ATTACHMENT 1 Safety Management System Implementation Framework

This attachment was established in accordance with Article 9 of this AOR proper, and refer to the Annex 19, Appendix 2 and ICAO Doc.9859. This appendix specifies the framework for the implementation and maintenance of a safety management system (SMS) by an operator or an approved maintenance organization. An SMS is a management system for the management of safety by an organization. The framework includes four components and twelve elements representing the minimum requirements for SMS implementation. The implementation of the framework shall be commensurate with the size of the organization and the complexity of the services provided, and maintain positive interface management with other organizations to promote safety. The SMS shall comply with followings rules:

1. Safety policy and objectives

1.1 Management commitment

1.1.1 The operator shall define its safety policy in accordance with international and national requirements. The safety policy shall:

a) reflect organizational commitment regarding safety, including the promotion of a positive safety culture;

b) include a clear statement about the provision of the necessary resources for the implementation of the safety policy;

c) include safety reporting procedures;

d) clearly indicate which types of behaviours are unacceptable related to the operator’s aviation activities and include the circumstances under which disciplinary action would not apply;

e) be signed by the accountable executive of the organization;

f) be communicated, with visible endorsement, throughout the organization; and

g) be periodically reviewed to ensure it remains relevant and appropriate to the operator.

1.1.2 Taking due account of its safety policy, the operator shall define safety objectives. The safety objectives shall:

a) form the basis for safety performance monitoring and measurement as required by 3.1.2 of this attachment;

b) reflect the operator’s commitment to maintain or continuously improve the overall effectiveness of the SMS;

c) be communicated throughout the organization; and

d) be periodically reviewed to ensure they remain relevant and appropriate to the operator.

1.2 Safety accountability and responsibilities

The operator shall:

a) identify the accountable executive who, irrespective of other functions, is accountable on behalf of the organization for the implementation and maintenance of an effective SMS;

b) clearly define lines of safety accountability throughout the organization, including a direct accountability for safety on the part of senior management;

c) identify the responsibilities of all members of management, irrespective of other functions, as well as of employees, with respect to the safety performance of the organization;

d) document and communicate safety accountability, responsibilities and authorities throughout the organization; and

e) define the levels of management with authority to make decisions regarding safety risk tolerability

1.3 Appointment of key safety personnel

The operator shall appoint a safety manager who is responsible for the implementation and maintenance of the SMS.

1.4 Coordination of emergency response planning

The operator required to establish and maintain an emergency response plan for accidents and incidents in aircraft operations and other aviation emergencies shall ensure that the emergency response plan is properly coordinated with the emergency response plans of those organizations it must interface with during the provision of its products and services.

1.5 SMS documentation

1.5.1 The operator shall develop and maintain an SMS manual that describes its:

a) safety policy and objectives;

b) SMS requirements;

c) SMS processes and procedures; and

d) accountability, responsibilities and authorities for SMS processes and procedures.

1.5.2 The operator shall develop and maintain SMS operational records as part of its SMS documentation.

2. Safety risk management

2.1 Hazard identification

2.1.1 The operator shall develop and maintain a process to identify hazards associated with its aviation products or services.

2.1.2 Hazard identification shall be based on a combination of reactive and proactive methods.

2.2 Safety risk assessment and mitigation

The operator shall develop and maintain a process that ensures analysis, assessment and control of the safety risks associated with identified hazards.

3. Safety assurance

3.1 Safety performance monitoring and measurement

3.1.1 The operator shall develop and maintain the means to verify the safety performance of the organization and to validate the effectiveness of safety risk controls.

3.1.2 The operator's safety performance shall be verified in reference to the safety performance indicators and safety performance targets of the SMS in support of the organization's safety objectives.

3.2 The management of change

The operator shall develop and maintain a process to identify changes which may affect the level of safety risk associated with its aviation products or services and to identify and manage the safety risks that may arise from those changes.

3.3 Continuous improvement of the SMS

The operator shall monitor and assess its SMS processes to maintain or continuously improve the overall effectiveness of the SMS.

4. Safety promotion

4.1 Training and education

4.1.1 The operator shall develop and maintain a safety training programme that ensures that personnel are trained and competent to perform their SMS duties.

4.1.2 The scope of the safety training programme shall be appropriate to each individual's involvement in the SMS.

4.2 Safety communication

The operator shall develop and maintain a formal means for safety communication that:

a) ensures personnel are aware of the SMS to a degree commensurate with their positions;

b) conveys safety-critical information;

c) explains why particular actions are taken to improve safety; and

d) explains why safety procedures are introduced or changed.

ATTACHMENT 2 Operations Specifications

This attachment was established in accordance with Article 12, 202 of this AOR proper, and was refer to the ICAO Doc.8335, Attachment B /AN879.

For purposes of standardization and administrative convenience, operations specifications may be divided into separate parts as follows:

Part A - General provisions

Part B - En-route authorizations and limitations

Part C - Aerodrome authorizations and limitations

Part D - Maintenance

Part E - Mass and balance

Part F - Interchange of equipment operations

Part G - Aircraft leasing operations and others

In accordance with article 12, 202 of this AOR, operators of civil air transport enterprises and general aviation enterprises shall not engage in operations unless the Operations Specifications submitted is approved by CAA during application or modification of operation scopes.

營運規範核准項目表

OPERATIONS SPECIFICATIONS

詳細連絡方式

ISSUING AUTHORITY CONTACT DETAILS

電話號碼 _______電傳號碼 _______ 電子郵件 __________

Telephone Fax E-mail

審查合格證明證號______ 公司名稱________日期_________簽章_________

AOC# Operator name Date Signature

申請營運事業名稱________________

Dba trading name

航空器型別/航空器國籍登記

Type of aircraft/Aircraft nationality registration

營運方式: 民用航空運輸業

Types of operation: Civil Air Transport Enterprise

□客運 □貨運 □其他 ___________

Passengers Cargo Other

營運區域：

Area(s) of operation

特殊限制：

Special limitations

特殊核准 **SPECIAL APPROVALS**	**是** **YES**	**否** **NO**	**項目說明** **DESCRIPTION**	備註 **REMARKS**
危險品 Dangerous goods	□	□		
低能見度操作 Low visibility operations 進場及落地 Approach and landing 起飛 Take-off	 □ □	 □ □	類別______ 跑道視程______公尺 決定高度____呎 跑道視程___公尺	
縮減垂直隔離□N/A RVSM	□	□		
延展轉降時限作業□N/A EDTO	□	□	門檻時間 Threshold Time ____________ 分鐘 Miniutes 最大轉降時間 Maximum Diversion Time_____________ ___________分鐘 Minutes	
以性能為基礎之導航 AR Navigation specifications for PBN operations	□	□		
以性能為基礎之通信 Performance-Based Communication	□	□		
以性能為基礎之監視 Performance-Based Surveillance	□	□		
持續適航 Continuing airworthiness	□	□		
電子飛行包 EFB	□	□		
其他 Other	□	□		

營運規範核准項目表
OPERATIONS SPECIFICATIONS

詳細連絡方式
ISSUING AUTHORITY CONTACT DETAILS
電話號碼 ______ 電傳號碼 ________ 電子郵件 _________
Telephone Fax E-mail

審查合格證明證號________公司名稱_________日期_________簽章____________
AOC# Operator name Date Signature
申請營運事業名稱________________
Dba trading name

航空器型別/航空器國籍登記
Type of aircraft/Aircraft nationality registration

營運方式: 普通航空業
Types of operation: General Aviation Enterprise

□空中遊覽 Aerial tourism　□勘察 Survey　□照測 Photographing　□消防 Fire-fighting
□搜尋 Searching　□救護 Paramedic　□拖吊 Hauling/Lifting　□噴灑 Spraying/Dusting
□拖靶勤務 Drone-hauling service　□商務專機 Business charter　□其他 _________ Other

營運區域：
Area(s) of operation

特殊限制：
Special limitations

特殊核准 **SPECIAL APPROVALS**	**是** **YES**	**否** **NO**	**項目說明** **DESCRIPTION**	備註 **REMARKS**
危險品 Dangerous goods	□	□		
低能見度操作 Low visibility operations 進場及落地 Approach and landing 起飛 Take-off	 □ □	 □ □	類別______ 跑道視程______ 公尺 決定高度____呎 跑道視程___公 尺	
縮減垂直隔離□N/A RVSM	□	□		
延展轉降時限作業□N/A EDTO	□	□	門檻時間 Threshold Time ____________ 分鐘 Miniutes 最大轉降時間 Maximum Diversion Time__________ ____________ 分鐘 Minutes	
以性能為基礎之導航 AR Navigation specifications for PBN operations	□	□		
以性能為基礎之通信 Performance-Based Communication	□	□		
以性能為基礎之監視 Performance-Based Surveillance	□	□		
持續適航 Continuing airworthiness				
電子飛行包 EFB	□	□		
其他 Other	□	□		

中華民國 交通部

民用航空局

營 運 規 範

OPERATIONS SPECIFICATIONS

修訂紀錄

RECORD OF REVISIONS

修訂版別 Revision No.	生效日期 Effective Date	修訂版別 Revision No.	生效日期 Effective Date
(XXX)	(YYYY-MM-DD)		

中華民國 交通部
民用航空局
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OPERATIONS SPECIFICATIONS
檢核表 – 第一章
CHECKLIST – PART A

項目 Paragraph	說明 Description	生效日期 Effective Date	修訂版別 Revision No.
1	適用 Applicability	(YYYY-MM-DD)	(XXX)
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OPERATIONS SPECIFICATIONS
檢核表 – 第二章
CHECKLIST – PART B

項目 Paragraph	說明 Description	生效日期 Effective Date	修訂版別 Revision No.
1	中華民國領域內之航空器飛航作業 Aircraft Operations within the Territory of R.O.C.	(YYYY-MM-DD)	(XXX)
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中華民國 交通部
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檢核表 – 第三章
CHECKLIST – PART C

項目 Paragraph	說明 Description	生效日期 Effective Date	修訂版別 Revision No.
1	通則 General	(YYYY-MM-DD)	(XXX)
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OPERATIONS SPECIFICATIONS
檢核表 – 第四章
CHECKLIST – PART D

項目 Paragraph	說明 Description	生效日期 Effective Date	修訂版別 Revision No.
1	飛機維護–飛機維護計劃授權 Aircraft Maintenance – Aircraft Maintenance Program Authorization	(YYYY-MM-DD)	(XXX)
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中華民國 交通部
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營 運 規 範
OPERATIONS SPECIFICATIONS
檢核表 – 第五章
CHECKLIST – PART E

項目 Paragraph	說明 Description	生效日期 Effective Date	修訂版別 Revision No.
1	乘客及組員重量 Determination of Weight of Passenger and Crew	(YYYY-MM-DD)	(XXX)
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檢核表 – 第六章
CHECKLIST – PART F

項目 Paragraph	說明 Description	生效日期 Effective Date	修訂版別 Revision No.
1	(保留頁) (reserve page)	(YYYY-MM-DD)	(XXX)
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中華民國 交通部
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OPERATIONS SPECIFICATIONS
檢核表 – 第七章
CHECKLIST – PART G

項目 Paragraph	說明 Description	生效日期 Effective Date	修訂版別 Revision No.
1	本營運規範持有人獲准依據下表所列之濕租合約從事各項作業。 The holder of these operations specifications is authorized to conduct operations in accordance with the wet lease agreements identified in the following tables.	(YYYY-MM-DD)	(XXX)
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中華民國 交通部
民用航空局
營 運 規 範
OPERATIONS SPECIFICATIONS
第 一 章 通 則
PART A GENERAL PROVISIONS

1.適用
Applicability
1.1 (內容中英文並陳但不重複輸入大綱編號)

2.定義
Definitions and Abbreviations
2.1 (內容中英文並陳但不重複輸入大綱編號)

3.核准之機型
Aircraft Authorization
3.1 (內容中英文並陳但不重複輸入大綱編號)

4.經核准之最低客艙組員人數
Authorized Minimum Number of Cabin Crew
4.1 (內容中英文並陳但不重複輸入大綱編號)

5.一般營運及飛航規則
General Operating and Flight Rules
5.1 (內容中英文並陳但不重複輸入大綱編號)

6.危險品之運送
Transportation of Dangerous Goods
6.1 (內容中英文並陳但不重複輸入大綱編號)

7.電子飛行資料包及電子操作程序檢查表作業
Electronic Flight Bag and Electronic Checklist
7.1 (內容中英文並陳但不重複輸入大綱編號)

8.使用電子式簽署、電子式紀錄保存及電子式手冊授權
Authorized to use of Electronic Signatures, Electronic Recordkeeping System, and Electronic Mannuals.
8.1 (內容中英文並陳但不重複輸入大綱編號)

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OPERATIONS SPECIFICATIONS
第 二 章 沿途之作業許可及限制
PART B EN-ROUTE AUTHORIZATIONS AND LIMITATIONS

1.中華民國領域內之航空器飛航作業
Aircraft Operations within the Territory of R.O.C.
1.1 (內容中英文並陳但不重複輸入大綱編號)

2.航空器航行於中華民國空域時，應按 AIP 或民航局核准之航路飛行，但以下情形例外：
Aircraft Operations in the territory of R. O. C. Airspace shall be conducted over the routes defined in approved Aeronautical Information Publications (AIPs) or over the routes approved by CAA, R. O. C., except:
2.1 (內容中英文並陳但不重複輸入大綱編號)

3.中華民國領域外之航空器飛航作業
Aircraft Operations outside the Territory of R.O.C.
3.1 (內容中英文並陳但不重複輸入大綱編號)

4.儀器飛航規則 (IFR)
Instrument Flight Rules
4.1 (內容中英文並陳但不重複輸入大綱編號)

5.作業於無機場管制塔台服務之機場
Operations at Aerodromes without Air Traffic Control Tower Service
5.1 (內容中英文並陳但不重複輸入大綱編號)

6.航空器之無線電與導航設備
Aircraft Radio and Navigation Equipment
6.1 (內容中英文並陳但不重複輸入大綱編號)

7.以性能為基礎之通信(PBC)
Performance-based communication
7.1(內容中英文並陳但不重複輸入大綱編號)

8.航路所需之以性能為基礎之導航作業
Enroute Operations within PBN Airspace
8.1 (內容中英文並陳但不重複輸入大綱編號)

9.以性能為基礎之監視(PBS)
Performance-based surveillance
9.1(內容中英文並陳但不重複輸入大綱編號)

10.管制員－駕駛員資料鏈結通信作業 (CPDLC)

Controller-Pilot Data Link Communication Operations
10.1 (內容中英文並陳但不重複輸入大綱編號)
11.延展轉降時限作業(EDTO)
Extended Diversion Time Operations
11.1 (內容中英文並陳但不重複輸入大綱編號)
12.縮減垂直隔離作業 (RVSM)
Operations within Reduced Vertical Separation Minimum (RVSM) Airspace
12.1 (內容中英文並陳但不重複輸入大綱編號)
13.廣播式自動回報監視系統作業 (ADS-B)
ADS-B (Automatic Dependent Surveillance – Broadcast) Operations
13.1 (內容中英文並陳但不重複輸入大綱編號)
14.超長程飛航作業
Ultra Long Range (ULR) Flight Operations
14.1 (內容中英文並陳但不重複輸入大綱編號)
15.北極區作業
North Polar Operations
15.1 (內容中英文並陳但不重複輸入大綱編號)
16.北大西洋最低導航性能規範作業(NAT MNPS)
North Atlantic Minimum Navigation Performance Specifications
16.1 (內容中英文並陳但不重複輸入大綱編號)

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OPERATIONS SPECIFICATIONS
第 三 章 航空站之作業許可及限制
PART C AERODROME AUTHORIZATIONS AND LIMITATIONS

1.通則
General
1.1 (內容中英文並陳但不重複輸入大綱編號)
2.儀器進場程序及機場最低飛航限度
Instrument Approach Procedures and Aerodrome Operating Minimum
2.1 (內容中英文並陳但不重複輸入大綱編號)
3.備用機場儀器飛航最低天氣標準
Alternate Airport IFR Weather Minimum
3.1 (內容中英文並陳但不重複輸入大綱編號)
4.儀器飛航起飛限度及起飛備用機場
IFR Takeoff Minimum and Alternate Airport for Departure
4.1 (內容中英文並陳但不重複輸入大綱編號)
5.對照表
Comparison Table
5.1 (內容中英文並陳但不重複輸入大綱編號)
6.核准之機場
Authorized Airports
6.1 (內容中英文並陳但不重複輸入大綱編號)
7.機場終端以性能為基礎之導航作業
Airport Terminal PBN Operations
7.1 (內容中英文並陳但不重複輸入大綱編號)

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OPERATIONS SPECIFICATIONS
第 四 章 維 護
PART D　MAINTENANCE

1.飛機維護 – 飛機維護計畫授權

Aircraft Maintenance – Aircraft Maintenance Program Authorization

1.1 (內容中英文並陳但不重複輸入大綱編號)

2.航空器及附件維護能量授權

Aircraft and Components Maintenance Authorization

2.1 (內容中英文並陳但不重複輸入大綱編號)

3.委託合格維修組織執行維護授權

Authorization to Make Arrangements with Other Organizations to Perform Substantial Maintenance

3.1 (內容中英文並陳但不重複輸入大綱編號)

4.最低裝備需求手冊授權

Minimum Equipment List (MEL) Authorization

4.1 (內容中英文並陳但不重複輸入大綱編號)

5.可靠性計畫之授權

Reliability Program Authorization

5.1 (內容中英文並陳但不重複輸入大綱編號)

6.縮減垂直隔離作業維護計畫授權

Maintenance Program Authorization for Airplanes Used for Operation in Designated Reduced Vertical Separation Minimum (RVSM) Airspace

6.1 (內容中英文並陳但不重複輸入大綱編號)

7.第二類/第三類儀降作業維護計畫授權

Maintenance Program Authorization for Airplanes Used for CAT II/III Operation

7.1 (內容中英文並陳但不重複輸入大綱編號)

8.以性能為基礎之通信作業計畫維護授權

Maintenance Program Authorization for Airplanes Used for Operation in Designated PBC Airspace

8.1 (內容中英文並陳但不重複輸入大綱編號)

9.以性能為基礎之導航作業計畫維護授權

Maintenance Program Authorization for Airplanes Used for Operation in Designated PBN Airspace

9.1 (內容中英文並陳但不重複輸入大綱編號)

10.以性能為基礎之監視作業計畫維護授權

Maintenance Program Authorization for Airplanes Used for Operation in Designated PBS Airspace

10.1 (內容中英文並陳但不重複輸入大綱編號)

11.廣播式自動回報監視系統作業計畫維護授權

Maintenance Program Authorization for Airplanes Used for Operation in Designated ADS-B Airspace

11.1 (內容中英文並陳但不重複輸入大綱編號)

12.最低導航性能規範授權

Maintenance Program Authorization for Airplanes Used for Operation in Designated Minimum Navigation Performance Specification (MNPS) Airspace

12.1 (內容中英文並陳但不重複輸入大綱編號)

13.延展轉降時限作業維護計畫授權

Maintenance Program Authorization for Extended Diversion Time Operations, EDTO

13.1 (內容中英文並陳但不重複輸入大綱編號)

14.短期維護時距延展授權

Short Term Escalation Authorization

14.1 (內容中英文並陳但不重複輸入大綱編號)

15.零組件共用/租借授權

Parts Pooled / Borrowed Authorization

16.1 (內容中英文並陳但不重複輸入大綱編號)

16.借用零件翻修時限短期延展授權

Short Term Escalation Authorization for Borrowed Parts Subject to Overhaul Requirement

16.1 (內容中英文並陳但不重複輸入大綱編號)

17.執行運渡特種飛航許可之持續授權

Special Flight Permit with Continuous Authorization to Conduct Ferry Flights

17.1 (內容中英文並陳但不重複輸入大綱編號)

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OPERATIONS SPECIFICATIONS
第 五 章 載重及平衡
PART E WEIGHT AND BALANCE

1.乘客及組員重量
Determination of Weight of Passenger and Crew

1.1 (內容中英文並陳但不重複輸入大綱編號)

2.托運行李重量
Determination of Weight of Checked Baggage

2.1 (內容中英文並陳但不重複輸入大綱編號)

3.定期飛機之秤重
Periodic Aircraft Weighing

3.1 (內容中英文並陳但不重複輸入大綱編號)

4.隨身行李之計畫
Carry-on Baggage Program

4.1 (內容中英文並陳但不重複輸入大綱編號)

5.航路上之配重安排與說明如下
The Following Loading Schedules and Instructions shall be Used for Routine Operations

5.1 (內容中英文並陳但不重複輸入大綱編號)

中華民國 交通部

民用航空局

營 運 規 範

OPERATIONS SPECIFICATIONS

第 六 章 交互使用協定

PART F INTERCHANGE OF EQUIPMENT OPERATIONS

生效日期 Effective Date：

頁次 Page：

第 七 章 航空器出租作業(濕租)
PART G AIRCRAFT LEASING OPERATIONS (WET LEASE)

1.本營運規範持有人獲准依據下表所列之濕租合約從事各項作業。營運時，所有操作均需符合本營運規範及租約條文所列規定。濕租合約中之租賃公司應為營運作業及航機適航負責。

The holder of these operations specifications is authorized to conduct operations in accordance with the wet lease agreements identified in the following tables. All operations conducted under the wet lease agreements shall be conducted in accordance with the authorizations, limitations, and provisions of these operations authorized specifications and the terms and conditions of the appropriate wet lease agreements. The lessor in the wet lease agreement shall be responsible for and maintain the operational control and airworthiness of the aircraft.

1.1 (內容中英文並陳但不重複輸入大綱編號)

2.溼租合約及國籍標誌與登記號碼

Wet Lease Agreements and Listed Aircraft

2.1 (內容中英文並陳但不重複輸入大綱編號)

中華民國交通部 民用航空局
審查合格證明證號：
Civil Aviation Administration MOTC. R. O. C.
Operating Certificate No.
(申請人名稱)　茲申請修正背頁所示之營運規範如下：
(Applicant‘s name) hereby makes application for amendment of the Specific Operating Provisions appearing on the reverse side hereof, as follows:
本人證明上述均為確實並代表　　　　　　　　　　　(申請人)提出申請。
I certify that the statements submitted in the connection herewith are true and that I am duly authorized to make application on behalf of (applicant's name).
日期 Date：
(簽章 Signature)
(職稱 Title)
檢查員之意見 Inspector‘s Recommendation：
修正編號：
Amendment No.　　　　　　　　　　(簽章 Signature)
生效日期：
Effective Date　　　　　　　　　　(職稱 Title)
取代　　　　　　　　(日期)核備　之條款
Supersedes Provisions dated

(營運規範之背面)

ATTACHMENT 3 Flight Rules for Operations under Adverse Weather

This attachment was established in accordance with Article 32, 207 of this AOR proper.

1. Regardless of weather, all aerodromes shall remain open during their published hours of operation. Weather Stations should provide the latest aerodrome weather reports, by which towers should provide ATIS by such information (this requirement may be waived if the tower is not capable of broadcasting ATIS), operators and flight crewmembers should monitor and pay attention to the latest weather reports.

2. The adverse weather herein refers to the following conditions: typhoons, thunderstorms, strong wind (gale) on ground (at a wind speed of 34kts or more) , squall line, wind shear at or below 2,000ft AGL, the low ceiling or low visibility conditions which might affect the selection of destination and alternate aerodrome, moderate or severe in-flight icing conditions, hale, snow, freezing rain, freezing fog or rime, moderate or severe turbulence (including clear air turbulence and mountain wave), volcanic ash, sand storms or dust storms, and the unforeseeable change of weather which renders the aerodrome to be below operating minimum, or the contamination of runway surface, unable to use the runway or the weather conditions which adversely affect the controllability and performance of aircraft, and the combination of one or more of which as mentioned above.

3. An operator shall establish procedures for the receiving and propagating of weather information, operating procedures for operations under adverse weather, operating limitations and training programmes, to ensure that all operating procedures comply with airplane flight manuals, flight operations manual, aircraft operating manuals and other airworthiness related documents while aircraft is in flight or in the event of an emergency.

4. Flight Rules with regard to typhoons:
   4.1 During the warning phases of a typhoon, even if the weather conditions of an aerodrome become lower than its operating minimum, the aerodrome shall remain operational in principal, so that emergency landings of aircraft can be made.
   4.2 During the warning phases of a typhoon, an aerodrome shall remain open while the weather conditions are not lower than its operating minima, and air traffic service unit shall provide, when appropriate, the weather reports for aerodromes where takeoffs and landings will be made.
   4.3 During a typhoon, when heavy precipitation causes the standing water on a runway, each aerodrome shall deal with this condition in accordance with pertinent regulations respectively. An operator (or its designated personnel) and its pilot-in-command shall decide whether a takeoff or landing can be made in accordance with pertinent approved regulations, and shall be responsible for safety of flight and flight operations control.

5. Flight Rules with regard to Thunderstorms:

5.1 An aircraft may request a clearance from an air traffic service unit to detour a thunderstorm when the thunderstorm along its intended flight path might create a potential hazard to such flight.

5.2 After a special weather report for thunderstorms has been issued by a weather station, an operator shall conduct its flight operations in accordance with the authorized operating minimum, and demand that its flight crewmembers observe these minimum closely, and aware that a flight to penetrate a thunderstorm is strictly forbidden.

5.3 Issuance of Thunderstorm overhead an Aerodrome (TSRA):

5.3.1 During the period of the issuance of thunderstorm overhead an aerodrome, an aerodrome shall remain open if the weather conditions are not below its operating minimum. air traffic control unit shall provide, when appropriate, the latest weather reports for aerodromes where takeoffs and landings will be made.

5.3.2 During the period of a thunderstorm, when heavy precipitation causes the standing water on a runway, each aerodrome shall deal with this condition in accordance with pertinent regulations respectively. An operator (or its designated personnel) and its pilot-in-command shall decide whether a takeoff or landing can be made in accordance with pertinent approved regulations, and shall be responsible for safety of flight and flight operations control.

5.3.3 The weather station shall issue a special weather report if the thunderstorm has dissipated or if the thunderstorm has moved away from the overhead position of the aerodrome.

ATTACHMENT 4（Deleted）

ATTACHMENT 5 HELICOPTER PERFORMANCE AND OPERATING LIMITATIONS

This attachment was established in accordance with Article 84, 233 of this AOR proper, and the ICAO Annex 6, Part III, Attachment A.

1. Definitions

Category A. With respect to helicopters, means a multi-engined helicopter designed with the international airworthiness standards approved and adopted by CAA, and capable of operations using take-off and landing data scheduled under a critical engine failure concept which assures adequate designated surface area and adequate performance capability for continued safe flight or safe rejected take-off.

Category B. With respect to helicopters, means a single engine or multi-engined helicopter which does not meet Category A standards. Category B helicopters have no guaranteed capability to continue safe flight in the event of an engine failure, and a forced landing is assumed.

2. General

2.1 Helicopters operating in performance Classes 1 and 2 should be certificated in Category A.

2.2 Helicopters operating in performance Class 3 should be certificated in either Category A or Category B (or equivalent).

2.3 Except as permitted by the appropriate authority:

2.3.1 Take-off or landing from/to heliports in a congested hostile environment should only be conducted in performance Class 1.

2.3.2 Operations in performance Class 2 should only be conducted with a safe forced landing capability during take-off and landing.

2.3.3 Operations in performance Class 3 should only be conducted in a non-hostile environment.

2.4 In order to permit variations from 2.3.1, 2.3.2 and 2.3.3, the Authority should undertake a risk assessment, considering factors such as:

2.4.1 the type of operation and the circumstances of the flight;

2.4.2 the area/terrain over which the flight is being conducted;

2.4.3 the probability of a critical power-unit failure and the consequence of such an event;

2.4.4 the procedures to maintain the reliability of the power-unit(s);

2.4.5 the training and operational procedures to mitigate the consequences of the critical power-unit failure.

2.4.6 installation and utilization of a usage monitoring system.

Note 1.— It is recognized that there may be instances in which a safe forced landing may not be possible due to environmental or other factors. Many States have already applied risk management and permitted variations to specific operations such as operations to helidecks where exposure to an engine failure is present without a safe forced landing. Permitting variations based on risk assessment is a normal part of the process of a State developing a code of performance. When operations without suitable areas for safe forced landings are being considered, all relevant factors should be evaluated. These may include the likelihood of the event, the possible consequences, any *mitigating measures as well as the potential benefits and costs of the operation. The specific process for conducting this evaluation is to be decided by the State. In any case, appropriate consideration of a safe forced landing should be either implicit or explicit to a performance code's construction. Accident history and other relevant safety data and analysis are crucial to the development of operational regulations in this area. The resulting requirements may take many forms, such as designation of approved operational areas, routes of flight and obstacle clearance requirements.*

Note 2.— If there are routes with access to suitable forced landing areas, these should be used for flights into and out of the congested area. Where no such routes exist, evaluation of the operation could include consideration of mitigating factors such as the reliability of the propulsion system in the short periods when flight over a suitable forced landing area is not possible.

Example

Purpose and Scope

The following example provides *quantitative specifications* to illustrate a level of performance intended by the provisions of Section II, Chapter 3. A State may use this example as a basis for establishing its code of performance, but may introduce variations provided such variations meet the safety objectives of Section II, Chapter 3 and Attachment A.

Abbreviations Specific to Helicopter Operations

Abbreviations

D Maximum dimension of helicopter
DPBL Defined point before landing
DPATO Defined point after take-off
DR Distance travelled (helicopter)
FATO Final approach and take-off area
HFM Helicopter flight manual
LDP Landing decision point
LDAH Landing distance available (helicopter)
LDRH Landing distance required (helicopter)
R Rotor radius of helicopter
RTODR Rejected take-off distance required (helicopter)
TDP Take-off decision point
TLOF Touchdown and lift-off area
TODAH Take-off distance available (helicopter)
TODRH Take-off distance required (helicopter)
VTOSS Take-off safety speed

1. Definitions

1.1 Only applicable to operations in performance Class 1

Landing distance required (LDRH). The horizontal distance required to land and come to a full stop from a point 15 m (50 ft) above the landing surface.

Rejected take-off distance required (RTODR). The horizontal distance required from the start of the take-off to the point where the helicopter comes to a full stop following a power-unit failure and rejection of the take-off at the take-off decision point.

Take-off distance required (TODRH). The horizontal distance required from the start of the take-off to the point at which VTOSS, a selected height and a positive climb gradient are achieved, following failure of the critical power-unit being recognized at TDP, the remaining power-units operating within approved operating limits.

Note.— The selected height stated above is to be determined with reference to either:

1. the take-off surface.

2. a level defined by the highest obstacle in the take-off distance required.

1.2 Applicable to operations in all performance classes

D. The maximum dimension of the helicopter.

Distance DR. DR is the horizontal distance that the helicopter has travelled from the end of the take-off distance available.

Landing distance available (LDAH). The length of the final approach and take-off area plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height.

R. The rotor radius of the helicopter.

Take-off distance available (TODAH). The length of the final approach and take-off area plus the length of helicopter clearway (if provided) declared available and suitable for helicopters to complete the take-off.

Take-off flight path. The vertical and horizontal path, with the critical power-unit inoperative, from a specified point in the take-off to 300 m (1 000 ft) above the surface.

Touchdown and lift-off area (TLOF). A load bearing area on which a helicopter may touch down or lift off.

VTOSS. Take-off safety speed for helicopters certificated in Category A.

Vy . Best rate of climb speed.

2. General

2.1 Applicability

2.1.1 Helicopters with a passenger seating configuration of more than 19, or helicopters operating to or from a heliport in a congested hostile environment should be operating in performance Class 1.

2.1.2 Helicopters with a passenger seating configuration of 19 or less but more than 9 should be operating in performance Class 1 or 2, unless operating to or from a congested hostile environment in which case the helicopters should be operating in performance Class 1.

2.1.3 Helicopters with a passenger seating configuration of 9 or less should be operating in performance Class 1, 2 or 3, unless operating to or from a congested hostile environment in which case the helicopters should be operating in performance Class 1.

2.2 Significant performance factors

To determine the performance of the helicopter, account should be taken of at least the following factors:

2.2.1 mass of the helicopter.

2.2.2 elevation or pressure-altitude and temperature.

2.2.3 wind; for take-off and landing, accountability for wind should be no more than 50 per cent of any reported steady headwind component of 5 knots or more. Where take-off and landing with a tailwind component is permitted in the flight manual, not less than 150 per cent of any reported tailwind component should be allowed. Where precise wind measuring equipment enables accurate measurement of wind velocity over the point of take-off and landing, these values may be varied.

2.3 Operating conditions

2.3.1 For helicopters operating in performance Class 2 or 3 in any flight phase where a power-unit failure may cause the helicopter to force-land:

2.3.1.1 a minimum visibility should be defined by the operator, taking into account the characteristics of the helicopter, but should not be less than 800 m for helicopters operating in performance Class 3.

2.3.1.2 the operator should verify that the surface below the intended flight path permits the pilot to execute a safe forced landing.

2.3.2 Performance Class 3 operations are not to be performed:

2.3.2.1 out of the sight of the surface.

2.3.2.2 at night.

2.3.2.3 when the cloud ceiling is less than 180 m (600 ft).

Note.— The text of 2.3 contains an interpretation of the principle of “appropriate consideration” *for a safe forced landing (contained in Section II, Chapter 3, 3.1.2). For States which take advantage of Section II, Chapter 3, 3.4, or which have risk assessed exposure and/or permitted night VFR operations, 2.3 should be replaced with an appropriately constructed alternative text.*

2.4 Obstacle accountability area

2.4.1 For the purpose of the obstacle clearance requirements in 4 below, an obstacle should be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:

2.4.1.1 for VFR operations:

a) half of the minimum width of the FATO (or the equivalent term used in the helicopter flight manual) defined in the helicopter flight manual (or when no width is defined, 0.75 D), plus 0.25 times D (or 3 m, whichever is greater), plus:

1) 0.10 DR for VFR day operations

2) 0.15 DR for VFR night operations

2.4.1.2 for IFR operations:

a) 1.5 D (or 30 m, whichever is greater), plus:

1) 0.10 DR for IFR operations with accurate course guidance

2) 0.15 DR for IFR operations with standard course guidance

3) 0.30 DR for IFR operations without course guidance

2.4.1.3 for operations with initial take-off conducted visually and converted to IFR/IMC at a transition point, the criteria required in 2.4.1 a) apply up to the transition point then the criteria required in 2.4.1 b) apply after the transition point.

2.4.2 For a take-off using a backup take-off procedure (or with lateral transition), for the purpose of the obstacle clearance requirements in 4 below, an obstacle located below the backup flight path (lateral flight path) should be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than half of the minimum width of the FATO (or the equivalent term used in the helicopter flight manual) defined in the helicopter flight manual (when no width is defined, 0.75 D plus 0.25 times D, or 3 m, whichever is greater) plus:

2.4.2.1 0.10 distance travelled from the back edge of the FATO for VFR day operations.

2.4.2.2 0.15 distance travelled from the back edge of the FATO for VFR night operations.

2.4.3 Obstacles may be disregarded if they are situated beyond:

2.4.3.1 7 R for day operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

2.4.3.2 10 R for night operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

2.4.3.3 300 m if navigational accuracy can be achieved by appropriate navigation aids.

2.4.3.4 900 m in the other cases.

Note.— Standard course guidance includes ADF and VOR guidance. Accurate course guidance includes ILS, MLS, or other course guidance providing an equivalent navigational accuracy.

2.4.4 The transition point should not be located before the end of TODRH for helicopters operating in performance Class 1 and before the DPATO for helicopters operating in performance Class 2.

2.4.5 When considering the missed approach flight path, the divergence of the obstacle accountability area should only apply after the end of the take-off distance available.

2.5 Source of performance data

An operator should ensure that the approved performance data contained in the helicopter flight manual is used to determine compliance with this Example, supplemented as necessary with other data acceptable to the State of the Operator.

3. Operating area considerations

3.1 FATO

For operations in performance Class 1, the dimensions of the FATO should be at least equal to the dimensions specified in the helicopter flight manual.

Note.— A FATO that is smaller than the dimensions specified in the helicopter flight manual may be accepted if the helicopter is capable of a hover out of ground effect with one engine inoperative (HOGE OEI), and the conditions of 4.1 below can be met.

