FIGURE 1-1. INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) FLIGHT PLAN

FLIGHT PLAN

PRIORITY ≪≡ FF →

ADDRESSEE(S)

FILING TIME

ORIGINATOR

SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND/OR ORIGINATOR

3 MESSAGE TYPE ≪≡ (FPL

7 AIRCRAFT IDENTIFICATION

8 FLIGHT RULES

TYPE OF FLIGHT

9 NUMBER

TYPE OF AIRCRAFT

WAKE TURBULENCE CAT.

10 EQUIPMENT

13 DEPARTURE AERODROME

TIME

15 CRUISING SPEED

LEVEL

ROUTE

16 DESTINATION AERODROME

TOTAL EET HR MIN

ALTN AERODROME

2ND ALTN AERODROME

18 OTHER INFORMATION

SUPPLEMENTARY INFORMATION (NOT TO BE TRANSMITTED IN FPL MESSAGES)

19 ENDURANCE HR MIN

PERSONS ON BOARD

EMERGENCY RADIO UHF VHF ELBA

SURVIVAL EQUIPMENT POLAR DESERT MARITIME JUNGLE

JACKETS LIGHT FLUORES UHF VHF

DINGHIES NUMBER CAPACITY COVER COLOUR

AIRCRAFT COLOUR AND MARKINGS

REMARKS

PILOT-IN-COMMAND

FILED BY | ACCEPTED BY | ADDITIONAL INFORMATION

DEPARTMENT OF COMMUNICATIONS, DUBLIN AC 80 Rev 85

FIGURE 1-2. INTERNATIONAL FLIGHT PLAN FAA FORM 7233-4

INTERNATIONAL FLIGHT PLAN

Form Approved: OMB No. 2120-0026

US Department of Transportation
Federal Aviation Administration

International Standards — Rules of the Air, Annex 2 requires the submission of a flight plan containing items 1—19 prior to operating any flight across international waters. Failure to file could result in a civil penalty not to exceed $1000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended).

PRIORITY INDICATOR	ADDRESS INDICATOR(S)	
FILING TIME	ORIGINATOR INDICATOR	SPECIFIC ADDRESSES AND/OR ORIGINATOR IDENTIFICATION(S)

3. DESCRIPTION	7. AIRCRAFT IDENTIFICATION AND SSR DATA	8. FLIGHT RULES AND TYPE OF FLIGHT	9. NO. & TYPE AIRCRAFT AND WAKE TURBULANCE DATA	10. EQUIPMENT
(—	—	≪ ≡ —	—	COMM. /NAV /ISSR ≪ ≡

13. AERODROME OF DEPARTURE AND TIME	FIR BOUNDARIES AND ESTIMATED TIME(S)
	S

15. CRUISING SPEED	LEVEL	ROUTE
—		S

17. AERODROME OF DESTINATION AND TIME	ETA	ALTERNATE AIRPORT(S)	18. OTHER (Control) INFORMATION
—	S	≪ ≡ —	

) ≪ ≡

SUPPLEMENTAL INFORMATION — Not Transmitted *(To Be Completed By Pilot)*

19. FUEL/ S POB/ S RDO/121.5 S 243 S 500 S 8364 ≪ ≡ POLAR S DESERT S MARITIME S JUNGLE COLOR OF S AIRCRAFT

LIGHT S FLUORESEIN S ≪ ≡ DINGHIES *(Specify No. & Capacity)* S COVER *(Specify Color)* ➡ RMK/

≪ ≡

FAA Form 7233-4 (10-83) NAME OF PILOT-IN-COMMAND SIGNATURE OF PILOT ***CLOSE FLIGHT PLAN UPON ARRIVAL*** (SEE REVERSE)

PRE-FLIGHT PILOT CHECKLIST

AIRCRAFT IDENTIFICATION | TIME OF BRIEFING

		REMARKS
WEATHER (Destination) (Alternate)	☐ PRESENT	
	☐ FORECAST	
WEATHER (En Route)	☐ PRESENT	
	☐ FORECAST	
	☐ PIREPS	
WINDS ALOFT	BEST CRZG. ALT.	
NAV AID & COMM. STATUS	☐ DESTINATION	
	☐ EN ROUTE	
AIRPORT CONDITIONS	☐ DESTINATION	
	☐ ALTERNATE	
ADIZ	☐ AIRSPACE RESTRICTIONS	

REPORT WEATHER CONDITIONS ALOFT

Report immediately weather conditions encountered—particularly cloud tops, upper cloud layers, thunderstorms, ice, turbulance, winds and temperature.

POSITION	ALTITUDE	TIME	WEATHER CONDITIONS

☆ U.S. Government Printing Office: 1984—430-693

FIGURE 1-3. NAVIGATION PERFORMANCE DATA

Reporting Period:	From:	To:

Aircraft Registration:

NAVIGATION PERFORMANCE DATA

Note 1: *Check (V)INS system used for steering where applicable*
Note 2: *Insert relevant data for each system as follows:*
a) For INS: on arrival at the ramp
b) for OMEGA: on ramp, or if preferable, after touch-douwn or on arrival over land-fall point
Note 3: *With INS, give the time in the navigation mode: with OMEGA, give the time in the MNPS area*
Note 4: *Give details of any relevant aspects of up-dating*

				RADIAL ERROR								Did A/c stay 25 NM of cleared track				
				INS System		1		2		3	Note 1					
				Note 2								Time			INS RATE	
				Brg.	Dist.	Brg.	Dist.	Brg.	Dist.			Note 3		Remarks	NM/HR	
Date	Flight	From	To	DGR	NM	DGR	NM	DGR	NM			H	MIN	Note 4	1	2	3
1	2	3	4	5	6	7	8	9	10			11		12	13	14	15	16

NATOMNPS.W51

November 1991

FIGURE 1-4. OMEGA INFORMATION

The International Omega Association, Inc. (IOA): The IOA publishes the "Bibliography of Omega Publications" and the "Proceeding of Annual Meetings," containing papers on Omega use, equipment, research and policy. The address is:

International Omega Association
P.O. Box 2324
Arlington, Virginia 22202-0324

The Institute of Navigation (ION): The ION publishes a quarterly journal, "Navigation," which periodically contains papers on Omega. The Fall 1986 issue of "Navigation" (Volume 33, No. 3), was dedicated to Omega and is a good general reference. The address is:

Institute of Navigation
1026 16th Street, N.W., Suite 104
Washington, DC 20036

Gross navigation errors (GNE) should be reported to the Central Monitoring Agency. The address is:

Central Monitoring Agency
CAA House
45-59 Kingsway
London WC2B6TE
United Kingdom

FIGURE 1-5. NOTAM OFFICES (NOF) THAT EXCHANGE NOTAM'S WITH THE UNITED STATES

The following tabulation is a listing of NOF's that currently exchange NOTAM's with the U.S. NOF:

