ATR Line Training

Last Updated: 7th Nov, 2018

METEOROLOGY
a) Weather
- Departure
- En route
- Destination
- Alternate

NOTAMS
a) NOTAMS Overview
b) Decoding a NOTAM

FLIGHT PLAN
a) Company Routing
b) Air/Block Time
c) Required Fuel
d) TOM Calculations
e) ATS Flight Plan
f) Fuel Requirements
g) Flight Level
h) Alternate Requirements

PRE FLIGHT
a) Tech Log
b) Aircraft Documents
c) Procedures:
I. Exterior Safety Inspection
II. Cockpit Safety Inspection
III. Preliminary Cockpit Prep.
IV. Interior Inspection
V. Exterior Inspection
VI. Cockpit Preparation
VII. Emergency Equipment
VIII. Door Operation

DEPARTURE BRIEFING
a) Push and Start procedure
b) Taxiways & Runway in use
c) SID, required NDB / VOR
d) VHF COMM frequencies
e) Noise abatement procedure
f) Obstacle Requirements (MSA)
g) Transition Altitude
h) Runway / Weather Conditions
i) Restricted / Prohibited Areas
j) A/C Status / MEL Restrictions
k) Radio Failure Procedure

DEPARTURE
a) Use of normal checklist
b) Engine starting
c) Before push back and start
d) Taxing
e) Take off flaps 15
f) Rolling takeoff
g) Static takeoff
h) SID
i) LNAV departure
j) Use of AFCS

GNSS / GPS
a) Initialization
b) Route Page
c) Leg page
d) DEP / ARR page
e) Hold page
f) Progress page
g) VNAV page
h) Temporary Data Building
i) Diversion on Route 2

DESCENT
a) Planning (Time Procedure)
b) Destination & ALT weather
c) Fuel Management:
I. Calculation
II. Insufficient TOD fuel

WEATHER
a) Adverse Weather Procedures
b) Anti-ice, level 2 and 3 use
c) Cold Weather Operation
d) Weather Radar Check and Use

PRECISION APPROACHES
a) AFCS approach (ILS)
b) FDS approach (ILS)
c) Raw data ILS (drift indicator)

NON PRECISION APPROACHES
a) LNAV coupled with conventional use
b) VOR approach
c) NDB approach
d) Visual approach
e) Circle to Land

LANDINGS
a) Flaps 25 Landing
b) Flaps 35 Landing
c) Cross Wind Landing
d) Go Around Technique

ITEMS FOR DISCUSSION
a) Pressurization
b) No Bleed Takeoff / Landing
c) Unpressurized Takeoff / Landing
d) ATPCS / UPTRIM OFF Procedure
e) Narrow Runway Operation
f) ACW 2 OFF Procedure
g) AHRS Erect in Flight
h) Jeppesen ATC & Emergency Chapter
i) RNP
j) Single Engine Ceiling
k) Terminal Control Area (TMA/TCA)
l) Descent Predictions
m) Consulting Graphs
n) MEL
o) Load and Trim Sheet

CRM SKILLS
a) Team Work
b) Assertiveness
c) Threat and Error Management
d) Decision Making
e) Effective Communication
f) Pilot Controller Communication
g) Situational Awareness

MISC
a) Minimum Acceleration Height
b) Understanding V_{APP} and V_{GA}
c) Effect of QNH on TOW
d) Airport Signs and Markings
e) Transponder Setting ON & ALT
f) Approach Climb Limit

METEOROLOGY

8.0.5.2 Weather

Actual and expected `conditions for takeoff and climb, including runway Conditions.

Enroute significant weather, forecast winds, temperatures, icing, turbulence.

Terminal forecasts for destinations, en-route alternate and destination alternate airports, and expected conditions at airports along the planned route

8.1.3 Meteorological Briefing

This briefing is enclosed in the briefing folder issued by Operations Control or outstation handling agents and shall include the following information:

a. Actual reports forecasts, runway report and airfield warnings and other information of hazardous weather conditions for the airfield of departure as well as any takeoff alternate airfields.

b. Forecasts for the destination, destination alternate(s) and appropriate en-route airfields.

c. The latest available synoptic, surface and upper air charts.

d. Information on any expected significant en-route weather (preferably significant weather charts) jet streams and where required the tropopause.

e. The documentation provided shall cover the flight in respect of time altitude and geographical extent. This includes additionally required routes, e.g. routes to alternates and all airfields required for legal flight planning (Enroute alternates as required for reduced Reserve and ETOPS/EDTO planning). It shall contain the latest available information, especially as far as airfield forecasts and actual reports, TREND and runway reports are concerned.

f. Should a Captain be in any doubt about any of the information provided at the briefing he should obtain clarification from the nearest Meteorological Office.

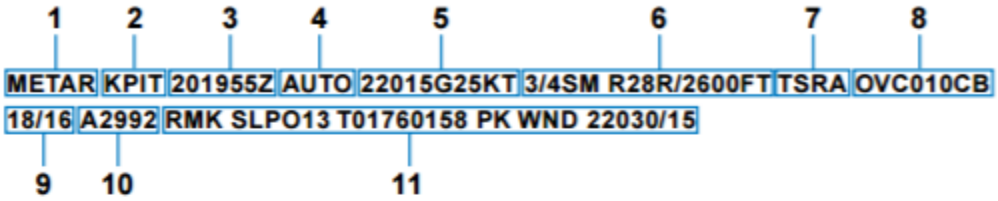
Honeywell

BENDIX/KING®

Understanding Aviation Weather Reports

UNDERSTANDING METARS

Refer to the numbers on the following diagram to find the appropriate descriptions.



1. Type of Report: **METAR** (SPECI will be seen here if this is a Special Weather Report)

2. ICAO Station Identifier: **KPIT**

   This is the location for which the METAR pertains.

3. Date and Time of Issue: **201955Z**

   The **20**th day of the month at **1955Z**ulu or UTC.

4. **AUTO** indicates the reporting station is an automated station. If the reporting station is a manned station this element will be omitted. Also, if a report from an automated station is modified by a person this element will be omitted. "COR" indicates a corrected report.

5. Wind: **22015G25KT**

   220 is the 3 digit true direction to the nearest 10°. Airport advisory service, ATIS and ATC towers report wind direction as magnetic. "VRB" in this place indicates variable winds less than or equal to 6 knots. If wind direction is varying more than 60° with speeds over 6 knots, an entry similar to "180V260" will be displayed in this place. This example actually shows wind direction varying by 80°.

   15 is the 2 or 3 digit wind speed (in knots).

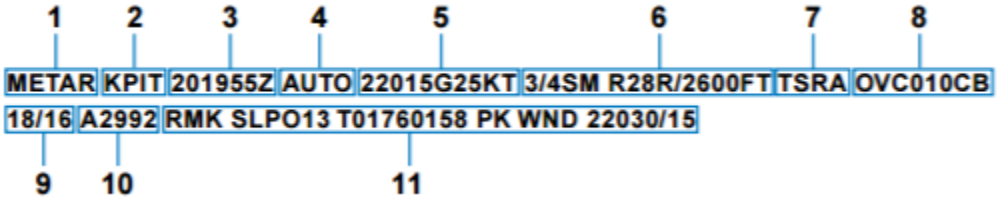
   25 is the 2 or 3 digit wind gust speed in knots (**KT**) because it follows a **G** (Gust).

6. Visibility: **3/4SM R28R/2600FT**

   3/4 indicates 3/4 statute mile (**SM**) visibility.

   Runway Visual Range (RVR) for **R28R** (runway 28 right) is 2600 feet (**2600FT**). An "M" in this distance number indicates visibility is less than the lowest reportable sensor value. A "P" indicates visibility is greater than the highest reportable sensor value.

NOTE: Only reported at those locations with certified RVR reporting capability.



7. Significant Present Weather: **TSRA**

TS is a two letter designation for thunderstorm. Other possible designations could be as follows:

BC	Patches
BL	Blowing
DR	Low Drifting
FZ	Supercooled/Freezing
MI	Shallow
PR	Partial
SH	Showers

The second two letter designator, **RA,** indicates moderate rain. Moderate is indicated by the absence of a "+", "-" or "VC" preceding the designation. These preceding designations represent the following:

+	Heavy
-	Light
VC	In the vicinity

Other possible designations could be as follows:

BR	Mist
DS	Dust Storm
DU	Widespread Dust
DZ	Drizzle
FC	Funnel Cloud
+FC	Tornado/Water Spout
FG	Fog
FU	Smoke
GR	Hail
GS	Small Hail/Snow Pellets
HZ	Haze
IC	Ice Crystals
PE	Ice Pellets
PO	Dust/Sand Whirls
PY	Spray
SA	Sand
SG	Snow Grains
SN	Snow
SQ	Squall
SS	Sandstorm
UP	Unknown Precipitation (Automated Observations)
VA	Volcanic Ash

8. Sky Condition: **OVC010CB**

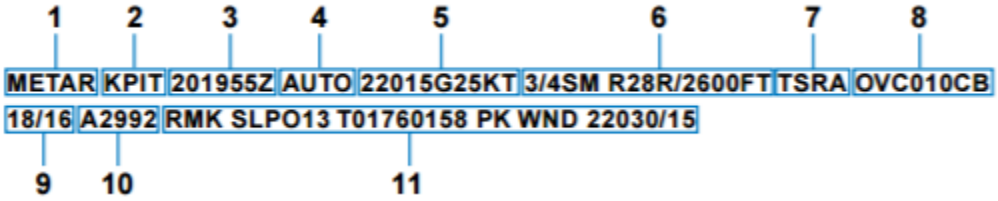
OVC indicates the sky is overcast. Cloud cover is based on the sky being divided into eighths or octas. Overcast means the sky is 8 octas covered. The cloud cover designators are as follows:

SKC	Sky Clear
CLR	Clear below 12,000 ft. (automated observing systems)
FEW	1-2 Octas
SCT	3-4 Octas
BKN	5-7 Octas
OVC	8 octas

"VV" may also be encountered here indicating an indefinite ceiling. For example, VV004 would indicate a vertical visibility of 400 feet.

010 indicates clouds are at 1000 feet.

CB denotes cloud type is cumulonimbus. "TCU" is another possible designator meaning towering cumulus. CI is cirrus.



9. Temperature/Dew Point: **18/16**

18 indicated the temperature is 18° Celsius. An "M" preceding the temperature means the temperature is below 0° Celsius.

16 indicated the dew point is 16° Celsius. An "M" preceding the dew point means the dew point is below 0° Celsius.

10. Altimeter Setting: **A2992**

A indicates the setting is in inches of mercury.

2992 is the altimeter setting. The first two digits are inches and the second two are hundredths.

11. Remarks: **RMK SLP013 T01760158 PK WND 22030/15**

RMK designates the beginning of the remarks. Remarks can contain anything, but often include the following:

SLP indicates sea level pressure in millibars from selected stations.

013 indicates pressure is 1001.3 millibars.

T01760158. Selected stations may also include a 9 place code indicating temperature and dewpoint to the nearest 1/10 degree. **T** denotes temperature. **0** indicates temperature is above 0° Celsius. A "1" in this position indicates a temperature below 0° Celsius. **176** indicates a temperature of 17.6° Celsius. The next **0** indicates the dew point is above 0° Celsius. A "1" in this position indicates a dew point below 0° Celsius. **158** indicates a dewpoint of 15.8° Celsius.

PK WND 22030/15. Selected stations may include peak wind observations which will appear in the remarks element.

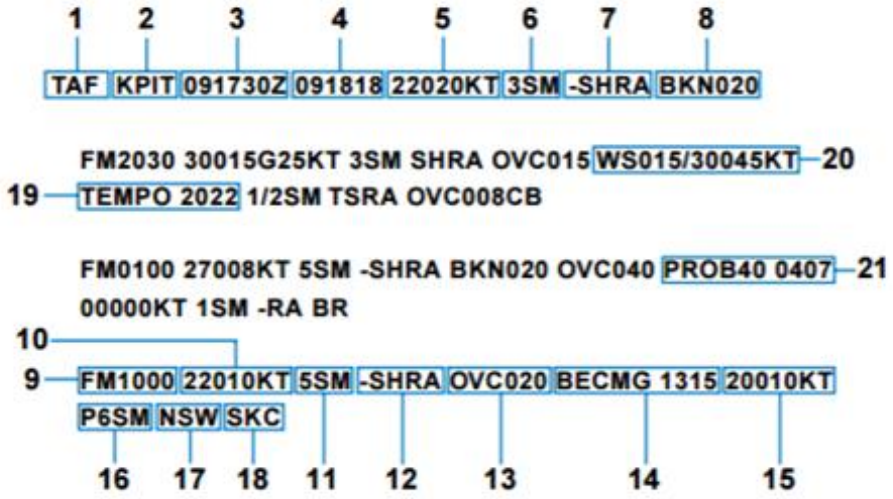
PK WND denotes peak wind.

200 indicates wind direction from 200°.

30/15 indicates a maximum instantaneous wind of 30 knots occurred at 15 minutes past the hour.

UNDERSTANDING TAFS

Refer to the numbers on the following diagram to find the appropriate descriptions.



1. Type of Report: **TAF**

   TAF indicates a Terminal Area Forecast. TAF AMD indicates an amended forecast.

2. ICAO Station Identifier: **KPIT**

   This is the airport for which the TAF pertains.

3. Date and Time of Issue: **091730Z**

   The **9**th day of the month at **1730Z**ulu or UTC.

4. Date and Time Valid: **091818**

   The **9**th day of the month, valid for 24 hours from 09**18**00Z to 10**18**00Z. An amended forecast (TAF AMD) will be valid for only the time interval remaining, usually less than 24 hours.

5. Forecast Wind: **22020KT**

   See #5 in the UNDERSTANDING METARs section for details.

6. Forecast Visibility: **3SM**

   See #6 in the UNDERSTANDING METARs section for details, except RVR is not included in a TAF

7. Forecast Weather Phenomenon: **-SHRA**

   See #7 in the UNDERSTANDING METARs section for details.

8. Sky Conditions: **BKN020**

   See #8 in the UNDERSTANDING METARs section for details.

9. Beginning of Changed Forecast Conditions: **FM1000**

   FM denotes "from" and **1000** indicates 1000Z. "From" means a significant change in prevailing conditions is expected. The described conditions follow this element and supercede all previous forecast conditions.

10. Forecast Wind: **22010KT**

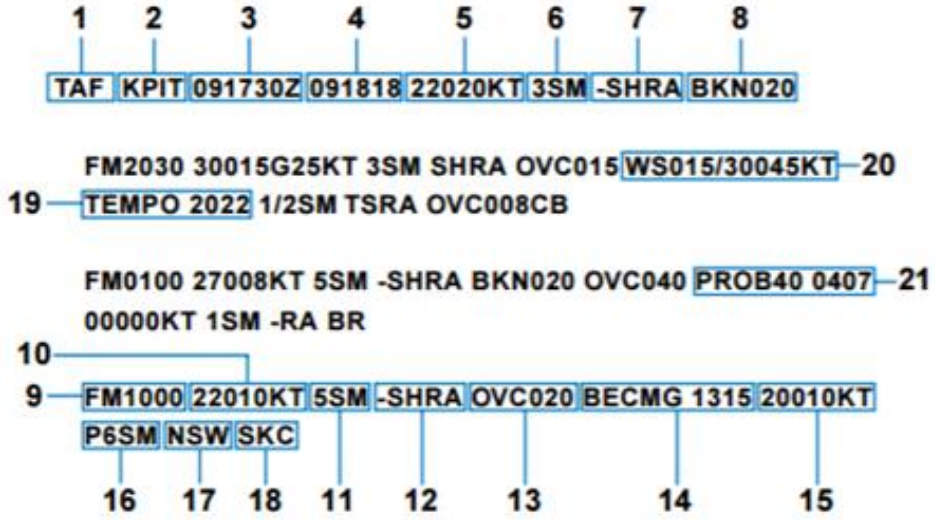
    See #5 in the UNDERSTANDING METARs section for details.

11. Forecast Visibility: **5SM**

    See #6 in the UNDERSTANDING METARs section for details.

12. Forecast Weather Phenomenon: **-SHRA**

    See #7 in the UNDERSTANDING METARs section for details.



13. Forecast Sky Conditions: **OVC020**

See #8 in the UNDERSTANDING METARs section for details.

14. Change in Conditions: **BECMG 1315**

BECMG indicates "becoming" over the time interval between 1300Z (**13**) and 1500Z (**15**). "Becoming" describes a gradual change in forecast conditions. The described conditions follow this element and supercede previously reported like elements.

15. Wind Becoming: **20010KT**

See #5 in the UNDERSTANDING METARs section for details. This element may be omitted if no change is expected.

16. Visibility Becoming: **P6SM**

See #6 in the UNDERSTANDING METARs section for details. This element may be omitted if no change is expected.

17. Weather Phenomenon Becoming: **NSW**

NSW indicates "No Significant Weather". See #7 in the UNDERSTANDING METARs section for details.

18. Sky Conditions Becoming: **SKC**

See #8 in the UNDERSTANDING METARs section for details. This element may be omitted if no change is expected.

19. Change in Conditions: **TEMPO 2022**

TEMPO indicates "temporary" changes expected as described between 2000Z (**20**)and 2200Z (**22**). "Temporary" indicates a temporary fluctuation in conditions, usually lasting less than one hour. The described conditions follow this element.

20. Low Level Windshear: **WS015/30045KT**

WS indicates "windshear" not associated with convective activity. **015** indicates the windshear is expected at 1500 feet. AGL Wind is expected from 300° (**300**) at 45 knots (**45KT**).

21. Change in Conditions: **PROB40 0407**

PROB40 indicates a 40% "probability" of described conditions occurring between 0400Z (**04**)and 0700Z (**07**). The described conditions follow this element.

Internet Resource for Weather Reports:

- ***http://www.theairlinepilots.com/weather-links.php***

NOTAMS Overview *(FAI FSS - Fairbanks Flight Service Station)*

A Notice To Airmen or NOTAM is a notice containing information (not known sufficiently in advance to publicize by other means) concerning the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System) the timely knowledge of which is essential to personnel concerned with flight operations.

Types of NOTAMS:

- CLASS I NOTAMS
- CLASS II NOTAMS
- INTERNATIONAL NOTAMS
- DOMESTIC NOTAMS
- CIVIL NOTAMS
- MILITARY NOTAMS
- PUBLISHED NOTAMS
- FDC NOTAMS
- CENTER AREA NOTAMS
- NOTAM (D)S INCLUDING (U) AND (O) NOTAMS
- NOTAM (L)S OR LOCAL NOTAMS

CLASS I NOTAMS (ICAO): NOTAMs distributed by means of telecommunication.

CLASS II NOTAMS (ICAO) OR PUBLISHED NOTAMS: NOTAMs distributed by means other than telecommunications. In the United States these NOTAMs are published in the Notices To Airmen Publication (NTAP) which is issued every 28 days.

INTERNATIONAL NOTAMS: Any NOTAM intended for distribution to more than one country would be considered an international NOTAM. However, an FSS does not have access to all international NOTAMs. For our purposes I will limit the definition to international NOTAMs that we at a FSS have access to. This would include NOTAMs stored in ICAO format in the United States NOTAM System (USNS) or published in the International NOTAMs section of the NTAP. The USNS stores international NOTAMS separately from domestic NOTAMs, but only for selected locations both inside and outside the United States. These NOTAMs are not included in a standard weather briefing unless specifically requested.

DOMESTIC NOTAMS: NOTAMs that are primarily distributed within the United States although they may also be available in Canada. Domestic NOTAMs stored in the USNS are coded in a domestic format rather than an ICAO format.

CIVIL NOTAMS: Any NOTAM that is part of the civil NOTAM system which includes any NOTAM this is not part of the military NOTAM system.

MILITARY NOTAMS: Any NOTAM that is part of the military NOTAM system which primarily includes NOTAMs on military airports and military airspace.

FDC NOTAMS: Flight Data Center NOTAMS are NOTAMs that are regulatory in nature such as changes to an instrument approach procedure or airway. Temporary Flight Restrictions (TFRs) are also issued as FDC NOTAMs.

CENTER AREA NOTAMS: An FDC NOTAM issued for a condition that is not limited to one airport, therefore it is filed under the Air Route Traffic Control Center (ARTCC) that controls the airspace involved. TFRs, airway changes and laser light activity are examples of this type of NOTAM. This becomes very important to know when looking for NOTAMs on your own. For example you must retrieve ZAN FDC NOTAMs for flights in Alaska because ZAN is the code for Anchorage ARTCC which is the controlling Center for all of Alaska.

NOTAM (D): A NOTAM given (in addition to local dissemination) distant dissemination beyond the area of responsibility of the Flight Service Station. This type of NOTAM now includes (U) NOTAMs and (O) NOTAMs. (U) NOTAMs are unverified NOTAMs which are those that are received from a source other than airport management and have not yet been confirmed by management personnel. This is allowed only at those airports where airport management has authorized it by Letter of Agreement. (O) NOTAMs are other aeronautical information which does not meet NOTAM criteria but may be beneficial to aircraft operations.

NOTAM (L): A NOTAM given local dissemination by voice and other means, such as telautograph and telephone, to satisfy local user requirements. This type of NOTAM is now used only in the military NOTAM system. All NOTAMs previously considered NOTAM (L)s in the civil NOTAM system are now considered NOTAM (D)s. *(Source: faa.gov)*

8.0.5.3 NOTAM

Check that all required facilities at departure, destinations and alternate airports are operational.

En route navaids and facilities at en-route airports

ICAO NOTAM Format

The format of NOTAM is defined in Annex 15 to the International Convention on Civil Aviation. Here is a typical NOTAM and its decode.

A1484/02 NOTAMN
Q) EGTT/QMRXX/IV/NBO/A/000/999/5129N00028W005
A) EGLL
B) 0208231540
C) 0210310500 EST
E) RWY 09R/27L DUE WIP NO CENTRELINE, TDZ OR SALS LIGHTING AVBL

NOTAM Decoder

A1484/02 - One letter to indicate the Series, a 4-digit NOTAM number followed by a stroke and two digits to indicate the year.

NOTAMN - Suffix N Indicates this is a new NOTAM. Other options are R for NOTAM replacing another or C for one cancelling another.

Q) EGTT/QMRXX/IV/NBO/A/000/999/5129N00028W005

This is the "Q" or qualifier line, it always starts Q) and contains the following fields, each separated by a stroke.

FIR (here EGTT, London FIR)

NOTAM Code, a 5 letter code starting with Q, defined in Annexe 15. Here QMR indicates that it concerns a Runway. XX indicates that remaining detail is in Plain Language. In this particular case the text shows that certain runway lighting is unavailable. Strictly speaking under ICAO rules this should have appeared as separate NOTAM for each type of lighting. QLCAS is the code for centreline lighting u/s QLZAS is the code for Touch Down Zone lighting u/s and QLAAS is the code for Approach Lighting u/s (note in all cases AS indicates unserviceable). The use of QMRXX here is a sensible compromise that reduces the number of NOTAM from three to one. A full list of codes is included in ICAO document 8126 (Aeronautical Information Services Manual).

IV - Indicates that this is significant for IFR and VFR traffic

NBO - Indicates for immediate attention of aircraft operators, for inclusion in PIB's and Operationally significant for IFR flights

A - Indicates scope, here Aerodrome, others are E (en-route) or W (nav warning)

000/999 - Lower and upper limits expressed as a flight level. In this case it has been left as the default as it is not applicable.

5129N00028W005 - Indicates the geographical centre and radius of influence, always this number of digits. In this case the radius is 5 n.m.

A) EGLL - ICAO indicator of the aerodrome or FIR (London Heathrow) can include more than one FIR

B) 0208231540 - Date/time group (UTC) when this NOTAM becomes effective

C) 0210310500 EST - Date/time group (UTC) when the NOTAM ceases to be effective. Note "EST" means "estimated" (NOT Eastern Standard Time!). All NOTAM with EST remain in force until cancelled or replaced.

E) RWY 09R/27L DUE WIP NO CENTRELINE, TDZ OR SALS LIGHTING AVBL - Text of the notam using ICAO abbreviations.

Decode of this is "Runway 09/27 due to work in progress no centreline, touchdown zone or simple approach lighting system available"

Here's the whole thing again

A1484/02 NOTAMN
Q) EGTT/QMRXX/IV/NBO/A/000/999/5129N00028W005
A) EGLL
B) 0208231540
C) 0210310500 EST
E) RWY 09R/27L DUE WIP NO CENTRELINE, TDZ OR SALS LIGHTING AVBL

and here's the same thing as it appears in the PIB produced by ANAIS

AGA: FROM 02/08/23 15:40 TO 02/10/31 05:00 EST A1484/02
E) RWY 09R/27L DUE WIP NO CENTRELINE, TDZ OR SALS LIGHTING AVBL

You can see that the Q line is omitted entirely, A) has been stripped out because it appears as the header to the section and B) and C) have been reformatted and placed in the first line. AGA has been derived from the Q Code "QMR" (see Annex 15). *(Source: flyingineurope.be).*

Internet Resource for NOTAMS:

- ***http://www.theairlinepilots.com/notams.php***

FLIGHT PLAN

PAGE 1

```
FLIGHT PLAN PACKAGE

PIA 595  SKZ-LHE 30NOV16 FLT PLAN ID BU005101
FTPRLS BU005101
-----------------------------------------------------------------
                    DISPATCH RELEASE MESSAGE
-----------------------------------------------------------------
              BAY NO:.....       CORD:.................

PK:595      CAPTAIN: K HAROON              SECTOR:SKZ-LHE   REG:APBKX

SDEP: 04:30  SARR: 06:20        BLK-TIME: 01:50    FLT-TIME: 01.32

TTL.FUEL: 2500    TRIP:   1109 FOD: 1300   HOLD: 583 + ALT: 626

EST.TOGW:  19516     EST.LGWT:  18407          RESERVE FUEL: 1209

EST.ZFW:  17135       RVD.ZFW: .........
```

From push back to parking, includes start up and taxi

From Takeoff to landing, no taxi

In this case block time is 28 min more than the flight time and is sufficient i.e. enough time to start and taxi to takeoff point then taxi to parking area after landing. If block time was only 10 min more than flight time then it might not be sufficient on busy airports duty to longer taxi times, therefore will be considered insufficient.

```
-----------------------------------------------------------------
ROUTE AND PROFILE
-----------------
OPSK DCT SK J173 RK J112 LEMOM LEMO2A OPLA
150

ALTERNATE 1 ROUTE AND PROFILE
-----------------------------
OPLA LEMO3A LEMOM J166 MOLTA J138 DIBBA MT DCT OPMT
140

-----------------------------------------------------------------

AIRCRAFT ACCEPTED                          Signatures Mandatory
CAPTAIN     K HAROON                . . . . . .
```

Routing to Destination

Flight Level (for destination)

Routing to Alternate

Flight Level (for alternate)

```
ORIGIN METAR
OPSK 292130Z NIL
```

Departure, destination and alternate weather report

```
DEST TAF
TAF OPLA 291535Z 2918/3024 08003KT 4000 FU NSC TX28/3010Z TN09/3002Z
           BECMG 3000/3004 00000KT 1000 BR BECMG 3004/3007 2500 FU

ALTN TAF
TAF OPMT 291550Z 2918/3012 36005KT 2000 FU FEW120 TN12/3001Z
TX27/3010Z  PROB30 TEMPO 3001/3004 00000KT 1000 BR FEW120 FM300600
36005KT 3000 FU SCT120
```

FLIGHT PLAN

PAGE 2

Fuel *Weight*

	PLANNED	FUEL	TIME	WEIGHTS		STRUCTURAL OR	
	TRIP	1109	01.32	PLAN	ACTUAL	PERF LIMIT	
	CONTINGENCY	91	00.08				
Extra Holding →	XHLD DEST	0	00.00	ZFW 17135	.....	MZFW	020800
	ALTN/MUX/OPMT	626	00.51	RPF 2500	.....	FCAP	005032
	XHLD ALTN	0	00.00	RPW 19635	.....	MRPW	022970
	STD HOLDING	583	00.45	TOW 19516	.....	MTOW	22800
ETP Build Up →	ETP/BU	0	00.00	TIF 1109	.....		
	RECLR/BU	0	00.00	LDW 18407	.....	MLDW	022350
	MIN REQUIRED	2409	03.16	FOD 1300			
	EXTRA	0	00.00	RES 1209			
	TKOF FUEL	2409	03.16				
	TAXI FUEL	91		FUEL ORDERED			
	RAMP FUEL	2500	03.16	REASON			
	BALLAST FUEL	0	INCL IN RAMP FUEL				

BURNOFF ADJUSTMENT PER 1000 KGS CHANGE IN TAKEOFF WT - 000003 KGS

Reclear or Redisptach build up

ZFW = Zero Fuel Weight
MZFW = Max ZFW
RPF = Ramp Fuel
FCAP = Fuel Capacity
RPW = Ramp Weight
MRPW = Max RPW
TOW = Takeoff Weight
MTOW = Max TOW
TIF = Trip Fuel
LDW = Landing Weight
MLDW = Max LDW
FOD = Fuel on Destination
RES = Reserve Fuel

Dotted lines are required to be filled by the crew

Three major equi-time points (ETP)s scenarios are :
1. Engine failure with drift down to single engine drift down height
2. Engine failure with depressurization (cruise FL100 on one engine)
3. Depressurization with no engine failure (cruise FL100 on two engines)
At the planning stage fuel will be "built up" at ETPs to take into account these scenarios. This is the critical fuel requirement for the flight. If required to "build up" fuel at a ETP, fuel in excess of what is required for the flight is carried.

RECLR / BU (Re clear or Re Dispatch Build Up)

From an accountant's viewpoint, the provision of reserve fuel costs money (the fuel needed to carry the hopefully unused reserve fuel). Techniques known variously as reclear, redispatch, or decision point procedure have been developed, which can greatly reduce the amount of reserve fuel needed while still maintaining all required safety standards. These techniques are based on having some specified intermediate airport to which the flight can divert if necessary; in practice such diversions are rare. The use of such techniques can save several tons of fuel on long flights, or it can increase the payload carried by a similar amount. A reclear flight plan has two destinations. The final destination airport is where the flight is really going to, while the initial destination airport is where the flight will divert to if more fuel is used than expected during the early part of the flight. The waypoint at which the decision is made as to which destination to go to is called the reclear fix or decision point. On reaching this waypoint, the flight crew make a comparison between actual and predicted fuel burn and check how much reserve fuel is available. If there is sufficient reserve fuel, then the flight can continue to the final destination airport; otherwise the aircraft must divert to the initial destination airport. The initial destination is positioned so that less reserve fuel is needed for a flight from the origin to the initial destination than for a flight from the origin to the final destination. Under normal circumstances, little if any of the reserve fuel is actually used, so when the aircraft reaches the reclear fix it still has (almost) all the original reserve fuel on board, which is enough to cover the flight from the reclear fix to the final destination. (Source: wikipedia.org)

Takeoff Mass Calculations

Box terminology originating from old, boxed format of loadsheet.

RESTRICTED MAX TAKE OFF WEIGHT INFORMATION

(A)	(B)		(C) Also known as BOX A, B and C	
R.T.O.G.W ~~22800~~	MLDW	22350	MZFW	20800
	TRIP FUEL	1109	T.O.FUEL	2409
Regulated TOGW	LNDG LMT TOGW	23459	ZFW LMT TOGW	23209

This will vary with atmospheric conditions so it cannot be precalculated and published on the flight plan like B. Max Landing Weight and C. Max ZFW.

	MAX T.O.G.W(BRAKE RELEASE)		22800
A	PERFORMANCE REGULATED TOGW AT 46 DEG C		21611
	MAX LANDING WEIGHT		22350
B	TRIP FUEL	+	1109
	LANDING LIMITED T.O.G.W	=	23459
	MAX ZERO FUEL WEIGHT		20800
C	TAKE OFF FUEL	+	2409
	FUEL LIMITED T.O.G.W	=	23209
	MAX T.O.G.W THIS FLIGHT (1)		21611 MIN. OF ABOVE LIMITS

F15 : 07/04/2015 **FOS** SUKKUR : SKZ 32

ELEVATION= 196.0(FT)	LIMITATION CODES	: ATR72-500	FAR
T.O.R.A. = 2743.0(M)	0-DRY CHECK 5-TYRE SPEED	: ATR72-500	
A.S.D.A. = 3017.0(M)	1-STRUCTURE 6-BRAKE ENERGY	: V2/VS OPTIMIZED	V1/VR OPTIMIZED
T.O.D.A. = 3017.0(M)	2-2ND-SEGMENT 7-RWY 2 ENGINES	: AIR COND. ON	
SLOPE = 0.04(%)	3-RUNWAY 8-FINAL T.O.	: NORMAL CONDITIONS	
LARGE WIDTH ASSUMED	4-OBSTACLE 9-VMC	: WITHOUT REVERSE	
TOW(KG) CODES	QNH=1013.25(HPA)	: DRY RUNWAY	
V1 VR V2(IAS KT)		: SCREEN HEIGHT 35 FT	
DTOW / DTOW	DQNH= -15/ +15	:	

For a difference of-15 hpa from 1013, adjust this amount from takeoff weight

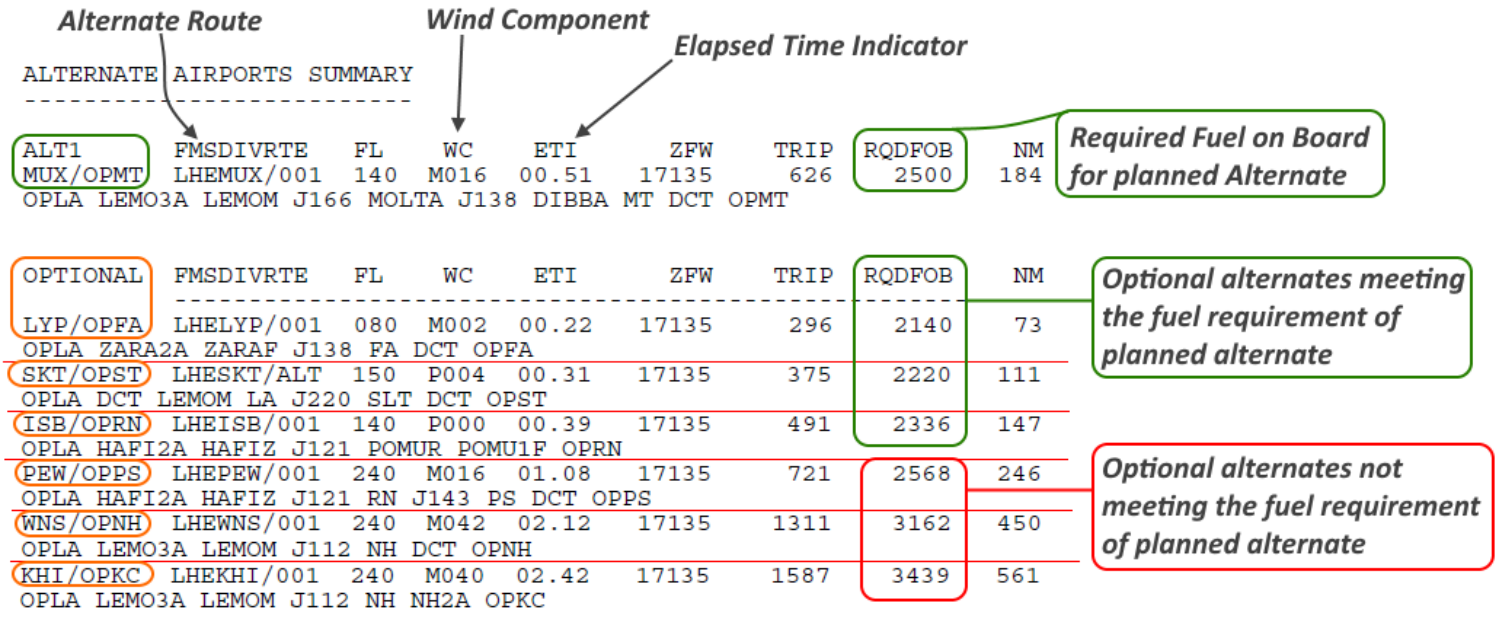
For a +15 difference use this

OAT (DC)	WIND (KT) -15	-10	0	10	20
	DV1 DVR DV2 / DV1 DVR DV2				
50.0	20613 2-6	21113 2-6	21172 2-2	21172 2-2	21172 2-2
	90 108 112	99 120 122	113 125 128	114 125 128	114 125 128
	-267 / +266	-327 / +316	-350 / +349	-350 / +349	-350 / +349
	+0 +0 +0/ +0 +0 +0	+1 +0 +1/ +0 -1 +0	+0 -1 -1/ +0 +1 +1	+0 -1 -1/ +1 +1 +1	+0 -1 -1/ +1 +1 +1
48.0	20851 2-6	21432 2-6	21550 2-2	21550 2-2	21550 2-2
	90 108 111	99 118 121	112 126 129	115 126 129	115 126 129
	-260 / +263	-320 / +316	-356 / +355	-356 / +355	-356 / +355
	+0 +0 +0/ +0 -1 +0	+0 +1 +1/ -1 +0 +0	+0 -1 -1/ +0 +1 +1	+0 -1 -1/ +1 +1 +1	+0 -1 -1/ +1 +1 +1
46.0	21082 2-6	21737 2-6	21928 2-2	21928 2-2	21928 2-2
	89 107 110	98 118 121	112 127 130	116 127 130	116 127 130
	-260 / +203	-316 / +318	-361 / +362	-361 / +362	-361 / +362
	+0 +0 +0/ +0 +0 +1	+0 +0 +0/ +0 -1 +0	+0 +0 -1/ +0 +1 +1	+0 +0 -1/ +0 +1 +1	+0 +0 -1/ +1 +1 +1