4. Limitations resulting from performance

4.1 Operations in performance Class 1

4.1.1 Take-off

4.1.1.1 The take-off mass of the helicopter should not exceed the maximum take-off mass specified in the flight manual for the procedure to be used and to achieve a rate of climb of 100 ft/min at 60 m (200 ft) and 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining power-units operating at an appropriate power rating, taking into account the parameters specified in 2.2 (Figure A-1).

4.1.1.2 Rejected take-off

The take-off mass should be such that the rejected take-off distance required does not exceed the rejected take-off distance available.

4.1.1.3 Take-off distance

The take-off mass should be such that the take-off distance required does not exceed the take-off distance available.

Note 1.— As an alternative, the requirement above may be disregarded provided that the helicopter with the critical power-unit failure recognized at TDP can, when continuing the take-off, clear all obstacles from the end of the take-off distance available to the end of the take-off distance required by a vertical margin of not less than 10.7 m (35 ft) (Figure A-2).

Note 2.— For elevated heliports, the airworthiness code provides appropriate clearance from the elevated heliport edge(Figure A-3).

4.1.1.4 Backup procedures (or procedures with lateral transition)

An operator should ensure that, with the critical power-unit inoperative, all obstacles below the backup flight path (the lateral flight path) are cleared by an adequate margin. Only the obstacles specified in 2.4.2 should be considered.

4.1.2 Take-off flight path

From the end of the take-off distance required with the critical power-unit inoperative:

4.1.2.1 The take-off mass should be such that the climb path provides a vertical clearance of not less than 10.7 m (35 ft)

for VFR operations and 10.7 m (35 ft) plus 0.01 DR for IFR operations above all obstacles located in the climb path. Only obstacles as specified in 2.4 should be considered.

4.1.2.2 Where a change of direction of more than 15 degrees is made, obstacle clearance requirements should be increased by 5 m (15 ft) from the point at which the turn is initiated. This turn should not be initiated before reaching a height of 60 m (200 ft) above the take-off surface, unless permitted as part of an approved procedure in the flight manual.

4.1.3 En route

The take-off mass is such that it is possible, in case of the critical power-unit failure occurring at any point of the flight path, to continue the flight to an appropriate landing site and achieve the minimum flight altitudes for the route to be flown.

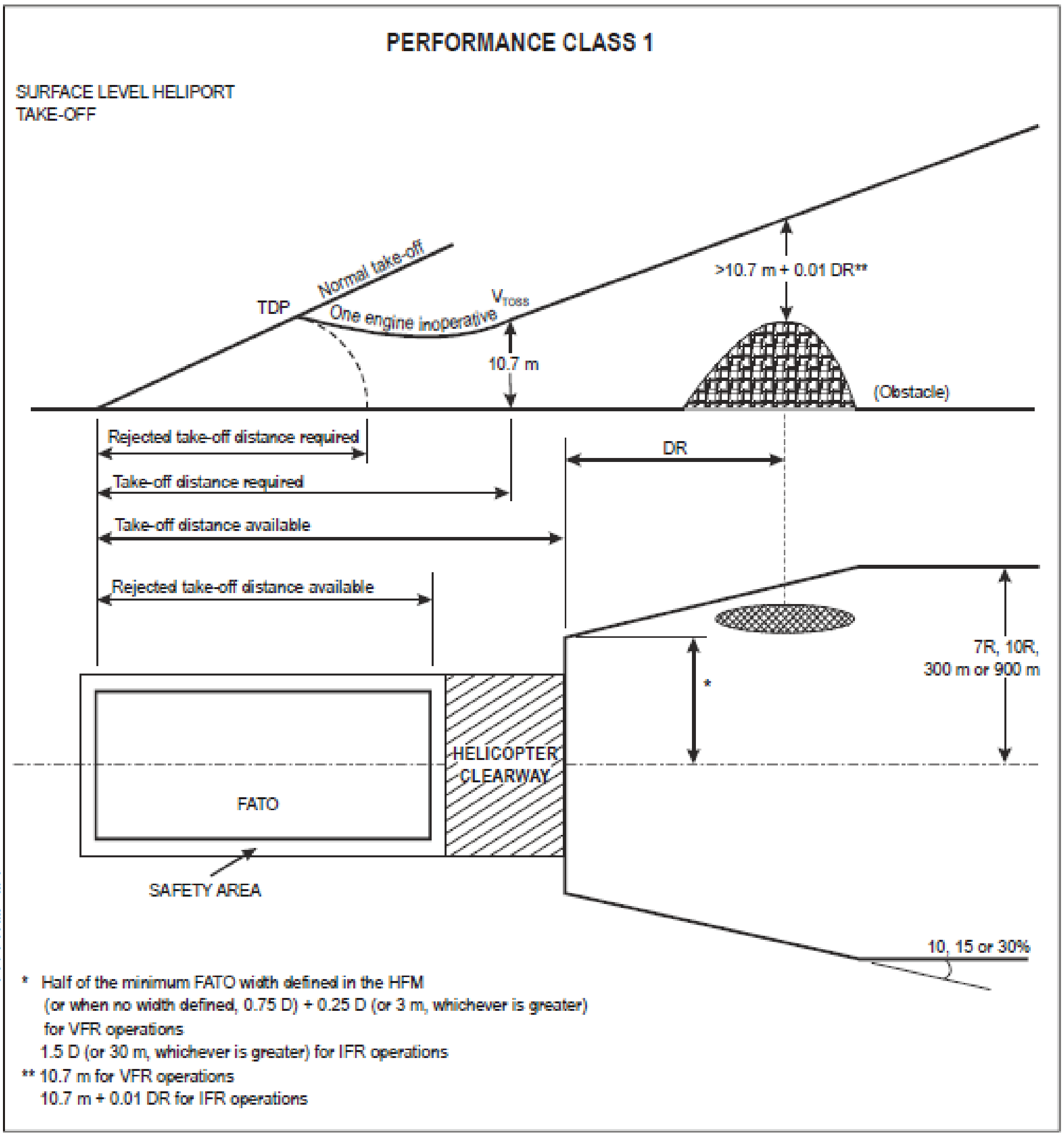


Figure A-1

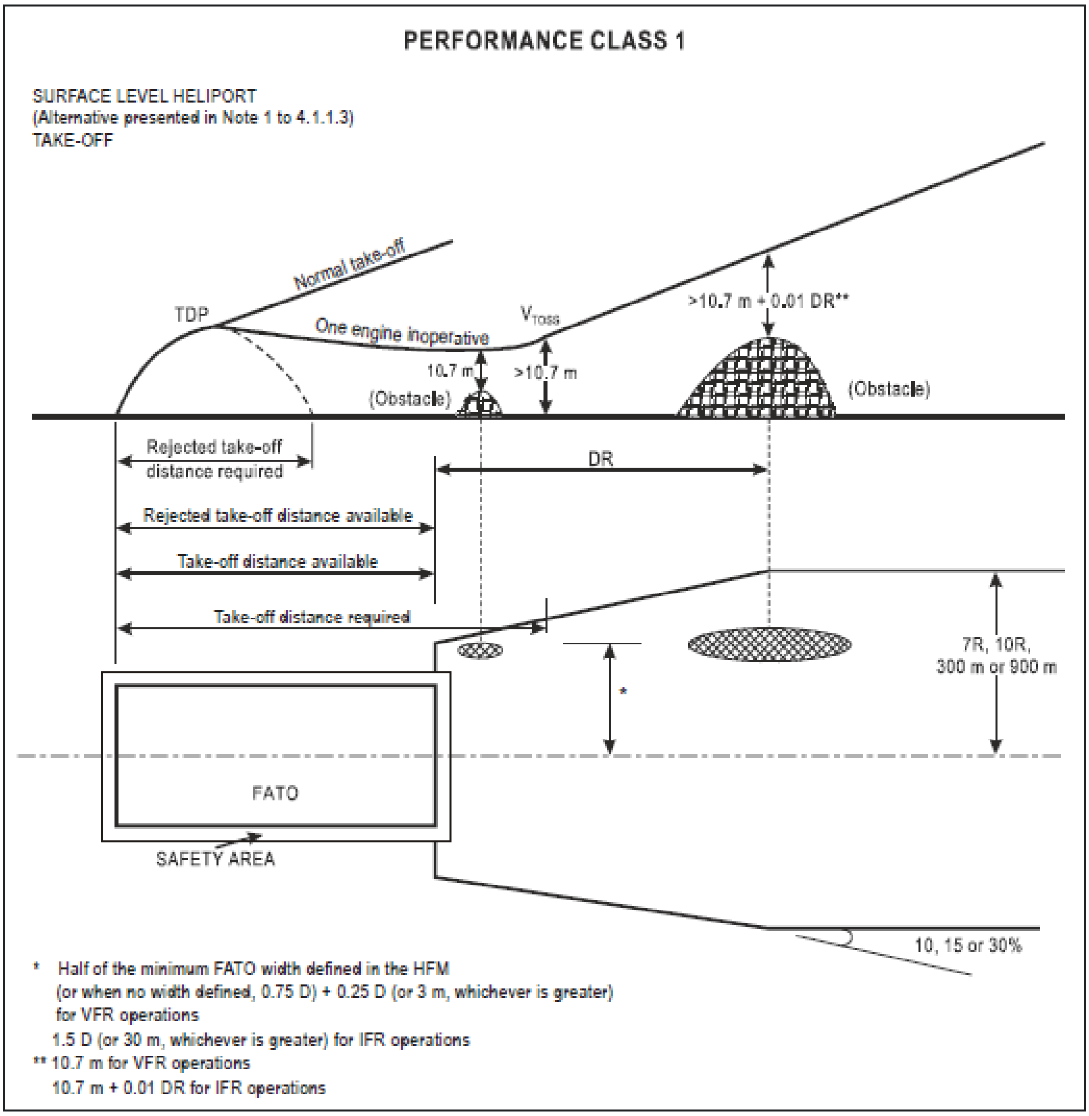

PERFORMANCE CLASS 1
SURFACE LEVEL HELIPORT
(Alternative presented in Note 1 to 4.1.1.3)
TAKE-OFF
Normal take-off
TDP
One engine inoperative
V_{TOSS}
>10.7 m + 0.01 DR**
10.7 m
>10.7 m
(Obstacle)
(Obstacle)
Rejected take-off distance required
DR
Rejected take-off distance available
Take-off distance available
Take-off distance required
7R, 10R, 300 m or 900 m
*
FATO
SAFETY AREA
10, 15 or 30%
* Half of the minimum FATO width defined in the HFM (or when no width defined, 0.75 D) + 0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure A-2

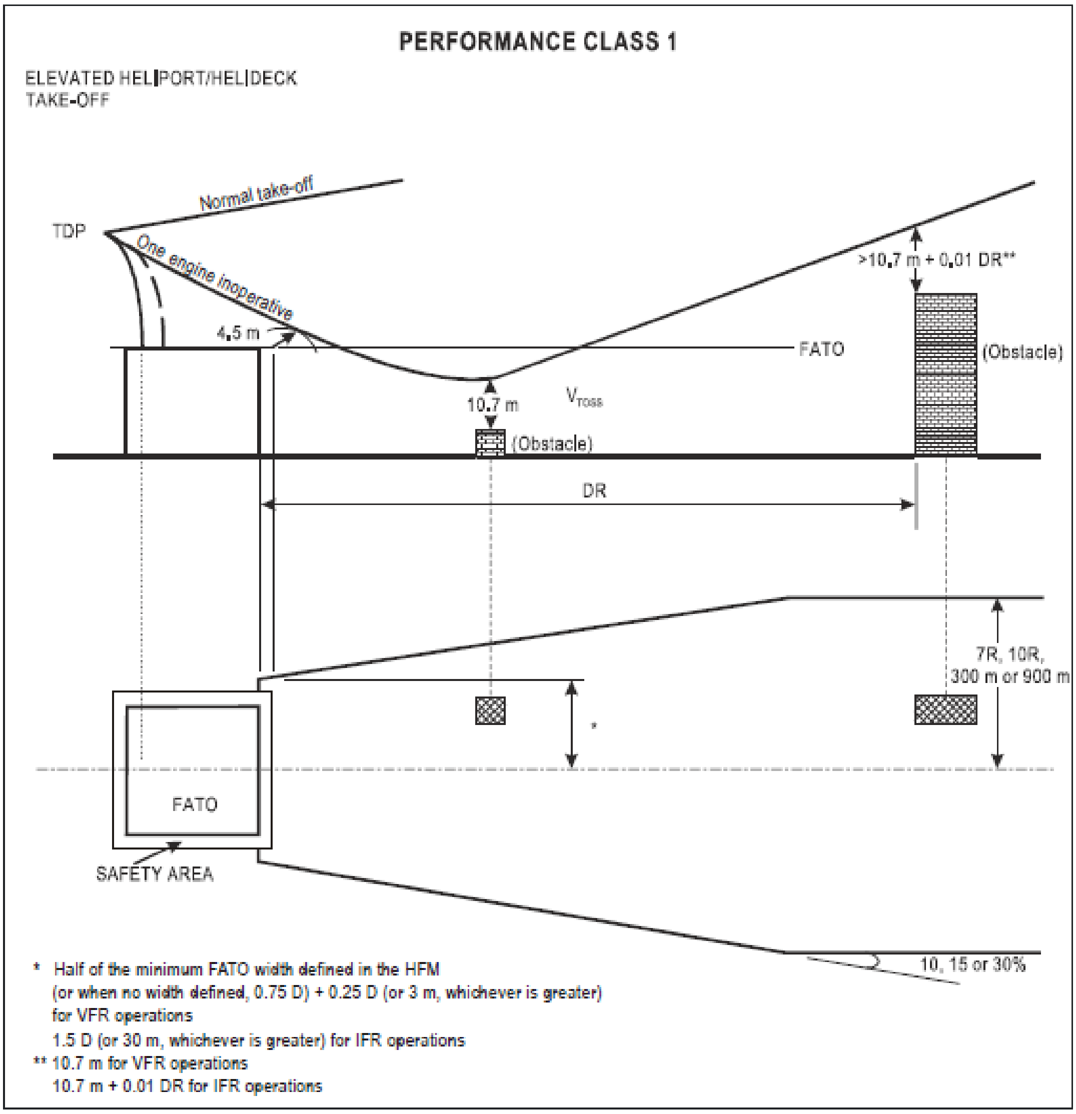


Figure A-3

4.1.4 Approach, landing and balked landing (Figures A-4 and A-5)

The estimated landing mass at the destination or alternate should be such that:

4.1.4.1 it does not exceed the maximum landing mass specified in the flight manual for the procedure to be used and to achieve a rate of climb of 100 ft/min at 60 m (200 ft) and 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining power-units operating at an appropriate power rating, taking into account the parameters specified in 2.2;

4.1.4.2 the landing distance required does not exceed the landing distance available unless the helicopter, with the critical power-unit failure recognized at LDP can, when landing, clear all obstacles in the approach path;

4.1.4.3 in case of the critical power-unit failure occurring at any point after the LDP, it is possible to land and stop within the FATO.

4.1.4.4 in the event of the critical power-unit failure being recognized at the LDP or at any point before the LDP, it is possible either to land and stop within the FATO or to overshoot, meeting the conditions of 4.1.2.1 and 4.1.2.2.

Note.— For elevated heliports, the airworthiness code provides appropriate clearance from the elevated heliport edge.

4.2 Operations in performance Class 2

4.2.1 *Take-off* (Figures A-6 and A-7)

The mass of the helicopter at take-off should not exceed the maximum take-off mass specified in the flight manual for the procedures to be used and to achieve a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical power-unit inoperative and the remaining power-units operating at an appropriate power rating, taking into account the parameters specified in 2.2.

4.2.2 Take-off flight path

From DPATO or, as an alternative, no later than 60 m (200 ft) above the take-off surface with the critical power-unit inoperative, the conditions of 4.1.2.1 and 4.1.2.2 should be met.

4.2.3 En route

The requirements of 4.1.3 should be met.

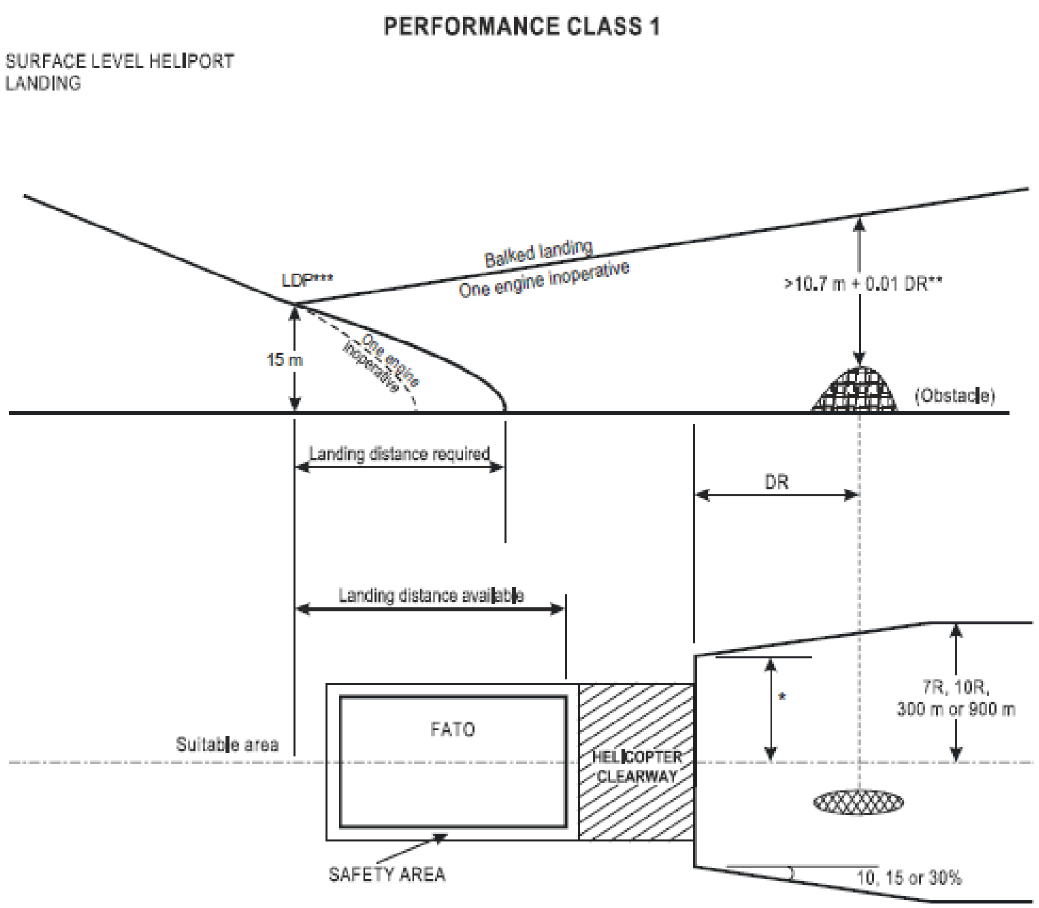
4.2.4 Approach, landing and balked landing (Figures A-8 and A-9)

The estimated landing mass at the destination or alternate should be such that:

4.2.4.1 it does not exceed the maximum landing mass specified in the flight manual for a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical power-unit inoperative and the remaining power units operating at an appropriate power rating, taking into account the parameters specified in 2.2;

4.2.4.2 it is possible, in case of the critical power-unit failure occurring at or before the DPBL, either to perform a safe forced landing or to overshoot, meeting the requirements of 4.1.2.1 and 4.1.2.2.

4.1.4.3 Only obstacles as specified in 2.4 should be considered.



* Half of the minimum FATO width defined in the HFM (or when no width defined, 0.75 D) + 0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations

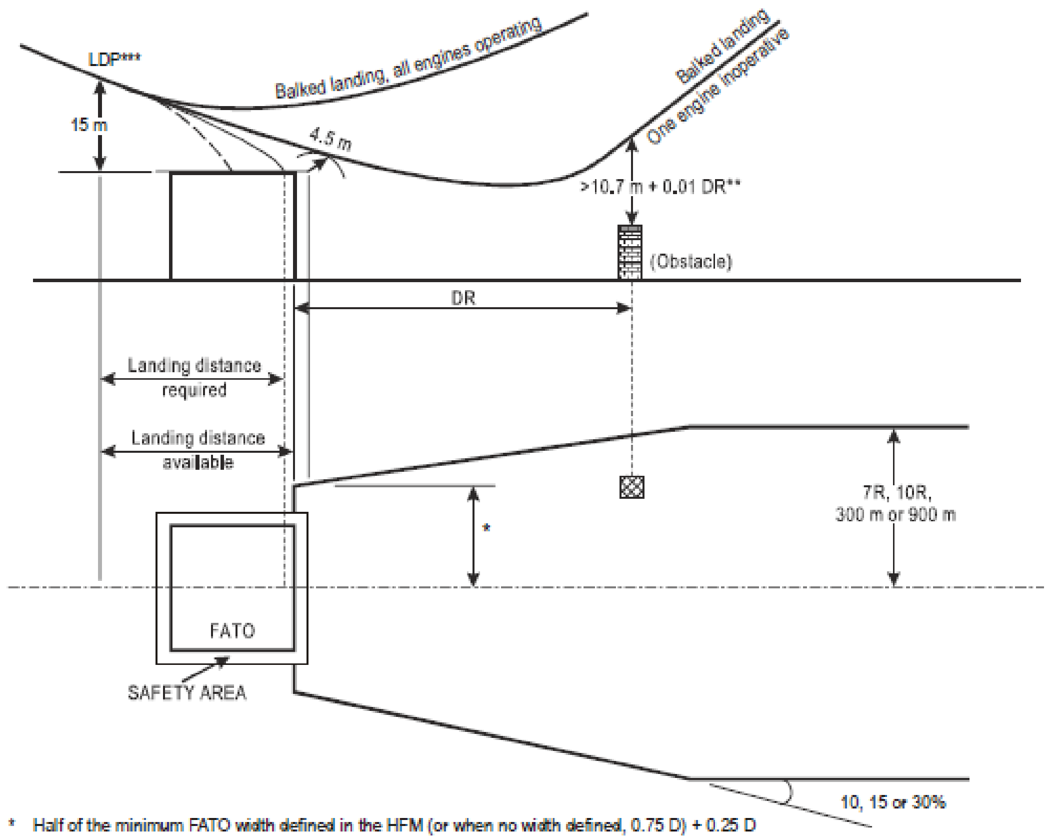
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

*** For the purposes of the diagram, all paths and distances emanate from 50 ft (15 m).
The actual height of this point and position of the LDP should be obtained from the HFM.

Figure A-4

PERFORMANCE CLASS 1

ELEVATED HELIPORT/HELIDECK
LANDING

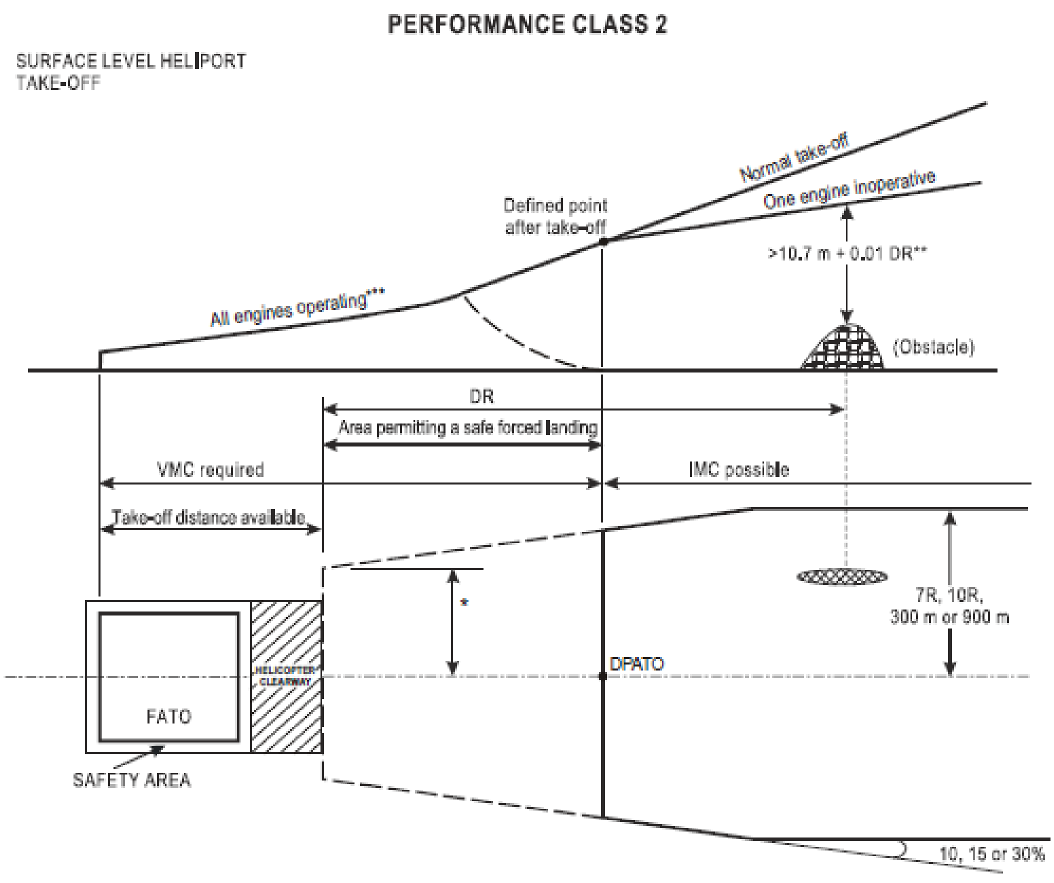


* Half of the minimum FATO width defined in the HFM (or when no width defined, 0.75 D) + 0.25 D
(or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations

** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

*** For the purposes of the diagram, all paths and distances emanate from 50 ft (15 m).
The actual height of this point and position of the LDP should be obtained from the HFM.

Figure A-5



* 0.75 D + [0.25 D (or 3 m, whichever is greater)] for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
*** Only the all-engines-operating flight path is shown.

Figure A-6

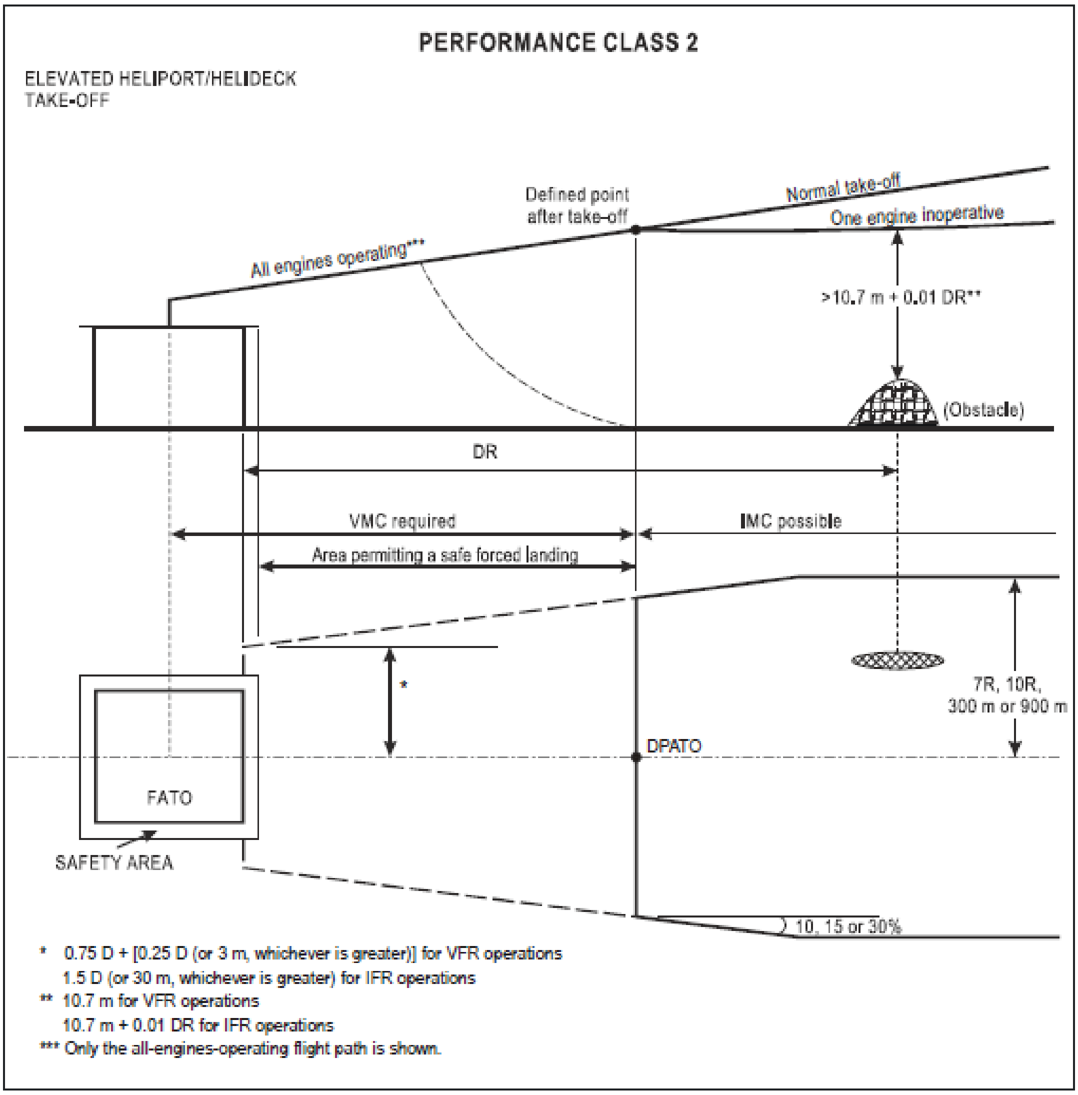

PERFORMANCE CLASS 2
ELEVATED HELIPORT/HELIDECK
TAKE-OFF
Defined point
after take-off
Normal take-off
One engine inoperative
All engines operating***
>10.7 m + 0.01 DR**
(Obstacle)
DR
VMC required
IMC possible
Area permitting a safe forced landing
*
7R, 10R,
300 m or 900 m
DPATO
FATO
SAFETY AREA
10, 15 or 30%
* 0.75 D + [0.25 D (or 3 m, whichever is greater)] for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
*** Only the all-engines-operating flight path is shown.

Figure A-7

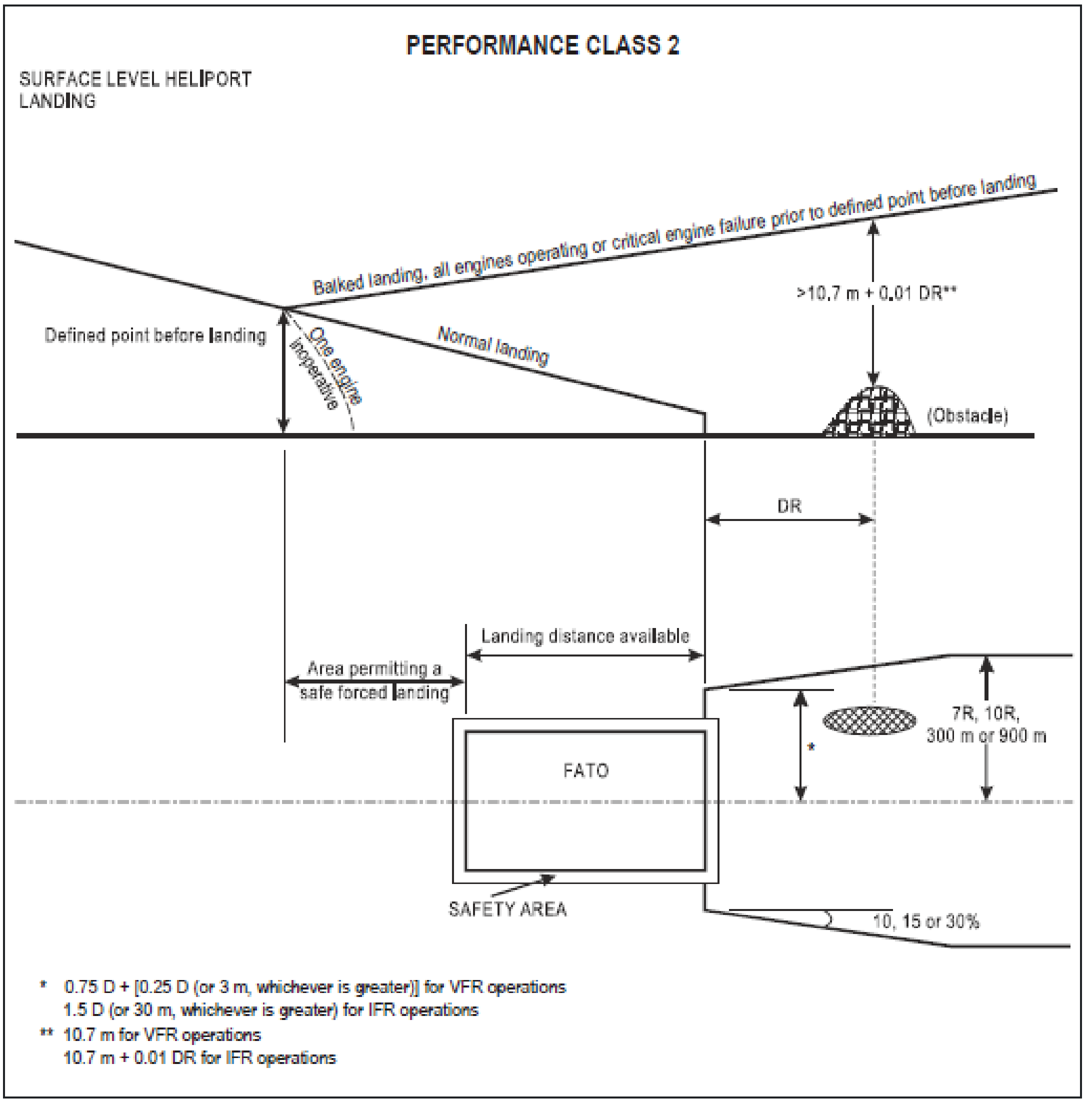

PERFORMANCE CLASS 2
SURFACE LEVEL HELIPORT
LANDING
Balked landing, all engines operating or critical engine failure prior to defined point before landing
>10.7 m + 0.01 DR**
Defined point before landing
One engine inoperative
Normal landing
(Obstacle)
DR
Landing distance available
Area permitting a safe forced landing
7R, 10R, 300 m or 900 m
FATO
SAFETY AREA
10, 15 or 30%
* 0.75 D + [0.25 D (or 3 m, whichever is greater)] for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure A-8

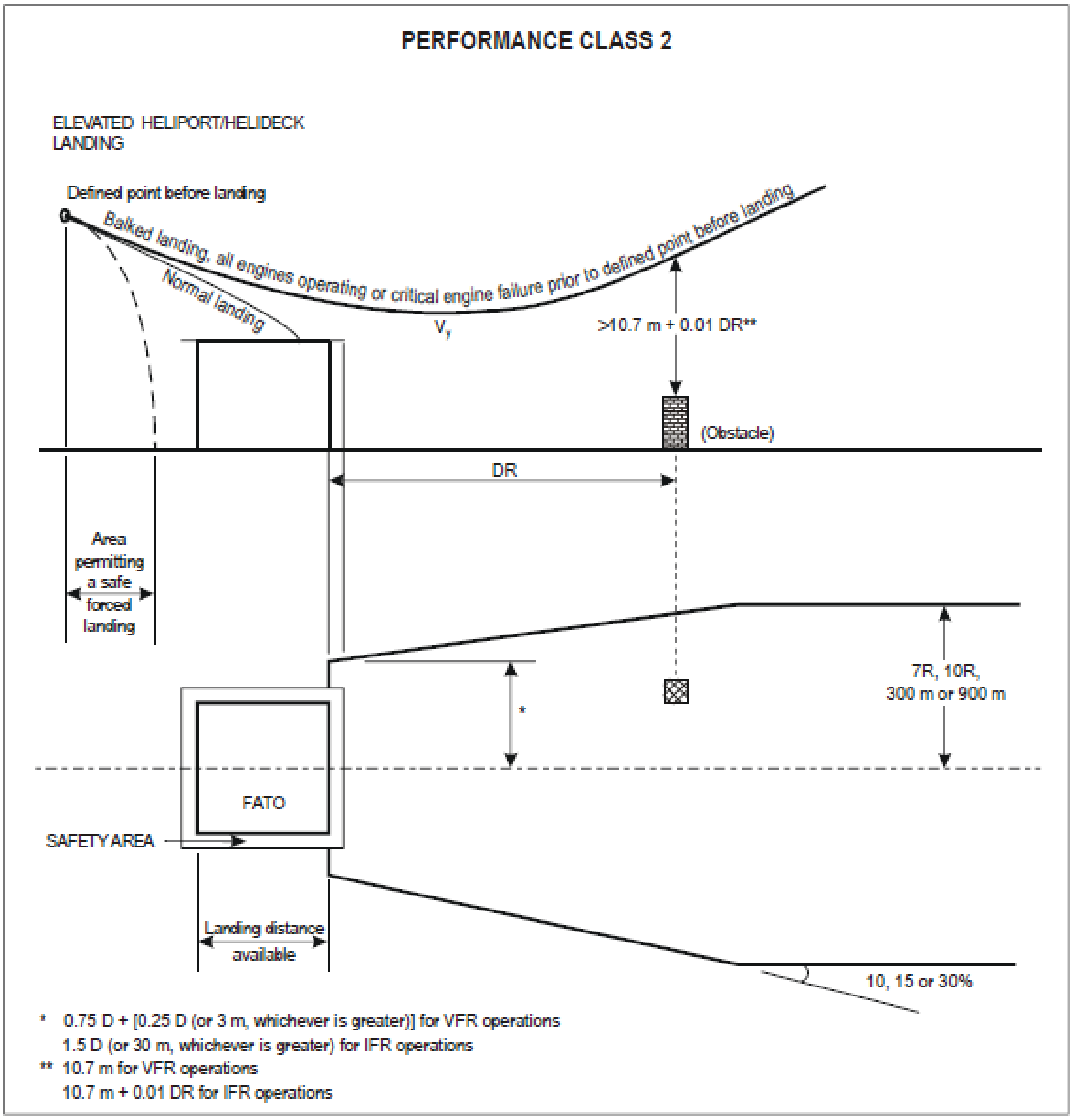


Figure A-9

4.3 Operations in performance Class 3

4.3.1 Take-off

The mass of the helicopter at take-off should not exceed the maximum take-off mass specified in the flight manual for a hover in ground effect with all power-units operating at take-off power, taking into account the parameters specified in 2.2. If conditions are such that a hover in ground effect is not likely to be established, the take-off mass should not exceed the maximum mass specified for a hover out of ground effect with all power-units operating at take-off power, taking into account the parameters specified in 2.2.