Country	[City]	Country	[City]	Country	[City]
Afghanistan	[Kabul]	Algeria	[Algiers]	Angola	[Luanda]
Argentina	[Buenos Aires]	Australia	[Sydney]	Austria	[Vienna]
Azores	[Santa Maria]	Bahamas	[Nassau]	Bahrain	[Bahrain]
Bangladesh	[Dacca]	Belgium	[Brussels]	Bermuda	
Bolivia	[LaPaz]	Brazil	[Rio de Janeiro]	Bulgaria	[Sofia]
Burma	[Rangoon]	Canada	[Ottawa]	Cape Verde	[Amilcar Cabral]
Chile	[Santiago]	China	[Beijing]	Columbia	[Bogota]
Cuba	[Havana]	Cyprus	[Nicosia]	Czechoslovakia	[Prague]
Denmark	[Copenhagen]	Dom. Rep.	[Santo Domingo]	E. Germany	[Berlin]
Ecuador	[Quayaquil]	Egypt	[Cairo]	England	[London]
Fiji	[Nandi]	Finland	[Helsinki]	France	[Paris]
Ghana	[Accra]	Greece	[Athens]	Greenland	[Sondre Stromfjord]
Guyana	[Georgetown]	Haiti	[Port au Prince]	Honduras	[Tequecigalpa]
Hong Kong		Hungary	[Budapest]	Iceland	[Reykjavik]
India	[Bombay]	India	[Calcutta]	India	[Madras]
India	[New Delhi]	Indonesia	[Jakarta]	Iran	[Tehran]
Ireland	[Shannon]	Israel	[Tel Aviv]	Italy	[Rome]
Jamaica	[Kingston]	Japan	[Tokyo]	Kenya	[Nairobi]
Lebanon	[Beirut]	Liberia	[Roberts]	Libya	[Tripoli]
Malaysia	[Kuala Lumpur]	Malta	[Luga]	Mexico	[Mexico City]
Morocco	[Casablanca]	Net. Antilles	[Curacao]	Netherlands	[Amsterdam]
New Zealand	[Auckland]	Nigeria	[Lagos]	Norway	[Oslo]
Pakistan	[Karachi]	Panama	[Tocumen]	Papua Nw. Guin.	[Port Moresby]
Paraguay	[Asuncion]	Peru	[Lima]	Philippines	[Manila]
Poland	[Warsaw]	Portugal	[Lisbon]	Romania	[Stockholm]
S. Africa	[Johannesburg]	S. Korea	[Seoul]	Senegal	
Singapore	Solomon Islands	Soviet Union	[Moscow]	Spain	[Port of Spain]
Sri Lanka	[Columbo]	Suriname	[Paramaribo]	Sweden	
Switzerland	[Zurich]	Syria	[Damascus]	Tahiti	[Caracas]
Taiwan	[Taipei]	Thailand	[Bankok]	Trinidad and Tobago.	[Belgrade] [Salisbury]
Turkey	[Ankara]	Uruguay	[Montevideo]	Venezuela	Turkey
W. Germany	[Frankfurt]	Western Samoa.	[Faleola]	Yugoslavia	W. Germany
Zaire	[Kinshasa]	Zambia	[Lusaka]	Zimbabwe	Zaire

The following tabulation is a listing of locations from which the U.S. NOF does not receive Class I NOTAM's:

Country	Country	Country
Albania	Botswana	Burundi
Cameroon	Central African Republic	Chad
Comoros	Congo	Equatorial Guinea
Ethiopa	Gabon	Gibraltar
Iraq	Jordan	Kampuchea
Korea (North)	Kuwait	Laos
Madagascar	Malawi	Mauritius
Mongolia	Mozambique	Nepal
Rwanda	Sao Tome & Principe	Saudi Arabia
Seychelles	Somalia	Sudan
Swaziland	Tunisia	Viet-Nam
Yemen Arab Republic	Yemen Democratic Republic	

FIGURE 1-6. DISTANCE CONVERSIONS

DISTANCE CONVERSION
CONVERSIONS

NOTE: CONVERSIONS ARE ROUNDED OFF TO NEAREST WHOLE NUMBER EXCEPT FOR THE FIRST ROW

KILOMETERS			STATUTE MILES			NAUTICAL MILES		
to SM		to NM	to KM		to NM	to KM		to SM
0.62137	1	0.53996	1.6093	1	0.86898	1.8520	1	1.1508
1.24	2	1.08	3.22	2	1.74	3.70	2	2.30
1.86	3	1.62	4.83	3	2.61	5.56	3	3.45
2.49	4	2.16	6.44	4	3.48	7.41	4	4.60
3.11	5	2.70	8.05	5	4.34	9.26	5	5.75
3.73	6	3.24	9.66	6	5.21	11.11	6	6.90
4.35	7	3.78	11.27	7	6.08	12.96	7	8.06
4.97	8	4.32	12.87	8	6.95	14.82	8	9.21
5.59	9	4.86	14.48	9	7.82	16.67	9	10.36
6.21	10	5.40	16.09	10	8.69	18.52	10	11.51
12.43	20	10.80	32.19	20	17.38	37.04	20	23.02
18.64	30	16.20	48.28	30	26.07	55.56	30	34.52
24.85	40	21.60	64.37	40	34.76	74.08	40	46.03
31.07	50	27.00	80.47	50	43.45	92.60	50	57.54
37.28	60	32.40	96.56	60	52.14	111.12	60	69.05
43.50	70	37.80	112.65	70	60.83	129.64	70	80.56
49.17	80	43.20	128.75	80	69.52	148.16	80	92.06
55.92	90	48.60	144.84	90	78.20	166.68	90	103.57
62.14	100	54.00	160.93	100	86.90	185.20	100	115.08
124.27	200	107.99	321.87	200	173.80	370.40	200	230.16
186.41	300	161.99	482.80	300	260.69	555.60	300	345.23
248.55	400	215.98	643.74	400	347.59	740.80	400	460.31
310.69	500	269.98	804.67	500	434.49	926.00	500	575.39
372.82	600	323.97	965.61	600	521.39	1111.20	600	690.47
434.96	700	377.97	1126.54	700	608.28	1296.40	700	805.55
497.10	800	431.97	1287.48	800	695.18	1481.60	800	920.62
559.23	900	485.96	1448.41	900	782.01	1666.80	900	1035.70
621.37	1000	539.96	1609.34	1000	868.98	1852.00	1000	1150.78

METERS to FEET			METERS to YARDS			INCHES to MILLIMETERS (MM)		
Meters	Ft / Meters	Ft	Meters	Yds/ Meters	Yds	Inches	mm / Inches	mm
.3048	1	3.2808	.9144	1	1.0936	.03937	1	25.4
1	2	7	2	2	2	.07874	2	50.8
1	3	10	3	3	3	.11811	3	76.2
1	4	13	4	4	4	.15748	4	101.6
2	5	16	5	5	5	.19685	5	127.0
2	6	20	5	6	7	.23622	6	152.4
2	7	23	6	7	8	.27559	7	177.8
2	8	26	7	8	9	.31496	8	203.2
3	9	30	8	9	10	.35433	9	228.6
3	10	33	9	10	11	.3937	10	254.0
6	20	66	16	20	22	.7874	20	508.0
9	30	98	27	30	33	1.1811	30	762.0
12	40	131	36	40	44	1.5748	40	1016.0
15	50	164	46	50	55	1.9685	50	1270.0
18	60	.197	55	60	66	2.3622	60	1524.0
21	70	230	64	70	77	2.7559	70	1778.0
24	80	262	73	80	88	3.1496	80	2032.0
27	90	295	82	90	99	3.5433	90	2286.0
30	100	328	91	100	110	3.9370	100	2540.0
61	200	656	183	200	219	7.8140	200	5080.0
91	300	984	274	300	329	11.8110	300	7620.0
122	400	1312	366	400	438	15.7480	400	10160.0
152	500	1640	457	500	548	19.6850	500	12700.0
183	600	1968	549	600	658	23.6220	600	15240.0
213	700	2296	640	700	767	27.5590	700	17780.0
244	800	2625	732	800	877	31.4960	800	20320.0
274	900	2953	823	900	987	35.4330	900	22860.0
305	1000	3281	914	1000	1096	39.3701	1000	25400.0

FIGURE 1-7. ICAO TERMINAL FORECAST (TAF)

International Terminal Forecasts (TAF) are in an alphanumeric code. They are issued two or four times daily for 24-hour periods beginning at 0000Z, 0600Z, 1200Z and 1800Z. The TAF is a series of groups made up of digits and letters. An individual group is identified by its position in the sequence, by its alphanumeric coding, by its length, or by a numeric indicator. The following is a St. Louis forecast in TAF code:

KSTL 1212 33025/35 0800 71SN 9//005 INTER 1215 0000 39BLSN 9//000 GRADU 1516 33020 4800 38BLSN 7SC030 TEMPO 1620 85SNSH GRADU 2122 33015 9999 WX NIL 3SC030 RAPID 00 VRB05 9999 SKC The forecast is broken down into the elements lettered "a" to "n" to aid in the discussion.

```
KSTL  1212  33025/35  0800  71SN  9//005
 a     b       c       d     e     f

INTER  1215   0000  39BLSN  9//000
                 g

GRADU  1516  33020  4800  38BLSN  7SC030
                      h

TEMPO  1620  84SNSH
          i

GRADU  2122  33015  9999  WX  NIL  3SC030
                        j

RAPID  00  VRB05  9999  SKC
              k

680304  590359  02134
  l       m       n
```

a. ***Station identifier.*** The TAF code uses ICAO 4-letter station identifiers.

b. ***Valid time.*** Valid Time of the forecast follows station identifier. "1212" means a 24-hourforecast valid from 1200Z until 1200Z the following day.

c. ***Wind.*** The wind forecast is usually a 5-digit group showing direction in 3 digits and speed in 2 digits. When the wind is expected to be 100 knots or more, the group is 6 digits with speed shown in 3 digits. When the speed is gusty or variable, peak speed is separated from average speed with a slash. For example, in the KSTL TAF, "33025/35" means wind 330, average speed 25 knots, peak speed 35 knots. A group "160115/130" means wind 160, 115 knots, peak speed 130 knots. "00000" means clam; "VRB" followed by speed indicates direction variable; i.e., "VRB10" means wind direction variable at 10 knots.

d. **Visibility.** Visibility is forecast in meters. Table 1 converts meters to miles. "0800" is 800 meters or ½ mile.

e. **Significant weather.** Significant weather is decoded using Table II. Groups in the table are numbered sequentially. Each number is followed by an acronym suggestive of the weather; you can soon learn to read most of the acronyms without reference to the table. Examples:

FIGURE 1-7. ICAO TERMINAL FORECAST (TAF) - Continued

"17TS," thunderstorm; "18SQ," squall' "31SA," sandstorm; "60RA," rain; "85SNSH," snow shower. "XX" between the number and acronym means "heavy." Examples: "33XXSA," heavy sandstorm; "67XXFZRA," heavy freezing rain. In the KSTL forecast, "71SN" means light snow. The TAF encodes only the single most significant type of weather unlike the U.S. domestic FT which permits encoding of multiple weather types.

f. Clouds. The cloud group is a 6-character group. The first digit is sky coverage in octas (eighths) as shown in Table III. The two letters identify cloud type as shown in the table. The last three digits are cloud height in hundreds of feet. In the KSTL TAF, "9//005" means sky obscured (9), clouds not observed (//), vertical visibility 500 feet (005). The TAF may include as many cloud groups as necessary to describe expected sky condition.

g. and i. Variation from prevailing conditions. Variation from prevailing conditions are identifiedby the contractions INTER and TEMPO as defined below. In the KSTL TAF, "INTER 1215 0000 39BLSN 9//000" means intermittently from 1200Z to 1500Z (1215) visibility zero meters (0000) or zero miles, blowing snow (39BLSN), sky obscured, clouds not observed, vertical visibility zero (9//000). "TEMPO 1620 85SNSH" means between 1600Z and 2000Z, temporary, or brief, snow showers. Omission of other groups imply no significant change in wind, visibility, or cloud cover.

h., j., and k. An expected change in prevailing conditions. An expected change in prevailing conditions is indicated by the contraction GRADU, RAPID, or FRONT as defined below. In the KSTL TAF, "GRADU 1516 33020 4800 38BLSN 7SC030" means a gradual change between 1500Z and 1600Z to wind 330 at 20 knots, visibility 4,800 meters or 3 miles (Table I), blowing snow, 7/8 stratocumulus (Table III) at 3,000 feet. "GRADU 2122 33015 9999 WX NIL 3SC030" means a gradual change between 2100Z and 2200Z to wind 330 at 15 knots, visibility 10 kilometers or more (more than 6 miles), no significant weather, 3/8 stratocumulus at 3,000 feet. "RADIP 00 VRB05 9999 SKC" means a rapid change about 0000Z to wind direction variable at 5 knots, visibility than 6 miles, sky clear.

Listed below are a few contractions used in the TAF. Some of the contractions are followed by time entries indicated by "tt" or "tttt" or by probability, "pp":

GRADU tttt	A gradual change occurring during a period in excess of one-half hour. "tttt" are the beginning and ending times of the expected change to the nearest hour; i.e., "GRADU 1213" means the transition will occur between 1200Z and 1300Z.
RAPID tt	A rapid change occurring in one-half hour or less. "tt" is the time to the nearest hour of the change; i.e., "RAPID 23" means the change will occur about 2300Z.
TEMPO tttt	Temporary changes from prevailing conditions lasting less than one hour. "tttt" are the earliest and latest change times during which the temporary changes are expected; i.e., "TEMPO 0107" means the temporary changes may occur between 0100Z and 0700Z.
INTER tttt	Intermittent changes from prevailing conditions are expected to occur frequently and briefly. "tttt" are the earliest and latest times the brief changes are expected; i.e., "INTER 1518" means that the brief changes may occur between 1500Z and 1800Z, the changes to persist for less than one half the time period.

FIGURE 1-7. ICAO TERMINAL FORECAST (TAF) - Continued

CAVOK	Ceiling and visibility OK. No clouds below 5,000 feet or below the highest minimum sector altitude, whichever is greater, and no cumulonimbus. Visibility 6 miles or greater. No precipitation, thunderstorms, shallow fog or drifting snow.
PROB pp	Probability of conditions occurring. "pp" is the probability in percent; i.e., "PROB 20" means a 20% probability of the conditions occurring.
WX NIL	No significant weather or obstructions to vision.
SKC	Sky clear.

l. Icing. An icing group may be included. It is a 6-digit group. The first digit is 6, identifying it as an icing group. The second digit is the type of ice accretion from Table IV. The next three digits are height of the base of the icing layer in hundreds of feet. The last digit is the thickness of the layer in thousands of feet. For example, let's decode the group "680304". "6" indicates an icing forecast; "8" indicates severe icing in cloud (Table IV); "030" means the base of the icing is at 3,000 feet; and "4" specifies a layer 4,000 feet thick.

m. Turbulence. A turbulence group also may be included. It also is 6-digit group coded the same as the icing group except a "5" identifies the group as a turbulence forecast, and type of turbulence is from Table IV. To decode the group "590359"; "5" identifies a turbulence forecast; "9": specifiesfrequent severe turbulence in cloud (Table IV); "035" means the base of the turbulent layer is 3,500 feet; "9" specifies that the turbulence layer is 9,000 feet thick.

When either an icing or a turbulent layer is expected to be more than 9,000 feet thick, multiple groups are used; the top specified in one group is coincident with the base in the following group. Let's assume a cloud base at 5,000 feet and the forecaster expects frequent turbulence in thunderstorms from the surface to 45,000 feet; the most hazardous turbulence is at mid-levels. This could be encoded 530005 550509 591409 592309 553209 554104. While you most likely will never see such a complex coding with this many groups, the flexible TAF code permits it.

n. Temperature. A temperature code is seldom included in a terminal forecast. However, it may be included if critical to aviation. It may be used to alert the pilot to high density altitude or possible frost when on the ground. The temperature group is identified by the digit "0". The next two digits are time to the nearest hour GMT at which the temperature will occur. The last two digits are temperature in degrees Celsius. A minus temperature is preceded by the letter "M." Examples: "02137" means temperature at 2100Z is expected to be 37C, about 99F; "012M02" means temperature at 1200Z is expected to be minus 2C. A forecast may include more than one temperaturegroup.