Temperature = 46 C
QNH = 1007 hpa
Wind = 10 knots tailwind

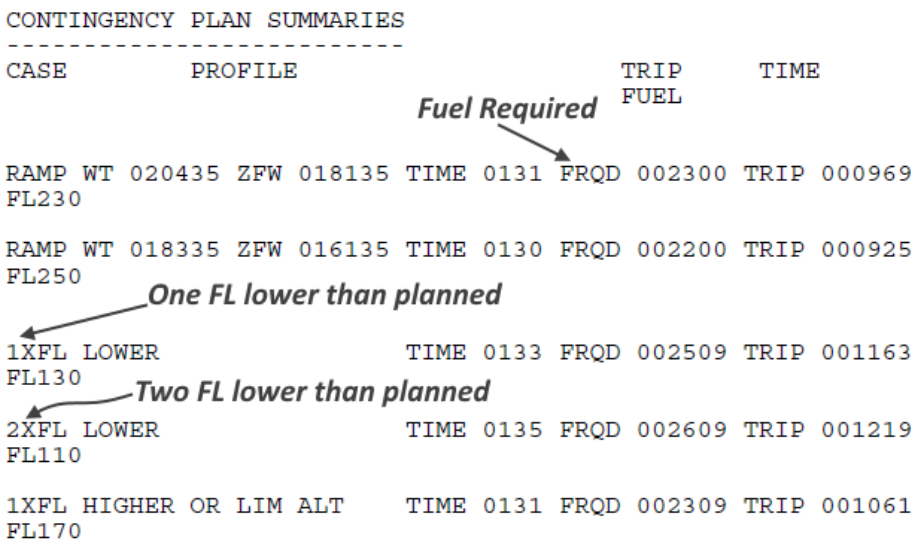
Max takeoff weight for ATR 72-500 = 22,800
Performace Limit takeoff weight = 21,737 (considering wind and temperature)
Standard QNH = 1013 and Actual QNH = 1007
QNH difference = 1013-1007 = 6 hpa
For a difference of-15 hpa, weight adjustement is 316 Kgs
For a difference of 6 hpa, weight adjustment = 316/15 = 21 x 6 = 126 Kgs
Performance limit takeoff weight = 21,737 - 126 = 21,611
Regulated TOW = Lower of Max Structural (22,800) and Performance Limited (21,611)
RTOW = 21,611

Final Takeoff Mass will be lower of (Box) A, B or C

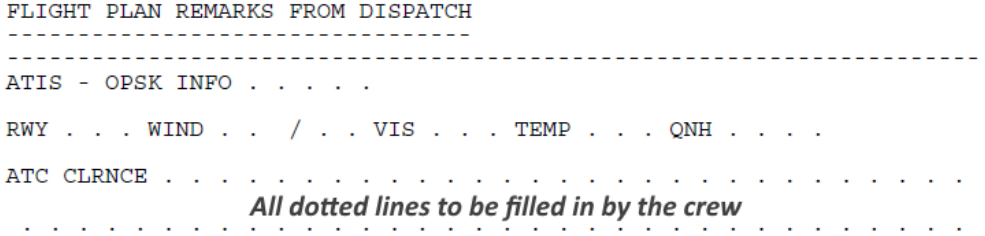


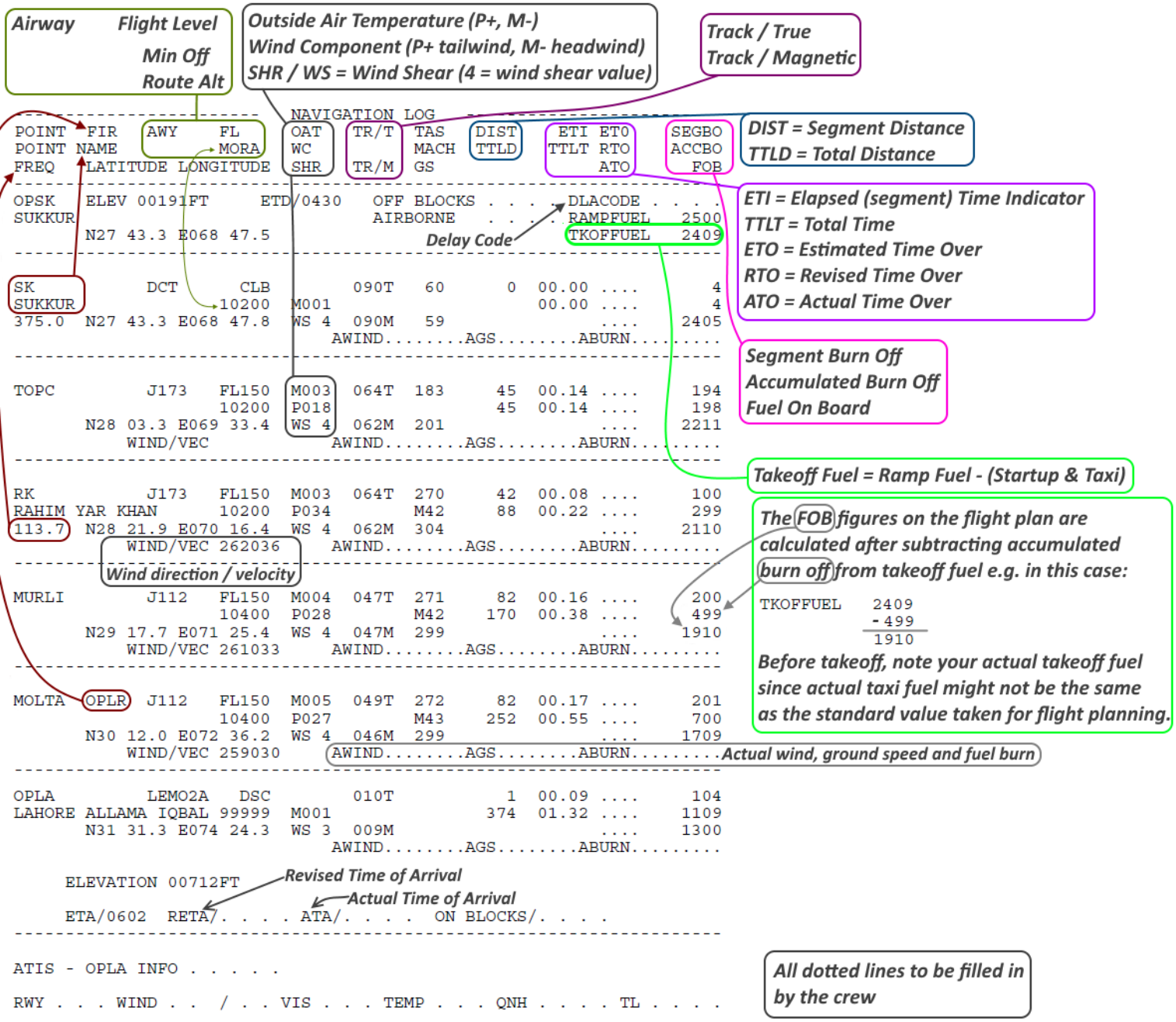
FLIGHT PLAN

PAGE 3



PAGE 3 ONWARDS






```
                        NAVIGATION LOG
POINT  FIR   AWY     FL      OAT   TR/T  TAS   DIST   ETI ETO     SEGBO
POINT NAME           MORA    WC          MACH  TTLD   TTLT RTO    ACCBO
FREQ   LATITUDE LONGITUDE    SHR   TR/M  GS           ATO  FOB
--------------------------------------------------------------------------
OPSK   ELEV 00191FT     ETD/0430   OFF BLOCKS . . .  DLACODE . . .
SUKKUR                             AIRBORNE   . . .  RAMPFUEL    2500
       N27 43.3 E068 47.5                            TKOFFUEL    2409
--------------------------------------------------------------------------

SK             DCT        CLB          090T   60       0  00.00 ....       4
SUKKUR                   10200  M001                      00.00 ....       4
375.0  N27 43.3 E068 47.8  WS 4  090M   59                    ....    2405
                          AWIND........AGS........ABURN..........
--------------------------------------------------------------------------

TOPC           J173    FL150  M003  064T  183      45  00.14 ....     194
                       10200  P018                45  00.14 ....     198
       N28 03.3 E069 33.4  WS 4  062M  201                ....    2211
           WIND/VEC            AWIND........AGS........ABURN..........
--------------------------------------------------------------------------

RK             J173    FL150  M003  064T  270      42  00.08 ....     100
RAHIM YAR KHAN         10200  P034        M42      88  00.22 ....     299
113.7  N28 21.9 E070 16.4  WS 4  062M  304                ....    2110
           WIND/VEC 262036     AWIND........AGS........ABURN..........
--------------------------------------------------------------------------

MURLI          J112    FL150  M004  047T  271      82  00.16 ....     200
                       10400  P028        M42     170  00.38 ....     499
       N29 17.7 E071 25.4  WS 4  047M  299                ....    1910
           WIND/VEC 261033     AWIND........AGS........ABURN..........
--------------------------------------------------------------------------

MOLTA  OPLR    J112    FL150  M005  049T  272      82  00.17 ....     201
                       10400  P027        M43     252  00.55 ....     700
       N30 12.0 E072 36.2  WS 4  046M  299                ....    1709
           WIND/VEC 259030     AWIND........AGS........ABURN..........
--------------------------------------------------------------------------

OPLA           LEMO2A   DSC          010T             1  00.09 ....     104
LAHORE ALLAMA IQBAL 99999  M001                    374  01.32 ....    1109
       N31 31.3 E074 24.3  WS 3  009M                    ....    1300
                          AWIND........AGS........ABURN..........

     ELEVATION 00712FT
     ETA/0602  RETA/. . . . ATA/. . . .  ON BLOCKS/. . . .
--------------------------------------------------------------------------

ATIS - OPLA INFO . . . . .

RWY . . . WIND . .  / . . VIS . . . TEMP . . . QNH . . . . TL . . . .
```

WS Values: *Wind shear is always measured in knots, with the values being either positive or negative. Increases in wind shear value are positive numbers, while decreases are noted as negative values. When operating in the upper atmosphere, wind shear value is almost always positive. Closer to the surface, you may experience negative wind shear values. Sample wind shear value calculation for a flight plan:*

Flight Level	Wind Speed
380 (1 level above Optimum)	52
370 (Optimum Cruising Level)	48
360 (1 level below Optimum)	42

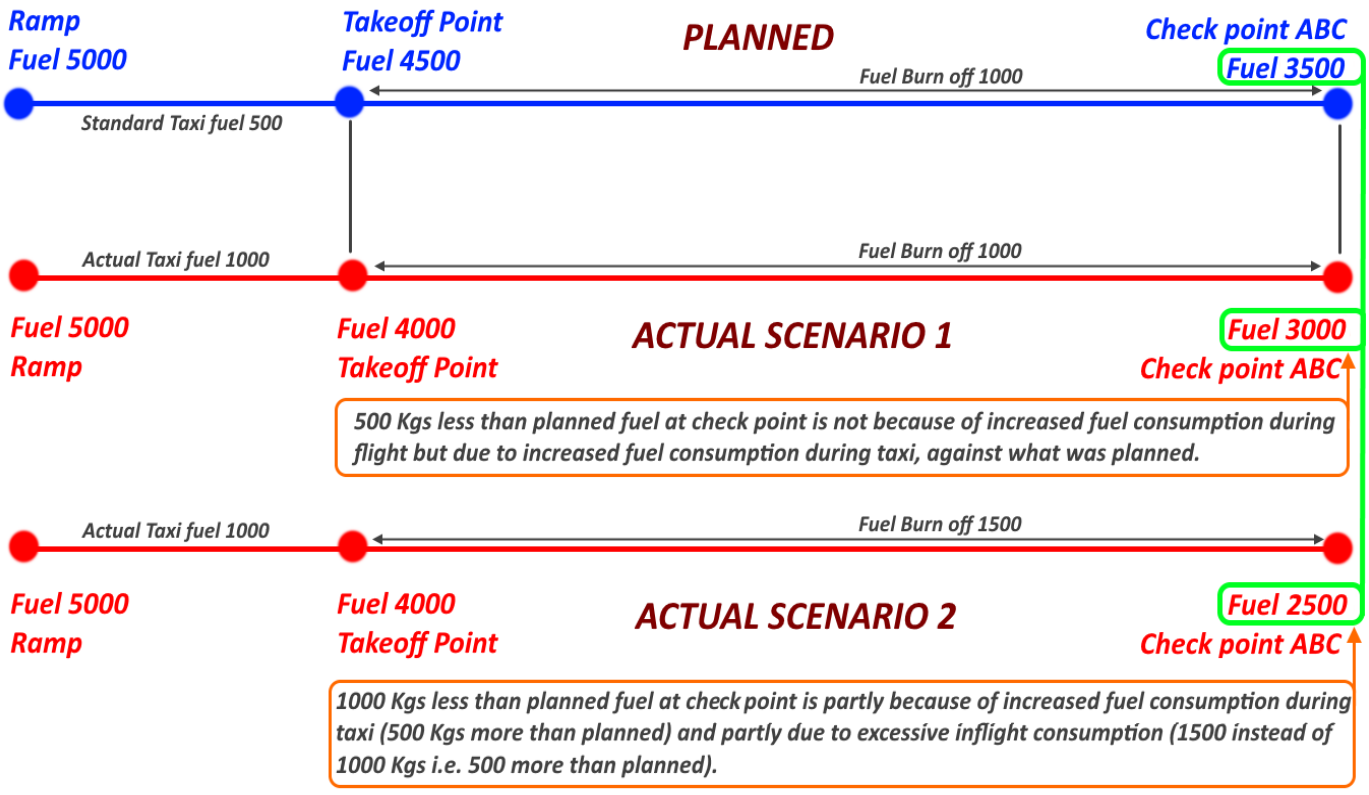
The difference in wind speed between one FL above optimal cruising altitude (52) and the one below optimum cruising altitude (42) is used to determine wind shear. The difference between the two is 10. This value (10) is then divided by 2 to account for the 2,000 ft. change in altitude. As a result, the vertical wind shear is reported as "5." A wind shear number is simply a numerical value of differences in wind speeds between flight levels. This value does not necessarily predict turbulence. Wind shear values help determine the possibility of turbulence being experienced in flight, but these values are not true indicators of potential of turbulence. It's best not to rely on wind shear values alone in terms of predicting turbulence. Wind shear should, instead, be used as an indicator to look further into the potential for flight turbulence. These values should be used along with satellite imagery, weather models and other data (like prognostic charts etc.) (Source: universalweather.com)

Takeoff Fuel

For flight planning, the takeoff fuel on the flight plan is given by subtracting the standard taxi fuel from the ramp fuel. Actual taxi time and hence taxi fuel might vary subject to traffic flow at the airport and weather. Therefore, your actual takeoff fuel might vary with the flight plan figure. e.g. after snowfall if you want to get your aircraft deiced first with engines running then fuel which you will consume during the interval between leaving the ramp and takeoff will be more than what you will consume on a usual day. If there are other aircraft with the same requirement, then you might have to wait for a long time before you reach your takeoff point. In this scenario your taxi fuel will vary a lot. It is not unusual for a big jet like B777 to eat up more than 1000 Kgs during taxi when departing from a busy airport like JFK where it sometimes takes about 30 minutes just to taxi to the takeoff point. Though on smaller aircraft like ATR, fuel consumed during taxi might not seem to be a big issue but as a standard operating procedure, it is required to note the takeoff fuel on all aircrafts before takeoff. This is important for the following reasons:

- Minimum Brake Release Fuel: It is that quantity of fuel which, at the commencement of the takeoff roll, complies with all regulatory requirements for the flight in question. This is the minimum legal fuel required for departure. If your actual takeoff fuel is substantially below the required takeoff fuel to legally complete the flight, you might have to return to ramp for re-fueling.

- In Flight Fuel Checks: If you are comparing flight plan FOB at your check point let's say ABC with actual FOB to know how you are doing on fuel, then it is important to note that actual FOB will be the remaining fuel on board after burning fuel from engine start to the check point ABC. Whereas flight plan FOB at check point ABC will be the fuel remaining after consuming fuel from takeoff point to check point ABC. In case of a long taxi and delay in takeoff, the taxi fuel consumed might be more than the standard taxi fuel used for flight planning, resulting in a situation where actual take off fuel will be less than the flight plan takeoff fuel. Let's assume it is 500 Kgs less. So if you did not check your actual takeoff fuel before takeoff, then on comparison with the flight plan FOB at check point ABC, you will feel that your actual FOB is 500 Kgs less than what it should have been at check point ABC. Whereas, if you had checked your actual takeoff fuel, you would know that under reading by 500 Kgs is due to increased consumption during taxi on ground and not during the flight. See the figure below:



```
POINT   FL100      FL 2XLOWER    FL 1XLOWER    FL PLANNED    FL 1XHIGHER
-------------------------------------------------------------------------

-------------  ENROUTE WIND AND TEMPERATURE SUMMARY  --------------

ROFOR OPSK/OPLA/001

WX PROG DAY/HOUR 2912
POINT   FL100      FL 2XLOWER    FL 1XLOWER    FL PLANNED    FL 1XHIGHER

SK      254018P07 11 257022P05 13 260029P01 15 262037M03 17 263044M07
RK      256019P07 11 258022P05 13 261029P01 15 262036M03 17 263043M08
MURLI   255015P06 11 258019P04 13 260026P00 15 261033M04 17 262041M08
MOLTA   246011P05 11 251014P03 13 256022M01 15 259030M05 17 260038M09
NIKET   237011P05 11 245014P03 13 253021M02 15 257028M06 17 259035M10
LEMOM   227010P04 11 238013P02 13 249019M02 15 254026M07 17 258032M11
LA      219008P04 11 233011P02 13 247017M02 15 254024M07 17 257030M11

DESCENT WIND       FL    070    130    210    290
                        22003  25017  26046  26077

-------------------------  END OF PLAN  ----------------------------
```

At MOLTA FL 130 (one level lower than planned FL 150), the wind is 256° 22 knots and temperature is -1°C.

AFTER END OF FLIGHT PLAN

ATS Flight Plan

```
      FLT  595 /30NOV16 - PLAN ID  BU005101  - PAGE  6 OF   6
(FPL-PIA595-IS
-AT72/M-SDFHRGY/S
-OPSK0430
-N0270F150 DCT SK J173 RK J112 LEMOM DCT
-OPLA0132 OPMT
-PBN/D2O2S1 SUR/TCAS EQUIPPED DOF/161130 REG/APBKX
 EET/OPLR0052
 CODE/760978
 RMK/ACAS II VER 7.1 EQUIPPED)
-E/0315 R/UVE J/LF A/CREAM  WHITE WITH GREEN WITH PIA LOGO C/K
 HAROON
```

Weather Briefing

```
FLIGHT CREW WX BRIEFING FLT  595  SKZ-LHE

TAF OPSK 291530Z 2918/3018 VRB03KT 2500 FU NSC TEMPO 3001/3005
00000KT 1000 BR SCT020 FM 300700 09007KT 4000 HZ NSC
```

Company Instructions

```
NOTAMS    FLT  595  SKZ-LHE
COMPANY INSTRUCTIONS ---------
REF LATEST CIRCULAR FLTOPS/CC/4/TUE APR 26 2016 ISSUED BY GMCC.
INSTRUCTIONS BY CHIEF PILOT TECHNICAL (OPS)
-------------------------
INSTRUCTIONS FOR B777
-------------------------
INST UPDATED JUN 13 2016
WITH SAARU UNSEVICEABLE OR ENGINE EEC IN ALTN MODE WHEN ENGINE
OPERATING AT ITS MAXIMUM RATED THRUST DURING TAKEOFF AND INITIAL
CLIMB CLOSE MONITORING OF ENGINE PARAMETERS IS REQUIRED.
```

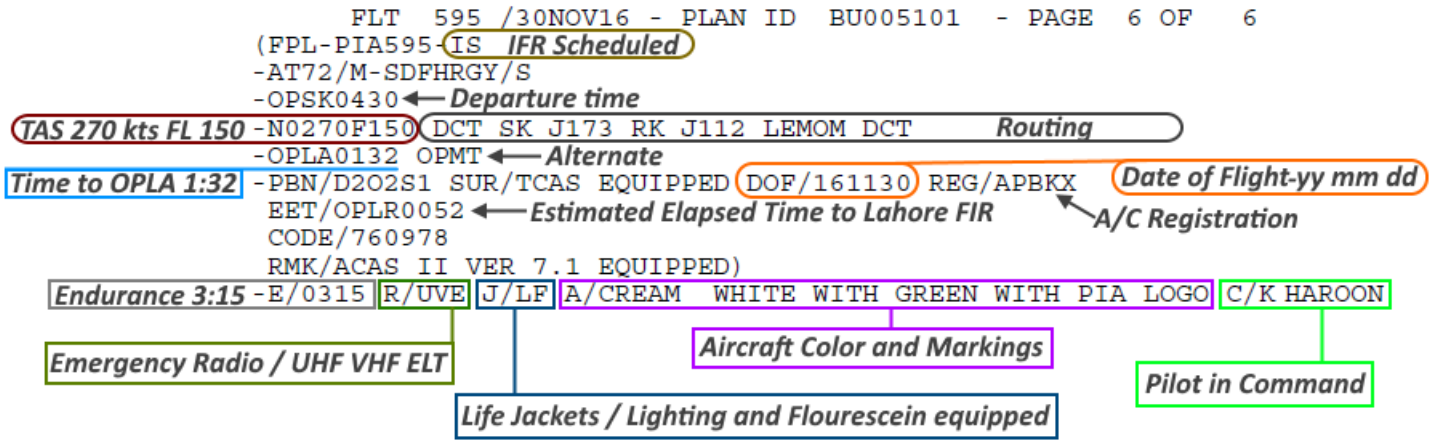
Aerodrome NOTAMS

```
NOTAMS   FLT  595  SKZ-LHE
(A0696/16 NOTAMN
A)OPLA B)1608150400 C)PERM
E)TRANSPONDER OPERATING PROCEDURES FOR ASMGCS (ADVANCED SURFACE
MOVEMENT GUIDANCE AND CONTROL SYSTEM) (SMR AND MLAT
(MULTILATERATION))
```

FIR NOTAMS

```
LAHORE FIR    PAKISTAN
688
NOXX01 KWSI 161304  WSI DDS 161304
 OPLR 16/0255
(C0255/16 NOTAMN
A)OPLR B)1611170400 C)1612171130
D)DAILY 0400-1130
E)FOLLOWING ROUTE SEGMENT OF DOMESTIC ATS ROUTE WITHIN LAHORE
FIR WILL NOT BE AVBL AT OR BELOW FL410 DUE OPERATIONAL REASONS
```

ATS FLIGHT PLAN



ATR 72

M = Medium (7,000 to 136,000 kg), Wake turbulence category

S = **VHF RTF/VOR/ILS** *(S) - Standard COM/NAV Setup*

D = **DME** *(D) - Distance Measurement Equipment*

F = **ADF** *(F) - Automatic Direction Finder*

H = **HF RTF** *(H) - HF Radiotelephone*

R = **PBN** *(R) - Performance-Based Navigation (PBN requires corresponding "PBN/" data in Field 18)*

G = **GNSS** *(G) - Global Navigation Satellite System*

Y = **VHF 8.33** *(Y) - 8.33 kHz Radio Channel Spacing*

S = **MODE S** *(S) - Mode S Transponder*

```
      FLT  595 /30NOV16 - PLAN ID  BU005101  - PAGE  6 OF   6
(FPL-PIA595-IS
-AT72/M-SDFHRGY/S
-OPSK0430
-N0270F150 DCT SK J173 RK J112 LEMOM DCT
-OPLA0132 OPMT
-PBN/D2O2S1 SUR/TCAS EQUIPPED DOF/161130 REG/APBKX
 EET/OPLR0052
 CODE/760978
 RMK/ACAS II VER 7.1 EQUIPPED)
-E/0315 R/UVE J/LF A/CREAM  WHITE WITH GREEN WITH PIA LOGO C/K
 HAROON
```

CODE/ *- Aircraft Address Code in Six Hexadecimal Chars.*

PBN/ Indication of RNAV or RNP capabilities

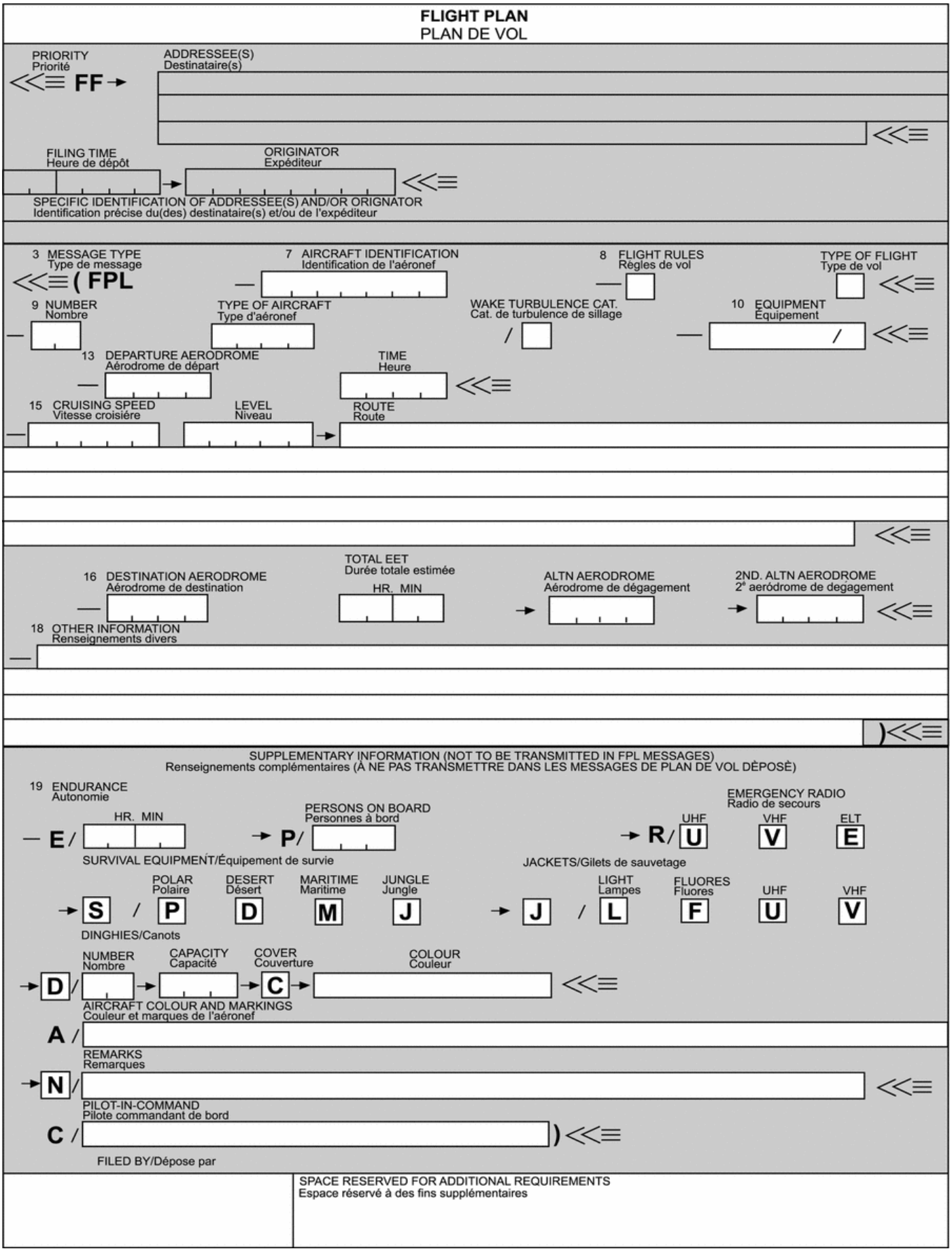
PBN / D2 = RNAV1 GNSS

PBN / O2 = Basic RNP1 GNSS

PBN / S2 = RNP APCH with BARO VNAV

Internet resource for flight plan guide: https://contentzone.eurocontrol.int/fpl

ATS FLIGHT PLAN FORM



EuroFPL ICAO Flightplan Form Basics

1 DATE OF FLIGHT

Six-digit date of flight in the format "YYMMDD", where "YY" is the last two digits of the year, "MM" is a two-digit representation of the month, and "DD" is a two-digit representation of the calendar day (all with leading zeroes where necessary).

i.e. 121015, 130122...

2 7 AIRCRAFT IDENTIFICATION

Aircraft registration letters/tail number or an ICAO agency designator with flight number. ICAO 2012 strictly enforces that this figure should be letters and numbers only, devoid of dashes, spaces, or other punctuation.

i.e. N123B, GCABC, KLM672, SWIFT45...

3 8 FLIGHT RULES

Denotes the category of flight rules: "I" for IFR, "V" for VFR, "Y" for when the flight will be initially IFR followed by one or more subsequent flight rules changes, and "Z" for VFR first with any number of subsequent changes. When a "Y" or "Z" flight is prepared, "VFR" or "IFR must be entered in the route string wherever the transitions/changes to the flight rules are planned to occur.

i.e. Departing VFR, cruising IFR, and landing VFR? File Z.

4 TYPE OF FLIGHT

Denotes the type of flight as follows: "S" for Scheduled Air Service, "N" for Non-scheduled Air Transport Operation, "G" for General Aviation, "M" for Military, and "X" for everything else. Other special flight status and handling considerations can be relayed via the 18 OTHER INFORMATION field's "STS/" and "RMK/" indicators.

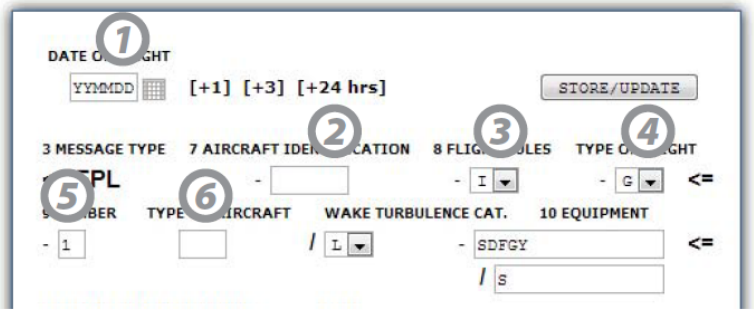
5 9 NUMBER

Number of aircraft in flight, if more than one. This figure is omitted if the flight is only a solo aircraft movement.

Did you know?

As of ICAO 2012, the date of flight (DOF/) figure is more widely recognized, and many more authorities world-wide will now accept filings as far out as five days ahead.

The [+1] [+3] and [+24 hrs] links will automatically set TIME and DATE OF FLIGHT figures 1, 3, or 24 hours ahead of the current time. If these fields aren't filled in, the system will presume a departure in one hour. If a TIME value is entered that is before, or less than 30 minutes ahead of, the current time, DATE OF FLIGHT will fill automatically with the next day's date. Otherwise, the current date will be entered.



6 TYPE OF AIRCRAFT

Type of aircraft, as specified in the latest ICAO Doc 8643, by the appropriate designator. A search for this designator code can be performed online at:

http://www.icao.int/publications/DOC8643/Pages/Search.aspx

If no designator exists for your aircraft, or there is more than one type of aircraft in your flight, enter "ZZZZ" here and specify number and type(s) in 18 OTHER INFORMATION preceded by "TYP/" tags.

i.e. P46T, EA50, C182...

EuroFPL ICAO Flightplan Form Basics

1 WAKE TURBULENCE CAT.

Wake turbulence category of aircraft as specified in ICAO Doc 8643 or based on weight and the following options: "L" for Light (< 7,000 kg), "M" for Medium (7,000 to 136,000 kg), "H" for Heavy (> 136,000 kg), and "J" for Jumbo (exceptionally heavy aircraft such as the Airbus A380-800). A search for the category can be performed online at:

http://www.icao.int/publications/DOC8643/Pages/Search.aspx

2 10 EQUIPMENT

The ICAO 2012 amendment includes extensive changes to the COM/NAV equipment codes used in the FPL message format. These changes and EuroFPL's helpful ICAO 2012 Equipment Wizard are explained in-depth on the next page (Page 3) of this briefing.

3 13 DEPARTURE AERODROME

Four-character location indicator of the departure aerodrome, "AFIL" if filed in the air, or "ZZZZ" if no official designator exists in ICAO Doc 7910. In the latter cases, ICAO 2012 strictly states that the aerodrome name or primary fix with location (degrees and minutes ddmmNdddmmE format preferred) be entered in 18 OTHER INFORMATION preceded by a "DEP/" tag.

i.e. EKRK, BIKF, LFPG, CYYR, ZZZZ...

4 TIME

Planned time of departure (UTC) in 24-hour "HHMM" format, where "HH" is a two-digit representation of the hour, and "MM" is a two-digit representation of the minutes past the hour (with leading zeroes where necessary).

i.e. 0615, 1342, 2305...

5 15 CRUISING SPEED

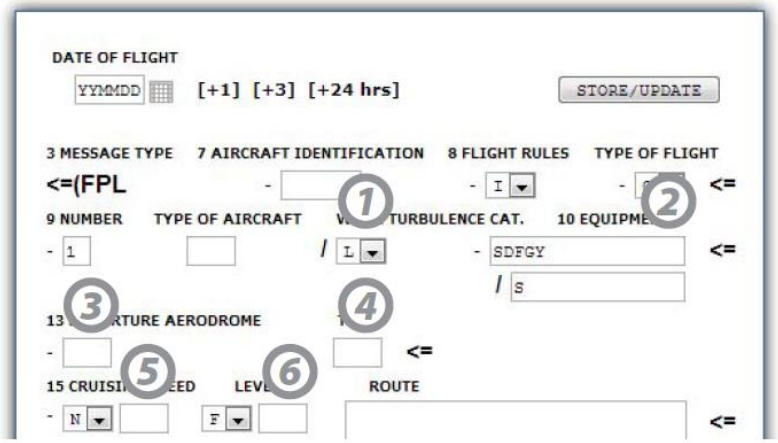
True airspeed for the initial or whole cruise segment of the flight, indicated as: "N" for Knots, followed by a four-digit figure, "M" for Mach number followed by a three-digit representation of ratio, or "K" for Kilometers/hour followed by a four-digit number.

i.e. K0830, N0485, M082...

Did you know?

The nature and scope of the [ICAO 2012] amendment is to update the ICAO model flight plan form in order to meet the needs of aircraft with advanced capabilities and the evolving requirements of automated air traffic management (ATM) systems, while taking into account compatibility with existing systems, human factors, training, cost and transition aspects."

ICAO State Letter (AN 13/2.1-08/50) - 25 June 2008



6 LEVEL

Planned cruising level for the initial or whole cruise segment of the flight, indicated as: "F" for Flight Level in 100s of feet, "A" for plain altitude in 100s of feet (both three-digit), "S" for Standard Metric Level in tens of metres, "M" for plain altitude in tens of metres (both four-digit), or "V" for uncontrolled VFR (number field left blank).

i.e. F330, M0840, A045...

EuroFPL ICAO Flightplan Form Basics

10 EQUIPMENT -- EuroFPL ICAO 2012 Equipment Wizard

EQUIPMENT

VHF RTF/VOR/ILS *(S) - Standard COM/NAV Setup*
GBAS *(A) - Ground Based Augmentation System*
LPV (APV/SBAS) *(B) - Localizer Performance with Vertical Guidance (Infers Satt.-Based Augmentation)*
LORANC *(C) - LORAN-C Radionavigation*
DME *(D) - Distance Measurement Equipment*
ACARS *(Multiple) - Addressing and Reporting System*
ADF *(F) - Automatic Direction Finder*
GNSS *(G) - Global Navigation Satellite System*
GNSS augmentation "NAV/" data in Field 18 optional.
HF RTF *(H) - HF Radiotelephone*
INERTIAL NAV *(I) - Aircraft Inertial Guidance*
CPDLC *(Multiple) - Controller-Pilot Data Link*
MLS *(K) - Microwave Landing System*
ILS *(L) - Instrument Landing System*
ATC RTF SATCOM *(Multiple) - Radiotelephone Satt.*
VOR *(O) - VHF Omnidirectional Radio Range*
PBN *(R) - Performance-Based Navigation*
PBN requires corresponding "PBN/" data in Field 18.
TACAN *(T) - Tactical Air Navigation System*
UHF RTF *(U) - UHF Radiotelephone*
VHF RTF *(V) - VHF Radiotelephone*
RVSM *(W) - Reduced Vertical Separation Minimum*
MNPS *(X) - Minimum Navigation Performance Spec.*
VHF 8.33 *(Y) - 8.33 kHz Radio Channel Spacing*
OTHER *(Z) - Other Item(s) Not Listed Above*
OTHER requires corresponding "COM/", "NAV/" or "DAT".

