDON 0930 F350 ONADE 1007 OMPPA MS53 310/60KMH MEAN 55N176W

III ARS UAL101 5045N02015W 1536 F310 ASC F350 51N030W 1621 51N 040W FUEL 0900 ICE SEV

IV ARS ANG273 MD 0846 19000FT TURB SEV

(3) Explanation of examples;

(a) The first example is a routine air-report for a transoceanic flight which has been designated to report routine meteorological observations at meridians spaced at intervals of 10 degrees. The wind reported is spot wind.

(b) The second example is a routine air-report for a transoceanic flight which is required to report routine meteorological observations at specified significant points. The wind reported, in kilometres per hour, is mean wind between the position reported and the previous fix.

(c) The third example is a special air-report which is required because of severe icing and is reported at the same time as a routine position report. It will be noted that the aircraft is climbing.

(d) The fourth example is a special air-report which is required because of severe turbulence encountered between air-reports. The aircraft is on QNH altimeter setting.

B-12 NATL/INTL FLIGHT DATA/PROCEDURES

	MODEL AR	**AIREP**
	RECORD AND TRANSMIT IN TELEGRAPHY (including teletypewriting)* as appropriate	TRANSMIT IN TELEPHONY* as appropriate
	1 ARP or ARS	**AIREP or AIREP SPECIAL
1	(aircraft identification)	(aircraft identification)
2	(latitude) N or S (longitude) E or W (significant point) ABM (significant point) (significant point) (bearing) (distance)	POSITION (latitude and longitude) OVER (significant point) ABEAM (significant point) (significant point) (bearing) (distance)
3	(time)	AT (time)
4	F (flight and level number) (number) M or FT ASC F (flight level number) or (number) M or FT DES F (flight level number) or (number) M or FT	FLIGHT LEVEL (number) (number) METERS or FEET CLIMBING TO FLIGHT LEVEL (number) or (number) METERS or FEET DESCENDING TO FLIGHT LEVEL (number) or (number) METERS or FEET
5	(next position) (time)	NEXT POSITION (position AT (time)
6	(ensuing significant point)	FOLLOWING POINT (position)
7	ETA (aerodrome) (time)	ESTIMATING ARRIVAL (aerodrome) AT (time)
8	FUEL (hours and minutes)	ENDURANCE (hours and minutes)
9	PS (degrees Celsius) MS (degrees (Celsius)	TEMPERATURE PLUS (degrees Celsius) TEMPERATURE MINUS (degrees Celsius)
10	(degrees)/(number) KMH or KT (MEAN) LV (MEAN) (latitude) N or S (longitude) E or W	WIND (number) DEGREES (number) KILOMETERS PER HOUR or KNOTS (MEAN) WIND LIGHT AND VARIABLE (MEAN) POSITION (latitude and longitude)
11	TURB MOD TURB SEV (INC)	TURBULENCE MODERATE TURBULENCE SEVERE (IN CLOUD)
12	ICE MOD ICE SEV	ICING MODERATE ICING SEVERE

	MODEL AR	AIREP
13	RA	RAIN
	SN	SNOW
	FZRA	FREEZING RAIN
	FC	FUNNEL CLOUD
	TS	THUNDERSTORM
	FRONT	FRONT
	SCT	SCATTERED
	BKN	BROKEN
	CNS	CONTINUOUS
	CB	CUMULONIMBUS
	BASE F (flight level number) or (number) M or FT	BASE FLIGHT LEVEL (number) or (number) METERS or FEET
	TOP F (flight level number) or (number) M or FT	TOP FLIGHT LEVEL (number) or (number) METERS or FEET
	TURB MOD } If observed prior to	TURBULENCE MODERATE
	ICE MOD } last 10 minutes.	ICING MODERATE
	(Significant radar echoes)	. . . . .
	(Difference between observed and forecast weather)	. . . . .
	AT (position of phenomenon reported under item 12 if different from that reported under item 2)	AT . . . . .

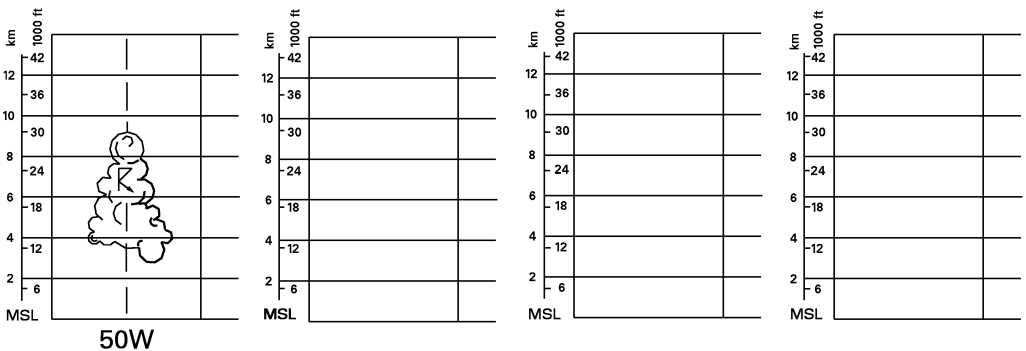
*Increasing use of air-reports in automated systems makes it essential that the elements of such reports be transmitted in the order and form prescribed.
**Only when Section 3 is included. When Section 3 is not included, the word "POSITION" may be used in telephony.

AIREP

		I	II	III	IV
	Operator.....	Aircraft identification (as per item 7 of flight plan) 568	Aircraft identification (as per item 7 of flight plan) 441	Aircraft identification (as per item 7 of flight plan) 101	Aircraft identification (as per item 7 of flight plan) 273
	Addressee	GANDER	REYKJAVIK	SHANWICK	PORT MORESBY
	† Message type designator	ARP	ARP	ARS	ARS
Section 1	1 Aircraft identification	BAW568	JAL441	UAL101	ANG 273
Section 1	2 Position	49N050W	ORDON	5045N 02015W	MD
Section 1	3 Time	1317	0930	1536	0846
Section 1	4 Flight level or altitude	F310	F350	F310 ASC F350	19000 FT
Section 1	5 Next position and time over	50N040W 1355	ONADE 1007	51N030W 1621	
Section 1	6 Ensuing significant point	50N030W	OMPPA	51N040W	
Section 2	7 Estimated time of arrival				
Section 2	8 Endurance	FUEL 0830		FUEL 0900	
Section 3	9 Air temperature	MS47	MS53		
Section 3	10 Spot wind or mean wind and position thereof	255/65KT	310/60KMH MEAN 55N176W		
Section 3	11 Turbulence	TURB MOD			TURB SEV
Section 3	12 Aircraft icing			ICE SEV	
Section 3	13 Supplementary information	SCT CB TOP F280			
	Time transmitted	1320	0932	1539	0847

Note: Completed forms can be computer generated, typed or handwritten.

PICTORIAL CROSS-SECTION**



SYMBOLS

- RAIN
- FOG
- FREEZING RAIN
- SAND OR DUSTSTORM
- ICE PELLETS
- STORM OR DRIFTING SNOW
- SNOW AND RAIN MIXED
- FUNNEL CLOUD (WATERSPOUT OR TORNADO)
- SNOW
- MODERATE TURBULENCE
- HAIL
- SEVERE TURBULENCE
- MODERATE ICING
- SQUALL
- THUNDER STORM
- SEVERE ICING
- LIGHTNING
- TROPICAL REVOLVING STORM
- MARKED MOUNTAIN WAVES

** Information entered on this pictorial cross-section is intented to supplement the observations recorded on this form when, in the opinion of the pilot-in-command, a graphical representation will usefully amplify or assist in clarifying the observations recorded elsewhere on this form.

MODEL VAR

Operator . . . . . Aircraft Identification (as per item 7 of flight plan) . . . . . Pilot-in-command . . . . . Dep. from . . . . . Date .. . . . . Time . . . . . UTC Arr. at . . . . . Date .. . . . . Time . . . . . UTC

	Addressee		
		AIREP SPECIAL	
Section 1	1	Aircraft identification	
	2	Position	
	3	Time	
	4	Flight level or altitude	
	5	VOLCANIC ACTIVITY OBSERVED AT	(position or bearing and distance from aircraft)
	6	Air temperature	
	7	Spot wind	
	8	Supplementary information (Brief description of activity including vertical and lateral extent of ash cloud, horizontal movement, rate of growth, etc. as available)	

The following information is not for transmission by RTF

TICK ☑ THE APPROPRIATE BOX

Section 2									
	9	Density of ash cloud	(a) wispy	☐	(b) moderate dense	☐	(c) very dense	☐	
	10	Colour of cloud	(a) white	☐	(b) light grey	☐	(c) dark grey	☐	
			(d) black	☐					
	11	Eruption	(a) continuous	☐	(b) intermittent	☐	(c) not visible	☐	
	12	Position of activity	(a) summit	☐	(b) side	☐	(c) single	☐	
			(d) multiple	☐	(e) not observed	☐			
	13	Other observed features of eruption	(a) lightning	☐	(b) glow	☐	(c) large rocks	☐	
			(d) ash fall out	☐	(e) mushrooming cloud	☐	(f) nil	☐	
	14	Effect on aircraft	(a) communications	☐	(b) nav. systems	☐	(c) engines	☐	
			(d) pitot static	☐	(e) windscreen	☐	(f) windows	☐	
			(g) nil	☐					
	15	Other effects	(a) turbulence	☐	(b) St. Elmos Fire	☐	(c) fumes	☐	
			(d) ash deposits	☐					
	16	Other information	Add any information considered useful						

e. IATA IN-FLIGHT BROADCAST PROCEDURES (IFBP) AFRICA REGION ON 126.9
(TFMWG-E/AFFSA FIL 12-647)

(1) Listening Watch - A listening watch should be maintained on 126.9 10 minutes before entering the designated airspace until leaving this airspace. For an aircraft taking off from an aerodrome located within the lateral limits of the designated airspace, listening watch should start as soon as appropriate and be maintained until leaving the airspace.

(2) Time of Broadcast - A broadcast should be clearly pronounced in English:

(a) 10 minutes before entering or crossing a FIR within IFBP region;

(b) For a pilot taking off from an aerodrome located within the IFBP region as soon as appropriate;

(c) 10 minutes prior to crossing or joining an ATS route, report crossing airway or waypoint. In the interest of reducing congestion on the IFBP frequency, pilots may exercise discretion to omit closely spaced repetitive IFBP reports.

(d) at not less than 20 minute intervals;

(e) before a change in flight level;

(f) at any other time considered necessary by the pilot.

(3) Broadcast Procedure - A broadcast message should be structured as follows:

(a) 'ALL STATIONS'

(b) 'THIS IS AZ... (flight number) in the XXX (name FIR) FIR'

(c) 'FL...'

(d) 'North-eastbound on XXnnn (airway)'

(e) 'Estimate XXXXX (or crossing airway if no waypoint) ... at ... UTC'

(f) 'AZ ...'

(g) 'FL...'

(h) 'in the XXX FIR'

(4) Operating Procedures

(a) Changes of Cruising Level

1 Changes of cruising level are considered necessary by pilots to avoid traffic conflicts, for weather avoidance, or for other valid operational reasons.

2 When cruising level changes are unavoidable, all available aircraft lighting which would improve the visual detection of the aircraft should be displayed while changing levels.

(b) Collision Avoidance - If, on receipt of a traffic information broadcast from another aircraft, a pilot decides that immediate action is necessary to avoid an imminent collision risk to his aircraft, and this cannot be achieved in accordance with the right-of-way provisions of Annex 2, he should:

1 Unless an alternative maneuver appears more appropriate climb or descend 500 ft.

2 Display all available aircraft lighting which would improve the visual detection of the aircraft.

3 As soon as possible reply to the broadcast advising action being taken.

4 Notify the action taken on the appropriate ATS frequency; and

5 As soon as situation has been rectified, resume normal flight level, notifying the action on the appropriate ATS frequency.

(c) Normal Position Reporting Procedures - Normal position reporting procedures should be continued at all times, regardless of any action taken to initiate or acknowledge a traffic information broadcast..

(d) Operation of Transponders - Pilots should ensure that transponder procedures as contained in ICAO PANS OPS Doc 8168 are compiled with and in the absence of other directions from ATC, operate the transponder on Mode A and C Code 2000. Note: Pilots are advised to ensure operation of transponders even when outside radar coverage in order to enable TCAS equipped aircraft to identify conflicting traffic.

(e) Use of TCAS - TCAS equipped aircraft should have TA/RA mode selected at maximum range.

(f) Use of SLOP - SLOP is promoted in AFI region.

(5) THE IFBP IN AFI - In many FIRs in the AFI Region communications both fixed and mobile have either not been implemented or operate well below the required reliability. This has an impact on the proper provision of Air Traffic Services, especially flight information service. Consequently, the AFI Regional Technical Conference has decided that IATA In-Flight Broadcast Procedure (IFBP) should be used within designated FIRs in the region as an interim measure until such time as communications facilities affecting the FIR in question have been improved.

(6) Designated Frequency in AFI - In the AFI Region the designated frequency for the IFBP is 126.9 MHz.

(7) Area of Application

(a) In the AFI Region the IFBP should be applied in the following FIRs and airspaces:

Asmara	Luanda
Brazzaville*	N'Djamena*
Kano	Niamey*
Khartoum	Tripoli**
Kinshasa	

(Note: Even though some FIRs are removed from area of applicability, some FIRs will continue applying IFBP in case of contingency (Dakar Terrestrial, Dakar Oceanic...)

* Brazzaville, Niamey and N'Djamena FIR provide CPDLC service, however these FIRs are maintained in IFBP area of applicability to accommodate users' requirement for linear boundaries to the extent feasible.

** Tripoli FIR mandated IFBP within their entire FIR, hence IFBP region extended from North of latitude 30°N to cover entire Tripoli FIR.

(8) Enforcement

(a) All airlines operating in the AFI region are requested to:

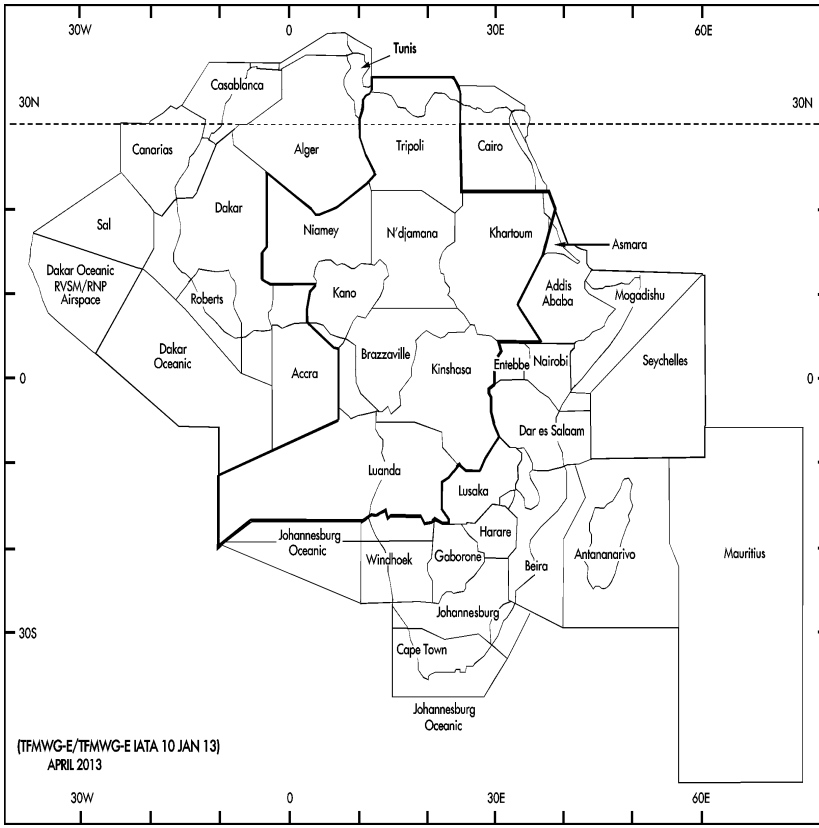
1 Ensure that their aircrews are fully briefed on the procedure and area of application described.

2 Ensure that their charts and flight documentation are fully amended to reflect the foregoing;

a Any operator reported to IATA as not applying the procedure shall be contacted immediately, informed of the procedure, and requested to apply it.

(9) Attention is drawn to the fact that during the Haj Pilgrimage period the number of east-west flights in North-Central part of the AFI Region increases dramatically and with it the risk of ATS incidents and the importance of the In-Flight Broadcast Procedure.

IATA IFBP - AREA OF APPLICABILITY
AFI REGION



B-20 NATL/INTL FLIGHT DATA/PROCEDURES

3. OCEANIC AREA COMMON VHF FREQUENCIES

(AFFSA/ICAO ANNEX 10 VOL II)

VHF air to air frequency 123.45 MHz enable aircraft engaged in flights over remote and oceanic areas, out of range of VHF ground stations, to exchange necessary operational information and to facilitate the resolution of operational problems.

4. USAF BIRD WATCH CONDITION CODES

(HQ AFFSA-XOS/HQ AFFSA-XOS FIL 16-298)

a. The following terminology has been established for rapid communication of bird activity. Bird locations should be given with the condition code.

(1) Condition SEVERE: Bird activity on or immediately above the active runway or other specific location representing high potential for strikes. Supervisors and aircrews must thoroughly evaluate mission need before conducting operations in areas under condition SEVERE.

(2) Condition MODERATE: Bird activity near the active runway or other specific location representing increased potential for strikes. BWC moderate requires increased vigilance by all agencies and supervisors, and caution by aircrews.

(3) Condition LOW: Bird activity on and around the airfield representing low potential for strikes.

5. RUNWAY CONDITION READING (RCR) CORRELATION CHART

(AFFSA-Afld Mgmt Ops/AFFSA-Afld Mgmt Ops FIL 14-884)

NOTE: Joint USAF/NASA tests have proven RCR measurements invalid where the only form of moisture affecting the runway is water. Readings taken during such conditions will be reported as Wet Runway - WR. Measurements taken when water or slush is present on an ice covered runway will be reported as RCR 12 or the measured decelerometer reading, whichever is lower.

Runway Condition Reading (RCR)	Percent Increase In Landing Roll
02 to 05	100 or more
06 to 12	99 to 46
13 to 18	45 to 16
19 to 25	15 to 0

Runway Condition Assessment Matrix (RCAM)

Assessment Criteria			Downgrade Assessment Criteria		
Runway Condition Description	**Runway Condition Code**	**Mu Reading**	**Vehicle Deceleration or Directional Control Observation**	**Pilot Reported Braking Action**	**Runway Condition Reading (RCR) Value***
• Dry	6	.46 or Higher	---	---	23-26
• Frost • Wet (includes Damp and 1/8" depth or less of Water) **1/8" (3mm) depth or less of:** • Slush • Dry Snow • Wet Snow	5	.40 - .45	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	Good	14-22
5° F (-15° C) and colder outside air temperature: • Compacted Snow	4	.37 - .39	Braking deceleration OR directional control is between Good and Medium.	Good to Medium	13
• Slippery when wet (wet runway) • Dry Snow or Wet Snow (any depth) over Compacted Snow **Greater than 1/8" (3 mm) depth of:** • Dry Snow • Wet Snow **Warmer than 5° F (-15° C) outside air temperature:** • Compacted Snow	3	.30 - .36	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	Medium	10-12
Greater than 1/8" (3 mm) depth of: • Water • Slush	2	.26 - .29	Braking deceleration OR directional control is between Medium and Poor.	Medium to Poor	8-9
• Ice	1	.21 - .25	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	Poor	7
• Wet Ice • Slush over Ice • Water on top of Compacted Snow	0	0 - .20	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	Nil	0-6

*NOTE: The RCR value was derived from AFTO 33-1-23, Equipment and Procedures for Obtaining Runway Condition Readings, formula used to convert Mu readings using the formula Mu x 32.2=RCR (rounded down to the nearest whole number).

Takeoff and Landing Performance Assessment (TALPA) is an improved way of assessing runway conditions. TALPA provides objective assessments tied to contaminant type and depth categories to change airplane braking performance on all paved runways with >25% (overall) surface contamination. Airfield operations will conduct three assessments on the runway (first third of runway, middle third, and final third). These assessments are presented to aircrew/mission planners as a Runway Condition Code (RwyCC) (values 0-6). Airfield Operations will publish these values via a FICON NOTAM.

FICON NOTAM example:

!ORD ORD RWY 04L FICON 5/3/5 50 PRCT WET, 50 PRCT 1/8 IN WET SN OVER COMPACTED SN, 50 PRCT 1/8 IN SLUSH. 1604251625-1604261625

O'Hare Runway 04L Field Condition 5/3/5 with the first third is 50% wet, the second third covered by 50% of 1/8 inch wet snow over compacted snow and the last third being 50% covered with 1/8 inch of slush. This FICON's effective period is April 25, 2016 at 1625Z to April 26, 2016 at 1625Z.

The Runway Condition Assessment Matrix (RCAM) provides the associated Mu reading and the Runway Condition Reading (RCR) value (0-26) associated with Takeoff and Landing Data (TOLD) graphs used to perform TOLD calculations. Note that Runway Surface Condition (RSC) readings are incorporated in the new TALPA Runway Condition Codes so these values will no longer be provided as a separate report.

Pilot reported (PIREP) braking conditions utilize the Good, Good to Medium, Medium, Medium to Poor, Poor, and Nil terms. See the RCAM for associated descriptions of each PIREP term.

Aircrew operating from civil airports will not be provided a RCR. Instead they will be provided a RwyCC. RCRs will still be available at USAF locations.

SOURCE: FAA AC 91-79A, Rev. 1

(AFFSA-XO/AFFSA-XO FIL 17-274)

GROUND VEHICLE FRICTION CORRELATION CHART
Nominal Test Speed, 65Km/h (40mph)[5]

Braking Action Level	RCR[1]	Grip-Tester	James Brake Index[2]	MU-Meter	Surface Friction Tester	Runway Friction Tester	BV-11 Skiddo-Meter	Decel Meters[3]	ICAO INDEX[4]
Good	>17	>0.49	> .0.58	>0.50	>0.55	>0.51	>0.59	>0.53	5
Fair	12-17	0.34-0.49	0.40-0.58	0.35-0.50	0.38-0.54	0.35-0.51	0.42-0.59	0.37-0.53	3-4
Poor	6-11	0.16-0.33	0.20-0.39	0.15-0.34	0.18-0.37	0.18-0.34	0.21-0.41	0.17-0.36	2-3
NL	≤5	≤0.14	≤0.17	≤0.14	≤0.16	≤0.15	≤0.19	≤0.16	

NOTES:
1. RCR=Runway Condition Report
2. JBI=James Brake Index
3. Decelerometers include Tapley, Bowmonk, and Electronic Recording Decelerometer
4. ICAO=International Civil Aviation Organization
5. A wet runway produces a drop in friction with an increase in speed. If the runway has good texture, allowing the water to escape beneath the tire, then the friction value will be less affected by speed. Conversely, a poorly textured surface will produce a larger drop in friction with increase in speed. Friction characteristics can be further reduced by poor drainage because of inadequate slopes or depressions in the runway surface.
6. Nominal Test Speed For varying Certified Friction Measuring Equipment illustrated in the table above shall be according to manufacturer guidelines and or instructions.
7. According to the FAA CertAlert No. 05-01 and the AIM 4-3-8 and 4-3-9, there is no correlation between MU reports and braking action effectiveness, although the information is still widely reported via NOTAM and ATIS. The ICAO still recognizes their significance and aircrew can expect to receive MU values via NOTAM and when operating under ICAO procedures. MU values alone do not guarantee braking action effectiveness. They should be considered along with aircraft technical order data, personal experience, technique, pilot braking action reports by like aircraft, and the rate of change of environmental conditions.

(AFFSA/AFFSA A3IF FIL 12-617)

6. WAVE-OFF LIGHTING AT USN/USMC AIRPORTS

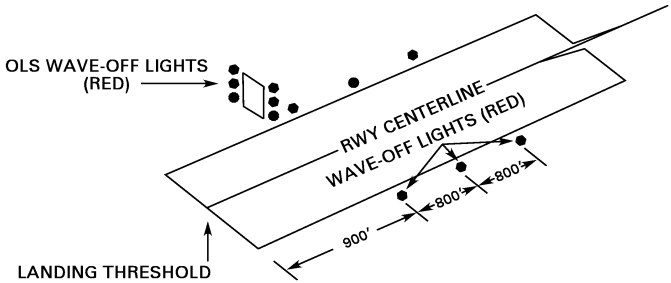
(NAVFIG/NAVFIG)

a. Emergency wave-off or "go around" due to unsafe runway conditions or aircraft configuration (normally wheels-up) may be signaled to aircraft on final approach by red, high intensity lights flashing near the runway touchdown zone.

b. These optical warning systems, when installed, may be activated by the tower controller, Landing Signal Officer (LSO), Runway Duty Officer (RDO), or, in the case of a wheels-up approach, by an enlisted "WHEELS" watch stationed approximately 1000 feet short of the landing runway. All of the preceding have the authority to order a wave-off if, in their judgment, the approach cannot be continued to a safe touchdown and/or roll-out. Such wave-off signals are mandatory unless the pilot is experiencing an emergency.

c. In addition to the foregoing, radio, red flares, hand/flag or standard ATC Aldis lamp signals may be used either individually or in combination to indicate wave-off. Normally, radio and/or Aldis lamp in addition to the flashing red lights, are used when wave-off is initiated by the tower controller.

d. Red wave-off lights are installed integrally with the Optical Landing System (OLS) used for visual glide slope information and/or along each side of the runway extending to 2500 feet from the threshold. When these lights are activated, pilots should execute an immediate wave-off and contact the tower for further clarification and instructions.



USN/USMC WAVE-OFF LIGHTING

7. PILOT CONTROL OF AIRPORT LIGHTING

(AIM)

a. Standard FAA approved radio-controlled lighting systems consist of various combinations of approach or runway lights activated by a 3-step control responsive to 7, 5, and/or 3 microphone clicks in 5 seconds. This 3-step control will turn on lighting facilities capable of either 3-step, 2-step, or 1-step operation. The 3-step and 2-step lighting facilities can be altered in intensity while the 1-step cannot. All lighting facilities which are radio controlled at an airport, whether on a single runway or multiple runways, operate on the same radio frequency and are illuminated for a period of 15 minutes from the most recent time of activation. Lighting facilities may not be extinguished prior to the end of the 15 minutes, except for the 1-step and 2-step REIL, which may be turned off when desired by keying the microphone 5 or 3 times respectively.

b. The DoD Enroute Supplement, Airport/Facility Listing contains information on the type of lighting, runway, and frequency used to activate the system. Examples: Service - Lgt - 3 step apch lgt Rwy 09-27; Service - Lgt - 2 step VASI and ODALS Rwy 13 - 123.0; Service - Lgt - ACTIVATE - HIRL Rwy 06-24 - 122.8.

c. The suggested method of operation is to always key the microphone 7 times. This will ensure all lights are on to the maximum intensity. If desired, intensity can be adjusted, where the capability is provided, to a lower intensity (or REIL turned off) by keying the microphone 5 and/or 3 times. Due to possible close proximity of airports using the same radio-control lighting frequencies, radio-controlled lighting receivers may be set at a low sensitivity requiring the aircraft to be relatively close to the airport to activate the system. Even if the lighting facilities are on upon arrival, key the microphone to ensure a full 15 minute separation.

d. At airports with other than FAA approved system, the type lights, method of control, and operating frequency will be in clear text.

e. Lighting facilities may be activated by the radio control system by keying the microphone as shown below:

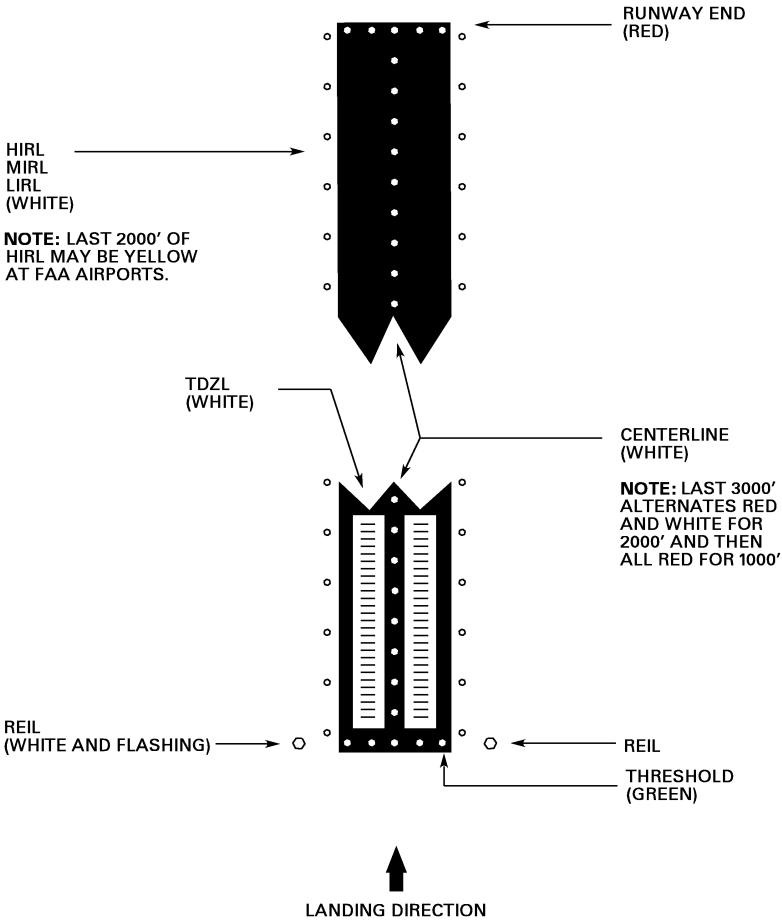
SYSTEM	KEY MICROPHONE	INTENSITY
3-step	7 times in 5 seconds	High
	5 times in 5 seconds	Medium
	3 times in 5 seconds	Low
*2 step	7 times in 5 seconds	High
	3 times in 5 seconds	Low
2-step REIL	3 times in 5 seconds	OFF
ACTIVATE (1-step) (HIRL, MIRL, LIRL, VASI or REIL)	5 times in 5 seconds	ON
1-step REIL	5 times in 5 seconds	OFF

*Activate to High intensity before selecting Medium Intensity

LEGEND
INSTRUMENT APPROACH PROCEDURES (CHARTS)
LIGHTING SYSTEMS

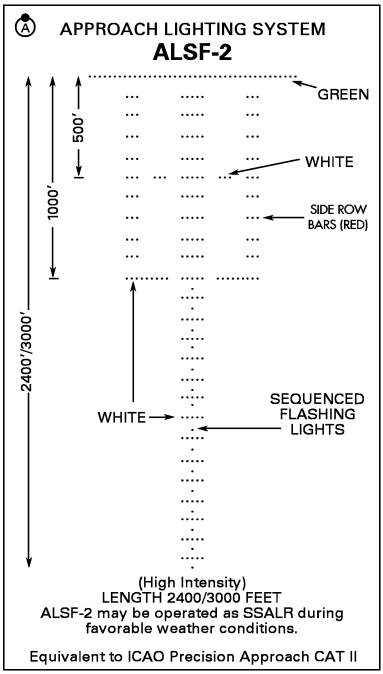
Lighting systems are presented in three sections; runway lighting, approach lighting and visual glide slope indicators. Availability of runway lighting will be shown by note in the airport sketch, e.g. TDZL/CL Rwy 15. Approach lighting and visual glide slope indicators are indicated on the airport sketch by a system identification, e.g. (A2) Lighting system depictions show typical configurations. Variations can exist. For more information see GP, Chap 2, Airport Lighting.

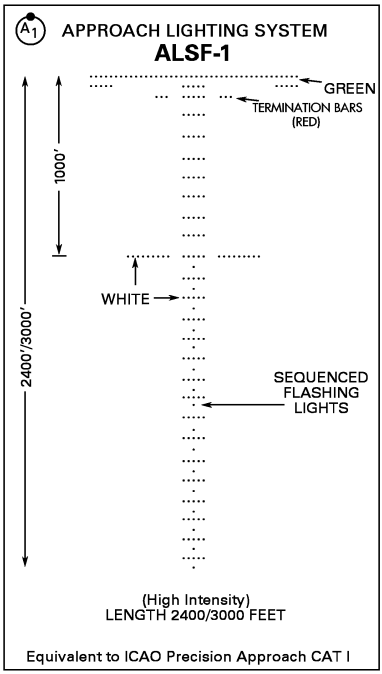
RUNWAY LIGHTING SYSTEMS

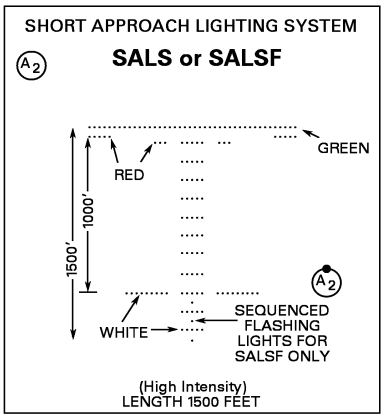


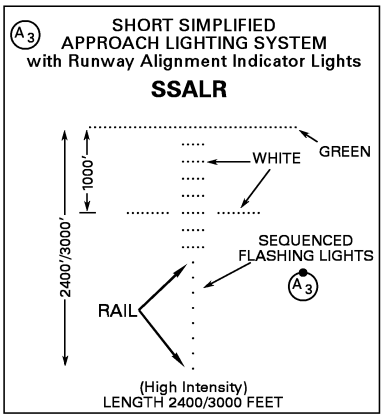
APPROACH LIGHTING SYSTEMS

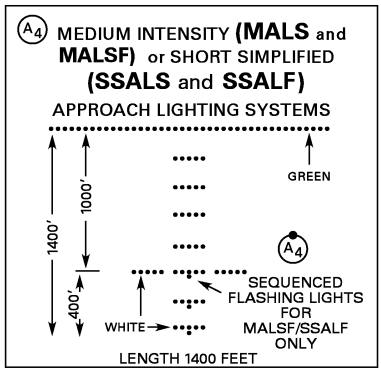
A dot "•" protrayed with approach lighting letter identifer indicates sequenced flashing lights (F) installed with the approach lighting system, e.g. (A1). Negative symbology, e.g., (A1), (V) indicates Pilot Controlled Lighting (PCL).

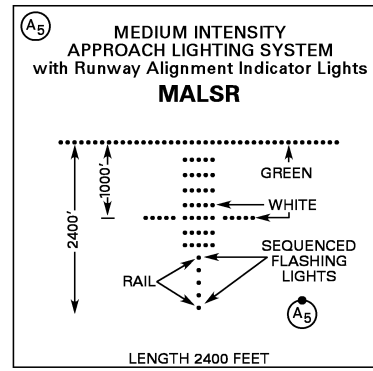


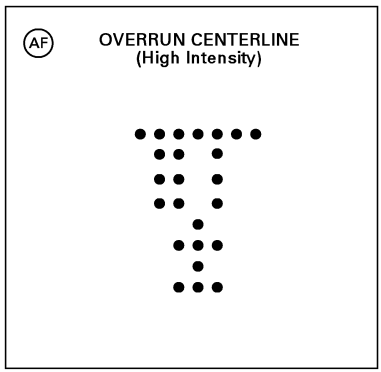


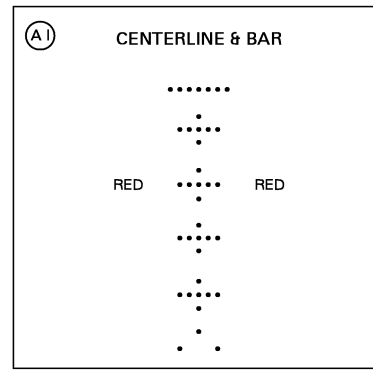


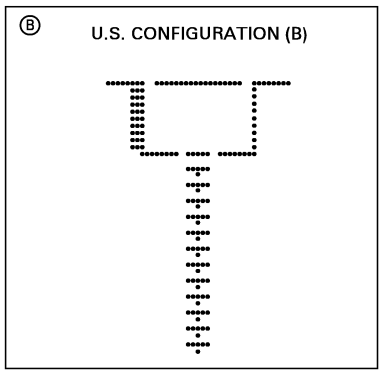


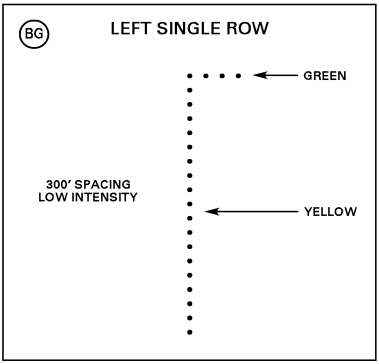

A4
MEDIUM INTENSITY (MALS and MALSF) or SHORT SIMPLIFIED (SSALS and SSALF)
APPROACH LIGHTING SYSTEMS
1400'
1000'
400'
GREEN
A4
SEQUENCED FLASHING LIGHTS FOR MALSF/SSALF ONLY
WHITE
LENGTH 1400 FEET

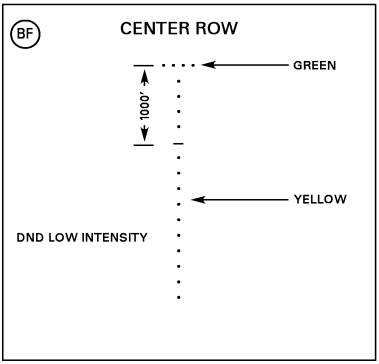

A5
MEDIUM INTENSITY APPROACH LIGHTING SYSTEM with Runway Alignment Indicator Lights
MALSR
2400'
1000'
GREEN
WHITE
SEQUENCED FLASHING LIGHTS
RAIL
A5
LENGTH 2400 FEET

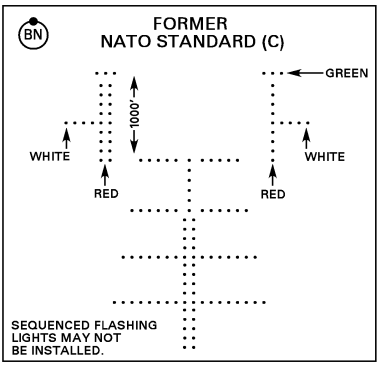

AF
OVERRUN CENTERLINE
(High Intensity)

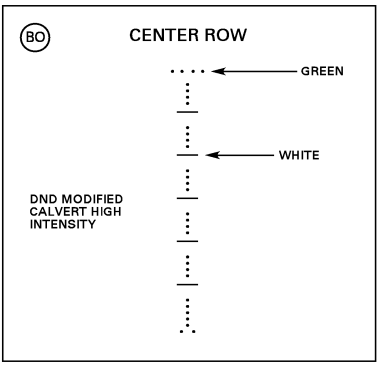

AI
CENTERLINE & BAR
RED
RED

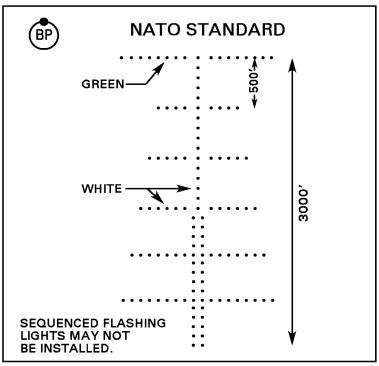

B
U.S. CONFIGURATION (B)

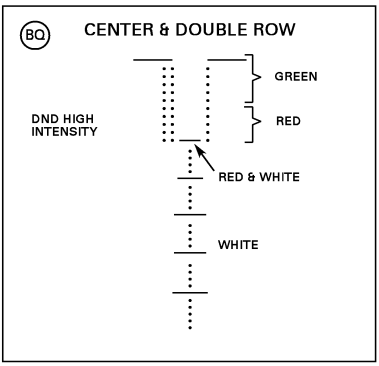

BG
LEFT SINGLE ROW
GREEN
300' SPACING
LOW INTENSITY
YELLOW


BF
CENTER ROW
GREEN
1000'
YELLOW
DND LOW INTENSITY


BN
FORMER
NATO STANDARD (C)
GREEN
1000'
WHITE
WHITE
RED
RED
SEQUENCED FLASHING
LIGHTS MAY NOT
BE INSTALLED.

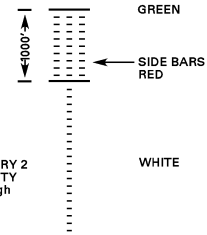

BO
CENTER ROW
GREEN
WHITE
DND MODIFIED
CALVERT HIGH
INTENSITY


BP
NATO STANDARD
GREEN
500'
WHITE
3000'
SEQUENCED FLASHING
LIGHTS MAY NOT
BE INSTALLED.

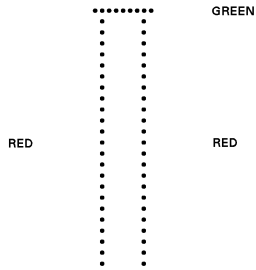

BQ
CENTER & DOUBLE ROW
GREEN
DND HIGH
INTENSITY
RED
RED & WHITE
WHITE

(BR) PORTABLE APPROACH

(BS) CENTER ROW

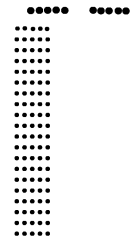


(E) TWO PARALLEL ROW

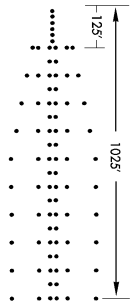


NOTE: STANDARD LENGTH 2400 FEET

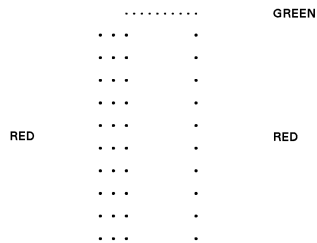
(F) LEFT ROW
(HIGH INTENSITY)



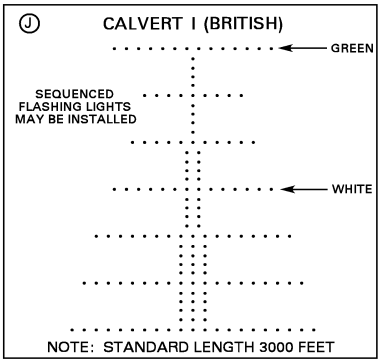
(G) HELICOPTER APPROACH
LIGHTING SYSTEM (HALS)



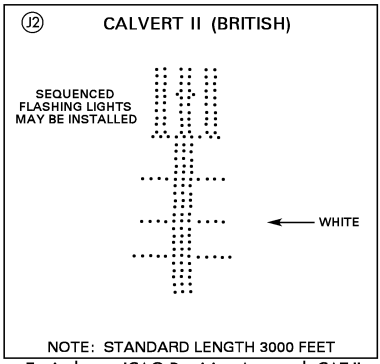
(I) AIR FORCE OVERRUN



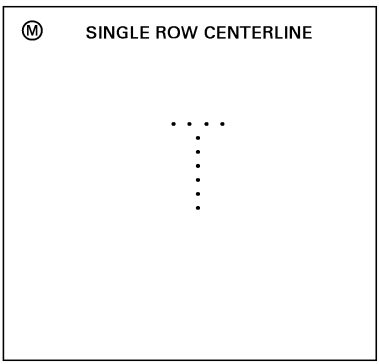
LENGTH 1000 FEET

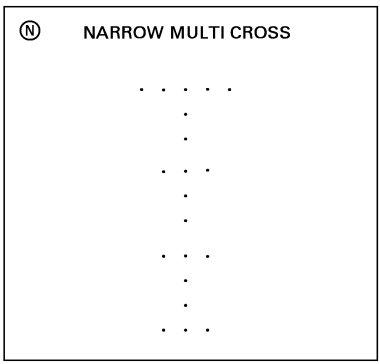


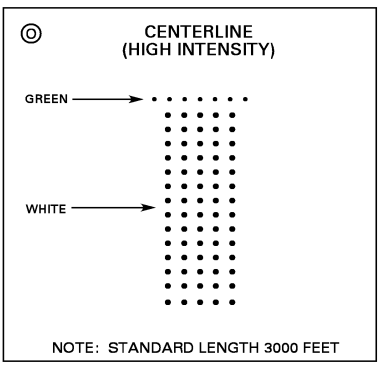
Equivalent to ICAO Precision Approach CAT I

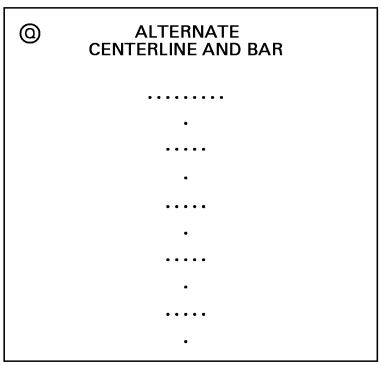


Equivalent to ICAO Precision Approach CAT II

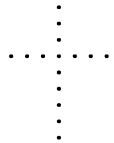




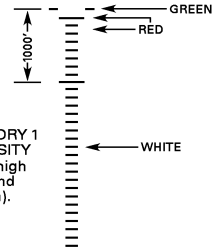




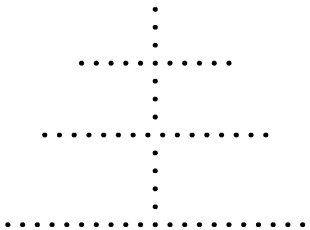
Ⓢ CROSS



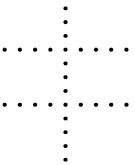
Ⓣ CENTER ROW



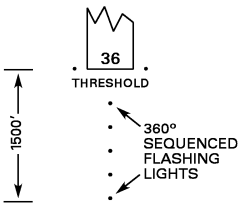
Ⓤ SINGAPORE CENTERLINE



Ⓧ CENTERLINE 2 CROSSBARS



OMNIDIRECTIONAL
APPROACH LIGHTING SYSTEM
ODALS

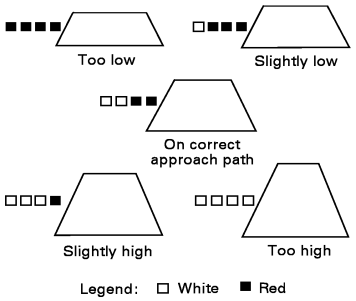


LENGTH 1500 FEET

VISUAL GLIDE SLOPE INDICATORS

Ⓟ PRECISION APPROACH PATH INDICATOR

PAPI

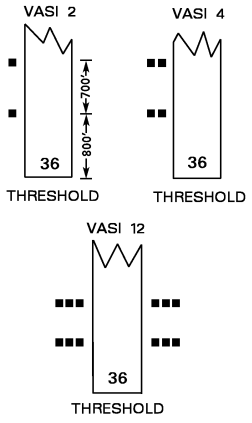


Ⓥ VISUAL APPROACH SLOPE INDICATOR

VASI

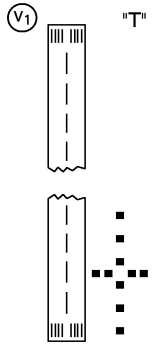
VISUAL APPROACH SLOPE INDICATOR WITH STANDARD THRESHOLD CLEARANCE PROVIDED.

ALL LIGHTS WHITE - TOO HIGH
FAR LIGHTS RED, NEAR LIGHTS WHITE - ON GLIDE SLOPE
ALL LIGHTS RED - TOO LOW



V_1 "T" - VISUAL APPROACH SLOPE INDICATOR

"T" - VASI



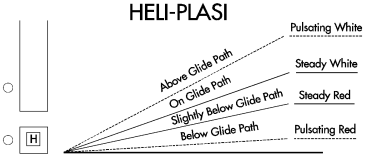
"T" on both sides of Rwy.
All lights variable white.
Correct approach slope - only cross bar visible.
Upright "T" - fly up
Inverted "T" - fly down
Red "T" - gross undershoot

V_2 PULSATING VISUAL APPROACH SLOPE INDICATOR

PVASI

PULSE LIGHT APPROACH SLOPE INDICATOR

HELI-PLASI



CAUTION: When viewing the Approach Slope Indicator in the pulsating white or pulsating red sector, it is possible to mistake this lighting aid for another aircraft or a ground vehicle. Pilots should exercise caution when using this type of system.

ALIGNMENT OF ELEMENTS SYSTEMS

(V5)

APAP

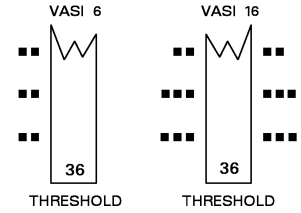
Painted panels which may be lighted at night. To use the system the pilot positions the aircraft so the elements are in alignment.

(V3)

VISUAL APPROACH SLOPE INDICATOR

VASI

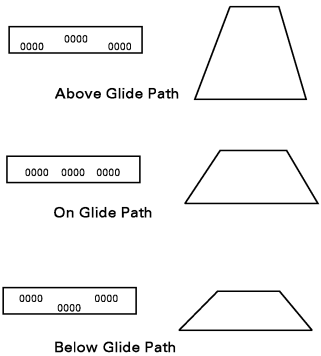
VISUAL APPROACH SLOPE INDICATOR WITH A THRESHOLD CROSSING HEIGHT TO ACCOMODATE LONG BODIED OR JUMBO AIRCRAFT.



(V)

LOW COST VISUAL APPROACH SLOPE INDICATOR

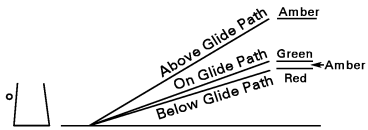
LCVASI



CAUTION: Visual references from the LCVASI are different from standard VASI. See GP, para. 5 for details.

(V4)

TRI-COLOR VISUAL APPROACH SLOPE INDICATOR



CAUTION: When the aircraft descends from green to red, the pilot may see a dark amber color during the transition from green to red.

B-36 NATL/INTL FLIGHT DATA/PROCEDURES

8. CIRVIS REPORTS

(AFFSA/AFMAN 10-206, NORADR 55-1)

a. CIRVIS (pronounced SUR VEES) reports are reports of information of vital importance to the security of the United States and Canada and their forces, which in the opinion of the observer, require very urgent defensive and/or investigative action by the US and/or Canadian Armed Forces.

b. CIRVIS reports should be transmitted in plain language, as soon as possible, to any available US or Canadian military or civil air/ground communications facility. Reporting procedures will be similar to those used when transmitting position reports except the call will be preceded by the word CIRVIS spoken three times to clear the frequency(ies) over all other communications, except DISTRESS and URGENCY. If this fails to clear the frequency(ies), the International Urgency Signal "XXX" transmitted three times or "PAN PAN" spoken three times will be employed.

c. Additional CIRVIS reports should be made if more information on the sighting becomes available. These should contain a reference to the original report.

d. A CANCELLATION report should be made in the event a previously reported sighting is positively identified as friendly or that it has been erroneously reported.

e. REPORT IMMEDIATELY BY RADIO:

(1) Hostile or unidentified single aircraft or formation of aircraft which appear to be directed against the United States, Canada or their forces.

(2) Missiles.

(3) Unidentified flying objects.

(4) Hostile or unidentified group(s) of military surface vessels.

(5) Hostile or unidentified submarines.

(6) Individual surface vessels, submarines, or aircraft of unconventional design, or engaged in suspicious activity or observed in an unusual location or on a course which may be interpreted as constituting a threat to the United States, Canada or their forces.

(7) Any unexplained or unusual activity which may indicate a possible attack against or through the United States or Canada, including the presence of any unidentified or suspicious ground parties in the Polar region or other remote or sparsely populated areas.

f. UPON LANDING:

(1) Reports which for any reason could not be transmitted while airborne.

(2) Unlisted airfields, facilities, weather stations or air navigation aids.

(3) Post landing reports (to include as many photographs as are obtained).

g. DO NOT REPORT craft or aircraft in normal passage or known U.S. or Canadian military or government vessels (including submarines) and aircraft.

9. JOINT SPECTRUM INTERFERENCE RESOLUTION (JSIR) PROCEDURES

(AFFSA/XOIA FIL 2-10)

a. Each operator of electromagnetic equipment is responsible for reporting JSIR incidents in a timely manner.

b. The following perishable information should be recorded at the time of the incident:

(1) True course, ground speed, and altitude (MSL).

(2) Weather conditions.

(3) Date/Time(Z)/Coordinates JSIR began.

(4) Date/Time(Z)/Coordinates JSIR most effective.

(5) Date/Time(Z)/Coordinates JSIR ended.

(6) Bearing(s) to JSIR source with corresponding times (Z) and victim coordinates.

(7) Frequency(ies) affected.

(8) Call signs/type aircraft/audio characteristics/scope presentations, etc noted.

c. JSIR reports may be transmitted in flight if a secure communications mode is available; otherwise, report should be delayed until it can be transmitted via secure means.

d. For detailed JSIR information and guidance refer to AFI 10-707; AR 5-12; OPNAVINST C3430.18A or MCO 03430.3.

NOTE: See FIH (Section B) USAF Global Communications System - HF Manager for additional information on services provided.

10. POLLUTION REPORT (POLREP) FORMAT

(USCG/G-OAV)

a. Pilots are requested to volunteer reports of water pollutants (oil, chemicals, dye, etc.) including size and source of the pollution, on-scene weather, and other significant information. The POLREP should be transmitted to the U.S. Coast Guard National Response Center (NRC), fone 800-424-8802 or 202-267-2675 via any available communications facility.

b. Pollution reports should be made anytime pollution is sighted within 200 nautical miles of the U.S. shoreline, on the Great Lakes, or within 50 nautical miles of any nation in the Wider Caribbean Region.

c. POLREP FORMAT

(1) Pollutant (oil, chemical, dye, etc.)

(2) Size of slick/polluted area (meters, yards, miles)

(3) Condition and color of pollutant (solid - streaked - windrows - fragmented; black - orange - brown - silvery sheen - iridescent sheen)

(4) Location (Lat/Long or radial/DME)

(5) Time discovered (UTC)

(6) Direction of movement (length axis)

(7) Source (course, speed, name (if vessel))

(8) On-scene weather (wind speed, direction, sea state, visibility, percent cloud cover)

(9) Altitude at which sighting made

(10) Identification and parent command of reporting source

(11) If known, any incident report number previously assigned by the NRC concerning the pollution incident being reported.

