Part 91
General operating and flight rules

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SUBPART A
General

91.1 Applicability

a) This Part prescribes rules governing the domestic and international operation of aircraft other than moored balloons, kites, unmanned rockets, and unmanned free balloons, which are governed by ECAR Part 101, and ultra light vehicles operated in accordance with Part 103 and light sport aircraft in accordance with Part 104 and agricultural aircraft Part 137

b) A corporate aviation operation involving three or more aircraft that are operated by pilots Employed for the purpose of flying the aircraft.

Note. — The term "aircraft" is used to indicate that a corporate aviation operation using a mix of airplanes and helicopters is be subject to this Recommendation as long as at least one airplane is involved

91.2 Definitions

Alternate heliport. A heliport specified in the flight plan to which a flight may proceed when it becomes inadvisable to land at the heliport of intended landing.

Approach and landing phase ? helicopters. That part of the flight from 300 m (1 000 ft) above the elevation of the FATO, if the flight is planned to exceed this height, or from the commencement of the descent in the other cases, to landing or to the balked landing point.

Agreement summary. When an aircraft is operating under an Article 83 bis agreement between the State of Registry and another State, the agreement summary is a document transmitted with the Article 83 bis Agreement registered with the ICAO Council that identifies succinctly and clearly which functions and duties are transferred by the State of Registry to that other State.

Note.— The other State in the above definition refers to the State of the principal location of a general aviation operator.

Defined point after take-off. The point, within the take-off and initial climb phase, before which the helicopter's ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required.

Defined point before landing. The point, within the approach and landing phase, after which the helicopter's ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required.

Continuous descent final approach (CDFA). A technique, consistent with stabilized approach procedures, for flying the final approach segment (FAS) of an instrument non-precision approach (NPA) procedure as a continuous descent, without level-off, from an altitude/height at or above the final approach fix altitude/height to a point approximately 15 m (50 ft) above the landing runway threshold or the point where the flare manoeuvre begins for the type of aircraft flown; for the FAS of an NPA procedure followed by a circling approach, the CDFA technique applies until circling approach minima (circling OCA/H) or visual flight manoeuvre altitude/height are reached.

En-route phase. That part of the flight from the end of the take-off and initial climb phase to the commencement of the approach and landing phase.

Elevated heliport. A heliport located on a raised structure on land.

Ground handling. Services necessary for an aircraft=s arrival at, and departure from, an airport, other than air traffic services.

Heliport operating minima. The limits of usability of a heliport for:

(a) Take-off, expressed in terms of runway visual range and/or visibility and, if necessary, cloud conditions;

(b) Landing in precision approach and landing operations, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appro-priate to the category of the operation;

(c) Landing in approach and landing operations with vertical guidance, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H); and

(d) Landing in non-precision approach and landing operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions.

Landing decision point (LDP). The point used in determining landing performance from which, a power-unit failure occurring at this point, the landing may be safely continued or a balked landing initiated.

Low-visibility operations (LVO). Approach operations in RVRs less than 550 m and/or with a DH less than 60 m (200 ft) or take-off operations in RVRs less than 400 m

Safe forced landing. Unavoidable landing or ditching with a reasonable expectancy of no injuries to persons in the aircraft or on the surface.

State of the principal location of a general aviation operator. The State in which the operator of a general aviation aircraft has its principal place of business or, if there is no such place of business, its permanent residence.

Note.— Guidance concerning the options for the principal location of a general aviation operator is contained in the Manual on the Implementation of Article 83 bis of the Convention on International Civil Aviation (Doc 10059).

Specific approval. A specific approval is an approval which is documented in the Operations Specifications for commercial air transport operations or in the list of specific approvals for non-commercial operations.

Note.— The terms authorization, specific approval, approval and acceptance are further described in Attachment 3.D.

Take-off and initial climb phase. That part of the flight from the start of take-off to 300 m (1 000 ft) above the elevation of the FATO, if the flight is planned to exceed this height, or to the end of the climb in the other cases.

Take-off decision point (TDP). The point used in determining take-off performance from which, a power-unit failure occurring at this point, either a rejected take-off may be made or a take-off safely continued.

VTOSS. The minimum speed at which climb shall be achieved with the critical power-unit inoperative, the remaining power-units operating within approved operating limits.

Take-off alternate. An alternate aerodrome at which an aircraft can land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

91.3 Pilot in command responsibilities

An operator shall ensure that all pilots are familiar with the laws, regulations and procedures, pertinent to the performance of their duties, prescribed for the areas to be traversed, the aerodromes to be used and the air navigation facilities relating thereto. The operator shall ensure that other members of the flight crew are familiar with such of these laws, regulations and procedures as are pertinent to the performance of their respective duties in the operation of the aeroplane

The pilot-in-command shall comply with the relevant laws, regulations and procedures of the States in which the aircraft is operated, in addition he is responsible for:

(a) The operation safety and security of the aircraft and the safety of all crew members, passenger and cargo on board;

(b) All cockpit crew and passenger briefed about;
  (1) Seat belts; and, as appropriate,
  (2) Emergency exits;
  (3) Life jackets;
  (4) Oxygen dispensing equipment; and
  (5) Other emergency equipment provided for individual use, including passenger emergency briefing cards.
  (6) The pilot-in-command shall ensure that all persons on board are aware of the location and general manner of use of the principal emergency equipment carried for collective use.
  (7) Restrictions on smoking

(c) The pilot-in-command shall:

(1) Ensure that each flight crew member holds a valid licence issued by the State of Registry, or if issued by another Contracting State, rendered valid by the State of Registry;
(2) Ensure that flight crew members are properly rated; and
(3) Be satisfied that flight crew members have maintained competency.

(d) The pilot-in-command shall ensure that a flight will not be commenced unless it has been ascertained by every reasonable means available that the ground and/or water facilities including communication facilities and navigation aids available and directly required on such flight, for the safe operation of the aero plane, are adequate for the type of operation under which the flight is to be conducted.

(e) Completing all checklists;

(f) Notifying the nearest authority by the quickest means possible in the event of an accident involving serious injury, death or substantial damage to the aircraft or property; In the event that the pilot-in-command is incapacitated the operator shall take the forgoing action.

(g) Notifying the nearest authority by the quickest means possible in the event of an act of unlawful interference with the conduct of the flight;

(h) Reporting all known defects of the aircraft at the end of the flight;

(i) Completion of the log book and the general declaration;

(j) Ensuring that he has adequate information regarding communication, navigation, search and rescue applicable to his intended area of operations; this information may be made available to the pilot by means of the operations manual.

(k) Complying with and more restrictive measures which may be required by the State of registry.
(1) Flight will not be commenced if any flight crew member is incapacitated from performing duties by any cause such as injury, sickness, fatigue, the effects of alcohol or drugs; and
(2) Flight will not be continued beyond the nearest suitable aerodrome/ heliport when flight crew members' capacity to perform functions is significantly reduced by impairment of faculties from causes such as fatigue, sickness, lack of oxygen.

(l) When observes that either another aircraft or a surface craft is in distress, if possible and unless considered unreasonable or unnecessary:
(1) keep the craft in distress in sight until compelled to leave the scene or advised by the rescue coordination centre that it is no longer necessary;
(2) Determine the position of the craft in distress;
(3) As appropriate, report to the rescue coordination centre or air traffic services unit as much of the following information as possible:
(i) Its position, expressed in geographical or grid coordinates or in distance and true bearing from a distinctive landmark or from a radio navigation aid;
(ii) Time of observation expressed in hours and minutes Coordinated Universal Time (UTC);
(iii) Number of persons observed;
(iv) Whether persons have been seen to abandon the craft in distress;
(v) On-scene weather conditions;
(vi) Apparent physical condition of survivors;
(vii) Apparent best ground access route to the distress site; and
(4) Act as instructed by the rescue coordination centre or the air traffic services unit.

(m) When intercepting a distress transmission Whenever a distress transmission is intercepted by a pilot-in-command of an aircraft if feasible:
(1) Acknowledge the distress transmission;
(2) Record the position of the craft in distress if given;
(3) Take a bearing on the transmission;
(4) Inform the appropriate rescue coordination center or air traffic services unit of the distress transmission, giving all available information; and
(5) At the pilot’s discretion, while awaiting instructions, proceed to the position given in the transmission.

(n) Complying with any more restrictive measures which may be required by the State of registry.

(o) Collecting sufficient information on climb performance with all engines operating to enable determination of the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique.

(p) The pilot-in-command shall have responsibility for operational control.

(q) An operator shall ensure that no pilot-in-command operates to or from an aerodrome using operating minima lower than those which may be established for that aerodrome by the State in which it is located, except with the specific approval of that State.

(r) The pilot-in-command shall continually ensure that:

(1) The amount of usable fuel remaining on board is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing.

(2) The pilot-in-command shall request delay information from ATC when unanticipated circumstances may result in landing at the destination aerodrome with less than the final reserve fuel plus any fuel required to proceed to an alternate aerodrome or the fuel required to operate to an isolated aerodrome.

(3) The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome, or other air traffic delays, may result in landing with less than the planned final reserve fuel.

(4) The pilot-in-command shall monitor the amount of usable fuel remaining on board to ensure it is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining.

(5) The pilot-in-command of the helicopter shall monitor the amount of usable fuel remaining on board to ensure it is not less than the fuel required to proceed to a landing site where a safe landing can be made with the planned final reserve fuel remaining.

(s) The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.

(t) Shall ensure that flight crew members demonstrate the ability to speak and understand the language used for aeronautical radiotelephony communications.

(u) Shall determine that aero plane performance will permit the take-off and departure to be carried out safely.

(v) Shall be responsible for the security of the aircraft during its operation.

(w) pilots should consider using appropriate procedures to ensure that a rate of climb or descent of less than 8 m/s or 1 500 ft/min (depending on the instrumentation available) is achieved throughout the last 300 m (1 000 ft) of climb or descent to the assigned altitude or flight level, when made aware of another aircraft at or approaching an adjacent altitude or flight level.

(x) The pilot-in-command of an aero plane operated in general aviation excluding turbojet engine and equipped with an airborne collision avoidance system (ACAS II) shall ensure that each flight crew member has been appropriately trained to competency in the use of ACAS II equipment and the avoidance of collision.

Note 1.— Procedures for the use of ACAS II equipment are specified in the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168), Volume I — Flight Procedures. ACAS II Training Guidelines for Pilots are provided in PANS-OPS, Volume I, Attachment to Part III, Section 3, Chapter 3.

Note 2.— Appropriate training, to the satisfaction of the ECAA, to competency in the use of ACAS II equipment and the avoidance of collisions may be evidenced, for example, by:

1- possession of a type rating for an aero plane equipped with ACAS II, where the operation and use of ACAS II are included in the training syllabus for the type rating; or

2- possession of a document issued by a training organization or person approved by the State to conduct training for pilots in the use of ACAS II, indicating that the holder has been trained in accordance with the guidelines referred to in Note 1; or

3- a comprehensive pre-flight briefing by a pilot who has been trained in the use of ACAS II in accordance with the guidelines referred to in Note 1.

(y) The pilot-in-command shall not conduct operations for which a specific approval is required unless such approval has been issued by the ECAA. Specific approvals shall follow the layout and contain at least the information listed in different related regulations.

(z)The pilot-in-command shall establish aerodrome operating minima in accordance with criteria specified by the ECAA, for each aerodrome to be used in operations. such minima shall not be lower than any that may be established for such aerodromes by the state of the aerodrome , except when specifically approved by the state

Note.— This Standard does not require the State of the Aerodrome to establish aerodrome operating minima.

(aa) The pilot-in-command shall ensure that, during take-off and landing and whenever considered necessary by reason of turbulence or any emergency occurring during flight, all passengers on board an aero plane shall be secured in their seats by means of the seat belts or harnesses provided.

(ab) the pilot-in-command shall report the runway braking action special air-report (AIREP) when the runway braking action encountered is not as good as reported.

Note : The procedures for making special air-reports regarding runway braking action are contained in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444), Chapter 4, and Appendix 1, Instructions for air-reporting by voice communication

(ac)Meteorological and operational observations by pilots:

(1) When meteorological conditions likely to affect the safety of other aircraft are encountered, they should be reported as soon as possible.

Note : The procedures for making meteorological observations on board aircraft in flight and for recording and reporting them are contained in Annex 3, the PANS-ATM (Doc 4444) and the appropriate Regional Supplementary Procedures (Doc 7030).

(2) The pilot-in-command should report runway braking action when the runway braking action encountered is not as good as reported.

Note.— The procedures for making special air-reports regarding runway braking action are contained in the PANS-ATM (Doc 4444), Chapter 4, and Appendix 1.

(ad) Recommendation.— The pilot-in-command, in making a decision on the adequacy of facilities and services available at an aerodrome of intended operation, should assess the level of safety risk associated with the aircraft type and nature of the operation, in relation to the availability of rescue and fire-fighting services (RFFS).

91.4 Pilot in command emergency authority

(a) In an emergency situation that requires immediate decision and action, the pilot in command may take any action that he considers necessary under the circumstances. In such a case he may deviate from prescribed operations procedures and methods and weather minimums of this Part, to the extent required in the interest of safety

(b) Whenever a pilot in command uses their emergency authority, they shall keep the appropriate ATS facility informed of the progress of the flight. The pilot in command that declared the emergency shall send a written report of any deviation through the certificate holder's operations manager to the ECAA and to the State of registry. The pilot in command shall send the report within ten days of using the emergency authority.

(c) The pilot-in-command of an aircraft shall have final authority as to the disposition of the aircraft while in command.

91.5 Operations requiring more than one cockpit crewmember

The number and composition of the cockpit crew will not be less than that specified in the aircraft flight manual or other documents associated with the certificate of airworthiness. For any operations conducted under this Part, the cockpit crew must meet the requirements of ECAR Part 61.

91.6 Composition of the flight crew

The number and composition of the flight crew shall not be less than that specified in the flight manual or other documents associated with the certificate of airworthiness.

91.7 Civil aircraft airworthiness

(a) No person may operate a civil aircraft unless the aircraft is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the aircraft.

(b) The pilot in command of a civil aircraft is responsible for determining whether the aircraft is in condition for safe flight. The pilot in command shall discontinue the flight when any un-airworthy mechanical, electrical, or structural conditions occur.

(c) A flight shall not be commenced until the pilot-in-command is satisfied that:

(1) The aircraft is airworthy, duly registered and that appropriate certificates with respect thereto are on board the aircraft

(2) The instruments and equipment installed in the aircraft are appropriate, taking into account the expected flight conditions;

(3) Any necessary maintenance has been performed in accordance with subpart E of this part

(4) The mass of the aero plane and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;

(5) Any load carried is properly distributed and safely secured; and

(6) The aircraft operating limitations, contained in the flight manual, or its equivalent, will not be exceeded.

(7) State of Registry shall take such precautions as are reasonably possible to ensure that the general level of safety contemplated by these provisions is maintained under all expected operating conditions, including those not covered specifically by the provisions of this chapter.

91.9 Civil aircraft flight manual, marking, and placard requirements

(a) Except as provided in paragraph (d) of this section, no person may operate a civil aircraft without complying with the operating limitations (including mass, center of gravity and noise) specified in the approved airplane or rotorcraft flight manual, markings, placards, or as otherwise prescribed by the certification authority of the country of registry.

(b) No person may operate an Egyptian registered civil aircraft:

(1) For which an airplane or rotorcraft flight manual is required by Part 21 unless there is available in the aircraft a current, approved airplane or rotorcraft flight manual or the manual provided for in Part 121.141(b); and

(2) For which an airplane or rotorcraft flight manual is not required by Part 21, unless there is available in the aircraft a current, approved airplane or rotorcraft flight manual, approved manual material, markings, and placards, or any combination thereof.

(c) No person may operate an Egyptian registered civil aircraft until that aircraft is identified in accordance with Part 45.

(d) Any persons taking off or landing a helicopter at a heliport constructed over water may make such momentary flight as is necessary for takeoff or landing through the prohibited range of the limiting height-speed envelope established for the helicopter if that flight through the prohibited range takes place over water on which a safe ditching can be accomplished and if the helicopter is amphibious or is equipped with floats or other emergency flotation gear adequate to accomplish a safe emergency ditching on open water.

(e) All aircraft shall carry a document that attests to the noise certification of the aircraft.

(f) All helicopters on flights over water in a hostile environment shall be certificated for ditching. Sea state shall be an integral part of ditching information.

(g) Where helicopters are operating to or from heliports in a congested hostile environment, the competent authority of the State in which the heliport is situated shall take such precautions as are necessary to control the risk associated with a power unit failure.

91.10 Reporting of hazardous conditions

When hazardous conditions caused by either weather or caused by reasons other than weather are encountered which could affect the safety of other aircraft, these conditions must be reported in detail as soon as possible to the appropriate authority.

91.11 Prohibition against interference with crewmembers

No person may assault, threaten, intimidate, or interfere with a crewmember in the performance of the crewmember's duties aboard an aircraft.

91.12 Refueling with passengers on board

Anyone who conducts refueling operations with passengers on board the aircraft must have trained personnel ready to initiate an evacuation of the aircraft in the event of an emergency and these personnel must be in two way communication with the ground crew that is supervising the refueling.

91.13 Careless or reckless operation

(a) Aircraft operations for the purpose of air navigation. No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another.

(b) Aircraft operations other than for the purpose of air navigation. No person may operate an aircraft, other than for the purpose of air navigation, on any part of the surface of an airport used by aircraft for air commerce (including areas used by those aircraft for receiving or discharging persons or cargo), in a careless or a reckless manner so as to endanger the life or property of another.

91.15 Dropping objects

No pilot in command of a civil aircraft may allow any object to be dropped from that aircraft in flight that creates a hazard to persons or property. However, this section does not prohibit the dropping of any object if reasonable precautions are taken to avoid injury or damage to persons or property.

91.17 Alcohol , drugs or Psychoactive Substances

(a) No person may act or attempt to act as a crewmember of a civil aircraft:
- (1) Within 8 hours after the consumption of any alcoholic beverage;
- (2) While under the influence of alcohol;
- (3) While using any drug or Psychoactive Substances that affects the person faculties in any way contrary to safety; or
- (4) While having 0.04 percent by weight or more of alcohol in the blood.

(b) Except in an emergency, no pilot of a civil aircraft may allow a person who appears to be intoxicated or who demonstrates by manner or physical indications that the individual is under the influence of drugs or Psychoactive Substances (except a medical patient under proper care) to be carried in that aircraft.

(c) A crewmember shall do the following:
- (1) On request of a law enforcement officer, submit to a test to indicate the percentage by weight of alcohol in the blood; when:
  - (i) The law enforcement officer is authorized under State or local law to conduct the test or to have the test conducted; and
  - (ii) The law enforcement officer is requesting submission to the test to investigate a suspected violation of State or local law governing the same or substantially similar conduct prohibited by paragraph (a)(1), (a)(2), or (a)(4) of this section.
- (2) Whenever the ECAA has a reasonable basis to believe that a person may have violated paragraph (a)(1), (a)(2), or (a)(4) of this section, that person shall, upon request by the ECAA, furnish to the ECAA or authorize any clinic, hospital, doctor, or other person to release to the ECAA, the results of each test taken within 4 hours after acting or attempting to act as a crewmember that indicates percentage by weight of alcohol in the blood.

(d) Whenever the ECAA has a reasonable basis to believe that a person may have violated paragraph (a)(3) of this section, that person shall, upon request by the ECAA, furnish to the ECAA, or authorize any clinic, hospital, doctor, or other person to release to the ECAA, the results of each test taken within 4 hours after acting or attempting to act as a crewmember that indicates presence of any drugs or Psychoactive Substances in the body.

(e) Any test information obtained by the ECAA under paragraph (c) or (d) of this section may be evaluated in determining a person's qualifications for any airman certificate or possible violations of this Part and may be used as evidence in any legal proceeding.

(f) No person whose function is critical to the safety of aviation (safety-sensitive personnel) shall undertake that function while under the influence of any psychoactive substance, by reason of which human performance is impaired. No such person shall engage in any kind of problematic use of substances.

91.18 Psychoactive Substances.

(a) No person may act or attempt to act as a crew member of a civil aircraft while under the influence of any psychoactive substance, by reason of which human performance is impaired. No such person will engage in any kind of problematic use of psychoactive substances.

(b) Except in an emergency, no pilot of a civil aircraft may allow a person who appears to be or who demonstrates by manner or physical indications that the individual is under the influence of psychoactive substances (except a medical patient under proper care) to be carried in that aircraft.

(c) A crew member must do the following:

(1) On request of The ECAA, submit to a test to indicate the presence of any psychoactive substances in the body, when—

(i) The ECAA conduct the test or to have the test conducted.

(ii) The ECAA is requesting submission to the test to investigate a suspected violation of the law governing the same or substantially similar conduct prohibited by paragraph (a) of this section.

(2) Whenever the ECAA has a reasonable basis to believe that a person may have violated paragraph (a) of this section, on request of the ECAA, that person must furnish to the ECAA the results, or authorize any clinic, hospital, or doctor, or other person to release to the ECAA, the results of each test taken within 4 hours after acting or attempting to act as a crew member that indicate the presence of any psychoactive substances in the body.

(d) Any test information obtained by the ECAA under paragraph (c) of this section may be evaluated in determining a person's qualifications for any airman certificate or possible violations, and may be used as evidence in any legal proceeding under the Civil Aviation Law.

91.19 Carriage, Selling and Offering of narcotic drugs, marijuana, depressant or stimulant drugs or Psychoactive Substances or any dangerous goods

(a) Except as provided in paragraph (b) of this section, no person may operate a civil aircraft within the Arab Republic of Egypt with knowledge that Psychoactive Substances, narcotic drugs, and depressant or stimulant drugs or similar substance, marijuana, or any dangerous goods are carried in the aircraft.

(b) Paragraph (a) of this section does not apply to any carriage of narcotic drugs, and depressant or stimulant drugs or similar substance, marijuana, or any dangerous goods, authorized by the ECAA or other Governmental agency and the States in which the aircraft is operated.

Note: Provisions for carriage of dangerous goods are contained in Part 175.

(c) No owner or operator of an aircraft registered in the Arab Republic of Egypt may offer or sell of narcotic drugs, marijuana, depressant or stimulant drugs or Psychoactive Substances

91.20 Offenses involving Alcohol , drugs or Psychoactive Substances

(d) General. This section applies to an employee who performs function for a part 61 and a Part 121 certificate holder, not operated by the Egyptian military.

(e) A conviction for the violation of any Egyptian Law, Rule or Regulation relating to the growing, processing, manufacture, sale, disposition, possession, transportation, or importation of narcotic drugs, marihuana, or depressant or stimulant drugs or Psychoactive Substances is grounds for:

(1) Suspension of an application for a certificate or rating issued under this Part for a period of 6 months after the date of that act if the commission of an act was for the first time; or

(2) Suspension of an application for any certificate or rating issued under this Part for a period of 1 year after the date of that act if the commission of an act was for the second time; or

(3) Revocation of any certificate or rating issued under this Part after the date of that act if the commission of an act was for the third time

(f) The commission of an act prohibited by Part 91.17or 91.18 or 91.19 is grounds for:
(1) Suspension of an application for a certificate or rating issued under this Part for a period of 6 months after the date of that act if the commission of an act was for the first time; or
(2) Suspension of an application for any certificate or rating issued under this Part for a period of 1 year after the date of that act if the commission of an act was for the second time; or
(3)` Revocation of any certificate or rating issued under this Part after the date of that act if the commission of an act was for the third time

91.20 bis. Refusal to submit to a drug or alcohol test

(a) General. This section applies to an employee who performs function for a part 61 and a Part 121 certificate holder, not operated by the Egyptian military.
(b) Refusal by the holder of a certificate issued under this Part to take a drug test or an alcohol test or Psychoactive Substances test is grounds for:
(1) Suspension of an application for any license or rating issued under this for a period of 6 months after the date of that act if the commission of an act was for the first time; or
(2) Suspension of an application for any license or rating issued under this a period of 1 year after the date of that act if the commission of an act was for the second time; or
(3) Revocation of any certificate or rating issued under this Part after the date of that act if the commission of an act was for the third time

91.21 Portable electronic devices

(a) Except as provided in paragraph (b) of this section, no person may operate, nor may any operator or pilot in command of an aircraft allow the operation of any portable electronic device on any of the following Egyptian registered civil aircraft:
(1) Aircraft operated by a holder of an aircraft operating certificate; or
(2) Any other aircraft while it is operated under IFR.
(b) Paragraph (a) of this section does not apply to:
(1) Portable voice recorders;
(2) Hearing aids;
(3) Heart pacemakers;
(4) Electric shavers; or
(5) Any other portable electronic device that the operator of the aircraft has determined will not cause interference with the navigation or communication system of the aircraft on which it is to be used accordance with EAC 121_15
(c) In the case of an aircraft operated by a holder of an aircraft operating certificate, the determination required by paragraph (b)(5) of this section shall be made by that operator of the aircraft on which the particular device is to be used. In the case of other aircraft, the determination may be made by the pilot in command or the other operator of the aircraft.

91.23 Truth-In-Leasing clause requirement in leases and conditional sales contracts

(a) Except as provided in paragraph (b) of this section, the parties to a lease or contract of conditional sale involving an Egyptian registered large civil aircraft, shall execute a written lease or contract and include therein a written truth-in-leasing clause as a concluding paragraph in large print, immediately preceding the space for the signature of the parties, which contains the following with respect to each such aircraft:
(1) Identification of the Part under which the aircraft has been maintained and inspected during the 12 months preceding the execution of the lease or contract of conditional sale, and certification by the parties thereto regarding the aircraft's status of compliance with applicable maintenance and inspection requirements in this Part for the operation to be conducted under the lease or contract of conditional sale.
(2) The name and address (printed or typed) and the signature of the person responsible for operational control of the aircraft under the lease or contract of conditional sale, and certification that each person understands that person's responsibilities for compliance with applicable ECARs.

(3) A statement of the factors relating to operational control of the aircraft and the applicable ECARs.

(b) The requirements of paragraph (a) of this section do not apply:

(1) To a lease or contract of conditional sale when:

(i) The party to whom the aircraft is furnished is a foreign air carrier or certificate holder under Parts 121, or 141; or

(ii) The party furnishing the aircraft is a foreign air carrier.

(2) To a contract of conditional sale, when the aircraft involved has not been registered anywhere prior to the execution of the contract, except as a new aircraft under a dealer's aircraft registration certificate.

(c) No person may operate a large civil aircraft of Egyptian registry that is subject to lease or contract of conditional sale to which paragraph (a) of this section applies, unless:

(1) The lessee or conditional buyer, or the registered owner if the lessee is not a citizen of the Arab Republic of Egypt, has mailed a copy of the lease or contract that complies with the requirements of paragraph (a) of this section, within 24 hours of its execution, to the aircraft registration branch of the ECASA.

(2) A copy of the lease or contract that complies with the requirements of paragraph (a) of this section must be carried in the aircraft and a copy of the lease or contract shall be made available for review upon request by the ECASA, and

(3) The lessee or conditional buyer, or the registered owner if the lessee is not a citizen of the Arab Republic of Egypt, has notified by telephone or in person the ECAA. Unless otherwise authorized by the ECAA, the notification shall be given at least 48 hours before takeoff in the case of the first flight of that aircraft under that lease or contract and inform the ECAA of:

(i) The location of the airport of departure;

(ii) The departure time;

(iii) The registration number of the aircraft involved;

(iv) The lease or contract furnished to the ECAA under paragraph (a) of this section when the commercial or financial information is obtained from a union. It is therefore, privileged and confidential, and will not be made suitable by the ECAA for public inspection or copying; and

(v) For the purpose of this section, a lease means any agreement by a person to furnish an aircraft to another person for compensation or hire, whether with or without cockpit crewmembers, other than an agreement for the sale of an aircraft and a contract of conditional sale. The person furnishing the aircraft is referred to as the lessor, and the person to whom it is furnished is the lessee.

91.25 Instruction: general

An A/C shall not be taxied on the movement area of an aerodrome unless the person at the controls:

(a) Has been duly authorized by the owner or in the case where it is leased the lessee, or a designated agent;

(b) Is fully competent to taxi the aero plane;

(c) Is qualified to use the radio telephone if radio communications are required; and

(d) Has received instruction from a competent person in respect of aerodrome layout, and where appropriate, information on routes, signs, marking, lights, ATC signals and instructions, phraseology and procedures, and is able to conform to the operational standards required for safe aero plane movement at the aerodrome.

(e) A helicopter rotor shall not be turned under power, for the purpose of flight, without a qualified pilot at the controls. The operator shall provide appropriately specific training and procedures to be followed for all personnel, other than qualified pilots, who are likely to carry out the turning of a rotor under power for purposes other than flight.

91.27 Formation flights

Aircraft shall not be flown in formation except by pre-arrangement among the pilots-in-command of the aircraft taking part in the flight and, for formation flight in controlled airspace, in accordance with the conditions prescribed by the ECAA- ATS authority(ies). These conditions shall include the following:

(a) The formation operates as a single aircraft with regard to navigation and position reporting;
(b) Separation between aircraft in the flight shall be the responsibility of the flight leader and the pilots-in-command of the other aircraft in the flight and shall include periods of transition when aircraft are manoeuvring to attain their own separation within the formation and during join-up and break-away; and
(c) A distance not exceeding 1 km (0.5 NM) laterally and longitudinally and 30 m (100 ft) vertically from the flight leader shall be maintained by each aircraft.

91.29 Time

(a) Co-ordinated Universal Time (UTC) shall be used and shall be expressed in hours and minutes and, when required, seconds of the 24-hour day beginning at midnight.
(b) A time check shall be obtained prior to operating a controlled flight and at such other times during the flight as may be necessary.
(c) Wherever time is utilized in the application of data link communications, it shall be accurate to within 1 second of UTC.

91.31 Termination of control

A controlled flight shall, except when landing at a controlled aerodrome, advise the appropriate ATC unit as soon as it ceases to be subject to air traffic control service.

91.33 Notifications required from operators

(a) An operator requiring meteorological service or changes in existing meteorological service shall notify, sufficiently in advance, the EMA or the meteorological office(s) concerned. The minimum amount of advance notice required shall be as agreed between the EMA or meteorological office(s) and the operator.
(b) The operator requiring service shall be notify when:
    (1) New routes or new types of operations are planned;
    (2) Changes of a lasting character are to be made in scheduled operations;
    (3) Other changes, affecting the provision of meteorological service, are planned.
    Such information shall contain all details necessary for the planning of appropriate arrangements by the meteorological authority.
(c) The aerodrome meteorological office, or the meteorological office concerned, shall be notified by the operator or a flight crew member:
    (1) Of flight schedules;
    (2) When non-scheduled flights are to be operated; and
    (3) When flights are delayed, advanced or cancelled.
(d) The notification to the aerodrome meteorological office, or the meteorological office concerned, of individual flights should contain the following information except that, in the case of scheduled flights, the requirement for some or all of this information may be waived by agreement between the meteorological office and the operator:
    (1) Aerodrome of departure and estimated time of departure;
    (2) Destination and estimated time of arrival;
    (3) Route to be flown and estimated times of arrival at, and departure from, any intermediate aerodrome(s);
    (4) Alternate aerodromes needed to complete the operational flight plan and taken from the relevant list contained in the regional air navigation plan; A take-off alternate aerodrome shall be selected and specified in the flight plan if the weather conditions at the aerodrome of departure are at or below the applicable aerodrome operating minima or it would not be possible to return to the aerodrome of departure for other reasons.
    (5) Cruising level;
    (6) For supersonic flights, the alternative subsonic cruising level and the locations of the transonic acceleration and deceleration areas and of the subsonic climb and descent paths;
    (7) Type of flight, whether under the visual or the instrument flight rules;
    (8) Type of meteorological information requested for a flight crew member, whether flight documentation and/or briefing or consultation; and
    (9) Time(s) at which briefing, consultation and/or flight documentation are required.

(e) If an operator has an operating base in a State other than the State of Registry, the operator shall notify the State in which the operating base is located Upon notification safety and security oversight shall be coordinated between the State in which the operating base is located and the State of Registry.

91.35 Aero plane Performance Operating Limitations

(a) ECAA should ensure that the level of performance should be met as far as practicable.

(b) This part is apply to all aero planes of over 5 700 kg maximum certificated take-off mass intended. For the carriage of passengers or cargo or mail in international air navigation.

(c) Operators shall be taken of all factors that significantly affect the performance of the aeroplane (such as: mass, operating procedures, the pressure altitude appropriate to the elevation of the aerodrome, runway slope, the ambient temperature, wind, and surface conditions of the runway at the expected time of use, i.e. presence of slush, water and/or ice, for landplanes, water surface condition for seaplanes). Such factors shall be taken into account directly as operational parameters or indirectly by means of allowances or margins, which may be provided in the scheduling of performance data or in the comprehensive and detailed code of performance in accordance with which the aeroplane is being operated.

Note.-, guidelines for using runway surface condition information on board aircraft in accordance with 2.2.4.4 are contained in the PANS-Aerodromes (Doc 9981) and in the Aeroplane Performance Manual (Doc 10064).

(d) Mass limitations:

(1) The mass of the aero plane at the start of take-off shall not exceed the mass at which tack off is complied with, nor the mass at which en-rout and landing are complied with, allowing for expected reductions in mass as the flight proceeds, and for such fuel jettisoning as is envisaged in applying En –rout and landing and landing at the aerodrome of intended landing and at any destination alternate aerodrome

(2) In no case shall the mass at the start of take off exceed the maximum take off mass specified in the flight manual for the pressure altitude appropriate to the elevation of the aerodrome, and if used as a parameter to determine the maximum take off mass, any other local atmospheric condition.

(3) In no case shall the estimated mass for the expected time of landing at the aerodrome of intended landing and at any destination alternate aerodrome, exceed the maximum landing mass specified in the flight manual for the pressure altitude appropriate to the elevation of those aerodromes, and if used as a parameter to determine the maximum landing mass, any other local atmospheric condition.

(4) In no case shall the mass at the start of take-off, or at the expected time of landing at the aerodrome of intended landing and at any destination alternate aerodrome, exceed the relevant maximum masses at which compliance has been demonstrated with the applicable noise certification Standards in Annex 16,Volume I, unless otherwise authorized in exceptional circumstances for a certain aerodrome or a runway where there is no noise disturbance problem, by the competent authority of the State in which the aerodrome is situated.

(e) Take-off. The aero plane shall be able, in the event of a critical engine failing at any point in the take-off, either to discontinue the take-off and stop within either the accelerate-stop distance available or the runway available, or to continue the take-off and clear all obstacles along the flight path by an adequate margin until the aero plane is in a position.

Note.— "An adequate margin" referred to in this provision is illustrated by the appropriate examples included in the Aeroplane Performance Manual (Doc 10064).

(f) Landing. The aero plane shall, at the aerodrome of intended landing and at any alternate aerodrome, after clearing all obstacles in the approach path by a safe margin, be able to land, with assurance that it can come to a stop or, for a seaplane, to a satisfactorily low speed, within the landing distance available. Allowance shall be made for expected variations in the approach and landing techniques, if such allowance has not been made in the scheduling of performance data.

Note.— guidance on appropriate margins for the "at time of landing assessment" are contained in the Aeroplane Performance Manual (Doc 10064).

91.37 Turbojet and large Aero plane operated in general aviation operations

(a) Composition of the flight crew

(1) Designation of pilot-in-command

For each flight the operator shall designate a pilot to act as pilot-in-command.

(2) Flight engineer

When a separate flight engineer's station is incorporated in the design of an aero plane, the flight crew shall include at least one flight engineer especially assigned to that station, unless the duties associated with that station can be satisfactorily performed by another flight crew member, holding a flight engineer licence, without interference with regular duties.

(b) Flight crew member emergency duties

An operator shall, for each type of aero plane, assign to all flight crew members the necessary functions they are to perform in an emergency or in a situation requiring emergency evacuation.

Recurrent training in accomplishing these functions shall be contained in the operator's training programme and shall include instruction in the use of all emergency and life-saving equipment required to be carried, and drills in the emergency evacuation of the aero plane.

(c) Flight crew member training programmes

(1) An operator shall establish and maintain a training programme that is designed to ensure that a person who receives training acquires and maintains the competency to perform assigned duties, including skills related to human performance. Ground and flight training programmes shall be established, either through internal programmes or through a training services provider, and shall include or make reference to a syllabus for those training programmes in the company operations manual. The training programme shall include training to competency for all equipment installed.

(2) Flight simulators should be used to the maximum extent practicable for initial and annual recurrent training.

(3) Ground and flight training programs shall be established, either through internal programs or through a training services provider, and shall include or make reference to a syllabus for those training programs in the company operations manual.

(4) The training programme shall include training to competency for all equipment installed.

(d) Qualifications

(1)An operator shall:

(i) ensure that each flight crew member assigned to duty holds a valid licence issued by the ECAA.

(ii) ensure that flight crew members are properly rated; and

(iii) be satisfied that flight crew members are competent to carry out assigned duties.

(2) The operator of an aero plane equipped with an airborne collision avoidance system (ACAS II) shall ensure that each flight crew member has been appropriately trained to competency in the use of ACAS II equipment and the avoidance of collisions.

Note 1.— Procedures for the use of ACAS II equipment are specified in the Procedures for Air Navigation Services —Aircraft Operations (PANS-OPS, Doc 8168), Volume I — Flight Procedures. ACAS II Training Guidelines for Pilots are provided in PANS-OPS, Volume I, Attachment to Part III, Section 3, Chapter 3.

Note 2.— Appropriate training, to the satisfaction of the State, to competency in the use of ACAS II equipment and the avoidance of collisions may be evidenced, for example, by:

(i) possession of a type rating for an aero plane equipped with ACAS II, where the operation and use of ACAS II are included in the training syllabus for the type rating; or

(ii) possession of a document issued by a training organization or person approved by the ECAA to conduct training for pilots in the use of ACAS II, indicating that the holder has been trained in accordance with the guidelines referred to in Note 1; or

(iii) a comprehensive pre-flight briefing by a pilot who has been trained in the use of ACAS II in accordance with the guidelines referred to in Note 1.

(3) Recent experience — pilot-in-command

An operator shall not assign a pilot to act as pilot-in-command of an aero plane unless that pilot has made at least three takeoffs and landings within the preceding 90 days on the same type of aero plane or in a flight simulator approved for the purpose.

(4) Recent experience — co-pilot

An operator shall not assign a co-pilot to operate at the flight controls of an aero plane during take-off and landing unless that pilot has made at least three take-offs and landings within the preceding 90 days on the same type of aero plane or in a flight simulator approved for the purpose.

(5) Pilot proficiency checks

An operator shall ensure that piloting technique and the ability to execute emergency procedures is checked periodically in such a way as to demonstrate the pilot's competence. Where the operation may be conducted under the instrument flight rules, an operator shall ensure that the pilot's competence to comply with such rules is demonstrated to either a check pilot of the operator or a representative of the State issuing the pilot licence.

Note.— The periodicity of the checks referred to in (5)above is dependent upon the complexity of both the aero plane and the operation.

(6) An operator should ensure that any person assigned as a flight operations officer/flight dispatcher is trained and maintains familiarization with all features of the operation which are pertinent to their duties, including knowledge and skills related to Human Factors.

(e) Cabin crew training

(1) An operator shall ensure that a training programme is completed by all persons before being assigned as a cabin crew member.

(2) An operator should establish and maintain a cabin crew training programme that is designed to ensure that persons who receive training acquire the competency to perform their assigned duties and includes or makes reference to a syllabus for the training programme in the company operations manual. The training programme should include Human Factors training.

Note.— Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).

91.39 ECAA Inspection Authority

(a) Each person holds a certificate under this part (or applied for such certificate) shall grant unrestricted and unlimited access for ECAA inspectors to inspect his personnel, facilities, equipment, documents and records to determine:

(1) Eligibility to continue to hold his certificate.

(2) Compliance with this ECAR part

(b) Failure to comply with paragraph (a) above shall be a basis to suspend, withdraw or revoke any certificate issued under this part.

91.41 - 91.99 {Reserved}

SUBPART B
Flight Rules General

91.101 Applicability
This subpart prescribes flight rules governing the operation of aircraft within the Egyptian FIR.

91.103 Preflight action
Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include:

(a) For a flight under IFR or a flight not in the vicinity of an airport, weather reports and forecasts, fuel requirements, alternatives available if the planned flight cannot be completed, and any known traffic delays of which the pilot in command has been advised by ATS;

(b) For any flight, runway lengths at airports of intended use, and the following takeoff and landing distance information:
  (1) For civil aircraft for which an approved airplane or rotorcraft flight manual containing takeoff and landing distance data is required, the takeoff and landing data contained therein; and
  (2) For civil aircraft other than those specified in paragraph (b)(1) of this section, other reliable information appropriate to aircraft, relating to aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight, wind and temperature.

(c) All available meteorological information appropriate to the intended flight intended to be used for the preparation of a flight away from the vicinity of the place of departure, and for every flight under the instrument flight rules. Such information shall include:
  (1) A study of available current weather reports and forecasts; and
  (2) The planning of an alternative course of action to provide for the eventuality that the flight cannot be completed as planned, because of weather conditions.

91.104 Flight plan
(a) An operator shall specify flight planning procedures to provide for the safe conduct of the flight based on considerations of aero plane performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes concerned. These procedures shall be included in the operations manual.

(b) Submission of a flight plan: Information relative to an intended flight or portion of a flight, to be provided to air traffic services units, shall be in the form of a flight plan.

(c) A flight plan shall be submitted prior to operating any:
  (1) Flight or portion thereof to be provided with air traffic control service;
  (2) IFR flight within advisory airspace;
  (3) Flight within or into designated areas, or along designated routes, when so required by the appropriate ATS authority to facilitate the provision of flight information, alerting and search and rescue services;
  (4) Flight within or into designated areas, or along designated routes, when so required by the appropriate ATS authority to facilitate co-ordination with appropriate military units or with air traffic services units in adjacent States in order to avoid the possible need for interception for the purpose of identification;
  (5) Flight across international borders.

(d) A flight plan shall be submitted before departure to an air traffic services reporting office or, during flight, transmitted to the appropriate air traffic services unit or air-ground control radio station, unless arrangements have been made for submission of repetitive flight plans.

(e) Unless otherwise prescribed by the appropriate ATS authority, a flight plan for a flight to be provided with air traffic control service or air traffic advisory service shall be submitted at least sixty minutes before departure, or, if submitted during flight, at a time which will ensure its receipt by the appropriate air traffic services unit at least ten minutes before the aircraft is estimated to reach the:
  (1) Intended point of entry into a control area or advisory area; or
  (2) Point of crossing an airway or advisory route.

(f) Contents of a flight plan : A flight plan shall comprise information regarding such of the following items as are considered relevant by the appropriate ATS authority:

(1) Aircraft identification;
(2) Flight rules and type of flight;
(3) Number and type(s) of aircraft and wake turbulence category;
(4) Equipment;
(5) Departure aerodrome;
(6) Take-off alternate aerodrome;
(7) Estimated off-block time;
(8) Cruising speed(s);
(9) Cruising level(s);
(10) Route to be followed;
(11) Destination aerodrome and total estimated elapsed time;
(12) Alternate aerodrome(s);
(13) Fuel endurance;
(14) Total number of persons on board;
(15) Emergency and survival equipment; and
(16) Other information.

(g) Completion of a flight plan:
(1) Whatever the purpose for which it is submitted, a flight plan shall contain information, as applicable, on relevant items up to and including "Alternate aerodrome(s)" regarding the whole route or the portion thereof for which the flight plan is submitted.
(2) It shall, in addition, contain information, as applicable, on all other items when so prescribed by the appropriate ATS authority or when otherwise deemed necessary by the person submitting the flight plan.

(h) Changes to a flight plan: Subject to the provisions of 91.104(j), all changes to a flight plan submitted for an IFR flight, or a VFR flight operated as a controlled flight, shall be reported as soon as practicable to the appropriate air traffic services unit. For other VFR flights, significant changes to a flight plan shall be reported as soon as practicable to the appropriate air traffic services unit.

(i) Closing a flight plan:
(1) Unless otherwise prescribed by the appropriate ATS authority, a report of arrival shall be made in person, by radiotelephony or via data link at the earliest possible moment after landing, to the appropriate air traffic services unit at the arrival aerodrome, by any flight for which a flight plan has been submitted covering the entire flight or the remaining portion of a flight to the destination aerodrome.
(2) When a flight plan has been submitted only in respect of a portion of a flight, other than the remaining portion of a flight to destination, it shall, when required, be closed by an appropriate report to the relevant air traffic services unit.
(3) When no air traffic services unit exists at the arrival aerodrome, the arrival report, when required, shall be made as soon as practicable after landing and by the quickest means available to the nearest air traffic services unit.
(4) When communication facilities at the arrival aerodrome are known to be inadequate and alternate arrangements for the handling of arrival reports on the ground are not available, the following action shall be taken. Immediately prior to landing the aircraft shall, ifservice; practicable, transmit to the appropriate air traffic services unit, a message comparable to an arrival report, where such a report is required. Normally, this transmission shall be made to the aeronautical station serving the air traffic services unit in charge of the flight information region in which the aircraft is operated.
(5) Arrival reports made by aircraft shall contain the following elements of information:
(i) aircraft identification;
(ii) departure aerodrome;
(iii) destination aerodrome (only in the case of a diversionary landing);
(iv) arrival aerodrome; and
(v) time of arrival.