FIGURE 1-8. VISIBILITY CONVERSION, TAF CODE TO MILES

METERS	MILES
0000	0
0100	1/16
0200	1/8
0300	3/16
0400	1/4
0500	5/16
0600	3/8
0800	1/2
1000	5/8
1200	3/4
1400	7/8
1600	1
1800	1 1/8
2000	1 1/4
2200	1 3/8
2400	1 1/2
2600	1 5/8
2800	1 3/4
3000	1 7/8
3200	2
3600	2 1/4
4000	2 1/2
4800	3
6000	4
8000	5
9000	6
9999	more than 6

FIGURE 1-9. TAF WEATHER CODES

CODE	DECODE
04FU	SMOKE
06HZ	DUST HAZE
08PO	DUST DEVILS
10BR	MIST
11MIFG	SHALLOW FOG - Patches
12MIFG	SHALLOW FOG - Continuous
17TS	THUNDERSTORMS
18SQ	SQUALL
19FC	FUNNEL CLOUD
30SA	DUSTSTORM or SANDSTORM - Decreased during the preceding hour
31SA	DUSTSTORM or SANDSTORM - No change during the preceding hour
32SA	DUSTSTORM or SANDSTORM - Began or increased during the preceding hour
33XXSA	HEAVY DUSTSTORM or SANDSTORM - Decreased during the preceding hour
34XXSA	HEAVY DUSTSTORM or SANDSTORM - No change during the preceding hour
35XXSA	HEAVY DUSTSTORM or SANDSTORM - Began or increased during the preceding hour
36DRSN	LOW DRIFTING SNOW - Slight or moderate
37DRSN	LOW DRIFTING SNOW - Heavy
38BLSN	BLOWING SNOW - Slight or moderate
39BLSN	BLOWING SNOW - Heavy
40BCFG	FOG PATCHES - Sky visible, has become thinner during the preceding hour
41BCFG	FOG PATCHES
42FG	FOG - Sky visible, has become thinner during the preceding hour
43FGFOG	Sky invisible, has become thinner during the preceding hour
44FG	Fog - Sky visible, no change during the last hour
45FGFOG	Sky invisible, no change during the preceding hour
46FGFOG	Sky visible, has begun or has become thicker during the preceding hour
47FGFOG	Sky invisible, has begun or has become thicker during the preceding hour
48FZFG	FREEZING FOG - Sky visible
49FZFG	FREEZING FOG - Sky invisible
50DZ	DRIZZLE - Intermittent, slight
51DZ	DRIZZLE - Continuous, slight
52DZ	DRIZZLE - Intermittent, moderate
53DZ	DRIZZLE - Continuous, moderate
54XXDZ	HEAVY DRIZZLE - intermittent
55XXDZ	HEAVY DRIZZLE - Continuous
56FZDZ	FREEZING DRIZZLE

FIGURE 1-9. TAF WEATHER CODES—Continued

CODE	DECODE
57XXFZDZ	HEAVY FREEZING DRIZZLE
58RA	RAIN - Drizzle and Rain, slight
59RA	RAIN - Drizzle and Rain, moderate or heavy
60RA	RAIN - Intermittent, slight
61RA	RAIN - Continuous, slight
62RA	RAIN - Intermittent, moderate
63RA	RAIN - Continuous, moderate
64XXRA	HEAVY RAIN - Intermittent, heavy
65XXRA	HEAVY RAIN - Continuous, heavy
66FZRA	FREEZING RAIN
67XXFZRA	HEAVY FREEZING RAIN
68RASN	RAIN and SNOW
69XXRASN	HEAVY RAIN and SNOW
70SN	SNOW - Intermittent, slight
71SN	SNOW - Continuous, slight
72SN	SNOW - Intermittent moderate
73SN	SNOW - Continuous moderate
74XXSN	HEAVY SNOW - Intermittent
75XXSN	HEAVY SNOW - Continuous
77SN	SNOW - Snow grains
79PE	ICE PELLETS
80RASH	SHOWERS
81XXSH	HEAVY SHOWERS - Moderate or heavy
82XXSH	HEAVY SHOWERS - Violent
83RASN	SHOWERS of RAIN and SNOW mixed
84XXRASN	HEAVY SHOWERS of RAIN and SNOW - Mixed
85SNSH	SNOW SHOWERS
86XXSN	HEAVY SNOW SHOWERS
87GR	SOFT HAIL - Moderate or heavy
89GR	HAIL - Not associated with thunder, slight
90XXGR	HEAVY HAIL - Not associated with thunder, moderate or heavy
91RA	RAIN - Slight rain at time of observation, thunderstorm during preceding hour but not at time of observation
92XXRA	RAIN - Moderate or heavy rain at time of observation, thunderstorm during the preceding hour but not at the time of observation
93GR	HAIL, SLIGHT SNOW - Or rain and snow mixed with hail, at time of observation, thunderstorm during preceding hour but not at time of observation
94XXGR	HEAVY HAIL - Moderate or heavy snow, or rain and snow mixed with hail at time of observation, thunderstorm during preceding hour but not at time of observation
95TS	THUNDERSTORM - Thunderstorm, slight or moderate, without hail but with rain and/or snow

FIGURE 1-9. TAF WEATHER CODES—Continued

CODE	DECODE
96TSGR	THUNDERSTORM with HAIL - Thunderstorm, slight or moderate, with hail
97XXTS	HEAVY THUNDERSTORM - Heavy, without hail
98TSSA	THUNDERSTORM with DUSTSTORM or SAND-STORM
99XXTSGR	HEAVY THUNDERSTORM with HAIL

FIGURE 1-10. TAF CLOUD CODE

CLOUD AMOUNT	CLOUD TYPE
0 0 (CLEAR)	CI Cirrus
1 1 octa or less but not zero	CC Cirrocumulus CS Cirrostratus
2 2 octas	AC Altocumulus
3 3 octas	AS Altostratus
4 4 octas	NS Nimbostratus
5 5 octas	SC Stratocumulus
6 6 octas	ST Stratus
7 7 octas or more but less than 8	CU Cumulus CB Cumulonimbus
8 8 octas (overcast)	//Cloud not visible
9 Sky obscured, or cloud amount not estimated	due to darkness or obscuring phenomena

FIGURE 1-11. TAF ICING & TURBULENCE

Fig. Code	Amount of Ice Accretion (TAF group 6)
0	No icing
1	Light icing
2	Light icing in cloud
3	Light icing in precipitation
4	Moderate icing
5	Moderate icing in cloud
6	Moderate icing in precipitation
7	Severe icing
8	Severe icing in cloud
9	Severe icing in precipitation

Fig. Code	Amount of Ice Accretion(TAF group 5)
0	None
1	Light turbulence
2	Moderate turbulence in clear air, infrequent
3	Moderate turbulence in clear air, frequent
4	Moderate turbulence in cloud, infrequent
5	Moderate turbulence in cloud, frequent
6	Severe turbulence in clear air, infrequent
7	Severe turbulence in clear air, frequent
8	Severe turbulence in cloud, infrequent
9	Severe turbulence in cloud, frequent

