Flight Planning

Table of Contents

Frequent or Planned Destinations Record

Airport _____ Ident. _____

FBO _____ Freq. _____ Tel: ( ) _____

Fax: ( ) _____

Hotel _____ Tel: ( ) _____

Fax: ( ) _____

Catering _____ Tel: ( ) _____

Airport _____ Ident. _____

FBO _____ Freq. _____ Tel: ( ) _____

Fax: ( ) _____

Hotel _____ Tel: ( ) _____

Fax: ( ) _____

Catering _____ Tel: ( ) _____

Airport _____ Ident. _____

FBO _____ Freq. _____ Tel: ( ) _____

Fax: ( ) _____

Hotel _____ Tel: ( ) _____

Fax: ( ) _____

Catering _____ Tel: ( ) _____

Notes _____

_____

_____

Airport _____ Ident. _____

FBO _____ Freq. _____ Tel: ( ) _____

Fax: ( ) _____

Hotel _____ Tel: ( ) _____

Fax: ( ) _____

Catering _____ Tel: ( ) _____

Airport _____ Ident. _____

FBO _____ Freq. _____ Tel: ( ) _____

Fax: ( ) _____

Hotel _____ Tel: ( ) _____

Fax: ( ) _____

Catering _____ Tel: ( ) _____

Airport _____ Ident. _____

FBO _____ Freq. _____ Tel: ( ) _____

Fax: ( ) _____

Hotel _____ Tel: ( ) _____

Fax: ( ) _____

Catering _____ Tel: ( ) _____

Notes _____

_____

_____

_____

Flight Planning – General

Takeoff Weight Determination

Charts in the Airplane Flight Manual (AFM), Section V, facilitate determination of takeoff, climb, landing performance, as well as flight planning at various parameters of weight, power, altitude, and temperature.

Maximum takeoff weight is 12,500 lbs, unless restricted by the following graphs:

- Maximum Takeoff Weight Permitted by Enroute Climb Requirements
- Takeoff Weight to Achieve Positive One Engine Inoperative Climb at Liftoff
- Maximum Enroute Weight (FAR 135 operations)
- Takeoff Weight to Meet FAR 25 Takeoff Climb Requirements (Optional)

FAR 23 Climb Requirements are:

- Surface to 400 ft AGL . . . . . POSITIVE
- At 1,500 ft AGL 0.75%
- Balked Landing Climb 2.5%

Takeoff Weight to Meet FAR 25 Takeoff and Climb Requirements

The following information has been presented to provide the option of limiting weight to obtain the performance specifications of FAR 25 during critical takeoff and initial climb flight segments.

NOTE: Their use is not mandatory and full compliance with other regulations applicable for FAR 25 is not implied.

The criteria for limiting weight involves the selection from the Takeoff Weight graphs of the most adverse conditions of:

- One Engine Inoperative Climb
- Field Length to Acclerate-Stop
- Field Length to Accelerate-Go
- The takeoff flight path required to clear known obstacles beyond the runway

Performance graphs associated with the above conditions are:

- Takeoff Weight to Meet FAR 25 Takeoff Climb Requirements graphs
- Accelerate-Stop graphs
- Accelerate-Go graphs
- Net Gradient of Climb graphs

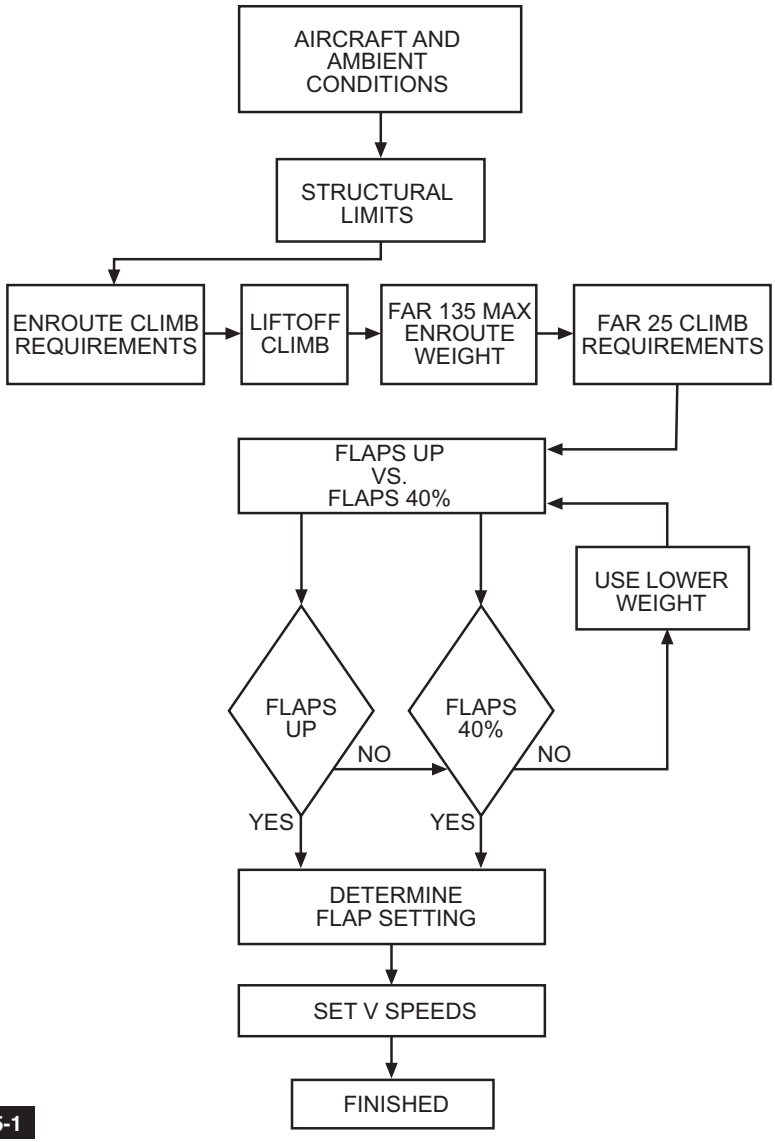
(Reference FAR 25.109, 25.111, 25.115, and 25.121)

The performance presented using this criteria is predicated on the autofeather system being armed and operable.

The Ground Minimum Control Speed (V_{MCG}) has been determined to be 84 knots. At this speed, control within 25 feet of the runway centerline is possible.

The flowchart on the following page illustrates the steps necessary to determine the maximum allowable takeoff weight.