(j) Adherence to flight plan
  (1) Except as provided for in 91.104(j) and 91.156(g), an aircraft shall adhere to the current flight plan or the applicable portion of a current flight plan submitted for a controlled flight unless a request for a change has been made and clearance obtained from the appropriate air traffic control unit, or unless an emergency situation arises which necessitates immediate action by the aircraft, in which event as soon as circumstances permit, after such emergency authority is exercised, the appropriate air traffic services unit shall be notified of the action taken and that this action has been taken under emergency authority.
  (2) Unless otherwise authorized by the appropriate ATS authority, or directed by the appropriate air traffic control unit, controlled flights shall, in so far as practicable when on:
    (i) An established ATS route, operate along the defined centre line of that route; or
    (ii) Any other route, operate directly between the navigation facilities and/or points defining that route.
  (3) Subject to the overriding requirement in 91.104(i)(2), an aircraft operating along an ATS route segment defined by reference to very high frequency omnidirectional radio ranges shall change over for its primary navigation guidance from the facility behind the aircraft to that ahead of it at, or as close as operationally feasible to, the change-over point, where established.
  (4) Deviation from the requirements in 91.104(i)(2) shall be notified to the appropriate air traffic services unit.

(k) Inadvertent changes: In the event that a controlled flight inadvertently deviates from its current flight plan, the following action shall be taken:
  (1) Deviation from track: if the aircraft is off track, action shall be taken forthwith to adjust the heading of the aircraft to regain track as soon as practicable.
  (2) Variation in true airspeed: if the average true airspeed at cruising level between reporting points varies or is expected to vary by plus or minus 5 per cent of the true airspeed, from that given in the flight plan, the appropriate air traffic services unit shall be so informed.
  (3) Change in time estimate: if the time estimate for the next applicable reporting point, flight information region boundary or destination aerodrome, whichever comes first, is found to be in error in excess of three minutes from that notified to air traffic services, or such other period of time as is prescribed by the appropriate ATS authority or on the basis of air navigation regional agreements, a revised estimated time shall be notified as soon as possible to the appropriate air traffic services unit.
  (4) Additionally, when an ADS agreement is in place, the air traffic services unit (ATSU) shall be informed automatically via data link whenever changes occur beyond the threshold values stipulated by the ADS event contract.

(l) Intended changes. Requests for flight plan changes shall include information as indicated hereunder:
  (1) Change of cruising level: aircraft identification; requested new cruising level and cruising speed at this level, revised time estimates (when applicable) at subsequent flight information region boundaries; and
  (2) Change of route:
    (i) Destination unchanged: aircraft identification; flight rules; description of new route of flight including related flight plan data beginning with the position from which requested change of route is to commence; revised time estimates; any other pertinent information.
    (ii) Destination changed: aircraft identification; flight rules; description of revised route of flight to revised destination aerodrome including related flight plan data, beginning with the position from which requested change of route is to commence; revised time estimates; alternate aerodrome(s); any other pertinent information.

91.105 Cockpit crewmembers at stations

(a) Take-off and landing. All flight crew members required to be on flight deck duty shall be at their stations.

(b) En route. All flight crew members required to be on flight deck duty shall remain at their stations except when their absence is necessary for the performance of duties in connection with the operation of the aeroplane or for physiological needs.

(c) Seat belts. All flight crew members shall keep their seat belts fastened when at their stations.

(d) Safety harness. When safety harnesses are provided, any flight crew member occupying a pilot's seat shall keep the safety harness fastened during the take-off and landing phases; all other flight crew members shall keep their safety harnesses fastened during the take-off and landing phases unless the shoulder straps interfere with the performance of their duties, in which case the shoulder straps may be unfastened but the seat belt must remain fastened.

Note.— Safety harness includes shoulder strap(s) and a seat belt which may be used independently.

(e) **All flight crew members required to be on flight deck duty shall communicate through boom** or throat microphones.

91.107 Use of safety belts, shoulder harness, and child restraint systems

(a) Unless otherwise authorized by the ECAA:

(1) No pilot may takeoff an Egyptian registered civil aircraft, unless all crewmembers and passengers are securely fastened with the proper restraint device, except a free balloon that incorporates a basket or gondola, or an airship when the pilot in command of that aircraft ensures that each person on board is briefed on how to fasten and unfasten that person's safety belt and, if installed, shoulder harness;

(2) No pilot may cause to be moved on the surface, take off, or land an Egyptian registered civil aircraft (except a free balloon that incorporates a basket or gondola, or an airship) unless the pilot in command of that aircraft ensures that each person on board has been notified to fasten his or her safety belt and, if installed, shoulder harness; and

(3) Except as provided in this paragraph, each person on board an Egyptian registered civil aircraft (except a free balloon that incorporates a basket or gondola, or an airship) must occupy an approved seat or berth with a safety belt and, if installed, shoulder harness, properly secured about him or her during movement on the surface, take off, and landing. For seaplane and float equipped rotorcraft operations during movement on the surface, the person pushing off the seaplane or rotorcraft from the dock and the person mooring the seaplane or rotorcraft at the dock are excepted from the preceding seating and safety belt requirements. Notwithstanding the preceding requirements of this paragraph, a person may:

(i) Be held by an adult who is occupying a seat or berth if that person has not reached his or her second birthday;

(ii) Use the floor of the aircraft as a seat, provided that the person is on board for the purpose of engaging in sport parachuting; or

(iii) Notwithstanding any other requirement of this Part, occupy an approved child restraint system furnished by the operator or one of the persons described in paragraph (a)(3)(iii)(A) of this section provided that:

(A) The child is accompanied by a parent, guardian, or attendant designated by the child parent or guardian to attend to the safety of the child during the flight; and

(B) The operator must comply with the following requirements:

(I) The restraint system must be properly secured to an approved foreword-facing seat or berth; and

(II) The child must be properly secured in the restraint system and must not exceed the specified weight limit for the restraint system.

(b) Unless otherwise stated, this section applies to operations conducted under Part 121.

91.109 Flight instruction, simulated instrument flight and certain flight tests

(a) No person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls. However, instrument flight instruction may be given in a single-engine airplane equipped with a single, functioning throw-over control wheel in place of fixed, dual controls of the elevator and ailerons when:

(1) The instructor has determined that the flight can be conducted safely; and

(2) The person manipulating the controls has at least a private pilot license with appropriate category and class ratings.

(b) No person may operate a civil aircraft in simulated instrument flight, unless:

(1) The other control seat is occupied by a safety pilot who possesses at least a private pilot certificate with category and class ratings appropriate to the aircraft being flown;

(2) The safety pilot has adequate vision forward and to each side of the aircraft, or a competent observer in the aircraft adequately supplements the vision of the safety pilot; and
(3) Except in the case of lighter-than-air-aircraft, the aircraft is equipped with fully functioning dual controls. However, simulated instrument flight may be conducted in a single-engine airplane, equipped with a single, functioning throw-over control wheel, in place of fixed, dual controls of the elevator and ailerons, when:
(i) The safety pilot has determined that the flight can be conducted safely;
(ii) The person manipulating the controls has at least a private pilot license with appropriate category and class ratings; and
(iii) No person may operate a civil aircraft that is being used for a flight test for an airline transport pilot certificate or a class or type rating on that certificate, or for a Part 121 proficiency check unless the pilot seated at the controls, other than the pilot being checked, is fully qualified to act as pilot in command of the aircraft.

(c) An operator shall ensure that when passengers are being carried, no emergency or abnormal situations shall be simulated.

91.111 Operating near other

(a) No person may operate an aircraft so close to another aircraft as to create a collision hazard.
(b) No person may operate an aircraft in formation flight except by arrangement with the pilot in command of each aircraft in the formation.
(c) No person may operate an aircraft, carrying passengers for hire, in formation flight.

91.113 Right-of-way rules: except water operations

(a) This section does not apply to the operation of an aircraft on water.
(b) General. When weather conditions permit, regardless of whether an operation is conducted under instrument flight rules or visual flight rules, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft. When a rule of this section gives another aircraft the right-of-way, the pilot shall give way to that aircraft and may not pass over, under, or ahead of it, unless well clear and takes into account the effect of aircraft wake turbulence. The aircraft that has the right-of-way shall maintain its heading and speed, but nothing in these rules shall relieve the pilot in command of an aircraft from the responsibility of taking such action, including collision avoidance maneuvers based on resolution advisories provided by ACAS or TCAS equipment, as will best avert collision.
(c) In distress. An aircraft in distress has the right-of-way over all other air traffic.
(d) Approaching head on. When two aircraft are approaching head-on or approximately so and there is danger of collision, each shall alter its heading to the right.
(e) Converging. When two aircraft are converging at approximately the same level, the aircraft that has the other on its right shall give way, except as follows:
(1) Power-driven heavier-than-air aircraft shall give way to airships, gliders and balloons;
(2) Airships shall give way to gliders and balloons;
(3) Gliders shall give way to balloons; and
(4) Power-driven aircraft shall give way to aircraft, which are seen to be towing other aircraft or objects.
(f) Overtaking. An overtaking aircraft is an aircraft that approaches another from the rear on a line forming an angle of less than 70 degrees with the plane of symmetry of the latter, i.e. is in such a position with reference to the other aircraft that at night it should be unable to see either of the aircraft's left (port) or right (starboard) navigation lights. An aircraft that is being overtaken has the right-of-way and the overtaking aircraft, whether climbing, descending or in horizontal flight, shall keep out of the way of the other aircraft by altering its heading, and no subsequent change in the relative positions of the two aircraft shall absolve the overtaking aircraft from this obligation until it is entirely past and clear.

(g) Landing. Aircraft, while on final approach to land or while landing, have the right-of-way over other aircraft in flight or operating on the surface, except that they shall not take advantage of this rule to force an aircraft off the runway surface which has already landed and is attempting to make way for an aircraft on final approach. When two or more aircraft are approaching an airport for the purpose of landing, the aircraft at the lower altitude has the right-of-way, but it shall not take advantage of this rule to cut in front of another which is on final approach to land or to overtake that aircraft. power-driven heavier-than-air aircraft shall give way to gliders.

(h) Taking off. An aircraft taxiing on the maneuvering area of an airport shall give way to aircraft taking off or about to take off. Surface movement of aircraft. In case of danger of collision between two aircraft taxiing on the movement area of an airport the following shall apply:
  (1) When two aircraft are approaching head on, or approximately so, each shall stop or where practicable alter its course to the right so as to keep well clear;
  (2) When two aircraft are on a converging course, the one which has the other on its right shall give way;
  (3) An aircraft, which is being overtaken, by another aircraft shall have the right-of-way and the overtaking aircraft shall keep well clear of the other aircraft;
  (4) An aircraft taxiing on the maneuvering area shall stop and hold at all taxi holding positions unless otherwise authorized by the airport control tower; and
  (5) An aircraft taxiing on the maneuvering area shall stop and hold at all lighted stop bars and may proceed further when the lights are switched off.

(i) Emergency landing. An aircraft that is aware that another is compelled to land shall give way to that aircraft.

91.115 Right-of-way rules: Water operations

(a) General. Each person operating an aircraft on the water shall, insofar as possible, keep clear of all vessels and avoid impeding their navigation, and shall give way to any vessel or other aircraft that is given the right-of-way by any rule of this section.

(b) Crossing. When aircraft, or an aircraft and a vessel, are on crossing courses, the aircraft or vessel to the other's right has the right-of-way.

(c) Approaching head-on. When aircraft, or an aircraft and a vessel, are approaching head-on or nearly so, each shall alter its course to the right to keep well clear.

(d) Overtaking. Each aircraft or vessel that is being overtaken has the right-of-way, and the one overtaking shall alter course to keep well clear.

(e) Special circumstances. When aircraft, or an aircraft and a vessel, approach so as to involve risk of collision, each aircraft or vessel shall proceed with careful regard to existing circumstances, including the limitations of the respective craft.

(f) Converging. An aircraft which has another aircraft or a vessel on its right shall give way so as to keep well clear.

(g) Approaching head-on. An aircraft approaching another aircraft or a vessel head-on, or approximately so, shall alter its heading to the right to keep well clear.

(h) Landing and taking off. Aircraft landing on or taking off from the water shall, in so far as practicable, keep well clear of all vessels and avoid impeding their navigation.

91.117 Aircraft speed

(a) Unless otherwise authorized by the ECAA, no person may operate an aircraft below 10,000 feet MSL in Class D air space at an indicated airspeed (IAS) of more than 250 knots (288 MPH).

(b) Unless otherwise authorized or required by ATS, no speed limitation is applicable in Class A and Class B airspace.

(c) If the minimum safe airspeed for any particular operation is greater than the maximum speed prescribed in this section, the aircraft may be operated at this minimum speed.

(d) The holding patterns shall be entered and flown as indicated in the table below:

Flight level (FL)	Category A and B aircraft	Jet aircraft	
		Normal conditions	Turbulence conditions
Up to Fl 140 (4250M) inclusive.	170 KT	230 KT(425KM/H)	280 KT (520 KM/H) or Mach 0.8, whichever is less
Above FL 140 (4250M) to Fl 200 (6100 M) inclusive.	240 KT (445 KM/H)		
Above FL 200 (6100 M) to FL 340 (10350M) inclusive.	265 KT (490 KM/H)		
Above FL 340 (10350 M).	Mach 0.83		Mach 0.83

91.119 Minimum safe altitudes: General

(a) Except when necessary for take-off or landing, or except by permission from the appropriate authority, aircraft shall not be flown over the congested areas of cities, towns or settlements or over an open-air assembly of persons, unless at such a height as will permit, in the event of an emergency arising, a landing to be made without undue hazard to persons or property on the surface.

(b) Helicopters may be operated at less than the minimums prescribed if the operation is conducted without hazard to persons or property on the surface. In addition, each person operating a helicopter shall comply with any routes or altitudes specifically prescribed for helicopters by the ECAA or ATS.

91.121 Altimeter settings

(a) A transition altitude is specified for each airport. No transition altitude is less than 900 meters (3000 feet) above an airport.

(b) Vertical positioning of aircraft when, at or below the transition altitude is expressed in terms of altitude whereas such positioning at or above the transition level is expressed in terms of flight levels. While passing through the transition layer, vertical positioning is expressed in terms of altitudes when descending and in terms of flight levels when ascending.

(c) Flight level zero is located at the atmospheric pressure level of 1013.2 hpa (29.92ins). Consecutive flight levels are separated by a pressure interval corresponding to 500 feet (152.4 meters) in the standard atmosphere.

(d) Take-off and climb: A QNH altimeter setting is made available to aircraft in taxi clearance prior to take-off.

(e) Vertical positioning of aircraft during climb is expressed in terms of altitudes until reaching the transition altitude, above which vertical positioning is expressed in terms of flight levels.

(f) Vertical separation en-route: Vertical separation during en-route flight shall be expressed in terms of flight levels at all times during an IFR flight.

(g) Approach and landing: A QNH altimeter setting is made available in approach clearances and in clearances to enter traffic circuit. QFE altimeter setting will be given on request.

91.123 Air traffic control service:

(a) Air traffic control clearances:

(1) An air traffic control clearance shall be obtained prior to operating a controlled flight, or a portion of a flight as a controlled flight. Such clearance shall be requested through the submission of a flight plan to an air traffic control unit.

(2) Whenever an aircraft has requested a clearance involving priority, a report explaining the necessity for such priority shall be submitted, if requested by the appropriate air traffic control unit;

(3) Potential reclearance in flight. If prior to departure it is anticipated that depending on fuel endurance and subject to reclearance in flight, a decision may be taken to proceed to a revised destination aerodrome, the appropriate air traffic control units shall be so notified by the insertion in the flight plan of information concerning the revised route (where known) and the revised destination; and

(4) An aircraft operated on a controlled aerodrome shall not taxi on the manoeuvring area without clearance from the aerodrome control tower and shall comply with any instructions given by that unit.

(b) Compliance with ATS clearances and instructions:

(1) The operation of an aircraft either in flight or on the movement area of an airport shall be in compliance with the general rules and, in addition, when in flight, either with :
(i) Visual flight rules, or
(ii) Instrument flight rules.

(2) When an ATS clearance has been obtained, a pilot in command may not deviate from that clearance, except in an emergency, unless that pilot obtained an amended clearance, or the deviation is in response to a traffic alert and collision avoidance system resolution advisory. When a pilot is uncertain of an ATS clearance, that pilot must immediately request clarification from ATS.

(3) Except in an emergency, no person may operate an aircraft contrary to ATS instructions in an area in which air traffic control is exercised.

(4) Each pilot in command who, in an emergency, deviates from an ATS clearance or instruction shall notify ATS of that deviation as soon as possible.

(5) Each pilot in command who (though not deviating from a rule of this subpart) is given priority by ATS in an emergency, shall submit a detailed report of that emergency within 48 hours to the manager of that ATS facility, if requested by ATS.

(6) Unless otherwise authorized by ATS, no person operating an aircraft may operate that aircraft according to any clearance or instructions that has been issued to the pilot of another aircraft for radar air traffic control purposes.

(c) Refer to EAC 91-15 for more information about the Operational Use and Pilot Training of ACAS .

19.125 Signals:

(i) Upon observing or receiving any of the signals given in Appendix (j), aircraft shall take such action as may be required by the interpretation of the signal given in that Appendix(j).

(ii) The signals of Appendix (j) shall, when used, have the meaning indicated therein. They shall be used only for the purpose indicated and no other signals likely to be confused with them shall be used.

(iii) A signalman shall be responsible for providing standard marshalling signals to aircraft in a clear and precise manner using the signals shown in Appendix (j).

(iv) No person shall guide an aircraft unless trained, qualified and approved by the ECAA to carry out the functions of a signalman.

(v) The signalman shall wear a distinctive fluorescent identification vest to allow the flight crew to identify that he or she is the person responsible for the marshalling operation.

(vi) Daylight fluorescent-coloured wands, table-tennis bats or gloves shall be used for all signalling by all participating ground staff during daylight hours. Illuminated wands shall be used at night or in low visibility.

(vii) ATS light signals have the meaning shown in the following table:

* clearances to land and to taxi will be given in due course:

Note: The signals of 91.125 shall, when used, have the meaning indicated therein. They shall be used only for the purpose indicated and no other signals likely to be confused with them shall be used.

LIGHT	FROM AERODRROME CONTROL TO:	
	Aircraft in flight	Aircraft on the ground
Steady green	Cleared to land	Cleared for take-off
Steady red	Give way to other aircraft and continue circling	Stop
Series of green flashes	Return for landing*	Cleared to taxi
Series of red flashes	Airport unsafe, do not land	Taxi clear of landing area in use
Series of white flashes	Land at this airport and proceed to apron*	Return to starting point on the airport

91.126 ATS airspace classification

The A.R.E. ATS airspace is classified and designated in three classes as show in the following table:

class	type of flight	Separation provided	Service provided	VMC visibility and distance from could minima	Speed limitation	Radio communication requirement	Subject to an ATS clearance
A	IFR only	All aircraft	Air traffic control service	not applicable	not applicable	continuous two-way	Yes
B	IFR	All aircraft	Air traffic control service	Not applicable	Not applicable	Continuous two-way	Yes
	VFR	All aircraft	Air traffic control service	8 Km at and above 3050 M (10000 ft) AMSL 5km below 3 050 M(10000 FT) AMSL. 1500M horizontal, 300 M vertical distance from cloud	Not applicable	continuous two-way	Yes
D	IFR	IFR from IFR	Air traffic control service including traffic information about VFR flights (and traffic avoidance advice on request)	Not applicable	250 kt IAS below 3050M (10000ft) AMSL.	Continuous two-way	Yes
	VFR	Nil	Traffic information between VFR and IFR flights (and traffic avoidance advice on request)	8 km at and above 3050 m (10000ft) AMSL 5km below 3050M (10000ft) AMSL. 1500 m horizontal; 300m vertical distance from cloud	250 kt IAS below 3050m (10000ft) AMSL	Continuous two-way	Yes

91.127 Fuel jettisoning

No person may perform fuel jettison over inhabited areas at heights less than 2000ft AGL. Precaution shall be taken that no other aircraft is less than 2000ft below the aircraft jettisoning fuel.

91.129 Unmanned free balloons

An unmanned free balloon shall be operated in such a manner as to minimize hazards to persons, property or other aircraft.

91.131 Operation on and in the vicinity of an aerodrome

An aircraft operated on or in the vicinity of an aerodrome shall, whether or not within an aerodrome traffic zone:

(i) Observe other aerodrome traffic for the purpose of avoiding collision;
(ii) Conform with or avoid the pattern of traffic formed by other aircraft in operation;
(iii) Make all turns to the left, when approaching for a landing and after taking off, unless otherwise instructed;
(iv) Land and take off into the wind unless safety, the runway configuration, or air traffic considerations determine that a different direction is preferable.

91.133 Danger, restricted and prohibited areas

(a) No person may operate an aircraft within a danger, or a restricted area contrary to the restrictions imposed, or within a prohibited area, unless that person has the permission of the using or controlling agency, as appropriate.
(b) Each person conducting, within a restricted area, an aircraft operation (approved by the using agency) that creates the same hazards as the operations for which the restricted area was designated may deviate from the rules of this subpart that are not compatible with the operation of the aircraft.

91.135 Position reports

(a) Unless exempted by the appropriate ATS authority or by the appropriate air traffic services unit under conditions specified by that authority, a controlled flight shall report to the appropriate air traffic services unit, as soon as possible, the time and level of passing each designated compulsory reporting point, together with any other required information. Position reports shall similarly be made in relation to additional points when requested by the appropriate air traffic services unit. In the absence of designated reporting points, position reports shall be made at intervals prescribed by the appropriate ATS authority or specified by the appropriate air traffic services unit.
(b) Controlled flights providing position information to the appropriate air traffic services unit via data link communications shall only provide voice position reports when requested.

91.137 Temporary flight restrictions

(a) The ECAA will issue a Notice to Airmen (NOTAM) designating an area within which temporary flight restrictions apply and specifying the hazard or condition requiring their issuance, whenever the determination has been made that the issuance is necessary in order to;
  (1) Protect persons and property on the surface or in the air from a hazard associated with an incident on the surface;
  (2) Provide a safe environment for the operation of disaster relief aircraft; or
  (3) Prevent an unsafe congestion of sightseeing and other aircraft above an incident or event, which may generate a high degree of public interest. The Notice to Airmen will specify the hazard or condition that requires the issuance of temporary flight restrictions.
(b) When a NOTAM has been issued under paragraph (a)(1) of this section no person may operate an aircraft within the designated area unless that aircraft is participating in the hazard relief activities and is being operated under the direction of the official in charge of on scene emergency response activities.
(c) When a NOTAM has been issued under paragraph (a)(2) of this section, no person may operate an aircraft within the designated area unless at least one of the following conditions are met;
  (1) The aircraft is participating in hazard relief activities and is being operated under the direction of the official in charge of on scene emergency response activities.
  (2) The aircraft is carrying law enforcement officials.
  (3) The aircraft is operating under an ATS approved IFR flight plan.
  (4) The operation is conducted directly to or from an airport within the area, or is necessitated by the impracticability of VFR flight above or around the area due to weather, or terrain; notification is given to the ATS facility specified in the NOTAM to receive advisories concerning disaster relief aircraft operations; and the operation does not hamper or endanger relief activities and is not conducted for the purpose of observing the disaster.

(5) The aircraft is carrying properly accredited news representatives, and prior to entering the area. A flight plan is filed with the appropriate ECAA or ATS facility specified in the Notice to Airmen and the operation is conducted above the altitude used by the disaster relief aircraft, unless otherwise authorized by the official in charge of on-scene emergency response activities.

(d) When a NOTAM has been issued under paragraph (a)(3) of this section, no person may operate an aircraft within the designated area unless at least one of the following conditions is met;
(1) The operation is conducted directly to or from an airport within the area, or is necessitated by the impracticability of VFR flight above or around the area due to weather or terrain, and the operation is not conducted for the purpose of observing the incident or event.
(2) The aircraft is operating under an ATS approved IFR flight plan.
(3) The aircraft is carrying incident or event personnel, or law enforcement officials.
(4) The aircraft is carrying properly accredited news representatives and, prior to entering that area, a flight plan is filed with the appropriate ATS facility specified in the NOTAM.

(e) Flight plans filed and notifications made with an ATS facility under this section shall include the following information :
(1) Aircraft identification types and color.
(2) Radio communications frequencies to be used.
(3) Proposed times of entry of, and exit from the designated area.
(4) Name of news media or organization and purpose of flight.
(5) Any other information requested by ATS.

91.138 Temporary flight restrictions in national disaster areas

No person may operate an aircraft within the designated airspace unless:
(a) That person has obtained authorization from the official in charge of associated emergency or disaster relief response activities, and is operating the aircraft under the conditions of that authorization;
(b) The aircraft is carrying law enforcement officials;
(c) The aircraft is carrying persons involved in an emergency or a legitimate scientific purpose;
(d) The aircraft is carrying properly accredited newspersons, and that prior to entering the area, a flight plan is filed with the appropriate ECAA or ATS facility and the operation is conducted in compliance with the conditions and restrictions established by the official in charge of on-scene emergency response activities, or,
(e) The aircraft is operating in accordance with an ATS clearance or instruction.

91.139 Emergency air traffic rules

(a) This section prescribes a process for utilizing Notices to Airmen (NOTAMs) to advise of the issuance and operations under emergency air traffic rules and regulations and designates the official who is authorized to issue NOTAMs on behalf of the ECAA in certain matters under this section.

(b) Whenever the ECAA determines that an emergency condition exists, or will exist, relating to the ECAA's ability to operate the air traffic control system and during which normal flight operations under this chapter cannot be conducted consistent with the required levels of safety and efficiency.
(1) The ECAA issues an immediately effective air traffic rule or regulation in response to that emergency condition; and
(2) The ECAA may utilize the NOTAM system to provide notification of the issuance of the rule or regulation. Those NOTAMs communicate information concerning the rules and regulations that govern the flight operations, the use of navigation facilities, and designation of that airspace in which the rules and regulations apply.

(c) When a NOTAM has been issued under this section, no person may operate an aircraft, or other device governed by the regulation concerned, within the designated airspace except in accordance with the authorizations, terms, and conditions prescribed in the regulation covered by the NOTAM.

91.141 Flight restriction in the proximity of Presidential and other parties

No person may operate an aircraft over or in the vicinity of any area to be visited or traveled by the President or other public figures contrary to the restrictions established by the ECAA and published in a Notice to Airmen (NOTAM).

91.143 Flight limitation in the proximity of space flight operations

No person may operate any aircraft of Egyptian registry, or pilot any aircraft under this authority of an airmen certificate issued by the ECAA within an area designated in a Notice to Airmen (NOTAM) for space flight operations except when authorized by ATS, or operated under the control of the Ministry of Defense.

91.144 Temporary restriction on flight operations during abnormally high barometric pressure conditions

(a) Special flight conditions. When any information indicates that barometric pressure on the route of flight currently exceeds or will exceed 1050 pHs no person may operate an aircraft or initiate a flight contrary to the requirements established by the ECAA and a published NOTAM issued under this section.

(b) Waivers. The ECAA is authorized to waive any restriction issued under paragraph (a) of this section to permit emergency supply, transport, or medical services to be delivered to isolated communities, where the operation can be conducted with an acceptable level of safety.

91.145 Unlawful interference

(a) An aircraft which is being subjected to unlawful interference shall endeavour to notify the appropriate ATS unit of this fact, any significant circumstances associated therewith and any deviation from the current flight plan necessitated by the circumstances, in order to enable the ATS unit to give priority to the aircraft and to minimize conflict with other aircraft.

(b) If an aircraft is subjected to unlawful interference, the pilot-in-command shall attempt to land as soon as practicable at the nearest suitable aerodrome or at a dedicated aerodrome assigned by the appropriate authority unless considerations aboard the aircraft dictate otherwise.

91.146 Aerodrome operating minima

(a) The pilot-in-command shall establish aerodrome operating minima in accordance with criteria specified by ECAA, for each aerodrome to be used in operations. When establishing aerodrome operating minima, any conditions that may be prescribed in the list of specific approvals shall be observed. Such minima shall not be lower than any that may be established for such aerodromes by the State of the Aerodrome, except when specifically approved by that State.

Note.— This Standard does not require the State of the Aerodrome to establish aerodrome operating minima.

(b) ECAA shall authorize operational credit(s) for operations with advanced aircraft. Such approvals shall not affect the classification of the instrument approach procedure.

Note 1.— Operational credit includes:

(1) For the purposes of an approach ban 91.148 (b)or dispatch considerations,, a minimum below the aerodrome operating minima;

(2) Reducing or satisfying the visibility requirements; or

(3) Requiring fewer ground facilities as compensated for by airborne capabilities.

Note 2.— Guidance on operational credit for aircraft equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS and CVS is contained in Attachment 2.B and in the Manual of All-Weather Operations (Doc 9365).

Note 3.— Information regarding a HUD or equivalent displays, including references to RTCA and EUROCAE documents, is contained in the Manual of All-Weather Operations (Doc 9365).

(c) Instrument approach operations shall be classified based on the designed lowest operating minima below which an approach operation shall only be continued with the required visual reference as follows:

(1) Type A: a minimum descent height or decision height at or above 75 m (250 ft); and

(2) Type B: a decision height below 75 m (250 ft). Type B instrument approach operations are categorized as:

(i) Category I (CAT I): a decision height not lower than 60 m (200 ft) and with either a visibility not less than 800 m or a runway visual range not less than 550 m;
(ii) Category II (CAT II): a decision height lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range not less than 300 m;
(iii) Category IIIA (CAT IIIA): a decision height lower than 30 m (100 ft) or no decision height and a runway visual range not less than 175 m;
(iv) Category IIIB (CAT IIIB): a decision height lower than 15 m (50 ft) or no decision height and a runway visual range less than 175 m but not less than 50 m; and
(v) Category IIIC (CAT IIIC): no decision height and no runway visual range limitations.

Note 1.— Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach operation would be conducted in accordance with the requirements of the most demanding category (e.g. an operation with a DH in the range of CAT IIIA but with an RVR in the range of CAT IIIB would be considered a CAT IIIB operation or an operation with a DH in the range of CAT II but with an RVR in the range of CAT I would be considered a CAT II operation).

Note 2.— The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In the case of a circling approach operation, the required visual reference is the runway environment.

Note 3.— Guidance on approach classification as it relates to instrument approach operations, procedures, runways and navigation systems is contained in the Manual of All-Weather Operations (Doc 9365).

(d) The operating minima for 2D instrument approach operations using instrument approach procedures shall be determined by establishing a minimum descent altitude (MDA) or minimum descent height (MDH), minimum visibility and, if necessary, cloud conditions.

Note.— For guidance on applying a continuous descent final approach (CDFA) flight technique on non-precision approach procedures, refer to PANS-OPS (Doc 8168), Volume I, Part I, Section 4, Chapter 1, paragraph 1.7.

(e) The operating minima for 3D instrument approach operations using instrument approach procedures shall be determined by establishing a decision altitude (DA) or decision height (DH) and the minimum visibility or RVR.

(f) When issuing a specific approval for the operational credit, the ECAA shall ensure that:
(1) The aeroplane meets the appropriate airworthiness certification requirements;
(2) The information necessary to support effective crew tasks for the operation is appropriately available to both pilots where the number of flight crew members specified in the operations manual (or other documents associated with the certificate of airworthiness) is more than one;
(3) The operator/owner has carried out a safety risk assessment of the operations supported by the equipment;
(4) The operator/owner has established and documented normal and abnormal procedures and MEL;
(5) The operator/owner has established a training programme for the flight crew members and relevant personnel involved in the flight preparation;
(6) the operator/owner has established a system for data collection, evaluation and trend monitoring for low visibility operations for which there is an operational credit; and
(7) the operator/owner has instituted appropriate procedures with respect to continuing airworthiness (maintenance and repair) practices and programmes.

Note 1.— Guidance on safety risk assessments is contained in the Safety Management Manual (SMM)(Doc 9859).

Note 2.— Guidance on operational approvals is contained in the Manual of All Weather Operations(Doc 9365).

For operations with operational credit with minima above those related to low visibilityoperations, the State of Registry shall establish criteria for the safe operation of the aeroplane.

Note.— Guidance on operational credit for operations with minima above those related to low visibility operations is contained in the Manual of All-Weather Operations (Doc 9365)

91.147 Interception

Interception of civil aircraft shall be governed by appropriate regulations and administrative directives issued by ECAA in compliance with the Convention on International Civil Aviation, and in particular Article 3(d) under which ECAA undertake, when issuing regulations for Egyptain registered aircraft, to have due regard for the safety of navigation of civil aircraft.

91.148 Aerodrome operating minima (In-flight)

(a) A flight shall not be continued towards the aerodrome of intended landing, unless the latest available information indicates that at the expected time of arrival, a landing can be effected at that aerodrome or at least one destination alternate aerodrome, in compliance with the operating minima established in accordance with 91.146.

(b) An instrument approach shall not be continued below 300 m (1 000 ft) above the aerodrome elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the aerodrome operating minima.
Note.— Criteria for the final approach segment is contained in PANS-OPS (Doc 8168), Volume II.

(c) If, after entering the final approach segment or after descending below 300 m (1 000 ft) above the aerodrome elevation, the reported visibility or controlling RVR falls below the specified minimum, the approach may be continued to DA/H or MDA/H. In any case, an aeroplane shall not continue its approach-to-land beyond a point at which the limits of the aerodrome operating minima would be infringed.
Note.— Controlling RVR means the reported values of one or more RVR reporting locations (touchdown, midpoint and stop-end) used to determine whether operating minima are or are not met. Where RVR is used, the controlling RVR is the touchdown RVR, unless otherwise specified by State criteria.

91.149 Limitations imposed by weather conditions for visual flight rules:

(a) For airplanes. Flight in accordance with the visual flight rules: A flight, except one of purely local character in visual meteorological conditions, to be conducted in accordance with the visual flight rules shall not be commenced unless available current meteorological reports, or a combination of current reports and forecasts, indicate that the meteorological conditions along the route, or that part of the route to be flown under the visual flight rules, will, at the appropriate time, be such as to render compliance with these rules possible.

(b) For helicopter. A flight, except one of purely local character in visual meteorological conditions, to be conducted in accordance with the visual flight rules shall not be commenced unless available current meteorological reports, or a combination of current reports and forecasts, indicate that the meteorological conditions along the route, or that part of the route to be flown under the visual flight rules, will, at the appropriate time, be such as to render compliance with these rules possible.

91.150 Alternate aerodromes

Destination alternate aerodromes

For a flight to be conducted in accordance with the instrument flight rules, at least one destination alternate aerodrome shall be selected and specified in the flight plans, unless:

(a) The duration of the flight from the departure aerodrome, or from the point of in-flight re-planning, to the destination aerodrome is such that, taking into account all meteorological conditions and operational information relevant to the flight, at the estimated time of use, a reasonable certainty exists that:

(1) The approach and landing may be made under visual meteorological conditions; and

(2) Separate runways are usable at the estimated time of use of the destination aerodrome with at least one runway having an operational instrument approach procedure; or

(b) The aerodrome of intended landing is isolated and:

(1) A standard instrument approach procedure is prescribed for the aerodrome of intended landing;

(2) A point of no return has been determined; and

(3) A flight shall not be continued past the point of no return unless available current meteorological information indicates that the following meteorological conditions will exist at the estimated time of use:

(i) A cloud base of at least 300 m (1 000 ft) above the minimum associated with the instrument approach procedure; and

(ii) Visibility of at least 5.5 km (3 NM) or of 4 km (2 NM) more than the minimum associated with the instrument approach procedure.

Note.— Separate runways are two or more runways at the same aerodrome configured such that if one runway is closed, operations to the other runway(s) can be conducted.

91.151 Fuel and oil requirements

(a) A flight shall not be commenced unless, taking into account both the meteorological conditions and any delays that are expected in flight, the aircraft carries sufficient fuel and oil to ensure that it can safely complete the flight. The amount of fuel to be carried must permit:

(1) when the flight is conducted in accordance with the instrument flight rules and a destination alternate aerodrome is not required in accordance with 91.150, or when the flight is to an isolated aerodrome, flight to the aerodrome of intended landing, and after that, have a final reserve fuel for at least 45 minutes at normal cruising altitude; or

(2) when the flight is conducted in accordance with the instrument flight rules and a destination alternate aerodrome is required, flight to the aerodrome of intended landing, then to an alternate aerodrome, and after that, have a final reserve fuel for at least 45 minutes at normal cruising altitude; or

(3) when the flight is conducted in accordance with day VFR, flight to the aerodrome of intended landing, and after that, have a final reserve fuel for at least 30 minutes at normal cruising altitude; or

(4) when the flight is conducted in accordance with night VFR, flight to the aerodrome of intended landing and thereafter have a final reserve fuel for at least 45 minutes at normal cruising altitude.

Note 1.— Nothing in 91.151 precludes amendment of a flight plan in flight in order to replan the flight to another aerodrome, provided that the requirements of 91.151 can be complied with from the point where the flight is replanned.

Note 2.— Guidance on planning operations to isolated aerodromes is contained in the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).

(b) The use of fuel after flight commencement for purposes other than originally intended during pre-flight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

91.152 In-flight fuel management

(a) The pilot-in-command shall monitor the amount of usable fuel remaining on board to ensure it is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining.

(b) The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome, or other air traffic delays, may result in landing with less than the planned final reserve fuel.

Note.— The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance, or air traffic delays, may result in landing with less than the planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

(c) The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the calculated usable fuel estimated to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.

Note 1.— The planned final reserve fuel refers to the value calculated in 91.151 and is the minimum amount of fuel required upon landing at any aerodrome.

Note 2.— The words "MAYDAY FUEL" describe the nature of the distress conditions as required in Annex 10, Volume II.

91.153 VFR flight plan: Information required

Information required. Unless otherwise authorized by ATS, each person filing a VFR flight plan shall include in Information required under 91.104(c).

91.155 Basic VFR weather minimums

(a) Except when operating as a special VFR flight, VFR flights shall be conducted so that the aircraft is flown in conditions of visibility and distance from clouds equal to or greater than those specified in the table below.

(b) Except when a clearance is obtained from an air traffic control unit, when deemed necessary, VFR flights shall not take off or land at an airport within a control zone, or enter the airport traffic zone or traffic pattern:
(1) When the ceiling is less than 450m (1500ft); or
(2) When the ground visibility is less than 5Km.

(c) VFR flights between sunset and sunrise, or such other period between sunset and sunrise as may be prescribed by the appropriate ATS authority, shall be operated in accordance with the conditions prescribed by such authority.

(d) Unless authorized by the appropriate ATS authority, and subject to specified conditions prescribed by that authority, VFR flight shall not be operated:
(1) Above FL 150.

(2) At transonic and supersonic speeds.
(3) Authorization for VFR flights to operate above FL 290 shall not be granted in areas where a vertical separation minimum of 300 m (1000 ft) is applied above FL 290.

(e) Authorization for VFR flights to operate above FL 290 shall not be granted in areas where a vertical separation minimum of 300 m (1000 ft) is applied above FL 290

(f) Except when necessary for takeoff or landing, or except by permission from the appropriate authority, a VFR flight shall not be flown:
(1) Over the congested areas of cities, towns or settlements, or over an open air assembly of persons at a height less than 300m (1000 Ft) above the highest obstacle within a radius of 600m from the aircraft.
(2) Elsewhere, except as specified in (1) of this section, aircraft shall not be flown at a height less than 150m (500 FT) above the ground or water.

(g) Except where otherwise indicated in air traffic control clearances, or specified by the appropriate authority, VFR flights in level cruising flight, when operated above 900m (3000 FT) from the ground or water, shall be conducted at a flight level appropriate to the track as specified in 91.159 (a) table.

(h) VFR flights shall comply with the following provisions:
(1) Operated within Classes B, C and D airspace;
(2) Forming part of aerodrome traffic at controlled aerodromes; or
(3) Operated as special VFR flights.

(i) A VFR flight operating within or into areas, or along routes, designated by the appropriate ATS authority in accordance with 91.104(b)(3) or (4) shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and report its position as necessary to, the air traffic services unit providing flight information service.

(j) An aircraft operated in accordance with the visual flight rules which wishes to change to compliance with the instrument flight rules shall:
(1) If a flight plan was submitted, communicate the necessary changes to be effected to its current flight plan; or
(2)When so required by 91.104, submit a flight plan to the appropriate air traffic services unit and obtain a clearance prior to proceeding IFR when in controlled airspace.

Altitude Band	Airspace Class	Flight visibility	Distance from cloud
At and above 3 050 m (10 000ft) AMSL	A*** BCDEFG	8 km	1 500 m horizontally 300 m (1 000 ft) vertically
Below 3 050 m (10000 ft) and above 900 m (3000 ft) AMSL, or above 300 m (1000 ft) above terrain, whichever is the higher	A*** BCDEFG	5 km	1 500 m horizontally 300 m (1 000 ft) vertically
At and below 900 m (3000 ft) AMSL, or 300 m (1000 ft) above terrain, whichever is the higher	A*** BCDE	5 km	1 500 m horizontally 300 m (1 000 ft) vertically
	FG	5 km**	Clear of cloud and of with the surface in sight

When the height of the transition altitude is lower than 3050 m (10000 ft) AMSL, FL100 should be used in lieu of 10000 ft.

** When so prescribed by the appropriate ATS authority:
(i) flight visibilities reduced to not less than 1500 m may be permitted for flights operating:
(A) At speeds that, in the prevailing visibility, will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision; or
(B) In circumstances in which the probability of encounters with other traffic would normally be low, e.g. in areas of low volume traffic and for aerial work at low levels.
(ii) Helicopters may be permitted to operate in less than 1500 m flight visibility, if maneuvered at a speed that will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision.

*** The VMC minima in Class A airspace are included for guidance to pilots and do not imply acceptance of VFR flights in Class A airspace.

(k) Weather deterioration below the VMC. When it becomes evident that flight in VMC in accordance with its current flight plan will not be practicable, a VFR flight operated as a controlled flight shall:
  (1) Request an amended clearance enabling the aircraft to continue in VMC to destination or to an alternative aerodrome, or to leave the airspace within which an ATC clearance is required;
  (2) If no clearance in accordance with (1) can be obtained, continue to operate in VMC and notify the appropriate ATC unit of the action being taken either to leave the airspace concerned or to land at the nearest suitable aerodrome;
  (3) If operated within a control zone, request authorization to operate as a special VFR flight; or
  (4) Request clearance to operate in accordance with the instrument flight rules.

91.157 Special VFR weather minimums

(a) Special VFR operations may be conducted at less than VFR.
(b) Special VFR operations may only be conducted:
  (1) Within the control zone.
  (2) With an ATS clearance.
  (3) Clear of clouds.

91.159 VFR cruising altitude or flight level

(a) Except while holding in a holding pattern of 2 minutes or less, or while turning, each person operating an aircraft under VFR in level cruising flight more than 3,000 feet above the surface shall maintain the appropriate altitude or flight level prescribed as specified in the following table, however, no flights shall fly below FL85 within the CAIRO FIR except in control zones for landing and takeoff.
(b) Flight Level/Track to be observed, when so required by this Part: are as follows:

TRACK

From 000 degrees to 179 degrees		**From 180 degrees to 359 degrees**	
VFR Flights Altitude		VFR Flights **Altitude**	
FL	Feet	FL	Feet
–	–	–	–
–	–	–	–
35	3 500	45	4 500
55	5 500	65	6 500
75	7 500	85	8 500
95	9 500	105	10 500
115	11 500	125	12 500
135	13 500	145	14 500
155	15 500	165	16 500
175	17 500	185	18 500
195	19 500	205	20 500
215	21 500	225	22 500
235	23 500	245	24 500
255	25 500	265	26 500
275	27 500	285	28 500

91.161 Aerodrome operating minima (Additional requirements for large and turbojet aeroplanes)

(a) The pilot-in-command/Operator shall establish aerodrome operating minima in accordance with criteria specified by ECAA, for each aerodrome to be used in operations. When establishing aerodrome operating minima any conditions that may be prescribed in the list of specific approvals

shall be observed. Such minima shall not be lower than any that may be established for such aerodromes by the State of the Aerodrome, except when specifically approved by that State.