4.3.2 Initial climb

The take-off mass should be such that the climb path provides adequate vertical clearance above all obstacles located along the climb path, all engines operating.

4.3.3 En route

The take-off mass is such that it is possible to achieve the minimum flight altitudes for the route to be flown, all engines operating.

4.3.4 Approach and landing

The estimated landing mass at the destination or alternate should be such that:

4.3.4.1 it does not exceed the maximum landing mass specified in the flight manual for a hover in ground effect with all power-units operating at take-off power, taking into account the parameters specified in 2.2. If conditions are such that a hover in ground effect is not likely to be established, the take-off mass should not exceed the maximum mass specified for a hover out of ground effect with all power-units operating at take-off power, taking into account the parameters specified in 2.2;

4.3.4.2 it is possible to perform a balked landing, all engines operating, at any point of the flight path and clear all obstacles by an adequate vertical interval.

ATTACHMENT 6 Airplane Performance Operating Limitations

This attachment was established in accordance with Article 84, 233 of this AOR proper, and the ICAO Annex 6, Part I, Attachment C.

The purpose of this Attachment is to provide guidance as to the level of performance intended by the provisions of Chapter 5 as applicable to turbine-powered subsonic transport type airplanes over 5,700 kg maximum certificated take-off mass having two or more engines. However, where relevant, it can be applied to all subsonic turbine-powered or piston-engine airplanes having two, three or four engines. Piston-engine airplanes having two, three or four engines which cannot comply with this Attachment may continue to be operated in accordance with Examples 1 or 2 of this Attachment. This example also applies for Principal National Airworthiness Code effected in 1969.

No detailed study has been made of the applicability of this example to operations subsonic turbine-powered airplanes which the individual certificate of airworthiness is first issued before 1969.
This Attachment is not intended for application to airplanes having short take-off and landing (STOL) or vertical take-off and landing (VTOL) capabilities.
The validity of this example has not therefore been established for operations, which may involve low decision heights and be associated with low minima operating techniques and procedures.

1. Definitions

Accelerate-stop distance available (ASDA). The length of the take-off run available plus the length of the stopway, if provided.

CAS (calibrated airspeed). The calibrated airspeed is equal to the airspeed indicator reading corrected for position and instrument error. (As a result of the sea level adiabatic compressible flow correction to the airspeed instrument dial, CAS is equal to the true airspeed (TAS) in Standard Atmosphere at sea level.)

Declared temperature. A temperature selected in such a way that when used for performance purposes, over a series of operations, the average level of safety is not less than would be obtained by using official forecast temperatures.

Expected. Used in relation to various aspects of performance (e.g. rate or gradient of climb), this term means the standard performance for the type, in the relevant conditions (e.g. mass, altitude and temperature).

Grooved or porous friction course runway. A paved runway that has been prepared with lateral grooving or a porous friction course (PFC) surface to improve braking characteristics
when wet.

Height. The vertical distance of a level, a point, or an object considered as a point, measured from a specified datum.

Note.— For the purposes of this example, the point referred to above is the lowest part of the airplane and the specified datum is the take-off or landing surface, whichever is applicable.

Landing distance available (LDA). The length of runway which is declared available and suitable

for the ground run of an airplane landing.
Landing surface. That part of the surface of an aerodrome which the aerodrome authority has declared available for the normal ground or water run of aircraft landing in a particular direction.
Net gradient. The net gradient of climb throughout these requirements is the expected gradient of climb diminished by the maneuvre performance (i.e. that gradient of climb necessary to provide power to maneuvre) and by the margin (i.e. that gradient of climb necessary to provide for those variations in performance which are not expected to be taken explicit account of operationally).
Reference humidity. The relationship between temperature and reference humidity is defined as follows:
— at temperatures at and below ISA, 80 per cent relative humidity,
— at temperatures at and above ISA + 28° C, 34 per cent relative humidity,
— at temperatures between ISA and ISA + 28° C, the relative humidity varies linearly between the humidity specified for those temperatures.
***Runway surface condition*.** The state of the surface of the runway: either dry, wet, or contaminated:
a) *Contaminated runway*. A runway is contaminated when more than 25 per cent of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by:
— water, or slush more than 3 mm (0.125 in) deep;
— loose snow more than 20 mm (0.75 in) deep; or
— compacted snow or ice, including wet ice.
b) *Dry runway*. A dry runway is one which is clear of contaminants and visible moisture within the required length and the width being used.
c) *Wet runway.* A runway that is neither dry nor contaminated.
Note 1.— In certain situations, it may be appropriate to consider the runway contaminated even when it does not meet the above definition. For example, if less than 25 per cent ofthe runway surface area is covered with water, slush, snow or ice, but it is located where rotation or lift-off will occur, or during the high speed part of the take-off roll, the effect will be far more significant than if it were encountered early in take-off while at low speed. In this situation, the runwayshould be considered to be contaminated.
Note 2.— Similarly, a runway that is dry in the area where braking would occur during a high speed rejected take-off, but damp or wet (without measurable water depth) in the area where acceleration would occur, may be considered to be dry for computing take-off performance. For example, if the first 25 per cent of the runway was damp, but the remaining runway length was dry, the runway would be wet using the definitions above. However, since a wet runway does not affected acceleration, and the braking portion of a rejected take-off would take place on a dry surface, it would be appropriate to use dry runway take-off performance.
***Take-off distance available (TODA)*.** The length of the takeoff run available plus the length of the clearway, if provided.

Take-off run available (TORA). The length of runway declared available and suitable for the ground run of an airplane taking off.

Take-off surface. That part of the surface of an aerodrome which the aerodrome authority has declared available for the normal ground or water run of aircraft taking off in a particular direction.

TAS (True airspeed). The speed of the airplane relative to undisturbed air.

VSo . A stalling speed or minimum steady flight speed in the landing configuration. (*Note.— See Example 1, 2.4.)*

VS1 . A stalling speed or minimum steady flight speed. (*Note.—See Example 1, 2.5.)*

Note 1.— See Chapter 1 and Annexes 8 and 14, Volume I,for other definitions.

Note 2.— The terms "accelerate-stop distance", "take-off distance", "V1", "take-off run", "net take-off flight path", "one engine inoperative en-route net flight path", and "two engines inoperative en-route net flight path", as relating to the airplane, have their meanings defined in the airworthiness requirements under which the airplane was certificated. If any of these definitions are found inadequate, then a definition specified by the State of the Operator should be use

3. General

3.1 The provisions of 4 to 7 should be complied with, unless deviations therefrom are specifically authorized by the State of the Operator on the grounds that the special circumstances of a particular case make a literal observance of these provisions unnecessary for safety.

3.2 Compliance with 4 to 7 should be established using performance data in the flight manual and in accordance with other applicable operating requirements. In no case should the limitations in the flight manual be exceeded. However, additional limitations may be applied when operational conditions not included in the flight manual are encountered. The performance data contained in the flight manual may be supplemented with other data acceptable to the State of the Operator if necessary to show compliance with 4 to 7. When applying the factors prescribed in this Attachment, account may be taken of any operational factors already incorporated in the flight manual data to avoid double application of factors.

3.3 The procedures scheduled in the flight manual should be followed except where operational circumstances require the use of modified procedures in order to maintain the intended level of safety.

Note.— See the Airworthiness Manual *(Doc 9760) for the related airworthiness performance guidance material.*

4. Airplane take-off performance limitations

4.1 No airplane should commence a take-off at a mass which exceeds the take-off mass specified in the flight manual for the altitude of the aerodrome and for the ambient temperature existing at the time of the take-off.

4.2 No airplane should commence a take-off at a mass such that, allowing for normal consumption of fuel and oil in flight to the aerodrome of destination and to the destination alternate aerodromes, the mass on arrival will exceed the landing mass specified in the flight manual for the altitude of each of the aerodromes involved and for the ambient temperatures anticipated at the time of landing.

4.3 No airplane should commence a take-off at a mass which exceeds the mass at which, in accordance with the minimum distances for take-off scheduled in the flight manual, compliance with 4.3.1 to 4.3.3 inclusive is shown.

4.3.1 The take-off run required should not exceed the take-off run available.

4.3.2 The accelerate-stop distance required should not exceed the accelerate-stop distance available.

4.3.3 The take-off distance required should not exceed the take-off distance available.

4.3.4 When showing compliance with 4.3 the same value of V1 for the continued and discontinued take-off phases should be used.

4.4 When showing compliance with 4.3 the following parameters should be taken into account:

a) the pressure altitude at the aerodrome;

b) the ambient temperature at the aerodrome;

c) the runway surface condition and the type of the runway surface;

d) the runway slope in the direction of the take-off;

e) the runway slope;

f) not more than 50 per cent of the reported headwind component or not less than 150 per cent of the reported tailwind component; and

g) the loss, if any, of runway length due to alignment of the airplane prior to take-off.

4.5 Credit is not taken for the length of the stopway or the length of the clearway unless they comply with the relevant specifications in Annex 14, Volume I.

5. Take-off obstacle clearance limitations

5.1 No airplane should commence a take-off at a mass in excess of that shown in the flight manual to correspond with a net take-off flight path which clears all obstacles either by at least a height of 10.7 m (35 ft) vertically or at least 90 m (300 ft) plus 0.125D laterally, where D is the horizontal distance the airplane has travelled from the end of take-off distance available, except as provided in 5.1.1 to 5.1.3 inclusive. For airplanes with a wingspan of less than 60 m (200 ft) a horizontal obstacle clearance of half the airplane wingspan plus 60 m (200 ft), plus 0.125D may be used. In determining the allowable deviation of the net take-off flight path in order to avoid obstacles by at least the distances specified, it is assumed that the airplane is not banked before the clearance of the net take-off flight path above obstacles is at least one half of the wingspan but not less than 15.2 m (50 ft) height and that the bank thereafter does not exceed 15°, except as provided in 5.1.4. The net take-off flight path considered is for the altitude of the aerodrome and for the ambient temperature and not more than 50 per cent of the reported headwind component or not less than 150 per cent of the reported tailwind component existing at the time of take-off. The take-off obstacle accountability area defined above is considered to include the effect of crosswinds.

5.1.1 Where the intended track does not include any change of heading greater than 15°,

a) for operations conducted in VMC by day, or

b) for operations conducted with navigation aids such that the pilot can maintain the airplane on the intended track with the same precision as for operations specified in 5.1.1 a),obstacles at a distance greater than 300 m (1 000 ft) on either side of the intended track need not be cleared.

5.1.2 Where the intended track does not include any change of heading greater than 15° for operations conducted in IMC, or in VMC by night, except as provided in 5.1.1 b); and where the intended track includes changes of heading greater than 15° for operations conducted in VMC by day, obstacles at a distance greater than 600 m (2 000 ft) on either side of the intended track need not be cleared.

5.1.3 Where the intended track includes changes of heading greater than 15° for operations conducted in IMC, or in VMC by night, obstacles at a distance greater than 900 m (3 000 ft) on either side of the intended track need not be cleared.

5.1.4 An airplane may be operated with bank angles of more than 15° below 120 m (400 ft) above the elevation of the end of the take-off run available, provided special procedures are used that allow the pilot to fly the desired bank angles safely under all circumstances. Bank angles should be limited to not more than 20° between 30 m (100 ft) and 120 m (400 ft), and not more than 25° above 120 m (400 ft). Methods approved by the State of the Operator should be used to account for the effect of bank angle on operating speeds and flight path including the distance increments resulting from increased operating speeds. The net take-off flight path in which the airplane is banked by more than 15° should clear all obstacles by a vertical distance of at least 10.7 m (35 ft) relative to the lowest part of the banked airplane within the horizontal distance specified in 5.1. The use of bank angles greater than those mentioned above should be subject to the approval from the State of the Operator.

6. En-route limitations

6.1 General

At no point along the intended track is an airplane having three or more engines to be more than 90 minutes at normal cruising speed away from an aerodrome at which the distance specifications for alternate aerodromes (see 7.3) are complied with and where it is expected that a safe landing can be made, unless it complies with 6.3.1.1.

6.2 One engine inoperative

6.2.1 No airplane should commence a take-off at a mass in excess of that which, in accordance with the one-engineinoperative en-route net flight path data shown in the flight manual, permits compliance either with 6.2.1.1 or 6.2.1.2 at all points along the route. The net flight path has a positive slope at 450 m (1,500 ft) above the aerodrome where the landing is assumed to be made after engine failure. The net flight path used is for the ambient temperatures anticipated along the route. In meteorological conditions where icing protection systems are to be operable, the effect of their use on the net flight path data is taken into account.

6.2.1.1 The slope of the net flight path is positive at an altitude of at least 300 m (1 000 ft) above all terrain and obstructions along the route within 9.3 km (5 NM) on either side of the intended track.

6..2.1.2 The net flight path is such as to permit the airplane to continue flight from the cruising altitude to an aerodrome where a landing can be made in accordance with 7.3, the net flight path clearing vertically, by at least 600 m (2 000 ft), all terrain and obstructions along the route within

9.3 km (5 NM) on either side of the intended track. The provisions of 6.2.1.2.1 to 6.2.1.2.5 inclusive are applied.

6.2.1.2.1 The engine is assumed to fail at the most critical point along the route, allowance being made for indecision and navigational error.

6.2.1.2.2 Account is taken of the effects of winds on the flight path.

6.2.1.2.3 Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with satisfactory fuel reserves, if a safe procedure is used.

6.2.1.2.4 The aerodrome, where the airplane is assumed to land after engine failure, is specified in the operational flight plan, and it meets the appropriate aerodrome operating minima at the expected time of use.

6.2.1.2.5 The consumption of fuel and oil after the engine becomes inoperative is that which is accounted for in the net flight path data shown in the flight manual.

6.3 Two engines inoperative — airplanes with three or more engines

6.3.1 Airplanes which do not comply with 6.1 should comply with 6.3.1.1.

6.3.1.1 No airplane should commence a take-off at a mass in excess of that which, according to the two-engine inoperative en-route net flight path data shown in the flight manual, permits the airplane to continue the flight from the point where two engines are assumed to fail simultaneously, to an aerodrome at which the landing distance specification for alternate aerodromes (see 7.3) is complied with and where it is expected that a safe landing can be made. The net flight path clears vertically, by at least 600 m (2 000 ft) all terrain and obstructions along the route within 9.3 km (5 NM) on either side of the intended track. The net flight path considered is for the ambient temperatures anticipated along the route. In altitudes and meteorological conditions where icing protection systems are to be operable, the effect of their use on the net flight path data is taken into account. The provisions of 6.3.1.1.1 to 6.3.1.1.5 inclusive apply.

6.3.1.1.1 The two engines are assumed to fail at the most critical point of that portion of the route where the airplane is at more than 90 minutes at normal cruising speed away from an aerodrome at which the landing distance specification for alternate aerodromes (see 7.3) is complied with and where it is expected that a safe landing can be made.

6.3.1.1.2 The net flight path has a positive slope at 450 m (1,500 ft) above the aerodrome where the landing is assumed to be made after the failure of two engines. 6.3.1.1.3 Fuel jettisoning is permitted to an extent consistent with 6.3.1.1.4, if a safe procedure is used.

6.3.1.1.4 The airplane mass at the point where the two engines are assumed to fail is considered to be not less than that which would include sufficient fuel to proceed to the aerodrome and to arrive there at an altitude of at least 450 m (1,500 ft) directly over the landing area and thereafter to fly for 15 minutes at cruise power and/or thrust.

6.3.1.1.5 The consumption of fuel and oil after the engines become inoperative is that which is accounted for in the net flight path data shown in the flight manual.

7. Landing limitations

7.1 Aerodrome of destination — dry runways

7.1.1 No airplane should commence a take-off at a mass in excess of that which permits the airplane to be brought to a full stop landing at the aerodrome of intended destination from 15.2 m (50 ft) above the threshold:

a) for turbo jet powered airplanes, within 60 per cent of the landing distance available; and

b) for turbo-propeller airplanes, within 70 per cent of the landing distance available.

The mass of the airplane is assumed to be reduced by the mass of the fuel and oil expected to be consumed in flight to the aerodrome of intended destination. Compliance is shown with 7.1.1.1 and with either 7.1.1.2 or 7.1.1.3.

7.1.1.1 It is assumed that the airplane is landed on the most favorable runway and in the most favorable direction in still air.

7.1.1.2 It is assumed that the airplane is landed on the runway which is the most suitable for the wind conditions anticipated at the aerodrome at the time of landing, taking due account of the probable wind speed and direction, of the ground handling characteristics of the airplane, and of other conditions (i.e. landing aids, terrain).

7.1.1.3 If full compliance with 7.1.1.2 is not shown, the airplane may be taken off if a destination alternate aerodrome is designated which permits compliance with 7.3.

7.1.1.4 When showing compliance with 7.1.1 at least the following factors should be taken into account:

a) the pressure altitude of the aerodrome;

b) the runway slope in the direction of the landing if greater than +/- 2.0 per cent; and

c) not more than 50 per cent of the headwind component or not less than 150 per cent of the tailwind component.

7.2 Aerodrome of destination — wet or contaminated runways

7.2.1 When the appropriate weather reports or forecasts or a combination thereof indicate that the runway at the estimated time of arrival may be wet, the landing distance available should be at least 115 per cent of the required landing distance determined in accordance with 7.1.

7.2.2 A landing distance on a wet runway shorter than that required by 7.2.1 but not less than that required by 7.1 may be used if the flight manual includes specific additional information about landing distance on wet runways.

7.2.3 When the appropriate weather reports or forecasts or a combination thereof indicate that the runway at the distance available should be the greater of:

a) the landing distance determined in accordance with 7.2.1; or

b) the landing distance determined in accordance with contaminated landing distance data with a safety margin acceptable to the State of the Operator.

7.2.4 If compliance with 7.2.3 is not shown, the airplane may take off if a destination alternate aerodrome is designated for which compliance is shown with 7.2.3 and 7.3.

7.2.5 When showing compliance with 7.2.2 and 7.2.3, the criteria of 7.1 should be applied accordingly. However, 7.1.1 a) and b) need not be applied to the wet and contaminated runway landing distance determination required by 7.2.2 and 7.2.3.

7.3 Destination alternate aerodrome

No aerodrome should be designated as a destination alternate aerodrome unless the airplane, at the mass anticipated at the time of arrival at such aerodrome, can comply with 7.1 and either 7.2.1 or 7.2.2, in accordance with the landing distance required for the altitude of the alternate aerodrome and in accordance with other applicable operating requirements for the alternate aerodrome.

7.4 Performance considerations before landing The operator should provide the flight crew with a method to ensure that a full stop landing, with a safety margin acceptable to the State of the Operator, that is at least the minimum specified in the Type Certificate holder's aircraft flight manual (AFM), or equivalent, can be made on the runway to be used in the conditions existing at the time of landing and with the deceleration means that will be used.

Example 1

1. Purpose and scope

The purpose of the following example is to illustrate the level of performance intended by the provisions of Chapter 5 as applicable to the types of airplanes described below. The Standards and Recommended Practices in Annex 6 effective on 14 July 1949 contained specifications similar to those adopted by some Contracting States for inclusion in their national performance codes. A very substantial number of civil transport airplanes have been manufactured and are being operated in accordance with these codes. Those airplanes are powered with reciprocating engines including turbo-compound design. They embrace twin-engined and four-engined airplanes over a mass range from approximately 4,200 kg to 70,000 kg over a stalling speed range, VS0 from approximately 100 to 175 km/h (55 to 95 kt) and over a wing loading range from approximately 120 to 360 kg/m2. Cruising speeds range over 555 km/h (300 kt). Those airplanes have been used in a very wide range of altitude, air temperature and humidity conditions. At a later date, the code was applied with respect to the evaluation of certification of the so-called "first generation" of turboprop and turbo-jet airplanes. Although only past experience can warrant the fact that this
example illustrates the level of performance intended by the Standards and Recommended Practices of Chapter 5, it is considered to be applicable over a wide range of airplane characteristics and atmospheric conditions. Reservation should however be made concerning the application of this example with respect to conditions of high air temperatures. In certain extreme cases, it has been found desirable to apply additional temperature and/or humidity accountability, particularly for the obstacle limited take-off flight path. This example is not intended for application to airplanes having short take-off and landing (STOL) or vertical take-off and landing (VTOL) capabilities. No detailed study has been made of the applicability of this example to operations in all-weather conditions. The validity of this example has not therefore been established for operations which may involve low decision heights and be associated with low minima operating techniques and procedures.

2. Stalling speed — minimum steady flight speed

2.1 For the purpose of this example, the stalling speed is the speed at which an angle of attack greater than that of maximum lift is reached, or, if greater, the speed at which a large amplitude pitching or rolling motion, not immediately controllable, is encountered, when the maneuvre described in 2.3 is executed.

Note.— It should be noted that an uncontrollable pitching motion of small amplitude associated with pre-stall buffeting does not necessarily indicate that the stalling speed has been reached.

2.2 The minimum steady flight speed is that obtained while maintaining the elevator control in the most rearward possible position when the manoeuvre described in 2.3 is executed. This speed would not apply when the stalling speed defined in 2.1 occurs before the elevator control reaches its stops.

2.3 Determination of stalling speed — Minimum steady flight speed

2.3.1 The airplane is trimmed for a speed of approximately 1.4VS1 . From a value sufficiently above the stalling speed to ensure that a steady rate of decrease is obtainable, the speed is reduced in straight flight at a rate not exceeding 0.5 m/s2 (1 kt/s) until the stalling speed or the minimum steady flight speed, defined in 2.1 and 2.2, is reached.

2.3.2 For the purpose of measuring stalling speed and minimum steady flight speed, the instrumentation is such that the probable error of measurement is known.

2.4 VS0

VS0 denotes the stalling speed if obtained in flight tests conducted in accordance with 2.3, or the minimum steady flight speed, CAS, as defined in 2.2, with:

a) engines at not more than sufficient power for zero thrust at a speed not greater than 110 per cent of the stalling speed;

b) propeller pitch controls in the position recommended for normal use during take-off;

c) landing gear extended;

d) wing flaps in the landing position;

e) cowl flaps and radiator shutters closed or nearly closed;

f) centre of gravity in that position within the permissible landing range which gives the maximum value of stalling speed or of minimum steady flight speed;

g) airplane mass equal to the mass involved in the specification under consideration.

2.5 VS1

VS1 denotes the stalling speed if obtained in flight tests conducted in accordance with 2.3, or the minimum steady flight speed, CAS, as defined in 2.2, with:

a) engines at not more than sufficient power for zero thrust at a speed not greater than 110 per cent of the stalling speed;

b) propeller pitch controls in the position recommended for normal use during take-off;

c) airplane in the configuration in all other respects and at the mass prescribed in the specification under consideration.

3. Take-off

3.1 Mass

The mass of the airplane at take-off is not to exceed the maximum take-off mass specified in the flight manual for the altitude at which the take-off is to be made.

3.2 Performance

The performance of the airplane as determined from the information contained in the flight manual is such that:

a) the accelerate-stop distance required does not exceed the accelerate-stop distance available;

b) the take-off distance required does not exceed the takeoff distance available;

c) the take-off path provides a vertical clearance of not less than 15.2 m up to D = 500 m (50 ft up to D = 1 500 ft) and 15.2 + 0.01 [D – 500] m (50 + 0.01 [D – 1 500] ft) thereafter, above all obstacles lying within 60 m plus half the wing span of the airplane plus 0.125D on either side of the flight path, except that obstacles lying beyond 1 500 m on either side of the flight path need not be cleared. The distance D is the horizontal distance that the airplane has travelled from the end of the take-off distance available.

Note.— This need not be carried beyond the point at which the airplane would be able, without further gaining in height, to commence a landing procedure at the aerodrome of takeoff or, alternatively, has attained the minimum safe altitude for commencing flight to another aerodrome.

However, the lateral obstacle clearance is liable to be reduced (below the values stated above) when, and to the extent that, this is warranted by special provisions or conditions which assist the pilot to avoid inadvertent lateral deviations from the intended flight path. For example, particularly in poor weather conditions, a precise radio aid may assist the pilot to maintain the intended flight path. Also, when the take-off is made in sufficiently good visibility conditions, it may, in some cases, be possible to avoid obstacles which are clearly visible but may be within the lateral limits noted in 3.2 c).

Note 1.— The procedures used in defining the acceleratestop distance required, the take-off distance required and the take-off flight path are described in the Appendix to this example.

Note 2.— In some national codes similar to this example, the specification for "performance" at take-off is such that no credit can be taken for any increase in length of acceleratestop distance available and take-off distance available beyond the length specified in Section 1 for take-off run available. Those codes specify a vertical clearance of not less than 15.2 m (50 ft) above all obstacles lying within 60 m on either side of the flight path while still within the confines of the aerodrome, and 90 m on either side of the flight path when outside those confines. It is to be observed that those codes are such that they do not provide for an alternative to the method of elements (see the Appendix to this example) in the determination of the take-off path. It is considered that those codes are compatible with the general intent of this example.

3.3 Conditions

For the purpose of 3.1 and 3.2, the performance is that corresponding to:

a) the mass of the airplane at the start of take-off;

b) an altitude equal to the elevation of the aerodrome; and for the purpose of 3.2:

c) the ambient temperature at the time of take-off for 3.2 a) and b) only;

d) the runway slope in the direction of take-off (landplanes);

e) not more than 50 per cent of the reported wind component opposite to the direction of take-off, and not less than 150 per cent of the reported wind component in the direction of take-off. In certain cases of operation of seaplanes, it has been found necessary to take account of the reported wind component normal to the direction of take-off.

3.4 Critical point

In applying 3.2 the critical point chosen for establishing compliance with 3.2 a) is not nearer to the starting point than that used for establishing compliance with 3.2 b) and 3.2 c).

3.5 Turns

In case the flight path includes a turn with bank greater than 15 degrees, the clearances specified in 3.2 c) are increased by

an adequate amount during the turn, and the distance D is measured along the intended track.

4. En route

4.1 One power-unit inoperative

4.1.1 At all points along the route or planned diversion therefrom, the airplane is capable, at the minimum flight altitudes en route, of a steady rate of climb with one power unit inoperative, as determined from the flight manual, of at least

1) K 〔Vso/185.2〕2m/s, Vso being expressed in km/h;

2) K 〔Vso /100〕2m/s, Vso being expressed in kt;

3) K 〔Vso /100〕2ft/min, Vso being expressed in kt; and K having the following value:

K = 4.04 – in the case of 1) and 2); and

K = 797 – in the case of 3)

Where N is the number of power-units installed. It should be noted that minimum flight altitudes are usually considered to be not less than 300 m (1 000 ft) above terrain along and adjacent to the flight path.

4.1.2 As an alternative to 4.1.1 the airplane is operated at an all power-unit operating altitude such that, in the event of a power-unit failure, it is possible to continue the flight to an aerodrome where a landing can be made in accordance with 5.3, the flight path clearing all terrain and obstructions along the route within 8 km (4.3 NM) on either side of the intended track by at least 600 m (2 000 ft). In addition, if such a procedure is utilized, the following provisions are complied with:

a) the rate of climb, as determined from the flight manual for the appropriate mass and altitude, used in calculating the flight path is diminished by an amount equal to

1) K 〔Vso/185.2〕2m/s, Vso being expressed in km/h;

2) K 〔Vso /100〕2m/s, Vso being expressed in kt;

3) K 〔Vso /100〕2ft/min, Vso being expressed in kt; and K having the following value:

K = 4.04 – in the case of 1) and 2); and

K = 797 – in the case of 3)

Where N is the number of power-units installed;

4.2 Two power-units inoperative *(applicable only to airplanes with four power-units)* The possibility of two power-units becoming inoperative when the airplane is more than 90 minutes at all power-units operating cruising speed from an en-route alternate aerodrome is catered for. This is done by verifying that at whatever such point such a double failure may occur, the airplane in the configuration and with the engine power specified in the flight manual can thereafter reach the alternate aerodrome without coming below the minimum flight altitude. It is customary to assume such fuel jettisoning as is consistent with reaching the aerodrome in question.

5. Landing

5.1 Mass

The calculated mass for the expected time of landing at the aerodrome of intended landing or any destination alternate aerodrome is not to exceed the maximum specified in the flight manual for the elevation of that aerodrome.

5.2 Landing distance

5.2.1 *Aerodrome of intended landing*

The landing distance at the aerodrome of the intended landing, as determined from the flight manual, is not to exceed 60 per cent of the landing distance available on:

a) the most suitable landing surface for a landing in still air; and, if more severe,

b) any other landing surface that may be required for landing because of expected wind conditions at the time of arrival.

5.2.2 *Alternate aerodromes*

The landing distance at any alternate aerodrome, as determined from the flight manual, is not to exceed 70 per cent of the landing distance available on:

a) the most suitable landing surface for a landing in still air; and, if more severe,

b) any other landing surface that may be required for landing because of expected wind conditions at the time of arrival.

Note.— The procedure used in determining the landing distance is described in the Appendix to this example.

5.3 Conditions

For the purpose of 5.2, the landing distances are not to exceed those corresponding to:

a) the calculated mass of the airplane for the expected time of landing;

b) an altitude equal to the elevation of the aerodrome;

c) for the purpose of 5.2.1 a) and 5.2.2 a), still air;

d) for the purpose of 5.2.1 b) and 5.2.2 b), not more than 50 per cent of the expected wind component along the landing path and opposite to the direction of landing and not less than 150 per cent of the expected wind component in the direction of landing.

APPENDIX TO EXAMPLE 1 ON AIRPLANE PERFORMANCE OPERATING LIMITATIONS —

PROCEDURES USED IN DETERMINING TAKE-OFF AND LANDING PERFORMANCE

1. General

1.1 Unless otherwise specified, Standard Atmosphere and still air conditions are applied.

1.2 Engine powers are based on a water vapour pressure corresponding to 80 per cent relative humidity in standard conditions. When performance is established for temperature above standard, the water vapour pressure for a given altitude is assumed to remain at the value stated above for standard atmospheric conditions.

1.3 Each set of performance data required for a particular flight condition is determined with the powerplant accessories absorbing the normal amount of power appropriate to that flight condition.

1.4 Various wing flap positions are selected. These positions are permitted to be made variable with mass, altitude and temperature in so far as this is considered consistent with acceptable operating practices.

1.5 The position of the centre of gravity is selected within the permissible range so that the performance achieved in the configuration and power indicated in the specification under consideration is a minimum.

1.6 The performance of the airplane is determined in such a manner that under all conditions the approved limitations for the powerplant are not exceeded.

1.7 The determined performance is so scheduled that it can serve directly in showing compliance with the airplane performance operating limitations.

2. Take-off

2.1 General

2.1.1 The take-off performance data are determined:

a) for the following conditions:

1) sea level;

2) airplane mass equal to the maximum take-off mass at sea level;

3) level, smooth, dry and hard take-off surfaces (landplanes);

4) smooth water of declared density (seaplanes);

b) over selected ranges of the following variables:

1) atmospheric conditions, namely: altitude and also pressure-altitude and temperature;

2) airplane mass;

3) steady wind velocity parallel to the direction of takeoff;

4) steady wind velocity normal to the direction of takeoff (seaplanes);

5) uniform take-off surface slope (landplanes);

6) type of take-off surface (landplanes);

7) water surface condition (seaplanes);

8) density of water (seaplanes);

9) strength of current (seaplanes).

2.1.2 The methods of correcting the performance data to obtain data for adverse atmospheric conditions include appropriate allowance for any increased airspeeds and cowl flap or radiator shutter openings necessary under such conditions to maintain engine temperatures within appropriate limits.

2.1.3 For seaplanes appropriate interpretations of the term landing gear, etc., are made to provide for the operation of retractable floats, if employed.

2.2 Take-off safety speed

2.2.1 The take-off safety speed is an airspeed (CAS) so selected that it is not less than:

a) 1.20VS1 , for airplanes with two power-units;

b) 1.15VS1 , for airplanes having more than two power units;

c) 1.10 times the minimum control speed, VMC established as prescribed in 2.3; where VS1 is appropriate to the configuration, as described in

2.3.1 b), c) and d).

2.3 Minimum control speed

2.3.1 The minimum control speed, VMC, is determined not to exceed a speed equal to 1.2VS1 , where VS1 corresponds with the maximum certificated take-off mass with:

a) maximum take-off power on all power-units;

b) landing gear retracted;

c) wing flaps in take-off position;

d) cowl flaps and radiator shutters in the position recommended for normal use during take-off;

e) airplane trimmed for take-off;

f) airplane airborne and ground effect negligible.

2.3.2 The minimum control speed is such that, when any one power-unit is made inoperative at that speed, it is possible to recover control of the airplane with the one power-unit still inoperative and to maintain the airplane in straight flight at that speed either with zero yaw or with a bank not in excess of 5 degrees.

2.3.3 From the time at which the power-unit is made inoperative to the time at which recovery is complete, exceptional skill, alertness, or strength on the part of the pilot is not required to prevent any loss of altitude other than that implicit in the loss of performance or any change of heading in excess of 20 degrees, nor does the airplane assume any dangerous attitude. 2.3.4 It is demonstrated that to maintain the airplane in steady straight flight at this speed after recovery and before retrimming does not require a rudder control force exceeding 800 N and does not make it necessary for the flight crew to reduce the power of the remaining power-units.

2.4 Critical point

2.4.1 The critical point is a selected point at which, for the purpose of determining the accelerate-stop distance and the take-off path, failure of the critical power-unit is assumed to occur. The pilot is provided with a ready and reliable means of determining when the critical point has been reached.

2.4.2 If the critical point is located so that the airspeed at that point is less than the take-off safety speed, it is demonstrated that, in the event of sudden failure of the critical power unit at all speeds down to the lowest speed corresponding with the critical point, the airplane is controllable satisfactorily and that the take-off can be continued safely, using normal piloting skill, without reducing the thrust of the remaining power-units.

2.5 Accelerate-stop distance required

2.5.1 The accelerate-stop distance required is the distance required to reach the critical point from a standing start and, assuming the critical power-unit to fail suddenly at this point, to stop if a landplane, or to bring the airplane to a speed of approximately 6 km/h (3 kt) if a seaplane.

2.5.2 Use of braking means in addition to, or in lieu of, wheel brakes is permitted in determining this distance, provided that they are reliable and that the manner of their employment is such that consistent results can be expected under normal conditions of operation, and provided that exceptional skill is not required to control the airplane.