11. USAF HIGH FREQUENCY GLOBAL COMMUNICATIONS SYSTEM (HFGCS)

(AFFSA/AFFSA FIL 13-067)

a. **GENERAL -** The HFGCS System is a worldwide network of 14 high-power HF stations providing air/ground HF command and control radio communications between ground agencies and US military aircraft and ships. Allied military and other aircraft are also provided support IAW agreements and international protocols as appropriate. The HFGCS is not dedicated to any service or command, but supports all DoD authorized users on a traffic precedence/priority basis. General services provided by the HFGCS are:

- General Phone Patch and Message Relay Services
- Automatic Link Establishment (ALE)
- HF Data Support
- Command and Control Mission Following
- Emergency Assistance
- Broadcasts
- HF Direction Finding Assistance
- ATC Support
- E-Mail connectivity to NIPRNeT and SIPRNeT
- Secure calls (not phone patch) via dedicated circuits can be made from AMC aircraft-TACC-AMC aircraft

b. **MODERNIZATION -** SCOPE Command replaces older high power Global HF equipment. SCOPE Command incorporates Automatic Link Establishment (ALE) to automate communications. All HFGCS station transmit and receive equipment is remotely controlled from the Centralized Network Control Station (CNCS) at Andrews AFB, MD.

c. PROCEDURES -

(1) General Calling. Aircrews use a preliminary call as outlined in ACP-121 US Supp 2 using the collective callsign "MAINSAIL" or the HFGCS station call sign (example: Sigonella Global this is Dark 86 on 11175, OVER). HFGCS operators require approximately 10 seconds (for automated equipment configuration) to respond to calls for service. The HFGCS operator may request the aircraft change to a discrete frequency for improved and/or extended service.

(a) PUBLISHED FREQUENCY LISTING - HFGCS stations operate on “core” frequencies to provide increased "Global" coverage. The published frequency listing does not reflect complete system frequency authorizations. These published frequencies will be used for initial contact, EAM broadcasts, and short-term C2 phone patch and message delivery. Other extended or special services will be moved to each station’s available "discrete" frequencies.

(b) FREQUENCY GUIDE - The frequency guides are designed to optimize air/ground communications.

Primary HFGCS Frequencies	24 Hours	8992 and 11175
Back up HFGCS Frequencies	Day	13200 15016
Back up HFGCS Frequencies	Night	4724 6739

	DISTANCE (1)		
TIME (2)	**200-750 NM**	**750-1500 NM**	**More than 1500 NM**
0000L	4724	6712-6739-8992	6712-6739-8992-11175
0400L	4724	4724-6712-6739	6712-6739-8992
0800L	4724-6712-6739	6712-6739-8992-11175	11175-13200-15016
1200L	4724-6712-6739	8992-11175-13200	13200-15016
1600L	4724-6712-6739	8992-11175-13200	13200-15016
2000L	4724-6712-6739	6712-6739-8992-11175	11175-13200-15016

1. When less than 200 NM any frequency may be used.
2. Local time at ground station.

FREQUENCIES - SUMMER (Apr-Sep)							
STATION	**4724**	**6712**	**6739**	**8992**	**11175**	**13200**	**15016**
Andrews	0500-1330Z		0300-1600Z	24 hours	24 hours	1330-0500Z	1600-0300Z
Ascension	2300-0700Z		2200-0900Z	24 hours	24 hours	0700-2300Z	0900-2200Z
Croughton	2300-0600Z	2100-0800Z		24 hours	24 hours	0600-2300Z	0800-2100Z
Diego Garcia	1400-0100Z		1200-0200Z	24 hours	24 hours	0100-1400Z	0200-1200Z
Elmendorf	0600-1500Z		0400-1700Z	24 hours	24 hours	1500-0600Z	1700-0400Z
Guam	1300-2200Z		1100-2400Z	24 hours	24 hours	2200-1300Z	2400-1100Z
Hawaii	0800-1700Z		0700-1800Z	24 hours	24 hours	1700-0800Z	1800-0700Z
Lajes	2200-0800Z		2000-1200Z	24 hours	24 hours	0800-2200Z	1200-2000Z
Offutt	0400-1330Z		0200-1700Z	24 hours	24 hours	1330-0400Z	1700-0200Z
Puerto Rico	0400-1200Z		0100-1400Z	24 hours	24 hours	1200-0400Z	1400-0100Z
Sigonella	2200-0530Z		1900-0900Z	24 hours	24 hours	0530-2200Z	0900-1900Z
West Coast	0600-1400Z		0300-1800Z	24 hours	24 hours	1400-0600Z	1800-0300Z
Yokota	1300-2200Z		1100-2200Z	24 hours	24 hours	2200-1300Z	2200-1100Z

FREQUENCIES - WINTER (Oct-Mar)							
STATION	**4724**	**6712**	**6739**	**8992**	**11175**	**13200**	**15016**
Andrews	2400-1200Z		2200-1400Z	24 hours	24 hours	1200-2400Z	1400-2200Z
Ascension	2200-0800Z		2100-1000Z	24 hours	24 hours	0800-2200Z	1000-2100Z
Croughton	1800-0600Z	1700-0900Z		24 hours	24 hours	0600-1800Z	0900-1700Z
Diego Garcia	1600-2300Z		1400-0200Z	24 hours	24 hours	2300Z-1600Z	0200-1400Z
Elmendorf	0330-1630Z		0200-1800Z	24 hours	24 hours	1630-0330Z	1800-0200Z
Guam	1300-2030Z		0800-2200Z	24 hours	24 hours	2030-1300Z	2200-0800Z
Hawaii	0700-1600Z		0400-1800Z	24 hours	24 hours	1600-0700Z	1800-0400Z
Lajes	1800-0730Z		1700-0900Z	24 hours	24 hours	0730-1800Z	0900-1700Z
Offutt	0030-1330Z		2300-1400Z	24 hours	24 hours	1330-0030Z	1400-2300Z
Puerto Rico	0100-1100Z		2300-1200Z	24 hours	24 hours	1100-0100Z	1200-2300Z
Sigonella	1700-0500Z		1600-0800Z	24 hours	24 hours	0500-1700Z	0800-1600Z
West Coast	0130-1400Z		0030-1500Z	24 hours	24 hours	1400-0130Z	1500-0030Z
Yokota	0900-2100Z		0800-2200Z	24 hours	24 hours	2100-0900Z	2200-0800Z

(2) Unclassified Phone Patch and Message Relay Services

(a) Phone Patch Service. Phone patching allows direct voice communications between ground agencies and aircraft by electronically connecting telephone circuits to radio transmitters and receivers. Phone patch service is reserved for official unclassified business only and shouldn't exceed 5 minutes. Patches of more than 5 minutes or of a sensitive nature should be run on a discrete frequency. Users requesting a phone patch must include all information necessary for HFGCS operators to complete the call, such as the identity or location of the called parties and telephone number if known. Phone patches are monitored by HFGCS operators. If radio reception isn't of sufficient quality to complete the patch, they will attempt to copy the traffic and relay it to addressees.

(b) Message Relay Service. HFGCS operators transcribe encoded or plain-text messages for aircraft or ground stations and forward them to the addresses by radio or landline. The text of the messages can be in the form of alpha-numerics, code words, plain text, acronyms, and/or numerical sequences. Aircrews may use "READ BACK" procedures when the message data is critical, or when an incomplete transmission is suspected due to poor radio reception. All messages received by Global stations will be accepted and delivered by the fastest means available according to precedence and priority.

(c) **ALE** - For ALE radios to operate properly, the radio must have a loaded datafill, be turned on in the "automatic/scanning" mode and remain there the duration of the flight. If the

radio is removed from the ALE mode, history tables will require time to rebuild and initial communications may be slightly degraded.

ALE Address and Frequency Chart											
Station	**ALE**					**Frequency**					
	Address	**3137**	**4721**	**5708**	**6721**	**9025**	**11226**	**13215**	**15043**	**18003**	**23337**
Andrews	ADW	x	x	x	x	x	x	x	x	x	x
Ascension	HAW	x	x		x	x	x	x	x	x	x
Croughton	CRO	x	x		x	x	x	x	x	x	x
Diego Garcia	JDG	x	x	x	x	x	x	x	x	x	x
Elmendorf	AED	x	x	x	x	x	x	x	x	x	x
Guam	GUA	x	x	x	x	x	x	x	x	x	x
Hawaii	HIK	x	x		x	x	x	x	x	x	x
Lajes	PLA	x	x	x	x	x	x	x	x	x	x
Offutt	OFF	x	x	x	x	x	x	x	x	x	x
Salinas	JNR	x	x	x	x	x	x	x	x	x	x
Sigonella	ICZ	x	x	x	x	x	x	x	x	x	
South Atlantic	MPA	x	x	x	x	x	x	x	x	x	x
West Coast	MCC	x	x	x	x	x	x	x	x	x	x
Yokota	JTY	x	x		x	x	x	x	x	x	
NOTE: Station McClellan renamed West Coast.											

(d) HF Data Service. All HFGCS stations have HF data access to AUTODIN/NOVA and SACCS. HF Radio Teletype requirement has been removed by Joint Staff J6.

(e) Command and Control Mission Following. C2 agencies can use the HFGCS for mission tracking/control of their aircraft. Aircraft responsible to a C2 agency for mission tracking/control should transmit an initial contact/departure report to a Global HF System station after takeoff. The following information should be included:

- Aircraft Call Sign
- Departure point and time
- Destination point and ETA
- Relay Instructions for C2 Agencies
- Remarks: DV codes, special instructions, etc.

d. **EMERGENCY ACTION MESSAGE (EAM) BROADCASTS -** Most HFGCS stations transmit high priority EAMs on published frequencies during specific broadcast periods. During EAM broadcast periods, aircraft may only transmit In-Flight Emergency traffic.

e. **EMERGENCY ASSISTANCE -** Distress and urgency situations should be clearly identified by the words "MAYDAY" or "PAN" as appropriate (refer ACP 121 US Supp 2, Ch 8 for definitive usage). Users should transmit present position and heading when encountering grave or serious emergency situations.

f. **HF DIRECTION FINDING (DF) ASSISTANCE -** HFGCS stations are capable of coordinating DF efforts between aircraft and direction finding facilities for both emergency situations and suspected spectrum interference location efforts.

(1) Emergency DF Requests. Aircraft requiring DF support should advise the HFGCS station of the nature of the emergency, a bearing (steer) or a position (fix). The HFGCS operator will arrange the support and ask the aircraft to transmit a slow count from 1 to 10 and back, followed by the aircraft call sign. The aircraft should then standby for further instructions and/or results of the service. DF facility response time will vary, depending on operating conditions, location of the aircraft, nature of request, prevailing DF facility operating commitments, type of DF facility providing the service and coordination of all concerned. The average response time is estimated at four minutes for bearings and ten minutes for positions after the slow count.

(2) DF Support for Suspected Spectrum Interference. Aircraft experiencing spectrum interference may obtain DF fix information on source of interference by calling the nearest

HFGCS station and requesting Spectrum Interference DF support. The aircraft will advise the Global stations of the frequency affected, type of interference (Voice, Morse Code, Printer, Noise, etc.) and request a read-back of the information passed. A report will be filed in accordance with AFI 10-707 by the aircrew upon landing. The Andrews CNCS will report Spectrum Interference DF results via message to the AF Frequency Management Agency and the aircraft unit command post.

g. **ATC SUPPORT -** HFGCS is not configured to meet ATC communications routing requirements and cannot provide ATC flight following service. This service can be obtained through the appropriate Civil/ICAO ATC communications agency such as the AREA CONTROL CENTER, SECTOR RADIO, or FLIGHT INFORMATION CENTER (see section B, ICAO HF Aeronautical Station List). Global HF stations will accept emergency ATC traffic and provide phone patch or message relay support as required.

h. **FLIGHT WATCH SUPPORT -** The Royal Air Force (RAF) Flight Watch (FW) Centers are:

(1) The RAF FW mission is to United Kingdom FW station provides United States High Frequency (HF) aircraft support to relay command and control messages. Respond to aircraft distress/emergency calls. In addition, assistance with request for or relay of weather information. Reference: Internet http://www.aidu.mod.uk/

(2) Phone patches can be provided (where available) to DSN numbers. Aircraft requesting this facility will be required to provide their 10-digit DSN number.

NOTE: There is 24 hour manned operations center at DHFCS Forest Moor and DHFCS Kinloss.

United Kingdom (TASCOMM)
Voice Call Sign: ARCHITECT
Frequency: 4742
5702
9031
11247
13257
18018

NOTE: Long range HF communications FW for RAF/Naval aircraft from 24 hour manned operations center at DHFCS Forest Moor and DHFCS Kinloss.

Special services contact: DHFCS on Forest Moor on UK MIL 93405 Ext 4240
DHFCS Kinloss on UK MIL 95131 Ext 7472

Ascension
Voice Call Sign: TAZCOMM
Frequency: 3146
4742
6733
11247

NOTE: Flight Watch available for notified flights.

Cyprus
Voice Call Sign: CYPRUS
Frequency: Channel 1 - 4742 (a)
Channel 2 - 9031
Channel 3 - 11247

NOTE: (a) H+15 weather broadcasts, when active.

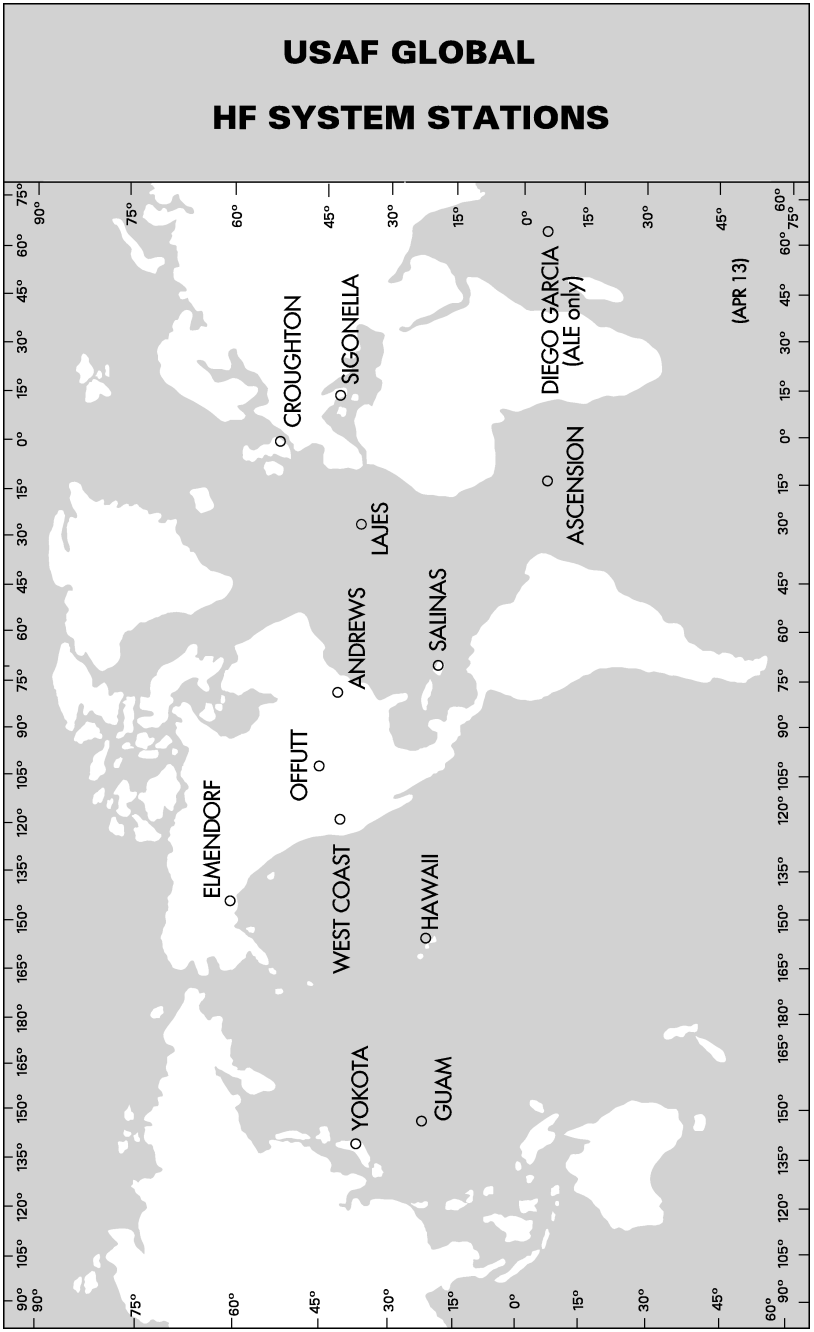
Mount Pleasant (MPA)
Voice Call Sign: VIPER
Frequency: 4742 (a)
11247 (a)

NOTE: (a) H+35 weather broadcasts when active.
1. Flight Watch available for notified flights.
2. Aircraft not fitted with ALE are to scroll through the frequencies in order to select the best reception. Transmissions are to be made at 15 sec intervals before changing to the next guard frequency.

i. **Points of Contact:**

(1) System Management - Questions or feedback concerning service or system access should be addressed to AFPSC CYSS/DOO, 203 W. Losey St. RM 3600, Scott AFB, IL 62225-5222, DSN 779-5749, COMM 618-229-5749.

(2) CNCS Operations – For immediate HF assistance, contact the 89 CS, Joint Base Andrews, MD at DSN 858-3109/5333 or Comm 301-981-3109/5333.


USAF GLOBAL
HF SYSTEM STATIONS
ELMENDORF
OFFUTT
WEST COAST
YOKOTA
GUAM
HAWAII
ANDREWS
SALINAS
LAJES
CROUGHTON
SIGONELLA
ASCENSION
DIEGO GARCIA
(ALE only)
(APR 13)

j. **AMC OPERATIONS CENTER -** The USAF Air Mobility Command (AMC) Tanker Airlift Control Center (TACC) provides worldwide C2 for AMC missions, while the appropriate theater Air Mobility Control Center (AMCC) provides C2 for theater operated missions. Either the TACC or appropriate AMCC can be contacted for airlift movement reporting and/or assistance directly through the Global stations. The voice call sign "MAINSAIL" may be used for establishing initial contact. Following initial contact, aircrews may request a phone patch to the desired center as follows:

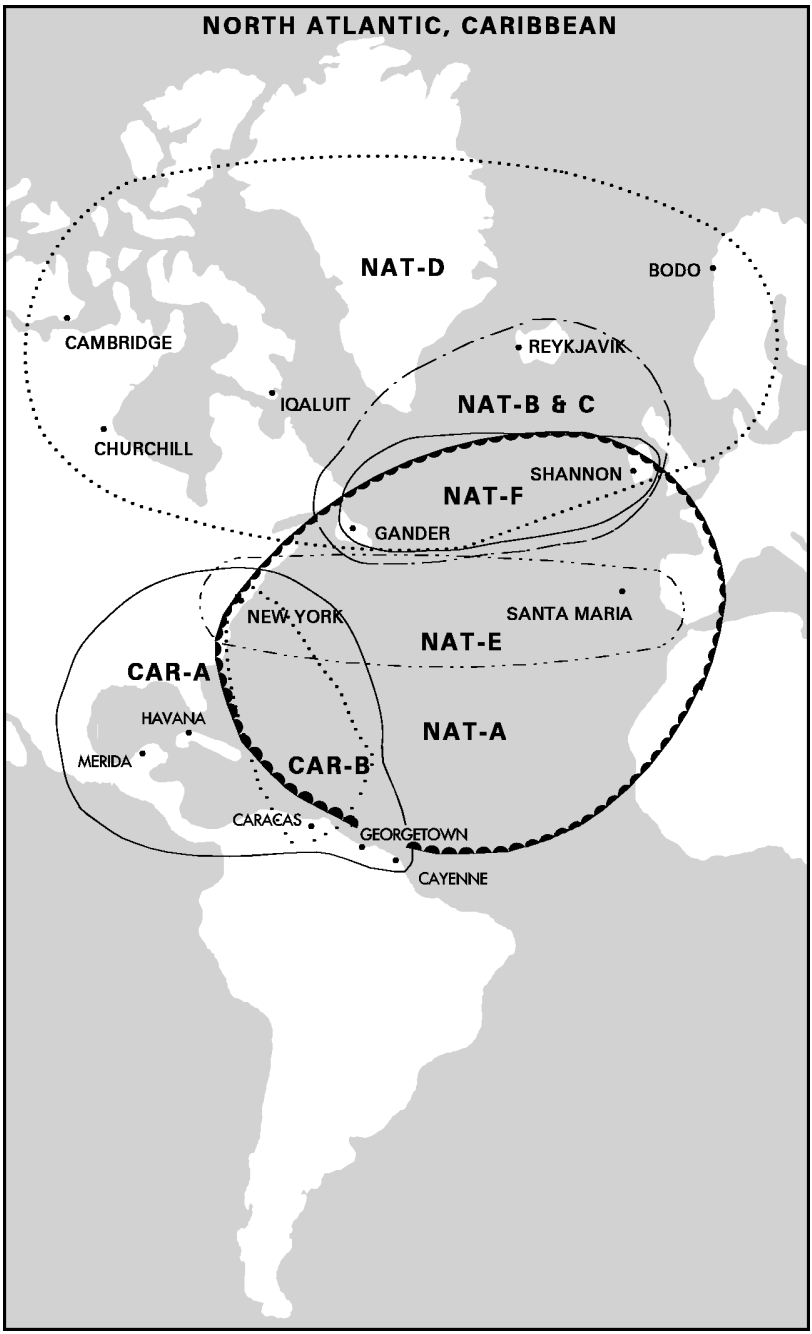
CENTER	CALL SIGN	PRIMAY DSN NUMBER	SECONDARY DSN NUMBER
Elmendorf AMCC	DENALI	317-552-3258	317-552-3439
Osan AMCC	BRICKWALL	315-784-6500	315-784-4950/4600
TACC C2 OPS	HILDA	312-779-0320	SEE NOTE
USAFE UTRACC	TRACKER	314-480-9292	314-480-7114/9293

NOTE: The TACC Cell may be called toll-free using 1-800-247-6625 (AIR-MOBL).

The Air Force Eastern Test Range (AFETR) HF Network may be used as a backup to GLOBAL. They may be contacted on USB 10780 (primary) and 20390 (secondary). Their call sign is CAPE RADIO.
(618 AOC (TACC)/618 AOC (TACC) FIL 15-493)

k. **ICAO HF AERONAUTICAL STATION LIST**

The ICAO HF aeronautical stations and selected extended range VHF stations contained in this list are extracted from the ICAO Aeronautical Regional Plans and other sources. The listing is to be used as a guide for flight information communications. All the HF stations listed are known to have SSB capability unless otherwise indicated. VHF extended range radio frequencies are shown in parenthesis. Not all stations operate on all frequencies at all times. Regional boundaries shown on the graphic pages represent areas of coverage for frequencies listed. Cities are shown for orientation purposes only.


NORTH ATLANTIC, CARIBBEAN
NAT-D
BODO
CAMBRIDGE
REYKJAVIK
IQALUIT
NAT-B & C
CHURCHILL
SHANNON
NAT-F
GANDER
NEW YORK
SANTA MARIA
NAT-E
CAR-A
HAVANA
NAT-A
MERIDA
CAR-B
CARACAS
GEORGETOWN
CAYENNE

NORTH ATLANTIC, CARIBBEAN

NORTH ATLANTIC (NAT-A)

CAYENNE -
3023 5440 5526 5540 8825
11291 13297

GANDER
3016④⑤ 5598④⑤ 8906④⑤ 13306④⑤

GEORGETOWN -
6730.5 8855 10096

LISBOA (127.9)

NEW YORK (129.9)
SATCOM VOICE 436623③
3016 5598 8906 13306 17946
21964

PIARCO -
5526 5550 5598 6577 8825
8855 8918 10096 11387 13297
17907

SANTA MARIA (127.9)
3016① 5598 8906 13306② 17946⑥

SHANWICK (127.9)
3016 5598 8906 13306

①0000-0800, 2100-2400 ②1000-2100
③631-244-2492. ④0030-0830Z++.
⑤1130-1930Z++. ⑥1200-1800

NAT-B

GANDER
2899 5616 8864 13291

REYKJAVIK (127.85)(126.55)
2899 5616 8864 13291

SHANWICK (127.9)
2899 5616 8864 13291

NAT-C

GANDER
2872 5649 8879 11336 13306

REYKJAVIK (127.85)(126.55)
2872 5649 8879 13306

SHANWICK (127.9)
2872 5649 8879 11336 13306

NAT-D

BODO -
2971 4675 8891 11279

CAMBRIDGE BAY -
2971 4675 8891 11279

CHURCHILL (126.9) ①
2971 4675 8891

GOOSE (126.9)

IQALUIT (126.9)
2971 4675 8891 11279

MONTREAL/PIERRE ELLIOTT TRUDEAU
(126.9)①②
2971 4675 8891 11279

REYKJAVIK (127.85)(126.55)
2971 4675 8891 11279 13291
17946

SHANWICK (127.9)
2971 4675 8891 11279 13291

WINNIPEG (126.9)①

①SELCAL. ②N63°45′ W68°33′

NAT-E

CANARIES -
2962② 6628 8825 11309 17946③

NEW YORK (129.9)
SATCOM VOICE 436623①
2962 6628 8825 11309 13354
17952

SANTA MARIA (127.9)
2962④ 6628 8825⑤ 11309⑥ 13354⑦

①631-244-2492. ②SS-SR ③SR-SS ④0000-0800
⑤0000-1900, 2300-2400 ⑥0900-1900 ⑦1100-
1900

NAT-F

GANDER (122.375)①②⑥ (126.9)①⑥
(127.1)②⑥ (127.9)③⑥ 3476④⑤ 6622④⑤
8831④⑤ 13291④⑤

SHANWICK (127.9)
3476 6622 8831 13291

①South ②North. ③N58°-62° AND W40′-50′.
④0030-0830Z++. ⑤1130-1930Z++.
⑥SELCAL.

CARIBBEAN ATLANTIC (CAR-A)

BARRANQUILLA -
2887 6577 8918 11387

CARACAS/MAIQUETIA (130.6)
5550 6577 8918 13297

GUATEMALA (126.9)
2887 5550 6577 8918 11396
13297

HAVANA (126.9)
2887 5550 6577 8918 11396
13297

MERIDA
2887 5550 6577 8918 11396
13297 17907

NEW YORK (130.7)
SATCOM VOICE 436623①
2887 3455 5550 6577 8846
11396

PANAMA (123.6)① (126.9)②
5520 6577
①East ②West

PARAMARIBO
8855

PIARCO -
5526 5550 5598 6577 8825
8855 8918 10096 11387 13297
17907

SAN ANDRES -
2887 3455 6577 6586 8846
8918 11387

SAN JOSE/EL COCO
2887 5550 6577 8918 11396
13297

TEGUCIGALPA (126.9)
2887 5550 6577 8918 11396
13297

①631-244-2492.

CARIBBEAN ATLANTIC (CAR-B)

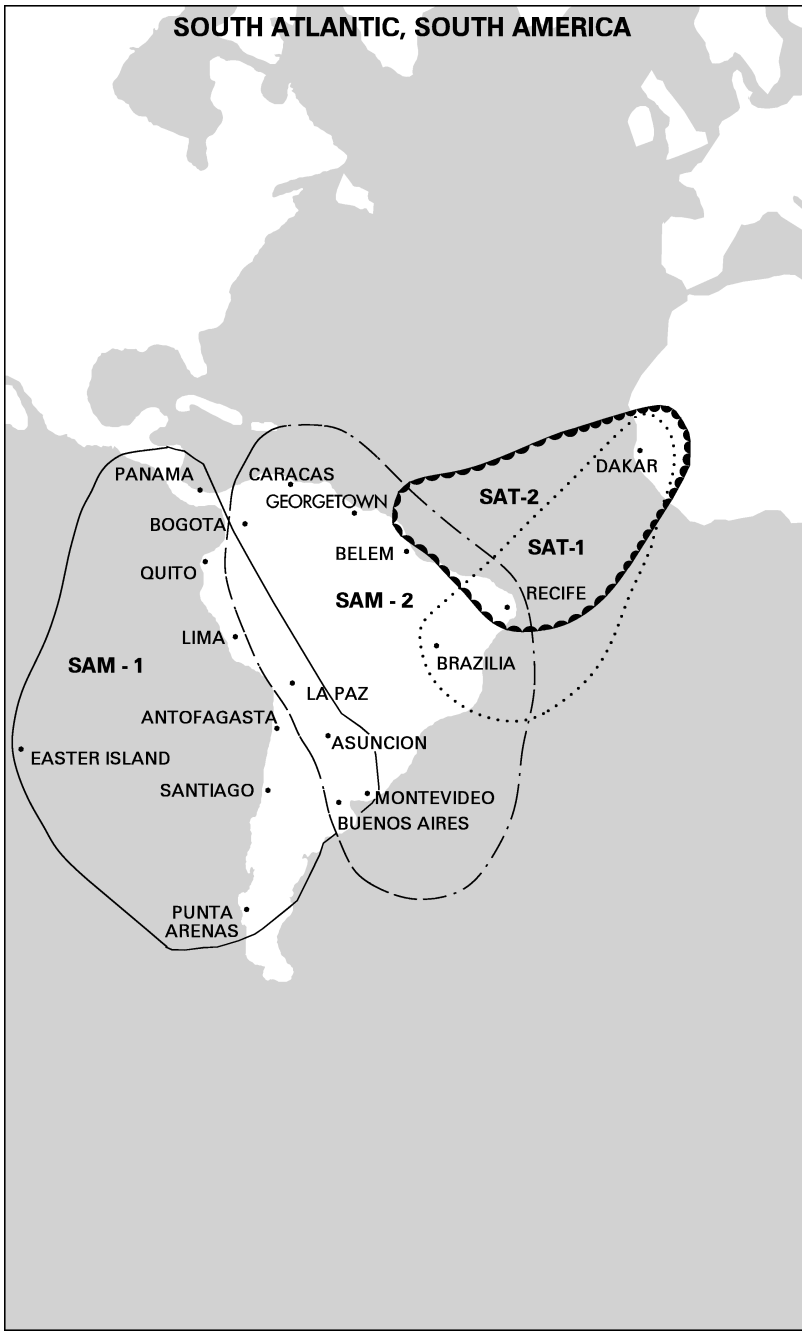
CAYENNE -
3023 5440 5526 5540 8825
11291 13297

GEORGETOWN -
6730.5 8855 10096

NEW YORK (130.7)
SATCOM VOICE 436623①
5520 6586 8918 11330 13297
17907

PIARCO -
5526 5550 5598 6577 8825
8855 8918 10096 11387 13297
17907

①631-244-2492.


SOUTH ATLANTIC, SOUTH AMERICA
PANAMA
CARACAS
GEORGETOWN
BOGOTA
QUITO
LIMA
SAM - 1
LA PAZ
ANTOFAGASTA
EASTER ISLAND
SANTIAGO
PUNTA ARENAS
ASUNCION
MONTEVIDEO
BUENOS AIRES
BELEM
SAM - 2
BRAZILIA
RECIFE
SAT-2
SAT-1
DAKAR

B-50 NATL/INTL FLIGHT DATA/PROCEDURES

SOUTH ATLANTIC, SOUTH AMERICA

SOUTH ATLANTIC (SAT 1,2)

ATLANTICO
2854 3452 5565 6535 8855
8861 11291 13315 13357 17907
17955

BRASILIA
3452 8861 13357

CANARIES -
2854② 3452② 5565 6535 8861
11291 13315① 13357 17955①

CAYENNE
3023 5440 5526 5540 8825
11291 13297

DAKAR ③ (120.5) (127.3)
3452② 5565② 5680 6673 8861
11291 13315 13357① 17955①

NOUADHIBOU
6673 8861

NOUAKCHOTT
6673 8861

RECIFE
3479 5526 6649 8855 10096

SAL -
2854 5565 6535 8861 11291
13357 17955

①SR-SS. ②SS-SR. ③SELCAL.

WESTERN SOUTH AMERICA (SAM-1)

ANTOFAGASTA (127.3)
4669 5604 6649 10024

ASUNCION (126.9)
6649 7647.5 11397

CORDOBA (126.5) (125.1)
2944 6649 10024

EZEIZA (124.1) (124.5) (125.6)
2944 6649 10024 11360 17907

LA PAZ
4669 6649 10024

LIMA (126.9)
6649 10024

MENDOZA (122.1) (126.9)
2944 6649 10024

MONTEVIDEO (126.7)
6649 10024

PANAMA (126.9)
2944 6649

PASCUA/EASTER ISLAND①② - all freq (127.3)
4669 5643 6649 8667 10024
13300 13261

①O/R. ②SR-SS.

PUERTO MONTT (126.9)
4669 5454 6649 10024

PUNTA ARENAS (126.9)
4669 6649 10024

RESISTENCIA (126.9)
2944 6649 10024

SALTA (126.9)
2944 6649 10024

SANTA CRUZ
2944 4669 6649 10024

SANTIAGO (127.3)
4669 5583 6649 10024 13300

EASTERN SOUTH AMERICA (SAM-2)

AMAZONICA
3479 5526 8855 10096

ASUNCION (126.9)
5526 8855 10096

BOGOTA (126.9)
3488① 5556② 6649 8855 8918
10024 10096

①2300-1100Z. ②1100-2300Z.

BRASILIA
5526 8855 10096

CAYENNE
3023 5440 5526 5540 8825
11291 13297

CARACAS/MAIQUETIA (130.6)
5526 8855 10096

CURITIBA -
3479 5526 8855 10096

EZEIZA (124.1) (124.5) (125.6)
3479 5526 8855 10096 17907

GEORGETOWN
6730.5 8855 10096

GUAYAQUIL (121.5) (126.9)
4669 5595 6535 6649 10024
11360

①SR-SS.

LA PAZ
5526 8855 10096

LETICIA (127.5)
3488 5526 6553 8855 8894
10096

1000-0300Z, extn O/R.

LIMA (126.9)
6649 10024

MANAUS
3479 5526 8855 10096

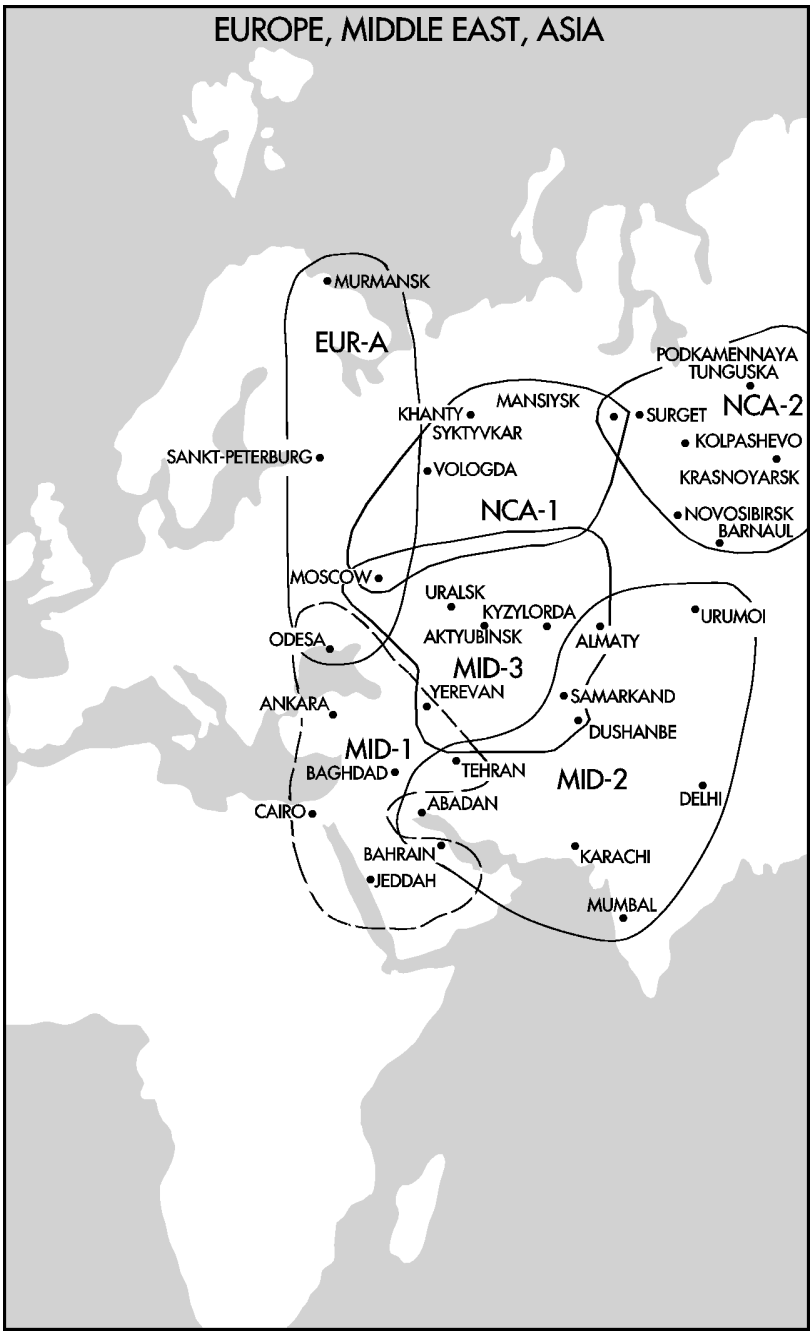
MONTEVIDEO (126.7)
3479 5526 8855 10096 17907

PANAMA (126.9)
2944 6649

PIARCO (124.2)
2887 2910 5526 6577 8825
8855 8918 10096 11387 13297

RECIFE
8855 10096

SANTA CRUZ
3479 5526 8855 10096


EUROPE, MIDDLE EAST, ASIA
MURMANSK
EUR-A
PODKAMENNAYA TUNGUSKA
NCA-2
KHANTY
MANSIYSK
SURGET
SYKTYVKAR
KOLPASHEVO
SANKT-PETERBURG
VOLOGDA
KRASNOYARSK
NCA-1
NOVOSIBIRSK
BARNAUL
MOSCOW
URALSK
KYZYLORDA
URUMOI
ODESA
AKTYUBINSK
ALMATY
MID-3
YEREVAN
SAMARKAND
ANKARA
DUSHANBE
MID-1
BAGHDAD
TEHRAN
MID-2
DELHI
CAIRO
ABADAN
BAHRAIN
KARACHI
JEDDAH
MUMBAI

EUROPE, MIDDLE EAST, ASIA

EUROPE (EUR-A)

BEIRUT -
2910 4689 8875

MALTA (W Sctr - 130.975 127.525)
(E Sctr - 123.625 122.775)
5661① 10084①

MOSCOW -
11390

MURMANSK -
4672 9024

SANKT - PETERBURG -
4672 9024

TUNIS -
3411 4689 5519 8826

① SELCAL

MIDDLE EAST (MID-1)

ADEN (124.5)
5100

AMMAN (128.5)
2992 5667 8918 13312

BAGHDAD
2992 5667 8918

BAHRAIN (126.7)
2992 5658 5667 8918 13288
13312

BEIRUT
3404 5603 8847 13336

DAMASCUS
2992① 5667 8918 13312②

JEDDAH -
5667 8918

KUWAIT
2992 5667 8918 13312

RIYAN
7595 8918

SANAA
13288

TEHRAN (133.4)
5856 5667 6925 8091 8918
10018 13288 13312

① SS-SR

(MID-2)

BAHRAIN (126.7)
2992 5658 5667 8918 13288
13312

MUMBAI (126.9)
3467 5658 8879 10018 13288

DELHI (127.1)
2872 3467 5580 5601 5658
8906 8948 10018 13288

KABUL (120.9)
3467 5658 10018 13288

KATHMANDU (126.5) (124.7)
2923 6607

KARACHI (125.4) (126.5) (128.3)
3467 5658 10018

KUWAIT
5658 10018 13288

LAHORE (119.1) (125.6) (127.5)
3467 5658 10018

MUSCAT (123.95 124.55)
5658① 10018①

NAGPUR (123.9)
2872 5601 6583 8861 8948

TEHRAN (133.4)
5856 5667 6925 8091 8918
10018 13288 13312

URUMQI (119.3)
3467 5658 10018

VARNASI (119.0)
2872 5580 8948

①HO

(MID-3)

ALMATY
3467 4669 4728 8951 10018

AKTYUBINSK
3440 4669 4728 5586 8951

DUSHANBE
3476 4095 5658 8145 9955
10018

KYZYLORDA
4669 8951

MOSCOW
11390

SAMARKAND
3467 5658 10018

TASHKENT
3467 4669 4728 5658 8951
10018

URALSK
3440 4669 4712 5586 8951

YEREVAN
2926 4712 5487 8918 11333

NORTH CENTRAL ASIA (NCA-1)

KHANTY MANSIYSK (134.6 135.6)

MOSCOW
11390

SYKTYVKAR
3422 4712 5596

VOLOGDA
4672

(NCA-2)

BARNAUL
3046 6704

KHANTY MANSIYSK (134.6 135.6)

KIRENSK
3046 3425 4728 6704

KOLPASHEVO
4712

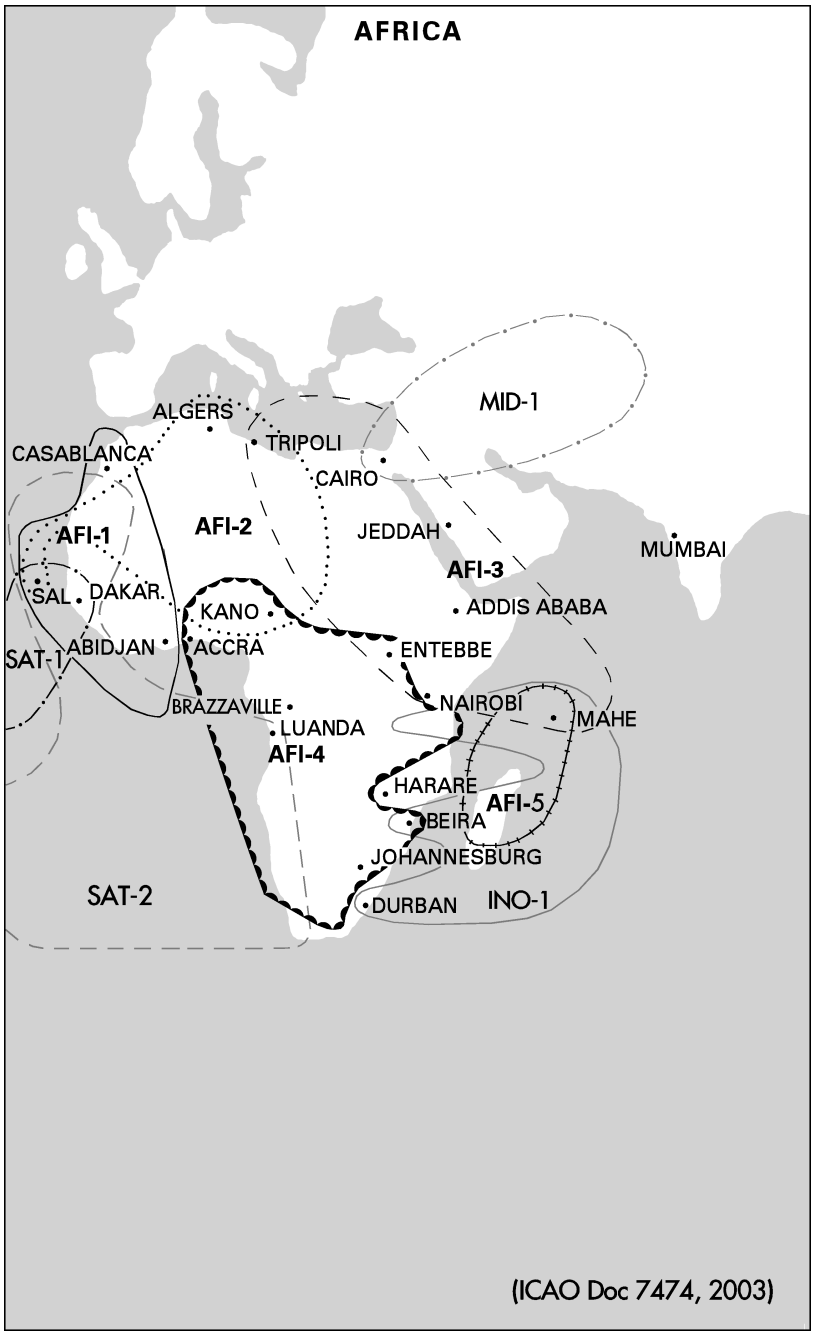
KRASNOYARSK
3046 6704

NOVOSIBIRSK
4712

PODKAMENNAYA TUNGUSKA (133.2)

SURGUT (129.3 132.2 133.3)

YENISEYSK
3046 6704


AFRICA
MID-1
ALGERS
TRIPOLI
CASABLANCA
CAIRO
AFI-1
AFI-2
JEDDAH
MUMBAI
AFI-3
SAL
DAKAR
KANO
ADDIS ABABA
SAT-1
ABIDJAN
ACCRA
ENTEBBE
BRAZZAVILLE
NAIROBI
MAHE
LUANDA
AFI-4
HARARE
AFI-5
BEIRA
JOHANNESBURG
SAT-2
DURBAN
INO-1
(ICAO Doc 7474, 2003)

AFRICA

AFRICA (AFI-1)

ABIDJAN ③ (121.1)
5680 6535 6586 6673 8861
13294

BAMAKO (119.1) -
6673 8861

BOUAKE -
6673

CASABLANCA -
3419 5652 8894 13273 17961

DAKAR ③ (120.5) (127.3)
3452② 5565① 5680 6535 6673
8861 11291 13315① 13357① 17955①

MONROVIA -
3452 6638 6673 8861 8882

NOUADHIBOU -
6673 8861

NOUAKCHOTT -
6673 8861

SAL -
2854 6673 8861 11291 13315
13357 17955

①SR-SS. ②SS-SR. ③SELCAL.

(AFI-2)

ALGIERS -
5652① 8894 13273①

KANO (124.1 128.5)
5493 5652 8903 13294

NDJAMENA ② (120.5) (128.1)
2878③ 5493 5652 8873 8894
8903 13294④

NIAMEY ② (126.1)
2878③ 3419③ 5493 5652 6586
8894 8903 13273④ 13294

OUAGADOUGOU-
6586 6673

TRIPOLI -
3419 5652 8894 13273

TUNIS 3411 5519 8826

①No SSB. ②SELCAL. ③SS-SR. ④SR-SS.

(AFI-3)

ADDIS ABABA (125.1 125.2 126.9)
5517 7595 8870 11300

ADEN
5658 11300

BENGHAZI -
3467 5517 6574 8870 11300
13288

BUJUM BURA -
8879 8903 8913 11300 13294

CAIRO (130.9)
3467① 5517 5637 6574 11300
13288②

DAR ES SALAAM (119.3 123.3)
5517 8870 8879 11300

DJIBOUTI (128.9)
5658 7595 11300

HARGEISA (118.7③ 132.5 132.9)
5517④⑤ 5658 11300⑤ 13288⑤

JEDDAH -
5658 11300

KHARTOUM (124.7)
3467 5517 11300 13288

MOGADISHU (120.9 132.5)
5517④⑤ 5658 11300⑤ 13288⑤

MUMBAI (126.9)
2872 3467 5601 5634 5658
6655 8879 8909 8948 10018
11300 13288

NAIROBI (118.5 120.5)
3467 5517 5634 6559 8879
8888 11300 13306

RIYAN -
5658 11300 13288

SANAA -
11300

SEYCHELLES⑤ (120.2 118.3)
3467③ 4657③ 8879③ 11300③ 13288

TRIPOLI -
3467 5517 6574 8870 11300
13288

①SS-SR. ②SR-SS. ③HS. ④SS-SR. ⑤SELCAL.

(AFI-4)

ACCRA -
5493 6586 8903 13294

BANGUI
6559 8903

BRAZZAVILLE ⑤ (121.1)
2878④ 5493 6559 8873 8903
13294

COTONOU
6586

DOUALA (125.1)
5493 6559 8873 8903 13294

FRANCEVILLE
6559 8873①③

GAROUA
8903①③

HARARE
5505 8861 8879

JOHANNESBURG (126.7)
5565 6559 8861 13315 17955
21926

KANO (124.1 128.5)
5493 5652 8903 13294

KINSHASA (123.7) (126.1) (128.1)
2879④ 3452④ 5493 8903 13294

LAGOS -
2878④ 5493 8903 13294

LIBREVILLE (126.5)
6559 8873 8903

LILONGWE
4657 6586 8879 8888

LUANDA (118.1) (119.1) (121.9)
2878 5493 8903 13294

LUSAKA (120.5) (120.9) (128.9)
2878 5493④ 8873 8879⑤

MALABO
6559 8873 8903

NIAMEY ⑤ (126.1)
2878④ 5493 6586 8903

SAO TOME/SALAZAR-
5493 8873⑥ 8903 13294

SEYCHELLES⑤ (120.2 121.5)
3476③ 4657③ 8879③ 11300③

WINDHOEK ③ (124.7)
8861

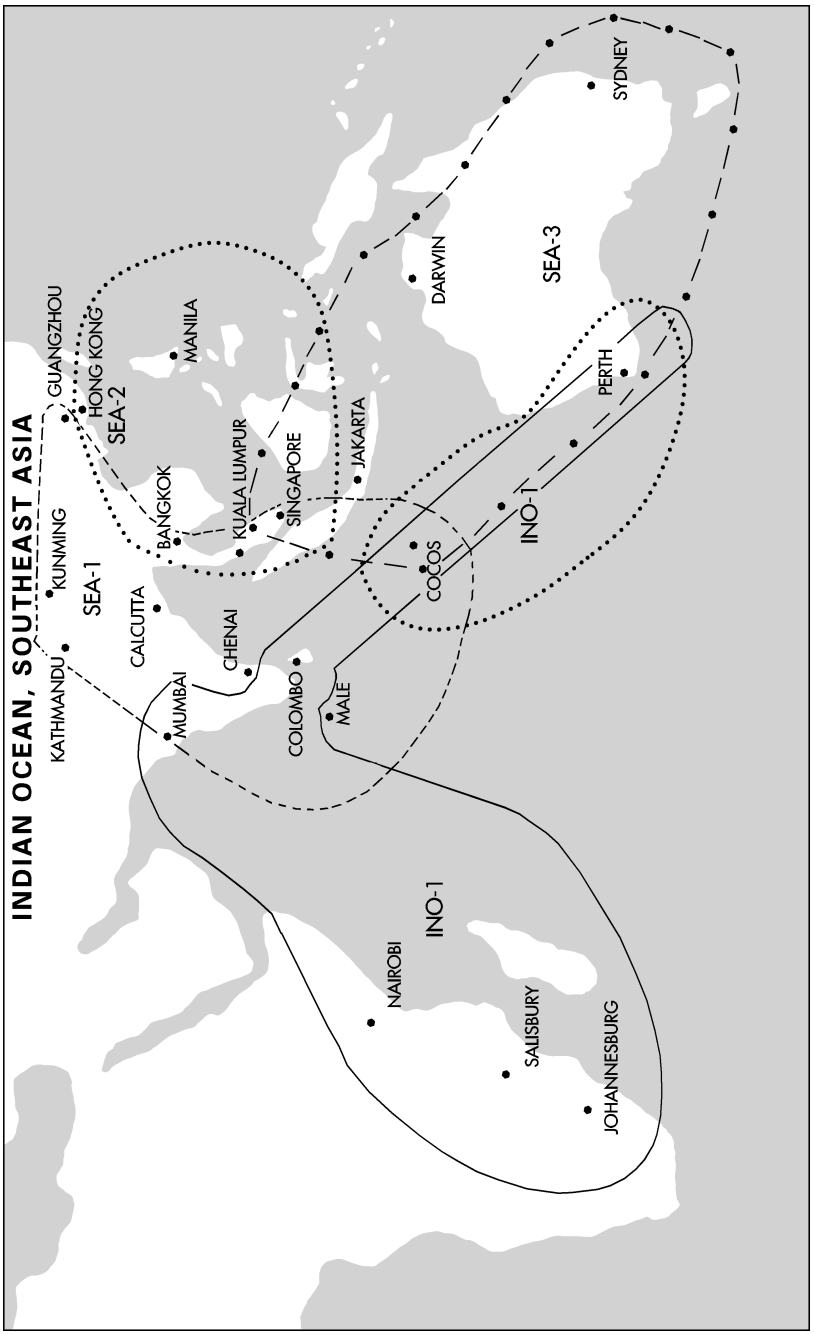
①O/R. ②0700-1800Z. ③HS. ④SS-SR.
⑤SELCAL. ⑥SR-SS.

(AFI-5)

ANTANANARIVO ② (126.7) (128.9)
3476③ 4657① 5634③ 8879 13306①

MORONI
4657① 5505① 8879 11300①

①SR-SS. ②SELCAL. ③SS-SR.


INDIAN OCEAN, SOUTHEAST ASIA
KATHMANDU
KUNMING
GUANGZHOU
HONG KONG
MANILA
BANGKOK
CALCUTTA
CHENNAI
MUMBAI
KUALA LUMPUR
SINGAPORE
JAKARTA
COLOMBO
MALE
COCOS
DARWIN
PERTH
SYDNEY
NAIROBI
SALISBURY
JOHANNESBURG
SEA-1
SEA-2
SEA-3
INO-1
INO-1

INDIAN OCEAN, SOUTHEAST ASIA

INDIAN OCEAN (INO-1)

ANTANANARIVO ④ (126.7) (128.9)
3476⑤ 4657⑥ 5634⑤ 8879 13306④

BEIRA (126.5 130.9)
3476 5493 8879 13306

COCOS (118.1)
3476 5634 8879 13306 17961

COLOMBO -
8879 13306

DAR ES SALAAM (119.3 123.3)
5517 8870 8879 11300

JOHANNESBURG (126.7)
5634 8879

LUSAKA (120.5 128.9)
5634 8873 8879 13306

MAHAJANGA -
8879

MAURITIUS -
3476 5634 8879 13306③

MUMBAI (126.9)
2872 3467 5601 5634 5658
6655 8879 8909 8948 10018
11300 13288

NAIROBI (118.5)
6559 13306

PERTH (123.9) (122.4)
3476 5634 8879 13306 17961

ST. DENIS/GILLOT -
3476⑥ 5634 8879

SEYCHELLES (120.2 119.7)
3476 5634 8879 13306 17961

TOAMASINA -
8879

①1500-0400Z. ②0300-1500Z. ③For operational requirements, OT O/R. ④HS. ⑤SR-SS. ⑥SS-SR.