Note.— This Standard does not require the State of the Aerodrome to establish aerodrome operating minima.

(b) ECAA shall authorize operational credit(s) for operations with aero planes equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS Where the operational credit relates to low visibility operations, the State of Registry shall issue a specific approval. Such authorizations shall not affect the classification of the instrument approach procedure.

. Note 1.— Operational credit includes:

(1) For the purposes of an approach ban, a minima below the aerodrome operating minima;

(2) Reducing or satisfying the visibility requirements; or

(3) Requiring fewer ground facilities as compensated for by airborne capabilities.

Note 2.— Guidance on operational credit for aircraft equipped with automatic landing systems, *a HUD or equivalent displays, EVS, SVS and CVS is contained in ECAR part 91 Appendix K and in the Manual of All-Weather Operations (ICAO Doc 9365).*

Note 3.— Information regarding a HUD or equivalent displays, including references to RTCA and EUROCAE documents, is contained in the Manual of All-Weather Operations (ICAO Doc 9365).

(c) Instrument approach operations shall be classified based on the designed lowest operating minima below which an approach operation shall only be continued with the required visual reference as follows:

(1) Type A: a minimum descent height or decision height at or above 75 m (250 ft); and

(2) Type B: a decision height below 75 m (250 ft). Type B instrument approach operations are categorized as:

(i) Category I (CAT I): a decision height not lower than 60 m (200 ft) and with either a visibility not less than 800 m or a runway visual range not less than 550 m;

(ii) Category II (CAT II): a decision height lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range not less than 300 m;

(iii) Category IIIA (CAT IIIA): a decision height lower than 30 m (100 ft) or no decision height and a runway visual range not less than 175 m;

(iv) Category IIIB (CAT IIIB): a decision height lower than 15 m (50 ft) or no decision height and a runway visual range less than 175 m but not less than 50 m; and

(v) Category IIIC (CAT IIIC): no decision height and no runway visual range limitations.

Note 1.— Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach operation would be conducted in accordance with the requirements of the most demanding category (e.g. an operation with a DH in the range of CAT IIIA but with an RVR in the range of CAT IIIB would be considered a CAT IIIB operation or an operation with a DH in the range of CAT II but with an RVR in the range of CAT I would be considered a CAT II operation).

Note 2.— The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In the case of a circling approach operation, the required visual reference is the runway environment.

Note 3.— Guidance on approach classification as it relates to instrument approach operations, procedures, runways and navigation systems is contained in the Manual of All-Weather Operations (ICAO Doc 9365).

(d) The operating minima for 2D instrument approach operations using instrument approach procedures shall be determined by establishing a minimum descent altitude (MDA) or minimum descent height (MDH), minimum visibility and, if necessary, cloud conditions.

Note. — For guidance on applying a continuous descent final approach (CDFA) flight technique on non-precision approach procedures, refer to PANS-OPS (ICAO Doc 8168), Volume I, Part I.

(v) The operating minima for 3D instrument approach operations using instrument approach procedures shall be determined by establishing a decision altitude (DA) or decision height (DH) and the minimum visibility or RVR.

(vi) A flight to be conducted in accordance with the instrument flight rules shall not:
(1) Take off from the departure aerodrome unless the meteorological conditions, at the time of use, are at or above the aerodrome operating minima for that operation; and
(2) Take off or continue beyond the point of in-flight re-planning unless at the aerodrome of intended landing or at each alternate aerodrome to be selected in compliance with 91.150, current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions will be, at the estimated time of use, at or above the aerodrome operating minima for that operation.

(vii) Aero plane operating procedures for landing performance An approach to land should not be continued below 300 m (1 000 ft) above aerodrome elevation unless the pilot-in-command is satisfied that, with the runway surface condition information available, the aero plane performance information indicates that a safe landing can be made.

NOTE 1 .The procedures for using runway surface condition information on board aircraft are contained in the PANS-Aerodromes (Doc 9981) and in the performance section of the aero plane flight manual, and for aero planes certificated in accordance with Annex 8, Part IIIB, the Aero plane Performance Manual (Doc 10064).

NOTE 2 :. Guidance on development of aeroplane performance information for aeroplanes certificated in accordance with Annex 8, Part IIIB is contained in the Aeroplane Performance Manual (Doc 10064).

91.163 Heliport or landing location operating minima

(a) The pilot-in-command shall establish operating minima in accordance with criteria specified by ECAA for each heliport or landing location to be used in operations. Such minima shall not be lower than any that may be established by the State of the Aerodrome, except when specifically approved by that State.

Note.— This Standard does not require the State of the Aerodrome to establish operating minima.

(b) ECAA may approve operational credit(s) for operations with helicopters equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS. Such approvals shall not affect the classification of the instrument approach procedure.

Note 1.— Operational credit includes:
(1) for the purposes of an approach ban, a minima below the heliport or landing location operating minima;
(2) reducing or satisfying the visibility requirements; or
(3) requiring fewer ground facilities as compensated for by airborne capabilities.

Note 2.— Guidance on operational credit for aircraft equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS and CVS is contained in ECAR part 91 Appendix K and in the Manual of All-Weather Operations (ICAO Doc 9365).

Note 3.— Information regarding a HUD or equivalent displays, including references to RTCA and EUROCAE documents, is contained in the Manual of All-Weather Operations (ICAO Doc 9365).

Note 4.— Automatic landing system — helicopter is an automatic approach using airborne systems which provide automatic control of the flight path, to a point aligned with the landing surface, from which the pilot can transition to a safe landing by means of natural vision without the use of automatic control.

91.164 Alternate aerodromes (Additional requirements for large and turbojet aero planes)

(a) Take-off alternate aerodrome

(1) A take-off alternate aerodrome shall be selected and specified in the flight plan if either the meteorological conditions at the aerodrome of departure are below the applicable aerodrome landing minima for that operation or if it would not be possible to return to the aerodrome of departure for other reasons.

(2) The take-off alternate aerodrome shall be located within the following flight time from the aerodrome of departure:

(i) for aeroplanes with two engines, one hour of flight time at a one-engine-inoperative cruising speed, determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass; or

(b) For aeroplanes with three or more engines two hours of flight time at an all engines operating cruising speed, determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass.

(3) For an aerodrome to be selected as a take-off alternate the available information shall indicate that, at the estimated time of use, the conditions will be at or above the applicable aerodrome operating minima for that operation.

91.165 Fuel requirements (Additional requirements for large and turbojet aeroplanes)

(1) An aero plane shall carry a sufficient amount of usable fuel to complete the planned flight safely and to allow for deviations from the planned operation.

(2) The amount of usable fuel to be carried shall, as a minimum, be based on:

(a) Fuel consumption data:
  (1) Provided by the aero plane manufacturer; or
  (2) Available, current aero plane specific data derived from a fuel consumption monitoring system; and

(b) The operating conditions for the planned flight including:
  (1) Anticipated aero plane mass؛
  (2) Notices to Airmen؛
  (3) current meteorological reports or a combination of current reports and forecasts؛
  (4) air traffic services procedures, restrictions and anticipated delays; and
  (5) the effects of deferred maintenance items and/or configuration deviations.

Note.— Where no specific fuel consumption data exist for the precise conditions of the flight, the aircraft may be operated in accordance with estimated fuel consumption data.

(3) The pre flight calculation of usable fuel required shall include:

(a) taxi fuel, which shall be the amount of fuel expected to be consumed before takeoff taking into account local conditions at the departure aerodrome and auxiliary power unit (APU) fuel consumption

(b) trip fuel, which shall be the amount of fuel required to enable the aero plane to fly from take off until landing at the destination aerodrome taking into account the operating conditions of 91.165(2)b;

(c) contingency fuel, which shall be the amount of fuel required to compensate for unforeseen factors. It shall be not less than five per cent of the planned trip fuel;

Note.— Unforeseen factors are those which could have an influence on the fuel consumption to the destination aerodrome, such as deviations of an individual aero plane from the expected fuel consumption data, deviations from forecast meteorological conditions, extended delays and deviations from planned routings and/or cruising levels.

(d) destination alternate fuel, which shall be:
  (1) Where a destination alternate aerodrome is required, the amount of fuel required to enable the aero plane to:
    (i) Perform a missed approach at the destination aerodrome;
    (ii) Climb to the expected cruising altitude;
    (iii) Fly the expected routing;
    (iv) Descend to the point where the expected approach is initiated; and
    (v) Conduct the approach and landing at the destination alternate aerodrome; or
  (2) Where a flight is operated without a destination alternate aerodrome, the amount of fuel required to enable the aero plane to fly for 15 minutes at holding speed at 450 m (1 500 ft) above destination aerodrome elevation in standard conditions; or
  (3) Where the aerodrome of intended landing is an isolated aerodrome:
    (i) For a reciprocating engine aero plane, the amount of fuel required to fly for 45 minutes plus 15 per cent of the flight time planned to be spent at cruising level, including final reserve fuel, or two hours, whichever is less; or

(ii) For a turbine engine aero plane, the amount of fuel required to fly for two hours at normal cruise consumption above the destination aerodrome, including final reserve fuel؛

(e) Final reserve fuel, which shall be the amount of fuel on arrival at the destination alternate aerodrome, or the destination aerodrome when no destination alternate aerodrome is required:

(4) For a reciprocating engine aero plane, the amount of fuel required to fly for 45 minutes; or

(5) For a turbine engine aero plane, the amount of fuel required to fly for 30 minutes at holding speed at 450 m (1 500 ft) above aerodrome elevation in standard conditions؛

(f) Additional fuel, which shall be the supplementary amount of fuel required to enable the aircraft to descend as necessary and proceed to land at an alternate aerodrome in the event of engine failure or loss of pressurization based on the assumption that such a failure occurs at the most critical point along the route؛

(g) Discretionary fuel, which shall be the extra amount of fuel to be carried at the discretion of the pilot in command.

(4) Recommendation.— Operators should determine one final reserve fuel value for each aero plane type and variant in their fleet rounded up to an easily recalled figure.

(5) The use of fuel after flight commencement for purposes other than originally intended during pre flight planning shall require a re analysis and, if applicable, adjustment of the planned operation.

Note. — Nothing in 91.165 precludes the in flight amendment of a flight plan to re plan that flight to another aerodrome, provided that the requirements of 91.165 can be complied with from the point where the flight is re planned.

91.167 In flight fuel management (Additional requirements for large and turbojet aeroplanes)

(1) An operator shall establish policies and procedures to ensure that in flight fuel checks and fuel management are performed Standard.

(2) The pilot in command shall continually ensure that the amount of usable fuel remaining on board is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing.

Note. — The protection of final reserve fuel is intended to ensure a safe landing at any aerodrome when unforeseen occurrences may not permit safe completion of an operation as originally planned. Guidance on flight planning including the circumstances that may require re analysis, adjustment and/or re planning of the planned operation before takeoff or en route, is contained in the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).

(3) The pilot in command shall request delay information from ATC when unanticipated circumstances may result in landing at the destination aerodrome with less than the final reserve fuel plus any fuel required to proceed to an alternate aerodrome or the fuel required to operate to an isolated aerodrome.

(4) The pilot in command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than the planned final reserve fuel.

Note.— The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance may result in landing with less than the planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

(5) The pilot in command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL when the calculated usable fuel estimated to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.

N1.The planned final reserve fuel refers to the value calculated in 91.165 (3)(e) and is the minimum amount of fuel required upon landing at any aerodrome.

N2.The words “MAYDAY FUEL” describe the nature of the distress conditions as required in Annex 10, Volume II, 5.3.2.1.1, b) 3.

Additional requirements for operations beyond 60 minutes to an en route alternate aerodrome (see 91.170).

91.168 Destination alternate airports

When a destination alternate aerodrome is required.

(a) A flight to be conducted in accordance with the instrument flight rules shall not be commenced unless the available information indicates that conditions, at the aerodrome of intended landing and at least one destination alternate will, at the estimated time of arrival, be at or above the aerodrome operating minima.

(b) For a flight to be conducted in accordance with instrument flight rules, at least one destination alternate is required to be selected and designated on the flight plan, unless the airport of intended landing is isolated and there is no suitable destination alternate airport.

(c) Two destination alternate aerodromes shall be selected and specified in the operational and ATS flight plans when, for the destination aerodrome

(1) Meteorological conditions at the estimated time of use will be below the operator's established aerodrome operating minima for that operation;

(2) Meteorological information is not available

(d) Notwithstanding the provisions in 4.3.4.1, 4.3.4.2 and 4.3.4.3, the State of the Operator may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve operational variations to alternate aerodrome selection criteria. The specific safety risk assessment shall include at least the:

(1) Capabilities of the operator;

(2) Overall capability of the aero plane and its systems;

(3) Available aerodrome technologies, capabilities and infrastructure;

(4) Quality and reliability of meteorological information;

(5) Identified hazards and safety risks associated with each alternate aerodrome variation; and

(6) Specific mitigation measures.

(e) To ensure that an adequate margin of safety is observed in determining whether or not an approach and landing can be safely carried out at each alternate aerodrome, the operator shall specify appropriate incremental values for height of cloud base and visibility, acceptable to the State of the Operator, to be added to the operator's established aerodrome operating minima.

(f) The operator shall establish a margin of time for the estimated time of use of an aerodrome to be approved by ECAA.

91.169 IFR flight plan

(a) Information required

(1) Information required. Unless otherwise authorized by ATS each person filing an IFR flight plan shall include in it the following information:

(i) Information required under 91.153

(ii) Alternate airport, except as provided in paragraph (2) of this section.

(2) Paragraph (1)(ii) of this section, does not apply if the airport of intended landing has a standard instrument approach procedure, and for at least 2 hours before and 2 hours after the estimated time of arrival, the weather reports and forecasts, or any combination thereof, indicate:

(i)The ceiling will be at least 1000 ft above the airport elevation, and

(ii)The visibility will be at least 5.5 km or 4 km greater than the minimum visibility for the selected approach procedure.

(3) IFR alternate airport weather minimums. Unless otherwise authorized by the ECAA, no person may include an alternate airport, in an IFR flight plan unless current weather forecasts indicate that, at the estimated time of arrival at the alternate airport, the ceiling and visibility at that airport will be at or above the following alternate airport weather minimums:

(i) If an instrument approach procedure has been published for that airport, the alternate airport minimums specified in that procedure or, if none are so specified, the following minimums:

(A) Precision approach procedure: Ceiling 600 feet and visibility 3500 Meters.

(B) Non-precision approach procedure: Ceiling 800 feet and visibility 3500 Meters.

(ii) If no instrument approach procedure has been published for that airport, the ceiling and visibility minimums are those allowing descent form the MEA, approach, and landing under basic VFR.

(4) Cancellation. When a flight plan has been activated, the pilot in command, upon canceling or completing the flight under the flight plan, shall notify an ECAA Flight Service Station or ATS facility.

(b) Change from IFR flight to VFR flight

(1) An aircraft electing to change the conduct of its flight from compliance with the instrument flight rules to compliance with the visual flight rules shall, if a flight plan was submitted, notify the appropriate air traffic services unit specifically that the IFR flight is cancelled and communicate thereto the changes to be made to its current flight plan.

(2) When an aircraft operating under the instrument flight rules is flown in or encounters visual meteorological conditions it shall not cancel its IFR flight unless it is anticipated, and intended, that the flight will be continued for a reasonable period of time in uninterrupted visual meteorological conditions

(c) The State of Registry shall establish criteria to be used for the estimated time of use of an aerodrome including a margin of time.

Note.— A widely accepted time margin for "estimated time of use" is one hour before and after tearliest and latest time of arrival. Additional considerations can be found in the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).

91.170 Additional requirements for operations beyond 60 minutes to an en-route alternate aerodrome

When conducting operations beyond 60 minutes from a point on a route to an en-route alternate aerodrome operators should ensure that:

(a) En-route alternate aerodromes are identified; and

(b)The pilot-in-command has access to current information on the identified en-route alternate aerodromes, including operational status and meteorological conditions.

91.171 VOR equipment check for IFR operations

(a) No person may operate a civil aircraft under IFR using the VOR system of radio navigation unless the VOR equipment of that aircraft;

(1) Is maintained, checked, and inspected under an approved procedure; or

(2) Has been operationally checked within the preceding 30 days, and was found to be within the limits of the permissible indicated bearing error set forth in paragraph (b) or (c) of this section.

(b) Except as provided in paragraph (c) of this section, each person conducting a VOR check under paragraph (a) (2)of this section shall;

(1) Use, at the airport of intended departure, an ECAA-operated or approved test signal or a test signal radiated by a certificated and appropriately rated radio repair station or, outside Egypt, a test signal operated or approved by an appropriate authority to check the VOR equipment (the maximum permissible indicated bearing error is plus or minus 4 degrees); or

(2) Use, at the airport of intended departure, a point on the airport surface designated as a VOR system check point by the ECAA, or, outside Egypt by an appropriate authority (the maximum permissible bearing error is plus or minus 4 degrees).

(3) If neither a test signal nor a designated checkpoint on the surface is available, use an airborne checkpoint designated by the ECAA or, outside Egypt, by an appropriate authority (the maximum permissible bearing error is plus or minus 6 degrees); or

(4) If no check signal or point is available, while in flight:

(i) Select a VOR radial that lies along the centerline of an established VOR airway;

(ii) Select a prominent ground point along the selected radial preferably more than 20 nautical miles from the VOR ground facility and maneuver the aircraft directly over the point at a reasonably low altitude; and

(iii) Note the VOR bearing indicated by the receiver when over the ground point (the maximum permissible variation between the published radial and the indicated bearing is 6 degrees).

(c) If dual system VOR (units independent of each other except for the antenna) is installed in the aircraft, the person checking the equipment may check one system against the other in place of the check procedures specified in paragraph (b) of this section. Both systems shall be tuned to the same VOR ground facility and note the indicated bearings to that station. The maximum permissible variation between the two indicated bearings is 4 degrees.

(d) Each person making the VOR operational check, as specified in paragraph (b) or (c) of this section, shall enter the date, place, bearing error, and sign the aircraft log or other record. In addition, if a test signal radiated by a repair station, as specified in paragraph (b)(1) of this section, is used, an entry must be made in the aircraft log or other record by the repair station certificate holder or the certificate holder's representative certifying to the bearing transmitted by the repair station for the check and the date of transmission.

91.173 ATS clearance and flight plan required

No person may operate an aircraft in controlled airspace under IFR unless that person has:

(a) Filed an IFR flight plan; and

(b) Received an appropriate ATS clearance.

91.175 Takeoff and landing under IFR

(a) Instrument approaches to civil airports. Unless otherwise authorized by the ECAA, when an instrument letdown to a civil airport is necessary, each person operating an aircraft, except a military aircraft of Egypt, shall use a standard instrument approach procedure prescribed for the airport.

(b) Authorized DH or MDA. For the purpose of this section, when the approach procedure being used provides for and requires the use of a DH or MDA, the authorized DH or MDA is the highest of the following :

(1) The DH or MDA prescribed by the approach procedure.

(2) The DH or MDA prescribed for the pilot in command.

(3) The DH or MDA for which the aircraft is equipped.

(c) Operation below DH or MDA. Where a DH or MDA is applicable, no pilot may operate an aircraft, except a military aircraft of Egypt at any airport below the authorized MDA or continue an approach below the authorized DH unless:

(1) The aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers, and for operations conducted under Part 121 unless that descent rate will allow touchdown to occur within the touchdown zone of the runway of intended landing;

(2) The flight visibility is not less than the visibility prescribed in the standard instrument approach being used; and

(3) Except for a Category II or Category III approach where any necessary visual reference requirements are specified by the ECAA, at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:

(i) The approach light system, except that the pilot may not descend below 100 feet above the touchdown zone elevation using the approach lights as a reference unless the red terminating bars or the red side row bars are also distinctly visible and identifiable.

(ii) The threshold.

(iii) The threshold markings.

(iv) The threshold lights.

(v) The runway end identifier lights.

(vi) The visual approach slope indicator.

(vii) The touchdown zone or touchdown zone markings.

(viii) The touchdown zone lights.

(ix) The runway or runway markings.

(x) The runway lights.

(d) Landing. No pilot operating an aircraft, except a military aircraft of Egypt, may land that aircraft when the flight visibility is less than the visibility prescribed in the standard instrument approach procedure being used.

(e) Missed approach procedures. Each pilot operating an aircraft, except a military aircraft of Egypt, shall immediately execute an appropriate missed approach procedure when either of the following conditions exist:
  (1) Whenever the requirements of paragraph (c) of this section are not met at either of the following times:
    (i) When the aircraft is being operated below MDA; or
    (ii) Upon arrival at the missed approach point, including a DH where a DH is specified and its use is required, and at any time after that until touchdown.
  (2) Whenever an identifiable part of the airport is not distinctly visible to the pilot during a circling maneuver at or above MDA, unless the inability to see an identifiable part of the airport results only from a normal bank of the aircraft during the circling approach.

(f) Civil airport takeoff minimums. Unless otherwise authorized by the ECAA, no pilot operating an aircraft under Part 121 may takeoff from a Civil airport under IFR unless weather conditions are at or above the weather minimums for IFR takeoff prescribed for that airport. If takeoff minimums are not prescribed for a particular airport, the following minimum apply to takeoffs under IFR for aircraft operating under those Parts:
  (1) For aircraft, other than helicopter, having two engines or less: 1600 Meters visibility.
  (2) For aircraft having more than two engines: 800 M visibility.
  (3) For helicopters -800 Meters visibility.

(g) Military airports. Unless otherwise prescribed by the ECAA, each person operating a civil aircraft under IFR into or out of a military airport shall comply with the instrument approach procedures and the takeoff and landing minimum prescribed by the military authority having jurisdiction of that airport.

(h) Limitation on procedure turns. In the case of a radar vector to a final approach course or fix, a timed approach from a holding fix, or an approach for which the procedure specifies " No PT," no pilot may make a procedure turn unless cleared to do so by ATS.

(i) ILS components. The basic ground components of an ILS are the localizer, glide slope, outer marker, middle marker, and, when installed for use with Category II or Category III instrument approach procedures, an inner marker. A compass locator or precision radar may be substituted for the outer or middle marker. DME, VOR, or non-directional beacon fixes authorized in the standard instrument approach procedure or surveillance radar may be substituted for the outer marker. Applicability of, and substitution for, the inner marker for Category II or III approaches is determined by the appropriate approach procedure, letter of authorization, or operations specification pertinent to the operation.

(j) A flight to be conducted in accordance with the instrument flight rules shall not:
  (1) Take off from the departure aerodrome unless the meteorological conditions, at the time of use, are at or above the aerodrome operating minima for that operation; and
  (2) Take off or continue beyond the point of in-flight re-planning unless at the aerodrome of intended landing or at each alternate aerodrome to be selected in compliance with 91.150, current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions will be, at the estimated time of use, at or above the aerodrome operating minima for that operation.

(k) The State of Registry shall establish criteria to be used for the estimated time of use of an aerodrome including a margin of time.

Note. - A widely accepted time margin for "estimated time of use" is one hour before and after the earliest and latest time of arrival. Additional considerations can be found in the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).

91.177 Minimum altitudes for IFR operations

(a) Except when necessary for take-off or landing or when specifically authorized by the appropriate authority, an IFR flight shall be flown at a level that is not below the minimum flight altitude established for the route

(b) An operator shall specify the method by which it is intended to determine minimum flight altitudes for operations conducted over routes for which minimum flight altitudes have not been established

by the State flown over or the responsible State, and shall include this method in the operations manual,

(c) ECAA should approve such method only after careful consideration of the probable effects of the following factors on the safety of the operation in question:
(1) The accuracy and reliability with which the position of the aero plane can be determined;
(2) The inaccuracies in the indications of the altimeters used;
(3) The characteristics of the terrain (e.g. sudden changes in the elevation);
(4) The probability of encountering unfavorable meteorological conditions (e.g. severe turbulence and descending air currents);
(5) Possible inaccuracies in aeronautical charts; and airspace restrictions.

(d) Otherwise, where no such minimum flight altitude has been established:
(1) Over high terrain or in mountainous areas, at a level which is at least 600 m (2000ft) above the highest obstacle located within 8 km of the estimated position of the aircraft;
(2) Elsewhere than as specified in (a) at a level which is at least 300 m (1000ft) above the highest obstacle located within 8 km of the estimated position of the aircraft.

91.179 IFR cruising flight level

The cruising levels to be observed when so required by this part are as follows:

TRACK

From 000 degrees to 179 degrees		**From 180 degrees to 359 degrees**	
IFR Flights Altitude		IFR Flights Altitude	
FL	Feet	FL	Feet
10	1 000	20	2 000
30	3 000	40	4 000
50	5 000	60	6 000
70	7 000	80	8 000
90	9 000	100	10 000
110	11 000	120	12 000
130	13 000	140	14 000
150	15 000	160	16 000
170	17 000	180	18 000
190	19 000	200	20 000
210	21 000	220	22 000
230	23 000	240	24 000
250	25 000	260	26 000
270	27 000	280	28 000
290	29 000	300	30 000
310	31 000	320	32 000
330	33 000	340	34 000
350	35 000	360	36 000
370	37 000	380	38 000
390	39 000	400	40 000
410	41 000	430	43 000
450	45 000	470	47 000
490	49 000	510	51 000
	etc.	etc.	etc.

91.181 Course to be flown

Unless otherwise authorized by ATS, no person may operate an aircraft within controlled airspace under IFR except as follows:

(a) Published airway, along the centerline of that airway.

(b) On any other route, along the direct course between the navigational aids or fixes defining that route. However this section does not prohibit maneuvering the aircraft to pass well clear of other air traffic or the maneuvering of the aircraft in VFR conditions to clear the intended flight path both before and during climb or descent.

91.183 Radio communications

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

(b) IFR Radio communications : The pilot in command of each aircraft operated under IFR in controlled airspace shall have continuous watch maintained on the appropriate frequency and shall report by radio as soon as possible;

(1) The time and altitude of passing each designated reporting point, or the reporting points specified by the ATS, except that while the aircraft is under radar control, only the passing of those reporting points specifically requested by ATS need be reported.

(2) Any un-forecasted weather conditions encountered; and

(3) Any other information relating to the safety of flight.

(c) An IFR flight operating outside controlled airspace but within or into areas, or along routes, designated by the appropriate ATS authority in accordance with 91.104(3) or d) shall maintain an air-ground voice communication watch on the appropriate communication channel and establish two-way communication, as necessary, with the air traffic services unit providing flight information service.

(d) Position reports An IFR flight operating outside controlled airspace and required by the appropriate ATS authority to:

(1) Submit a flight plan,

(2) Maintain an air-ground voice communication watch on the appropriate communication channel and establish two-way communication, as necessary, with the air traffic services unit providing flight information service,shall report position as specified in appropprat to Air traffic control service for controlled flights.

91.185 communications failure

(a) Communication failure. If a communication failure precludes compliance with 91.183(a), the aircraft shall comply with the voice communication failure procedures contained in (ICAO Annex 10, Volume II), and with such of the following procedures as are appropriate. The aircraft shall attempt to establish communications with the appropriate air traffic control unit using all other available means. In addition, the aircraft, when forming part of the aerodrome traffic at a controlled aerodrome, shall keep a watch for such instructions as may be issued by visual signals.

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

(1) Continue to fly in visual meteorological conditions; land at the nearest suitable aerodrome; and report its arrival by the most expeditious means to the appropriate air traffic control unit.;

(2) If considered advisable, complete an IFR flight in accordance with 91.185(c)

(c) If in instrument meteorological conditions or when the pilot of an IFR flight considers it inadvisable to complete the flight in accordance with 91.185(b)(1),, the aircraft shall:

(1) Unless otherwise prescribed on the basis of regional air navigation agreement, in airspace where radar is not used in the provision of air traffic control, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 20 minutes following the aircraft's failure to report its position over a compulsory reporting point and thereafter adjust level and speed in accordance with the filed flight plan;

(2) In airspace where radar is used in the provision of air traffic control, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 7 minutes following:

(i) The time the last assigned level or minimum flight altitude is reached;
(ii) The time the transponder is set to Code 7600; or
(iii) The aircraft's failure to report its position over a compulsory reporting point; whichever is later, and thereafter adjust level and speed in accordance with the filed flight plan.

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

(4) Proceed according to the current flight plan route to the appropriate designated navigation aid or fix serving the destination aerodrome and, when required to ensure compliance with (3) below, hold over this aid or fix until commencement of descent;

(5) Commence descent from the navigation aid or fix specified in (2) at, or as close as possible to, the expected approach time last received and acknowledged; or, if non expected approach time has been received and acknowledged, at, or as close as possible to, the estimated time of arrival resulting from the current flight plan;

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

(7) Land, if possible, within thirty minutes after the estimated time of arrival specified in (3) or the last acknowledged expected approach time, whichever is later.

Note 1: The provision of air traffic control service to other flights operating in the airspace concerned will be based on the premise that an aircraft experiencing communication failure will comply with the rules in 91.185(c)

Note 2 : See also 91.177.

91.187 Operation under IFR in controlled airspace

(a) Malfunction reports

(1) The pilot in command of each aircraft operated in controlled airspace under IFR shall report as soon as practical to ATS any malfunctions of navigational, approach, or communication equipment occurring in flight.

(2) In each report required by paragraph (a) of this section, the pilot in command shall include the:
(i) Aircraft identification;
(ii) Equipment affected;
(iii) Degree to which the capability of the pilot to operate under IFR in the ATS system is impaired; and
(iv) Nature and extent of assistance desired from ATS.

(b) Rules applicable to IFR flights within controlled airspace

(1) IFR flights shall comply with the provisions of Air traffic control sirves, when operated in controlled airspace.

(2) An IFR flight operating in cruising flight in controlled airspace shall be flown at a cruising level, or, if authorized to employ cruise climb techniques, between two levels or above a level, selected from:
(i) The Tables of cruising levels in 91.179, or
(ii) A modified table of cruising levels, when so prescribed in accordance with Appendix 3 for flight above FL 410, except that the correlation of levels to track prescribed therein shall not apply whenever otherwise indicated in air traffic control clearances or specified by the appropriate ATS authority in Aeronautical Information Publications.

(c) Rules applicable to IFR flights outside controlled airspace Cruising levels An IFR flight operating in level cruising flight outside of controlled airspace shall be flown at a cruising level appropriate to its track as specified in:

(1) The tables of cruising levels in 91.179, except when otherwise specified by the appropriate ATS authority for flight at or below 900 m (3 000 ft) above mean sea level; or

(2) A modified table of cruising levels, when so prescribed in accordance with 91.179 for flight above FL 410.

91.189 Category II and III operation: General operating rules

(a) No person may operate a civil aircraft in a Category II or III operation unless:

(1) The cockpit crew of the aircraft consists of a pilot in command and a second in command who holds the appropriate authorizations and ratings prescribed in Part 61;
(2) Each cockpit crewmember has adequate knowledge of, and familiarity with, the aircraft and the procedures to be used; and
(3) The instrument panel in front of the pilot who is controlling the aircraft has appropriate instrumentation for the type of flight control guidance system that is being used.

(b) Unless otherwise authorized by the ECAA, no person may operate a civil aircraft in a Category II or Category III operation unless each ground component required for that operation and the related airborne equipment is installed and operating.

(c) Authorized DH. For the purpose of this section, when the approach procedure being used provides for and requires the use of a DH, the authorized DH is the highest of the following:
(1) The DH prescribed by approach procedure;
(2) The DH prescribed for the pilot in command; and
(3) The DH for which the aircraft is equipped.

(d) Unless otherwise authorized by the ECAA, no pilot operating an aircraft in a Category II or Category III approach that provides and requires use of a DH may continue the approach below the authorized decision height unless the following conditions are met;
(1) The aircraft is in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers, and where that descent rate will allow touchdown to occur within the touchdown zone of the runway of intended landing;
(2) At least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot;
(i) The approach light system, except that the pilot may not descend below 100 feet above the touchdown zone elevation using the approach lights as a reference unless the red terminating bars or the red side row bars are also distinctly visible and identifiable;
(ii) The threshold;
(iii) The threshold markings;
(iv) The threshold lights;
(v) The touchdown zone or touchdown zone markings; and
(vi) The touchdown zone lights.

(e) Unless otherwise authorized by the ECAA, each pilot operating an aircraft shall immediately execute an appropriate missed approach whenever, prior to touchdown, the requirements of paragraph (d) of this section are not met.

(f) No person operating an aircraft using a Category III approach without decision height may land that aircraft except in accordance with the provisions of the letter of authorization issued by the ECAA.

(vi) Paragraph (a) through (f) of this section does not apply to operations conducted by the holders of certificates issued under Part 121. No person may operate a civil aircraft in a Category II or Category III operation conducted by the holder of a certificate issued under Part 121 unless the operation is conducted in accordance with that certificate holder's operations specifications.

(vii) Guidance material on certification and Criteria for approval of category III landing weather minim is included in EAC 91-12

91.191 Category II manual

(a) No person may operate a civil aircraft of Egyptian registry in a Category II operation unless:
(1) There is available in the aircraft a current, approved Category II manual for that aircraft;
(2) The operation is conducted in accordance with the procedures, instructions and limitations in that manual; and
(3) The instruments and equipment listed in the manual that are required for a particular Category II operation have been inspected and maintained in accordance the maintenance program contained in that manual.

(b) Each operator shall keep a current copy of the approved manual at its principal base of operations and shall make it available for inspection upon request of the ECAA.

(d) The section does not apply to operations conducted by the holder of a certificate issued under Part 121.

(e) Guidance material on certification and Criteria for approval of category II landing weather minim is included in EAC 91-11.

91.193 Certificate of authorization for certain Category II operations

The ECAA may issue a certificate of authorization authorizing deviations from requirements of 91.189,and 91.191 for the operation of small aircraft (less than 5700 kg MTGW) aircraft in Category II operations if the ECAA finds that the proposed operation can be safely conducted under the terms of the certificate. Such authorization does not permit operation of the aircraft carrying persons or property for compensation or hire.

91.195 Craft equipment

(a) Aircraft shall be equipped with suitable instruments and with navigation equipment appropriate to the route to be flown.

(b) An instrument approach shall not be continued beyond the outer marker fix in case of precision approach, or below 300 m (1000 ft) above the aerodrome in case of non-precision approach, unless the reported visibility or controlling RVR is above the specified minimum. If, after passing the outer marker fix in case of precision approach, or after descending below 300 m (1000 ft) above the aerodrome in case of non-precision approach, the reported visibility or controlling RVR falls below the specified minimum, the approach may be continued to DA/H or MDA/H. In any case, an aeroplane shall not continue its approach-to-land beyond a point at which the limits of the aerodrome operating minima would be infringed.

91.197 Instrument flight procedures

(a) Instrument approach operations shall be classified based on the designed lowest operating minima below which an approach operation shall only be continued with the required visual reference as follows:

(1) Type A: a minimum descent height or decision height at or above 75 m (250 ft); and

(2) Type B: a decision height below 75 m (250 ft). Type B instrument approach operations are categorized as:

(i) Category I (CAT I): a decision height not lower than 60 m (200 ft) and with either a visibilitynot less than 800 m or a runway visual range not less than 550 m;

(ii) Category II (CAT II): a decision height lower than 60 m (200 ft), but not lower than 30 m(100 ft) and a runway visual range not less than 300 m;

(iii) Category III (CAT III): a decision height lower than 30 m (100 ft) or no decision heightand a runway visual range not less than 300 m or no runway visual range limitations ;

Note 1. — Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach operation would be conducted in accordance with the requirementsof the most demanding category (e.g. an operation with a DH in the range of CAT III but with an RVR in the range of CAT III would be considered a CAT III operation or an operation with a DH in the range of CAT II but with an RVR in the range of CAT I would be considered a CAT II operation). This does not apply if the RVR and/or DH has been approved as operational credits

Note 2. — The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In the case of a circling approach operation the required visual reference is the runway environment.

(b) One or more instrument approach procedures designed in accordance with the classification of instrument approach and landing operations shall be approved and promulgated by the State in which the aerodrome is located to serve each instrument runway or aerodrome utilized for instrument flight operations.

(c) All aeroplanes operated in accordance with instrument flight rules shall comply with the instrument flight procedures approved by the State in which the aerodrome is located.

(d) An aircraft electing to change the conduct of its flight from compliance with the instrument flight rules to compliance with the visual flight rules shall, if a flight plan was submitted, notify the

appropriate air traffic services unit specifically that the IFR flight is cancelled and communicate thereto the changes to be made to its current flight plan.

(e) When an aircraft operating under the instrument flight rules is flown in or encounters visual meteorological conditions it shall not cancel its IFR flight unless it is anticipated, and intended, that the flight will be continued for a reasonable period of time in uninterrupted visual meteorological conditions.

(f) Category II and Category III instrument approach operations shall not be authorized unless RVR information is provided.

(g) For instrument approach operations, aerodrome operating minima below 800 m visibility should not be authorized unless RVR information is provided.

(h) (ECAA shall issue a specific approval for instrument approach operations in low visibility which shall only be conducted when RVR information is provided.

Note.— Guidance on low visibility operations is contained in the Manual of All-Weather Operations (Doc 9365).

(i) For take-off in low visibility, the State of Registry shall issue a specific approval for the minimum take-off RVR .

Note.— In general, visibility for take-off is defined in terms of RVR. An equivalent horizontal visibility may also be used.

(j) Meteorological observations

The procedures for making meteorological observations on board aircraft in flight and for recording and reporting them are contained in Annex 3, the PANS-ATM (Doc 4444) and the appropriate Regional Supplementary Procedures (Doc 7030).

-ATM (Doc 4444) and the appropriate Regional Supplementary Procedures (Doc 7030).

91.199 Flight in icing conditions

(a) Aflight to be operated in known or expected icing conditions shall not be commenced unless the aeroplane is certificated and equipped to cope with such conditions.

(b) A flight to be planned or expected to operate in suspected or known ground icing conditions shall not take off unless the aero plane has been inspected for icing and, if necessary, has been given appropriate de-icing/anti-icing treatment. Accumulation of ice or other naturally occurring contaminants shall be removed so that the aero plane is kept in an airworthy condition prior to take-off.

Note.— Guidance material is given in the Manual of Aircraft Ground De-icing/Anti-icing Operations *(Doc 9640).*

91.200 Helicopter operating procedures for noise abatement

An operator should ensure that take-off and landing procedures take into account the need to minimize the effect of helicopter noise.

SUBPART C
Equipment, Instrument and Certificate Requirements

91.201 Communication equipment

(a) An aeroplane to be operated in accordance with the instrument flight rules or at night shall be provided with radio communication equipment. Such equipment shall be capable of conducting two-way communication with those aeronautical stations and on those frequencies prescribed by the appropriate authority.

Note.— The requirements of (a) are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

(b) When compliance with (a) requires that more than one communication equipment unit be provided, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other.

(c) An aeroplane to be operated in accordance with VFR, but as a controlled flight, shall, unless exempted by the appropriate authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

(d) An aeroplane to be operated on a flight to which the provisions of the requirements for extended flights over water or flights over designated land areas apply shall, unless exempted by the appropriate authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

(e) The radio communication equipment required in accordance with (a) to (d) shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

(f) For operations where communication equipment is required to meet an RCP specification for performance-based communication (PBC), an aeroplane shall, in addition to the requirements specified in (a) to (e):

(1) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s); and

(2) have information relevant to the aeroplane RCP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or ECAA; and

(3) where the aeroplane is operated in accordance with a MEL, have information relevant to the aeroplane RCP specification capabilities included in the MEL.

Note.— Information on the performance-based communication and surveillance (PBCS) concept and guidance material on its implementation are contained in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).

(g) ECAA shall establish criteria for operations where an RCP specification for PBC has been prescribed.

(h) In establishing criteria for operations where an RCP specification for PBC has been prescribed, ECAA shall require that the operator/owner establish:

(1) Normal and abnormal procedures, including contingency procedures;

(2) Flight crew qualification and proficiency requirements, in accordance with the appropriate RCP specifications;

(3) A training programme for relevant personnel consistent with the intended operations; and

(4) Appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RCP specifications.

(i) ECAA shall ensure that, in respect of those aeroplanes mentioned in (f), adequate provisions exist for:

(1) Receiving the reports of observed communication performance issued by monitoring programmes established in accordance with 172.159; and

(2) Taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RCP specification.

(j) In addition to the requirements of (a) to (i) above, for large and turbojet aeroplanes:

(1) An aeroplane shall be provided with radio communication equipment capable of:

(i) Conducting two-way communication for aerodrome control purposes;

(ii) Receiving meteorological information at any time during flight; and

(iii) Conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

Note.— The requirements of (j) 1) are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

(2) The equipment installation shall be such that the failure of any single unit required for either communications, navigation or surveillance purposes or any combination thereof will not result in the failure of another unit required for communications, navigation or surveillance purposes.

(3) Communication equipment shall satisfy FM immunity performance Standards for Communications Systems in accordance with ICAO Annex 10, Volume III, Part II

(4) VHF Data Link Systems : In regions where VHF Data Link Communicatios are required these systems shall satisfy the requirements specified in Annex 10 Vol. III Part I Ch.6

(5) HF Data Link Systems : In regions where HF Data Link Communicatios are required these systems shall satisfy the requirements specified in Annex 10 Vol. III Part I Ch.11

(6) VHF Voice Communication Systems shall satisfy the requirements specified in Annex 10 Vol. III Part II Ch.2 .

(7) HF Voice Communication Systems shall satisfy the requirements specified in Annex 10 Vol. III Part II Ch.2 .

(8) SELCAL Systems if installed shall satisfy the requirements specified in Annex 10 Vol. III Part II Ch.3 .

91.202 Navigation equipment

91.202 Navigation equipment

(a) An aeroplane shall be provided with navigation equipment which will enable it to proceed:

(1) In accordance with its flight plan; and

(2) In accordance with the requirements of air traffic services; except when, if not so precluded by the appropriate authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

(b) For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, an aeroplane shall, in addition to the requirements specified in (a):

(1) Be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s); and

(2) Have information relevant to the aeroplane navigation specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of the Design or the ECAA; and

(3) Where the aeroplane is operated in accordance with a MEL, have information relevant to the aeroplane navigation specification capabilities included in the MEL.

Note.— Guidance on aeroplane documentation is contained in the Performance-based Navigation (PBN) Manual (Doc 9613).

(c) the ECAA shall establish criteria for operations where a navigation specification for PBN has been prescribed.

(d) In establishing criteria for operations where a navigation specification for PBN has been prescribed, the State of Registry shall require that the operator/owner establish:

(1) Normal and abnormal procedures including contingency procedures;

(2) Flight crew qualification and proficiency requirements in accordance with the appropriate navigation specifications;

(3) Training for relevant personnel consistent with the intended operations; and

(4) appropriate maintenance procedures to ensure continued airworthiness in accordance with the appropriate navigation specifications.

Note 1.— Guidance on safety risks and mitigations for PBN operations, in accordance with Annex 19, are contained in the Performance-based Navigation (PBN) Operational Approval Manual (Doc 9997).

Note 2.— Electronic navigation data management is an integral part of normal and abnormal procedures.

(e) the ECAA shall issue a specific approval for operations based on PBN authorization required (AR) navigation specifications.

Note.— Guidance on specific approvals for PBN authorization required (AR) navigation specifications is contained in the Performance-based Navigation (PBN) Operational Approval Manual (Doc 9997).

(f) For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, minimum navigation performance specifications (MNPS) are prescribed, an aeroplane shall be provided with navigation equipment which:

(1) Continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and

(2) Has been authorized by the ECAA for the MNPS operations concerned.

Note.— The prescribed minimum navigation performance specifications and the procedures governing their application are published in the Regional Supplementary Procedures (Doc 7030).

(g) For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, a reduced vertical separation minimum (RVSM) of 300 m (1 000 ft) is applied between FL 290 and FL 410 inclusive, an aeroplane:

(1) Shall be provided with equipment which is capable of:

(i) Indicating to the flight crew the flight level being flown;

(ii) Automatically maintaining a selected flight level;

(iii) Providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alert shall not exceed ±90 m (300 ft); and

(iv) Automatically reporting pressure-altitude;

(2) Shall be authorized by the ECAA for operation in the airspace concerned; and

(3) Shall demonstrate a vertical navigation performance in accordance with Appendix G.

(h) Prior to granting the RVSM specific approval required in accordance with (g) 2), the State shall be satisfied that:

(1) The vertical navigation performance capability of the aeroplane satisfies the requirements specified in Appendix G;

(2) The owner/operator has instituted appropriate procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; and

(3) The owner/operator has instituted appropriate flight crew procedures for operations in RVSM airspace.

Note.— An RVSM specific approval is valid globally on the understanding that any operating procedures specific to a given region will be stated in the operations manual or appropriate crew guidance.