SURVEILLANCE

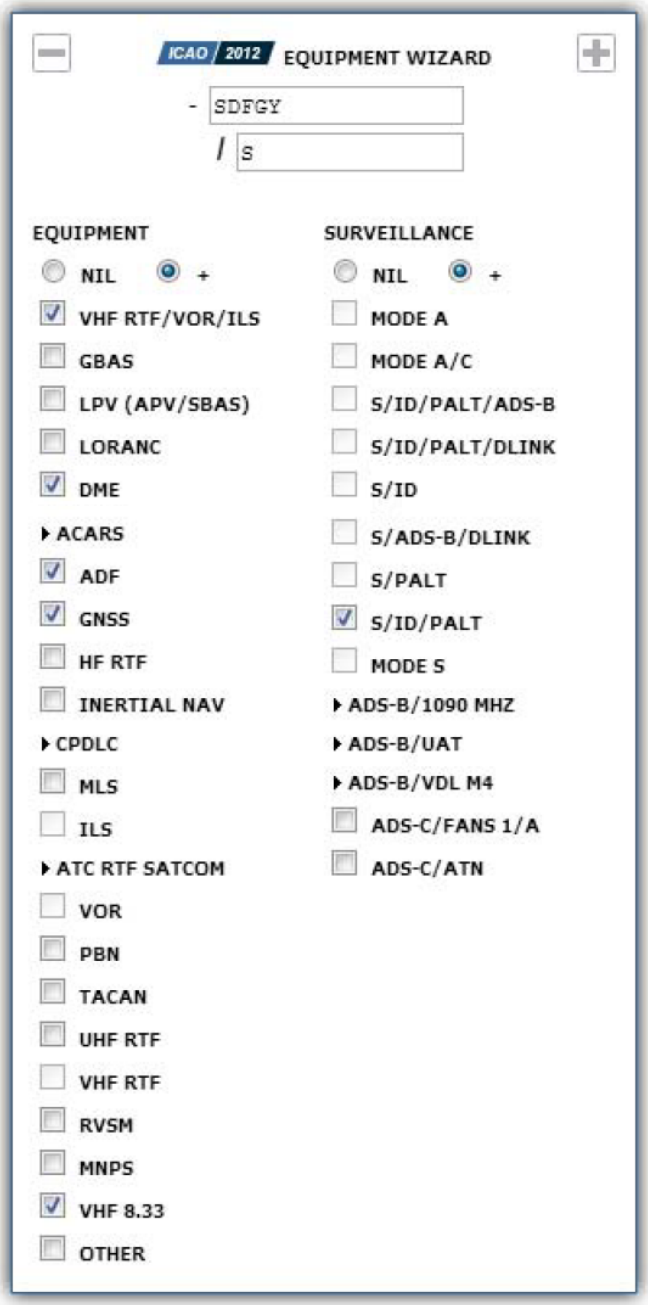
MODE A *(A) - Mode A Transponder*
MODE A/C *(C) - Mode A Transponder with Mode C*
S/[...] *(Multiple) - Mode S Transponder with or without...*
ID *- Aircraft Identification* **PALT** *- Pressure Altitude*
ADS-B *- Surveillance Broadcast* **DLINK** *- Data Link*
MODE S *(S) - Mode S Transponder*
ADS-B/1090 MHz *(Multiple) -1090 MHz Out/In*
ADS-B/UAT *(Multiple) - Universal Access Trans. Out/In*
ADS-B/VDL M4 *(Multiple) - VHF Digital Mode 4 Out/In*
ADS-C/FANS 1/A *(D1) - Sur. Contract Future Air Nav.*
ADS-C/ATN *(G1) - Sur. Contract Aeronautical Telecom*

Key Changes:

* *New indicators added to describe complex compliment items.*
* *The S indicator "VHF RTF/VOR/ILS" is no longer inclusive of ADF.*
* *If "PBN" is specified, Field 18 requires corresponding "PBN/" data.*
* *If "OTHER" is specified, Field 18 requires "COM/", "NAV/", or "DAT/".*

For a good overall online reference see also:

http://contentzone.eurocontrol.int/FPL/



EuroFPL ICAO Flightplan Form Basics

1 ROUTE

A string of points (and connecting airways or DCTs where applicable) describing an ATS route or path of fixes no more than 30 minutes flying time or 200nm apart, including those points where a change of speed, level, track, or flight rules is planned. Points can be listed by their coded designator (i.e. LN, MAY, HADDY), a 7 or 11-character representation of their coordinates (i.e. 46N078W, 4620N07805W), or a point relative to a reference point based on bearing and distance (i.e. DUB190040 being 40nm out on the 190 degree magnetic bearing from DUB).

Change of speed and/or level is indicated by appending data formatted as in 15 CRUISING SPEED and LEVEL to a point, after a slash (i.e. MAY/N0305F180, 46N078W/M082F330). Change of flight rules are shown by a standalone "VFR" or "IFR" to indicate the beginning of that phase of flight.

2 16 DESTINATION AERODROME

Four-character location indicator of the destination aerodrome or "ZZZZ" if no official designator exists in ICAO Doc 7910. In the latter case, ICAO 2012 strictly states that the aerodrome name or final fix with location (degrees and minutes ddmmNdddmmE format preferred) be entered in 18 OTHER INFORMATION preceded by a "DEST/" tag.

i.e. EKRK, BIKF, LFPG, CYYR, ZZZZ...

3 TOTAL EET

Total estimated enroute time in "HHMM" format, where "HH" is a two-digit representation of the hours and "MM" is a two-digit representation of minutes in flight (with leading zeroes where necessary).

i.e. 0142, 0305, 0047...

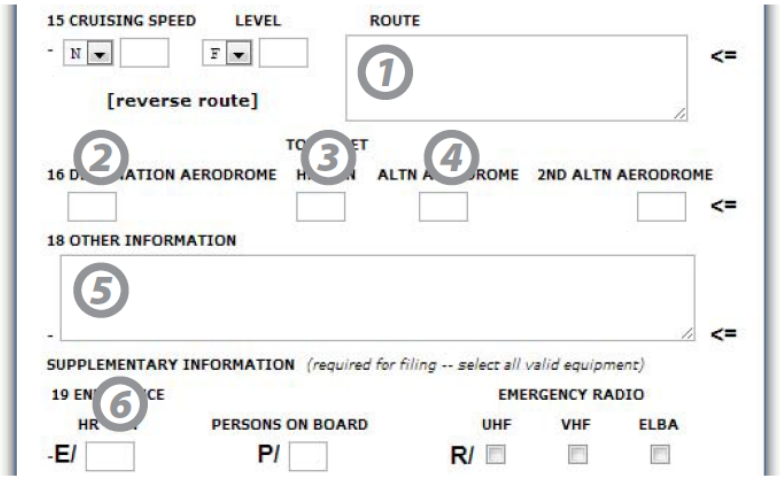
4 (2ND) ALTN AERODROME

Four-character location indicator of the alternate aerodrome(s) or "ZZZZ" if no official designator exists in ICAO Doc 7910. In the latter case, ICAO 2012 strictly states that the aerodrome name(s) with location (degrees and minutes ddmmNdddmmE format preferred) be entered in 18 OTHER INFORMATION preceded by a "ALTN/" tag.

i.e. EKRK, BIKF, LFPG, CYYR, ZZZZ...

Did you know?

If you don't enter a TOTAL EET figure, a temporary figure is automatically calculated upon STORE/UPDATE that is based on great circle distance and basic cruise speed (no winds) to allow for easy validation of the flightplan. After running a navigation log, a more accurate TOTAL EET figure can be entered along with "EET/" entries in the 18 OTHER INFORMATION field where appropriate.



5 18 OTHER INFORMATION

The ICAO 2012 amendment includes extensive changes to the way data is presented and ordered for Field 18 data in the FPL message format. These changes and EuroFPL's helpful ICAO 2012 Other Information Wizard are explained in-depth on the next page (Page 5) of this briefing.

6 19 ENDURANCE

Total fuel endurance in "HHMM" format, where "HH" is a two-digit representation of the hours and "MM" is a two-digit representation of minutes of fuel (with leading zeroes where necessary).

i.e. 0142, 0305, 0047...

EuroFPL ICAO Flightplan Form Basics

18 OTHER INFORMATION -- EuroFPL ICAO 2012 Other Information Wizard

STS/ - *Indicators for Special Handling by ATS*

PBN/ - *RNAV and/or RNP Capability Indicators*

***EUR/** - *Protected Status Indicator for IFPS*

NAV/ - *Nav. Equipment Data and GNSS Augmentation*

i.e. NAV/SBAS

COM/ - *Comm. Equipment Not Specified in Field 10*

DAT/ - *Data Capabilities Not Specified in Field 10*

SUR/ - *Surveillance Capabilities Not Specified in Field 10*

DEP/ - *Name/Coords (ddmmNdddmmE) of Departure Aerodrome When "ZZZZ" Specified in Field 13*

i.e. DEP/CROSLAND 5337N00149W

DEST/ - *Name/Coords (ddmmNdddmmE) of Destination Aerodrome When "ZZZZ" Specified in Field 16*

i.e. DEST/VENLO 5123N00603E

REG/ - *Aircraft Registration if Different Than Field 7*

EET/ - *Estimated Enroute Time(s) in "HHMM" format to Significant Fixes or FIR Boundaries*

i.e. EET/CAP0745 EHAA0830

SEL/ - *SELCAL Code For Applicable Aircraft*

TYP/ - *Number and Type(s) of Aircraft if "ZZZZ" in Field 8*

CODE/ - *Aircraft Address Code in Six Hexadecimal Chars.*

***RVR/** - *Runway Visual Range Requirement in Metres*

DLE/ - *Enroute Delay or Holding Point with "HHMM" Time*

i.e. DLE/MDG0030

OPR/ - *ICAO Designator or Name of Aircraft Operator*

PER/ - *Aircraft Performance Category Where Applicable*

ALTN/ - *Name/Coords (ddmmNdddmmE) of Destination Alternate Aerodromes if "ZZZZ" in Field 16.*

i.e. ALTN/TOUL 4846N00558E

RALT/ - *Enroute Alternates*

TALT/ - *Take-off Alternates*

RIF/ - *Route Details to Revised Destination Aerodrome*

RMK/ - *Plain Language Remarks Where Necessary*

***STAYINFO/** - *IFPS Indicators for Stay Activity*

***RFP/** - *Replacement Flightplan Indicator for IFPS*

** For IFPS Flights Only*

Key Changes:

** New indicators have been introduced, some retracted.*

** The sequence that indicators should appear in is now compulsory.*

** Any given indicator can only appear ONCE in Field 18.*

** Hyphen (-) and oblique stroke (/) characters forbidden in data.*

** "STS/" indicator is no longer free-text.*

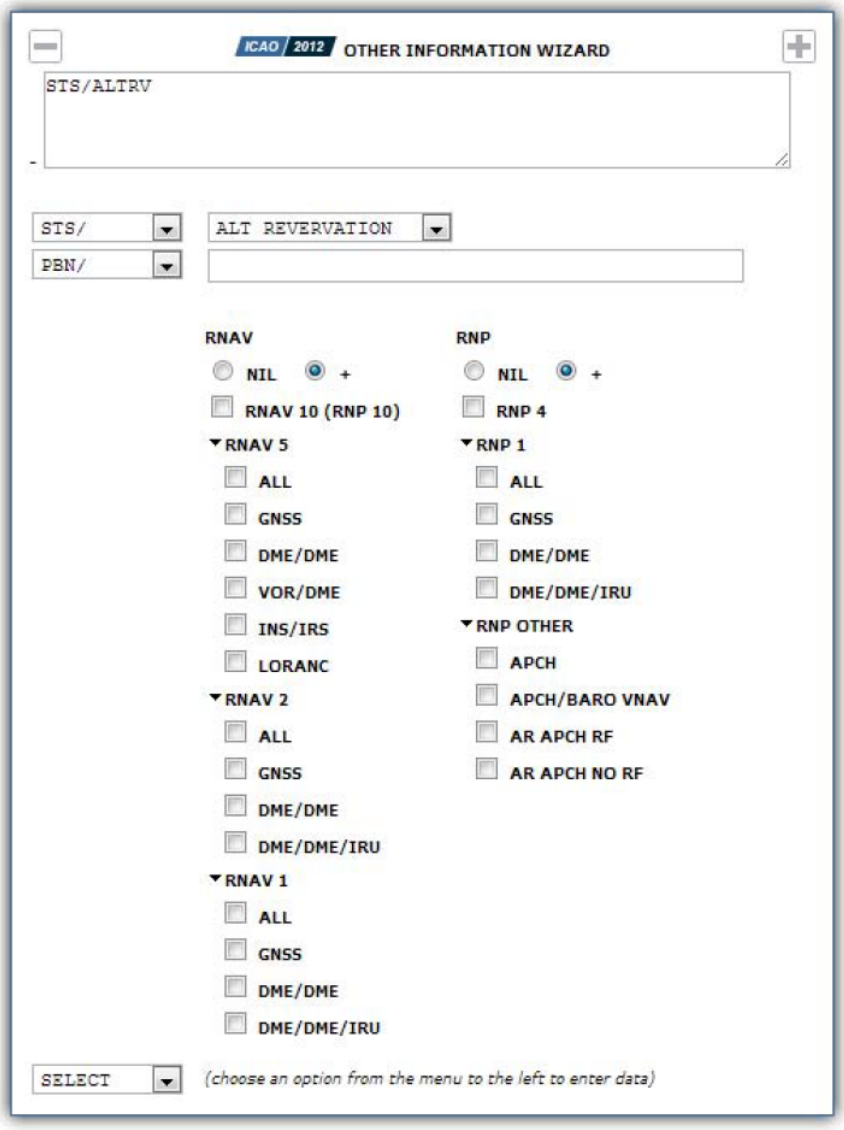
** "PBN/" is now mandatory to detail PBN equipment capabilities.*

** "NAV/" entry is required when GNSS equipment is specified.*

For a good overall online reference see also:

http://contentzone.eurocontrol.int/FPL/

Multiple entries of the same type will be automatically concatenated except for items such as STAYINFO entries which will be numerically sequenced in the order that they appear.



1 PERSONS ON BOARD

Total number of persons including passengers and crew that will be onboard, or "TBN" (To Be Notified) if unknown at time of filing.

2 EMERGENCY RADIO

Please note that any available equipment or features should be CLICKED ON here. The printable PDF version of the form will reverse these selections as per the convention of crossing out equipment and features that are not available.

Select "UHF" here if you are able to receive and xmit at 243.0 MHz, "VHF" here if you are able to receive and xmit at 121.5 MHz, and/or "ELBA" if an emergency location beacon is present on the plane.

3 SURVIVAL EQUIPMENT

Please note that any available equipment or features should be CLICKED ON here. The printable PDF version of the form will reverse these selections as per the convention of crossing out equipment and features that are not available.

Select the appropriate items indicating what types of survival equipment, if any, are carried.

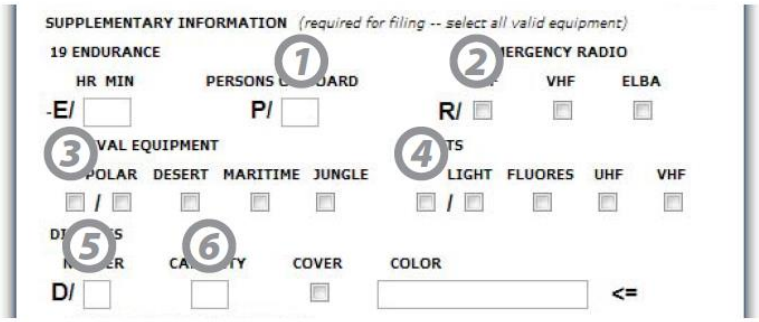
4 JACKETS

Please note that any available equipment or features should be CLICKED ON here. The printable PDF version of the form will reverse these selections as per the convention of crossing out equipment and features that are not available.

Select "LIGHT" if your life jacket(s) are lighting equipped, "FLUORES" if fluorescein equipped, and "UHF" or "VHF" if radio equipped.

Did you know?

Due to ICAO Doc 4444 convention and the strict nature of many authorities Flight Data Managers, flightplan supplemental data is often only transmitted to AROs and other full-service offices, and not included when transmitting directly to towers and area controllers. Because of this, it is often wise to copy your pilot contact info (phone) to an 18 OTHER INFORMATION "RMK/" entry, so that you can be contacted directly by all parties if a timely resolution is sought for any issues with your flight.



5 DINGHIES (NUMBER)

The number of survival dinghies carried onboard. Leave blank if none.

6 DINGHIES (CAPACITY)

Total capacity, in persons, of all dinghies carried. Leave blank if none.

---

1 DINGHIES (COVER)

Check this box if the dinghies have protective canopies.

2 DINGHIES (COLOR)

Plain text description of the dinghies primary color.

3 AIRCRAFT COLOR AND MARKINGS

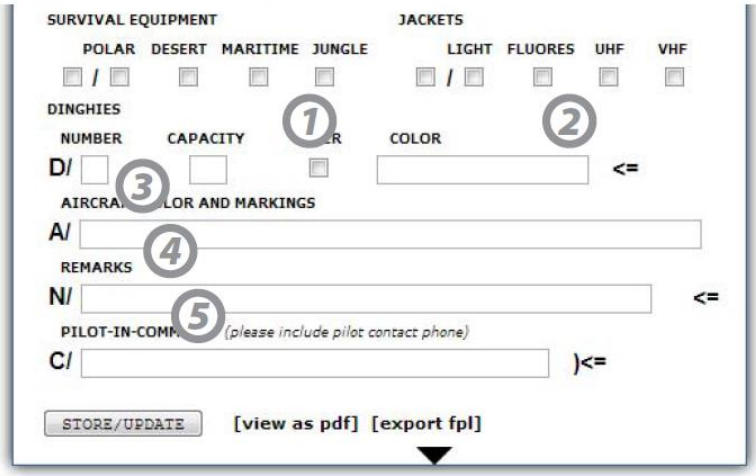
Plain text description of aircraft color and any significant livery markings or characteristics.

4 REMARKS

Indicate any other survival equipment carried and/or other remarks specifically regarding survival equipment and search-and-rescue (SAR) information.

5 PILOT-IN-COMMAND

Name and preferably phone contact information of the pilot in command. Including phone contact information helps in those rare cases that timely clarification or further information is required by ATC accepting the flight.



FUEL REQUIREMENTS

7.0.1.3 Planning Factors:

The total fuel required for a safe flight and allows for deviations from the planned operations comprises of the following components:

Trip Fuel which comprises:

- Take Off, Acceleration, SID and Climb
- Cruise
- Descent
- STAR and Instrument Approach Procedure to land

Note: Where published most commonly used SID and STAR are considered. Where SIDs have not been published a distance of 6 NM is to be added in the CFP.

Additional Fuel is required for:

Start UP and Taxi

- Use of APU
- Quantities known to be unusable
- Contingencies
- Alternate airfields
- Holding

7.5 FUEL POLICY FOR TURBO PROP AEROPLANE (ATR 42-500)

7.5.1 Taxi Fuel

A standard quantity of 91kgs to cater for ground maneuvers from engine start to brake release should be added as taxi fuel.

7.5.2 Fuel for operation of Hotel Mode on ATR 42-500 aeroplane

Whenever operation of Hotel mode is anticipated, an additional fuel for the anticipated time will also be included in taxi fuel. This fuel will be calculated on the basis that use of hotel mode for 30 minutes will require 55 kg /122lb of fuel.

7.5.3 Trip Fuel

The fuel required from departure station to the planned destination, based on forecast meteorological conditions, is called Trip Fuel. This includes Take-off, Acceleration, SID, Climb, Cruise, Descent, STAR and max of 10min fuel for approach or expected Instrument Approach Procedure to land. Some aeroplane have a fuel flow in excess of FCOM data. In view of this a pre-calculated percentage of fuel is added to all components of the required fuel to meet this aeroplane performance deterioration (APD).

7.5.4 Contingency Fuel

5 % of trip fuel (min 91kgs, max 95kgs).

7.5.5 Alternate Fuel

The alternate fuel required from destination to the alternate is based on estimated weight at destination, optimum altitude, Enroute forecast OAT and wind velocity. This includes fuel for one missed approach at destination, acceleration, climb, cruise, descent and approach to land maneuver.

7.5.6 Holding Fuel

Fuel required for 45 minutes with holding speed at 1500 ft above alternate airport elevation in ISA conditions. Estimated weight and forecast temperature above the alternate.

7.5.7 Block Fuel

The block fuel will consist of the following:

- Taxi fuel plus,
- Trip fuel plus,
- Contingency fuel plus,
- *Alternate fuel plus,
- Holding fuel plus,
- Any extra fuel,

7.5.8 Fuel Tankering (for the next sector)

Fuel Tankering shall be provided as per policy on flights to destinations where fuel is not available in such a way that the fuel remaining at destination is equal to block fuel of next sector, considering trip fuel inclusive of contingency fuel. This is same as fuel required to operate to an isolated airport. This is taken as sum of alternate and holding and fuel required for tankering to cater for the next sector.

Final Reserve Fuel is fuel calculated at estimated landing weight on arrival at the alternate airport at 1500 AAL in standard conditions and is 45min for turbo prop & 30min for turbine engine aeroplane.

Reserve, Final Reserve or Holding Fuel?

If your departure is A, destination is B and alternate is C, then on arrival at B, you need to have fuel from B to C + Some extra fuel because you don't want to plan your flight in a way that in case of diversion from B you go to C with almost dry tanks i.e. no margin. I mean if you go to market to buy a pair of jeans which on the company's website displays a cost of 5000, you won't carry exact 5000 but will keep some extra, just in case.

So fuel from B to C + "Some Extra" = Reserve Fuel. Also known as "Company Minimum Reserve".

In case of diversion once you reach your alternate (assuming you have already used up your contingency fuel) you would have burnt fuel from B to C and will be left with "Some Extra" fuel which you carried as a safety precaution. This "Some Extra" fuel is now the final fuel quantity which you have with you, so it is called the "Final Reserve" - *Makes Sense*. But how much is "Some Extra"? They decided it should be equivalent to fuel that is consumed in 30 minutes for jets and 45 minutes for turboprops. Since burn off varies with height, weight and air density condition. They added the conditions of 1500 feet, Estimated landing weight on arrival and ISA conditions.

So final reserve is just that extra amount that you carry for safety, you can't hold on it for 30 or 45 minutes otherwise you'll run the tanks dry. Emboldened by the way final reserve is calculated i.e. “30/45 mins holding”, “Holding Fuel” is sometimes used to signify “Final Reserve”.

In case you anticipate heavy traffic at some airport and think you need more fuel then that fuel will be “Extra Holding Fuel” as compared to the “Final Reserves” which is mentioned on the flight plan as “Standard Holding fuel”. See the figure:

PLANNED	FUEL	TIME
TRIP	416	00.39
CONTINGENCY	91	00.08
XHLD DEST	227	00.30
ALTN/ISB/OPRN	262	00.33
XHLD ALTN	0	00.00
STD HOLDING	332	00.45
ETP/BU	0	00.00
RECLR/BU	0	00.00
MIN REQUIRED	1328	02.35
EXTRA	181	00.15
TKOF FUEL	1509	02.50
TAXI FUEL	91	
RAMP FUEL	1600	02.50

A0929/16 - ALL ACFT ARRIVING AT PESHAWAR TO CARRY SUFFICIENT FUEL TO CATER FOR EXCESSIVE DELAYS DUE TO EXTENSIVE MILITARY FLYING/ ANY CONTINGENCY IN ACCORDANCE WITHIN PARA 4.3.6, SUB PARA 4.3.6.1 AND 4.3.6.3 OF ICAO ANNEXURE-6 (AIRCRAFT OPERATION).
IN ADDITION FUEL SUFFICIENT FOR HOLDING OR UPTO 30 MIN AT HOLDING SPEED IS TO BE CARRIED BY ALL ACFT ARRIVING AT PESHAWAR AS PER PROVISIONS OF PARA 4.3.6.3.2 (A) (2) OF ABOVE REFERRED ANNEXURE. 21 SEP 07:05 2016 UNTIL 30 DEC 23:59 2016 ESTIMATED. CREATED: 21 SEP 07:06 2016

PAKISTAN International Airlines	Operations Manual Part – A Edition – III	Chapter 7 Page 14
	FUEL POLICY	Rev : 00 1st Dec 2014

Final Reserve Fuel is fuel calculated at estimated landing weight on arrival at the alternate airport at 1500 AAL in standard conditions and is 45min for turbo prop & 30min for turbine engine aeroplane.

A Rule of Thumb

ATR 42/72-500 average fuel consumption is about 600 Kg / hour (10 Kg/min)
To have an approx idea of the required fuel, lets check this fuel data.
Time to Dest and Alt is 39 + 33 = 72 min, so we need 720 Kg for this.
In addition to above we need 91 for contingency, make it 100.
91 for taxi, make it 100 and 45 min final reserve which @ 10 Kg/min becomes 450, make it 500. That means 100+100+500 = 700 we need over and above 720. That makes it 1420, which is quite close to our accurate (wind catered) computer generated min required fuel figure of 1328. This is just to have a rough idea of fuel required for the flight.

Time to Dest + Alt in mins ⟵add a zero at the end + 700

SELECTION OF CRUISING LEVEL

PAKISTAN International Airlines	Operations Manual Part – A Edition – III	Chapter 8 Page 13
	FLIGHT PREPARATION & PLANNING	Rev : 00 1st Dec 2014

unpressurized cabin.

Cruising levels will be selected based on the following factors:

a. Distance between departure airfield and destination.

b. Height of terrain over which the flight is to operate.

c. Air Traffic Control and airspace considerations.

d. Fuel consumption at a given altitude or flight level.

e. Wind conditions and resulting wind components at a given altitude or flight level.

f. Other meteorological conditions such as turbulence, icing or thunderstorm activity.

g. Aeroplane or equipment performance capability or limitations.

h. PIA flights shall maintain a minimum buffet margin as a maneuvering protection against turbulence and airspeed excursions. The buffet margin depends is on type, weight, speed and atmospheric conditions. If no turbulence is anticipated the following buffet margins are recommended.

B 747	1.3 G
B 777	1.3 G
A 310	1.3 G
A320	1.5 G
ATR	2.0 G

j. Buffet margins vary with cruise Mach number. Operating at Mach numbers significantly faster or slower than the speed for optimum buffet margin will reduce the actual margin considerably.

k. Ideally a cruising level should be selected which will satisfy all flight requirements and result in optimum aeroplane performance with regard to the above factors. However this is not always possible. A single factor such as terrain elevation, wind component or aeroplane performance limitation may, on a given flight, determine the selection of the cruising level but all factors must be considered.

l. When planning climb to higher levels assess if this will result in improved fuel economy. In headwinds, levels below optimum may be preferred if ground speed increases by more than 5kts for each 1000ft below optimum cruise level.

m. The altitude or flight level nominated on the OFP should be used if, after the above factors have been considered, it is determined that:-

1) No significant performance or fuel economy penalty will result from its use.

2) All en-route altitude requirements are met.

3) No other factors exist which preclude its use or dictate the use of another altitude or flight level.

ALTERNATE REQUIREMENTS

8.3 SELECTION OF DESTINATION AND ALTERNATE AIRFIELDS

8.3.1 General

Safety is the predominant factor when selecting destination and alternate airfields. It must be ascertained that conditions and ground facilities required for the flight are adequate for the type of operation. Prior to commencement of any flight the most important points to be considered are:

a. Airfield infrastructure (e.g. runways, taxi ways, ramp area, lighting, navigation aids, etc.) and aeroplane performance requirements

b. Meteorological and ATS services.

c. Customs and immigration facilities and regulations.

d. Emergency Services including Rescue and Fire Fighting

e. Curfew's PPR (prior permission required)

f. Technical Facilities

g. The possibility for onward transportation of passengers, Cargo and crew.

8.3.2 Minima for Pre-Flight Planning

The planning according to this section shall be based on the forecast conditions i.e. weather forecast and airfield condition. Circling minima apply if forecast conditions indicate that a circling approach will be necessary for landing.

The forecast weather should be at or above the applicable planning minima at the expected time of arrival or is expected to improve to those minima within a time period for which supplementary fuel is carried.

8.3.3 Destinations Selection

A destination is an airfield served by PIA scheduled, charter and special flight. It must be designated as being available for such use and are contains in the Jeppesen Airway Manual.

8.3.4 Destination Weather / Forecast Minima

It is PIA policy to plan all flights with at least one destination alternate. However if the destination airfield is forecast to be below the applicable planning minima at the expected time of arrival, the flight may be dispatched providing two destination alternates are filed. The alternate fuel must be sufficient to proceed to the alternate airfield which requires the greater amount of fuel.

8.3.5 Destination Forecast & Alternate Selection

a. Forecast must indicate that weather condition at the planned time of arrival will be at or above the approach chart minima for the expected arrival runway as published in the Jeppesen Airway Manual. It is PIA policy to plan a flight with one destination alternate. If the destination forecast weather for period of ±2 hrs of ETA indicates:-
   - Ceiling 2000 ft or above and
   - Visibility 5 km or more then:

b. Only one nearest alternate should be nominated. However alternate fuel for at least 100 nm will be carried.

c. If the Destination Forecast Wx ±1 hr. of ETA is above its own Alternate Minima for an Instrument Approach then only one Alternate more than 100 nm away should be nominated.

d. If the weather criteria mentioned above are not met then two Alternates will be nominated. Fuel to be carried for the farther of the two, one of which must be more than 100 nm direct distance away from destination.

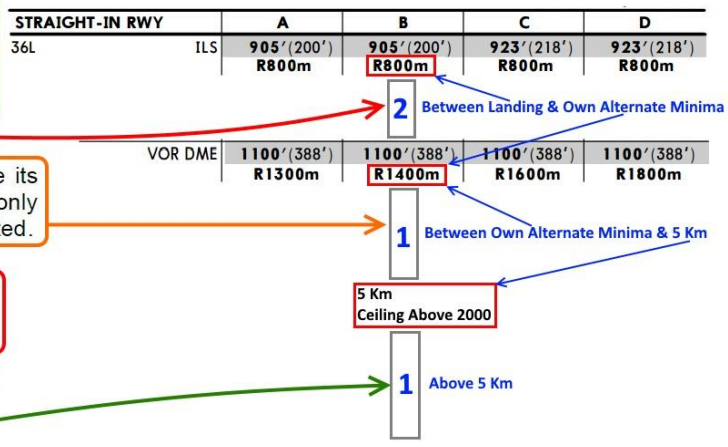
7.2 Selection of Alternate Airfield

Selection of an Alternate Airfield will be as follows:

a. If the Destination Forecast Wx for a period ± 2 hrs. of ETA indicates:
Ceiling 2000 ft. or above and Visibility 5 km or more then only one nearest alternate should be nominated, however, alternate fuel for at least 100 nm will be carried.

b. If the Destination Forecast Wx ± 1 hr. of ETA is above its own Alternate Minima for an Instrument Approach then only one Alternate more than 100 nm away should be nominated.

c. If the weather criteria does not meet the above conditions or when meteorological / operational information or conditions are not available for destination airport then two alternates shall be nominated. Fuel to be carried for the farther of the two, one of which must be more than 100 nm direct distance away from destination.



8.3.6 Destination Alternate

a. An alternate aerodrome is an aerodrome to which an aeroplane may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing.

b. Any airfield nominated as an alternate should be designated as being available for use, included in the list of PIA domestic / international destinations and alternates prepared by Routes & Navigation Section and available in Jeppesen Airway Manual.

c. The destination alternate(s) is to be specified in both the OFP and ATC flight plan.

8.3.7 Takeoff Alternate

A takeoff alternate aerodrome (at or above its own operating minima) shall be selected and specified in the operational flight plan if the weather conditions at the aerodrome of departure are at or below the applicable aerodrome operating minima or it would not be possible to return to the aerodrome of departure for any other reasons. The takeoff alternate aerodrome shall be located within the following distance from the aerodrome of departure:

a. Two Engine Aeroplane

Not more than a distance equivalent to a flight time of one hour at the single engine cruise speed in still air in ISA conditions.

b. Three of Four Engine Aeroplane.

Not more than a distance equivalent to a flight time of two hours at one engine inoperative cruise speed in still air in ISA conditions.

Note: For takeoff alternate, En route alternate and destination alternate refer to ATC chapter of Jeppesen Airway Manual.

8.3.8 Alternate Weather Minima

Company planning minima for destination alternates will be as per the following table unless restricted by local regulation. Flight crew and flight planning personnel should take into account the most probable expected runway, to be in use when selecting an alternate.

Alternate Airport Minima	
Type of Approach in Use	**Application Planning Minima**
Precision Approach (CAT-II)	Precision Approach CAT-I
Precision Approach (CAT-I)	Non Precision Approach
Non Precision Approach	Non Precision + 200ft / 1000m ceiling at or above MDH
Circling Approach	Circling

Note: Once airborne the Approach chart Minima of Jeppesen Airway Manual shall be applicable.

8.3.9 Enroute Alternate / Emergency Airport (Non-ETOPS/EDTO)

ICAO Regulations dictate that an airport should be designated for flights over high terrain, where for performance or oxygen requirements, an en-route landing can be safely made. For planning purposes the Weather Minima of an Enroute Alternate/Emergency Airport shall be as per "Alternate Airport Minima" above.

A Company list of enroute emergency airports is available in the Jeppesen manual (PIA Data Section).

Non Precision Charted:
- *MDH +200 feet*
- *RVR/VIS +1000m*

Ceiling at or above MDH

8.3.10 In Flight Considerations

If required the destination and/or alternate may be re-nominated during flight, taking into account the fuel remaining, the latest meteorological information and/or other operational considerations.

Alternate: Published one engine out Minima shall only be considered if higher that the applicable alternate planning minima.

Takeoff alternate: Published one engine out minima shall only be considered if higher than the applicable takeoff alternate planning minima.

8.3.11 Published One Engine out Minima

In any case where a one-engine-out Minima is published on the approach chart for destination or alternate, pre-flight planning is affected as follows:

Destination: Normal all engines minima apply, i.e. one engine out Minima to be disregarded.

8.3.12 Aeroplane Approach Category

For planning purposes, aeroplane approach category for straight-in and circling approaches are as follows:

Aeroplane Type	Straight In	Circling
B747-200 / 300	CAT D	CAT D
B777-200 ER	CAT C	CAT D
B777-200 LR	CAT C	CAT D
B777-300 ER	CAT D	CAT D
A310-300	CAT C	CAT C
A320	CAT C	CAT C
ATR42-500	CAT B	CAT B

8.3.13 In Flight Diversion to Alternate Aerodrome

Whenever a diversion is necessary the following should be considered:

Irrespective of the alternate airport designated in the ATC flight plan, conditions permitting, the flight may be diverted, in order of preference, to:

a. The Next Destination,

b. Company preferred alternate

c. In case of emergency or situation where the Pilot-in-Command has to land as soon as possible or land at the nearest suitable airport, he shall take whatever action is deemed to be necessary taking into account the urgency of situation.

d. Any other suitable airport

e. The company or its agent, if contactable, should be informed of the diversion, reason of diversion and the intended alternate aerodrome. However, if they recommend a different airport, then, conditions permitting, diversion be made to the recommended airport.

8.3.16 Rescue & Fire Fighting Categories

The following RFF (Rescue & Fire Fighting) categories are desired for PIA operations.

Departure & Destination Categories

Aeroplane Type	RFF Category
B-747	9
B-777-200ER	9
B-777-200LR	9
B-777-300ER	9
A-310	8
A-320	6
ATR 42-500	4

Destination Alternate Categories

Aeroplane	RFF Category
B747	8
B777-200ER	8
B777-200LR	8
B777-300ER	8
A310	7
A320	5
ATR 42-500	3

PREFLIGHT - TECHLOG

ANO NO. -001-AWRG ISSUE 5. Dated 4th April 2011

PAKISTAN International Airlines
Great People to Fly With

Pakistan International
Engineering & Maintenance

Certificate of Maintenance Review (C of MR)

Aircraft Type : ATR 72-500 **Registration Mark:** AP-BKV

Aircraft Hours : 7015:09 **Aircraft Cycles :** 5093

I hereby certify that I have reviewed all the documents of the above mentioned aircraft, which are completed and are in accordance with the approved maintenance schedule. All the maintenance specified in the approved maintenance schedule, Mandatory, Modification, SB's, AD's, CPCP task and all other Mandatory, requirements have been carried out appropriately as per specified time schedule. The aircraft is fully airworthy and meets all the safety / Airworthiness standards and all applicable Mandatory requirements are duly complied with.

This Certificate of Maintenance Review (CMR) is valid until 20-06-2017 (date)

I am fully conversant with relevant Rules of CARs 94, ANOs and Airworthiness Notices.

Signature 27/12/16

Name MUHAMMAD ALI AFTAB
Chief Engineer Quality Assurance
P.I.A. J.I.A.P. Karachi.

AME No. 1100

Date : 22-12-2016

Form No EM/MP&R/GEN_192

PIA
Great People to Fly With

ENGINEERING & MAINTENANCE
AIRCRAFT MAINTENANCE RELEASE

Aircraft Type: ATR 72-500
Aircraft Hours: 6987

Registration mark: AP-BKV
Maintenance Check: A

We herby certify that all maintenance work on the above mentioned aircraft has been completed satisfactory and in accordance with the approved maintenance schedule. The aircraft is fully airworthy and meets all the safety/Airworthiness standards.