SOUTHEAST ASIA (SEA-1)

CALCUTTA (127.3)
2872 2923 2947 3470 3491
5484 5580 6556 6583 8861
8906 8948 10066 13318

CHENNAI (124.1)
2872 3470 5670 6583 6655
8861 8909 10066 13318

COCOS (118.1)
11285

COLOMBO -
3470 5670 11285 13318 17907

DHAKA (121.3)
2947 3491 6556 10066

KARACHI (125.4) (126.5) (128.3)
3467 5658 10018

KATHMANDU (126.5)(124.7)
2923 6607

KUALA LUMPUR -
3470 5670 6556 11285 13318
17907

MALE INTL. -
3470 5670 11285 13318 17907

MEDAN -
3470 5670 11285 11396 13318
17907

NAGPUR (123.9)
2872 5601 6583 8861 8948

SINGAPORE -
6556 11297

TRIVANDRUM (120.6)
3470 5670 11285

VARNASI (119.0)
2872 5580 8948

SOUTHEAST ASIA (SEA-2)

HOCHIMINH (123.3)
11297 11396 13309 5655 8942

HONG KONG (127.1)
3485 5655 8942 11396 13309

KINABALU -
6825

KUALA LUMPUR -
5655 8942 11396

MANILA (124.9)
3485 5655 8942 11396 13309

PHNOM PENH (127.5)
8942

SINGAPORE -
5655 8942 11396

SOUTHEAST ASIA (SEA-3)

BALI -
3470 6556 11396

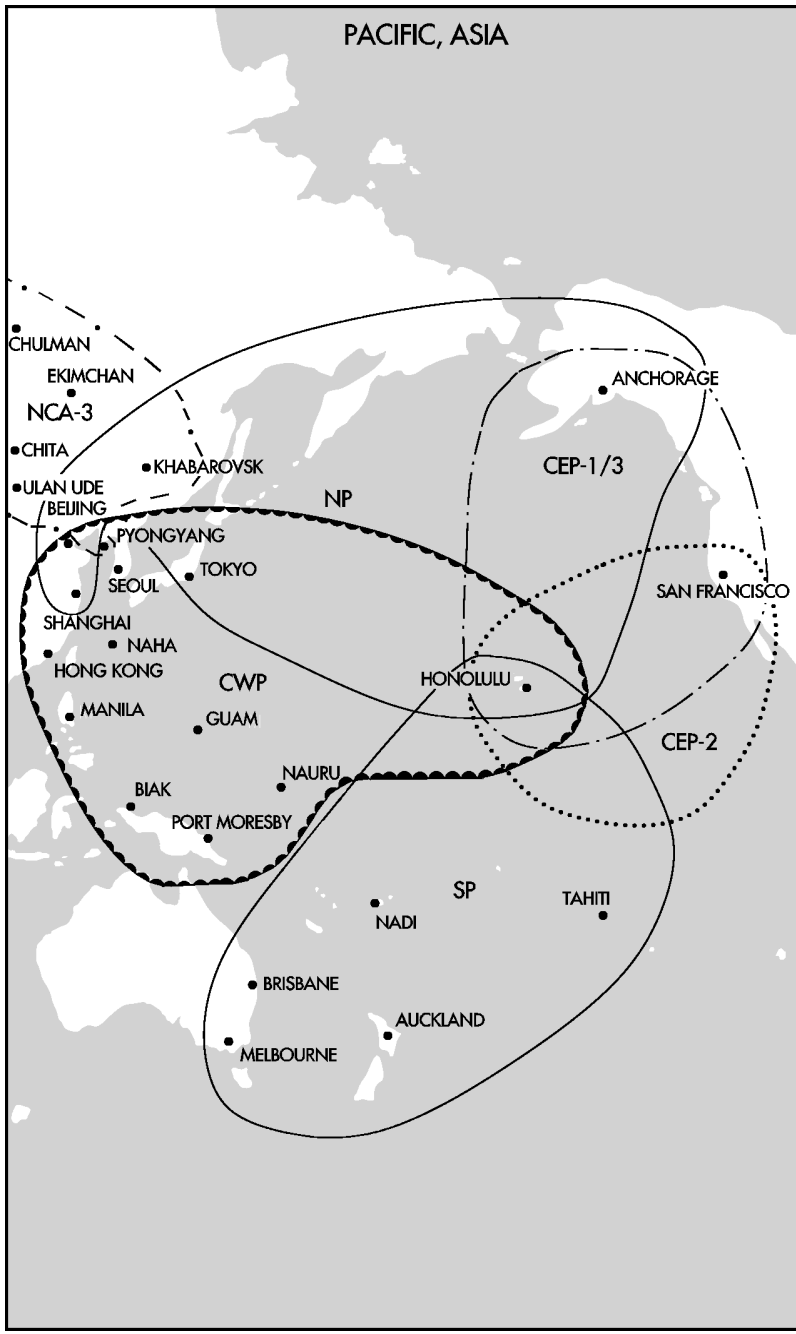
COCOS (118.1)
6556 13318

JAKARTA -
3470 6556 10066 11396 13318
17907

PERTH (123.9) (122.4)
3470 6556 11396 13318 17907

SINGAPORE -
6556

UJUNG PANDANG -
3470 6556 11396


PACIFIC, ASIA
CHULMAN
EKIMCHAN
NCA-3
CHITA
KHABAROVSK
ULAN UDE
BEIJING
NP
PYONGYANG
TOKYO
SEOUL
SHANGHAI
NAHA
HONG KONG
CWP
MANILA
GUAM
NAURU
BIAK
PORT MORESBY
HONOLULU
ANCHORAGE
CEP-1/3
SAN FRANCISCO
CEP-2
SP
NADI
TAHITI
BRISBANE
AUCKLAND
MELBOURNE

PACIFIC, ASIA

CENTRAL WEST PACIFIC (CWP)

BEIJING -
3016 6571 8897

DAEGU (125.7)
6425 6665 6675

HONG KONG (127.1)
6532 8903 13300

MANILA (124.9)
2998 6532 6562 8903 13300
17904

NAHA (126.9)
2998 3455 4666 6532 8903
11384 13300 17904

PORT MORESBY (120.9)
3419 3425 5565 6622 8837
8861 11393

SAN FRANCISCO (ARINC) (131.95)
SATCOM VOICE 436625①
2998 4666 6532 8903 11384
13300 17904 21985

SEOUL (127.1)
3004 6532 8903 13300 13303
17904

SHANGHAI -
3016 6571 8897

TAIPEI (127.3)
6532 8903 13300

TOKYO (127.3) (127.4)
2998 3455 4666 6532 8903
11384 13300 17904

①925-371-3920

NORTH PACIFIC (NP)

BEIJING -
3016 6571 8897

SAN FRANCISCO (ARINC) (131.95)
SATCOM VOICE 436625①
2932 5628 5667 6655 8915
8951 10048 11330 13273 13339
17946 21925

SHANGHAI -
3016 6571 8897

TOKYO (126.7)
2932 5628 6655 8951 10048
11330 13273 17904

①925-371-3920

CENTRAL EAST PACIFIC (CEP-1)

SAN FRANCISCO (ARINC) (129.4①) (131.95)
SATCOM VOICE 436625②
3413 3452 5574 6673 8843
10057 13288 13354

①Available to call San Francisco between Seattle and Anchorage.
②925-371-3920

(CEP-2)

SAN FRANCISCO (ARINC) (129.4) (131.95)
SATCOM 436625①
2869 5547 11282 13288 21964

①925-371-3920

SOUTH PACIFIC (SP)

AUCKLAND -
3467 5643 8867 13261 17904

BRISBANE -
3467 5643 8867 13261 17904

MELBOURNE -
3461 4693 6580 8858

NADI (126.7)
3425 3467 5643 6553 8846
8867 11339 13261 17904

PASCUA/EASTER ISLAND (126.9)①
4669① 5643 6649 8667 13300

RAROTONGA (118.1)
3425 6553 8846 11339 13354

SAN FRANCISCO (ARINC) (131.95)
SATCOM VOICE 436625②
3467 5643 8867 13261 17904

TAHITI (126.7)
3467 5643 8867 13261 17904

①O/R.
②925-371-3920

NORTH CENTRAL ASIA (NCA-3)

CHITA -
3425 6670

CHULMAN -
2986 3461 4465 4728 5568
6589

EKIMCHAN -
3461 6589

KHABAROVSK -
2868 3102 3461 4465 5557
6589 6692 7870

KIRENSK -
3046 3425 4728 6704

ULAANBAATAR -
5505 5715

ULAN UDE -
3425 6670

12. USAF MARS HIGH FREQUENCY PHONE PATCH NETWORK (AFMARSPPN)

a. **GENERAL -** The Air Force MARS Phone Patch System (AFMARSPPN) is a network of auxiliary HF stations authorized by the Department of Defense to provide phone patch service between US military aircraft, ground agencies and ships. Allied military and other aircraft are also provided support IAW agreements and international protocols as appropriate. The AFMARSPPN system is not dedicated to any service or command, but supports all DoD authorized users on a traffic precedence/priority basis. General services provided by MARSRADIO are:

- Unencrypted Official and Morale (aka - health & welfare) Phone Patch Services to DSN or Commercial numbers

- Emergency Assistance through phone patch or radio operator message relay

- Radio Equipment Checks from ground or in-flight stations

- SELCAL radio equipment checks and service, transmit to aircraft only

b. **PROCEDURES -**

(1) General Calling: Aircrews use a preliminary call as outlined in ACP-121 US Supp 2 using the collective callsign "MARSRADIO". Operators may require approximately 10 seconds (for automated equipment configuration) to respond to calls for service. The operator may request the aircraft change to a discrete frequency for improved and/or extended service. If an answer is not received on the primary frequency, call on the Alternate or Winter frequencies. Note: There are normally multiple ground stations in the network. You may be "handed off" to a station with better HF coverage depending on your location and time of day.

(a) PUBLISHED FREQUENCY LISTING - MARSRADIO stations operate on USAF frequencies to provide increased "Global" coverage. The published frequency listing does not reflect complete system frequency authorizations. These published frequencies will be used for initial contact. Extended or special services may be moved to available "discrete" frequencies.

(b) FREQUENCY GUIDE - The frequency guides are designed to optimize air/ground communications.

Primary AFMARSPPN Frequency	24 Hours	13927.0
Alternate AFMARSPPN Frequency	24 Hours	7633.5
Tertiary / CONUS Night	2300 - 1400Z	4557.0

(2) Unclassified Phone Patch and Message Relay Services

(a) **PHONE PATCH SERVICE** - Phone patching allows direct voice communications between aircraft and ground agencies by electronically connecting telephone circuits to radio transmitters and receivers. Phone patch service is reserved for official unclassified business only and shouldn't exceed 5 minutes. Patches of more than 5 minutes or of a sensitive nature should be run on a discrete frequency. Users requesting a phone patch should include all information necessary for operators to complete the call, such as the identity or location of the called parties and telephone number if known. Phone patches are monitored by MARSRADIO operators and may be recorded for system usage and training purposes. If radio reception isn't of sufficient quality to complete the patch, they will attempt to copy the traffic and relay it to addressee.

(b) **RADIO CHECKS** – MARSRADIO routinely provides radio checks.

(c) **SELECTIVE CALLING (SELCAL)** - Some MARSRADIO stations can send a SELCAL broadcast. This service, when available, is provided to check aircraft's equipment and also can be prearranged to notify when there is traffic or callback for that aircraft. SELCAL may be used with aircraft within CONUS and globally. Aircraft must be on MARSRADIO frequencies to receive a SELCAL notification.

c. **EMERGENCY ASSISTANCE** - Distress and urgency situations should be clearly

identified by the words "MAYDAY" or "PAN" as appropriate (refer ACP 121 US Supp 2, Ch 8 for definitive usage). Users should transmit present position and heading when encountering grave or serious emergency situations. MARSRADIO is prepared to extend whatever assistance required for whatever duration during an emergency. Emergency traffic will take precedence over all but FLASH traffic.

d. **ATC SUPPORT** - AFMARSPPN is not configured to meet ATC communications routing requirements and cannot provide ATC flight following service. This service can be obtained through the appropriate Civil/ICAO ATC communications agency such as the AREA CONTROL CENTER, SECTOR RADIO, or FLIGHT INFORMATION CENTER (see section B, ICAO HF Aeronautical Station List). MARSRADIO will accept emergency ATC traffic and provide phone patch or message relay support as required.

e. **POINTS OF CONTACT:** Questions or feedback concerning service or system access should be addressed to:

(1) **MARSRADIO Operations Manager:** Richard Duncan, Commercial phone 800-HF-COMMS

(2) **Headquarters System Management -** David Stapchuk, CIV, DAF Chief, AF MARS 203 W Losey St Scott AFB IL 62225 DSN 779-5964 Commercial 618-229-5964.

(38 CYRS-SCM/38 CYRS-SCM FIL 17-394)

13. SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES IN OCEANIC AREAS AND REMOTE AREAS

a. The following general procedures are intended as guidance only. Although all possible contingencies cannot be covered, they provide for cases of inability to maintain assigned level due to:

(1) Inability to maintain assigned flight level due to meteorological conditions, aircraft performance or pressurization failure;

(2) Enroute diversion across the prevailing traffic flow; and

(3) Loss of, or significant reduction in, the required navigation capability when operating in airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations.

b. The procedures are applicable primarily when rapid descent and/or turn-back, or diversion to an alternate airport is required. The pilot's judgment shall determine the sequence of actions to be taken, taking into account specific circumstances.

c. If an aircraft is unable to continue the flight in accordance with its ATC clearance, and/or an aircraft is unable to maintain the navigation performance accuracy specified for the airspace, a revised clearance shall be obtained, whenever possible, prior to initiating any action.

d. The radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) preferably spoken three times shall be used as appropriate. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and the overall air traffic situation.

e. If prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time and, until a revised clearance is received, the pilot shall:

(1) Leave the assigned route or track by initially turning at least 45 degrees to the right or to the left, in order to acquire a same or opposite direction track offset 15 NM (28 km) from the assigned track centerline. When possible, the direction of the turn should be determined by the position of the aircraft relative to any organized route or track system. Other factors which may affect the direction of the turn are:

(a) The direction to an alternate airport,

(b) Terrain clearances

(c) Any strategic lateral offset being flown; and

(d) The flight levels allocated on adjacent routes or tracks.

FAA NOTE: A turn of less than or greater than 90 degrees may be required depending on the type of contingency and whether the pilot intends to continue in the same direction or reverse course.

(2) Having initiated the turn, the pilot should:

(a) If unable to maintain the assigned flight level, initially minimize the rate of descent to the extent that is operationally feasible (pilots should take into account the possibility that aircraft below on the same track may be flying a 1 or 2 NM strategic lateral offset procedure (SLOP)) and select a final altitude which differs from those normally used by 500 ft (150 m) if at or below FL410, or by 1000 ft (300 m) if above FL410; or

(b) If able to maintain the assigned flight level, once the aircraft has deviated 10 NM (19 km) from the assigned track centerline, climb or descend to select a flight level which differs from those normally used by 500 ft (150 m), if at or below FL410, or by 1000 ft (300 m) if above FL410;

(3) Establish communications with and alert nearby aircraft by broadcasting, at suitable intervals; aircraft identification, flight level, position (including ATS route designator or the track code, as appropriate) and intentions on the frequency in use and on 121.5 MHz (or, as back-up, on the inter-pilot air-to air frequency 123.45 MHz);

(4) In North Atlantic High Level Airspace (NAT HLA), before commencing any diversion across the flow of adjacent traffic, aircraft should, while maintaining 15 NM offset track, expedite climb above or descent below the vast majority of NAT traffic (i.e. to a level above FL410 or below FL280), and then maintain a flight level which differs from those normally used: by 1000 ft if above FL410, or by 500 ft if below FL410. However, if the pilot is unable or unwilling to carry out a major climb or descent, then any diversion should be carried out at a level 500 ft different from those in use within NAT HLA airspace, until a new ATC clearance is obtained.

(5) Maintain a watch for conflicting traffic both visually and by reference to ACAS (TCAS) (if equipped);

(6) Turn on all aircraft exterior lights (commensurate with appropriate operating limitations);

(7) Keep the SSR transponder on at all times; and

(8) Take action as necessary to ensure the safety of the aircraft.

f. When leaving the assigned track to acquire and maintain the track laterally separated by 15 NM (28 km), the flight crew, should, where practicable, avoid overshooting the track to be acquired, particularly in airspace where a 30 NM (55.5 km) lateral separation minimum is applied.

(HQ AFFSA-XOS/ICAO 4444 15.2, ICAO NAT Doc 007, FAA International NOTAMS Sec. 2, USAF FIL 16-314)

B-68 NATL/INTL FLIGHT DATA/PROCEDURES

Register of National Clearances and Operational Restrictions On the Use of IFF Mark XII MODE 4

1. The policy and procedures adopted by NATO for the management of IFF/SIF are contained in ACP 160 NATO Supplement 1(E), para. 210 on IFF interference states:

"Within their AOR'S, some nations restrict their operations of IFF/SIF interrogators/transponders; therefore, approval for their use shall be sought from national authorities. (Mode 4 is not approved for general use by most European nations.)"

2. NATO promulgates national restrictions for use of Mode 4 through a working paper, AC/92 (CNS) WP (2001) 1 dated 25 SEP 01. The following table is an extract of this working paper and is intended to provide aircrews with the basic national information for Mode 4 operations and the national POC's for obtaining permission to operate IFF/SIF Mode 4 within a respective country.

Country	Airborne Mode 4 Authorization	Airborne IFF Mode 4 Interrogations	National Clearance POCs	National publication of information
Belgium	None	Not allowed	BE AIR COMPONENT Sec A 3.20 Quartier Reine Elizabeth 1 Rue d'Evere B-1140 Brussels FAX +32-2-701-4085	BE MIL AIP BELGIUM
Bulgaria	No authorization	Not allowed	Not provided	Not available
Canada	Yes, for Canadian and Allied Air Platforms, but with coordination for Mode 4 interrogations which are only permitted at specified locations and geographical areas - Canadian Forces Base Cold Lake, Canadian Forces Base Bagotville.	Yes, areas of opn are Canadian western, eastern & Arctic coastal/off shore regions only, on non-interference, no protection basis	Temporary and permanent clearances, Department of National Defense (DND), Spectrum Management Cell (Ops) Telephone # 613-992-8744	Arrangement A-98-DND/ NAV Canada Agreement
Czech Republic	No authorization	Not allowed	J6/GS Czech Army, PO BOX 69, 16001 Prague 6 FAX+42023119330	Not provided

Country	Airborne Mode 4 Authorization	Airborne IFF Mode 4 Interrogations	National Clearance POCs	National publication of information
Denmark	Mode 4 training will be executed in order to train system operators in the effective use of Mode 4, therefore the use of Mode 4 should be exercised at any given opportunity during daily training or exercises. Standing clearances for national forces (RDAF).	Inside Copenhagen TMA, employment is only authorized after special permission by Copenhagen ACC via TACDEN. In order to avoid unintended use of Mode 4 inside Copenhagen TMA, all Mode 4 equipped aircraft will put the Mode 4 ON/OUT switch to the OUT position when operating inside the Copenhagen TMA.	NARFA, Denmark	TACDEN OPINS 21
Estonia	Not provided	Not provided	Not provided	Not provided
France	Yes	Permitted in accordance with ACP 160 procedures	CDAOA/EMO/A6, CABA 117, 26 Boulevard Victor 00460 ARMEES - FRANCE	Not provided
Germany	The use of Mode 4 is limited in space and time. Reference describes the "Regulation for a Mode 4 use limited in time and space over the territory of the Federal Republic of Germany in Peace" and is to be observed. In addition, the appropriate requirements within ICAO Annex 10 and STANAG 4193 are to be met.	No airborne IFF Mode 4 interrogations are allowed because no frequency application has yet been filed for this purpose. No frequency application has yet been made for airborne interrogators.	FuZNatLV (NAPC) SSZ/COSA von Seyditz-Kaserne Römerstrasse 132 D-47546 Kalkar Tel: +39 2824 90 2141 Fax: +49 2824 90 2142 E-mail: FueZNatLv@bundeswehr.org	Point of contact: Luftwaffenführungskommando A 6d, Postfach 90 61 10 / 504 / 06, D-51127 Köln Fax: +49 2203 908 4031 LwFueKdoA6d@bundeswehr.org

Country	Airborne Mode 4 Authorization	Airborne IFF Mode 4 Interrogations	National Clearance POCs	National publication of information
Greece	Not provided	Not provided	Not provided	Not provided
Hungary	Yes. No standing clearances	Yes, but some territories of Hungary are under protection of Mode 4 usage. Using Mode 4 interrogators in these areas is possible after getting a special permission.	Senior IFF Officer MoD HU J-6 Communications Division 1885 Budapest, Hungary, PoB 25 Tel +36-236-5132 Fax +36-236-5303 Email: jozsef.sari@mil.hu	Not provided
Italy	Not provided	Not provided	Not provided	Not provided
Latvia	Not provided	Not provided	Not provided	Not provided
Lithuania	No authorization	No temporary clearances	Not applicable	Not provided
The Netherlands	Only land-based and shipborne use of Mode 4 is allowed, with a max. of seven interrogators operating in a specific time period.	Not allowed at present	Air Traffic Control The Netherlands Navigation Affairs POB 75200 1117 ZT SCHIPHOL-O The Netherlands	Not provided

Country	Airborne Mode 4 Authorization	Airborne IFF Mode 4 Interrogations	National Clearance POCs	National publication of information
Norway	Yes	Are allowed, subject to special procedures.	A frequency supportability request is required at least 30 days prior to operation of Mode 4 over Norwegian territory. Using the Frequency Management Sub-Committee (FMSC) 14 point message format, message should be forwarded to CHOD Norway CIS Staff using SIC: SPA	Not provided
Poland	Mode 4 training will be executed in order to train system operators in the effective use of Mode 4.	Not allowed	C-3 Directorate - J6 General Staff Polish Armed Forces ul. Rakowlecka 4A 00-904 Warsaw, Poland FAX: +48-22-6870-008	Not provided
Portugal	In principle, yes	Not applicable	Clearance requests should be submitted to CHOD PO via Frequency Management Sub-Committee (FMSC) Representative	Not provided

Country	Airborne Mode 4 Authorization	Airborne IFF Mode 4 Interrogations	National Clearance POCs	National publication of information
Romania	Yes	Yes, after getting special permission.	Col Ioan Gegiu J-6/GS/ROU MOD TEL/FAX: +4021-4107138 Email: igegiu@mapn.ro Cdr Viorel Maharea NARFA/J6/GS/ROU MOD TEL/FAX: +4021-4107130 Email: vmaharea@mapn.ro	Not provided
Slovak Republic	No authorization	Not allowed	NARFA SVK, Communication and Information Systems Division, Defense planning and resources mgmt section Ministry of Defense, Kutuzovova 8, 832 47 Bratislava, Slovak Republic. Fax: +421 2 44259945 e-mail: NARFASVK@mod.gov.sk	Not provided
Slovenia	Not provided	Not provided	Not provided	Not provided
Spain	To be advised	To be advised	To be advised	To be published in national Aeronautical Information Publication

Country	Airborne Mode 4 Authorization	Airborne IFF Mode 4 Interrogations	National Clearance POCs	National publication of information
Sweden	No authorization	Not allowed	Swedish Armed Forces Joint Data Link Opns Cell, JDLOC Lidingovagen 24 10785 Stockholm Tel: +46-8-788 99 91 E-Mail: torbjorn.strandberg@mil.se	None
The Former Yugoslav Republic of Macedonia	Authorization possible upon request.	Allowed on request. Subject to possible interference.	Civil Aviation Administration Dame Gruev 1 1000 Skopje, The Former Yugoslav Republic of Macedonia	No national publication.
Turkey	By airborne or surface platforms within Turkish airspace is not allowed	Not allowed	Clearance request should be submitted to TGS	Not provided

Country	Airborne Mode 4 Authorization	Airborne IFF Mode 4 Interrogations	National Clearance POCs	National publication of information
United Kingdom	Limited use approved only on case-by-case basis at present	Currently allowed only by RN Sea King oversea areas to the SW of the UK; Tornado F3 - outside Terminal Maneuver Areas (TMAs) and not within Class A, D, and E airspace; E-3D Sentry - outside TMAs and not within Class A, D, and E airspace, ltd to known AEW orbit areas; Nimrod MRA4 - outside TMAs and not within Class A, D, and E airspace, for trials use only; Typhoon - outside TMAs and not within Class A, D, and E airspace, for trials use only. Ground-based IFF Mode 4 interrogations currently only permitted by Type 101 radars at various sites around the UK (caveats are set in parallel with the equipment).	Secretariat, National IFF/SSR Committee Surveillance and Spectrum Management K6 Gate 6 CAA House 45-49 Kingsway London WC2B 6TE Tel: +44 207 453 6534 Fax: +44 207 453 6565	Information on clearances is distributed to individual applicants. Information on clearances developed from the work described under Standing clearances (above) will be published in MOD Orders and Standard Operating Procedures.
United States	Yes	Airborne Mode 4 interrogations are allowed after coordination and documentation by frequency assignments in the National Telecommunications and Information Administration (NTIA) Government Master File (GMF).	MAJCOM and Installation Spectrum Manager (ISM)	MOA Office of Spectrum Mgt of the FAA and Freq Mgt Offices of the Army, Navy and Air Force . . . Dated JAN 08.

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SECTION C

METEOROLOGICAL INFORMATION

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C-2 METEOROLOGICAL INFORMATION

1. TELEPHONE WEATHER/NOTAM BRIEFINGS

(AFFSA/AFFSA-A3OF FIL 07-851)

a. Military pilots departing a location where military weather and NOTAM services are not available will obtain required information as follows:

(1) Contact the Operational Weather Squadron (OWS) responsible for your area. OWSs are located worldwide to be the primary 24-hour weather-briefing source. Local base/post weather flights may assist transient aircrews if and when higher priority taskings and local mission support allow. Contact information is listed on the following pages; or

(2) Obtain information from published Command-approved weather sources.

(3) Obtain information from the US National Weather Service (http://aviationweather.gov/).

(4) Obtain information from an NWS/FAA-approved source IAW FAAO 8900.1 (http://fsims.faa.gov).

(5) Obtain information from accredited local agencies.

(6) Real time NOTAM updates are available at https://notams.jcs.mil.

b. When talking to a military forecaster, please provide the following information at least 2 hours prior to desired brief time:

(1) Name of person calling.

(2) Aircraft type and call sign.

(3) VFR or IFR and proposed altitude.

(4) ETD for departure point and ETA for destination and alternates.

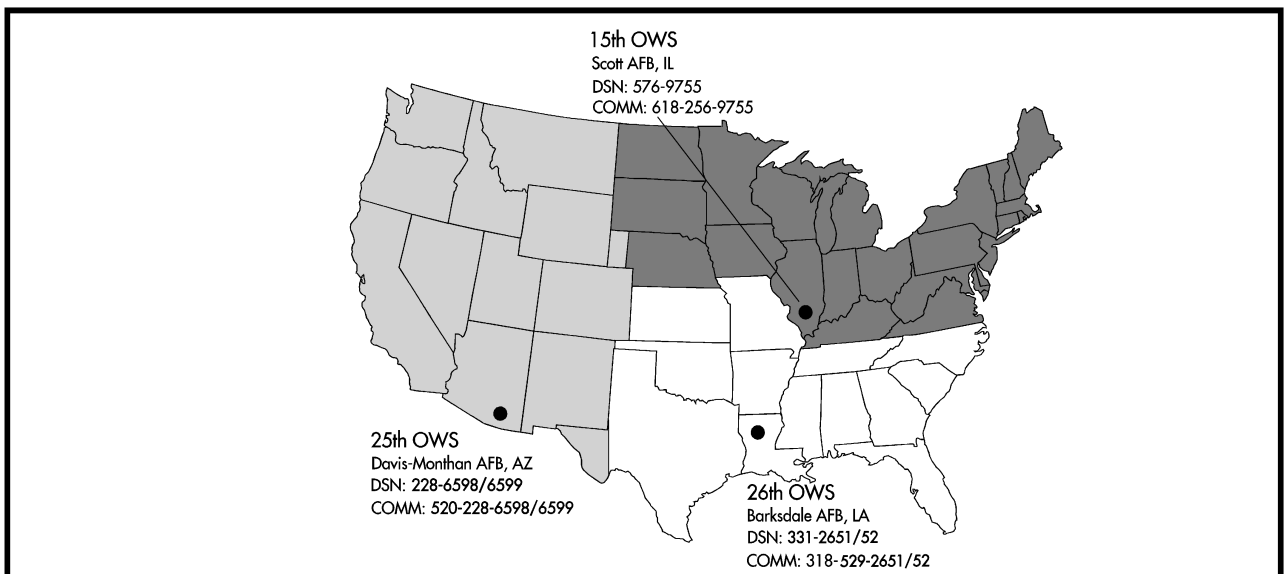
(5) Route.

(6) Enroute stops, if applicable (in order, with ETAs).

2. MILITARY WEATHER/NOTAM BRIEFING FACILITIES

(AFFSA/XOF/15 OWS FIL 05-414)

AF Weather OWS AORs - CONUS



(AFFSA/AFFSA FIL 08-126)
8 MAY 2008

C-4 METEOROLOGICAL INFORMATION

a. 18 AF/TACC Missions

AIR FORCE

18 AF Tanker Airlift Control Center (TACC) Global Mobility Weather Operations

Area of Responsibility: 18 AF/TACC Flight Managed Missions Worldwide and 18 AF Training Missions

Watches, Warnings, and Advisories may not be representative or available at the time of Flight Weather Package development. Contact TACC/XOW, local weather, ATC, Base Operations, or Command Center for updated Flight Weather Information prior to departure and please provide a Pilot Report during flight.

Contact Information:
Flight Managed Voice: DSN 312-779-0308, Comm 618-229-0308 or 1-800-AIR MOBL
Flight Managed Airborne Contact (PMSV) via Phone Patch: DSN 312-779-0308
Training Mission Voice: DSN 312-779-0353, Comm 618-229-0353 or 1-800-AIR MOBL
Training Mission Airborne Contact (PMSV) via Phone Patch: DSN 312-779-0353
Fax: DSN 312-576-2635, Comm 618-256-2635
24 hr POC E-Mail Address: tacc.xow@us.af.mil
NIPRNET Homepage: https://tacc.us.af.mil

(618 AOC-TACC/618 AOC-TACC FIL 13-046)

b. CONUS, NORTHWESTERN ATLANTIC, EASTERN CANADA

AIR FORCE

15 OWS at Scott AFB, Under Command and Control of AFWA

Area of Responsibility: ND, SD, NE, MN, IA, WI, IL, IN, OH, WV, KY, VA, NY, PA, MD, DE, NJ, CT, RI, MA, NH, VT, ME, DC and Eastern Canada.
*Exceptions:
1) 15 OWS AORs extends out to the US Air Defense Identification Zone (ADIZ), circa 200 miles off the U.S. VA coast.

Contact Information:
Voice: DSN 312-576-9755, Comm 618-256-9755
Fax: DSN 312-576-4855, Comm 618-256-4855
STU-III: DSN 312-576-9699
Airborne Contact via Phone Patch: DSN 312-576-9755

15 OWS Area of Responsibility

Base/Post	Combat Weather Flight	Transient Flight Weather Briefings	
	DSN	DSN	Commercial
Andrews AFB	858-2840/5826	576-9755	618-256-9755
Dover AFB	445-4175/4176	576-9755	618-256-9755
Ellsworth AFB	675-1042	576-9755	618-256-9755
Ft Belvoir	656-7117/7106	576-9755	618-256-9755
Ft Campbell	635-2653/5989	576-9755	618-256-9755
Ft Drum	772-6065	576-9755	618-256-9755
Ft Eustis	826-3343/5300	576-9755	618-256-9755
Ft Knox	464-5653/5517	576-9755	618-256-9755
Grand Forks AFB	362-4396/4398	576-9755	618-256-9755

15 OWS Area of Responsibility			
Base/Post	**Combat Weather Flight**	**Transient Flight Weather Briefings**	
Grissom ARB	388-2203	576-9755	618-256-9755
Langley AFB	574-5907/5908	576-9755	618-256-9755
McGuire AFB	650-3992/3568	576-9755	618-256-9755
	DSN	DSN	Commercial
Minot AFB	453-6385	576-9755	618-256-9755
Offutt AFB	271-3459	576-9755	618-256-9755
Scott AFB	576-5906/3340	576-9755	618-256-9755
Westover ARB	589-3100	576-9755	618-256-9755
Wright Patterson AFB	787-7779	576-9755	618-256-9755

(AFFSA/AFFSA FIL 09-230)

25 OWS at Davis Monthan AFB, Under Command and Control of AFWA

Area of Responsibility: WA, OR, CA, ID, MT, WY, CO, UT, NV, AZ, NM, and western panhandle of TX (west of 100° W).

*Exceptions:
1) 25 OWS provides support to 90th Space Wing (F.E. Warren AFB) assets within the 15 OWS AOR.
2) 25 OWS AOR extends out to the US Air Defense Identification Zone (ADIZ), approximately 200 miles off the U.S. West coasts.
3) 30 OSS/OSW provides supports to Vandenburg AFB

Contact Information:
Voice: DSN 312-228-6598/6599, Comm 520-228-6598/6599
Toll Free: 1-877-451-8367
Fax: DSN 312-228-7361, Comm 520-228-7361
STU-III: DSN 312-228-6589
Airborne Contact via Phone Patch: DSN 312-228-6598/6599
NIPRNET Homepage: https://25ows.dm.af.mil
SIPRNET Homepage: http://25ows.davismonthan.af.smil.mil

(30 OSS-OSA/30 OSS-OSA FIL 13-965)

C-6 METEOROLOGICAL INFORMATION

25 OWS Area of Responsibility			
Base/Post	**Combat Weather Flight**	**Transient Flight Weather Briefings**	
	DSN	DSN	Commercial
Beale AFB	368-9134	228-6598/6599	520-228-6598/6599
Buckley AFB	847-9782	UNAVBL	520-228-6598/6599
Cannon AFB	681-2748/2749	228-6598/6599	520-228-6598/6599
Creech AFB	384-1723	228-6598/6599	520-228-6598/6599
Davis Monthan AFB	228-6014	228-6598/6599	520-228-6598/6599
Edwards AFB	527-4472	228-6598/6599	520-228-6598/6599
F.E. Warren AFB	481-3431/2488	228-6598/6599	520-228-6598/6599
Fairchild AFB	657-5514	228-6598/6599	520-228-6598/6599
Ft Bliss	621-1214/1215	228-6598/6599	520-228-6598/6599
Ft Carson	691-3651	228-6598/6599	520-228-6598/6599
Ft Huachuca	879-2865/2859	228-6598/6599	520-538-2865/2859
Ft Irwin	470-9527	228-6598/6599	520-228-6598/6599
Ft Lewis	357-7061	228-6598/6599	520-228-6598/6599
Hill AFB	777-2018	228-6598/6599	520-228-6598/6599
Holloman AFB	572-3924/3925	228-6598/6599	520-228-6598/6599
Kirtland AFB	246-9707/9722	228-6598/6599	520-228-6598/6599
Luke AFB	896-6805/2992	228-6598/6599	520-228-6598/6599
Malmstrom AFB	632-2981	228-6598/6599	520-228-6598/6599
March ARB	447-3602	228-6598/6599	520-228-6598/6599
McChord AFB	382-5005/3434	228-6598/6599	520-228-6598/6599
Mountain Home AFB	728-6303/6304	228-6598/6599	520-228-6598/6599
Nellis AFB	682-4744	228-6598/6599	520-228-6598/6599
Peterson AFB	834-4337	228-6598/6599	520-228-6598/6599
Schriever AFB	N/A	228-6598/6599	520-228-6598/6599
Travis AFB	837-3003	228-6598/6599	520-228-6598/6599
USAF Academy	333-2058/2059	228-6598/6599	520-228-6598/6599
Vandenberg AFB	276-8022	276-8022	805-606-8022

(AFFSA-XOS/AFFSA-XOS FIL 16-406)

Transient Flight Weather Briefings at Toll Free 1-877-451-8367.

26 OWS at Barksdale AFB, Under Command and Control of AFWA

Area of Responsibility: KS, MO, OK, AR, TX (except western panhandle), LA, MS, AL, TN, GA, FL (including Florida Keys), SC, NC, a portion of USJFCOM AOR to include Bermuda, Gulf of Mexico, and Eastern Mexico (East of 100°W).

*Exceptions:
1) 26 OWS AORs extends out to the US Air Defense Identification Zone (ADIZ), circa 200 miles off the U.S. TX, LA, MS, AL, NC, SC, and FL coasts.
2) 45 WS provides support to Cape Canaveral AS and Patrick AFB.
3) Contract personnel provide weather support at Dobbins ARB.

Contact Information:
Voice: DSN 312-331-2651/52, Comm 318-456-4775
Toll Free: 1-866-223-9328
Fax: DSN 312-331-2609, Comm 318-456-3493
NIPRNET Homepage: https://ows.barksdale.af.mil
SIPRNET Homepage: http://ows.barksdale.af.smil.mil

(26 OWS/26 OWS FIL 10-517)

26 OWS Area of Responsibility

Base/Post	Combat Weather Flight	Transient Flight Weather Briefings	
	DSN	DSN	Commercial
Altus AFB	866-7522	331-2651/52	318-529-2651/52
Barksdale AFB	781-3136-/3176	331-2651/52	318-529-2651/52
Cape Canaveral AFS	467-8485/86	331-2651/52	318-529-2651/52
Charleston AFB	673-3016	331-2651/52	318-529-2651/52
Columbus AFB	742-2970	331-2651/52	318-529-2651/52
Dobbins ARB	625-5190	331-2651/52	318-529-2651/52
Dyess AFB	461-2524	331-2651/52	318-529-2651/52
Eglin AFB (Destin Ft Walton Beach)	872-4800	331-2651/52	318-529-2651/52
Ft Benning	835-5628/3824	331-2651/52	318-529-2651/52
Ft Bragg	236-7100/7414	331-2651/52	318-529-2651/52
Ft Hood	738-9620/9400/9166	331-2651/52	318-529-2651/52
Ft Leavenworth	N/A	331-2651/52	318-529-2651/52
Ft Leonard Wood	581-0272	331-2651/52	318-529-2651/52
Ft Polk	863-4100/4021	331-2651/52	318-529-2651/52
Ft Riley	856-6562	331-2651/52	318-529-2651/52
Ft Rucker	558-8385/8397	331-2651/52	318-529-2651/52
Ft Sill	639-4000/3200	331-2651/52	318-529-2651/52
Ft Stewart	870-7823/4090	331-2651/52	318-529-2651/52
Homestead ARB	791-7511/7513	331-2651/52	318-529-2651/52
Hunter AAF	729-5207/5467/5207	331-2651/52	318-529-2651/52
Hurlburt Field	579-7423	331-2651/52	318-529-2651/52
Keesler AFB	597-3305	331-2651/52	318-529-2651/52
Kelly Field	945-5709	331-2651/52	318-529-2651/52

C-8 METEOROLOGICAL INFORMATION

26 OWS Area of Responsibility			
Base/Post	**Combat Weather Flight**	**Transient Flight Weather Briefings**	
Laughlin AFB	732-5654	331-2651/52	318-529-2651/52
Little Rock AFB	731-6152	331-2651/52	318-529-2651/52
MacDill AFB	968-4405/2854	331-2651/52	318-529-2651/52
Maxwell AFB	493-2071	331-2651/52	318-529-2651/52
McConnell AFB	743-3707	331-2651/52	318-529-2651/52
Moody AFB	460-3457	331-2651/52	318-529-2651/52
Patrick AFB	467-8485/86	331-2651/52	318-529-2651/52
Pope Fld	424-6543	331-2651/52	318-529-2651/52
Randolph AFB	487-3040	331-2651/52	318-529-2651/52
Robins AFB	468-3573	331-2651/52	318-529-2651/52
Seymour Johnson AFB	722-4089	331-2651/52	318-529-2651/52
Shaw AFB	965-2362/63/64	331-2651/52	318-529-2651/52
Sheppard AFB	736-4256	331-2651/52	318-529-2651/52
Tinker AFB	884-3196	331-2651/52	318-529-2651/52
Tyndall AFB	523-2609	331-2651/52	318-529-2651/52
Vance AFB	448-7530	331-2651/52	318-529-2651/52
Whiteman AFB	975-3061	331-2651/52	318-529-2651/52

(AFFSA-XOS/AFFSA-XOS FIL 17-110)

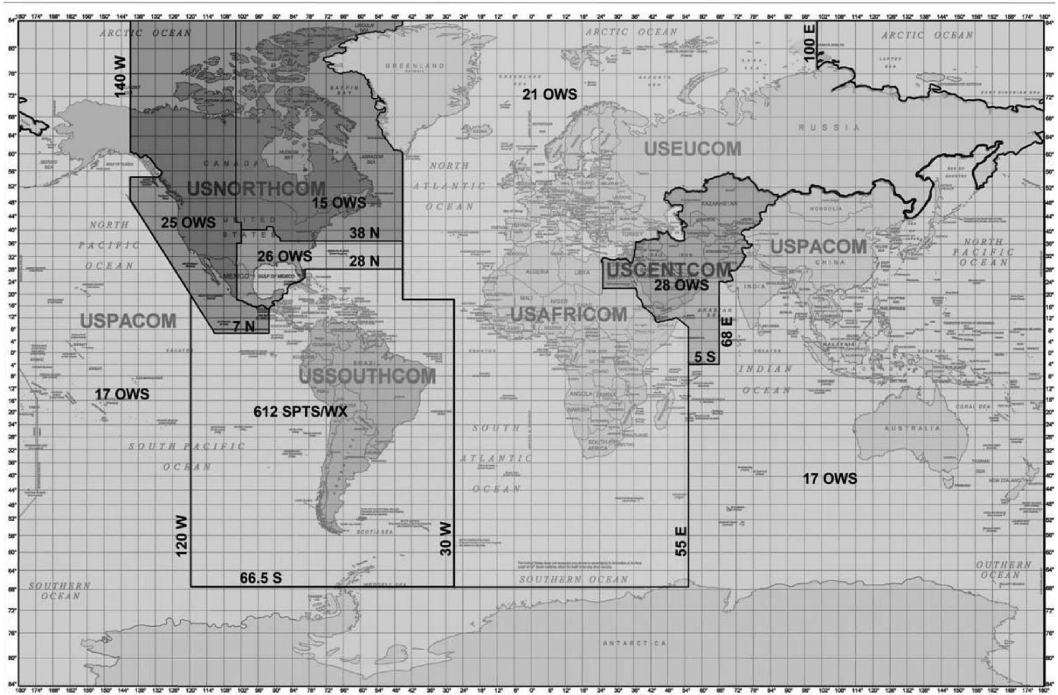
Transient Flight Weather Briefings at Toll Free 1-866-223-9328.

MARINE CORPS	**DSN**	**COMMERCIAL**
Beaufort	228-7904	
Camp Pendleton	365-3327	760-725-3327
Cherry Point	466-2523	252-466-4442
Miramar	577-4028/4029	
New River	752-6828/6968	910-449-6828/6968
Quantico	278-2298	703-784-2298/2468
Twentynine Palms	952-7809/7831	
Yuma	269-2266	928-269-2266

NAVY	**DSN**	**COMMERCIAL**
Cecil Field	860-5952/5862	904-778-5952/5862
Corpus Christi	861-2124/2125	361-961-2124/2125
El Centro	958-8522	760-339-2522
Fallon	890-2816	775-426-2816/2425
Fort Worth	739-7065	817-782-7065
Jacksonville	942-2541	904-542-2541
Key West	483-2524	305-292-2524
Kingsville	876-6350	512-516-6350
Lakehurst	624-2334	201-323-2334
Lemoore	949-1020	559-998-1020
Mayport	960-6196/6197	904-270-6196/6197
Meridian	446-2445	601-679-2445
New Orleans	363-3207/3559	504-393-3207/3559
North Island	735-6033/9161	619-545-6033/9161

NAVY	DSN	COMMERCIAL
Norfolk (LP-1)	564-7797	757-444-7797/1301
Oceana	433-2177	804-433-2177
Patuxent River	342-3174	301-342-3174
Pensacola	922-2460/2386	850-452-2460/2386
Point Mugu	351-8508	805-989-8508
Whidbey Island	820-2677/2244	360-257-2677/2244
Whiting Field N	868-7119/7102	850-623-7119/7102
Willow Grove	991-6578	215-443-6576 (NAVFIG/NAVFIG FIL 163430)

Air Force Operational Weather Squadron Areas of Responsibility



(AF-A3O-WP/AF-A3O-WP FIL 08-497)

c. EUROPE

AIR FORCE

21st OWS at Sembach AB, Under Command and Control of USAFE/A3

Area of Responsibility: Albania, Andorra, Armenia, Austria, Azerbaijan, Azores, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Ireland, Italy, Kosovo, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Romania, Russia (west of 60°E - Ural Mts), San Marino, Serbia and Montenegro, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, Vatican City, Baltic Sea, Mediterranean Sea, Black Sea, Cyprus, Turkey, Syria, Lebanon, Israel. Africa: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central Africa Republic, Chad, Congo, Cote D'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Lesotho, Liberia, Libya, Malawi, Mali, Mauritania, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe.

*Exceptions:
1) 26 OWS has responsibility for operational-level weather support for Bermuda, and portions of the North Atlantic. The 65 OSS/OSW is responsible for the terminal forecast for Lajes AB and provides flight weather briefings for transient aircrews.

NOTE: The 21st Operational Weather Squadron (21 OWS) provides remote weather briefs available 24 hours. PMSV contact not available, however communications can be accomplished with phone patch.

Contact Information:
Voice: DSN 314-489-2133 C+49/0631-536-2133, altn DSN 496-6145 C+49/06302-67-6145
Fax: DSN 314-496-6181, Comm +49-6302-67-6181
STU III: DSN 314-496-6190
Airborne Contact via Phone Patch: DSN 314-496-6145
NIPRNET Homepage: https://ows.sembach.af.mil,https://131.54.133.238./
SIPRNET Homepage: http://ows.usafe.af.smil.mil

(21 OWS-DO/21 OWS-DO FIL 11-871)

21st OWS Area of Responsibility

Base/Post	Combat Weather Flight	Transient Flight Weather Briefings	
	DSN	DSN	Commercial
Aviano AB	632-7207/7628	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Coleman	382-4555/5166	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Grafenwoehr	475-8349	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Hohenfels	466-2891	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Illesheim	467-4557	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Incirlik AB	676-6880	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Katterbach	467-2789	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Lajes AB	CONUS 535-3657 Europe 245-3657	CONUS 535-3657 Europe 245-3657	Prim +49/0631-536-2133 Alt +49/06302-67-6145

C-12 METEOROLOGICAL INFORMATION

21st OWS Area of Responsibility			
Base/Post	**Combat Weather Flight**	**Transient Flight Weather Briefings**	
	DSN	DSN	Commercial
RAF Lakenheath	226-2168/4660	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
RAF Mildenhall	238-2050/2551	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Ramstein AB	480-2185/2488	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Rota NS	314-727-2404/2405	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Sembach AB	-	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Sigonella	314-624-5285/5286	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Souda	399-9489 x-274	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Spangdahlem AB	452-6064/6749	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Tuzla AB	768-2005	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145
Wiesbaden	337-4117	Prim 314-489-2133 Alt 496-6145	Prim +49/0631-536-2133 Alt +49/06302-67-6145

(21 OWS-DO/21 OWS-DO FIL 12-089)

NAVY*	**DSN**
Capodichino, Italy	314-626-5234

*NAVY Switchboard DSN 225-9801 is available for all overseas calls.

d. PACIFIC

AIRFORCE

17 OWS at JBPH-H, Under 13AF

Area of Responsibility: Korea, Japan, China, Taiwan, Mongolia, Thailand, Vietnam, Laos, Cambodia, Burma, Malaysia, Singapore, India, Nepal, Sri Lanka, Bangladesh, Diego Garcia, Madagascar, Australia, New Zealand, Indonesia, New Guinea, Hawaiian Islands, tropical and subtropical Pacific including WESTPAC, the Indian Ocean except for the area north of 5S Lat and west of 70E Lon, and Alaska, including the Aleutians and Arctic Ocean.

Contact Information:
Voice: DSN 315-449-8335 Comm 808-449-8335
Fax: DSN 315-449-8336 Comm 808-449-8336 STE DSN 315-449-4064 Comm 808-449-4064
Airborne Contact via Phone Patch: DSN 315-449-8333 Comm 808-449-8333
NIPRNET Homepage: https://17ows.hickam.af.mil/
SIPRNET Homepage: http://l7ows.hickam.af.smil.mil/

17 OWS Area of Responsibility

Base/Post	Combat Weather Flight	Transient Flight Weather Briefings	
	DSN	DSN	Commercial
Andersen AFB	315-366-5230/1407	315-449-8333	808-449-8333
Bradshaw AAF	315-469-2458	315-449-8333	808-449-8333
Cp Eagle	315-753-7740/6868	315-449-8333	808-449-8333
Cp Humphreys	315-753-7743/7740	315-449-8333	808-449-8333
Cp Red Cloud	315-732-9311	315-449-8333	808-449-8333
Cp Zama	315-263-5787	315-449-8333	808-449-8333
Eielson AFB	317-377-1160/3140	315-449-8333	808-449-8333
Elmendorf AFB	317-552-4903/4397	315-449-8333	808-449-8333
Ft Wainwright	317-353-7111/0691	315-449-8333	808-449-8333
JBPH-H	315-449-2251	315-449-8333	808-449-8333
Wheeler AAF	315-656-1017	315-449-8333	808-449-8333
Wake Island (BaseOps)	315-424-2104	315-449-8333	808-449-8333
Kadena AB	315-634-3129/ 3140/4162	315-449-8333	808-449-8333
Kunsan AB	315-782-4262/ 4501/5976	315-449-8333	808-449-8333
Misawa AB	315-226-3065	315-449-8333	808-449-8333
Osan AB	315-784-9370	315-449-8333	808-449-8333
Seoul AB	315-741-6282	315-449-8333	808-449-8333
Yokota AB	315-225-7213	315-449-8333	808-449-8333
Yongsan AIN	315-725-4206	315-449-8333	808-449-8333

(35 OSS-OSAA/35 OSS-OSAA FIL 14-1004)

MARINE CORPS	DSN	COMMERCIAL
Futenma, Okinawa	636-3177	

C-14 METEOROLOGICAL INFORMATION

MARINE CORPS	**DSN**	**COMMERCIAL**
Iwakuni, Japan	235-3005	
Kaneohe Bay, Hawaii	207-0404	808-257-2839

NAVY	**DSN**	**COMMERCIAL**
Adak, Alaska	317-892-4186/8069	907-592-4186/8069
Atsugi, Japan	315-264-3208	
Diego Garcia, IO	370-3670/3590	

e. CARIBBEAN, CENTRAL/SOUTH AMERICA

AIR FORCE

612 SPTS at Davis Monthan AFB, Under Command and Control of 12 AF

Area of Responsibility: Western Mexico (west of 100°W), Central & South America, Caribbean Basin - including the Bahamas Islands.

Contact Information:
Voice: DSN 312-228-1977/2025/2138
Fax: DSN 312-228-1284, Comm 520-228-1284
Toll Free: 1-877-451-8367
STU-III: DSN 312-228-3292
Airborne Contact via Phone Patch: DSN 312-228-1977/2025/2138
NIPRNET Homepage: http://25ows.dm.af.mil
SIPRNET Homepage: http:/25ows.davismonthan.af.smil.mil

612 SPTS Area of Responsibility			
Base/Post	**Combat Weather Flight**	**Transient Flight Weather Briefings**	
	DSN	DSN	Commercial
Soto Cano AB	449-4260/4245/6236	228-1977	520-228-1977

(25 OWS/25 OWS FIL 09-709)

NAVY	**DSN**	**COMMERCIAL**
Guantanamo Bay NS, Cuba	564-4063 x-6439/6494	804-444-4063 x-6439/6493

f. EASTERN MEDITERRANEAN, SOUTHWEST ASIA, SAUDI ARABIA, SOUTHERN CIS/CASPIAN BASIN

AIR FORCE

28 OWS at Shaw AFB, Under Command and Control of 9 AF

Area of Responsibility: Pakistan, Afghanistan, Iran, Iraq, Jordan, Saudi Arabia, Kuwait, Bahrain, Qatar, United Arab Emirates, Oman, Yemen, Persian Gulf, Red Sea, Egypt, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, and Caspian Sea.

Contact Information:
Voice: DSN 312-965-0489/0902/06, Comm 803-895-0489/0902/06
Fax: DSN 312-965-0493, Comm 803-895-0493
Toll Free: 1-877-297-4192
STU-III: DSN 312-965-0489
Airborne Contact via Phone Patch: DSN 312-965-0906/07
NIPRNET Homepage: https://28ows.shaw.af.mil
SIPRNET Homepage: http://28ows.shaw.af.smil.mil

(28 OWS-WXB/28 OWS-WXB FIL 08-304)

3. PILOT-TO-METRO SERVICE (PMSV), USAF

(AFFSA/AFFSA)

a. The USAF weather units operate a Pilot to Metro Service (PMSV) at selected AFBs and AAFs to provide aircrews a direct contact. "Full Service" facilities are manned by fully qualified personnel. "Limited Service" facilities are manned by individuals not qualified to prepare, issue or interpret forecasts and who will identify themselves as a "weather apprentice." If a forecast or forecast interpretation is required and a fully qualified person is not available, the apprentice will refer the aircrew to a "Full Service" facility. The apprentice may only relay the following information: surface observations, TAFs for which an amendment capability exists, weather watches, warnings, and advisories.

b. Enroute and alternate meteorological watch is the pilot's responsibility. PMSV will be used to the maximum to update forecasts and obtain latest weather observations. Destination meteorological watch is a joint responsibility of the pilot and destination operations section. Operations will notify pilot of adverse weather information as provided by weather personnel.

c. The radio call for PMSV is "METRO", e.g., "Travis METRO". When requesting terminal weather, advise the forecaster/observer of your ETA. For overseas flights, use Global HF System Stations whenever possible (See listing in this Handbook).