(i) the ECAA shall ensure that, in respect of those aeroplanes mentioned in (g), adequate provisions exist for:

(1) Receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with 172.143, EAC 91-8 and EAC 91-9; and

(2) Taking immediate corrective action for individual aircraft, or aircraft type groups, identified in such reports as not complying with the height-keeping requirements for operation in airspace where RVSM is applied.

(j) the ECAA that has issued an RVSM specific approval to an owner/operator shall establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the owner/operator have their heightkeeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per aeroplane, whichever period is longer. If an owner/operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.

Note.— Monitoring data from any regional monitoring programme established in accordance with 172.159, may be used to satisfy the requirement.

(k) All States that are responsible for airspace where RVSM has been implemented, or that have issued RVSM specific approvals to owners/operators within their State, shall establish provisions and procedures which ensure that appropriate action will be taken in respect of aircraft and owners/operators found to be operating in RVSM airspace without a valid RVSM specific approval.

Note 1.— These provisions and procedures need to address both the situation where the aircraft in question was operating without a specific approval in the airspace of the State, and the situation where an owner/operator for which the State has regulatory oversight responsibility is found to be operating without the required specific approval in the airspace of another State.

Note 2.— Guidance material relating to the specific approval for operation in RVSM airspace is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574).

(l) The aeroplane shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the aeroplane to navigate in accordance with (d) and where applicable (e), (f) and (g).

Note 1.— This requirement may be met by means other than the duplication of equipment.

Note 2.— Guidance material relating to aircraft equipment necessary for flight in airspace where a 300 m (1 000 ft) VSM is applied above FL 290 is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574).

(m) On flights in which it is intended to land in instrument meteorological conditions, an aeroplane shall be provided with radio equipment capable of receiving signals providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance for each aerodrome at which it is intended to land in instrument meteorological conditions and for any designated alternate aerodromes.

(n) Navigation equipment shall satisfy FM immunity performance Standards for ILS Localizer, and VOR receivers in accordance with ICAO Annex 10, Volume I - Radio Navigation Aids, Chapter 3,

(o) ADF systems :

(1) Accuracy of bearing indication as specified in Annex 10 Vol. I Ch.3.9.1.1

(2) System characteristics as specified in Annex 10 Vol. II Ch.6.2

91.203 Civil aircraft: Certifications and document required on board

(a) Except as provided in 91.715, no person may operate a civil aircraft unless it has on board the following:

(1) An appropriate and current airworthiness certificate except a special flight permit. The ECAA requires the sections of the operations manual required in Part 121 containing that portion of the operations specifications issued under Part 21. The manual requirements include a flight manual containing all aircraft operating limitations, current and suitable en-route and approach charts for the area of intended operations, the procedures, signals and maneuvers of intercepted aircraft and information regarding search and rescue procedures applicable to the area of intended operations. In lieu of the operations specifications issued under Part 121, an authorization under this part may be used to comply provided the aircraft has the registration marks assigned to the aircraft under Part 47.

(2) An effective Egyptian registration certificate issued to its owner or, for operation within Egypt, the aircraft registration application or a registration certificate issued under the laws of a foreign country.

(3) Operations manual

An operator shall provide, for the use and guidance of personnel concerned, an operations manual containing all the instructions and information necessary for operations personnel to perform their duties. The operations manual shall be amended or revised as is necessary to ensure that the information contained therein is kept up to date. All such amendments or revisions shall be issued to all personnel that are required to use this manual.

Note 1. — States may reference accepted and recognized industry codes of practice as the basis for the development of an operations manual.

Note 2. — Appendix L contains guidance on the organization and content of an operations manual.

Note 3. — An operator should provide operations staff and flight crew with an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft. The manual should be consistent with the aircraft flight manual and checklists to be used. The design of the manual should observe Human Factors principles.

(4) Operating instructions — general

An operator shall ensure that all operations personnel are properly instructed in their particular duties and responsibilities and the relationship of such duties to the operation as a whole.

Recommendation. — An operator should issue operating instructions and provide information on aero plane climb performance to enable the pilot-in-command to determine the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique. This information should be included in the operations manual.

(b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under 91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.

(c) No person may operate an aircraft with a fuel tank installed within the passenger compartment or a baggage compartment unless the installation was accomplished pursuant to Part 43, and a copy of Egyptian reporting form authorizing that installation is on board the aircraft.

(d) No person may operate a civil airplane (domestic or foreign) into or out of an airport in Egypt unless it complies with fuel venting and exhaust emissions requirements.

(e) In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in the following paragraphs shall be installed or carried, as appropriate, on the aircraft according to the aircraft used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be approved or accepted by the State of Registry.

(f) The following is a summary of the document required on board the aircraft:

(1) Documents
- (i) Certificate of Registration
- (ii) Certificate of Airworthiness
- (iii)Noise Certificate (if applicable)
- (iv) Air Operator Certificate
- (v) Aircraft Radio License
- (vi) Third party liability Insurance Certificate(s).
- (vi)Each flight crew member shall, on each flight, carry a valid flight crew license with appropriate rating(s)
- (viii) Journey log book

(2) Manuals
- (i) The current parts of the Operations
- (ii) Manual relevant to the duties of the crew
- (iii) The current Aircraft Flight Manual
- (iv) MMEL/ DDPG
- (v) FCOM
- (vi) QRH (Quick Reference Handbook)
- (vii)WBM

(3) Additional information and forms
- (i) Operational Flight Plan
- (ii) Aircraft Technical Log
- (iii) ATS flight plan
- (iv) NOTAM/AIS briefing
- (v) Documentation
- (vi) Meteorological information
- (vii) Mass and balance documentation
- (viii) Notification of special categories of passenger
- (ix) Notification of special loads including dangerous goods
- (x) Current maps and charts
- (xi) Passenger Manifest
- (xii) Cargo Manifest
- (xiii) Forms for reporting.

91.204 Powered civil aircraft with standard category Egyptian airworthiness certificates: Instrument and equipment requirements

(a) General: An aircraft shall at all times be equipped with instruments which will enable the cockpit crew to control the flight path of the aircraft, carry out any required procedural maneuver, and comply with the operating limitations of the aircraft during all phases of the operation. Except as provided in paragraph (c)(2) and (d) of this section, no person may operate a powered civil aircraft with a standard category Egyptian airworthiness certificate in any operation described in paragraphs (b) through (d) of this section unless that aircraft contains the instruments and equipment specified in those paragraphs or Egyptian approved equivalents for that type of operation, and those instruments and items of equipment are in operable condition.

Note-1: Instruments that are used by any one pilot shall be so arranged as to permit the pilot to see their indications readily from his or her station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.

Note -2 : Pressurized aero planes when carrying passengers shall be equipped with operative weather-detecting equipment capable of detecting thunderstorms whenever such aeroplanes are being operated in areas where such conditions may be expected to exist along the route either at night or under instrument meteorological conditions.

(b) Visual-flight rules (day). For VFR flight during the day, the following instruments and equipment are required;

(1) Airspeed indicator;
(2) Altimeter;
(3) A magnetic direction indicator (magnetic compass);
(4) Tachometer for each engine;
(5) Oil pressure gauge for each engine;
(6) Temperature gauge for each liquid-cooled engine;
(7) Oil temperature gauge for each air-cooled engine;
(8) Manifold pressure gauge for each altitude engine;
(9) Fuel gauge indicating the quantity of fuel in each tank;
(10) Landing gears position indicator, if the aircraft has a retractable landing gear;
(11) An approved and accessible first aid kit (as appropriate);
(12) A fire extinguisher that, when discharged, will not cause dangerous contamination within the aircraft:
  (i) One is required in the cockpit; and
  (ii) One is required for each passenger compartment separate from the cockpit and not accessible by the cockpit crew.
(13) An approved seat or birth with an approved seat belt equipped with a metal to metal latching device for each occupant 2 years of age or older. For all aircraft, an approved safety belt and shoulder harness for each front seat;
(14) Spare electrical fuses of appropriate ratings for replacement of those accessible in flight;
(15) An accurate timepiece indicating the time in hours, minutes and seconds;
(16) For all pressurized aircraft first certified after January 1, 1990 there must be a system installed to alert the cockpit crew of any loss of pressurization;
(17) A Mach number indicator when the aircraft has operating limitations expressed in terms of indicated Mach number;
(18) Radio communication equipment when operating at night, extended over water, over designated land areas or when operating in controlled airspace that is appropriate for the applicable aeronautical agency and must provide communication on emergency frequency 121.5 MHz. When more than one type of radio communication equipment is needed to comply with this requirement, then they must be independent so that failure of one does not mean failure of both;
(19) An emergency locator transmitter, if required by 91.207;
(20) For normal, utility, and acrobatic category airplanes with a seating configuration, excluding pilot seats, of 9 or less, manufactured after December 12,1986, a shoulder harness for:
  (i) Each front seat that meets the requirements of ECAR Part 23, in effect on December 12, 1985; and

(ii) Each additional seat that meets the requirements of 23 in effect on December 12, 1985.

(21) For rotorcraft manufactured after September 16, 1992, a shoulder harness for each seat that meets the requirements of Part 27 or 29 in effect on September 16,1991; and

(22) All Aircraft's on all flights should be equipped with a safety harness for each flight crewmember seat.

(23) For small civil airplanes manufactured after July 18, 1978, an approved shoulder harness for each front seat. The shoulder harness must be designed to protect the occupant from serious head injury when the occupant experiences the ultimate inertia forces. Each shoulder harness installed at a cockpit crewmember station must permit the crewmember, when seated and with the safety belt and shoulder harness fastened, to perform all functions necessary for flight operations for purpose of this paragraph:

(i) The date of manufacture of an airplane is the date the inspection acceptance records reflect that the airplane is complete and meets the Egyptian-approved type design data; and

(ii) A front seat is a seat located at a cockpit crewmember station or any seat located alongside such a seat.

(c) Visual flight rules at night and instrument flight rules. For VFR at night and IFR flight the following instruments and equipment are required:

(1) Instruments and equipment specified in paragraph (b) of this section;

(2) An approved aviation red or aviation white anti-collision light system on all Egyptian registered civil aircraft anti-collision light systems initially installed after August 11, 1971, on aircraft for which a type certificate was issued or applied for before August 11, 1971, must at least meet the anti-collision light standards of ECAR Parts 22, 23, 25, 27 or 29, as applicable, that were in effect on August 10, 1971, except that the color may be either aviation red or aviation white, in the event of failure of any light of the anti-collision light system. Operations with the aircraft may be continued to a stop where repairs or replacement can be made;

(3) An adequate source of electrical energy for all installed electrical and radio equipment;

(4) One spare set of fuses or three spare fuses of each kind required, that are accessible to the pilot in flight;

(5) Two-way radio communications system and navigational equipment appropriate to the ground facilities to be used;

(6) Gyroscope rate-of-turn indicator, except on the following aircraft;

(i) Airplanes with a third attitude instrument system usable through flight attitudes of 360 degrees of pitch and roll and installed in accordance with the instrument requirements prescribed in 121.305(j); and

(ii) Rotorcraft with a third attitude instrument system usable through flight attitudes of +/- 80 degrees of pitch and +/- 120 degrees of roll and installed in accordance with JAR/FAR 29.

(7) Slip-skid indicator;

(8) Sensitive altimeter adjustable for barometric pressure;

(9) A clock displaying hours, minutes, and seconds with a sweep-second pointer or digital presentation;

(10) Generator or alternator of adequate capacity;

(11) Gyroscopic pitch and bank indicator (artificial horizon);

(12) Gyroscopic direction indicator (directional gyro or equivalent);

(13) A means of indicating if the power supply to the gyroscopic instrument is adequate;

(14) A vertical velocity indicating system;

(15) A means by which the cockpit crew can determine the outside air temperature;

(16) A system that will protect the airspeed indicating system from malfunctioning due to condensation or icing;

(17) Pressurized aero planes intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa shall be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

(18) Approved position lights;

(19) Two landing lights. For helicopters one of the landing lights should be trainable, at least in the vertical plane.

(20) Illumination of the flight instruments and equipment that is essential to the safe operation of the aircraft;
(21) Lights in the passenger compartment;
(22) Flashlights for each crewmember station; and
(23) Such additional instruments or equipment as may be prescribed by the appropriate authority.

(d) Flight at and above 24,000 ft, MSL (FL 240). If VOR navigational equipment is required under paragraph (d)(2) of this section, no person may operate an Egyptian registered civil aircraft within Egypt unless that aircraft is equipped with approved distance measuring equipment (DME). When DME required by this paragraph fails at and above FL 240, the pilot in command of the aircraft shall notify ATS immediately, and then may continue operations at and above FL 240 to the next airport of intended landing at which repairs or replacement of the equipment can be made.

91.205 Equipment required for seaplanes

The following list of equipment is required for all operations of seaplanes or amphibian aircraft being operated as seaplanes:

(a) A life jacket or equivalent flotation device for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided;
(b) Equipment for making sound signals as prescribed in the International Regulations for Preventing Collisions at Sea;
(c) One anchor; and
(d) One sea anchor.

91.206 Emergency equipment required for all aircraft

The following list of equipment is required for all aircraft operations:

(a) When an aero plane is operating over water at a distance of greater than 50NM from land, then the aero plane must have one life jacket or equivalent floatation device easily accessible for each person on board;
(b) For all single engine aero plane: operating over water beyond gliding distance of land must carry an accessible flotation device for each person on board the aeroplane; or when taking off or landing at an aerodrome where, in the opinion of the pilot-in-command, the take-off or approach path is so disposed over water that in the event of a mishap there would be a likelihood of a ditching; should carry one life jacket or equivalent individual floatation device for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided.

Note.— "Landplanes" includes amphibians operated as landplanes.

(c) When operating 100NM for single engine or 200NM for multi-engine aero plane, then accessible life rafts in sufficient number to carry all persons on board and equipped with survival kits and pyrotechnic signaling devices; and
(d) When operating over designated areas where search and rescue is considered by the controlling State to be difficult, then the aircraft will carry signaling devices and survival equipment appropriate to the area being over-flown.
(e) All helicopters flying over water at a distance from land corresponding to more than 10 minutes at normal cruise speed in the case of performance Class 1 or 2 helicopters; or beyond auto rotational or safe forced landing distance from land in the case of performance Class 3 helicopters shall be equipped with:
(1) A permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter
(2) One life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided;
(3) Life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken; and
(4) Equipment for making the pyrotechnical distress signals.

Note.1— For offshore operations, a survival suit should be worn by all occupants when the sea temperature is less than 10°C or when the estimated rescue time exceeds the calculated survival time. When the elevation and strength of the sun results in a high temperature hazard on the flight desk, consideration should be given to alleviating the flight crew from this recommendation.

Note.2— When establishing rescue time, the sea state and the ambient light conditions should be taken into consideration.

(f) Performance category B helicopters when operating beyond auto rotational distance from land but within a distance from land specified by the appropriate authority of the responsible State shall be equipped with one life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided.

(g) Performance category A and B helicopters, when taking off or landing at a heliport where, in the opinion of the State of the Operator, the take-off or approach path is so disposed over water that in the event of a mishap there would be likelihood of a ditching, at least the equipment required in (e)(2) shall be carried.

(h) Each life jacket and equivalent individual flotation device, when carried in accordance with this 4.5, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.

(i) Rafts which are not deployable by remote control and which have a mass of more than 40 kg should be equipped with some means of mechanically assisted deployment.

(j) All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 1991, at least 50 per cent of the life rafts carried in accordance with the provisions of (e)(3) should be deployable by remote control.

(k) For offshore operations, when operating beyond auto rotational distance from the land, the life jacket shall be worn unless the occupant is wearing an integrated survival suit that includes the functionality of the life jacket.

(l) Helicopters operating in performance Class 3 when operating beyond the distance specified in (f) shall be equipped as in (e).

(m) Aero planes of a maximum certificated take-off mass of over 5 700 kg newly introduced into service after 1 January 1975 shall be fitted with an emergency power supply, independent of the main electrical generating system, for the purpose of operating and illuminating, for a minimum period of 30 minutes, an attitude indicating instrument (artificial horizon), clearly visible to the pilot-in-command. The emergency power supply shall be automatically operative after the total failure of the main electrical generating system and clear indication shall be given on the instrument panel that the attitude indicator(s) is being operated by emergency power

(n) Aircraft with advanced cockpit automation systems (glass cockpits) should have system redundancy that provides the flight crew with attitude, heading, airspeed and altitude indications in case of failure of the primary system or display.

91.207 Emergency locator transmitters

(a) Except as provided in paragraph (f),(g) of this section or when exempted for technical reasons of non-availability of approved kits/spares, no person may operate an Egyptian registered civil aircraft unless there is attached to the aircraft emergency locator transmitter(s) that is (are) in operable conditions according to the following:

(1) For aero planes :

(i)Except as provided for in (ii), from 1 July 2008, all aeroplanes shall be equipped with at least one ELT of any type.

(ii) All aeroplanes for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with at least one automatic ELT.

(2) For helicopters:

(i) From 1 July 2008, all helicopters operating in performance Class 1 and 2 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in 4.3.1 a), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

(ii) From 1 July 2008, all helicopters operating in performance Class 3 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in 4.3.1 b), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

(b) Each emergency locator transmitter required by paragraph (a) of this section must be attached to the aircraft in a manner such that the probability of damage to the transmitter in the event of crash impact is minimized. Fixed, portable and deployable automatic type transmitters must be attached to the aircraft as far aft as practicable.

(c) Batteries used in the emergency locator transmitters required by paragraphs (a) of this section must be replaced (or recharged, if the batteries are rechargeable) when:

(1) The transmitter has been in use for more than 1 cumulative hour; or

(2) 50 percent of batteries useful life (or, for rechargeable batteries, 50 percent of their useful life of charge), as established by the transmitter manufacturer has expired. The new expiration date for replacing (or recharging) the battery must be legibly marked on the outside of the transmitter and entered in the aircraft maintenance record. This does not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

(d) Each emergency locator transmitter required by paragraph (a) of this section must be inspected within 12 calendar months after the last inspection for:

(1) Proper installation;

(2) Battery corrosion;

(3) Operation of the controls and crash sensor; and

(4) The presence of a sufficient signal radiated from its antenna.

(e) From 1 January 2005, emergency locator transmitters shall operate on 406 MHZ and 121.5 MHZ simultaneously.

(f) ELT equipment carried shall operate in accordance with the relevant provisions of Annex 10, Volume III as amended.

(g) All ELTs operating on 406 MHz shall:

(1) Be COSPAS-SARSAT approved according to type approval standard (C-ST-007).

(2) Operate simultaneously on both 406 MHz and 121.5 MHz,

(3) Be of the automatically activated type , and

(4) Be assigned a unique code in accordance with EAC91_14 and the operator must provide the ECAA with the coded identification of the ELT.

(5) Be registered at ECAA according to the manner described by ECAA procedures and the register information regarding ELT will be immediately submitted to Rescue Coordination Center (RCC) Cairo as identified in the Egyptian AIP as amended,

(h) Not withstanding paragraph (a) of this section, a person may:

(1) Ferry a newly acquired airplane from the place where possession of it was taken to a place where the emergency locator transmitter is to be installed; and

(2) Ferry an airplane with an inoperative emergency locator transmitter from a place where repairs or replacements cannot be made to a place where they can be made. No person other than required crewmembers may be carried aboard an airplane being ferried under this section.

(i) Paragraph (a) of this section does not apply to:

(1) Aircraft while engaged in training operations conducted entirely within a 50-nautical mile radius of the airport from which such local flight operations began;

(2) Aircraft while engaged in flight operations incident to design and testing;

(3) New aircraft while engaged in flight operations incident to their manufacture, preparation, and delivery.

(4) Aircraft while engaged in flight operations incident to the aerial application of chemicals and other substances for agricultural purposes;

(5) Aircraft certificated by the ECAA for research and development purposes;

(6) Aircraft while used for showing compliance with regulations, crew training, exhibition, air racing, or market surveys; and

(7) Aircraft equipped to carry not more than one person.
(8) An aircraft during any period for which the transmitter has been temporarily removed for inspection, repair, modification, or replacement according to the following conditions:
(i) The aircraft records contain an entry which includes the date of initial removal, the make, model, serial number, and reason for removing the transmitter, and a placard located in view of the pilot to show "ELT not installed"; and
(ii) The aircraft may not operate more than 90 days after the ELT is initially removed from the aircraft.

(j) Refer to EAC 91-14 as amended for details of ELT coding protocols and their priorities.

91.208 Surveillance equipment

(a) An aeroplane shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services.
(b) For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance (PBS), an aeroplane shall, in addition to the requirements specified in (a):
1) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification(s);
2) have information relevant to the aeroplane RSP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or ECAA; and
3) where the aeroplane is operated in accordance with a MEL, have information relevant to the aeroplane RSP specification capabilities included in the MEL.

Note 1.— Information on surveillance equipment is contained in the Aeronautical Surveillance Manual (Doc 9924).

Note 2.— Information on RSP specifications for performance-based surveillance is contained in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).

(c) ECAA shall establish criteria for operations where an RSP specification for PBS has been prescribed.
(d) In establishing criteria for operations where an RSP specification for PBS has been prescribed, ECAA shall require that the operator/owner establish:
(1) Normal and abnormal procedures, including contingency procedures;
(2) Flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;
(3) A training programme for relevant personnel consistent with the intended operations; and
(4) Appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RSP specifications.
(e) ECAA shall ensure that, in respect of those aeroplanes mentioned in (b), adequate provisions exist for:
(1) Receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with Annex 11, Chapter 3, 3.3.5.2; and
(2) Taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RSP specification.

91.209 Aircraft lights

No person may, during the period from sunset to sunrise:
(a) Operate an aircraft unless it has lighted position lights;
(b) Park or move an aircraft in, or in dangerous proximity to, a night flight operations area of an airport unless the aircraft:
(1) Is clearly illuminated;
(2) Has lighted position lights; or
(3) Is in an area that is marked by obstruction lights;
(c) Anchor an aircraft unless the aircraft:
(1) Has lighted anchor lights; or
(2) Is in an area where anchor lights are not required on vessels; or

(d) Operate an aircraft, required by 91.204(c)(3) to be equipped with an anti-collision light system, unless it has approved and lighted aviation red or aviation white anti-collision lights. However, the anti-collision lights need not be lighted when the pilot in command determines that, because of operating conditions, it would be in the interest of safety to turn the lights off.

(e) Lights to be displayed by aircraft Except as provided by 91.209(i), from sunset to sunrise or during any other period which may be prescribed by the ECAA all aircraft in flight shall display:
  (1) Anti-collision lights intended to attract attention to the aircraft; and
  (2) Navigation lights intended to indicate the relative path of the aircraft to an observer and other lights shall not be displayed if they are likely to be mistaken for these lights.

(f) Except as provided by 91.209(i), from sunset to sunrise or during any other period prescribed by the ECAA:
  (1) All aircraft moving on the movement area of an aerodrome shall display navigation lights intended to indicate the relative path of the aircraft to an observer and other lights shall not be displayed if they are likely to be mistaken for these lights;
  (2) Unless stationary and otherwise adequately illuminated, all aircraft on the movement area of an aerodrome shall display lights intended to indicate the extremities of their structure;
  (3) All aircraft operating on the movement area of an aerodrome shall display lights intended to attract attention to the aircraft; and
  (4) All aircraft on the movement area of an aerodrome whose engines are running shall display lights which indicate that fact.

(g) Except as provided by 91.209(i), all aircraft in flight and fitted with anti-collision lights to meet the requirement of 91.209(e)(1) shall display such lights also outside the period specified in 91.209(e).

(h) Except as provided by 91.209(i), all aircraft:
  (1) Operating on the movement area of an aerodrome and fitted with anti-collision lights to meet the requirement of 91.209(f)(3); or
  (2) On the movement area of an aerodrome and fitted with lights to meet the requirement of 91.209(f)(4); shall display such lights also outside the period specified in 91.209(f).

(i) A pilot shall be permitted to switch off or reduce the intensity of any flashing lights fitted to meet the requirements of 91.209(e), 91.209(f), 91.209(g) and 91.209(h) if they do or are likely to:
  (1) Adversely affect the satisfactory performance of duties; or
  (2) Subject an outside observer to harmful dazzle.

(j) Lights to be displayed by aircraft on the water. Between sunset and sunrise or such other period between sunset and sunrise as may be prescribed by the appropriate authority, all aircraft on the water shall display lights as required by the International Regulations for Preventing Collisions at Sea unless it is impractical for them to do so, in which case they shall display lights as closely similar as possible in characteristics and position to those required by the International Regulations.

91.210 Supplemental oxygen

(a) General. No person may operate an Egyptian registered civil aircraft:
  (1) At cabin pressure altitudes above 12,500 feet (MSL) up to and including 14,000 feet (MSL) unless the required minimum flight crew is provided with and uses supplemental oxygen for that part of the flight at those altitudes that is of more than 30 minutes duration;
  (2) At cabin pressure altitudes above 14,000 feet (MSL) unless the required minimum flight crew is provided with and uses supplemental oxygen during the entire flight time at those altitudes; and
  (3) At cabin pressure altitudes above 15,000 feet (MSL) unless each occupant of the aircraft is provided with supplemental oxygen.

(b) Pressurized cabin aircraft.
  (1) No person may operate an aircraft with a pressurized cabin:
    (i) At flight altitudes above flight level 250 unless at least a 10-minute supply of supplemental oxygen, in addition to any oxygen required to satisfy paragraph (a) of this section, is available for each occupant of the aircraft for use in the event that a descent is necessitated by loss of cabin pressurization; and

(ii) At flight altitudes above flight level 350 unless one pilot at the controls of the airplane is wearing and using an oxygen mask that is secured and sealed and that either supplies oxygen at all times or automatically supplies oxygen whenever the cabin pressure altitude of the airplane exceeds 14,000 feet (MSL), except that the one pilot need not wear and use an oxygen mask while at or below flight level 410 if there are two pilots at the controls and each pilot has a quick-donning type of oxygen mask that can be placed on the face with one hand from the ready position within 5 seconds, supplying oxygen and properly secured and sealed.

(2) Notwithstanding paragraph (b)(1)(ii) of this section, if for any reason at any time it is necessary for one pilot to leave the controls of the aircraft when operating at flight altitudes above flight level 350, the remaining pilot at the controls shall put on and use an oxygen mask until the other pilot has returned to that crewmember's station.

91.211 Oxygen supply

(a) A flight that is planned to be operated at flight altitudes at which the atmospheric pressure in personnel compartments will be greater than 10,000 ft shall not be commenced unless sufficient stored breathing oxygen is carried to supply:

(1) All crew members and 10 per cent of the passengers for any period in excess of 30 minutes that the pressure in compartments occupied by them will be between 700 hPa and 620 hPa; and;

(2) The crewmembers and all passengers for any period that the atmospheric pressure in compartments occupied by them will be greater than 13,000 ft.

(b) A flight to be operated with a pressurized aircraft shall not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all crewmembers and passengers, as is appropriate to the circumstances of the flight being undertaken, including, in the event of loss of pressurization, for any period that the atmospheric pressure in any compartment occupied by them would be less than 700In addition, when an aeroplane is operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa and cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, there shall be no less than a 10-minute supply for the occupants of the passenger compartment.

(c) For the purpose of providing first aid treatment to occupants who require undiluted oxygen following a descent from altitudes greater than Flight Level 250, a supply of oxygen in accordance with the requirements of paragraph (d) of this section must be provided for two percent of the occupants for the entire flight after cabin depressurization at cabin altitudes above 8,000 ft., but in no case to less than one person. An appropriate number of acceptable dispensing units, but in no case less than two, must be provided, with a means for the cabin crew to use this supply.

(d) The requirements for the first aid oxygen equipment required in paragraph (c) above, must provide a minimum mass flow of oxygen to each user of not less than four liters per minute. There may be a means to decrease this flow to not less than two liters per minute at any cabin altitude. The quantity of oxygen required is based upon an average flow rate of three liters per minute per person for whom first aid oxygen is required.

91.212 Use of oxygen

(a) All cockpit crew members, when engaged in performing duties essential to the safe operation of an aircraft in flight, shall use breathing oxygen continuously whenever the circumstances prevail for which its supply has been required in 91.210(a) or 91.210(b).

(b) All flight crew members of pressurized aero planes operating above an altitude where the atmospheric pressure is less than 376 hPa shall have available at the flight duty station a quick-donning type of oxygen mask which will readily supply oxygen upon demand..

(c) Should one pilot leave his position at the controls, the remaining pilot at the controls of the aircraft shall at all times wear and use an oxygen mask secured, sealed and supplying oxygen. The certificate holder shall demonstrate that the mask can be put on without disturbing eyeglasses and without delaying the cockpit crewmember from proceeding with his assigned emergency duties. The oxygen mask, after being put on, must not prevent the immediate communication between cockpit crewmembers and other crewmembers over the aircraft intercommunication system. The remaining pilot need not wear and use an oxygen mask if each cockpit crewmember on flight deck

duty has a quick donning type oxygen mask that the certificate holder has shown can be placed on the face from its ready position, properly secured, sealed and supplying oxygen upon demand, with one hand and within five seconds.

(d) Before takeoff each crewmember shall personally preflight the oxygen mask intended for use of that crewmember. This preflight must ensure the system is properly functioning and the supply and pressure are adequate.

(e) Each cabin crew shall, in aircraft operating above an altitude greater than Flight Level 250, carry portable oxygen equipment with at least a 15 minute supply of oxygen unless it is demonstrated that enough portable oxygen units with masks or spare outlets and masks are distributed throughout the cabin to ensure immediate availability of oxygen to each cabin crew, regardless of their location at the time of a loss of pressurization.

(f) Before flight is conducted above Flight Level 250, a crewmember shall instruct the passengers on the necessity of using oxygen in the event of cabin depressurization and shall point out to the passengers the location and demonstrate the use of the oxygen dispensing equipment.

91.213 Inoperative instruments and equipment

(a) Except as provided in paragraph (d) of this section, no person may takeoff an aircraft with inoperative instruments or equipment installed unless the following conditions are met;
  (1) An approved minimum equipment list exists for that aircraft.
  (2) The aircraft has within it a letter of authorization, issued by the ECAA, authorizing operation of the aircraft under the minimum equipment list, the letter of authorization may be obtained by written request of the airworthiness certificate holder. The minimum equipment list and the letter of authorization constitute a supplemental type certificate for the aircraft.
  (3) The approved minimum equipment list must:
    (i) Be prepared in accordance with the limitation specified in paragraph (b) of this section; and
    (ii) Provide for the operation of the aircraft with the instrument and equipment in an inoperable condition.
  (4) The aircraft records available to the pilot must include an entry describing the inoperable instruments and equipment.
  (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.

(b) The following instruments and equipment may not be included in a minimum equipment list:
  (1) Instrument and equipment that are either specifically or otherwise required by the airworthiness requirement under which the aircraft is type certificated and which are essential for safe operations under all operating conditions.
  (2) Instruments and equipment required by an airworthiness directive to be in operable condition unless the airworthiness directive provides otherwise.
  (3) Instruments and equipment required for specific operation by this Part.

(c) A person authorized to use an approved minimum equipment list issued for a specific aircraft under Part 121 shall use that minimum equipment list in connection with operations conducted with that aircraft under this Part without additional approval requirements.

(d) Except for operations conducted in accordance with paragraph (a) or (c) of this section, a person may takeoff an aircraft in operations conducted under this Part with inoperative instruments and equipment without an approved Minimum equipment list provided;
  (1) The flight operation is conducted in:
    (i) Rotorcraft, non-turbine powered airplane, glider, or lighter-than-aircraft for which a master Minimum equipment list has been developed; or
    (ii) Small rotorcraft, non-turbine powered small airplane, glider, or lighter-than -air aircraft for which a master minimum equipment list has not been developed; and
  (2) The inoperative instruments and equipment are not:
    (i) Part of the VFR-day type certification instruments and equipment prescribed in the applicable airworthiness regulations under which the aircraft was type certificated;
    (ii) 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;

(iii) Required by 91.204 or any other rule of this Part for the specific kind of flight operation being conducted; or
(iv) Required to be operational by an airworthiness directive; and
(3) The inoperative instruments and equipment are:
(i) Removed from the aircraft, the cockpit control placard, and the maintenance recorded in accordance with Part 43; and
(ii) Deactivated and placard " Inoperative." if deactivation of the inoperative instrument or equipment involves maintenance, it must be accomplished and recorded in accordance with Part 43; and
(4) A determination is made by a pilot, who is certificated and appropriately rated under Part 61, 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. An aircraft with inoperative instruments or equipment as provided in paragraph (d) of this section is considered to be in a properly altered condition acceptable to the ECAA.

(e) Notwithstanding any other provision of this section, an aircraft with inoperable instruments or equipment may be operated under a special flight permit issued in accordance with Part 21.

(f) MEL Rectification interval Extension:

A person may apply for an extension of MEL items category B and C rectification intervals to the ECAA , this extension of the rectifications interval is as a maximum of the same duration as the rectification interval specified in the MEL.

91.215 ATS transponder and altitude reporting equipment and use:

(a) ATS transponder equipment installed must meet the performance and environmental requirements of any class of (Mode A with altitude reporting capability), or the appropriate class of (Mode S) that meets the requirements of ICAO Annex 10, Volume IV, Ch 3 and of ICAO Annex 10, Volume III, Part I Ch 5 as amended.

(b) All airspace, unless otherwise authorized or directed by ATS, no person may operate an aircraft in the airspace described in paragraph (b)(1) through (b)(5) of this section, unless that aircraft is equipped with an operable coded radar beacon transponder having either Mode 3/A 4096 code capability, replying to Mode 3/A interrogations with the code specified by ATS, or a Mode S capability, replying to Mode 3/A interrogations with the code specified by ATS and inter-mode and Mode S interrogations, and that aircraft is equipped with automatic pressure altitude reporting equipment having a Mode C capability that automatically replies to Mode C interrogations by transmitting pressure altitude information in 100-foot increments. This requirement applies:
(1) All aircraft in Class A, Class B, and Class C airspace areas;
(2) Any aircraft which was not originally certificated with an engine-driven electrical system or which has not subsequently been certified with such a system installed, balloon or glider may conduct operations in the airspace within 30 nautical miles of an Egyptian airport, provided such operations are conducted
(i) Outside any Class A, Class B, or Class C airspace area; and
(ii) Below the altitude of the ceiling of a Class B or Class C airspace area designated for an airport or 10,000 feet MSL, whichever is lower; and
(3) All aircraft in all airspace above the ceiling and within the lateral boundaries of a Class B or Class C airspace area designated for an airport upward to 10,000 feet MSL; and
(4) All aircraft except any aircraft which was not originally certificated with an engine-driven electrical system or which has not subsequently been certified with such a system installed, balloon, or glider:
(i) In all airspace at and above 10,000 feet MSL, excluding the airspace at and below 2,500 feet above the surface; and
(ii) In the airspace from the surface to 10,000 feet MSL within a 10-nautical mile radius of any Egyptian airport excluding the airspace below 1,200 feet outside of the lateral boundaries of the surface area of the airspace designated for that airport.
(A) Transponder on operation. While in the airspace as specified in paragraph (b) of this section or in all controlled airspace, each person operating an aircraft equipped with an operable ATS transponder maintained in accordance with 91.413 of this Part shall

operate the transponder, including Mode C equipment if installed, and shall reply on the appropriate code or as assigned by ATS.

(B) ATS authorized deviations. Requests for ATS authorized deviations must be made to the ATS facility having jurisdiction over the concerned airspace within the time periods specified as follows:

(I) For operation of an aircraft with an operating transponder but without operating automatic pressure altitude reporting equipment having a Mode C capability, the request may be made at any time.

(II) For operation of an aircraft with an inoperative transponder to the airport of ultimate destination, including any intermediate stops, or to proceed to a place where suitable repairs can be made or both, the request may be made at any time.

(III) For operation of an aircraft that is not equipped with a transponder, the request must be made at least one hour before the proposed operation.

91.217 Data correspondence between automatically reported pressure altitude data and the pilot's altitude reference

No person may operate any automatic pressure altitude reporting equipment associated with a radar beacon transponder when deactivation of that equipment is directed by ATS;

(a) When deactivation of that equipment is directed by ATS;

(b) Unless, as installed, that equipment was tested and calibrated to transmit altitude data corresponding within 125 feet (on a 95 percent probability basis) of the indicated or calibrated datum of the altimeter normally used to maintain flight altitude, with that altimeter referenced to 29.92 inches of mercury for altitudes from sea level to the maximum operating altitude of the aircraft; or

(c) Unless the altimeters and digitizers in that equipment meet the standards of TSO-C10b and TSO-C88, respectively, as amended, or equivalent Standards.

91.218 Altitude alerting system or device: turbojet-powered civil airplanes

(a) Except as provided in paragraph (d) of this section, no person may operate a turbojet-powered Egyptian-registered civil airplane unless that airplane is equipped with an approved altitude alerting system or device that is in operable condition and meets the requirements of paragraph (b) of this section.

(b) Each altitude alerting system or device required by paragraph (a) of this section must be able to:

(1) Alert the pilot:

(i) Upon approaching a pre-selected altitude in either ascent or descent, by a sequence of both aural and visual signals in sufficient time to establish level flight at that pre-selected altitude; or

(ii) Upon approaching a pre-selected altitude in either ascent or descent, by a sequence of visual signals in sufficient time to establish level flight at that pre-selected altitude, and when deviating above and below that pre-selected 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) Pre-select 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; and

(5) 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 paragraph. A radio altimeter may be included to provide the signal if the operator has approved procedure for its use to determine DH or MDA, as appropriate.

(c) Each operator to which this section applies must establish and assign procedures for the use of the altitude alerting system or device and each flight crewmember must comply with those procedures assigned to him.(d) Paragraph(a) of this section does not apply to any operation of an airplane that has an experimental certificate or to the operation of any airplane for the following purposes:

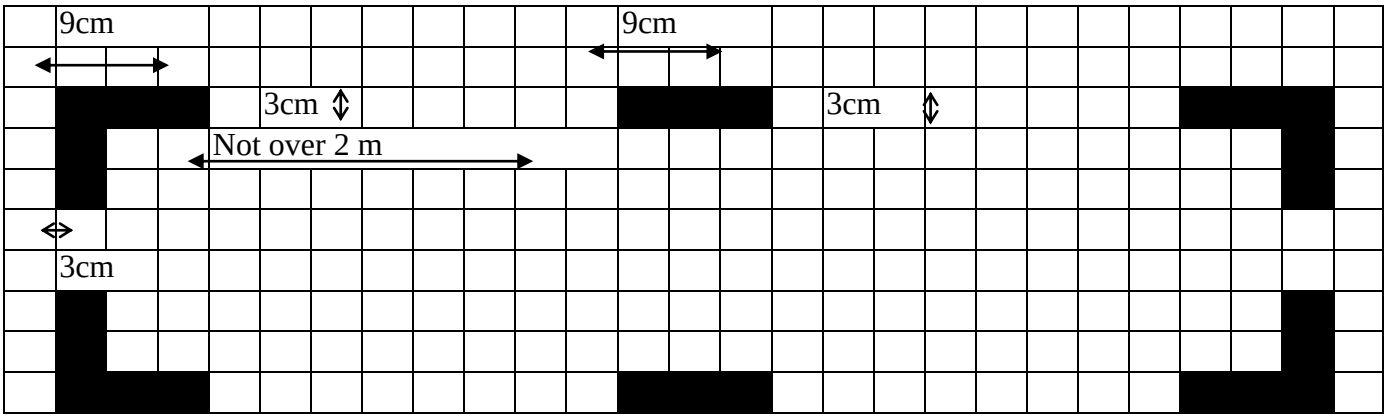
(1) Ferrying a newly acquired airplane from the place where possession of it was taken to a place where the altitude alerting system or device is to be installed;

(2) Continuing a flight as originally planned, if the altitude alerting system or device becomes inoperative after the airplane has taken off; however, the flight may not depart from a place where repair or replacement can be made;
(3) Ferrying an airplane with any inoperative altitude alerting system or device from a place where repairs or replacements cannot be made to a place where it can be made;
(4) Conducting an airworthiness flight test of the airplane;.
(5) Ferrying an airplane to a place outside Egypt for the purpose of registering it in another country;
(6) Conducting a sales demonstration of the operation of the airplane; and.
(7) Training foreign flight crews in the operation of the airplane before ferrying it to a place outside Egypt for the purpose of registering it in a foreign country.

91.219 Requirements for marking of aircraft break-in points

No person may operate a civil aircraft unless that aircraft meets the following markings requirements, and as shown in the figure below;

(a) If areas of the aircraft fuselage suitable for break-in by rescue crews in the event of an emergency are marked they must be marked in the colors red or yellow, and if necessary outlined in white to contrast the markings with the background; and
(b) IF the corner markings are more than two meters apart, intermediate lines measuring 9 cm by 3 cm shall be inserted so that there is no more than 2 m between the adjacent markings;



91.221 Traffic alert and collision avoidance system equipment and use

(a) All turbine-engined aero planes of a maximum certificated take-off mass in excess of 15 000 kg , or authorized to carry more than 30 passengers, for which the individual airworthiness certificate is first issued after 1 January 2007 shall be equipped with an airborne collision avoidance system (ACAS II).
(b) All turbine-engined aero planes of a maximum certificated take-off mass in excess of 15 000 kg , or authorized to carry more than 30 passengers, for which the individual airworthiness certificate is first issued after 24 November 2005 , should be equipped with an airborne collision avoidance system (ACAS II).
(c) An ACAS system shall satisfy the minimum performance level , be installed and operate in accordance with the relevant provisions of ICAO Annex 10, Volume IV, Ch.4 as amended.
(d) After 1 January 2014, All new ACAS installation shall monitor own aircraft s vertical rate to verify compliance with RA sense. If non-compliance is detected, ACAS shall stop assuming compliance, and instead shall assume the observed vertical rate . Compliance with this requirement can be achieved through the implementation of TCAS version 7.1; previous versions do not comply with this requirement .
(e) After 1 January 2017, All ACAS units shall comply with the requirements stated in (d) above.
Recommendation.— **All ACAS should be compliant with the requirements stated in (d) above.**
(f) Refer to ECA 91-15 for more information about the Operational Use and Pilot Training of ACAS.
(g) ECAA adopts all definitions related to ACAS as prescribed in ICAO documents & Annex 10 VOL.IV CH4.

91.223 Ground proximity warning-glide slope deviation alerting system.

(a) All turbine-engined aero planes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers, for which the individual certificate of airworthiness is first issued on or after1 January 2004, shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function that meeting the requirements of TSO C-92a, C-92b or C-92c, as amended, or equivalent Standards..

(b) From 1 January 2007, all turbine-engined aero planes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers, shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

(c) All turbine-engined aero planes should be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

(d) All piston-engined aero planes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers should be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

(e) A ground proximity warning system shall provide automatically a timely and distinctive warning to the flight crew when the aero plane is in potentially hazardous proximity to the earth's surface.

(f) A ground proximity warning system shall provide, as a minimum, warnings of at least the following circumstances:
(1) Excessive descent rate;
(2) Excessive altitude loss after take-off or go-around; and
(3) Unsafe terrain clearance.

(g) The operator shall implement database management procedures that ensure the timely distribution and update of current terrain and obstacle data to the ground proximity warning system.

(1) Excessive descent rate;
(2) Excessive terrain closure rate;
(3) Excessive altitude loss after take-off or go-around;
(4) Unsafe terrain clearance while not in landing configuration;
(5) Gear not locked down;
(6) Flaps not in a landing position; and
(7) Excessive descent below the instrument glide path.

(h) All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less and authorized to carry more than five but not more than nine passengers for which the individual certificate of airworthiness is first issued on or after 1 January 2026, shall be equipped with a ground proximity warning system which provides the warning for unsafe terrain clearance and a forward-looking terrain avoidance function..

Note: Unless otherwise specified in an air traffic control instruction, to avoid unnecessary Airborne Collision Avoidance System (ACAS II) resolution advisories in aircraft at or approaching adjacent altitudes or flight levels, pilots should consider using appropriate procedures to ensure that a rate of climb or descent of less than 8 m/s or 1 500 ft/min (depending on the instrumentation available) is achieved throughout the last 300 m (1 000 ft) of climb or descent to the Assigned altitude or flight level, when made aware of another aircraft at or approaching an adjacent altitude or flight level

91.224 Turbine aeroplane - runway overrun awareness and alerting system (ROAAS)

All turbine-engine aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg,
for which the individual certificate of airworthiness is first issued on or after 1 January 2026, shall be equipped with a runway overrun awareness and alerting system (ROAAS).