Takeoff Weight Determination Procedure



5-1

Flaps UP vs. Flaps 40%
One Engine Inoperative

Example:

Associated Conditions:

- Runway Length (Paved, Level, Dry) . . . . . 4,700 FEET
- Pressure Altitude . . . . . 6,000 FEET MSL
- Temperature . . . . . 20°C
- Takeoff Weight . . . . . 12,OOO LBS
- Zero Wind
- No Obstacle
- Standard Gear

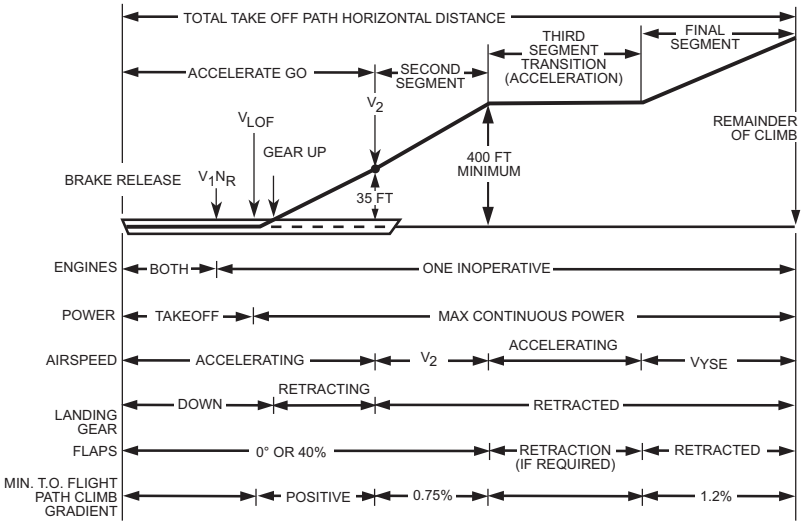
	Distances	
	Flaps UP	**Flaps 40%**
Ground Roll	2820	2700
Accelerate-Stop	4600	4600
Accelerate-Go[1]	9800	7400
Climb Gradient	3.2%	2.1%
V_2	119	105

In this example, the most significant effect of using flaps 40% for takeoff is a reduced Accelerate-Go figure which will result in achieving a larger margin of safety on this particular runway. Should an engine suddenly fail at V_1, the airplane would not lift off until passing the end of the runway if flaps were not used for takeoff. By selecting Flaps Approach for takeoff, Accelerate-Stop becomes limiting and remains within the available runway length.

[1]Air distance is 50% of Takeoff Field Length

Minimum Climb/Obstacle Clearance

One Engine Inoperative



5-2

Landing Gross Weight Determination

Charts in the AFM, Section V, facilitate determination of approach and landing performance, landing field requirements, and approach speed values.

When using the charts in Section V, remember the following important issues:

Climb – Balked Landing Chart

- Balked landing climb speed is 100 kts. (21 kts below V_{YSE} at gross weight)
- Flaps and gear are left in the landing configuration until obstacles are cleared. Flap and gear retraction occurs while transitioning to a normal climb attitude, airspeed, and power configuration.
- There is a 10°C penalty for operations with ice vanes extended

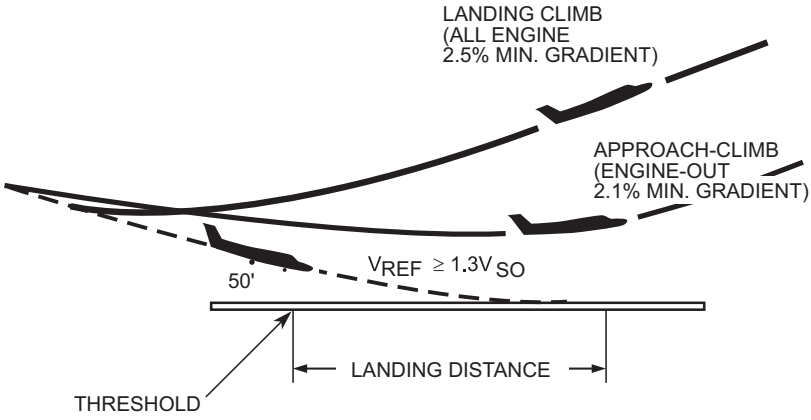
Normal Landing Distance without Propeller Reversing

- Power is retarded to maintain an 800 foot-per-minute (fpm) rate of descent. 900 fpm needed with flaps UP.
- Landing distances assume using maximum braking without sliding the tires.

Normal Landing Distance with Propeller Reversing

- Power is retarded to maintain 1,000 fpm rate of descent.
- Landing distances assume using maximum braking without sliding the tires.
- Maximum propeller reverse is applied until reaching a complete stop.

Landing Path Profile



5-3

Sample Weight and Balance Loading Form

SERIAL:		REGISTRATION DATE: NO:		
REF	ITEM	WEIGHT *( )	ARM (IN)	MOM/100 *( )
1.	BASIC EMPTY WEIGHT			
2.	CREW			
3.	PASSENGERS OR CARGO			
4.	BAGGAGE			
5.	CABINET CONTENTS			
6.	**SUB TOTAL** ZERO FUEL CONDITION DO NOT EXCEED 11,000 LBS (**B200**) 10,400 LBS (**200**)			
7.	FUEL LOADING			
8.	**SUB TOTAL** RAMP CONDITION			
9.	LESS FUEL FOR START, TAXI, AND TAKEOFF	90		177
10.	**TOTAL** TAKEOFF CONDITION			
11.	FUEL LOADING (FROM LINE 7)			
12.	MINUS TOTAL FUEL USED TO DESIGNATION INCLUDING START, TAXI, AND TAKEOFF			
13.	FUEL REMAINING (MOM/100 FROM USABLE FUEL TABLE)			
14.	PLUS ZERO FUEL WEIGHT (FROM LINE 6)			
15.	LANDING CONDITION			

* ENTER UNITS USED IN LB & LB-IN OR KG & KG-IN.

Weight and Balance Determination

To determine than an aircraft is (and remains) within the gross weight and center of gravity limitations, use the checklist below to complete a loading schedule (sample on opposite page).

1. Record the basic empty weight and moment from the Basic Empty Weight and Balance form (or from the latest superceding forms). The moment must be divided by 100 to correspond to Useful Load Moment tables presented in the AFM.
2. Record the weight and corresponding moment of each item to be carried. These values are found on the Useful Load Weight and Moment tables.
3. Total the weight column and moment column. The total weight, without usable fuel, must not exceed the Maximum Zero Fuel Weight for the aircraft.