4. PILOT-TO-METRO SERVICE (PMSV), USN AND USMC

(NAVFIG/NAVFIG FIL 0047-09)

a. Pilot-to-Metro Services (PMSV) are available from all Naval Meteorology and Oceanography Command (NAVMETOCCOM) and U. S. Marine Corps (USMC) aviation weather activities. The primary purpose of PMSV is for communicating various types of weather information to pilots. PMSV is also used to update the Flight Weather Briefing Form (DD-175-1) and to receive pilot weather reports (PIREPS) of significant or hazardous weather phenomena, which are entered into weather telecommunications networks.

b. Sub-Regional Forecast Center (SRFC) Concept. Under the NAVMETOCCOM Sub-Regional Forecast Center (SRFC) concept of operations, forecasting has been centralized to support outlying satellite detachments during off-peak hours, when a forecaster is not on duty. Most NAVMETOCCOM and USMC stations are manned 24 hours with observers maintaining a basic weather watch. Observers are authorized to provide basic weather information via PMSV, such as providing the latest field conditions or nearby observation data, or reading a Terminal Aerodrome Forecast (TAF) report. For any requests for forecast services, DD-175-1 updates or extensions, the observer acts as an intermediary between the pilot and SRFC forecaster. Some delay will be experienced in these instances as the SRFC Forecaster receives and processes information for the observer to pass along to the pilot over PMSV. In some cases the SRFC is close

enough to a supported satellite detachment for the pilot to radio directly to the SRFC for required assistance.

c. The radio call for PMSV is "METRO", e.g. "Fallon METRO". Advise the forecaster/ observer of ETA when terminal weather is requested.

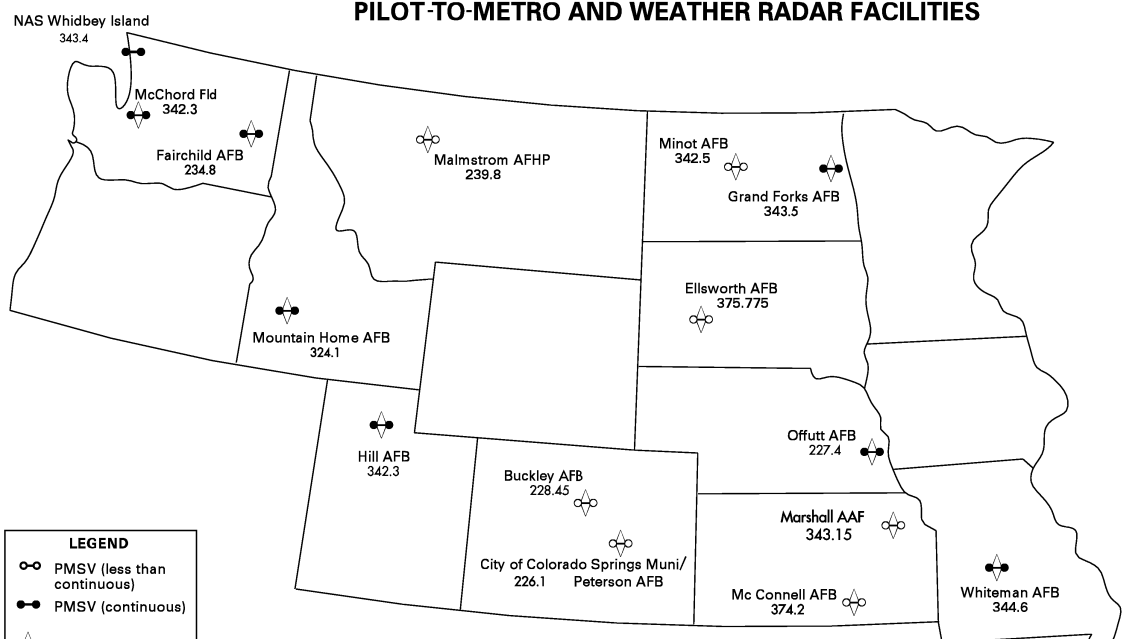
d. SRFC affects the following facilities:

NAVY LOCATION	HOURS OF OPERATION	SRFC	REMARKS
Corpus Christi, TX	H24		SRFC for Kingsville.
El Centro, CA	1300-0700Z++	North Island	
Fort Worth, TX	H24 0001-1200Z++	Corpus Christi	Observer is intermediary between the aircraft and SRFC.
Jacksonville, FL	H24		
Key West, FL	H24 2230-1030Z++		
Kingsville, TX	H24 0500-1200Z++ Mon-Thu, 0500-1800Z++ Fri-Sun	Corpus Christi	Aircraft are referred to "Corpus Christi Metro" 344.6.
Lemoore, CA	1500-0800Z++ Mon-Thu, 1500-0200Z++ Fri, N/A Sat, 2300-0400Z++ Sun		OTHER TIMES: One hour prior to and during NOTAMed airfield hours.
Mayport, FL	H24 2230-1030Z++		
Meridian, MS	H24 0500-1200Z++	Pensacola	Observer is intermediary between the aircraft and SRFC.
New Orleans, LA	1300-0400Z++ Mon-Sat, 1500-2200Z++ Sun	Pensacola	Observer is intermediary between the aircraft and SRFC.
Norfolk, VA	H24		
North Island, CA	H24		SRFC for Miramar and El Centro.
Oceana, VA	H24		
Patuxent River, MD	H24		
Pensacola, FL	H24		SRFC for Meridian, New Orleans and Whiting Fld N.
Whidbey Island, WA	H24		
Whiting Fld N, FL	H24 0500-1200Z++ Mon-Fri, H24 Sat-Sun	Pensacola	Aircraft are referred to "Pensacola Metro" 359.6.
Willow Grove, PA	H24 2300-1200Z++		

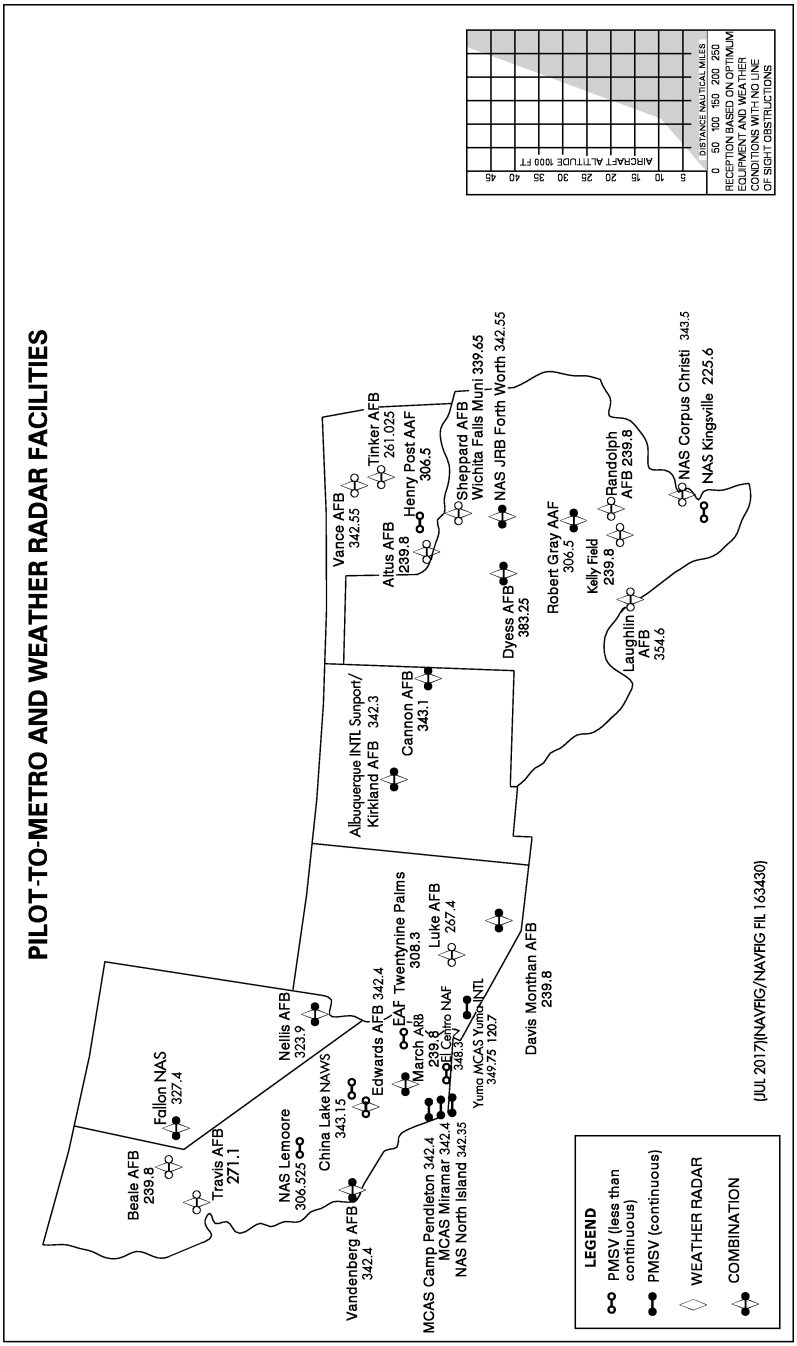
C-18 METEOROLOGICAL INFORMATION

USMC LOCATION	HOURS OF OPERATION
Beaufort, SC	1200-0400Z++ Mon-Thu; 1200-2300Z++ Fri; clsd hol.
Camp Pendleton, CA	
Cherry Point, NC	H24
Kaneohe Bay, HI	H24
Miramar, CA	H24
New River, NC	1100-2200Z++ OT ctc Cherry Point, NC.
Quantico, VA	H24
Yuma, AZ	H24

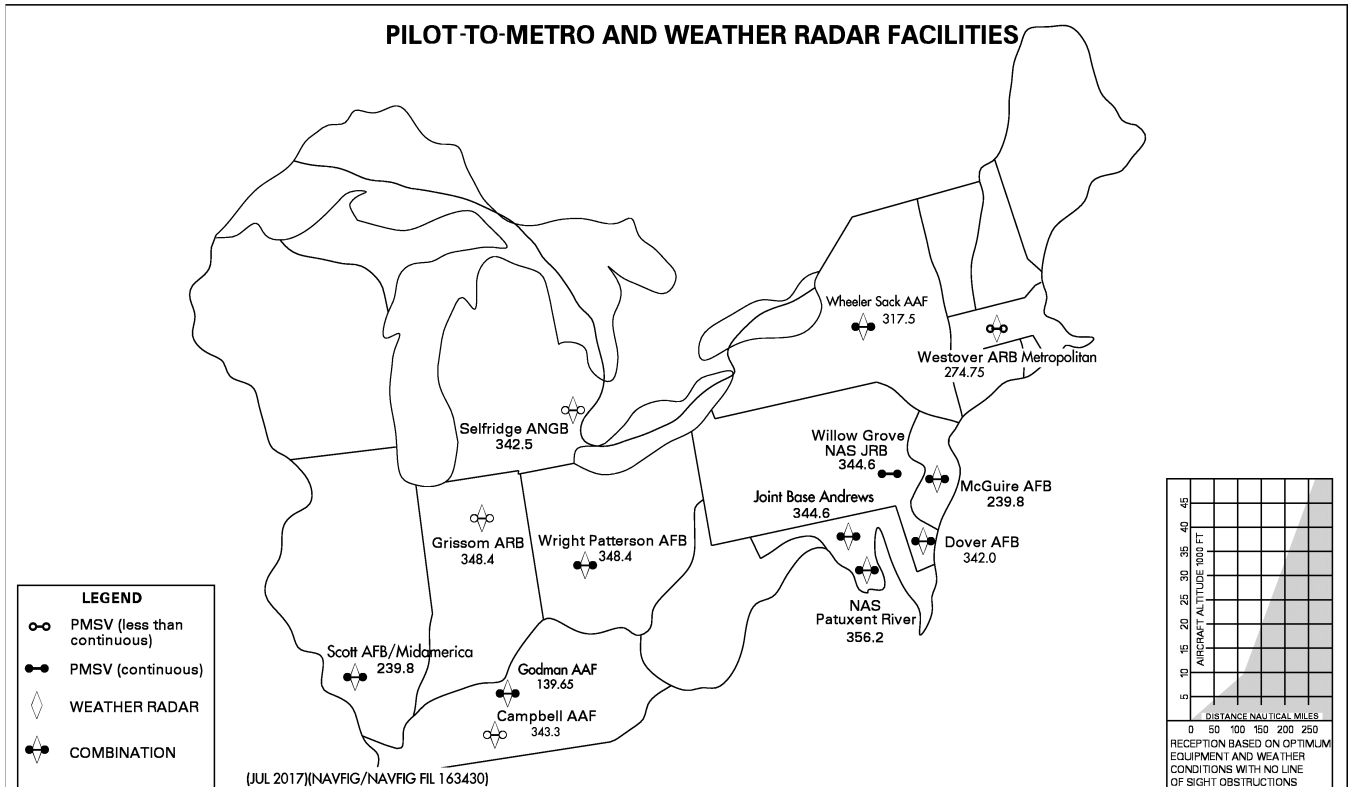
PILOT-TO-METRO AND WEATHER RADAR FACILITIES



(SEP 15)(AFFSA/ARMY FIL 2015-52)

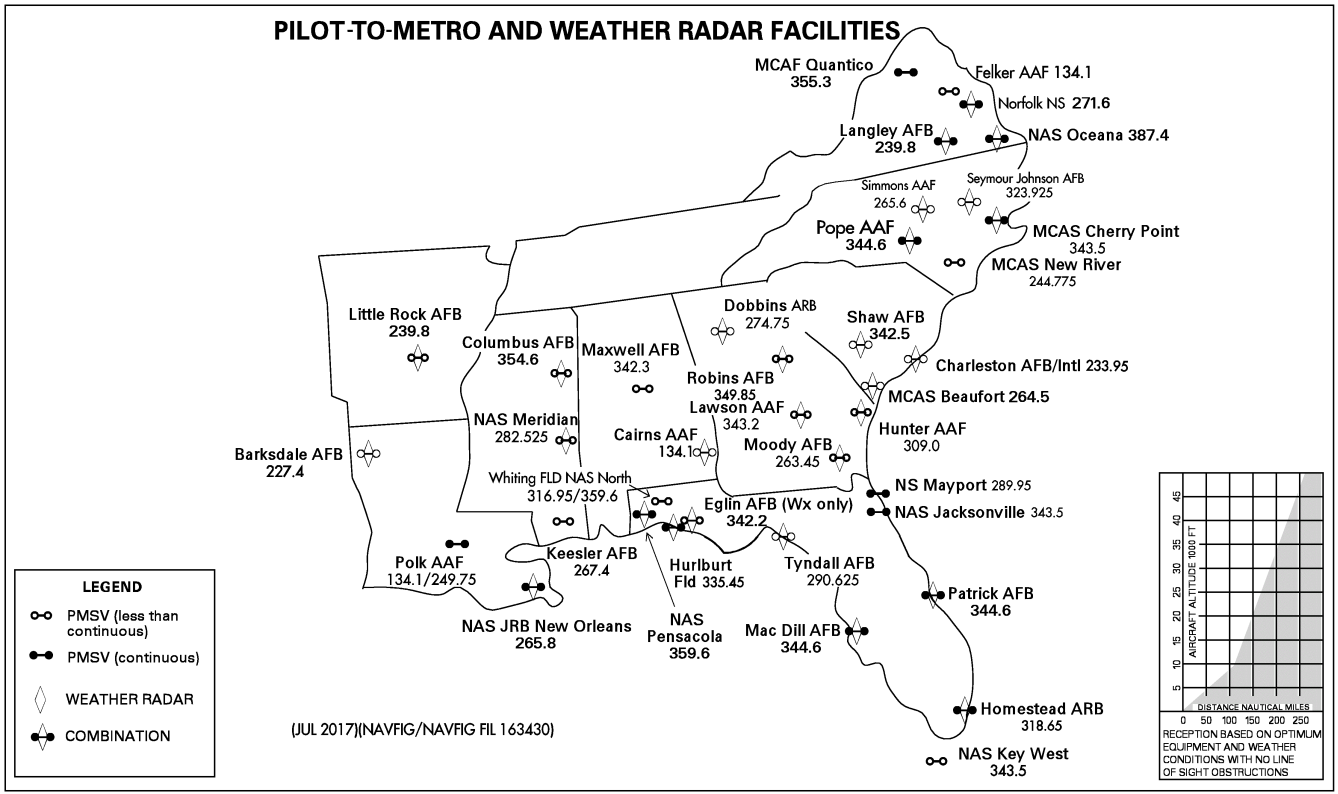

PILOT-TO-METRO AND WEATHER RADAR FACILITIES
Beale AFB 239.8
Travis AFB 271.1
Fallon NAS 327.4
NAS Lemoore 306.525
China Lake NAWS 343.15
Nellis AFB 323.9
Vandenberg AFB 342.4
Edwards AFB 342.4
MCAS Camp Pendleton 342.4
MCAS Miramar 342.4
NAS North Island 342.35
EAF Twentynine Palms 308.3
March ARB 239.8
Luke AFB 267.4
Gila Bend NAF 346.3
Yuma MCAS Yuma INTL 349.75 120.7
Davis Monthan AFB 239.8
Albuquerque INTL Sunport/ Kirkland AFB 342.3
Cannon AFB 343.1
Vance AFB 342.55
Altus AFB 239.8
Tinker AFB 261.025
Henry Post AAF 306.5
Sheppard AFB Wichita Falls Muni 339.65
NAS JRB Forth Worth 342.55
Dyess AFB 383.25
Robert Gray AAF 306.5
Kelly Field 239.8
Randolph AFB 239.8
Laughlin AFB 354.6
NAS Corpus Christi 343.5
NAS Kingsville 225.6
LEGEND
PMSV (less than continuous)
PMSV (continuous)
WEATHER RADAR
COMBINATION
(JUL 2017)(NAVFIG/NAVFIG FIL 163430)
AIRCRAFT ALTITUDE 1000 FT
0 5 10 15 20 25 30 35 40 45
DISTANCE NAUTICAL MILES
0 50 100 150 200 250
RECEPTION BASED ON OPTIMUM EQUIPMENT AND WEATHER CONDITIONS WITH NO LINE OF SIGHT OBSTRUCTIONS

PILOT-TO-METRO AND WEATHER RADAR FACILITIES



(JUL 2017)(NAVFIG/NAVFIG FIL 163430)

PILOT-TO-METRO AND WEATHER RADAR FACILITIES



5. PILOT-TO-METRO WEATHER RADAR FACILITIES (DoD Non-CONUS Stations)

(AFFSA/AFFSA FIL 10-486)(NAVFIG/NAVFIG)

Hours are continuous unless otherwise stated in remarks. Consult Enroute Supplement for PMSV frequencies.

*Weather Radar

AREA/FACILITY	REMARKS	CHART/PANEL NO.
1. **CARIBBEAN**		
CUBA		
Guantanamo Bay NS		H-2F, L-5A, 6F
2. **PACIFIC**		
ALASKA		
Adak NAF		H-2, L-2
*Eielson AFB		H-1, L-3 (FAIRBANKS AREA CHART)
*Elmendorf AFB		H-1, L-4 (ANCHORAGE AREA CHART)
GUAM		
Guam Intl	Joint Civ/Mil airfield. Anderson AFB Metro backup.	1B
*Anderson AFB		1B
HAWAII		
*Hickam AFB		2F
Kaneohe Bay MCAF		2F
JAPAN		
Atsugi NAF		3B, A-1A (Tokyo)
*Chitose		3D
Hamamatsu		3A
Iwakuni MCAS		4G
Miho	2200-0800Z Mon-Fri, 2200-0300Z Sat, OT 1 hr prior notice required.	4G
Nyutabaru		4G
Yokota		3B, A-1A (Tokyo)
KOREA		
A-511 (Pyongtaek)		A-1A (Seoul-Osan)
*Kunsan AB	WX svc avbl 1900-1100Z, Mon thru Fri, excld hol and down-days; hrs adjusted to coincide with 8 FW flying and/or automated sensor outages/ augmentation.	4E
Osan AB	Full services	A-1A (Seoul-Osan)
OKINAWA		5C
Futenma MCAS		
*Kadena AB		5C

C-24 METEOROLOGICAL INFORMATION

AREA/FACILITY	REMARKS	CHART/PANEL NO.
3. **INDIAN OCEAN**		
Diego Garcia NSF		20E, G
4. **EUROPE**		
FINLAND		
Helsinki-Vantaa		H-2H, L-1D
Rovaniemi	0300-1900Z++	H-1D, L-1D


PILOT TO METRO & WEATHER RADAR FACILITIES
LAJES
AZORES
Bardufoss
Bodo
GREECE
Ankara
TURKEY
Izmir
INCIRLIK
Trondheim
SUNDSVALL/HARNOSAND
Nicosia
Oslo
ARLANDA
Stavanger
Aberdeen
Glasgow
Dublin
Shannon
LAKENHEATH
MILDENHALL
RAF Fairford
(Exercise/Contingency only)
London
Copenhagen
Hamburg
Hannover
Berlin
WIESBADEN
SPANGDAHLEM
RAMSTEIN
Paris
GRAFENWOHR
ANSBACH
HOHENFELS
STUTTGART
Salzburg
Bern
AVIANO
Milan
Toulouse
Barcelona
Lisboa
PMSV (less than continuous)
PMSV (continuous)
WEATHER RADAR
COMBINATION
Consult Enroute Supplement for PMSV frequencies
(DEC 08)

C-26 METEOROLOGICAL INFORMATION

6. VOLMET VOICE WEATHER BROADCASTS

Meteorological information for aircraft in flight may be obtained through routine and special VHF and HF weather broadcasts. VHF broadcasts are normally continuous and contain current airport weather reports, with trend parts where available, and occasionally SIGMET information. HF broadcasts are normally scheduled at regular intervals and contain current airport reports, with trend parts where available, and airport forecasts.

(AFFSA/AIP GEN 3.5)

A - ACTUAL WEATHER REPORT
F - LANDING FORECAST
S - SIGMET
T - FORECAST TREND TYPE

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
ALGER				
126.8	0500-2200Z	H+10 & H+40	A	ALGER, ANNABA, CONSTANTINE, ORAN, TUNIS, MADRID, BARCELONA, PALMA, MARSEILLE, NICE.
ALICANTE				
126.0	H24	Continuous	AT	BARAJAS, PALMA DE MALLORCA, MALAGA, VALENCIA, ALICANTE, IBIZA, GRANADA, ALGER, ORAN.
AMAZONICA				
132.50 132.45 132.10 132.30 132.40 132.25 132.15	H24 H24 H24 H24 H24 H24 H24	Continuous	AT	CONCEICAO DO ARAGUAAIA, AMAPA, ALTA FLORESTA, VAL DE CANS, BOA VISTA INTL, CACHIMBO, CAROLINA, CARAJAS, CRUZEIRO DO SUL, EDUARDO GOMES INTL, JACAREACANGA GUAJARA-MIRIM, ALTAMIRA, ITACOATIARA, ITAITUBA PREFEITO RENATO MOREIRA, MARABA, MONTE DOURADO, PONTA PELADA, SANTAREM, MACAPA, MANICORE, OIAPOGUE, GOVERNADOR JORGE TEIXEIRA DE OLIVEIRA, PRESIDENT MEDICI MARECHAL CUNHA MACHADO, TROMBETAS, TEFE, TARAUAC TIRIOS, TABATINGA, TUCURUI, SAO GABRIEL DA CACHOEIRA, VILHENA, IAUARETE
			AFT	AMAPA, ALTA FLORESTA, VAL DE CANS, BOA VISTA INTL, CAROLINA, CARAJAS, CRUZEIRO DO SUL, EDUARDO GOMES INTL, ALTAMIRA, PREFEITO RENATO MOREIRA, MARABA, PORTA PELADA, MACAPA, MANICORE, OIAPOGUE, GOVERNADOR JORGE TEIXEIRA DE OLIVEIRA, PRESIDENT MEDICI, MARECHAL CUNHA MACHADO, SANTAREM, TEFE, TARAUACA, TABATINGA, SAO GABRIEL DA CACHOEIRA, VILHENA

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
AMSTERDAM				
126.2	H24	Continuous	AT	AMSTERDAM, ROTTERDAM (T IF AVAILABLE), BRUSSELS, DUSSELDORF, HAMBURG, COPENHAGEN, HEATHROW, GATWICK, CHARLES DE GAULLE. Weather reports may be obtained on request on freqs: 123.7, 123.85, 124.3, 124.875, 125.75, 129.3, 133.1 MHZ.
ANCHORAGE				
2863	H24	H+25-30 &	AT	ANCHORAGE, FAIRBANKS, COLD BAY,
6679	H24	H+55-00		VANCOUVER.
8828	H24		A	
13282	H24			ELMENDORF AFB, KING SALMON.
ANDERSEN				
18002	2200-0700Z	H+15 & H+45	A	ANDERSEN, KADENA, YOKOTA.
13201	2000-0900Z			
11176	H24			
8967	H24			
6738	0700-2200Z			
4721	0900-2000Z			
ANKARA				
127.0	H24	Continuous	AT	ESENBOGA, ATATURK, ADNAN MENDERES, BEIRUT INTL.
ANTANANARIVO*				
5499	0225-1930Z	H+25 & H+55	A	IVATO
10057				* Broadcast in French and Malagasy language between 0300-1900Z on frequencies (1502, 3288, 6170, 7105) and at 0200Z and at 2200Z on frequencies 3288 and 6170
ASUNCION				
5601	0905-2315Z	H+05	AFST	SILVIO PETTIROSSI INTL.
10067		H+15		
			AFT*	BASE 5 GENERAL ADRAIN JARA, TENTIENTE COL. CAMELO PERALTA, ENCARNACION, DR. LUIS MARIA ARGANA, CARLOS MIGUEL JIMENEZ, SAN JUAN BAUTISTA, VILLARRICA, BAHIA NEGRA, LA VICTORIA, POZO COLORADO, CAPITAN EMILO NUDDLEMAN, SAN ESTANISLAO, SAN PEDRO. *Every 3 hours and if necessary every hour.
ATHINAI				
127.8	H24	Continuous	AT	ANDRAVIDA, ATHINAI, CAIRO INTL, NIKOS KAZANTZAKIS, IOANNIS KAPODISTRIAS, ISTANBUL, LARNACA, DIGORAS, MAKEDONIA.

C-28 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
AUCKLAND				
6679 8828 13282	H24 H24 H24	H+20+H-25	AFT	AUCKLAND, CHRISTCHURCH WELLINGTON, NADI, FALEOLO, NOUMEA, PAGO PAGO, TAHITI.
		H+50+H-55	AFT	AUCKLAND, CHRISTCHURCH WELLINGTON, NADI, FALEOLO, NOUMEA, PAGO PAGO, TAHITI.
BAHRAIN				
128.8	H24	Continuous	AT	BAHRAIN INTL, KING FAHD INTL, KING ABDULAZIZ INTL, KING KHALED INTL, KUWAIT INTL, ABU DHABI INTL, DUBAI INTL, RAS AL KHAIMAH INTL, SHARJAH INTL, MUSCAT INTL, DOHA INTL
BAKU				
114.1	H24	Continuous	AT	HEYDAR ALIYEV (BAKU), TEHRAN, TBILISI, TURKMENBASHI, ASHGHABAT, ALMATY, TASHKENT, NAKHCHIVAN
BANGKOK				
11387 6676	2310-1145Z H24	H+10-15 & H+40-45	S* AT	BANGKOK INTL
2965	1210-2245Z	H+10-15 & H+40-45	AT	BANGKOK INTL, CHIANG MAI INTL, HAT YAI INTL, NOIBAI INTL, PHUKET INTL, YANGON INTL, U TAPHAO INTL, TANSONNHAT INTL, PHNOM PENH, VIENTAINE *As avbl
BARCELONA				
127.6	H24	Continuous	AT	BARAJAS, BARCELONA, PALMA DE MALLORCA, MALAGA, IBIZA, GIRONA, MENORCA, TOULOUSE, MARSEILLE.
BEIJING				
*13285 *8849 **5673 **3458	0000-1600Z	H+15 - H+20 H+45 - H+50	AFST	CAPITAL, ZHOUSHUIZI, HONGQUIAO, TAOXIAN, WUSU, BINHAI. *Day **Ngt

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
BEIRUT				
126.0	H24	Continuous	AT	BEIRUT INTL, NICOSIA, DAMASCUS INTL, MARKA INTL, CAIRO INTL, BAGHDAD INTL, ABADAN INTL, KUWAIT INTL, BAHRAIN INTL, ISTANBUL, ANKARA, TEHRAN
BEOGRAD				
126.4	H24	Continuous	AF	BEOGRAD, ZAGREB, DUBROVNIK, WIEN, BUDAPEST, BUCURESTI/OTOPENI, SOFIA, THESSALONIKI.
BERLIN				
128.4		Continuous	AF	SCHONEFELD, TEGEL, DRESDEN*, LEIPZIG/HALLE, PRAHA, COPENHAGEN, WARSZAWA, WEIN *(Trend forecast available).
BLOEMFONTEIN				
130.3	0400-1800Z	Continuous	AT	BLOEMFONTEIN*, CAPE TOWN*, EAST LONDON, JAN SMUTS*, KIMBERLEY, PORT ELIZABETH*, UPINGTON, DURBAN, MASERU, GEORGE. *Trend.
BODO*				
124.25	H24	Continuous	AST	BODO, EVENES, ANDOYA, BARDUFOSS, TROMSO, ALTA, VAERNES, GARDERMOEN. *English and Scandinavian language.
BORDEAUX				
126.4	H24	Continuous	A	GENEVA/COINTRIN, MERIGNAC, BLAGNAC, BARAJAS, BARCELONA, LISBOA, CHARLES DE GAULLE, ORLY, PALMA DE MALLORCA.
			S	SIGMET NOTICES FROM THE BORDEAUX FIR and FRANCE UIR.

C-30 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
BRASILIA				
132.15 132.25 132.40 132.55 132.60	H24	Continuous	AT	(SUB AREA 1) BASE AREA, BRASILIA, BARRA DO GARCAS, MARECHAL RONDON, SANTA GENOVEVA, HIDROELECTRICA, BRIGADEIRO LYSIAS RODRIGUES, PORTO NACIONAL
			AFT	BASE AEREA, BRASILIA, BARRA DO GARCAS, MARECHAL RONDON, SANTA GENOVEVA, BRIGADEIRO LYSIAS RODRIGUES
			S*	BRASILIA FIR This MET information will be provided for Enroute aircraft where MET phenomena are Forecast or observed.
			AT	(SUB AREA 2) CAMPO DELIO JARDIM DE MATTOS, ARAXA, PAMPULHA-CARLOS DRUMMOND DE ANDRADE, MAJOR BRIGADEIRO DOORGAL BORGES, UMBERTO MODIANO, CABO FRIO, TANCREDO NEVES, BARTOLOMEU LISANDRO RJ, PLATAFORMA P-15 RJ, SAO PEDRO DA ALDEIA, HELPN SAO TOME, FRONTEIRA, FURNAS, GALEAO-ANTONIO CARLOS JOBIM, GOVERNADOR VALADARES, USIMINAS, FRANCISCO DE ASSIS, JACAREPAGUA, PLATAFORMA P-25 RJ, LAGOA SANTA, MACAE, MARIO RIBEIRO, PLATAFORMA P-20 RJ, CARLOS PRATES, SANTOS DUMONT, SANTA CRUZ, TEN.-CEL AV.CESAR BOMBONATO MG, UBERABA, MAJOR BRIGADEIRO TROMPOWSKY, GOIABEIRAS
			AFT	CAMPO DELIO JARDIM DE MATTOS, PAMPULHA-CARLOS DRUMMOND DE ANDRADE, CABO FRIO, TANCREDO NEVES, BARTOLOMEU LISANDRO RJ, SAO PEDRO DA ALDEIA, GALEAO-ANTONIO CARLOS JOBIM, FRANCISCO DE ASSIS, JACAREPAGUA, MACAE, SANTOS DUMONT, SANTA CRUZ, TEN.-CEL.AV.CESAR BOMBONATO MG, UBERABA, GOIABEIRAS
			AT	(SUB AREA 3) ARARAQUARA, CHAFEI AMSEI, PLATA-FORMA PNA-1 RJ, GUARULHOS, GUARATINGUETA, VIRACOPOS, MARTE, POCOS DE CALDAS, LEITE LOPES, SAO JOSE DOS CAMPOS, CONGONHAS, SAO JOSE DO RIO PRETO, BASE AEREA, HELIPONTO BAVT, CAMPO FONTENELLE

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
			AFT	GUARULHOS, GUARATINGUETA, VIRACOPOS, LEITE LOPES, SAO JOSE DOS CAMPOS, CONGONHAS, SAO JOSE DO RIO PRETO, BASE AEREA, CAMPO FONTENELLE
BRATISLAVA				
126.2	0500-2030Z++	Continuous	AT	M R STEFANIK, RUZYNE, KOSICE, SLIAC, TATRY, PIESTANY, ZILINA, MOSNOV.
BRAZZAVILLE*				
10057	1800-0500Z	H+15 & H+25 H+45 & H+55	AFST	BRAZZAVILLE, NDJAMENA, DOUALA, BANGUI, LIBREVILLE, YAOUNDE, KINSHASA, KANO**, LAGOS**, LUANDA**. *English & French language ** Broadcast upon receipt
BRINDISI				
127.6	H24	Continuous	S	BRINDISI.
			A	CAPODICHINO, CIAMPINO.
			AT	BRINDISI, PISA, ROMA/FIUMICINO, ATHINAI, THESSALONIKI, KERKIRA, ANDRAVIDA.
BRUSSELS				
127.80	H24	Continuous	AT	BRUSSELS NATIONAL, OOSTENDE, HEATHROW, LUXEMBOURG, SCHIPHOL, ORLY, FRANKFURT, KOLN-BONN, DUSSELDORF.
BUCURESTI				
126.8	H24	Continuous	AT	AUREL VLAICU, BEOGRAD, BUDAPEST, HENRI COANDA, ISTANBUL, KIEV, M. KOGALNICEANU, SOFIA, TRAIAN VUIA.
129.4	H24	Continuous	S	BUCURESTI FIR.
BUDAPEST				
127.4	H24	Continuous	AT	BUDAPEST, PRAHA, BRATISLAVA, ARAD, BUCURESTI/O, BEOGRAD, SOFIA, WARSZAWA, WIEN
			S	BUDAPEST FIR
CAIRO				
126.2	H24	H+10, 20, 30, 40, 50	AT	CAIRO INTL, HURGHADA, SHARM EL SHEIKH, LUXOR, ASWAN, BORG EL ARAB, ALEXANDRIA.
			F	CAIRO INTL.

C-32 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
CALCUTTA				
11387 6676 2965	H24 (0300-1300Z) (1300-0300Z)	H+05-10 & H+35-40	AFT AT	CALCUTTA, MUMBAI, DELHI. DHAKA, RANGOON.
CASABLANCA				
127.6	H24	Continuous	AT	MOHAMED V, SALE, BOUKHALF, MENARA, INEZGANE.
			A	ANGADS, GRAN CANARIA, MALAGA, SEVILLA.
CHITA				
128.3	H24	Continuous	AT	KADALA, MUKHINO, IRKUTSK, IGNATYEVO, YAKUTSK
COMODORO RIVADAVIA RADIO				
4675 8938	0900-2400Z 0900-2400Z	H+30	A*	COMODORO RIVADAVIA, RIO GALLEGOS, TRELEW, AEROPARQUE JORGE NEWBERY, BARILOCHE, BAHIA BLANCA.
		H+30	F*	VIEDMA, ESQUEL, LAGO ARGENTINO, SAN JULIAN SAN ANTONIO OESTE, PERITO MORENO, GOBERNADOR GREGORES, PUERTO DESEADO SANTA CRUZ, RIO GRANDE, MAQUINCHAO, PASO DE INDIOS, USHUAIA, EL MAITEN, EL BOLSON, ALTO RIO SENGUER, JOSE DE SAN MARTIN, RIO MAYO, RIO TURBIO.
		H+40	ST	COMODORO RIVADAVIA FIR*, EZEIZA FIR**. *Every hour. **Every Even Hour. **NOTE:** Broadcast of any information depends upon availability.
COPENHAGEN				
127.0	H24	Continuous	AFT	KASTRUP, BILLUND, AALBORG, HAMBURG, MALMO, GOTEBORG, ARLANDA, OSLO, STAVANGER.

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
CORDOBA RADIO				
5475	H24	H+25	A*	CORDOBA, JUJUY, SALTA, TUCUMAN, MENDOZA.
8952	H24	H+25	F*	ORAN, LA RIOJA, CATAMARCA, CERES, RIO CUARTO, MARCOS JUAREZ, TARTAGAL, VILLA DOLORES, CHILECITO, SAN JUAN, SAN LUIS, VILLA REYNOLDS, SAN RAFAEL, MALARGUE, SAN MARTIN, AEROPARQUE JORGE NEWBERY, SAUCE VIEJO, ROSARIO.
			ST	CORDOBA FIR*, MENDOZA FIR**, EZEIZA FIR***. *Every Hour. **Every Even Hour. ***Every Odd Hour. NOTE: Broadcast of any information depends upon availability.
CURITIBA				
132.05 (S sctr) 132.45 (N sctr)	H24	Continuous	AT	ASSIS, ARACATUBA, CMT. GUSTAVO KRAERMER, BACACHERI, BAURU, CASCAVEL, CACADOR, CAMPO GRANDE, CHAPECO, FORQUILHINHA, CANOAS, CORUMBA, AFONSO PENA, CAMPO DOS BUGRES, PRESIDENTE PRUDENTE, CATARATAS, HERCILIO LUZ, TANCREDO THOMAS DE FARIA, JOINVILLE, LAGES, LINS, LONDRINA, REGIONAL DE MARINGA SILVO NAME JUNIOR, MARILIA, NAVEGANTES SANTO ANGELO, SALGADO, FILHO, LAURO KURTZ, PELOTAS, PONTA PORA, RIO GRANDE, SANTA MARIA, TOLEDO, TELEMACO BORBA, TORRES, RUBEM BERTA, URUBUPUNGA
			AFT	CMT. GUSTAVO KRAEMER, BACACHERI, BAURU, CAMPO GRANDE, CANOAS, CORUMBA, AFONSO PENA, PRESIDENTE PRUDENTE, CATARATAS, HERCILIO LUZ, JOINVILLE, LONDRINA, NAVEGANTES, SALGADO FILHO, PELOTAS, PONTA PORA, SANTA MARIA, RUBEM BERTA
			S	CURITIBA FIR
DAMASCUS				
2992	H24	H+30 & Special	AFT	DAMASCUS INTL.
5667	H24	H+00 & Special	AFT*	ALEPPO INTL.
8918	H24			*+30 O/R.
13312	H24	H+00 & Special	A	DEIR ZZOR, KAMISHLY, PALMYRA.

C-34 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
DNIPROPETROVSK				
126.45	H24	Continuous	AT	BORYSPIL, DNIPROPETROVSK, DONETSK, KHARKIV, ODESA, ROSTOV, ZHULUANY.
DUBLIN				
127.0	H24	Continuous	AFT	DUBLIN, SHANNON, CORK, BELFAST, GLASGOW, PRESTWICK, MANCHESTER, HEATHROW, GATWICK.
EDMONTON MILITARY				
6753	2300-1200Z	EVEN HRS+20	A	NAMAO, VANCOUVER, WINNIPEG, COMOX,
15035	1200-2300Z	SSB, Voice only		COLD LAKE, CALGARY INTL, RESOLUTE BAY, CAMBRIDGE BAY, CHURCHILL, YELLOWKNIFE, WHITEHORSE, THULE AFB.
			F	RESOLUTE BAY*, CAMBRIDGE BAY*, CHURCHILL*, YELLOWKNIFE*, WHITEHORSE*, THULE AFB*.
		ODD HRS+20 SSB, Voice only	F	NAMAO, VANCOUVER WINNIPEG, COMOX, COLD LAKE, CALGARY INTL, RESOLUTE BAY*, CAMBRIDGE BAY*, CHURCHILL*, YELLOWKNIFE*, WHITEHORSE*, THULE AFB*.
EKOFISK				
118.975	0500-1700Z		AS	SOLA, KARMOY, LISTA.

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
EZEIZA RADIO				
2881 5601 11369	H24 H24 H24	H+15	A*	AEROPARQUE JORGE NEWBERY, ROSARIO, MAR DEL PLATA, NEUQUEN, BAHIA BLANCA, BARILOCHE, SAUCE VIEJO, PORTO ALEGRE (Brazil), MONTEVIDEO (Uruguay), ASUNCION (Paraguay), PUDAHUEL (Chile), ANTOFAGASTA (Chile).
		H+15	A**	CORDOBA, JUJUY, SALTA, TUCUMAN, MENDOZA.
		H+15	A***	RESISTENCIA, CORRIENTES, POSADAS, CATARATAS DEL IGUAZU, COMODORO RIVADAVIA, TRELEW, RIO GALLEGOS.
		H+15	F*	EL PALOMAR, PARANA, GUALEGUAYCHU, LABOULAYE, JUNIN, SANTA ROSA, TANDIL, CONCORDIA, GENERAL PICO, DON TORCUATO, LA PLATA, AZUL, DOLORES, NECOCHEA, PEHUAJO.
		H+15	F**	ORAN, LA RIOJA, CATAMARCA, CERES, RIO CUARTO, MARCOS JUAREZ, TARTAGAL, VILLA DOLORES, CHILECITO, SAN JUAN, SAN LUIS, VILLA REYNOLDS, SAN RAFAEL, MALARGUE, SAN MARTIN.
		H+15	F***	PRESIDENCIA ROQUE SANEZ PENA, FORMOSA, RECONQUISTA, MONTE CASEROS, PASO DE LOS LIBRES, CURUZU CUATIA, GOYA, VIEDMA, ESQUEL, LAGO ARGENTINO, SAN JULIAN, SAN ANTONIO OESTE, PERITO MORENO, GOBERNADOR GREGORES, PUERTO DESEADO, SANTA CRUZ, RIO GRANDE, MAQUINCHAO, PASO DE INDIOS, USHUAIA, EL MAITEN, EL BOLSON, ALTO RIO SENGUER, JOSE DE SAN MARTIN, RIO MAYO, RIO TURBIO.
		H+01	ST	EZEIZA FIR*, COMODORO RIVADAVIA. FIR**, RESISTENCIA FIR***. *Every Hour. **Every Even Hour. ***Every Odd Hour. **NOTE:** Broadcast of any information depends upon availability.
FRANKFURT 1				
127.6	H24	Continuous	AFT	FRANKFURT, BRUSSELS, AMSTERDAM, ZURICH, GENEVA, BALE-MULHOUSE, WIEN, PRAHA, CHARLES DE GAULLE.

C-36 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
FRANKFURT 2				
135.775		Continuous	AF	FRANKFURT, KOLN/BONN, DUSSELDORF, STUTTGART*, NURNBERG*, MUNCHEN, HAMBURG, TEGEL *(Trend forecast available).
GANDER				
3485	H24	H+20-25	F	MONTREAL/PIERRE ELLIOTT TRUDEAU, TORONTO, OTTAWA.
6604	H24		A	MONTREAL/PIERRE ELLIOTT TRUDEAU, TORONTO, GANDER, OTTAWA, GOOSE.
10051	H24	H+25-30	FS(1*)	WINNIPEG, EDMONTON, CALGARY, CHURCHILL.
13270	H24		A	KUUJJUAQ, WINNIPEG, CHURCHILL.
		H+50-55	F	GANDER, ST JOHNS, HALIFAX.
			A	MONTREAL/Mirabel, STEPHENVILLE, GANDER, HALIFAX, ST JOHNS.
		H+55-60	FS(1*)	GOOSE, IQALUIT, SONDRESTROM.
			A	GOOSE, IQALUIT, SONDRESTROM, KUUJJUAQ. 1* Includes SIGMET or notification of SIGMET affecting flights operating above FL 100 in the Gander Oceanic and the Gander, Moncton, Montreal and Toronto domestic FIR.
GENEVA				
126.8	H24	Continuous	A	COINTRIN, ZURICH, BALE/MULHOUSE, NICE, SAINT EXUPERY, CHARLES DE GAULLE, ORLY, LINATE, MALPENSA.
HANNOVER (BREMEN VOLMET)				
127.4	H24	Continuous	AF	HANNOVER*, HAMBURG, BREMEN*, KOLN/BONN, FRANKFURT, TEGEL, AMSTERDAM, COPENHAGEN *(Trend forecast available).
HARARE				
113.1	0400-1800Z	Continuous	A	HARARE.

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
HELSINKI-VANTAA				
128.4	H24	Continuous	AT	HELSINKI, ST PETERSBERG/PULKOVO, ARLANDA, TALLIN/YULEMIST.
			A	OULU*, VAASA*, TAMPERE/PIRKKALA, TURKU KUOPIO*. *Hourly only.
HONG KONG				
128.875	H24	Continuous	A	SHENZHEN,TAIPEI
			AT	MACAU, GAOXIONG
2863	H24	H+15-20 &	A	NAHA
6679		H+45-50	AT	HONG KONG INTL,
8828 13282				GUANGZHOU/BAIYUN, CHIANG KAI SHEK INTL, GAOXIONG, NINOY AQUINO INTL, MACTAN
			F	HONG KONG INTL
338	H24	H+15-20 & H+45-50	ST	HONG KONG INTL
HONOLULU				
2863	H24	H+00-05 &	A	HONOLULU, HILO, AGANA, KAHULUI.
6679	H24	H+30-35	F	HONOLULU, HILO, AGANA.
8828	H24		S	HONOLULU FIR.
13282	H24	H+05-10 & H+35-40	A	SAN FRANCISCO, SEATTLE, LOS ANGELES, PORTLAND, SACRAMENTO, ONTARIO, LAS VEGAS.
			F	SAN FRANCISCO, SEATTLE, LOS ANGELES.
			S	HONOLULU FIR.
		H+25-30 & H+55-60	A	ANCHORAGE, FAIRBANKS, COLD BAY, VANCOUVER, ELMENDORF, KING SALMON.
			F	ANCHORAGE, FAIRBANKS, COLD BAY, VANCOUVER.
INNSBRUCK				
130.475	H24	Continuous	AFST	MUNCHEN, ZURICH, ALTENRHEIN, FRIEDRICHSHAFEN, HOHENEMS, ALPE RAUZ, PATSCHERKOFEL, GERLOS, ZELL AM SEE, BOLZANO/BOZEN.
	0250-2250Z++	Continuous	AFST	INNSBRUCK*, SALZBURG*, KLAGENFURT*, LINZ*. *During operational hours.

C-38 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
IRKUTSK				
125.475	H24	Continuous	AT	IRKUTSK, KADALA, MUKHINO, BRATSK, YEMELYANOVO
ISTANBUL				
127.4	H24	Continuous	AT	ATATURK, ESENBOGA, ADNAN MENDERES, ATHENS, SOFIA, BUCHAREST.
JONKOPING*				
127.2	H24	Continuous	AFT	ARLANDA, STURUP.
			AF	BROMMA, LANDVETTER**, VISBY, JONKOPING, KARLSTAD, ANGELHOLM, RONNEBY, KALMAR.
			A	HALMSTAD *The transmission is controlled from ARLANDA. **Available 0500-1800Z++. **NOTE:** Information updated H+05 & H+35
KARACHI				
11387	0130-1500Z	H+15-H+20 & H-45-H-50	AT	KARACHI, NAWABSHAH, LAHORE
2965	1500-0130Z		AT	ISLAMABAD
6676		Continuous	AT	DELHI, BOMBAY, SINGAPORE
KAZAKHSTAN				
130.1	H24	Continuous	ATS	AKTAU
126.0	H24	Continuous	ATS	AKTOBE
129.8	H24	Continuous	ATS	ALMATY
127.7	H24	Continuous	ATS	ASTANA
127.4	H24	Continuous	ATS	ATYRAU
127.8	H24	Continuous	ATS	KARAGANDA
119.2	H24	Continuous	ATS	SHYMKENT
KHABAROVSK				
127.875	H24	Continuous	AT	NOVY, IGNATYEVO, KNEVICHI, KHOMUTOVO, KADALA, IRKUTSK

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
KLAGENFURT				
122.275	H24	Continuous	AFST	KLAGENFURET*, GRAZ*, ZEL am SEE, FELBERTAUERN, LAVANT bei LIENZ, SPITTAL/DRAU, NEUMARKTER SATTEL, SONNBLICK, MAUTERNDORF, SCHOBERPAL, 2 ZELTWEG*, AIGEN/ ENNSTAL*. *During operational hours.
KUWAIT				
126.625	H24	Continuous	AFST	BAHRAIN, DOHA, ABU DHABI, DUBAI, RIYADH, DAMMAM, TEHRAN, MASHHAD, SHIRAZ
KYIV (VOLMET BORYSPIL)				
129.375	H24	Continuous	AT	BORYSPIL, CHISINAU, LVIV, MINSK-2, ODESA, RIGA, SHEREMETYEVO, VNUKOVO.
KYRGYZ REPUBLIC				
127.9	H24	Continuous	AT	BISHKEK/MANAS
134.2	H24	Continuous	AT	OSH
LA PAZ				
8070	1015-2315	H+15	A	ASCENSION DE GUARAYOS, COBIJA, COCHABAMBA, EL TROMPILLO, GUAYARAMERIN, LAPAZ, MAGDALENA, ORURO, PUERTO SUAREZ, RIBERALTA, ROBORE, RURRENABAQUE, SAN BORJA, SAN IGNACIO DE MOXOS, SAN IGNACIO DE VELASCO, SANTA ANA, SUCRE, TARIJA, TRINIDAD, VIRU VIRU, YACUIBA.
LAS PALMAS				
126.2	H24	Continuous	AT	GRAN CANARIA, TENERIFE NORTE, TENERIFE SUR, FUERTEVENTURA, LANZAROTE, CASABLANCA, MARRAKECH, AGADIR, BARAJAS, LISBOA.
LIBREVILLE*				
112.1	0700-1800Z	Continuous	AT	LIBREVILLE. *English and French language. **NOTE:** Information update H+00 & H+30.
LISBOA				
126.4	H24	Continuous	AST	LISBOA.
			A	PORTO, FARO, SEVILLA, BARAJAS, TENERIFE SUR, MADEIRA, PORTO SANTO.

C-40 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
LONDON (MAIN)				
135.375	H24	Continuous	AT	AMSTERDAM, BRUSSELS, CHARLES DE GAULLE, DUBLIN, GATWICK, GLASGOW, HEATHROW, MANCHESTER, STANSTED.
LONDON (NORTH)				
126.6	H24	Continuous	AT	BLACKPOOL, EAST MIDLANDS, GATWICK, LEEDS BRADFORD, LIVERPOOL, MANCHESTER, NEWCASTLE, DURHAM TREES VALLEY.
LONDON (SOUTH)				
128.6	H24	Continuous	AT	BIRMINGHAM, BOURNEMOUTH, BRISTOL, CARDIFF, EXETER, JERSEY, LUTON, NORWICH, SOUTHAMPTON, SOUTHEND.
LVIV				
133.325	H24	Continuous	AT	BRATISLAVA, CHERNIVITSI, DNIPROPETROVSK, FERIHEGY, IVANO FRANKIVSK, LVIV, ODESA, RIVNE, WARSAW.
MACDILL				
18019 13244 11246 8993 6750 4746	0900-2400Z 0900-2400Z H24 H24 0001-0900Z 0001-0900Z	H+15 & H+45	A	ANDREWS, CHARLESTON, DOVER, MCGUIRE, POPE.
MADRID				
126.2	H24	Continuous	AT	BARAJAS, BARCELONA, SEVILLA, MALAGA, VALENCIA, ALICANTE, BILBAO, LISBOA, BORDEAUX.
MAGADAN				
126.2	HO	Continuous	AT	SOKOL, YELIZOVO, NOVY
MALTA				
126.8		Continuous	AT	ROME/FIUMICINO, NAPLES, PALERMO, CATANIA, TUNIS, TRIPOLI, BENGHAZI, MALTA/LUQA

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
MARSEILLE				
127.4	H24	Continuous	A	PROVENCE, LINATE, COTE D'AZUR, SAINT EXUPERY, GENEVA/COINTRIN, CHARLES DE GAULLE, BARCELONA, ROME/ FIUMICINO, PALMA DE MALLORCA.
			S	SIGMET notices from the MARSEILLE FIR and FRANCE UIR.
MILANO				
126.6	H24	Continuous	S	MILANO.
			A	TORINO, GENOVA/SESTRI, VENEZIA/ TESSERA, BERGAMO/ORIO AL SERIO.
			AT	MILANO/LINATE, MILANO/MALPENSA, PISA/SAN GIUSTO, ROMA/FIUMICINO, NICE.
MINSK-2				
126.675	H24	Continuous	AT	MINSK-2, KYIV/BORYSPIL, WARSAW, RIGA, MOSCOW/SHEREMETYEVO, MOSCOW VNUKOVO, FRANKFURT MAIN, HOMIEL, SANKT-PETERBURG/PULKOVO.
MONTEVIDEO				
8873	1000-2100Z	H+15	AFST	CARRASCO INTL.
5451			AFT	ANGEL S ADAMI, ARTIGAS, CAPT. CORBETA CC CURBELO, CERR LARGO, COLONIA, EL JAGUEL, RIVERA.
MOSCOW				
127.875	0300-2100Z	Continuous	AT	SHEREMETYEVO, PULKOVO, BORYSPIL', VNUKOVO, OKENCIE, VANTAA, DOMODEDOVO, VILNIUS
MUMBAI				
11387	H24	H+25-30 &	AFT	MUMBAI, COLOMBO/KATUNAYAKE INTL.
6676	H24	H+55-00	AT	CHENNAI, KARACHI CIVIL, AHMEDABAD. (T-only 0110-1610Z).
2965				
MUSCAT				
127.4	H24	Continuous	A	MUSCAT INTL, UAE AERODROMES, BAHRAIN

C-42 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
NEW YORK				
3485 6604	H24 H24	H+00-05	A	DETROIT, CHICAGO, CLEVELAND, NIAGARA FALLS, MILWAUKEE, INDIANAPOLIS.
10051	H24		F	DETROIT, CHICAGO, CLEVELAND.
13270	H24	H+05-10	A	BANGOR, PITTSBURGH, WINDSOR LOCKS, ST LOUIS, CHARLOTTE, MINNEAPOLIS.
			F	BANGOR, PITTSBURGH, CHARLOTTE.
			S	NEW YORK FIR.
		H+10-15	A	NEW YORK, NEWARK, BOSTON, BALTIMORE, PHILADELPHIA, WASHINGTON.
			F	NEW YORK, NEWARK, BOSTON.
		H+15-20	A	BERMUDA, MIAMI, TAMPA, WEST PALM BEACH, ATLANTA.
			F	BERMUDA, MIAMI, ATLANTA.
			S	MIAMI/SAN JUAN FIR.
		H+30-35	A	DETROIT, CHICAGO, CLEVELAND, NIAGARA FALLS, MILWAUKEE, INDIANAPOLIS.
			F	NIAGARA FALLS, MILWAUKEE, INDIANAPOLIS.
		H+35-40	A	BANGOR, PITTSBURGH, WINDSOR LOCKS, ST LOUIS, CHARLOTTE, MINNEAPOLIS.
			F	WINDSOR LOCKS, ST LOUIS.
			S	NEW YORK FIR.
		H+40-45	A	NEW YORK, NEWARK, BOSTON, BALTIMORE, PHILADELPHIA, WASHINGTON.
			F	BALTIMORE, PHILADELPHIA, WASHINGTON.
		H+45-50	A	BERMUDA, MIAMI, TAMPA, WEST PALM BEACH, ATLANTA.
			S	MIAMI/SAN JUAN FIR.
NICOSIA				
127.2	H24	Continuous		LARNACA, ATHINAI, RODOS/PARADISI, BEIRUT INTL, DAMASCUS INTL, ESENBOGA, ATATURK, BEN GURION, PAPHOS.