Note :ECAR 91 page 4 (TOC) shall be revised to include the new item 91.224

91.225 Least risk bomb location

All operators must specify, for each aircraft type operated, a least risk location on the aircraft Max. Take off mass in access of 45.500 kg and seats 60 passengers and for which the application for certification was submitted on or after 12 March 2000 a least-risk location on the aero plane shall be identified where a bomb or other or other explosive device may be placed to minimize the effects or the aircraft in the case of detonation. This location must be published in the applicable operating manual (s) and emergency checklists.

91.227 Equipment required for operation above 15000m (49000ft)

All aircraft intended to be operated above 1500m (49000 ft) must have equipment that is capable of measuring and indicating continuously the dose rate of total cosmic radiation being received and the cumulative dose on each flight. The display unit shall be readily visible to the cockpit crew.

91.229 Aero planes and Helicopters equipped with automatic landing systems, a head-up display (HUD) or equivalent displays, enhanced vision systems (EVS), synthetic vision systems (SVS) and/or combined vision systems (CVS)

(a) Where aero planes or helicopters are equipped with automatic landing systems, a HUD or equivalent displays, or EVS, SVS or CVS, or any combination of those systems into a hybrid system, criteria for the use of such systems for the safe operation of an aero plane or a helicopter shall be in accordance with ECAR Part 91 Appendix K.

(b) Where large and turbojet aero planes are equipped with automatic landing systems, a HUD or equivalent displays, or EVS, SVS or CVS, or any combination of those systems into a hybrid system, the use of such systems for the safe operation of an aero plane shall be approved by ECAA.

Note.— Information regarding a HUD or equivalent displays, including references to RTCA and EUROCAE documents, is contained in the Manual of All-Weather Operations (ICAO Doc 9365).

(c) In establishing operational criteria for the use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, ECAA shall ensure that:

(1) The equipment meets the appropriate airworthiness certification requirements;

(2) The owner has carried out a safety risk assessment associated with the operations supported by the automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS;

(3) The owner has established and documented the procedures for the use of, and training requirements for, automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS.

Note 1.— Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (ICAO Doc 9859).

Note 2. — Guidance on establishing *operational* criteria *is contained in Attachment 2.B. to ICAO Annex 6 Part II and Attachment I to ICAO Annex 6 Part III.*

91.231 Flight recorders

(a) Notes

(1) Crash protected flight recorders comprise one or more of the following:
— a flight data recorder(FDR) ,
— a cockpit voice recorder (CVR),
— an airborne image recorder (AIR),
— a data link recorder (DLR).
As per Appendix E and Appendix F image and data link information may be recorded on either the CVR or the FDR.

(2) Lightweight flight recorders comprise one or more of the following:
— an aircraft data recording system (ADRS),
— a cockpit audio recording system (CARS),
— an airborne image recording system (AIRS),
— a data link recording system (DLRS).
As per Appendix E and Appendix F image and data link information may be recorded on either the CARS or the ADRS.

(3) For helicopters, Combination recorders (FDR/CVR) may be used to meet the flight recorder equipage requirements in this part.

(4) Detailed requirements on flight recorders are contained in Appendix E and Appendix F .

(5) Section 121.5 contains requirements for States regarding the use of voice, image and/or data recordings and transcripts.

(6) For aeroplanes for which the application for type certification is submitted to a Contracting State before 1 January 2016, specifications applicable to crash-protected flight recorders may be found in EUROCAE ED-112, ED-56A,ED-55, Minimum Operational Performance Specifications (MOPS), or earlier equivalent documents.

(7) For aeroplanes for which the application for type certification is submitted to a Contracting State on or after 1 January 2016, specifications applicable to crash-protected flight recorders may be found in EUROCAE ED-112A, Minimum Operational Performance Specification (MOPS), or equivalent documents.

(9) Specifications applicable to lightweight flight recorders may be found in EUROCAE ED-155, Minimum Operational Performance Specification (MOPS), or equivalent documents.

(10) For helicopters for which the application for type certification is submitted to a Contracting State before 1 January 2016, specifications applicable to crash-protected flight recorders may be found in EUROCAE ED-112, ED-56A, ED-55, Minimum Operational Performance Specification (MOPS), or earlier equivalent documents

(11) For helicopters for which the application for type certification is submitted to a Contracting State on or after 1 January 2016, specifications applicable to crash-protected flight recorders may be found in EUROCAE ED-112A, Minimum Operational Performance Specification (MOPS), or equivalent documents

(b) Flight data recorders and aircraft data recording systems

. Note.—Parameters to be recorded:
- for aeroplanes tables E-1 and E-3 of Appendix E .
- for helicoptes tables F-1 and F-3 of Appendix F .

1. Applicability

1.1 **Recommendation**.—All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 should be equipped with:

(a) an FDR which should record at least the first 16 parameters listed in table E-1 of Appendix E or;

(b) a Class C AIR or AIRS capable of recording flight path and speed parameters displayed to the pilot(s) as defined in 2.2.3 of Appendix E ; or

(c) an ADRS which should record at least the first 7 parameters listed in table E-3 of Appendix E.

Note— AIR or AIRS classification is defined in Appendix E .

1.2 All aeroplanes for which the application for type certification is submitted to a Contracting State on or after 1 January 2016, and which are required to be fitted with an FDR, shall comply with a maximum recording interval as specified in Appendix E.

Note — "The application for type certification is submitted to a Contracting State" refers to the date of application of the original "Type Certificate" for the aeroplane type, not the date of certification of particular aeroplane variants or derivative models.

1.3 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2005 shall be equipped with an FDR which shall record at least the first 78 parameters listed in table E-1 of Appendix E.

1.4 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with an FDR which shall record at least the first 32 parameters listed in table E-1 of Appendix E.

1.5 **Recommendation**.—All aeroplanes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989, shall be equipped with an FDR which should record at least the first 16 parameters listed in table E-1 of Appendix E.

1.6 All helicopters of a maximum certificated take-off mass of over 3 175 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2016 shall be equipped with an FDR which shall record at least the first 48 parameters listed in table F-1 of Appendix F.

1.7 All helicopters of a maximum certificated take-off mass of over 7 000 kg, or having a passenger seating configuration of more than nineteen, for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with an FDR which shall record at least the first 30 parameters listed in table F-1 of Appendix F.

1.8 **Recommendation**.—All helicopters of a maximum certificated take-off mass of over 3 175 kg, up to and including 7 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989, should be equipped with an FDR which should record at least the first 15 parameters listed in table F-1 of Appendix F .

Note 1.— Above 8 standards are not applicable to general aviation operation

1.9 **Recommendation.**— All turbine-engined aeroplanes with a seating configuration of more than five passenger seats and a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 should be equipped with:

a) an FDR which should record at least the first 16 parameters in table E-1 of Appendix E; or

b) a Class C AIR or AIRS which should record at least the flight path and speed parameters displayed to the pilot(s), as defined in 2.2.2 of Appendix E; or

c) an ADRS which should record at least the first 7 parameters listed in table E-3 of Appendix E.

Note 1.— AIR or AIRS classification is defined in 4.1 of Appendix E.

Note 2.— "The application for type certification that is submitted to a Contracting State" refers to the date of application of the original "Type Certificate" for the aeroplane type, not the date of certification of particular aeroplane variants or derivative models

1.10 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in table E-1 of Appendix E.

1.11 **Recommendation.—** All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2023 should be equipped with an FDR capable of recording at least the 82 parameters listed in table E-1 of Appendix E.

Note 2. — Above 3 standards are applicable to general aviation operation

2. Recording technology

FDRs, ADRS, AIRs or AIRS shall not use engraving metal foil, frequency modulation (FM), photographic film or magnetic tape.

3. Duration

(a) For aeroplanes: All FDRs shall retain the information recorded during at least the last 25 hours of their operation, with the exception of those installed on aeroplanes referenced in 2.5 for which the FDR shall retain the information recorded during at least the last 30 minutes of its operation, and, in addition, sufficient information from the preceding take-off for calibration purposes.

(b) For helicopters: All FDRs shall retain the information recorded during at least the last 10 hours of their operation.

(C) Cockpit voice recorders and cockpit audio recording systems

1. Applicability

1.1 All turbine-engine aeroplanes of a maximum certificated take-off mass of over 2 250 kg, up to and including 5 700 kg, for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with either a CVR or a CARS

1.2 **Recommendation**.—All turbine-engine aeroplanes of a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 and required to be operated by more than one pilot should be equipped with either a CVR or a CARS.

1.3 All turbine-engined aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with a CVR.

1.4 **Recommendation**.—All aeroplanes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1987, should be equipped with a CVR.

1.5 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR.

1.6 All helicopters of a maximum certificated take-off mass of over 7 000 kg shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

1.7 **Recommendation**.—All helicopters of a maximum certificated take-off mass of over 3 175 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 should be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed should be recorded on the CVR.

Note 1.— Above 7 standards are not applicable to general aviation operation

1.8 **Recommendation.**— All turbine-engined aeroplanes with a seating configuration of more than five passenger seats and a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 and required to be operated by more than one pilot should be equipped with either a CVR or a CARS

Note 2.— Above standard are applicable to general aviation operation

2. Recording technology

CVRs and CARS shall not use magnetic tape or wire.

3. Duration

(a) For aero planes:

1. All CVRs shall retain the information recorded during at least the last 2 hours of their operation.

2 . All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2022 shall be

equipped with a CVR which shall retain the information recorded during at least the last 25 hours of its operation.

3. All aeroplanes that are required to be equipped with CARS, and for which the individual certificate of airworthiness is first issued on or after 1 January 2025, shall be equipped with a CARS which shall retain the information recorded during at least the last two hours of their operation.

(b) For helicopters:

All helicopters required to be equipped with a CVR shall be equipped with a CVR which shall retain the information recorded during at least the last two hours of its operation

(d) Data link recorders

1. Applicability

1.1 All aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which use any of the data link communications applications referred to in 5.1.2 of Appendix E and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder

1.2 All aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016 to use any of the data link communications applications referred to in 5.1.2 of Appendix E , shall record the data link communications messages on a crash-protected flight recorder, unless the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 1 January 2016.

1.3 **Recommendation**.— All aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016 to use any of the data link communications applications referred to in 5.1.2 of Appendix E should record the data link communications messages on a crash-protected flight recorder

Note 1.— Refer to table L-5 in Attachment L, Annex 6 Part I for examples of data link communication recording requirements.

Note 2.— Data link communications are currently conducted by either ATN-based or FANS 1/A-equipped aircraft.

Note 2.— A Class B AIR could be a means for recording data link communications applications messages to and from the aeroplanes where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.

Note 3.— The "aircraft modifications" refer to modifications to install the data link communications equipment on the aircraft (e.g. structural, wiring).

1.4 All helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which use any of the data link communications applications referred to in 5.1.2 of Appendix F and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder

1.5 All helicopters for which the individual certificate of airworthiness was first issued before 1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016 to use any of the data link communications applications referred to in 5.1.2 of Appendix F, shall record the data link communications messages on a crash-protected flight recorder unless the data link communications equipment is compliant with a type design or aircraft modification first approved prior to 1 January 2016.

Note 1.— Refer to table G-4 in Attachment G, Annex 6 Part III for examples of data link communication recording requirements

Note 2.— A Class B AIR could be a means for recording data link communications applications messages to and from the helicopters where it is not practical or is

prohibitively expensive to record those data link communications applications messages on FDR or CVR.

Note 3.— The "aircraft modifications" refer to modifications to install the data link communications equipment on the aircraft (e.g. structural, wiring).

1.6 **Recommendation**.— All helicopters for which the individual certificate of airworthiness was first issued before1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016 to use any of the data link communications applications referred to in 5.1.2 of Appendix F , should record the data link communications messages on a crash-protected flight recorder.

2. Duration

The minimum recording duration shall be equal to the duration of the CVR.

3. Correlation

Data link recording shall be able to be correlated to the recorded cockpit audio.

(e) **Flight recorders — general**

1. Construction and installation

Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

2. Operation

2.1. Flight recorders shall not be switched off during flight time.

2.2. To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined in accordance with Annex 13.

Note 1.— The need for removal of the flight recorder records from the aircraft will be determined by the investigation authority in the State conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

Note 2.— The operator's responsibilities regarding the retention of flight recorder records are contained in 121.150.

3. Continued serviceability

Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

Note.— Procedures for the inspections of the flight recorder systems are given in Appendix E and Appendix F.

4. Flight recorder electronic documentation

Recommendation.— The documentation requirement concerning FDR and ADRS parameters provided by operators to accident investigation authorities should be in electronic format and take account of industry specifications.

Note.— Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.

5. Combination recorders

5.1. **Recommendation**.— All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2016, and which are required to be equipped with both a CVR and an FDR, should be equipped with two combination recorders (FDR/CVR).

5.2. All aeroplanes of a maximum certificated take-off mass of over 15 000 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2016, and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders (FDR/CVR). One recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

5.3. **Recommendation.**— All aeroplanes of a maximum certificated take-off mass over 5 700 kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders (FDR/CVR).

5.4. **Recommendation.**— All multi-engine turbine-powered aeroplanes of a maximum certificated take-off mass of 5 700 kg or less, required to be equipped with an FDR and/or a CVR, may alternatively be equipped with one combination recorder (FDR/CVR).

(f) **Flight recorder data recovery**

1. All aeroplanes of a maximum certificated take-off mass of over 27 000 kg and authorized to carry more than nineteen passengers for which the application for type certification is submitted to a Contracting State on or after 1 January 2021, shall be equipped with a means approved by the State of the Operator, to recover flight recorder data and make it available in a timely manner.
2. In approving the means to make flight recorder data available in a timely manner, the State of the Operator shall take into account the following:
   (a) The capabilities of the operator;
   (b) Overall capability of the aeroplane and its systems as certified by State of Design;
   (c) The reliability of the means to recover the appropriate CVR channels and appropriate FDR data; and
   (d) Specific mitigation measures.
   Note.— Guidance on approving the means to make flight recorder data available in a timely manner is contained in the Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery (Doc 10054).

91.233 Electronic flight bags (EFBs)

Note.— Guidance on EFB equipment, functions and specific approval is contained in EAC 121.15 and the Manual on Electronic Flight Bags (ICAO Doc 10020).

(a) Where portable EFBs are used on board an aeroplane or a helicopter, the operator shall ensure that they do not affect the performance of the aeroplane systems, equipment or the ability to operate the aeroplane or the helicopter.

(b) Where EFBs are used on board an aeroplane or the helicopter the operator shall:
   (1) Assess the safety risk(s) associated with each EFB function;
   (2) Establish and document the procedures for the use of, and training requirements for, the device and each EFB function; and
   (3) Ensure that, in the event of an EFB failure, sufficient information is readily available to the flight crew for the flight to be conducted safely.
   Note.— Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859).

(c) the ECAA shall issue a specific approval for the operational use of EFB functions to be used for the safe operation of aeroplanes or helicopters.

(d) EFB specific approval:

When issuing a specific approval for the use of EFBs, the ECAA shall ensure that:
   (1) The EFB equipment and its associated installation hardware, including interaction with aeroplane or helicopter systems if applicable, meet the appropriate airworthiness certification requirements;
   (2) The operator has assessed the safety risks associated with the operations supported by the EFB function(s);
   (3) The operator has established requirements for redundancy of the information (if appropriate) contained in and displayed by the EFB function(s);
   (4) The operator has established and documented procedures for the management of the EFB function(s) including any database it may use; and
   (5) The operator has established and documented the procedures for the use of, and training requirements for, the EFB and the EFB function(s).
   Note—Guidence on safety risk assessments is contained in the safety management manual (SMM) (Doc 9859)

SUBPART D
Special Flight Operations

91.301 {Reserved}

91.303 Aerobatic flight

No person may operate an aircraft in aerobatics flight:

(a) Over any congested area of a city, town, or settlement.

(b) Over an open air assembly of persons.

(c) Within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport.

(d) Within 4 nautical miles of the center line of any airways.

(e) Below an altitude of 1.500 feet above the surface; or

(f) When flight visibility is less than 3 statute miles. For the purposes of this section, aerobatics flight means an intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight.

(g)No aircraft shall be flown acrobatically except under conditions prescribed by the ECAA and as indicated by relevant information, advice and/or clearance from the appropriate air traffic services unit.

91.305 Flight test areas

No person may flight-test an aircraft except over open water or sparsely populated areas, having light air traffic.

91.307 Parachutes and parachuting

(a) 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 and:

(1) If a chair type (canopy in back), it has been packed by a certificated and appropriately rated parachute rigger within the preceding 120 days; or

(2) If any other type, it has been packed by a certificated appropriately rated parachute rigger:

(i) Within the preceding 120 days, if its canopy, shrouds, and harness are composed of nylon, rayon, or other similar synthetic fiber or material that are substantially resistant to damage from mold, mildew, or other fungi and other rotting agents propagated in a moist environment; or

(ii) 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 paragraph (a) (2) (i) of this section.

(b) Except in an emergency, no pilot in command may allow, and no person may make, a parachute jump from an aircraft within the Arab Republic of Egypt except in accordance with Part 105.

(c) Unless such occupant of the aircraft is wearing an approved parachute, no pilot of a civil aircraft carrying any person (other than crewmember) may execute any intentional maneuver that exceeds:

(1) A bank of 60 degrees relative to the horizon; or

(2) A nose-up or nose-down attitude of 30 degrees relative to the horizon.

(d) Paragraph (c) of this section does not apply to:

(1) Flight-tests for pilot certification or rating; or

(2) Spins and other flight maneuvers required by the regulations for any certificate or rating when given by:

(i) A certificated flight instructor; or

(ii) An airline transport pilot instructing in accordance with Part 61.

(e) For the purposes of this section, approved parachute means:

(1) A parachute manufactured under a type certificate or a technical standard order (C-23 series); or

(2) A personnel-carrying military parachute identified by an NAF, AAF, or AN drawing number, an AAF order number, or any other military designated or specification number.

(f) Parachute descents, other than emergency descents, shall not be made except under conditions prescribed by the ECAA and as indicated by relevant information, advice and/or clearance from the appropriate air traffic services unit.

91.309 Towing gliders

(a) No person may operate a civil aircraft towing a glider unless:
  (1) The pilot in command of the towing aircraft is qualified under Part 61;
  (2) The towing aircraft is equipped with a tow-hitch of a kind, and installed in a manner, that is approved by the ECAA.
  (3) The tow line 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. However, the towline used may have a breaking strength more than twice the maximum certificated operating weight of the glider if:
    (i) 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.
    (ii) A safety link is installed at the point of attachment of the tow line 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 lateral boundaries of the surface area of Class B, Class C, Class D, or Class E airspace designated for an airport, or before making each towing flight within such controlled airspace if required by ATS, the pilot in command notifies the control tower. If a control tower does not exist or is not in operation, the pilot in command must notify the ECAA before conducting any towing operations in that airspace; and.
  (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.

(b) No pilot of a civil aircraft may intentionally release a towline, after release of the glider, in a manner that endangers the life or property of another.

91.311 Towing: Other than under 91.309

(a) No pilot of the civil aircraft may tow anything with that aircraft (other than under 91.309) except in accordance with the terms of a certificate of waiver issued by the ECAA.

(b) No aircraft or other object shall be towed by an aircraft, except in accordance with requirements prescribed by the ECAA and as indicated by relevant information, advice and/or clearance from the appropriate air traffic services unit.

91.313 Restricted category civil aircraft: Operating limitations

(a) No person may operate a restricted category civil aircraft:
  (1) For other than the special purpose for which it is certificated; or
  (2) In an operation other than one necessary to accomplish the work activity directly associated with that special purpose.

(b) For the purpose of paragraph (a) of this section, operating a restricted category civil aircraft to provide cockpit crewmember training in a special purpose operation for which the aircraft is certificated is considered to be an operation for that special purpose.

(c) No person may operate a restricted category civil aircraft carrying persons or property for compensation or hire. For the purposes of this paragraph, a special purpose operation involving the carriage of persons or material necessary to accomplish that operation, such as crop dusting, seeding, spraying, and banner towing (including the carrying of required persons or material to the location of that operation), and operation for the purpose of providing cockpit crewmember training in a special purpose operation, are not considered to be the carriage of persons or property for compensation or hire.

(d) No person may be carried on a restricted category civil aircraft unless that person:
  (1) Is a cockpit crewmember;
  (2) Is a cockpit crewmember trainee;
  (3) Performs an essential function in connection with a special purpose operation for which the aircraft is certificated; or
  (4) Is necessary to accomplish the work activity directly associated with the special purpose.

(e) Except when operating in accordance with the terms and conditions of a certificate of waiver or special operating limitations issued by the ECAA, no person may operate a restricted category civil aircraft within the Arab Republic of Egypt:
  (1) Over a densely populated area.
  (2) In a congested airway; or
  (3) Near a busy airport where passenger transport operations are conducted.

(f) This section does not apply to non-passenger carrying civil rotorcraft external-load operations.

(g) No person may operate a small restricted-category civil airplane manufactured after July 18, 1978, unless an approved shoulder harness is installed for each front seat. The shoulder harness must be designed to protect each occupant from serious head injury when the occupant experiences the ultimate inertia forces. The shoulder harness installation at each cockpit crewmember station must permit the crewmember, when seated and with his safety belt and shoulder harness fastened, to perform all functions necessary for flight operations. For purpose of this paragraph:
  (1) The date of manufacture of an airplane is the date the inspection acceptance records reflect that the airplane is complete and meets the ECAA approved type design data; and
  (2) A front seat is a seat located at a cockpit crewmember station or any seat located alongside such a seat.

91.315 Limited category civil aircraft: Operating limitations

No person may operate a limited category civil aircraft carrying persons or property for compensation or hire.

91.317 Provisionally certificated civil aircraft: Operating limitations

(a) No person may operate a provisionally certificated civil aircraft unless that person is eligible for a provisional airworthiness certificate under Part 21.

(b) No person may operate a provisionally certificated civil aircraft outside the Arab Republic of Egypt unless that person has specific authority to do so from the ECAA and each foreign country involved.

(c) Unless otherwise authorized by the Head of Flight Safety Standard Sector, no person may operate a provisionally certificated civil aircraft in air transportation.

(d) Unless otherwise authorized by the ECAA, no person may operate a provisionally certificated civil aircraft except:
  (1) In direct conjunction with the type or supplemental type certification of that aircraft.
  (2) For training cockpit crews, including simulated air carrier operations.
  (3) Demonstration flight by the manufacturer for prospective purchasers.
  (4) Market surveys by the manufacturer.
  (5) Flight checking of instruments, accessories, and equipment that do not affect the basic airworthiness of the aircraft; or
  (6) Service testing of the aircraft.

(e) Each person operating a provisionally certificated civil aircraft shall operate within the prescribed limitations displayed in the aircraft or set forth in the provisional aircraft flight manual or other appropriate document. However, when operating in direct conjunction with the type or supplemental type certification of the aircraft, that person shall operate under the experimental aircraft limitations of Part 21 and when flight testing, shall operate under the requirements of 91.305 of this Part.

Note: An operator should provide operations staff and flight crew with an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft. The manual should be consistent with the aircraft flight manual and checklists to be used. The design of the manual should observe Human Factors principles

(f) Each person operating a provisionally certificated civil aircraft shall establish approved procedures for:
  (1) The use and guidance of flight and ground personnel in operating under this section; and
  (2) Operating in and out of airports where takeoffs or approaches over populated areas are necessary. No person may operate that aircraft except in compliance with the approved procedures.

(g) Each person operating a provisionally certificated civil aircraft shall ensure that each cockpit crewmember is properly certificated and has adequate knowledge of, and familiarity with, the aircraft and procedures to be used by that crewmember.

(h) Each person operating a provisionally certificated civil aircraft shall maintain it as required by applicable regulations and as may be specially prescribed by the ECAA.

(i) Whenever the manufacturer, or the ECAA, determines that a change in design, construction, or operation is necessary to ensure safe operation, no person may operate a provisionally certificated civil aircraft until that change has been made and approved. Part 21 applies to operations under this section.

(j) Each person operating a provisionally certificated civil aircraft:
  (1) May carry in that aircraft only persons who have proper interest in the operations allowed by this section or who are specifically authorized by both the manufacturer and the ECAA; and.
  (2) Shall advise each person carried that the aircraft is provisionally certificated.

(k) The ECAA may prescribe additional limitations or procedures that the ECAA considers necessary, including limitations on the number of persons who may be carried in the aircraft.

91.319 Aircraft having experimental certificates: Operating limitations

(a) No person may operate an aircraft that has an experimental certificate:
  (1) For other than the purpose for which the certificate was issued; or
  (2) Carrying persons or property for compensation or hire.

(b) No person may operate an aircraft that has an experimental certificate outside of an area assigned by the ECAA until it is shown that:
  (1) The aircraft is controllable throughout its normal range of speeds and throughout all the maneuvers to be executed; and
  (2) The aircraft has no hazardous operating characteristics or design features.

(c) Unless otherwise authorized by the ECAA in special operating limitations, no person may operate an aircraft that has an experimental certificate over a densely populated area or in a congested airway. The ECAA may issue special operating limitations for particular aircraft to permit takeoffs and landings to be conducted over a densely populated area or in a congested airway, in accordance with terms and conditions specified in the authorization in the interest of safety in air commerce.

(d) Each person operating an aircraft that has an experimental certificate shall:
  (1) Advise each person carried of the experimental nature of the aircraft.
  (2) Operate under VFR, day only, unless otherwise specifically authorized by the ECAA; and.
  (3) Notify the control tower of the experimental nature of the aircraft when operating the aircraft into or out of airports with operating control towers.

(e) The ECAA may prescribe additional limitations that the ECAA considers necessary, including limitations on the persons that may be carried in the aircraft.

91.321 Information on unmanned free balloons

Operators of unmanned free balloons shall keep the appropriate air traffic services units informed of details of flights of unmanned free balloons in accordance with the provisions of this Part.

91.323 {Reserved}

91.325 Primary category aircraft: Operations limitations

(a) No person may operate a primary category aircraft carrying persons or property for compensation or hire.

(b) No person may operate a primary category aircraft that is maintained by the pilot-owner under an approved special inspection and maintenance program except:
  (1) The pilot-owner; or
  (2) A designee of the pilot-owner, provided that the pilot-owner does not receive compensation for the use of the aircraft.

91.327-91.399 {Reserved}

SUBPART E
Maintenance, Preventive Maintenance, and Alterations

91.401 Applicability

(a) This subpart prescribes rules governing the maintenance, preventive maintenance, and alterations of Egyptian registered civil aircraft operating within or outside of the Arab Republic of Egypt.

(b) Sections 91.405, 91.409, 91.411, 91.417, and 91.419 of this subpart do not apply to an aircraft maintained in accordance with a continuous airworthiness maintenance program as provided in Parts 121 or 129.

91.403 General

(a) The owner or operator of an aircraft is primarily responsible for maintaining that aircraft in an airworthy condition, including compliance with all applicable air worthiness requirements submitted by the state of design .

(b) No person may perform maintenance, preventive maintenance, or alterations on an aircraft other than as prescribed in this subpart and other applicable regulations, including Part 43.

(c) No person may operate an aircraft for which a manufacturer's maintenance manual or instructions for continued airworthiness has been issued that contains an airworthiness limitations section unless the mandatory replacement times, inspection intervals, and related procedures specified in that section or alternative inspection intervals and related procedures set forth in an operations specification approved by the ECAA under Part 121 or in accordance with an inspection program approved under 91.409 (c) have been complied with.

(d) An operator should ensure that all maintenance personnel receive initial and continuation training acceptable to ECAA and appropriate to their assigned tasks and responsibilities. This should include Human Factors and coordination with other maintenance personnel and flight crew.

(e) An operator should provide a maintenance control manual, as specified in 3.11.1, for the use and guidance of maintenance and operations personnel

(f) An operator shall provide, for the use and guidance of maintenance and operational personnel concerned, maintenance programmed, acceptable to the State of Registry, containing the information required An operator's maintenance control manual may be issued in separate parts, should be developed according to industry codes of practice or to the State of Registry's guidance material, and should at a minimum contain the following information:

(1) The means for complying with the procedures
(2) The means of recording the names and duties of the person or persons.
(3) The maintenance programme.
(4) The methods used for the completion and retention of the operator's maintenance records.
(5) The procedures for complying with the service information reporting.
(6) The procedures for implementing action resulting from mandatory continuing airworthiness information;
(7) A system of analysis and continued monitoring of the performance and efficiency of the maintenance programme, in order to correct any deficiency in that programme;
(8) The aircraft types and models to which the manual applies;
(9) The procedures for ensuring that un service abilities affecting airworthiness are recorded and rectified; and
(10) Procedures for advising the State of Registry of significant in-service occurrences.

91.405 Maintenance required

Each owner or operator of an aircraft:

(a) Shall have that aircraft inspected as prescribed in subpart E of this Part and shall, between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in Part 43.

(b) Shall ensure that maintenance personnel make appropriate entries in the aircraft maintenance records indicating the aircraft has been approved for return to service;

(c) Shall have any inoperative instruments or item of equipment, permitted to be inoperative by 91.213(d)(2) of this Part, repaired, replaced, removed, or inspected at the next required inspection; and

(d) When listed discrepancies include inoperative instruments or equipment, shall ensure that a placard has been installed as required by Part 43.

91.407 Operation after maintenance, preventive maintenance, rebuilding, or alteration

(a) No person may operate any aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless;
  (1) It has been approved for return to service by a person authorized under Part 43; and
  (2) The maintenance record entry required by Part 43, as applicable, has been made.

(b) No person may carry any person (other than crewmember) in an aircraft that has been maintained, rebuilt, or altered in a manner that may have appreciably changed its flight characteristics or substantially affected its operation in flight until an appropriately rated pilot with at least a private pilot certificate flies the aircraft, makes an operational check of the maintenance performed or alteration made, and logs the flight in the aircraft records.

(c) The aircraft does not have to be flown as required by paragraph (b) of this section if, prior to flight, ground tests, inspections, or both show conclusively that the maintenance, preventive maintenance, rebuilding, or alteration has not appreciably changed the flight characteristics or substantially affected the flight operation of the aircraft.

91.409 Inspections

(a) Except as provided in paragraph (c) of this section, no person may operate an aircraft unless, within the preceding 12 calendar months, it has had;
  (1) An annual inspection in accordance with Part 43 and has been approved for return to service by a person authorized by Part 43; or
  (2) An inspection for the issuance of airworthiness certificate in accordance with Part 21. No inspection performed under paragraph (b) of this section may be substituted for any inspection required by this paragraph unless it is performed by a person authorized to perform annual inspections and is entered as an "annual" inspection in the required maintenance records.

(b) Except as provided in paragraph (c) of this section, no person may operate an aircraft carrying any person (other than a crewmember) for hire, and no person may give flight instruction for hire in an aircraft which that person provides, unless within the preceding 100 hours of time in service the aircraft has received an annual or 100 hour inspection and been approved for return to service in accordance with Part 43 of this chapter or has received an inspection for the issuance of an airworthiness certificate in accordance with Part 21. The 100 hour limitation may be exceeded by not more than 10 hours while en route to reach a place where the inspection can be done. The excess time used to reach a place where the inspection can be done must be included in computing the next 100 hours of time in service. That is; the next 100 hours inspection must be performed 100 hours from which the original was due.

(c) Paragraphs (a) and (b) of this section do not apply to;
  (1) An aircraft that carries a special flight permit, a current experimental certificate, or a provisional airworthiness certificate;
  (2) An aircraft inspected in accordance with an approved aircraft inspection program under Part 121 and so identified by the registration number in the operations specifications of the certificate holder having the approved inspection program;
  (3) An aircraft subject to the requirements of paragraph (d) or (e) of this section; or
  (4) Turbine-powered rotorcraft when the operator elects to inspect that rotorcraft in accordance with paragraph (e) of this section.

(d) Progressive inspection: Each registered owner or operator of an aircraft desiring to use a progressive inspection program must submit a written request to the ECAA Flight Safety Standards Sector, and shall provide;
  (1) A certificated maintenance engineer holding type A and C license, a certificated airframe repair station, or the manufacturer of the aircraft to supervise or conduct the progressive inspection;
  (2) A current inspection procedures manual available and readily understandable to pilot and maintenance personnel containing, in detail;
    (i) 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;

(ii) 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 enroute and for changing an inspection interval because of service experience;
(iii) Sample routine and detailed inspection forms and instructions for their use ; and
(iv) Sample reports and records and instructions for their use;

(3) Adequate facilities and equipment for necessary disassembly and proper inspection of the aircraft; and

(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 must ensure that the aircraft, at all times, will be airworthy and will conform to all applicable ECAA 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 ECAA Flight Safety Standards Sector, in writing, of the discontinuance. After the discontinuance, the first annual inspection under 91.409 (a)(1) is due within 12 calendar months after the last complete inspection of the aircraft under the progressive inspection. The 100 hour inspection under 91.409(b) 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.

(e) Large airplanes, turbojet multiengine airplanes, turbo-propeller multiengine airplanes, and turbine-powered rotorcraft. No person may operate a large airplane, turbojet multiengine airplane, turbo-propeller multi-engine airplanes, or turbine-powered rotorcraft unless the replacement times for life limited parts specified in the aircraft specifications, type data sheets, or other documents approved by the ECAA are complied with and the airplane or turbine-powered rotorcraft, including the airframe, engines, propellers, rotors, appliances, survival equipment, and emergency equipment, is inspected in accordance with an inspection program selected under the provision of paragraph (f) of this section, except that, the owner or operator of turbine-powered rotorcraft may elect use the inspection provisions of 91.409(a),(b),(c), or (d) in lieu of to 91.409(f).

(f) Selection of inspection program under paragraph (e) of this section. The registered owner or operator of each airplane or turbine-powered rotorcraft described in paragraph (e) of this section must select, identify in the aircraft maintenance records, and use one of the following programs for the inspection of the aircraft:

(1) A continuous airworthiness inspection program that is part of a continuous airworthiness maintenance program currently in use by person holding an air carrier operating certificate or an operating certificate issued under Part 121 and operating that make and model aircraft under Part 121.

(2) An approved aircraft inspection program approved under Part 135 and currently in use by a person holding an operating certificate issued under Part 121.

(3) A current inspection program recommended by the manufacture.

(4) Any other inspection program established by the registered owner or operator of the airplane or turbine-powered rotorcraft and approved by the ECAA under paragraph (g) of this section. However, the ECAA may require revision of this inspection program in accordance with the provisions of 91.415. Each operator shall include in the selected program the name and address of the person responsible for scheduling the inspections required by the program and make a copy of that program available to the person performing inspections on the aircraft and, upon request, to the ECAA.

(g) Inspection program approved under paragraph (e) of this section. Each operator of an airplane or turbine-powered rotorcraft desiring to establish or change an approved inspection program under paragraph (f)(4) of this section must submit the program for approval by the ECAA. The program must be in writing and include at least the following information:

(1) Instruction and procedures for the conduct of inspection for the particular make and model airplane or turbine-powered rotorcraft including necessary tests and checks. The instructions and procedures must set forth in detail the parts and areas of the airframe, engines, propellers, rotors, and appliances, including survival and emergency equipment required to be inspected.

(2) A schedule for performing the inspections that must be performed under the program expressed in terms of the time in service, calendar time, number of system operations, or any combinations of these.

(h) Changes from one inspection program to another, when an operator changes from one inspection program under paragraph (f) of this section to another, the time in service, calendar times, or cycles of operation accumulated under the previous program must be applied in determining inspection due times under the new program.

91.411 Altimeter system and altitude reporting equipment tests and inspections

(a) No person may operate an airplane, or helicopter, in controlled airspace under IFR unless:

(1) Within the preceding 24 calendar months, each static pressure system, each altimeter instrument, and each automatic pressure altitude reporting system has been tested and inspected and found to comply with appendix E of Part 43;

(2) Except for the use of system drain and alternate static pressure valves, following any opening and closing of the static pressure system, that system has been tested and inspected and found to comply with Part 43; and.

(3) Following installation or maintenance of the automatic pressure altitude reporting system of the ATS transponder where data correspondence error could be introduced, in the integrated system has been tested, inspected, and found to comply with Part 43.

(b) The tests required by paragraph (a) of this section must be conducted by:

(1) The manufacturer of the airplane, or helicopter, on which the tests and inspections are to be performed;

(2) A certificated repair station properly equipped to perform those functions and holding;

(i) An instrument rating, Class I:

(ii) A limited instrument rating appropriate to the make and model of appliance to be tested.

(iii) A limited rating appropriate to the test to be performed.

(iv) An airframe rating appropriate to the airplane, or helicopter, to be tested; or.

(v) A limited rating for a manufacturer issued for the appliance in accordance with Part 145; or.

(3) A certificated mechanic with an airframe rating (static pressure system tests and inspections only).

(c) Altimeter and altitude reporting equipment approved under Technical Standards Orders are considered to be tested and inspected as of the date of their manufacture.

(d) No person may operate an airplane, or helicopter, in controlled airspace under IFR at an altitude above the maximum altitude at which all altimeters and the automatic altitude reporting system of that airplane, or helicopter, have been tested.

91.413 ATC transponder tests and inspections

(a) No persons may use an ATS transponder that is specified in 91.214 (a),or Part 121 unless, within the preceding 24 calendar months, the ATS transponder has been tested and inspected and found to comply with Part 43; and.

(b) Following any installation or maintenance on an ATS transponder where data correspondence error could be introduced, the integrated system has been tested, inspected, and found to comply with Part 43.

(c) The tests and inspections specified in this section must be conducted by:

(1) A certificated repair station properly equipped to perform those functions and holding:

(i) A radio rating, Class III;

(ii) A limited radio rating appropriate to the make and model transponder to be tested;

(iii) A limited rating appropriate to the test to be performed;

(iv) A limited rating for a manufacturer issued for the transponder in accordance with Part 145; or

(2) A holder of a continuous airworthiness maintenance program as provided in Part 121; or

(3) The manufacturer of the aircraft on which the transponder to be tested is installed, if the transponder was installed by that manufacturer.

91.415 Changes to aircraft inspection programs

(a) Whenever the ECAA finds that revisions to an approved aircraft inspection program under 91.409 (f)(4) are necessary for the continued adequacy of the program, the owner or operator shall, after notification by the ECAA, make any changes in the program found to be necessary by the ECAA.

(b) The owner or operator may petition the ECAA to reconsider the notice to make any changes in a program in accordance with paragraph (a) of this section.

(c) The petition must be filed with the ECAA Flight Safety Standards Sector which requested the change to the program within 30 days after the certificate holder receives the notice.

(d) Except in the case of an emergency requiring immediate action in the interest of safety, the filling of the petition stays the notice pending a decision by the ECAA.

91.417 Maintenance records for aircraft

(a) Except for work performed in accordance with 91.411 and 91.413, each registered owner or operator shall keep the following records for the periods specified in paragraph (b) of this section:

(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 must include;

(i) A description (or reference to data acceptable to the ECAA) of the work performed; and.

(ii) The date of completion of the work performed; and.

(iii) The signature, and certificate number of the person approving the aircraft for return to service.

(2) Records containing the following information:

(i) The total time in service of the airframe, each engine, each propeller, and each rotor.

(ii) The current status of life-limited parts of each airframe, engine, propeller, rotor, and appliance.

(iii) The time since last overhaul of all items installed on the aircraft which are required to be overhauled on a specified time basis.

(iv) 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.

(v) 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.

(vi) Copies of the forms prescribed by Part 43 for each major alteration to the airframe and currently installed engines, rotors, propellers, and appliances.

(b) The owner or operator shall retain the following records for the periods prescribed:

(1) The records specified in paragraph (a)(1) of this section shall be retained for 1 year after the work is performed.

(2) The records specified in paragraph (a)(1) of this section shall be retained until the work is repeated or supervised by other work or for 1 year after the work is performed.

(3) The records specified in paragraph (a)(2) of this section shall be retained and transferred with the aircraft at the time the aircraft is sold.

(4) A list of defects furnished to a registered owner or operator under Part 43 shall be retained until the defects are repaired and the aircraft is approved for return to service.

(c) The owner or operator shall make all maintenance records required to be kept by this section available for inspection by the ECAA. In addition, the owner or operator shall present the form described in paragraph (d) of this section for inspection upon request of any law enforcement officer.

91.419 Transfer of maintenance records

Any owner or operator who sells an Egyptian registered aircraft shall transfer to the purchaser, at the time of sale, the following records of that aircraft, in plain language form or in coded form at the

election of the purchaser, if the coded form provides for the preservation and retrieval of information in a manner acceptable to the ECAA:

(a) The records specified in 91.417(a)(2).

(b) The records specified in 91.417(a)(1) which are not included in the records covered by paragraph(a) of this section, except that the purchaser may permit the seller to keep physical custody of such records. However, custody of records by the seller does not relieve the purchaser of the responsibility under 91.417(c) to make the records available for inspection by the ECAA or any authorized representative of the Flight Safety Standards Sector.

91.421 Rebuilt engine maintenance records

(a) The owner or operator may use a new maintenance record, without previous operating history, for an aircraft engine rebuilt by the manufacturer or by an agency approved by the manufacturer.

(b) Each manufacturer or agency that grants zero time to an engine rebuilt by it shall enter in the new record:
(1) A signed statement of the date the engine was rebuilt.
(2) Each change made as required by airworthiness directives; and.
(3) Each change made in compliance with manufacturer's service bulletins, if the entry is specifically requested in that bulletin.

(c) For the purposes of this section, a rebuilt engine is a used engine that has been completely disassembled, inspected, repaired as necessary, reassembled, tested, and approved in the same manner and to the same tolerances and limits as a new engine with either new or used parts. However, all parts used in it must conform to the production drawing tolerances and limits for new parts or be of approved oversize or undersize dimensions for a new engine.

91.423 Inspection and continued serviceability of flight data and cockpit voice recording systems

No person may operate an airplane or helicopter unless the flight data and cockpit voice recording systems have been inspected as follows:

(a) Prior to the first flight of the day, the built in test features for the flight data recorder (FDR), cockpit voice recorder (CVR) and flight data acquisition unit will be exercised to confirm proper operation.

(b) Annual inspections shall be completed as follows;
(1) The readout of the recorded data from the FDR and CVR must confirm that the recorder operates correctly for the nominal duration of the recording.
(2) The analysis of the FDR must evaluate the quality of the recorded data to determine if the bit error rate is within acceptable limits and to determine the nature and distribution of the errors.
(3) A complete flight recorded by the FDR must be examined to evaluate the validity of the recorded parameters. Particular attention must be given to those parameters that are taken from the aircraft's electrical bus systems.
(4) The facilities used to accomplish the examination required in (3) of this section must have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals.
(5) An annual examination of the CVR is required by re-playing the CVR recording while the equipment is installed in the aircraft. As part of this test a sample signal must be recorded using each aircraft-sensing unit to ensure all signal sources are meeting clarity standards.
(6) When practical, during the annual examination, a sample of in-flight recordings of the CVR should be examined for signal strength and clarity:
(i) Flight recorder systems must be considered unserviceable when a period of poor quality data, unintelligible signals, or one or more of the mandatory parameters is not recorded correctly.
(ii) A report of the annual inspection must be made available to the ECAA.
(iii) The following requirements are established for calibrating the FDR system;
(A) The FDR system should be recalibrated as recommended by the manufacturer to ensure the accuracy of the engineering conversion routines for the mandatory parameters and also to confirm the unit is operating within tolerances.

(B) When the parameters of altitude and airspeed are provided by sensors dedicated to the FDR system, then there should be a recalibration performed as recommended by the manufacturer.

(iv) Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the records.

91.425-91.499 {Reserved]

SUBPART F
Large and Turbine-Powered Multiengine Airplanes

91.501 Applicability

(a) This subpart prescribes operating rules, in addition to those prescribed in other subparts in this Part, governing the operation of large and of turbojet-powered multiengine civil airplanes of Egyptian registry. The operating rules in this subpart do not apply to those airplanes when they are required to be operated under Parts 121, 129, and 137. Section 91.409 prescribes an inspection program for large and for turbine-powered (turbojet and turboprop) multiengine airplanes of Egyptian registry when they are operated under this Part or Part 129 or 137.