FIGURE 1-12. CONVERSION OF ALTIMETER SETTING INCHES OF MERCURY - MILLIBARS

1 inch of mercury = 33.863 hectopascals = 33.863 millibars

INCHES	MILLIBARS									
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
26.0	880.5	880.8	881.1	881.5	881.8	882.2	882.5	882.8	883.2	883.5
26.1	883.8	884.2	884.5	884.9	885.2	885.5	885.9	886.2	886.6	886.9
26.2	887.2	887.6	887.9	888.3	888.6	888.9	889.3	889.6	889.9	890.3
26.3	890.6	891.0	891.3	891.6	892.0	892.3	892.7	893.0	893.3	893.7
26.4	894.0	864.3	894.7	895.0	895.4	895.7	896.0	896.4	896.7	897.1
26.5	897.4	897.7	898.1	898.4	898.7	899.1	899.4	899.8	900.1	900.4
26.6	900.8	901.1	901.5	901.8	902.1	902.5	902.8	903.2	903.5	903.8
26.7	904.2	904.5	904.8	905.2	905.5	905.9	906.2	906.5	906.9	907.2
26.8	907.6	907.9	908.2	908.6	908.9	909.2	909.6	909.9	910.3	910.6
26.9	910.9	911.3	911.6	912.0	912.3	912.6	913.0	913.3	913.6	914.0
27.0	914.3	914.7	915.0	915.3	915.7	916.0	916.4	916.7	917.0	917.4
27.1	917.7	918.1	918.4	918.7	919.1	919.4	919.7	920.1	920.4	920.8
27.2	921.1	921.4	921.8	922.1	922.5	922.8	923.1	923.5	923.8	924.1
27.3	924.5	924.8	925.2	925.5	925.8	926.2	926.5	926.9	927.2	927.5
27.4	927.9	928.2	928.5	928.9	929.2	929.6	929.9	930.2	930.6	930.9
27.5	921.3	931.6	931.9	932.3	932.6	933.0	933.3	933.6	934.0	934.3
27.6	934.6	935.0	935.3	935.7	936.0	936.3	936.7	937.0	937.4	937.7
27.7	938.0	938.4	938.7	939.0	939.4	939.7	940.1	940.4	940.7	941.1
27.8	941.4	941.8	942.1	942.4	942.8	943.1	943.4	943.8	944.1	944.5
27.9	944.8	945.1	945.5	945.8	946.2	946.5	946.8	947.2	947.5	947.9
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	962.8	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	977.7	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	988.2	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	992.6	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	1000.4	1000.7	1001.0	1001.4	1001.7	1002.0
29.6	1002.4	1002.7	1003.1	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	1007.5	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	1014.0	1014.6	1014.9	1015.2	1015.6
30.0	1015.9	1016.3	1016.6	1016.9	1017.3	1017.6	1018.0	1018.3	1018.6	1019.0
30.1	1019.3	1019.6	1020.0	1020.3	1020.7	1021.0	1021.3	1021.7	1022.0	1022.4
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	1030.4	1030.5	1030.8	1031.2	1031.5	1031.8	1032.2	1032.5
30.5	1032.9	1033.2	1033.5	1033.9	1034.2	1024.5	1034.9	1035.2	1035.6	1035.9
30.6	1036.2	1026.6	1036.9	1037.3	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	1047.8	1048.1	1048.4	1048.8	1049.1	1049.4

FIGURE 1-13. HECTOPASCALS (OR MILLIBARS) TO INCHES OF MERCURY

HECTOPASCALS or MILLIBARS to INCHES (1 hectopascal = 1 millibar = 0.02953 inches of mercury)

hPa or mb	INCHES									
	0	1	2	3	4	5	6	7	8	9
710	20.97	21.00	21.03	21.05	21.08	21.11	21.14	21.17	21.20	21.23
720	21.26	21.29	21.32	21.35	21.38	21.41	21.44	21.47	21.50	21.53
730	21.56	21.59	21.62	21.65	21.67	21.70	21.73	21.76	21.79	21.82
740	21.85	21.88	21.91	21.94	21.97	22.00	22.03	22.06	22.09	22.12
750	22.15	22.18	22.21	22.24	22.27	22.30	22.32	22.35	22.38	22.41
760	22.44	22.47	22.50	22.53	22.56	22.59	22.62	22.65	22.68	22.71
770	22.74	22.77	22.80	22.83	22.86	22.89	22.92	22.94	22.97	23.00
780	23.03	23.06	23.09	23.12	23.15	23.18	23.21	23.24	23.27	23.30
790	23.33	23.36	23.39	23.42	23.45	23.48	23.51	23.54	23.56	23.59
800	23.62	23.65	23.68	23.71	23.74	23.77	23.80	23.83	23.86	23.89
810	23.92	23.95	23.98	24.01	24.04	24.07	24.10	24.13	24.16	24.19
820	24.21	24.24	24.27	24.30	24.33	24.36	24.39	24.42	24.45	24.48
830	24.51	24.54	24.57	24.60	24.63	24.66	24.69	24.72	24.75	24.78
840	24.81	24.83	24.86	24.89	24.92	24.95	24.98	25.01	25.04	25.07
850	25.10	25.13	25.16	25.19	25.22	25.25	25.28	25.31	25.34	25.37
860	25.40	25.43	25.45	25.48	25.51	25.54	25.57	25.60	25.63	25.66
870	25.69	25.72	25.75	25.78	25.81	25.84	25.87	25.90	25.93	25.96
880	25.99	26.02	26.05	26.07	26.10	26.13	26.16	26.19	26.22	26.25
890	26.28	26.31	26.34	26.37	26.40	26.43	26.46	26.49	26.52	26.55
900	26.58	26.61	26.64	26.67	26.70	26.72	26.75	26.78	26.81	26.84
910	26.87	26.90	26.93	26.96	26.99	27.02	27.05	27.08	27.11	27.14
920	27.17	27.20	27.23	27.26	27.29	27.32	27.34	27.37	27.40	27.43
930	27.46	27.49	27.52	27.55	27.58	27.61	27.64	27.67	27.70	27.73
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	28.26	28.29	28.32
960	28.35	28.38	28.41	28.44	28.47	28.50	28.53	28.56	28.58	28.61
970	28.64	28.67	28.70	28.73	28.76	28.79	28.85	28.85	28.88	28.91
980	28.94	28.97	29.00	29.03	29.06	29.09	29.15	29.15	29.18	29.21
990	29.23	29.26	29.29	29.32	29.35	29.38	29.44	29.44	29.47	29.50
1000	29.53	29.56	29.59	29.62	29.65	29.68	29.74	29.74	29.77	29.80

FIGURE 1-13. HECTOPASCALS (OR MILLIBARS) TO INCHES OF MERCURY—Continued
HECTOPASCALS or MILLIBARS to INCHES (1 hectopascal = 1 millibar = 0.02953 inches of mercury)

hPa or mb	INCHES									
	0	1	2	3	4	5	6	7	8	9
1010	29.83	29.85	29.88	29.91	29.94	29.97	30.03	30.03	30.06	30.09
1020	30.12	30.15	30.18	30.21	30.24	30.27	30.33	30.33	30.36	30.39
1030	30.42	30.45	30.47	30.50	30.53	30.56	30.62	30.62	30.65	30.68
1040	30.71	30.74	30.77	30.80	30.83	30.86	30.92	30.92	30.95	30.98
1050	31.01	31.04	31.07	31.10	31.12	31.15	31.21	31.21	31.24	31.27

FIGURE 1-13. HECTOPASCALS (OR MILLIBARS) TO INCHES OF MERCURY—Continued

HECTOPASCALS or MILLIBARS to INCHES (1 hectopascal = 1 millibar = 0.02953 inches of mercury)

MN	HECTOPASCALS (or MILLIBARS)									
	0	1	2	3	4	5	6	7	8	9
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.	1002.	1003.	1005.	1006.	1007.	1009.	1010.	1011.
760	1013.	1014.	1015.	1017.	1018.	1019.	1021.	1022.	1023.	1025.
770	1026.	1027.	1029.	1030.	1031.	1033.	1034.	1035.	1037.	1038.
780	1039.	1041.	1042.	1043.	1045.	1046.	1047.	1049.	1050.	1051.
790	1053.	1054.	1055.	1057.	1058.	1059.	1061.	1062.	1063.	1065.
800	1066.	1067.	1069.	1070.	1071.	1073.	1074.	1075.	1077.	1078.