2.5.3 The landing gear remains extended throughout this distance.

2.6 Take-off path

2.6.1 General

2.6.1.1 The take-off path is determined either by the method of elements, 2.6.2, or by the continuous method, 2.6.3, or by any acceptable combination of the two.

2.6.1.2 Adjustment of the provisions of 2.6.2.1 c) 1) and 2.6.3.1 c) is permitted when the take-off path would be affected by the use of an automatic pitch changing device, provided that a level of performance safety exemplified by 2.6 is demonstrated.

2.6.2 Method of elements

2.6.2.1 In order to define the take-off path, the following elements are determined:

a) The distance required to accelerate the airplane from a standing start to the point at which the take-off safety speed is first attained, subject to the following provisions:

1) the critical power-unit is made inoperative at the critical point;

2) the airplane remains on or close to the ground;

3) the landing gear remains extended.

b) The horizontal distance traversed and the height attained by the airplane operating at the take-off safety speed during the time required to retract the landing gear, retraction being initiated at the end of 2.6.2.1 a) with:

1) the critical power-unit inoperative, its propeller windmilling, and the propeller pitch control in the position recommended for normal use during takeoff, except that, if the completion of the retraction of the landing gear occurs later than the completion of the stopping of the propeller initiated in accordance with 2.6.2.1 c) 1), the propeller may be assumed to be stopped throughout the remainder of the time required to retract the landing gear;

2) the landing gear extended.

c) When the completion of the retraction of the landing gear occurs earlier than the completion of the stopping of the propeller, the horizontal distance traversed and the height attained by the airplane in the time elapsed from the end of 2.6.2.1 b) until the rotation of the inoperative propeller has been stopped, when:

1) the operation of stopping the propeller is initiated not earlier than the instant the airplane has attained a total height of 15.2 m (50 ft) above the take-off surface;

2) the airplane speed is equal to the take-off safety speed;

3) the landing gear is retracted;

4) the inoperative propeller is windmilling with the propeller pitch control in the position recommended for normal use during take-off.

d) The horizontal distance traversed and the height attained by the airplane in the time elapsed from the end of

2.6.2.1 c) until the time limit on the use of take-off power is reached, while operating at the take-off safety speed, with:

1) the inoperative propeller stopped;

2) the landing gear retracted. The elapsed time from the start of the take-off need not extend beyond a total of 5 minutes.

e) The slope of the flight path with the airplane in the configuration prescribed in 2.6.2.1 d) and with the remaining power-unit(s) operating within the maximum continuous power limitations, where the time limit on the use of take-off power is less than 5 minutes.

2.6.2.2 If satisfactory data are available, the variations in drag of the propeller during feathering and of the landing gear throughout the period of retraction are permitted to be taken into account in determining the appropriate portions of the elements.

2.6.2.3 During the take-off and subsequent climb represented by the elements, the wing flap control setting is not changed, except that changes made before the critical point has been reached, and not earlier than 1 minute after the critical point has been passed, are permitted; in this case, it is demonstrated that such changes can be accomplished without undue skill, concentration, or effort on the part of the pilot.

2.6.3 Continuous method

2.6.3.1 The take-off path is determined from an actual take-off during which:

a) the critical power-unit is made inoperative at the critical point;

b) the climb-away is not initiated until the take-off safety speed has been reached and the airspeed does not fall below this value in the subsequent climb;

c) retraction of the landing gear is not initiated before the airplane reaches the take-off safety speed;

d) the wing flap control setting is not changed, except that changes made before the critical point has been reached, and not earlier than 1 minute after the critical point has been passed, are permitted; in this case, it is demonstrated that such changes can be accomplished without undue skill, concentration, or effort on the part of the pilot;

e) the operation of stopping the propeller is not initiated until the airplane has cleared a point 15.2 m (50 ft) above the take-off surface.

2.6.3.2 Suitable methods are provided and employed to take into account, and to correct for, any vertical gradient of wind velocity which may exist during the take-off. 2.7 Take-off distance required The take-off distance required is the horizontal distance along the take-off flight path from the start of the take-off to a point where the airplane attains a height of 15.2 m (50 ft) above the take-off surface.

2.8 Temperature accountability

Operating correction factors for take-off mass and take-off distance are determined to account for temperature above and below those of the Standard Atmosphere. These factors are obtained as follows:

a) For any specific airplane type the average full temperature accountability is computed for the range of mass and altitudes above sea level, and for ambient temperatures expected in operation. Account is taken of the temperature effect both on the aerodynamic characteristics of the airplane and on the engine power. The full temperature accountability is expressed per degree of temperature in terms of a mass correction, a take-off distance correction and a change, if any, in the position of the critical point.

b) Where 2.6.2 is used to determine the take-off path, the operating correction factors for the airplane mass and take-off distance are at least one half of the full accountability values. Where 2.6.3 is used to determine the take-off path, the operating correction factors for the airplane mass and take-off distance are equal to the full accountability values. With both methods, the position of the critical point is further corrected by the average amount necessary to assure that the airplane can stop within the runway length at the ambient temperature, except that the speed at the critical point is not less than a minimum at which the airplane can be controlled with the critical power-unit inoperative.

3. Landing

3.1 General

The landing performance is determined:

a) for the following conditions:

1) sea level;

2) airplane mass equal to the maximum landing mass at sea level;

3) level, smooth, dry and hard landing surfaces (landplanes);

4) smooth water of declared density (seaplanes);

b) over selected ranges of the following variables:

1) atmospheric conditions, namely: altitude and also pressure-altitude and temperature;

2) airplane mass;

3) steady wind velocity parallel to the direction of landing;

4) uniform landing-surface slope (landplanes);

5) type of landing surface (landplanes);

6) water surface condition (seaplanes);

7) density of water (seaplanes);

8) strength of current (seaplanes).

3.2 Landing distance

3.2.1 The landing distance is the horizontal distance between that point on the landing surface at which the airplane is brought to a complete stop or, for seaplanes, to a speed of approximately 6 km/h (3 kt) and that point on the landing surface which the airplane cleared by 15.2 m (50 ft).

3.3 Landing technique

3.3.1 In determining the landing distance:

a) immediately before reaching the 15.2 m (50 ft) height, a steady approach is maintained, landing gear fully extended, with an airspeed of not less than 1.3VS0 ;

b) the nose of the airplane is not depressed in flight nor the forward thrust increased by application of engine power after reaching the 15.2 m (50 ft) height;

c) the wing flap control is set in the landing position, and remains constant during the final approach, flare out and touch down, and on the landing surface at air speeds above 0.9VS0 . When the airplane is on the landing surface and the airspeed has fallen to less than 0.9VS0 , change of the wing-flap-control setting is permitted;

d) the landing is made in a manner such that there is no excessive vertical acceleration, no excessive tendency to bounce, and no display of any uncontrollable or otherwise undesirable ground (water) handling characteristics, and such that its repetition does not require either an exceptional degree of skill on the part of the pilot, or exceptionally favorable conditions;

e) wheel brakes are not used in a manner such as to produce excessive wear of brakes or tires, and the operating pressures on the braking system are not in excess of those approved.

3.3.2 In addition to, or in lieu of, wheel brakes, other reliable braking means are permitted to be used in determining the landing distance, provided that the manner of their employment is such that consistent results can be expected under normal conditions of operation and that exceptional skill is not required to control the airplane.

3.3.3 The gradient of the steady approach and the details of the technique used in determining the landing distance, together with such variations in the technique as are recommended for landing with the critical power-units inoperative, and any appreciable variation in landing distance resulting therefrom, are entered in the flight manual.

Example 2

1. Purpose and scope

The purpose of the following example is to illustrate the level of performance intended by the provisions of Chapter 5 as applicable to the types of airplanes described below. This material was contained in substance in Attachment A to the now superseded edition of Annex 6 which became effective on 1 May 1953. It is based on the type of requirements developed by the Standing Committee on Performance* with such detailed changes as are necessary to make it reflect as closely as possible a performance code that has been used nationally. A substantial number of civil transport airplanes have been manufactured and are being operated in accordance with these codes. Those airplanes are powered with reciprocating engines, turbo-propellers and turbo-jets. They embrace twin-engined and four-engined airplanes over a mass range from approximately 5,500 kg to 70,000 kg over a stalling speed range, VS0 , from approximately 110 to 170 km/h (60 to 90 kt) and over a wing loading range from approximately 120 to 350 kg/m2. Cruising speeds range up to 740 km/h (400 kt). Those airplanes have been used in a very wide range of altitude, air temperature and humidity conditions. Although only past experience can warrant the fact that this example illustrates the level of performance intended by the Standards and Recommended Practices of Chapter 5, it is considered to be applicable, except for some variations in detail as necessary to fit particular cases, over a much wider range of airplane characteristics. Reservation should, however, be made concerning one point. The landing distance specification of this example, not being derived from the same method as other specifications, is valid only for the range of conditions stated for Example 1 in this Attachment.

This example is not intended for application to airplanes having short take-off and landing (STOL) or vertical take-off and landing (VTOL) capabilities. No detailed study has been made of the applicability of this example to operations in all-weather conditions. The validity of this example has not therefore been established for operations which may involve low decision heights and be associated with low weather minima operating techniques and procedures.

2. Take-off

2.1 Mass

The mass of the airplane at take-off is not to exceed the maximum take-off mass specified in the flight manual for the altitude and temperature at which the take-off is to be made. * The ICAO Standing Committee on Performance, established as a result of recommendations of the Airworthiness and Operations Divisions at their Fourth Sessions, in 1951, met four times between 1951 and 1953.

2.2 Performance

The performance of the airplane, as determined from the information contained in the flight manual, is such that:

a) the accelerate-stop distance required does not exceed the accelerate-stop distance available;

b) the take-off run required does not exceed the take-off run available;

c) the take-off distance required does not exceed the takeoff distance available;

d) the net take-off flight path starting at a point 10.7 m (35 ft) above the ground at the end of the take-off distance required provides a vertical clearance of not less than 6 m (20 ft) plus 0.005D above all obstacles lying within 60 m plus half the wing span of the airplane plus 0.125D on either side of the intended track until the relevant altitude laid down in the operations manual for an en-route flight has been attained; except that obstacles lying beyond 1,500 m on either side of the flight path need not be cleared. The distance D is the horizontal distance that the airplane has traveled from the end of the take-off distance available.

Note.— This need not be carried beyond the point at which the airplane would be able, without further gaining in height, to commence a landing procedure at the aerodrome of take-off or, alternatively, has attained the minimum safe altitude for commencing flight to another aerodrome.

However, the lateral obstacle clearance is liable to be reduced (below the values stated above) when, and to the extent that, this is warranted by special provisions or conditions which assist the pilot to avoid inadvertent lateral deviations from the intended flight path. For example, particularly in poor weather conditions, a precise radio aid may assist the pilot to maintain the intended flight path. Also, when the take-off is made in sufficiently good visibility conditions, it may, in some cases, be possible to avoid obstacles which are clearly visible but may be within the lateral limits noted in 2.2 d).

Note.— The procedures used in determining the accelerate stop distance required, the take-off run required, the take-off distance required and the net take-off flight path are described in the

Appendix to this example.

2.3 Conditions

For the purpose of 2.1 and 2.2, the performance is that corresponding to:

a) the mass of the airplane at the start of take-off;

b) an altitude equal to the elevation of the aerodrome;

c) either the ambient temperature at the time of take-off, or a declared temperature giving an equivalent average level of performance; and for the purpose of 2.2:

d) the surface slope in the direction of take-off (landplanes);

e) not more than 50 per cent of the reported wind component opposite to the direction of take-off, and not less than 150 per cent of the reported wind component in the direction of take-off. In certain cases of operation of seaplanes, it has been found necessary to take account of the reported wind component normal to the direction of take-off.

2.4 Power failure point

In applying 2.2 the power failure point chosen for establishing compliance with 2.2 a) is not nearer to the starting point than that used for establishing compliance with 2.2 b) and 2.2 c).

2.5 Turns

The net take-off flight path may include turns, provided that:

a) the radius of steady turn assumed is not less than that scheduled for this purpose in the flight manual;

b) if the planned change of direction of the take-off flight path exceeds 15 degrees, the clearance of the net takeoff flight path above obstacles is at least 30 m (100 ft) during and after the turn, and the appropriate allowance, as prescribed in the flight manual, is made for the reduction in assumed gradient of climb during the turn;

c) the distance D is measured along the intended track.

3. En route

3.1 All power-units operating At each point along the route and planned diversion therefrom, the all power-units operating performance ceiling appropriate to the airplane mass at that point, taking into account the amount of fuel and oil expected to be consumed, is not less than the minimum altitude (see Chapter 4, 4.2.6) or, if greater, the planned altitude which it is intended to maintain with all power-units operating, in order to ensure compliance with 3.2 and 3.3.

3.2 One power-unit inoperative From each point along the route and planned diversions therefrom, it is possible in the event of one power-unit becoming inoperative to continue the flight to an en-route alternate aerodrome where a landing can be made in accordance with 4.2 and, on arrival at the aerodrome, the net gradient of climb is not less than zero at a height of 450 m (1,500 ft) above the elevation of the aerodrome.

3.3 Two power-units inoperative (applicable only to airplanes with four power-units) For each point along the route or planned diversions therefrom, at which the airplane is more than 90 minutes' flying time at all power-units operating cruising speed from an en-route alternate aerodrome, the two power-units inoperative net flight path is such that a height of at least 300 m (1,000 ft) above terrain can be maintained until arrival at such an aerodrome.

Note.— The net flight path is that attainable from the expected gradient of climb or descent diminished by 0.2 per cent.

3.4 Conditions

The ability to comply with 3.1, 3.2 and 3.3 is assessed:

a) either on the basis of forecast temperatures, or on the basis of declared temperatures giving an equivalent average level of performance;

b) on the forecast data on wind velocity versus altitude and locality assumed for the flight plan as a whole;

c) in the case of 3.2 and 3.3, on the scheduled gradient of climb or gradient of descent after power failure appropriate to the mass and altitude at each point considered;

d) on the basis that, if the airplane is expected to gain altitude at some point in the flight after power failure has occurred, a satisfactory positive net gradient of climb is available;

e) in the case of 3.2 on the basis that the minimum altitude (see Chapter 4, 4.2.6), appropriate to each point between the place at which power failure is assumed to occur and the aerodrome at which it is intended to alight, is exceeded;

f) in the case of 3.2, making reasonable allowance for indecision and navigational error in the event of powerunit failure at any point.

4. Landing

4.1 Mass

The calculated mass for the expected time of landing at the aerodrome of intended landing or any destination alternate aerodrome is not to exceed the maximum specified in the flight manual for the altitude and temperature at which the landing is to be made.

4.2 Landing distance required The landing distance required at the aerodrome of the intended landing or at any alternate aerodrome, as determined from the flight manual, is not to exceed the landing distance available on:

a) the most suitable landing surface for a landing in still air; and, if more severe,

b) any other landing surface that may be required for landing because of expected wind conditions at the time of arrival.

4.3 Conditions

For the purpose of 4.2, the landing distance required is that corresponding to:

a) the calculated mass of the airplane for the expected time of landing;

b) an altitude equal to the elevation of the aerodrome;

c) the expected temperature at which landing is to be made or a declared temperature giving an equivalent average level of performance;

d) the surface slope in the direction of landing;

e) for the purpose of 4.2 a), still air; for the purpose of 4.2 b), not more than 50 per cent of the expected wind component along the landing path and opposite to the direction of landing and not less than 150 per cent of the expected wind component in the direction of landing.

APPENDIX TO EXAMPLE 2 ON AIRPLANE PERFORMANCE OPERATING

LIMITATIONS —

PROCEDURES USED IN DETERMINING TAKE-OFF AND LANDING PERFORMANCE

1. General

1.1 Unless otherwise stated, reference humidity and still air conditions are applied.

1.2 The performance of the airplane is determined in such a manner that the approved airworthiness limitations for the airplane and its systems are not exceeded.

1.3 The wing flap positions for showing compliance with the performance specifications are selected.

Note.— Alternative wing flap positions are made available, if so desired, in such a manner as to be consistent with acceptably simple operating techniques.

1.4 The position of the centre of gravity is selected within the permissible range so that the performance achieved in the configuration and power indicated in the specification under consideration is a minimum.

1.5 The performance of the airplane is determined in such a manner that under all conditions the approved limitations for the powerplant are not exceeded.

1.6 While certain configurations of cooling gills have been specified based upon maximum anticipated temperature, the use of other positions is acceptable provided that an equivalent level of safety is maintained.

1.7 The determined performance is so scheduled that it can serve directly in showing compliance with the airplane performance operating limitations.

2. Take-off

2.1 General

2.1.1 The following take-off data are determined for sea level pressure and temperature in the Standard Atmosphere, and reference humidity conditions, with the airplane at the corresponding maximum take-off mass for a level, smooth, dry and hard take-off surface (landplanes) and for smooth water of declared density (seaplanes):

a) take-off safety speed and any other relevant speed;

b) power failure point;

c) power failure point criterion; associated with items d), e), f) e.g. airspeed indicator reading;

d) accelerate-stop distance required;

e) take-off run required;

f) take-off distance required;

g) net take-off flight path;

h) radius of a steady Rate 1 (180 degrees per minute) turn made at the airspeed used in establishing the net takeoff flight path, and the corresponding reduction in gradient of climb in accordance with the conditions of 2.9.

2.1.2 The determination is also made over selected ranges of the following variables:

a) airplane mass;

b) pressure-altitude at the take-off surface;

c) outside air temperature;

d) steady wind velocity parallel to the direction of take-off;
e) steady wind velocity normal to the direction of take-off (seaplanes);
f) take-off surface slope over the take-off distance required (landplanes);
g) water surface condition (seaplanes);
h) density of water (seaplanes);
i) strength of current (seaplanes);
j) power failure point (subject to provisions of 2.4.3).

2.1.3 For seaplanes appropriate interpretations of the term landing gear, etc., are made to provide for the operation of retractable floats, if employed.

2.2 Take-off safety speed

2.2.1 The take-off safety speed is an airspeed (CAS) so selected that it is not less than:
a) 1.20VS1 , for airplanes with two power-units;
b) 1.15VS1 , for airplanes having more than two power units;
c) 1.10 times the minimum control speed, VMC, established as prescribed in 2.3;
d) the minimum speed prescribed in 2.9.7.6; where VS1 is appropriate to the take-off configuration.

Note.— See Example 1 for definition of VS1 .

2.3 Minimum control speed

2.3.1 The minimum control speed is such that, when any one power-unit is made inoperative at that speed, it is possible to recover control of the airplane with the one power-unit still inoperative and to maintain the airplane in straight flight at that speed either with zero yaw or with a bank not in excess of 5 degrees.

2.3.2 From the time at which the power-unit is made inoperative to the time at which recovery is complete, exceptional skill, alertness, or strength, on the part of the pilot is not required to prevent any loss of altitude other than that implicit in the loss of performance or any change of heading in excess of 20 degrees, nor does the airplane assume any dangerous attitude. 2.3.3 It is demonstrated that to maintain the airplane in steady straight flight at this speed after recovery and before retrimming does not require a rudder control force exceeding 800 N and does not make it necessary for the flight crew to reduce the power of the remaining power-units.

2.4 Power failure point

2.4.1 The power failure point is the point at which sudden complete loss of power from the power-unit, critical from the performance aspect in the case considered, is assumed to occur. If the airspeed corresponding to this point is less than the take-off safety speed, it is demonstrated that, in the event of sudden failure of the critical power-unit at all speeds down to the lowest speed corresponding with the power failure point, the airplane is controllable satisfactorily and that the take-off can be continued safely, using normal piloting skill, without:
a) reducing the thrust of the remaining power-units; and
b) encountering characteristics which would result in unsatisfactory controllability on wet runways.

2.4.2 If the critical power-unit varies with the configuration, and this variation has a substantial effect on performance, either the critical power-unit is considered separately for each element concerned, or it is shown that the established performance provides for each possibility of single power-unit failure.

2.4.3 The power failure point is selected for each take-off distance required and take-off run required, and for each accelerate-stop distance required. The pilot is provided with a ready and reliable means of determining when the applicable power failure point has been reached.

2.5 Accelerate-stop distance required

2.5.1 The accelerate-stop distance required is the distance required to reach the power failure point from a standing start and, assuming the critical power-unit to fail suddenly at this point, to stop if a landplane, or to bring the airplane to a speed of approximately 9 km/h (5 kt) if a seaplane.

2.5.2 Use of braking means in addition to, or in lieu of, wheel brakes is permitted in determining this distance, provided that they are reliable and that the manner of their employment is such that consistent results can be expected under normal conditions of operation, and provided that exceptional skill is not required to control the airplane.

2.6 Take-off run required

The take-off run required is the greater of the following:

1.15 times the distance required with all power-units operating to accelerate from a standing start to takeoff safety speed; 1.0 times the distance required to accelerate from a standing start to take-off safety speed assuming the critical power-unit to fail at the power failure point.

2.7 Take-off distance required

2.7.1 The take-off distance required is the distance required to reach a height of:

10.7 m (35 ft), for airplanes with two power-units,

15.2 m (50 ft), for airplanes with four power-units, above the take-off surface, with the critical power-unit failing at the power failure point.

2.7.2 The heights mentioned above are those which can be just cleared by the airplane when following the relevant flight path in an unbanked attitude with the landing gear extended.

Note.— Paragraph 2.8 and the corresponding operating requirements, by defining the point at which the net take-off flight path starts as the 10.7 m (35 ft) height point, ensure that the appropriate net clearances are achieved.

2.8 Net take-off flight path

2.8.1 The net take-off flight path is the one-power-unit inoperative flight path which starts at a height of 10.7 m (35 ft) at the end of the take-off distance required and extends to a height of at least 450 m (1,500 ft) calculated in accordance with the conditions of 2.9, the expected gradient of climb being diminished at each point by a gradient equal to:

0.5 per cent, for airplanes with two power-units,

0.8 per cent, for airplanes with four power-units.

2.8.2 The expected performance with which the airplane is credited in the take-off wing flap, take-off power condition, is available at the selected take-off safety speed and is substantially available at 9 km/h (5 kt) below this speed.

2.8.3 In addition the effect of significant turns is scheduled as follows:

Radius. The radius of a steady Rate 1 (180 degrees per minute) turn in still air at the various true airspeeds corresponding to the take-off safety speeds for each wing-flap setting used in establishing the net take-off flight path below the 450 m (1,500 ft) height point, is scheduled. Performance change. The approximate reduction in performance due to the above turns is scheduled and corresponds to a change in gradient of

〔0.5(V/185.2)2〕% where V is the true airspeed in km/h; and

〔0.5(V/100)2〕% where V is the true airspeed in knots.

2.9 Conditions

2.9.1 Air speed

2.9.1.1 In determining the take-off distance required, the selected take-off safety speed is attained before the end of the take-off distance required is reached. 2.9.1.2 In determining the net take-off flight path below a height of 120 m (400 ft), the selected take-off safety speed is maintained, i.e. no credit is taken for acceleration before this height is reached.

2.9.1.3 In determining the net take-off flight path above a height of 120 m (400 ft), the airspeed is not less than the selected take-off safety speed. If the airplane is accelerated after reaching a height of 120 m (400 ft) and before reaching a height of 450 m (1,500 ft), the acceleration is assumed to take place in level flight and to have a value equal to the true acceleration available diminished by an acceleration equivalent to a climb gradient equal to that specified in 2.8.1.

2.9.1.4 The net take-off flight path includes transition to the initial en-route configuration and airspeed. During all transition stages, the above provisions regarding acceleration are complied with.

2.9.2 Wing flaps

The wing flaps are in the same position (take-off position) throughout, except:

a) that the flaps may be moved at heights above 120 m (400 ft), provided that the airspeed specifications of 2.9.1 are met and that the take-off safety speed applicable to subsequent elements is appropriate to the new flap position;

b) the wing flaps may be moved before the earliest power failure point is reached, if this is established as a satisfactory normal procedure.

2.9.3 Landing gear

2.9.3.1 In establishing the accelerate-stop distance required and the take-off run required, the landing gear are extended throughout.

2.9.3.2 In establishing the take-off distance required, retraction of the landing gear is not initiated until the selected take-off safety speed has been reached, except that, when the selected take-off safety speed exceeds the minimum value prescribed in 2.2 retraction of the landing gear may be initiated when a speed greater than the minimum value prescribed in 2.2 has been reached.

2.9.3.3 In establishing the net take-off flight path, the retraction of the landing gear is assumed to have been initiated not earlier than the point prescribed in 2.9.3.2.

2.9.4 Cooling

For that part of the net take-off flight path before the 120 m (400 ft) height point, plus any transition element which starts at the 120 m (400 ft) height point, the cowl flap position is such that, starting the take-off at the maximum temperatures permitted for the start of take-off, the relevant maximum temperature limitations are not exceeded in the maximum anticipated air temperature conditions. For any subsequent part of the net take-off flight path, the cowl flap position and airspeed are such that the appropriate temperature limitations would not be exceeded in steady flight in the maximum anticipated air temperatures. The cowl flaps of all power-units at the start of the take-off are as above, and the cowl flaps of the inoperative power-unit may be assumed to be closed upon reaching the end of the take-off distance required.

2.9.5 Power unit conditions

2.9.5.1 From the starting point to the power failure point, all power-units may operate at maximum take-off power conditions. The operative power-units do not operate at maximum take-off power limitations for a period greater than that for which the use of maximum take-off power is permitted.

2.9.5.2 After the period for which the take-off power may be used, maximum continuous power limitations are not exceeded. The period for which maximum take-off power is used is assumed to begin at the start of the take-off run.

2.9.6 Propeller conditions

At the starting point, all propellers are set in the condition recommended for take-off. Propeller feathering or pitch coarsening is not initiated (unless it is by automatic or autoselective means) before the end of the take-off distance required.

2.9.7 Technique

2.9.7.1 In that part of the net take-off flight path prior to the 120 m (400 ft) height point, no changes of configuration or power are made which have the effect of reducing the gradient of climb.

2.9.7.2 The airplane is not flown or assumed to be flown in a manner which would make the gradient of any part of the net take-off flight path negative.

2.9.7.3 The technique chosen for those elements of the flight path conducted in steady flight, which are not the subject of numerical climb specifications, are such that the net gradient of climb is not less than 0.5 per cent.

2.9.7.4 All information which it may be necessary to furnish to the pilot, if the airplane is to be flown in a manner consistent with the scheduled performance, is obtained and recorded.

2.9.7.5 The airplane is held on, or close to the ground until the point at which it is permissible to initiate landing gear retraction has been reached.

2.9.7.6 No attempt is made to leave the ground until a speed has been reached which is at least:

15 per cent above the minimum possible unstick speed with all power-units operating; 7 per cent above the minimum possible unstick speed with the critical power-unit inoperative; except that these unstick speed margins may be reduced to 10 per cent and 5 per cent, respectively, when the limitation is due to landing gear geometry and not to ground stalling characteristics.

Note.— Compliance with this specification is determined by attempting to leave the ground at progressively lower speeds (by normal use of the controls except that up-elevator is applied earlier and more coarsely than is normal) until it has been shown to be possible to leave the ground at a speed which complies with these specifications, and to complete the take-off. It is recognized that during the test maneuvre, the usual margin of control associated with normal operating techniques *and scheduled performance information will not be available.*

2.10 Methods of derivation

2.10.1 General

The take-off field lengths required are determined from measurements of actual take-offs and ground runs. The net take-off flight path is determined by calculating each section separately on the basis of performance data obtained in steady flight.

2.10.2 Net take-off flight path

Credit is not taken for any change in configuration until that change is complete, unless more accurate data are available to substantiate a less conservative assumption; ground effect is ignored.

2.10.3 Take-off distance required

Satisfactory corrections for the vertical gradient of wind velocity are made.

3. Landing

3.1 General

The landing distance required is determined:

a) for the following conditions:

1) sea level;

2) airplane mass equal to the maximum landing mass at sea level;

3) level, smooth, dry and hard landing surfaces (landplanes);

4) smooth water of declared density (seaplanes);

b) over selected ranges of the following variables:

1) atmospheric conditions, namely: altitude, or pressure-altitude and temperature;

2) airplane mass;

3) steady wind velocity parallel to the direction of landing;

4) uniform landing surface slope (landplanes);

5) nature of landing surface (landplanes);

6) water surface condition (seaplanes);

7) density of water (seaplanes);

8) strength of current (seaplanes).

3.2 Landing distance required

The landing distance required is the measured horizontal distance between that point on the landing surface at which the airplane is brought to a complete stop or, for seaplanes, to a speed of approximately 9 km/h (5 kt) and that point on the landing surface which the airplane cleared by 15.2 m (50 ft) multiplied by a factor of 1/0.7.

Note.— Some States have found it necessary to use a factor of 1/0.6 instead of 1/0.7.

3.3 Landing technique

3.3.1 In determining the measured landing distance:

a) immediately before reaching the 15.2 m (50 ft) height, a steady approach is maintained, landing gear fully extended, with an airspeed of at least 1.3VS0 ;

Note.— See Example 1 for definition of VS0 .

b) the nose of the airplane is not depressed in flight nor the forward thrust increased by application of engine power after reaching the 15.2 m (50 ft) height;

c) the power is not reduced in such a way that the power used for establishing compliance with the balked landing climb requirement would not be obtained within 5 seconds if selected at any point down to touch down;

d) reverse pitch or reverse thrust are not used when establishing the landing distance using this method and field length factor. Ground fine pitch is used if the effective drag/weight ratio in the airborne part of the landing distance is not less satisfactory than that of conventional piston-engined airplane;

Note.— This does not mean that reverse pitch or reverse thrust, or use of ground fine pitch, are to be discouraged.

e) the wing flap control is set in the landing position, and remains constant during the final approach, flare out and touch down, and on the landing surface at airspeeds above 0.9VS0 . When the airplane is on the landing surface and the airspeed has fallen to less than 0.9VS0 , change of the wing-flap-control setting is acceptable; f) the landing is made in a manner such that there is no excessive vertical acceleration, no excessive tendency to bounce, and no display of any other undesirable handling characteristics, and such that its repetition does not require either an exceptional degree of skill on the part of the pilot, or exceptionally favorable conditions;

g) wheel brakes are not used in a manner such as to produce excessive wear of brakes or tires, and the operating pressures on the braking system are not in excess of those approved.

3.3.2 The gradient of the steady approach and the details of the technique used in determining the landing distance, together with such variations in the technique as are recommended for landing with the critical engine inoperative, and any appreciable variation in landing distance resulting therefrom are entered in the flight manual.

ATTACHMENT 7 Minimum Equipment List

This attachment was established in accordance with Article 96 of this AOR proper, and ICAO Annex 6, Part I, Attachment G.

1. A minimum equipment list, approved by the operator, is therefore necessary for each aircraft, based on the master minimum equipment list established for the aircraft type by the organization responsible for the type design in conjunction with the State of Design.

2. The minimum equipment list is not intended to provide for operation of the aircraft for an indefinite period with inoperative systems or equipment. The basic purpose of the minimum equipment list is to permit the safe operation of an aircraft with inoperative systems or equipment within the framework of a controlled and sound programme of repairs and parts replacement.

3. If deviations from the requirements of CAA in the certification of aircraft were not permitted an aircraft could not be flown unless all systems and equipment were operable. Experience has proved that some unserviceability can be accepted in the short term when the remaining operative systems and equipment provide for continued safe operations.

4. CAA should indicate through approval of a minimum equipment list those systems and items of equipment that may be inoperative for certain flight conditions with the intent that no flight can be conducted with inoperative systems and equipment other than those specified.

5. Operators are to ensure that no flight is commenced with multiple minimum equipment list items inoperative without determining that any interrelationship between inoperative systems or components will not result in an unacceptable degradation in the level of safety and/or undue increase in the flight crew workload.

6. The exposure to additional failures during continued operation with inoperative systems or equipment must also be considered in determining that an acceptable level of safety is being maintained. The minimum equipment list may not deviate from requirements of the flight manual limitations section, emergency procedures or other airworthiness requirements of the CAA or of the operator unless the appropriate airworthiness authority or the flight manual provides otherwise.

7. Systems or equipment accepted as inoperative for a flight should be placarded where appropriate and all such items should be noted in the aircraft technical log to inform the flight crew and maintenance personnel of the inoperative system or equipment.

8. For a particular system or item of equipment to be accepted as inoperative, it may be necessary to establish a maintenance procedure, for completion prior to flight, to deactivate or isolate the system or equipment. It may similarly be necessary to prepare an appropriate flight crew operating procedure.

ATTACHMENT 8 Number of First-aid Kits, Medical Kits, Universal Precaution Kits and Medical Supplies

This attachment was established in accordance with Articles 98 and 239 of this AOR, and ICAO Annex 6, Part I, Attachment A.

1.Types

1.1 The different types of medical supplies should be provided as follows: first-aid kit(s) for carriage on all airplanes, universal precaution kit(s) for carriage on all airplanes that require a cabin crew member, and a medical kit for carriage where the airplane is authorized to carry more than 100 passengers on a sector length of more than two hours.

1.2 The carriage of AEDs should be determined by operators on the basis of a risk assessment taking into account the particular needs of the operation.

2. Number of first-aid and universal precaution kits

2.1 First-aid kits

The number of first-aid kits should be appropriate to the number of passenger seats which the airplane is authorized to carry:

Number of passenger seats	*First-aid kits*
0 - 100	1
101 - 200	2
201 - 300	3
301 - 400	4
401 - 500	5
More than 500	6

2.2 Universal precaution kits

For routine operations, one or two universal precaution kits should be carried on aircraft that are required to operate with at least one cabin crew member, and two universal precaution kit should be carried on aircraft where the airplane is authorized to carry more than 250 passengers. Additional kit(s) should be made available at times of increased public health risk, such as during an outbreak of a serious communicable disease having pandemic potential. Such kits may be used to clean up any potentially infectious body contents such as blood, urine, vomit and feces and to protect the cabin crew members who are assisting potentially infectious cases of suspected communicable disease.

3. Location

3.1 First-aid and universal precaution kits should be distributed as evenly as practicable throughout the passenger cabins. They should be readily accessible to cabin crew members.

3.2 The medical kit, when carried, should be stored in an appropriate secure location.

4. Contents

4.1 The following provides guidance on typical contents of first-aid, universal precaution and medical kits.

4.1.1 First-aid kit (List of contents):

a) Antiseptic swabs (10/pack)

b) Bandage: adhesive strips

c) Bandage: gauze 7.5 cm × 4.5 m

d) Bandage: triangular; safety pins

e) Dressing: burn 10 cm × 10 cm

f) Dressing: compress, sterile 7.5 cm × 12 cm

g) Dressing: gauze, sterile 10.4 cm × 10.4 cm

h) Tape: adhesive 2.5 cm (roll)

i) Steri-strips (or equivalent adhesive strip)

j) Hand cleanser or cleansing towelettes

k) Pad with shield, or tape, for eye

l) Scissors: 10 cm

m) Tape: Adhesive, surgical 1.2 cm × 4.6 m

n) Tweezers: splinter

o) Disposable gloves (multiple pairs)

p) Thermometers (non-mercury)

q) Mouth-to-mouth resuscitation mask with one-way valve

r) First-aid manual, current edition

s) Incident record form

The following suggested medications can be included in the first-aid kits:

a) Mild to moderate analgesic

b) Antiemetic

c) Nasal decongestant

d) Antacid

e) Antihistamine

4.1.2 Universal precaution kit (List of contents):

a) Dry powder that can convert small liquid spill into a sterile granulated gel

b) Germicidal disinfectant for surface cleaning

c) Skin wipes

d) Face/eye mask (separate or combined)

e) Gloves (disposable)

f) Protective apron

g) Large absorbent towel

h) Pick-up scoop with scraper

i) Bio-hazard disposal waste bag

j) Instructions

4.1.3 Medical kit (List of contents):

Equipment

a) Stethoscope

b) Sphygmomanometer (electronic preferred)

c) Airways, oropharyngeal (three sizes)

d) Syringes (appropriate range of sizes)

e) Needles (appropriate range of sizes)

f) Intravenous catheters (appropriate range of sizes)

g) Antiseptic wipes

h) Gloves (disposable)

i) Needle disposal box

j) Urinary catheter

k) System for delivering intravenous fluids

l) Venous tourniquet

m) Sponge gauze

n) Tape – adhesive

o) Surgical mask

p) Emergency tracheal catheter (or large gauge intravenous cannula)

q) Umbilical cord clamp

r) Thermometers (non-mercury)

s) Basic life support cards

t) Bag-valve mask

u) Flashlight and batteries

Medication

a) Epinephrine 1:1 000

b) Antihistamine – injectable

c) Dextrose 50% (or equivalent) – injectable: 50 ml

d) Nitroglycerin tablets, or spray

e) Major analgesic

f) Sedative anticonvulsant – injectable

g) Antiemetic – injectable

h) Bronchial dilator – inhaler

i) Atropine – injectable

j) Adrenocortical steroid – injectable

k) Diuretic – injectable

l) Medication for postpartum bleeding

M) Sodium chloride 0.9% (minimum 250 ml)

n) Acetyl salicylic acid (aspirin) for oral use

o) Oral beta blocker

If a cardiac monitor is available (with or without an AED) add to the above list:
Epinephrine 1:10 000 (can be a dilution of epinephrine 1:1 000)

ATTACHMENT 9 The Required Number of Portable Fire Extinguishers Meets the Requirements of a Civil Air Transport Aircraft

This attachment was established in accordance with Article 99 of this AOR proper.