We are fully conversant with the relevant rules given in CAR 94, ANOs and Airworthiness Notices.

CATEGORY	NAME & SIGNATURE	AME LICENSE/ APPROVAL NO	DATE
A & C (Airframe & Engine)	MUHAMMAD ASIF	AML 01471	06-12-2016
X (Electrical Instrument)	ZEESHAN HASSAN	AML 02079	06-12-2016
R Radio & Radar	ZEESHAN HASSAN	AML 02079	06-12-2016

Printed at PIA Press (EXT)

The maintenance Release (MR) is valid until N/A (dates) or upon completion of 7487 Flying hours from the date of certification whichever is earliest.

Note: (Refer ANO 92.0001/Appendix 'K')

1- The Maintenance Release shall be issued at time specified in the relevant approved maintenance schedule.

2- The Maintenance Release shall be issued in duplicate; one copy shall be carried on board the aircraft and the other shall be kept at station where Maintenance Release is issued or at Base Station of the aircraft.

3- The Maintenance Release does not replace Aircraft certificate of release service.

ATR 72-500

Preamble to Aircraft Maintenance Program

PCAA Approval No: HQCAA/2210/83/AW
Date: 29-04-2015

Except ATR its the earliest of date or hours

Type of Aircraft	Line Checks: Transit	Line Checks: Layovers	Routine Checks: 'A'	Routine Checks: 'B'
B777-200 / -300	Transit (Outstation & Base)	** Daily check Service check1 250FH Service check2 500FH	75 days / 1000 FH	—

CHECK 'A'
This check shall be performed at an interval of 500 FH. Whenever check 'A' is performed, this check, Daily check and Line check shall also be performed.

3-4.3 PIA FLEET MAINTENANCE CHECKS AND INTERVALS

Type of Aircraft	Line Checks: Transit	Line Checks: Layovers	Routine Checks: 'A'	Routine Checks: 'B'	Routine Checks: 'C'	Major Checks: MID - D	Major Checks: 'D'	* C of MR Issuance
ATR42-500	Transit (Outstation & Base)	Daily check 24 elapsed Hrs. Line check 48 elapsed Hrs Weekly Check 7 calendar Days	500 FH	—	5000 FH	Check "4C" 20,000 FH		As per PCAA ANO 92.0001 Requirements

PIA NOTES FOR ATTENTION CREW

ISSUE DATE

AP- BKZ

ITEM	NOTE: The following items contain information, regarding modification, technical irregularities, Etc, effecting the operation of this specific AIRCRAFT.	DATE	SIGNATURE
01	AS PER THE INSTRUCTIONS ISSUED BY C.E AW THIS AIRCRAFT (AP-BKZ) COMPLIES WITH THE REQUIREMENTS OF TCAS 7.1 VERSION	15/12/16	AML 0160

Engineering & Maintenance

Carried Forward Defects List.

AP-BKX

Non-Airworthy Items

S.NO.	C/F Slip No & date	Tentative Closing Date	Signature / Authority No.	Tech Log slip No./rectification date	Signature / Authority No.
01	50/13 07 16	BEFORE 07 01 17	AME 01810	20/18-07-16	
02	18/03 10 16	NIGHT MAINT.	19.12	20/03 10 16	1815
03	93/13-10-16	NIGHT MAINT	1240	99/14-10-16	1240
04	29/18-10-16	18-04-17	1815		
05	70/06-11-16.	BEFORE 5-MAY-2017	2.66	72/06-11-16	AML 02966
06	29/13-01-17.	180 DAYS.	AML 01463	39/14-01-17	AML 01219

PAKISTAN International Airlines

EM/MP&R/GEN201 Rev 0

Pakistan International

Engineering & Maintenance

Carried Forward Defects List.

AP-BKX

MEL ITEMS

S.NO.	C/F Slip No & date	MEL Ref	CAT	Expiry date	Signature/ Authority No.	Tech. Log slip No./rectification date	Signature / Authority No.
1	23/08/8/16	33-1/10-1	C	02/09/16	1467	55/130816	AML 02117
2	56/12/8/16	34-5 33-1	C	30/8/16	1467	60/14-8-16	AML 02138
3	77/17/8/16	33-2 HCL-081	C	27/8/16	1467	98/20-08-16	1467
4	01/20/08/16	34-5 HCL 71-1	C	31/08/16	2114	12/22-08-16	1467
5	14/20/08/16	31-1 21-1	C	02/09/16	2117	16/24-08-16	1467
6	15/23/08/16	31-1 21-1	C	2/09/16	2117	76/03-09-16	1908
7	25/260816	30-1 11-2	B	29/08/16	01734	43/28/08/16	02572
8	03/180916	54-1 54-1	A	24/09/16		07/190916	AML 02117
9	51/240916	ITEM LIN NUMBER	LOW RATING	—		56/240916	
10	60/250916 (CEP-A)	01 DAY.		26/09/16	AML 01810	67/260916	AML 01810
11	72/26-9/16	74-1 21-1	03 DAYS	30/09/16	AML 02003	77/270916	2114
12	96/30 09 16	31-1	CAT C	10/10/16	2114	34/18 10 16	AML 01802
13	66/06 11 16	23-3 70-1	CAT C	16/11/16	AML 02066	124/4/10/16	AML 01611
14	58/28/11/16	33 42-1	C	8/12/16	1908	03/04/04/16	AML 01908
15	86/021216	34 33-1	C	12/12/16	2227	99/251216	AML 01908
16	37/01/01/17	33 43-1	D	08/1/17	1611		

Form No: 3-02-121A Rev 2

FLT NO	D D M M Y Y	A/C REGN NO.	FROM	TO	ITEM NO	OIL REFILL	E1	E2	E3	E4	APU	ETOPS REL	REF DATE	D D M M Y Y	REF. ITEM NO
5T16	3 1 1 2 1 6	AP-BKX	MUX	KHI	3	7									

SNAG: STROBE LT IS INTERMITTENT.

RECTIFICATION: TAIL SIDE STROBE LT C/F AS NIS PER MEL REF CH-33 ITEM NO 43-1 PAGE NO 33-2 IN CAT D

CERTIFIES THAT WORK SPECIFIED, EXCEPT AS OTHERWISE SPECIFIED, WAS CARRIED OUT IN ACCORDANCE WITH APPLICABLE PCAA REGULATIONS AND IN RESPECT TO THAT WORK THE AIRCRAFT IS CONSIDERED READY FOR RELEASE TO SERVICE

ATA | D D M M Y Y | TIME | SIGN | AUTH: 1611

NAME: SOHAIL ZAFAR | SIGN | AUTH: CAPT | TIME

RELEASE NOTE & DATE: | DELAY | MEL A B C D CF

POS	TAG	PART NUMBER	SERIAL No. OFF	SERIAL No. ON

DISTRIBUTION:

WHITE # OFFICE COPY (NOT TO BE REMOVED)
BLUE # TO BE REMOVED AND PLACED IN HIL POCKET

PINK # COMPUTER
GREEN # REMOVE AT LINE STATION & AT BASE KARACHI / ISLAMABAD

Form No. 9-22-121A Rev 3

FLT NO.	D D M M Y Y	A/C REGN NO.	FROM	TO	ITEM NO	OIL REFILL	E1	E2	E3	E4	APU	ETOPS REL	REF. DATE	D D M M Y Y	REF. ITEM NO
340	120117	AP-BKV	~~KHH~~	LYP	2	2	0	0	—						

SNAG	RECTIFICATION
A/C RELEASE TO SERVICE.	TRANSIT CHK DONE AT KHH AS PER CARD # ATR 72-PK-TR ISSUE # II DT 15/04/15.

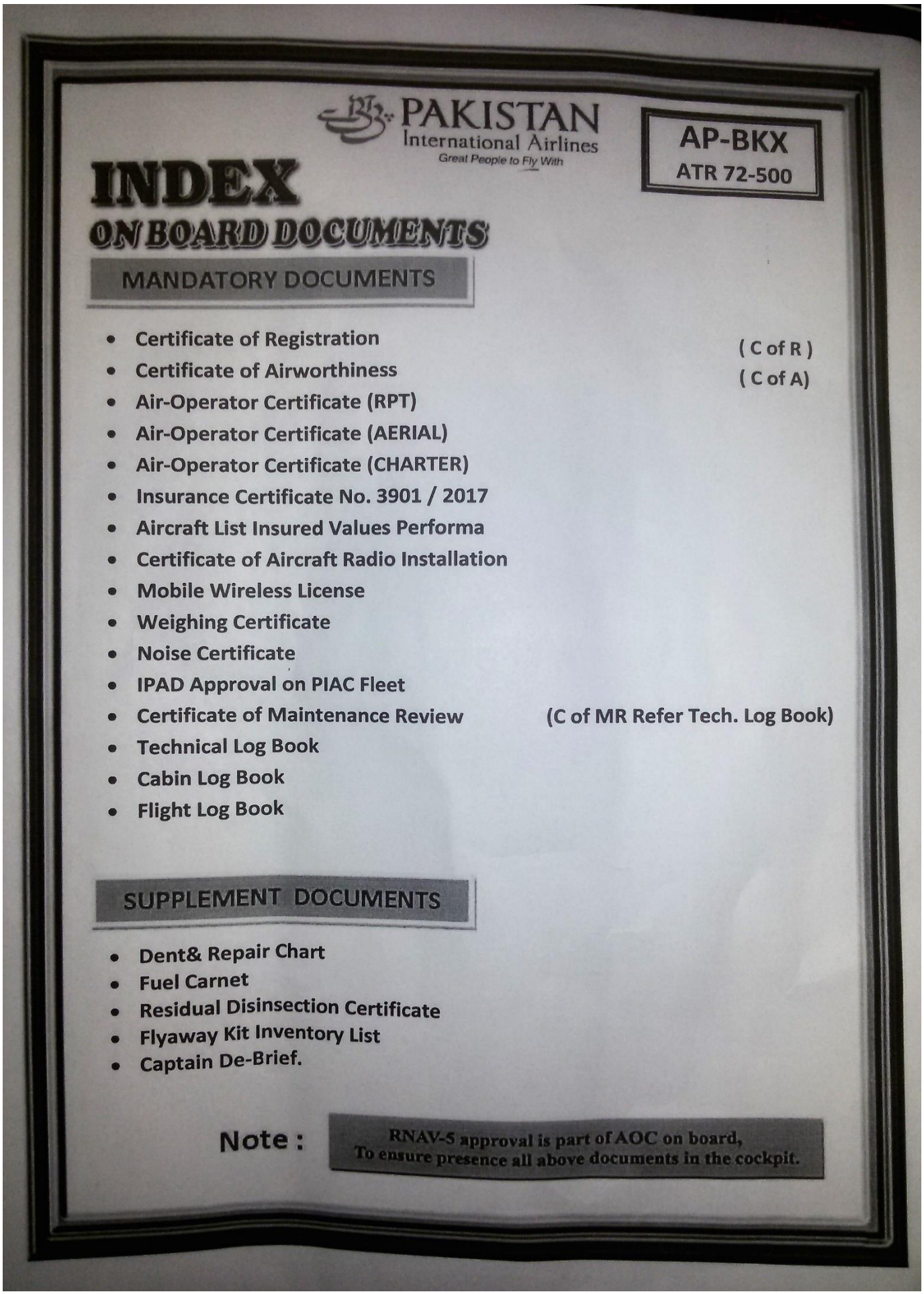
CERTIFIES THAT WORK SPECIFIED, EXCEPT AS OTHERWISE SPECIFIED, WAS CARRIED OUT IN ACCORDANCE WITH APPLICABLE PCAA REGULATIONS AND IN RESPECT TO THAT WORK. THE AIRCRAFT IS CONSIDERED READY FOR RELEASE TO SERVICE

NAME:	SIGN:	AUTH:	TIME	ATA	D D M M Y Y	TIME	SIGN:	AUTH:
ZEESHAN	Zeeshan.	02079	1800	~~12~~ 00	120117	1800	Zeeshan	02079

RELEASE NOTE & DATE: DELAY MEL A B C D C/F

POS	TAG	PART NUMBER	SERIAL No. OFF	SERIAL No. ON
	—	—	—	—

PREFLIGHT – AIRCRAFT DOCUMENTS



PAKISTAN International Airlines
Great People to Fly With

AP-BKX
ATR 72-500

INDEX
ON BOARD DOCUMENTS

MANDATORY DOCUMENTS

- Certificate of Registration (C of R)
- Certificate of Airworthiness (C of A)
- Air-Operator Certificate (RPT)
- Air-Operator Certificate (AERIAL)
- Air-Operator Certificate (CHARTER)
- Insurance Certificate No. 3901 / 2017
- Aircraft List Insured Values Performa
- Certificate of Aircraft Radio Installation
- Mobile Wireless License
- Weighing Certificate
- Noise Certificate
- IPAD Approval on PIAC Fleet
- Certificate of Maintenance Review (C of MR Refer Tech. Log Book)
- Technical Log Book
- Cabin Log Book
- Flight Log Book

SUPPLEMENT DOCUMENTS

- Dent& Repair Chart
- Fuel Carnet
- Residual Disinsection Certificate
- Flyaway Kit Inventory List
- Captain De-Brief.

Note : RNAV-5 approval is part of AOC on board, To ensure presence all above documents in the cockpit.

PAKISTAN
CIVIL AVIATION AUTHORITY
Airworthiness Directorate

CAAF-026-AWXX-1.0

CERTIFICATE OF REGISTRATION

CERTIFICATE NO. **882/1**

1. Nationality & Registration Marks.	2. Manufacturer & Manufacturer's Designation of Aircraft.	3. Aircraft Serial Number.
AP-BKX	**ATR-GIE AVIONS de TRANSPORT REGIONAL 1, ALLEE PIERRE NADOT 31712 BLAGNAC CEDEX FRANCE (ATR 72-212A)**	**MSN: 1037**

4. Name of Owner: **OTTAWA LEASING LIMITED**

OPERATOR: PAKISTAN INTERNATIONAL AIRLINES CORPORATION

Address of Owner: **CUMBERLAND HOUSE, 9TH FLOOR, 1 VICTORIA STREET, HAMILTON HM11, BERMUDA**

C/O. PIA, HEAD OFFICE BUILDING, JIAP, KARACHI-PAKISTAN.

5. It is hereby certified that above described aircraft has been entered on the Aircraft Register in accordance with the Convention on International Civil Aviation dated 7th December, 1944 Civil Aviation Ordinance 1960 and the rules made thereunder.

Date of Issue: 30th June, 2015

for **(ENGR. S. SHAUKAT HAMEED)**
DIRECTOR AIRWORTHINESS
DIRECTOR GENERAL

NOTE: If there is any change in the ownership of the aircraft or the aircraft is destroyed or permanently withdrawn from use, the registration and this Certificate become void. Under these conditions this Certificate shall be returned immediately to Director General Civil Aviation Authority along-with pertinent information completed on the reverse.

PAKISTAN
CIVIL AVIATION AUTHORITY
Airworthiness Directorate

CAAF-009-AWRG-1.1

CERTIFICATE OF AIRWORTHINESS

CERTIFICATE NO. **829/1**

1. Nationality & Registration Marks.	2. Manufacturer & Manufacturer's Designation of Aircraft.	3. Aircraft Serial Number.
AP-BKX	**ATR-GIE AVIONS de TRANSPORT REGIONAL 1, ALLEE PIERRE NADOT 31712 BLAGNAC CEDEX FRANCE (ATR 72-212A)**	**MSN: 1037**

4. Category

(i) Regular Public Transport.
(ii) Charter Operation.
(iii) Aerial Work Operation.
(Subject to limitations of operating licence issued)

5. This Certificate of Airworthiness is issued, pursuant to the Convention of International Civil Aviation dated 7th December, 1944, EASA Part 25 and related regulations*, Civil Aviation Ordinance 1960 and the rules made there under in respect of the mentioned aircraft which is considered to be Airworthy when maintained and operated in accordance with the forgoing and the pertinent limitations.

(ENGR. S. SHAUKAT HAMEED)
DIRECTOR AIRWORTHINESS
for **DIRECTOR GENERAL**

Date of Issue: 30th June, 2015

6. This certificate is valid for the period (s) shown below			Signature, official stamp & date
From 30 JUN 2015	to	29 JUN 2016	PAKISTAN (CAA)
From 30.06.2016	to	29.06.2017	CAW (S), PAKISTAN CAA 28-06-16
From	to		
From	to		
From	to		
From	to		

NOTE:

No entries or endorsements may be made on this Certificate except in the manner and by the person authorized for that purpose by the Director General Civil Aviation Authority. If this Certificate is lost, the Director General Civil Aviation Authority should be informed at once, the Certificate No. being quoted.

Any person finding this Certificate should forward it immediately to the Director General Civil Aviation Authority, Jinnah International Airport, Karachi, Pakistan.

*EASA TCDS No. A.084

AIR OPERATOR CERTIFICATE

(RPT OPERATIONS)

ISLAMIC REPUBLIC OF PAKISTAN

Pakistan Civil Aviation Authority

AOC NO:- AOC-003/96-AL EXPIRY DATE: 31st December, 2017	M/S PAKISTAN INTERNATIONAL AIRLINES CORPORATION LIMITED (PIACL) ADDRESS: Pakistan International Airlines Corporation Head Office, JIAP, Karachi, Pakistan. TELEPHONE NO.(s) +92 21 2199040000	OPERATIONAL POINTS OF CONTACT: Director Flight Operations TEL: +92 21 99046050 FAX: +92 21 99242328 E-Mail: dfo@piac.aero

This certificate certifies that **M/S PAKISTAN INTERNATIONAL AIRLINES CORPORATION LIMITED** is authorized to perform Commercial Air Operations, as defined in the attached operations specifications, in accordance with the Operations Manual and Part-XI, Section 3, of CARs 94.

This certificate is valid subject to validity of RPT License issued by Directorate of Air Transport, Pakistan Civil Aviation Authority.

Date of issue:
1st January, 2017

Asim Suleiman

(ASIM SULEIMAN)
Air Marshal (Retd.)
Director General
Pakistan Civil Aviation Authority

CAPTAIN ARIF MAJEED
Director Flight Standards
FLIGHT STANDARDS DIRECTORATE
HQs Civil Aviation Authority

CERTIFIED TRUE COPY

OPERATIONS SPECIFICATIONS				
SPECIAL LIMITATIONS:	• All Shippers and Packers, Freight Forwarders, Ground Handling Agents and Security Staff Involved with PIAC must have specific approval to handle Dangerous Goods from the Regulatory Authority of the State from where they are loaded. *"No COMAT is to be carried".* • Please see limitation mentioned against each aircraft registration number as on Page 1 of 5.			
SPECIAL AUTHORIZATIONS	Yes	No	SPECIFIC APPROVALS	REMARKS
Dangerous Goods	☑	☐	HQCAA/5264/17/FS/2083 dated 23rd Dec, 2009	
Low visibility Approach and Landing Take-off Operational Credit(s)	☑ ☑ ☐	☐ ☐ ☑	**B772/B773** CAT I 550 m DH 200 ft CAT II 350 m DH 100 ft CAT III A RVR 200m (TDZ) DH 50 ft CAT III B RVR 75m (TDZ) DH 00 ft RVR 125m / 150 m	
Low visibility Approach and Landing Take-off Operational Credit(s)	☑ ☑ ☐	☐ ☐ ☑	**A310** CAT I 550 m DH 200 ft CAT II RVR 350 m DH 100 ft RVR 150 m	
Low visibility Approach and Landing Take-off Operational Credit(s)	☑ ☑ ☐	☐ ☐ ☑	**ATR42/ATR72** CAT I RVR 550 m DH 200 ft RVR 400 m	
Low visibility Approach and Landing Take-off Operational Credit(s)	☑ ☑ ☐	☐ ☐ ☑	**A320** CAT I RVR 550 m DH 200 ft RVR 400 m	
Low visibility Approach and Landing Take- off Operational Credit (s)	☑ ☑ ☐	☐ ☐ ☑	**A333*** CAT II RVR 350m DH 100 ft CAT III A RVR 200m DH 50 ft CAT III B RVR 125m DH Nil ft RVR 200m	
RVSM	☑	☐		EXCEPT ATR42/ATR72
EDTO (B772/B773)	☑	☐	Maximum Threshold time: 60 minutes * Maximum diversion time: 180 minutes **ENGINE TYPES B-777** GE90-94B (-200ER), GE90-110B1L (-200LR) & GE90-115BL (-300 ER) **A333*** Maximum Diversion Time: 120 minutes	* HQCAA 5262/40/FS/1942 dated 4th Dec, 2009

OPERATIONS SPECIFICATIONS				
SPECIAL AUTHORIZATIONS	Yes	No	SPECIFIC APPROVALS	REMARKS
Navigation Specifications for PBN operations	☑	☐	**B772/B773**	
			RNAV 10 (RNP 10)	GPS (MMR), ADIRU
			RNAV 5	GPS(MMR), DME/DME, VOR/DME, ADIRU
			RNAV 2	ALL PERMITTED SENSORS (GPS(MMR), DME/DME, DME/DME/ADIRU)
			RNAV 1	ALL PERMITTED SENSORS (GPS(MMR), DME/DME, DME/DME/ADIRU)
			RNP 4	GPS (MMR), ADIRU
			RNP 1	ALL PERMITTED SENSORS (GPS(MMR), DME/DME, DME/DME/ADIRU)
			RNP APCH	WITHOUT BARO-VNAV, WITH BARO-VNAV
			A310	
			RNAV 10 (RNP 10)	IRS
			RNAV 5	DME/DME, VOR/DME, IRS
			RNAV 2	DME/DME, DME/DME/IRS
			RNAV 1	DME/DME, DME/DME/IRS
			RNP 1	DME/DME,DME/DME/IRS
			ATR 42/ATR72	
			RNAV 5	GNSS, DME/DME, VOR/DME
			RNAV 2	(GNSS, DME/DME)
			RNAV 1	(GNSS, DME/DME)
			RNP 1	GNSS, DME/DME
			RNP APCH	
			A320	
			RNAV 10 (RNP 10)	GPS (MMR), ADIRU
			RNAV 5	GPS(MMR), DME/DME, VOR/DME, ADIRU
			RNAV 2	ALL PERMITTED SENSORS (GPS(MMR), DME/DME, DME/DME/ADIRU)
			RNAV 1	ALL PERMITTED SENSORS (GPS(MMR), DME/DME, DME/DME/ADIRU)
			RNP 4	GPS (MMR), ADIRU
			RNP 1	ALL PERMITTED SENSORS (GPS(MMR), DME/DME, DME/DME/ADIRU)
			RNP APCH	WITHOUT BARO-VNAV, WITH BARO-VNAV
			A333*	
			RNAV 10	IRS/FMGEC, MCDU/ND, GPS
			RNAV 5	GPS, VOR/DME, DME/ IRS, FMGEC/ MCDU/ ND
			RNP 4	IRS/ FMGEC, GPS, MCDU/ ND
			RNAV 1	GPS,2 IRS/FD, FMGEC/ MCDU, ND
			RNAV 2	GPS, IRS/ FD, FMGEC/ MCDU, ND
			RNP APCH	WITH BARO-VNAV

NATIONAL INSURANCE COMPANY LIMITED

(OWNED BY THE GOVERNMENT OF PAKISTAN)

Dept: AVIATION (HO)

Ref No.: NAV-PIA-2017/2018

12th January 2017

INSURANCE CERTIFICATE NO 3901/2017

TO WHOM IT MAY CONCERN

Certified that we the NATIONAL INSURANCE COMPANY LIMITED have insured the entire fleet of aircraft owned or operated by PAKISTAN INTERNATIONAL AIRLINES CORPORATION, Quiad-e-Azam International Airport, Karachi as detailed in the attached schedule for the period **15-01-2017** to **14-01-2018** both days inclusive local standard time against the following risks while operating anywhere in the world,

1. a. Aviation Hull All Risks, as per schedule of aircraft attached.	
b. Combined single limit in respect of Passengers, Baggage, Third Party, Cargo, Mail and General Third Party Liability	US$ 1,000,000,000 (Max. Liab. Limit AOA)
c. Spare Engines and Spares All Risks	US$ 30,000,000 (Anyone Engine) US$ 30,000,000 (Anyone sending)
2. Primary Cargo Legal Liability	US$ 1,000,000 (Max. Liab. Limit AOA)
Separate Hull War and Allied Perils.	(As per schedule)

Subject to the terms conditions, limitations exclusions and cancellation provisions of the relevant policy No. **NAV-PIA-78-00271-2/17** which expire at Midnight **14th January 2018** local standard time.

The coverage provided shall not contravene any applicable United Nations Sanctions.

For & On Behalf of
National Insurance Company Limited

MUHAMMAD HANIF HISBANI
Manager (Re-Insurance)
NATIONAL INSURANCE COMPANY LIMITED
Ministry of Commerce Government of Pakistan
NIC Building Abbas Shaheed Road
Karachi-74400 (Pakistan)

NIC BUILDING, ABBASI SHAHEED ROAD, P.O. BOX 10506 KARACHI-74400
Direct Lines: (92-21) 99225763, 99225756 PABX: 99225741-50 UAN : 111-642-642 FAX: (92-21) 99225735, 99225874
E-mail: nusrathussain@nicl.com.pk, hanifhisbani@nicl.com.pk, qurbanalisoomro@nicl.com.pk website: www.nicl.com.pk

PAKISTAN
CIVIL AVIATION AUTHORITY
Airworthiness Directorate

CERTIFICATE OF RADIO INSTALLATION

CAAF-021-AWXX-1.0

NO. RC/AP-BKX/AW/1

Type of Aircraft ATR 72-212A

Nationality and Registration Mark: AP-BKX

Operator: M/S. PAKISTAN INTERNATIONAL AIRLINES CORPORATION

This aircraft radio apparatus has been inspected by CAA (Pak) and its installation is approved as complying with the requirements in accordance with relevant Civil Aviation Rules.

Name of Equipment	Quantity	Manufacturer	Model
i. HF Communication	01	COLLINS	T/R # HF9031A
ii. VHF Communication	02	COLLINS	VHF22C
iii. ADF	02	COLLINS	ADF-60A
iv. Marker / VOR / ILS	02	COLLINS	VIR32
v. DME	02	COLLINS	DME-42
vi. Radio Altimeter	01	TRT	ERT011
vii. Weather Radar	01	HONEYWELL	WU 660
viii. ATC Transponder	02	COLLINS	TDR94D
ix. ELT Impact	01	ELTA	ADT406^2 AF/AP
x. ELT Survival	01	ELTA	ADT406S
xi. T^{2}CAS (EGPWS Integrated)	01	ACSS	TT-950
xii. GNSS (GPS)	01	HONEYWELL	HT1000
xiii. SSCVR	01	FAIRCHILD	FA2100
xiv. SSFDR	01	FAIRCHILD	FA2100

Ref. HQCAA/2209/BKX-II/AW

Dated : 30th June, 2015

for

(Engr. SYED SHAUKAT HAMEED)
DIRECTOR AIRWORTHINESS
DIRECTOR GENERAL
CIVIL AVIATION AUTHORITY
KARACHI, PAKISTAN

PIA
Pakistan International

CABIN MAINTENANCE DIVISION
AIRCRAFT APPEARANCE SECTION

ORIGINAL

0000-4109

RESIDUAL DISINSECTION CERTIFICATE

Interior surface including cargo space of this aircraft AP-BKX.
(Aircraft Registration)

were treated with permethrin on 11.01.17. *(Date)* *in accordance with the World Health Organization recommendation (W.H.O Weekly Epidemiological Record No. 7.1985 p.47 and No. 12.1985 p.90)*

Expiry Date: 10.02.17.

Signed: Dr. Inayat A. Shahro

Designation: Sr. Entomologist (Ph.D)
Aircraft Appearance
PIA Karachi Airport

Port: Karachi

Date: 11.01.17.

Note: *The Treatment must be renewed if cleaning or other operation remove a significant amount of the permethrin residue otherwise in any case within 4 weeks of the last disinsection as per W.H.O requirement.*

Printed at PIA Press(8128)

PREFLIGHT - PROCEDURES

DEPARTURE BRIEFING

6.5.2 ABORT ITEM LIST

Following are the conditions when CM1 shall discontinue the takeoff:

a. BEFORE REACHING SPEED 60 KTS

1. ATPCS not armed.
2. NP exceeding 101%
3. ITT exceeding Red MarK (OAT 15 deg C or higher)
4. Config Warning

b. UPTO SPEED V1

1. Engine Failure
2. Engine Fire
3. Flaps Unlock
4. Pitch Disconnect
5. Dual DC Gen Fault

Any other situation, which in the opinion of CM1, is unsafe for the continuation of takeoff.

Note: CM2 shall ensure torque corresponds to the manual bugs on the torque indicator or P/L adjusted, if required.

Note: Clean up procedures, memory items, checklist procedure and intention, in case of engine failure or engine fire should also be covered during briefing.

6.5.3 AIRFIELD BRIEFING

Prior to each departure, PF shall carry out Airfield Briefing as follows:

- STATUS of the AIRCRAFT.
- NOTAMS.
- Airfield and departure weather briefing.
- Push back and Start up procedure.
- Frequencies to be used.
- Anticipated taxi routing to the runway in use.
- Runway condition.
- Flap configuration.
- BLEED ON/OFF and use of Anti Ice.
- Anticipated Runway, SID and related GNSS, NAV, EFIS and ADU selections.
- Acceleration, Transition and Minimum safe Altitudes.
- Communication failure procedure.
- Any other pertinent procedure affecting departure(e.g. MEL dispatch restrictions, takeoff alternate)

CM1 shall call "FINAL COCKPIT PREPARATION CHECKLIST" on completion of cockpit preparation and relevant briefings, CM2 shall read the Final Cockpit Preparation Checklist and on completion shall announce "FINAL COCKPIT PREPARATION CHECKLIST COMPLETE".

RADIO FAILURE

6 COMMUNICATIONS FAILURE

6.1 GENERAL RULES

6.1.1 An aircraft operated as a controlled flight shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and establish two-way communication as necessary with, the appropriate air traffic control unit, except as may be prescribed by the appropriate ATS authority in respect of aircraft forming part of aerodrome traffic at a controlled aerodrome. *(Annex 2, 3.6.5.1)*

NOTE 1: SELCAL or similar automatic signalling devices satisfy the requirement to maintain a listening watch.

NOTE 2: The requirement for an aircraft to maintain an air-ground voice communication watch remains in affect after CPDLC has been established.

6.1.2 If a communication failure precludes compliance with 6.1.1, the aircraft shall comply with the communication failure procedures in 6.2 below, and with such of the following procedures as are appropriate. The aircraft shall attempt to establish communications with the appropriate air traffic control unit using all other available means. In addition, the aircraft, when forming part of the aerodrome traffic at a controlled aerodrome, shall keep a watch for such instructions as may be issued by visual signals. *(Annex 2, 3.6.5.2)*

6.1.2.1 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.

(Annex 2, 3.6.5.2.1)

6.1.2.2 If in instrument meteorological conditions or when the pilot of an IFR flight considers it inadvisable to complete the flight in accordance with 6.1.2.1 the aircraft shall:

a. unless otherwise prescribed on the basis of regional air navigation agreement, in airspace where radar is not used in the provision of air traffic control, 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. in airspace where radar is used in the provision of air traffic control, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 7 minutes following:

   1. the time the last assigned level or minimum flight altitude is reached; or

   2. the time the transponder is set to Code 7600; or

   3. the aircraft's failure to report its position over a compulsory reporting point;

   whichever is later, and thereafter adjust level and speed in accordance with the filed flight plan;

c. when being radar vectored or having been directed by ATC to proceed offset using RNAV without a specified limit, rejoin the current flight plan route no later than the next significant point, taking into consideration the applicable minimum flight altitude;

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

e. commence descent from the navigation aid or fix specified in d. 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;

f. complete a normal instrument approach procedure as specified for the designated navigation aid or fix; and

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

NOTE:

a. The provision of air traffic control service to other flights operating in the airspace concerned will be based on the assumption that an aircraft experiencing radio failure will comply with the rules in 6.1.2.2.

b. See also **AIR TRAFFIC CONTROL** — International Civil Aviation Organization Rules of the Air.

(Annex 2, 3.6.5.2.2)

6.2 AIR-GROUND COMMUNICATIONS FAILURE

6.2.1 When an aircraft station fails to establish contact with the aeronautical station on the designated frequency, it shall attempt to establish contact on another frequency appropriate to the route. If this attempt fails, the aircraft station shall attempt to establish communication with other aircraft or other aeronautical stations on frequencies appropriate to the route. In addition, an aircraft operating within a network shall monitor the appropriate VHF frequency for calls from nearby aircraft. *(Annex 10, Vol II, 5.2.2.7.1.1)*

6.2.2 If the attempts specified under 6.2.1 fail, the aircraft station shall transmit its message twice on the designated frequency(ies), preceded by the phrase **"TRANSMITTING BLIND"** and, if necessary, include the addressee(s) for which the message is intended. *(Annex 10, Vol II, 5.2.2.7.1.2)*

Procedures for Air Navigation Services (PANS) Recommendation — *In network operation, a message which is transmitted blind should be transmitted twice on both primary and secondary frequencies. Before changing frequency, the aircraft station should announce the frequency to which it is changing. (Annex 10, Vol II, 5.2.2.7.1.2.1)*

6.3 RECEIVER FAILURE

6.3.1 When an aircraft station is unable to establish communication due to receiver failure, it shall transmit reports at the scheduled times, or positions, on the frequency in use, preceded by the phrase **"TRANSMITTING BLIND DUE TO RECEIVER FAILURE**". The aircraft station shall transmit the intended message, following this by a complete repetition. During this procedure, the aircraft shall also advise the time of its next intended transmission. *(Annex 10, Vol II, 5.2.2.7.1.3.1)*

6.3.2 An aircraft which is provided with air traffic control or advisory service shall, in addition to complying with 6.3.1, transmit information regarding the intention of the pilot-in-command with respect to the continuation of the flight of the aircraft. *(Annex 10, Vol II, 5.2.2.7.1.3.2)*

6.3.3 When an aircraft is unable to establish communication due to airborne equipment failure it shall, when so equipped, select the appropriate SSR code to indicate radio failure. *(Annex 10, Vol II, 5.2.2.7.1.3.3)*

6.4 TRANSPONDER PROCEDURES — RADIO COMMUNICATION FAILURE

6.4.1 The pilot of an aircraft losing two-way communications shall set the transponder to Mode A Code 7600. *(Doc 8168, Vol I, Part III, Section 3, Chapter 1, 1.5)*

NOTE: A controller who observes an SSR response indicating selection of the communications failure code will determine the extent of the failure by instructing the pilot to SQUAWK IDENT or to change code. If it is determined that the aircraft receiver is functioning, further control of the aircraft will be continued using code changes or IDENT transmission to acknowledge receipt of clearances. Different procedures may be applied to Mode S equipped aircraft in areas of Mode S coverage.

GNSS

http://www.theairlinepilots.com/forumarchive/atr/atr-gnss.pdf

EN ROUTE DIVERSION

http://www.theairlinepilots.com/forumarchive/atr/atr-enroute-diversion.pdf

FUEL MANAGEMENT

7.7 IN-FLIGHT FUEL MANAGEMENT

7.7.1 General

Fuel checks shall be carried out at regular intervals throughout each flight in order to establish that actual fuel consumption matches that planned. Such checks should be carried out over enroute waypoints at intervals normally not exceeding 30 minutes. Comparison of actual fuel on board with the Minimum required as indicated on the CFP will enable early identification of higher than anticipated consumption.

7.7.2 Company Minimum Reserve

It is the Captain's responsibility to ensure by the manner in which he/she conducts the flight that the fuel calculated to be remaining on board at the destination is at least equal to the sum of alternate fuel and holding fuel. For convenience this sum is referred to as Company Minimum Reserve (CMR). The value of the CMR may change as the flight progresses.

7.7.3 Insufficient Fuel Remaining (Enroute)

The CFP provides Minimum Required fuel values at each waypoint. These values are only accurate if the CFP conditions of weight, wind, temperature, route and flight level are encountered for the remainder of the flight. Crews are expected to make maximum use of any flight Management systems to predict fuel on board at destination based on actual conditions. If it becomes apparent that the predicted fuel remaining at destination will be less than the required minimum corrective action must be taken. This corrective action should ensure that adequate fuel will be on board at destination and may involve any of the following:

a. Reducing consumption for the remainder of the flight by:
   1) Flying at a more fuel economical speed.
   2) Flying at a more economical flight level.
   3) Flying a more direct routing.

b. Selecting an alternate airfield closer to the intended destination. When considering a closer alternate it should be noted that the 100 NM limit, while applicable at the preflight planning stage, does not apply in flight. Furthermore, any airfield listed in the Route Manual may be considered in this regard, provided that the weather conditions at ETA are forecast to be at or above the applicable landing minima at that airfield. If available and valid, a TREND forecast updates a TAF.

c. Should none of these actions be possible, an enroute technical stop for refueling should be made.

7.7.4 APPROACHING DESTINATION

7.7.4.1 General

In the later stages of any flight, it may be possible to reduce the fuel reserves required at destination. This option is subdivided into two phases. One is applicable based on fuel calculations prior to the top of descent (TOD), and the other is applicable after the aeroplane has commenced its descent to the destination airfield.