FIGURE 1-14. JET FUEL CONVERSION

LBS - KG - U.S. GAL - LITER

TURBINE FUEL volume/weight (up to 5 pounds variation per 100 gallons due to fuel grade and temperature)								
U.S. Gal	U.S. Lbs / Gal	Lbs	Liter	Lbs / Liter	Lbs	Liter	Kg / Liter	Kg
0.15	1	6.7	0.57	1	1.8	1.25	1	0.8
0.3	2	13	1.1	2	3.6	2.5	2	1.6
0.45	3	20	1.7	3	5.4	3.8	3	2.4
0.6	4	27	2.3	4	7.2	5.0	4	3.2
0.75	5	33	2.8	5	9.0	6.2	5	4.0
0.9	6	40	3.4	6	11	7.5	6	4.8
1.05	7	47	4	7	13	8.8	7	5.6
1.2	8	53	4.5	8	14	10	8	6.4
1.35	9	60	5.1	9	16	11	9	7.2
1.5	10	67	5.7	10	18	12	10	8
3	20	130	11	20	36	25	20	16
4.5	30	200	17	30	54	38	30	24
6	40	270	23	40	72	50	40	32
7.5	50	330	28	50	90	62	50	40
9	60	400	34	60	110	75	60	48
10.5	70	470	40	70	130	88	70	56
12	80	530	45	80	140	100	80	64
13.5	90	600	51	90	160	110	90	72
15	100	670	57	100	180	120	100	80
30	200	1300	110	200	360	250	200	160
45	300	2000	170	300	540	380	300	240
60	400	2700	230	400	720	500	400	320
75	500	3300	280	500	900	620	500	400
90	600	4000	340	600	1100	750	600	480
105	700	4700	400	700	1300	880	700	560
120	800	5300	450	800	1400	1000	800	640
135	900	6000	510	900	1600	1100	900	720
150	1000	6700	570	1000	1800	1200	1000	800

FIGURE 1-15. VOLUME CONVERSION

IMP GAL - U.S. GAL - LITER

TURBINE FUEL volume/weight (up to 5 pounds variation per 100 gallons due to fuel grade and temperature)								
Imp Gal	U.S. / Imp Gal / Gal	U.S. Gal	U.S. Gal	U.S. Liter / Gal	Liter	Imp Gal	Imp Liter / Gal	Liter
.83267	1	1.2010	.26418	1	3.7853	.21997	1	4.5460
2	2	2	1	2	8	0.4	2	9
2	3	4	1	3	11	0.7	3	14
3	4	5	1	4	15	0.9	4	18
4	5	6	1	5	19	1	5	23
5	6	7	2	6	23	1	6	27
6	7	8	2	7	26	2	7	32
7	8	10	2	8	30	2	8	36
7	9	11	2	9	34	2	9	41
8	10	12	3	10	38	2	10	45
17	20	24	5	20	76	4	20	91
25	30	36	8	30	114	7	30	136
33	40	48	11	40	151	9	40	182
42	50	60	13	50	189	11	50	227
50	60	72	16	60	227	13	60	273
58	70	84	18	70	265	15	70	318
67	80	96	21	80	303	18	80	364
75	90	108	24	90	341	20	90	409
83	100	120	26	100	378	22	100	455
167	200	240	53	200	757	44	200	909
250	300	360	79	300	1136	66	300	1364
333	400	480	106	400	1514	88	400	1818
416	500	600	132	500	1893	110	500	2273
500	600	721	158	600	2271	132	600	2728
583	700	841	185	700	2650	154	700	3182
666	800	961	211	800	3028	176	800	3637
750	900	1081	238	900	3407	198	900	4091
833	1000	1201	264	1000	3785	220	1000	4546

FIGURE 1-16. LENGTH CONVERSIONS

KILOMETERS - NAUTICAL MILES

KILOMETERS		
to SM		to NM
0.62137	1	0.53996
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
24.85	40	21.60
31.07	50	27.00
37.28	60	32.40
43.50	70	37.80
49.71	80	44.20
55.92	90	48.60
62.14	100	54.00
124.27	200	107.99
186.41	300	161.99
248.55	400	215.98
310.69	500	269.98
372.82	600	323.97
434.96	700	377.97
497.10	800	431.97
559.23	900	485.96
621.37	1000	539.96

NAUTICAL MILES		
to KM		to SM
1.8520	1	1.1508
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	80.56
148.16	80	92.06
166.68	90	103.57
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	805.55
1481.60	800	920.62
1666.80	900	1035.70
1852.00	1000	1150.78

FIGURE 1-17. LOCAL TIME CHART

LOCAL TIME CHART

	-9	-5	-3½	UTC	+2	-5½	+7	+9	
	ALASKA	NEW YORK	GANDER	LONDON	CAIRO	BOMBAY	BANGKOK	TOKYO	
	1500	1900	2030	0000	0200	0530	0700	0900	
	1600	2000	2130	0100	0300	0630	0800	1000	
	1700	2100	2230	0200	0400	0730	0900	1100	
	1800	2200	2330	0300	0500	0830	1000	1200	
	1900	2300	0030	0400	0600	0930	1100	1300	
PREVIOUS DAY	2000	0000	0130	0500	0700	1030	1200	1400	
	2100	0100	0230	0600	0800	1130	1300	1500	
	2200	0200	0330	0700	0900	1230	1400	1600	
	2300	0300	0430	0800	1000	1330	1500	1700	
	0000	0400	0530	0900	1100	1430	1600	1800	
	0100	0500	0630	1000	1200	1530	1700	1900	
	0200	0600	0730	1100	1300	1630	1800	2000	
	0300	0700	0830	1200	1400	1730	1900	2100	
	0400	0800	0930	1300	1500	1830	2000	2200	
	0500	0900	1030	1400	1600	1930	2100	2300	
	0600	1000	1130	1500	1700	2030	2200	0000	
	0700	1100	1230	1600	1800	2130	2300	0100	NEXT DAY
	0800	1200	1330	1700	1900	2230	0000	0200	
	0900	1300	1430	1800	2000	2330	0100	0300	
	1000	1400	1530	1900	2100	0030	0200	0400	
	1100	1500	1630	2000	2200	0130	0300	0500	
	1200	1600	1730	2100	2300	0230	0400	0600	
	1300	1700	1830	2200	0000	0330	0500	0700	
	1400	1800	1930	2300	0100	0430	0600	0800	

FIGURE 1-18. RADIO PROPAGATION FORECAST CHART

RADIO-SUISSE SA TELECOMMUNICATIONS MOBILE RADIO SERVICES P.O. BOX CH-3000 BERNE 14	RADIO PROPAGATION FORECAST for HF Communications with BERNA-RADIO
Frequencies in kHz: WATCH FREQUENCIES: ON REQUEST: 4654.0 H24 3010.0 6643.0 H24 25500.0 8936.0 H24 10069.0 H24 13205.0 H24 15046.0 H24 18023.0 H24 21988.0 DAY-TIME 23285.0 DAY-TIME	**NOTAM:** OWING TO PREDICTED LOW SUNSPOT ACTIVITY, RADIO PROPAGATIONS REMAIN SHAKY. IN CASE OF UNSUCCESSFUL COMMUNICATION ATTEMPT, TRY NEXT HIGHER OR LOWER FREQUENCY.