   All weight in excess of this limitation must be fuel.
4. Enter the desired fuel loading weight and moment from the Useful Load Weights and Moments – Usable Fuel table.

   The auxiliary tanks may be used only when the main tanks are completely filled.
5. Subtract 90 lbs of fuel at an average moment of 177 to allow for fuel consumption for Start, Taxi, and Takeoff to arrive at the Takeoff Condition. The total takeoff weight must not exceed the maximum allowable takeoff weight and the total moment must be within the minimum and maximum moments shown on the Moment Limits vs. Weight table or graph.
6. Using the data supplied in the Performance Section of the AFM, calculate the fuel remaining at the landing destination by subtracting the total weight of fuel consumed (including Start, Taxi, and Takeoff fuel) from the original fuel loading.

7. For Landing condition weight and balance, add the Landing Fuel weight and moment to the Zero Fuel weight and moment values. The landing moment must be within the minimum and maximum moments shown on the Moment Limits vs. Weight table for that weight.

   If the total moment is less than the minimum moment allowed, useful load items must be shifted aft or forward load items reduced. If the quantity or location of load items is changed, the calculations must be revised and the moments rechecked.

Weight – Shift Calculations

Should either the takeoff or landing weight and balance fall outside specified limitations, use the following methods to bring the aircraft load back into allowable limits.

1. Determine the necessary distance the CG must be moved to bring the airplane back into limits by subtracting the maximum moment from the calculated moment (or for forward CG problems; calculated moment from the minimum moment).
2. Divide the moment difference by the calculated takeoff weight and multiply that value by 100. The result is the distance the CG must be shifted.
3. Determine the required distance to move a specific weight by multiplying Takeoff Weight and the desired shift in CG. Divide this product by the weight to be moved.

$$\frac{\textbf{Weight to be Shifted}}{\textbf{Takeoff Weight}} = \frac{\textbf{Desired Change in CG}}{\textbf{Weight Arm Distance}}$$

4. The result is the minimum distance required for a specific weight to be moved in order to shift the center of gravity by the required amount.

International Flight Planning
Frequently Used International Terms

International Term	Explanation
ACC	Area Control Center
ADCUS	Advise Customs
AFIL	Air-Filed ICAO Flight Plan
ARINC	Aeronautical Radio Inc.
ATS	Air Traffic Services
BERNA	Swiss Radio Service
DEC	General Declaration (customs)
ETP	Equal Time Point (navigation)
FIC	Flight Information Center
FIR	Flight Information Region
GCA	Ground Controlled Approach
GEOMETER	A clear plastic attachment to a globe that aids in making surface measurements and determining points on the globe
IATA	International Air Traffic Association
ICAO	International Civil Aviation Organization
MET	See METAR
METAR	Routine Aviation Weather Reports
MNPS	Minimum Navigation Performance Specifications
NAT	North Atlantic

International Term	Explanation
NOPAC	North Pacific
OAG	Official Airline Guide
OKTA	Measure of cloud cover in eighths (five OKTAs constitute a ceiling)
OTS	Organized Track Structure
PPO	Prior Permission Only
PSR	Point of Safe Return (navigation)
QFE	Used in some nations; an altimeter setting that causes the altimeter to read zero feet when on the ground
QNE	Altimeter setting used at or above transition altitude (FL 180 in U.S.); this setting is always 29.92
QNH	Altimeter setting that causes altimeter to read field elevation on the ground
SITA	Societe Internationale de Telecommunications Aeronautiques; international organization provides global telecommunications network information to the air transport industry
SPECI	Aviation selected special WX reports
SSR	Secondary Surveillance Radar
TAF	Terminal Airdrome Forecast
UIR	Upper Information Region
UTA	Upper Control Area
WWV/WWVH	Time and frequency standard broadcast stations

International Operations Checklist

Aircrews are required to carry all appropriate FAA licenses and at least an FCC Restricted Radio Telephone Operations license. In addition, passport, visas, and an International Certificate of Vaccination are often required. The International Flight Information Manual (IFIM) specifies passport, inoculation and visa requirements for entry to each country.

The IFIM is a collection of data from Aeronautical Information Publications (AIP) published by the civil aviation authorities (CAA) of various countries.

The following detailed checklist should be helpful in establishing international operations requirements and procedures. You may want to use it to prepare your own customized checklist for your organization's planned destinations.

I. DOCUMENTATION

PERSONNEL, CREW

- ❒ Airman's certificates
- ❒ Physical
- ❒ Passport
- ❒ Extra photos
- ❒ Visa
- ❒ Tourist card
- ❒ Proof of citizenship (not driver's license)
- ❒ Immunization records
- ❒ Traveler's checks
- ❒ Credit cards
- ❒ Cash
- ❒ Passenger manifest (full name, passport no.)
- ❒ Trip itinerary
- ❒ International driver's license

AIRCRAFT

- ❒ Airworthiness certificate
- ❒ Registration
- ❒ Radio licenses
- ❒ MNPS certification
- ❒ Aircraft flight manual
- ❒ Maintenance records
- ❒ Certificates of insurance (U.S. military and foreign)
- ❒ Import papers (for aircraft of foreign manufacture)

II. OPERATIONS

PERMITS

- ❒ Flight authorization letter
- ❒ Overflights
- ❒ Landing
- ❒ Advance notice
- ❒ Export licenses (navigation equipment)
- ❒ Military
- ❒ Customs overflight
- ❒ Customs landing rights

SERVICES

Inspection

- ❒ Customs forms
- ❒ Immigrations
- ❒ Agricultural (disinfectant)

Ground

- ❒ Handling agents
- ❒ FBOs

- ❒ Fuel (credit cards, carnets)
  - ❒ Prist
  - ❒ Methanol
  - ❒ Anti-ice/De-ice
- ❒ Maintenance
  - ❒ Flyaway kit (spares)
  - ❒ Fuel contamination check

Financial

- ❒ Credit cards
- ❒ Carnets
- ❒ Letters of credit
  - ❒ Banks
  - ❒ Servicing air carriers
  - ❒ Handling
  - ❒ Fuelers
- ❒ Traveler's checks
- ❒ Cash