7.7.4.2 Prior to Top of Descent

The Company Minimum Reserve can be reduced by recalculating the fuel to alternate. Within one hour of destination, diversion fuel to the alternate airfield may be calculated from cruise altitude, provided the forecast and actual weather for both destination and alternate airfields indicates at least 5000 meters visibility and 1000 ft ceiling.

7.1 IN-FLIGHT FUEL MONITORING & LOW FUEL

7.1.1 Procedure

The PIC shall ensure that the correct type and quantity of fuel is carried on board. Units of weight shall be the same as on the cockpit fuel gauges. In flight fuel burn and flight time monitoring checks shall commence from the first convenient waypoint in cruise and thereafter approximately every 30 minutes over a waypoint. The PM shall record on the CFP the actual time over waypoint and the actual fuel quantity for comparison.

Close vigilance and early decision making is necessary in order to ensure that diversion and holding allowances are not eroded to an extent that OPERATIONAL SAFETY is compromised.

A diversion to alternate may not be initiated if landing at destination is assured, when weather at destination is above its own alternate minima, and expected to remain so until after Expected Approach Time. The PIC shall ensure that the minimum fuel quantity upon landing is not less than that required to fly the airplane for 30 minutes at clean holding speeds, at 1500 feet altitude, under standard atmospheric conditions. This restriction shall also ensure that it is better than the minimum landing fuel requirement of the Authority.

A landing must be made with a minutes of 30minutes of fuel remaining. Any time it is expected to go below 30 **minutes of fuel**, an emergency must be declared.

If at any time it is known that the aeroplane may land with fuel less than RESERVE FUEL at destination (Alternate plus Holding), ATC must be informed by declaring "MINIMUM FUEL" & Fuel Remaining in minutes.

Advice ATC of your minimum fuel status when your fuel supply has reached a state where, upon reaching destination / alternate you cannot accept any undue delay & any change to existing clearance may result in less than the reserve/final reserve.

When, having committed to land at a specific airport, the PIC calculates that any change to the existing clearance to that airport may result in landing with less than planned final reserve fuel, the PIC should declare "MINIMUM FUEL."

The intent of a "MINIMUM FUEL" declaration is to inform ATC that the flight has committed to land at a specific airport and any change to the existing clearance may result in landing with less than planned final reserve fuel. This is not an emergency situation, but rather an indication that an emergency situation is possible should any additional delay occur.

Be aware a minimum fuel advisory does not imply a need for traffic priority.

If the remaining usable fuel is expected to go below 30 minutes/final reserve fuel and the PIC declares the need for traffic priority to ensure a safe landing, a fuel emergency shall be declared on account of low fuel by declaring "MAYDAY, MAYDAY, MAYDAY, FUEL and report fuel remaining in minutes.

ADVERSE WEATHER PROCEDURES

AA

R This chapter is divided in four parts :

- Icing,
- Cold weather operations,
- Operations in wind conditions

R - Volcanic Ash encounter

ICING

I - GENERAL

Icing conditions are defined as follows :

▶ Atmospheric icing conditions.

Atmospheric icing conditions exist when OAT on ground and take-off is at or below 5°C or when TAT in flight is at or below 7°C and visible moisture in the air in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow sleet and ice cristals).

▶ Ground icing conditions

Ground icing conditions exist when the OAT is at or below 5°C when operating on ramps, taxiways and runways where surface snow, standing water or slush is present.

II – OPERATIONS WITHIN THE CERTIFIED ICING ENVELOPE

Even small quantities of ice accretions, which may be difficult to detect visually, may be sufficient to affect the aerodynamic efficiency of an airfoil. For this reason, ALL ANTI ICING PROCEDURES and SPEED LIMITATIONS MUST BE COMPLIED WITH as soon as and as long as ICING CONDITIONS are met and even before ice accretion actually takes place.

THE LOWER AOA OF STALL WARNING AND STICK PUSHER ACTIVATION THRESHOLD DEFINED FOR ICING REMAIN ACTIVE AS LONG AS THE "ICING AOA" CAPTION IS ILLUMINATED.

Anti-ice and de-ice-systems are provided. The AIRFRAME de-icing will LIMIT the amount of ice adhering to the airfoil but CANNOT eliminate ALL ICE ACCRETION because of the unprotected elements on the leading edges and the continuous accretion between two consecutive boot cycles. RESIDUAL ICE must be considered, not only during periods when accretion develops, but ALSO AFTER ICING CONDITIONS HAVE BEEN LEFT (continued climb above icing clouds as an example).

MINIMUM ICING SPEEDS

– The minimum maneuver / operating speeds defined for normal conditions (2.02.01) MUST BE INCREASED and the new value enforced whenever

ICE ACCRETION { is possible (Flight in atmospheric icing conditions), or exists (ice accretion developing or residual ice).

PERFORMANCES IMPLICATION

The drag increase associated with ice accretion will induce a decrease in performance which must be taken into consideration.
The dominant effects are :

▷ Twin ENGINE ceiling is reduced (see FCOM 3.04)

▷ SINGLE ENGINE ceiling is reduced (see FCOM 3.09)
However, the performance loss may be minimized by using FLAPS 15°.
This is the reason why, IF OBSTACLE LIMITATIONS EXISTS whenever MINIMUM ICING SPEEDS ARE IMPOSED (ICING AOA light illuminated) SINGLE ENGINE CRITICAL PHASES (FINAL TAKE OFF CLIMB, EN ROUTE, DRIFT DOWN PROCEDURES) MUST BE PERFORMED WITH FLAPS 15 CONFIGURATION.

Note : If no obstacle limitation exist, Flaps 0 may be used for single engine cruise in order to benefit from a higher cruise speed but at a lower cruising altitude. Refer to 3.09.00 for the descent.

DETECTION

- Ice accretion may be primarily detected by observing the Icing Evidence Probe (IEP). At night, this IEP is automatically illuminated when NAV lights are selected ON. Ice accretion may also be detected on windshield, airframe (leading edges), wipers and side windows.
- The ice detector may help the crew to recognize the beginning of ice accretion (ICING light steady + MC +sc).
- Clear ice accretion may be difficult to detect. If clear ice is suspected, temporary selection of airframe boots is recommended as the action of boots will shatter the ice and make its observation much more obvious.

PROCEDURES IN ATMOSPHERIC ICING CONDITIONS

▷ ENTERING ICING CONDITIONS

- ANTI ICING (PROP – HORNS – SIDE WINDOWS) . . . . . ON

Note : horns anti icing selection triggers the illumination of the "ICING AOA" green light, and lowers the AOA stall warning threshold.

- MODE SEL . . . . . confirm AUTO

- MINIMUM Maneuver/Operating ICING SPEED . . . . BUGGED and OBSERVED

- ICE ACCRETION . . . . . MONITOR

Note : These procedures are applicable TO ALL FLIGHT PHASES including take off.

▷ AT FIRST VISUAL INDICATION OF ICE ACCRETION, AND AS LONG AS ATMOSPHERIC ICING CONDITIONS EXIST

- ANTI ICING (PROP – HORNS – SIDE WINDOWS) . . . . . Confirm ON
- MODE SEL . . . . . Confirm AUTO
- ENG DE ICING . . . . . ON
- AIR FRAME DE ICING . . . . . ON
- MINIMUM Maneuver/Operating ICING SPEED . . . . BUGGED and OBSERVED
- BE ALERT TO SEVERE ICING DETECTION.
  In case of severe icing, refer to 2.04.05.

Notes : 1.When ice accretion is visually observed, DE ICERS MUST BE selected and maintained ON as long as icing conditions exist.

2.Ice detector may also help the crew to determine continuous periods of ice accretion as the ICING It remains illuminated as long as the ice detector senses ICE ACCUMULATING.
The ice detector may not detect certain ice accretion form (see FCOM 1.13.20).

3.If a noticeable performance decrease and (or) significant vibrations occur due to propeller residual icing then, in order to improve the deicing of the blades, it is recommended :

- *To check that the MODE SEL is AUTO, or that the MAN mode is selected in accordance with SAT.*
- *To set CLs on 100 OVRD for continuous periods of not less than 5 minutes in order to benefit from an increased centrifugal effect.*

4.If ice accretion is seen by the detector with HORNS ANTI ICING and/or AIRFRAME DE ICING still OFF, the ICING light will flash until corrective actions are taken.

5.Engines de-icing must be selected ON prior to airframe de-icing to take benefit of an immediate engines de-icing.
If not, engines de-icing will be effective 60 or 240 seconds later depending on MOD SEL selection.

▷ WHEN LEAVING ICING CONDITIONS

DE ICING and ANTI ICING may be switched OFF.

Note : Leaving DE ICING in operation UNNECESSARILY is detrimental to boots life.

The DE ICING blue light on memo panel will blink if deicers are still ON more than 5 minutes after ice detector has stopped to signal ice accretion (ICING amber light OFF).

▷ WHEN THE AIRCRAFT IS VISUALLY VERIFIED CLEAR OF ICE

ICING AOA caption may be cancelled and normal speeds may be used.

Note : Experience has shown that the last part to clear is the ice evidence probe. As long as this condition is not reached, the icing speeds must be observed and the ICING AOA caption must not be cancelled.

TAKE OFF IN GROUND ICING CONDITIONS BUT WITHOUT ATMOSPHERIC ICING CONDITIONS

A GENERAL

1 - Contaminant may adhere to wheels brakes when taxiing on contaminated ramps, taxiways and runways.

2 - During take off, there is no contamination on wings or engines nacelles but contaminant might affect the propellers.

B PROCEDURE

For take off in ground icing conditions but without atmospheric icing conditions, the following procedure must be applied.

BEFORE TAKE OFF

PROPELLERS ANTI ICING ONLY . . . . . ON

AFTER TAKE OFF

LANDING GEAR (if possible) . . . . . CYCLE

PROP ANTI ICING . . . . . AS RQD

Notes :

1. *Take off may be scheduled using normal minimum V2 = 1.13 VSR.*
2. *Horns anti icing must not be selected ON to avoid lowering the AOA of stall warning threshold.*
3. *Landing gear cycling after take-off with a significant layer of contaminant on the runway (slush, snow) is highly recommended to avoid brakes freezing especially if the procedure described page 19 as "special case" (brakes heating before take-off) has not been followed for any reason.*

SEVERE ICE ACCRETION

- During flight, severe icing conditions that exceed those for which the airplane is certificated shall be determined by the following :

  Severe icing is characterized by ice covering all or a substantial part of the unheated portion of either side window,
  Note : This cue is visible after a very short exposure (about 30 seconds).

  and / or

  Unexpected decrease in speed or rate of climb,

  and / or

  The following secondary indications :
  . Water splashing and streaming on the windshield.
  . Unusually extensive ice accreted on the airframe in areas not normally observed to collect ice.
  . Accumulation of ice on the lower surface of the wing aft of the protected areas.
  . Accumulation of ice on the propeller spinner farther aft than normally observed.

- The following weather conditions may be conducive to severe in-flight icing :
  . Visible rain at temperatures close to 0°C ambient air temperature (SAT).
  . Droplets that splash or splatter on impact at temperatures close to 0°C ambient air temperature (SAT).

- The occurence of rain when SAT is below freezing temperature should always trigger the alertness of the crew.

EXIT THE SEVERE ICING ENVIRONMENT

- Know as much about your operating environment as you can.
  Carefully review weather packages for Pilot reports of icing conditions, tops reports, temperatures aloft forecasts and forecasts of icing, freezing drizzle and freezing rain. Monitor both Total Air Temperature and Static Air Temperature during climb and while en route. Use the weather radar. Areas of precipitation which will paint on the radar will be of sufficient droplet size to produce freezing rain when encountered in freezing temperatures or on a cold soaked aircraft.
- Marginal freezing temperatures and icing conditions should create a heightened state of awareness. Remember, severe ice can still be incurred at temperatures down to approximately - 18° C, at high altitude.
- Be alert to severe icing cues defined pages 12/13.
- When severe icing is encountered, take appropriate steps to leave the conditions. Since these unique conditions are usually small in area and associated with very specific temperatures conditions, a change in altitude of just a couple thousand feet may place you in a totally different environment.
- Make reports to ATC and Company.
  There is no better operational tool available today than first hand reports of these conditions. Remember that because these are localized areas and extremely temperature dependent, another aircraft passing through the same area at a different airspeed may experience different conditions. For example, a laboratory test showed for a specific, yet normal condition, rime ice up to about 150 kt, mixed ice as speed was increased to about 200 kt, glaze ice between 200 and 360 kt, and no accretion above 360 kt.

Note : Reporting of icing conditions as defined in the FAA's Airman's information Manual (AIM) :

***Trace** : Ice becomes perceptible. Rate of accumulation is slightly greater than the rate of sublimation. It is not hazardous even though deicing/anti-icing equipment is not utilized unless encountered for an extended period of time (over 1 hour).*

***Light** : The rate of accumulation may create a problem if flight is prolonged in this environment (over 1 hour). Occasional use of de-ice/anti-icing equipment removes/prevents accumulation. It does not present a problem if the deicing/anti-icing equipement is used.*

***Moderate** : The rate of accumulation is such that even short encounters become potentially hazardous and use of deicing/anti-icing equipment or flight diversion is necessary.*

***Severe** : The rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard. Immediate flight diversion is necessary.*

COLD WEATHER OPERATION

http://www.theairlinepilots.com/forumarchive/atr/atr-cold-weather-operations.pdf

WEATHER RADAR CHECK AND USE

http://www.theairlinepilots.com/forumarchive/atr/atr-wx-radar.pdf

LANDING TECHNIQUE

- Make sure that between 500 and 50 feet your speed is under control and power setting is stable. Keep flying the approach till 10 feet.

- Between 50 and 10 feet you may adjust the rate of descent but make sure not to level off before 10 feet.
- At 10 feet, flare to level off. This requires very little input, a little more and you'll start to balloon, especially with factors like excess speed / power, thermal effect in hot weather conditions and ground effect.

- At 10 feet *(if required)* while leveling off, slightly reduce power so that the aircraft does not have the energy to go up.
- With less power in a level attitude, the aircraft will naturally sink.
- Once the aircraft sinks, flare into a positive attitude for landing and gently reduce the power.

Note: For a greaser don't pull back the power levels rapidly to idle. All you need is a trickle of power back to get the torque numbers down but keeping the levers above the point where that characteristic pitch change sound occurs. However, leaving the power on for too long or high speeds will affect the landing distance so for short fields consider early power reduction to idle.

CROSSWIND LANDING TECHNIQUE

SAFETY NOTE # 1

BE PREPARED FOR CROSSWIND LANDING

When crosswind conditions are reported on arrival airport, it is essential to anticipate by reviewing the landing technique and to prepare an action plan before starting the approach. This "Be prepared for crosswind landing" provides an overview of operational factors involved in planning and conducting the approach and flare under crosswind conditions, as well as some recommendations regarding handling techniques.

Key points for a safe and successful crosswind landing

- Review and brief crosswind landing technique.
- Strictly adhere to computed Vapp.
- Ensure strengthened crew cooperation.
- Be prepared for a go-around.
- Look for a reduced air/ground transition.
- Keep aileron into wind during landing roll.

MAXIMUM RECOMMENDED CROSSWIND

The crosswind value given in the AFM performance section (6-01) as maximum demonstrated crosswind shall be understood as the maximum crosswind under which the capacity of the ATR aircraft for landing was demonstrated during flight tests. It shall be considered as the maximum recommended crosswind.

The operators may consider establishing operating conditions, based on crews experience or airfields specificities, for which the maximum crosswind would be reduced.

During the approach briefing the pilot flying shall evaluate his/her own ability to land in announced crosswind condition and get prepared for a go-around and/or a diversion.

The AFM 6-01 also provides maximum recommended crosswind applicable in case of contaminated runway.

APPROACH SPEED

The FCOM (3.08.02) defines the approach speed as Vapp = VmHB + wind factor where the wind factor is the maximum of either 1/3 of the headwind velocity or the gust in full (to be understood as the difference between the maximum reported wind and the steady wind, without considering wind direction). **In any case the wind factor to be added is limited to 15 kt.**

For example, when landing in Toulouse Blagnac airport on runway 14R, with a wind reported as 200° / 18 kt gusting at 30 kt, 1/3 of headwind component is 3 kt while the gust in full is 12 kt (30-18). Hence the wind factor to be considered for the approach speed computation will be 12 kt.

The wind factor shall not be increased further, even in strong crosswind conditions. An excessive approach speed increases the duration of the flare (while under crosswind conditions, it is preferable to shorten the transition from air to ground), , it also increases the risk of landing with nose landing gear first and it increases the landing distance . Long flare and "greased" landings are not recommended by ATR.

PREPARING THE APPROACH

The best defence against crosswind conditions is anticipation through a reminder of the landing technique before starting the approach. While preparing for the approach, the crew shall check the applicable maximum demonstrated crosswind, calculate the estimated drift on final, the approach speed and associated preset values (pitch and torque). The pilot flying shall evaluate his/her own ability to land in forecasted conditions and the crew shall review the available means to timely detect any change in wind conditions, and how changes will be communicated. **It is of utmost importance that the crew organizes their resources in order to build and maintain proper situational awareness on final approach.**

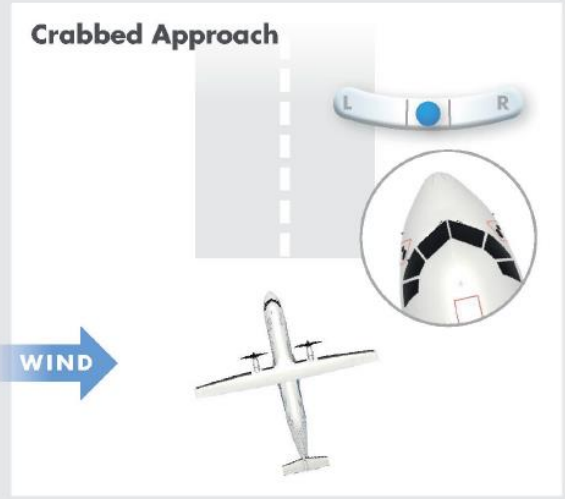
CONDUCTING THE APPROACH

ATR recommends performing a crabbed approach. : wings level and drift correction.

ATR recommends disconnecting the autopilot and yaw damper at the latest at 500 ft in order to have time to establish manual control.

Crosswind conditions are often associated with turbulence. In any case, the crew shall strictly adhere to the stabilized approach criteria in force within the applicable operator Standard Operating Procedures. Any deviation shall be called out and corrected. Performing a go-around is an option that shall be considered at any time until a safe landing is ensured.

During final approach, the crew shall pay particular attention to changes in wind direction and strength and maintain a high level of cooperation.



DECRAB AND FLARE TECHNIQUES

ATR recommends the standard decrabbing technique: the pilot flying decrabs the aircraft by coordinating downwind rudder input, with into wind aileron input. These actions enable to align the aircraft with runway axis.

This manoeuver shall be initiated at the latest at 20 ft but could be started earlier. The resulting aircraft position must be maintained up to the touchdown. Correction of flight path deviation, if necessary, will be performed around this new position.

Power reduction shall be initiated passing 20 ft. **The touchdown shall occur with power levers at Flight Idle.** In coordination with power reduction, the pilot flying progressively adjusts aircraft pitch to flare the aircraft, until upwind main landing gear contacts with the runway.

As wind intensity increases, manoeuvers dynamic should be implemented toward a faster executed set of simultaneous actions.

Aileron deflections are exaggerated for a better visual understanding.

AIRCRAFT HANDLING DURING LANDING ROLL AND DECELERATION

The upwind main wheels contact the ground first, followed by downwind main wheels. After both main landing gears contact, the pilot flying assists the nose landing gear towards the ground and selects the power levers to Ground Idle. Selecting power levers on Ground Idle causes an effective reduction of energy. If further deceleration is needed the crew could use reverse or brake to minimize landing roll.

During the landing roll, the pilot flying holds the control column in nose down position to increase directional efficiency, maintaining aileron input into the wind. In case of insufficient aileron input, crosswind gusts will lift the upwind wing and make the aircraft turn (accentuated by weather cock effect). To avoid that, the pilot flying must gradually increase the aileron input into the wind (up to maximum deflection if necessary). In addition, rudder pedals shall be used to keep the airplane on runway axis and **any heading deviation must be corrected smoothly, especially in upwind direction**.

In case of lateral deviation tendency, reverse shall be released and the pilot shall primarily use rudder pedals to regain lateral control. Asymmetrical braking can also be used to assist lateral control as rudder efficiency decreases with airspeed.

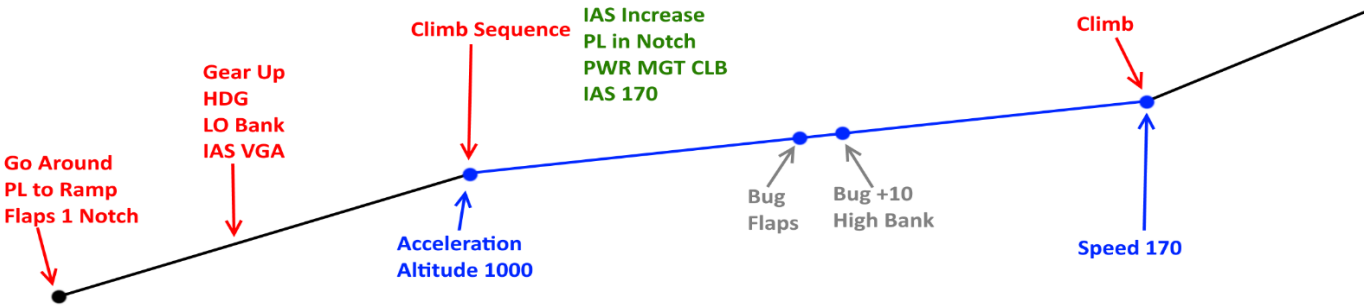
Below 70 kt, The Captain controls airplane alignment with nose wheel steering and the First Officer maintains aileron input into the wind until the aircraft comes to a complete stop.

Note: the use of reverse is more efficient at high speed and brake at low speed. Reverse shall be selected only after pilot monitoring has checked and announced the 2 low pitch green lights.

GOAROUND – 2 ENGINES

PF	PM
INITIAL ACTIONS	
CALL – "GO AROUND, SET POWER, FLAPS 1 NOTCH" GA P/B on PL – Depress Rotate – GA Pitch Attitude (8º) PL – Advance to Ramp	Flaps – Retract 1 Notch Power – Check and Adjust (TQ & NP = 100%) Call – "GA POWER SET, FLAPS __"
POSITIVE RATE OF CLIMB	
	Call – "POSITIVE RATE"
Call: • GEAR UP • HDG • LO BANK • IAS to VGA	Gear Up – Select Yaw Damper – On Taxi / TO light – Off Set and Call – HDG / LO BANK / IAS to VGA
	Call – Gear Up, Flaps __ *(when indicated)*
Call and Set – "SET SPEED BUG VGA"	Set and Call – "XXX SET"
ACCELERATION ALTITUDE – 1000ft	
PL Retard – In Notch Call – CLIMB PROCEDURE	ADU IAS – Increase PL – In Notch PWR MGT – CLB TQ / NP – Check Climb Setting ADU IAS – 170/160 Call – "CLIMB PROCEDURE COMPLETE"
Call and Set – "SET SPEED BUG 170/160"	Set and Call – "170/160 SET"
WHITE / RED BUG	
FLAPS 0 *With Flaps 25 during acceleration, select Flaps 15 at WB or VGA+15 whichever is earlier.*	
BUG +10	
SET HIGH BANK	
AFTER T/O CHECKLIST	

2 Engine Go Around



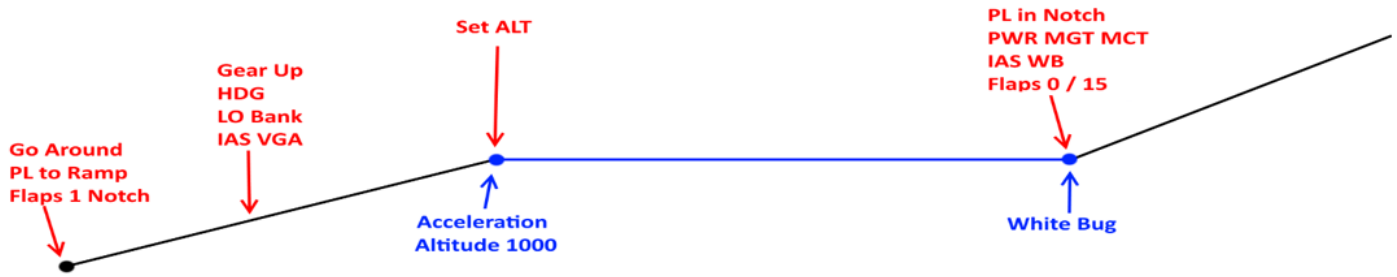
GO AROUND ACTIONS – 3 STAGES WITH 3 STEPS IN EACH STAGE

GO AROUND – 1 ENGINE

PF	PM
INITIAL ACTIONS *(Power – Flaps – Attitude)*	
CALL – "GO AROUND, SET POWER, FLAPS 1 NOTCH" GA P/B on PL – Depress Rotate – GA Pitch Attitude (8º) PL – Advance to Ramp	Flaps – Retract 1 Notch Power – Check and Adjust (TQ & NP = 100%) Call – "GA POWER SET, FLAPS __"
POSITIVE RATE OF CLIMB *(Gear – Heading – Speed)*	
	Call – "POSITIVE RATE"
Call: • GEAR UP • HDG • LO BANK • IAS to VGA	Gear Up – Select Yaw Damper – On Taxi / TO light – Off Set and Call – HDG / LO BANK / IAS to VGA
	Call – Gear Up, Flaps __ *(when indicated)*
Call and Set – "SET SPEED BUG VGA"	Set and Call – "XXX SET"
ACCELERATION ALTITUDE (1000 FT)	
	Call – ACCELERATION ALTITUDE
Call – SET ALT	Do & Call – ALT GREEN
SET SPEED BUG TO WHITE BUG	
WHITE BUG	
	Call – WHITE BUG
Do & Call: • PL IN THE NOTCH Call: • SET MCT • IAS TO WB	Check: • PL in the Notch Set & Call: • MCT SET (check TQ / NP) • IAS XXX SET (WB Speed)
Call: • NORMAL CONDITION FLAPS 0 ***** • ICING CONDITION MAINTAIN FLAPS 15	Flaps – 0 / 15
AFTER T/O CHECKLIST	

***** *For a Flaps 35 go-around, with Flaps 25 during acceleration, select Flaps 15 at WB or VGA+15 whichever is earlier.*

1 Engine Go Around



GO AROUND ACTIONS – 3 STAGES WITH 3 STEPS IN EACH STAGE

AIR PRESSURIZATION

AUTO MODE OPERATION

R Since the pressure control is fully automatic, the crew action is reduced to the setting of the LANDING ELEVATION.

Note : In order to avoid pressure transients :

- *To switch from AUTO to MAN operation :*
  1. *Turn the MAN RATE knob to MAN position.*
  2. *Select MAN mode by using the CAB PRESS MODE SEL pb.*
  3. *Operate the MAN RATE knob as required to set cabin rate.*
- *To switch from MAN to AUTO operation :*
  1. *Disengage MAN mode by using the CAB PRESS MODE SEL pb.*
  2. *Turn the MAN RATE knob smoothly to NORM position.*

TAKE-OFF

Before take-off, both bleed valves are selected ON or OFF according to engine operating instructions. The regulation will start after take-off providing the bleed valves are ON.

IN-FLIGHT CONTROL

The controller computes a theoretical cabin altitude function of
- Landing elevation selected
- T.O. elevation memorized
- Cabin pressure
- Aircraft altitude

and adjusts cabin rate of climb to match actual cabin altitude with this computed altitude or the landing elevation whichever is higher.

Note : If a failure occurs after TO and the crew decides before reaching 3500 ft above departure airfield elevation to return to that same airport, the system memorises the T.O. altitude and no crew action will be needed.
The extreme values for cabin rate of change are :
+ 550 ft/mn during cabin climb up to Za = 20 000 ft.
+ 620 ft/mn during cabin climb above Za = 20 000 ft.
– 400 ft/mn during cabin normal descent.
– 500 ft/mn during cabin rapid descent (DESCENT RATE pb selected FAST).

DEPRESSURIZATION

Before landing, to avoid a cabin pressure bump when touching down, the cabin altitude is automatically maintained at selected landing elevation minus 300 ft.
After touch down (landing gear absorber compressed), a depressurization signal is received by the controller. The cabin rate of depressurization is controlled at + 550 ft/mn up to the full opening of the ouflow valves.

NO BLEED TAKEOFF OR LANDING

The pressurization system is run by engine bleed air. Using the bleed air means you have less engine power available as compared to what is available with bleeds off. If takeoff performance requires all your power, you do a no-bleeds takeoff. No bleeds – No pressurization, but this is a transient condition because at acceleration altitude you will put the bleeds on and the aircraft will start getting pressurized. Same would be true for landing, if go around requires all your power.

AA

AIR CONDITIONING

Take off performances are computed with AIR CONDITIONING ON.

To take into account the effect of AIR CONDITIONING OFF add to the runway length the ΔL correction given in the following table :

LENGTH AIR COND. ON	ΔL AIR COND. OFF
750 m (2460 ft)	0 m (0 ft)
1000 m (3280 ft)	10 m (30 ft)
1500 m (4920 ft)	25 m (80 ft)
2000 m (6560 ft)	45 m (140 ft)
2500 m (8200 ft)	65 m (210 ft)
3000 m (9840 ft)	85 m (270 ft)

Note : The FOS, in accordance with AFM, takes into account a conservative performance decrement linked to the thermodynamical limitation of the engine. If the day conditions authorize a mechanical limit operation of the engine (i.e torque bleed ON = 90 % for TO and 100 % for RTO), the take off may be performed air conditioning ON without performance penalty.

UNPRESSURIZED TAKEOFF OR LANDING

ATR	MASTER MINIMUM EQUIPMENT LIST	MMEL 21	
		EASA APPROVED	PAGE 1A
			JUN 13

ATA 21 – AIR CONDITIONING

30-1 Pressurization system	C	1	0	*	(o)	(m)	The pressurization system (automatic and/or manual modes) may be inoperative **for a non pressurized flight** provided: (a) Extended overwater flight is prohibited, and (b) Outflow valve is secured in open position if manual mode is inoperative.

ATR	DISPATCH DEVIATION GUIDE	DDG 21
		PAGE 1
		JUN 13

ATA 21 – AIR CONDITIONING

30-1 – Pressurization system

OPERATIONAL PROCEDURES

Unpressurized flight:

Limitations

Maximum operating altitude: 10 000 ft

PAKISTAN International Airlines	Operations Manual Part – A Edition – III	**Chapter 8** Page 13
	FLIGHT PREPARATION & PLANNING	Rev : 00 1st Dec 2014

8.2.3 **Selection of Cruising Levels**

As a policy, PIA does not operate passenger flights with unpressurized cabin.

Normal procedures

■ **If manual mode is operative**

OVBD VALVE ..... FULL OPEN
CAB PRESS MODE SEL ..... MAN
MAN RATE KNOB ..... MAX INCREASE
BLEED VALVE ..... ON

Note: Control aircraft vertical speed to take into account passenger comfort.

■ **If manual mode is inoperative**

MAINTENANCE PROCEDURE ..... APPLY

MAINTENANCE PROCEDURES

ELECTROPNEUMATIC OUTFLOW VALVES BLOCKAGE IN OPEN POSITION:
Refer to JIC 21.31.20 DNZ 10000.

ATPCS / UPTRIM OFF PROCEDURE

ATR 72 A AFM	SUPPLEMENTS INTRODUCTION	7_02.00 PAGE : 1 / 001 DGAC APPROVED / FEB 01

7 . 02 . 00 – INTRODUCTION

Following sections cover AFM amendments associated with MMEL dispatch.

No combination of the hereafter considered cases is allowed for dispatch :

01 Dispatch with one ACW generator channel inoperative
02 Dispatch with spoilers control system inoperative
03 Dispatch with flaps retracted
04 Dispatch with one wheel brake deactivated or removed
05 Dispatch with anti skid system inoperative
06 Dispatch with autofeather system inoperative
07 Dispatch with one EEC OFF
08 Dispatch with one AFU inoperative
09 Dispatch with one TQ indicator inoperative
10 Dispatch with ATPCS OFF
11 Dispatch with landing gear down
12 Ferry flight with pitch elevators disconnected

DISPATCH WITH ONE AFU INOPERATIVE

CAUTION : A maintenance procedure is required.
Refer to MMEL 1–77 page1 item 001
Apply dispatch with ATPCS OFF procedure (supplement n°10)

1 DISPATCH WITH AUTOFEATHER SYSTEM INOPERATIVE

Uptrim and AFU are considered operative. If not, refer to the connected procedure.

– Perform a take off with flaps 15
– Increase V1 limited by VMCG by 5 kt
– Increase VR by 2 kt
– Increase VMCA by 3 kt, check VR, V2
– Increase VMCL by 3 kt
– Check effect on TOR, TOD, 2nd segment climb

NOTE :In case of engine failure after V1, do not reduce PL below 45° of PLA before feathering.

~~- Apply RTO power by pushing both PLs up to the ramp~~ ***Uptrim Avaialable***

F15 : 25/08/2015	ABU DHABI	: AUH 13
ELEVATION= 88.0(FT)	LIMITATION CODES	ATR72-500 FAR
T.O.R.A. = 4101.0(M)	0-DRY CHECK 5-TYRE SPEED	ATR72-500
A.S.D.A. = 4156.0(M)	1-STRUCTURE 6-BRAKE ENERGY	V2/VS OPTIMIZED V1/VR OPTIMIZED
T.O.D.A. = 4521.0(M)	2-2ND-SEGMENT 7-RWY 2 ENGINES	AIR COND. OFF
SLOPE = 0.00(%)	3-RUNWAY 8-FINAL T.O.	NORMAL CONDITIONS
LARGE WIDTH ASSUMED	4-OBSTACLE 9-VMC	WITHOUT REVERSE
		AUTOFEATHER INOP.
TOW(KG) CODES	QNH=1013.25(HPA)	DRY RUNWAY
V1 VR V2(IAS KT)		SCREEN HEIGHT 35 FT
DTOW / DTOW	DQNH= -15/ +15	
OAT : DV1 DVR DV2 / DV1 DVR DV2		
(DC)		

	WIND (KT)				
	-15	-10	0	10	20
50.0	18109 2-2	18109 2-2	18109 2-2	18109 2-2	18109 2-2
	100 117 118	107 117 118	107 117 118	107 117 118	107 117 118
	-298 / +296	-298 / +296	-298 / +296	-298 / +296	-298 / +296
	+0 -1 -1/ +0 +1 +1:	-1 -1 -1/ +1 +1 +1:	-1 -1 -1/ +1 +1 +1:	-1 -1 -1/ +1 +1 +1:	-1 -1 -1/ +1 +1 +1:

2 DISPATCH WITH ATPCS OFF

~~Uptrim and~~ AFU is considered operative. If not, refer to the connected procedure.

- Perform a take off with flaps 15
- Increase V1 limited by VMCG by 5 kt
- Increase VR by 2 kt
- Increase VMCA by 3 kt. Check VR and V2
- Increase VMCL by 3 kt
- Check ATPCS inoperative effect on TOR, TOD and 2nd segment

NOTE :In case of engine failure after V1 do not reduce PL below 45° of PLA before feathering

In Both Cases, Autofeather Not Available
Same Penalties

- Select ATPCS OFF and BLEED VALVES OFF
- Apply RTO power by pushing both PLs up to the ramp ***Uptrim Not Available***
- After take off set both PLs into the notches, then apply CLIMB SEQUENCE
- BLEED VALVES . . . . . ON

F15 : 25/08/2015	ABU DHABI	: AUH 13
ELEVATION= 88.0(FT)	LIMITATION CODES	ATR72-500 FAR
T.O.R.A. = 4101.0(M)	0-DRY CHECK 5-TYRE SPEED	ATR72-500
A.S.D.A. = 4156.0(M)	1-STRUCTURE 6-BRAKE ENERGY	V2/VS OPTIMIZED V1/VR OPTIMIZED
T.O.D.A. = 4521.0(M)	2-2ND-SEGMENT 7-RWY 2 ENGINES	AIR COND. OFF
SLOPE = 0.00(%)	3-RUNWAY 8-FINAL T.O.	NORMAL CONDITIONS
LARGE WIDTH ASSUMED	4-OBSTACLE 9-VMC	WITHOUT REVERSE
		ATPCS OFF
TOW(KG) CODES	QNH=1013.25(HPA)	DRY RUNWAY
V1 VR V2(IAS KT)		SCREEN HEIGHT 35 FT
DTOW / DTOW	DQNH= -15/ +15	
OAT : DV1 DVR DV2 / DV1 DVR DV2		
(DC)		

	WIND (KT)				
	-15	-10	0	10	20
50.0	18109 2-2	18109 2-2	18109 2-2	18109 2-2	18109 2-2
	100 117 118	107 117 118	107 117 118	107 117 118	107 117 118
	-298 / +296	-298 / +296	-298 / +296	-298 / +296	-298 / +296
	+0 -1 -1/ +0 +1 +1:	-1 -1 -1/ +1 +1 +1:	-1 -1 -1/ +1 +1 +1:	-1 -1 -1/ +1 +1 +1:	-1 -1 -1/ +1 +1 +1:

NARROW RUNWAY OPERATION

OPERATIONS ON NARROW RUNWAYS

1 – GENERAL

APPLICABILITY

This supplement applies to airplanes operated according to the provisions of the DGAC "Condition Spéciale B11" relative to operations on narrow runways (width < 30 m (98 ft)).