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
NOVOSIBIRSK				
128.3	H24	Continuous	A	TOLMACHEVO, BARNAUL, ABAKAN, KRASNOYARSK, OMSK
OAKLAND				
2863	H24	H+05-10 &	AT	SAN FRANCISCO, LOS ANGELES, SEATTLE.
6679	H24	H+35-40	T	SACRAMENTO, ONTARIO, LAS VEGAS.
8828 13282	H24 H24		S*	SAN FRANCISCO, SALT LAKE CITY. *To be included in the broadcasts only if time available.
OSH				
128.8	H24	Continuous	AT	TASHKENT/YUZHNY, SAMARKAND, BUHARA, DUSHANBE, KHUDZHAND, NAMANGAN, NUKUS, TERMEZ, URGENCH
OSLO				
128.6	H24	Continuous	AT	FLESLAND, LANDVETTER, KASTRUP, KJEVIK, GARDERMOEN, SOLA, ARLANDA.
PARIS				
126.0	H24	Continuous	A	CHARLES DE GAULLE, ORLY, GATWICK, SAINT EXUPERY, ZURICH, GENEVA/ COINTRIN, BRUSSELS NATIONAL, HEATHROW, SCHIPHOL.
			S	SIGMET notices from the BREST, REIMS, PARIS FIRS and FRANCE UIR.
PISA				
128.4	H24	Continuous	S	ROMA ACC
			A	BOLOGNA, RONCHI DEI LEGIONARI, VENEZIA/TESSERA.
			AT	PISA, RIMINI, ZURICH, GENEVE, BALE/ MULHOUSE, MUNCHEN.
PORTO VELHO METRO				
132.30	H24	Continuous	AT	GUAJARA-MIRIM
			AFT	CRUZEIRO DO SUL, PORTO VELHO, PRESIDENTE MEDICI, TARAUACA, TABATINGA, VILHENA
			S*	PORTO VEHLO FIR. *This MET information will be provided for enroute aircraft where MET phenomena are forecast or observed.

C-44 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
PRAHA				
128.605	H24	Continuous	AS	SCHONEFELD, IVANKA, FERIHEGY, FRANKFURT/MAIN, MUNCHEN, RUZYNE, OKECIE, ZURICH.
125.525	H24	Continuous	AS	TURANY, KARLOVY VARY, MOSNOV, PARDUBICE, RUZYNE, KUNOVICE.
RECIFE				
123.95 124.90	H24	Continuous	AT	SANTA MARIA, CARAVELAS, FERNANDO DE NORONHA, PINTO MARTINS, ILHEUS, PRESIDENTE CASTRO PINTO, REGIONAL DO CARIRI, JOAO SUASSUNA, CHAPADA DIAMANTINA, BOM JESUS DA LAPA, ZUMBI DOS PALMARES, DIX-SEPT ROSADO AUGUSTO SEVERO, PARNAIBA, PETROLINA, PORTO SEGURO, VITORIA DA CONQUISTA, HOTEL TRANS-AMERICA, TERESINA, PAULO AFONSO
			AFT	SANTA MARIA, CARAVELAS, FERNANDO DE NORONHA, PINTO MARTINS, ILHEUS, PRESIDENTE CASTRO PINTO, JOAO SUASSUNA, BOM JESUS DA LAPA, ZUMBI DOS PALMARES, AUGUSTO SEVERO, PETROLINA, PORTO SEGURO, VITORIA DA CONQUISTA, TERESINA
			S*	RECIFE FIR. *This MET information will be provided for Enroute aircraft where MET phenomena are forecast or observed.
RESISTENCIA RADIO				
4675	H24	H+20	A*	RESISTENCIA, CORRIENTES, POSADAS, CATARATAS DEL IGUAZU, AEROPARQUE JORGE NEWBERY, ROSARIO, SAUCE VIEJO, ASUNCION (Paraguay).
		H+20	F	PRESIDENCIA ROQUE SANEZ PENA, FORMOSA, RECONQUISTA, MONTE CASEROS, PASO DE LOS LIBRES, CURUZU CUATIA, GOYA.
		H+50	ST	RESISTENCIA FIR*, EZEIZA FIR**, CORDOBA FIR***. *Every Hour. **Every Even Hour. ***Every Odd Hour. **NOTE:** Broadcast of any information depends upon availability.

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
RIGA				
127.65	H24	Continuous	AFST	RIGA, VILNIUS, TALLIN/ULLEMISTE
			AFT	STOCKHOLM/ARLANDA, MOSCOW/SHEREMETYEVO, ST. PETERSBURG/PULKOVO, MOSCOW/ VNUKOVO, HELSINKI/VANTAA, WARSAW
ROMA CIAMPINO				
126.0	H24	Continuous	S	ROMA ACC.
			A	ROMA CIAMPINO, CATANIA/ FONTANAROSSA, PALERMO.
			AT	ROMA/FIUMICINO, CAPODICHINO, LINATE, MALPENSA, MALTA, TUNIS.
ROYAL AIR FORCE				
5450	H24	Continuous	A	
11253	H24	Continuous	A	

Broadcast of airfields will be twice an hour in slot times allotted below:

00/30	BENSON, COLTISHALL, CONINGSBY, LEEMING, LEUCHARS, LOSSIEMOUTH, MARHAM, ODIHAM, SHAWBURY, HANNOVER, GEILENKIRCHEN, GARDERMOEN, TRONDHEIM
06/36	ALDERGROVE, BIRMINGHAM, BRIZE, NORTON, CRANWELL, EAST MIDLANDS, KINLOSS, LYNEHAM, MANCHESTER, NORTHOLT, PRESTWICK, STANSTED, WADDINGTON
12/42	SPLIT, BUDAPEST, BARI, GIOIA DEL COLLE, AVIANO, RIMINI, ANCONA, ROME, CONSTANTA, BUCHAREST, PRISTINA, SKOPJE
18/48	KEFLAVIK, ASCENSION, BANJUL, DAKAR, GIBRALTAR, MOMBASA, NAIROBI, RIO DE JANEIRO, MONTEVIDEO, BRIZE, NORTON, LYNEHAM, WADDINGTON, FUJAIRAH
24/54	ADANA, AKROTIRI, AL UDEID, AMMAN, BASRAH, BAHRAIN, CARIO, KEBUL, KUWAIT, MUSCAT, AL KHARJ, SALALAH, THUMRAIT

C-46 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
SALTA RADIO				
5475	H24	H+15	A*	CORDOBA, JUJUY, SALTA, TUCUMAN, RESISTENCIA, CATARATAS DEL IGUAZU, AEROPARQUE JORGE NEWBERY, ANTOFAGASTA (Chile), SANTA CRUZ DE LA SIERRA (Bolivia).
		H+15	F*	ORAN, LA RIOJA, CATAMARCA, CERES, RIO CUARTO, MARCOS JUAREZ, TARTAGAL, VILLA DOLORES, CHILECITO.
		H+45	ST	CORDOBA FIR*, RESISTENCIA FIR**, MENDOZA FIR***. *Every Hour. **Every Even Hour. ***Every Odd Hour. **NOTE:** Broadcast of any information depends upon availability.
SAMARA				
126.875	H24	Continuous	AT	KURUMOCH, BARATAYEVKA, KAZAN, SARATOV, NIZHNY, NOVGOROD, UFA, VOLGOGRAD, ORENBURG
SANKT-PETERBURG				
125.875	H24	Continuous	AT	PULKOVO, SHEREMETYEVO, VNUKOVO, MINSK-2, KHRABROVO, VILNIUS, ARLANDA, VANTAA
SANTIAGO				
126.6	H24	Continuous	A	MADRID, BARCELONA, ASTURIAS, SANTIAGO, LISBOA, PORTO, FARO, BREST, NANTES.
SCOTTISH				
125.725	H24	Continuous	AT	ABERDEEN, ALDERGROVE, EDINBURGH, GLASGOW, HEATHROW, INVERNESS, PRESTWICK, STORNOWAY, SUMBURGH.
SEVILLA				
127.0	H24	Continuous	AT	BARAJAS, SEVILLA, MALAGA, GIBRALTAR, LISBOA, FARO, CASABLANCA, TANGER, RABAT/SALE.

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
SHANNON				
3413	SS-SR	H+00	FS	BRUSSELS NTL, HAMBURG.
8957 5505 13264	H24 H24 SR-SS		AS	BRUSSELS NTL, HAMBURG, FRANKFURT MAIN, COLOGNE/BONN, DUSSELDORF, MUNICH.
		H+05	F	HEATHROW, SHANNON, PRESTWICK.
			A	HEATHROW, SHANNON, PRESTWICK, GATWICK, SCHIPHOL, MANCHESTER.
		H+10	AS	KASTRUP, ARLANDA, LANDVETTER, BERGEN/FLESLAND, OSLO/ GARDERMOEN, HELSINKI/VANTAA, DUBLIN, BARCELONA.
		H+15	F	BARAJAS, LISBON, ORLY.
			A	BARAJAS, LISBON, SANTA MARIA, ORLY, CHARLES DE GAULLE, SATOLAS.
		H+20	FS	ROME/FIUMICINO, MALPENSA.
			AS	ROME/FIUMICINO, MALPENSA, ZURICH, GENEVA/COINTRIN, TURIN/CASELLE, KEFLAVIK.
		H+30	FS	FRANKFURT MAIN, COLOGNE/BONN.
			AS	BRUSSELS NTL, HAMBURG, FRANKFURT MAIN, COLOGNE/BONN, DUSSELDORF, MUNICH.
		H+35	F	GATWICK, SCHIPHOL, MANCHESTER.
			A	HEATHROW, SHANNON, PRESTWICK, GATWICK, SCHIPHOL, MANCHESTER.
		H+40	AS	KASTRUP, ARLANDA, LANDVETTER, BERGEN/FLESLAND, OSLO/ GARDERMOEN, HELSINKI/VANTAA, DUBLIN, BARCELONA.
		H+45	F	SANTA MARIA, ATHENS, CHARLES DE GAULLE.
		H+45	A	BARAJAS, LISBON, SANTA MARIA, ORLY, CHARLES DE GAULLE, SAINT EXUPERY.
		H+50	FS	ZURICH, GENEVA/COINTRIN.
			AS	ROME/FIUMICINO, MALPENSA, ZURICH, GENEVA/COINTRIN, TURIN/CASELLE, KEFLAVIK.

C-48 METEOROLOGICAL INFORMATION

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
SIMFEROPOL (VOLMET BORYSPIL)				
128.125	H24	Continuous	AT	CHISINAU, DNIPROPETROVSK, ISTANBUL, KRYVYI RIH, MYKOLAIV, ODESA, SHEREMETYEVO, SIMFEROPOL, SOCHI.
SINGAPORE				
6676 11387	1230-2230Z 2230-1230Z	H+20 & H+50	A	SINGAPORE, KUALA LUMPUR, SUBANG, SOEKARNO-HATTA, KUCHING, BRUNEI, KOTA KINABALU, DEN PASAR, PENANG.
			F	SINGAPORE
			F*	KUALA LUMPUR
			F**	SOEKARNO-HATTA
			S	SINGAPORE * H+20 only ** H+50 only
SOFIA				
126.6	H24	Continuous	T	SOFIA, VARNA, BURGAS, PLOVDIV, BUDAPEST, BUCURESTI, BEOGRAD, THESSALONKI, ISTANBUL
STOCKHOLM				
127.6	H24	Continuous	AFT	ARLANDA, SKAVSTA, KASTRUP, LANDVETTER*, OSLO, HELSINKI, TURKU.
			AF	KUNGSANGEN, STURUP, VISBY. *Available 0500-1800Z++. **NOTE:** Information updated H+05 & H+35
SUNDSVALL*				
127.8	H24	Continuous	AFT	ARLANDA.
			AF	BROMMA, SUNDSVALL-HARNOSAND, UMEA, FROSON, ORNSKOLDSVIK, SKELLETEA, LULEA, KIRUNA.
			A	KRAMFORS.
				*The transmission is controlled from ARLANDA. **NOTE:** Information updated H-05 & H-35.
SYDNEY				
6676 11387	H24 H24	H+00 & H+30	T	SYDNEY/KINGSFORD SMITH, BRISBANE, MELBOURNE, ADELAIDE, DARWIN, TOWNSVILLE, PERTH, CAIRNS.
			F	CAIRNS.

FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
TAIWAN				
124.4	H24		AFST	TAOYUAN INTL, KAOHSIUNG
TASHKENT/YUZHNY				
125.475	H24	Continuous	AT	TASHKENT/YUZHNY, ALMATY, SAMARKAND, BUKHARA, BISHKEK, DUSHANBE, ASHGABAT, TERMEZ, URGENCH
TRENTON (MILITARY)				
15034 6754	1000-0000Z 2300-1100Z	H+10-15	AT	SHEARWATER, GREENWOOD, GANDER, HALIFAX
		H+15-20		BAGOTVILLE, TRENTON, OTTAWA, TORONTO
		H+20-25		CALGARY, COLD LAKE, WINNIPEG, EDMONTON
		H+25-30		COMOX, VICTORIA, VANCOUVER, ABBOTSFORD
TEL-AVIV				
126.8	H24	Continuous	AS	BEN GURION
TOKYO				
2863 6679	H24	H+10-15 & H+40-45	AFT	NEW TOKYO INTL (NARITA), KANSAI INTL.
8828 13282			A	TOKYO INTL (HANEDA), NEW CHITOSE, NAGOYA, FUKUOKA, SEOUL/KOREA.
TUNIS				
126.6	H24	Continuous	AST	CARTHAGE, ZARZIS, HABIB BOURGUIBA, THYNA, TABARKA 7 NOVEMBRE, NEFTA, GAFSA
WARSZAWA				
127.6	H24	Continuous	AT	OKECIE, LAWICA, LECH WALESA, SHEREMETYEVO, FERIHEGY, RUZYNE, SCHONEFELD, KASTRUP, ARLANDA.

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FACILITY/ FREQ	OPR HOURS	BROADCASTS	TYPE	AIRPORTS SERVICED
WIEN				
126.00	H24	Continuous	AFST	SCHWECHAT, BRATISLAVA, BUDAPEST, ZAGREB, MUNCHEN.
	0250-2250Z++		AFST	LINZ,* SALZBURG*, GRAZ*, KLAGENFURT*. During operational hours.
122.55	0500-1800Z++	Continuous	AFST	WR. NEUSTADT, WR. NEUSTADT/OST, VOSLAU SEMMERING/STUJLECK, NEUTENGBACH, TULLN, ST. POLTEN, KREMS, ALLENTSTEIG, HAAG, FREISTADT/ FLUGPLATZ, MARIAZELL, PYHRNPAL SCHOBERSTEIN, SCHOBERPAL, UBELBACH, KAPFENBERG, GUSSING.
122.55	0500-1800Z++	Continuous	AS	WIENER NEUSTADT, VOSLAU, NEULENGBACH, TULIN, ST. POLTEN, KREMS, ALLENSTEIG, HAAG, MARIAZELL, PYHRNPAL, SCHOBERPAL, UBELBACH, KAPFENBERG, MONICKIRCHEN, GUSSING.
YOKOTA				
18002	0001-0800Z	H+00 & H+30	A	ELMENDORF, KADENA, OSAN, YOKOTA.
13201	2100-1000Z			
11236	H24			
8967	H24			
6738	0800-2400Z			
4747	1000-2100Z			
ZAGREB				
127.8	0500-2100Z	H+10-H+15	AT	ZAGREB, LJUBLJANA, BEOGRAD, DUBROVNIK, SPLIT, RIJEKA, ZURICH, MUNCHEN, FRANKFURT MAIN, SARAJEVO.
ZURICH				
127.2	H24	Continuous	A	ZURICH, GENEVA, BALE-MULHOUSE, FRANKFURT/MAIN, MUNCHEN, STUTTGART, MALPENSA, LINATE, LUGANO.

7. NATIONAL WEATHER SERVICE - FAA WEATHER INFORMATION SERVICE

(AIM)

a. The National Weather Service (NWS) maintains an extensive surface, upper air, and radar observation program and also supports the FAA pilot weather briefing services.

b. Aviation weather forecasts are prepared by Weather Service Forecast Offices. Types of forecasts prepared are:

(1) Terminal Forecasts (FT) - prepared 3 times a day (CONUS and Caribbean) or 4 times a day (Alaska and Hawaii). FT are valid for 24 hours with the last 6 hours in categorical outlooks.

(a) Categorical outlooks describing ceiling and visibility are defined as follows:

1. LIFR (Low IFR) - Ceiling less than 500 feet and/or visibility less than 1 mile.

2. IFR - Ceiling 500 to less than 1,000 feet and/or visibility 1 to less than 3 miles.

3. MVFR (Marginal VFR) - Ceiling 1,000 to 3,000 feet and/or visibility 3 to 5 miles inclusive.

4. VFR - Ceiling greater than 3,000 feet and visibility greater than 5 miles including sky clear.

5. The cause of LIFR, IFR, or MVFR is indicated by either ceiling or visibility restrictions or both. The contraction "CIG" and/or weather and obstruction to vision symbols are used. If wind or gusts of 25 knots or greater are forecast for the outlook period, the word "WIND" is also included for all categories including VFR.

(2) Route Forecasts - prepared 3 times a day, with the morning and mid- day forecasts valid for 12 hours and the evening forecast valid for 18 hours.

(3) Area Forecasts (FA) - prepared 3 times a day (CONUS) and 4 times a day (Hawaii) and amended as required.

(4) Winds aloft forecasts - provided for CONUS, Alaska, and Hawaii.

c. Inflight weather advisories are issued only when required.

d. FAA Weather Services:

(1) Preflight weather briefings are obtained from FSS or NWS briefer and are available 24 hours a day in person, by radio, or by phone. FSS briefers are not authorized to make original forecasts, but translate and interpret available weather data for your route and destination. NWS briefers do not provide aeronautical information or accept flight plans. There are three types of preflight briefings. You should specify the type you desire along with route, destination, ETD, ETA, and type of flight, IFR or VFR.

(a) Standard briefing - request this briefing if you have not received recorded preliminary information such as TWEB.

(b) Abbreviated briefing - request this briefing if you have received recorded preliminary information, need to update a previous briefing, or need only one or two specific items.

(c) Outlook briefing - request this briefing when your ETD is 6 or more hours from the briefing time. This is for planning purposes only and a Standard or Abbreviated briefing is needed prior to departure.

(2) Available weather reports and forecasts are displayed at each FSS and Weather Service Office. Pilots should feel free to use this information or ask a specialist for assistance.

8. FAA PILOT-TO-WEATHER BRIEFER SERVICE

(AIM)

a. Direct pilot-to-weather briefer service is available by radio contact with any Flight Service Station operated by the FAA. Flight Service Specialists are qualified and certified by the NWS as Pilot Weather Briefers. They are not authorized to make original forecasts, but are authorized to translate and interpret the available forecasts and reports directly into terms of weather conditions which you can expect along your flight route and at destination. They will also assist you in selecting an alternate course of action in the event adverse weather is encountered. Combined Station/ Tower (CS/T) personnel are not certified pilot weather briefers. They can assist by providing factual data from weather reports and forecasts.

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9. FAA WEATHER BROADCASTS

(AIM)

a. TRANSCRIBED WEATHER BROADCASTS (TWEB)

(1) Meteorological and aeronautical data are recorded on tapes and broadcast continuously over selected low frequency (190-535 KHz) navigational aids and/or VORs.

(2) Generally, the broadcast contains route-oriented data with prepared National Weather Service (NWS) forecasts, inflight advisories, winds aloft, and select current information such as weather reports, NOTAMs, or special notices. At selected locations, telephone access to the TWEB has been provided (TEL- TWEB). Telephone numbers for this service are available from the FSS. TWEB services are made available for preflight and inflight planning and should not be considered a substitute for preflight weather briefings.

b. Hazardous Inflight Weather Advisory Service (HIWAS)

(1) A continuous broadcast of inflight weather advisories on VOR frequencies including summarized Severe Weather Forecast Alert (AWW), SIGMETs, Convective SIGMETs, Center Weather Advisories (CWA), AIRMETs, and PIREPs. HIWAS makes additional weather information available but is not a replacement for preflight or inflight briefings or real time weather updates from EFAS.

(2) Where HIWAS has been implemented, a HIWAS alert will be broadcast on all but emergency frequencies by ARTCC and terminal facilities and will include an alert announcement, frequency instruction, and type of advisory updated.

(3) Where HIWAS has been implemented, a HIWAS alert will be broadcast on all but emergency frequencies by FSSs and will include an alert announcement, frequency instruction, and type of advisory updated.

(4) In those areas where HIWAS has been implemented, ARTCC, Terminal, and FSS facilities have discontinued broadcast of inflight weather advisories listed and paragraph SIGMETs and AIRMETs, subparagraphs (6) and (8).

c. UNSCHEDULED BROADCASTS - These broadcasts are made by FSSs on VOR and select VHF frequencies upon receipt of special weather reports, PIREPs, NOTAMs, and other information enhancing safety of flight. These broadcasts will begin with the announcement "Aviation Broadcast" followed by data identification.

d. Select Alaskan Flight Service Stations having voice facilities on VORs or NDBs, broadcast weather reports and Notice to Airmen information at 15 minutes past each hour from reporting points within approximately 150 miles from the broadcast station.

10. ENROUTE FLIGHT ADVISORY SERVICE (EFAS)

(AIM 7-1-4)

a. EFAS is a service specifically designed to provide enroute aircraft with timely and meaningful weather advisories pertinent to the type of flight intended, route of flight, and altitude. In conjunction with this service, EFAS is also a central collection and distribution point for pilot reported weather information. EFAS is provided by specially trained specialists in selected AFSS's controlling multiple Remote Communications Outlets covering a large geographical area and is normally available throughout the conterminous U.S. and Puerto Rico from 6 a.m. to 10 p.m. EFAS provides communications capabilities for aircraft flying at 5,000 feet above ground level to 17,500 feet MSL on a common frequency of 122.0 MHz. Discrete EFAS frequencies have been established to ensure communications coverage from 18,000 through 45,000 MSL serving in each specific ARTCC area. These discrete frequencies may be used below 18,000 feet when coverage permits reliable communication.

NOTE: When an EFAS outlet is located in a time zone different from the zone in which the flight

watch control station is located, the availability of service may be plus or minus one hour from the normal operating hours.

b. Contact flight watch by using the name of the ARTCC facility identification serving the area of your location, followed by your aircraft identification, and the name of the nearest VOR to your position. The specialist needs to know this approximate location to select the most appropriate transmitter/receiver outlet for communications coverage.

EXAMPLE-
Cleveland Flight Watch, Cessna One Two Three Four Kilo, Mansfield V-O-R, over.

c. Charts depicting the location of the flight watch control stations (parent facility) and the outlets they use are contained in the A/FD. If you do not know in which flight watch area you are flying, initiate contact by using the words "Flight Watch," your aircraft identification, and the name of the nearest VOR. The facility will respond using the name of the flight watch facility.

EXAMPLE-
Flight Watch, Cessna One Two Three Four Kilo, Mansfield V-O-R, over.

d. AFSS's that provide Enroute Flight Advisory Service are listed regionally in the A/FD's.

e. EFAS is not intended to be used for filing or closing flight plans, position reporting, getting complete preflight briefings, or obtaining random weather reports and forecasts. Enroute flight advisories are tailored to the phase of flight that begins after climb-out and ends with descent to land. Immediate destination weather and terminal aerodrome forecasts will be provided on request. Pilots requesting information not within the scope of flight watch will be advised of the appropriate AFSS/FSS frequency to obtain the information. Pilot participation is essential to the success of EFAS by providing a continuous exchange of information on weather, winds, turbulence, flight visibility, icing, etc., between pilots and flight watch specialists. Pilots are encouraged to report good weather as well as bad, and to confirm expected conditions as well as unexpected to EFAS facilities.

11. INFLIGHT WEATHER ADVISORIES

(AIM 7-1-5)

a. The NWS issues inflight weather advisories designated as Severe Weather Forecasts Alerts (AWW's), Convective SIGMET's (WST's), SIGMET's (WS's), Center Weather Advisories (CWA's), and AIRMET's (WA's). Inflight advisories serve to notify enroute pilots of the possibility of encountering hazardous flying conditions which may not have been forecast at the time of the preflight briefing. Whether or not the condition described is potentially hazardous to a particular flight is for the pilot and/or aircraft dispatcher in a 14 CFR Part 121 operation to evaluate on the basis of experience and the operational limits of the aircraft. Inflight weather advisories in the contiguous U.S. are described and plotted primarily using high altitude VOR's as reference points. In Alaska and Hawaii, advisories are described and plotted using either geographic references or latitude/longitude coordinates.

b. Severe Weather Forecast Alerts (AWW's) are preliminary messages issued in order to alert users that a Severe Weather Bulletin (WW) is being issued. These messages define areas of possible severe thunderstorms or tornado activity. The messages are unscheduled and issued as required by the Aviation Weather Center at Kansas City, Missouri.

(1) Each AWW is numbered sequentially beginning January 1 of each year.

EXAMPLE-
MKC AWW 161755
WW 279 SEVERE TSTM NY PA NJ
161830Z-170000Z
AXIS..70 STATUTE MILES EITHER SIDE OF LINE..10W KMSS TO 20E KABE..AVIATION COORDS..60 NM EITHER SIDE / 60 NW KSLK - 35W KEWR..HAIL SURFACE AND ALOFT..2 INCHES. SURFACE WIND GUSTS..65 KNOTS. MAX TOPS TO 540. MEAN WIND VECTOR 19020. REPLACES WW 278..OH PA NJ

(2) Status reports are issued as needed on Severe Weather Watch Bulletins to show progress of storms and to delineate areas no longer under the threat of severe storm activity. Cancellation bulletins are issued when it becomes evident that no severe weather will develop or that storms have subsided and are no longer severe.

c. Convective SIGMETS's (WST's) in Conterminous U.S.: WST's concern only thunderstorms and related phenomena (tornadoes, heavy precipitation, hail, and high surface winds) over the conterminous U.S. and imply the associated occurrence of turbulence, icing, and convective low level wind shear. Individual WST's for each day are numbered sequentially (00-1-99), beginning at 00Z. The affected geographic area is contained in the number; i.e., the first WST issued each day in the eastern U.S. is Convective SIGMET 1E, the second is Convective SIGMET 2E, and so forth. WST's are issued on a scheduled basis, hourly at 55 minutes past the hour (H+55), and are valid for two hours or until superseded by the next hourly update. WST's are issued for any of the following phenomena:

(1) Severe thunderstorm due to:

(a) Surface winds greater than or equal to 50 knots.

(b) Hail at the surface greater than or equal to 3/4 inches in diameter.

(c) Tornadoes.

(2) Embedded thunderstorms.

(3) A line of thunderstorms.

(4) Thunderstorms greater than or equal to VIP level 4 affecting 40% or more of an area at least 3,000 square miles.

REFERENCE-
Pilot/Controller Glossary Term-Radar Weather Echo Intensity Levels.

NOTE: Since thunderstorms are the reason for issuing the WST, severe or greater turbulence, severe icing, and low-level wind shear (gust fronts, downbursts, microbursts, etc.) are implied and will not be specified in the advisory.

d. Convective SIGMET Bulletins.

(1) Three Convective SIGMET bulletins, each covering a specified geographic area, are issued. These areas are the Eastern (E), Central (C), and Western (W) U.S.. The boundaries that separate the Eastern from the Central and the Central from the Western U.S. are 87 and 107 degrees West, respectively. These bulletins are issued on a scheduled basis, hourly at 55 minutes past the hour (H+55), and as a special bulletins on an unscheduled basis.

(2) Each of the Convective SIGMET bulletins will be:

(a) Made up of one or more individually numbered Convective SIGMET's.

(b) Valid for two hours or until superseded by the next hourly issuance.

(c) The text of the bulletin consists of either an observation and a forecast or just a forecast.

(3) On an hourly basis, an outlook is made for each of the three Convective SIGMET regions. The outlook for a particular region is appended to the Convective SIGMET bulletin for the same region. The convective outlook is also appended to special Convective SIGMET's. The outlook is reviewed each hour and revised when necessary. The outlook is a forecast and meteorological discussion for thunderstorm systems that are expected to require Convective

SIGMET issuances during a time period 2-6 hours into the future. Furthermore, an outlook will always be made for each of the three regions, even if it is a negative statement.

e. SIGMET's (WS's) within the conterminous U.S. are issued by the Aviation Weather Center (AWC) when the following phenomena occur or are expected to occur:

(1) Severe or extreme turbulence or clear air turbulence (CAT) not associated with thunderstorms.

(2) Severe icing not associated with thunderstorms.

(3) Duststorms, sandstorms, or volcanic ash lowering surface or inflight visibilities to below three miles.

(4) Volcanic eruption.

f. Volcanic eruption SIGMET's are identified by an alphanumeric designator which consists of an alphabetic identifier and issuance number. The first time an advisory is issued for a phenomenon associated with a particular weather system, it will be given the next alphabetic designator in the series and will be numbered as the first for that designator. Subsequent advisories will retain the same alphabetic designator until the phenomenon ends. In the conterminous U.S., this means that a phenomenon that is assigned an alphabetic designator in one area will retain that designator as it moves within the area or into one or more other areas. Issuances for the same phenomenon will be sequentially numbered, using the same alphabetic designator until the phenomenon no longer exists. Alphabetic designators NOVEMBER through YANKEE, except SIERRA and TANGO are only used for SIGMET's, while designators SIERRA, TANGO and ZULU are used for AIRMET's.

g. Center Weather Advisories(CWA's)

(1) CWA's are unscheduled inflight, flow control, air traffic, and air crew advisory. By nature of its short lead time, the CWA is not a flight planning product. It is generally a Nowcast for conditions beginning within the next two hours. CWA's will be issued:

(a) As a supplement to an existing SIGMET, Convective SIGMET or AIRMET.

(b) When an Inflight Advisory has not been issued but observed or expected weather conditions meet SIGMET/AIRMET criteria based on current pilot reports and reinforced by other sources of information about existing meteorological conditions.

(c) When observed or developing weather conditions do not meet SIGMET, Convective SIGMET, or AIRMET criteria; e.g., in terms of intensity or area coverage, but current pilot reports or other weather information sources indicate that existing or anticipated meteorological phenomena will adversely affect the safe flow of air traffic within the ARTCC area of responsibility.

(2) The following example is a CWA issued from the Kansas City, Missouri, ARTCC. The "3" after ZKC in the first line denotes this CWA has been issued for the third weather phenomena to occur for the day. The "301" in the second line denotes the phenomena number again (3) and the issuance number (1) for this phenomena. The CWA was issued at 2140Z and is valid until 2340Z.

EXAMPLE-
ZKC3 CWA 032140
ZKC CWA 301 VALID UNTIL 032340
ISOLD SVR TSTM over KCOU MOVG SWWD 10KTS ETC.

h. AIRMET's (WA) may be of significance to any pilot or aircraft operator and are issued for all domestic airspace. They are of particular concern to operators and pilots of aircraft sensitive to the phenomena described and to pilots without instrument ratings and are issued by the AWC for the following weather phenomena which are potentially hazardous to aircraft:

(1) Moderate icing.

(2) Moderate turbulence.

(3) Sustained winds of 30 knots or more at the surface.

(4) Widespread area of ceilings less than 1,000 feet and/or visibility less than three miles.

(5) Extensive mountain obscurement.

i. AIRMET's are issued on a scheduled basis every six hours, with unscheduled amendments issued as required. AIRMET's have fixed alphanumeric designator with ZULU for icing and freezing level data, TANGO for turbulence, strong surface winds, and wind shear, and SIERRA for instrument flight rules and mountain obscuration.

12. USAF AUTOMATIC METEOROLOGICAL SYSTEM (FMQ-19)

a. The FMQ-19 is the primary surface weather observing system of the United States Air Force and operates similarly to ASOS as discussed in Paragraph 14a.

(1) System Description:

(a) The FMQ-19 consists of individual weather sensor groups normally located at the instrumented approach ends of the airfield. (CAT II and above instrumented runways in excess of 8,000 feet will also have a midfield visibility sensor for midfield Runway Visual Range readings.)

(b) Every FMQ-19 will contain the following basic set of sensors:

1. Cloud height indicator(s)

2. Visibility sensor(s)

3. Precipitation identification sensor(s)

4. Freezing rain sensor (cold climate locations)

5. Pressure sensor (three sensors for triple redundancy and cross comparison)

6. Ambient temperature/Dew point temperature sensor

7. Anemometer(s) (wind direction and speed sensor)

8. Rainfall accumulation sensor

9. Lightning Detector

(2) USAF weather personnel will augment FMQ-19 observations IAW Air Force Manual 15-111. Augmentation infers Air Force weather personnel will remain situational aware of weather conditions occurring and will enter weather information that the system can not sense (e.g., Tornados, Funnel Clouds, Waterspouts, Hail, Dust, Volcanic Ash, etc). In addition, Air Force weather personnel will augment the FMQ-19 sensors whenever they are inoperable. Augmented observations will have the Remark "AO2A" encoded in the remarks section.

(3) A FMQ-19 report without augmentation will contain only weather data capable of being reported automatically. The report modifier for an automated observation is "AUTO" and the Remark "AO2" will be encoded in the remarks section.

(AF-A30-WP/AF A30-WP FIL 08-496)

13. AUTOMATED WEATHER OBSERVATION SYSTEM (AWOS)

(AIM)

a. AWOS is a real time system consisting of various sensors, a processor, a computer generated voice subsystem, and transmitter to broadcast local minute-by-minute weather directly to the aircraft.

(1) AWOS observations derived from an automated system will include the prefix "AWOS."

(2) Some AWOS locations will be augmented by certified observers who will provide weather and obstruction to visibility information in the remarks of the report when the reported visibility is less than 3 miles. Augmentation is identified as "OBSERVER WEATHER."

(3) The reported visibility is derived from a sensor near the touchdown of the primary instrument runway. The AWOS visibility is reported as a runway visibility value and may differ from the prevailing visibility.

(4) The reported sky condition/ceiling is derived from the ceilometer located next to the visibility sensor and may differ from the Observer sky condition because the AWOS is totally dependent on clouds over the sensor site.

b. There are nine operational levels of AWOS:

AWOS-A - reports altimeter setting (any other information is advisory only).

AWOS-AV - reports altimeter setting and visibility (any other information is advisory only).

AWOS-1 - usually reports altimeter setting, wind data, temperature, dew point, and density altitude.

AWOS-2 - reports the same as AWOS-1 plus visibility.

AWOS-3 - reports the same as AWOS-2 plus cloud/ceiling data.

AWOS-3P - reports the same as AWOS-3 plus a precipitation identification sensor.

AWOS-3PT - reports the same as AWOS-3P plus thunderstorm/lightning reporting capability.

AWOS-3T - reports the same as AWOS-3 plus thunderstorm/lighting reporting capability.

AWOS-4 - reports the same as AWOS-3 plus precipitation occurance, type and accumulation, freezing rain, thunderstorm, and runway surface sensors.

NOTE: AWOS information is transmitted over a discrete radio frequency or the voice portion of a local NAVAID. The system transmits a 20 to 30 second weather message each minute. The messages are updated each minute and are receivable within 25 NM of the AWOS site, at or above 3000' AGL.

c. AWOS broadcasts phraseology generally follows that used in other weather broadcasts. Following are explanations of exceptions.

(1) The word "TEST" is added when the system is not in commissioned status.

(2) The phrase "TEMPORARILY INOPERATIVE" is added when the system is inoperative.

(3) Ceiling is announced as either "CEILING" or "INDEFINITE CEILING." All automated ceiling heights are measured ceilings except indefinite ceilings.

(4) The word "CLEAR" is not used in AWOS due to limitations in height ranges of the sensors. No clouds detected is announced as "NO CLOUDS BELOW" or "CLEAR BELOW."

(5) "SKY CONDITION MISSING" is announced only if the system level is able to report ceiling/sky condition and the data is not available. Ceiling/sky conditions are not announced if the system level is not able to report them.

(6) "VISIBILITY LESS THAN ONE QUARTER" is the lowest visibility reported. "VISIBILITY MISSING" is announced only if the system level is able to report visibility and the data is not available. Visibility is not announced if the system level is not able to report it.

(7) If remarks are included, the word "REMARKS" is announced after the altimeter setting in the following priority:

(a) Automated remarks

- Density altitude

- Variable visibility

- Variable wind direction

(b) Manual remarks (prefaced with "OBSERVER WEATHER")

- Type and intensity of precipitation

- Direction and intensity of thunderstorms

- Obstructions to visibility when 3 miles or less

14. AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS) / AUTOMATED WEATHER SENSOR SYSTEM (AWSS)

(AIM)

a. The ASOS/AWSS is the primary surface weather observing system of the United States. The program to install and operate these systems throughout the United States is a joint effort of the National Weather Service (NWS), the FAA and the Department of Defense. ASOS/AWSS is designed to support aviation operations and weather forecast activities. The ASOS/AWSS will provide continuous minute-by-minute observations and perform the basic observing functions necessary to generate an aviation routine weather report (METAR) and other aviation weather information. The information may be transmitted over a discrete VHF radio frequency or the voice portion of a local NAVAID. ASOS/AWSS transmissions on a discrete VHF radio frequency are engineered to be receivable to a maximum of 25 NM from the ASOS/AWSS site and a maximum altitude of 10,000 feet AGL. At many locations, ASOS/AWSS signals may be received on the surface of the airport, but local conditions may limit the maximum reception distance and/or altitude. While the automated system and the human may differ in their methods of data collection and interpretation, both produce an observation quite similar in form and content. For the "objective" elements such as pressure, ambient temperature, dew point temperature, wind, and precipitation accumulation, both the automated system and the observer use a fixed location and time-averaging technique. The quantitative differences between the observer and the automated observation of these elements are negligible. For the "subjective" elements, however, observers use a fixed time, spatial averaging technique to describe the visual elements (sky condition, visibility and present weather), while the automated systems use a fixed location, time averaging technique. Although this is a fundamental change, the manual and automated techniques yield remarkably similar results within the limits of their respective capabilities.

(1) System Description:

(a) The ASOS/AWSS at each airport location consists of four main components:

1. Individual weather sensors.

2. Data collection and processing units.

3. The acquisition control unit.

4. Peripherals and displays.

(b) The ASOS/AWSS sensors perform the basic function of data acquisition. They continuously sample and measure the ambient environment, derive raw sensor data and make them available to the collection and processing units.

(2) Every ASOS/AWSS will contain the following basic set of sensors:

(a) Cloud height indicator (one or possibly three).

(b) Visibility sensor (one or possibly three).

(c) Precipitation identification sensor.

(d) Freezing rain sensor (at select sites).

(e) Pressure sensors (two sensors at small airports; three sensors at large airports).

(f) Ambient temperature/Dew point temperature sensor.

(g) Anemometer (wind direction and speed sensor).

(h) Rainfall accumulation sensor.

(3) The ASOS/AWSS data outlets include:

(a) Those necessary for on-site airport users.

(b) National communications networks.

(c) Computer-generated voice (available through FAA radio broadcast to pilots, and dial-in telephone line).

(4) An ASOS/AWOS/AWSS report without human intervention will contain only that weather data capable of being reported automatically. The modifier for this METAR report is "AUTO". When an observer augments or backs-up an ASOS/AWOS/AWSS site, the "AUTO" modifier disappears.

(5) There are two types of automated stations, AO1 for automated weather reporting stations without a precipitation discriminator, and AO2 for automated stations with a precipitation discriminator. As appropriate, "AO1" and "AO2" shall appear in remarks. (A precipitation discriminator can determine the difference between liquid and frozen/freezing precipitation).

15. METAR and TAF Code

(AFFSA-XOS/AFFSA-XOS, AFPAM 11-238, FIL 16-302)

a. **Aviation Routine Weather Reports (METAR)** is the observation code used to report meteorological data. METAR was adopted internationally for worldwide use, but each country can modify the code (i.e. use meters vice miles). When METAR data is missing, it is simply omitted. Some exceptions apply in remarks such as RVRNO or SLPNO when RVR or SLP are normally reported but are not currently available.

C-60 METEOROLOGICAL INFORMATION

- Report Type: METAR is a scheduled observation taken between 55-59 minutes past the hour (a.k.a. hourly observation). **SPECI** (Special Report) is an unscheduled observation taken when certain criteria have been met and may be taken anytime.

METAR KBLV 011657Z AUTO/COR 25015G30KT 210V290 3/8SM R32L/1000FT FG BKN005 01/M01 A2984 RMK SLP034

SPECI KBLV 011715Z 25015G30KT 210V290 3SM BKN015 01/M01 A2984 RMK SLP034

Where: **KBLV,** Scott AFB (International Civil Aviation Organization (ICAO).

When: **011657Z,** first two digits (01) are the date; the last four (**1657**) are time (UTC).

Designators/Correction Modifiers: AUTO is an observation taken from an unattended Automated Surface Observation System (ASOS), Automated Weather Observing System (AWOS), or the Air Force's Automated Meteorological Station (AMS), also known as AN/FMQ-19. AO1 is an ASOS without a rain vice snow discriminator and AO2 has a discriminator. AO2A denotes an automated observation augmented by a human observer. COR indicates a corrected observation.

Wind: **25015G30KT, 250** degrees at **15** knots (**KTS**) gusting (**G**) to **30** knots

Wind Variability: **210V290**, reported when direction varies by at least 60 degrees and speeds are greater than 6 knots, with direction extremes (**210** and **290**) separated by "**V**." **VRB** is used (without direction extremes) when speed is less than or equal to 6 knots.

Visibility: **3/8SM** (**statute miles**), is the prevailing visibility. Sector visibility is reported in Remarks, if it differs from the prevailing and is less than 3 miles. Overseas locations use meters vice statute miles with 9999 (7 sm or greater) as the largest value.

Runway Visual Range (**RVR**): **R32L/1000FT**, used when prevailing visibility is one sm or less and/or the RVR for the runway is 6000 ft/1830 meters or less. **R**unway **32L** (32-Left(**C**-Center, **R**-Right)) has **1000ft** (meters overseas) visibility. **M** is RVR less than lowest reportable sensor value and **P** is greater than highest value **V** means RVR is variable. **R06L2000V4000FT** means RVR for **6 L**eft is **V**ariable between **2,000** and **4,000ft**.

Significant Weather: **FG**, is fog. See weather Table to decode.

Sky Condition: **BKN005**, is broken (**BKN**) ceiling at 500 feet (**005**) AGL. Clouds are reported in eights for coverage and hundreds of feet AGL for heights. Automated systems do not report cloud bases above 12,000 feet. **NOTE:** an asterisk (*) denote ceiling:

SKC	0 (Sky clear, NOTE: ASOS will use CLR for no clouds below 12,000 ft)
FEW	Trace-2
SCT	3-4
***BKN**	5-7
***OVC**	8
TCU	Towering Cumulus present
CB	Cumulonimbus/thunderstorm present
***VV**	Vertical Visibility (indefinite ceiling)

Temperature/Dew Point: **01/M01**, Temperature (**01**) and dewpoint (**M01**) in degrees Celsius. An "**M**" is minus or below zero.

Altimeter: **A2984, A** is the altimeter designator and **2984** is 29.84 inches of mercury (U.S.). International locations may use hectopascals or millibars.

Remarks: RMK SLP034, Remarks (**RMK**) may be encoded in plain language and will contain supplementary data. **SLP034** is sea level pressure (**SLP**) at 1003.4 millibars (**034**). Place a "10" (if the 3 digit value is 400 or less) or "9" before the group and a decimal before the last digit. **Caution:** Do not confuse METAR RMK 5xxxx (3 hr pressure tendency) or 6xxxx (6-hr precipitation amounts) with the TAF 5xxxx (turbulence) and 6xxxx (icing).

Weather Table:

Step 1: Intensity (preceding group	**Step 3: Description**	**Step 4: Precipitation**	**Step 5: Obscuration**	**Step 6: Other**
Light (-)	**MI** Shallow	**DZ** Drizzle	**FG** Fog (vsby<= 5/8 mile)	**PO** dust/sand whirls
Moderate No sign	**PR** Partial (covering only part of sky)	**RA** Rain	**BR** Mist (vsby>= 5/8 mile)	**SQ** Squalls
Heavy (+)		**SN** Snow	**FU** Smoke	**FC** Funnel cloud (S) ex. Tornado or Waterspout
+can also mean " a well developed dust/sand storm, whirl, dust devil tornado or waterspout	**BC** Patches	**SG** Snow Grains	**VA** Volcanic Ash	**SS** Sandstorm
	DR Low Drifting	**IC** Ice Crystals	**DU** Dust	**DS** Dust Storm
	BL Blowing	**PL** Ice Pellets	**SA** Sand	
	SH Showers	**GR** Hail (>5 mm or .2)	**HZ** Haze	
Step 2: Proximity	**TS** Thunderstorm	**GS** Small hail (<5 mm or .2")	**PY** Spray	
VC In the Vicinity	**FZ** Freezing	**UP** Unknown Precipitation (ASOS only)		
Examples:				
TSRA - thunderstorm, moderate rain	**-RA FG** - light rain, fog	**BLPY** - blowing spray	**VCSH** - showers in the vicinity	**FZDZ** - freezing drizzle
+SN - heavy snow	**BR HZ** - mist, haze (vis>=5/8 mi.)	**BCFG** - patchy fog	**+DRSN** - heavy snow, drifting	**BCFG** - patchy fog

REMARKS TABLE:

REMARK:	**Decode as:**
WSHFT45	**W**ind **ShiFT** at **45** minutes past the hour
FROPA	**FRO**ntal **PA**ssage
PKWND 34050/38	**Peak Wind 340** at **50** knots occurred at **38** minutes past the hour
RVRNO	**RVR NO**t reported
RABO5E30SNB20E55	**Ra**in **B**egan at **05** min past hour-**E**nded at **30** min past hour
	SNow **B**egan at **20** min. past the hour **E**nded at **55** min. past hour
TSB05E30	**T**hunder**S**torm **B**egan at **05** min. past hour and **E**nded at **30** min past hour
PRESRR/PRESFR	**PRES**sure **R**ising **R**apidly/**PRES**sure **F**alling **R**apidly
RSC	**R**unway **S**urface **C**ondition
RCR01	**R**unway **C**ondition **R**eading valued 0 to 25 - highest values are optimum
LSR	**L**oose **S**now on **R**unway
PSR	**P**acked **S**now on **R**unway
IR	**I**ce on **R**unway
RCRNR	**RCR NOT R**eported or base operations closed
OCNL	**OC**casio**N**a**L** (less than 1 flash/minute)
FRQ	**FR**e**Q**uent (about 1 to 6 flashes/minute)
CONS	**CO**nti**N**uou**S** (more than 6 flashes/minute)

C-62 METEOROLOGICAL INFORMATION

CG	**C**loud to **G**round
IC	**I**n **C**loud
CC	**C**loud to **C**loud
CB W MOV E	**C**umulonim**B**us **W**est **M**oving **E**ast
CBMAM DSNT S	**C**umulonim**B**us **MAM**matus **D**i**S**ta**NT** **S**outh
TCU OVD	**T**owering **CU**mulus **OV**erhea**D**
ACC W	**A**lto**C**umulus **C**astellanus **W**est
ACSL SW-S	**A**lto**C**umulus Standing **L**enticular **S**outh**W**est through south
CCSL OVR MT E	**C**irro**C**umulus Standing **L**enticular **OV**e**R** the **M**oun**T**ain(s) **E**ast
VIRGA DSNT NE	**Virga** (Precipitation observed but not reaching ground) **dist**a**nt** **n**ort**h**east
TWR VIS 1	**T**o**W**e**R** **VIS**ibility **1** mile (reported if greater than surface)
SFC VIS 2 1/2	**S**ur**F**a**C**e **VIS**ibility **2-1/2** miles
VIS 2 RY 11	**VIS**ibility **2** miles at **R**unwa**y** **one-one**
VIS 1V2	**VIS**ibility **V**ariable between **1** and **2** miles
VIS N2	**VIS**ibility to the **N**orth **2** miles
WR	**W**et **R**unway

Statute Miles to Meters					
STATUTE MILES	**METERS**	**STATUTE MILES**	**METERS**	**STATUTE MILES**	**METERS**
0	0000	1-1/2	2400	3	4800
1/16	0100	-	2500	-	4900
1/8	0200	1-5/8	2600	-	5000
3/16	0300	-	2700	4	6000
1/4	0400	1-3/4	2800	-	7000
5/16	0500	-	2900	5	8000
3/8	0600	1-7/8	3000	6	9000
-	0700	-	3100	7	9999
1/2	0800	2	3200	8	9999
-	0900	-	3300	9	9999
5/8	1000	-	3400	10	9999
-	1100	-	3500	11	9999
3/4	1200	2-1/4	3600	12	9999
-	1300	-	3700	13	9999
7/8	1400	-	3800	14	9999
-	1500	-	3900	15	9999
1	1600	2-1/2	4000	20	9999
-	1700	-	4100	25	9999
1-1/8	1800	-	4200		
-	1900	-	4300		
1-1/4	2000	2-3/4	4400		
-	2100	-	4500		
1-3/8	2200	-	4600		
-	2300	-	4700		

b. **Aerodrome Forecast** (**TAF**). The **TAF** is a forecast for a particular terminal covering a period of time up to 24 hours. A **TAF** contains a forecast of wind, prevailing visibility, precipitation and/or obstruction to visibility, sky coverage (eights), icing, turbulence, minimum altimeter setting and pertinent plain language remarks. If required an amended TAF (**AMD**) is issued and supersedes the previous TAF because it no longer represents the current or expected weather. Also corrected TAF (**COR**) is a TAF corrected for error and supersedes previous TAF's. Refer to the time in the last text line for the current forecast.

CIVIL TAF:

KSTL 161125Z 1612/1718 29014KT P6SM OVC035
TEMPO 1612/1616 -SN OVC025
FM161900 30014KT P6SM FEW040
FM170200 30009KT P6SM SCT150

MILITARY TAF:

KBLV051151Z 0512/0612 14005KT 8000 BR FEW030 WS010/18040KT QNH2960INS
BECMG 0513/0514 16010KT 3200 -SHRA OVC020 QNH2959INS
TEMPO 0514/0516 21015G30KT 1600 TSRA BKN008CB OVC020
BECMG 0516/0517 29008KT 3200 -RA OVC030 620304 QNH2958INS
BECMG 0518/0519 31012G22KT 9999 NSW SCT040 WSCONDS 520004 QNH2952INS
BECMG 0520/0521 30008KT 9999 SKC QNH2950INS T08/18Z TM01/11Z

Where: **KBLV,** Scott AFB and **KSTL** St. Louis (ICAOs)

Date and Valid Times: **051130Z 051212,** is the date (**05**) and the issuance time (**1130Z**) (omitted in military TAFs). Forecast is valid for **05** at **12Z** until the next day (06) at **12Z.**

Change Groups: **TEMPO 1316, FM 1600, BECMG 2224,** and **PROB40 0006**, **TEMPO 1316** is a temporary condition between **13Z** and **16Z**. **FM 1600** is "From **16Z**" indicating a rapid change in conditions. **BECMG 2224** is "becoming **22Z** to **24Z**" indicating a gradual change in conditions by the end time listed. **PROB40 0006** (civil use only) is "**40%** probability of associated weather conditions occurring between **00Z** and **06Z**."

Wind: **20013G20KT, 200** degrees (true) at **13** knots (**KT**) gusting (**G**) to **20** knots. Variable (**VRB**) winds can't be forecasted with confidence due to: thunderstorms, are less than 6 knots, or vary by more than 60 degrees (has a variance (**V**) range (i.e. **210V300**)).

Visibility: **5SM, P6SM, 8000, 9999,** is **5** statute miles (**SM**). **P6SM** means plus (**P**) six statute miles (**6SM**) or unrestricted (U.S. civil). **8000** meters (military/overseas) and **9999** is visibility greater than 9000 meters (7 sm or greater). **CAVOK** (**C**eiling **A**nd **V**isibility **OK**) is no significant weather, visibility is 10 km or greater and no ceilings below 5,000 ft.

Forecast Weather: **SHRA** is light rain showers. See Weather Table to decode. **NSW** (no significant weather) is used when the weather listed in the previous group is no longer expected to occur. **NSW** does NOT indicate the absence of clouds or hazards. Absence of any weather group indicates that no weather is expected during the forecast period.