Cockpit: at least one portable fire extinguisher.
Cargo Compartment: at least one portable fire extinguisher within each accessible class e cargo compartment in flight.

Cabin Compartment: (list below).

PASSENGER SEATING CAPACITY	REQUIRED NUMBER OF PORTABLE FIRE EXTINGUISHERS
7~30	1
31~60	2
61~200	3
201~300	4
301~400	5
401~500	6
501~600	7

ATTACHMENT 10 The Required Number of Protective Breathing Equipment (PBE) meets the Requirements of a Civil Air Transport Aircraft

This attachment was established in accordance with Article 99 of this AOR proper.

1. General

1.1 The equipment must be designed to protect the appropriate crewmember from smoke, carbon dioxide, and other harmful gases while on flight deck duty or while combating fires.

1.3 The part of the equipment protecting the eyes shall not cause any appreciable adverse effect on vision and must allow corrective glasses to be worn.

1.4 The equipment must supply protective oxygen of 15 minutes duration per crewmember at a pressure altitude of 8,000 feet.

1.2 The equipment must meet the maintenance requirements of the manufacturer to ensure the availability and standby status to achieve the emergency usage.

2. Installation and quantities

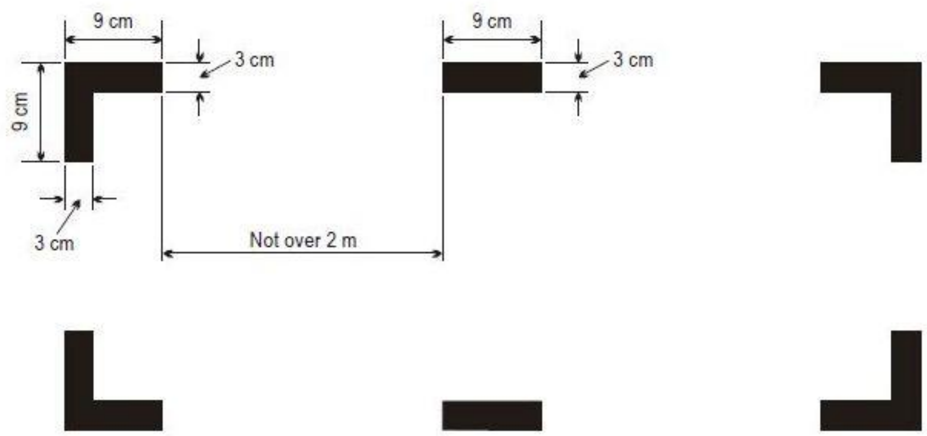
2.1 Cockpit: at least one portable protective breathing equipment shall be located inside the cockpit or other appropriated means provided by operators and approved by CAA.

2.2 Cabin compartment: at least one portable protective breathing equipment shall be located within the range of 3 feet of each portable fire extinguisher or other appropriated means provided by operators and approved by CAA.

2.3 Cargo compartment: at least one portable protective breathing equipment for each flight crew accessible Class A, Class B and Class E cargo compartment (In accordance with the Cargo compartment classification set forth in FAR Part 25).

ATTACHMENT 11 Marking of Break-in Points

This attachment was established in accordance with Article 110, 245 of this AOR proper and ICAO Annex 6, Part I, Ch.6.2.4.



MARKING OF BREAK-IN POINTS

ATTACHMENT 12（Deleted）

ATTACHMENT 12-1

This attachment was established in accordance with Article 118-1of this AOR proper, and referred to ICAO Annex 6, Part I, Appendix 9.

1. PURPOSE AND SCOPE

   Location of an aeroplane in distress aims at establishing, to a reasonable extent, the location of an accident site within a 6 NM radius.

2. OPERATION

   2.1 An aeroplane in distress shall automatically activate the transmission of information from which its position can be determined by the operator and the position information shall contain a time stamp. It shall also be possible for this transmission to be activated manually. The system used for the autonomous transmission of position information shall be capable of transmitting that information in the event of aircraft electrical power loss, at least for the expected duration of the entire flight.

   2.2 An aircraft is in a distress condition when it is in a state that, if the aircraft behaviour event is left uncorrected, can result in an accident. Autonomous transmission of position information shall be active when an aircraft is in a distress condition. This will provide a high probability of locating an accident site to within a 6 NM radius. The operator shall be alerted when an aircraft is in a distress condition with an acceptable low rate of false alerts. In case of a triggered transmission system, initial transmission of position information shall commence immediately or no later than five seconds after the detection of the activation event.

   Note 1.— Aircraft behaviour events can include, but are not limited to, unusual attitudes, unusual speed conditions, collision with terrain and total loss of thrust/propulsion on all engines and ground proximity warnings.

   Note 2.— A distress alert can be triggered using criteria that may vary as a result of aircraft position and phase of flight. Further guidance regarding in-flight event detection and triggering criteria may be found in the EUROCAE ED-237, Minimum Aviation System Performance Specification (MASPS) for Criteria to Detect In-Flight Aircraft Distress Events to Trigger Transmission of Flight Information.

   2.3 When an aircraft operator or an air traffic service unit (ATSU) has reason to believe that an aircraft is in distress, coordination shall be established between the ATSU and the aircraft operator.

   2.4 The State of the Operator shall identify the organizations that will require the position information of an aircraft in an emergency phase. These shall include, as a minimum:

   a) air traffic service unit(s) (ATSU); and

   b) SAR rescue coordination centre(s) (RCC) and sub-centres.

   2.5 When autonomous transmission of position information has been activated, it shall only be able to be deactivated using the same mechanism that activated it.

   Note 1.— Refer to Annex 11 for emergency phase criteria.

Note 2.— Refer to Annex 12 for required notifications in the event of an emergency phase.

2.6 The accuracy of position information shall, as a minimum, meet the position accuracy requirements established for ELTs.

ATTACHMENT 13 Lights to be displayed by Airplanes

This attachment was established in accordance with Article 125, 256 of this AOR proper, and referred to ICAO Annex 6, Part I, Appendix 1.

1. Terminology

When the following terms are used in this attachment, they have the following meanings:

Angles of coverage.

a) Angle of coverage A is formed by two intersecting vertical planes making angles of 70 degrees to the right and 70 degrees to the left respectively, looking aft along the longitudinal axis to a vertical plane passing through the longitudinal axis.

b) Angle of coverage F is formed by two intersecting vertical planes making angles of 110 degrees to the right and 110 degrees to the left respectively, looking forward along the longitudinal axis to a vertical plane passing through the longitudinal axis.

c) Angle of coverage L is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the airplane, and the other 110 degrees to the left of the first, when looking forward along the longitudinal axis.

d) Angle of coverage R is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the airplane, and the other 110 degrees to the right of the first, when looking forward along the longitudinal axis.

Horizontal plane. The plane containing the longitudinal axis and perpendicular to the plane of symmetry of the airplane.

Longitudinal axis of the airplane. A selected axis parallel to the direction of flight at a normal cruising speed, and passing through the centre of gravity of the airplane.

Making way. An airplane on the surface of the water is "making way" when it is under way and has a velocity relative to the water.

Under command. An airplane on the surface of the water is "under command" when it is able to execute manoeuvres as required by the International Regulations for Preventing Collisions at Sea for the purpose of avoiding other vessels.

Under way. An airplane on the surface of the water is "under way" when it is not aground or moored to the
ground or to any fixed object on the land or in the water.

Vertical planes. Planes perpendicular to the horizontal plane.

Visible. Visible on a dark night with a clear atmosphere.

2. Navigation lights to be displayed in the air

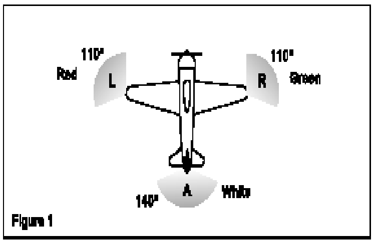
Note.— The lights specified herein are intended to meet the requirements of Annex 2 for navigation lights.

As illustrated in Figure 1, the following unobstructed navigation lights shall be displayed:

2.1 a red light projected above and below the horizontal plane through angle of coverage L;

2.2 a green light projected above and below the horizontal plane through angle of coverage R;

2.3 a white light projected above and below the horizontal plane rearward through angle of coverage A.



3. Lights to be displayed on the water

3.1 General

Note.— The lights specified herein are intended to meet the requirements of Annex 2 for lights to be displayed by airplanes on the water.

The International Regulations for Preventing Collisions at Sea require different lights to be displayed in each of the following circumstances:

3.1.1 when under way.

3.1.2 when towing another vessel or airplane.

3.1.3 when being towed.

3.1.4 when not under command and not making way.

3.1.5 when making way but not under command.

3.1.6 when at anchor.

3.1.7 when aground.

The lights required by airplanes in each case are described below.

3.2 When under way

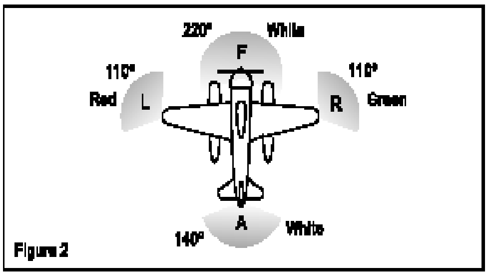
As illustrated in Figure 2, the following appearing as steady unobstructed lights:

3.2.1 a red light projected above and below the horizontal through angle of coverage L.

3.2.2 a green light projected above and below the horizontal through angle of coverage R.

3.2.3 a white light projected above and below the horizontal through angle of coverage A.

3.2.4 a white light projected through angle of coverage F.



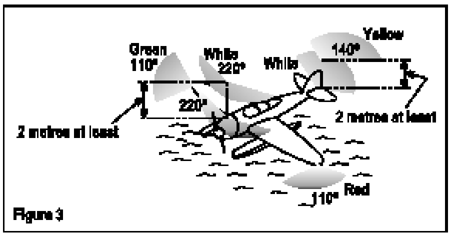
The lights described in 3.2.1, 3.2.2 and 3.2.3 should be visible at a distance of at least 3.7 km (2 NM). The light described in 3.2.4 should be visible at a distance of 9.3 km (5 NM) when fitted to an airplane of 20 m or more in length or visible at a distance of 5.6 km (3 NM) when fitted to an airplane of less than 20 m in length.

3.3 When towing another vessel or airplane as illustrated in Figure 3, the following appearing as steady, unobstructed lights:

3.3.1 the lights described in 3.2.

3.3.2 a second light having the same characteristics as the light described in 3.2 d) and mounted in a vertical line at least 2 m above or below it.

3.3.3 a yellow light having otherwise the same characteristics as the light described in 3.2 c) and mounted in a vertical line at least 2 m above it.

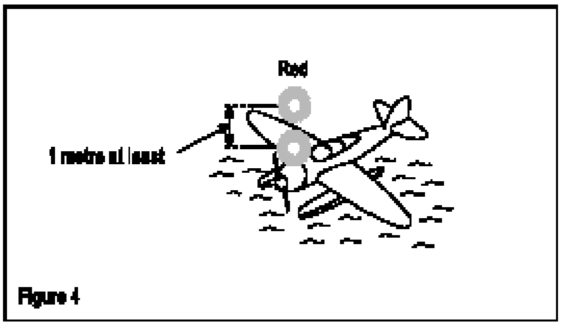


3.4 When being towed

The lights described in 3.2.1, 3.2.2 and 3.2.3 appearing as steady, unobstructed lights.

3.5 When not under command and not making way

As illustrated in Figure 4, two steady red lights placed where they can best be seen, one vertically over the other and not less than 1 m apart, and of such a character as to be visible all around the horizon at a distance of at least 3.7 km (2 NM).



3.6 When making way but not under command

As illustrated in Figure 5, the lights described in 3.5 plus the lights described in 3.2.1, 3.2.2 and 3.2.3.

Note.— The display of lights prescribed in 3.5 and 3.6 is to be taken by other aircraft as signals that the airplane showing them is not under command and cannot therefore get out of the way. They are not signals of airplanes in distress and requiring assistance.

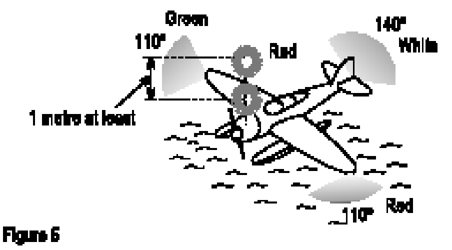


Figure 6

3.7 When at anchor

3.7.1 If less than 50 m in length, where it can best be seen, a steady white light (Figure 6), visible all around the horizon at a distance of at least 3.7 km (2 NM).

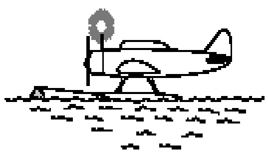


Figure 6

3.7.2 If 50 m or more in length, where they can best be seen, a steady white forward light and a steady white rear light (Figure 7) both visible all around the horizon at a distance of at least 5.6 km (3 NM).

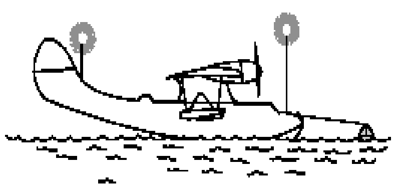
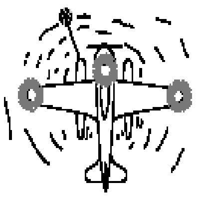


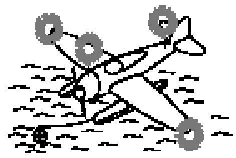
Figure 7

3.7.3 If 50 m or more in span a steady white light on each side (Figures 8 and 9) to indicate the maximum span and visible, so far as practicable, all around the horizon at a distance of at least 1.9 km (1 NM).



Less than 50 metres in length; 50 metres or more in span

Figure 8



50 metres or more in length; 50 metres or more in span

Figure 9

3.8 When aground

The lights prescribed in 3.7 and in addition two steady red lights in vertical line, at least 1 m apart so placed as to be visible all around the horizon.

ATTACHMENT 14 （Deleted）

ATTACHMENT 15 （Deleted）

ATTACHMENT 16 Operations in North Atlantic (NAT) Minimum Navigation Performance Specifications Airspace

This attachment was established in accordance with Article 134 of this AOR proper, and the ICAO Doc.7030.

Section 1
The MNPS shall be applicable in that volume of airspace between FL 285 and FL 420 within the Oceanic Control Areas of Santa Maria, Shanwick (to the east boundary), Reykjavik (to the west boundary), Gander Oceanic (to the west boundary) and New York Oceanic(to the west boundary), excluding the area west of 60°W and south of 38°30′N.

Section 2
For flights within MNPS airspace specified in Section 1, aircraft shall have lateral navigation performance capability such that:

1. The standard deviation of lateral track errors shall be less than 11.7 km (6.3 NM); the statistics of standard deviation is based on the average value, and the average value is zero nautical miles. The whole picture of the statistics data generated would be: the standard deviation within plus and minus one to the average value incorporates 68% of all data, whereas the standard deviation within plus and minus two to the average value incorporates 95% of all data.

2. The proportion of the total flight time spent by aircraft 56 km (30 NM) or more off the cleared track shall be less than 5.3 × 10-4(less than 1 hour in 1887 flight hours).

3. The proportion of the total flight time spent by aircraft between 93 and 130 km (50 and 70 NM) off the cleared track shall be less than 1.3 × 10-5(less than 1 hour in 7693 flight hours).

ATTACHMENT 17 Operating under Reduced Vertical Separation Minimum (RVSM)

This attachment was established in accordance with Article 135, 264, and 347 of this AOR proper, and referred to ICAO Doc. 9574.

Section 1. Definitions

Reduced Vertical Separation Minimum (RVSM) Airspace. Within RVSM airspace, air traffic control (ATC) separates aircraft by a minimum of 1,000 feet vertically between flight level (FL) 290 and FL 410 inclusive. RVSM airspace is special qualification airspace; the operator and the aircraft used by the operator must be approved by the CAA. Air-traffic control notifies operators of RVSM by providing route planning information. Section 8 of this attachment identifies airspace where RVSM may be applied.

RVSM Group Aircraft. Aircraft within a group of aircraft, approved as a group by the CAA, in which each of the aircraft satisfy each of the following:

1. The aircraft have been manufactured to the same design, and have been approved under the same type certificate, amended type certificate, or supplemental type certificate.

2. The static system of each aircraft is installed in a manner and position that is the same as those of the other aircraft in the group. The same static source error correction is incorporated in each aircraft of the group.

3. The avionics units installed in each aircraft to meet the minimum RVSM equipment requirements of this attachment are:
   3.1 Manufactured to the same manufacturer specification and have the same part number.
   3.2 Of a different manufacturer or part number, if the applicant demonstrates that the equipment provides equivalent system performance.

RVSM Nongroup Aircraft. An aircraft that is approved for RVSM operations as an individual aircraft.

RVSM Flight envelope. An RVSM flight envelope includes the range of Mach number, weight divided by atmospheric pressure ratio, and altitudes over which an aircraft is approved to be operated in cruising flight within RVSM airspace. RVSM flight envelopes are defined as follows:

4. The full RVSM flight envelope is bounded as follows:
   4.1 The altitude flight envelope extends from FL 290 upward to the lowest altitude of the following:
      4.1.1 FL 410 (the RVSM altitude limit);
      4.1.2 The maximum certificated altitude for the aircraft; or
      4.1.3 The altitude limited by cruise thrust, buffet, or other flight limitations.

4.2 The airspeed flight envelope extends:
   4.2.1 From the airspeed of the slats/flaps-up maximum endurance (holding) airspeed, or the maneuvering airspeed, whichever is lower;

4.2.2 To the maximum operating airspeed, or airspeed limited by cruise thrust buffet, or other flight limitations, whichever is lower.

4.2.3 All permissible gross weights within the flight envelopes defined in paragraphs (1) and (2) of this definition.

5. The basic RVSM flight envelope is the same as the full RVSM flight envelope except that the airspeed flight envelope extends:

5.1 From the airspeed of the slats/flaps-up maximum endurance (holding) airspeed, or the maneuver airspeed, whichever is lower;

5.2 To the upper Mach/airspeed boundary defined for the full RVSM flight envelope, or a specified lower value not less than the long-range cruise Mach number plus .04 Mach, unless further limited by available cruise thrust, buffet, or other flight limitations.

Section 2. Aircraft Approval

1. An operator may be authorized to conduct RVSM operations if the CAA finds that its aircraft comply with this section.

2. The applicant for authorization shall submit the appropriate data package for aircraft approval. The package must consist of at least the following:

2.1 An identification of the RVSM aircraft group or the nongroup aircraft.

2.2 A definition of the RVSM flight envelopes applicable to the subject aircraft.

2.3 Documentation that establishes compliance with the applicable RVSM aircraft requirements of this section.

2.4 The conformity tests used to ensure that aircraft approved with the data package meet the RVSM aircraft requirements.

2.5. Altitude-keeping equipment: All aircraft. To approve an aircraft group or a nongroup aircraft, the CAA must find that the aircraft meets the following requirements:

2.5.1 The aircraft must be equipped with two operational independent altitude measurement systems.

2.5.2 The aircraft must be equipped with at least one automatic altitude control system that controls the aircraft altitude:

2.5.2.1 Within a tolerance band of ±65 feet about an acquired altitude when the aircraft is operated in straight and level flight under nonturbulent, nongust conditions; or

2.5.2.2 Within a tolerance band of ±130 feet under nonturbulent, nongust conditions for aircraft for which application for type certification occurred on or before April 9, 1997 that are equipped with an automatic altitude control system with flight management/performance system inputs.

2.6 The aircraft must be equipped with an altitude alert system that signals an alert when the altitude displayed to the flight crew deviates from the selected altitude by more than:

2.6.1 ±300 feet for aircraft for which application for type certification was made on or before April 9, 1997; or

2.6.2 ±200 feet for aircraft for which application for type certification is made after April 9, 1997.

3. Altimetry system error containment: Group aircraft for which application for type certification was made on or before April 9, 1997. To approve group aircraft for which application for type certification was made on or before April 9, 1997, the CAA must find that the altimetry system error (ASE) is contained as follows:
   3.1 At the point in the basic RVSM flight envelope where mean ASE reaches its largest absolute value, the absolute value may not exceed 80 feet.
   3.2 At the point in the basic RVSM flight envelope where mean ASE plus three standard deviations reaches its largest absolute value, the absolute value may not exceed 200 feet.
   3.3 At the point in the full RVSM flight envelope where mean ASE reaches its largest absolute value, the absolute value may not exceed 120 feet.
   3.4 At the point in the full RVSM flight envelope where mean ASE plus three standard deviations reaches its largest absolute value, the absolute value may not exceed 245 feet.
   3.5 Necessary operating restrictions. If the applicant demonstrates that its aircraft otherwise comply with the ASE containment requirements, the CAA may establish an operating restriction on that applicant's aircraft to restrict the aircraft from operating in areas of the basic RVSM flight envelope where the absolute value of mean ASE exceeds 80 feet, and/or the absolute value of mean ASE plus three standard deviations exceeds 200 feet; or from operating in areas of the full RVSM flight envelope where the absolute value of the mean ASE exceeds 120 feet and/or the absolute value of the mean ASE plus three standard deviations exceeds 245 feet.

4. Altimetry system error containment: Group aircraft for which application for type certification is made after April 9, 1997. To approve group aircraft for which application for type certification is made after April 9, 1997, the CAA must find that the altimetry system error (ASE) is contained as follows:
   4.1 At the point in the full RVSM flight envelope where mean ASE reaches its largest absolute value, the absolute value may not exceed 80 feet.
   4.2 At the point in the full RVSM flight envelope where mean ASE plus three standard deviations reaches its largest absolute value, the absolute value may not exceed 200 feet.

5. Altimetry system error containment: Nongroup aircraft. To approve a nongroup aircraft, the CAA must find that the altimetry system error (ASE) is contained as follows:
   5.1 For each condition in the basic RVSM flight envelope, the largest combined absolute value for residual static source error plus the avionics error may not exceed 160 feet.
   5.2 For each condition in the full RVSM flight envelope, the largest combined absolute value for residual static source error plus the avionics error may not exceed 200 feet.

6. Traffic Alert and Collision Avoidance System (TCAS) Compatibility With RVSM Operations: All aircraft. After March 31, 2002, unless otherwise authorized by the CAA, if operate an aircraft

that is equipped with TCAS II in RVSM airspace, the standard of TCAS II shall comply with the ICAO Annex 10.

7. If the CAA finds that the applicant's aircraft comply with this section, the CAA notifies the applicant in writing.

Section 3. Operator Authorization

1. Authority for an operator to conduct flight in airspace where RVSM is applied is issued in operations specifications, a Letter of Authorization, or management specifications issued under subpart K of this part, as appropriate. To issue an RVSM authorization, the CAA must find that the operator's aircraft have been approved in accordance with Section 2 of this attachment and the operator complies with this section.

2. An applicant for authorization to operate within RVSM airspace shall apply in a form and manner prescribed by the CAA. The application must include the following:
   - 2.1 An approved RVSM maintenance program outlining procedures to maintain RVSM aircraft in accordance with the requirements of this attachment. Each program must contain the following:
     - 2.1.1 Periodic inspections, functional flight tests, and maintenance and inspection procedures, with acceptable maintenance practices, for ensuring continued compliance with the RVSM aircraft requirements.
     - 2.1.2 A quality assurance program for ensuring continuing accuracy and reliability of test equipment used for testing aircraft to determine compliance with the RVSM aircraft requirements.
     - 2.1.3 Procedures for returning noncompliant aircraft to service.
   - 2.2 Initial and recurring pilot training requirements for an applicant.
   - 2.3 Policies and procedures: An applicant who operates under Chapter 2 of AOR must submit RVSM policies and procedures that will enable it to conduct RVSM operations safely.

3. Validation and Demonstration. In a manner prescribed by the CAA, the operator must provide evidence that:
   - 3.1 It is capable to operate and maintain each aircraft or aircraft group for which it applies for approval to operate in RVSM airspace.
   - 3.2 Each pilot has an adequate knowledge of RVSM requirements, policies, and procedures.

Section 4. RVSM Operations

1. Each person requesting a clearance to operate within RVSM airspace shall correctly annotate the flight plan filed with air traffic control with the status of the operator and aircraft with regard to RVSM approval. Each operator shall verify RVSM applicability for the flight planned route through the appropriate flight planning information sources.

2. No person may show, on the flight plan filed with air traffic control, an operator or aircraft as approved for RVSM operations, or operate on a route or in an area where RVSM approval is required, unless:
   2.1 The operator is authorized by the CAA to perform such operations.
   2.2 The aircraft has been approved and complies with the requirements of Section 2 of this attachment.

Section 5. Deviation Authority Approval

The CAA may authorize an aircraft operator to deviate from the requirements of a specific flight in RVSM airspace if that operator has not been approved in accordance with Section 3 of this attachment if:

1. The operator submits a request in a time and manner acceptable to the CAA.

2. At the time of filing the flight plan for that flight, ATC determines that the aircraft may be provided appropriate separation and that the flight will not interfere with, or impose a burden on, the operations of operators who have been approved for RVSM operations in accordance with Section 3 of this attachment.

Section 6. Reporting Altitude-Keeping Errors

Each operator shall report to the CAA each event in which the operator's aircraft has exhibited the following altitude-keeping performance:

1. Total vertical error of 300 feet or more;

2. Altimetry system error of 245 feet or more; or

3. Assigned altitude deviation of 300 feet or more.

Section 7. Removal or Amendment of Authority

The CAA may amend operations specifications or management specifications issued to revoke or restrict an RVSM authorization, or may revoke or restrict an RVSM letter of authorization, if the CAA determines that the operator is not complying, or is unable to comply, with this attachment. Examples of reasons for amendment, revocation, ore restriction include, but are not limited to, an operator's:

1. Committing one or more altitude-keeping errors in RVSM airspace;

2. Failing to make an effective and timely response to identify and correct an altitude-keeping error; or

3. Failing to report an altitude-keeping error.

Section 8. Airspace Designation

1. RVSM in the North Atlantic.

1.1 RVSM may be applied in the NAT in the following ICAO Flight Information Regions (FIRs): New York Oceanic, Gander Oceanic, Sondrestrom FIR, Reykjavik Oceanic, Shanwick Oceanic, and Santa Maria Oceanic.

1.2 RVSM may be effective in the Minimum Navigation Performance Specification (MNPS) airspace within the NAT. The MNPS airspace within the NAT is defined by the volume of airspace between FL 285 and FL 420 (inclusive) extending between latitude 27 degrees north and the North Pole, bounded in the east by the eastern boundaries of control areas Santa Maria Oceanic, Shanwick Oceanic, and Reykjavik Oceanic and in the west by the western boundaries of control areas Reykjavik Oceanic, Gander Oceanic, and New York Oceanic, excluding the areas west of 60 degrees west and south of 38 degrees 30 minutes north.

2. RVSM in the Pacific.

2.1 RVSM may be applied in the Pacific in the following ICAO Flight Information Regions (FIRs): Anchorage Arctic, Anchorage Continental, Anchorage Oceanic, Auckland Oceanic, Brisbane, Edmonton, Honiara, Los Angeles, Melbourne, Nadi, Naha, Nauru, New Zealand, Oakland, Oakland Oceanic, Port Moresby, Seattle, Tahiti, Tokyo, Ujung Pandang and Vancouver.

3. RVSM in the West Atlantic Route System (WATRS). RVSM may be applied in the New York FIR portion of the West Atlantic Route System (WATRS). The area is defined as beginning at a point 38°30' N/60°00'W direct to 38°30'N/69°15' W direct to 38°20' N/69°57' W direct to 37°31' N/71°41' W direct to 37°13' N/72°40' W direct to 35°05' N/72°40' W direct to 34°54' N/72°57' W direct to 34°29' N/73°34' W direct to 34°33' N/73°41' W direct to 34°19' N/74°02' W direct to 34°14' N/73°57' W direct to 32°12' N/76°49' W direct to 32°20' N/77°00' W direct to 28°08' N/77°00' W direct to 27°50' N/76°32' W direct to 27°50' N/74°50' W direct to 25°00' N/73°21' W direct to 25°00'05' N/69°13'06' W direct to 25°00' N/69°07' W direct to 23°30' N/68°40' W direct to 23°30' N/60°00' W to the point of beginning.

ATTACHMENT 18 Requirements for Flight-cycle-dependent Repair Assessment Program

This attachment was established in accordance with Article 143 of this AOR.

An operator who uses aircraft types of BAC 1-11, B707, B720, B727, B737, B747, DC-8, DC-9, MD-80, DC-10, F28, L-1011or A300(excluding the 600 series) in flight operations, shall establish a Repair Assessment Program for the aforementioned aircraft types when the flight cycles of which exceed the number listed as follows. The implementation of such Repair Assessment Program shall be approved by CAA.

1. For BAC 1-11 all series, 60,000 flight cycles.

2. For B707 all series, 15,000 flight cycles.

3. For B720 all series, 23,000 flight cycles.

4. For B727 all series, 45,000 flight cycles.

5. For B737 all series, 60,000 flight cycles.

6. For B747 all series, 15,000 flight cycles.

7. For DC-8 all series, 30,000 flight cycles.

8. For DC-9, MD-80 all series, 60,000 flight cycles.

9. For DC-10 all series, 30,000 flight cycles.

10. For L-1011 all series, 27,000 flight cycles.

11. For F28MK1000, 2000, 3000, 4000 series, 60,000 flight cycles.

12. A300 ：
   - 12.1 For B2 series, 30,000 flight cycles.
   - 12.2 For B4-100 series(including B4-2C series)：30,000 flight cycles for the portion of airframe at or above the lower end of the windows, 36,000 flight cycles for the portion of airframe at or below the lower end of the windows.
   - 12.3 For B4-200 series：25,000 flight cycles for the portion of airframe at or above the lower end of the windows, 36,000 flight cycles for the portion of airframe at or below the lower end of the windows.

Attachment 18-1 Transport category airplane widespread fatigue damage inspection compliance requirements and limit of validity

This attachment is referred to Article 144-1 and referred to FAR 26.21, 26.23 and 121.1115

1. Operator operating any airplane as listed in below table shall incorporated the airworthiness limitations section pertaining to widespread fatigue damage inspection and Limit of validity (LOV) which is approved by the Regulatory Authority of airplane manufacture into its maintenance program r before its compliance date.
2. Those aircraft which did not receive the approved Limit of Validity from the Authority of State of Design shall use the Table 1 as their limit.
3. The operator might exceed the Limit of Validity of aircraft when escalated Limit of Validity was approves by the Authority of State of Design and the airworthiness Limitations items related to wide-spread fatigue damage were incorporated into maintenance program.

Table 1

Airplane model	**Default LOV [flight cycles (FC) or flight hours (FH)]**	**Compliance date**
Airbus—（Type Certificates and Amended Type Certificates approved before January 14, 2011）		
A300 B2-1A, B2-1C, B2K-3C, B2-203	48,000 FC	August 14, 2013
A300 B4-2C, B4-103	40,000 FC	August 14, 2013
A300 B4-203	34,000 FC	August 14, 2013
A300-600 Series	30,000 FC/67,500 FH	August 14, 2013
A310-200 Series	40,000 FC/60,000 FH	August 14, 2013

A310-300 Series	35,000 FC/60,000 FH	August 14, 2013
A318 Series	48,000 FC/60,000 FH	February 14, 2016
A319 Series	48,000 FC/60,000 FH	February 14, 2016
A320-100 Series	48,000 FC/48,000 FH	February 14, 2016
A320-200 Series	48,000 FC/60,000 FH	February 14, 2016
A321 Series	48,000 FC/60,000 FH	February 14, 2016
A330-200, -300 Series (except WV050 family) (non enhanced)	40,000 FC/60,000 FH	February 14, 2016
A330-200, -300 Series WV050 family (enhanced)	33,000 FC/100,000 FH	February 14, 2016
A330-200 Freighter Series	See NOTE.	February 14, 2016
A340-200, -300 Series (except WV 027 and WV050 family) (non enhanced)	20,000 FC/80,000 FH	February 14, 2016
A340-200, -300 Series WV 027 (non enhanced)	30,000 FC/60,000 FH	February 14, 2016

A340-300 Series WV050 family (enhanced)	20,000 FC/100,000 FH	February 14, 2016
A340-500, -600 Series	16,600 FC/100,000 FH	February 14, 2016
A380-800 Series	IAW the Airworthiness Limitation Section of the ICA.	February 14, 2016
Boeing—（Type Certificates and Amended Type Certificates approved before January 14, 2011）		
717	60,000 FC/60,000 FH	February 14, 2016
727 (all series)	60,000 FC	August 14, 2013
737 (Classics): 737-100, -200, -200C, -300, -400, -500	75,000 FC	August 14, 2013
737 (NG): 737-600, -700, -700C, -800, -900, -900ER	75,000 FC	February 14, 2016
747 (Classics): 747-100, -100B, -100B SUD, -200B, -200C, -200F, -300, 747SP, 747SR	20,000 FC	August 14, 2013
747-400: 747-400, -400D, -400F	20,000 FC	February 14, 2016
757	50,000 FC	February 14, 2016

767	50,000 FC	February 14, 2016
777-200, -300	40,000 FC	February 14, 2016
777-200LR, 777-300ER	40,000 FC	February 14, 2017
777F	11,000 FC	February 14, 2017
Bombardier—Existing 1Models Only:		
CL-600: 2D15 (Regional Jet Series 705), 2D24 (Regional Jet Series 900)	60,000 FC	February 14, 2017
Embraer—Existing 1Models Only:		
ERJ 170	See NOTE.	February 14, 2017
ERJ 190	See NOTE.	February 14, 2017
Fokker—Existing 1Models Only:		
F.28 Mark 0070, Mark 0100	90,000 FC	August 14, 2013
Lockheed—Existing 1Models Only:		
L-1011	36,000 FC	August 14, 2013
188	26,600 FC	August 14, 2013
382 (all series)	20,000 FC/50,000 FH	August 14, 2013

McDonnell Douglas—Existing 1Models Only:		
DC-8, -8F	50,000 FC/50,000 FH	August 14, 2013
DC-9 (except for MD-80 models)	100,000 FC/100,000 FH	August 14, 2013
MD-80 (DC-9-81, -82, -83, -87, MD-88)	50,000 FC/50,000 FH	August 14, 2013
MD-90	60,000 FC/90,000 FH	February 14, 2016
DC-10-10, -15	42,000 FC/60,000 FH	August 14, 2013
DC-10-30, -40, -10F, -30F, -40F	30,000 FC/60,000 FH	August 14, 2013
MD-10-10F	42,000 FC/60,000 FH	February 14, 2016
MD-10-30F	30,000 FC/60,000 FH	February 14, 2016
MD-11, MD-11F	20,000 FC/60,000 FH	February 14, 2016
Maximum Takeoff Gross Weight Changes:		
All airplanes whose maximum takeoff gross weight has been	Not applicable.	August 14, 2013 or within 12

decreased to 75,000 pounds or below after January 14, 2011, or increased to greater than 75,000 pounds at any time by an amended type certificate or supplemental type certificate		months after the LOV is approved, or before operating the airplane, whichever occurs latest
All Other Airplane Models (TCs and amended TCs) not Listed in Table 2	Not applicable	February 14, 2016 or within 12 months after the LOV is approved, or before operating the airplane, whichever occurs latest

4. Operator operating any airplane as listed in below table shall incorporated the airworthiness limitations section pertaining to widespread fatigue damage inspection and Limit of validity (LOV) which is approved by the Regulatory Authority of airplane manufacturer into its maintenance program before July 14, 2013.