Compliance with the "Condition spéciale" noted above does not constitute approval to conduct narrow runways operations. Such authorization must be obtained by the operator from the appropriate authorities.

2 – LIMITATIONS

The limitations of section 2 of this Flight Manual must be completed by the following :

- Minimum runway width : **14 m (46 ft).**
- Maximum crosswind for take off and landing : **25 kt.**
- The following equipments are required :
  - **both ACW generators**
  - **both main and DC auxiliary hydraulic pumps**
  - **MFC modules 1B and 2B**
  - **Nose wheel steering**

NOTE : Refer to MMEL (ATA 61) in case of PEC inoperative.

3 – NORMAL PROCEDURES

The procedures of section 3 of this Flight Manual remain applicable.

In addition, whoever is the PF (CM1 or CM2) :

- at take–off, CM1 should keep his hand on nose wheel steering until 90 kt ;
- At landing, CM1 should be ready to use nose wheel steering as soon as the nose wheel is on the ground.

4 – EMERGENCY PROCEDURES and PROCEDURES FOLLOWING FAILURES

The procedures of sections 4 and 5 of this Flight Manual remain applicable.

5 – PERFORMANCE

Correct the V1 limited by VMCG value (see graph in 6.03) by adding :

Runway width (w)	V1 limited by VMCG increase
w > 26 m (85 ft)	0 kt
21.5 m (71 ft) < w ≤ 26 m (85 ft)	1 kt
18.5 m (61 ft) < w ≤ 21.5 m (71 ft)	2 kt
16.5 m (54 ft) < w ≤ 18.5 m (61 ft)	3 kt
14.5 m (48 ft) < w ≤ 16.5 m (54 ft)	4 kt
14m (46 ft) < w ≤ 14.5 m (48 ft)	5 kt

ACW GEN OFF PROCEDURE

ATR	MASTER MINIMUM EQUIPMENT LIST	MMEL 24	
		EASA APPROVED	PAGE 1
			JUN 13

ACW							
22-1 ACW generator channel (generator + related GCU)	B	2	1	*	(o)	(m)	One may be inoperative provided: (a) HYD AUX pump is operative, and (b) Two engines taxi is performed, and (c) Aircraft is not operated on narrow runways (width < 30 m (98 ft)), and (d) Aircraft is not operated into known or forecast icing conditions, and (e) AFM penalties are applied, and (f) Ground operations above 8500 ft (when authorized), including taxi, do not exceed 10 minutes

ATR	DISPATCH DEVIATION GUIDE	DDG 24
		PAGE 1
		MAY 11

ATA 24 – ELECTRICAL POWER

22-1 – ACW generator channel (generator + related GCU)

OPERATIONAL PROCEDURES

If accelerate stop has to be performed, EMER BRAKING has to be used.

Refer to AFM Supplement N°01 7_02.01: Dispatch with one ACW generator channel inoperative.

MAINTENANCE PROCEDURES

This procedure has to be performed prior to the next flight following the ACW generator channels fault triggering to detect a mechanical damage (bearing failure...).

DISPATCH WITH ONE ACW GENERATOR CHANNEL INOPERATIVE

- If accelerate stop has to be performed, EMER BRAKING has to be used.
- Check EMER BRAKING effect on ASD

In case the other ACW GEN fails, normal braking will not be available

- Check GEAR DOWN effect on 2nd segment climb and approach climb
- Check GEAR DOWN effect on final take off climb

In case the other ACW GEN fails, normal gear retraction will not be available

- Check single engine ceiling by using a weight penalty
- Avoid icing conditions
- Taxi on both engines

ELEVATION= 88.0(FT)	LIMITATION CODES		ATR72-500		FAR
T.O.R.A. = 4101.0(M)	0-DRY CHECK	5-TYRE SPEED	ATR72-500		
A.S.D.A. = 4156.0(M)	1-STRUCTURE	6-BRAKE ENERGY	V2/VS OPTIMIZED		V1/VR OPTIMIZED
T.O.D.A. = 4521.0(M)	2-2ND-SEGMENT	7-RWY 2 ENGINES	AIR COND. OFF		
SLOPE = 0.00(%)	3-RUNWAY	8-FINAL T.O.	NORMAL CONDITIONS		
LARGE WIDTH ASSUMED	4-OBSTACLE	9-VMC	WITHOUT REVERSE		
			ONE ACW GEN INOP.		

	TOW(KG) CODES	QNH=1013.25(HPA)	DRY RUNWAY
	V1 VR V2(IAS KT)		SCREEN HEIGHT 35 FT
	DTOW / DTOW	DQNH= -15/ +15	
OAT (DC)	DV1 DVR DV2 / DV1 DVR DV2		

	WIND (KT)				
	-15	-10	0	10	20
50.0	17833 8-9	17833 8-9	17833 8-9	17833 8-9	17833 8-9
	89 96 101	89 96 101	89 96 101	89 96 101	89 96 101
	-261 / +260	-261 / +260	-261 / +260	-261 / +260	-261 / +260
	+0 +0 -1/ +1 +1 +1	+0 +0 -1/ +1 +1 +1	+0 +0 -1/ +1 +1 +1	+0 +0 -1/ +1 +1 +1	+0 +0 -1/ +1 +1 +1

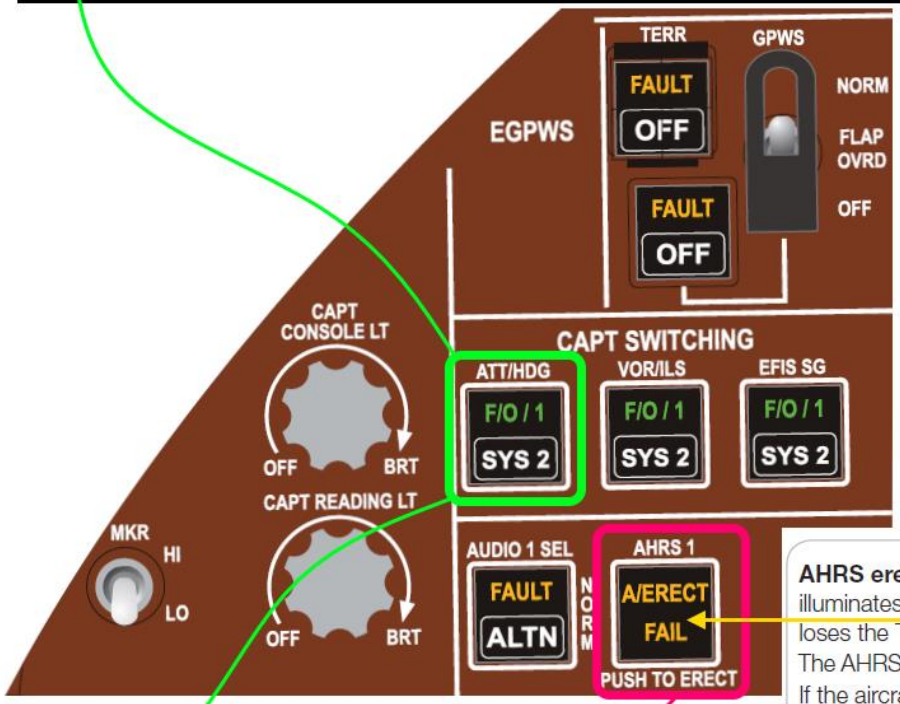
AHRS (ATTITUDE AND HEADING REFERENCE) ERECT IN FLIGHT

AHRS FAILURE
the associated information immediatly disappear from both CRTs. ATT FAIL message is displayed

AHRS FAILURE
the associated information immediatly disappear from both CRTs. HDG FAIL message is displayed

AHRS FAIL

ATT / HDG PB affected side ..... DEPRESS
Periodically compare remaining AHRS outputs to STBY INST



AHRS erect pb
illuminates amber when the associated AHRS loses the TAS signal from the ADC.
The AHRS is operating in attitude mode.
If the aircraft is stabilized (unaccelareted level flight) a gyro fast erection may be performed by depressing the associated pb for 15 s.

AHRS A / ERECT FAIL

ATT / HDG PB affected side ..... DEPRESS
- **When possible**
  AIRCRAFT .....STABILIZE SPEED AND LEVEL
  AHRS affected side, PUSH TO ERECT PB .....
  .....DEPRESS FOR 15 SECONDS

JEPPESEN ATC AND EMERGENCY CHAPTERS

Airway Manual

Table of Contents

- International Civil Aviation Organization - Air Traffic Management
  - Air Traffic Management (Doc 4444)
  - Appendix 1 – Instructions for Air-Reporting by Voice Communications
  - Appendix 2 - Flight Plan
  - Appendix 4 -- Air Traffic Incident Report

Airway Manual

Table of Contents

- Emergency Procedures - Middle East
  - Contingency Plans - Middle East
  - Special Procedures for In-Flight Contingencies Middle East
  - Search and Rescue Facilities
- State Rules and Procedures - Middle East
  - Afghanistan - ICAO Differences or State Special Procedures
  - Bahrain - ICAO Differences or State Special Procedures
  - Bangladesh - ICAO Differences or State Special Procedures
  - Cyprus - ICAO Differences or State Special Procedures
  - Iraq - ICAO Differences or State Special Procedures
  - Israel - ICAO Differences or State Special Procedures
  - Jordan - ICAO Differences or State Special Procedures
  - Kuwait - ICAO Differences or State Special Procedures
  - Lebanon - ICAO Differences or State Special Procedures
  - Nepal - ICAO Differences or State Special Procedures
  - Qatar - ICAO Differences or State Special Procedures
  - Saudi Arabia - ICAO Differences or State Special Procedures
  - Turkey - ICAO Differences or State Special Procedures
  - U.A.E. - ICAO Differences or State Special Procedures
  - Yemen - ICAO Differences or State Special Procedures

RNP AND RNAV

RNP

The ICAO Special Committee on Future Air Navigation Systems (FANS) defines RNP as a statement of required navigation accuracy in the horizontal plane (lateral and longitudinal position fixing) necessary for operation in a defined airspace. RNP types are identified by a single accuracy value, shown in the table below. For example, the statement of RNP 1 refers to required navigation performance accuracy within 1 NM of the desired flight path at least 95% of the flying time.

Table: 16.1: Existing levels of navigation accuracy

RNP RNAV Type	Accuracy in the designated airspace
RNP 1	±1.0 NM
RNP 4	±4.0 NM
RNP 5 (B-RNAV)	±5.0 NM
RNP 10	±10.0NM
RNP 12.6	±12.6NM
RNP 20	±20.0NM

Basic RNAV, B-RNAV (RNP 5), is a derivate of RNP 4, allowing continued operation without modification of existing route structures and is implemented in the ECAC (European Civil Aviation Conference) Airspace.

Potential application for RNP airspace includes:

- a defined airspace, such as North Atlantic minimum navigation performance specifications (MNPS) airspace.
- A fixed ATS route, such as between Sydney, Australia and Auckland, New Zealand.
- random track operations.
- a volume of airspace, such as a block altitude, on a specified route.

The implementation of RNP allows enhancements of ATC system capacity and efficiency while retaining or establishing enhanced system safety.

RNAV

Area Navigation, RNAV, is the primary means of meeting RNP requirements. RNAV operations within the RNP concept permit flight in any airspace within prescribed accuracy tolerances, without the need to fly directly over ground-based navigation facilities. The application of RNAV techniques provides a number of benefits, for example:

- establishment of more direct routes reducing the flight distances.
- establishment of dual or parallel routes to accommodate a greater flow of en route traffic.
- establishment of bypass routes for high density traffic areas.
- establishment of contingency routes.
- establishment of optimum locations for holding patterns.
- reduces the number of ground navigation facilities.

Navigation parameters such as distance and bearing to a way point are computed from the aeroplane's position to the location of the way point. Course guidance is generally derived from the linear deviation from the desired track of a great circle course. The desired course may be pilot elect able or may be determined by the navigation computer through computations based on the locations of successive way points.

Precision RNAV (P-RNAV) (RNP 1) - shall provide a 95% containment value of ± 1 NM (± 1.85 km).
Basic RNAV (B-RNAV) (RNP 5) - shall provide a 95% containment value of ± 5 NM (± 9.26 km). This level is similar to that currently achieved by aeroplanes without RNAV capability on ATS routes defined by a VOR or VOR/DME, when VOR's are less than 100 NM apart.

RNP AND RNAV REQUIREMENTS

For RNP and RNAV operations, operators have the responsibility to ensure the required level accuracy, within the notified RNP/RNAV environment, by means of appropriate

equipment usage and prescribed procedures for the flight crew. It is essential that ATC.
receives an indication from the operator that a flight, planned along RNP/RNAV routes or in a RNP/RNAV area, has the required navigation capability.

APPROVAL AND CERTIFICATION

A fundamental requirement for the implementation of RNP is the approval of flight operations in the various RNP type airspaces by the State of the operator. Approval will be granted individually for each operator and each individual aircraft type used by the operator. RNAV and FMS equipment also needs to obtain airworthiness approval by the national authority. The approving authority must ensure that aircraft equipment be installed and operated in a manner appropriate to the RNP type approval being sought.

An approval for a certain RNP type does not mean that the aeroplane may be operated wherever the RNP type applies. The RNP type approval is specific to a particular type of navigation equipment and application, and for the use of INS/IRS a time limit may apply. For example, an aircraft, having approval for RNP 5 in the B-RNAV airspace of Europe, using RNAV equipment requiring input from ground based navigation facilities such as VOR/DME may not be operated in a RNP 10 airspace where such facilities are not available.

EQUIPMENT REQUIREMENTS

RNP

Many different types of equipment are currently available to meet requirements for one or more RNP types. For example, a VOR/DME navigation system in combination with a simple RNAV computer accepting VOR/DME input is the least sophisticated equipment.

RNAV

Area Navigation Equipment determines aeroplane's position by processing data from one or more sensors. Determination of aeroplane's position is dependent on such factors as sensor availability and accuracy, signal parameters (signal source

strength, transmitted signal degradation). Position determination may employ such inputs as :

- distance measurements from two or more Distance Measuring Equipment (DME) ground stations (DME-DME);
- Very High Frequency Omnidirectional radio Range with DME (VOR/DME);
- Inertial systems (INS, with radio updating or limited 2 hour use after last on ground update)
- LORAN C (with limitations)
- Global Navigation Satellite System (with limitations).

GENERAL OPERATIONAL LIMITATIONS

Due to the availability and integrity of the various sensor systems, and effects of from outside sources, certain operational limitations must be imposed on the use of some types of RNAV equipment as follows:

Operational Areas

Operators shall define the area(s) in which operations are intended and ensure that equipment usage is capable of performance within the defined standard.

Operational Equipment

- **INS**

Without an automatic radio update, INS function is limited in usage for a 2 hour period from the last on ground position update. This can result in a degradation of accuracy with elapsed time. As a requirement, a linear decay value of 1.5 to 2 NM per hour must be considered.

- **GNSS**

During the pre-flight planning phase, if 24 satellites (23 if baro-aiding is incorporated into the GPS installation) are projected to be operational for the flight, then the aeroplane can depart without further action. If 23 satellites or less (22 or less if baro-aiding is incorporated), are projected to be operational, then the availability of GPS integrity (RAIM) should be confirmed for the intended flight (route and time).

SYSTEM AVAILABILITY

Navigation systems must demonstrate an acceptably reliable continuity of function prior to approval. National authorities may choose to rely on redundancy of systems in order to obtain an average airborne system availability of 99.99% of flight time for B-RNAV. Navigation function availability may be assured by the use of the multi sensor area navigation systems which incorporate various position fixing sensors, each of which is individually usable for airborne area navigation. Some RNAV systems permit the use of combinations of systems or pilot selection of one system in preference to another, depending on factors such as reception and weather conditions.

RECOMMENDATIONS

As long as VOR/DME facilities are available, and aeroplanes are equipped with VOR/DME instrumentation, the carriage of a single B-RNAV system will provide equivalent safety to the average systems availability requirements. It is anticipated that the withdrawal of VOR facilities will result in a requirement to carry redundant B-RNAV systems in order to meet the average system availability requirement.

CONTINGENCY

Flight Crew Inputs

Procedures shall enable erroneous flight crew inputs to be detected before the aeroplane's position accuracy can be degraded. It is the crew's responsibility to ensure that the navigation accuracy is maintained. In particular, the following common mistakes must be avoided:

Insertion errors

Coordinates are inserted incorrectly into the system. (Particular care must be taken in case of a new ATC clearance).

De-coupling

If the pilot allows the autopilot to become de-coupled from the equipment which he/she thinks is providing steering output.

Using Faulty Equipment

The pilot might continue to use a navigation system which has become inaccurate.

FUNCTIONAL REQUIREMENTS

Navigation equipment should be capable of enabling the aeroplane to be navigated within the constraints of the air traffic service to the accuracy required in a promulgated RNP type of airspace. The carriage of RNAV equipment may be required in some regions or States and therefore the reason why frequent reference is made to the use of RNAV equipment.

NAVIGATION DATA BASE

It is the responsibility of the States to maintain the level of accuracy and thoroughness of the source material on which data bases rely. Data base providers have the responsibility to ensure that they accurately reproduce the source material as provided by the States.

RNP

Aeroplane's Flight Management System (FMS) software should employ the same geodetic reference datum as that used for locating ground based or earth-referenced navigational aids to avoid navigation errors when transferring between different geodetic reference datum application areas. The equipment shall provide an electronically-updatable navigation database containing at least the following location information:

- ARP
- VORs, DMEs, VORTACs and NDBs
- All named fixes
- All procedures defined by a State such as Routes, SIDs, STARs, APCH, holdings, etc.

RNAV

For B-RNAV a navigation data base is optional. If provided, it shall consist of current navigation reference data officially promulgated for civil aviation use, and contain at least navigation aid and way point information covering the region of intended operation. It is desirable if storing a number of flight plans. The navigation data base installed in the aeroplane must be checked for its validity before the flight.

Route planning

The system shall allow the construction and/or modification of a flight plan. The flight crew shall be able to determine the

correctness of the flight plan. B-RNAV shall provide a means for the insertion or modification of data in the flight plan via the RNAV Control Display Unit (CDU).

In-Flight Update

Verification of the data in respect to the Flight Path being flown, and the stored data base at any time without the guidance and navigation outputs of the computer being affected is mandatory. The route data shall consist of the names or coordinates of the way points and shall include distance and tracks between them. The present track and distance to go to the next way point shall be provided, except when operating on a non fixed leg. The flight crew shall be able to modify the flight plan at any time. An additional means of updating the flight plan by use of a ground/air data link is optional.

NAVIGATION

Navigation Mode and Annunciation

The flight crew shall be enabled to monitor navigation mode and position.

Tuning and Selection of Radio Aids

Automatic selection and tuning of VOR and/or DME channels in accordance with stored program procedures, and related aeroplane's position and data base requirements, is required. The selected frequencies and ICAO identifiers shall be available for display. Individual NAVAIDs shall be inhibited from the automatic selection process by the crew if desired. The ability of manual tuning to/of a Radio Navigation Aid (NAVAID) or displaying the data shall be given.

Route Execution

(Aeroplanes equipped with FMS should comply with the following statements in general):

Cross Track Deviation

A continuous display of distance from the intended track shall be provided. The display resolution shall be consistent with the system accuracy.

Parallel Offsets

A system is desired which provides the ability to fly parallel tracks offset by up to 20 NM from the primary track defined by

the way points. The presence of an offset shall be continuously indicated.

Flight Plan

Operators of aeroplanes fitted with RNAV having a navigation accuracy meeting RNP 5 shall insert the designator 'R' in item 10 of the flight plan.

Operators of State aeroplanes not equipped with RNAV but having a navigation accuracy meeting RNP shall not insert the designators 'S' or 'R' in item 10 of the flight plan. Since such flights require special handling by air traffic control, item 18 of the flight plan shall contain STS/NONRNAV.

CONTINGENCY PROCEDURES

If, as a result of a failure of the RNAV system or degradation of it below RNP 5, an aeroplane is unable to either enter the designated airspace or continue operations in accordance with the current air traffic control clearance, a revised clearance shall, whenever possible, be obtained by the pilot.

When a verbal coordination process is being used, the sending air traffic control unit shall include the phrase 'NEGATIVE-RNAV' at the end of the message. The phrase 'NEGATIVE-RNAV' shall be also included by the pilot immediately following the aeroplane call sign whenever initial contact on an ATC unit frequency is established.

OPERATIONS MANUAL

The Operations manual shall describe the RNAV equipment procedures to be used for

- pre-flight, in-flight and post-flight; and
- in the event of a loss or impairment of RNAV navigation capability. The procedures as filed by the state authorities do strictly apply.

2. Engine failure

2.1. Gross and net flight paths

Regulations require that the flight paths are determined as stated below:

CS / FAR 25.123 En-route flight paths

(a) For the en-route configuration, the flight paths must be determined at each weight, altitude, and ambient temperature (…). The variation of the weight along the flight path, accounting for the progressive consumption of fuel (…) by the operating engines, may be included in the computation. The flight paths must be determined (…) with:

(1) The most unfavorable center of gravity

(2) The critical engine inoperative

(3) The remaining engine at the available maximum continuous power (...)

(b) The one-engine-inoperative net flight path data must represent the actual climb performance diminished by a gradient of climb of 1.1% for two-engined aeroplanes.

Net flight path = gross flight path - gradient penalty

The **gross flight path** is the flight path actually flown by the aircraft after an engine failure.

The **net flight path** is the gross flight path minus a mandatory climb reduction. Ideally the aircraft should be able to maintain the gross flight path, but the climb performance is reduced to conservatively account for aircraft performance degradation and pilot average skills.

NOTE: The gradient penalty applies on air gradient.

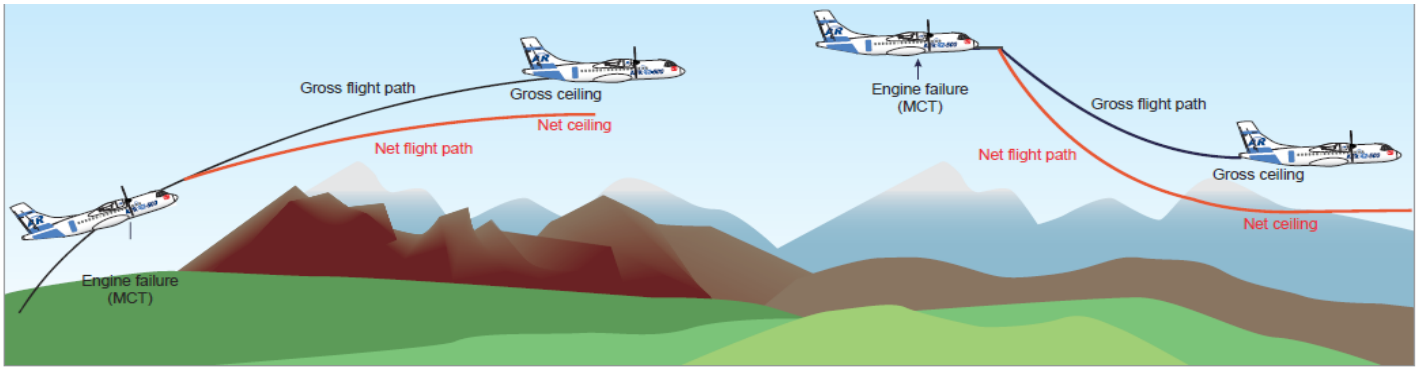


Figure F1: Gross and net flight paths (climb and descent)

2.2. Following engine failure procedure

In any case, the maximum continuous power (MCT) is set to the remaining engine.

• If no obstacle limitation (condition 1)

If the engine failure occurs during the **cruise**, a 200 kt descent is performed until a vertical speed of 500ft/mn is reached. If the engine failure occurs during **climb**, climb is continued at $V_{mLB0°}$ or $V_{mLB15°}$ depending on the atmospheric conditions, until the single engine ceiling.

• If obstacle limitation (condition 2)

If the engine failure occurs during cruise, over a mountainous or a restricted area, the **drift-down procedure** is followed.

The minimum manoeuver speed in flight is V_{mLB} flaps 0° in normal conditions and V_{mLB} flaps 15° in icing conditions. This speed ensures the highest altitude versus the distance in climb, and the best lift-to-drag ratio speed during descent. This speed is selected when an engine failure occurs in flight and that the vertical profile has to be optimised.
This procedure consists in:

- deciding at the decision point whether to continue, divert or return.
- then decelerating to $V_{mLB0°}$ or $V_{mLB15°}$ depending on the atmospheric conditions, called in this case **drift-down speed**, and descending to the gross ceiling, where, if the obstacle is cleared, a single engine cruise is initiated.

NOTE: Procedures are detailed in the FCOM 3.09.03, *One engine inoperative procedure - in flight.*

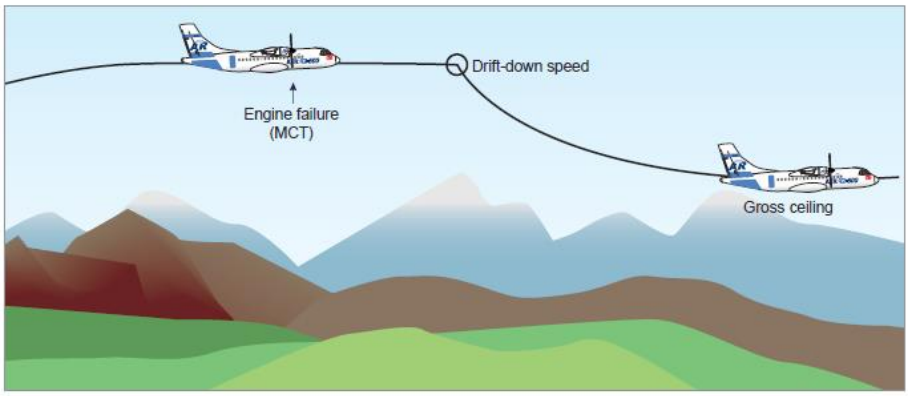


Figure F2: Drift-down procedure

2.3. Obstacle Clearance

2.3.1. Lateral Clearance

Obstacle clearance must be ensured throughout the route, in case of an engine failure. The problem is to clearly identify which obstacles must be cleared. Regulations indicate which obstacles must be taken into account.

EU-OPS 1.500 En-route - One engine inoperative

(c) The net flight path must permit the aeroplane to continue flight from the cruising altitude to an aerodrome where landing can be made (…) clearing (…) all terrain and obstructions along the route within 9.3 km (5 nm) on either side of the intended track

(d) (…) an operator must increase the widths margins (…) to 18.5 km (10 nm) if the navigational accuracy does not meet the 95% containment level.

NOTE: The FAA regulation (FAR 121.191 *En-route limitations: One engine inoperative*) is quite similar, except that it requires a lateral margin of 5 statute miles on each side of the intended track.

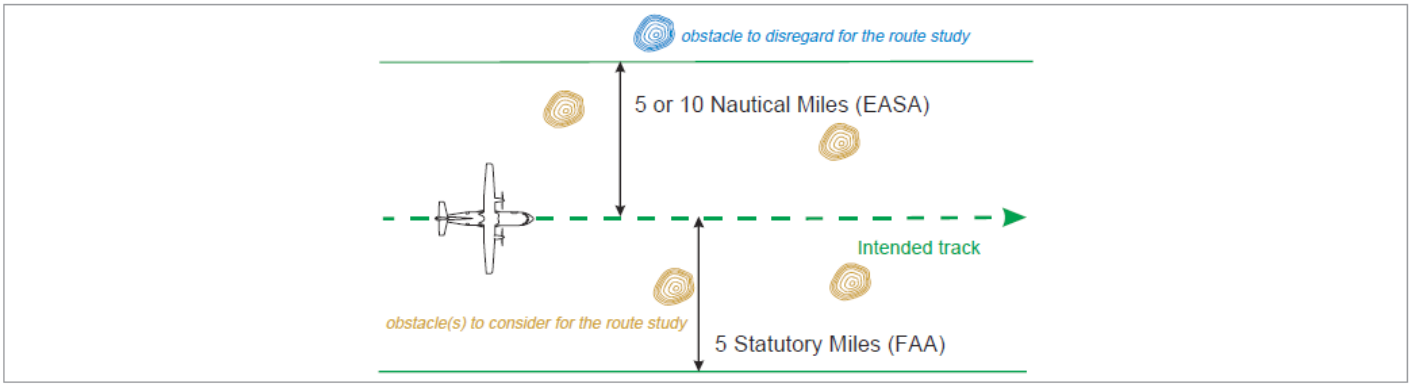


Figure F3: En-route Lateral Clearance

2.3.2. Vertical Clearance

Vertical clearance shall always be understood as a **margin between the net flight path and the obstructions**. The en-route net flight path shall be determined from the **Aircraft Flight Manual**, and must take into account the meteorological conditions **(wind and temperature)** prevailing in the area of operations. Moreover, if icing conditions can be expected at the diversion level, the effect of the **anti/de-ice** system must be considered on the net flight path.

Any route study should be conducted by checking one of the following two vertical clearance conditions. When Condition 1 cannot be met, or when it appears to be too penalising in terms of weight, a detailed study must then be carried out to fulfill Condition 2.

Condition 1: 1,000 feet clearance margin

EU-OPS 1.500 / FAR 121.191 En-route - One engine inoperative

(b) The gradient of the net flight path must be positive at at least 1,000 ft above all terrain and obstructions along the route within 5 Nm on either side of the intended track.

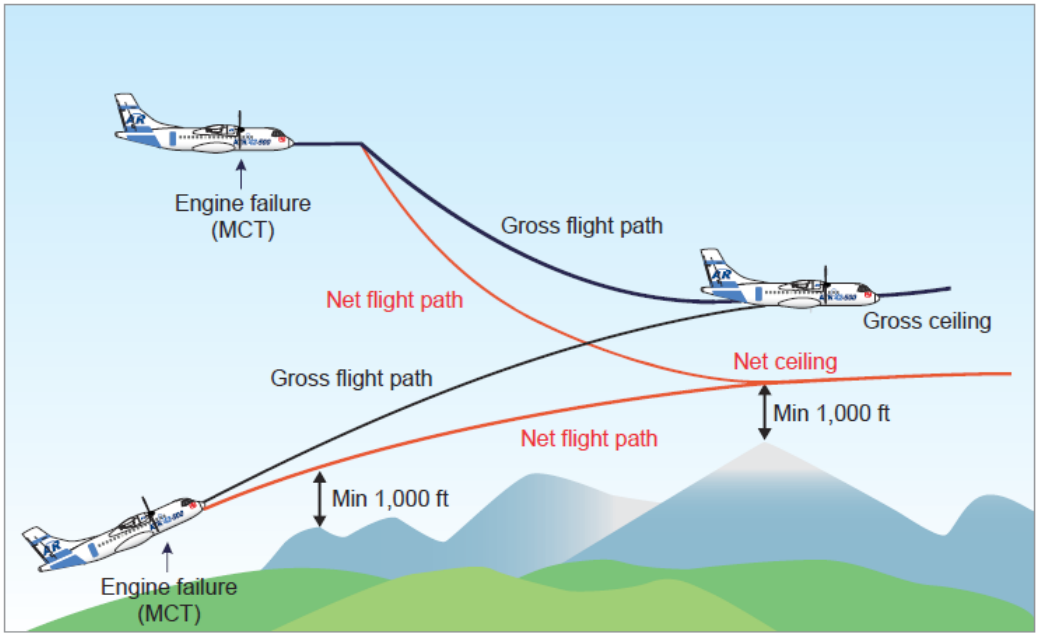


Figure F4: *Condition 1: 1000ft vertical clearance*

Condition 2: 2,000 feet clearance margin

Condition 2 concerns the case of an engine failure during the cruise phase. When Condition 1 is not met, or when it is too limiting in terms of weight, a drift-down procedure should be studied, as detailed below.

EU-OPS 1.500 / FAR 121.191 En-route - One engine inoperative

(c) The net flight path must permit the aeroplane to continue flight from cruising altitude to an aerodrome where a landing can be made, (…) clearing vertically, by at least 2,000 ft all terrain and obstructions along the route

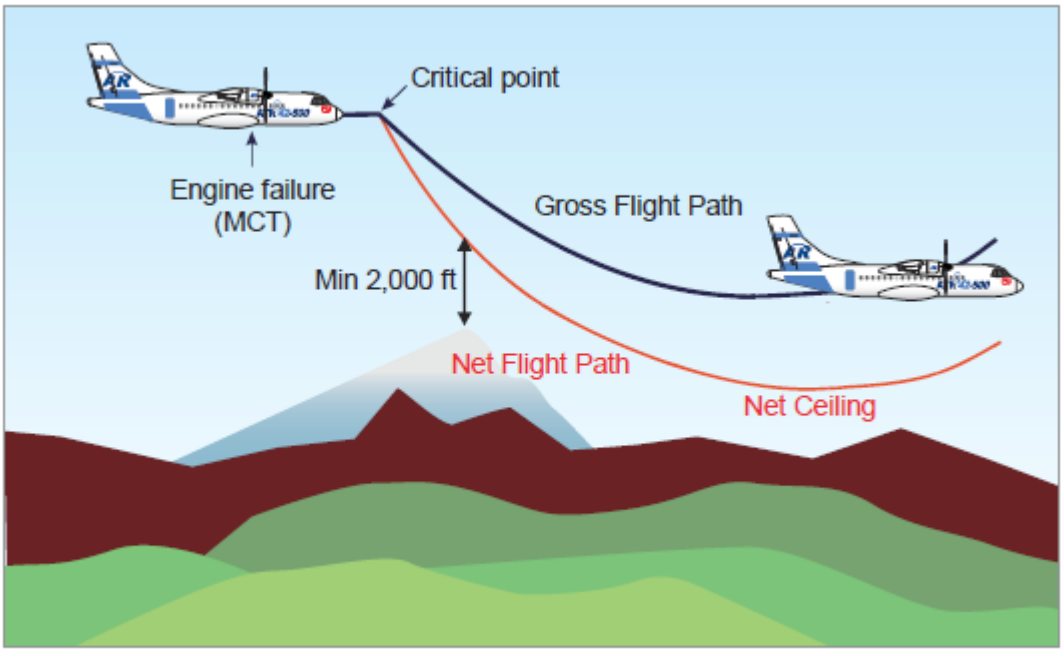


Figure F5. *Condition 2: 2000ft vertical clearance*

Fulfilling condition 2 implies determining **critical points** along the route. Those are the points at which, if an engine failure occurs and if the aircraft initiates a drift-down, the net flight path will clear the most penalising obstacle by the minimum required 2,000 ft margin. A critical point can be a:

- **no-return point:** Point after which it is not possible to turn back, otherwise the 2,000 feet obstacle clearance margin on the net flight path would not be met.
- **continuing point:** Point after which it is possible to continue on the route because the 2,000 feet obstacle clearance margin on the net flight path is ensured.

If the no-return point is obtained after the continuing point, the route is suitable, and if an engine failure occurs in-between a **decision** must be taken to return or continue.

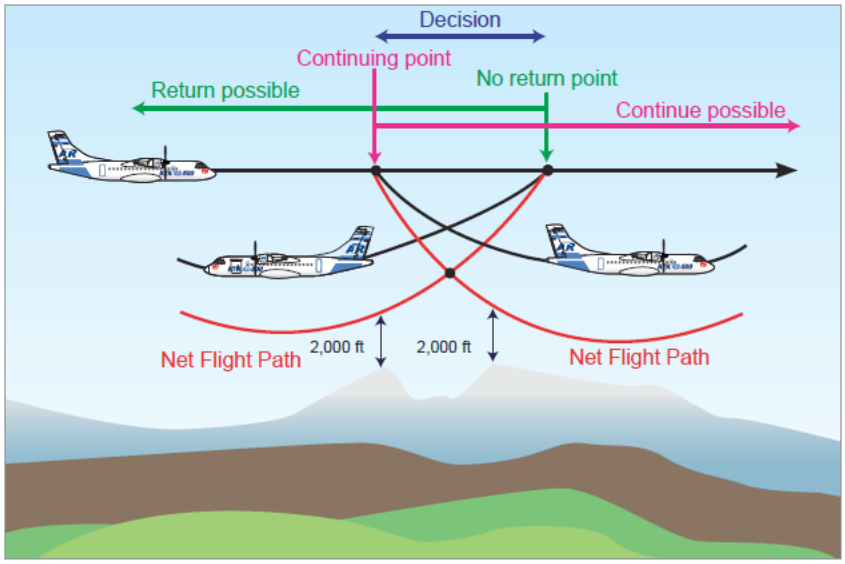


Figure F6: Continuing Point located before the No-Return Point

If the no-return point is obtained before the continuing point, the route is not suitable, and if an engine failure occurs in-between the aircraft must **divert** to another airport.