COMMUNICATIONS

Equipment

- ❒ VHF
- ❒ UHF
- ❒ HF SSB
- ❒ Headphones
- ❒ Portables (ELTs, etc.)
- ❒ Spares

Agreements

- ❒ ARINC
- ❒ BERNA (Switzerland)
- ❒ SITA
- ❒ Stockholm

NAVIGATION

Equipment

- ❒ VOR
- ❒ DME
- ❒ ADF
- ❒ Inertial
- ❒ VLF/OMEGA
- ❒ LORAN
- ❒ GPS

Publications

- ❒ Onboard computer (update)
- ❒ En route charts (VFR, IFR)
- ❒ Plotting charts
- ❒ Approach charts (area, terminal)
- ❒ NAT message (current)
- ❒ Flight plans
- ❒ Blank flight plans

III. OTHER PUBLICATIONS

- ❒ Operations manual
- ❒ International Flight Information Manual
- ❒ Maintenance manuals
- ❒ Manufacturer's sources
- ❒ World Aviation Directory
- ❒ Interavia ABC
- ❒ Airports International Directory
- ❒ MNPS/NOPAC
- ❒ Customs Guide

IV. SURVIVAL EQUIPMENT

- ❒ Area survival kit (with text)
- ❒ Medical kit (with text)
- ❒ Emergency locator transmitter
- ❒ Floatation equipment
  - ❒ Raft
  - ❒ Life Jackets

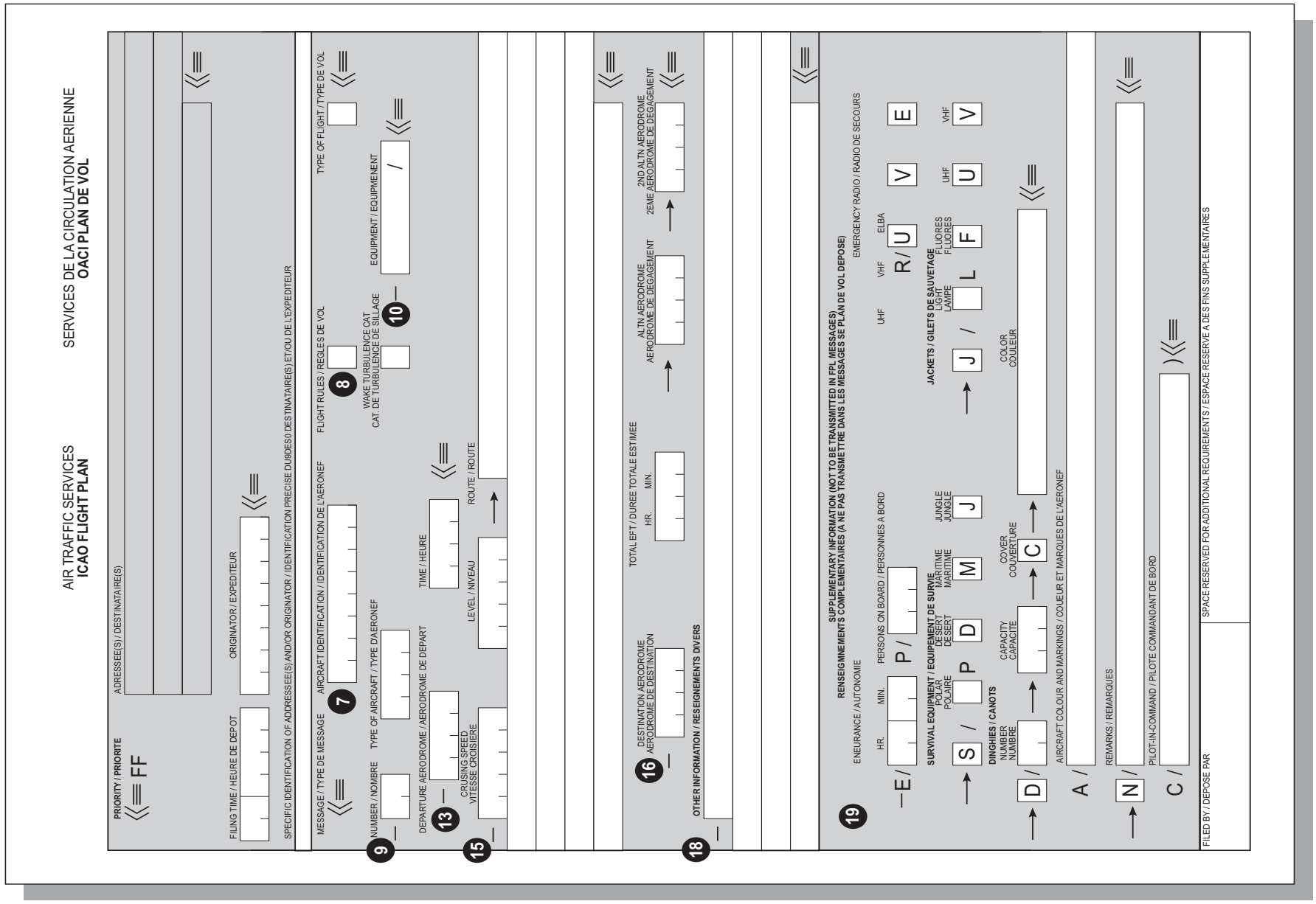
V. FACILITATION AIDS

- ❒ U.S. Department of State
- ❒ U.S. Department of Commerce
- ❒ U.S. Customs Service
- ❒ National Flight Data Center (FAA) Notams
- ❒ FAA Office of International Aviation
- ❒ FAA Aviation Security

VI. OTHER CONSIDERATIONS

- ❒ Pre-flight planner
- ❒ Aircraft locks
- ❒ Spare keys
- ❒ Security devices
- ❒ Commissary supplies
- ❒ Electrical adapters (razors, etc.)
- ❒ Ground transportation
- ❒ Hotel reservations
- ❒ NBAA International Feedback cards
- ❒ Catering
- ❒ WX service
- ❒ Reservations
- ❒ Slot times

ICAO International Flight Plan Form



ICAO Flight Plan Form Completion – Items 7-19

Complete all ICAO flight plans prior to departure. Although the ICAO flight plan form is printed in numerous languages, the format is always the same.

Always enter cruising speed and cruising level as a group. In the body of the flight plan form, if one item changes, the other item must be re-entered to keep speed and level a matched pair.

Always enter latitude and longitude as 7 or 11 characters. If entering minutes of one, enter minutes of the other as well, even if zeros.

Significant points should not be more than one hour apart.

Consider entering overflight/landing permissions after RMK/ in Item 18.

Item 7: Aircraft Identification (7 characters maximum)

Insert (A) the aircraft registration marking or (B) aircraft operating agency ICAO designator followed by the flight identification.