Sky Condition: **BKN030** is a broken (**BKN**) ceiling at 3000 feet (**030**) AGL. Clouds are forecasted in eights for coverage and hundreds of feet AGL for heights. **NOTE:** an asterisk (*) denotes a ceiling:

SKC	Sky clear
FEW	Trace-2
SCT	3-4
*BKN	5-7
*OVC	8
CB	Cumulonimbus/thunderstorm
*VV	Vertical Visibility (indefinite ceiling)

Icing Conditions: 620304, is icing **(6)** light in cloud (RIME) **(2)** from 3,000 ft (**030**) to 7,000 ft **(4).** The icing group is for surface up to 10,000 ft, non-thunderstorm associated, and is prefixed with

a **6**. To decode:
1. The icing designator "6" (**6**20304).
2. Next digit is type and intensity (6**2**0304) (see table)
3. Next three digits is the base in hundreds of feet (62**030**4).
4. Last digit is the thickness in thousands of feet (620304), add to base to get layer top.

	Icing intensity
Code	**Decode**
0	Trace or none
1	Light icing (mixed)
2	Light icing in cloud (**RIME**)
3	Light icing in precipitation (clear)
4	Moderate icing (mixed)
5	Moderate icing in cloud (**RIME**)
6	Moderate icing in precipitation (clear)
7	Sever icing (mixed)
8	Severe icing in cloud (**RIME**)
9	Severe icing in precipitation (clear)

Turbulence Conditions: 520004, turbulence **(5)** is occasional turbulence in clear air **(2)** from surface (**000**) to 4,000 feet (**4**). The turbulence group is for surface up to 10,000 ft, non-thunderstorm associated, CAT II aircraft, and is prefixed with a **5**. To decode:
1. The turbulence designator is **"5"** (**5**20004).
2. Next digit is the intensity (5**2**0004) (see table).
3. Next three digits is the base in hundreds of feet (52**000**4).
4. Last digit is the thickness in thousands of feet (520004), add to base to get layer top.

	Turbulence Intensity
Code	**Decode**
0	**Trace**
1	**Light turbulence**
2	**Moderate turbulence in clear air occasional**
3	**Moderate turbulence in clear air frequent**
4	**Moderate turbulence in cloud occasional**
5	**Moderate turbulence in cloud frequent**
6	**Severe turbulence in clear air occasional**
7	**Severe turbulence in clear air frequent**
8	**Severe turbulence in cloud occasional**
9	**Severe turbulence in cloud frequent**
X	**Extreme turbulence**

Lowest Altimeter Setting: QNH2960INS (military and international), is the minimum altimeter (**QNH**) setting of **29.60** inches of mercury (**INS**). Some countries are hectopascals or millibars (**Q1016**).

Wind Shear: WS010/18040KT, is wind shear **(WS)** at 1,000 ft **(010)** AGL, **180** degrees true direction at 40 knots **(040KT)**. WS is included when non-convective low level winds (up to 2,000 ft AGL) change in speed and/or direction creating shear. **WSCONDS** is potential wind shear when not enough data is available to reliably predict exact parameters.

Temperatures: TM01/11Z 08/18Z (first or last line military TAF's), are temperatures **(T)** for TAF time period **(051212Z)**. Minimum is -1°C **(M01)** and will occur at **11Z**. Maximum is 8°C **(08)** and will occur at **18Z**.

16. AUTOMATIC TERMINAL INFORMATION SERVICE (ATIS)

(AIM)

a. ATIS frequencies are incorporated on individual FLIP Terminal Instrument Approach Procedures, Enroute Charts and aerodrome listings in the Enroute Supplement. Where this service is available, listing will be found on the COMMUNICATIONS line, e.g., (ATIS 108.5). Pilots will be

expected to listen to ATIS broadcasts where in operation to obtain essential, but routine, terminal information. The following procedures apply:

(1) ATIS broadcasts are recorded and the pilot should notify controllers that he has received the broadcast by repeating the alphabetical code word appended to the broadcast. Example: "INFORMATION ECHO RECEIVED".

(2) When the pilot acknowledges that he has received the ATIS broadcast, controllers may omit those items contained on the broadcast if they are current. Rapidly changing conditions will be issued by Air Traffic Control and the ATIS will contain words as follows: "LATEST CEILING/VISIBILITY/ALTIMETER/(OTHER CONDITIONS) WILL BE ISSUED BY APPROACH CONTROL/TOWER."

(3) The absence of a sky condition/ceiling and/or visibility on ATIS indicates a sky condition/ceiling of 5000 feet or above and visibility of 5 miles or more. A remark may be made on the broadcast, "The weather is better than 5000 and 5," or the existing weather may be broadcast.

(4) Controllers will automatically issue pertinent information to pilots who do not acknowledge receipt of the ATIS broadcast or who acknowledge receipt of a broadcast which is not current.

17. PILOT WEATHER REPORTS (PIREPs) FORMAT

(AFFSA/AFFSA LTR)

a. Pilots will immediately report hazardous weather conditions, thunderstorms/lightning, turbulence, icing and windshear to ARTCC, terminal ATC, or FSS. Also, pilots are urged to promptly volunteer reports of cloud bases, tops and layers, flight visibility, precipitation, strong winds, and any other significant flight condition information. Follow with a report to METRO to ensure rapid dissemination to other using agencies. If flight conditions delay reporting to METRO while airborne, ensure the PIREP is reported to METRO immediately after landing.

b. The following procedures are applicable when making inflight weather reports:

(1) PILOT REPORTS WILL BE MADE UNDER THE FOLLOWING CONDITIONS:

(a) Inflight when requested.

(b) When unusual and unforecast weather conditions are encountered.

(c) When weather conditions on an IFR approach differ from the latest observation.

(d) When a missed approach is executed due to weather.

(e) When a wind shear is encountered on departure or arrival. (See following report format)

(2) PIREP FORMAT:

(a) Location of phenomena (station identifier, radial/DME and route segment)

(b) Time (UTC)

(c) Altitude (MSL)

(d) Type Aircraft

(e) Sky Cover (bases, tops and amount)

(f) Flight Visibility and Weather

(g) Air Temperature

(h) Wind

(i) Turbulence (see tables below)

(j) Icing (see tables below)

(k) Remarks

(3) TURBULENCE REPORTING TABLES - REPORT THE TURBULENCE INTENSITY AND FREQUENCY -

INTENSITY	AIRCRAFT REACTION	REACTION INSIDE ACFT
LIGHT	LIGHT TURBULENCE: Turbulence that momentarily causes slight, erratic changes in altitude and/ or attitude.	Occupants may feel a slight strain against seat belts or shoulder straps. Unsecured objects may be displaced slightly. Food service may be conducted and little or no difficulty is encountered in walking.
MODERATE	MODERATE TURBULENCE: Turbulence that causes changes in altitude and/or attitude, but with the aircraft remaining in positive control at all times. It usually causes variations in indicated airspeed. or MODERATE CHOP: Turbulence that causes rapid bumps or jolts without appreciable changes in aircraft altitude or attitude.	Occupants feel definite strains against seat belts or shoulder straps. Unsecured objects are dislodged. Food service and walking are difficult.
SEVERE	SEVERE TURBULENCE: Turbulence that causes large, abrupt changes in altitude and/or attitude. It usually causes large variations in indicated airspeed. Aircraft may be momentarily out of control.	Occupants are forced violently against seat belts or shoulder straps. Unsecured objects are tossed about. Food service and walking are impossible.
EXTREME	EXTREME TURBULENCE: Turbulence in which the aircraft is violently tossed about and is practically impossible to control. It may cause structural damage.	

FREQUENCY	DEFINITION
OCCASIONAL **INTERMITTENT**	Less than 1/3 of the time 1/3 to 2/3 of the time
CONTINUOUS	More than 2/3 of the time
CLEAR AIR TURBULENCE (CAT)	
High level turbulence (normally above 15,000 feet MSL) not associated with cumuliform clouds should be reported as CAT, preceded by the appropriate intensity. The success of the CAT Forecast Program depends heavily on CAT PIREPs.	

(4) AIRFRAME ICING REPORTING TABLES - REPORT ICING INTENSITY AND TYPE

INTENSITY	ICE ACCUMULATION
TRACE	Ice becomes perceptible. Rate of accumulation slightly greater than rate of sublimation. It is not hazardous even though de- icing/ anti-icing equipment is not used, unless encountered for an extended period of time (over one hour).
LIGHT	The rate of accumulation may create a problem if flight is prolonged in this environment (over one hour). Occasional use of de-icing/anti-icing equipment removes/prevents accumulation. It does not present a problem if the de- icing/anti-icing equipment is used.
MODERATE	The rate of accumulation is such that even short encounters become potentially hazardous and use of de-icing/anti-icing equipment or diversion is necessary.
SEVERE	The rate of accumulation is such that de-icing/anti-icing equipment fails to reduce or control the hazard. Immediate diversion is necessary.
TYPE	**DEFINITION**
RIME ICE	Rough, milky, opaque ice formed by the instantaneous freezing of small super cooled water droplets.
CLEAR ICE	Glossy, clear or translucent ice formed by the relatively slow freezing of large super cooled water droplets.

(5) WIND SHEAR REPORTS - Pilots should, as soon as possible, report the following to the controlling agency with a follow-up call to Metro when time permits.

(a) If able state the loss/gain of airspeed and the altitude(s) at which it was encountered.

EXAMPLE: "Lewandowski Approach Control (call sign) encountered wind shear on final, gained 25 knots between 600 and 400 feet followed by loss of 40 knots between 400 feet and surface."

(b) If unable to report shear in specific terms, make reports in terms of the effect upon their aircraft.

EXAMPLE: "Even Tower (call sign) encountered an abrupt wind shear at 800 feet on final, max thrust required."

18. WORLD METEOROLOGICAL ORGANIZATION GROUND/AIR CODE

(AFFSA/ICAO Doc. 8896 Ed. 6, Appendix 9)

Civil Meteorological Messages transmitted to aircraft may utilize this Code in reporting the amount of individual Cloud Layer or Mass. The term "OKTA" is used, in this instance, preceded by a number 1 through 8. The relationship of this Code System to the more common use of tenths is shown in the following table:

0		0
1	OKTA or less, but not zero	1/10 or less, but not zero
2	OKTAS	2/10 - 3/10
3	OKTAS	4/10
4	OKTAS	5/10
5	OKTAS	6/10
6	OKTAS	7/10 - 8/10
7	OKTAS or more but no 8 OKTAS	9/10 or more but not 10/10

8	OKTAS	10/10
9	Sky obscured, or cloud amount cannot be estimated.	

19. NATO COLOR CODED WEATHER CONDITIONS

(RAF FIH)

COLOR	BASE OF LOWEST CLOUD LAYER OF 3/8 (SCT) OR MORE	SURFACE VISIBILITY
BLUE	2500 ft AGL	8 km (4.3 nm)
WHITE	1500 ft AGL	5 km (2.7 nm)
GREEN	700 ft AGL	3.7 km (2 nm)
YELLOW*	300 ft AGL	1.6 km (0.9 nm)
AMBER	200 ft AGL	0.8 km (0.4 nm)
RED	Below 200 ft AGL	Less than 0.8 km (0.4 nm)
BLACK	BLACK Airfield not usable for other reasons than cloud and/or visibility minima.	

BLACK, when used, will precede weather color code.

***NOTE:**
At RAF airfields under the control of HQ 1-3 and at RN airfields code yellow is sub-divided as follows:

YELLOW 1	500 ft AGL	2.5 KM (1.4 nm)
YELLOW 2	300 ft AGL	1.6 KM (0.9 nm)

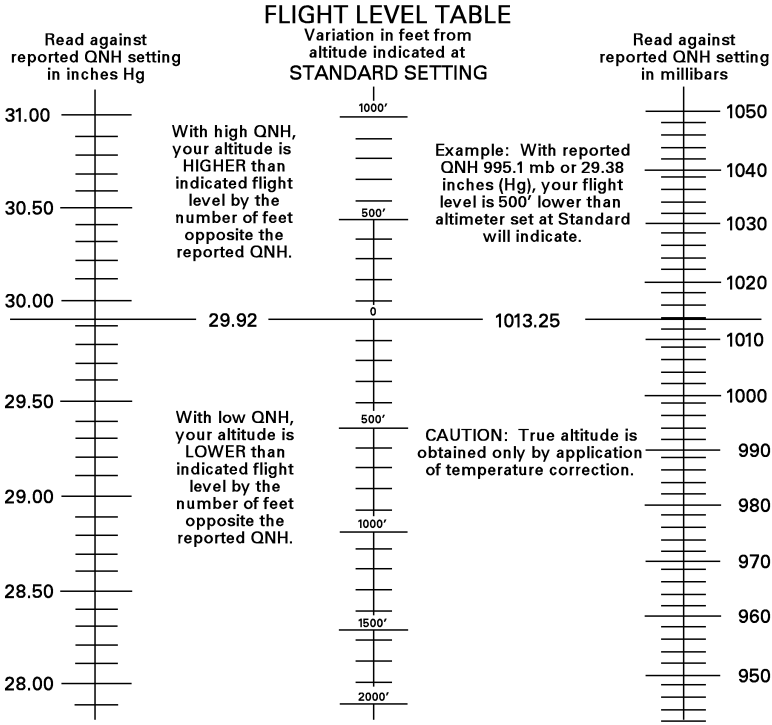
SECTION D

CONVERSION TABLES & FREQUENCY PAIRING

TABLE OF CONTENTS

D-2 CONVERSION TABLES

1. TABLES (CONVERSION)



ALTIMETER SETTING		
SETTING	AT AIRPORT	IN THE AIR
Standard 29.92 Hg - 1013.25 mb	Variable elevation reading above or below actual elevation	Positive separation by pressure level but at varying actual altitudes
QNH	Actual elevation reading when aircraft on ground	Altitude indicated (without consideration of temperature)

TEMPERATURE SCALES IN DEGREES															
°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-40	-40.0	-28	-18.4	-16	3.2	-4	24.8	8	46.4	20	68.0	32	89.6	44	111.2
-39	-38.2	-27	-16.6	-15	5.0	-3	26.6	9	48.2	21	69.8	33	91.4	45	113.0
-38	-36.4	-26	-14.8	-14	6.8	-2	28.4	10	50.0	22	71.6	34	93.2	46	114.8
-37	-34.6	-25	-13.0	-13	8.6	-1	30.2	11	51.8	23	73.4	35	95.0	47	116.6
-36	-32.8	-24	-11.2	-12	10.4	0	32.0	12	53.6	24	75.2	36	96.8	48	118.4
-35	-31.0	-23	-9.4	-11	12.2	1	33.8	13	55.4	25	77.0	37	98.6	49	120.2
-34	-29.2	-22	-7.6	-10	14.0	2	35.6	14	57.2	26	78.8	38	100.4	50	122.0
-33	-27.4	-21	-5.8	-9	15.8	3	37.4	15	59.0	27	80.6	39	102.2		
-32	-25.6	-20	-4.0	-8	17.6	4	39.2	16	60.8	28	82.4	40	104.0		
-31	-23.8	-19	-2.2	-7	19.4	5	41.0	17	62.6	29	84.2	41	105.8		
-30	-22.0	-18	-0.4	-6	21.2	6	42.8	18	64.4	30	86.0	42	107.6		
-29	-20.2	-17	1.4	-5	23.0	7	44.6	19	66.2	31	87.8	43	109.4		

ALTITUDE PRESSURE TABLE - INCHES FEET

Inches	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
28.0	1824	1814	1805	1795	1785	1776	1766	1756	1746	1737
28.1	1727	1717	1707	1698	1688	1678	1668	1659	1649	1639
28.2	1630	1620	1610	1601	1591	1581	1572	1562	1552	1542
28.3	1533	1523	1513	1504	1494	1484	1475	1465	1456	1446
28.4	1436	1427	1417	1407	1398	1388	1378	1369	1359	1350
28.5	1340	1330	1321	1311	1302	1292	1282	1273	1263	1254
28.6	1244	1234	1225	1215	1206	1196	1186	1177	1167	1158
28.7	1148	1139	1129	1120	1110	1100	1091	1081	1072	1062
28.8	1053	1043	1034	1024	1015	1005	995	986	976	967
28.9	957	948	938	929	919	910	900	891	881	872
29.0	863	853	844	834	825	815	806	796	787	777
29.1	768	758	749	739	730	721	711	702	692	683
29.2	673	664	655	645	636	626	617	607	598	589
29.3	579	570	560	551	542	532	523	514	504	495
29.4	485	476	467	457	448	439	429	420	410	401
29.5	392	382	373	364	354	345	336	326	318	308
29.6	298	289	280	270	261	252	242	233	224	215
29.7	205	196	187	177	168	159	149	140	131	122
29.8	112	103	94	85	75	66	57	47	38	29
29.9	20	10	+1	-8	-17	-26	-36	-45	-54	-63
30.0	-73	-82	-91	-100	-110	-119	-128	-137	-146	-156
30.1	-165	-174	-183	-192	-202	-211	-220	-229	-238	-248
30.2	-257	-266	-275	-284	-293	-303	-312	-321	-330	-339
30.3	-348	-358	-367	-376	-385	-394	-403	-412	-421	-431
30.4	-440	-449	-458	-467	-476	-485	-494	-504	-513	-522
30.5	-531	-540	-549	-558	-567	-576	-585	-594	-604	-613
30.6	-622	-631	-640	-649	-658	-667	-676	-685	-694	-703
30.7	-712	-721	-730	-740	-749	-758	-767	-776	-785	-794
30.8	-803	-812	-821	-830	-839	-848	-857	-866	-875	-884
30.9	-893	-902	-911	-920	-929	-938	-947	-956	-965	-974
31.0	-983	-992	-1001	-1010	-1019	-1028	-1037	-1046	-1055	-1064

D-4 CONVERSION TABLES

BAROMETRIC READINGS FROM INCHES TO HECTOPASCALS OR MILLIBARS										
Inches	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
	Hectopascals or Millibars									
28.0-	948.2	948.5	948.9	949.2	949.5	949.9	950.2	950.6	950.9	951.2
28.1-	951.6	951.9	952.3	952.6	952.9	953.3	953.6	953.9	954.3	954.6
28.2-	955.0	955.3	955.6	956.0	956.3	956.7	957.0	957.3	957.7	958.0
28.3-	958.3	958.7	959.0	959.4	959.7	960.0	960.4	960.7	961.1	961.4
28.4-	961.7	962.1	962.4	962.7	963.1	963.4	963.8	964.1	964.4	964.8
28.5-	965.1	965.5	965.8	966.1	966.5	966.8	967.2	967.5	967.8	968.2
28.6-	968.5	968.8	969.2	969.5	969.9	970.2	970.5	970.9	971.2	971.6
28.7-	971.9	972.2	972.6	972.9	973.2	973.6	973.9	974.3	974.6	974.9
28.8-	975.3	975.6	976.0	976.3	976.6	977.0	977.3	977.6	978.0	978.3
28.9-	978.7	979.0	979.3	979.7	980.0	980.4	980.7	981.0	981.4	981.7
29.0-	982.1	982.4	982.7	983.1	983.4	983.7	984.1	984.4	984.8	985.1
29.1-	985.4	985.8	986.1	986.5	986.8	987.1	987.5	987.8	988.1	988.5
29.2-	988.8	989.2	989.5	989.8	990.2	990.5	990.9	991.2	991.5	991.9
29.3-	992.2	992.5	992.9	993.2	993.6	993.9	994.2	994.6	994.9	995.3
29.4-	995.6	995.9	996.3	996.6	997.0	997.3	997.6	998.0	998.3	998.6
29.5-	999.0	999.3	999.7	1000.0	1000.3	1000.7	1001.0	1001.4	1001.7	1002.0
29.6-	1002.4	1002.7	1003.0	1003.4	1003.7	1004.1	1004.4	1004.7	1005.1	1005.4
29.7-	1005.8	1006.1	1006.4	1006.8	1007.1	1007.4	1007.8	1008.1	1008.5	1008.8
29.8-	1009.1	1009.5	1009.8	1010.2	1010.5	1010.8	1011.2	1011.5	1011.9	1012.2
29.9-	1012.5	1012.9	1013.2	1013.5	1013.9	1014.2	1014.6	1014.9	1015.2	1015.6
30.0-	1015.9	1016.3	1016.6	1016.9	1017.3	1017.6	1017.9	1018.3	1018.6	1019.9
30.1-	1019.3	1019.6	1020.0	1020.3	1020.7	1021.0	1021.3	1021.7	1022.0	1022.3
30.2-	1022.7	1023.0	1023.4	1023.7	1024.0	1024.4	1024.7	1025.1	1025.4	1025.7
30.3-	1026.1	1026.4	1026.8	1027.1	1027.4	1027.8	1028.1	1028.4	1028.8	1029.1
30.4-	1029.5	1029.8	1030.1	1030.5	1030.8	1031.2	1031.5	1031.8	1032.2	1032.5
30.5-	1032.8	1033.2	1033.5	1033.9	1034.2	1034.5	1034.9	1035.2	1035.6	1035.9
30.6-	1036.2	1036.6	1036.9	1037.2	1037.6	1037.9	1038.3	1038.6	1038.9	1039.3
30.7-	1039.6	1040.0	1040.3	1040.6	1041.0	1041.3	1041.7	1042.0	1042.3	1042.7
30.8-	1043.0	1043.3	1043.7	1044.0	1044.4	1044.7	1045.0	1045.4	1045.7	1046.1
30.9-	1046.4	1046.7	1047.1	1047.4	1047.7	1048.1	1048.4	1048.8	1049.1	1049.4

Thousandths of an inch								
Inches	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
Hectopascals or Millibars	0.03	0.07	0.10	0.14	0.17	0.20	0.24	0.27	0.30

	BAROMETRIC READINGS FROM MILLIBARS OR HECTOPASCALS TO INCHES									
Hecto-pascals or Millibars	0	1	2	3	4	5	6	7	8	9
	Inches									
940	27.76	27.79	27.82	27.85	27.88	27.91	27.94	27.96	27.99	28.02
950	28.05	28.08	28.11	28.14	28.17	28.20	28.23	28.23	28.29	28.32
960	28.35	28.38	28.41	28.44	28.47	28.50	28.53	28.56	28.59	28.61
970	28.64	28.67	28.70	28.73	28.76	28.79	28.82	28.85	28.88	28.91
980	28.94	28.97	29.00	29.03	29.06	29.09	29.12	29.15	29.18	29.21
990	29.23	29.26	29.29	29.32	29.35	29.38	29.41	29.44	29.47	29.50
1000	29.53	29.56	29.59	29.62	29.65	29.68	29.71	29.74	29.77	29.80
1010	29.83	29.85	29.88	29.91	29.94	29.97	30.00	30.03	30.06	30.09
1020	30.12	30.15	30.18	30.21	30.24	30.27	30.30	30.33	30.36	30.39
1030	30.42	30.45	30.47	30.50	30.53	30.56	30.59	30.62	30.65	30.68
1040	30.71	30.74	30.77	30.80	30.83	30.86	30.89	30.92	30.95	30.98
1050	31.01	31.04	31.07	31.10	31.12	31.15	31.18	31.21	31.24	31.27

	BAROMETRIC READINGS FROM MILLIMETERS TO INCHES									
Milli-meters	0	1	2	3	4	5	6	7	8	9
	Inches									
710	27.97	28.01	28.05	28.09	28.13	28.17	28.21	28.24	28.28	28.32
720	28.36	28.40	28.44	28.48	28.52	28.56	28.60	28.64	28.68	28.72
730	28.76	28.80	28.84	28.88	28.91	28.95	28.99	29.03	29.07	29.11
740	29.15	29.19	29.23	29.27	29.31	29.35	29.39	29.43	29.47	29.51
750	29.55	29.58	29.62	29.66	29.70	29.74	29.78	29.82	29.86	29.90
760	29.94	29.98	30.02	30.06	30.10	30.14	30.18	30.21	30.25	30.29
770	30.33	30.37	30.41	30.45	30.49	30.53	30.57	30.61	30.65	30.69
780	30.73	30.77	30.81	30.85	30.88	30.92	30.96	31.00	31.04	31.08

D-6 CONVERSION TABLES

Milli-meters	BAROMETRIC READINGS FROM MILLIMETERS TO HECTOPASCALS OR MILLIBARS									
	0	1	2	3	4	5	6	7	8	9
	Hectopascals or Millibars									
530	706.6	707.9	709.3	710.6	711.9	713.3	714.6	715.9	717.3	718.6
540	719.9	721.3	722.6	723.9	725.3	726.6	727.9	729.3	730.6	731.9
550	733.3	734.6	735.9	737.3	738.6	739.9	741.3	742.6	743.9	745.3
560	746.6	747.9	749.3	750.6	751.9	753.3	754.6	755.9	757.3	758.6
570	759.9	761.3	762.6	763.9	765.3	766.6	767.9	769.3	770.6	771.9
580	773.3	774.6	775.9	777.3	778.6	779.9	781.3	782.6	783.9	785.3
590	786.6	787.9	789.3	790.6	791.9	793.3	794.6	795.9	797.3	798.6
600	799.9	801.3	802.6	803.9	805.3	806.6	807.9	809.3	810.6	811.9
610	813.3	814.6	815.9	817.3	818.6	819.9	821.3	822.6	823.9	825.3
620	826.6	827.9	829.3	830.6	831.9	833.3	834.6	835.9	837.3	838.6
630	839.9	841.3	842.6	843.9	845.2	846.6	847.9	849.3	850.6	851.9
640	853.3	854.6	855.9	857.3	858.6	859.9	861.3	862.6	863.9	865.3
650	866.6	867.9	869.3	870.6	871.9	873.3	874.6	875.9	877.3	878.6
660	879.9	881.3	882.6	883.9	885.3	886.6	887.9	889.3	890.6	891.9
670	893.3	894.6	895.9	897.3	898.6	899.9	901.3	902.6	903.9	905.3
680	906.6	907.9	909.3	910.6	911.9	913.3	914.6	915.9	917.3	918.6
690	919.9	921.3	922.6	923.9	925.3	926.6	927.9	929.3	930.6	931.9
700	933.3	934.6	935.9	937.3	938.6	939.9	941.3	942.6	943.9	945.3
710	946.6	947.9	949.3	950.6	951.9	953.3	954.6	955.9	957.3	958.6
720	959.9	961.3	962.6	963.9	965.3	966.6	967.9	969.3	970.6	971.9
730	973.3	974.6	975.9	977.3	978.6	979.9	981.3	982.6	983.9	985.3
740	986.6	987.9	989.3	990.6	991.9	993.3	994.6	995.9	997.3	998.6
750	999.9	1001.3	1002.6	1003.9	1005.3	1006.6	1007.9	1009.3	1010.6	1011.9
760	1013.3	1014.6	1015.9	1017.2	1018.6	1019.9	1021.2	1022.6	1023.9	1025.2
770	1026.6	1027.9	1029.2	1030.6	1031.9	1033.2	1034.6	1035.9	1037.2	1038.6
780	1039.9	1041.2	1042.6	1043.9	1045.2	1046.6	1047.9	1049.2	1050.6	1051.9
790	1053.2	1054.6	1055.9	1057.2	1058.6	1059.9	1061.2	1062.6	1063.9	1065.2
800	1066.6	1067.9	1069.2	1070.6	1071.9	1073.2	1074.6	1075.9	1077.2	1078.6

DISTANCES

METERS FEET		
MTR	FT - MTR	FT
0.305	1	3.281
0.610	2	6.562
0.914	3	9.843
1.219	4	13.123
1.524	5	16.404
1.829	6	19.685
2.134	7	22.966
2.438	8	26.247
2.743	9	29.528
3.048	10	32.808
6.096	20	65.617
9.144	30	98.425
12.192	40	131.233
15.240	50	164.042
18.288	60	196.850
21.336	70	229.658
24.384	80	262.467
27.432	90	295.275
30.480	100	328.083
60.960	200	656.2
91.440	300	984.3
121.920	400	1312.3
152.400	500	1640.4
304.800	1000	3280.8
609.601	2000	6561.7
914.402	3000	9842.5
1219.202	4000	13123.2
1524.003	5000	16404.2

KILOMETERS TO		
SM	KM	NM
0.62	1	0.54
1.24	2	1.08
1.86	3	1.62
2.49	4	2.16
3.11	5	2.70
3.73	6	3.24
4.35	7	3.78
4.97	8	4.32
5.59	9	4.86
6.21	10	5.40
12.43	20	10.80
18.64	30	16.20
24.86	40	21.60
31.07	50	27.00
37.28	60	32.40
43.50	70	37.80
49.71	80	43.20
55.92	90	48.60
62.14	100	54.00
124.28	200	107.99
186.42	300	161.99
248.56	400	215.98
310.69	500	269.98
372.83	600	323.97
434.97	700	377.97
497.11	800	431.97
559.25	900	485.96
621.39	1000	539.96

STATUTE MILES TO		
KM	SM	NM
1.61	1	0.87
3.22	2	1.74
4.83	3	2.61
6.44	4	3.48
8.05	5	4.34
9.66	6	5.21
11.27	7	6.08
12.87	8	6.95
14.48	9	7.82
16.09	10	8.69
32.19	20	17.38
48.28	30	26.07
64.37	40	34.76
80.47	50	43.45
96.56	60	52.14
112.65	70	60.83
128.74	80	69.52
144.84	90	78.21
160.93	100	86.90
321.86	200	173.8
482.79	300	260.7
643.72	400	347.6
804.65	500	434.5
965.58	600	521.4
1126.5	700	608.3
1287.4	800	695.2
1448.4	900	782.1
1609.3	1000	869.0

NAUTICAL MILES TO		
KM	NM	SM
0.185	0.1	0.115
0.370	0.2	0.230
0.556	0.3	0.345
0.741	0.4	0.460
0.926	0.5	0.575
1.111	0.6	0.690
1.296	0.7	0.806
1.482	0.8	0.921
1.667	0.9	1.036
1.85	1	1.15
3.70	2	2.30
5.56	3	3.45
7.41	4	4.60
9.26	5	5.75
11.11	6	6.90
12.96	7	8.06
14.82	8	9.21
16.67	9	10.36
18.52	10	11.51
37.04	20	23.02
55.56	30	34.52
74.08	40	46.03
92.60	50	57.54
111.12	60	69.05
129.64	70	80.55
148.16	80	92.06
166.68	90	103.57

NAUTICAL MILES TO		
KM	NM	SM
185.20	100	115.08
370.40	200	230.16
555.60	300	345.23
740.80	400	460.31
926.00	500	575.39
1111.20	600	690.47
1296.40	700	805.54
1481.60	800	920.62
1666.80	900	1035.70
1852.00	1000	1150.78

DISTANCES

MILLIMETERS TO INCHES

10	2/5
20	4/5
30	1 1/5
40	1 3/5
50	2
60	2 2/5
70	2 4/5
80	3 1/10
90	3 1/2
100	3 9/10
110	4 3/10
120	4 7/10
130	5 1/10
140	5 1/2
150	5 9/10
160	6 3/10
170	6 7/10
180	7 1/10
190	7 1/2
200	7 9/10
210	8 3/10
220	8 7/10
230	9 1/10
240	9 2/5
250	9 4/5

METERS TO YARDS

100	109
200	219
300	328
400	437
500	547
600	656
700	766
800	875
900	984
1000	1094
1100	1203
1200	1312
1300	1422
1400	1531
1500	1640
1600	1750
1700	1859
1800	1969
1900	2078
2000	2187
3000	3281
4000	4374
5000	5468
6000	6562
7000	7655
8000	8749
9000	9842

YARDS TO METERS

100	91
200	183
300	274
400	366
500	457
600	549
700	640
800	732
900	823
1000	914
1100	1006
1200	1097
1300	1189
1400	1280
1500	1372
1600	1463
1700	1554
1800	1646
1900	1737
2000	1829
3000	2743
4000	3658
5000	4572
6000	5486
7000	6401
8000	7315
9000	8230

NAUTICAL MILES TO METERS

0.1	185
0.2	370
1/4	463
0.3	556
0.4	741
1/2	926
0.6	1111
0.7	1296
3/4	1389
0.8	1482
0.9	1667
1	1852
1 1/4	2315
1 1/2	2778
1 3/4	3241
2	3704
2 1/4	4167
2 1/2	4630
2 3/4	5093
3	5556
3 1/4	6019
3 1/2	6482
3 3/4	6945
4	7408
5	9260

METERS TO NAUTICAL MILES

100	0.054
500	0.270
1000	0.540
2000	1.080
3000	1.620
4000	2.160
5000	2.700
6000	3.240
7000	3.780
8000	4.320
9000	4.860
10,000	5.399

DISTANCES

METERS TO FEET

→ Meters ↓	0	100	200	300	400	500	600	700	800	900
	Feet									
0	0	328	656	984	1312	1641	1969	2297	2625	2953
1000	3281	3609	3937	4265	4593	4922	5250	5578	5906	6234
2000	6562	6890	7218	7546	7874	8203	8531	8859	9187	9515
3000	9843	10171	10499	10827	11155	11484	11812	12140	12468	12796
4000	13124	13452	13780	14108	14436	14765	15093	15421	15749	16077
5000	16405	16733	17061	17389	17717	18046	18374	18702	19030	19358
6000	19686	20014	20342	20670	20998	21327	21655	21983	22311	22639
7000	22967	23295	23623	23951	24279	24608	24936	25264	25592	25920
8000	26248	26576	26904	27232	27560	27889	28217	28545	28873	29201
9000	29529	29857	30185	30513	30841	31170	31498	31826	32154	32482
10000	32810	33138	33466	33794	34122	34451	34779	35107	35435	35763
11000	36091	36419	36747	37075	37403	37732	38060	38388	38716	39044
12000	39372	39700	40028	40356	40684	41013	41341	41669	41997	42325
13000	42653	42981	43309	43637	43965	44294	44622	44950	45278	45606
14000	45934	46262	46590	46918	47246	47575	47903	48231	48559	48887
15000	49215	49543	49871	50199	50527	50856	51184	51512	51840	52168
16000	52496	52824	53152	53480	53808	54137	54465	54793	55121	55449

METERS PER SECOND TO NAUTICAL MILES PER HOUR (KNOTS)

Meters per Second	Nautical Miles per Hour (Knots)
65	127
70	137
75	146
80	156
85	166
90	175
95	185
100	195
105	205
110	214
115	224
120	234
125	243
130	253
135	263
140	273
145	282
150	292
155	302

D-10 CONVERSION TABLES

LIQUIDS					
U.S. GALS.	LTRS	IMP. GALS	U.S. GALS	IMP/U.S. GALS	IMP. GALS
0.264	1	0.220	1.201	1	0.833
0.528	2	0.440	2.402	2	1.665
0.792	3	0.660	3.603	3	2.498
1.057	4	0.880	4.803	4	3.331
1.321	5	1.100	6.004	5	4.164
1.585	6	1.320	7.205	6	4.996
1.849	7	1.540	8.406	7	5.829
2.113	8	1.760	9.607	8	6.662
2.377	9	1.980	10.808	9	7.495
2.642	10	2.200	12.009	10	8.327
5.283	20	4.399	24.017	20	16.655
7.925	30	6.599	36.026	30	24.982
10.566	40	8.799	48.035	40	3.309
13.208	50	10.999	60.043	50	41.636
15.849	60	13.198	72.052	60	49.964
18.491	70	15.398	84.061	70	58.291
21.132	80	17.598	96.070	80	66.618
23.774	90	19.797	108.078	90	74.946
26.416	100	21.997	120.087	100	83.273

U.S. GALLONS*			LITERS*		
TO LBS. AVIATION FUEL		TO LBS. TURBINE FUEL	TO KGS. AVIATION FUEL		TO KGS. TURBINE FUEL
6	1	6.7	0.7	1	0.8
60	10	66.8	7.2	10	8.0
120	20	133.5	14.4	20	16.0
180	30	200.3	21.6	30	24.0
240	40	267.0	28.8	40	32.0
300	50	333.8	35.9	50	40.0
360	60	400.6	43.1	60	48.0
420	70	467.3	50.3	70	56.0
480	80	534.1	57.5	80	64.0
540	90	600.9	64.7	90	72.0
600	100	667.6	71.9	100	80.0
1200	200	1335.0	143.8	200	160.0
1800	300	2003.0	215.7	300	240.0
2400	400	2670.0	287.6	400	320.0
3000	500	3338.0	359.4	500	400.0
3600	600	4006.0	431.3	600	480.0
4200	700	4673.0	503.2	700	560.0
4800	800	5341.0	575.1	800	640.0
5400	900	6009.0	647.0	900	720.0
6000	1000	6676.0	718.9	1000	800.0
12000	2000	13352.0	1438.0	2000	1600.0
18000	3000	20028.0	2157.0	3000	2400.0
24000	4000	26705.0	2876.0	4000	3200.0
30000	5000	33382.0	3595.0	5000	4000.0
60000	10000	66763.0	7189.0	10000	8000.0

***NOTE:** These figures are approximate only, as temperature or octane will change volume/weight ratio.

WEIGHTS		
KGS.	LBS./KGS.	LBS.
0.454	1	2.205
0.907	2	4.409
1.361	3	6.614
1.814	4	8.818
2.268	5	11.023
2.722	6	13.228
3.175	7	15.432
3.629	8	17.637
4.082	9	19.842
4.536	10	22.046
9.072	20	44.092
13.608	30	66.139
18.144	40	88.185
22.68	50	110.23
27.216	60	132.28
31.751	70	154.32
36.287	80	176.37
40.823	90	198.42
45.359	100	220.46

OIL			
LITERS to	KGS. OIL	U.S. GALS to	LBS.OIL
1	0.9	1	7.5
2	1.8	2	15.0
3	2.7	3	22.5
4	3.6	4	30.0
5	4.5	5	37.5
6	5.4	6	45.0
7	6.3	7	52.5
8	7.2	8	60.0
9	8.1	9	67.5
10	9.0	10	75.0
20	18.0	20	150.0
30	27.0	30	225.0
40	36.0	40	300.0
50	45.0	50	375.0
60	54.0	60	450.0
70	63.0	70	525.0
80	72.0	80	600.0
90	81.0	90	675.0
100	90.0	100	750.0

D-12 CONVERSION TABLES

PSI/DYNE CONVERSION TABLE

PRESSURE READING FROM PSI TO NEWTON/M^2 AND DYNES/CM^2
TO OBTAIN:

NEWTON/M^2 = CF x 10^4 OR DYNES/CM^2 = CF x 10^5

PSI	CF
1	.6895
5	3.4475
10	6.895
15	10.3425
20	13.79
25	17.2375
30	20.685
35	24.1325
40	27.58
45	31.0275
50	34.475
55	37.9225
60	41.37
65	44.8175
70	48.265
75	51.7125
80	55.16
85	58.6075
90	62.055
95	65.5025
100	68.95

EXAMPLE

20 PSI = 13.79x10^4 NT/M^2

= 13.79x10^5 DYNES/CM^2

OR

25x10^5 DYNES/CM^2 = 36.25 PSI

OR

37x10^4 NT/M^2 = 53.66 PSI

OR

250 PSI = 172.375x10^5 DYNES/CM^2

FORMULA

PSI x 6895 = NT/M^2 x 10 = DYNES/CM^2

CF = Conversion Factor

2. STANDARD NAMING CONVENTION FOR AIRCRAFT LANDING GEAR CONFIGURATION

(SF/FAA ORDER 5300.7)

OLD	CURRENT	NEW DESCRIPTION
S	S	Single wheel type ldg gear (DC3, C47, F15), etc
D*	D	Dual wheel type ldg gear (B737, BE1900), etc
T	D	Dual wheel type ldg gear (P3, C9)
ST	2S	Two single wheels in tandem type ldg gear (C130)
TRT	2T	Two triple wheels in tandem type ldg gear (C17), etc
DT*	2D	Two dual wheels in tandem type ldg gear (707), etc
TT	2D	Two dual wheels in tandem type ldg gear (B757, KC135)
SBTT	2D/D1	Two dual wheels in tandem/dual wheel body gear type ldg gear (KC10)
none	2D/2D1	Two dual wheels in tandem/two dual wheels in tandem body gear type ldg gear (A340-600)
DDT	2D/2D2	Two dual wheels in tandem/two dual wheels in double tandem body gear type ldg gear (747, E4)
TTT*	3D	Three dual wheels in tandem type ldg gear (777), etc
TT	D2	Dual wheel gear two struts per side main gear type ldg gear (B52)
TDT	C5	Complex dual wheel and quadruple wheel combination ldg gear (C5)
*FAA only		

3. AIRCRAFT CLASSIFICATION NUMBERS - DoD AIRCRAFT

(AFFSA/USAF FIL 16-200)

The aircraft and Pavement Classification Number (ACN/PCN) System is fully explained in the Airport/Facility Directory Legend of each Enroute Supplement. The table below gives the ACN values for DoD aircraft at the aircraft empty weight and maximum takeoff weight. An ACN value for an intermediate weight can be calculated by interpolation between the limits.

An interactive ACN/PCN calculator for many DoD aircraft can be accessed at:
https://transportation.wes.army.mil/acnpcn/

AIRCRAFT CLASSIFICATION NUMBERS

AIRCRAFT TYPE	WEIGHT EMPTY MAX T/O (1000 LBS)	TIRE PRESSURE PSI	RIGID PAVEMENT SUBGRADES				FLEXIBLE PAVEMENT SUBGRADES			
			HIGH	MED	LOW	ULTRA LOW	HIGH	MED	LOW	ULTRA LOW
A-10	20 50	185	8 20	8 20	8 20	8 20	8 20	8 20	8 20	8 20
B-1B	189 477	220	20 67	22 80	26 93	30 103	21 69	22 79	25 98	33 117
B-2A	110 336.5	215	12 52	11 44	13 61	15 67	11 45	12 50	13 62	16 78
B-52	230 480	305	36 95	40 108	45 119	50 127	30 76	31 82	35 92	42 110
C-5A/B	375 837	130	13 30	14 36	16 37	20 58	14 36	15 41	17 50	23 69
C-9	22 108	148	4 27	5 29	5 31	5 31	4 25	4 26	4 30	5 33

D-14 CONVERSION TABLES

AIRCRAFT TYPE	WEIGHT EMPTY MAX T/O (1000 LBS)	TIRE PRESSURE PSI	RIGID PAVEMENT SUBGRADES				FLEXIBLE PAVEMENT SUBGRADES			
			HIGH	MED	LOW	ULTRA LOW	HIGH	MED	LOW	ULTRA LOW
C-12	10 17	95	2 4	2 4	2 4	3 5	1 3	2 4	2 4	2 5
C-12J	11 16.6	95	2 4	3 4	3 4	3 5	2 3	2 4	2 4	3 5
C-17	279 585	144	20 51	23 49	21 53	23 66	15 40	16 44	18 53	24 69
C-20A,B	42 70	175	12 22	13 23	13 23	13 24	10 19	11 21	12 22	13 23
C-20H	44 75	175	13 24	13 25	13 26	14 26	11 21	12 22	13 23	15 24
C-21	10.7 18.3	160	2 4	2 5	2 5	2 5	2 4	2 4	2 5	2 5
C-23	17.4 24.6	79	6 8	6 8	6 8	6 8	6 9	6 9	6 9	6 9
C-32	138 255	190	15 31	17 37	20 43	23 49	15 32	17 36	19 44	25 57
C-37A	49 90.5	198	15 31	15 32	16 32	16 33	11 24	12 26	14 28	15 29
C-40A,B,C	100 171.5	204	25 47	26 49	28 52	29 54	22 41	23 43	24 48	28 53
C-130 E,H,AMP	85 175	70 123	12 36	14 38	15 42	17 44	9 27	12 33	15 37	18 43
C-130J Short/Long	85 155/164	70 118	16/16 30/32	17/17 33/34	18/18 35/36	20/20 38/38	14/14 27/27	16/16 30/31	17/17 33/34	19/19 38/39
AC-130	110 175	76 123	18 34	20 37	22 41	24 43	15 30	17 34	21 37	25 43
EC-130	105 175	75 123	17 36	19 39	21 42	23 45	13 28	16 33	20 37	23 44
HC-130	84 175	70 123	13 34	14 37	15 41	17 43	8 30	12 34	15 37	18 43
C-135	142 302	155	11 34	12 41	14 50	17 56	10 34	13 41	16 49	20 56
E-3	158.7 325	195	15 36	16 43	19 52	22 59	16 40	17 45	20 55	26 70
E-4	488 798	200	23 44	27 53	32 63	37 72	27 50	29 55	33 67	44 88
E-6	180 342	195	20 46	22 53	26 62	30 71	21 47	23 53	25 64	33 80
F-4	32 58	265	11 26	12 26	12 25	12 25	13 27	13 26	13 26	13 25
F-15A, B	42 54	290	17 24	17 24	17 23	17 23	18 24	17 23	17 22	17 22
F-15C/D	28.2 68	355	13 32	13 32	13 32	13 32	12 28	12 28	12 28	12 28
F-15E	31.7 81	320	14 37	14 37	14 37	14 37	13 33	13 33	13 33	13 33
F-16A, B	17 35	275	6 15	6 15	6 15	6 15	6 14	6 14	6 14	6 13

AIRCRAFT TYPE	WEIGHT EMPTY MAX T/O (1000 LBS)	TIRE PRESSURE PSI	RIGID PAVEMENT SUBGRADES				FLEXIBLE PAVEMENT SUBGRADES			
			HIGH	MED	LOW	ULTRA LOW	HIGH	MED	LOW	ULTRA LOW
F-16C/D	16.9 37.5	310	8 18	8 18	8 18	8 18	7 16	7 16	7 16	7 16
KC-10	270.8 590	190	19 45	20 55	23 67	27 77	22 56	23 62	25 74	32 101
KC-135E	140 300	170	15 33	16 39	18 47	20 54	14 37	16 41	18 49	23 64
KC-135R	160 322	170	12 36	13 43	17 52	25 60	18 41	19 45	22 55	28 71
P-3A/B/C	61 140	180	16 44	17 46	18 48	19 49	14 38	14 41	16 44	18 47
T-43	60.5 128	148	14 33	15 36	16 37	16 39	13 30	13 31	14 35	16 39
VC-25 B747-200	445 836	190 +0/-5	16* 46*	23 55	20* 66*	24* 76*	18* 52*	26 58	21* 71*	27* 92*

4. TEMPERATURE ERRORS

(AFFSA-A3OF/AFFSA-A3OF FIL 16-140)

a. Pressure altimeters are calibrated to indicate true altitudes under International Standard Atmospheric (ISA) conditions. Any deviation from these standard conditions will result in an erroneous reading on the altimeter. This error becomes important when considering obstacle clearances in temperatures lower than standard since the aircraft's altitude is below the figure indicated by the altimeter.

b. The error is proportional to the difference between actual and ISA temperature and the height of the aircraft above the altimeter setting source. Height above altimeter source is considered to be published HAT or HAA for the approach. The amount of error is approximately 4 feet per thousand feet for each degree Celsius of difference.

c. Corrections should be made to all altitude inside the FAF to include Decision Heights (DHs), Decision Altitude (DAs), Minimum Descent Altitude (MDAs) as well as any step down fix altitudes. See service regulations for corrections to the FAF altitude and other altitudes outside the FAF.

d. Temperature values are those at the altimeter setting source (normally the aerodrome unless using remote altimeter settings).

TEMPERATURE CORRECTION CHART
Height Above Altimeter Setting

Reported Temp °C	200	300	400	500	600	700	800	900	1000	1300	1500	1800	2000	2300	3000	4000	5000
0	20	20	30	30	40	40	50	50	60	80	90	100	120	130	170	230	280
-5	20	30	30	40	50	60	60	70	80	100	120	140	160	180	230	310	390
-10	20	30	40	50	60	70	80	90	100	130	150	180	200	230	290	390	490
-15	30	40	50	60	70	90	100	110	120	160	180	220	240	270	360	480	600
-20	30	50	60	70	90	100	120	130	140	190	210	260	280	330	420	570	710
-25	40	50	70	90	100	120	130	150	170	220	250	300	330	380	490	660	830
-30	40	60	80	100	120	140	150	170	190	250	280	340	380	430	570	760	950
-35	50	70	90	110	130	150	170	190	220	280	320	390	430	490	640	860	1080
-40	50	80	100	120	150	170	190	220	240	310	360	430	480	550	720	970	1210
-45	60	80	110	140	160	190	220	240	270	350	400	480	540	620	800	1080	1350
-50	60	90	120	150	180	210	240	270	300	390	450	530	590	680	890	1190	1500

D-16 CONVERSION TABLES

HAT/HAA

EXAMPLE: TACAN RWY 35 - GRAND FORKS AFB, TEMP -25°C. (CAT "D")

NOTE: Must round interpolated values to nearest 10 feet.