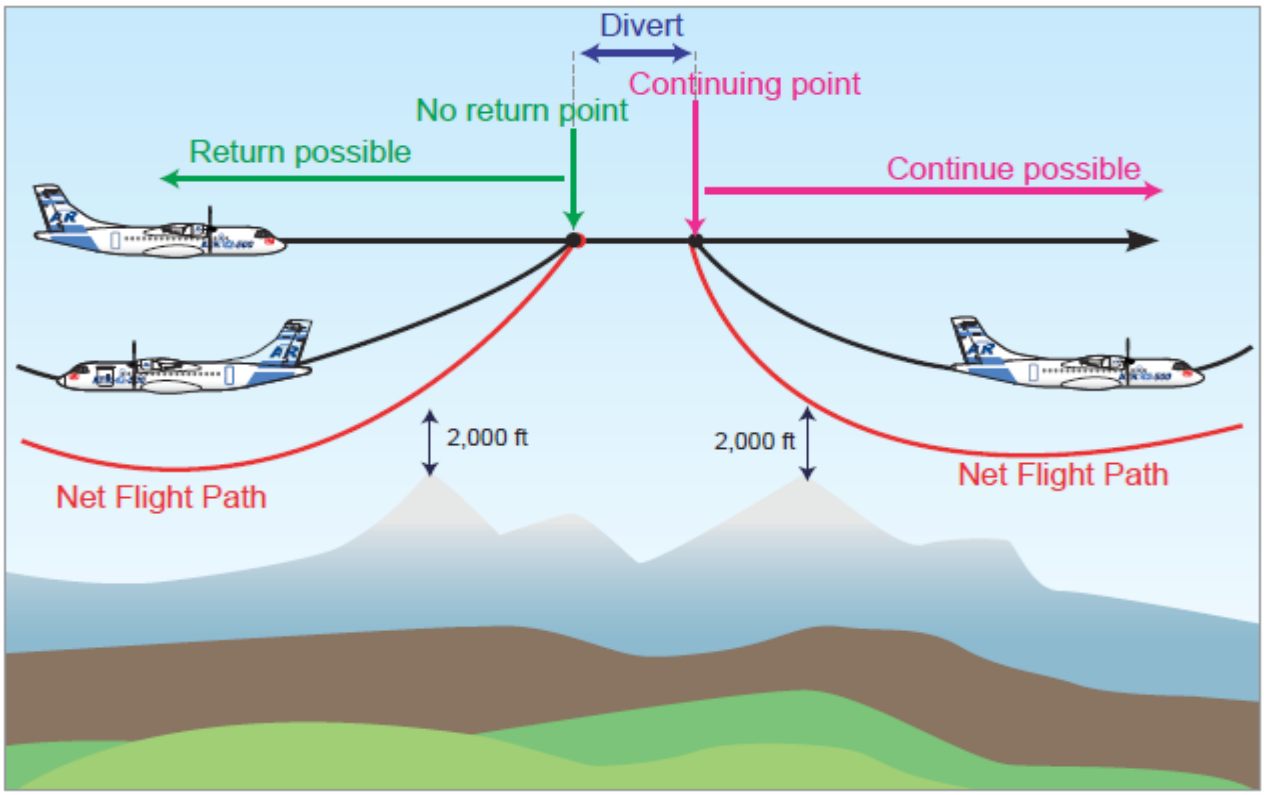


Figure F7: Continuing Point located after the No-Return Point

2.4. Methodology for engine failure study

2.4.1. In climb

From a topographic map, select in the regulatory corridor, all the constraining obstacles that must be cleared during the climb phase. Plot these obstacles on a graph, with their distance from the intended route (horizontal axis) and their height (vertical axis).
From the AFM, determine the climb net flight path for a conservative weight (for instance, use the maximum certified take-off weight), and for conservative meteorological conditions. Plot it on the previous graph.
If the net flight path clears each obstacle with a margin of at least 1,000 feet, the route study is finished and obstacle clearance is ensured at any moment during climb.
If the net flight path does not clear at least one of the obstacles by 1,000 feet, reduce the take-off weight and recalculate the net flight path until the previous condition is checked. If it is not possible, establish a diversion procedure.

2.4.2. In cruise

From a topographic map, determine the highest obstacle in the regulatory corridor and add 1,000 feet to obtain a height H_1.
From the AFM, determine the net ceiling (H_2) at a conservative weight. For instance, choose the heaviest possible aircraft weight at the entrance of the constraining area.
If H_2 is higher than H_1, the route study is completed and the obstacle clearance is ensured at any moment.
If H_2 is lower than H_1, then a more detailed study based on Condition 2 shall be conducted, or a weight limitation at take-off established, or a new route found.

2.4.3. Determination of En-route limitation

Let us consider a route flown with an ATR 72-500, which goes over a mountain with a height of 14,000 feet. Let us determine the different en-route limitations, in ISA conditions and in still air.

Condition 1 → weight limitation

The single engine net ceiling must be 1000ft above the more constraining obstacle of the route, 15,000 feet in this case.
The corresponding en-route limiting weight is read in the single engine net ceiling table below: to have a single engine net ceiling equals to 15,000 feet, the weight along the route must not exceed **18,800 Kg**.

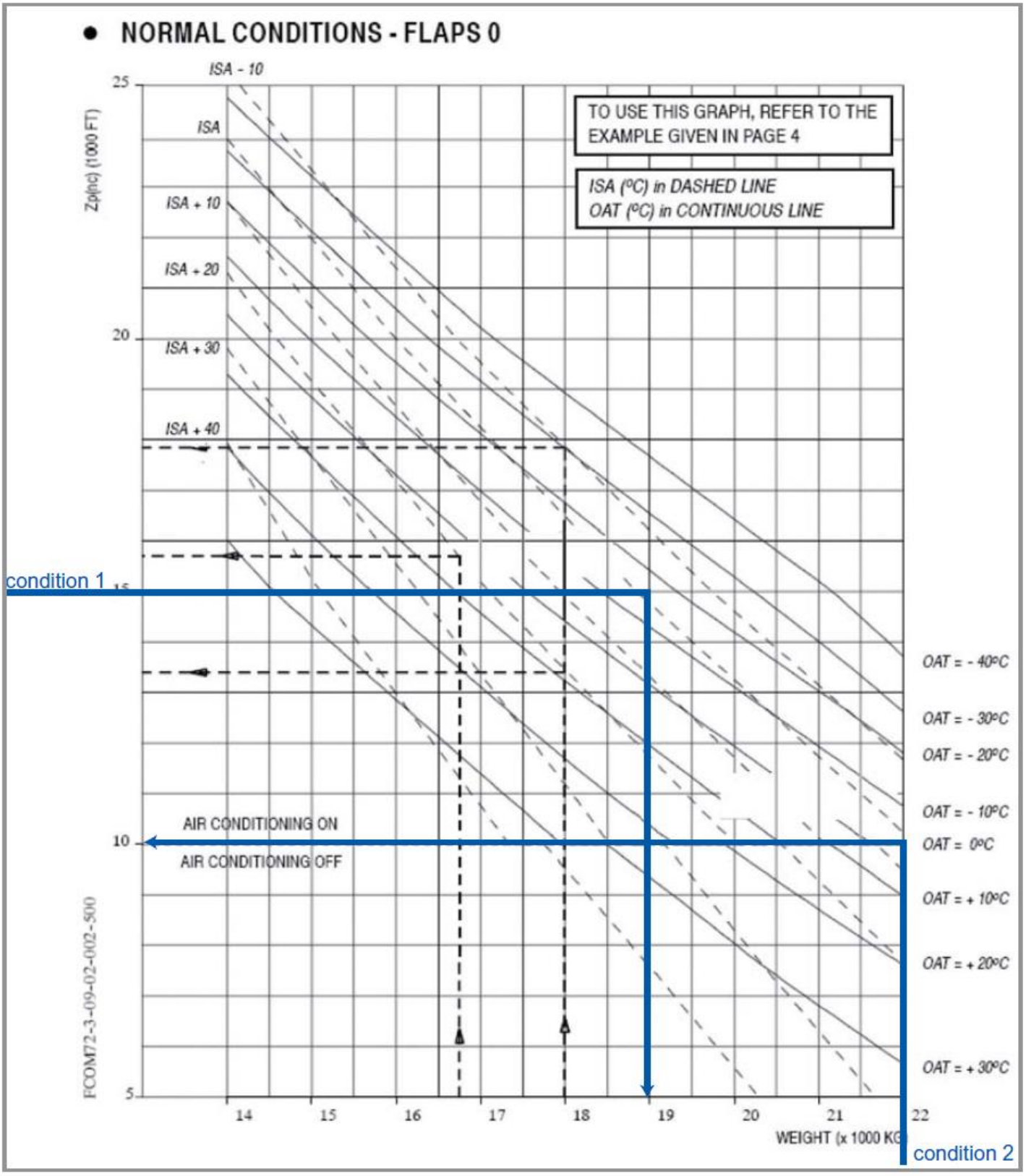


Figure F8: FCOM 3.09.02 p2, One engine inoperative

The fuel burnt to reach this obstacle is added. Let us assume the fuel to go is 700 kg, the TOW limited by the en-route obstacle is thus **19,500 Kg**.

If this limitation is too constraining for the dispatch, the other calculation based on condition 2 is carried on.

Condition 2 → critical point

More payload is loaded, and the TOW is finally 22,350 Kg. The weight at start of cruise is 22,000 Kg. The single engine net ceiling for this weight is read in the previous graph, and is 10,200 feet.
The cruise FL chosen is FL210. The critical point determination is done with the **drift-down descent profile** drawn below; this profile represents the real flight path flown by the aircraft during a drift-down. The drift-down starts at 10,800 ft (=21,000-10,200) above the single engine ceiling and crosses 20,000 ft above obstacle, **30 Nm** further.
The **critical decision point** of whether to continue or to divert is located 30 Nm before the obstacle.

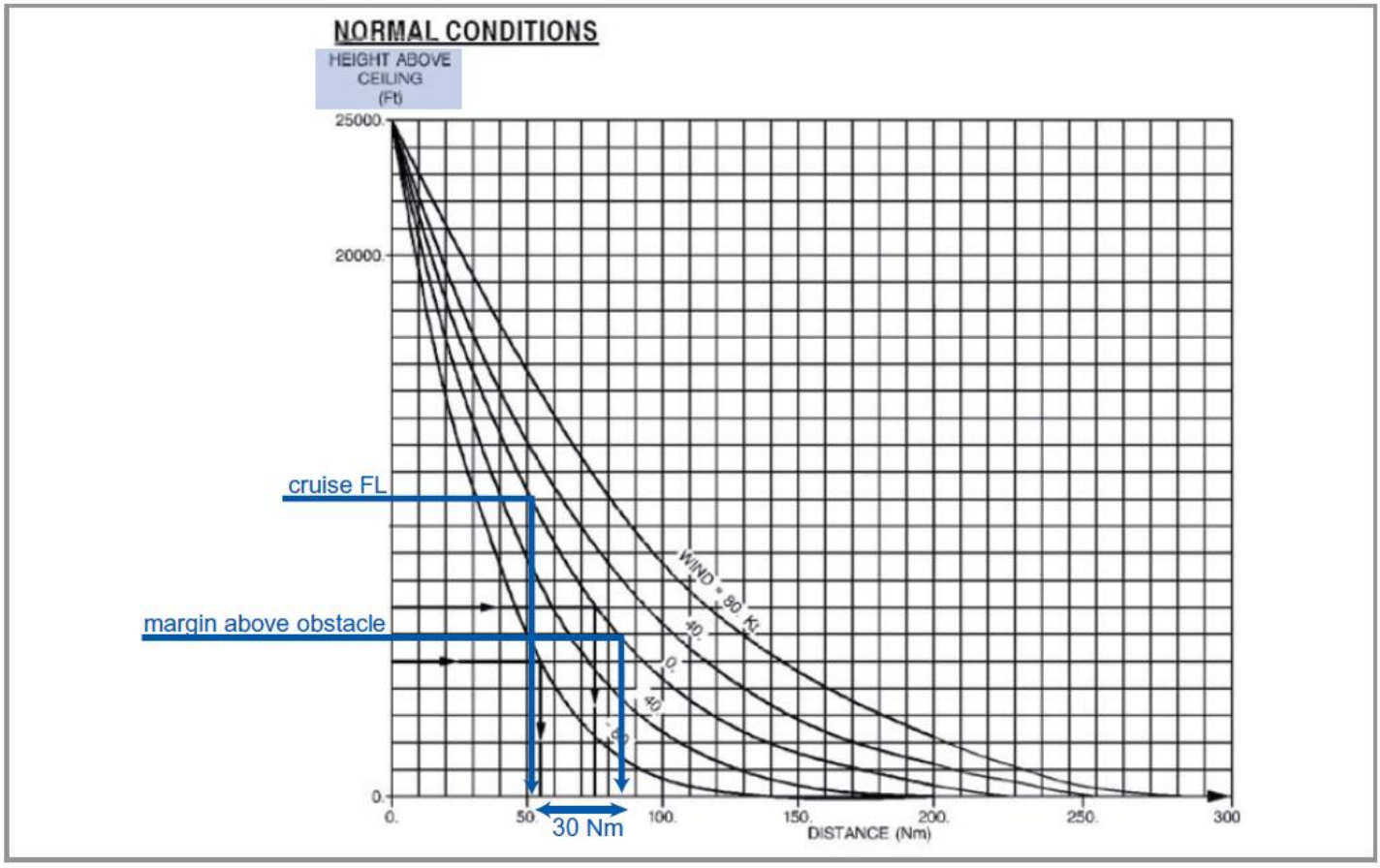


Figure F9: FCOM 3.09.02 p5, One engine inoperative

Summary

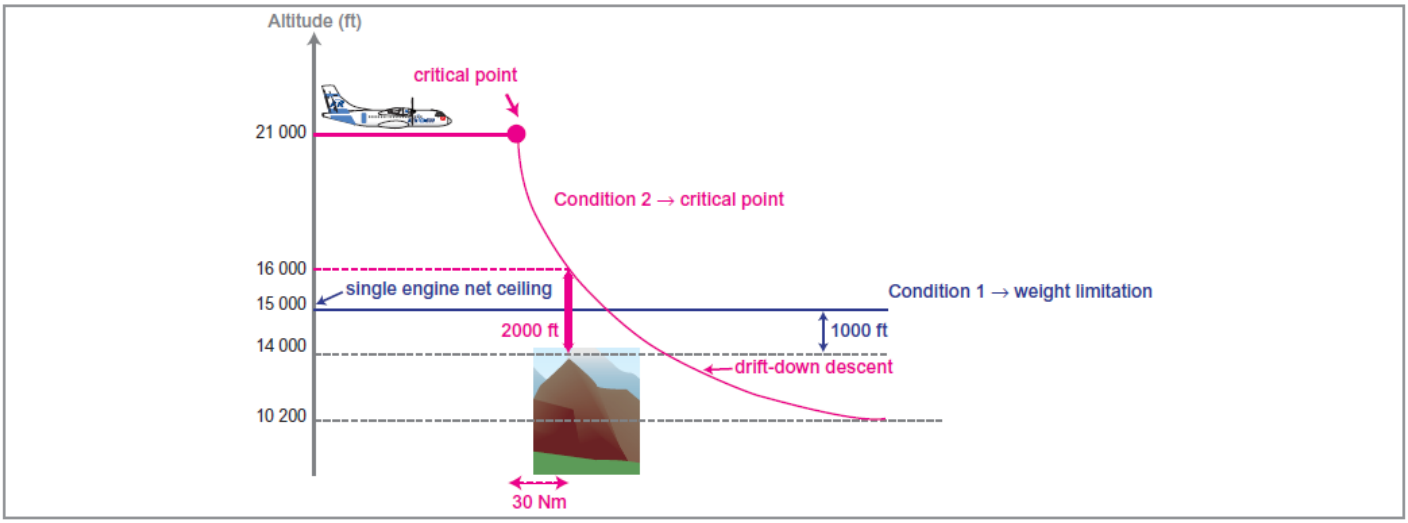


Figure F10: En-route study example

For weight in KG, use white boxes.
For weight in LB, use shaded boxes.

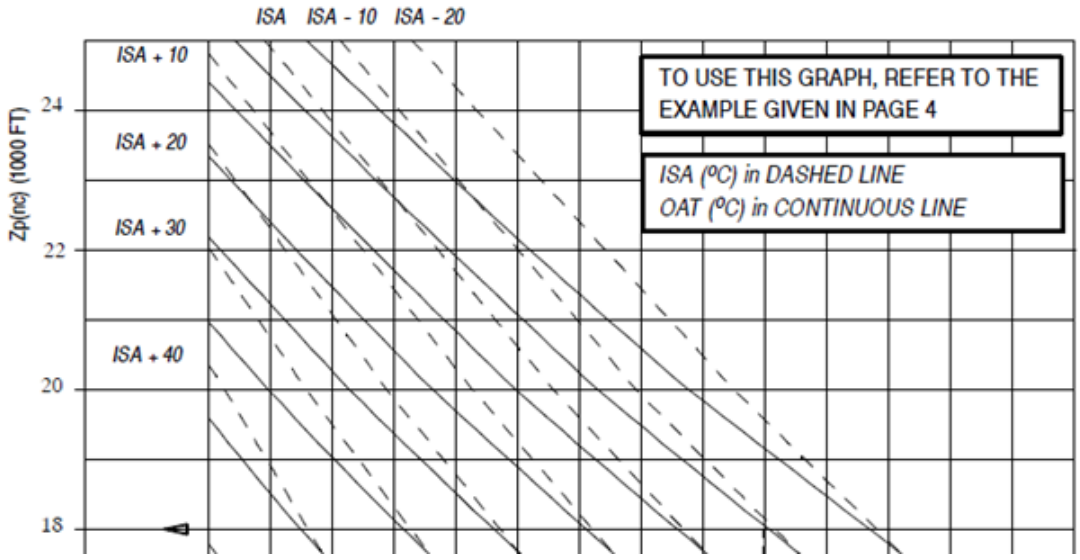
SINGLE ENGINE GROSS CEILING (FT)
NORMAL CONDITIONS (FLAPS 0)

WEIGHT x 1000 kg	ISA - 10		ISA		ISA + 10		ISA + 15		ISA + 20		WEIGHT x 1000 lb
< 12.5	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000	**< 28**
13.0	25000	25000	25000	25000	25000	25000	25000	25000	24800	24500	**29**
13.5	25000	25000	25000	25000	25000	24800	24400	24100	23700	23500	**30**

NET CEILING

Considering the atmospheric conditions of the day, read your net ceiling on one of the two following graphs :

- **NORMAL CONDITIONS - FLAPS 0**



TERMINAL CONTROL AREA

A terminal control area is a Control Area normally established at the confluence of ATS Routes in the vicinity of one or more major aerodromes. (ICAO Annex 2: Rules of the Air).

A terminal control area (TMA, or TCA in the U.S. and Canada), also known as a terminal manoeuvring area (TMA) in Europe, is an aviation term to describe a designated area of controlled airspace surrounding a major airport where there is a high volume of traffic. TMA airspace is normally designed in a circular configuration centered on the geographic coordinates of the airport, and differs from a control area in that it includes several levels of increasingly larger areas, creating an "upside-down wedding cake" shape. In Canada, the TCA is normally designated as class B, C or D. In the U.S., the airspace of a TCA is typically designated as class B. In the U.K., the airspace of a TMA is usually designated as class A, D or E. *(Source: wikipedia.org)*

Definitions

Control Zone (CZ): Controlled airspace of defined dimensions surrounding specified airports, extending upward from the surface of the earth to 3000' AAE unless otherwise specified.

Terminal Control Area (TCA): Controlled airspace of defined dimensions surrounding specified high-volume traffic airports, designated to serve arriving, departing and en route aircraft and to provide IFR control service.

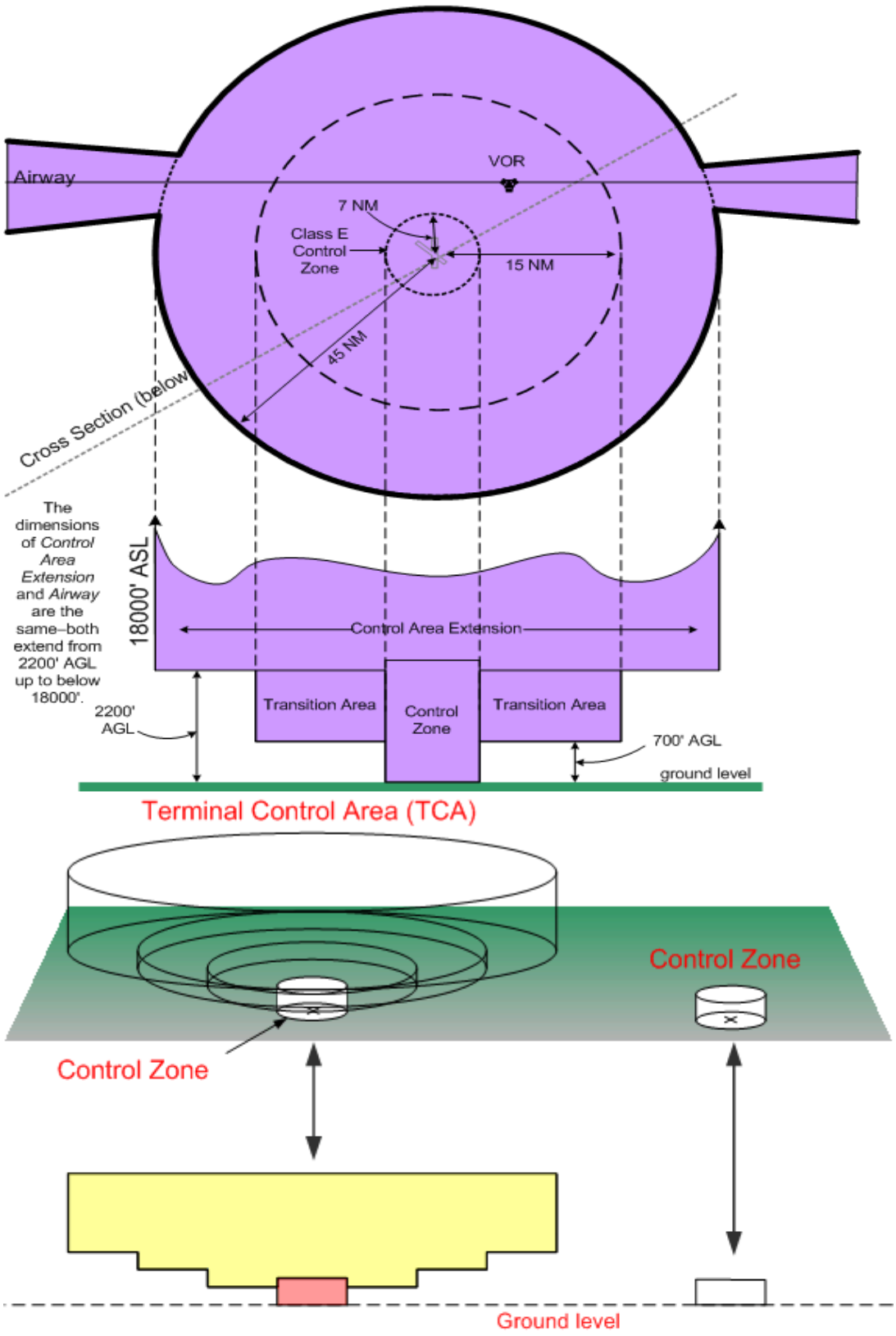
Control Area Extension (CAE): Controlled airspace surrounding specified airports, normally extending upwards from 2200' above the surface of the earth unless otherwise specified, and designed to provide additional controlled airspace for the containment of IFR operations.

Transition Areas: Controlled airspace surrounding specified airports, based at 700' and normally extending 15 NM from the airport, and designed to provide additional controlled airspace for the containment of IFR operations.

Control Zones surround specified airports; they usually have a 7 NM (nautical mile) radius and extend from the surface to 3000’ AAE (above aerodrome elevation). They may be designated Class B, C, D or E airspace.

Control Zones associated with larger airports are, as mentioned earlier, commonly surrounded by Terminal Control Areas, Transition Areas, or Control Area Extensions, as shown on charts. This expanded controlled airspace is designed to provide separation between aircraft in high-density traffic areas. Large transport aircraft, for example, will require more than 7 NM to descend for landing. At Vancouver International Airport there is a 7NM Control Zone; but surrounding the Control Zone is 45 NM radius Terminal Control Area (TCA) which has the dimensions of an inverted “wedding cake;” as you get closer to the Control Zone, the floor of the TCA gets closer to the ground in accordance with numerous “step down” sectors. The rules of the Vancouver Control Zone (Class C Airspace) are the same as the Vancouver TCA—a clearance from ATC is required prior to entry, Mode C Transponder, etc. *(Source: langleyflyingschool.com)*

Control Area Extension and Transition



The Control Zone is the only form of controlled airspace that makes contact with the ground. While they widely vary with respect to dimensions, Control Zones normally have a 7 NM radius and are capped at 3000'. With a Terminal Control Area, the TCA simply lies over and envelops the Control Zone, providing extended controlled airspace at high-traffic airports where large transport aircraft required more distance to set up an approach for landing. TCAs can extend upward as high as high-level controlled airspace (FL180), and they are normally composed of three tiers: the lowest tier normally extends out to twelve miles from the airport, and is based at 1200' AGL; the second tier extends out 35 NM from the airport and is based at 2200' AGL, and the third extends out 45 NM and is based at 9500' AGL.

DESCENT PREDICTIONS

http://www.theairlinepilots.com/forumarchive/concepts-procedures/managing-descent-profile.pdf

CONSULTING GRAPHS

ATR F.C.O.M.	TAKE-OFF CORRECTIONS	3.03.03 P 4 | 001 | | | APR 08

AA

CLOSE OBSTACLES IN NORMAL CONDITIONS

Locate the obstacles on the following graph and determine the decrement to apply to the WAT limiting weight previously computed to define the obstacles limiting weight.

ATR F.C.O.M.	CLIMB 190 kt	3.04.03 P 1 | 200 | | | APR 08

AB

TWIN-ENGINE CEILING – NORMAL CONDITIONS

ATR F.C.O.M.	CLIMB ICING CONDITIONS	3.04.04 P 11 | 200 | | | APR 08

AA

MAXIMUM OPERATIONAL CEILING (Twin engine)

ICING CONDITIONS - FLAPS 0- V_{MLB0} = 1.45 V_{SR}

MINIMUM RATE = 100 FT/MN

GROSS CLIMB GRADIENT – ONE ENGINE OUT – ONE ENGINE AT MAX CONTINUOUS POWER
IAS = V_{MLB}
NORMAL CONDITIONS : FLAPS 0 / 1.22 VSR – ICING CONDITIONS FLAPS 15 / 1.31 VSR

NORMAL CONDITIONS FLAPS 25°

One propeller feathered - one engine : GO AROUND POWER -

AIR CONDITIONING OFF - ANTI/DE ICING OFF - GEAR UP-

NET CEILING

Considering the atmospheric conditions of the day, read your net ceiling on one of the two following graphs :

DOWN HILL RULE - NORMAL CONDITIONS - FLAPS 0

200 KT IAS DESCENT

In the special case where there is no obstacle limitation, following graphs give net descent flight path down to the selected cruise level, with 200 KT IAS and flaps 0 .

MINIMUM EQUIPMENT LIST (MEL)

Minimum Equipment List

PREAMBLE

1. **GENERAL**

1.1 The PCAA Rules require that all equipment installed on an aircraft in compliance with the Airworthiness Standards and the Operating Rules must be operative. However, the rules also permit the publication of a Minimum Equipment List (MEL) where compliance with certain equipment requirements is not necessary in the interest of safety under all operating conditions. Experience has shown that with the various levels of redundancy designed into aircraft, operation of every system or installed component may not be necessary when the remaining operative equipment can provide an acceptable level of safety. A Master Minimum Equipment List (MMEL) is developed by the FAA/DGAC or the Regulatory Body of the country of origin of the subject aircraft, with participation by the aviation industry, to improve aircraft utilization and thereby provide more convenient and economic air transportation for the public. This approved MMEL will include those items of equipment related to Airworthiness and operating regulations and other items of equipment which the regulatory body finds may be inoperative and yet maintain an acceptable level of safety by appropriate conditions and limitations; it does not contain obviously required items such as wings, flaps and rudders. The MMEL is the basis for development of individual operator's MEL, which takes into consideration the operator's particular aircraft equipment configuration and operational conditions. Operator MELs for administrative control may include items not contained in the MMEL; however, relief for administrative control items must be approved by the DG PCAA. An operator's MEL may differ in format from the MMEL, but cannot be less restrictive than the MMEL. Based on the respective aircraft configuration, the operator will develops its own MEL and submit the same to DG PCAA for approval together with the MMEL of the aircraft type. The individual operator's MEL, when approved and authorized, permits operation of the aircraft with inoperative equipment covered by the MEL.

1.2 Equipment not required by the operation being conducted and equipment in excess of PCAA requirements are included in the MEL with appropriate conditions and limitations. The exposure to additional failures during continued operation with an operative system or component must also be considered in determining that an acceptable level of safety is being maintained. The MEL must not deviate from the Aircraft Flight Manual Limitations, Emergency Procedures or with Airworthiness Directives. It is important to remember that all equipments related to the airworthiness and the operating regulations of the aircraft not listed on the MMEL must be operative. Suitable conditions and limitations in the form of placards, maintenance procedures, crew operating procedures and

other restrictions as necessary are specified in the MEL to ensure that an acceptable level of safety is maintained.

1.3 The MEL is intended to permit operation with inoperative items of equipment for a period of time until repairs can be accomplished. It is important that repairs be accomplished at the earliest opportunity. In order to maintain an acceptable level of safety and reliability the MEL establishes limitations on the duration of and conditions for operation with inoperative equipment. The MEL provides for release of the aircraft for flight with inoperative equipment. When an item of equipment is discovered to be inoperative, it is reported by making an entry in the Aircraft Maintenance Record / Technical Log. The item is then either repaired or may be deferred as per the MEL. MEL conditions and limitations do not relieve the operator from determining that the aircraft is in condition for safe operation with items of equipment inoperative.

1.4 When these requirements are met, an Airworthiness Release, Aircraft Maintenance Record/Logbook entry, or other approved documentation is issued. Such documentation is required prior to operation with any item of equipment inoperative. Operators are responsible for exercising the necessary operational control to ensure that an acceptable level of safety is maintained. When operating with multiple inoperative items, the interrelationships between those items and the effect on aircraft operation and crew workload will be considered. Operators are to establish a controlled and sound repair program including the parts, personnel, facilities, procedures and schedules to ensure timely repair.

1.5 Dispatch/Release of airplane with more than one item unserviceable is not allowed if a simultaneous change in operating procedure for more than one major aircraft system would be necessary e.g. faults which require a change in electrical system operation and in hydraulic system operation would not be simultaneously permissible. Dispatch/Release of airplane with more than one part missing from any one system is not allowed unless specifically indicated in DDG. Parts from different systems may be missing simultaneously, unless otherwise specified provided the limitation imposed by para 1.4 is not violated. WHENEVER DOUBT EXISTS TO DISPATCH OR NOT, contact Chief Pilot Technical (Operations) and Chief Engineer Quality Assurance or their representatives for advice on telephone at Karachi.

1.6 WHEN USING THE MEL, COMPLIANCE WITH THE STATED INTENT OF THE PREAMBLE, DEFINITIONS, THE CONDITIONS AND LIMITATIONS SPECIFIED IN THE MEL IS REQUIRED. Definitions of various symbols, abbreviations etc. used in the MEL format is to be in line (with required approved alterations) with the Definitions as given in the FAA / DGAC – Master Minimum Equipment List copy of which is attached as Annexure-1 to this Preamble.

2. RELEASE OF AIRCRAFT FROM A TRANSIT STATION WITH DEFECTS COVERED UNDER MEL

2.1 In case where a defect is detected enroute, every endeavor should be made to rectify it. Only in exceptional cases, where the defect cannot be justifiably rectified at the transit stations, and the same does not affect the safety of flight, it may be Carried Forward in the Technical Log for rectification at Base.

2.2 Effective monitoring of the Carried Forward (CF) defects shall be carried out on continuous basis by Flight Operations and Engineering & Maintenance Departments on CARRIED FORWARD DEFECT MONITORING AND CONTROL (CFDM & C) SYSTEM.

2.3 Enough justification must be available if a snag is carried forward in Technical Log.

2.4 CF defects shall be entered in the release Technical Log Slip.

3. RELEASE OF AIRCRAFT FROM MAINTENANCE BASE (KARACHI OR ISLAMABAD) WITH CARRIED FORWARD DEFECTS

3.1 Aircraft for which Base Maintenance facility exists at Karachi then Karachi Airport will be considered as Base for this aircraft and Islamabad Airport will be considered as base for the aircraft for which Base Maintenance facility exists at Islamabad. All possible efforts will be made when the aircraft lands at its base with a Carried Forward (CF) defect to rectify the same. Only in exceptional cases (but within the Repair Intervals as given in the definitions – Annexure – 1) the defect may be carried forward on the aircraft from its Base.

3.2 It will be Engineering responsibility to ensure that the aircraft is not released on a flight when the time period limitation given in MEL (in form of A, B, C & D) is exceeded.

3.3 The Allowable Technical Deficiency Information will be sent to stations along the route. The information shall be recognized by a standard prefix "AATD" (Aircraft Allowable Technical Deficiency), Flt. No. and Aircraft Registration. This will always be sent by Manager Central Control, MCC.

3.4 For defects those are CF ex-base (Karachi or Islamabad as applicable) the status report will be sent to Flight Standards Directorate, PCAA every 3 days.

4. RELEASE OF AIRCRAFT FROM OUTSTATION WITH DEFECT/ DEFECTS NOT COVERED UNDER MEL

4.1 Under normal circumstances no such release shall be allowed. However, in extreme emergency, procedure as laid down in para 4.2 through 4.3 shall be followed to release aircraft under these circumstances.

4.2 If an aircraft at outstation is required to be released with defect / defects to be carried forward which are not covered under MEL then the same is to be brought to the notice of Director Flight Operations and Director Engineering and Maintenance or their designated nominees. The above two directors would jointly study the reported defect / defects and determine its impact on the safety of flight of the effected aircraft. If the aircraft is to be released for flight with the said defect / defects not rectified then this is to be brought to the notice of PCAA, Director Flight Standards (DFS) / Director Airworthiness (DAW) or his nominees by the Director Flight Operations (DFO) or Director Engineering & Maintenance (DE&M) or their representatives that they have jointly arrived at the decision that the aircraft can be released and that clearance for the same may be accorded for the aircraft to return to the base. The aircraft is to be released only after obtaining the approval from the PCAA.

4.3 Release of aircraft with MEL covered defects on expiry of time period limitations given in MEL (in form of A, B, C & D) is **NOT** covered under this authorization.

5. RELEASE OF AIRCRAFT WITH MEL COVERED DEFECTS ON EXPIRY OF TIME PERIOD LIMITATIONS GIVEN IN MEL

If repair interval requires more time than as described in relevant category of that particular inoperative system(s) or component(s), deferred in accordance with the MEL, waiver from PCAA (Director Flight Standards or his nominees) shall be obtained. The waiver shall be initiated by Engineering & Maintenance Department on a prescribed form and shall be signed by Director Engineering & Maintenance or his nominee then subsequently signed by Director Flight Operations and or his nominee.

6. CREW RESPONSIBILITIES

6.1 The existence of this list does not in any way absolve the Captain from ensuring that the aircraft is safe for particular flight from the time the aircraft departs.

6.2 Captain has to be aware of all Operational and Technical consequences of the failure concerned and has to ensure that the faulty system component is adequately isolated or deactivated and placarded.

6.3 The Pilot – in – Command will ensure that the appropriate crew members are properly acquainted with any revision of procedures, duties or limitations.

6.4 The Captain has the authority to insist on the rectification of a defect even though it is covered under MEL, irrespective of the decision from Operators Headquarter.

6.5 If Captain insists on rectification, Captain will star mark the defect and put down his signature. Star marking will only be done by crew operating the out going flight.

7. BALLAST: Only non-combustible material may be used as ballast.

(A N N E X U R E – 1)

1. SYSTEM DEFINITIONS

System numbers are based on the Air Transport Association (ATA) Specification Number 100 and items are numbered sequentially.

a) "Item" (Column 1) means the equipment, system, component, or function listed in the "Item" column.

b) "Standard Equipment" (Column 2) is the number (quantity) of items normally installed in the aircraft. This number represents the aircraft configuration considered in developing this MEL. Should the number be a variable (e.g. passenger cabin items) a number is not required.

NOTE: When the MMEL shows a variable number installed (If possible), the MEL must reflect the actual number installed or an alternate means of configuration control approved by the DFS/DAW (PCAA)

c) "Minimum for Dispatch" (Column 3) is the minimum number (quantity) of items required for operation provided the conditions specified in column 4 are met.

d) "Supplemental Procedure" (column 4) in this column includes a statement either prohibiting or permitting operation with a specific number of items inoperative, provisos (conditions and limitations) for such operation, and appropriate notes.

ITEM	STANDARD EQUIPMENT	MINIMUM FOR DISPATCH			SUPPLEMENTAL PROCEDURES
10-1 FLOW SELECTOR	C	1	0	*	May be inoperative provided one mode (NORM or HIGH) is operative and used

e) A vertical bar (change bar) in the margin indicates a change, addition or deletion in the adjacent text for the current revision of that page only. The change bar is dropped at the next revision of that page.