A. Insert only the aircraft registration marking (e.g., EIAKO, 4XBCD, N2567GA) if one of the following is true:

- the aircraft's radiotelephony call sign consists of the aircraft registration marking alone (e.g., OOTEK)
- the registration marking is preceded by the ICAO telephone designator for the aircraft operating agency (e.g., SABENA OOTEK
- the aircraft is not equipped with radio.

B. Insert the ICAO designator for the aircraft operating agency followed by the flight identification (e.g., KL511, WT214, K7123, JH25) if the aircraft's radiotelephony call sign consists of the ICAO telephony designator for the operating agency followed by the flight identification (e.g. KLM 511, NIGERIA 213, KILO UNIFORM 123, JULIETT HOTEL 25).

Item 8: Flight Rules and Type of Flight (1 or 2 characters)

Flight Rules: Insert one of the following letters to denote the intended flight rules category:

- **I** if IFR
- **V** if VFR
- **Y** if IFR first*
- **Z** if VFR first*

*Note: Specify in Item 15 (Route) the point(s) where a flight rules change is planned.

Type of Flight: Insert one of the following letters to denote the type of flight when so required by the appropriate ATS authority:

- **S** if scheduled air service
- **N** if non-scheduled air transport operation
- **G** if general aviation
- **M** if military
- **X** if other than the above

Item 9: Number (1 or 2 characters) and Type of Aircraft (2 to 4 characters) and Wake Turbulence Category (1 character)

Number of Aircraft: Insert number of aircraft if more than one.

Type of Aircraft: Insert the appropriate designator as specified in ICAO Doc 8643, Aircraft Type Designators. If no such designator has been assigned, or in case of formation flight comprising more than one aircraft type, insert ZZZZ, then specify in Item 18 the number(s) and type(s) of aircraft, preceded by TYP/.

Wake Turbulence Category: Insert / + H, M, or L:

- **/H** Heavy – maximum certificated T/O mass of 136,000 kg (300,000 lbs) or more
- **/M** Medium – maximum certificated T/O mass of less than 136,000 kg but more than 7,000 kg (between 15,500 and 300,000 lbs)
- **/L** Light – maximum certificated T/O mass of 7,000 kg or less (15,500 lbs)

Item 10: Equipment

Radio Communication, Navigation, and Approach Aid Equipment: Insert one of the following letters:

- **N** if COM/NAV/approach aid equipment is not carried or is inoperative.
- **S** if standard COM/NAV/approach aid equipment (VHF RTF, ADF, VOR, ILS, or equipment prescribed by ATS authority) is on board and operative;

and/or insert one of the following letters to indicate corresponding COMM/NAV/approach aid equipment is available and operative:

- **A** not allocated
- **B** not allocated
- **C** LORAN C
- **D** DME
- **E** not allocated
- **F** ADF
- **G** (GNSS)
- **H** HF RTF
- **I** Inertial Navig.
- **J** (Data Link)
- **K** (MLS)
- **L** ILS
- **M** Omega
- **O** VOR
- **P** not allocated
- **Q** not allocated
- **R** RNP type certification
- **T** TACAN
- **U** UHF RTF
- **V** VHF RTF
- **W** when prescribed by ATS
- **X** when prescribed by ATS
- **Y** when prescribed by ATS
- **Z** Other (specify in Item 18)

SSR Equipment: Insert one of the following letters to describe the operative SSR equipment on board:

- **N** None
- **A** Transponder Mode A (4 digits- 4 096 codes)
- **C** Transponder Mode A and Mode C
- **X** Transponder Mode S without aircraft ID or pressure-altitude transmission
- **P** Transponder Mode S with pressure altitude transmission, but without aircraft ID transmission
- **I** Transponder Mode S with aircraft ID transmission, but without pressure-altitude transmission
- **S** Transponder Mode S with both pressure altitude and aircraft ID transmission

Item 13: Departure Aerodrome (4 characters) and Time (4 characters)

Departure Aerodrome: Insert one of the following:

- ICAO four-letter location indicator of the departure aerodrome.
- If no location indicator assigned, insert ZZZZ, then specify in Item 18 the name of the aerodrome, preceded by DEP/.
- If flight plan submitted while in flight, insert AFIL, then specify in Item 18 the four-letter location indicator of the ATS unit from which supplementary flight plan data can be obtained, preceded by DEP/.

Time: Insert one of the following:

- for a flight plan submitted before departure: the estimated off-block time
- for a flight plan submitted while in flight: the actual or estimated time over the first point of the route to which the flight plan applies.

Item 15: Cruising Speed (5 characters), Cruising Level (5 characters), and Route

Cruising Speed: Insert the true air speed for the first or whole cruising portion of the flight in one of the following forms:

- Kilometers per hour: K + 4 figures (e.g., K0830)
- Knots: N + 4 figures (e.g., N0485)
- Mach number: M + 3 figures (e.g., M082) if prescribed by ATS.

Cruising Level: Insert the planned cruising level for the first or whole portion of the planned route using one of the following forms:

- Flight level: F + 3 figures (e.g., F085; F330)
- Standard metric level in tens of metres: S + 4 figures (e.g., S1130) if prescribed by ATS.
- Altitude in hundreds of feet: A + 3 figures (e.g., A045; A100)
- Altitude in tens of metres: M + 4 figures (e.g., M0840)
- For uncontrolled VFR flights: VFR

Route: Include changes of speed, level, and/or flight rules.

For flights along designated ATS routes:

- If the departure aerodrome is on or connected to the ATS route, insert the designator of the first ATS route.
- If the departure aerodrome is not on or connected to the ATS route, insert the letters DCT followed by the point of joining the first ATS route, followed by the designator of the ATS route.
- Insert each point at which a change of speed, change of level, change of ATS route, and/or a change of flight rules is planned. For a transition between lower and upper ATS routes oriented in the same direction, do not insert the point of transition.
- In each case, follow with the designator of the next ATS route segment even if it is the same as the previous one (or with DCT if the flight to the next point is outside a designated route), unless both points are defined by geographical coordinates.

Flights outside designated ATS routes:

- Insert points not normally more than 30 minutes flying time or 200 nautical miles apart, including each point at which a change of speed or level, a change of track, or a change of flight rules is planned.
- When required by ATS, define the track of flights operating predominantly in an east-west direction between 70°N and 70°S by reference to significant points formed by the intersections of half or whole degrees of latitude with meridians spaced at intervals of 10 degrees of longitude. For flights operating in areas outside those latitudes, define the tracks by significant points formed by the intersection of parallels of latitude with meridians normally spaced not to exceed one hour's flight time. Establish additional significant points as deemed necessary.