	ALTITUDE	HAT/HAA	CORRECTION	CORRECTED ALTITUDE
MDA STR IN	1300′ MSL	389′	+70′	1370′ MSL
CIRCLING MDA	1480′ MSL	569′	+100′	1580′ MSL

5. FREQUENCY PAIRING PLAN

The following is a list of VHF/UHF NAVAID FREQUENCY CHANNELING AND PAIRING:

							DME AIRBORNE INTERROGATE			DME GND REPLY	
							PULSE CODE				
DME	---------- FREQUENCY ----------				MLS		NORMAL	P/DME			
CHN NO.	LOC	GS	VHF/ VOR	MLS	CHN NO.	FREQ	DME US	IA US	FA US	DME FREQ	PC US
1X	-	-	134.40	-	-	1025	12	--	--	962	12
1Y	-	-	134.45	-	-	1025	36	--	--	1088	30
2X	-	-	134.50	-	-	1026	12	--	--	963	12
2Y	-	-	134.55	-	-	1026	36	--	--	1089	30
3X	-	-	134.60	-	-	1027	12	--	--	964	12
3Y	-	-	134.65	-	-	1027	36	--	--	1090	30
4X	-	-	134.70	-	-	1028	12	--	--	965	12
4Y	-	-	134.75	-	-	1028	36	--	--	1091	30
5X	-	-	134.80	-	-	1029	12	--	--	966	12
5Y	-	-	134.85	-	-	1029	36	-	-	1092	30
6X	-	-	134.90	-	-	1030	12	-	-	967	12
6Y	-	-	134.95	-	-	1030	36	-	-	1093	30
7X	-	-	135.00	-	-	1031	12	-	-	968	12
7Y	-	-	135.05	-	-	1031	36	-	-	1094	30
8X	-	-	135.10	-	-	1032	12	-	-	969	12
8Y	-	-	135.15	-	-	1032	36	-	-	1095	30
9X	-	-	135.20	-	-	1033	12	-	-	970	12
9Y	-	-	135.25	-	-	1033	36	-	-	1096	30
10X	-	-	135.30	-	-	1034	12	-	-	971	12
10Y	-	-	135.35	-	-	1034	36	-	-	1097	30
11X	-	-	135.40	-	-	1035	12	-	-	972	12
11Y	-	-	135.45	-	-	1035	36	-	-	1098	30
12X	-	-	135.50	-	-	1036	12	-	-	973	12
12Y	-	-	135.55	-	-	1036	36	-	-	1099	30
13X	-	-	135.60	-	-	1037	12	-	-	974	12
13Y	-	-	135.65	-	-	1037	36	-	-	1100	30
14X	-	-	135.70	-	-	1038	12	-	-	975	12
14Y	-	-	135.75	-	-	1038	36	-	-	1101	30
15X	-	-	135.80	-	-	1039	12	-	-	976	12
15Y	-	-	135.85	-	-	1039	36	-	-	1102	30
16X	-	-	135.90	-	-	1040	12	-	-	977	12
16Y	-	-	135.95	-	-	1040	36	-	-	1103	30

							DME AIRBORNE INTERROGATE			DME GND REPLY	
							PULSE CODE				
DME	---------- FREQUENCY ----------			MLS			NORMAL	P/DME			
CHN NO.	LOC	GS	VHF/ VOR	MLS	CHN NO.	FREQ	DME US	IA US	FA US	DME FREQ	PC US
17X	-	-	108.00	-	-	1041	12	-	-	978	12
17Y	-	-	108.05	5043.0	540	1041	36	36	42	1104	30
18X	108.10	334.70	108.10	5031.0	500	1042	12	12	18	979	12
18Y	108.15	334.55	108.15	5043.6	542	1042	36	36	42	1105	30
19X	-	-	108.20	-	-	1043	12	-	-	980	12
19Y	108.25	-	108.25	5044.2	544	1043	36	36	42	1106	30
20X	108.30	334.10	108.30	5031.6	502	1044	12	12	18	981	12
20Y	108.35	333.95	108.35	5044.8	546	1044	36	36	42	1107	30
21X	-	-	108.40	-	-	1045	12	-	-	982	12
21Y	-	-	108.45	5045.4	548	1045	36	36	42	1108	30
22X	108.50	329.90	108.50	5032.2	504	1046	12	12	18	983	12
22Y	108.55	329.75	108.55	5046.0	550	1046	36	36	42	1109	30
23X	-	-	108.60	-	-	1047	12	-	-	984	12
23Y	-	-	108.65	5046.6	552	1047	36	36	42	1110	30
24X	108.70	330.50	108.70	5032.8	506	1048	12	12	18	985	12
24Y	108.75	330.35	108.75	5047.2	554	1048	36	36	42	1111	30
25X	-	-	108.80	-	-	1049	12	-	-	986	12
25Y	-	-	108.85	5047.8	556	1049	36	36	42	1112	30
26X	108.90	329.30	108.90	5033.4	508	1050	12	12	18	987	12
26Y	108.95	329.15	108.95	5048.4	558	1050	36	36	42	1113	30
27X	-	-	109.00	-	-	1051	12	-	-	988	12
27Y	-	-	109.05	5049.0	560	1051	36	36	42	1114	30
28X	109.10	331.40	109.10	5034.0	510	1052	12	12	18	989	30
28Y	109.15	331.25	109.15	5049.6	562	1052	36	36	42	1115	30
29X	-	-	109.20	-	-	1053	12	-	-	990	12
29Y	-	-	109.25	5050.2	564	1053	36	36	42	1116	30
30X	109.30	332.00	109.30	5034.6	512	1054	12	12	18	991	12
30Y	109.35	331.85	109.35	5050.8	566	1054	36	36	42	1117	30
31X	-	-	109.40	-	-	1055	12	-	-	992	12
31Y	-	-	109.45	5051.4	568	1055	36	36	42	1118	30
32X	109.50	332.60	109.50	5035.2	514	1056	12	12	18	993	12
32Y	109.55	332.45	109.55	5052.0	570	1056	36	36	42	1119	30
33X	-	-	109.60	-	-	1057	12	-	-	994	12
33Y	-	-	109.65	5052.6	572	1057	36	36	42	1120	30
34X	109.70	333.20	109.70	5035.8	516	1058	12	12	18	995	12
34Y	109.75	333.05	109.75	5035.2	574	1058	36	36	42	1121	30
35X	-	-	109.80	-	-	1059	12	-	-	996	12
35Y	-	-	109.85	5053.8	576	1059	36	36	42	1122	30
36X	109.90	333.80	109.90	5036.4	518	1060	12	12	18	997	12
36Y	109.95	333.65	109.95	5054.4	578	1060	36	36	42	1123	30
37X	-	-	110.00	-	-	1061	12	-	-	998	12
37Y	-	-	110.05	5055.0	580	1061	36	36	42	1124	30
38X	110.10	334.40	110.10	5037.0	520	1062	12	12	18	999	12
38Y	110.15	334.25	110.15								
39X			110.20	-	-	1063	12	-	-	1000	12

D-18 CONVERSION TABLES

							DME AIRBORNE INTERROGATE			DME GND REPLY	
							PULSE CODE				
DME	---------- FREQUENCY ----------			MLS			NORMAL	P/DME			
CHN NO.	LOC	GS	VHF/ VOR	MLS	CHN NO.	FREQ	DME US	IA US	FA US	DME FREQ	PC US
39Y	-	-	110.25	5056.2	584	1063	36	36	42	1126	30
40X	110.30	335.00	110.30	5037.6	522	1064	12	12	18	1001	12
40Y	110.35	334.85	110.35	5056.8	586	1064	36	36	42	1127	30
41X	-	-	110.40	-	-	1065	12	-	-	1002	12
41Y	-	-	110.45	5057.4	588	1065	36	36	42	1128	30
42X	110.50	329.60	110.50	5038.2	524	1066	12	12	18	1003	12
42Y	110.55	329.45	110.55	5058.0	590	1066	36	36	42	1129	30
43X	-	-	110.60	-	-	1067	12	-	-	1004	12
43Y	-	-	110.65	5058.6	592	1067	36	36	42	1130	30
44X	110.70	330.20	110.70	5038.8	526	1068	12	12	18	1005	12
44Y	110.75	330.05	110.75	5059.2	594	1068	36	36	42	1131	30
45X	-	-	110.80	-	-	1069	12	-	-	1006	12
45Y	-	-	110.85	5059.8	596	1069	36	36	42	1132	30
46X	110.90	330.80	110.90	5039.4	528	1070	12	12	18	1007	12
46Y	110.95	330.65	110.95	5060.4	598	1070	36	36	42	1133	30
47X	-	-	111.00	-	-	1071	12	-	-	1008	12
47Y	-	-	111.05	5061.0	600	1071	36	36	42	1134	30
48X	111.10	331.70	111.10	5040.0	530	1072	12	12	18	1009	12
48Y	111.15	331.55	111.15	5061.6	602	1072	36	36	42	1135	30
49X	-	-	111.20	-	-	1073	12	-	-	1010	12
49Y	-	-	111.25	6062.2	604	1073	36	36	42	1136	30
50X	111.30	332.30	111.30	5040.6	532	1074	12	12	18	1011	12
50Y	111.35	332.15	111.35	5062.8	606	1074	36	36	42	1137	30
51X	-	-	111.40	-	-	1075	12	-	-	1012	12
51Y	-	-	111.45	5063.4	608	1075	36	36	42	1136	30
52X	111.50	332.90	111.50	5041.2	534	1076	12	12	18	1013	12
52Y	111.55	332.75	111.55	5064.0	610	1076	36	36	42	1139	30
53X	-	-	111.60	-	-	1077	12	-	-	1014	12
53Y	-	-	111.65	5064.4	612	1077	36	36	42	1140	30
54X	111.70	333.50	111.70	5041.8	536	1078	12	12	18	1015	12
54Y	111.75	333.35	111.75	5065.2	614	1078	36	36	42	1141	30
55X	-	-	111.80	-	-	1079	12	-	-	1016	12
55Y	-	-	111.85	5065.8	616	1079	36	36	42	1142	30
56X	111.90	331.10	111.90	5042.4	538	1080	12	12	18	1017	12
56Y	111.95	330.95	111.95	5066.4	618	1080	36	36	42	1143	30
57X	-	-	112.00	-	-	1081	12	-	-	1018	12
57Y	-	-	112.05	-	-	1081	36	-	-	1144	30
58X	-	-	112.10	-	-	1082	12	-	-	1019	12
58Y	-	-	112.15	-	-	1082	36	-	-	1145	30
59X	-	-	112.20	-	-	1083	12	-	-	1020	12
59Y	-	-	112.25	-	-	1083	36	-	-	1146	30
60X	-	-	133.30	-	-	1084	12	-	-	1021	12
60Y	-	-	133.35	-	-	1084	36	-	-	1147	30
61X	-	-	133.40	-	-	1085	12	-	-	1022	12
61Y	-	-	133.45	-	-	1085	36	-	-	1148	30

							DME AIRBORNE INTERROGATE			DME GND REPLY	
							PULSE CODE				
DME	---------- FREQUENCY ----------				MLS		NORMAL	P/DME			
CHN NO.	LOC	GS	VHF/ VOR	MLS	CHN NO.	FREQ	DME US	IA US	FA US	DME FREQ	PC US
62X	-	-	133.50	-	-	1086	12	-	-	1023	12
62Y	-	-	133.55	-	-	1086	36	-	-	1149	30
63X	-	-	133.60	-	-	1087	12	-	-	1024	12
63Y	-	-	133.65	-	-	1087	36	-	-	1150	30
64X	-	-	133.70	-	-	1088	12	-	-	1151	12
64Y	-	-	133.75	-	-	1088	36	-	-	1025	30
65X	-	-	133.80	-	-	1089	12	-	-	1152	12
65Y	-	-	133.85	-	-	1089	36	-	-	1026	30
66X	-	-	133.90	-	-	1090	12	-	-	1153	12
66Y	-	-	133.95	-	-	1090	36	-	-	1027	30
67X	-	-	134.00	-	-	1091	12	-	-	1154	12
67Y	-	-	134.05	-	-	1091	36	-	-	1028	30
68X	-	-	134.10	-	-	1092	12	-	-	1155	12
68Y	-	-	134.15	-	-	1092	36	-	-	1029	30
69X	-	-	134.20	-	-	1093	12	-	-	1156	12
69Y	-	-	134.25	-	-	1093	36	-	-	1030	30
70X	-	-	112.30	-	-	1094	12	-	-	1157	12
70Y	-	-	112.35	-	-	1094	36	-	-	1031	30
71X	-	-	112.40	-	-	1095	12	-	-	1158	12
71Y	-	-	112.45	-	-	1095	36	-	-	1032	30
72X	-	-	112.50	-	-	1096	12	-	-	1159	12
72Y	-	-	112.55	-	-	1096	36	-	-	1033	30
73X	-	-	112.60	-	-	1097	12	-	-	1160	12
73Y	-	-	112.65	-	-	1097	36	-	-	1034	30
74X	-	-	112.70	-	-	1098	12	-	-	1161	12
74Y	-	-	112.75	-	-	1098	36	-	-	1035	30
75X	-	-	112.80	-	-	1099	12	-	-	1162	12
75Y	-	-	112.85	-	-	1099	36	-	-	1036	30
76X	-	-	112.90	-	-	1100	12	-	-	1163	12
76Y	-	-	112.95	-	-	1100	36	-	-	1037	30
77X	-	-	113.00	-	-	1101	12	-	-	1164	12
77Y	-	-	113.05	-	-	1101	36	-	-	1038	30
78X	-	-	113.10	-	-	1102	12	-	-	1165	12
78Y	-	-	113.15	-	-	1102	36	-	-	1039	30
79X	-	-	113.20	-	-	1103	12	-	-	1166	12
79Y	-	-	113.25	-	-	1103	36	-	-	1040	30
80X	-	-	113.30	-	-	1104	12	-	-	1167	12
80Y	-	-	113.35	5067.0	620	1104	36	36	42	1041	30
81X	-	-	113.40	-	-	1105	12	-	-	1168	12
81Y	-	-	113.45	5067.6	622	1105	36	36	42	1042	30
82X	-	-	113.50	-	-	1106	12	-	-	1169	12
82Y	-	-	113.55	5068.2	624	1106	36	36	42	1043	30
83X	-	-	113.60	-	-	1107	12	-	-	1170	12
83Y	-	-	113.65	5068.8	626	1107	36	36	42	1044	30
84X	-	-	113.70	-	-	1108	12	-	-	1171	12

D-20 CONVERSION TABLES

							DME AIRBORNE INTERROGATE			DME GND REPLY	
							PULSE CODE				
DME	---------- FREQUENCY ----------				MLS		NORMAL	P/DME			
CHN NO.	LOC	GS	VHF/ VOR	MLS	CHN NO.	FREQ	DME US	IA US	FA US	DME FREQ	PC US
84Y	-	-	113.75	5069.4	628	1108	36	36	42	1045	30
85X	-	-	113.80	-	-	1109	12	-	-	1172	12
85Y	-	-	113.85	5070.0	630	1109	36	36	42	1046	30
86X	-	-	113.90	-	-	1110	12	-	-	1173	12
86Y	-	-	113.95	5070.6	632	1110	36	36	42	1047	30
87X	-	-	114.00	-	-	1111	12	-	-	1174	12
87Y	-	-	114.05	5071.2	634	1111	36	36	42	1048	30
88X	-	-	114.10	-	-	1112	12	-	-	1175	12
88Y	-	-	114.15	5071.8	636	1112	36	36	42	1049	30
89X	-	-	114.20	-	-	1113	12	-	-	1176	12
89Y	-	-	114.25	5072.4	638	1113	36	36	42	1050	30
90X	-	-	114.30	-	-	1114	12	-	-	1177	12
90Y	-	-	114.35	5073.0	640	1114	36	36	42	1051	30
91X	-	-	114.40	-	-	1115	12	-	-	1178	12
91Y	-	-	114.45	5073.6	642	1115	36	36	42	1052	30
92X	-	-	114.50	-	-	1116	12	-	-	1179	12
92Y	-	-	114.55	5074.2	644	1116	36	36	42	1053	30
93X	-	-	114.60	-	-	1117	12	-	-	1180	12
93Y	-	-	114.65	5074.8	646	1117	36	36	42	1054	30
94X	-	-	114.70	-	-	1118	12	-	-	1181	12
94Y	-	-	114.75	5075.4	648	1118	36	36	42	1055	30
95X	-	-	114.80	-	-	1119	12	-	-	1182	12
95Y	-	-	114.85	5076.0	650	1119	36	36	42	1056	30
96X	-	-	114.90	-	-	1120	12	-	-	1183	12
96Y	-	-	114.95	5076.6	652	1120	36	36	42	1057	30
97X	-	-	115.00	-	-	1121	12	-	-	1184	12
97Y	-	-	115.05	5077.2	654	1121	36	36	42	1058	30
98X	-	-	115.10	-	-	1122	12	-	-	1185	12
98Y	-	-	115.15	5077.8	656	1122	36	36	42	1059	30
99X	-	-	115.20	-	-	1123	12	-	-	1186	12
99Y	-	-	115.25	5078.4	658	1123	36	36	42	1060	30
100X	-	-	115.30	-	-	1124	12	-	-	1187	12
100Y	-	-	115.35	5079.0	660	1124	36	36	42	1061	30
101X	-	-	115.40	-	-	1125	12	-	-	1188	12
101Y	-	-	115.45	5079.6	662	1125	36	36	42	1062	30
102X	-	-	115.50	-	-	1126	12	-	-	1189	12
102Y	-	-	115.55	5050.2	664	1126	36	36	42	1063	30
103X	-	-	115.60	-	-	1127	12	-	-	1190	12
103Y	-	-	115.65	5080.8	666	1127	36	36	42	1064	30
104X	-	-	115.70	-	-	1128	12	-	-	1191	12
104Y	-	-	115.75	5081.4	668	1128	36	36	42	1065	30
105X	-	-	115.80	-	-	1129	12	-	-	1192	12
105Y	-	-	115.85	5082.0	670	1129	36	36	42	1066	30
106X	-	-	115.90	-	-	1130	12	-	-	1193	12
106Y	-	-	115.95	5082.6	672	1130	36	36	42	1067	30

							DME AIRBORNE INTERROGATE			DME GND REPLY	
							PULSE CODE				
DME	---------- FREQUENCY ----------				MLS		NORMAL	P/DME			
CHN NO.	LOC	GS	VHF/ VOR	MLS	CHN NO.	FREQ	DME US	IA US	FA US	DME FREQ	PC US
107X	-	-	116.00	-	-	1131	12	-	-	1194	12
107Y	-	-	116.05	5083.2	674	1131	36	36	42	1068	30
108X	-	-	116.10	-	-	1132	12	-	-	1195	12
108Y	-	-	116.15	5083.8	676	1132	36	36	42	1069	30
109X	-	-	116.20	-	-	1133	12	-	-	1196	12
109Y	-	-	116.25	5084.4	678	1133	36	36	42	1070	30
110X	-	-	116.30	-	-	1134	12	-	-	1197	12
110Y	-	-	116.35	5085.0	680	1134	36	36	42	1071	30
111X	-	-	116.40	-	-	1135	12	-	-	1198	12
111Y	-	-	116.45	5085.6	682	1135	36	36	42	1072	30
112X	-	-	116.50	-	-	1136	12	-	-	1199	12
112Y	-	-	116.55	5086.2	684	1136	36	36	42	1073	30
113X	-	-	116.60	-	-	1137	12	-	-	1200	12
113Y	-	-	116.65	5086.8	686	1137	36	36	42	1074	30
114X	-	-	116.70	-	-	1138	12	-	-	1201	12
114Y	-	-	116.75	5087.4	688	1138	36	36	42	1075	30
115X	-	-	116.80	-	-	1139	12	-	-	1202	12
115Y	-	-	116.85	5088.0	690	1139	36	36	42	1076	30
116X	-	-	116.90	-	-	1140	12	-	-	1203	12
116Y	-	-	116.95	5088.6	692	1140	36	36	42	1077	30
117X	-	-	117.00	-	-	1141	12	-	-	1204	12
117Y	-	-	117.05	5089.2	694	1141	36	36	42	1078	30
118X	-	-	117.10	-	-	1142	12	-	-	1205	12
118Y	-	-	117.15	5089.8	696	1142	36	36	42	1079	30
119X	-	-	117.20	-	-	1143	12	-	-	1206	12
119Y	-	-	117.25	5090.4	698	1143	36	36	42	1080	30
120X	-	-	117.30	-	-	1144	12	-	-	1207	12
120Y	-	-	117.35	-	-	1144	36	-	-	1081	30
121X	-	-	117.40	-	-	1145	12	-	-	1208	12
121Y	-	-	117.45	-	-	1145	36	-	-	1082	30
122X	-	-	117.50	-	-	1146	12	-	-	1209	12
122Y	-	-	117.55	-	-	1146	36	-	-	1083	30
123X	-	-	117.60	-	-	1147	12	-	-	1210	12
123Y	-	-	117.65	-	-	1147	36	-	-	1084	30
124X	-	-	117.70	-	-	1148	12	-	-	1211	12
124Y	-	-	117.75	-	-	1148	36	-	-	1085	30
125X	-	-	117.80	-	-	1149	12	-	-	1212	12
125Y	-	-	117.85	-	-	1149	36	-	-	1086	30
126X	-	-	117.90	-	-	1150	12	-	-	1213	12
126Y	-	-	117.95	-	-	1150	36	-	-	1087	30

(FCC/NGA-NACO)

D-22 CONVERSION TABLES

6. JULIAN DATE CALENDAR

Regular Years (2011, 2013, 2014, 2015, 2017, 2018, 2019, 2021...)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
1	1	32	60	91	121	152	182	213	244	274	305	335
2	2	33	61	92	122	153	183	214	245	275	306	336
3	3	34	62	93	123	154	184	215	246	276	307	337
4	4	35	63	94	124	155	185	216	247	277	308	338
5	5	36	64	95	125	156	186	217	248	278	309	339
6	6	37	65	96	126	157	187	218	249	279	310	340
7	7	38	66	97	127	158	188	219	250	280	311	341
8	8	39	67	98	128	159	189	220	251	281	312	342
9	9	40	68	99	129	160	190	221	252	282	313	343
10	10	41	69	100	130	161	191	222	253	283	314	344
11	11	42	70	101	131	162	192	223	254	284	315	345
12	12	43	71	102	132	163	193	224	255	285	316	346
13	13	44	72	103	133	164	194	225	256	286	317	347
14	14	45	73	104	134	165	195	226	257	287	318	348
15	15	46	74	105	135	166	196	227	258	288	319	349
16	16	47	75	106	136	167	197	228	259	289	320	350
17	17	48	76	107	137	168	198	229	260	290	321	351
18	18	49	77	108	138	169	199	230	261	291	322	352
19	19	50	78	109	139	170	200	231	262	292	323	353
20	20	51	79	110	140	171	201	232	263	293	324	354
21	21	52	80	111	141	172	202	233	264	294	325	355
22	22	53	81	112	142	173	203	234	265	295	326	356
23	23	54	82	113	143	174	204	235	266	296	327	357
24	24	55	83	114	144	175	205	236	267	297	328	358
25	25	56	84	115	145	176	206	237	268	298	329	359
26	26	57	85	116	146	177	207	238	269	299	330	360
27	27	58	86	117	147	178	208	239	270	300	331	361

Regular Years (2011, 2013, 2014, 2015, 2017, 2018, 2019, 2021...)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
28	28	59	87	118	148	179	209	240	271	301	332	362
29	29		88	119	149	180	210	241	272	302	333	363
30	30		89	120	150	181	211	242	273	303	334	364
31	31		90		151		212	243		304		365

Leap Years (2012, 2016, 2020, 2024, 2028, 2032...)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
1	1	32	61	92	122	153	183	214	245	275	306	336
2	2	33	62	93	123	154	184	215	246	276	307	337
3	3	34	63	94	124	155	185	216	247	277	308	338
4	4	35	64	95	125	156	186	217	248	278	309	339
5	5	36	65	96	126	157	187	218	249	279	310	340
6	6	37	66	97	127	158	188	219	250	280	311	341
7	7	38	67	98	128	159	189	220	251	281	312	342
8	8	39	68	99	129	160	190	221	252	282	313	343
9	9	40	69	100	130	161	191	222	253	283	314	344
10	10	41	70	101	131	162	192	223	254	284	315	345
11	11	42	71	102	132	163	193	224	255	285	316	346
12	12	43	72	103	133	164	194	225	256	286	317	347
13	13	44	73	104	134	165	195	226	257	287	318	348
14	14	45	74	105	135	166	196	227	258	288	319	349
15	15	46	75	106	136	167	197	228	259	289	320	350
16	16	47	76	107	137	168	198	229	260	290	321	351
17	17	48	77	108	138	169	199	230	261	291	322	352
18	18	49	78	109	139	170	200	231	262	292	323	353
19	19	50	79	110	140	171	201	232	263	293	324	354
20	20	51	80	111	141	172	202	233	264	294	325	355
21	21	52	81	112	142	173	203	234	265	295	326	356

D-24 CONVERSION TABLES

Leap Years (2012, 2016, 2020, 2024, 2028, 2032...)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
22	22	53	82	113	143	174	204	235	266	296	327	357
23	23	54	83	114	144	175	205	236	267	297	328	358
24	24	55	84	115	145	176	206	237	268	298	329	359
25	25	56	85	116	146	177	207	238	269	299	330	360
26	26	57	86	117	147	178	208	239	270	300	331	361
27	27	58	87	118	148	179	209	240	271	301	332	362
28	28	59	88	119	149	180	210	241	272	302	333	363
29	29	60	89	120	150	181	211	242	273	303	334	364
30	30		90	121	151	182	212	243	274	304	335	365
31	31		91		152		213	244		305		366

SECTION E

STANDARD TIME SIGNALS

TABLE OF CONTENTS

E-2 STANDARD TIME SIGNALS

1. WWV AND WWVH

a. WWV and WWVH continuously broadcast nominal frequencies and time consistent with the internationally agreed upon time scale, Coordinated Universal Time (UTC) on 2.5, 5, 10, 15 and 20 MHz.

(1) Station Identification is made by voice announcement in English every thirty minutes approximately on the hour and the half hour. Periods with no Audio Tones or Special Announcements, during which the Carrier, Second Ticks, Time Announcements and 100 Hz modified IRIG H Time Code continue, occur from 45 to 50 minutes after the hour at WWV, and from 15 to 20 minutes after the hour at WWVH.

(2) The Time System used is Coordinated Universal Time (UTC), expressed in terms of a 24-hour clock, and is given in a voice announcement every minute preceding the return of the Audio Tone.

EXAMPLE: 1435 UTC would be: "At the tone - fourteen hours, thirty five minutes Coordinated Universal Time."

(3) The Time and Frequency Signals broadcast by WWV may be heard live via telephone by calling C303-499-7111. This service is automatically limited to 3 minutes per call. Similar time-of-day broadcasts from WWVH can be heard by calling C808-335-4363 on the Island of Kauai through the overseas operator.

NOTE: The specific hour and minute mentioned is actually the time in the time zone centered around Greenwich, England, and may be better known as "Greenwich Mean Time" (GMT).

2. STATION JJY, TOKYO

a. Station JJY Time Signals are in the form of an interruption of the Carrier Wave for 20 milliseconds before the second and 200 milliseconds before the minute. The end of each interruption is the exact time. The signals are broadcast on the following times:

2.5 MHz -	0659 to 2259Z
4 MHz and 5 MHz -	24 hours
8 MHz and 10 MHz -	2059 to 1059Z

b. The standard 1000 Hz carrier is omitted 4 minutes beginning at 0000 UTC. The 5th minute, from the 23rd to the 57th second, will be the Identification Signals on 1000 Hz/S modulation as follows:

Call Sign	Twice
Time Code	Once (24 hour JST)
Warning Code	Five (5) times
W	Abnormal
U	Unstable
N	Normal
Voice Announcement	(except 4000 kHz)
Call Sign	Twice
Time	(24 hour JST) once in Japanese and once in English

3. U.S. NAVAL OBSERVATORY

(NAVFIG/NAVFIG FIL 0029-12)

U.S. Naval Observatory master clock time may be obtained via telephone by calling DSN 762-1401, C202-762-1401. This service is limited to approximately one minute. Alternate USN master clock at Schriever AFB, CO DSN 560-6742 C719-567-6742.

4. CANADIAN TIME SIGNALS

STATION CHU, OTTAWA, ONTARIO, operates continuously on the following frequencies: 3330 kHz, 7335 kHz, and 14670 kHz. The second pulses consist of 300 cycles of a 1000 Hz tone with certain omissions and identifications. Omission of the 29th pulse identifies the half minute and omission of the 51st to 59th pulse provides a window for voice announcement. Zero pulse of each minute is 1/2 second long and the hour is identified by a pulse of one full second followed by 40 seconds of silence. The bilingual voice announcement which is heard each minute takes the form: "CHU CANADA-EASTERN STANDARD TIME- -HOURS- -MINUTES- -HEURES- -MINUTES" (English

on even minutes, French on odd) and on the hour "CHU CANADA-EASTERN STANDARD TIME- -HOURS EXACTLY,- -HEURES PRECISES".

5. BBC RADIO TIME SIGNALS

The time signal consists of five short "pips" from second 55 to second 59, followed by a lengthened pip, the start of which marks the minute to an accuracy of 261 1/20 second. The duration of each short pip is 100 milliseconds and that of the long pip is 500 milliseconds.

		TIME OF EMISSION (GMT)		
	FREQ (kHz)	**MON-FRI**	**SAT**	**SUN**
BBC RADIO 1	1053	0530	0600	0600
	1089	0600	1300	1700
		0700	1930	2400
		0800	2400	
		2200		
		2400		
BBC RADIO 4	198	0200	0200	0200
		0300	0300	0300
		0400	0400	0400
		0500	0500	0500
		0600	0600	0600
		0700	0700	0700
	720	0800	0800	0800
		0900	0900	0900
		1000	1000	1300
		1100	1100	1600
		1200	1300	1700
		1300	1400	1800 (B)
		1400	1500	1900
		1500	1800 (B)	2100
		1600 ①	2200 (B)	2200 (B)
		1700	2400 (B)	2400 (B)
		1800 (B)		
		1900		
		2400 (B)		

① Not Mon.
(B) BIG BEN

6. VNG LLANDILO - NSW, AUSTRALIA

a. Air Services Australia provides a time signal broadcast service from its transmitters located at Llandilo NSW VNG

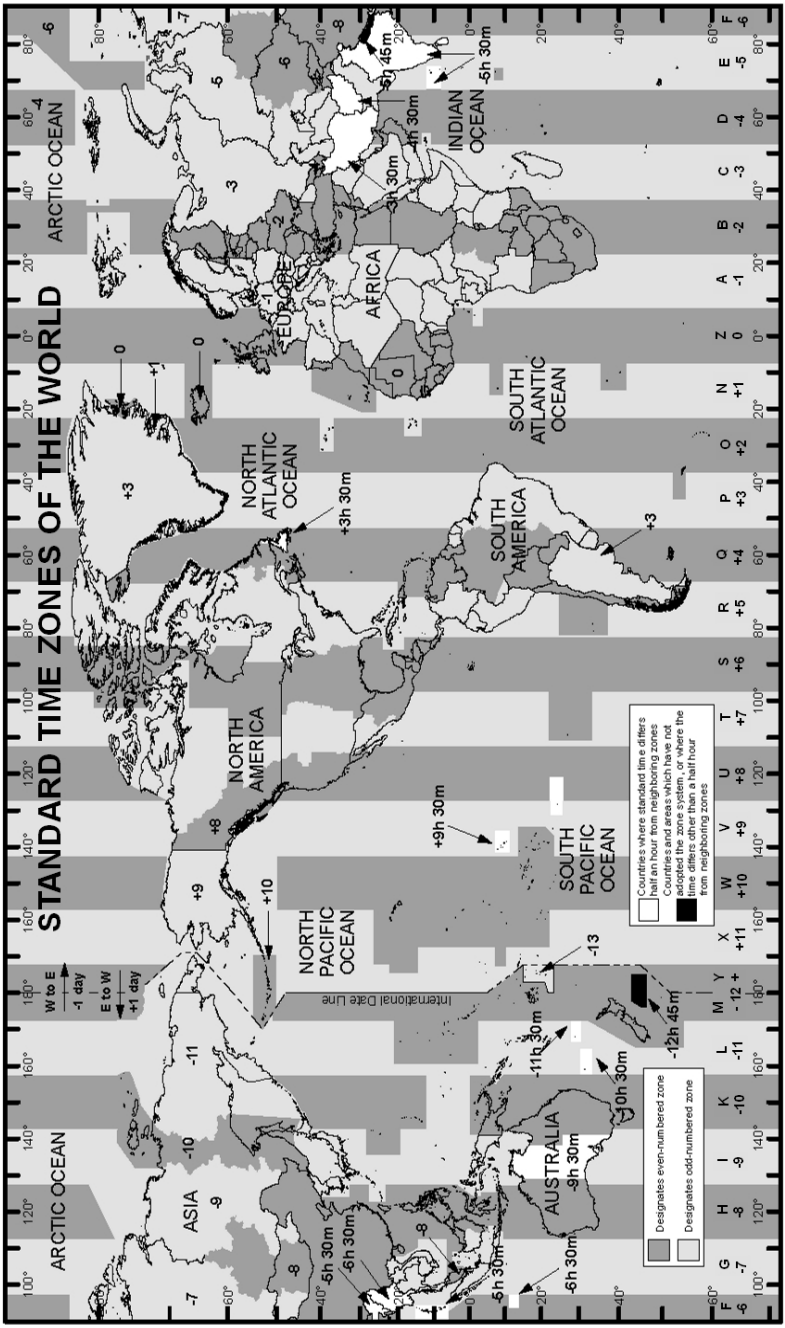
b. The transmission schedule is as follows:

FREQ (MHZ)	TIME	POWER (KW)
2.5	H24	1.0
5.0	H24	10.0
16.0	2200-1000Z	5.0

c. The VNG station identification is given each quarter hour.

d. The start of each minute is marked by a 500 millisecond pulse. Normal second markers are 50 milliseconds long. Seconds number 55-58 are only 5 milliseconds long; in minutes number 5, 10, 15, etc, seconds number 50-58 are only 5 milliseconds long. Second number 59 is always omitted.

E-4 STANDARD TIME SIGNALS



SECTION F

FLIP AND NOTAM ABBREVIATIONS/CODE

TABLE OF CONTENTS

F-2 FLIP AND NOTAM ABBREVIATIONS

1. FLIP and NOTAM ABBREVIATIONS - This listing provides a ready reference of abbreviations used in Flight Information Publications (FLIPs) and the DoD NOTAM System. Codes, e.g., POL, Lighting, JASU etc., are listed elsewhere in the Supplement Legends. The abbreviations presented are intended to represent grammatical variations of the basic form. (Example - "trans" may mean "transmit", "transmitting," "transmitted," or "transmits.")

A

A	Alert Area (followed by identification)
A	Area Chart (followed by identification)
A/A	air to air
AAF	Army Air Field
AAI	Angle of Approach Indicator
AAL	above airport level
AAL	Aircraft Approach Limitations
AAS	Airport Advisory Service
AB	Airbase
abm	abeam
ABn	Aerodrome Beacon
abt	about
abv	above
ACA	Arctic Control Area
ACC	Air Combat Command
ACC	Area Control Center
ACCID	notification of aircraft accident
accom	accommodate
acft	aircraft
ACL	altimeter check location
ACLS	Automatic Carrier Landing System
ACN	Aircraft Classification Number
acpt	accept
act	activity
ACW	Aircraft Control and Warning
A/D	Aerodrome
ADA	Advisory Area
ADC	Aerospace Defense Command
ADCC	Air Defense Control Center
ADCF	air defense control facility
ADCUS	Advise Customs
ADDC	Air Defense Direction Center
addn	addition
ADF	Automatic Direction Finder
ADIZ	Air Defense Identification Zone
adj	adjacent
admin	administration
ADR	Advisory Route
ADS-B	Automatic Dependent Surveillance-Broadcast
advs	advise
advsy	advisory
AEIS	Aeronautical Enroute Information Service
AER	Approach End of Runway
AFA	Army Flight Activity
AFB	Air Force Base
afct	affect
AFFF	Aqueous Film Forming Foam
AFFSA	Air Force Flight Standards Agency
AFHP	Air Force Heliport
AFI	African/Indian Ocean (ICAO Region, Air Force Instruction
AFIL	Flight plan filed while airborne

AFIO	Authorization for Fighter Interceptor Operations
AFIS	Automatic Flight Information Service
afld	airfield
AFM	Air Force Manual
AFMC	Air Force Material Command
AFOD	US Army Flight Operations Detachment
AFR	Air Force Regulation
AFRC	Armed Forces Reserve Center
AFRC	Air Force Reserve Command
AFRS	American Forces Radio Stations
aft	after
AFTN	Aeronautical Fixed Telecommunication Network
AG	Agriculture
A/G	air/ground
A-G	Arresting Gear
AGA	airfield or air routes ground aids
agcy	Agency
A-GEAR	Arresting Gear
AGL	above ground level
agn	again
AHP	Army heliport
AIP	Aeronautical Information Publication
AIRAC	aeronautical information regulation and control
AIREP	Air Reports (Metro in Plain Language)
AIRNAVO	US Navy Air Navigation Office
AIS	Aeronautical Information Services
AL	Approach and Landing Chart
ALA	alighting area
ALERFA	alert phase
ALF	Auxiliary Landing Field
ALS	Approach Light System
ALSF-1	High Intensity ALS Category I configuration with sequenced Flashers (code)
ALSF-2	High Intensity ALS Category II configuration with sequenced Flashers (code)
alt	altitude
altn	alternate
ALTRV	Altitude Reservation
AM	Amplitude Modulation
AM	ante meridiem, midnight to noon
AMC	Air Mobility Command
amd	amend
amdt	amendment
ammo	ammunition
AMSL	Above Mean Sea Level
ANGB	Air National Guard Base
ANG	Air National Guard
ANGS	Air National Guard Station
ANO	Air Navigation Order
ant	antenna
AOE	Airport/Aerodrome of Entry
AP	Area Planning, Autopilot System (FAA)
APAPI	Abbreviated Precision Approach Path Indicator
apch	approach
apn	apron

F-4 FLIP AND NOTAM ABBREVIATIONS

APO	Air Force or Army Post Office
APP	Approach Control
Apr	April
aprx	approximate
APU	Auxiliary Power Unit
APV	Approach with Vertical Guidance
apv	approve
apvl	approval
AR	Aerial Refueling
AR	Army Reserve, Air Receive
ARB	Air Reserve Base
ARC	Area of Responsibility Center
ARCAL (Canada)	Aircraft Radio Control of Aerodrome Lighting
ARCP	Air Refueling Control Point
ARCT	Air Refueling Control Time
ARFOR	Area Forecast
ARINC	Aeronautical Radio Inc.
ARIP	Air Refueling Initial Point
arng	arrange
ARNG	Army National Guard
ARO	ATS Reporting Office
ARP	Airport Reference Point
arpt	airport
arr	arrive
ARS	Air Rescue Service/Air Reserve Station
ARSA	Airport RADAR Service Area
ARSR	Air Route Surveillance Radar
ARTC	Air Route Traffic Control
ARTCC	Air Route Traffic Control Center
AS	Air Station
ASAP	as soon as possible
ASDA	accelerate - stop distance available
ASDE	Airport Surface Detection Equipment
asgn	assign
ASL	Above Sea Level
ASOS	Automated Surface Observation System
ASR	Airport Surveillance Radar
ASRgn	Altimeter Setting Region
ASSC	Airport Surface Surveillance Capability
ASU	Aircraft Starting Unit
AT	Air Transmit
ATA	Actual Time of Arrival
ATC	Air Traffic Control
ATC	Air Training Command
ATCAA	Air Traffic Control Assigned Airspace
ATCC	Air Traffic Control Center
ATCOM	Air Traffic Control Communications (Ship to Shore)
ATCRBS	Air Traffic Control Radar Beacon System
ATD	Actual Time of Departure
ATD	Along Track Distance
ATF	Automatic Terrain Following
ATFM	Air Traffic Flow Management
ATIS	Automatic Terminal Information Service
ATS	Air Traffic Service
attn	attention
ATZ	airport traffic zone
Aug	August

auth	authority
auto	automatic
AUW	All Up Weight (gross weight)
aux	auxiliary
AVASI	abbreviated VASI
avbl	available
avg	average
AvGas	aviation gasoline
avn	aviation
AvOil	aviation oil
avord	aviation ordnance
AWOS	Automated Weather Observing System
AWS	Air Weather Service
AWSS	Automated Weather Sensor System
awt	await
awy	airway
az	azimuth

B

BA	braking action
BASH	Bird Aircraft Strike Hazard
BC	back course
bcn	beacon
bcst	broadcast
bdry	boundary
BEQ	Bachelor Enlisted Quarters
BKN	Broken
bldg	building
blkd	blocked
blw	below
BM	bone marker, back marker
BN	Bound (FAA)
BOA	Break-Off Altitude
BOH	Break-Off Height
BOQ	Bachelor Officers Quarters
brg	bearing
brkg	braking
BRNAV	Basic Area Navigation
BS	Broadcast Station (commercial)
btn	between
bus	business
BWC	Bird Watch Condition
byd	beyond
BZ	Buffer Zone

C

C	Celsius (degrees), Centigrade (degrees)
C	Center (runway designation)
C	Circling Approach (on instrument approach chart)
C	Commercial Circuit (Telephone)
CAC	Centralized Approach Control
CALS	combat assault landing strip
cap	capacity
CAR	Caribbean (ICAO Region)
CARF	Central Altitude Reservation Facility
CAS	Calibrated Airspeed
cat	category
CAT	Clear Air Turbulence
CAVU	Ceiling and Visibility Unlimited
CB	Crash Boat
CCW or cntclkws	counterclockwise

F-6 FLIP AND NOTAM ABBREVIATIONS

CDI	Course Direction Indicator
ceil	ceiling
CERAP	Center Radar Approach Control
cfm	confirm
CFMU	Central Flow Management Unit
CGAF	Coast Guard Air Facility
CGAS	Coast Guard Air Station
CH	channel
chan	channel
CHAPI	Chase Helicopter Approach Path Indicator
chg	change
cht	chart
CIG	ceiling
cir	circle, circling
CIS	Commonwealth of Independent States
CIRVIS	Communications Instructions Reporting Vital Intelligence Sightings
CIT	near or over large towns
civ	civil, civilian
ck	check
cl	class
CL	Centerline Lighting System
clbr	calibration
clnc	clearance
CLNC DEL	clearance delivery
CLR	Clear
clsd	closed
CMNPS	Canadian Minimum Navigation Performance Specifications Airspace.
cmsn	commission
CNATRA	Chief of Naval Air Training
CNF	Computer Navigation Fix
cnl	cancel
CNO	Chief of Naval Operations
cns	continuous
cnsld	Consolidated
cntclkws or CCW	counterclockwise
cntr	center
cntrln	centerline
CO	Commanding Officer
Co	Company, County
com	communication
comd	command
Comdr	Commander
comdt	commandant
coml	commercial
compl	complete
compul	compulsory
comsn	commission
CON	Control (voice call), Consol, Consolan
conc	concrete
cond	condition
const	construction
cont	continue
CONUS	Continental United States
convl	conventional
coord	coordinate
COP	change over point
copter	helicopter
corr	correct
cov	cover

CPDLC	Controller-Pilot Data Link Communications
crdr	corridor
cros	cross
CRP	Compulsory Reporting Point
crs	course
CRT	Cathode Ray Tube
CS	call sign
CS	communication station
CSA	Caribbean and South America
cstl	coastal, coastline
CSTMS	Customs
CStn	communication station
CTA	Control Area
CTAF	Common Traffic Advisory Frequency
CTAM	climb to and maintain
ctc	contact
ctl	control
CTLZ	Control Zone
ctn	caution
CVFP	Charted Visual Flight Procedure
CVFR	Controlled Visual Flight Rules
CW	Clockwise, Continuous Wave, Carrier Wave
CWA	Center Weather Advisory
CWT	hundredweight
cwy	clearway

D

D	Danger Area (followed by identification)
DA	Decision Altitude
DAFIF™	Digital Aeronautical Flight Information File
DASR	Digital Airport Surveillance Radar
D-ATIS	Digital Automatic Terminal Information Service
daylt	daylight
db	decibel
dckg	docking
DCL	Departure Clearance
dct	direct
Dec	December
DECCA	Decca Navigator
decom	decommission
deg	degree
del	delivery
DEMIZ	DEW East Military Identification Zone
DENEB	fog dispersal operations
dep	depart
DEP	Departure Control
DER	Departure End of Runway
destn	destination
det	detachment
DF	Direction Finder
DFTI	distance from touchdown indicator
dgr	danger
DH	Decision Height
direc	directional
disc	discontinue
disem	disseminate
displ	displace
dist	district, distance
div	division

F-8 FLIP AND NOTAM ABBREVIATIONS

DL	Direct Line to FSS
dlt	delete
dly	daily
dly	delay
DME	Distance Measuring Equipment (UHF standard, TACAN compatible)
DND	Department of National Defense (Canada)
DNVT	Digital Non-Secure Voice Telephone
DoD	Department of Defense
dpth	depth
DR	Dead Reckoning
drct	direct
DSB	Double Sideband
DSN	Defense Switching Network
DT	Daylight Savings Time
DTAM	descent to and maintain
DTU	Data Transfer Unit
dupe	duplication
dur	duration
dur	during
DV	Distinguished Visitor
DVFR	Defense Visual Flight Rule
DVOR	Doppler VOR

E

E	East
ea	each
EAF	Expeditionary airfield
EAT	Expected Approach Time
Ebnd	Eastbound
ECM	Electronic Counter Measures
ECN	Enroute Change Notice
EDCT	expected departure clearance time
EEFC	Eastern European Fuel Codes
EET	estimated elapsed time
EFAS	Enroute Flight Advisory Service
EFC	Expect Further Clearance
eff	effect
EFIS	Electronic Flight Information System
E-HA	Enroute High Altitude
EHF	extremely high frequency (30,000 to 300,000 MHz)
E-LA	Enroute Low Altitude
elev	elevation
ELT	Emergency Locator Transmitter
em	emission
EMAS	Engineered Materials Arresting System
emerg	emergency
eng	engine
enrt	enroute
EOBT	estimated off-block time
EOR	End of Runway
EPD	Earliest Practicable Date
EPI	Expanded Position Indicator
eqpt	equipment
ERDA	Energy Research and Development Administration
E-S	Enroute Supplement
est	estimate
estab	establish
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure

ETE	Estimated Time Enroute
ETO	estimated time over significant point
ETS	European Telephone System
EUCARF	European Central Altitude Reservation Function
Eur	Eureka
Eur	Europe
EUR	European (ICAO Region)
ev	every
evac	evacuate
exc	except
excld	exclude
exer	exercise
exm	exempt
exp	expect
ext	extent
extn	extend, extension
extv	extensive

F

F	Fahrenheit (degrees)
F	fixed
FAA	Federal Aviation Administration
fac	facility
FAF	Final Approach Fix
FACSFAC	Fleet Area Control and Surveillance Facility
FAP	Final Approach Point
FAR	Federal Air Regulations
FARP	Forward Arming and Refueling Point
FAS	Final Approach Speed
FAWS	Flight Advisory Weather Service
fax	facsimile
FBAA	Flying Boat Alighting Area
FBO	Fixed Base Operator
FBW	Fly by Wire
FCC	Flight Control Center
FCG	Foreign Clearance Guide
FCLP	field carrier landing practice
fcst	forecast
FD	Flight Director System (FAA)
Feb	February
FIC	Flight Information Center
FIFOR	Flight Forecast (in international MET figures)
FIH	Flight Information Handbook
FI/P	Flight Inspection Permanent
FIR	Flight Information Region
FIS	Flight Information Service
FI/T	Flight Inspection Temporary
FL	flight level
fld	field
flg	flashing
FLIP	Flight Information Publication
flr	flare
flt	flight
fltck	flight check
FLT CON	Flight Control
fluc	fluctuate
flw	follow
FM	Fan Marker, Frequency Modulation
FMP	Flow Management Position
FMS	Flight Management System
FMU	Flow Management Unit

F-10 FLIP AND NOTAM ABBREVIATIONS

FNA	final approach
FOC	Flight Operations Center
FOD	Foreign Object Damage
fone	telephone
FPL	Flight Plan
fpm	feet per minute
FPO	Fleet Post Office
fqt	frequent
fr	from
freq	frequency, frequent
Fri	Friday
frng	firing
FS	Flight Service
FSC	Flight Service Center
FSL	full stop landing
FSS	Flight Service Station
fst	first
ft	foot
ftr	fighter
furn	furnish
F/W	Fixed Wing

G

G	green
G	grid
GA	Glide Angle
G/A	ground-to-air
gal	gallon
G-,A-,R-,B-	Low Frequency Airways (green, amber, red, blue)
GAT	General Air Traffic (Europe-Asia)
GBAS	Ground-Based Augmentation System
GCA	Ground Controlled Approach
GCAS	Ground Collision Avoidance System
GCI	Ground Control Intercept
GCO	Ground Communications Outlet
GCT	Greenwich Civil Time
gen	general
gldr	glider
GLS	GNSS Landing System
GMT	Greenwich Mean Time (when not a figure of time)
gnd	ground
gndck	ground check
GND	Ground Control
gnry	gunnery
GNSS	Global Navigation Satellite System
govt	government
GP	Glide Path
Gp	Group
GPI	Ground Point of Intercept
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
grad	gradient
grav	gravel
grd	guard
grdl	gradual
Griv	Grivation
GS	glide slope
GV	Grid variation
GWT	gross weight

H

H	Enroute High Altitude Chart (followed by identification)
H+	Hours or hours plus... minutes past the hour
H24	continuous operation
HAA	Height Above Airport/ Aerodrome
HAL	Height Above Landing Area
HALS	Helicopter Approach Lighting System
HAR	Height Above Runway
HAT	Height Above Touchdown
HATh	Height Above Threshold
haz	hazard
HDF	High Frequency Direction Finder
hdg	heading
HDTA	High Density Traffic Airport/ Aerodrome
HF	High Frequency (3000 to 30,000 KHz)
Hg	mercury
hgr	hangar
HGS	Heads-up Guidance System (FAA)
hgt	height
hi	high
Hi ALT or HA	High Altitude
HIFOR	High Level Forecast
HILS	Heliport Instrument Lighting System
HIRL	High Intensity Runway Lights
HIRTA	high intensity radio transmission area
HIWAS	Hazardous Inflight Weather Advisory Service
HJ	Sunrise to Sunset
HKSAR	Hong Kong Special Administrative Region
hldg	holding
HN	Sunset to Sunrise
HO	Service available to meet operational requirements
hol	holiday
HOLF	Helicopter Outlying Field
horiz	horizontal
hosp	hospital
hPa	hectopascal
HPMA	High Performance Military Aircraft
HPOX	High Pressure Oxygen
HPZ	Helicopter Protected Zone
HQ	Headquarters
hr	hour
HS	service available during hours of scheduled operations
hsg	housing
HTA	Helicopter Training Area
HUD	Heads-up Display
HVDF	High and Very High Frequency Direction Finder (at the same location)
hvy	heavy
HW	Heavy Weight
hwy	highway
HX	Station having no specific working hours
Hz	Hertz (cycles per second)

I

I	island

F-12 FLIP AND NOTAM ABBREVIATIONS

IACC	Inter-Agency Air Cartographic Committee
IAF	Initial Approach Fix
IAL	instrument approach and landing chart
IAP	Instrument Approach Procedure
IAR	intersection of air routes
IAS	Indicated Air Speed
IATA	International Air Transport Association
IAW	in accordance with
IBn	identification Beacon
ICAO	International Civil Aviation Organization
ice	icing
ICLS	Instrument Carrier Landing System
ident	identification
IF	Intermediate Fix
IFF	Identification, Friend or Foe
IFIM	International Flight Information Manual.
IFPS	Integrated Initial Flight Plan Processing System
IFR	Instrument Flight Rules
IFR-S	FLIP IFR Supplement
IFSS	International Flight Service Station
IGS	Instrument Guidance System
ILA	Instrument Landing Aid
ILS	Instrument Landing System
IM	Inner Marker
IMC	Instrument Meteorological Conditions
IMG	Immigration
immed	immediate
in	inch
INA	initial approach
inactv	inactive
inad	inadvertent
inbd	inbound
INC	In Cloud
Inc	Incorporated
incl	include
INCR	INCREASE
indef	indefinite
info	information
inop	inoperative
INP	if not possible
inpr	in progress
INREQ	information request
INS	Inertial Navigation System
inst	instrument
instl	install
instr	instruction
int	intersection
intcntl	intercontinental
intcp	intercept
intl	international
intmed	intermediate
intmt	intermittent
intrg	interrogate
introd	introduce
intrp	interrupt
ints	intense
intsf	intensify
INTXN	Intersection (for Instrument Approach Procedures only)
IP	Initial Point

IR	IFR Military Training Route
irreg	Irregularly
IRU	Inertial Reference Unit
ISJTA	Intensive Student Jet Training Area
ISMLS	Interim Standard Microwave Landing System
isol	isolate

J

J	Jet Fuel
J	Jet Route (followed by identification)
JAL	High Altitude Instrument Approach Procedure Chart
J-bar	jet aircraft barrier
Jan	January
JARB	Joint Air Reserve Base
JASU	Jet Aircraft Starting Unit
JATO	Jet Assisted Take-Off
JCS	Joint Chiefs of Staff
JNC	Jet Navigation Chart
jng	joining
JOAP	Joint Oil Analysis Program
JOSAC	Joint OperationalSupport Airlift Center
JRB	Joint Reserve Base
jtstr	jet stream
Jul	July
Jun	June

K

K	Kopter (spoken ICAO ATS route designator)
kg	kilograms
kHz	kilohertz
KIAS	Knots Indicated Airspeed
KLIZ	Korea Limited Identification Zone (KLIZ is also the ICAO identifier for LORING AFB, ME)
km	kilometer
kmh	kilometers per hour
KPa	Kilopascal
Kt or K	Knots
kw	kilowatt

L

L	Compass locator
L	Enroute Low Altitude Chart (followed by identification)
L	Left (Runway designation)
L	Local Time
LAAS	Low Altitude Alert System, Local Area Augmentation System (FAA)
LAHSO	Land And Hold Short Operations
L-AOE	Limited Airport of Entry
lat	latitude
latrl	lateral
LAWRS	Limited Aviation Weather Reporting Station
lb	pound (weight)
lcl	local
LCN	load classification number
LCP	French Peripheral Classification Line
lctd	located
lctn	location
lctr	locator
LCVASI	Low Cost Visual Approach Slope Indicator
lczr	localizer
LDA	Landing Distance Available

F-14 FLIP AND NOTAM ABBREVIATIONS

LDA	Localizer-type Directional Aid
ldg	landing
LDI	landing direction indicator
len	length
LF	Low Frequency (30 to 300 KHz)
LFR	Low/Medium Frequency Range
lgt	light
lgtd	lighted
LHOX	Low and High Pressure Oxygen
LIH	light intensity high
LIL	light intensity low
LIM	light intensity medium
LIRL	Low Intensity Runway Lights
LLWAS	Low-Level Wind Shear Alert System
LLZ	ICAO Localizer (for ICAO Instrument Approach Procedures only) Note: FAA LOC/LDA parameters are inclusive within ICAO LLZ parameters.
LMM	Compass locator at Middle Marker ILS
LMT	Local Mean Time
LNAV	Lateral Navigation
lo	low
LoALT or LA	Low Altitude
LOC	Localizer (For Instrument Approach Procedures only)
Lo Int	Low Intensity Lights
LOM	Compass locator at Outer Marker ILS
long	longitude
Loran	Long Range Aid to Navigation
LOX	Liquid Oxygen
LP	Low Power, Localizer Performance (FAA)
LPOX	Low Pressure Oxygen
LPV	Localizer Performance with Vertical Guidance
LR	Long Range, Lead Radial
LRA	Landing Rights Airport
LRRS	Long Range Radar Station
LSB	lower side band
lt	left
LTA	Lighter than air
ltd	limited
LTG	lightning
ltr	letter
ltrs	liters
lv	leave
lyr	layer
LZ	landing zone

M

M	meters, magnetic (after a bearing)
M	Military Circuit (telephone)
MAA	Maximum Authorized Altitude
MACC	Military Area Control Center
mag	magnetic
mag brg	magnetic bearing
maint	maintain, maintenance
maj	major
MALS	Medium Intensity Approach Lighting System
MALSF	MALS with Sequenced Flashers

MALSR	MALS with Runway Alignment Indicator Lights
mand	mandatory
mand alt	mandatory altitude
MAP	Missed Approach Point
Mar	March
MARA	Military Activity Restricted Area
MARSA	Military Authority Assumes Responsibility for Separation of Aircraft
MASMS	Military Airspace Management System
MATO	Military Air Traffic Operations
MATZ	Military Aerodrome Traffic Zone
max	maximum
mb	millibars
MB	Mooring Buoys
MCA	Minimum Crossing Altitude
MCAAF	Marine Corps Auxiliary Air Facility
MCAAS	Marine Corps Auxiliary Air Station
MCAB	Marine Corps Air Base
MCAC	Military Common Area Control
MCAF	Marine Corps Air Facility
MCAGCC	Marine Corps Air Ground Combat Center
MCALF	Marine Corps Auxiliary Landing Field
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCC	Military Climb Corridor
MCOLF	Marine Corps Outlying Field
MDA	Minimum Descent Altitude
MDF	Medium Frequency Direction Finder
MEA	Minimum Enroute Altitude
med	medium
MEHT	Minimum Eye Height over Threshold
mem	memorial
MET	Meteorological, Meteorology
METAR	Aviation Routine Weather Report (in international MET figure code)
METRO	Pilot-to-Metro voice call
MF	Mandatory Frequency (Canada)
MF	Medium Frequency (300 to 3000 KHz)
MFA	Minimum Flight Altitude
MFA	Military Flying Area (Canada)
MFS	Military Flight Service
mgmt	Management
mgr	manager
MHDF	Medium and High Frequency Direction Finder (at same location)
MHVDF	Medium, high and very high Frequency Direction Finder (at same location)
MHz	Megahertz
MID/ASIA	Middle East/Asia (ICAO Region)
MIDIZ	Mid-Canada Identification Zone
MIJI	Meaconing, Intrusion, Jamming, and Interference
mil	military
MIL OVRN	Military Overrun Lights
min	minimum, minute
MIN	Montenegro

F-16 FLIP AND NOTAM ABBREVIATIONS

MIRL	Medium Intensity Runway Lights
MIS	Meteorological Impact Statement
misl	missile
mkr	marker (beacon)
MLS	Microwave Landing System
MM	Middle Marker, ILS
MMLS	Mobile Microwave Landing System
MNPS	Minimum Navigation Performance Specifications
mnt	monitor
MOA	Military Operations Area
MOC	minimum obstruction clearance
MOCA	Minimum Obstruction Clearance Altitude
mod	moderate
mod	modify
MOG	Maximum (aircraft) on the Ground
Mon	Monday
mov	move
MP	maintenance period
mph	miles per hour (statute)
MR	Medium Range
MRA	Minimum Reception Altitude
mrk	mark, marker
MSA	Minimum Safe Altitude
msg	message
MSL	Mean sea level
msn	mission
mt	mount, mountain
MTA	Minimum Terrain Clearance Altitude
MTAF	Mandatory Traffic Advisory Frequency
MTC	Military Terminal Control
MTCA	Military Terminal Control Area
mthly	monthly
MTOW	Maximum Takeoff Weight
mtrs, M or m	meters
MUAC	Military Upper Area Control
multi	multiple
muni	municipal
MV	Magnetic Variation
MVA	Minimum Vectoring Altitude
MVDF	Medium and Very High Frequency Direction Finder (at same location)