Table 2

Airplane model	Default LOV [flight cycles (FC) or flight hours (FH)]
Airbus:	
Caravelle	15,000 FC/24,000 FH
Avions Marcel Dassault:	

Breguet Aviation Mercure 100C	20,000 FC/16,000 FH
Boeing:	
Boeing 707 (-100 Series and -200 Series)	20,000 FC
Boeing 707 (-300 Series and -400 Series)	20,000 FC
Boeing 720	30,000 FC
Bombardier:	
CL-44D4 and CL-44J	20,000 FC
BD-700	15,000 FH
Bristol Aeroplane Company:	
Britannia 305	10,000 FC
British Aerospace Airbus, Ltd.:	
BAC 1-11 (all models)	85,000 FC
British Aerospace (Commercial Aircraft) Ltd.:	
Armstrong Whitworth Argosy A.W. 650 Series 101	20,000 FC
BAE Systems (Operations) Ltd.:	
BAe 146-100A (all models)	50,000 FC

BAe 146-200-07	50,000 FC
BAe 146-200-07 Dev	50,000 FC
BAe 146-200-11	50,000 FC
BAe 146-200-07A	47,000 FC
BAe 146-200-11 Dev	43,000 FC
BAe 146-300 (all models)	40,000 FC
Avro 146-RJ70A (all models)	40,000 FC
Avro 146-RJ85A and 146-RJ100A (all models)	50,000 FC
D & R Nevada, LLC:	
Convair Model 22	1,000 FC/1,000 FH
Convair Model 23M	1,000 FC/1,000 FH
deHavilland Aircraft Company, Ltd.:	
D.H. 106 Comet 4C	8,000 FH
Gulfstream:	
GV	40,000 FH
GV-SP	40,000 FH

Ilyushin Aviation Complex:	
IL-96T	10,000 FC/30,000 FH
Lockheed:	
300-50A01 (USAF C 141A)	20,000 FC

ATTACHMENT 19 Check Airman Qualifications

This attachment was established in accordance with Article 163 and 279 of this AOR proper.

1. Has a flight experience of eight years or above in airplane or helicopter, or has a flight experience of 2 years or above in free balloon, and classified in accordance with aircraft category as follows:
   1.1 An airplane pilot shall have 3 years experience in civil aviation, and 2 years of which shall be in the capacity of captain.
   1.2 A helicopter pilot shall have 2 years experience as a captain in civil aviation.
   1.3 A free balloon pilot shall have 1 year experience as a commercial pilot, or a pilot of foreign nationality hired by the operator, shall have a qualification of an examiner, or have an experience of an examiner in pilot-in-command proficiency check, authorized by the civil aviation authority of the balloon manufacturer.

2. Has an experience of flight instructor or instructor pilot for at least one year.

3. Total Flight Time:
   3.1 5,000 hours minimum for an airplane pilot, but for an aircraft of which the gross weight not exceeds 15,000 Kgs, the total flight time requirement may be waived to no less than 3,000 hours.
   3.2 2,000 hours minimum for a helicopter pilot, and the flight time of which shall incorporate 1,000 hours helicopter flight time as minimum.
   3.3 70 hours of free balloon flight time minimum for a free balloon pilot.

4. Has no record showing any disciplinary action taken for the violation of regulations within the preceding year, and for the violation in civil penalty of the Civil Aviation Act within the preceding 2 years.

5. Holds a valid CAA type certificate appropriate to the aircraft.

ATTACHMENT 20 Control Manual Contents

This attachment was established in accordance with Article 182 of this AOR proper, and ICAO Doc. 9760.

The following minimum requirements for material that must be included in the flight operations manual and other related documents.

1. Management and supervision of flight operations
   1.1 Duties and responsibilities
   1.2 Check list for emergency and safety equipment
   1.3 Minimum equipment list and special operations authorization, including operation requirement in RNP airspace
   1.4 Safety measurements of refueling while passengers on board

2. Self-audit and accident prevention plan in light of the articles of this AOR, including the descriptions safety policy and personnel duties

3. Fight operations training
   3.1 The details of flight crewmembers training programmes
   Note: Procedures for upset prevention and recovery training in a flight simulation training device could refer to "the Procedures for Air Navigation Services — Training" (PANS-TRG, Doc 9868). Guidance on upset prevention and recovery training in a flight simulation training device could refer to the "Manual on Aeroplane Upset Prevention and Recovery Training" (Doc 10011). Guidance material to design flight crew training programmes could refer to the "Manual of Evidence-based Training" (Doc 9995).
   3.2 The details of cabin crewmembers training programmes

4. The limitations of flight time, flight Duty Period and duty period

   Flight time, flight duty period and duty period of flight crew member shall comply with this AOR, and provide provisions of in flight rest time and procedures of in-flight crew composition and in-flight relief.

5. Flight operations
   5.1 Command and responsibility of each flight crewmember in each phase of flight
   5.2 Accountability of each flight crewmember in normal and abnormal situations
   5.3 Fuel policy regarding all occasions and including one or more engines inoperative during cruise
   5.4 The carriage and supply of Oxygen in accordance with this AOR
   5.5 Operational Control of weight and balance
   5.6 Operation of ground anti-icing/deicing
   5.7 Format, content and utilization of operational flight plan

5.8 Normal, abnormal and emergency procedures for Flight crewmembers and the related information
5.9 Standard operational procedures for each phase of flight
5.10 Rules for the usage of normal procedures checklist
5.11 Emergency evacuation procedures
5.12 Contingency procedures for abnormal condition in departure
5.13 The awareness of altitude hold and alert call-out in auto-pilot flight
5.14 The utilization of auto-pilot and auto-throttle in IFR and in the condition of 5.19 and 5.23
5.15 Confirmation and acknowledge of ATC clearance and terrain awareness
5.16 Departure and approach briefings
5.17 Familiarization of routes and designation airports
5.18 Details of stable approach
5.19 The limitation of descent rate in low altitude
5.20 GO/NO GO conditions for IFR approach
5.21 Guideline for conducting precision and non-precision instrument approach
5.22 Flight crewmembers duties assignment and workload management during night flying, IMC flying and approach/landing phases
5.23 Instructions, training and policy requirements for CFIT and GPWS
5.24. Information regarding the interception for civil aircraft, including:
  5.24.1. Procedures for the response of intercepted aircraft by PIC as set forth in ICAO Annex 2
  5.24.2. Visual signals for the intercepting and intercepted aircraft as set forth in ICAO Annex 2
5.25 Operations above 15,000 m (49,000 ft)
  5.25.1 Provide adequate information about actions taken after the overdose of cosmic radiation
  5.25.2 Procedures for emergency descent, including:
    5.25.2.1 The necessity of early warning to the appropriate air traffic control unit and get special permit for emergency descent, and;
    5.25.2.2 Actions taken while suffering from jamming or loss communication with air traffic control unit.

6. Aircraft performance
Normal climb and operation performance information as set for the this AOR

7. Route guides and Aeronautical charts to ensure the communication, navaids, airports and other information are accessible for each flight

8. Minimum flight altitudes
8.1 Method for determining flight
8.2 List of minimum flight altitudes for each route to be flown

9. Aerodrome operating minima
9.1 Method for determining aerodrome operating minima
9.2 Aerodrome operating minima for regular and alternate designations

9.3 Increments of operating minima while the downgrade of airport navaids

10. Rescue and Fire Fighting Services (RFFS) Levels

10.1 Visual signals for air-ground communication as set forth in ICAO Annex 12.

10.2 Captain observation procedures as set forth in ICAO Annex 12.

10.3 An operator shall, as part of its safety management system, assess the level of rescue and fire fighting service (RFFS) protection available at any aerodrome intended to be specified in the operational flight plan in order to ensure that an acceptable level of protection is available for the aeroplane intended to be used, as set forth in ICAO Annex 6.

11 Operations for the carriage of dangerous goods including actions taken in emergency situations

12. Navigation

12.1 List of airborne navigation equipment, including any required in RNP airspace

12.2 Procedures for long range navigation

13. Communication-situations of maintenance of standby on guard channel

14. Security

14.1 Instructions and procedures for security operations

14.2 Compliance of security requirements as set forth in this AOR

15 Proper considerations of human factors in training programme

Note: refers to the ICAO Doc.9683 Human factor training manual

A General Maintenance Manual (GMM) or other related documents should be carried into effect to meet the maintenance requirement of the operator.

1. Maintenance department organization chart

2. Commitment of maintenance supervisor to airworthiness responsibility

3. Responsibilities of maintenance mangers

4. Job descriptions of maintenance personnel

5. Maintenance facilities and capabilities

6. Manual revision, distribution and effective pages/versions control

7. Maintenance and service procedures

8. Hand-off of maintenance tasks

9. The development of maintenance plan and its revisions

10. Maintenance and service methods and means approved by CAA

11. Procedures of Return to Service (RTS)

12. Quality audit policies and system

13. Inspection system, aircraft inspection, shop inspection, parts receiving inspection

14. Authorization and release, qualification of authorized inspectors, authorized rating and roster

15. RII and inspection procedures

16. Control of aircraft weight and balance

17. Re-fueling and de-fueling procedures while passenger on board

18. Management of Precise Measuring Equipment (PME)

19. Management of Airworthiness Directive (AD)

20. Management of work sheet /engineering order

21. Management of technical publication

22. Standards and procedures for major repairs, major alternation

23. Policies for non-mandatory technical modifications

24. Maintenance control system

25. Management of maintenance records

26. MEL and Defer/Defect correction procedures

27. Parts management

28. Evaluation and management of contracting maintenance

29. Sample of maintenance document, forms and tags

30. Reliability control program

31. Policy and procedures for test flight

32. Special operations procedures

33. Regulation

34. Service difficult report and incident reporting procedures

35. Operation procedures for line maintenance

ATTACHMENT 20-1 The Operations of Spraying and Dusting (Agriculture aircraft)
This attachment was established in accordance with Article **202-1** of this AOR proper, and FAR Part 137

1. Applicability

1.1 A general aviation operator, performing agricultural aircraft operation shall comply with the guidance of the attachment in AOR.

1.2 Agricultural aircraft operation is the operation of an aircraft for the purpose of:

1.2.1 Dispensing any economic poison,

Note：Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insect, rodent, nematode, fungus, weed, and other forms of plant or animal life or virus. This does not include viruses on or living in humans or animals. Any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

1.2.2 Dispensing any other substance intended for plant nourishment, soil treatment, propagation of plant life, or pest control.

1.2.3 Engaging in dispensing activities directly affecting agriculture, horticulture, or forest preservation, but not including the dispensing of live insects.

2. Personnel requirements.

2.1 A chief supervisor designated by an air operator (or a private operator) shall be familiar with the basic safety principles and techniques. An operator may not comply with the requirements of paragraphs from 2.1.1.2 to 2.1.1.4 of this attachment should the operation be executed without any chemicals.

2.1.1 Basic safety principles

2.1.1.1 Steps taken before starting operations, including a survey of the work area.

2.1.1.2 Knowledge and main points about safety process of economic poisons and the proper disposal methods of used containers for those poisons.

2.1.1.3 The general effects of economic poisons and agricultural chemicals on plants, animals, and persons, with emphasis on those normally used in the areas of intended operations; and the precautions to be observed in using poisons and chemicals.

2.1.1.4 Primary symptoms of persons affected by economic poisons, the appropriate emergency measures to take, and the location of medical institutions.

2.1.1.5 Performance capabilities and operating limitations of the aircraft to be used.

2.1.1.6 Safe flight and operating procedures.

2.1.2 Flight skills shall be performed with the load to the maximum certificated take-off weight, or the maximum weight established for the special-purpose load, whichever is greater:

2.1.2.1 Short-field and soft-field take offs (airplanes only).

2.1.2.2 Approaches to the working area.

2.1.2.3 Flare-outs.

2.1.2.4 Swath runs.

2.1.2.5 Pullups and turnarounds.

2.1.2.6 Rapid deceleration or quick stops (helicopters only).

2.2 Operators shall ensure that each person used in an agricultural aircraft operation is informed of their duties and responsibilities for the operation.

2.3 The PIC who performs the agricultural aircraft operation shall possess an appropriate and valid type rating of the aircraft after completion of both knowledge and skill training. Chief supervisor shall ensure that the services of the PIC shall meet the requirement of section 2.1 in this attachment. The PIC shall demonstrate the ability to the supervisor before executing the dispensing operation for the first time. If the supervisor acknowledges that the PIC has the related experience involved in safe flight operation, pesticide dispensing, or fields of chemicals, that he or she may ignore the demonstration.

3. Aircraft requirements.

The aircraft which conducts the jettison operation shall meet the following requirements:

3.1 The aircraft is equipped with approved type certificate (TC) or supplemental type certificate (STC) of a jettisoning device. The aircraft status is airworthy, and is in a condition for safe operation.

3.2 The aircraft has suitable seat belts and shoulder harnesses installed for each pilot station.

4. Operating restriction

Dispensing any material or substance in a manner that will not create a hazard to persons or property on the surface.

5. Use of safety belts and shoulder harnesses.

Pilots who conduct agricultural aircraft operation under the attachment shall securely fasten a safety belt and shoulder harness.The shoulder harness may be unfastened if it hinders the occupant in performing his or her required duties.

6. Deviation from airport traffic pattern.

For take-offs and landings, the PIC of an aircraft engaged in agricultural operation may deviate from an airport traffic pattern when authorized by the control tower. And the aircraft at all times shall remain clear of, and gives way to, aircraft conforming to the traffic pattern of the airport.

7. Operation over congested areas:

7.1 If the operation is conducted over congested area, the agricultural aircraft operation shall be complied with the followings:

7.1.1 The letter of authorization shall be acquired for the target working area from the local government.

7.1.2 Provide sufficient protecting measures to persons and property on the surface.

7.1.3 A notice should be given to the affected public before the dispensing operations begin. Newspaper ads, radio announcements, or television announcements are all effective methods.

7.1.4 Permission of the flight operation shall be acquired. The content of the flight plan shall include obstacle consideration, the emergency landing capabilities of the aircraft, and coordination with air traffic control.

7.1.5 Single-engine aircraft operation shall be complied with the followings:

7.1.5.1 Except for helicopters, no aircraft operations may be conducted over densely populated area, such as loaded take-offs pull-ups and turnarounds.

7.1.5.2 No person may operate an aircraft over a congested area lower than the altitudes prescribed in Rules of the air unless practical dispensing operation is necessary (include entering or exiting the area).

7.1.5.3 When in the vicinity of the congested area (include entering or exiting the area), pilots shall maintain adequate track and altitude to determine that the aircraft will not jeopardize property and persons on the surface in case of emergency landing.

7.1.6 Multiengine aircraft operation shall be complied with the followings:

7.1.6.1 Operation with multiengine aircraft over a densely populated area shall be executed on a safely effective length of the runway of an airport.

7.1.6.2 Calculating Maximum Takeoff Weight of a multiengine airplane taken off over densely populated area, the method is that: The aircraft is able to maintain the rate of climb 50 feet per minute or more at the highest elevation of the working area, at least 1000 feet above the highest obstacle, or calibrated pressure altitude of 5,000 feet MSL (whichever is higher) when the critical engine is inoperative, would permit a rate of climb of at least 50 feet per minute at an altitude of at least 1,000 feet above the elevation of the highest ground or obstruction within the area to be worked or at a pressure altitude of 5,000 feet MSL, whichever is higher. Aforementioned is assumed that the propeller of the inoperative engine is feathered; flaps and landing gears is in favorable configuration; maximum continuous horse power is available from the good engine.

7.1.6.3 No person may operate any multiengine aircraft over a congested area below the altitudes instructed by the air traffic control except during the actual dispensing operation (include pull-ups and turnarounds, entering and exiting the working area) approaches, departures, and turnarounds

8. Operation requirements for pilots and aircraft over congested areas:.

8.1 PIC shall at least have the following flight experience:

8.1.1 The PIC shall have 25 hours of flight time in the make and basic model of the aircraft. At least 10 of flight hours must have been acquired within the preceding 12 calendar months.

8.1.2 The PIC shall have 100 hours of flight experience in agricultural dispensing operations.

8.1.3 Except for a helicopter, an aircraft shall be equipped and capable of jettisoning at least one-half of the aircraft's maximum authorized load of agricultural material within 45 seconds. An aircraft equipped with a device for releasing the tank or hopper as a unit shall have a means to prevent inadvertent release by the pilot or other crewmember.

9. Records keeping for air operators:

Each holder of general aviation in agricultural aircraft operation shall keep their records at the operator's designated home base of operations. The following items are required to keep in records:

9.1 The legal company and business address;

9.2 The date of the service;

9.3 The name and quantity of the material dispensed for each operation conducted; and

9.4 The name, address, and certificate number of each pilot used in agricultural aircraft operations and the date that practical test was held recently.

ATTACHMENT 20-2 The Helicopter external-load operations

This attachment was established in accordance with Article 202-1 of this regulation, and FAR Part 133, EASA Commission Regulation (EU) No 965/2012 and 2016/1199.

1. Applicability and definition

1.1 The general aviation enterprise shall comply with provisions of this attachment when carrying out helicopter external-load operations.

1.2 The provisions of this attachment do not apply to:

1.2.1 Helicopter manufacturers when developing external-load attaching means.

1.2.2 Helicopter manufacturers demonstrate conformity of equipment utilized in according with helicopter airworthiness standards described in Civil Aviation Act Article 23 paragraph 1.

1.2.3 Operations conducted by a person demonstrating compliance for the issuance of an approval for helicopter external-load operations.

1.2.4 Training flights conducted in preparation for the demonstration of compliance with this attachment.

1.3 The following paragraphs define helicopter and designations, according to the equipment, operating methods, and carriage items or personnel:

1.3.1 Class A helicopter external-load combination: The external load cannot move freely, cannot be jettisoned, and does not extend below the landing gear. An example of a Class A load is the carriage of items in an approved cargo rack, bin, or fixture attached to the exterior of the aircraft, such type shall be recorded in the flight manual and accepted by CAA.

1.3.2 Class B helicopter external-load combination: The external load is jettisonable, carried above or below the skids, and lifted free of land or water during the helicopter operation. An air conditioner unit being lifted onto the roof of a tall building is an example of a Class B load.

1.3.3 Class C helicopter external-load combination: The external load is jettisonable and remains in contact with land or water during the helicopter operation. Wire stringing, dragging a long pole, and boat towing are some examples of Class C loads.

1.3.4 Class D helicopter external-load combination: The external load allow carriage of an item, crewmember or person who is essential and directly connected with the external-load operation. A person being transported externally from offshore to a ship utilizing a personnel lifting device is an example of Class D load.

1.4 Helicopter offshore operations means a helicopter operation that has a substantial proportion of any flight conducted over open sea areas to or from an offshore location.

2. Requirements for helicopter

Helicopter external-load operations should comply to:

2.1 The operator should have exclusive use of helicopter to control and use for at least six consecutive months.

2.2 Comply with helicopter airworthiness standard under Article 23, paragraph 1 of the Act, and certificated or accepted by the CAA (might exclude external-load equipment).

2.3 Hold a valid Certificate of Airworthiness.

3. Personal Requirements

3.1 The operator must assign a pilot who holds a current commercial pilot-helicopter or air transport pilot license, with a rating appropriate for the helicopter external-load operations, and assign a pilot to pilot in command.

3.2 The operator must designate one pilot as the chief pilot who supervise and execute helicopter external-load operations and be approved by CAA. If necessary, the chief pilot may also designate to a qualified pilot to perform the duty and responsibility for the chief pilot. The chief pilot and his/her designee shall holds a current commercial pilot-helicopter or air transport pilot license with an appropriate rating for helicopter external-load operations. The duty and responsibility of the chief pilot and his/her designee shall be included in the helicopter external-load operations manual as described at the Paragraph 10 of this attachment.

3.3 The operator shall report any change in designation of chief pilot or his/her designee immediately to the CAA. The new chief pilot must be designated within 30 days and approved by CAA.

3.4 A person who has performed a Helicopter external-load operations should complete the initial and recurrent training which approved by CAA in preceding twelve (12) months before the execution of the assignment, or he/she has completed the same class and type of the Helicopter external-load operations in preceding twelve (12) months before the execution of the assignment.

3.5 Knowledge and skill Requirements:

3.5.1 Except as provided in 3.5.4 of this section, operator shall establish respective training program, including initial and recurrent training, in according with 3.5.2 and 3.5.3 which will be carried into effect after approved by CAA. Those who complete the training and pass the written and practical testes shall be authorized by operator then be permitted to perform helicopter external-load operations.

3.5.2 The knowledge training shall including following subjects. The test of the training may be performed by oral or written at the option of operator.

3.5.2.1 Steps to be taken before starting operations, including a survey of the flight area.

3.5.2.2 Proper method of loading, rigging, or attaching the external load.

3.5.2.3 Performance capabilities, under approved operating procedures and limitations, of the helicopter to be used.

3.5.2.4 Proper operating procedures of flight and ground crews.

3.5.2.5 Appropriate manual procedures which including external-load operations manual, flight manual or operating manual.

3.5.3 Practical training and its proficiency check shall be established in according with the type of helicopter that intended to operate and including the following items:

3.5.3.1 Takeoffs and landings.

3.5.3.2 Demonstration of directional control while hovering.

3.5.3.3 Acceleration from a hover.

3.5.3.4 Flight at operational airspeeds.

3.5.3.5 Approaches to landing or working area.

3.5.3.6 Maneuvering the external load into the release position.

3.5.3.7 Demonstration of winch operation, if a winch is installed to hoist the external load.

3.5.4 CAA might agree recognize operator designated chief pilot’s knowledge and skill to exempt or deduct part of the training and proficiency check which according with 3.5.2 and 3.5.3 based on his/her operating experience and safety records.

3.6 The chief pilot should have the following operation and flight experience in helicopter external-load operations:

3.6.1 Offshore operation:

3.6.1.1 1,000 hours as pilot-in-command of helicopters, or 1,000 hours as co-pilot of which 200 hours is as pilot-in-command in helicopter external-load operations.

3.6.1.2 50 hoist cycles conducted offshore, of which 20 cycles shall be at night if night operations are being conducted. A hoist cycle means one down-and-up cycle of the hoist equipment.

3.6.2 Onshore operation:

3.6.2.1 500 hours as pilot-in-command of helicopters, or 500 hours as co-pilot of which 100 hours is as pilot-in-command in helicopter external-load operations.

3.6.2.2 200 hours operating experience in helicopters gained in an operational environment similar to the helicopter external-load operations.

3.6.2.3 50 hoist cycles, of which 20 cycles shall be at night if night operations are being conducted. A hoist cycle means one down-and-up cycle of the hoist equipment.

3.7 The pilot and crew involved in helicopter external-load operations should comply with the following proficiency requirement:

3.7.1 Class A, B and C helicopter external-load combination: Within the preceding 12 months, complete 3 takeoffs and landings, each operation shall include hovering.

3.7.2 Class D helicopter external-load combination:

3.7.2.1 For day operation: Within the preceding 90 days, complete 3 times day and night external operation, each operation shall include hovering.

3.7.2.2 For night operation: Within the preceding 90 days, complete 3 times night external operation, each operation shall include hovering.

3.7.3 To whom did not complete aforementioned training described in 3.7.1 or 3.7.2, he/she shall complete the training program and the following training before he/she dispatch to perform helicopter external-load operations.

3.7.3.1 Complete three times helicopter external-load operations under supervision by the check pilot who meets the requirements of 3.7.1 or 3.7.2.

3.7.3.2 The helicopter external-load operations in the previous paragraph shall include the practical training and test described in 3.5.3.

3.7.3.3 The check pilot shall check the pilot whether his/her complied with technical requirement or not. If necessary, additional training may be required to determine whether his/her is qualified.

3.8 The operator shall establish the minimum crew member requirement in the helicopter external-load operations manual by considering type of helicopter, weather condition, external-load combination, environment of offshore operation, meteorological conditions, and movement of ships (or platform) at sea. Operator shall assign two pilots and more than one crew in onshore or offshore operation while performing class D external-load combination.

4. Operation approval

4.1. No person may conduct a helicopter external-load operations unless approved by CAA. The helicopter external-load operations shall be described in Operation Specification about approved external-load combination and shall not be transfer to other person.

4.2 Operator shall be approved by CAA before performing helicopter external-load operations. The Operation Specifications shall recorded the approved type of helicopter, its nationality and registration number.

4.3 The operator shall maintain the Operations Specifications up to date and provide lists of helicopter and equipment for inspection by CAA inspector.

4.4 Operating crew members engaged in helicopter external-load operations shall carry relevant approval documents during operation.

4.5 CAA may suspend the approval if the operator cease helicopter external-load operations more than one year. The aforementioned operator shall amend the Operation Specification and submit to CAA for further review and approval.

5. Operating rules

5.1 No person may conduct a helicopter external-load operations without, or contrary to, the helicopter external-load operations manual approved by CAA.

5.2 Before a person may operate a helicopter with an external-load combination that differs substantially from any that person has previously carried with that type of helicopter (whether or not the helicopter external-load combination is of the same class), that person must conduct, in a manner that will not endanger persons or property on the surface, such of the following flight-operational checks are appropriate to the external-load combination:

5.2.1 A determination that the weight of the helicopter-load combination and the location of its center of gravity are within approved limits, that the external load is securely fastened, and that the external load does not interfere with devices provided for its emergency release.

5.2.2 Make an initial liftoff and verify that controllability is satisfactory.

5.2.3 While hovering, verify that directional control is adequate.

5.2.4 Accelerate into forward flight to verify that no attitude (whether of the helicopter or of the external load) is encountered in which the helicopter is uncontrollable or which is otherwise hazardous.

5.2.5 In forward flight, check for hazardous oscillations of the external load, but if the external load is not visible to the pilot, other crewmembers or ground personnel may make this check and signal the pilot.

5.2.6 Increase the forward airspeed and determine an operational airspeed at which no hazardous oscillation or hazardous aerodynamic turbulence is encountered.

5.3 If the helicopter external-load operations over congested areas, a flight shall comply with the following:

5.3.1 The operator must develop a plan for each complete operation and obtain approval for the operation. The plan must include that exclude unauthorized persons from the area in which the operation will be conducted, coordination with air traffic control, if necessary, and a detailed chart depicting the flight routes and altitudes.

5.3.2 Each flight must be conducted at altitude and route approved. It will allow a jettisonable external load to be released, and the helicopter landed, in an emergency without hazard to persons or property on the surface.

5.4 Unless approved by CAA and the operations are conducted without creating a hazard to persons or property on the surface, no person may conduct external-load operations, including approaches, departures, and load positioning maneuvers necessary for the operation, below 500 feet above the surface and closer than 500 feet to persons, vessels, vehicles, and structures.

5.5 No person may conduct helicopter external-load operations or a person be carried as part of the external-load under IFR or the hour between the end of evening civil twilight and the beginning of morning civil twilight unless specifically approved by CAA.

5.6 In case of emergency operation, the following requirement shall be followed:

5.6.1 In an emergency involving the safety of persons or property, the pilot in command may deviate from the rules of this part to the extent required to meet that emergency.

5.6.2 Each person who deviates from a rule of this attachment shall notify CAA within 72 hours after the deviation. The operator shall provide a complete emergency operating report of the helicopter operation involved, including a description of the deviation and reasons for it. If the event involved as a Mandatory Occurrence Report item, operator shall follow the articles set forth in Regulations of Aircraft Flight Safety-related Events.

5.7 When engaged in helicopter external-load operations, the flight crew shall establish two-way communication with ground workers.

5.8 The operator shall have the helicopter tracking capability to track the position of the helicopter which it operates throughout its area of operations, to preserve information and data, and to assist in the coordination of search and rescue.

5.9 Weather condition

5.9.1 While performing onshore or offshore helicopter external-load operations, operator shall follow the meteorological standards in VFR.

5.9.2 When flying between offshore locations located in class G airspace where the overwater sector is less than 10 NM, VFR flights may be conducted when the limits are at, or better than, the following:

	Day		Night	
	Height (note 1)	Visibility	Height (note 1)	Visibility
Single pilot	300 feet	3 km	500 feet	5 km
Two pilot	300 feet	2 km (note 2)	500 feet	5 km (note 3)

Note 1. The cloud base shall allow flight at the specified height to be below and clear of cloud.

Note 2. Helicopters may be operated in flight visibility down to 800 m, provided the destination or an intermediate structure is continuously visible.

Note 3. Helicopters may be operated in flight visibility down to 1,500 m, provided the destination or an intermediate structure is continuously visible.

5.10 Wind speed limitation: When engaged in helicopter offshore flight operations, sea surface wind speed shall not over 60 NM, and shall not over aircraft operating limitations.

6. Carriage of persons

6.1 No operator may allow a person to be carried during helicopter external-load operations unless that person:

6.1.1 Is a flight crewmember.

6.1.2 Is a flight crewmember in training.

6.1.3 Is a necessary person related to the operations of external-load operation.

6.2 The pilot in command shall ensure that all persons are briefed before takeoff on all pertinent procedures to be followed (including normal, abnormal, and emergency procedures), equipment to be used and the hazard of electrostatic discharge during the external-load operation.

6.3 The operator shall comply with item sixth (6) of attachment 20-5 of this regulation to operate external-load operation in adverse weather.

7. Airworthiness and equipment requirements

7.1 The Type Certification and Supplemental Type Certification of the helicopter which involved in external-load operation should be written its ability of external-load operation and have the adequate performance information written in the Flight Manual.

7.2 The operator shall establish a maintenance program in according with Instructions for Continued Airworthiness from manufacturer of helicopter, appliances and parts and approved by CAA to perform maintenance.

7.3 The equipment shall comply with Item seventh (7) of attachment 20-5 of this regulation to operate external-load operation.

7.4 The person signing a maintenance release shall be either the holder of a valid CAA aircraft maintenance engineer certificate or the holder of a valid mechanic license acceptable to CAA, and shall ensure that operations in regard to maintenance and maintenance release be conducted as authorized by GMM. Under the conditions which approved by CAA that operator has established procedures, no malfunction occurs to the helicopter and flight crew who have completed the approved training, the requirement of a maintenance release may be waived after the pilot-in-command has conducted a preflight check and recorded the completion of the check in the maintenance log book.

8. Flight characteristics

8.1 The operator should verify the actual flight characteristics of external-load combination of the helicopter conforms to the flight characteristics in accordance with 8.2, 8.3 and 8.4, and apply for approval from CAA. However, for those have been approved by the CAA are not subject to this restriction. The verified weight of external load (including the connection device mounted outside the aircraft) shall be the maximum external-load weight applied.

8.2 Class A helicopter external-load combinations: The operation shall include the following maneuvers:

8.2.1 Takeoff and landing.

8.2.2 Demonstration of adequate directional control while hovering.

8.2.3 Acceleration from a hover.

8.2.4 Horizontal flight at airspeeds up to the maximum airspeed for which authorization is requested.

8.3 Class B and D helicopter external-load combinations: The operation shall include the following maneuvers:

8.3.1 Pickup of the external load.

8.3.2 Demonstration of adequate directional control while hovering.

8.3.3 Acceleration from a hover.

8.3.4 Horizontal flight at airspeeds up to the maximum airspeed for which authorization is requested.

8.3.5 Demonstrating appropriate lifting device operation.

8.3.6 Maneuvering of the external load into release position and its release, under probable flight operation conditions, by means of each of the quick-release controls installed on the helicopter.

8.4 Class C helicopter-load combinations: For Class C helicopter-load combinations used in wire-stringing, cable-laying, or similar operations, the operation shall consist of the maneuvers, as applicable, prescribed in paragraph 8.3.

8.5 The external load and quick release device shall comply with the helicopter airworthiness standards specified in Paragraph 1 of Article 23 of Civil Aviation Act.

8.6 Weight and center of gravity shall comply the following:

8.6.1 Weight. The total weight of the helicopter external-load combination must not exceed the total weight approved for the helicopter during its type certification.

8.6.2 Center of gravity. The location of the center of gravity must, for all loading conditions, be within the range established for the helicopter during its type certification. For Class C helicopter external-load combination, the magnitude and direction of the loading force must be established at those values for which the effective location of the center of gravity remains within its established range.

9. The helicopter external-load combination of Class D may be conducted only in accordance with the following:

9.1 The helicopter to be used must have been type certificated under transport Category A or a transport category helicopter which has been certificated by other state of design and validated by CAA. The helicopter must provide hover capability with one engine inoperative at that operating weight and altitude.

9.2 The helicopter must be equipped to allow direct radio intercommunication among required crewmembers.

9.3 The lifting device shall be approved by aircraft type certification of the state of design.

9.4 The lifting device must have an emergency release requiring two distinct actions.

10. Helicopter external-load operations manual.

10.1 The helicopter external-load operations manual shall be compiled in accordance with the provisions of the flight manual submitted by the operator to the CAA for reference, but it is not necessary to list the altitude/speed chart as an operational limitation.

10.2 The helicopter external-load operations manual shall contain the following contents:

10.2.1 Operating limitations, procedures (normal and emergency), performance, and other information established under this attachment.

10.2.2 The helicopter external-load combination approved by CAA.

10.2.3 Information on any peculiarities discovered when operating particular helicopter external-load combinations;

10.2.4 Precautionary advice regarding static electricity discharges for Class B, Class C, and Class D helicopter external-load combinations.

10.2.5 Any other information essential for safe operation with external-load operation.

10.2.6 The crew responsibility related to helicopter external-load operations, including the chief pilot, his/her designee, and operating crews.

10.2.7 The crew composition and training related to helicopter external-load operations.

10.2.8 The equipment requirements and dispatch criteria related to helicopter external-load operations.

11. Markings and placards.

The following markings and placards must be displayed conspicuously and must be such that they cannot be easily erased, disfigured, and obscured:

11.1 A placard (displayed in the cockpit or cabin) stating the class of helicopter external-load combination for which the helicopter has been approved and the occupancy limitation.

11.2 A placard, marking, or instruction (displayed next to the external-load attaching means) stating the maximum external load prescribed as an operating limitation.

ATTACHMENT 20-3 Free balloon flight operations and tethered activities.

This attachment was established in accordance with Article 202-1 and Article 299 of this AOR proper

1. Applicability

1.2 A general aviation operator engaged in free balloon flight operations shall operate in compliance with this attachment of AOR.

1.3 A free balloon operator engaged in general flight operations describe in Chapter 4 of AOR shall operate in compliance with the instruments and equipments specified in this attachment.

2. Aircraft requirement :

2.1 Inspect the balloon and assure that :

2.1.1 All required inspections are properly signed off.

2.1.1.1 Complete all inspections in accordance with maintenance program.

2.1.1.2 Aircraft registration and proper registration markings.

2.1.1.3 Instructions for continued airworthiness are complied with.

2.2 Assure the airworthiness certificate and registration certificates are legible and in the balloon.

2.3 Make a general 360 inspection of the exterior of the balloon and security of all required equipment.

3. Operation requirement :

3.1 Aircraft operators shall hold a free balloon operation manual.

3.2 Aware of meteorological phenomena, obstacles clearance conditions on lunch site and shall not endanger life, property and other aircraft.

3.3 The aircraft engaged in free balloon tethered activities shall hold a effective airworthiness certificate and shall be manipulated by a qualified pilot, all activities shall be approved by CAA prior to operation.

4. Training requirements for flight crew

4.1 PREREQUISITES - Knowledge of:

4.1.1 Free balloon airworthiness standards adopted by CAA.

4.1.2 AC 91-71 Hot Air Balloon Operations with Airborne Heater.

4.2 Balloon airman training or annual review is accomplished satisfactorily in accordance with approved training program.

5. A free balloon may operated if the balloon is equipped with the following:

5.1 Equipments for free balloon :

5.1.1 An altimeter ;

5.1.2 A vertical speed indicator ;

5.1.3 A timepiece, which may be carried on the person of the pilot, that is accurate to and readable to the nearest hour, minute and second for the duration of the flight ;

5.1.4 A fire-distinguisher ;

5.1.5 A First Aid kit;

5.1.6 One set of walky-talky or above (controlled and uncontrolled area) ; one set of aviation radio telephone or above (controlled area).