  For flights operating predominantly in a north-south direction, define tracks by reference to significant points formed by the intersection of whole degrees of longitude with specified parallels of latitude that are spaced at 5 degrees.
- Insert DCT between successive points unless both points are defined by geographical coordinates or bearing and distance.

Examples of Route Sub-entries

Enter a space between each sub-entry.

1. ATS route (2 to 7 characters): BCN1, B1, R14, KODAP2A
2. Significant point (2 to 11 characters): LN, MAY, HADDY
   - degrees only (7 characters – insert zeros, if necessary): 46N078W
   - degrees and minutes (11 characters – insert zeros if necessary): 4620N07805W
   - bearing and distance from navigation aid (NAV aid ID [2 to 3 characters] + bearing and distance from the NAV aid [6 characters – insert zeros if necessary]): a point 180 magnetic at a distance of 40 nautical miles from VOR "DUB" = DUB180040

3. Change of speed or level (max 21 characters):

   insert point of change/cruising speed and level – LN/N0284A045, MAY/N0305F180, HADDY/N0420F330, DUB180040/M084F350

4. Change of flight rules (max 3 characters):

   insert point of change (space) change to IFR or VFR – LN VFR, LN/N0284A050 IFR

5. Cruise climb (max 28 characters)

   insert C/point to start climb/climb speed / levels –

   C/48N050W / M082F290F350

   C/48N050W / M082F290PLUS

   C/52N050W / M220F580F620

Item 16: Destination Aerodrome (4 characters), Total Estimated Elapsed Time (EET, 4 characters), Alternate Aerodrome(s) (4 characters)

Destination aerodrome: insert ICAO four-letter location indicator. If no indicator assigned, insert ZZZZ.

Total EET: insert accumulated estimated elapsed time. If no location indicator assigned, specify in Item 18 the name of the aerodrome, preceded by DEST/.

Alternate aerodrome(s): insert ICAO four-letter location indicator. If no indicator assigned to alternate, insert ZZZZ and specify in Item 18 the name of the alternate aerodrome, preceded by ALTN/.

Item 18: Other Information

This section may be used to record specific information as required by appropriate ATS authority or per regional air navigation agreements. Insert the appropriate indicator followed by an oblique stroke (/) and the necessary information. See examples below.

- Estimated elapsed time/significant points or FIR boundary designators: EET/CAP0745, XYZ0830.
- Revised destination aerodrome route details/ICAO aerodrome location indicator: RIF/DTA HEC KLAX. (Revised route subject to reclearance in flight.)
- Aircraft registration markings, if different from aircraft I.D. in Item 7: REG/N1234.
- SELCAL code: SEL/_____.
- Operator's name, if not obvious from the aircraft I.D. in Item 7: OPR/_____.
- Reason for special handling by ATS (e.g., hospital aircraft, one-engine inoperative): STS/HOSP, STS/ONE ENG INOP.
- As explained in Item 9: TYP/_____.
- Aircraft performance data: PER/_____.
- Communication equipment significant data: COM/UHF Only.
- Navigation equipment significant data: NAV/INS.
- As explained in Item 13: DEP/_____.
- As explained in Item 16: DEST/_____, or ALTN/_____.
- Other remarks as required by ATS or deemed necessary: RMK/_____.

Item 19: Supplementary Information

Endurance: insert fuel endurance in hours and minutes.

Persons on Board: insert total persons on board, including passengers and crew. If unknown at time of filing, insert TBN (to be notified).

Emergency Radio, Survival Equipment, Jackets, Dinghies: cross out letter indicators of all items not available; complete blanks as required for items available. (jackets: L = life jackets with lights, J = life jackets with fluorescein).

ICAO Position Reporting Format

Outside the U.S., position reports are required unless specifically waived by the controlling agency.

Initial Contact (Frequency Change)

1. Call sign
2. Flight level (if not level, report climbing to or descending to cleared altitude)
3. Estimating (next position) at (time) GMT

Position Report

1. Call sign
2. Position (if position in doubt, use phonetic identifier. For oceanic reports, first report the latitude, then the longitude (e.g., 50N 60W)
3. Time (GMT) or (UST)
4. Altitude or flight level (if not level, report climbing to or descending to altitude)
5. Next position
6. Estimated elapsed time (EET)

FAA Flight Plan Form

US DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE VFR IFR DVFR	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME PROPOSED (Z) ACTUAL (Z)	7. CRUSING ALTITUDE

8. ROUTE OF FLIGHT

9. DESTINATION (Name of airport and city)	10. EST TIME ENROUTE HOURS MINUTES	11. REMARKS

12. FUEL ON BOARD HOURS MINUTES	13. ALTERNATE AIRPORT(S)	14. PILOTS NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
		17. DESTINATION CONTACT / TELEPHONE (OPTIONAL)	

18. COLOR OF AIRCRAFT	CIVIL AIRCRAFT PILOTS. FAR Part 91 requires you to file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in civil penalty not to exceed $1,000 for each violation (Section 901 of the Federal Aviation Act of 1956, as amended). Filing of a VFR flight plan is recomended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.

FAA Form 7233-1 (8-82) CLOSE VFR FLIGHT PLAN WITH ____________ FSS ON ARRIVAL

FAA Flight Plan Form Completion Instructions

Block 1 Check the type flight plan. Check both the VFR and IFR blocks if composite VFR/IFR.

Block 2 Enter your complete aircraft identification, including the prefix “N,” if applicable.

Block 3 Enter the designator for the aircraft, or if unknown, the aircraft manufacturer’s name.

When filing an IFR flight plan for a TCAS equipped aircraft, add the prefix T for TCAS.
Example: T/G4/R.

When filing an IFR flight plan for flight in an aircraft equipped with a radar beacon transponder, DME equipment, TACAN-only equipment or a combination of both, identify equipment capability by adding a suffix to the AIRCRAFT TYPE, preceded by a slant (/) as follows:

/X no transponder

/T transponder with no Mode C

/U transponder with Mode C

/D DME, but no transponder

/B DME and transponder, but no Mode C

/A DME and transponder with Mode C

/M TACAN only, but no transponder

/N TACAN only and transponder, but with no Mode C

/P TACAN only and transponder with Mode C

/Y LORAN, VOR/DME, or INS only, but with no transponder

/C LORAN, VOR/DME, INS, and transponder, but with no Mode C

/I LORAN, VOR/DME, INS, and transponder with Mode C

ADVANCED RNAV WITH TRANSPONDER AND MODE C (if an aircraft is unable to operate with a transponder and/or Mode C, it will revert to the appropriate code listed above under Area Navigation

/E Flight Management System (FMS) with enroute, terminal, and approach capability.