(b) Operations that may be conducted under the rules in this subpart instead of those in Parts 121, 129, and 137 when common carriage is not involved, which includes the following types of operations;

(1) Ferry or training flights;

(2) Aerial work operations such as aerial photography or survey, or pipeline patrol, but not including fire fighting operations;

(3) Flights for demonstration of an airplane to prospective customers when no charge is made except for those specified in paragraph (d) of this section;

(4) Flights conducted by the operator of an airplane for his personnel transportation, or the transportation of his guests when no charge, assessment, or fee is made for the transportation;

(5) Carriage of officials, employees, guests, and property of a company on an airplane operated by that company, or the parent of a subsidiary of the company or a subsidiary of the parent when the carriage is within the scope of, and incidental to, the business of the company (other than transportation by air) and no charge, assessment or fee is made for the carriage in excess of the cost of owning operating, and maintaining the airplane, except that no charge of any kind may be made for the carriage of a guest of a company, when the carriage is not within the scope of, and incidental to, the business of the company;

(6) The carriage of company officials, the employees and guests of the company on an airplane operated under a time sharing, interchange, or joint ownership agreement as defined in paragraph (c) of this section;

(7) The carriage of property (other than mail) on an airplane operated by a person in the furtherance of a business or employment (other than transportation by air) when the carriage is within the scope of, and incidental to, that business or employment and no charge, assessment, or fee is made for the carriage other than those specified in paragraph (d) of this section;

(8) The carriage on an airplane of an athletic team, sports group, choral group, or similar group having a common purpose or objective when there is no charge, assessment, or fee of any kind made by any person for that carriage; and

(9) The carriage of persons on an airplane operated by a person in the furtherance of a business other than transportation by air for the purpose of selling them land, goods, or property, including franchises or distributorships, when the carriage is within the scope of, and incidental to, the business and no charge, assessment, or fee is made for that carriage.

(c) As used in this section:

(1) A time sharing agreement means an agreement whereby a person leases his airplane with cockpit crew to another person, and no charge is made for the flights conducted under that arrangement other than those specified in paragraph (d) of this section.

(2) An interchange agreement means an agreement whereby a person leases his airplane to another person in exchange for equal time, when needed, on the other person's airplane, and no charge, assessment, or fee is made, except that charge may be made not to exceed the difference between the cost of owning, operating, and maintaining the two airplanes;

(3) A joint ownership agreement means an agreement whereby one of the registered joint owners of an airplane employees and furnishes the cockpit crew for that airplane and each of the registered joint owners pays a share of the charges specified in the agreement.

(d) The following may be charged as expenses of a specific flight, for transportation as authorized by paragraphs(b)(3) and (7)and (c)(1) of this section:
(1) Fuel, oil, lubricant, and other additives.
(2) Travel expenses of the crew including food, lodging, and ground transportation.
(3) Hangar and tie-down cost away from the aircraft's base of operation.
(4) Insurance obtained for the specific flight.
(5) Landing fees, airport taxes, and similar assessment.
(6) Customs, foreign permit, and similar fees directly related to the flight.
(7) In flight food and beverages.
(8) Passenger ground transportation.
(9) Flight planning and weather contract services.
(10)An additional charge equal to 100 percent of the expenses listed in paragraph (d) (1) this section.

91.502 Compliance with laws, regulations and procedures

(a) An operator shall ensure that all employees know that they must comply with the laws, regulations and procedures of those States in which operations are conducted.

Note.— Information for pilots on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS (Doc 8168), Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

(b) An operator shall ensure that all pilots are familiar with the laws, regulations and procedures, pertinent to the performance of their duties, prescribed for the areas to be traversed, the aerodromes to be used and the air navigation facilities relating thereto. The operator shall ensure that other members of the flight crew are familiar with such of these laws, regulations and procedures as are pertinent to the performance of their respective duties in the operation of the aero plane.

(c) The pilot-in-command is responsible for operational control. An operator shall describe the operational control system in the operations manual and identify the roles and responsibilities of those involved with the system.

Note.— The rights and obligations of a State in respect to the operation of aero planes registered in that State are not affected by this provision.

(d) An operator shall ensure that the pilot-in-command has available on board the aero plane all the essential information concerning the search and rescue services in the area over which the aero plane will be flown.

Note.— This information may be made available to the pilot by means of the operations manual or such other means as is considered appropriate.

(e) An operator shall ensure that flight crew members demonstrate the ability to speak and understand the language used for aeronautical radiotelephony communications as specified in Annex 1.

91.503 Flying equipment and operating information

(a) The pilot in command of an airplane shall insure that the following flying equipment and aeronautical charts and data, in current and appropriate form, are accessible for each flight at the pilot station of the airplane:
(1) A flash light having at least two size "D" cells, or the equivalent, that is in good working order.

(2) A cockpit checklist containing the procedures required by paragraph (b) of this section.
(3) Pertinent aeronautical charts.
(4) For IFR, VFR over-the-top, or night operations, each pertinent navigational enroute, terminal area, and approach and letdown chart.
(5) In a case of multiengine airplane, one-engine inoperative climb performance data.

(b) Each cockpit checklist must contain the following procedures and shall be used by the cockpit crewmembers when operating the airplane:
(1) Before starting engines.
(2) Before takeoff.
(3) Cruise.
(4) Before landing.
(5) After landing.
(6) Stopping engines.
(7) Emergencies.

(c) Each emergency cockpit checklist procedure required by paragraph (b) (7) of section must contain the following procedures, as appropriate:
(1) Emergency operation of fuel, hydraulic, electrical, mechanical systems.
(2) Emergency of instruments and controls.
(3) Engine inoperative procedures.
(4) Any other procedures necessary for safety.

(d) The equipment, charts, and data described in this section shall be used by the pilot in command or\and other members of the cockpit crew, when pertinent.

91.504 Safety management

Note.— ECAR 19 includes safety management provisions for international general aviation operators of large or turbojet aero planes. Further guidance is contained in the Safety Management Manual (SMM) (Doc 9859).

(a) ECAA shall not allow the use of recordings or transcripts of CVR, CARS, Class A AIR and Class A AIRS for purposes other than the investigation of an accident or incident as per Annex 13 except where the recordings or transcripts:
(1) Are related to a safety-related event identified in the context of a safety management system; are restricted to the relevant portions of a de-identified transcript of the recording; and are subject to the protections accorded by Annex 19;
(2) Are sought for use in criminal proceedings not related to an event involving an accident or incident investigation and are subject to the protections accorded by Annex 19; or
(3) Are used for inspections of flight recorder systems as provided in Section 7 of Appendix 2.3.
Note. — Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19. When an investigation under Annex 13 is instituted, investigation records are subject to the protections accorded by Annex 13.

(b) ECAA shall not allow the use of recordings or transcripts of FDR, ADRS as well as Class B and Class C AIR and AIRS for purposes other than the investigation of an accident or incident as per Annex 13, except where the recordings or transcripts are subject to the protections accorded by Annex 19 and:
(1) Are used by the operator for airworthiness or maintenance purposes;
(2) Are sought for use in proceedings not related to an event involving an accident or incident investigation;
(3) Are de-identified; or
(4) Are disclosed under secure procedures.

Note. — Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19.

91.505 Familiarity with operating limitations and emergency equipment

(a) Each pilot-in-command of an airplane shall, before beginning a flight, become familiar with the airplane flight manual for that airplane, if required, and with any placards, listings, instrument marking, or any combination thereof, containing each operating limitation prescribed for that airplane by the ECAA including those specified in 91.9 (b).

(b) Each required member of the crew shall, before beginning a flight, become familiar with the emergency equipment installed on the airplane to which that crewmember is assigned and with the procedures to be followed for the use of that equipment in an emergency situation.

91.507 Equipment requirements: Or over-the-top or night VFR operations

No person may operate an airplane over-the-top or at night under VFR unless that airplane is equipped with the instruments and equipment for IFR operations under 91.205(c) and one electric landing light for night operations. Each required instrument and item of equipment must be in operable condition.

91.509 Survival equipment for over water operation

(a) No person may take off an airplane for a flight over water more than 50 nautical miles from the nearest shore unless the airplane is equipped with a life preserver or approved flotation means for each occupant of the airplane.

(b) No person may take off an airplane for a flight over water more than 30 minutes flying time or 100 nautical miles from the nearest shore unless it has on board the following survival equipment:
  (1) A life preserver equipped with an approved survivor locator light, for each occupant of the airplane.
  (2) Enough life raft (each equipped with an approved survival locator light) of a rated capacity and buoyancy to accommodate the occupants of the airplane.
  (3) At least one pyrotechnic signaling device for each life raft.
  (4) One self-buoyant, water-resistant, portable emergency radio signaling device that is capable of transmission on the appropriate emergency frequency or frequencies and not dependent upon the airplane power supply.
  (5) A lifeline stored in accordance with FAR Part 25.

(c) The required life raft, life preservers and signaling devices must be installed in conspicuously marked locations and easily accessible in the event of a ditching without appreciable time for preparatory procedures.

(d) A survival kit, appropriately equipped for the route to be flown, must be attached to each required life raft.

(e) As used in this section, the term shore means that area of land adjacent to the water which is above the high water mark and excludes land areas which are intermittently under water.

91.511 Radio equipment for over water operations

(a) Except as provided in paragraphs (c) and (d) of this section, no person may take off an airplane for a flight over water more than 30 minutes flying time or 100 nautical miles from the nearest shore unless it has at least the following operable equipment:
  (1) Radio communication equipment appropriate to the facilities to be used and able to transmit to, and receive from, any place on the route, at least one surface facility:
    (i) Two transmitters.
    (ii) Two microphones.
    (iii) Two headsets or one headset and one speaker.

(iv) Two independent receivers.

(2) Appropriate electronic navigation equipment consisting of at least two independent electronics navigation units capable of providing the pilot with the information necessary to navigate the airplane within the airspace assigned by the air traffic control. However, receivers that can receive both communications and required navigational signals may be used in place of a separate communications receivers and a separate navigational signal receivers unit.

(b) For the purposes of paragraphs (a)(1)(iv) and (a)(2) of this section, a receivers or electronic navigation unit is independent if the function of any Part of it does not depend on the functioning of any Part of another receivers or electronic navigation unit.

(c) Notwithstanding the provisions of paragraph (a) of this section, a person may operate an airplane on which no passengers are carried from a place where repairs or replacement cannot be made to a place where they can be made, if not more than one of each of the dual items of radio communications and navigational equipment specified in paragraph (a) (1) (i) through (iv) and (a)(2) of this section malfunctions or becomes inoperative.

(d) Notwithstanding the provisions of paragraph (a) of this section, when both VHF and HF communications are required for the route and the airplane has two VHF transmitters and two VHF receivers for communications, only one HF transmitter and one HF receivers is required for communications.

(e) As used in this section, the term shore means that area of the land adjacent to the water which is above the high-water mark and excludes land areas which are intermittently under water.

91.513 Emergency equipment

(a) No person may operate an aircraft unless it is equipped with the emergency equipment listed in this section.

(b) Each item of equipment:

(1) Must be inspected in accordance with 91.409 to ensure its continued serviceability and immediate readiness for its intended purposes;

(2) Must be readily accessible to the crew.

(3) Must clearly indicate its method of operation; and

(4) When carried in a compartment or container, must have that compartment or container marked as to contents and date of last inspection.

(c) Hand fire extinguishers must be provided for use in crew, passenger, and cargo compartment in accordance with the following:

(1) The type and quantity of extinguishing agent must be suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used.

(2) At least one hand fire extinguisher must be provided and located in or near the flight deck in a place that is readily accessible to the cockpit crew.

(3) At least one hand fire extinguisher must be conveniently located in the passenger compartment in each airplane accommodating more than six or less than 31 passengers, and at least two hand fire extinguishers must be conveniently located in the passenger compartment of each airplane accommodating more than 30 passengers.

(4) Hand fire extinguishers must be installed and secured in such a manner that they may not interfere with the safe operation of the airplane or adversely affect the safety of the crew and passengers. They must be readily accessible and, unless the locations of the fire extinguishers are obvious, their stowage provisions must be properly identified.

(5) Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in an Aircraft for which the individual certificate of airworthiness is first issued on or after 31 December 2011 and any extinguishing agent used in a portable fire extinguisher

in an Aircraft for which the individual certificate of airworthiness is first issued on or after 31 December 2018 shall**:**

(i) Meet the applicable minimum performance requirements of the state of registry; and

(ii) Not be of a type listed in the 1987 Montreal Protocol on substances that depute the Ozone Layer as it appears in the Eighth Edition of the Handbook for the Montreal Protocol on substances that depute the Ozone Layer, Annex A, Group II

Note:- Information concerning extinguishing agents is contained in the UNEP Hal on Technical Options Commit Technical Note No. 1- New Technology Hal on Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the use of Halons for Aircraft Fire Suppression systems

(d) First aid kits for treatment of injuries most likely to occur in flight or in minor accidents must be provided.

(e) Each airplane accommodating more than 19 passengers must be equipped with a crash axe.

(f) Each passenger-carrying airplane must have a portable battery-powered megaphone or megaphones readily accessible to the crewmembers assigned to direct emergency evacuation, installed as follows:

(1) One megaphone on each airplane with a seating capacity of more than 60 but less than 100 passengers, at the most rearward location in the passenger cabin where it would be readily accessible to a normal cabin crew seat. However, the ECAA may grant a deviation from the requirements of this subparagraph if the ECAA finds that a different location would be more useful for evacuation of persons during an emergency.

(2) On each airplane with a seating capacity of 100 or more passengers, one megaphone installed at the forward end and one installed at the most rearward location where it would be readily accessible to a normal cabin crew seat.

91.515 Flight altitude rules

(a) Notwithstanding 91.119, and except as provided in paragraph(b) of this section, no person may operate an airplane under VFR at less than;

(1) One thousand feet from any mountain, hill, or other obstruction to flight, for day operations; and

(2) The altitudes prescribed in 91.177, for night operations.

(b) This section does not apply;

(1) During takeoff or landing;

(2) When a different altitude is authorized by a waiver to this section under subpart J of this Part; or

(3) When a flight is conducted under the special VFR weather minimums of 91.157 with an appropriate clearance from ATS.

91.517 Passenger information

(a) Except as provided in paragraph (b) of this section, no person may operate an airplane carrying passengers unless it is equipped with signs that are visible to passengers and cabin crew to notify them when smoking is prohibited and when safety belts must be fastened. The signs must be so constructed that the crew can turn them on and off. They must be turned on during movement on the surface, for each takeoff, for each landing, and when otherwise considered to be necessary by the pilot in command.

(b) The pilot in command of an airplane that is not required, in accordance with applicable aircraft and equipment requirements, to be equipped as provided in paragraph (a) of this section shall ensure that the passengers are notified orally each time that it is necessary to fasten their safety belts and when smoking is prohibited.

(c) If passenger information signs are installed, no passenger or crewmember may smoke while any "no smoking" sign is lighted nor may any passenger or crewmember smoke in any lavatory.

(d) Each passenger required by 91.107(a)(3) to occupy a seat or berth shall fasten his or her safety belt about him or her and keep it fastened while any "fasten seat belt" sign is lighted.

(e) Each passenger shall comply with instructions given him or her by crewmembers regarding compliance with paragraphs (b), (c), and (d) of this section.

91.519 Passenger briefing

(a) Before each takeoff the pilot in command of an airplane carrying passengers shall ensure that all passengers have been orally briefed on:

(1) Smoking: Each passenger shall be briefed on when, where, and under what conditions smoking is prohibited. This briefing shall include a statement, as appropriate, that the ECARs require passenger compliance with lighted passenger information signs and no smoking placards, prohibit smoking in lavatories, and require compliance with crewmember instructions with regard to these items;

(2) Use of safety belts and shoulder harnesses: Each passenger shall be briefed on when where and under what conditions it is necessary to have his or her safety belt and, if installed, his or her shoulder harness fastened about him or her. This briefing shall include a statement, as appropriate, that the ECARs require passenger compliance with the lighted passenger sign and / or crewmember instructions with regard to these items;

(3) Location and means for opening the passenger entry door and emergency exits;

(4) Location of survival equipment;

(5) Ditching procedure and the use of flotation equipment required under 91.509 for a flight over water; and

(6) The normal and emergency use of oxygen equipment installed on the airplane.

(b) The oral briefing required by paragraph (a) of this section shall be given by the pilot in command or a member of the crew, but need not be given by the pilot in command or a member of the crew, when the pilot in command determines that the passengers are familiar with the contents of the briefing. It may be supplemented by printed cards for the use of each passenger containing;

(1) A diagram of, and methods of operating, the emergency exits; and

(2) Other instructions necessary for use of emergency equipment.

(c) Each card used under paragraph (b) must be carried in convenient locations on the airplane for the use of each passenger and must contain information that is pertinent only to the type and model airplane on which it is used.

91.521 Shoulder harness

(a) No person may operate a transport category airplane that was type certificated after January 1, 1958, unless it is equipped at each seat in flight deck station with a combined safety belt and shoulder harness that meets the applicable requirements specified in Part 25, except that;

(1) Shoulder harnesses and combined safety belt and shoulder harnesses that were approved and installed before March 6, 1980, may continue to be used; and

(2) Safety belt and shoulder harness restraint systems may be designed to the inertia load factors established under the certification basis of the airplane.

(b) No person may operate a transport category airplane unless it is equipped at each required cabin crew seat in the passenger compartment with a combined safety belt and shoulder harness the meets the applicable requirements specified in Part 25, except that;

(1) Shoulder harnesses and combined safety belt and shoulder harnesses that were approved and installed before March 6, 1980, may continue to be used; and

(2) Safety belt and shoulder harness restraint systems may be designed to the inertia load factors established under the certification basis of the airplane.

(c) Aero planes for which the individual certificate of airworthiness is first issued on or after 1 January 1981 shall be equipped with a forward or rearward facing (within 15 degrees of the longitudinal axis of the aero plane) seat, fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of 91.533 in respect of emergency evacuation.

91.523 Carry-on baggage

No pilot in command of an airplane having a seating capacity more than 19 passengers may permit a passenger to stow baggage aboard that airplane except;

(a) In suitable baggage or cargo storage compartments, or as provided in 91.525; or

(b) Under a passenger seat in such a way that it will not slide forward under crash impacts severe enough to induce the ultimate inertia forces specified in Part 25, or the requirements of the regulations under which the airplane was type certificated. Restraining devices must also limit sideward motion of under-seat baggage and be designed to withstand crash impacts severe enough to induce sideward forces specified in Part 25.

91.525 Carriage of cargo

(a) No pilot in command may permit cargo to be carried in any airplane unless;
  (1) It is carried on an approved cargo rack, bin, or compartment installed in the airplane;
  (2) It is secured by means approved by the ECAA; or
  (3) It is carried in accordance with each of the following:
    (i) It is properly secured by a safety belt or other tie down having enough strength to eliminate the possibility of shifting under all normally anticipated flight and ground conditions.
    (ii) It is packaged or covered to avoid possible injury to passengers.
    (iii) It does not impose any load in seats or on the floor structure that exceeds the load limitation for those components.
    (iv) It is not located in a position that restricts the access to or use of any required emergency or regular exit, or the use of the aisle between the crew and passenger compartment.
    (v) It is not carried directly above seated passengers.

(b) When cargo is carried in cargo compartments that are designed to require the physical entry of a crewmember to extinguish any fire that may occur during flight, the cargo must be loaded so as to allow a crewmember to effectively reach all parts of the compartment with the contents of a hand fire extinguisher.

91.527 Operating in icing conditions

(a) No pilot may take off an airplane that has;
  (1) Frost, snow, or ice adhering to any propeller, windshield, or powerplant installation or to an airspeed, altimeter, rate of climb, or flight attitude instrument system;
  (2) Snow or ice adhering to the wings or stabilizing or control surfaces, or
  (3) Any frost adhering to the wings or stabilizing or control surfaces.

(b) Except for an airplane that has ice protection provisions that meet the requirements for transport category airplane type certification, no pilot may fly;
  (1) Under IFR into known or forecast moderate icing conditions; or
  (2) Under VFR into known light or moderate icing conditions unless the aircraft has functioning de-icing or anti-icing equipment protecting each propeller, windshield, wing, stabilizing or control surface, and each airspeed, altimeter, rate of climb, or flight attitude instrument system.

(c) Except for an airplane that has ice protection provisions that meet the requirements for transport category airplane type certification, no pilot may fly an airplane into known or forecast severe icing conditions.

(d) If current weather reports and briefing information relied upon by the pilot in command indicate that the forecast icing conditions that would otherwise prohibit the flight will not be encountered during the flight because of changed weather conditions since the forecast, the restrictions in paragraph (b) and (c) of this section based on forecast conditions do not apply.

91.529 Flight engineer requirements

(a) No person may operate the following airplanes without a cockpit crewmember holding a current flight engineer certificate:

(1) An airplane for which a type certificate was issued before January 2, 1964, having a maximum certificated takeoff weight of more than 80000 pounds.

(2) An airplane type certificated after January 2, 1964, for which a flight engineer is required by the type certification requirements.

(b) No person may serve as a required flight engineer on an airplane unless, within the preceding 6 calendar months, that person has had at least 50 hours of flight time as a flight engineer on that type airplane or has been checked by the ECAA on that type airplane and is found to be familiar and competent with all essential current information and operating procedures.

91.531 Second in command requirements

(a) Except as provided in paragraph (b) of this section, no person may operate the following airplanes without a pilot who is designated as second in command of that airplane:

(1) A large airplane, except that a person may operate an airplane without a pilot who is designated as second in command, if that airplane is certificated for operation with one pilot.

(2) A turbojet-powered multiengine airplane for which two pilots are required under the type certification requirements for that airplane.

(3) A commuter category airplane, except that a person may operate a commuter category airplane notwithstanding paragraph(a)(1) of this section, that has a passenger seating configuration, excluding pilots seats, of nine or less without a pilot who is designated as a second in command if that airplane is type certificated for operations with one pilot.

(b) The ECAA may issue a letter of authorization for the operation of an airplane without compliance with the requirements of paragraph(a) of this section if that airplane is designed for and type certificated with only one pilot station. The authorization contains any conditions that the ECAA finds necessary for safe operation.

(c) No person may designate a pilot to serve as second in command, nor may any pilot serve as second in command, of an airplane required under this section to have two pilots unless that pilot meets the qualifications for second in command prescribed in ECAR Part 61.

91.533 Cabin crew requirements

(a) No person may operate an airplane unless at least the following number of cabin crew are on board the airplane:

(1) For airplanes having more than 19 but less than 51 passengers on board, one cabin crew.

(2) For airplane having more than 50 but less than 101 passengers on board, two cabin crew.

(3) For airplanes having more than 100 passengers on board, two cabin crew plus one additional cabin crew for each unit (or Part of a unit) of 50 passengers above 100.

(b) No person may serve as a cabin crew on an airplane when required by paragraph (a) of this section unless that person has demonstrated to the pilot in command familiarity with the necessary

functions to be performed in an emergency or a situation requiring emergency evacuation and is capable of using the emergency equipment installed in that airplane.

91.535 Stowage of food, beverage, and passenger service equipment during aircraft movement on the surface, takeoff, and landing

(a) No operator may move an aircraft on the surface, take off, or land when any food, beverage, or tableware furnished by the operator is located at any passenger seat.

(b) No operator may move an aircraft on the surface, take off, or land unless each food and beverage tray and seat back tray table is secured in its stowed position.

(c) No operator may permit an aircraft to move on the surface, take off, or land unless each passenger serving cart is secured in its stowed position.

(d) No operator may permit an aircraft to move on the surface, take off or land unless each movie screen that extends into the aisle is stowed.

(e) Each passenger shall comply with instructions given by a crewmember with regard to compliance with this section.

91.537 Operating facilities

(a)The operator shall ensure that a flight will not be commenced unless it has been ascertained by every reasonable means available that the ground and/or water facilities including communication facilities and navigation aids available and directly required on such flight, for the safe operation of the aeroplane, are adequate for the type of operation under which the flight is to be conducted.

(b)The operator, in making a decision on the adequacy of facilities and services available at an aerodrome of intended operation, shall assess the level of safety risk associated with the aircraft type and nature of the operation, in relation to the availability of rescue and firefighting services (RFFS).

91.538-91.599 {Reserved}

SUBPART G
Additional Equipment and Operating Requirements For Large and Transport Category Aircraft

91.609 Flight Recorders

(a) Flight data recorders

(1) Operation:

(i) All aero planes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2005 shall be equipped with a Type IA FDR.

(ii) All aero planes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with a Type I FDR.

(iii) Recommendation.— All aero planes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989, should be equipped with a Type II FDR.

(b) Cockpit voice recorders

(1) Operation:

(i) All turbine-engined aero planes of a maximum certificated take-off mass of over 5 700 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with a CVR.

(ii) All aero planes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR.

(iii) Recommendation.— All aero planes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1987, should be equipped with a CVR.

(c) Combination recorders: Recommendation.— All aero planes of a maximum certificated take-off mass over 5 700 kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders (FDR/CVR).

(d) Flight recorder records: The owner of the aero plane, or in the case where it is leased, the lessee, shall ensure, to the extent possible, in the event the aero plane becomes involved in an accident or incident, the preservation of all related flight recorder records and, if necessary, the associated flight recorders, and their retention in safe custody pending their disposition as determined in accordance with Annex 13.

91.611 Data link recorders

(a) All aero planes or helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which utilize any of the data link communications applications listed in table*E-3* of ECAR Part 91 Appendix E and are required to carry a cockpit voice recorder (CVR), shall record on a flight recorder, all data link communications messages

(b) All aero planes or helicopters which are modified on or after 1 January 2016 to install and utilize any of the data link communications applications listed in table*E-3* of ECAR Part 91 Appendix E and are required to carry a CVR, shall record on a flight recorder the data link communications messages.

(c) Duration

The minimum recording duration shall be equal to the duration of the CVR.

(d) Correlation

Data link recording shall be able to be correlated to the recorded cockpit audio.

(e) Applications to be recorded:

(1) Where the aircraft flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the aircraft) and downlinks (from the aircraft), shall be recorded on the aircraft. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall to be recorded.

(2) Messages applying to the applications listed below shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity.

(3) Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

(i) Data link initiation capability
(ii) Controller – pilot data link communications
(iii) Data link – flight information services
(iv) Automatic dependent surveillance – contract
(v) Automatic dependent surveillance – broadcast*
(vi) Aeronautical operational control*

Note1. — Data link recorders performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specification (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

Note 2. — Data link communications are currently conducted by either ATN-based or FANS1/A equipped aircraft.

Note 3.— A Class B AIR could be a means for recording data link communications applications messages to and from the aero planes or helicopters where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.

Note4. — Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft.

Note5. — Descriptions of the applications are contained in table*E-3* of ECAR Part 91 Appendix E.

SUBPART H
Foreign Aircraft Operations and Operations of Egyptian Registered Civil Aircraft outside the Arab Republic of Egypt

91.701 Applicability

This subpart applies to the operations of civil aircraft of Egyptian registry outside of the Arab Republic of Egypt and the operations of foreign civil aircraft within the Arab Republic of Egypt.

91.703 Operations of civil aircraft of Egyptian registry outside the Arab Republic of Egypt

(a) Each person operating a civil aircraft of Egyptian registry outside of the Arab Republic of Egypt shall:

(1) When over the high seas, comply with annex 2 (Rules of the Air) to the Convention on International Civil Aviation and with 91.117(c), this part;

(2) When within a foreign country, comply with the regulations relating to the flight and maneuver of aircraft there in force;

(3) Except for 91.307(b), 91.309, 91.323, and 91.711, comply with this Part so far as it is not inconsistent with applicable regulations of the foreign country where the aircraft is operated or annex 2 of the Convention on International Civil Aviation; and

(4) When over the North Atlantic within airspace designated as minimum navigation performance specifications airspace, comply with 91.705.

(5) When within the airspace designated as required navigation performance (RNP) specifications airspace, the aircraft and operator shall comply with the requirements of that airspace as specified in ICAO Doc.7030.

(6) When within the airspace where vertical separation Minimum (VSM) is applied, comply with 91.706.

(b) For operations where a navigation specification for performance-based navigation has been prescribed, an aero plane shall, in addition to the requirements specified in paragraph (a) of this section:

(1) Be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s); and

(2) Be authorized by the State of the Operator for such operations.

91.705 Operations within the north Atlantic Minimum Navigation Performance Specifications Airspace

No person may operate a civil aircraft of Egyptian registry in North Atlantic airspace designated as Minimum Navigation Performance Specifications (MNPS) airspace unless:

(a) The aircraft has approved navigation performance capability which complies with the requirements of appendix C of this Part: and

(b) The operator is authorized by the ECASA to perform such operations.

(c) The ECASA authorizes deviations from the requirements of this section in accordance with section 3 of appendix C to this Part.

91.706 Operations within airspace where a vertical separation minimum (VSM) is applied

No person may operate a civil aircraft in airspace where a vertical separation minimum (VSM) is applied unless:

(a)The aircraft has approved minimum aircraft system and specification standard (MASPS) that complies with the requirements of ICAO/Doc. (9574) and EAC91-9.

(b)The operator is authorized to perform such operations.

(c) The operator and the operator's aircraft comply with the requirements of appendix G of this part.

91.707 Performance-Based Navigation within Egyptian airspace designated navigation specifications (RNP-5)

No person may operate a civil aircraft in Egyptian airspace designated as required navigation performance specifications (RNP-5) airspace unless:

(a) The aircraft has approved navigation performance specifications RNP-5 that complies with the requirements ICAO Doc.9613 as amended.

(b) The operator is authorized to perform such operations.

91.709 Operations within airspace where a Precision Area navigation (P-RNAV) is applied

(a) No person may operate a civil aircraft in airspace where a Precision Area navigation (P-RNAV) is applied unless:

(b) The aircraft has approved minimum aircraft system and specification standard (MASPS) that complies with the requirements of ICAO Doc. 9613 as amended and EAC 91-16

(c) The operator is authorized to perform such operations.

91.711 Special rules for foreign civil aircraft

(a) General. In addition to the other applicable regulations of this Part, each person operating a foreign civil aircraft within the Arab Republic of Egypt shall comply with this section.

(b) VFR. No person may conduct VFR operations, which require two-way radio communications under this Part unless at least one crewmember of that aircraft is able to conduct two way radio communications in the English language and is on duty during that operation.

(c) IFR. No person may operate a foreign civil aircraft under IFR unless;

(1) That aircraft is equipped with:

(i) Radio equipment allowing two-way radio communication with ATC when it is operated in controlled airspace; and

(ii) Radio navigational equipment appropriate to the navigational facilities to be used.

(2) Each person piloting the aircraft:

(i) Holds a current Egyptian Instrument rating or is authorized by his foreign airman certificate to pilot under IFR; and

(ii) Is thoroughly familiar with the Arab Republic of Egypt en route, holding, and letdown procedures; and

(3) At least one crewmember of that aircraft is able to conduct two-way radiotelephone communications in the English language and that crewmember is on duty while the aircraft is approaching, operating within, or leaving the Arab Republic of Egypt.

(d) Over water. Each person operating a foreign civil aircraft over water off the shores of the Arab Republic of Egypt shall give flight notification or file a flight plan in accordance with the supplementary procedures for the ICAO region concerned.

(e) Flight at and above FL 240. If VOR navigational equipment is required under paragraph (c)(1)(ii) of this section, no person may operate a foreign civil aircraft within the Arab Republic of Egypt at or above FL 240, unless the aircraft is equipped with distance measuring equipment (DME) capable of receiving and indicating distance information from the VORTAC facilities to be used. When DME required by this paragraph fails at and above FL 240, the pilot in command of the aircraft shall notify ATC immediately and may than continue operations at and above FL 240 to the next airport of intended landing at which repairs or replacement of the equipment can be made. However, paragraph (e) of this section does not apply to the foreign civil aircraft that are not equipped with DME when operated for the following purposes and if ATC is notified prior to each takeoff:

(1) Ferry flights to and from a place in the Arab Republic of Egypt where repairs or alterations are to be made.

(2) Ferry flights to a new country of registry.
(3) Flight of a new aircraft for the purpose of:
(i) Flight testing the aircraft;
(ii) Training foreign flight crews in the operation of the aircraft; or
(iii) Ferrying the aircraft for export delivery outside the Arab Republic of Egypt.
(4) Ferry, demonstration, and test flight of an aircraft brought by the Arab Republic of Egypt for the purpose of demonstration or testing the whole or any Part thereof.

91.713 Territorial application of the rules of the air

The rules of the air shall apply to aircraft bearing the nationality and registration marks of a EGYPT, wherever they may be, to the extent that they do not conflict with the rules published by the State having jurisdiction over the territory overflown

91.715 Special flight authorizations for foreign civil aircraft

(a) Foreign civil aircraft may be operated without airworthiness certification required under 91.203 if a special flight authorization for that operation is issued under this section. Application for special flight authorization must be made to the Head of Flight Safety Standards sector of the ECAA.
(b) The ECAA may issue a special flight authorization for a foreign civil aircraft subject to any conditions and limitations that the ECAA considers necessary for safe operation in the Arab Republic of Egypt airspace.
(c) No person may operate a foreign civil aircraft under a special flight authorization unless that operation also complies with the Special Regulations of the Department of Transportation.

91.717-91.799 {Reserved}

Subpart I
Limitations on Aircraft Noise and Engine Emission

91.801 Applicability

This Subpart prescribes limitations on the operation of Egyptian civil aircraft in respect to aircraft noise and engine emission.

91.803 Aircraft noise level compliance

No person may operate an aircraft to or from any aerodrome within Egypt unless, the ECAA has determined that Egyptian civil registered aircraft complies with the minimum requirements specified in ECAR Part 36.

Recommendation. — Noise abatement procedures specified by an operator for any one aero plane type should be the same for all aerodromes.

Note. — A single procedure may not satisfy requirements at some aerodromes.

91.805 Aircraft engine emissions compliance

(a) No person may operate a turbo-jet or turbo-fan powered aircraft to or from any aerodrome within Egypt after 31 December 2005 unless, the ECAA has determined that Egyptian registered aircraft, or the aircraft engines comply with requirements of Annex 16 volume II comply with the applicable aircraft engine emissions requirements prescribed in ECAR Part 34.

(b) The ECAA may issue deviations to the mandatory compliance dates provided in (a) above based on a review of the methods and schedule of compliance submitted.

SUBPART J
Waivers

91.901 {Reserved}

91.903 Policy and procedures

(a) The ECAA may issue a certificate of waiver authorizing the operation of aircraft in deviation from any rule listed in this subpart if the administrator finds that the proposed operation can be safely conducted under the terms of that certificate of waiver.

(b) An application for a certificate of waiver under this part is made on a form and in a manner prescribed by the ECAA and must be submitted to the ECAA for approval.

(c) A certificate of waiver is effective as specified in that certificate of waiver.

91.905 List of rules subject to waivers

Section

91.107 Use of safety belts.
91.111 Operating near other aircraft.
91.113 Right of way rules: Except water operations.
91.115 Right of way rules: Water operations.
91.117 Aircraft speed.
91.119 Minimum safe altitudes: General.
91.121 Altimeter settings.
91.123 Compliance with ATC clearances and instructions.
91.125 ATC light signals.
91.126 Operating on or in the vicinity of an airport in Class G airspace.
91.127 Operating on or in the Vicinity of an airport in Class E airspace.
91.129 Operations in Class D airspace.
91.130 Operations in Class C airspace.
91.131 Operations in Class B airspace.
91.133 Restricted and prohibited areas.
91.135 Operations in Class A airspace.
91.137 Temporary flight restrictions.
91.141 Flight restrictions in the proximity of the Presidential and other parties.
91.153 VFR flight plan: Information required.
91.155 Basic VFR weather minimums
91.157 Special VFR weather minimums.
91.159 VFR cruising altitude or flight level.
91.169 IFR flight plan: Information required.
91.173 ATC clearance and flight plan required.
91.175 Takeoff and landing under IFR.
91.177 Minimum altitudes for IFR operations.
91.179 IFR cruising altitude or flight level.
91.181 Course to be flown.
91.183 IFR radio communications.
91.185 IFR operations: Two-way radio communications failure.
91.187 Operation under IFR in controlled airspace: Malfunction reports.
91.209 Aircraft lights.
91.303 Aerobatics flights.
91.305 Flight test areas.
91.311 Towing other than under 91.309.
91.313(E) Restricted category civil aircraft: Operating limitations.
91.515 Flight altitude rules.
91.705 Operations within the North Atlantic minimum navigation performance specifications airspace.

APPENDIX A
RESERVED

APPENDIX B
Authorization to Exceed Mach 1

91. ab.1 Application

(a) An applicant for an authorization to exceed Mach 1 must apply in a form and manner prescribed by the ECAA and must comply with this appendix.

(b) In addition, each application for an authorization to exceed Mach 1 covered by section 2 (a) of this appendix must contain all information requested by the ECAA necessary to assist him in determining whether the designation of a particular test area or issuance of a particular authorization is a "major significantly affecting the quality of the human environment" within the meaning of the National Environment, and to assist him in complying with that act and with related, guidelines, and others prior to such action:

(1) In addition, each application for an authorization to exceed Mach 1 covered by Section 2 (a) of this appendix must contain;

(2) Information showing that operation at a speed greater than Mach 1 is necessary to accomplish one or more of the purposes specified in section 2 (a) of this appendix, including a showing that the purpose of the test cannot be safely or properly accomplished by over ocean testing;

(3) A description of the test area proposed by the applicant, including an environmental analysis of that area meeting the requirements of paragraph (b) of this section; and

(4) Conditions and limitations that will ensure that no measurable sonic boom overpressure will reach the surface outside of the designated test area.

(c) An application is denied if the ECAA finds that such action is necessary to protect or enhance the environment.

91.ab.2 Issuance

(a) For a flight in designated test area, an authorization to exceed Mach 1 may be issued when the ECAA has taken the environmental protective actions specified in Section 1(b) of this appendix and the applicant shows one or more of the following:

(1) The flight is necessary to show compliance with airworthiness requirements;

(2) The flight is necessary to determine the sonic boom characteristics of the airplane or to establish means of reducing or eliminating the effects of sonic boom; and

(3) The flight is necessary to demonstrate the conditions and limitations under which speeds greater than a true flight Mach number of 1 will not cause a measurable sonic boom overpressure to reach the surface.

(b) For a flight outside of designated test area, an authorization to exceed Mach 1 may be issued if the applicant shows conservatively under paragraph (a)(3) of this section that.

(1) The flight will not cause a measurable sonic boom overpressure to reach the surface when the aircraft is approved under condition and limitations demonstrated under paragraph (a)(3) of this section; and

(2) Those conditions and limitations represent all foreseeable operating conditions.

91.ab.3 Duration

An authorization to exceed Mach 1 is effective until it expires or is surrendered, or until suspended or terminated by the ECAA, Such an authorization may be amended or suspended by the ECAA at any time if the ECAA finds that such action is necessary to protect the environment Within 30 days of notification of amendment, the holder of the authorization must request reconsideration or the amendment or the authorization is automatically terminated. if reconsideration is requested with the 30-day period, the amendment or suspension continues until the holder shows why the authorization should not be amended or terminated. Upon such Showing, the ECAA may terminate or amend the authorization if the ECAA finds that such action is necessary to protect the environment, or he may reinstate the authorization without amendment if he finds that termination or amendment is not necessary to protect the environment.

APPENDIX C
OPERATIONS IN THE NORTH ATLANTIC (NAT)
Minimum Navigation Performance Specifications (MNPS) Airspace

91.ac.1 NAT MNPS

Airspace is that volume of airspace between FL 275 and FL 400 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 boundary of Reykjavik Oceanic Control Area, the western boundary of Gander Oceanic Control Area, and the western boundary of New York Oceanic Control Area, excluding the area west of 60 degrees west and south of 38 degrees 30 minutes north.

91.ac.2 NAT MNPS performance capability

The navigation performance capability required for aircraft to be operated in the airspace defined in section 1 of this appendix is as follows;

(a) The standard deviation of lateral track errors shall be less than 6.3 NM (11.7 Km). Standard deviation is a statistical measure of data about a mean value. The mean is zero nautical miles. The overall form of data is such that the plus and minus 1 standard deviation about the mean encompasses approximately 68 percent of the data and plus or minus 2 deviations encompasses approximately 95 percent.

(b) The proportion of the total flight time spent by aircraft 30 NM (55.6 Km) or more off the cleared track shall be less than 5.3 x 10-4 (less than 1 hour in 1,887 flight hours).

(c) The proportion of the total flight time spent by aircraft between 50 NM and 70 NM (92.6 Km and 129.6 Km) off the cleared track shall be less than 13x10-5 (less than 1 hour in 7.693 flight hours) .

91.ac.3 NAT MNPS deviation authorization

Air traffic control (ATC) may authorize an aircraft operator to deviate from the requirements of 91.705 for a specific flight if, at the time of flight plan filing 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 upon, the operations of the other aircraft which meet the requirements of 91.705.

APPENDIX D
Category II Operations
Manual Instruments, Equipment and Maintenance

91.ad.1 Category II manual

(a) Application for approval. An applicant for approval of a category II manual or an amendment to an approved category II manual must submit the proposed manual or amendment to the Flight Safety Standards Sector, if the application requests an evaluation program, it must include the following:
  (1) The location of the aircraft and the place where the demonstrations are to be conducted; and
  (2) The date the demonstrations are to commence (at least 10 days after filing the application).

(b) Contents each category II manual must contain:
  (1) The registration number, make, and model of the aircraft to which it applies;
  (2) A maintenance program as specified in section 4 of this appendix; and
  (3) The procedure 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 ECAA.

91.ad.2 Required Instrument And Equipment.

The instruments and equipment listed in this section must be installed in each aircraft operated in a category II operation. This section does not require duplication of instruments and equipment required by ECAR part 91:

(a) Group 1:
  (1) Two localizer and glide slope receiving systems, each system must 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;
  (2) A communication system that does not affect the operation of at least one of the ILS systems;
  (3) A marker beacon receiver that provides distinctive aural and visual indications of the outer and the middle markers;
  (4) Two gyroscopic pitch and bank indicating systems;
  (5) Two gyroscopic direction indicating systems;
  (6) Two airspeed indicators;
  (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. After June 26, 1979, two sensitive altimeters adjustable for barometric pressure, having markings at 20-foot intervals and each having placarded correction for altimeter scale error and for the wheel height of the aircraft;
  (8) Two vertical speed indicators;
  (9) A flight control guidance system that consists of either an automatic approach coupler or a flight or a flight director system. A Flight director system must display computed information as searing 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 must 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 subparagraph(1) of this paragraph; and
  (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.

(b) Group II:
  (1) Warning systems for immediate detection by the pilot of system faults in item(1),(4),(5), and (9) of Group I and, if installed for use in category III operations, the radio altimeter and auto throttle system;

(2) Dual controls;
(3) An externally vented static pressure system with an alternate static pressure source;
(4) A windshield wiper or equivalent means of providing adequate cockpit visibility for a safe visual transition by either pilot to touchdown and rollout; and
(5) A heat source malfunctioning due to icing of the pilot system.

91.ad.3 Instruments And Equipment Approval.

(a) General. The instruments and equipment required by section 2 of this appendix must be approved as provided in this section before being used in category II operations. Before presenting an aircraft for approval of the instruments and equipment, it must be shown that since the beginning of the 12h calendar month before the date of submission:
(1) The ILS localizer and glide slope equipment were bench checked according to the manufacturer's instructions and found to meet standards specified by ECAA;
(2) The altimeters and the static pressure systems were tested and inspected in accordance with part 43; and
(3) All other instruments and items of equipment specified in section 2(a) of this appendix that are listed in the proposed maintenance program were bench checked and found to meet the manufacturer's specifications.

(b) Flight control guidance system. All components of the flight control guidance system must be approved as installed by the evaluations program specified in paragraph (e) of this section 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 must be approved under this paragraph, Related system or devices, such as the auto throttle and computed missed approach guidance system, must be approved in the same manner if they are to be used for category II operations.

(c) Radio altimeter. A radio altimeter must meet the performance criteria of this paragraph for original approval and after each subsequent alteration:
(1) It must display to the flight crew clearly and positively the wheel height of the main landing gear above the terrain;
(2) It must 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:
(i) Pitch angles of zero to plus or minus 5 degrees about the mean approach altitude;
(ii) Roll angles of zero to 20 degrees in either direction;
(iii) Forward velocities from minimum approach speed to 20 knots; and
(iv) Sink rates from zero to 15 feet per second at altitudes from 100 to 200 feet.
(3) Over level ground, it must track the actual altitude of the aircraft without significant lag or oscillation;
(4) With the aircraft at an altitude of 200 feet or less, any abrupt change terrain representing no more than 10 percent of the aircraft's altitude must not cause the altimeter to unlock, and indicator response to such changes must not exceed 0.1 seconds and, in addition, if the system unlocks for greater changes, it must require the signal in less than 1 second;
(5) System that contain a push-to-test feature must test the entire system (with or without an antenna) at a simulated altitude of less than 500 feet; and
(6) The system must 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.

(d) Other instruments and equipment. All other instruments and items of equipment required by 2 of this appendix must 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.

(e) Evaluation program:
(1) Application. Approval by evaluation is requested as a part of the application for approval of the category II manual; and
(2) Demonstrations. Unless otherwise authorized by the ECAA, the evaluation program for each aircraft requires the demonstration specified in this paragraph. At least 50 ILS approaches must 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 must be successful. A successful approach is one in which.