TIME IN UTC	00	02	04	06	08	10	12	14	16	18	20	22
EUR												
Northern Europe	6	4	6	10	10	10	13	10	10	10	10	8
Central Europe	4	4	4	6	8	10	10	8	8	6	8	6
Balkan/Western and Central Med. Sea	8	6	8	10	13	15	15	13	10	13	13	8
NAT/NAM												
30° W (mid-atlantic)/Iceland	8	6	6	8	10	10	13	13	13	13	13	10
U.S. and Canada East Coast	10	6	6	10	15	15	15	15	15	15	13	13
West Coast U.S.A./Brit. Columbia	13	6	6	8	10	13	13	13	15	15	15	15
Alaska/Transpolar	10	6	8	10	10	13	13	13	13	13	13	10
CAR												
Antilles/Gulf of Mexico	10	6	6	8	8	10	15	15	15	15	15	13
Mexico/Latin America	10	8	6	8	8	10	15	15	15	15	15	13
SAM												
South Atlantic	6	6	6	10	15	15	18	15	15	18	15	10
Northern South America	10	6	6	8	10	15	15	18	18	18	15	13

FIGURE 1-18. RADIO PROPAGATION FORECAST CHART—Continued

RADIO-SUISSE SA TELECOMMUNICATIONS MOBILE RADIO SERVICES P.O. BOX CH-3000 BERNE 14	RADIO PROPAGATION FORECAST for HF Communications with BERNA-RADIO
Frequencies in kHz: WATCH FREQUENCIES: ON REQUEST: 4654.0 H24 3010.0 6643.0 H24 25500.0 8936.0 H24 10069.0 H24 13205.0 H24 15046.0 H24 18023.0 H24 21988.0 DAY-TIME 23285.0 DAY-TIME	**NOTAM:** OWING TO PREDICTED LOW SUNSPOT ACTIVITY, RADIO PROPAGATIONS REMAIN SHAKY. IN CASE OF UNSUCCESSFUL COMMUNICATION ATTEMPT, TRY NEXT HIGHER OR LOWER FREQUENCY.

TIME IN UTC	00	02	04	06	08	10	12	14	16	18	20	22
Central South America	10	8	8	10	10	18	18	18	18	18	15	13
Southern South America	10	8	8	10	8	15	18	21	18	18	18	13
AFI												
Northern Africa/Med. Coast	10	6	6	10	13	15	15	15	13	15	15	10
Sahara/Canary Islands/Azeroes	10	8	8	10	13	15	15	15	15	15	15	13
Liberia-Ghana-Nigeria-belt	6	6	6	10	13	13	15	15	15	15	13	10
Angola/Zaire/Zambia/Tanzania	6	6	6	13	15	15	15	15	18	18	13	8
South Africa	6	6	4	13	18	21	21	21	15	10	8	6
Egypt/Sudan	8	6	8	10	15	15	15	15	15	15	13	10
Ethiopia/Kenya	8	6	8	13	15	15	15	15	15	15	10	10
SW Indian Ocean/Seychelles	6	6	13	15	18	18	18	18	15	13	10	8
MID/ASIA/PAC												
Turkey/Eastern Med. Sea	8	6	8	13	13	15	15	18	18	18	15	10
Israel/Jordan/Lebanon/Iraq/Syria	6	6	8	10	13	15	15	18	18	18	10	10
Saudi-Arabia/Oman/Yemen	8	6	10	13	13	15	15	13	15	15	10	10

FIGURE 1-18. RADIO PROPAGATION FORECAST CHART—Continued

RADIO-SUISSE SA
TELECOMMUNICATIONS
MOBILE RADIO SERVICES
P.O. BOX
CH-3000 BERNE 14

RADIO PROPAGATION FORECAST
for HF Communications with
BERNA-RADIO

Frequencies in kHz:

WATCH FREQUENCIES: ON REQUEST:

4654.0	H24	3010.0
6643.0	H24	25500.0
8936.0	H24	
10069.0	H24	
13205.0	H24	
15046.0	H24	
18023.0	H24	
21988.0	DAY-TIME	
23285.0	DAY-TIME	

NOTAM:

OWING TO PREDICTED LOW SUNSPOT ACTIVITY, RADIO PROPAGATIONS REMAIN SHAKY. IN CASE OF UNSUCCESSFUL COMMUNICATION ATTEMPT, TRY NEXT HIGHER OR LOWER FREQUENCY.

TIME IN UTC	00	02	04	06	08	10	12	14	16	18	20	22
Iran/Persian Gulf	8	6	10	13	15	15	15	13	13	13	10	10
Moscow/Tashkent	8	6	10	13	13	15	15	13	13	13	13	10
Pakistan/India/Northern Indian Ocean	8	10	15	15	15	15	15	13	13	13	10	10
Indochina/Indonesia	13	10	15	18	18	18	15	18	15	10	10	8
Philippines/Japan/China/Hong Kong	10	10	13	15	15	15	15	13	13	10	10	8
Australia/New Zealand	10	13	15	18	18	13	10	10	10	10	6	10
Pacific	10	10	10	10	13	10	10	10	13	13	13	13

Period: MAY / JUNE / JULY / AUGUST 1987

FIGURE 1-19.

SPEED, TEMPERATURE, AND WEIGHT CONVERSION CONVERSIONS

METERS PER SECOND to FEET PER MINUTE (mps = 196.85 fpm)

MPS	FPM	MPS	FPM	MPS	FPM	MPS	FPM
1	197	6	1181	11	2165	16	3150
1.5	295	6.5	1279	11.5	2263	16.5	3248
2	394	7	1378	12	2362	17	3346
2.5	492	7.5	1476	12.5	2460	17.5	3444
3	591	8	1575	13	2559	18	3543
3.5	689	8.5	1673	13.5	2657	18.5	3641
4	787	9	1772	14	2756	19	3740
4.5	885	9.5	1870	14.5	2854	19.5	3838
5	984	10	1969	15	2953	20	3937
5.5	1082	10.5	2067	15.5	3051		

METERS PER SECOND to KNOTS (1 mps = 1.9438 knots)

Meters p/sec.	0	1	2	3	4	5	6	7	8	9
					Knots					
0	-	1.9	3.9	5.8	7.8	9.7	11.7	13.6	15.6	17.5
10	19.4	21.4	23.3	25.3	27.2	29.2	31.1	33.0	35.0	36.9
20	38.9	40.8	42.8	44.7	46.6	48.6	50.5	52.5	54.4	56.4
30	58.3	60.3	62.2	64.1	66.1	68.0	70.0	71.9	73.9	75.8
40	77.8	79.7	81.6	83.6	85.5	87.5	89.4	91.4	93.3	95.2
50	97.2	99.1	101.1	103.0	105.0	106.9	108.8	110.8	112.7	114.7
60	116.6	118.6	120.5	122.5	124.4	126.3	128.3	130.2	132.2	134.1
70	136.1	138.0	140.0	141.9	143.8	145.8	147.7	149.7	151.6	153.6

TEMPERATURES (CELSIUS/FAHRENHEIT)

°C	°F	°C	°F	°C	°F
-40	-40.0	-8	17.6	24	75.2
-39	-38.2	-7	19.4	25	77.0
-38	-36.4	-6	21.2	26	78.8
-37	-34.6	-5	23.0	27	80.6
-36	-32.8	-4	24.8	28	82.4
-35	-31.0	-3	26.6	29	84.2
-34	-29.2	-2	28.4	30	86.0
-33	-27.4	-1	30.2	31	87.8
-32	-25.6	0	32.0	32	89.6
-31	-23.8	1	33.8	33	91.4
-30	-22.0	2	35.6	34	93.2
-29	-20.2	3	37.4	35	95.0
-28	-18.4	4	39.2	36	96.8
-27	-16.6	5	41.0	37	98.6
-26	-14.8	6	42.8	38	100.4
-25	-13.0	7	44.6	39	102.2
-24	-11.2	8	46.4	40	104.0
-23	-9.4	9	48.2	41	105.8
-22	-7.6	10	50.0	42	107.6
-21	-5.8	11	51.8	43	109.4
-20	-4.0	12	53.6	44	111.2
-19	-2.2	13	55.4	45	113.0
-18	-0.4	14	57.2	46	114.8
-17	1.4	15	59.0	47	116.6
-16	3.2	16	60.8	48	118.4
-15	5.0	17	62.6	49	120.2
-14	6.8	18	64.4	50	122.0
-13	8.6	19	66.2	51	123.8
-12	10.4	20	68.0	52	125.6
-11	12.2	21	69.8	53	127.4
-10	14.0	22	71.6	54	129.2
-9	15.8	23	73.4	55	131.0

WEIGHT

Lbs	Kgs / Lbs	Kgs
2.2046	1	.45359
4	2	1
7	3	1
9	4	2
11	5	2
13	6	3
15	7	3
18	8	4
20	9	4
22	10	4
44	20	9
66	30	14
88	40	18
110	50	23
132	60	27
154	70	32
176	80	36
198	90	41
220	100	45
441	200	91
661	300	16
882	400	181
1102	500	227
1323	600	272
1543	700	318
1764	800	363
1984	900	408
2205	1000	454

FIGURE 1-20.