Equipment requirements are:

(a) Dual FMS which meets the specifications of AC25-15, Approval of Flight Management Systems in Transport Category Airplanes; AC20-129, Airworthiness Approval of Vertical Navigation (VNAV) Systems for use in the US National Airspace System (NAS) and Alaska' AC20-130, Airworthiness Approval of Multi-Sensor Navigation Systems for use in the US National Airspace System (NAS) and Alaska; or equivalent criteria as approved by Flight Standards.

(b) A flight director and autopilot control system capable of following the lateral and vertical FMS flight plan.

(c) At least dual inertail reference units (IRUs).

(d) A database containing the waypoints and speed/altitude constraints for the route and/or procedure to be flown that is automatically loaded into the FMS flight plan.

(e) An electronic map.

/F A single FMS with enroute, terminal, and approach capability that meets the equipment requirements of /E, (a) through (d), above. (U.S. and U.S. territories only unless otherwise authorized).

/G Global Positioning System (GPS)/Global Navigation Satellite System (GNSS) equipped aircraft with enroute and terminal capability.

/R Required Navigational Performance (Denotes capability to operate in RNP designated airspace and routes).

/W Reduced Vertical Separation Minima (RVSM).

/Q Required Navigation Performance (RNP) and Reduced Vertical Separation Minima (RVSM) (Indicate approval for application of RNP and RVSM separation standards). It should be noted that /Q is for automation purposes only and will not be filed by system users. FAA processors will convert the combination of /R + /W to = /Q.

Block 4 Enter your true airspeed (TAS).

Block 5 Enter the departure airport identifier code, or if code is unknown, the name of the airport.

Block 6 Enter the proposed departure time in Coordinated Universal Time (UTC). If airborne, specify the actual or proposed departure time as appropriate.

Block 7 Enter the appropriate IFR altitude (to assist the briefer in providing weather and wind information).

Block 8 Define the route of flight by using NAVAID identifier codes, airways, jet routes, and waypoints.

Block 9 Enter the destination airport identifier code, or if unknown, the airport name. Include the city name (or even the state name) if needed for clarity.

Block 10 Enter estimated time enroute in hours and minutes.

Block 11 Enter only those remarks pertinent to ATC or to the clarification of other flight plan information, such as the appropriate call sign associated with the designator filed in Block 2 or ADCUS.

Block 12 Specify the fuel on board in hours and minutes.

Block 13 Specify an alternate airport, if desired or required.

Block 14 Enter the complete name, address, and telephone number of the pilot in command. Enter sufficient information to identify home base, airport, or operator. This information is essential for search and rescue operations.

Block 15 Enter total number of persons on board (POB), including crew.

Block 16 Enter the aircraft's predominant colors.

Block 17 Record the FSS name for closing the flight plan. If the flight plan is closed with a different FSS or facility, state the recorded FSS name that would normally have closed your flight plan. Information transmitted to the destination FSS consists only of that in Blocks 3, 9, and 10. Estimated time enroute (ETE) will be converted to the correct estimated time of arrival (ETA).

Optional Record a destination telephone number to assist search and rescue contact should you fail to report or cancel your flight plan within 1/2 hour after your estimated time of arrival (ETA).

ICAO Weather Format

Sample METAR

A routine aviation weather report on observed weather, or METAR, is issued at hourly or half-hourly intervals. A special weather report on observed weather, or SPECI, is issued when certain criteria are met. Both METAR and SPECI use the same codes.

A forecast highly likely to occur, or TREND, covers a period of two hours from the time of the observation. A TREND forecast indicates significant changes in respect to one or more of the following elements: surface wind, visibility, weather, or clouds. TREND forecasts use many of the same codes as TAFs.

Most foreign countries may append a TREND to a METAR or SPECI. In the U.S., however, a TREND is not included in a METAR or SPECI.

The following example indicates how to read a METAR.

KHPN 201955Z 22015G25KT 2SM
R22L/1000FT TSRA OVC010CB 18/16 A2990
RERAB25 BECMG 2200 24035G55

KHPN. ICAO location indicator.

201955Z. Date and time of issuance. METARs are issued hourly.

22015G25KT. Surface wind (same as TAF). If the first three digits are VAR, the wind is variable with wind speed following. If direction varies 60° or more during the ten minutes immediately preceding the observation, the two extreme directions are indicated with the letter V inserted between them (e.g., **280V350**).

NOTE: G must vary 10 kts or greater to report gust.

2SM. Prevailing horizontal visibility in statute miles. In the U.S., issued in statute miles with the appropriate suffix (**SM**) appended. When a marked directional variation exists, the reported minimum visibility is followed by one of the eight compass points to indicate the direction (e.g., **2SMNE**).

R22L/1000FT. The runway visual range group. The letter **R** begins the group and is followed by the runway description (**22L**). The range in feet follows the slant bar (**1000FT**). In other countries range is in meters and no suffix is used.

TSRA OVC010CB. Thunderstorms (**TS**) and rain (**RA**) with an overcast layer at 1,000 ft and cumulonimbus clouds.

NOTE: More than one cloud layer may be reported.

18/16. Temperatures in degrees Celsius. The first two digits (**18**) are observed air temperature; the last two digits (**16**) are dew point temperature. A temperature below zero is reported with a minus (**M**) prefix code (e.g., **M06**).

A2990. Altimeter setting. In the U.S., **A** is followed by inches and hundredths; in most other countries, **Q** is followed by hectopascals (i.e., millibars).

RERAB25. Recent operationally significant condition. A two letter code for recent (**RE**) is followed by a two letter code for the condition (e.g., **RA** for rain). A code for beginning or ending (**B** or **E**) and a two-digit time in minutes during the previous hour. When local circumstances also warrant, wind shear may also be indicated (e.g., **WS LDG RWY 22**).

NOTE: A remark (RMK) code is used in the U.S. to precede supplementary data of recent operationally significant weather.

NOTE: RMK [SLP 013] breaks down SEA LVL press to nearest tenth (e.g., 1001.3 reported as SLP 013).

BECMG AT 2200 24035G55. A TREND forecast. The becoming code (**BECMG**) is followed by a when sequence (**AT 2200)** and the expected change (e.g., surface winds at 240° true at 35 kts with gusts up to 55 kts).