5.2 Equipments for hot air balloon :

5.2.1 A fuel quantity gauge. If fuel cells are used, means must be incorporated to indicate to the crew the quantity of fuel in each cell during flight. The means must be calibrated in appropriate units or in percent of fuel cell capacity ;

5.2.2 Two different sources of ignition.

5.3 Equipments for inflatable free balloon :

5.3.1 A compass ;

5.3.2 An envelope are pressure gage.

ATTACHMENT 20-4 Additional Requirements for Approved Operations by Single-engine Turbine-powered Airplanes at Night and/or In Instrument Meteorological conditions (IMC)

This attachment was established in accordance with Article **202-1** of this AOR proper, and refer to the requirement of the flight crew experience addressed in the ICAO Annex 6, Part I,5.1.2,5.4,Appendix, Canadian Aviation Regulations Standard Part VII 723.24 and India Civil Aviation Requirement Section 3 Air Transport Series 'C' Part III.

1. In approving operations by single-engine turbine-powered airplanes at night and/or in IMC, the Operator shall ensure that the airworthiness certification of the airplane is appropriate and that the overall level of safety intended by the provisions of Aircraft Flight Operation Regulations and Regulations for Aircraft Airworthiness Certification and Maintenance Management is provided by:

   1.1 the reliability of the turbine engine;

   1.2 the operator's maintenance procedures, operating practices, flight dispatch procedures and crew training programs; and

   1.3 equipment and other requirements provided in accordance with this Attachment.

2. Turbine engine reliability

   2.1 Turbine engine reliability shall be shown to have a power loss rate of less than 1 per 100 000 engine hours.

   Note.— Power loss in this context is defined as any loss of power, the cause of which may be traced to faulty engine or engine component design or installation, including design or installation of the fuel ancillary or engine control systems.

   2.2 The operator shall be responsible for engine trend monitoring.

   2.3 To minimize the probability of in-flight engine failure, the engine shall be equipped with:

      2.3.1 an ignition system that activates automatically, or is capable of being operated manually, for take-off and landing, and during flight, in visible moisture;

      2.3.2 a magnetic particle detection or equivalent system that monitors the engine, accessories gearbox, and reduction gearbox, and which includes a flight deck caution indication; and

      2.3.3 an emergency engine power control device that permits continuing operation of the engine through a sufficient power range to safely complete the flight in the event of any reasonably probable failure of the fuel control unit.

3. Systems and equipment

   3.1 Single-engine turbine-powered airplanes approved to operate at night and/or in IMC shall be equipped with the following systems and equipment intended to ensure continued safe flight and to assist in achieving a safe forced landing after an engine failure, under all allowable operating conditions:

3.1.1 two separate electrical generating systems, each one capable of supplying all probable combinations of continuous in-flight electrical loads for instruments, equipment and systems required at night and/or in IMC;

3.1.2 a radio altimeter;

3.1.3 an emergency electrical supply system of sufficient capacity and endurance, following loss of all generated power, to as a minimum:

3.1.3.1 maintain the operation of all essential flight instruments, communication and navigation systems during a descent from the maximum certificated altitude in a glide configuration to the completion of a landing;

3.1.3.2 lower the flaps and landing gear, if applicable;

3.1.3.3 provide power to one pitot heater, which must serve an air speed indicator clearly visible to the pilot;

3.1.3.4 provide for operation of the landing light that is independent of the landing gear and is capable of adequately illuminating the touchdown area in a night forced landing.

3.1.3.5 provide for one engine restart, if applicable; and

3.1.3.6 provide for the operation of the radio altimeter;

3.1.4 two attitude indicators, powered from independent sources;

3.1.5 a means to provide for at least one attempt at engine re-start;

3.1.6 airborne weather radar;

3.1.7 a certified area navigation system capable of being programmed with the positions of aerodromes and safe forced landing areas, and providing instantly available track and distance information to those locations;

3.1.8 for passenger operations, passenger seats and mounts which meet dynamically-tested performance standards and which are fitted with a shoulder harness or a safety belt with a diagonal shoulder strap for each passenger seat;

3.1.9 in pressurized airplanes, sufficient supplemental oxygen for all occupants for descent following engine failure at the maximum glide performance from the maximum certificated altitude to an altitude at which supplemental oxygen is no longer required;

3.1.10 a landing light that is independent of the landing gear and is capable of adequately illuminating the touchdown area in a night forced landing; and

3.1.11 an engine fire warning system.

4. Minimum equipment list

The operator shall require the minimum equipment list approved (as attachment 7) to specify the operating equipment required for night and/or IMC operations, and for day/VMC operations.

5. Flight manual information

The flight manual shall include limitations, procedures, approval status and other information relevant to operations by single-engine turbine-powered airplanes at night and/or in IMC.

6. Event reporting

6.1 Operator approved for operations by single-engine turbine-powered airplanes at night and/or in IMC shall report all significant failures, malfunctions or defects to the State of the Operator who in turn will notify the State of Design.

6.2 CAA shall review the safety data and monitor the reliability information so as to be able to take any actions necessary to ensure that the intended safety level is achieved. Operator will notify major events or trends of particular concern to the appropriate Type Certificate Holder and the State of Design.

7. Operator planning

7.1 Operator route planning shall take account of all relevant information in the assessment of intended routes or areas of operations, including the following:

7.1.1 the nature of the terrain to be overflown, including the potential for carrying out a safe forced landing in the event of an engine failure or major malfunction;

7.1.2 weather information, including seasonal and other adverse meteorological influences that may affect the flight; and

7.1.3 other criteria and limitations as specified by the State of the Operator.

7.2 An operator shall identify aerodromes or safe forced landing areas available for use in the event of engine failure, and the position of these shall be programmed into the area navigation system.

Note — A ‘safe’ forced landing in this context means a landing in an area at which it can reasonably be expected that it will not lead to serious injury or loss of life, even *though the airplane may incur extensive damage.*

8. Flight crew experience, training and checking

8.1 The PIC shall have instrument certificated and experience required as followings:

8.1.1 total flying experience at least 700 hours

8.1.2 total PIC flying experience at least 300 hours

8.1.3 total instrument flying experience as PIC at least 100 hours

8.1.4 total PIC flying experience on type at least 50 hours

8.1.5 PIC flying experience in the last six months on type at least 10 hours

8.1.6 total flying experience in night operations on type at least 10 hours

8.2 An operator’s flight crew training and checking shall be appropriate to night and/or IMC operations by single-engine turbine-powered aeroplanes, covering normal, abnormal and emergency procedures and, in particular, engine failure, including descent to a forced landing in night and/or in IMC conditions.

9. Limitations

9.1 Route limitations

The flight plan route limitation for airplanes operating at steady wind weather condition, the gliding distance shall not beyond the distance from flight level at that time to an area suitable for a safe forced landing/ditching.

9.2 Passenger carried limitation

Operating a single-engine turbine-powered airplanes, passengers carried are limited to 8.

10. Operator certification or validation for operating night and/or in IMC

The operator shall demonstrate the ability to conduct operations by single-engine turbine-powered airplanes at night and/or in IMC through a certification and approval process specified by the State of the Operator.

11. All single-engine turbine-powered airplanes operating at Night and/or In Instrument Meteorological conditions (IMC) shall be equipped with engine trend monitoring system. For the airplanes which the certificate of airworthiness is first issued on or after 1st of January 2005 shall be equipped with automatic turbine engine trend monitoring system.

ATTACHMENT 20-5 The Helicopter Offshore Flight Operations

This attachment was established in accordance with Article 57-1 and 202-1 of this regulation, EASA Commission Regulation (EU) No 965/2012 and No 2016/1999.

1. Applicability

1.1 Helicopters shall abide by the provisions of this attachment when engaging in offshore flight operations on the main island of Taiwan, between outlying islands and offshore locations, and between offshore locations.

1.2 Helicopter offshore flight operations means a helicopter operation that has a substantial proportion of any flight conducted over open sea areas to or from an offshore location.

2. Certification requirement

2.1 Comply with the airworthiness standard of the helicopter in Paragraph 1 of Article 23 of Civil Aviation Act and have been certified or validated the Civil Aviation Administration.

2.2 Hold valid airworthiness certificate.

3. Personal requirement

3.1 The operator must designate a pilot who holds a current commercial pilot-helicopter or air transport pilot license, with a rating appropriate, for the helicopter offshore flight operations, and assign a pilot to be pilot in command.

3.2 The operator must designate one pilot as the chief pilot for helicopter offshore flight operations and be approved by CAA. If necessary, the chief pilot may also designate to a qualified pilot to perform the duty and responsibility for the chief pilot. The chief pilot and his/her designee shall holds a current commercial pilot-helicopter or air transport pilot license with an appropriate rating for helicopter offshore flight operations.

3.3 The operator shall establish the following procedures:

3.3.1 The selection and dispatch criteria for flight crew in considering his/her previously flight experience.

3.3.2 Establish the minimum experience requirements of chief pilot for offshore flight operations.

3.3.3 Establish flight crew training and proficiency check program. The program shall consider the operating environment of offshore flight operations and including normal, abnormal and emergency procedures, crew resource management and water survival training, etc.

3.4 Knowledge and skill requirements:

3.4.1 Operator shall establish respective training program, including initial and recurrent training, in according with 3.4.2 and 3.4.3 which will be carried into effect after approved by CAA. Those who complete the training and pass the written and practical testes shall be authorized by operator then be permitted to perform helicopter offshore flight operations.

3.4.2 The knowledge training shall including following subjects. The test of the training may be performed by oral or written at the option of operator.

3.4.2.1 Steps to be taken before starting operations, including a survey of the flight area.

3.4.2.2 Proper method of loading, rigging, or attaching in helicopter.

3.4.2.3 Performance capabilities, under approved operating procedures and limitations, of the helicopter to be used.

3.4.2.4 Proper operating procedures of flight and ground crews.

3.4.2.5 Appropriate manual procedures which including offshore flight operations manual, helicopter flight manual or operating manual.

3.4.3 Practical training and its proficiency check shall be established in according with the type of helicopter that intended to operate and including the following items:

3.4.3.1 Takeoffs and landings.

3.4.3.2 Demonstration of directional control while hovering.

3.4.3.3 Acceleration from a hover.

3.4.3.4 Flight at operational airspeeds.

3.4.3.5 Approaches to landing or working area.

3.4.4 CAA might agree recognize operator designated chief pilot's knowledge and skill to exempt or deduct part of the training and proficiency check which according with 3.4.2 and 3.4.3 based on his/her operating experience and safety records.

3.5 A pilot conducting offshore flight operations in the preceding 90 days shall comply any one of following requirements:

3.5.1 At least 3 take-offs, departures, approaches and landings at an offshore location in a helicopter of the same type or an approved full flight simulator (FFS) representing that type.

3.5.2 As approved to operate the offshore flight operations at night, he/she has carried out at least 3 take-offs, departures, approaches and landings at night at an offshore location in a helicopter of the same type or an approved FFS representing that type.

3.5.3 To whom did not complete at least 3 take-offs, departures, approaches and landings in the preceding 90 days, he/she shall complete the training program in a helicopter of the same type or an approved FFS representing that type, fulfill the requirement of 3.5.1 and 3.5.2, and pass the proficiency check before he/she dispatch to perform offshore flight operations.

4. Operational approval

4.1 Operator shall be approved before performing offshore flight operations. The Operation Specifications shall recorded the approved type of helicopter, its nationality and registration number.

4.2 The operator shall maintain the Operations Specifications up to date and provide lists of helicopter and equipment for inspection by CAA inspector.

5. Operating rules

5.1 The operator shall implement a safety management system according to article 9 of chapter 2 and article 285-2 of chapter 3, establish prevent activity to reduce the risk of offshore flight operation. The following shall be required:

5.1.1 Procedures for selection, composition and training of the pilot.

5.1.2 Duty and responsibility of flight crew and relevant personnel.

5.1.3 Required equipment and criteria for dispatch.

5.1.4 Flight operating procedures and limitations which including normal and abnormal procedures to mitigate risk of flight.

5.2 The operator shall abide the following rules:

5.2.1 An operational flight plan is prepared prior to each flight.

5.2.2 The occupant safety briefing includes any specific safety information on offshore flight operations related items and is provided prior to boarding the helicopter.

5.2.3 Pilots make optimum use of the automatic flight control systems (AFCS) throughout the flight.

5.2.4 Specific offshore approach profiles are established, including stable approach parameters and the corrective action to be taken if an approach becomes unstable;

5.2.5 Procedures are in place for a member of the flight crew to monitor the flight instruments during an offshore flight operations to ensure that a safe flight path is maintained;

5.2.6 The flight crew takes immediate and appropriate corrective action when a height alert is activated;

5.2.7 Procedures are in place to require the emergency flotation systems to be armed for all overwater arrivals and departures of offshore flight.

5.3 The operator shall only use offshore locations that are suitable in relation to size and weight of the type of helicopter and to the operations concerned.

5.4 During emergency operation, the following rules shall abide:

5.4.1 In an emergency involving the safety of persons or property, the PIC may deviate from the rules of this attachment to the extent required to meet that emergency.

5.4.2 Each person who deviates from a rule of this attachment shall notify CAA within 72 hours after the deviation. The operator shall provide a complete emergency operating report of the helicopter operation involved, including a description of the deviation and reasons for it. If the event involved as a Mandatory Occurrence Report item, operator shall follow the articles set forth in Regulations of Aircraft Flight Safety-related Events.

5.5 When takeoff from or landing to an offshore location, the operating performance and limitations of the helicopter shall be complied with.

5.6 The operator shall have the helicopter tracking capability to track the position of the helicopter which it operates throughout its area of operations, to preserve information and data, and to assist in the coordination of search and rescue.

5.7 Weather condition

When flying between offshore locations located in class G airspace where the overwater sector is less than 10 NM, VFR flights may be conducted when the limits are at, or better than, the following:

	Day		Night	
	Height (note 1)	Visibility	Height (note 1)	Visibility
Single pilot	300 feet	3 km	500 feet	5 km
Two pilot	300 feet	2 km (note 2)	500 feet	5 km (note 3)

Note 1. The cloud base shall allow flight at the specified height to be below and clear of cloud.

Note 2. Helicopters may be operated in flight visibility down to 800 m, provided the destination or an intermediate structure is continuously visible.

Note 3. Helicopters may be operated in flight visibility down to 1,500 m, provided the destination or an intermediate structure is continuously visible.

5.8 Wind limitations: Operation to an offshore location shall only be performed when the wind speed at the helideck is reported to be not more than 60 knots including gusts.

6. Carriage of persons.

6.1 No operator may allow a person to be carried during helicopter external-load operations unless that person:

6.1.1 Is a flight crewmember.

6.1.2 Is a flight crewmember in training.

6.1.2 Is a necessary person related to the operations of external-load.

6.2 The pilot in command shall ensure that all persons are briefed before takeoff on all pertinent procedures to be followed (including normal, abnormal, and emergency procedures).

6.3 In case of adverse weather, the following requirement shall be followed:

6.3.1 Approved life jackets shall be worn at all times by all persons on board unless integrated survival suits that meet the combined requirement of the survival suit and life jacket are worn.

6.3.2 All occupants on board shall wear an approved survival suit when one of the following occurs:

6.3.2.1 When the weather report or forecasts available to the pilot-in-command indicate that the sea temperature will be less than plus 10 °C during the flight.

6.3.2.2 When the estimated rescue time exceeds the calculated survival time.

6.3.2.3 When the flight is planned to be conducted at night.

6.3.3 When performing the offshore flight operations, all occupants on board shall carry and be instructed on the use of emergency breathing systems.

6.3.4 Life rafts

6.3.4.1 All life rafts carried shall be installed so as to be usable were evaluated and certificated.

6.3.4.2 All life rafts carried shall be installed so as to facilitate their ready use during offshore flight operations.

6.3.4.3 The number of life rafts installed:

6.3.4.4 In the case of a helicopter carrying less than 12 persons, at least one life raft with a rated capacity of not less than the maximum number of persons on board.

6.3.4.5 In the case of a helicopter carrying more than 11 persons, at least two life rafts, sufficient together to accommodate all persons capable of being carried on board and, if one is lost, the remaining life raft(s) having the overload capacity sufficient to accommodate all persons on the helicopter.

6.3.4.6 Each life raft shall contain at least one survival emergency locator transmitter (ELT).

6.3.4.7 Each life raft shall contain life-saving equipment, including means of sustaining life, as appropriate to the flight to be undertaken.

6.4 The operator may, based on a risk assessment result and take appropriately mitigate action, allow occupants, medically incapacitated at an offshore location, to partly wear or not wear survival suits on return flights or flights between offshore locations.

7. Airworthiness and equipment requirements

7.1 The operator shall establish a maintenance program in according with Instructions for Continued Airworthiness from manufacturer of helicopter, appliances and parts and approved by CAA to perform maintenance.

7.2 For the helicopter equipped with flight recorder in according with Article 111 and 112, the operator shall establish and maintain a flight data analysis program. The flight data analysis programme shall be non-punitive and contain adequate safeguards to protect the source(s) of the data.

7.3 The helicopter shall be equipped with an emergency lighting system with an independent power supply to provide a source of general cabin illumination to facilitate the evacuation of the helicopter.

7.4 The following helicopters conducting offshore flight operations shall be fitted with a Vibration Health Monitoring system capable of monitoring the status of critical rotor and rotor drive systems to collect monitoring and alerting information, analysis system performance and take appropriate corrective action for abnormal situation.

7.4.1 Helicopter of a maximum certificated take-off mass in excess of 3,175 kg for which the certificate of airworthiness is first issued on or after 31 Dec. 2016.

7.4.2 Helicopter with a seating capacity of more than 9 occupants, for which the certificate of airworthiness is first issued on or after 1 Jan. 2017.

7.4.3 Helicopter for which the certificate of airworthiness was first issued on or after 1 Jan. 2019.

7.5 Helicopters with a maximum operational occupant seat configuration (MOPSC) of more than 9 shall be equipped with a Passenger Address (PA) system. Helicopters with an MOPSC of 9 or less need not be equipped with a PA system if the operator can demonstrate that the pilot's voice is understandable at all occupants' seats in flight and approved by CAA.

7.6 Helicopters shall be equipped with a radio altimeter that is capable of emitting an audio and a visual warning below a pre-set height selectable by the pilot.

7.7 All emergency exits, including crew emergency exits, and any door, window or other opening that is intended for emergency egress, and the means for opening them shall be clearly marked for the guidance of occupants using them. Such markings shall be designed to remain visible if the helicopter is capsized or the cabin is submerged.

7.8 Helicopters with a maximum certificated take-off mass of more than 3,175 kg or a MOPSC of more than 9 and first issued with an individual certificate of airworthiness after 31 December 2018 shall be equipped with an Helicopter terrain awareness warning system that meets the requirements for FAA or EASA class A equipment as specified in an acceptable standard.

7.9 Non-jettisonable doors that are designated as ditching emergency exits shall have a means of securing them in the open position so that they do not interfere with the occupants' egress in all sea conditions up to the maximum sea conditions required to be evaluated for ditching and flotation.

7.10 The person signing a maintenance release shall be either the holder of a valid CAA aircraft maintenance engineer certificate, or the holder of a valid mechanic license acceptable to CAA, and shall ensure that operations in regard to maintenance and maintenance release be conducted as authorized by GMM. Under the conditions which approved by CAA that operator has established procedures, no malfunction occurs to the helicopter and flight crew who have completed the approved training, the requirement of a maintenance release may be waived after the pilot-in-command has conducted a preflight check and recorded the completion of the check in the maintenance log book.

ATTACHMENT 21 Numbers of Portable Fire Extinguishers Required in General Aviation Aircraft

This attachment is established in accordance with Article 240 of this AOR proper.

1. Cockpit: at least 1

2. Cabin Compartments: listed below

Passenger capacity	No. of extinguishers
10 - 30	1
31 - 60	2
61 - 200	3
201 - 300	4

ATTACHMENT 22 Pilot-in-command Proficiency Check and Recent Flight Experience.

This attachment is established in accordance with Article 287 of this AOR proper and FAR Part 91.5, 61.56, 61.57, 61.58

Operation of Aircraft requiring more than one Pilot Flight Crewmember.

1. To serve as pilot in command of an aircraft that is type certificated for more than one required pilot flight crewmember, a person shall:
   1.1 Within the preceding 12 calendar months, complete a pilot-in-command in an aircraft that is type certificated for more than one required pilot flight crewmember.
   1.2 Complete the type certification proficiency check provided in Chapter 2 and Chapter 3 of AOR.

2. The pilot-in-command proficiency check required by Item 1 may be accomplished by satisfactory completion of one of the following:
   2.1 A pilot-in-command proficiency check conducted by a person authorized by the CAA, consisting of the maneuvers and procedures required for a type rating, in an aircraft type certificated for more than one required pilot flight crewmember.
   2.2 A pilot-in-command practical test conducted by CAA, in an aircraft type certificated for more than one required pilot flight crewmember.
   2.3 The initial or periodic practical test required for the issuance of a pilot examiner or check airman designation, in an aircraft type certificated for more than one required pilot flight crewmember.

3. A check or test described in Item 2.1 through 2.3 may be accomplished in a full flight simulator under this chapter, subject to the following:
   3.1 Except as provided for in Item 3.2 and 3.3, if an otherwise qualified and approved full flight simulator used for a pilot-in-command proficiency check is not qualified and approved for a specific required maneuver:

      3.1.1 The training center shall annotate, in the applicant's training record, the maneuver or maneuvers omitted.

      3.1.2 Prior to acting as pilot in command, the pilot shall demonstrate proficiency in each omitted maneuver in an aircraft or full flight simulator qualified and approved for each omitted maneuver.

   3.2 If the full flight simulator is not qualified and approved for circling approaches:

      3.2.1 The applicant's record shall include the statement, “Proficiency in circling approaches not demonstrated”.

      3.2.2 The applicant may not perform circling approaches as pilot in command when weather conditions are less than the basic VFR conditions described in this chapter, until proficiency in circling approaches has been successfully demonstrated in a full flight simulator qualified and approved for circling approaches or in an aircraft to a person authorized by the CAA to conduct the check.

3.3 If the full flight simulator used is not qualified and approved for landings, the applicant shall:

3.3.1 Hold a type rating in the airplane represented by the full flight simulator.

3.3.2 Have completed within the preceding 90 days at least three takeoffs and three landings as the sole manipulator of the flight controls in the type airplane for which the pilot-in-command proficiency check is sought.

4. For the purpose of meeting the pilot-in-command proficiency check requirements of Item 1, a person may act as pilot in command of a flight under day VFR conditions or day IFR conditions if no person or property is carried.

Operation of Aircraft requiring single Pilot.

1. To serve as pilot in command of an aircraft that is type certificated for single pilot , a person shall:

1.1 Within the preceding 12 calendar months, complete a pilot-in-command in an aircraft that is type certificated for more than one required pilot flight crewmember.

1.2 Complete the type certification proficiency check provided in Chapter 2 and Chapter 3 of AOR.

2. (a) Except as provided in Item 5 of this section, a flight review consists of a minimum of 1 hour of flight training and 1 hour of ground training. The review must include:

2.1 Normal, abnormal/emergency procedures flight rule and written test for chapter 4 of AOR ;

2.2 A review of those maneuvers and procedures that, at the discretion of check pilot examiner, check pilot or flight instructor giving the review, are necessary for the pilot to demonstrate the safe exercise of the privileges of the pilot certificate.

3. Except as provided in paragraph 4 and 6 of section, no person may act as pilot in command of an aircraft unless, since the beginning of the 12th calendar month before the month in which that pilot acts as pilot in command, that person has—

3.1 Accomplished a flight review given in an aircraft for which that pilot is rated by designated examiner, check pilot or flight instructor, and

3.2 A logbook endorsed from a designated examiner, check pilot or flight instructor who gave the review certifying that the person has satisfactorily completed the review.

4. A person who has, within the period of 12 month, satisfactorily accomplished one or more phases of an CAA-accepted pilot proficiency award program need not accomplish the flight review required by this section.

5. A person who holds a flight instructor certificate and who has, within the period of 12 month, satisfactorily completed a renewal of a flight instructor certificate, need not accomplish the one hour of ground training specified in paragraph2.

6. A student pilot need not accomplish the flight review required by this section provided the student pilot is undergoing training for a certificate and has a current solo flight endorsement.

7. Meet the requirements of pilot-in-command recent experience of this attachment.

Recent flight experience: Pilot in command.

1. General experience.
   1.1 No person may act as a pilot in command of an aircraft carrying passengers or of an aircraft certificated for more than one pilot flight crewmember unless that person has made at least three takeoffs and three landings within the preceding 90 days:
      1.1.1 The person acted as the sole manipulator of the flight controls;
      1.1.2 The required takeoffs and landings were performed in an aircraft of the same category, class, and type, and, if the aircraft to be flown is an airplane with a tailwheel, the takeoffs and landings must have been made to a full stop in an airplane with a tailwheel.
   1.2 For the purpose of meeting the requirements of paragraph 1.1 of this section, a person may act as a pilot in command of an aircraft under day VFR or day IFR, provided no persons or property are carried on board the aircraft, other than those necessary for the conduct of the flight.
   1.3 To meet the requirement by paragraph 1.1 of this section may be accomplished in a inspected or accepted full flight simulator by CAA, used in accordance with an approved course.

2. Night takeoff and landing experience.
   2.1 No person may act as pilot in command of an aircraft carrying passengers during night time, unless within the preceding 90 days that person has made at least three takeoffs and three landings to a full stop during night time:
      2.1.1 That person acted as sole manipulator of the flight controls.
      2.1.2 The required takeoffs and landings were performed in an aircraft of the same category, class, and type.
   2.2 To meet the requirement by paragraph 2.1 of this section may be accomplished in a inspected or accepted full flight simulator by CAA, used in accordance with an approved course.

3. Instrument experience.

   A person may act as pilot in command under IFR or weather conditions if:
   3.1 Within the 6 calendar months preceding the month of the flight, that person performed and logged at least the following tasks and iterations in an aircraft, for the instrument rating privileges to be maintained in actual weather conditions, or under simulated conditions using a view-limiting device that involves having performed the following—
      3.1.1 Six instrument approaches.
      3.1.2 Holding procedures and tasks.
      3.1.3 Intercepting and tracking courses through the use of navigational electronic systems.
   3.2 Within the 6 calendar months preceding the month of the flight, that person performed and logged tasks described in 3.1.1, 3.1.2, 3.1.3 and iterations in a inspected or accepted full flight simulator by CAA.

4. Instrument proficiency check.

A person who has failed to meet the instrument experience requirements of paragraph 3.1, 3.2 of this section shall not act as a pilot-in-command under IFR condition.

5. In each turbine-powered airplane that is type certificated for more than one pilot crewmember that the pilot seeks to operate under night time and act as a pilot-in-command, that pilot must have accomplished and logged the night time takeoff and landing recent flight experience, as follow:
   5.1 The pilot shall hold the same type of commercial rating, and:
      5.1.1 Total logged flight hours 1,500 or more.
      5.1.2 Meet the requirement of paragraph 1.1 of this section. Accomplished and logged at least 3 takeoffs and 3 landings during daytime, and acted as the sole manipulator of the flight controls
      5.1.3 Within the preceding 90 days prior to the operation of that airplane, the pilot must have accomplished and logged at least 15 hours of flight time in the type of airplane that the pilot seeks to operate under this alternative; and
      5.1.4 within the preceding 6 months that person has made at least three takeoffs and three landings to a full stop during night time, and acted as the sole manipulator of the flight controls
   5.2 The pilot in command must hold at least a commercial pilot certificate with the appropriate category, class, and type rating for each airplane that is type certificated for more than one pilot crewmember that the pilot seeks to operate under this alternative, and:
      5.2.1 That pilot must have logged at least 1,500 hours of aeronautical experience as a pilot;
      5.2.2 Have accomplished and logged the daytime takeoff and landing recent flight experience of paragraph 1 of this section, as the sole manipulator of the flight controls;
      5.2.3 Within the preceding 90 days prior to the operation of that airplane, the pilot must have accomplished and logged at least 15 hours of flight time in the type of airplane that the pilot seeks to operate under this alternative; and
      5.2.4 Within the preceding 12 months prior to the month of the flight, the pilot must have completed a training program that is approved under CAA. The approved training program must have required and the pilot must have performed, at least 6 takeoffs and 6 landings to a full stop as the sole manipulator of the controls in a full flight simulator that is representative of a turbine-powered airplane that requires more than one pilot crewmember. The full flight simulator's visual system must have been adjusted to represent the period beginning 1 hour after sunset and ending 1 hour before sunrise.

If a pilot takes the pilot-in-command proficiency check in the calendar month before or the calendar month after the month in which it is due, the pilot is considered to have taken it in the month in which it was due for the purpose of computing when the next pilot-in-command proficiency check is due.

ATTACHMENT 23 The Instruments, Equipment and Flight Documentations meets the Requirements of an Aircraft

This attachment is established in accordance with Article 299 of this AOR proper and FAR Part 91.205 and Appendix A.

1. Visual-flight rules (day). For VFR flight during the day, the following instruments and equipment are required:
   1.1 Airspeed indicator.
   1.2 Altimeter.
   1.3 Magnetic compass.
   1.4 Tachometer for each engine.
   1.5 Oil pressure gauge for each engine using pressure system.
   1.6 Temperature gauge for each liquid-cooled engine.
   1.7 Oil temperature gauge for each air-cooled engine.
   1.8 Manifold pressure gauge for each altitude engine.
   1.9 Fuel gauge indicating the quantity of fuel in each tank.
   1.10 Landing gear position indicator, if the aircraft has a retractable landing gear.
   1.11 Installation of an approved aviation red or aviation white anti-collision light system. In the event of failure of any light of the anti-collision light system, operation of the aircraft may continue to a location where repairs or replacement can be made.
   1.12 If the aircraft is operated for hire over water and beyond power-off gliding distance from shore, approved flotation gear readily available to each occupant and at least one pyrotechnic signaling device.
   1.13 A certificated safety belt with a metal-to-metal latching device for each occupant 2 years of age or older.
   1.14 A certificated shoulder harness at a flight crewmember station or any other seat for small aircraft.
   1.15 An emergency locator transmitter in accordance with Article 300.
   1.16 A certificated shoulder harness for utility and acrobatic category aircraft with a seating configuration, excluding pilot seats, of 9 or less shall
   1.17 A certificated shoulder harness for each seat of a rotorcraft that meets the requirements of Article 23 paragraph 1 of AOR approved by CAA.

2. Visual flight rules (night) if applicable. For VFR flight at night, the following instruments and equipment are required:
   2.1 Instruments and equipment specified in Item 1.
   2.2 Position lights.
   2.3 One electric landing light.
   2.4 An adequate source of electrical energy for all installed electrical and radio equipment.

2.5 One spare set of fuses, or three spare fuses of each kind required, that are accessible to the pilot in flight.

3. Instrument flight rules. For IFR flight, the following instruments and equipment are required:
   3.1 Instruments and equipment specified in Item 1, and, for night VFR flight (if applicable), instruments and equipment specified in Item 2.
   3.2 Two-way radio communication and navigation equipment suitable for the route to be flown.
   3.3 Gyroscopic rate-of-turn indicator, except on the following aircraft:
      3.3.1 Airplanes with a third attitude instrument system usable through flight attitudes of 360 degrees of pitch and roll.
      3.3.2 Rotorcraft with a third attitude instrument system usable through flight attitudes of ±80 degrees of pitch and ±120 degrees of roll.
   3.4 Slip-skid indicator.
   3.5 Sensitive altimeter adjustable for barometric pressure.
   3.6 A clock displaying hours, minutes, and seconds with a sweep-second pointer or digital presentation.
   3.7 Generator or alternator of adequate capacity.
   3.8 Gyroscopic pitch and bank indicator (artificial horizon).
   3.9 Gyroscopic direction indicator.

4. Flight at and above 24,000 feet MSL (FL 240). If VOR navigation equipment is required under Item 3.2 of this section, no person may operate a civil aircraft within the nation at or above FL 240 unless that aircraft is equipped with certificated DME or a suitable RNAV system.

5. Category II operations. The requirements for Category II operations are the instruments and equipment specified in Item 3 and 7.

6. Category III operations. The instruments and equipment required for Category III operations are specified in Item 3.

7. Category II Operations: Manual, Instruments, Equipment, and Maintenance
   7.1 Category II Operations Manuals
      7.1.1 Application for approval. An applicant for approval of a Category II manual or an amendment to an approved Category II manual shall submit the proposed manual or amendment to the CAA. If the application requests an evaluation program, it shall include the following:
         7.1.1.1 The location of the aircraft and the place where the demonstrations are to be conducted.
         7.1.1.2 The date the demonstrations are to commence (at least 10 days after filing the application).
         7.1.1.3 Contents. Each Category II manual shall contain:
            7.1.1.3.1 The registration number, make, and model of the aircraft to which it applies.
            7.1.1.3.2 A maintenance program as specified in this appendix.

7.1.1.3.3 The procedures and instructions related to recognition of decision height, use of runway visual range information, approach monitoring, the decision region (the region between the middle marker and the decision height), the maximum permissible deviations of the basic ILS indicator within the decision region, a missed approach, use of airborne low approach equipment, minimum altitude for the use of the autopilot, instrument and equipment failure warning systems, instrument failure, and other procedures, instructions, and limitations that may be found necessary by the CAA.

7.2 Required Instruments and Equipment

The instruments and equipment listed in this section shall be installed in each aircraft operated in a Category II operation. This section does not require duplication of instruments and equipment required by Article 299 of AOR or any other provisions of this chapter.

7.2.1 Group I.

7.2.1.1Two localizer and glide slope receiving systems. Each system shall provide a basic ILS display and each side of the instrument panel must have a basic ILS display. However, a single localizer antenna and a single glide slope antenna may be used.

7.2.1.2 A communications system that does not affect the operation of at least one of the ILS systems.

7.2.1.3 A marker beacon receiver that provides distinctive aural and visual indications of the outer and the middle markers.

7.2.1.4 Two gyroscopic attitude indicator.

7.2.1.5 Two gyroscopic direction indicator.

7.2.1.6 Two airspeed indicators.

7.2.1.7 Two sensitive altimeters adjustable for barometric pressure, each having a placarded correction for altimeter scale error and for the wheel height of the aircraft. Two sensitive altimeters adjustable for barometric pressure, having markings at 20-foot intervals and each having a placarded correction for altimeter scale error and for the wheel height of the aircraft.

7.2.1.8 Two vertical speed indicators.

7.2.1.9 A flight control guidance system that consists of either an automatic approach coupler or a flight director system. A flight director system shall display computed information as steering command in relation to an ILS localizer and, on the same instrument, either computed information as pitch command in relation to an ILS glide slope or basic ILS glide slope information. An automatic approach coupler shall provide at least automatic steering in relation to an ILS localizer. The flight control guidance system may be operated from one of the receiving systems required by Item 7.2.1.1.

7.2.1.10 For Category II operations with decision heights below 150 feet either a marker beacon receiver providing aural and visual indications of the inner marker or a radio altimeter.

7.2.2 Group II.

7.2.2.1 Warning systems for immediate detection by the pilot of system faults in Item 2.1.1, 2.1.4, 2.1.5 and 2.1.9 of Group I and, if installed for use in Category III operations, the radio altimeter and autothrottle system.

7.2.2.2 Dual controls.

7.2.2.3 A static pressure system with an alternate static pressure source.

7.2.2.4 A windshield wiper or equivalent means of providing adequate cockpit visibility for a safe visual transition by either pilot to touchdown and rollout.

7.2.2.5 A heat source for each airspeed system pitot tube installed or an equivalent means of preventing malfunctioning due to icing of the pitot system.

7.3 Instruments and Equipment Approval

7.3.1 The instruments and equipment required by Item 7.2 of this attachment shall be approved as provided in this section before being used in Category II operations. Before presenting an aircraft for approval by CAA, it shall be shown that since the beginning of the 12th calendar month before the date of submission:

7.3.2 The ILS localizer and glide slope equipment were bench checked according to the manufacturer's instructions.

7.3.3 The altimeters and the static pressure systems were tested and inspected in accordance with Regulations of Airworthiness and Maintenance Management for Aviation Products, Appliances and Parts.

7.3.3.1 All other instruments and items of equipment specified in this attachment that are listed in the proposed maintenance program were bench checked and found to meet the manufacturer's specifications.

7.3.4 Flight control guidance system. All components of the flight control guidance system shall be approved as installed by the evaluation program specified in this attachment if they have not been approved for Category III operations under applicable type or supplemental type certification procedures. In addition, subsequent changes to make, model, or design of the components shall be approved under this paragraph. Related systems or devices, such as the autothrottle and computed missed approach guidance system, shall be approved in the same manner if they are to be used for Category II operations.