(i) At the 100-foot decision height, the indicated airspeed and heating are satisfactory for a normal fare and landing (speed must be plus or minimum 5 knots of programmed airspeed, but may not be less than computed threshold speed if auto throttles are used);

(ii) 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;

(iii) Deviation from glide slope after leaving the outer marker does not exceed 50 percent of full-scale deflection as displayed on the ILS Indicator;

(iv) Non unusual roughness or excessive attitude changes occur after leaving the middle marker; and

(v) In the case of 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.

(3) Records. During the evaluation program the following information must be maintained by the applicant for the aircraft with respect to each approach and made available the ECAA upon request:

(i) Each deficiency in airborne instruments and equipment that prevented the initiation of an approach;

(ii) The reasons for discontinuing an approach, including the altitude above the runway at which it was discontinued;

(iii) Speed control at the 100-foot decision height if auto throttle are used;

(iv) Trim condition of the aircraft upon disconnecting the auto coupler with respect to continuation to flare and landing;

(v) 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 on the runway extended to the middle marker. Estimated touchdown point must be indicated on the runway diagram;

(vi) Compatibility of flight director with the auto coupler, if applicable; and

(vii) Quality of overall system performance.

(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 exit, the system is approved as installed.

91.ad.4 Maintenance program

(a) Each maintenance program must contain the following:

(1) A list of each instrument and item of equipment specified in 2 of this appendix that is installed in the aircraft and approved for category II operations, including the make and model of those specified in 2 (a).

(2) A schedule that provides for the performance of inspections under subparagraph (5) of this paragraph within 3 calendar months after the date of the previous inspection.

(3) The inspection must be performed by a person authorized by Part 43, except that each alternate inspection may be replaced by a functional flight deck.

(4) This functional flight check must be performed by a pilot holding a category II pilot authorization for the type aircraft checked.

(5) A schedule that provides for the performance of bench checks for each listed instrument and item of equipment that is specified in section 2(a) within 12 calendar months after the date of the previous bench check.

(6) A schedule that provides for the performance of a test and inspection of each static pressure system in accordance with appendix E to Part 43 within 12 calendar months after the date of the previous test and inspection.

(7) The procedure 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 section 2(a) of this appendix to perform as approval for category II operations including a procedure for recording functional flight checks.

(8) A procedure for ensuring that the pilot is informed of all defects in listed instruments and items of equipment.

(9) A procedure for issuing 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.

(10) A procedure for an entry in the maintenance records required by 43.9 of this chapter that shows the date, airport and reason for each discontinued category II operation because of a malfunction of a listed instrument or item of equipment.

(b) Bench check: A bench check required by this section must comply with this paragraph.

(1) It must be performed by a certificated repair station holding one of the following ratings as appropriate to the equipment checked;

(i) An instrument rating.

(ii) A radio rating.

(iii) A rating issued subpart D of Part 145.

(2) It must consist of removal of an instrument or item of equipment and performance of the following:

(iv) A visual inspection for cleanliness, impending failure, and the need for lubrication, repair, or replacement of parts;

(v) Correction of items found by the that visual inspection; and

(vi) 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.

(3) 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.

Appendix E
Flight Recorders (Aero planes)

The material in this Appendix concerns flight recorders intended for installation in aeroplanes engaged in international air navigation. Crash-protected flight recorders comprise one or more of the following:

— a flight data recorder (FDR),
— a cockpit voice recorder (CVR),
— an airborne image recorder (AIR),
— a data link recorder (DLR).

When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CVR or the FDR.

Lightweight flight recorders comprise one or more of the following:

— an aircraft data recording system (ADRS),
— a cockpit audio recording system (CARS),
— an airborne image recording system (AIRS),
— a data link recording system (DLRS).

When image or data link information is required to be recorded on a lightweight flight recorder, it is permissible to record it on either the CARS or the ADRS.

1. General requirements:

1.1 Non-deployable flight recorder containers shall be painted a distinctive orange colour.

1.2 Non-deployable crash-protected flight recorder containers shall:

a) carry reflective material to facilitate their location; and

b) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 kHz.At the earliest practicable date, but not later than 1 January 2018, this device shall operate for a minimum of 90 days.

1.3 Automatic deployable flight recorder containers shall:

a) be painted a distinctive orange colour, however the surface visible from outside the aircraft may be of another colour;

b) carry reflective material to facilitate their location; and

c) have an integrated automatically activated ELT.

1.4 The flight recorder systems shall be installed so that:

a) the probability of damage to the recordings is minimized;

b) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and

c) if the flight recorder systems have an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact; and

d) for aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be minimized.

Note. — The erase function is intended to prevent access to CVR and AIR recordings by normal replay or copying means, but would not prevent accident investigation authorities access to such recordings by specialized replay or copying techniques.

1.5 The crash-protected flight recorders shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorders without jeopardizing service to essential or emergency loads.

1.6 The lightweight flight recorders shall be connected to a power source having the characteristics which ensure proper and reliable recording in the operational environment.

1.7 The flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.

1.8 Means shall be provided for an accurate time correlation between the flight recorder systems recordings.

1.9 The manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recorder systems:

a) manufacturer's operating instructions, equipment limitations and installation procedures;

b) parameter origin or source and equations which relate counts to units of measurement; and

c) manufacturer's test reports.

1.10 The holder of the airworthiness approval for the installation design of the flight recorder system shall make available the relevant continuing airworthiness information to the operator of the aeroplane to be incorporated in the continuing airworthiness maintenance programme. This continuing airworthiness
information shall cover in detail all the tasks required to ensure the continued serviceability of the flight recorder system.

Note 1.— The flight recorder system is composed of the flight recorder as well as any dedicated sensors, hardware and software that provide information required per this Appendix.

Note 2.— Conditions related to the continued serviceability of a flight recorder system are defined in Section 6 of this Appendix. The Manual on Flight Recorder System Maintenance (FRSM) (Doc 10104) provides guidance on maintenance tasks associated with flight recorder systems.

2. Flight Data Recorder (FDR) and Aircraft Data Recording Systems (ADRS)

2.1 Start and stop logic

The FDR or ADRS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power.

2.2 Parameters to be recorded

2.2.1 The parameters that satisfy the requirements for FDRs are listed in Table E-1. The number of parameters to be recorded shall depend on aeroplane complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of aeroplane complexity. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by aeroplane systems or the flight crew to operate the aeroplane. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.

2.2.2 If further FDR recording capacity is available, recording of the following additional information shall be (should be for general aviation) considered:

a) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority:
   1) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;
   2) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY,
      ETC.;
   3) warnings and alerts; and
   4) the identity of displayed pages for emergency procedures and checklists; and

b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs.

2.2.3 The parameters that satisfy the requirements for flight path and speed as displayed to the pilot(s) are listed below. The parameters without an (*) are mandatory parameters which shall be recorded. In addition, the parameters designated by an (*) shall be recorded if an information source for the parameter is displayed to the pilot and is practicable to record:

— Pressure altitude
— Indicated airspeed or calibrated airspeed
— Heading (primary flight crew reference)
— Pitch attitude
— Roll attitude
— Engine thrust/power
— Landing-gear status*
— Total or outside air temperature*
— Time*
— Navigation data*: drift angle, wind speed, wind direction, latitude/longitude
— Radio altitude*

2.2.4 The parameters that satisfy the requirements for ADRS are the first 7 parameters in Table E-3.

2.2.5 If further ADRS recording capacity is available, the recording of any parameters from 8 onwards defined in Table E-3 shall be considered.

2.3 Additional information

2.3.1 The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certificating authority.

2.3.2 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator. The documentation needs to be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

3. Cockpit Voice Recorder (CVR) and Cockpit Audio Recording System (CARS)

3.1 Start and stop logic

The CVR or CARS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR or CARS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

3.2 Signals to be recorded

3.2.1 The CVR shall record simultaneously on four separate channels, or more, at least the following:

a) voice communication transmitted from or received in the aeroplane by radio;
b) aural environment on the flight deck;
c) voice communication of flight crew members on the flight deck using the aeroplane's interphone system, if installed;
d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker;
and voice communication of flight crew members using the passenger address system, if installed.

3.2.2 The preferred CVR audio allocation should be as follows:
a) pilot-in-command audio panel;
b) co-pilot audio panel;
c) additional flight crew positions and time reference; and
d) cockpit area microphone.

3.2.3 The CARS shall record simultaneously on two separate channels, or more, at least the following:
a) voice communication transmitted from or received in the aeroplane by radio;
b) aural environment on the flight deck;
c) voice communication of flight crew members on the flight deck using the aeroplane's interphone system, if installed;
d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; an
e) voice communication of flight crew members using the passenger address system, if installed, and
f) digital communications with ATS, unless recorded by the FDR (for general aviation).

3.2.4 The preferred CARS audio allocation should be as follows:
a) voice communication; and
b) aural environment on the flight deck.

4. Automatic Deployable Flight Recorder (ADFR)

4.1Operation

The following requirements shall apply to an ADFR:
— deployment shall take place when the aeroplane structure has been significantly deformed;
— deployment shall take place when an aeroplane sinks in water;
— ADFR shall not be capable of manual deployment;
— the ADFR shall be able to float on water;
— the ADFR deployment shall not compromise the safe continuation of the flight;
— the ADFR deployment shall not significantly reduce the chance of survival of the recorder and of successful transmission by its ELT;
— the ADFR deployment shall not release more than one piece;
— an alert shall be made to the flight crew when the ADFR is no longer captive to the aircraft;
— the flight crew shall have no means to disable ADFR deployment when the aircraft is airborne;
— the ADFR shall contain an integrated ELT, which shall activate automatically during the deployment
sequence. Such ELT may be of a type that is activated in-flight and provides information from which
a position can be determined; and
— the integrated ELT of an ADFR shall satisfy the same requirements as an ELT required to be installed on an aeroplane. The integrated ELT shall at least have the same performance as the fixed ELT to maximize detection of the transmitted signal.

Note 1.— Refer to the Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery (Doc 10054) for more information on ADFR.

Note 2.— If an integrated ELT of a type that is activated in flight is used within an ADFR, it could be a means
to comply with the requirements of Chapter 6, 6.18.

5. Data Link Recorder (DLR)

5.1Applications to be recorded

5.1.1 Where the aircraft flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the aircraft) and downlinks (from the aircraft), shall be recorded on the aircraft. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note.— Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft.

5.1.2 Messages applying to the applications listed in Table E-2 shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

6. Flight Crew-Machine Interface Recordings / Airborne Image Recorder (AIR) and Airborne Image Recording System (AIRS)

6.1Start and stop logic

The AIR or AIRS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR or AIRS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

6.2Classes

6.2.1 A Class A AIR or AIRS captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

Note 1.— To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the
head and shoulders of crew members whilst seated in their normal operating position.

Note 2.— There are no provisions for Class A AIR or AIRS in this document.

6.2.2 A Class B AIR or AIRS captures data link message displays.

6.2.3 A Class C AIR or AIRS captures instruments and control panels.

Note.— A Class C AIR or AIRS may be considered as a means for recording flight data where it is not
practical or is prohibitively expensive to record on an FDR or an ADRS, or where an FDR is not
required.

6.3 Applications to be recorded (not applicable for general aviation)

6.3.1 The operation of switches and selectors and the information displayed to the flight crew from electronic displays shall be captured by sensors or other electronic means.

6.3.2 The recording of operation of switches and selectors by the flight crew shall include the following:

— any switch or selector that will affect the operation and the navigation of the aircraft; and
— selection of normal and alternate systems.

6.3.3 The recording of the information displayed to the flight crew from electronic displays shall include the following:

— primary flight and navigation displays;
— aircraft system monitoring displays;

— engine indication displays;
— traffic, terrain, and weather displays;
— crew alerting systems displays;
— stand-by instruments; and
— installed EFB to the extent it is practical.

6.3.4 If image sensors are used, the recording of such images shall not capture the head and shoulders of the flight crew members while seated in their normal operating position.

7. Inspections of Flight Recorder Systems

7.1 Prior to the first flight of the day, the built-in test features for the flight recorders and flight data acquisition unit (FDAU), when installed, shall be monitored by manual and/or automatic checks.

7.2 FDR systems or ADRS, CVR systems or CARS, and AIR systems or AIRS shall have recording inspection intervals of one year; subject to the approval from the appropriate regulatory authority, this period may be extended to two years provided these systems have demonstrated a high integrity of serviceability and self-monitoring. DLR systems or DLRS shall have recording inspection intervals of two years; subject to the approval from the appropriate regulatory authority, this period may be extended to four years provided these systems have demonstrated high integrity of serviceability and self-monitoring.

7.3 Recording inspections shall be carried out as follows:

a) an analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;
b) the FDR or ADRS recording from a complete flight shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR or ADRS. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;
c) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;
d) an examination of the recorded signal on the CVR or CARS shall be carried out by replay of the CVR or CARS recording. While installed in the aircraft, the CVR or CARS shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;
e) where practicable, during the examination, a sample of in-flight recordings of the CVR or CARS shall be examined for evidence that the intelligibility of the signal is acceptable;
f) an examination of the recorded images on the AIR or AIRS shall be carried out by replay of the AIR or AIRS recording. While installed in the aircraft, the AIR or AIRS shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards; and
g) an examination of the recorded messages on the DLR or DLRS shall be carried out by replay of the DLR or DLRS recording.

7.4 A flight recorder system shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.

7.5 A report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.

7.6 Calibration of the FDR system:

a) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every five years. The recalibration shall determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and

b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every two years.

Table E-1 Parameter guidance for flight data recorders

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared toFDR readout)	Recording resolution
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	±0.125%/h	1 s
2	Pressure-altitude		–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max V_{So} *(Note 1)* V_{So} to 1.2 V_D *(Note 2)*	1	±5% ±3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5	Normal acceleration *(Notes 8 and 9)*	Application for type certification is submitted to a Contracting State before 1 January 2016	–3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%	0.004 g
		Application for type certification is submitted to a Contracting State on or after 1 January 2016	–3 g to +6 g	0.0625	±1% of maximum range excluding datum error of ±5%	0.004 g
6	Pitch attitude		±75° or usable range whichever is greater	0.25	±2°	0.5°
7	Roll attitude		±180°	0.25	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1		
9	Power on each engine *(Note 3)*		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared toFDR readout)	Recording resolution
10*	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
11*	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position		Stowed, in transit, and reverse	1 (per engine)		
13*	Ground spoiler/speed Brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature		Sensor range	2	±2°C	0.3°C
15*	Autopilot/auto throttle/AFCS mode and engagement status		A suitable combination of discretes	1		
16	Longitudinal acceleration *(Notes 8 and 9)*	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g
17	Lateral acceleration *(Notes 8 and 9)*	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g
18	Pilot input and/or control surface position- primary controls (pitch, roll, yaw) *(Notes 4 and 8)*	Application for type certification submitted to a Contracting State before 1 January 2016	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
		Application for type certification submitted to a Contracting State on or after 1 January 2016	Full range	0.125	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
19	Pitch trim position		Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared toFDR readout)	Recording resolution
20*	Radio altitude		–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
21*	Vertical beam deviation (ILS/GNSS/GLS glide path, MLS elevation, IRNAV/IAN vertical deviation)		Signal range	1	±3%	0.3% of full range
22*	Horizontal beam deviation (ILS/GNSS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)		Signal range	1	±3%	0.3% of full range
23	Marker beacon passage		Discrete	1		
24	Master warning		Discrete	1		
25	Each NAV receiver frequency selection *(Note 5)*		Full range	4	As installed	
26*	DME 1 and 2 distance (includes Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/IAN)) *(Notes 5 and 6)*		0 – 370 km (0 – 200 NM)	4	As installed	1 852 m (1 NM)
27	Air/ground status		Discrete	1		
28*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)		Discrete	1		
29*	Angle of attack		Full range	0.5	As installed	0.3 % of full range
30*	Hydraulics, each system (low pressure)		Discrete	2		0.5% of full range
31*	Navigation data (latitude/longitude, ground speed and drift angle) *(Note 7)*		As installed	1	As installed	
32*	Landing gear and gear selector position		Discrete	4	As installed	
33	Groundspeed		As installed	1	Data should be obtained from the most accurate system	1 kt
34	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discretes or full range)	1	±5%	2% of full range

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared toFDR readout)	Recording resolution
35*	Additional engine parameters (EPR, N_1, indicated vibration level, N_2, EGT, fuel flow, fuel cut-off lever position, N_3, engine fuel metering valve position)	Engine fuel metering valve position: Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	Each engine each second	As installed	2% of full range
36*	TCAS/ACAS (traffic alert and collision avoidance system)		Discretes	1	As installed	
37*	Wind shear warning		Discrete	1	As installed	
38*	Selected barometric Setting (pilot, co-pilot)		As installed	64	As installed	0.1 mb (0.01 in-Hg)
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical Speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle, final approach path (IRNAV/IAN))			1	As installed	
45*	Selected decision height		As installed	64	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot, co-pilot)		Discrete(s)	4	As installed	
47*	Multi- function/engine/alerts display format		Discrete(s)	4	As installed	
48*	AC electrical bus status		Discrete(s)	4	As installed	
49*	DC electrical bus status		Discrete(s)	4	As installed	
50*	Engine bleed valve position		Discrete(s)	4	As installed	
51*	APU bleed valve position		Discrete(s)	4	As installed	
52*	Computer failure		Discrete(s)	4	As installed	
53*	Engine thrust command		As installed	2	As installed	

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared toFDR readout)	Recording resolution
54*	Engine thrust target		As installed	4	As installed	2% of full range
55*	Computed centre of gravity		As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank		As installed	64	As installed	1% of full range
57*	Head up display in use		As installed	4	As installed	
58*	Para visual display on/off		As installed	1	As installed	
59*	Operational stall protection, stick shaker and pusher activation		As installed	1	As installed	
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)		As installed	4	As installed	
61*	Ice detection		As installed	4	As installed	
62*	Engine warning each engine vibration		As installed	1	As installed	
63*	Engine warning each engine over temperature		As installed	1	As installed	
64*	Engine warning each engine oil pressure low		As installed	1	As installed	
65*	Engine warning each engine over speed		As installed	1	As installed	
66*	Yaw trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle		Full range	1	±5%	0.5°
69*	De-icing and/or anti- icing systems selection		Discrete(s)	4		
70*	Hydraulic pressure (each system)		Full range	2	±5%	100 psi
71*	Loss of cabin pressure		Discrete	1		
72*	Cockpit trim control input position, Pitch		Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position, Roll		Full range	1	±5%	0.2% of full range or as installed
74*	Cockpit trim control input position, Yaw		Full range	1	±5%	0.2% of full range or as installed
75*	All cockpit flight control input forces (control wheel, control column, rudder		Full range (±311 N (±70 lbf), ± 378 N (±85 lbf), ± 734 N (±165 lbf))	1	±5%	0.2% of full range or as installed
76*	Event marker		Discrete	1		

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared toFDR readout)	Recording resolution
77*	Date		365 days	64		
78*	ANP or EPE or EPU		As installed	4	As installed	
79*	Cabin pressure altitude	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed (0 ft to 40 000 ft recommended)	1	As installed	100 ft
80*	Aeroplane computed weight	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of ful l range
81*	Flight director command	Application for type certification submitted to a Contracting State on or after 1 January 2023	Full range	1	± 2°	0.5°
82*	Vertical speed	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	0.25	As installed (32 ft/min recommended)	16 ft/min

Notes.—

1. VSo stalling speed or minimum steady flight speed in the landing configuration.
2. VD design diving speed.
3. Record sufficient inputs to determine power.
4. For aeroplanes with control systems in which movement of a control surface will back drive the pilot's control, ''or'' applies. For aeroplanes with control systems in which movement of a control surface will not back drive the pilot's control, ''and'' applies. In aeroplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately. In aeroplanes with independent pilot input on primary controls, each pilot input on primary controls needs to be recorded separately.
5. If signal available in digital form.
6. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.
7. If signals readily available.
8. It is not intended that aeroplanes issued with an individual certificate of airworthiness before 1 January 2016

be modified to meet the measurement range, maximum sampling and recording interval, accuracy limits or

recording resolution description detailed in this Appendix.

9. Accelerations maximum sampling and recording interval (seconds) for general aviation as following:
   - Normal Acceleration is 0.125,;
   - Lateral acceleration is 0.25 ;
   - Longitudinal acceleration is 0.25

Table E-2 Description of Applications for Data Link Recorders

Item No.	Application type	Application description	Recording content

Item No.	Application type	Application description	Recording content
1	Data link initiation	This includes any applications used to log on to or initiate data link service. In FANS-1/A and ATN, these are ATS facilities notification (AFN) and context management (CM) respectively.	C
2	Controller-pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C
3	Addressed surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the automatic dependent surveillance — contract (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight information	This includes any service used for delivery of flight information to specific aircraft. This includes, for example, data link aviation weather report service (D-METAR), data link-automatic terminal service (D-ATIS), digital Notice to Airmen (D-NOTAM) and other textual data link services..	C
5	Aircraft broadcast surveillance	This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance — broadcast (ADS-B) output data. Where parametric data sent by the aeroplane are reported within the message they shall be recorded unless data from the same source are recorded on the FDR..	M*
6	Aeronautical operational control data	This includes any application transmitting or receiving data used for aeronautical operational control purposes (per the ICAO definition of operational control).	M*

Key:
C: Complete contents recorded.
M: Information that enables correlation to any associated records stored separately from the aero plane.
*: Applications that are to be recorded only as far as is practicable given the architecture of the system.

Table E-3 Parameter Characteristics for Aircraft Data Recording Systems

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading					Heading is preferred, if not available, yaw rate shall be recorded
	a) Heading (Magnetic or True)	±180º	1	±2°	0.5°	
	b) Yaw rate	±300º/s	0.25	±1% + drift of 360°/h	2°/s	

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
2	Pitch					Pitch attitude is preferred, if not available, pitch rate shall be recorded
	a) Pitch attitude	±90º	0.25	±2º	0.5°	
	b) Pitch rate	±300º/s	0.25	±1% + drift of 360°/h	2°/s	
3	Roll					Roll attitude is preferred, if not available, roll rate shall be recorded
	a) Roll attitude	±180º	0.25	±2º	0.5°	
	b) Roll rate	±300º/s	0.25	±1% + drift of 360°/h	2°/s	
4	Positioning system:					UTC time preferred where available.
	a) Time	24 hours	1	±0.5 s	0.1 s	
	b) Latitude/longitude	Latitude:±90° Longitude:±180°	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	c) Altitude	–300 m (–1 000 ft) to maximum certificated altitude of aeroplane +1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	
	d) Ground speed	0–1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	
	e) Track	0–360º	2 (1 if available)	As installed (± 2º recommended)	0.5°	
	f) Estimated error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available
5	Normal acceleration	–3 g to + 6 g (*)	0.25 (0.125 if available)	As installed (± 0.09 g excluding a datum error of ±0.45 g recommended)	0.004 g	
6	Longitudinal acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft)recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or total air temperature)	–50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3 % recommended)	1 kt (0.5 kt recommended)	
11	Engine RPM	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
12	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
13	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full	
16	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed should be provided.
17	Engine gas generator speed (Ng)	0-150%	Each engine each second	As installed	0.2% of full range	
18	Free power turbine speed (Nf)	0-150%	Each engine each second	As installed	0.2% of full range	
19	Coolant temperature	Full range	1	As installed (±5°C recommended)	1° C	
20	Main voltage	Full range	Each engine each second	As installed	1 Volt	
21	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range	
22	Flaps position	Full range or each discrete position	2	As installed	0.5°	
23	Primary flight control surface position	Full range	0.25	As installed	0.2 % of full range	
24	Fuel quantity	Full range	4	As installed	1% of full range	
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		* Where available, record up-and- locked and down-and-locked position

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
29	Novel/unique aircraft features	As required	As required	As required	As required	

E: Essential parameters
R: Recommended parameters

Key:

Appendix F
Flight Recorder (Helicopters)

The material in this Appendix concerns flight recorders intended for installation in helicopters engaged in international air navigation. Crash-protected flight recorders comprise one or more of the following:

— a flight data recorder (FDR),
— a cockpit voice recorder (CVR),
— an airborne image recorder (AIR),
— a data link recorder (DLR).

When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CVR or the FDR.

Lightweight flight recorders comprise one or more of the following:
— an aircraft data recording system (ADRS),
— a cockpit audio recording system (CARS),
— an airborne image recording system (AIRS),
— a data link recording system (DLRS).

When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CARS or the ADRS.

1. General Requirements

1.1 Non-deployable flight recorder containers shall be painted a distinctive orange colour.

1.2 Non-deployable crash-protected flight recorder containers shall:

a) carry reflective material to facilitate their location; and

b) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 kHz. At the earliest practical date, but not later than 1 January 2018, this device shall operate for a minimum of 90 days.

1.3 Automatic deployable flight recorder containers shall:

a) be painted a distinctive orange colour, however the surface visible from outside the helicopter may be of another colour;

b) carry reflective material to facilitate their ocation; and c)have an integrated automatically activated ELT.

1.4 The flight recorder systems shall be installed so that:

a) the probability of damage to the recordings is minimized;

b) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly;

c) if the flight recorder systems have an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact; and

d) for helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be minimized.

Note.— The erase function is intended to prevent access to CVR and AIR recordings by normal replay or copying means, but would not prevent accident investigation authorities access to such recordings by specialized replay or copying techniques

1.5 The crash-protected flight recorders shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorders without jeopardizing service to essential or emergency loads.

1.6 The lightweight flight recorders shall be connected to a power source having the characteristics which ensure proper and reliable recording in the operational environment.

1.7 The flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.

1.8 Means shall be provided for an accurate time correlation between the flight recorder systems functions.

1.9 The manufacturer usually provides the appropriate certificating authority with the following information in respect of the flight recorder systems:

a) manufacturer's operating instructions, equipment limitations and installation procedures;

b) parameter origin or source and equations which relate counts to units of measurement; and

c) manufacturer's test reports.

2. Flight Data Recorder (FDR) and Aircraft Data Recording System (ADRS)

2.1 Start and stop logic

The FDR or ADRS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power.

2.2 Parameters to be recorded

2.2.1 The parameters that satisfy the requirements for FDRs, are listed in Table A4-1. The number of parameters to be recorded shall depend on helicopter complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of helicopter complexity. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by helicopter systems or the flight crew to operate the helicopter. However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.

2.2.2 The following parameters shall satisfy the requirements for flight path and speed:

— pressure altitude
— indicated airspeed
— outside air temperature
— heading
— normal acceleration
— lateral acceleration
— longitudinal acceleration (body axis)
— time or relative time count
— navigation data*: drift angle, wind speed, wind direction, latitude/longitude
— radio altitude*

2.2.3 If further FDR recording capacity is available, recording of the following additional information shall be considered:

a) additional operational information from electronic displays, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS); and

b) additional engine parameters (EPR, N1, fuel flow, etc.).

2.2.4 The parameters that satisfy the requirements for ADRS are the first 7 parameters listed in Table A4-3.

2.2.5 If further ADRS recording capacity is available, the recording of any parameters from 8 onwards defined in Table A4-3 shall be considered.

2.3 Additional information

2.3.1 The measurement range, recording interval and accuracy of parameters on installed equipment is usually verified by methods approved by the appropriate certificating authority.

2.3.2 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator/owner. The documentation shall be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

3. Cockpit Voice Recorder (CVR) and Cockpit Audio Recording System (CARS)

3.1 Start and stop logic

The CVR or CARS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR or CARS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

3.2 Signals to be recorded

3.2.1 The CVR shall record simultaneously on four separate channels, or more, at least the following:

a) voice communication transmitted from or received in the aircraft by radio;

b) aural environment on the flight deck;

c) voice communication of flight crew members on the flight deck using the interphone system, if installed;

d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and

e) voice communication of flight crew members using the passenger address system, if installed.

3.2.2 Recommendation.—The preferred CVR audio allocation should be as follows:

a) pilot-in-command audio panel;

b) co-pilot audio panel;

c) additional flight crew positions and time reference; and d) cockpit area microphone.

3.2.3 The CARS shall record simultaneously on two separate channels, or more, at least the following:

a) voice communication transmitted from or received in the helicopter by radio;

b) aural environment on the flight deck; and

c) voice communication of flight crew members on the flight deck using the helicopter's interphone system, if installed.

3.2.4 Recommendation.— The preferred CARS audio allocation should be as follows:

a) voice communication; and

b) aural environment on the flight deck.

4. Airborne Image Recorder (AIR) and Airborne Image Recording System (AIRS)

4.1 Start and stop logic

The AIR or AIRS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR or AIRS

shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight

4.2 Classes

4.2.1 A Class A AIR or AIRS captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

Note 1.— To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.

Note 2.— There are no provisions for Class A AIRs or AIRS in this document.

4.2.2 A Class B AIR or AIRS captures data link message displays.

4.2.3 A Class C AIR or AIRS captures instruments and control panels.

Note.— A Class C AIR or AIRS may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR, or where an FDR is not required.

5. Data Link Recorder (DLR)

5.1 Applications to be recorded

5.1.1 Where the helicopter flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the helicopter) and downlinks (from the helicopter), shall be recorded on the helicopter. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall too be recorded.

Note.— Sufficient information to derive the content of the data link communications message, and the time the messages were displayed to the flight crew, is needed to determine an accurate sequence of events on board the aircraft.

5.1.2 Messages applying to the applications listed in Table A4-2 shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) are to be recorded only as far as is practicable given the architecture of the system.

6. INSPECTIONS OF FLIGHT RECORDER SYSTEMS

6.1 Prior to the first flight of the day, the built-in test features for the flight recorders and flight data acquisition unit (FDAU), when installed, shall be monitored by manual and/or automatic checks.

6.2 FDR systems or ADRS, CVR systems or CARS, and AIR systems or AIRS shall have recordinginspection intervals of one year; subject to the approval from the appropriate regulatory authority, this period may be extended to two years, provided these systems have demonstrated a high integrity of serviceability and self-monitoring. DLR systems or DLRS shall have recording inspection intervals of two years; subject to the approval from the appropriate regulatory authority, this period may be extended to four years, provided these systems have demonstrated high integrity of serviceability and self- monitoring.

6.3 Recording inspections shall be carried out as follows:

a) an analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;

b) the FDR or ADRS recording from a complete flight shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR or ADRS. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;

c) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;

d) an examination of the recorded signal on the CVR or CARS shall be carried out by replay of the CVR or CARS recording. While installed in the aircraft, the CVR or CARS shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;

e) where practicable, during the examination, a sample of in-flight recordings of the CVR or CARS shall be examined for evidence that the intelligibility of the signal is acceptable; and

f) an examination of the recorded images on the AIR or AIRS shall be carried out by replay of the AIR or AIRS recording. While installed in the aircraft, the AIR or AIRS shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards.

g) an examination of the recorded messages on the DLR or DLRS shall be carried out by replay of the DLR or DLRS recording.

6.4 A flight recorder system shall be considered unserviceable if there is a significant period of poor-quality data, unintelligible signals or if one or more of the mandatory parameters is not recorded correctly.

6.5 A report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.

6.6 Calibration of the FDR system:

a) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at least every five years or in accordance with the recommendations of the sensor manufacturer to determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and

b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed as recommended by the sensor manufacturer, or at least every two years.

Table F-1 **Parameter Characteristics for Flight Data Recorders**

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	±0.125% per hour	1 s
2	Pressure altitude		–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed		As the installed pilot display measuring system	1	±3%	1 kt
4	Heading		360°	1	±2°	0.5°
5	Normal acceleration		–3 g to +6 g	0.125	±0.09 g excluding a datum error of ±0.045 g	0.004 g
6	Pitch attitude		±75° or 100% of useable range whichever is greater	0.5	±2°	0.5°
7	Roll attitude		±180°	0.5	±2°	0.5°

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
8	Radio transmission keying		On-off (one discrete)	1	—	—
9	Power on each engine		Full range	1 (per engine)	±2%	0.1% of full range
10	Main rotor:					
	Main rotor speed Rotor brake		50–130% Discrete	0.51	±2% —	0.3% of full range —
11	Pilot input and/or control surface position — primary controls (collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal)		Full range	0.5 (0.25 recommended)	±2% unless higher accuracy uniquely required	0.5% of operating range
12	Hydraulics, each system (low pressure and selection)		Discrete	1	—	—
13	Outside air temperature		Sensor range	2	±2°C	0.3°C
14*	Autopilot/ autothrottle/AFCS mode and engagement status		A suitable combination of discretes	1	—	—
15*	Stability augmentation system engagement		Discrete	1	—	—
16*	Main gearbox oil pressure		As installed	1	As installed	6.895 kN/m2 (1 psi)
17*	Main gearbox oil temperature		As installed	2	As installed	1°C
18	Yaw rate		±400°/second	0.25	±1.5% maximum range excluding datum error of ±5%	±2°/s
19*	Sling load force		0 to 200% of certified load	0.5	±3% of maximum range	0.5% for maximum certified load
20	Longitudinal acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
21	Lateral acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
22*	Radio altitude		–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft), 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
23*	Vertical beam deviation		Signal range	1	±3%	0.3% of full range
24*	Horizontal beam deviation		Signal range	1	±3%	0.3% of full range
25	Marker beacon passage		Discrete	1	—	—
26	Warnings		Discrete(s)	1	—	—
27	Each navigation receiver frequency selection		Sufficient to determine selected frequency	4	As installed	—

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
28*	DME 1 and 2 distances		0–370 km 0–200 NM)	4	As installed	1 852 m (1 NM)
29*	Navigation data (latitude/longitude, ground speed, drift angle, wind speed, wind direction)		As installed	2	As installed	As installed
30*	Landing gear and gear selector position		Discrete	4	—	—
31*	Engine exhaust gas temperature (T4)		As installed	1	As installed	
32*	Turbine inlet temperature (TIT/ITT)		As installed	1	As installed	
33*	Fuel contents		As installed	4	As installed	
34*	Altitude rate		As installed	1	As installed	
35*	Ice detection		As installed	4	As installed	
36*	Helicopter health and usage monitor system		As installed	—	As installed	—
37	Engine control modes		Discrete	1	—	—
38*	Selected barometric setting (pilot and co-pilot)		As installed	64 (4 recommended)	As installed	0.1 mb (0.01 in Hg)
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
45*	Selected decision height		As installed	4	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot and co-pilot)		Discrete(s)	4	—	—
47*	Multi-function/ engine/alerts display format		Discrete(s)	4	—	—
48*	Event marker		Discrete	1	—	—

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
49*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position) and (operational status)	Application for Type certification is submitted to a Contracting State on or after 1 January 2023	Discrete	1	As installed	—
50*	TCAS/ACAS (traffic alert and collision avoidance system) and (operational status)	Application for Type certification is submitted to a Contracting State on or after 1 January 2023	Discrete	1	As installed	—
51*	Primary flight controls – pilot input forces	Application for Type certification is submitted to a Contracting State on or after 1 January 2023	Full range	0.125 (0.0625 recommended)	± 3% unless higher accuracy is uniquely required	0.5% of operating range
52*	Computed centre of gravity	Application for Type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
53*	Helicopter computed weight	Application for Type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range

Table F-2 Description of Applications for Data Link Recorders

Item No.	Application type	Application description	Recording content
1	Data link initiation	This includes any applications used to log on to or initiate data link service. In FANS-1/A and ATN, these are ATS facilities notification (AFN) and context management (CM) respectively.	C
2	Controller-pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C

Item No.	Application type	Application description	Recording content
3	Addressed surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the automatic dependent surveillance — contract (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight information	This includes any service used for delivery of flight information to specific aircraft. This includes, for example, data link aviation weather report service (D-METAR), data link-automatic terminal service (D-ATIS), digital Notice to Airmen (D-NOTAM) and other textual data link services..	C
5	Aircraft broadcast surveillance	This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance — broadcast (ADS-B) output data. Where parametric data sent by the aeroplane are reported within the message they shall be recorded unless data from the same source are recorded on the FDR..	M*
6	Aeronautical operational control data	This includes any application transmitting or receiving data used for aeronautical operational control purposes (per the ICAO definition of operational control).	M*

Key:
C: Complete contents recorded.
M: Information that enables correlation to any associated records stored separately from the aero plane.
*: Applications that are to be recorded only as far as is practicable given the architecture of the system.

Table F-3 Parameter Characteristics for Aircraft Data Recording Systems

NO. NONo.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1.	Heading					*Heading is preferred, if not available, yaw rate shall be recorded
	a) Heading (Magnetic or True)	±180º	1	±2°	0.5°	
	b) Yaw rate	±300º/s	0.25	±1% + drift of 360°/h	2°/s	
2.	Pitch					*Pitch attitude is preferred, if not available, pitch rate shall be recorded
	a) Pitch attitude	±90º	0.25	±2º	0.5°	
	b) Pitch rate	±300º/s	0.25	±1% + drift of 360°/h	2°/s	
3.	Roll					*Roll attitude is preferred, if not available, roll rate shall be recorded
	a) Roll attitude	±180º	0.25	±2º	0.5°	
	b) Roll rate	±300º/s	0.25	±1% + drift of 360°/h	2°/s	
4.	Positioning system:					UTC time preferred where available.
	a) Time	24 hours	1	±0.5 s	0.1 s	
	b) Latitude/longitude	Latitude:±90° Longitude:±180°	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	c) Altitude	–300 m (–1 000 ft) to maximum certificated altitude of aeroplane +1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	
	d) Ground speed	0–1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	
	e) Track	0–360º	2 (1 if available)	As installed (± 2º recommended)	0.5°	
	f) Estimated error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available
5.	Normal acceleration	–3 g to + 6 g	0.25 (0.125 if available)	As installed (± 0.09 g excluding a datum error of ±0.05 g recommended)	0.004 g	
6.	Longitudinal acceleration	±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7.	Lateral acceleration	±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8.	External static pressure (or pressure altitude)	34.4 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (±1 hPa (0.3 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 hPa (0.03 in-Hg) or 1.5 m (5 ft)	
9.	Outside air temperature (or total air temperature)	–50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10.	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3 % recommended)	1 kt (0.5 kt recommended)	

NO. NONo.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
11.	Main rotor speed (Nr)	50% to 130% or available sensor range	0.5	As installed	0.3% of full range	
12.	Engine RPM (*)	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	*For pistonengined helicopters
13.	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14.	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
15.	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
16.	Manifold pressure (*)	Full range	Each engine each second	As installed	0.2% of full	*For pistonengined helicopters
17.	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	*Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power. A margin for possible overspeed should be provided. Only for turbineengined helicopters.
18.	Engine gas generator speed (Ng) (*)	0-150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
19.	Free power turbine speed (Nf) (*)	0-150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
20.	Collective pitch	Full range	0.5	As installed	0.1% of full range	
21.	Coolant temperature (*)	Full range	1	As installed (±5°C recommended)	1° C	*Only for pistonengined helicopters
22.	Main voltage	Full range	Each engine each second	As installed	1 Volt	
23.	Cylinder head Temperature (*)	Full range	Each cylinder each second	As installed	2% of full range	*Only for pistonengined helicopters
24.	Fuel quantity	Full range	4	As installed	1% of full range	
25.	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26.	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27.	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28.	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		* Where available, record up-and- locked and down- and-locked position
29.	Novel/unique aircraft features	As required	As required	As required	As required	

APPENDIX G
Operations in Reduced Vertical Separation Minimum (RVSM) Airspace

91.ag.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 ECAA. Air-traffic control notifies operators of RVSM by providing route-planning information

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

(a) 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.

(b) 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.

(c) The avionics units installed in each aircraft to meet the minimum RVSM equipment requirements of this appendix are:

(1) Manufactured to the same manufacturer specification and have the same Part number; or

(2) Of a different manufacturer or Part number, if the applicant demonstrates that the equipment provides equivalent system performance as prescribed in EAC91-9.

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:

(d) The full RVSM flight envelope is bounded as follows:

(1) The altitude flight envelope extends from FL 290 upward to the lowest altitude of the following:

(i) FL 410 (the RVSM altitude limit);

(ii) The maximum certificated altitude for the aircraft; or

(iii) The altitude limited by cruise thrust, buffet, or other flight limitations.

(2) The airspeed flight envelope extends:

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

(ii) To the maximum operating airspeed (Vmo/Mmo), or airspeed limited by cruise thrust buffet, or other flight limitations, whichever is lower.

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

(e) The basic RVSM flight envelope is the same as the full RVSM flight envelope except that the airspeed flight envelope extends:

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

(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 0.04 Mach, unless further limited by available cruise thrust, buffet, or other flight limitations.

91.ag.2 Aircraft approval

(a) An operator may be authorized to conduct RVSM operations if the ECAA finds that its aircraft comply with this section.

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

(1) An identification of the RVSM aircraft group or the nongroup aircraft;

(2) A definition of the RVSM flight envelopes applicable to the subject aircraft;

(3) Documentation that establishes compliance with the applicable RVSM aircraft requirements of this section; and

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

(c) Altitude-keeping equipment: All aircraft. To approve an aircraft group or a nongroup aircraft, the ECAA must find that the aircraft meets the following requirements:

(1) The aircraft must be equipped with two operational independent altitude measurement systems.

(2) The aircraft must be equipped with at least one automatic altitude control system that controls the aircraft altitude;

(i) 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

(ii) 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.

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

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

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

(4) One Secondary Surveillance Radar (SSR) altitude reporting transponder with capability for switching to operate from either altitude measurement system.

(d) Altimetry system error containment: According to manufacturer approved documentation.

91.ag.3 Operator authorization

(a) Authority for an operator to conduct flight in airspace where RVSM is applied is issued in operations specifications or a Letter of Authorization, as appropriate. To issue an RVSM authorization, the ECAA must find that the operator's aircraft have been approved in accordance with Section 2 of this appendix and that the operator complies with this section.

(b) An applicant for authorization to operate within RVSM airspace shall apply in a form and manner prescribed by the ECAA (refer to EAC91-9). The application must include the following:

(1) An approved RVSM maintenance program outlining procedures to maintain RVSM aircraft in accordance with the requirements of this appendix. Each program must contain the following:

(i) Periodic inspections, functional flight tests, and maintenance and inspection procedures, with acceptable maintenance practices, for ensuring continued compliance with the RVSM aircraft requirements.

(ii) 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.

(iii) Procedures for returning non compliant aircraft to service.

(2) For an applicant who operates under Part 121, initial and recurring pilot training requirements.

(3) Policies and Procedures. An applicant who operates under Part 121 shall submit RVSM policies and procedures that will enable it to conduct RVSM operations safely.

(c) Validation and Demonstration. In a manner prescribed by the ECAA, the operator must provide evidence that:

(1) It is capable to operate and maintain each aircraft or aircraft group for which it applies for approval to operate in RVSM airspace; and

(2) Each pilot has an adequate knowledge of RVSM requirements, policies, and procedures.

91.ag.4 RVSM operations

(a) 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.

(b) 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:

(1) The operator is authorized by the ECAA to perform such operations; and

(2) The aircraft has been approved and complies with the requirements of Section 2 of this appendix.

91.ag.5 Each Operator shall establish procedures which ensures that a minimum of two aero planes of each aircraft type grouping have their height-keeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per aero plane, whichever period is longer. If an operator aircraft type grouping consists of a single aero plane, monitoring of that aero plane shall be accomplished within the specified period.

Note.— Monitoring data from any regional monitoring programme established in accordance with ECAR 172.89(a)(3), may be used to satisfy the requirement.

91.ag.6 Reporting altitude-keeping errors

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

(a) Total vertical error of 300 feet or more;

(b) Altimetry system error of 245 feet or more; or

(c) Assigned altitude deviation of 300 feet or more.

91.ag.7 Removal or amendment of authority

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

(a) Committing one or more altitude-keeping errors in RVSM airspace;

(b) Failing to make an effective and timely response to identify and correct an altitude-keeping error; or

(c) Failing to report an altitude-keeping error.

APPENDIX H
Mass and Balance

91.ah.1 General

(a) An operator shall ensure that during any phase of operation, the loading, mass and centre of gravity of the aircraft complies with the limitations specified in the approved aircraft flight manual, weight and balance manual, the mass and balance program or the accepted operator operations manual if more restrictive.

(b) An operator must establish the mass and the centre of gravity of any aircraft by actual weighing prior to initial entry into service and thereafter at intervals of 3 years if individual aircraft masses are used and 9 years if fleet masses are used. The accumulated effects of modifications and repairs on the mass and balance must be accounted for and properly documented. Furthermore, aircraft must be reweighed if the effect of modifications on the mass and balance is not accurately known.

(c) An operator must determine the mass of all operating items and crewmembers included in the aircraft dry operating mass by weighing or by using standard masses. The influence of their position on the aircraft centre of gravity must be determined.