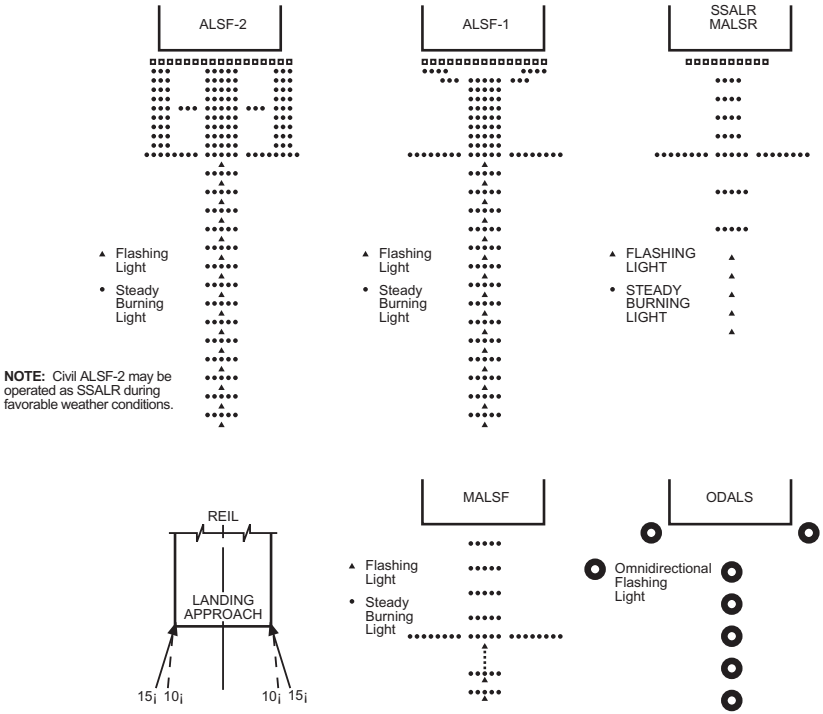
NOTE: For more information on METAR/TAF, consult the FAA brochure “New Aviation Weather Format METAR/TAF.” Copies may be obtained by writing to: FAA/ASY-20, 400 7th Street, S.W. Washington, DC 20590.

Aeronautical Lighting and Visual Aids

Approach Light Systems (ALS)

ALS provide the basic means to transition from instrument flight to visual flight for landing. Operational requirements dictate the sophistication and configuration of the approach light system for a particular runway.

ALS are configurations of signal lights starting at the landing threshold and extending into the approach area to a distance of 2,400-3,000 feet for precision instrument runways and 1,400-1,500 feet for non-precision instrument runways. Some systems include sequenced flashing lights which appear to the pilot as a ball of light traveling towards the runway at high speed (twice a second).



In-Runway Lighting

Runway Centerline Lighting System (RCLS). Runway centerline lights are installed on some precision approach runways to facilitate landing under adverse visibility conditions. They are located along the runway centerline and are spaced at 50-foot intervals. When viewed from the landing threshold, the runway centerline lights are white until the last 3,000 feet of the runway. The white lights begin to alternate with red for the next 2,000 feet, and for the last 1,000 feet of the runway, all centerline lights are red.

Touchdown Zone Lights (TDZL). Touchdown zone lights are installed on some precision approach runways to indicate the touchdown zone when landing under adverse visibility conditions. They consist of two rows of transverse light bars disposed symmetrically about the runway centerline. The system consists of steady-burning white lights which start 100 feet beyond the landing threshold and extend to 3,000 feet beyond the landing threshold or to the midpoint of the runway, whichever is less.

Taxiway Lead-Off Lights. Taxiway lead-off lights extend from the runway centerline to a point on an exit taxiway to expedite movement of aircraft from the runway. These lights alternate green and yellow from the runway centerline to the runway holding position or the ILS/MLS critical area, as appropriate.

Land and Hold Short Lights. Land and hold short lights are used to indicate the hold short point on certain runways which are approved for Land and Hold Short Operations (LAHSO). Land and hold short lights consist of a row of pulsing white lights installed across the runway at the hold short point. Where installed, the lights will be on anytime that LAHSO is in effect. These lights will be off when LAHSO is not in effect.

Taxiway Lights

Taxiway Edge Lights. Taxiway edge lights are used to outline the edges of taxiways during periods of darkness or restricted visibility conditions. These fixtures emit blue light.

NOTE: At most major airports these lights have variable intensity settings and may be adjusted at pilot request or when deemed necessary by the controller.

Taxiway Centerline Lights. Taxiway centerline lights are used to facilitate ground traffic under low visibility conditions. They are located along the taxiway centerline in a straight line on straight portions, on the centerline of curved portions, and along designated taxiing paths in portions of runways, ramp, and apron areas. Taxiway centerline lights are steady burning and emit green light.

Clearance Bar Lights. Clearance bar lights are installed at holding positions on taxiways in order to increase the conspicuousness of the holding position in low visibility conditions. They may also be installed to indicate the location of an intersecting taxiway during periods of darkness. Clearance bars consist of three in-pavement steady-burning yellow lights.

Runway Guard Lights. Runway guard lights are installed at taxiway/runway intersections. They are primarily used to enhance the conspicuousness of taxiway/runway intersections during low visibility conditions, but may be used in all weather conditions. Runway guard lights consist of either a pair of elevated flashing yellow lights installed on either side of the taxiway or a row of in-pavement yellow lights installed across the entire taxiway, at the runway holding position marking.

NOTE: Some airports may have a row of three or five in-pavement yellow lights installed at taxiway/runway intersections. They should not be confused with clearance bar lights described in paragraph ìRunway Guard Lightsî.

Stop Bar Lights. Stop bar lights, when installed, are used to confirm the ATC clearance to enter or cross the active runway in low visibility conditions (below 1,200 feet Runway Visual Range). A stop bar consists of a row of red, unidirectional, steady-burning in-pavement lights installed across the entire taxiway at the runway holding position, and elevated steady-burning red lights on each side. A controlled stop bar is operated in conjunction with the taxiway centerline lead-on lights which extend from the stop bar toward the runway. Following the ATC clearance to proceed, the stop bar is turned off and the lead-on lights are turned on. The stop bar and lead-on lights are automatically reset by a sensor or backup timer.

CAUTION: Pilots should never cross a red illuminated stop bar, even if an ATC clearance has been given to proceed onto or across the runway.

NOTE: If, after crossing a stop bar, the taxiway centerline lead-on lights inadvertently extinguish, pilots should hold their position and contact ATC for further instructions.