7.3.5 Radio altimeter. A radio altimeter shall meet the performance criteria of this paragraph for original approval and after each subsequent alteration.

7.3.5.1 It shall display to the flight crew clearly and positively the wheel height of the main landing gear above the terrain.

7.3.5.2 It shall display wheel height above the terrain to an accuracy of plus or minus 5 feet or 5 percent, whichever is greater, under the following conditions:

7.3.5.2.1 Pitch angles of zero to plus or minus 5 degrees about the mean approach attitude.

7.3.5.2.2 Roll angles of zero to 20 degrees in either direction.

7.3.5.2.3 Forward velocities from minimum approach speed up to 200 knots.

7.3.5.2.4 Sink rates from zero to 15 feet per second at altitudes from 100 to 200 feet.

7.4 Over level ground, it shall track the actual altitude of the aircraft without significant lag or oscillation.

7.5 With the aircraft at an altitude of 200 feet or less, any abrupt change in terrain representing no more than 10 percent of the aircraft's altitude shall not cause the altimeter to unlock, and indicator response to such changes shall not exceed 0.1 seconds and, in addition, if the system unlocks for greater changes, it shall reacquire the signal in less than 1 second.

7.6 Systems that contain a push-to-test feature shall test the entire system (with or without an antenna) at a simulated altitude of less than 500 feet.

7.7 The system shall provide to the flight crew a positive failure warning display any time there is a loss of power or an absence of ground return signals within the designed range of operating altitudes.

7.8 Other instruments and equipment. All other instruments and items of equipment required by this appendix shall be capable of performing as necessary for Category II operations. Approval is also required after each subsequent alteration to these instruments and items of equipment.

7.9 Evaluation program

7.9.1 Approval by evaluation is requested as a part of the application for approval of the Category II manual.

7.9.2 Demonstrations. Unless otherwise authorized by the Administrator, the evaluation program for each aircraft requires the demonstrations specified in this paragraph. At least 50 ILS approaches shall be flown with at least five approaches on each of three different ILS facilities and no more than one half of the total approaches on any one ILS facility. All approaches shall be flown under simulated instrument conditions to a 100-foot decision height and 90 percent of the total approaches made shall be successful. A successful approach is one in which—

7.9.2.1 At the 100-foot decision height, the indicated airspeed and heading are satisfactory for a normal flare and landing (speed shall be plus or minus 5 knots of programmed airspeed, but may not be less than computed threshold speed if autothrottles are used);

7.9.2.2 The aircraft at the 100-foot decision height, is positioned so that the cockpit is within, and tracking so as to remain within, the lateral confines of the runway extended;

7.9.2.3 Deviation from glide slope after leaving the outer marker does not exceed 50 percent of full-scale deflection as displayed on the ILS indicator;

7.9.2.4 No unusual roughness or excessive attitude changes occur after leaving the middle marker.

7.9.2.5 In the case of an aircraft equipped with an approach coupler, the aircraft is sufficiently in trim when the approach coupler is disconnected at the decision height to allow for the continuation of a normal approach and landing.

7.9.3 Records. During the evaluation program the following information shall be maintained by the applicant for the aircraft with respect to each approach and made available to the CAA upon request:

7.9.3.1 Each deficiency in airborne instruments and equipment that prevented the initiation of an approach.

7.9.3.2 The reasons for discontinuing an approach, including the altitude above the runway at which it was discontinued.

7.9.3.3 Speed control at the 100-foot decision height if auto throttles are used.

7.9.3.4 Trim condition of the aircraft upon disconnecting the auto coupler with respect to continuation to flare and landing.

7.9.3.5 Position of the aircraft at the middle marker and at the decision height indicated both on a diagram of the basic ILS display and a diagram of the runway extended to the middle marker. Estimated touchdown point shall be indicated on the runway diagram.

7.9.3.6 Compatibility of flight director with the auto coupler, if applicable.

7.9.3.7 Quality of overall system performance.

7.9.4 Evaluation. A final evaluation of the flight control guidance system is made upon successful completion of the demonstrations. If no hazardous tendencies have been displayed or are otherwise known to exist, the system is approved as installed.

7.10 Maintenance program

7.10.1 Each maintenance program shall contain the following:

7.10.1.1 A list of each instrument and item of equipment specified in Item 7.2 of this attachment that is installed in the aircraft and approved for Category II operations, including the make and model of those specified in Item 2.1.

7.10.1.2 A schedule that provides for the performance of inspections under Item 7.4.1.5 within 3 calendar months after the date of the previous inspection. The inspection shall be performed by a person authorized by this chapter, except that each alternate inspection may be replaced by a functional flight check. This functional flight check shall be performed by a pilot holding a Category II pilot authorization for the type aircraft checked.

7.10.1.3 A schedule that provides for the performance of bench checks for each listed instrument and item of equipment that is specified in Item 7.2.1 within 12 calendar months after the date of the previous bench check.

7.10.1.4 A schedule that provides for the performance of a test and inspection of each static pressure system within 12 calendar months after the date of the previous test and inspection in accordance with Attachment 24 of AOR.

7.10.1.5 The procedures for the performance of the periodic inspections and functional flight checks to determine the ability of each listed instrument and item of equipment specified in item 2 of this attachment to perform as approved for Category II operations including a procedure for recording functional flight checks.

7.10.1.6 A procedure for assuring that the pilot is informed of all defects in listed instruments and items of equipment.

7.10.1.7 A procedure for assuring that the condition of each listed instrument and item of equipment upon which maintenance is performed is at least equal to its Category II approval condition before it is returned to service for Category II operations in accordance with this attachment.

7.10.1.8 A procedure for an entry in the maintenance records that shows the date, airport, and reasons for each discontinued Category II operation because of a malfunction of a listed instrument or item of equipment.

7.10.2 Bench check. A bench check shall comply with the following:

7.10.2.1 It shall be performed by a certificated repair station holding one of the following ratings as appropriate to the equipment checked:

7.10.2.1.1 An instrument rating.

7.10.2.1.2 A radio rating.

7.10.2.1.3 Accessories rating.

7.10.2.2 It shall consist of removal of an instrument or item of equipment and performance of the following:

7.10.2.2.1 A visual inspection for cleanliness, impending failure, and the need for lubrication, repair, or replacement of parts;

7.10.2.2.2 Correction of items found by that visual inspection.

7.10.2.2.3 Calibration to at least the manufacturer's specifications unless otherwise specified in the approved Category II manual for the aircraft in which the instrument or item of equipment is installed.

Extensions. After the completion of one maintenance cycle of 12 calendar months, a request to extend the period for checks, tests, and inspections is approved if it is shown that the performance of particular equipment justifies the requested extension.

ATTACHMENT 24 Flight Rules for Inoperative Instruments and Equipment

This attachment was established in accordance with Article 303 and 315 of this AOR proper and FAR Part 91.213.

1. No person may take off an aircraft with inoperative instruments or equipment installed unless the following conditions are met:
   1.1 An approved Minimum Equipment List exists for that aircraft.
   1.2 The aircraft has within it a letter of authorization, issued by the CAA, authorizing operation of the aircraft under the Minimum Equipment List.
   1.3 The approved Minimum Equipment List shall:
      1.3.1 Be prepared in accordance with the limitations specified in Item 2 of this attachment.
      1.3.2 Provide for the operation of the aircraft with the instruments and equipment in an inoperable condition.
   1.4 The aircraft records available to the pilot shall include an entry describing the inoperable instruments and equipment.
   1.5 The aircraft is operated under all applicable conditions and limitations contained in the Minimum Equipment List and the letter authorizing the use of the list.

2. The following instruments and equipment may not be included in a Minimum Equipment List:
   2.1 Instruments and equipment that are either specifically or otherwise required by the airworthiness requirements under which the aircraft is type certificated and which are essential for safe operations under all operating conditions.
   2.2 Instruments and equipment required by an airworthiness directive to be in operable condition unless the airworthiness directive provides otherwise.
   2.3 Instruments and equipment required for specific operations by this chapter of this AOR.

3. Except for operations conducted in accordance with Item 1 of this attachment, a person may takeoff an aircraft in operations conducted under this attachment with inoperative instruments and equipment without an approved Minimum Equipment List provided:
   3.1 The flight operation is conducted in a:
      3.1.1 Rotorcraft, non-turbine-powered airplane, glider, lighter-than-air aircraft, powered parachute, or weight-shift-control aircraft, for which a master minimum equipment list has not been developed.
      3.1.2 Small rotorcraft, nonturbine-powered small airplane, glider, or lighter-than-air aircraft for which a Master Minimum Equipment List has been developed.
   3.2 The inoperative instruments and equipment are not:
      3.2.1 Part of the VFR-day type certification instruments and equipment prescribed in the applicable airworthiness regulations under which the aircraft was type certificated.
      3.2.2 Indicated as required on the aircraft's equipment list, or on the Kinds of Operations Equipment List for the kind of flight operation being conducted.

3.2.3 Required by Article 295 of this AOR or any other rule of this chapter for the specific kind of flight operation being conducted.

3.2.4 Required to be operational by an airworthiness directive.

3.3 The inoperative instruments and equipment are:

3.3.1 Removed from the aircraft, the cockpit control placarded, and the maintenance recorded.

3.3.2 Deactivated and placarded "Inoperative." If deactivation of the inoperative instrument or equipment involves maintenance, it shall be accomplished and recorded.

3.3.3 A determination is made by a pilot, who is certificated and appropriately rated, or by a person, who is certificated and appropriately rated to perform maintenance on the aircraft, that the inoperative instrument or equipment does not constitute a hazard to the aircraft.

ATTACHMENT 25 Performance of Altitude Alerting System or Device meets the Requirements of a Turbojet-Powered Aircraft

This attachment was established in accordance with Article 306 of this AOR proper and FAR Part 91.219.

Each altitude alerting system or device installed in a turbojet-powered aircraft shall be able to:

1. Alert the pilot:
   1.1 Upon approaching a preselected altitude in either ascent or descent, by a sequence of both aural and visual signals in sufficient time to establish level flight at that preselected altitude; or
   1.2 Upon approaching a preselected altitude in either ascent or descent, by a sequence of visual signals in sufficient time to establish level flight at that preselected altitude, and when deviating above and below that preselected altitude, by an aural signal;
2. Provide the required signals from sea level to the highest operating altitude approved for the airplane in which it is installed;
3. Preselect altitudes in increments that are commensurate with the altitudes at which the aircraft is operated;
4. Be tested without special equipment to determine proper operation of the alerting signals.

Accept necessary barometric pressure settings if the system or device operates on barometric pressure. However, for operation below 3,000 feet AGL, the system or device need only provide one signal, either visual or aural, to comply with this attachment. A radio altimeter may be included to provide the signal if the operator has an approved procedure for its use to determine DA/DH or MDA, as appropriate.

ATTACHMENT 26 Parachute provided for Emergency meeting the requirements of an Aircraft

This attachment was established in accordance with Article 311 of this AOR proper and FAR Part 91.307.

1. No pilot of a civil aircraft may allow a parachute that is available for emergency use to be carried in that aircraft unless it is an approved type
   1.1 For chair-type(canopy in the back): it has been packed by a certificated and appropriately rated parachute rigger with in the preceding 120 days.
   1.2 For other types of parachute:
      1.2.1 within the preceding 120 days, if its canopy, shrouds, and harness are composed exclusively of nylon, rayon, or other similar synthetic fiber or materials that are substantially resistant to damage from mold, mildew, or other fungi and other rotting agents propagated in a moist environment; or
      1.2.2 Within the preceding 60 days, if any part of the parachute is composed of silk, pongee, or other natural fiber or materials not specified in Item 1.2.1.
2. Except in an emergency, no pilot in command may allow, and no person may conduct, a parachute operation from an aircraft within the R.O.C..
3. Unless each occupant of the aircraft is wearing an approved parachute, no pilot of a civil aircraft carrying any person (other than a crewmember) may execute any intentional maneuver that exceeds:
   3.1 A bank of 60 degrees relative to the horizon.
   3.2 A nose-up or nose-down attitude of 30 degrees relative to the horizon.
4. Item 3 does not apply to:
   4.1 Pilot certification or rating.
   4.2 Spins and other flight maneuvers required by the regulations for any certificate or rating when given by a certificated flight instructor.

A parachute manufactured under a type certificate, a technical standard order, a personnel-carrying military parachute or any other military designation or specification number.

ATTACHMENT 27 Towing: Gliders

This attachment was established in accordance with Article 312 of this AOR proper and FAR Part 91.309.

No person may operate a civil aircraft towing a glider unless:

1. The pilot in command of the towing aircraft is qualified under CAA certification;
2. The towing aircraft is equipped with a tow-hitch of a kind, and installed in a manner, that is approved by the CAA.
3. The towline used has breaking strength not less than 80 percent of the maximum certificated operating weight of the glider and not more than twice this operating weight. The towline used may have a breaking strength more than twice the maximum certificated operating weight of the glider if:
   - 3.1 A safety link is installed at the point of attachment of the towline to the glider with a breaking strength not less than 80 percent of the maximum certificated operating weight of the glider and not greater than twice this operating weight.
   - 3.2 A safety link is installed at the point of attachment of the towline to the towing aircraft with a breaking strength greater, but not more than 25 percent greater, than that of the safety link at the towed glider end of the towline and not greater than twice the maximum certificated operating weight of the glider.
4. Before conducting any towing operation within the airspace of an airport, or before making each towing flight within such controlled airspace if required by ATC, the pilot in command shall notify the control tower. If a control tower does not exist or is not in operation, the pilot in command shall notify the CAA air traffic unit serving that controlled airspace before conducting any towing operations in that airspace.
5. The pilots of the towing aircraft and the glider have agreed upon a general course of action, including takeoff and release signals, airspeeds, and emergency procedures for each pilot.

No pilot of an aircraft may intentionally release a towline, after release of a glider, in a manner that endangers the life or property of another.

ATTACHMENT 28 Progressive Inspection Programme

This attachment was established in accordance with Article 317 of this AOR proper, and FAR Part 91.409.

1. Each operator or owner of an aircraft desiring to use a progressive inspection program should submit a written request to CAA for approval before implementation.

2. The Progressive Inspection Programme shall meet the following requirements:
   - 2.1 A certificated aircraft maintenance engineer holding an inspection authorization, a certificated repair station, or the manufacturer of the aircraft to supervise or conduct the progressive inspection.
   - 2.2 A current inspection procedures manual available and readily understandable to pilot and maintenance personnel containing, in detail:
     - 2.2.1 An explanation of the progressive inspection, including the continuity of inspection responsibility, the making of reports, and the keeping of records and technical reference material;
     - 2.2.2 An inspection schedule, specifying the intervals in hours or days when routine and detailed inspections will be performed and including instructions for exceeding an inspection interval by not more than 10 hours while en route and for changing an inspection interval because of service experience.
     - 2.2.3 Sample routine and detailed inspection forms and instructions for their use.
     - 2.2.4 Sample reports and records and instructions for their use;
   - 2.3 Enough housing and equipment for necessary disassembly and proper inspection of the aircraft.
   - 2.4 Appropriate current technical information for the aircraft.

The frequency and detail of the progressive inspection shall provide for the complete inspection of the aircraft within each 12 calendar months and be consistent with the manufacturer's recommendations, field service experience, and the kind of operation in which the aircraft is engaged. The progressive inspection schedule shall ensure that the aircraft, at all times, will be airworthy and will conform to all applicable FAA aircraft specifications, type certificate data sheets, airworthiness directives, and other approved data. If the progressive inspection is discontinued, the owner or operator shall immediately notify the CAA, in writing, of the discontinuance. After the discontinuance, the first annual inspection under Article 317, paragraph 1, item 1 is due within 12 calendar months after the last complete inspection of the aircraft under the progressive inspection. The 100-hour inspection under Article 317, paragraph 2 is due within 100 hours after that complete inspection. A complete inspection of the aircraft, for the purpose of determining when the annual and 100-hour inspections are due, requires a detailed inspection of the aircraft and all its components in accordance with the progressive inspection. A routine inspection of the aircraft and a detailed inspection of several components is not considered to be a complete inspection.

ATTACHMENT 29 Altimeter System Test and Inspection

This attachment was established in accordance with Article 319 of this AOR proper and FAR Part 43 Appendix E.

Each person performing the altimeter system tests and inspections shall comply with the following:

1. Static pressure system:
   1.1 Ensure freedom from entrapped moisture and restrictions.
   1.2 Determine that leakage is in accordance with the Article 23, paragraph 1 of AOR that adopts the international standards of airworthiness , such as the tolerances established in FAR Part 23.1325 or FAR Part 25.1325, whichever is applicable.
   1.3 Determine that the static port heater, if installed, is operative.
   1.4 Ensure that no alterations or deformations of the airframe surface have been made that would affect the relationship between air pressure in the static pressure system and true ambient static air pressure for any flight condition.

2. Altimeter:
   2.1 Test by an appropriately rated repair facility in accordance with the following subparagraphs. Unless otherwise specified, each test for performance may be conducted with the instrument subjected to vibration. When tests are conducted with the temperature substantially different from ambient temperature of approximately 25 ℃, allowance shall be made for the variation from the specified condition.
      2.1.1 Scale error. With the barometric pressure scale at 29.92 inches of mercury, the altimeter shall be subjected successively to pressures corresponding to the altitude specified in Table I up to the maximum normally expected operating altitude of the airplane in which the altimeter is to be installed. The reduction in pressure shall be made at a rate not in excess of 20,000 feet per minute to within approximately 2,000 feet of the test point. The test point shall be approached at a rate compatible with the test equipment. The altimeter shall be kept at the pressure corresponding to each test point for at least 1 minute, but not more than 10 minutes, before a reading is taken. The error at all test points shall not exceed the tolerances specified in Table I.
      2.1.2 Hysteresis. The hysteresis test shall begin not more than 15 minutes after the altimeter's initial exposure to the pressure corresponding to the upper limit of the scale error test prescribed in Item 2.1.1; and while the altimeter is at this pressure, the hysteresis test shall commence. Pressure shall be increased at a rate simulating a descent in altitude at the rate of 5,000 to 20,000 feet per minute until within 3,000 feet of the first test point (50 percent of maximum altitude). The test point shall then be approached at a rate of approximately 3,000 feet per minute. The altimeter shall be kept at this pressure for at least 5 minutes, but not more than 15 minutes, before the test reading is taken. After the reading has been taken, the pressure shall be increased further, in the same manner as before, until the

pressure corresponding to the second test point (40 percent of maximum altitude) is reached. The altimeter shall be kept at this pressure for at least 1 minute, but not more than 10 minutes, before the test reading is taken. After the reading has been taken, the pressure shall be increased further, in the same manner as before, until atmospheric pressure is reached. The reading of the altimeter at either of the two test points shall not differ by more than the tolerance specified in Table II from the reading of the altimeter for the corresponding altitude recorded during the scale error test.

2.1.3 After effect. Not more than 5 minutes after the completion of the hysteresis test prescribed in Item 2.1.2, the reading of the altimeter (corrected for any change in atmospheric pressure) shall not differ from the original atmospheric pressure reading by more than the tolerance specified in Table II.

2.1.4 Friction. The altimeter shall be subjected to a steady rate of decrease of pressure approximating 750 feet per minute. At each altitude listed in Table III, the change in reading of the pointers after vibration shall not exceed the corresponding tolerance listed in Table III.

2.1.5 Case leak. The leakage of the altimeter case, when the pressure within it corresponds to an altitude of 18,000 feet, shall not change the altimeter reading by more than the tolerance shown in Table II during an interval of 1 minute.

2.1.6 Barometric scale error. At constant atmospheric pressure, the barometric pressure scale shall be set at each of the pressures (falling within its range of adjustment) that are listed in Table IV, and shall cause the pointer to indicate the equivalent altitude difference shown in Table IV with a tolerance of 25 feet.

2.2 Altimeters which are the air data computer type with associated computing systems, or which incorporate air data correction internally, may be tested in a manner and to specifications developed by the manufacturer which are acceptable to the CAA.

3. Automatic Pressure Altitude Reporting Equipment and ATC Transponder System Integration Test. The test shall be conducted by an appropriately rated person under the conditions specified in item 1. Measure the automatic pressure altitude at the output of the installed ATC transponder when interrogated on Mode C at a sufficient number of test points to ensure that the altitude reporting equipment, altimeters, and ATC transponders perform their intended functions as installed in the aircraft. The difference between the automatic reporting output and the altitude displayed at the altimeter shall not exceed 125 feet.

4. Records shall be complied with the provisions of CAA regulations as to content, form, and disposition of the records. The person performing the altimeter tests shall record on the altimeter the date and maximum altitude to which the altimeter has been tested and the persons approving the airplane for return to service shall enter that data in the airplane log or other permanent record.

Table I

Altitude	Equivalent pressure (inches of mercury)	Tolerance ±(feet)
−1,000	31.018	20
0	29.921	20
500	29.385	20
1,000	28.856	20
1,500	28.335	25
2,000	27.821	30
3,000	26.817	30
4,000	25.842	35
6,000	23.978	40
8,000	22.225	60
10,000	20.577	80
12,000	19.029	90
14,000	17.577	100
16,000	16.216	110
18,000	14.942	120
20,000	13.750	130
22,000	12.636	140
25,000	11.104	155
30,000	8.885	180
35,000	7.041	205
40,000	5.538	230
45,000	4.355	255
50,000	3.425	280

Table II—Test Tolerances

Test	Tolerance (feet)
Case Leak Test	±100
Hysteresis Test:	
First Test Point (50 percent of maximum altitude)	75
Second Test Point (40 percent of maximum altitude)	75
After Effect Test	30

Table III—Friction

Altitude (feet)	Tolerance (feet)
1,000	±70
2,000	70
3,000	70
5,000	70
10,000	80
15,000	90
20,000	100
25,000	120
30,000	140
35,000	160
40,000	180
50,000	250

Table IV—Pressure-Altitude Difference

Pressure (inches of Hg)	Altitude difference (feet)
28.10	−1,727
28.50	−1,340
29.00	−863
29.50	−392
29.92	0
30.50	+531
30.90	+893
30.99	+974

ATTACHMENT 30 ATC Transponder Tests and Inspections

This attachment was established in accordance with Article 320 of this AOR proper and FAR Part 91.413.

The ATC transponder tests required by Article 320 of this AOR proper may be conducted using a bench check or portable test equipment and shall meet the requirements prescribed in Item 1 through 10 of this attachment. If portable test equipment with appropriate coupling to the aircraft antenna system is used, operate the test equipment for ATCRBS transponders at a nominal rate of 235 interrogations per second to avoid possible ATCRBS interference. Operate the test equipment at a nominal rate of 50 Mode S interrogations per second for Mode S. An additional 3 dB loss is allowed to compensate for antenna coupling errors during receiver sensitivity measurements conducted in accordance with the procedures prescribed in Item 3.1 when using portable test equipment.

1. Radio Reply Frequency:
   - 1.1 For all classes of ATCRBS transponders, interrogate the transponder and verify that the reply frequency is 1090 ±3 Megahertz (MHz).
   - 1.2 For classes 1B, 2B, and 3B Mode S transponders, interrogate the transponder and verify that the reply frequency is 1090 ±3 MHz.
   - 1.3 For classes 1B, 2B, and 3B Mode S transponders that incorporate the optional 1090 ±1 MHz reply frequency, interrogate the transponder and verify that the reply frequency is correct.
   - 1.4 For classes 1A, 2A, 3A, and 4 Mode S transponders, interrogate the transponder and verify that the reply frequency is 1090 ±1 MHz.

2. Suppression: When Classes 1B and 2B ATCRBS Transponders, or Classes 1B, 2B, and 3B Mode S transponders are interrogated Mode 3/A at an interrogation rate between 230 and 1,000 interrogations per second; or when Classes 1A and 2A ATCRBS Transponders, or Classes 1B, 2A, 3A, and 4 Mode S transponders are interrogated at a rate between 230 and 1,200 Mode 3/A interrogations per second:
   - 2.1 Verify that the transponder does not respond to more than 1 percent of ATCRBS interrogations when the amplitude of P2 pulse is equal to the P1 pulse.
   - 2.2 Verify that the transponder replies to at least 90 percent of ATCRBS interrogations when the amplitude of the P2 pulse is 9 dB less than the P1 pulse. If the test is conducted with a radiated test signal, the interrogation rate shall be 235 ±5 interrogations per second unless a higher rate has been approved for the test equipment used at that location.

3. Receiver Sensitivity:
   - 3.1 Verify that for any class of ATCRBS Transponder, the receiver minimum triggering level (MTL) of the system is −73 ±4 dbm, or that for any class of Mode S transponder the receiver MTL for Mode S format (P6 type) interrogations is −74 ±3 dbm by use of a test set either:
     - 3.1.1 Connected to the antenna end of the transmission line;

3.1.2 Connected to the antenna terminal of the transponder with a correction for transmission line loss; or

3.1.3 Utilized radiated signal.

3.2 Verify that the difference in Mode 3/A and Mode C receiver sensitivity does not exceed 1 db for either any class of ATCRBS transponder or any class of Mode S transponder.

4. Radio Frequency (RF) Peak Output Power:

4.1 Verify that the transponder RF output power is within specifications for the class of transponder. Use the same conditions as described in Item 3.1.1, 3.1.2, and 3.1.3.

4.1.1 For Class 1A and 2A ATCRBS transponders, verify that the minimum RF peak output power is at least 21.0 dbw (125 watts).

4.1.2 For Class 1B and 2B ATCRBS Transponders, verify that the minimum RF peak output power is at least 18.5 dbw (70 watts).

4.1.3 For Class 1A, 2A, 3A, and 4 and those Class 1B, 2B, and 3B Mode S transponders that include the optional high RF peak output power, verify that the minimum RF peak output power is at least 21.0 dbw (125 watts).

4.1.4 For Classes 1B, 2B, and 3B Mode S transponders, verify that the minimum RF peak output power is at least 18.5 dbw (70 watts).

4.1.5 For any class of ATCRBS or any class of Mode S transponders, verify that the maximum RF peak output power does not exceed 27.0 dbw (500 watts).

5. Mode S Diversity Transmission Channel Isolation: For any class of Mode S transponder that incorporates diversity operation, verify that the RF peak output power transmitted from the selected antenna exceeds the power transmitted from the nonselected antenna by at least 20 db

6. Mode S Address: Interrogate the Mode S transponder and verify that it replies only to its assigned address. Use the correct address and at least two incorrect addresses. The interrogations should be made at a nominal rate of 50 interrogations per second.

7. Mode S Formats: Interrogate the Mode S transponder with uplink formats (UF) for which it is equipped and verify that the replies are made in the correct format. Use the surveillance formats UF=4 and 5. Verify that the altitude reported in the replies to UF=4 are the same as that reported in a valid ATCRBS Mode C reply. Verify that the identity reported in the replies to UF=5 are the same as that reported in a valid ATCRBS Mode 3/A reply. If the transponder is so equipped, use the communication formats UF=20, 21, and 24.

8. Mode S All-Call Interrogations: Interrogate the Mode S transponder with the Mode S-only all-call format UF=11, and the ATCRBS/Mode S all-call formats (1.6 microsecond P4pulse) and verify that the correct address and capability are reported in the replies (downlink format DF=11).

9. ATCRBS-Only All-Call Interrogation: Interrogate the Mode S transponder with the ATCRBS-only all-call interrogation (0.8 microseconds P4pulse) and verify that no reply is generated.

10. Squitter: Verify that the Mode S transponder generates a correct squitter approximately once per second.
11. Records: Comply with the pertinent provisions or regulations as to content, form, and disposition of the records.

ATTACHMENT 31 The Maintenance Records for the Periods specified meet the Requirements of an Aircraft and Components

This attachment was established in accordance with Article 322 and 323 of this AOR proper and FAR Part 91.417.

Except for work performed in accordance with Article 319 and 320 of this AOR, each registered owner or operator shall keep the following records for the periods specified:

1. Records of the maintenance, preventive maintenance, and alteration and records of the 100-hour, annual, progressive, and other required or approved inspections, as appropriate, for each aircraft (including the airframe) and each engine, propeller, rotor, and appliance of an aircraft. The records shall include—
   1.1 A description (or reference to data acceptable to the Administrator) of the work performed.
   1.2 The date of completion of the work performed.
   1.3 The signature and certificate number of the person approving the aircraft for return to service.

2. Records containing the following information:
   2.1 The total time in service of the airframe, each engine, each propeller, and each rotor.
   2.2 The current status of life-limited parts of each airframe, engine, propeller, rotor, and appliance.
   2.3 The time since last overhaul of all items installed on the aircraft which are required to be overhauled on a specified time basis.
   2.4 The current inspection status of the aircraft, including the time since the last inspection required by the inspection program under which the aircraft and its appliances are maintained.
   2.5 The current status of applicable airworthiness directives (AD) including, for each, the method of compliance, the AD number, and revision date. If the AD involves recurring action, the time and date when the next action is required.
   2.6 Copies of the forms prescribed by Regulations For Aircraft Airworthiness Certification and Maintenance Management for each major alteration to the airframe and currently installed engines, rotors, propellers, and appliances.

3. The owner or operator shall retain the following records for the periods prescribed:
   3.1 The records specified in Item 1 of this section shall be retained until the work is repeated or superseded by other work or for 1 year after the work is performed.
   3.2 The records specified in Item 2 of this section shall be retained and transferred with the aircraft at the time the aircraft is sold.
   3.3. The operator may establish the electronic managing procedures of recording/signature system, and implement the procedures after obtaining CAA’s approval.

4. A list of defects furnished to a registered owner or operator shall be retained until the defects are repaired and the aircraft is approved for return to service.

5. The owner or operator shall make all maintenance records required to be kept by this section available for inspection by the CAA or any authorized representative of law enforcement organization.
6. When a fuel tank is installed within the cabin or cargo compartment, A copy of an aircraft, its powerplant, propeller, components and part, major repair minor repair form shall be kept on the modified aircraft by the owner or operator.

ATTACHMENT 32 Authorization for Ferry Flight with One Engine Inoperative

This attachment was established in accordance with Article 344 of this AOR proper and FAR Part 91.611.

1. The holder of an air carrier operating certificate may conduct a ferry flight of a four-engine aircraft or a turbine-engine-powered aircraft equipped with three engines, with one engine inoperative, to a base for the purpose of repairing that engine subject to the following:
   1.1 The aircraft model has been test flown and found satisfactory for safe flight in accordance with Item 2 or 3, as appropriate.
   1.2 The approved Flight Manual contains the following performance data and the flight is conducted in accordance with that data:
      1.2.1 Maximum weight.
      1.2.2 Center of gravity limits.
      1.2.3 Configuration of the inoperative propeller (if applicable).
      1.2.4 Runway length for takeoff (including temperature accountability).
      1.2.5 Altitude range.
      1.2.6 Certificate limitations.
      1.2.7 Ranges of operational limits.
      1.2.8 Performance information.
      1.2.9 Operating procedures.
   1.3 The operator has CAA approved procedures for the safe operation of the aircraft, including specific requirements for:
      1.3.1 Limiting the operating weight on any ferry flight to the minimum necessary for the flight plus the necessary reserve fuel load;
      1.3.2 A limitation that takeoffs shall be made from dry runways unless, based on a showing of actual operating takeoff techniques on wet runways with one engine inoperative, takeoffs with full controllability from wet runways have been approved for the specific model aircraft and included in the Flight Manual.
      1.3.3 Operations from airports where the runways may require a takeoff or approach over populated areas.
      1.3.4 Inspection procedures for determining the operating condition of the operative engines.
   1.4 No person may take off an aircraft under this section if:
      1.4.1 The initial climb is over thickly populated areas.
      1.4.2 Weather conditions at the takeoff or destination airport are less than those required for VFR flight.
   1.5 Persons other than required flight crewmembers shall not be carried during the flight.
   1.6 No person may use a flight crewmember for flight under this section unless that crewmember is thoroughly familiar with the operating procedures for one-engine inoperative ferry flight contained in the certificate holder's manual and the limitations and performance information in the Aircraft Flight Manual.

2. The aircraft performance of a reciprocating-engine with one engine inoperative shall be determined by flight test as follows:
   2.1 A speed not less than 1.3 VS1shall be chosen at which the aircraft may be controlled satisfactorily in a climb with the critical engine inoperative (with its propeller removed or in a configuration desired by the operator and with all other engines operating at the maximum power determined in Item 2.2.3.
   2.2 The distance required to accelerate to the speed listed in Item 2.1 and to climb to 50 feet shall be determined with:
      2.2.1 The landing gear extended.
      2.2.2 The critical engine inoperative and its propeller removed or in a configuration desired by the operator.
      2.2.3 The other engines operating at not more than maximum power established under Item 2.3.

The takeoff, flight and landing procedures, such as the approximate trim settings, method of power application, maximum power, and speed shall be established.

ATTACHMENT 33 Chinese-English term references

This attachment was established in accordance with Article 351 of this AOR.

空中工作	Aerial work
機場	Aerodrome
機場最低飛航限度	Aerodrome operating minimum
航空器	Aircraft
航空器維修工程師	Aircraft maintenance engineer
飛航管制	Air traffic control (ATC)
備用機場	Alternate aerodrome
艙壓高度	Cabin Pressure altitude
客艙組員	Cabin crew
正駕駛員	Captain
座艙通話紀錄器	Cockpit voice recorder (CVR)
商用飛航作業	Commercial air transport operation
外形差異手冊	Configuration deviation list (CDL)
操控下接近地障	Control flight into terrain
組員	Crew member
巡航高度	Cruising level
危險物品	Dangerous goods (DG)
決定高度	Decision altitude (DA)
決定實際高度	Decision height (DH)
航空器簽派員	Dispatcher
執勤期間	Duty period
緊急定位發報機	Emergency locator transmitter (ELT)
加強型接近地面警告系統	Enhanced Ground proximate warning system (EGPWS)
延展轉降時限作業	Extended Diversion Time Operations (EDTO)
增强目視系統	Enhanced vision system (EVS)
急救箱	First aid kit (FAK)
飛航組員	Flight crew member
飛航資料紀錄器	Flight data recorder
飛航執勤期間	Flight duty period
飛航工程師	Flight engineer

飛航手冊	Flight manual
航務手冊	Flight operation manual
飛航計畫	Flight plan
飛航紀錄器	Flight recorder
飛航時間	Flight time
飛行模擬機	Full Flight Simulator (FFS)
接近地面警告系統	Ground proximate warning system (GPWS)
抬頭顯示器	Head-up display (HUD)
新進訓練	Initial training
儀器進場及降落作業	Instrument approach and landing operations
儀器飛航規則	Instrument flight rule (IFR)
儀器天氣情況	Instrument meteorological condition (IMC)
大型航空器	Large aircraft
救生艇	Life raft
航路考驗	Line check
航路操作經驗	Line operating experience
馬克數	Mach number
主最低裝備需求手冊	Master minimum equipment list (MMEL)
最大起飛重量	Maximum certificated take-off mass
醫療箱	Medical kit
最低下降高度	Minimum descent altitude (MDA)
最低下降實際高度	Minimum descent height (MDH)
最低裝備需求手冊	Minimum equipment list (MEL)
最低導航性能規範	Minimum navigation performance specification
誤失進場	Miss approach
加強飛航組員	Multiple flight crew
超越障礙物高度	Obstacle clearance altitude (OCA)
超越障礙物實際高度	Obstacle clearance height (OCH)
操作飛航計畫	Operational flight plan
操作手冊	Operations manual
營運規範	Operation specification
航空器使用人	Operator
機長	Pilot-in-command (PIC)
壓力高度	Pressure altitude

定期複訓	Recurrent training
縮減垂直隔離	Reduced Vertical Separation Minimum (RVSM)
恢復資格訓練	Requalification training
以性能為基礎之導航	Performance-based navigation (PBN)
休息期間	Rest period
跑道視程	Runway visual range (RVR)
標準飛航組員	Single flight crew
小型航空器	Small aircraft
航空器註冊國	State of registry
使用人所在國	State of the operator
機種轉換訓練	Transition training
使用時間	Time in service
空中防撞系統	Traffic/Airborne collision avoidance system (TCAS/ACAS)
衛生防護箱	Universal precaution kits
升等訓練	Upgrade training
最低隔離空層	Vertical separation minima
特高頻	Very high frequency (VHF)
目視飛航規則	Visual flight rule (VFR)
目視天氣情況	Visual meteorological condition (VMC)