N

N	North
N/A	not applicable
NA	not authorized (For Instrument Approach Procedure take-off and alternate MINIMA only.)
NAAS	Naval Auxiliary Air Station
NADC	Naval Air Development Center
NADEP	Naval Air Depot
NAES	Naval Air Engineering Station
NAF	Naval Air Facility
NALF	Naval Auxiliary Landing Field
NALO	Naval Air Logistics Office
NAM	North American (ICAO Region)
NAR	North American Routes for North Atlantic Traffic
NAS	Naval Air Station

NASA	National Aeronautics and Space Administration
NAT	North Atlantic (ICAO Region)
natl	national
NATO	North Atlantic Treaty Organization
NATOPS	Naval Air Training and Operating Procedures
nav	navigation
navaid	navigation aid
NAVFIG	Naval Flight Information Group
NAVMTO	Navy Material Transportation Office
NAWC	Naval Air Warfare Center
NAWS	Naval Air Weapons Station
Nbnd	Northbound
NCRP	Non-Compulsory Reporting Point
NDB	Non-Directional Radio Beacon
NE	Northeast
nec	necessary
NEW	Net Explosives Weight
NFD	National Flight Database (FAA)
ngt	night
NGA STL	National Geospatial-Intelligence Agency St. Louis
NM	nautical miles
nml	normal
No or Nr	number
NOF	International NOTAM Office
NOLF	Navy Outlying Field
NoPT	No Procedure Turn Required (procedure turn shall not be executed without ATC clearance)
NORAD	North American Aerospace Defense Command
NORDO	Lost communications or no radio installed/available in aircraft
NOS	National Ocean Service
NOTAM	Notice to Airmen
not flt ck	not flight checked
NOTUN	Notice of Unreliability
Nov	November
NPA	Non-Precision Approach
Nr or No	number
NS	Naval Station
NSA	Naval Support Activity
NS ABTMT	Noise abatement
NSF	Naval Support Facility
nstd	nonstandard
ntc	notice
NVD	Night Vision Devices
NVG	Night Vision Goggles
NW	Northwest
NWC	Naval Weapons Center
NWS	National Weather Service
NWS	North Warning System

O

O/A	On or about
OAC	Oceanic Area Control, Oceanic Area Control Center
OAS	obstacle assessment surface
OAT	Operational Air Traffic
obsc	obscure
ObsHt	obstacle height
obsn	observation
obst	obstruction

F-18 FLIP AND NOTAM ABBREVIATIONS

OCA	Obstacle Clearance Altitude
OCA	Oceanic Control Area
OCH	obstacle clearance height
OCL	Obstacle Clearance Limits
ocnl	occasional
OCONUS	Outside Continental Limits of US
oct	octane
Oct	October
ODALS	Omnidirectional Approach Lighting System
ODO	Operations Duty Officer
ODP	Obstacle Departure Procedure
offl	official
OFFL BUS	Official business only
OIC	Officer In Charge
OK	we agree, correct
OLF	Outlying Field
OLS	Optical Landing System
OM	Outer Marker, ILS
ONC	Operational Navigation Chart
OOD	Officer Of the Day
OPAREA	Operating Area op by operating authority
opr	operate, operator
OPS	Operations
O/R	on request
OROCA	Off-Route Obstruction Clearance Altitude
ORTCA	Off-Route Terrain Clearance Altitude
orig	original
O/S	out of service
OSV	Ocean Station Vessel
OT	other times
otp	on top
OTR	Oceanic Transition Routes
OTS	Organized Track System
OUT	Facility off the air, or operational but not suitable for IFR operations-limitations explained
outbd	outbound
OVC	overcast
ovft	overflight
ovrn	overrun
OWS	Operational Weather Squadron
OX	Oxygen
OXRB	Oxygen Replacement Bottles

P

P	Civil Aerodrome available to transient military aircraft
P	Page (on Area Planning PCN)
P	Planning
P	Prohibited area (followed by identification)
PAC	Pacific (ICAO Region)
PACAF	Pacific Air Forces
PACOM	Pacific Command
PALS	Precision Approach and Landing Systems
PANS	Procedures for Air Navigation Services
PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
para	paragraph
parl	parallel
pat	pattern

PAX	Passenger
PCA	Positive Control Area
PCN	Pavement Classification Number
PCN	Planning Change Notice
PCZ	Positive Control Zone
PDM	Periodic Depot Maintenance
pent	penetrate
perm	permanent
perms	permission
pers	personnel
PFC	Porous Friction Courses
PIREP	Pilot Report (pertaining to MET conditions)
PJE	Parachuting Activities/ Exercises
P/L	plain language
PLA	practice low approach
PLASI	Pulse Light Approach Slope Indicator
p-line	pole/power line
pln	plan
PM	Post Meridiem, noon til midnight
PMSV	Pilot-to-Metro Service
PMRF	Pacific Missile Range Facility
PN	prior notice
PNR	point of no return
POB	persons on board
POL	Petrol, Oils and Lubricants
POMAR	Position Operational Meteorological Aircraft Report
POMOLA	Poor Mans Optical Landing System
posn	position
PPI	Plan Position Indicator
PPR	Prior Permission Required
pps	pulse per second
PRA	Precision Radar Approach (Instrument Approach Procedures Identification only)
prcht	parachute
precip	precipitation
pref	prefer
PRESAIR	Air Compressors
prev	previous
prim	primary
prk	park
PRM	Precision Runway Monitor
PRNAV	Precision Area Navigation
pro	procedure
prob	probable
proh	prohibited
pro tn	procedure turn
prov	provisional
ps	plus
psia	Pounds per square inch Ambient
psig	Pounds per square inch Gage
psnl	personal
PSP	Pierced Steel Planking
pt	point
ptcp	participate
PTD	Pilot to Dispatcher
PTS	Polar Track Structure
pub	publication
publ	publish
PV	prevailing visibility

PVASI	Pulsating Visual Approach Slope Indicator
pvt	private
pwr	power

Q

QDM	Magnetic heading (zero wind)
QDR	Magnetic bearing
QFE	Altimeter Setting above station
QNE	Altimeter Setting of 29.92 inches which provides height above standard datum plane
QNH	Altimeter Setting which provides height above mean sea level
qtrs	quarters
quad	quadrant

R

R	Ground Receive
R-	radial (followed by 3 digits- for use on instrument approach charts)
R	Restricted Area (followed by identification)
R	Right (runway designation)
RA	Radio Altimeter setting height
RACON	Radar Beacon
rad	radius, radial
RAF	Royal Air Force
RAI	runway alignment indicator
RAIL	Runway Alignment Indicator Lights
RAIZ	Automated Area Information Responders
RAMCC	Regional Air Movement Control Center
RAOB	Radiosonde observation
R-AOE	Regular Airport of Entry
RAPCON	Radar Approach Control (USAF)
RATCF	Radar Air Traffic Control Facility (Navy)
RB	Rescue Boat
RBn	Radio Beacon
RBS	Radar Bomb Scoring
RCA	reach cruise altitude
RCAG	Remote Center Air to Ground Facility
RCC	Rescue Coordination Center
RCF	Radar Control Facility (USAF)
RCF	Radio Communication Failure
RCL	runway centerline
RCLS	Runway Centerline Light System
RCO	Remote Communications Outlet
rcpt	reception
RCR	Runway Condition Reading
rcv	receive
rcvr	receiver
rdo	radio
recog	recognition
reconst	reconstruct
ref	reference
refuel	refueling
reg	regulation, regular
REIL	Runway End Identifier Lights
rel	reliable
relctd	relocated
REP	Reporting Point

repl	replace
reps	repairs
req	request
RETIL	Rapid Exit Taxiway Indicator Light
RF	Radius to Fix
RFP	Replacement Flight Plan
rg	range
Rgn	Region
Rgnl	Regional
rgt	right
rlgd	realigned
RLLS	Runway Lead-in Light System
rmk	remark
RNAV	Area Navigation
rng	range, radio range
RNP	Required Navigation Performance
ROC	rate of climb
ROFOR	Route Forecast (in international MET figure code)
RON	Remain Overnight
Rot Lt or Bcn	Rotating Light or Beacon
RPA	Remotely Piloted Aircraft
RPI	Runway Point of Intercept
rpt	repeat
rpt	report
rqr	require
RR	Railroad
RRL	Runway Remaining Lights
RRP	Runway Reference Point
RSC	Rescue Sub-Center
RSC	Runway Surface Condition
RSDU	Radar Storm Detection Unit
RSE	Runway Starter Extension/ Starter Strip
RSP	Responder (beacon)
RSR	Route Surveillance Radar
RSRS	Reduced Same Runway Separation
rstd	restricted
R/T	Radiotelephony
RTB	Return to Base
rte	route
RTF	Radiotelephone
RTG	radio telegraph
RTR	Remote Transmitter Receiver
RTT	radio teletypewriter
ruf	rough
rufness	roughness
RV	Rescue Vessel
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minima
RVV	Runway Visibility Value
R/W	Rotary/Wing
rwy	runway
RwyCC	Runway Condition Code

S

S	Straight-in-Approach (on instrument approach charts)
S	South
S	Supersonic (spoken ICAO ATS route designator)
SAFE-BAR	Safeland Barrier
SALS	Short Approach Lighting System

F-22 FLIP AND NOTAM ABBREVIATIONS

SALSF	SALS with Sequenced Flasher
SAM	South American (ICAO Region)
SAM	Special Air Mission
san	sanitary
SAR	Search and Rescue
SAR	Special Administrative Region
SARA	Search and Rescue Aid
SARPS	Standards and Recommended Practices
Sat	Saturday
satfy	satisfactory
SAVASI	Simplified Abbreviated Visual Approach Slope Indicator
SAWRS	Supplemental Aviation Weather Reporting Station
SBA	Standard Beam Approach
SBAS	Satellite-Based Augmentation System
Sbnd	Southbound
sby	standby
SCATANA	Security Control of Air Traffic and Air Navigational Aids
Sched	scheduled services
SCT	Scattered
sctr	sector
S/D	Seadrome
SDF	Simplified Directional Facility
SE	Southeast
sec	second, section
secd	secondary
seg	segment
SELCAL	Selective Calling System
SEng	Single Engine
Sep	September
sepn	separation
SES	Senior Executive Service
SFA	Single Frequency Approach
sfc	surface
SFL	Sequence Flashing Lights
SFO	Simulated Flameout
sgl	signal
SHAPE	Supreme Headquarters Allied Powers Europe
SHF	Super High Frequency (3000 to 30000 MHz)
SIAP	Standard Instrument Approach Procedure
SID	Standard Instrument Departure
SIF	Selective Identification Feature
simul	simultaneously
SIZ	Security Identification Zone
sked	schedule
SM	statute miles
SMC	surface movement control
SMGCS	Surface Movement Guidance & Control System
SMR	surface movement radar
SOAP	Spectrometric Oil Analysis Program
SOF	Supervisor of Flying
SR	Short Range
SR	Slow Speed Low Altitude Training Route
SR	Sunrise
SRA	Surveillance Radar Approach
SRE	Surveillance Radar Element of GCA (Instrument Approach Procedures Identification only)

SRR	search and rescue region
SRS	Substitute Route Structure
SS	Sunset
SSALF	Simplified Short ALS with sequenced flashers
SSALR	Simplified Short Approach Lighting System with RAIL
SSALS	Simplified Short Approach Lighting System
SSB	Single Sideband
SSR	Secondary Surveillance Radar
SST	Supersonic Transport
STAR	Standard Terminal Arrival
std	standard
stn	station
STOL	Short Take-Off and Landing
stor	storage
str-in	Straight-in
stu	student
subj	subject
sum	summer
Sun	Sunday
sur	surround
survl	survival, surveillance
suspd	suspended
svc	service
svcbl	serviceable
svcg	servicing
SVFR	Special Visual Flight Rules
SW	Southwest
swy	stopway
sxn	section
sys	system

T

T	Ground Transmit
T	Terminal Area Chart (followed by identification)
T	True (after a bearing)
TA	Transition Altitude
TA	Transition Area (for chart use only)
TAA	Terminal Arrival Area (FAA)
TAC	TACAN (For Instrument Approach Procedures Only)
TACAN	Tactical Air Navigation Equipment
TAF	Aerodrome (terminal or alternate) forecast in abbreviated form
TAFOR	Aerodrome (terminal or alternate) forecast in full form
TAFOT	Aerodrome Forecast in Units of English System
TALCE	Tanker Airlift Control Element
TAMET	Aerodrome Forecast in Units of Metric System
TAR	Terminal Area Surveillance Radar (for NOTAM use only)
TAS	True Airspeed
TBA	to be activated
TBI	to be inactivated
TCA	Terminal Control Area
TCH	Threshold Crossing Height
TCN	Terminal Change Notice
TCTA	Transcontinental Control Area
TD	Touchdown
TD	Transponder
TDWR	Terminal Doppler Weather Radar

F-24 FLIP AND NOTAM ABBREVIATIONS

TDZ	Touchdown Zone
TDZE	Touchdown Zone Elevation (For Instrument Approach Procedures Only)
TDZL	Touchdown Zone Lights
temp	temperature
TF	Terrain Following
tfc	traffic
TFR	Terrain Following Radar
TGL	touch and go landing
TGS	taxiway guidance system
T-HA	Terminal High Altitude (FLIP)
thld	threshold
thou	thousand
THRE	Threshold elevation
thru	through
Thu	Thursday
til	until
tkof	takeoff
T-LA	Terminal Low Altitude (FLIP)
TLa	Transition Layer
TLv	Transition Level
tmpry	temporary
TOC	tactical operations center
TODA	Take-off Distance Available
TORA	Take-off Run Available
TP	Tire Pressure
TPC	Tactical Pilotage Chart
tr	track
TRA	Temporary Reserved Airspace
TRACON	Terminal Radar Approach Control (FAA)
tran	transient
trans	transmit
trml	terminal
trng	training
trns	transition
TRSA	Terminal Radar Service Area
T-S	Terminal Seaplane (FLIP)
TSA	Temporary Segregated Airspace
TT	teletype
Tue	Tuesday
turb	turbulence
TV	Television
twd	toward
TWEB	Transcribed Weather Broadcast
twr	tower
TWX	Telegraphic Message
twy	taxiway
twyl	taxiway link

U

U	Upper (spoken ICAO ATS route designator)
UAB	until advised by
UACC	Upper Area Control Center (used outside US)
UAR	Upper Air Route
UAS	Unmanned Aerial System/ Unmanned Aircraft System
UAV	Unmanned Aerial Vehicle
UC	under construction (for chart use only)
UCN	Urgent Change Notice
UDA	Upper Advisory Area
UDF	Ultra High Frequency Direction Finder

UFA	until further advised
UFN	until further notice
UHF	Ultra High Frequency (300 to 3000 MHz)
UIC	Upper Information Center
UIR	Upper Flight Information Region
unauthd	unauthorized
unavbl	unavailable
unctl	uncontrolled
unk	unknown
unlcig	unlimited ceiling
unlgtd	unlighted
unltd	unlimited
unmrk	unmarked
unmto	unmonitored
unrel	unreliable
unrstd	unrestricted
unsatfy	unsatisfactory
unsked	unscheduled
unsvc	unserviceable
unuse	unusable
USA	United States Army, United States of America
USAF	United States Air Force
USAFE	United States Air Force in Europe
USAFIB	US Army Flight Information Bulletin
USAP	US Antarctic Program
USB	Upper Side Band
USBER	US Mission Berlin
USCG	United States Coast Guard
USMC	United States Marine Corps
USMTM	US Military Training Mission
USN	United States Navy
USNOF	US NOTAM Facility
UTA	Upper Control Area
UTC	Coordinated Universal Time
UTRACC	USAFE Tanker Recce Airlift Control Center

V

V	Defense Switching Network (telephone formerly AUTOVON)
V	VOR Federal Airway (followed by identification)
VAL	Visiting Aircraft Line
var	magnetic variation
VASI	Visual Approach Slope Indicator
VCIA	Vehicle Component Impact Area
vcnty	vicinity
VCOA	Visual Climb Over Airport (FAA)
VDA	Vertical Descent Angle
VDF	Very High Frequency Direction Finder
VDP	visual descent point
veh	vehicle
vert	vertical
VFC	Visual Flight Conditions
VFR	Visual Flight Rules
VFR-S	FLIP VFR Supplement
VGSI	Visual Glide Slope Indicating System
VHF	Very High Frequency (30 to 300 MHz)
via	by way of
VIP	Very Important Person
vis	visibility

F-26 FLIP AND NOTAM ABBREVIATIONS

VLF	Very Low Frequency
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VOIP	Voice Over Internet Protocol
VOLMET	Meteorological Information for Aircraft in Flight
VOR	VHF Omnirange
VORTAC	VOR and TACAN Navigational Facilities - collocated
VOT	VOR receiver testing facility
VR	VFR Military Training Route
vrb	variable
vsp	vertical speed
V/STOL	Vertical and Short Take-Off and Landing aircraft
VTOL	vertical takeoff and landing
V/V	Vertical Velocity

W

W	Warning Area (followed by identification)
W	Watts, West, White
WAAS	Wide Area Augmentation System
WAC	World Aeronautical Chart
wbar	with bar lights
Wbnd	Westbound
WCH	Wheel Crossing Height
WDI	wind direction indicator
wdspr	widespread
Wed	Wednesday
WEF	With Effect From
WEF	Effective From
WEPS	Weapons
Wg	Wing
WGS	World Geodetic System
wi	within
wid	width
WIE	with immediate effect
win	winter
WIP	work in progress
wk	week
wkd	weekday
wkend	weekend
wkly	weekly
wng	warning
wo	without
WPM	Words per minute
WPT	waypoint (RNAV)
WSP	Weather System Processor
wt	weight
W/T	Wireless Telegraphy
wx	weather
WxR	Weather Radar

X

x	cross
xbar	crossbar

Y

Y	Yellow
YCZ	yellow caution zone
yd	yard
YG	Yellow-Green Beacon
yr	year

Z

Z	Greenwich Mean Time (time groups only)

Z	VHF Station Location Marker
ZI	Zone of Interior

F-28 FLIP AND NOTAM ABBREVIATIONS

2. STATE/PROVENCE/COUNTRY ("FIPS/GENC") - are shown by an abbreviation. Beginning in 2014 the FIPS country codes will be replaced by the GENC country codes. NOTE: Both the FIPS code and GENC code will be shown for each Enroute Supplement entry (e.g. Aruba...AA/AW, Belgium...BE/BE) until further notice.

Country	FIPS	GENC
AFGHANISTAN	AF	AF
AKROTIRI	AX	QZ
ALBANIA	AL	AL
ALGERIA	AG	DZ
AMERICAN SAMOA	AQ	AS
ANDORRA	AN	AD
ANGOLA	AO	AO
ANGUILLA	AV	AI
ANTARCTICA	AY	AQ
ANTIGUA AND BARBUDA	AC	AG
ARGENTINA	AR	AR
ARMENIA	AM	AM
ARUBA	AA	AW
ASHMORE AND CARTIER ISLANDS	AT	XA
AUSTRALIA	AS	AU
AUSTRIA	AU	AT
AZERBAIJAN	AJ	AZ
BAHAMAS, THE	BF	BS
BAHRAIN	BA	BH
BAKER ISLAND	FQ	XB
BANGLADESH	BG	BD
BARBADOS	BB	BB
BASSAS DA INDIA	BS	QS
BELARUS	BO	BY
BELGIUM	BE	BE
BELIZE	BH	BZ
BENIN	BN	BJ
BERMUDA	BD	BM
BHUTAN	BT	BT
BOLIVIA	BL	BO
BOSNIA AND HERZEGOVINA	BK	BA
BOTSWANA	BC	BW
BOUVET ISLAND	BV	BV
BRAZIL	BR	BR
BRITISH INDIAN OCEAN TERRITORY	IO	IO
BRUNEI	BX	BN
BULGARIA	BU	BG
BURKINA FASO	UV	BF
BURMA	BM	MM
BURUNDI	BY	BI
CAMBODIA	CB	KH
CAMEROON	CM	CM
CANADA	CA	CA
CAPE VERDE	CV	CV
CAYMAN ISLANDS	CJ	KY
CENTRAL AFRICAN REPUBLIC	CT	CF
CHAD	CD	TD
CHILE	CI	CL
CHINA	CH	CN
CHRISTMAS ISLAND	KT	CX
CLIPPERTON ISLAND	IP	CP
COCOS (KEELING) ISLANDS	CK	CC
COLOMBIA	CO	CO
COMOROS	CN	KM
CONGO (BRAZZAVILLE)	CF	CG
CONGO (KINSHASA)	CG	CD
COOK ISLANDS	CW	CK
CORAL SEA ISLANDS	CR	XC

Country	FIPS	GENC
COSTA RICA	CS	CR
CÔTE D'IVOIRE	IV	CI
CROATIA	HR	HR
CUBA	CU	CU
CUBA	CU	A2
CURAÇAO	UC	CW
CYPRUS	CY	CY
CZECH REPUBLIC	EZ	CZ
DENMARK	DA	DK
DHEKELIA	DX	XD
DJIBOUTI	DJ	DJ
DOMINICA	DO	DM
DOMINICAN REPUBLIC	DR	DO
ECUADOR	EC	EC
EGYPT	EG	EG
EL SALVADOR	ES	SV
EQUATORIAL GUINEA	EK	GQ
ERITREA	ER	ER
ESTONIA	EN	EE
ETHIOPIA	ET	ET
ETOROFU, HABOMAI, KUNASHIRI, AND SHIKOTAN ISLANDS	PJ	QP
EUROPA ISLAND	EU	XE
FALKLAND ISLANDS (ISLAS MALVINAS)	FK	FK
FAROE ISLANDS	FO	FO
FIJI	FJ	FJ
FINLAND	FI	FI
FRANCE	FR	FR
FRENCH GUIANA	FG	GF
FRENCH POLYNESIA	FP	PF
FRENCH SOUTHERN AND ANTARCTIC LANDS	FS	TF
GABON	GB	GA
GAMBIA, THE	GA	GM
GAZA STRIP	GZ	XG
GAZA STRIP	GZ	PS
GEORGIA	GG	GE
GERMANY	GM	DE
GHANA	GH	GH
GIBRALTAR	GI	GI
GLORIOSO ISLANDS	GO	QX
GREECE	GR	GR
GREENLAND	GL	GL
GRENADA	GJ	GD
GUADELOUPE	GP	GP
GUAM	GQ	GU
GUATEMALA	GT	GT
GUERNSEY	GK	GG
GUINEA	GV	GN
GUINEA-BISSAU	PU	GW
GUYANA	GY	GY
HAITI	HA	HT
HEARD ISLAND AND MCDONALD ISLANDS	HM	HM
HONDURAS	HO	HN
HONG KONG	HK	HK
HOWLAND ISLAND	HQ	XH
HUNGARY	HU	HU
ICELAND	IC	IS
INDIA	IN	IN
INDONESIA	ID	ID

Country	FIPS	GENC
IRAN	IR	IR
IRAQ	IZ	IQ
IRELAND	EI	IE
ISLE OF MAN	IM	IM
ISRAEL	IS	IL
ITALY	IT	IT
JAMAICA	JM	JM
JAN MAYEN	JN	XJ
JAPAN	JA	JP
JARVIS ISLAND	DQ	XQ
JERSEY	JE	JE
JOHNSTON ATOLL	JQ	XU
JORDAN	JO	JO
JUAN DE NOVA ISLAND	JU	QU
KAZAKHSTAN	KZ	KZ
KENYA	KE	KE
KINGMAN REEF	KQ	XM
KIRIBATI	KR	KI
KOREA, NORTH	KN	KP
KOREA, SOUTH	KS	KR
KOSOVO	KV	XK
KUWAIT	KU	KW
KYRGYZSTAN	KG	KG
LAOS	LA	LA
LATVIA	LG	LV
LEBANON	LE	LB
LESOTHO	LT	LS
LIBERIA	LI	LR
LIBYA	LY	LY
LIECHTENSTEIN	LS	LI
LITHUANIA	LH	LT
LUXEMBOURG	LU	LU
MACAU	MC	MO
MACEDONIA	MK	MK
MADAGASCAR	MA	MG
MALAWI	MI	MW
MALAYSIA	MY	MY
MALDIVES	MV	MV
MALI	ML	ML
MALTA	MT	MT
MARSHALL ISLANDS	RM	MH
MARTINIQUE	MB	MQ
MAURITANIA	MR	MR
MAURITIUS	MP	MU
MAYOTTE	MF	YT
MEXICO	MX	MX
MICRONESIA, FEDERATED STATES OF	FM	FM
MIDWAY ISLANDS	MQ	QM
MOLDOVA	MD	MD
MONACO	MN	MC
MONGOLIA	MG	MN
MONTENEGRO	MJ	ME
MONTSERRAT	MH	MS
MOROCCO	MO	MA
MOZAMBIQUE	MZ	MZ
NAMIBIA	WA	NA
NAURU	NR	NR
NAVASSA ISLAND	BQ	XV
NEPAL	NP	NP
NETHERLANDS	NL	NL
NETHERLANDS	NL	BQ
NEW CALEDONIA	NC	NC
NEW ZEALAND	NZ	NZ
NICARAGUA	NU	NI
NIGER	NG	NE
NIGERIA	NI	NG
NIUE	NE	NU
NORFOLK ISLAND	NF	NF
NORTHERN MARIANA ISLANDS	CQ	MP
NORWAY	NO	NO
OMAN	MU	OM
PAKISTAN	PK	PK
PALAU	PS	PW
PALMYRA ATOLL	LQ	XL
PANAMA	PM	PA
PAPUA NEW GUINEA	PP	PG
PARACEL ISLANDS	PF	XP
PARAGUAY	PA	PY
PERU	PE	PE
PHILIPPINES	RP	PH
PITCAIRN ISLANDS	PC	PN
POLAND	PL	PL
PORTUGAL	PO	PT
PUERTO RICO	RQ	PR
QATAR	QA	QA
REUNION	RE	RE
ROMANIA	RO	RO
RUSSIA	RS	RU
RWANDA	RW	RW
SAINT BARTHELEMY	TB	BL
SAINT HELENA, ASCENSION, AND TRISTAN DA CUNHA	SH	SH
SAINT KITTS AND NEVIS	SC	KN
SAINT LUCIA	ST	LC
SAINT MARTIN	RN	MF
SAINT PIERRE AND MIQUELON	SB	PM
SAINT VINCENT AND THE GRENADINES	VC	VC
SAMOA	WS	WS
SAN MARINO	SM	SM
SAO TOME AND PRINCIPE	TP	ST
SAUDI ARABIA	SA	SA
SENEGAL	SG	SN
SERBIA	RI	RS
SEYCHELLES	SE	SC
SIERRA LEONE	SL	SL
SINGAPORE	SN	SG
SINT MAARTEN	NN	SX
SLOVAKIA	LO	SK
SLOVENIA	SI	SI
SOLOMON ISLANDS	BP	SB
SOMALIA	SO	SO
SOUTH AFRICA	SF	ZA
SOUTH GEORGIA AND SOUTH SANDWICH ISLANDS	SX	GS
SOUTH SUDAN	OD	SS
SPAIN	SP	ES
SPRATLY ISLANDS	PG	XS
SRI LANKA	CE	LK
SUDAN	SU	SD
SURINAME	NS	SR
SVALBARD	SV	XR
SWAZILAND	WZ	SZ
SWEDEN	SW	SE
SWITZERLAND	SZ	CH
SYRIA	SY	SY
TAIWAN	TW	TW
TAJIKISTAN	TI	TJ
TANZANIA	TZ	TZ
THAILAND	TH	TH
TIMOR-LESTE	TT	TL
TOGO	TO	TG
TOKELAU	TL	TK
TONGA	TN	TO
TRINIDAD AND TOBAGO	TD	TT
TROMELIN ISLAND	TE	XT

F-30 FLIP AND NOTAM ABBREVIATIONS

Country	FIPS	GENC
TUNISIA	TS	TN
TURKEY	TU	TR
TURKMENISTAN	TX	TM
TURKS AND CAICOS ISLANDS	TK	TC
TUVALU	TV	TV
UGANDA	UG	UG
UKRAINE	UP	UA
UNITED ARAB EMIRATES	AE	AE
UNITED KINGDOM	UK	GB
UNITED STATES	US	US
URUGUAY	UY	UY
UZBEKISTAN	UZ	UZ
VANUATU	NH	VU
VATICAN CITY	VT	VA
VENEZUELA	VE	VE
VIETNAM	VM	VN
VIRGIN ISLANDS, BRITISH	VI	VG
VIRGIN ISLANDS, U.S.	VQ	VI
WAKE ISLAND	WQ	QW
WALLIS AND FUTUNA	WF	WF
WEST BANK	WE	XW
WEST BANK	WE	PS
WESTERN SAHARA	WI	EH
YEMEN	YM	YE
ZAMBIA	ZA	ZM
ZIMBABWE	ZI	ZW

3. NOTAM CODE -

(ICAO DOC 8400)

a. The ICAO NOTAM Code is published to enable the coding of information regarding the establishment, condition or change of radio aids, aerodromes and lighting facilities, dangers to aircraft in flight, or search and rescue facilities. Encoding facilitates the dissemination of NOTAMs by reducing the transmission time over telecommunication channels and eliminating translation. The transmission of NOTAM over the international aeronautical telecommunication service is governed by the appropriate sections of the current "Communication Procedures" and Aeronautical Information Services Procedures. The former contains information on the acceptability of and priority to be accorded to NOTAM for transmission over the international aeronautical telecommunication service, the latter has full instructions on the textual format and contents of NOTAM.

b. All NOTAM Code groups contain a total of five letters:

(1) The first letter of the Code group is always the letter Q to indicate that it is a Code abbreviation for use in the composition of NOTAM. The letter Q has been chosen to avoid conflict with any assigned radio call sign.

(2) The second and third letters identify the subject reported upon and

(3) The fourth and fifth letters denote its status of operation. The code identifying the subject or denoting its status of operation is, whenever possible, self-evident. Where more than one subject could be identified by the same self- evident code the most important subject is chosen.

(a) Facilities, services and other information which require coding have been classified by subject into sections and subsections. The second letter of the code group, which may be any letter of the alphabet except Q, indicates the subject subsections as follows:

AGA (Aerodromes)

LIGHTING facilities	**- L**
MOVEMENT and landing area	**- M**
FACILITIES and services	**- F**

CNS (Communications, Navigation and Surveillance)

COMMUNICATION and radar facilities	**- C**
INSTRUMENT and microwave landing systems	**- I**
terminal and enroute **N**AVIGATION facilities	**- N**
GNSS services	**- G**

ATM (Air Traffic Management)

AIRSPACE organization	**- A**
air traffic and VOLMET **S**ERVICES	**- S**
air traffic **P**ROCEDURES	**- P**

Navigation Warnings

airspace **R**ESTRICTIONS	**- R**
WARNINGS	**- W**

Other information

OTHER information	**- O**

(b) The fourth letter of the code group, which may be any letter of the alphabet except Q, indicates status subsections as follows:

A	**A**vailability
C	**C**hanges
H	**H**azard conditions
L	**L**imitations
XX	Other

c. The significations assigned to NOTAM Code groups are to be amplified or completed where necessary by the addition of appropriate location indicators, name of station, geographical coordinates, abbreviations, frequencies, call signs or figures. ICAO abbreviations are to be used in preference to plain language wherever possible. The information necessary to complete a signification, as indicated between parentheses, shall be given as applicable. For amplification of the NOTAM Code as necessary to complete a signification the following applies:

(1) amplifications relating to the second and third letters (subject of the NOTAM) must precede the NOTAM Code.

(2) amplifications relating to the fourth and fifth letters (status of operation) must follow the NOTAM Code.

Examples (as applicable to Item E) of the NOTAM Class I format:

(a) The touchdown zone lights of RWY 27 are not available due to power failure.

Coded version:
E) RWY 27 QLZAU DUE POWER FAILURE.

(b) The taxiway edge lights of TWY B are obscured by snow.

Coded version:
E) TWY B QLYHO.

(c) On the strip of RWY 09/27 snow banks to a height of 15 ft exist.

Coded version:
E) RWY 09/27 QMWHY 15 FT

(d) The minimum safe altitude in sector 90° to 180° inbound VOR ident DOM changed to 3600 ft AMSL.

Coded version:
E) MSA 90 TO 180 DEG INBOUND VOR DOM QAACH 3600 FT AMSL

d. Five (5) letter NOTAM Code groups are formed in the following manner:

(1) FIRST LETTER

(a) The letter Q (See paragraph b.)

(2) SECOND AND THIRD LETTERS

(a) The appropriate combination of two letters selected from the "Second and Third Letters" section of the Code to identify the facility, service or danger to aircraft in flight being reported upon. (See paragraph b. (3) (a).

(3) FOURTH AND FIFTH LETTERS

(a) The appropriate combination of two letters selected from the "Fourth and Fifth Letters" section of the Code to denote the status of operation of the facility, service or danger to aircraft in flight reported upon. (See paragraph b. (3) (b)).

e. The NOTAM Code is to be used in conjunction with the NOTAM Class I format. The subject matter of the NOTAM will be subdivided into items identified by the letters A through G inclusive, each followed by a closing parenthesis. If there is no information for entry against a particular item, that item/identifier is omitted. The content of each item is:

ITEM	CONTENT
A)	ICAO location identifier of the aerodrome or FIR in which the facility, airspace, or condition being reported on is located. More than one FIR/UIR may be indicated when appropriate.
B)	Date/time group consisting of 8 figures, indicating the beginning of the period of validity giving month, day and hour in UTC or with immediate effect (WIE).
C)	Approximate duration (APRX DUR) of the period of validity, or permanent (PERM), or until further notice (UFN), or date/time group giving month, day and hour in UTC.
D)	Specified periods (if applicable) of activity of hazard, status or condition being reported on, within the period of validity.
E)	Text of the NOTAM coded, amplified or completed as necessary. Plain language will be used when suitable NOTAM Code groups are not available. ICAO abbreviations will be used when appropriate.
F)	Lower limit of Navigation Warnings/Airspace Reservations if applicable.
G)	Upper limit applicable to Item F).

NOTE: The use of this NOTAM format requires that each NOTAM deals with one subject and one condition concerning this subject only.

f. Examples of NOTAM Class I:

(1) The Distance Measuring Equipment (DME) at Paris/Orly not available on the 31st day of March at 2359 UTC until the 1st day of April at 0600 UTC.

NOTAM Class I:

A) LFPO B) 03312359 C) 04010600 E) QNDAU

Explanation:

Item A) ICAO location indicator identifying Paris/Orly, the location of the facility being reported on.

Item B) Date/time group of the beginning of the period of validity in which the facility is not available.

Item C) Date/time group of the end of the period of validity in which the facility is not available.

Item E) The letter "Q" identifies the five letter Code group as the NOTAM Code group. Second and third letter "ND" identifying "Distance measuring equipment (DME)". Fourth and fifth letter "AU" denoting that the facility is not available.

(2) In the Montreal FIR gun firing will take place on the 21st day of February from 0800 hours UTC until 1100 hours UTC within an area of 10 nautical miles radius around the location 45°37' North, 74°00' West from the surface up to an altitude of 6,100 meters (20,000 feet).

F-34 FLIP AND NOTAM ABBREVIATIONS

NOTAM Class I:

A) CZUL B) 02210800 C) 02211100
E) QWMLW RADIUS 10 NM AROUND 453700N 740000W
F) SFC G) 6100 M (20000 FT)

4. THE NOTAM CODE - DECODE

SECOND AND THIRD LETTERS

Code	Signification
AGA Lighting facilities (L)	
LA	Approach lighting system (specify runway and type)
LB	Aerodrome beacon
LC	Runway center line lights (specify runway)
LD	Landing direction indicator lights
LE	Runway edge lights (specify runway)
LF	Sequenced flashing lights (specify runway)
LG	Pilot-controlled lighting
LH	High intensity runway lights (specify runway)
LI	Runway end identifier lights (specify runway)
LJ	Runway alignment indicator lights (specify runway)
LK	Category II components of approach lighting system (specify runway)
LL	Low intensity runway lights (specify runway)
LM	Medium intensity runway lights (specify runway)
LP	Precision Approach Path Indicator (PAPI) (specify runway)
LR	All landing area lighting facilities
LS	Stopway lights (specify runway)
LT	Threshold lights (specify runway)
LU	Helicopter approach path indicator
LV	Visual Approach Slope Indicator system (VASI) (specify type and runway)
LW	Heliport lighting
LX	Taxiway center line lights (specify taxiway)
LY	Taxiway edge lights (specify taxiway)
LZ	Runway touchdown zone lights (specify runway)
AGA Movement and landing area (M)	
MA	Movement area
MB	Bearing strength (specify part of landing area or movement area)
MC	Clearway (specify runway)
MD	Declared distances (specify runway)
MG	Taxiing guidance system
MH	Runway arresting gear (specify runway)
MK	Parking area
MM	Daylight markings (specify threshold, center line, etc.)
MN	Apron
MO	Stopbar (specify taxiway)
MP	Aircraft stands (specify)
MR	Runway (specify runway)
MS	Stopway (specify runway)
MT	Threshold (specify runway)

MU	Runway turning bay (specify runway)
MW	Strip/shoulder (specify runway)
MX	Taxiway(s) (specify)
MY	Rapid exit taxiway (specify)

AGA
Facilities and services (F)

FA	Aerodrome
FB	Friction Measuring Device
FC	Ceiling measurement equipment
FD	Docking system (specify AGNIS, BOLDS, etc.)
FE	Oxygen (specify type)
FF	Fire fighting and rescue
FG	Ground movement control
FH	Helicopter alighting area/ platform
FI	Aircraft de-icing (specify)
FJ	Oils (specify type)
FL	Landing direction indicator
FM	Meteorological service (specify type)
FO	Fog dispersal system
FP	Heliport
FS	Snow removal equipment
FT	Transmissometer (specify runway and,where applicable,designator(s) of transmissometer(s)
FU	Fuel availability
FW	Wind direction indicator
FZ	Customs/immigration

CNS
Communications and surveillance facilities (C)

CA	Air/ground facility (specify service and frequency)
CB	Automatic dependent surveillance - broadcast (details)
CC	Automatic dependent surveillance - contract (details)
CD	Controller-pilot data link communications (details)
CE	Enroute surveillance radar
CG	Ground Controlled Approach system (GCA)
CL	Selective Calling system (SELCAL)
CM	Surface movement radar
CP	Precision Approach Radar(PAR) (specify runway)
CR	Surveillance radar element of precision approach radar system (specify wavelength)
CS	Secondary Surveillance Radar (SSR)
CT	Terminal Area Surveillance Radar (TAR)

CNS
Instrument and microwave landing systems (I)

IC	Instrument Landing System (ILS)
ID	DME associated with ILS
IG	Glide path (ILS) (specify runway)
II	Inner marker (ILS) (specify runway)
IL	Localizer (ILS) (specify runway)
IM	Middle marker (ILS) (specify runway)
IN	Localizer (not associated with ILS)
IO	Outer marker (ILS) (specify runway)
IS	ILS Category I (specify runway)

F-36 FLIP AND NOTAM ABBREVIATIONS

IT	ILS Category II (specify runway)
IU	ILS Category III (specify runway)
IW	Microwave Landing System (MLS) (specify runway)
IX	Locator, outer (ILS) (specify runway)
IY	Locator, middle (ILS) (specify runway)

CNS
GNSS services (G)

GA	GNSS airfield-specific operations (specify operation)
GW	GNSS area-wide operations (specify operation)

CNS
Terminal and enroute navigation facilities (N)

NA	All radio navigation facilities (except . . .)
NB	Non-directional radio beacon)
NC	DECCA
ND	Distance Measuring Equipment (DME)
NF	Fan marker
NL	Locator (specify identification)
NM	VOR/DME
NN	TACAN
NT	VORTAC
NV	VOR
NX	Direction finding station (specify type and frequency)

ATM
Airspace organization (A)

AA	Minimum altitude (specify enroute/crossing/safe)
AC	Control Zone
AD	Air Defense Identification Zone (ADIZ)
AE	Control Area (CTA)
AF	Flight Information Region (FIR)
AH	Upper control area (UTA)
AL	Minimum usable flight level
AN	Area navigation route
AO	Oceanic Control Area (OCA)
AP	Reporting point (specify name or coded designator)
AR	ATS route (specify)
AT	Terminal Control Area
AU	Upper flight information region (UIR)
AV	Upper advisory area (UDA)
AX	Significant point
AZ	Aerodrome traffic zone

ATM
Air traffic and VOLMET services (S)

SA	Automatic Terminal Information Service (ATIS)
SB	ATS reporting office
SC	Area Control Center (ACC
SE	Flight Information Service (FIS)
SF	Aerodrome Flight Information Service (AFIS)
SL	Flow control center
SO	Oceanic Area Control Center (OAC)
SP	Approach control service (APP)
SS	Flight Service Station (FSS)
ST	Aerodrome control tower (TWR)
SU	Upper area control center (UAC)

SV	VOLMET broadcast
SY	Upper advisory service (specify)

ATM
Air traffic procedures (P)

PA	Standard instrument arrival (STAR) (specify route designator)
PB	Standard VFR arrival
PC	Contingency procedures
PD	Standard Instrument Departure (SID) (specify route designator)
PE	Standard VFR departure
PF	Flow control procedure
PH	Holding procedure
PI	Instrument approach procedure (specify type and runway)
PK	VFR approach procedure
PL	Flight plan processing, filing and related contingency
PM	Aerodrome operating minima (specify procedure and amended minimum)
PN	Noise operating restrictions
PO	Obstacle clearance altitude and height (specify procedure)
PR	Radio failure procedure
PT	Transition altitude and transition level (specify)
PU	Missed approach procedure (specify runway)
PX	Minimum holding altitude (specify fix)
PZ	ADIZ procedure

Navigation Warnings - Airspace Restrictions (R)

RA	Airspace reservation (specify)
RM	Military operating area
RO	Overflying of . . . (specify)
RR	Restricted area (specify national prefix and number)
RT	Temporary restricted area (Specify area)

Navigation Warnings - Warnings (W)

WA	Air display
WB	Aerobatics
WC	Captive balloon or kite
WD	Demolition of explosives
WE	Exercises (specify)
WF	Air refueling
WG	Glider flying
WH	Blasting
WJ	Banner/target towing
WL	Ascent of free balloon
WM	Missile, gun or rocket firing
WP	Parachute Jumping Exercise, paragliding, or hang gliding
WR	Radioactive materials or toxic chemicals (specify)
WS	Burning or blowing gas
WT	Mass movement of aircraft
WU	Unmanned aircraft
WV	Formation flight
WW	Significant volcanic activity
WY	Aerial survey
WZ	Model flying

Other Information (O)

OA	Aeronautical information service
OB	Obstacle (specify details)
OE	Aircraft entry requirements

F-38 FLIP AND NOTAM ABBREVIATIONS

OL	Obstacle lights on . . . (specify)
OR	Rescue coordination center

FOURTH AND FIFTH LETTERS

Code	Signification
Availability (A)	
AC	Withdrawn for maintenance
AD	Available for daylight operation
AF	Flight checked and found reliable
AG	Operating but ground checked only, awaiting flight check
AH	Hours of service are now
AK	Resumed normal operation
AL	Operative (or reoperative) subject to previously published limitations/ conditions
AM	Military operations only
AN	Available for night operation
AO	Operational
AP	Available, prior permission required
AR	Available on request
AS	Unserviceable
AU	Not available (specify reason if appropriate)
AW	Completely withdrawn
AX	Previously promulgated shutdown has been canceled
Changes (C)	
CA	Activated
CC	Completed
CD	Deactivated
CE	Erected
CF	Frequency changed to
CG	Downgraded to
CH	Changed
CI	Identification or radio call sign changed to
CL	Realigned
CM	Displaced
CN	Cancelled
CO	Operating
CP	Operating on reduced power
CR	Temporarily replaced by
CS	Installed
CT	On test, do not use
Hazard Conditions (H)	
HA	Braking action is . . . 1) Poor 2) Medium/Poor 3) Medium 4) Medium/Good 5) Good
HB	Braking coefficient is . . . (specify measurement device used)
HC	Covered by compacted snow to a depth of
HD	Covered by dry snow to a depth of
HE	Covered by water to a depth of
HF	Totally free of snow and ice
HG	Grass cutting in progress
HH	Hazard due to (specify)
HI	Covered by ice

HJ	Launch planned . . . (specify balloon flight identification or project code name, launch site, planned period of launch(es) - date/time, expected climb direction, estimate time to pass 18,000 m (60,000 ft), or reaching cruising level if at or below 18,000 m (60,000 ft), together with estimated location)
HK	Migration in progress
HL	Snow clearance completed
HM	Marked by
HN	Covered by wet snow or slush to a depth of
HO	Obscured by snow
HP	Snow clearance in progress
HQ	Operations Cancelled
HR	Standing water
HS	Sanding
HT	Approach according to signal area only
HU	Launch in progress . . . (specify balloon flight identification or project code name, launch site, date/time of launch(es), estimated time passing 18,000 m (60,000 ft), or reaching cruising level if at or below 18,000 m (60,000 ft), together with estimated location, estimated date/time of termination of the flight and planned location of ground contact, when applicable)
HV	Work completed
HW	Work in progress
HX	Concentration of birds
HY	Snow banks exist (specify height)
HZ	Covered by frozen ruts and ridges
Limitation (L)	
LA	Operating on auxilliary power supply
LB	Reserved for aircraft based therein
LC	Closed
LD	Unsafe
LE	Operating without auxilliary power supply
LF	Interference from
LG	Operating without identification
LH	Unserviceable for aircraft heavier than
LI	Closed for IFR operations
LK	Operating as a fixed light
LL	Usable for length of . . . and width of . . .
LN	Closed to all night operations
LP	Prohibited to
LR	Aircraft restricted to runways and taxiways
LS	Subject to interruption
LT	Limited to
LV	Closed to VFR operations
LW	Will take place
LX	Operating but caution advised due to
TT	Hazard
OTHERS (XX)	
XX	Plain language

5. NATIONAL FLIGHT DATA CENTER (NFDC) FDC NOTAM CONTRACTIONS -

This listing contains contractions used by the FAA's NFDC in FDC NOTAMs. These contractions will not be used in the DoD FLIP or NOTAM Systems. These contractions appear in the FAA Notices to Airmen Book.

F-40 FLIP AND NOTAM ABBREVIATIONS

A

AADC	Approach and Departure Control
A/C	Approach Control
ACCUM	Accumulate
ACR	Air Carrier
ACT	Restricted Area
ACTV/ACTVT	Active/Activate
ADZ/ADZA	Advise/Advised
AFD	Airport Facility Directory
AFSS	Automated Flight Service Station
ALTM	Altimeter
ALSTG	Altimeter Setting
AP	Airport
APL	Airport Lights
AP LGT	Airport Lighting
ARFF	Aircraft Rescue & Fire Fighting
ATCT	Airport Traffic Control Tower
AZM	Azimuth

B

BERM	Snowbank(s) Containing Earth/Gravel
BLO	Below
BND	Bound

C

CAAS	Class A Airspace
CBAS	Class B Airspace
CBSA	Class B Surface Area
CCAS	Class C Airspace
CCSA	Class C Surface Area
CD	Clearance Delivery
CDAS	Class D Airspace
CDSA	Class D Surface Area
CEAS	Class E Airspace
CESA	Class E Surface Area
CFA	Controlled Firing Area
CGAS	Class G Airspace
CLKWS	Clockwise
CMSN/ CMSND	Commission/ Commissioned
CNCL/ CNCLD/CNL	Cancel/Canceled/Cancel
CNTRLN	Centerline

D

DALGT	Daylight
DCMS/ DCMSND	Decommission/ Decommissioned
DISABLD	Disabled
DLA/DLAD	Delay/Delayed
DMNST	Demonstration
DPCR	Departure Procedure
DRFT/DRFTD	Drift/Drifted Snowbanks (Caused by wind action)
DSTC	Distance
DWPNT	Dew Point

E

EFAS	Enroute Flight Advisory Service
ENTR	Entire
EXCP	Except

F

FA	Final Approach
FRH	Fly Runway Heading
FRZN	Frozen

G

GP	Glide Slope

	H
HEL	Helicopter
HELI	Heliport
HP	Holding Pattern
	I
IBND	Inbound
ID	Identification
	L
LAA	Local Airport Advisory
LAWRS	Limited Aviation Weather Reporting Station
LC	Local Control
LNDG	Landing
LO	Compass Locator
LT	Left Turn After Take-off
	M
MMM	Minimum
MONTR	Monitor
MSAW	Minimum Safe Altitude Warning
	N
NMR	Nautical Mile Radius
	O
OBSTN	Obstruction
OPER	Operate
OVR	Over
	P
PAEW	Personnel and Equipment Working
PAJA	Parachute Jumping Activities
PCL	Pilot Controlled Lighting
PLW	Plow/Plowed
PRIRA	Primary Radar
PROP	Propeller
PSGR	Passenger
PT/PTN	Procedure Turn
	R
REP	Report
RMDR	Remainder
RQRD	Required
RSVN	Reservation
RT	Right Turn After Take-off
RTS	Return to Service
RVRM	RVR Midpoint
RVRR	RVR Rollout
RVRT	RVR Touchdown
RVV	Runway Visibility Value
	S
SECRA	Secondary Radar
SI	Straight-In Approach
SND	Sand/Sanded
SNGL	Single
SNW	Snow
	T
TDWR	Terminal Doppler Wx Radar
TEMPO	Temporary
TFR	Temporary Flight Restrictions
TNH	Thin
THR	Threshold
TRSN	Transition
TSNT	Transient
	U
UNMKD	Unmarked
UNMNT	Unmonitored
UNRELBL	Unreliable
UNUSBL	Unusable

	V	WND	Wind
VICE	Instead of/Versus	WP	Waypoint
	W	WTR	Water on Runway(s)
WKDAYS	Weekdays (Mon-Fri)		

SIGNALS INITIATED BY INTERCEPTED AIRCRAFT AND RESPONSES BY INTERCEPTING AIRCRAFT

SERIES	INTERCEPTED AIRCRAFT SIGNALS	MEANING	INTERCEPTING AIRCRAFT RESPONSE	MEANING
4	DAY or NIGHT - Raising landing gear (if fitted) and flashing landing lights while passing over runway in use or helicopter landing area at a height exceeding 300 m (1000 ft) but not exceeding 600 m (2000 ft) (in the case of a helicopter, at a height exceeding 50 m (170 ft) but not exceeding 100 m (330 ft) above the airport level, and continuing to circle runway in use or helicopter landing area. If unable to flash landing lights, flash any other lights available.	Airport You have designated is inadequate.	DAY or NIGHT - If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate airport, the intercepting aircraft raises its landing gear (if fitted) and uses the Series 1 signals prescribed for intercepting aircraft.	Understood follow me.
			If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood you may proceed.
5	DAY or NIGHT - Regular switching on and off of all available lights but in such a manner as to be distinct from flahsing lights.	Cannot comply.	DAY or NIGHT - Use Series 2 signals prescribed for intercepting aircraft.	Understood
6	DAY or NIGHT - Irregular flashing of all available lights.	In distress.	DAY or NIGHT - Use Series 2 signals prescribed for intercepting aircraft.	Understood

ACTION BY INTERCEPTED AIRCRAFT

1. The word "interception" in this context does not include intercept and escort service provided, on request, to an aircraft in distress, in accordance with the Search and Rescue Manaul (Doc 7333).

2. An aircraft which is intercepted by another aircraft shall immediately:

a. follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals;

b. notify, if possible, the appropriate air traffic services unit;

c. attempt to establish radio communication with the appropriate intercept control unit, by making a general call on the emergency frequency 121.5 MHz, giving the identity of the intercepted aircraft and the nature of the flight; and if no contact has been established and if practicable, repeating this call on the emergency frequency 243 MHz;

d. if equipped with SSR transponder select Mode 3/A Code 7700, unless otherwise instructed by the appropriate air traffic services unit.

3. If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual or radio signals, the intercepted aircraft shall request immediate clarification while continuing to comply with the instructions given by the intercepting aircraft.

INTERCEPTION SIGNALS - ICAO STANDARD
FOR COUNTRY EXCEPTIONS TO ICAO STANDARD
SEE SECTION A

(ICAO ANNEX 2, RULES OF THE AIR, NOV 05)

SIGNALS INITIATED BY INTERCEPTING AIRCRAFT AND RESPONSES BY INTERCEPTED AIRCRAFT

SERIES	INTERCEPTING AIRCRAFT SIGNALS	MEANING	INTERCEPTED AIRCRAFT RESPONSE	MEANING
1	DAY or NIGHT - Rocking aircraft and flashing navigational lights at irregular intervals (and landing lights in the case of a helicopter) from a position slightly above and ahead of, and normally to the left of, the intercepted aircraft (or to the right if the intercepted aircraft is a helicopter) and, after acknowledgment, a slow level turn, normally to the left, (or to the right in the case of a helicopter) on the desired heading.	You have been intercepted. Follow me.	DAY or NIGHT - Rocking aircraft, flashing navigational lights at irregular intervals and following.	Understood, will comply.
	NOTE 1: Meteorological conditions or terrain may require the intercepting aircraft to reverse the positions and direction of turn given above in Series 1.		**NOTE:** Additional action required to be taken by intercepted aircraft is prescribed in "ACTION BY INTERCEPTED AIRCRAFT."	
	NOTE 2: If the intercepted aircraft is not able to keep pace with the intercepting aircraft, the latter is expected to fly a series of race-track patterns and to rock the aircraft each time it passes the intercepted aircraft.			
2	DAY or NIGHT - An abrupt breakaway maneuver from the intercepted aircraft consisting of a climbing turn of 90 degrees or more without crossing the line of flight of the intercepted aircraft.	You may proceed.	DAY or NIGHT - Rocking aircraft.	Understood, will comply.
3	DAY or NIGHT - Lowering landing gear (if fitted), showing steady landing lights and overflying runway in use or, if the intercepted aircraft is a helicopter, overflying the helicopter landing area. In the case of helicopters, the intercepting helicopter makes a landing approach, coming to hover near to the landing area.	Land at this airport.	DAY or NIGHT - Lowering landing gear, (if fitted), showing steady landing lights and following the intercepting aircraft and, if after overflying the runway in use or helicopter landing area, landing is considered safe, proceeding to land.	Understood will comply.

CONTINUE TO INSIDE BACK COVER