VOLUME AND WEIGHT OF AVIATION FUEL AND OIL CONVERSION

TABLES and CODES

VOLUME

Imp Gal	U.S. Gal/Imp Gal	U.S. Gal	U.S. Gal	Liter/U.S. Gal	Liter	U.S. Gal	Lbs/U.S. Gal	Liter
.83267	1	1.2010	.26418	1	3.7853	.21997	1	4.5460
2	2	2	1	2	8	.4	2	9
2	3	4	1	3	11	.7	3	14
3	4	5	1	4	15	.9	4	18
4	5	6	1	5	19	1	5	23
5	6	7	2	6	23	1	6	27
6	7	8	2	7	26	2	7	32
7	8	10	2	8	30	2	8	36
7	9	11	2	9	34	2	9	41
8	10	12	3	10	38	2	10	45
17	20	24	5	20	76	4	20	91
25	30	36	8	30	114	7	30	136
33	40	48	11	40	151	9	40	182
42	50	60	13	50	189	11	50	227
50	60	72	16	60	227	13	60	273
58	70	84	18	70	265	15	70	318
67	80	96	21	80	303	18	80	364
75	90	108	24	90	341	20	90	409
83	100	120	26	100	378	22	100	455
167	200	240	53	200	757	44	200	909
250	300	360	79	300	1136	66	300	1364
333	400	480	106	400	1514	88	400	1818
416	500	600	132	500	1893	110	500	2273
500	600	721	158	600	2271	132	600	2728
583	700	841	185	700	2650	154	700	3182
666	800	961	211	800	3028	176	800	3637
750	900	1081	238	900	3407	198	900	4091
833	1000	1201	264	1000	3785	220	1000	4546

OIL volume/weight (approximate according to Temp)

U.S. Gal	Lbs/U.S. Gal	Lbs	Liter	Lbs/Liter	Lbs	Liter	Kg / Liter	Kg
.13333	1	7.5000	.50471	1	1.9813	1.1127	1	.89871
.3	2	15	1.0	2	4	2	2	2
.4	3	22	1.5	3	6	3	3	3
.5	4	30	2.0	4	8	4	4	4
.7	5	38	2.5	5	10	6	5	5
.8	6	45	3.0	6	12	7	6	5
.9	7	52	3.5	7	14	8	7	6
1.1	8	60	4.0	8	16	9	8	7
1.2	9	68	4.5	9	18	10	9	8
1.3	10	75	5.0	10	20	11	10	9
3	20	150	10	20	40	22	20	18
4	30	225	15	30	59	33	30	27
5	40	300	20	40	79	44	40	36
7	50	375	25	50	99	56	50	45
8	60	450	30	60	119	67	60	54
9	70	525	35	70	139	78	70	63
11	80	600	40	80	158	89	80	72
12	90	675	45	90	178	100	90	81
13	100	750	50	100	198	111	100	90
27	200	1500	101	200	396	222	200	180
40	300	2250	151	300	594	334	300	270
53	400	3000	202	400	792	445	400	360
67	500	3750	252	500	991	556	500	449
80	600	4500	303	600	1189	668	600	539
93	700	5250	353	700	1387	779	700	629
107	800	6000	404	800	1585	890	800	719
120	900	6750	454	900	1783	1001	900	809
133	1000	7500	505	1000	1981	1113	1000	899

FIGURE 1-20. - Continued

VOLUME AND WEIGHT OF AVIATION FUEL AND OIL CONVERSION

TABLES and CODES

TURBINE FUEL volume/weight
(up to 5 pounds variation per 100 gallons due to fuel grade and temperature)

U.S. Gal	Lbs/U.S. Gal	Lbs	Liter	Lbs / Liter	Lbs	Liter	Kg / Liter	Kg
.15	1	6.7	0.57	1	1.8	1.25	1	.8
.3	2	13	1.1	2	3.6	2.5	2	1.6
.45	3	20	1.7	3	5.4	3.8	3	2.4
.6	4	27	2.3	4	7.2	5.0	4	3.2
.75	5	33	2.8	5	9.0	6.2	5	4.0
.9	6	40	3.4	6	11	7.5	6	4.8
1.05	7	47	4	7	13	8.8	7	5.6
1.2	8	53	4.5	8	14	10	8	6.4
1.35	9	60	5.1	9	16	11	9	7.2
1.5	10	67	5.7	10	18	12	10	8
3	20	130	11	20	36	25	20	16
4.5	30	200	17	30	54	38	30	24
6	40	270	23	40	72	50	40	32
7.5	50	330	28	50	90	62	50	40
9	60	400	34	60	110	75	60	48
10.5	70	470	40	70	130	88	70	56
12	80	530	45	80	140	100	80	64
13.5	90	600	51	90	160	110	90	72
15	100	670	57	100	180	125	100	80
30	200	1300	110	200	360	250	200	160
45	300	2000	170	300	540	380	300	240
60	400	2700	230	400	720	500	400	320
75	500	3300	280	500	900	620	500	400
90	600	4000	340	600	1100	750	600	480
105	700	4700	400	700	1300	880	700	560
120	800	5300	460	800	1400	1000	800	640
135	900	6000	510	900	1600	1100	900	720
150	1000	6700	570	1000	1800	1200	1000	800

AVIATION GAS volume/weight (approximate according to Temp)

Gal	Lbs/ Gal	Lbs	Liter	Lbs/Liter	Lbs	Liter	Kg / Liter	Kg
.167	1	6.00	.631	1	1.58	1.39	1	.719
.3	2	12	1	2	3	3	2	1
.5	3	18	2	3	5	4	3	2
.7	4	24	2	4	6	6	4	3
.8	5	30	3	5	8	7	5	4
1.0	6	36	4	6	10	8	6	4
1.2	7	42	4	7	11	10	7	5
1.3	8	48	5	8	13	11	8	6
1.5	9	54	6	9	14	12	9	6
1.7	10	60	6	10	16	14	10	7
3	20	120	13	20	32	28	20	14
5	30	180	19	30	48	42	30	22
7	40	240	25	40	63	56	40	29
8	50	300	32	50	79	70	50	36
10	60	360	38	60	95	83	60	43
12	70	420	44	70	111	97	70	50
13	80	480	50	80	127	111	80	58
15	90	540	57	90	143	125	90	65
17	100	600	63	100	158	139	100	72
33	200	1200	126	200	317	278	200	144
50	300	1800	189	300	476	417	300	216
67	400	2400	252	400	634	556	400	288
83	500	3000	315	500	793	695	500	359
100	600	3600	378	600	951	834	600	431
117	700	4200	442	700	1110	974	700	503
133	800	4800	505	800	1268	1113	800	575
150	900	5400	568	900	1427	1252	900	647
167	1000	6000	631	1000	1585	1391	1000	719