CH21 AIRCONDITIONING

ITEM	STANDARD EQUIPMENT	MINIMUM FOR DISPATCH			SUPPLEMENTAL PROCEDURES
10-1 FLOW SELECTOR	C	1	0	*	May be inoperative provided one mode (NORM or HIGH) is operative and used
22-1 RECIRCULATION FAN	C	2	0	*	May be inoperative
23-1 OVERBOARD VALVE	C	1	1	* (O)	Automatic mode may be inoperative provided manual mode is checked operative prior to each departure and flight is conducted in order to maintain ΔP ≤ 1 PSI

2. "Airplane Flight Manual" (AFM) is the document required for type certification and approved by the responsible FAA/DGAC Aircraft Certification Office. The FAA/DGAC approved AFM for the specific aircraft is listed on the applicable Type Certificate Data Sheet.

3. "As required by FAR/JAR" means that the listed item is subject to certain provisions (restrictive or permissive) expressed in the FAR/JAR operating rules. The number of items required by the FAR/JAR must be operative. Items installed that are in excess of the FAR/JAR requirements may be permitted by the Operator's MEL to be inoperative if not otherwise required by the MMEL.

4. "*" Symbol in column 4 indicates the listed item if inoperative, must be placarded to inform and remind the crewmembers and maintenance personnel of the equipment condition.

   Note: To the extent practical, placards should be located adjacent to the control or indicator for the item affected; however, unless otherwise specified, placard wording and location will be determined by the operator.

5. "-" Symbol in column 2 and/or column 3 indicates a variable number (quantity) of the item installed.

   Note: Where the MMEL shows a variable number installed, the MEL must reflect the actual number installed (If Possible) or an alternate means of configuration control approved by the DFS/DAW (PCAA).

6. "Deleted" in the remarks column after a sequence item indicates that the item was previously listed but is now required to be operative if installed in the Aircraft.

7. "ER" refers to extended range operations of a two-engine airplane, which has a type design approval for ER operations and complies with the provisions of Advisory Circular 120-42. Refer applicable circular by C.P. TECH.

8. "Federal Aviation Regulations" (FAR) means the applicable portions of the Federal Aviation Act and Federal Aviation Regulations.

9. "Joint Aviation Regulations" (JAR) means the applicable portions of the Joint Aviation Act and Joint Aviation Regulations.

10. "Flight Day (Calendar Day)" means a 24 hour period (from midnight to midnight) either Universal Coordinated Time (UCT) or local time, during which at least one flight is initiated for the affected aircraft.

11. "Icing Conditions" means an atmospheric environment that may cause ice to form on the aircraft or in the engine(s).

12. Alphabetical/Numerical symbol in column 4 indicates provisos (condition or limitation) that must be complied with for operation with the listed item inoperative.

13. "Inoperative" means a system and/or component malfunctions to the extent that it does not accomplish its intended purpose and/or is not consistently functioning normally within its approved operating limit(s) or tolerances.

14. "Notes" in column 4 provide additional information for crew member or maintenance consideration. Notes are used to identify applicable material which is intended to assist with compliance, but do not relieve PIACL of the responsibility for compliance with all applicable requirements. Notes are not a part of the provisos.

UIPMENT		MINIMUM FOR DISPATCH		SUPPLEMENTAL PROCEDURES
C	1	0	*	May be inoperative provided one mode (NORM or HIGH) is operative and used Note: Some smoke procedures request to select air flow HIGH. Nevertheless associated procedures efficiency has been demonstrated with air flow NORM.

15. Inoperative components of an inoperative system: Inoperative items which are components of a system which is inoperative are usually considered components directly associated with and having no other function than to support that system. (Warning/caution systems associated with the inoperative system must be operative unless relief is specifically authorized as per the MEL).

16. "(M)" or "(m)" symbol indicates a requirement for a specific maintenance procedure which must be accomplished prior to operation with the listed item inoperative. Normally these procedures are accomplished by maintenance personnel; however, other personnel may be qualified and authorized to perform certain functions. Procedures requiring specialized knowledge or skill, or requiring the use of tools or test equipment should be accomplished by maintenance personnel. The satisfactory accomplishment of all maintenance procedures, regardless of who performs them, is the responsibility of the PIACL. Appropriate procedures are published as part of the DDG.

17. "(O)" or "(o)" symbol indicates a requirement for a specific operations procedure which must be accomplished in planning for and/or operating with the listed item inoperative. Normally these procedures are accomplished by the flight crew; however, other personnel may be qualified and authorized to perform certain functions. The satisfactory accomplishment of all procedures, regardless of who performs them, is the responsibility of the PIACL. Appropriate procedures are published as part of the DDG.

ITEM	STANDARD EQUIPMENT	MINIMUM FOR DISPATCH			SUPPLEMENTAL PROCEDURES	
10-1 FLOW SELECTOR	C	1	0	*		May be inoperative provided one mode (NORM or HIGH) is operative and used Note: Some smoke procedures request to select air flow HIGH. Nevertheless associated procedures efficiency has been demonstrated with air flow NORM.
22-1 RECIRCULATION FAN	C	2	0	*		May be inoperative
23-1 OVERBOARD VALVE	C	1	1	*	(O)	Automatic mode may be inoperative provided manual mode is checked operative prior to each departure and flight is conducted in order to maintain ΔP ≤ 1 PSI
						-OR-
	C	1	0	*	(M)	May be inoperative provided it is deactivated, and extended overwater flight is prohibited, and flight level is limited to FL170.

MAINTENANCE & OPERATIONS NOTES IN DISPATCH DEVIATION & PROCEDURE GUIDE (DDPG) OR DISPACH DEVIATION GUIDE (DDG):

Maintenance (M) and Operations (O) procedures are provided in Dispatch Deviation Guide (DDG). Compliance with these procedures is mandatory as it is regulatory requirement.

However DDG also provides certain procedure recommended by manufacturer but not required by regulatory authority, such procedures are specified under the heading "Maintenance Notes" or "Operations Notes". There is no notation for these procedures (Notes) in the MEL. There is a possibility of dispatching the aircraft without observing these recommended procedures (Notes).

Therefore it is essential to consult DDG in addition to MEL even then symbol (M) or (O) is not available in MEL for that particular defect in order to ensure that all the relevant checks /procedures are followed.

ALL ATR MODELS

ATA 21 – AIR CONDITIONING

23-1 – Overboard valve

OPERATIONAL PROCEDURES

- **On ground before departure**

  VISUAL CHECK OF VALVE NORMAL OPERATION:

  OVBD VALVE ..... FULL CLOSE

  OVBD VALVE ..... FULL OPEN

- **On ground, engine 1 not running**

  OVBD VALVE ..... FULL OPEN

- **In flight or on ground engine 1 running**

  OVBD VALVE ..... FULL CLOSE

  ■ **If EXHAUST MODE illuminates amber and ΔP ≤ 1PSI**

  OVBD VALVE ..... FULL OPEN

CAUTION: **Do not select OVBD VALVE OPEN if ΔP > 1 PSI.**
ΔP ≤ 1PSI will be obtained by flying under FL115 and adjusting Z CAB in MAN PRESS mode in order to keep this ΔP without reaching EXCESS CAB ALT alarm

Note: Avoid leaving avionics vent selected ON for a long period of time with high OAT

MAINTENANCE PROCEDURES

OVERBOARD VENTILATION VALVE DE-ENERGIZATION:
Refer to JIC 21-23-22 CHK 10000 : 001 to 002 paragraph 3, setting the valve open in intermediate position.

Note: Avoid leaving avionics vent selected ON for a long period of time with high OAT

18. "Deactivated" and "Secured" means that the specified component must be put into an acceptable condition for safe flight. An acceptable method of securing or deactivating will be established by the Operator.

19. "Visual Flight Rules" (VFR) is as defined in FAR Part 91. This precludes a pilot from filling an Instrument Flight Rules (IFR) flight plan.

20. "Visual Meteorological Conditions" (VMC) means the atmospheric environment is such that would allow a flight to proceed under the visual flight rules applicable to the flight. This does not preclude operating under Instrument Flight Rules.

21. "Visual Moisture" means an atmospheric environment containing water in any form that can be seen in natural or artificial light; for example, clouds, fog, rain, sleet, hail or snow.

22. "Passenger Convenience Items/ Non Essential Equipment & Furnishing,(NEF)" means those items related to passenger convenience, comfort or entertainment such as, but not limited to, galley equipment, movie equipment, ash trays, stereo equipment, overhead reading lamps, etc.

23. Repair intervals: All users of an MEL approved under ANO91-0007 must effect repairs of inoperative systems or components, deferred in accordance with the MEL, at or prior to the repair times established by the following letter designators:

Note: The letter designators are inserted adjacent to column 2.

CH21 AIRCONDITIONING

ITEM	STANDARD EQUIPMENT	MINIMUM FOR DISPATCH			SUPPLEMENTAL PROCEDURES
10-1 FLOW SELECTOR	C	1	0	*	May be inoperative provided one mode (NORM or HIGH) is operative and used Note: Some smoke procedures request to select air flow HIGH. Nevertheless associated procedures efficiency has been demonstrated with air flow NORM.
22-1 RECIRCULATION FAN	C	2	0	*	May be inoperative
23-1 OVERBOARD VALVE	C	1	1	* (O)	Automatic mode may be inoperative provided manual mode is checked operative prior to each departure and flight is conducted in order to maintain ΔP ≤ 1 PSI
					-OR-
	C	1	0	*	(M) May be inoperative provided it is deactivated, and extended overwater flight is prohibited, and flight level is limited to FL170.

CATEGORY A

No standard interval is specified, however, items in this category shall be rectified in accordance with the conditions stated in the Remarks column (4) of the MEL.

Whenever the provision in the "Remarks or Exceptions" column of the MEL states cycles or flight time, the time interval begins with the next flight. Whenever the time interval is listed as flight days, the time interval begins on the flight day following the day of discovery.

Time Limited Dispatch - Some MEL's have relief that is subject to time limited dispatch expressed as a specific number of engine hours or cycles, and will start in accordance with the times established by the engine manufacturer or as indicated in the remarks column of the MEL. Time limited relief cannot be extended.

CATEGORY B

Items in this category shall be repaired within three (3) consecutive calendar days (72 hours); excluding the day the malfunction was recorded in the aircraft maintenance record/logbook. For example if it were recorded at 10 am on January 26th, the three-day interval would begin at midnight the 26th and end at midnight the 29th.

CATEGORY C

Items in this category shall be repaired within ten (10) consecutive calendar days (240 hours), excluding the day the malfunction was recorded in the aircraft maintenance record/logbook. For example if it were recorded at 10 am on January 26th, the ten-day interval would begin at midnight the 26th and end at midnight February 5th.

CATEGORY D

Items in this category shall be repaired within one hundred and twenty (120) consecutive calendar days (2880 hours), excluding the day the malfunction was recorded in the aircraft maintenance log and/or record.

24. CCAS provides electronic messages refer to a system capable of providing different priority levels of systems information messages (e.g. Warning, Caution, Advisory Status, and Maintenance). Any airplane discrepancy message that affects dispatchability will normally be at status message level (e.g. Advisory Status) or higher.

25. "Administrative control item" means an item listed by the operator in the MEL for tracking and informational purposes. It may be added to an operator's MEL by approval of the Chief Pilot Technical (Operations)/ Chief Engineer (QA) provided no relief is granted, or provided conditions and limitations are contained in an approved document i.e. Structural Repair Manual, Airworthiness directive, etc. If relief other than that granted by an approved document is sought for an administrative control item, a request must be submitted to the DFS/DAW (PCAA). If the request results in review and approval by the PCAA, the item becomes an MEL item rather than an administrative control item.

26. "Day of Discovery" is the calendar day an equipment / instrument malfunction was recorded in the aircraft maintenance log and or record. This day is excluded from the calendar days or flight days specified in the MMEL for the repair of an inoperative item of equipment. This provision is applicable to all MEL items, i.e. categories "A, B, C, and D".

LOAD AND TRIM SHEET

```
.FLM652/10JANLHE/D/LS
PAKISTAN INTL AIRLINES
L O A D S H E E T              CHECKED        APPROVED          EDNO
ALL WEIGHTS IN KILOGRAMS          4980                          1

FROM/TO  FLIGHT      A/C REG VERSION    CREW   DATE      TIME
LHE ISB  PK652/10    APBKZ   70Y        2/2    10JAN17   2037

                              WEIGHT          DISTRIBUTION
LOAD IN COMPARTMENTS          1000 FLH/300 FRH/300 AFF/0 AFA/400
PASSENGER/CABIN BAG           3975 53/0/0 TTL 53 CAB 0 SOB 57
                                   Y 53 SOC 0

TOTAL TRAFFIC LOAD             4975
DRY OPERATING WEIGHT          14065
ZERO FUEL WEIGHT ACTUAL       19040 MAX 20800
TAKE OFF FUEL                  2009
TAKE OFF WEIGHT  ACTUAL       21049 MAX 22800 L
TRIP FUEL                       629
LANDING WEIGHT   ACTUAL       20420 MAX 22350
TAXI OUT FUEL                    91

                                          LAST MINUTE CHANGES
BALANCE AND SEATING CONDITIONS DEST SPEC  CL/CPT + -  WEIGHT
BI           42 DOI             52
LIZFW        56 MACZFW          27
LITOW        59 MACTOW          28

CABIN CLASS
Y     53
CABIN AREA
OA    19
OB    21
OC    13

UNDERLOAD BEFORE LMC   1751              LMC TOTAL   + -

CAPTAINS INFORMATION/NOTES
CAPTAIN = K.HAROON =
BW      13389   BI             42
MATW  22970  RAMP TAXI WEIGHT ACTUAL  21140
CG LIMITS LIZFW  FWD        31 AFT       72
          LITOW  FWD        38 AFT       77
B/1000 C/O M/O
PANTRY CODE   DOM       /364


LDM
PK652/10.APBKZ.70Y.2/2
-ISB.53/0/0.T1000.FLH/300.FRH/300.AFA/400.PAX/0/53.PAD/0/2
SI
ISB  C     0  M     0  B  46/  1000  E     0  BT     0

DOW     14065
DOI        52
LOADSHEET BY LHELCPK CTC 990344302
WT REPORT 06
FUEL DENSITY  .787 KG/L AT 17.5C
CAPT- K.HAROON


CPM
PK652/10.APBKZ.STD
-FW2/ISB/300/B.VR2
-FW1/ISB/300/B.VR1
-AF1.NIL
-AF2/ISB/400/B.VRO
SI
```

GFLM652/10JANLHE/D/LS
PAKISTAN INTL AIRLINES
L O A D S H E E T
ALL WEIGHTS IN KILOGRAMS

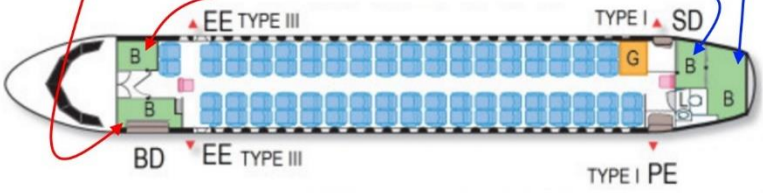
CHECKED 4980 APPROVED

EDNO 1

FROM/TO	FLIGHT	A/C REG	VERSION	CREW	DATE	TIME
LHE ISB	PK652/10	APBKZ	70Y	2/2	10JAN17	2037

LOAD IN COMPARTMENTS	WEIGHT	DISTRIBUTION FWD LEFT HAND			AFT
	TOTAL 300+300+400	FLH/300	FRH/300	AFF/0	AFA/400
PASSENGER/CABIN BAG	3975	53/0/0 TTL 53 CAB 0 SOB 57			
		Y 53 SOC 0			

PE: Passenger Entry
SD: Service Door
BD: Baggage Door
EE: Emergency Exit
B : Baggage
L : Lavatory
G : Galley



CAB : Weight of personal belongings carried in the cabin, not included in Passenger Weight

			TOTAL PAX			
PASSENGER/CABIN BAG	3975	53/0/0	TTL 53	CAB 0	SOB 57	53 PAX +04 CREW
	TOTAL WEIGHT @ 75Kg / Pax	Y 53 Adult/Child/Infant Economy Class	SOC 0 Seat Occupied by Cargo		SOULS ON BOARD	

Total weight of passengers, baggage, cargo, mail and E.I.C. (any equipment in compartment) not included in the DRY OPERATING WEIGHT.

TOTAL TRAFFIC LOAD	4975		
DRY OPERATING WEIGHT	14065		Basic Weight plus any operational item: crew, crew bags, flight equipment, pantry (catering equipment, food, beverages, etc.). It excludes useable fuel and traffic load.
ZERO FUEL WEIGHT ACTUAL	19040	MAX 20800	
TAKE OFF FUEL	2009		Fuel at Take-Off. Amount of fuel on board less the fuel consumed before Take-Off. Taxi fuel is not included.
TAKE OFF WEIGHT ACTUAL	21049	MAX 22800	L Indicator showing which of the max weight is limiting the allowed traffic load.
TRIP FUEL	629		
LANDING WEIGHT ACTUAL	20420	MAX 22350	
TAXI OUT FUEL	91		considered burned and not included in actual takeoff weight.

BALANCE AND SEATING CONDITIONS

BI	42	DOI	52
LIZFW	56	MACZFW	27
LITOW	59	MACTOW	28

CABIN CLASS

Y	53

CABIN AREA

OA	19
OB	21
OC	13

UNDERLOAD BEFORE LMC 1751

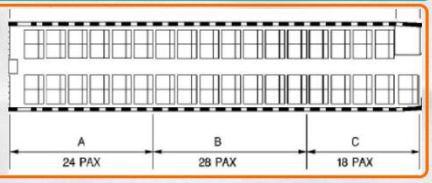
LAST MINUTE CHANGES

DEST	SPEC	CL/CPT	+	-	WEIGHT

LMC TOTAL + -

```
BALANCE AND SEATING CONDITIONS
BI              42 DOI              52
LIZFW           56 MACZFW           27
LITOW           59 MACTOW           28

CABIN CLASS
Y       53          Y = Economy     53 Passengers
CABIN AREA
OA      19
OB      21
OC     +13
        53
```




```
UNDERLOAD BEFORE LMC    1751
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- BI = Basic Index. Moment index corresponding to the Basic Weight of the aircraft.
- DOI = Dry Operating Index. Moment index to a given D.O.W.
- LIZFW = Loaded Index at Zero Fuel Weight. Index referring to the actual ZFW.
- LITOW = Loaded Index at Take Off Weight. Index referring to the actual TOW.
- MACTOW = Center of gravity at take-off in % MAC (mean aerodynamic chord).
- MACZFW = Center of gravity at zero fuel in % MAC.

- UNDERLOAD : Margin of load that remains. Difference between maximum and actual gross weight indicated by L.

```
TAKE OFF WEIGHT  ACTUAL   21049 MAX 22800 L
```

22800 - 21049 = 1751

```
                          WEIGHT          DISTRIBUTION
LOAD IN COMPARTMENTS        1000 FLH/300 FRH/300 AFF/0 AFA/400
PASSENGER/CABIN BAG         3975 53/0/0 TTL 53 CAB 0 SOB 57
                                 Y 53 SOC 0
```

(53 + 1 = 54) (57 + 1 = 58)

AFTER LMC

```
TOTAL TRAFFIC LOAD            4975
DRY OPERATING WEIGHT         14065
ZERO FUEL WEIGHT ACTUAL +90  19040 MAX 20800      19130
TAKE OFF FUEL                 2009
TAKE OFF WEIGHT  ACTUAL +90  21049 MAX 22800 L    21139
TRIP FUEL                      629
LANDING WEIGHT   ACTUAL +90  20420 MAX 22350      20510
TAXI OUT FUEL                   91
```

```
BALANCE AND SEATING CONDITIONS
BI              42 DOI              52
LIZFW           56 MACZFW           27
LITOW           59 MACTOW           28

CABIN CLASS
Y       53
CABIN AREA
OA      19
OB      21
OC      13

UNDERLOAD BEFORE LMC    1751
```

LAST MINUTE CHANGES

DEST	SPEC	CL/CPT	+	−	WEIGHT
ISB	1 PAX	Y / B	+		75
ISB	1 BAG	F / LH	+		15

LMC TOTAL (+) − 90

CAPTAINS INFORMATION/NOTES

Basic Weight = Empty Weight (12423) + Configuration Weight (966) = 13389.

CAPTAIN = K.HAROON =

BW 13389 BI 42 *Basic Index = Moment index corresponding to the Basic Weight of the aircraft.*

MATW 22970 *Max Taxi Weight*

RAMP TAXI WEIGHT ACTUAL 21140 *ZFW (19040) + Ramp Fuel (2100) = 21140*

CG LIMITS LIZFW FWD 31 AFT 72 *Loaded Index at ZFW. Index referring to the actual ZFW.*

LITOW FWD 38 AFT 77 *Loaded Index at TOW. Index referring to the actual TOW.*

B/1000 C/O M/O *Baggage = 1000 Kg, Cargo = 0, Mail = 0.*

PANTRY CODE DOM *(Domestic)* /364 *(Kgs)*

LDM *(Load Distribution Message)*

PK652/10.APBKZ.70Y.2/2 *Flight 652 / 10th Jan . A/C Reg AP-BKZ . Configuration 70 Economy . Cockpit 2 / Cabin 2*

-ISB.53/0/0.T1000.FLH/300.FRH/300.AFA/400.PAX/0/53.PAD/0/2 *PAD / C / Y (Club 0 / Economy 2)*

Destination . Adult/Child/Inf . Total bag wt . Fwd L Hold / Wt . Fwd R Hold / Wt . Aft hold Aft / Wt . Passengers/C0/Y53 (excluding Infants) . Passenger Available for Disembarkation. Industry staff travelling with free ticket or reduced fare.

SI *Supplementary Information such as EET (Flight time), WCHS (Wheelchair - cannot climb stairs), fuel ballast, etc.*

ISB *Dest* C *Cargo* 0 *nil* M *Mail* 0 *nil* B *Bags* 46/ *46* 1000 */ their weight 1000* E *EIC: Equipment in Compartment* 0 BT *Baggage in Transit* 0

DOW 14065 *Dry Operating Weight: Weight prior to loading the traffic load and fuel. It is the Basic Weight plus any operational item : crew, crew bags, flight equipment, pantry (catering equipment, food, beverages, etc). In this case Basic Weight 13389 + Pantry 364 + Crew 312 = DOW 14065.*

DOI 52 *Dry Operating Index. Moment index to a given DOW.*

LOADSHEET BY LHELCPK CTC 990344302 *Contact number*

WT REPORT 06

FUEL DENSITY .787 KG/L AT 17.5C *Celsius*

CAPT- K.HAROON

WEIGHT AND BALANCE MANUAL

ALL WEIGHT IN KG — **WEIGHT REPORT 06**

(A) AIRCRAFT EMPTY WEIGHT

A/C REG	EMPTY WEIGHT	INDEX	STRUCTURAL LIMITS		
			MAX ZFW	MAX LW	MAX TOGW
AP-BKZ	12423	32.2			

(B) CONFIGURATION

CONFIGURATION	WEIGHT	INDEX
12P / 58Y or 70 Y	966	9.4

(E) CREW

CREW		WITHOUT BAGG.		WITH BAGG.	
COCKPIT	CABIN	WEIGHT	INDEX	WEIGHT	INDEX
2	2	312	90.5	412	85.5

(H) LAST MINUTE CHANGES (LMC)

NO CHANGE IN CG IS REQUIRED IF PAX OR WEIGHT CHANGES (LOADING / OFF LOADING) ARE RESTRICTED TO:

ONE PAX IN ZONE B

185 KG FUEL (FOR BLOCK FUEL LESS THAN 5000KG)

ONLY ZFW, TOGW AND TOTAL PERSON ON BOARD FIGURES HAVE TO BE REVISED.

CPM *CPM message (Containers / Pallets Message): Only for flights operated by palletized aircraft to inform about the uld's (unit load devices), position, destination, gross weight and content.*

PK652/10.APBKZ.STD

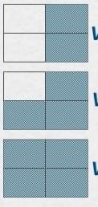
-FW2/ISB/300/B.VR2

-FW1/ISB/300/B.VR1

-AF1.NIL

-AF2/ISB/400/B.VR0

Holds *Dest* *Weight* *VR: Volume Remaining*



Another operational Load message is UCM message (Uld Control Message). Only for flights operated by palletized aircraft to inform about the uld's (unit load devices) arriving and departing from station in order to control the stock of uld's. Operational load messages (LDM, CPM, UCM) must be dispatched, no later than 15 minutes after take-off using standard IATA format.

LOAD CONTROL IATA CODES:

- *AOG : Spare parts required for aircraft on ground followed by loading position and weight e.g. AOG/1/150*
- *AVIH : Live animals loaded in hold.*
- *BAL : Ballast loaded in hold.*
- *BED : Stretcher installed in cabin followed by the number of seats occupied.*
- *BCW : Crew bags.*
- *CAO : Cargo aircraft only.*
- *CAT : Cargo Attendant.*
- *COM : Comail. Company mail followed by loading position and weight.*
- *CSU : Catering equipment loaded in holds not used on flight.*
- *DAA : Delivery at aircraft. Example : baby strollers.*
- *DHC : Dead head crew. Crew positioning to / from duty occupying passenger seats travelling with free ticket. Also a PRF, but not PAD.*
- *EIC : Equipment in compartment, not included in DOW/DOI followed by loading position and weight.*
- *EXP : Expedite (rush bags) followed by loading position and pieces.*
- *FKT : Flight kit.*
- *HUM : Human remains in coffin.*
- *NIL : No items loaded.*
- *PAN : Pantry.*
- *PER : Perishable cargo.*
- *PAD : Passenger Available for Disembarkation. Industry staff travelling with free ticket or reduced fare.*
- *PRF : Industry staff travelling with free ticket or reduced fare.*
- *VAL : Valuable cargo.*

TEAM WORK

14.0 CREW POSITIONS & DUTY

14.0.1 Flight Deck Teamwork

a. Superior teamwork consists mainly of mutual initiative, assistance and continuous briefing. It is necessary, therefore, for Flight Crew members to inform each other about their intentions and other important facts concerning the flight, such as a temporary disruption of lookout, a momentary break in listening watch on the normal communication frequencies, handing over of controls, use of the autopilot, handling of throttles, etc.

b. Whenever a Flight Crew member observes or suspects any irregularity, deviation or anomaly in the operation of the aeroplane or its system, he shall immediately advise the Captain before analyzing the situation further.

c. Since crew compositions are constantly changing, it is necessary to standardize flight deck teamwork by adhering to relevant PIA Standard Operating Procedures at all times.

d. It is recommended that the Captain make a brief check of the cabin appearance on embarking and supervises, by means of spot checks, the preparatory work of the other crew members.

e. Good teamwork between Flight and Cabin Crew is required in order to ensure that the cabin is prepared in time for takeoff and landing.

3.8.8.2 Team Building

Exercise secure authority. The Captain exercises authority in a confident and competent manner, without being autocratic. The Captain acts decisively when the situation dictates.

Other crewmembers exercise the authority vested in their respective positions, as required, to discharge their duties.

Involves entire crew in decision-making process. Decisions are made in a timely and competent manner, and conveyed to the entire crew. The crew is included in the decision-making process, whenever possible, to increase the likelihood of making an optimal decision.

Use appropriate techniques to manage interpersonal and operational conflict. Crewmembers assess underlying problems, identify crew goals, and suggest solutions to alleviate interpersonal or operational conflict.

Crewmembers employ a style of resolution appropriate to the nature and criticality of the problem, and look for collaborative (or "win-win") solutions whenever possible.

Adapts to crew interpersonal differences. Crewmembers demonstrate an ability to adapt to different personalities and characteristics. Crewmembers identify and establish commonalities as a basis for building an effective team environment.

Crewmembers cope effectively with operational stress. Crewmembers demonstrate understanding of the debilitating effect of stress on performance in an aviation environment, and identify the symptoms of stress in self and other crewmembers; Crewmembers communicate observations to others when operational necessity dictates. Crewmembers

ASSERTIVENESS

http://www.theairlinepilots.com/forumarchive/flightsafety/assertiveness.pdf

3.8.6 Assertiveness

Assertiveness is ensuring your input is heard and understood rather than hinting or silently watching as perceived mistakes are about to be made. The five steps to an assertive statement are:

a. Opening statement "Amir, Sohail, Captain, etc."

b. State your concern – Take ownership, "I'm uncomfortable with…."

c. State the problem – The problem as you see it.

d. Offer a suggestion – Suggested solution to the problem

e. Reach agreement – Crew members, reaching a mutually agreeable solution, may take more than one assertive statement from one or more of the crew

CRM

http://www.theairlinepilots.com/forumarchive/flightsafety/crm.pdf

THREAT AND ERROR MANAGEMENT

http://www.theairlinepilots.com/forumarchive/flightsafety/threat-error-management.pdf

DECISION MAKING

http://www.theairlinepilots.com/forumarchive/flightsafety/decision-making.pdf

EFFECTIVE COMMUNICATION

http://www.theairlinepilots.com/forumarchive/flightsafety/effective-communication.pdf

EFFECTIVE PILOT CONTROLLER COMMUNICATION

http://www.theairlinepilots.com/forumarchive/flightsafety/pilot-controller-communication.pdf

SITUATIONAL AWARENESS

http://www.theairlinepilots.com/forumarchive/flightsafety/situational-awareness.pdf

MINIMUM ACCELERATION HEIGHT

http://www.theairlinepilots.com/forumarchive/atr/atr-min-acc.pdf

UNDERSTANDING V_{APP} AND V_{GA}

http://www.theairlinepilots.com/forumarchive/atr/atr-vapp-vga.pdf

EFFECT OF QNH ON TOW

	TOW(KG) CODES V1 VR V2(IAS KT) DTOW / DTOW	QNH=1013.25(HPA) DQNH= -15/ +15	DI S(
OAT (DC)	DV1 DVR DV2 / DV1 DVR DV2		
		WIND (KT)	
	-15	-10	0
46.0	20145 2-6 90 107 111 -264 / +260 +0 +1 +0/ -1 +0 +0	20609 2-6 99 119 121 -324 / +308 +0 +0 +1/ -1 -1 +0	20656 2-2 112 124 127 -345 / +345 +0 -1 -2/ +0 +1 +1

If QNH = 1007 then:

TOW = 20656 - 138 = 20518

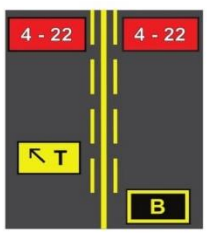
(i.e. 345/15 = 23, so 1013 - 1007 = 6 and 6 x 23 = 138)

So why not mention 23 Kg per Hpa instead of 345 Kg per 15 Hpa?

The reason why ATR did not put a figure/Hpa is that you can interpolate but you can not extrapolate. In fact, if you are lookig to the QNH effect on TOW, it's only linear close to the limitation. If you want to have more than 15 Hpa variation, you have to increase this value in the FOS.

AIRPORT SIGN AND MARKING – QUICK REFERENCE GUIDE

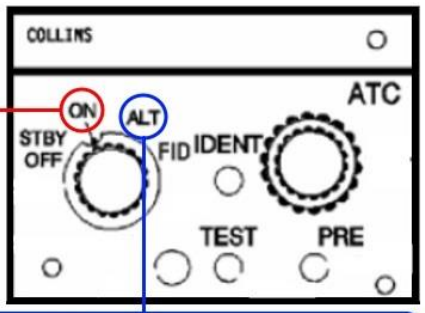
EXAMPLE	TYPE OF SIGN	PURPOSE	LOCATION/CONVENTION
	Mandatory: Hold position for taxiway/ runway intersection.	Denotes entrance to runway from a taxiway.	Located L side of taxiway within 10 feet of hold position markings.
	Mandatory: Holding position for runway/runway intersection.	Denotes intersecting runway.	Located L side of rwy prior to intersection, & R side if rwy more than 150' wide, used as taxiway, or has "land & hold short" ops.
	Mandatory: Holding position for runway approach area.	Denotes area to be protected for aircraft approaching or departing a runway.	Located on taxiways crossing thru runway approach areas where an aircraft would enter an RSA or apch/ departure airspace.
	Mandatory: Holding position for ILS critical area/precision obstacle free zone.	Denotes entrance to area to be protected for an ILS signal or approach airspace.	Located on twys where the twys enter the NAVAID critical area or where aircraft on taxiway would violate ILS apch airspace (including POFZ).
	Mandatory: No entry.	Denotes aircraft entry is prohibited.	Located on paved areas that aircraft should not enter.
	Taxiway Location.	Identifies taxiway on which the aircraft is located.	Located along taxiway by itself, as part of an array of taxiway direction signs, or combined with a runway/ taxiway hold sign.
	Runway Location.	Identifies the runway on which the aircraft is located.	Normally located where the proximity of two rwys to one another could cause confusion.
	Runway Safety Area / OFZ and Runway Approach Area Boundary.	Identifies exit boundary for an RSA / OFZ or rwy approach.	Located on taxiways on back side of certain runway/ taxiway holding position signs or runway approach area signs.
	ILS Critical Area/POFZ Boundary.	Identifies ILS critical area exit boundary.	Located on taxiways on back side of ILS critical area signs.
	Direction: Taxiway.	Defines designation/direction of intersecting taxiway(s).	Located on L side, prior to intersection, with an array L to R in clockwise manner.
	Runway Exit.	Defines designation/direction of exit taxiways from the rwy.	Located on same side of runway as exit, prior to exit.
	Outbound Destination.	Defines directions to take-off runway(s).	Located on taxi routes to runway(s). Never collocated or combined with other signs.
	Inbound Destination.	Defines directions to airport destinations for arriving aircraft.	Located on taxi routes to airport destinations. Never collocated or combined with other types of signs.
	Information.	Provides procedural or other specialized information.	Located along taxi routes or aircraft parking/staging areas. May not be lighted.
	Taxiway Ending Marker.	Indicates taxiway does not continue beyond intersection.	Installed at taxiway end or far side of intersection, if visual cues are inadequate.
	Distance Remaining.	Distance remaining info for take-off/landing.	Located along the sides of runways at 1000' increments.

EXAMPLE	TYPE OF MARKING	PURPOSE	LOCATION/CONVENTION
	Holding Position.	Denotes entrance to runway from a taxiway.	Located across centerline within 10 feet of hold sign on taxiways and on certain runways.
	ILS Critical Area/POFZ Boundary.	Denotes entrance to area to be protected for an ILS signal or approach airspace.	Located on twys where the twys enter the NAVAID critical area or where aircraft on taxiway would violate ILS apch airspace (including POFZ).
	Taxiway/Taxiway Holding Position.	Denotes location on taxiway or apron where aircraft hold short of another taxiway.	Used at ATCT airports where needed to hold traffic at a twy/twy intersection. Installed provides wing clearance.
	Non-Movement Area Boundary.	Delineates movement area under control of ATCT, from non-movement area.	Located on boundary between movement and non-movement area. Located to ensure wing clearance for taxiing aircraft.
 Taxiway Edge.		Defines edge of usable, full strength taxiway.	Located along twy edge where contiguous shoulder or other paved surface NOT intended for use by aircraft.
 Dashed Taxiway Edge.		Defines taxiway edge where adjoining pavement is usable.	Located along twy edge where contiguous paved surface or apron is intended for use by aircraft.
	Surface Painted Holding Position.	Denotes entrance to runway from a taxiway.	Supplements elevated holding position signs. Required where hold line exceeds 200'. Also useful at complex intersections.
	Enhanced Taxiway Centerline.	Provides visual cue to help identify location of hold position.	Taxiway centerlines are enhanced 150' prior to a runway holding position marking.
	Surface Painted Taxiway Direction.	Defines designation/direction of intersecting taxiway(s).	Located L side for turns to left. R side for turns to right. Installed prior to intersection.
	Surface Painted Taxiway Location.	Identifies taxiway on which the aircraft is located.	Located R side. Can be installed on L side if combined with surface painted hold sign.

Ref. AC 150/5340-1J *Standards for Airport Markings*, and AC 150/5340-18D *Standards for Airport Signs Systems*

TRANSPONDER SETTING “ON” OR “ALT”

ON ATC Transponder Mode S replies to both Mode A and Mode C interrogations but without from ground or air.



Setting the knob to ON or ALT, in air or on the ground, the ATC will get your mode C in both cases.

The wordings "but without" seem to be a typographical error.

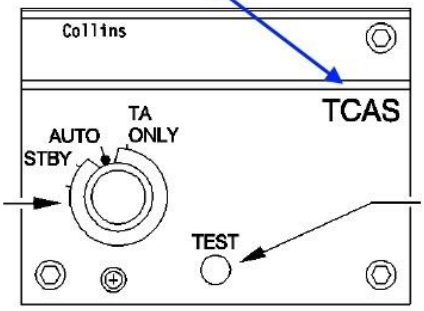
So then what's the use of ALT position?

ALT position is for TCAS.

ALT Normal operating position.
Transponder replies with flight level information.

If the selection is ON and not ALT then TCAS VSI shows the message "TCAS OFF" even if TCAS is set to AUTO.

With transponder set to ON, other aircraft will see you on their TCAS VSI without mode C. While ATC will get your mode C.



APPROACH CLIMB LIMIT

http://www.theairlinepilots.com/forumarchive/atr/atr-app-climb-limit.pdf