(d) An operator must establish the mass of the traffic load, including any ballast, by actual weighing or determine the mass of the traffic load in accordance with standard passenger and baggage masses.

(e) An operator must determine the mass of the fuel load by using the actual density or, if not known, the density calculated in accordance with a method specified in the mass and balance program.

91.ah.2 Terminology

(a) Dry operating mass. The total mass of the aircraft ready for a specific type of operation excluding all usable fuel and traffic load. This mass includes items such as:
  (1) Crew and crew baggage؛
  (2) Catering and removable passenger service equipment ; and
  (3) Potable water and lavatory chemicals .

(b) Maximum zero fuel mass. The maximum permissible mass of an aircraft with no usable fuel. The mass of the fuel contained in particular tanks must be included in the zero fuel mass when it is explicitly mentioned in the aircraft flight manual limitations.

(c) Maximum structural landing mass. The maximum permissible total aircraft mass upon landing under normal circumstances.

(d) Maximum structural take off mass. The maximum permissible total aircraft mass at the start of the take-off run.

(e) Passenger classification:
  (1) Adults, male and female, are defined as persons of an age of 12 years and above;
  (2) Children are defined as persons of an age of two years and above but who are less than 12 years of age;
  (3) Infants are defined as persons who are less than 2 years of age; and
  (4) Traffic load. The total mass of passengers, baggage and cargo, including any non-revenue load.

91.ah.3 Loading, mass and balance

An operator shall specify, in the general operations manual, the principles and methods involved in the loading and in the mass and balance system that meet the requirements of this section. This system must cover all types of intended operations.

91.ah.4 Mass values for crew

(a) An operator shall use the following mass values to determine the dry operating mass:
  (1) Actual masses including any crew baggage ;
  (2) Standard masses, including hand baggage, of 85 kg for cockpit crew members and 75 kg for cabin crew members; or

(3) Other standard masses acceptable to the ECAA.

(b) An operator must correct the dry operating mass to account for any additional baggage. The position of this additional baggage must be accounted for when establishing the centre of gravity of the aircraft.

91.ah.5 Mass values for passengers and baggage

(a) An operator shall compute the mass of passengers and checked baggage using either the actual weighed mass of each person and the actual weighed mass of baggage or the standard mass values specified in Tables 1 through 3 below except where the number of passenger seats available is less than 10. In such cases passenger mass may be established by use of a verbal statement by or on behalf of each passenger and adding to it a pre-determined constant to account for hand baggage and clothing. The procedure specifying when to select actual or standard masses and the procedure to be followed when using verbal statements must be included in the general operations manual.

(b) If determining the actual mass by weighing, an operator must ensure that passengers' personal belongings and hand baggage are included. Such weighing must be conducted immediately prior to boarding and at an adjacent location.

(c) If determining the mass of passengers using standard mass values, the standard mass values in Tables 1 and 2 below must be used. The standard masses include hand baggage and the mass of any infant below 2 years of age carried by an adult on one passenger seat. Infants occupying separate passenger seats must be considered as children for the purpose of this sub-paragraph.

(d) Mass values for passengers – 20 passenger seats or more:

(1) Where the total number of passenger seats available on an aircraft is 20 or more, the standard masses of male and female passengers in Table 1 are applicable. As an alternative, in cases where the total number of passenger seats available is 30 or more, the 'All Adult' mass values in Table 1 are applicable; and

(2) For the purpose of Table 1, holiday charter means a charter flight solely intended as an element of a holiday travel package. The holiday charter mass values apply provided that not more than 5% of passenger seats installed in the aircraft are used for the non-revenue carriage of certain categories of passengers.

Table 1

Passenger seats	20		30 and more
	Male	Female	***All adult***
All flights except holiday charters	88 kg	70 kg	84 kg
Holiday charters	83 kg	69 kg	76 kg
Children	35 kg	35 kg	35 kg

(e) Mass values for passengers – 19 passenger seats or less:

(1) Where the total number of passenger seats available on an aircraft is 19 or less, the standard masses in Table 2 are applicable; and

(2) On flights where no hand baggage is carried in the cabin or where hand baggage is accounted for separately, 6 kg may be deducted from the above male and female masses. Articles such as an overcoat, an umbrella, a small handbag or purse, reading material or a small camera are not considered as hand baggage for the purpose of this sub-paragraph.

Table 2

Passenger seats	1 – 5	6 – 9	10 – 19
Male	104 kg	96 kg	92 kg
Female	86 kg	78 kg	74 kg
Children	35 kg	35 kg	35 kg

(f) Mass values for baggage

(1) Where the total number of passenger seats available on the aircraft is 20 or more the standard mass values given in Table 3 are applicable for each piece of checked baggage. For aircraft with 19 passenger seats or less, the actual mass of checked baggage, determined by weighing, must be used; and

(2) For the purpose of Table 3:

(i) Domestic flight means a flight with origin and destination within the borders of one State؛ and

(ii) Intercontinental flight, means a flight with origin and destination in different continents.

Table 3 – 20 or more passenger seats

Type of flight	Baggage standard mass
Domestic	11 kg
Intercontinental	15 kg
All other	13 kg

(g) If an operator wishes to use standard mass values other than those contained in Tables 1 to 3 above, he must advise the ECAA of his reasons and gain its approval in advance. He must also submit for approval a detailed weighing survey plan and apply the statistical analysis method given in EAC 91-1. After verification and approval by the ECAA of the results of the weighing survey, the revised standard mass values are only applicable to that operator.The revised standard mass values can only be used in circumstances consistent with those under which the survey was conducted. Where revised standard masses exceed those in Tables 1–3, then such higher values must be used.

(h) On any flight identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass, an operator must determine the actual mass of such passengers by weighing or by adding an adequate mass increment.

(i) If standard mass values for checked baggage are used and a significant number of passengers check in baggage that is expected to exceed the standard baggage mass, an operator must determine the actual mass of such baggage by weighing or by adding an adequate mass increment.

(j) An operator shall ensure that the pilot in command is advised when a non-standard method has been used for determining the mass of the load and that this method is stated in the mass and balance documentation.

91.ah.6 Mass and balance documentation

(a) An operator shall establish an ECAA approved method for use as mass and balance documentation prior to each flight specifying the load and its distribution. The mass and balance documentation must enable the pilot in command to determine that the load and its distribution is such that the mass and balance limits of the aircraft are not exceeded. The person preparing the mass and balance documentation must be named on the document. The person supervising the loading of the aircraft must confirm by signature that the load and its distribution are in accordance with the mass and balance documentation. This document must be acceptable to the pilot in command, his acceptance being indicated by countersignature or equivalent.

(b) An operator must specify procedures for last minute changes to the load.

(c) Subject to the approval of the ECAA, an operator may use an alternative to the procedures required by paragraphs (a) and (b) above.

ATTACHMENT 1
Mass and balance

91.ah.at.1.1– General

(a) Determination of the dry operating mass of an aircraft

(1) Weighing of an aircraft:

(i) New aircraft are normally weighed at the factory and are eligible to be placed into operation without reweighing if the mass and balance records have been adjusted for alterations or modifications to the aircraft. Aircraft transferred from one operator with an approved mass control programme to another operator with an approved programme need not be weighed prior to use by the receiving operator until 4 years have elapsed since the last weighing ; and

(ii) The individual mass and Centre of Gravity (CG) position of each aircraft shall be re-established periodically. The maximum interval between two weightings must be defined by the operator and must meet this section requirements. In addition, the mass and the CG of each aircraft shall be re-established, whenever the cumulative changes to the dry operating mass exceed ± 0.5% of the maximum landing mass or the cumulative change in CG position exceeds 0.5% of the mean aerodynamic chord, either by:

(A) Weighing; or

(B) Calculation, if the operator is able to provide the necessary justification to prove the validity of the method of calculation chosen ،

(2) Fleet mass and CG position:

(i) For a fleet or group of aircraft of the same model and configuration, an average dry operating mass and CG position may be used as the fleet mass and CG position, provided that the dry operating masses and CG positions of the individual aircraft meet the tolerances specified in sub-paragraph (ii) below. Furthermore, the criteria specified in sub-paragraphs (iii), (iv) and (a)(3) below are applicable;

(ii) Tolerances:

(A) If the dry operating mass of any aircraft weighed, or the calculated dry operating mass of any aircraft of a fleet, varies by more than ±0.5% of the maximum structural landing mass from the established dry operating fleet mass or the CG position varies by more than ±0.5 % of the mean aero-dynamic chord from the fleet CG, that aircraft shall be omitted from that fleet. Separate fleets may be established, each with differing fleet mean masses;

(B) In cases where the aircraft mass is within the dry operating fleet mass tolerance but its CG position falls outside the permitted fleet tolerance, the aircraft may still be operated under the applicable dry operating fleet mass but with an individual CG position;

(C) If an individual aircraft has, when compared with other aircraft of the fleet, a physical, accurately accountable difference (e.g. galley or seat configuration), that causes exceedance of the fleet tolerances, this aircraft may be maintained in the fleet provided that appropriate corrections are applied to the mass and/or CG position for that aircraft; and

(D) Aircraft for which no mean aerodynamic chord has been published must be operated with their individual mass and CG position values or must be subjected to a special study and approval.

(iii) Use of fleet values:

(A) After the weighing of an aircraft, or if any change occurs in the aircraft equipment or configuration, the operator must verify that this aircraft falls within the tolerances specified in sub-paragraph (2)(ii) above;

(B) Aircraft which have not been weighed since the last fleet mass evaluation can still be kept in a fleet operated with fleet values, provided that the individual values are revised by computation and stay within the tolerances defined in sub-paragraph (2)(ii) above. If these individual values no longer fall within the permitted

tolerances, the operator must either determine new fleet values fulfilling the conditions of sub-paragraphs (2)(i) and (2)(ii) above, or operate the aircraft not falling within the limits with their individual values ; and

(C) To add an aircraft to a fleet operated with fleet values, the operator must verify by weighing or computation that its actual values fall within the tolerances specified in sub-paragraph (2)(ii) above.

(iv) To comply with sub-paragraph (2)(i) above, the fleet values must be updated at least at the end of each fleet mass evaluation.

(3) Number of aircraft to be weighed to obtain fleet values:

(i) If 'n' is the number of aircraft in the fleet using fleet values, the operator must at least weigh, in the period between two fleet mass evaluations, a certain number of aircraft defined in the Table below, rounded to the next highest number:

Number of aircraft in the fleet	Minimum number of Weightings
2 or 3	N
4 to 9	(n+3)/2
10 or more	(n+51)/10

(ii) In choosing the aircraft to be weighed, aircraft in the fleet which have not been weighed for the longest time shall be selected; and

(iii) The interval between 2 fleet mass evaluations must not exceed 48 months.

(4) Weighing procedure:

(i) The weighing must be accomplished either by the manufacturer or by an approved maintenance organization .

(ii) Normal precautions must be taken consistent with good practices such as:

(A) Checking for completeness of the aircraft and equipment؛

(B) Determining that fluids are properly accounted for؛

(C) Ensuring that the aircraft is clean; and

(D) Ensuring that weighing is accomplished in an enclosed building.

(iii) Any equipment used for weighing must be properly calibrated, zeroed, and used in accordance with the manufacturer's instructions. Each scale must be calibrated either by the manufacturer, by a civil department of weights and measures or by an appropriately authorized organization within 2 years or within a time period defined by the manufacturer of the weighing equipment, whichever is less. The equipment must enable the mass of the aircraft to be established accurately.

(b) Special standard masses for the traffic load. In addition to standard masses for passengers and checked baggage, an operator can submit for approval to the ECAA standard masses for other load items.

(c) Aircraft loading:

(1) An operator must ensure that the loading of its aircraft is performed under the supervision of qualified personnel.

(2) An operator must ensure that the loading of the freight is consistent with the data used for the calculation of the aircraft mass and balance.

(3) An operator must comply with additional structural limits such as the floor strength limitations, the maximum load per running metre, the maximum mass per cargo compartment, and/or the maximum seating limits.

(d) Centre of gravity limits:

(1) Operational CG envelope. Unless seat allocation is applied and the effects of the number of passengers per seat row, of cargo in individual cargo compartments and of fuel in individual tanks is accounted for accurately in the balance calculation, operational margins must be applied to the certificated centre of gravity envelope. In determining the CG margins, possible deviations from the assumed load distribution must be considered. If free seating is applied, the operator must introduce procedures, to ensure corrective action by cockpit crewmember, if extreme longitudinal seat selection occurs. The CG margins and associated operational procedures؛

including assumptions with regard to passenger seating, must be acceptable to the ECAA.

(2)In-flight centre of gravity: Further to sub-paragraph (d)(1) above, the operator must show that the procedures fully account for the extreme variation in CG travel during flight caused by passenger/crew movement and fuel consumption/transfer .

ATTACHMENT 2
Mass and Balance Documentation

91.ah.at.2.1 General

(a) Mass and balance documentation:
  (1) Contents:
    (i) The mass and balance documentation must contain at least the following information:
      (A) The aircraft registration and type؛
      (B) The flight identification number and date؛
      (C) The identity of the pilot in command؛
      (D) The identity of the person who prepared the document؛
      (E) The dry operating mass and the corresponding CG of the aircraft؛
      (F) The mass of the fuel at take-off and the mass of trip fuel؛
      (G) The mass of consumables other than fuel؛
      (H) The components of the load including passengers, baggage, freight and ballast ؛
      (I) The take-off mass, landing mass and zero fuel mass ؛
      (J) The load distribution؛
      (K) The applicable aircraft CG positions ; and
      (L) The limiting mass and CG values.
    (ii) Subject to the approval of the ECAA, an operator may omit some of this data from the mass and balance documentation.
  (2) Last minute change. If any last minute change occurs after the completion of the mass and balance documentation, this must be brought to the attention of the pilot in command and the last minute change must be entered on the mass and balance documentation. The maximum allowed change in the number of passengers or hold load acceptable as a last minute change must be specified in the operations manual. If this number is exceeded, new mass and balance documentation must be prepared.

(b) Computerized systems. Where mass and balance documentation is generated by a computerized mass and balance system, the operator must verify the integrity of the output data. He must establish a system to check that amendments of his input data are incorporated properly in the system and that the system is operating correctly on a continuous basis by verifying the output data at intervals not exceeding 6 months.

(c) Onboard mass and balance systems. An operator must obtain the approval of the ECAA if he wishes to use an onboard mass and balance computer system as a primary source for dispatch.

(d) Data link. When mass and balance documentation is sent to aircraft via datalink, a copy of the final mass and balance documentation as accepted by the pilot in command must be available on the ground.

91.ah.at.2.2 Fuel density

If the actual fuel density is not known, the operator may use the standard fuel density values specified in the operations manual for determining the mass of the fuel load. Such standard values should be based on current fuel density measurements for the airports or areas concerned.

91.ah.at.2.3 Accuracy of weighing equipment

The mass of the aircraft as used in establishing the dry operating mass and the centre of gravity must be established accurately. Since a certain model of weighing equipment is used for initial and periodic weighing of aircraft of widely different mass classes, one single accuracy criterion for weighing equipment cannot be given. However, the weighing accuracy is considered satisfactory if the following accuracy criteria are met by the individual scales/cells of the weighing equipment used:

(a) For a scale/cell load below 2,000 kg: An accuracy of ± 1%;
(b) For a scale/cell load from 2,000 kg to 20,000 kg: An accuracy of ± 20 kg; and
(c) For a scale/cell load above 20,000 kg: An accuracy of ± 0.1 %.

91.ah.at.2.4 Centre of gravity limits

In the certificate limitations section of the aircraft flight manual, forward and aft CG limits are specified. These limits ensure that the certification stability and control criteria are met throughout the entire flight and allow the proper trim setting for take-off. An operator should ensure that these limits are observed by defining operational procedures or a CG envelope, which compensates for deviations and errors as listed below:

(a) Deviations of actual CG at empty or operating mass from published values due, for example, to weighing errors, unaccounted modifications and/or equipment variations;
(b) Deviations in fuel distribution in tanks from the applicable schedule;
(c) Deviations in the distribution of baggage and cargo in the various compartments as compared with the assumed load distribution as well as inaccuracies in the actual mass of baggage and cargo;
(d) Deviations in actual passenger seating from the seating distribution assumed when preparing the mass and balance documentation; (See Note)
(e) Deviations of the actual CG of cargo and passenger load within individual cargo compartments or cabin sections from the normally assumed mid position;
(f) Deviations of the CG caused by gear and flap positions and by application of the prescribed fuel usage procedure (unless already covered by the certified limits); and
(g) Deviations caused by in-flight movement of cabin crew, pantry equipment and passengers.

Note: Large CG errors may occur when "free seating" (freedom of passengers to select any seat when entering the aircraft) is permitted. Although in most cases reasonably even longitudinal passenger seating can be expected, there is a risk of an extreme forward or aft seat selection causing very large and unacceptable CG errors (assuming that the balance calculation is done on the basis of an assumed even distribution). The largest errors may occur at a load factor of approximately 50% if all passengers are seated in either the forward or aft half of the cabin. Statistical analysis indicates that the risk of such extreme seating adversely affecting the CG is greatest on small aircraft.

91.ah.at.2.5 Passenger mass established by use of a verbal statement

(a) When asking each passenger on aircraft with less than 10 passenger seats for his/her mass (weight), specific constants should be added to account for hand baggage and clothing. These constants should be determined by the operator on the basis of studies relevant to his Particular routes, etc. and should not be less than:
    (1) For clothing: 4 kg; and
    (2) For hand baggage: 6 kg.
(b) Personnel boarding passengers on this basis should assess the passenger's stated mass and the mass of passengers' clothing and hand baggage to check that they are reasonable. Such personnel should have received instruction on assessing these mass values. Where necessary, the stated mass and the specific constants should be increased so as to avoid gross inaccuracies.

91.ah.at.2.6 Holiday charter

A "charter flight solely intended as an element of a holiday travel package" is a flight where the entire passenger capacity is hired by one or more charterer(s) for the carriage of passengers who are travelling, all or in part by air, on a round trip basis for holiday purposes. Categories of passengers such as company personnel, tour operators' staff, representatives of the press, ECAA officials etc. can be included within the 5% alleviation without negating the use of holiday charter mass values.

91. ah.at.2.7 Adjustment of standard masses

When standard mass values are used, the operator is required to identify and adjust the passenger and checked baggage masses in cases where significant numbers of passengers or quantities of baggage are suspected of exceeding the standard values. This requirement implies that the operations manual should contain appropriate directives to ensure that:

(a) Check-in, operations and cabin staff and loading personnel report or take appropriate action when a flight is identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass, and/or groups of passengers carrying exceptionally heavy baggage (eg. military personnel or sports teams); and

(b) On small aircraft, where the risks of overload and/or CG errors are the greatest, pilots in command must pay special attention to the load and its distribution and make proper adjustments.

91. ah.at.2.8 Guidance on passenger weighing surveys

Operators seeking approval to use standard passenger masses differing from those prescribed in Tables 1 and 2, on similar routes or networks may pool their weighing surveys provided that:

(a) The ECAA has given prior approval for a joint survey;

(b) The survey procedures and the subsequent statistical analysis meet the criteria of this appendix; and

(c) In addition to the joint weighing survey results, results from individual operators Participating in the joint survey should be separately indicated in order to validate the joint survey results.

Note: Detailed guidance on this subject is given in EAC 91-1.

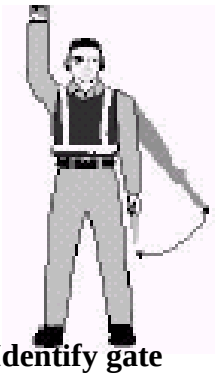
Appendix I
Operations in Required Navigation Performance (RNP 5) Airspace in Egypt

Deleted and refer to latest (AIP)

Appendix J
MARSHALLING SIGNALS
From a signalman to an aircraft

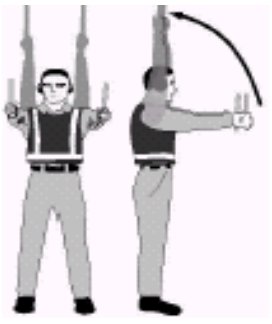
Note 1.— These signals are designed for use by the signalman, with hands illuminated as necessary
to facilitate observation by the pilot, and facing the aircraft in a position:
(a) for fixed-wing aircraft, forward of the left-wing tip within view of the pilot on left side of aircraft, where best seen by the pilot; and
(b) for helicopters, where the signalman can best be seen by the pilot.
Note 2.— The meaning of the relevant signals remains the same if bats, illuminated wands or torchlight's are held.
Note 3.— The aircraft engines are numbered, for the signalman facing the aircraft, from right to left (i.e. No. 1 engine being the port outer engine).
Note 4.— Signals marked with an asterisk (*) are designed for use to hovering helicopters.
Note 5.— References to wands may be also read to refer to daylight fluorescent-colored table tennis bats or gloves (daytime only).
Note 6. — References to the signalman may also be read to refer to Marshallese.

1. **Wing walker/guide**



Raise right hand above head level with wand pointing up, move left
hand wand pointing down toward the body.
Note.— This signal provides an indication by a person positioned at the aircraft wingtip, to the pilot/marshaled/push-back operator, that the aircraft movement on/off a parking position would be unobstructed.
[Replaces Signal 1]

2. **Identify gate**



Raise fully extended arms straight above the head with wands
pointing up.
[Replaces Signal 2]

3. Proceed to next signalman or as directed by tower/ground control

body and point with wands to direction of next signalman or taxi area.
[Replaces Signal

4. Straight ahead

Bend extended arms at elbows and move wands up and down from chest height to head.
[Replaces Signal 4]

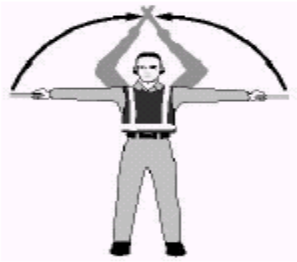
5.(a) Turn left
(from the pilots point of view)

With right arm and wand extended at a 90° angle to the body, left hand makes the come ahead signal. The rate of signal motion indicates to the pilot the rate of aircraft turn.
[Replaces Signal 5 a)]

5 .(b) Turn right
(from the pilots point of view)

With left arm and wand extended at a 90° angle to the body, right hand makes the come ahead signal. The rate of signal motion indicates to the pilot the rate of aircraft turn.
[Replaces Signal 5 b)]

6.(a) Normal stop



Fully extend arms and wands at a 90° angle to the sides and slowly move to above the head until wands cross.
[Replaces Signal 6]10

6.(b) Emergency stop

Abruptly extend arms and wands to top of head, crossing wands.
[Replaces Signal 6]

7.(a) Set brakes

acknowledgment

Raise hand just above shoulder height with open palm. Ensuring eye contact with the flight crew, close hand into a fist. **Do not** move until receipt of thumbs up from the flight crew.
[Replaces Signal 7 a)]

7.(b) Release brakes

Do

Raise hand just above shoulder height with hand closed in a fist. Ensuring eye contact with the flight crew, open palm. **not** move until receipt of thumbs up acknowledgment from the flight crew.
[Replaces Signal 7 b)]
11

8.(a) Chocks inserted

wands

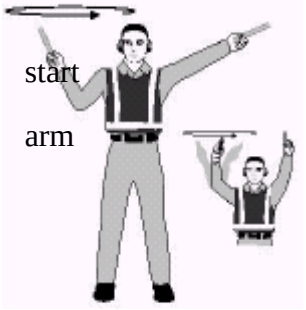
With arms and wands fully extended above head, move inward in a "jabbing" motion until the wands touch. **Ensure** an acknowledgment is received from the flight crew.
[Replaces Signal 8 a)]

8.(b) Chocks removed

wands

With arms and wands fully extended above head, move outward in a "jabbing" motion. **Do not** remove chocks until authorized by the flight crew.
[Replaces Signal 8 b)]

9. Start engine(s)



Raise right arm to head level with wand pointing up and a circular motion with hand, at the same time with the left raised above head level point to engine to be started.
[Replaces Signal 9]
12

10. Cut engines

Extend arm with wand forward of body at shoulder level, move hand and wand to top of left shoulder and draw wand to top of right shoulder in a slicing motion across throat.
[Replaces Signal 10]

11. Slow down

Move extended arms downwards in a “patting gesture”, moving wands up and down from waist to knees.
[Replaces Signal 11]

Signal 12. Slow down engine(s) on indicated side. — Retain current version in Annex 2

13. Move back

With the arms in front of the body at waist height, rotate the arms in a forward motion. To stop the rearward movement, use Signals 6 a) or 6 b).
[Replaces Signal 13]

Signal 14 a). **Turns while backing** — *For tail to starboard* — Retain current version in Annex 2.
Signal 14 b). Turns while backing — *For tail to port.* — Retain current version in Annex 2.13

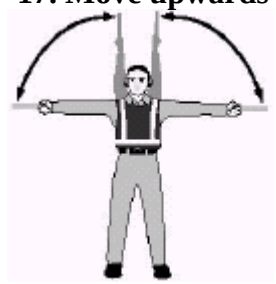
15. Affirmative/all clear

Raise right arm to head level with wand pointing up or display hand with thumbs up, left arm remains at side by knee.
Note.— This signal is also used as a technical/servicing communication signal.
[Replaces Signal 15]

***16. Hover**

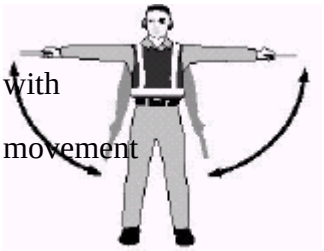
Fully extend arms and wands at a 90° angle to the sides.
[Replaces Signal 16]

***17. Move upwards**



Fully extend arms and wands at a 90° angle to the sides and with palms turned up move hands upwards. Speed of movement indicates rate of ascent.
[Replaces Signal 17]

***18. Move downwards**



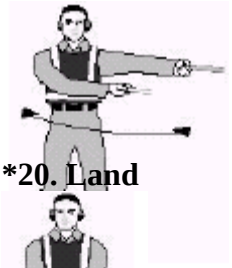
Fully extend arms and wands at a 90° angle to the sides and with palms turned down move hands downwards. Speed of movement indicates rate of descent.
[Replaces Signal 18]
14

***19 a). Move horizontally left**
(from the pilots point of view)

Extend arm horizontally at a 90° angle to the right side of the body. Move other arm in same direction in a sweeping motion.

[Replaces Signal 19]

***19 b). Move horizontally right**
(from the pilots point of view)



Extend arm horizontally at a 90° angle to the left side of the body. Move other arm in same direction in a sweeping motion. [Replaces Signal 19]

***20. Land**

Cross arms with wands downwards and in front of body. [Replaces Signal 20]

21. Fire

Move right hand wand in a "fanning" motion from the shoulder to the knee, while at the same time pointing with the left-hand wand to the area of the fire.

[NEW SIGNAL]

22. Hold position/stand-by

Fully extend arms and wands downwards at a 45° angle to the sides. Hold the position until the aircraft is clear for the next maneuver.

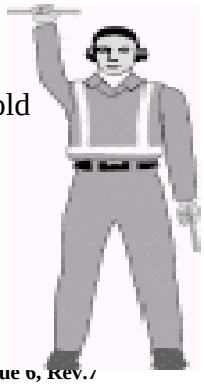
[NEW SIGNAL]

23. Dispatch aircraft

Perform a standard salute with right hand and/or wand to dispatch the aircraft. Maintain eye contact with the flight crew until the aircraft has begun to taxi.

[NEW SIGNAL]

24. Do not touch controls (technical/servicing communication signal)



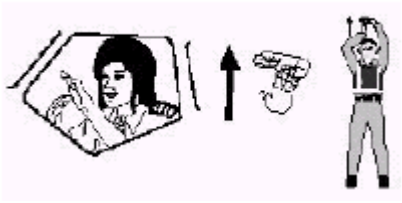
hold

Extend right arm fully above the head and close fist or

wand in the horizontal position; left arm remains at side by knee.

[NEW SIGNAL]

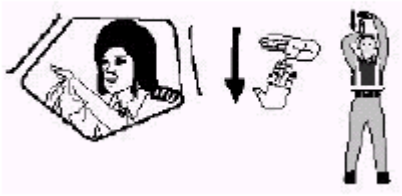
25. Connect ground power (technical/servicing communication signal)



Hold arms fully extended above head, open left hand horizontally and move finger tips of right hand into and touch the open palm of left hand (forming a "T"). At night, illuminated wands can also be used to form the "T" above the head.

[NEW SIGNAL]

26. Disconnect power (technical/servicing communication signal)



Hold arms fully extended above head with finger tips of right hand touching the open horizontal palm of the left hand (forming a "T"), then move right hand away from the left. **Do not** disconnect power until authorized by the flight crew. At night, illuminated wands can also be used to open the "T" above the head.
[NEW SIGNAL]

27. Negative (technical/servicing communication signal)

Hold right arm straight out at 90° from shoulder and point wand down to ground or display hand with thumbs down, hand remains at side by knee.

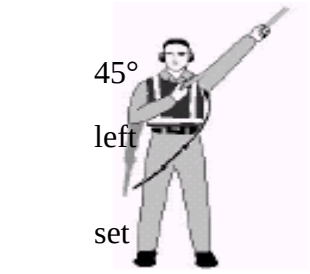
[NEW SIGNAL]

28. Establish communication via interphone (technical/servicing communication signal)

Extend both arms at 90° from body and move hands to cup both ears.

[NEW SIGNAL]

29. Open/close stairs (technical/servicing communication signal)



With right arm at side and left arm raised above head at a 45° angle, move right arm in sweeping motion towards top of left shoulder.
Note.— This signal is intended mainly for aircraft with the set of integral stairs at the front.

Appendix K
HEAD-UP DISPLAY (HUD), EQUIVALENT DISPLAYS AND VISION SYSTEMS

Introduction

The material in this appendix provides guidance for certified HUD and vision systems intended for operational use in aircraft engaged in international air navigation. A HUD, vision systems and hybrid systems may be installed and operated to provide guidance, enhance situational awareness and/or to obtain an operational credit by establishing minima below the aerodrome operating minima, for approach ban purposes, or reducing the visibility requirements or requiring fewer ground facilities as compensated for by airborne capabilities. HUD and vision systems may be installed separately or together as part of a hybrid system. Any operational credit to be obtained from their use requires approval from ECAA.

Note 1.— "Vision systems" is a generic term referring to the existing systems designed to provide images, i.e. enhanced vision systems (EVS), synthetic vision systems (SVS) and combined vision systems (CVS).

Note 2.— Operational credit can be granted only within the limits of the design approval.

Note 3.— Currently, operational credit has been given only to vision systems containing an image sensor providing a real-time image of the actual external scene on the HUD.

1. HUD and equivalent displays

1.1 General

1.1.1 A HUD presents flight information into the pilot's forward external field of view without significantly restricting that external view.

1.1.2 A variety of flight information may be presented on a HUD depending on the intended flight operation, flight conditions, systems capabilities and operational approval. A HUD may include, but is not limited to, the following:

a) airspeed;
b) altitude;
c) heading;
d) vertical speed;
e) angle of attack;
f) flight path or velocity vector;
g) attitude with bank and pitch references;
h) course and glide path with deviation indications;
i) status indications (e.g. navigation sensor, autopilot, flight director); and
j) alerts and warning displays (e.g. ACAS, wind shear, ground proximity warning).

1.2 Operational applications

1.2.1 Flight operations with a HUD can improve situational awareness by combining flight information located on head-down displays with the external view to provide pilots with more immediate awareness of relevant flight parameters and situation information while they continuously view the external scene. This improved situational awareness can also reduce errors in flight operations and improve the pilot's ability to transition between instrument and visual references as meteorological conditions change. Flight operations applications may include the following:

(a) Enhanced situational awareness during all flight operations, but especially during taxi, take-off, approach and landing;
(b) Reduced flight technical error during take-off, approach and landing; and
(c) Improvements in performance due to precise prediction of touchdown area, tail strike awareness/warning and rapid recognition of and recovery from unusual attitudes.

1.2.2 A HUD may be used for the following purposes:
a) To supplement conventional flight deck instrumentation in the performance of a particular task or operation. The primary cockpit instruments remain the primary means for manually controlling or manoeuvring the aircraft; and
b) As a primary flight display:
(1) Information presented by the HUD may be used by the pilot in lieu of scanning head-down displays. Operational approval of a HUD for such use allows the pilot to control the aircraft by reference to the HUD for approved ground or flight operations; and
2) Information presented by the HUD may be used as a means to achieve additional navigation or control performance. The required information is displayed on the HUD. Operational credit, in the form of lower minima, for a HUD used for this purpose may be approved for a particular aircraft or automatic flight control system. Additional credit may also be allowed when conducting HUD operations in situations where automated systems are otherwise used.

1.2.3 A HUD, as a stand-alone system, may qualify for operations with reduced visibility or RVR or replace some parts of the ground facilities such as touchdown zone and/or centre line lights. Examples and references to publications in this regard can be found in the Manual of All-Weather Operations (Doc 9365).

1.2.4 A HUD or equivalent display is one that has at least the following characteristics: it has a head-up presentation not requiring transition of visual attention from head down to head up; it displays sensor-derived imagery conformal to the pilot's external view; it permits simultaneous view of the EVS sensor imagery, required aircraft flight symbology, and the external view; and its display characteristics and dynamics are suitable for manual control of the aircraft. Before such systems can be used, the appropriate airworthiness and operational approvals must be obtained.

1.3 HUD training

1.3.1 Training requirements should be established, monitored and approved by ECAA. Training requirements should include requirements for recent experience if ECAA determines that these requirements are significantly different than the current requirements for the use of conventional head-down instrumentation.

1.3.2 HUD training should address all flight operations for which the HUD is designed and operationally approved. Some training elements may require adjustments based on whether the aero plane has a single or dual HUD installation. Training should include contingency procedures required in the event of head-up display degradation or failure. HUD training should include the following elements as applicable to the intended use:
a) an understanding of the HUD, its flight path, energy management concepts and zymology. This should include operations during critical flight events (e.g. ACAS traffic advisory/resolution advisory, upset and wind shear recovery, engine or system failure);
b) HUD limitations and normal procedures, including maintenance and operational checks performed to ensure normal system function prior to use. These checks include pilot seat adjustment to attain and maintain appropriate viewing angles and verification of HUD operating modes;

c) HUD use during low visibility operations, including taxi, take-off, instrument approach and landing in both day and night conditions. This training should include the transition from head-down to head-up and head-up to head-down operations;

d) failure modes of the HUD and the impact of the failure modes or limitations on crew performance;

e) crew coordination, monitoring and verbal call-out procedures for single HUD installations with head-down monitoring for the pilot not equipped with a HUD and head-up monitoring for the pilot equipped with a HUD;

f) crew coordination, monitoring and verbal call-out procedures for dual HUD installations with use of a HUD by the pilot flying the aircraft and either head-up or head-down monitoring by the other pilot;

g) consideration of the potential for loss of situational awareness due to "tunnel vision" (also known as cognitive tunneling or attention tunneling);

h) any effects that weather, such as low ceilings and visibilities, may have on the performance of a HUD; and

i) HUD airworthiness requirements.

2. Vision systems

2.1 General

2.1.1 Vision systems can display electronic real-time images of the actual external scene achieved through the use of image sensors (EVS) or display synthetic images, which are derived from the on-board avionic systems (SVS). Vision systems can also consist of a combination of these two systems or combined vision systems (CVS). Such a system may display electronic real-time images of the external scene using the EVS component of the system. However, the merging of EVS and SVS into a CVS is dependent on the intended function (e.g. whether or not there is intent to achieve operational credit).

2.1.2 The information from vision systems may be displayed on a head-up or head-down display. When enhanced vision imagery is displayed on a HUD, it should be presented to the pilot's forward external field of view without significantly restricting that external view.

2.1.3 The enhanced position fixing and guidance provided by SVS may provide additional safety for all phases of flight especially low visibility taxi, take-off, approach and landing operations.

2.1.4 Light emitting diode (LED) lights may not be visible to infrared-based vision systems due to the fact that LED lights are not incandescent and they do not have a significant heat signature. Operators of such vision systems will need to acquire information about the LED implementation programmes at aerodromes where they operate.

2.2 Operational applications

2.2.1 Flight operations with enhanced vision image sensors allow the pilot to view an image of the external scene obscured by darkness or other visibility restrictions. When the external scene is partially obscured, enhanced vision imaging may allow the pilot to acquire an image of the external scene earlier than with natural or unaided vision. The improved acquisition of an image of the external scene may improve situational awareness.

2.2.2 Vision system imagery may also allow pilots to detect terrain or obstructions on the runway or taxiways. A vision system image can also provide visual cues to enable earlier runway alignment and a more stabilized approach.

2.2.3 The combined display of aircraft performance, guidance and imagery may allow the pilot to maintain a more stabilized approach and smoothly transition from enhanced visual references to natural visual references.

2.3 Vision systems training

2.3.1 Training requirements should be established, monitored and approved by ECAA. Training requirements should include recency of experience requirements if ECAA determines that these requirements are significantly different than the current requirements for the use of a HUD without enhanced vision imagery or conventional head-down instrumentation.

2.3.2 Training should address all flight operations for which the vision system is approved. This training should include contingency procedures required in the event of system degradation or failure. Training for situational awareness should not interfere with other required operations. Training for operational credit should also require training on the applicable HUD used to present the enhanced visual imagery. Training should include the following elements as applicable:

a) an understanding of the system characteristics and operational constraints;
b) normal procedures, controls, modes and system adjustments (e.g. sensor theory including radiant versus thermal energy and resulting images);
c) operational constraints, normal procedures, controls, modes and system adjustments;
d) limitations;
e) airworthiness requirements;
f) vision system display during low visibility operations, including taxi, take-off, instrument approach and landing; system use for instrument approach procedures in both day and night conditions;
g) failure modes and the impact of failure modes or limitations upon crew performance, in particular, for two-pilot operations;
h) crew coordination and monitoring procedures and pilot call-out responsibilities;
i) transition from enhanced imagery to visual conditions during runway visual acquisition;
j) rejected landing: with the loss of visual cues of the landing area, touchdown zone or rollout area;
k) any effects that weather, such as low ceilings and visibilities, may have on the performance of the vision system; and
l) effects of aerodrome lighting using LED lights.

2.4 Operational concepts

2.4.1 Instrument approach operations that involve the use of vision systems include the instrument phase and the visual phase. The instrument phase ends at the published MDA/H or DA/H unless a missed approach is initiated. The continued approach to landing from MDA/H or DA/H will be conducted using visual references. The visual references will be acquired by use of an EVS or CVS, natural vision or a combination of the two.

2.4.2 Down to a defined height, typically 30 m (100 ft), the visual references will be acquired by means of the vision system. Below this height the visual references should be solely based on natural vision. In the most advanced applications, the vision system is expected to be able to be used down to touchdown without the requirement for natural vision acquisition of visual references. Using the EVS or CVS does not change the classification of an instrument approach procedure, since the published DA/H remains unchanged and maneuvering below DA/H is conducted by visual references acquired by means of the EVS or CVS.

2.4.3 In addition to the operational credit that EVS/CVS is able to provide, these systems may also provide an operational and safety advantage through improved

situational awareness, earlier acquisition of visual references and smoother transition to references by natural vision. These advantages are more pronounced for Type A approach operations than for Type B approach operations.

2.5 Visual references

2.5.1 The required visual references do not change due to the use of an EVS or CVS, but those references are allowed to be acquired by means of either vision system until a certain height during the approach (see Figure K-1).

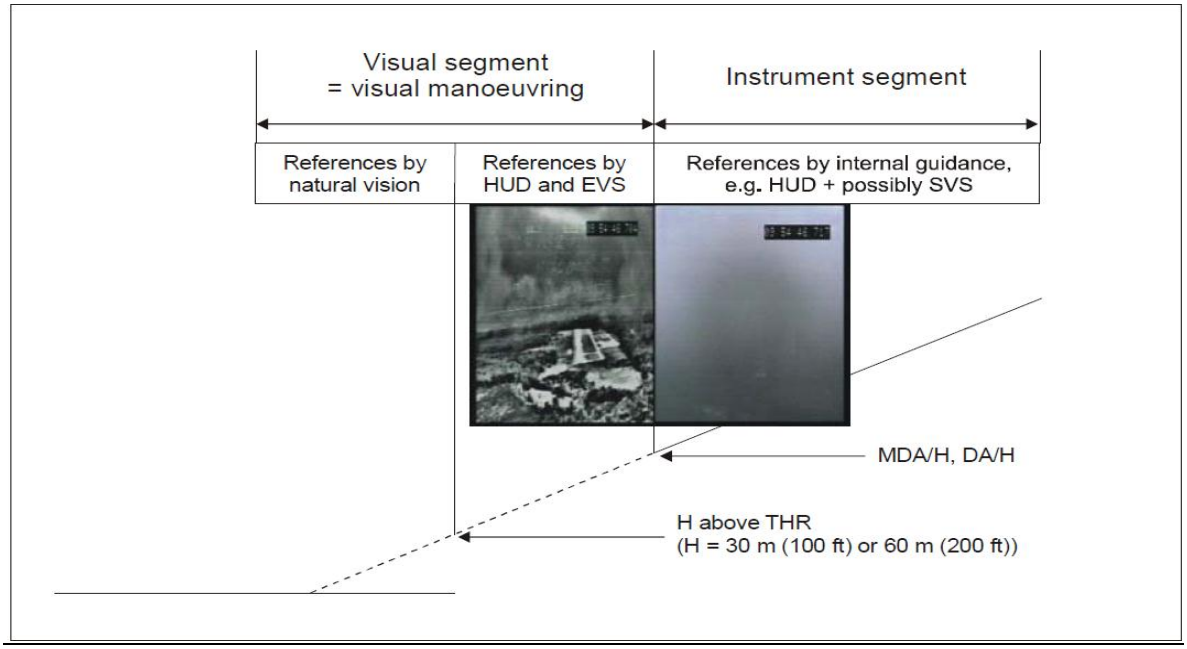


Figure K-1. EVS operations — transition from instrument to visual references

2.5.2 In regions that have developed requirements for operations with vision systems, the visual references are indicated in Table K-1.

Table K-1. Examples of operational credits

OPERATIONS BELOW DA/DH OR MDA/MDH	
Example 1	Example 2
For procedures designed to support Type A operations, the following visual references for the intended runway should be distinctly visible and identifiable: • the approach lighting system; or • the runway threshold, identified by at least one of the following: — the beginning of the runway landing surface; — threshold lights; or — runway end identifier lights; and • the touchdown zone, identified by at least one of the following: — the runway touchdown zone landing surface; — touchdown zone lights; — touchdown zone markings; or — runway lights.	For procedures designed to support 3D Type A and Type B CAT I operations, the following visual references should be displayed and identifiable to the pilot on the EVS image: • elements of the approach lighting system; or • the runway threshold, identified by at least one of the following: — the beginning of the runway landing surface; — threshold lights; — threshold identification lights; or — the touchdown zone, identified by at least one of the following: – the runway touchdown zone landing surface; – touchdown zone lights; – touchdown zone markings; or – runway lights.
Operations below 60 m (200 ft) above touchdown zone elevation	Operations below 60 m (200 ft) above threshold elevation
No additional requirements apply at 60 m (200 ft).	For procedures designed to support 3D Type A operations, the visual references are the same as those specified below for Type B CAT I operations.
Operations below 30 m (100 ft) above touchdown zone elevation	Operations below 30 m (100 ft) above threshold elevation
The visibility must be sufficient for the following to be distinctly visible and identifiable to the pilot without reliance on the EVS: • the lights or markings of the threshold; or • the lights or markings of the touchdown zone.	For procedures designed to support Type B CAT II operations, at least one of the visual references specified below should be distinctly visible and identifiable to the pilot without reliance on the EVS: • the lights or markings of the threshold; or • the lights or markings of the touchdown zone.

3. Hybrid systems

3.1 A hybrid system generically means that two or more systems are combined. The hybrid system typically has improved performance compared to each of the component systems, which in turn may qualify for operational credit. Vision systems are normally part of a hybrid system, e.g. EVS is typically combined with a HUD. Including more components in the hybrid system normally enhances the performance of the system.

3.2 Table K-2 provides some examples of hybrid system components. Any combination of the listed systems may constitute a hybrid system. The degree of operational credit that may be given to a hybrid system depends on its performance (accuracy,

integrity and availability) as assessed and determined by the certification and operational approval processes.

Table K-2. Examples of hybrid system components

Systems based on image sensors	Systems not based on image sensors
EVS • Passive infrared sensors • Active infrared sensors • Passive millimeter wave radiometer • Active millimeter wave radar	SVS
	Auto flight systems, flight control computers, automatic landing systems
	Systems for position fixing
CVS (where the EVS component as above qualifies for operational credit)	CVS (the SVS component)
	HUD, equivalent display
	ILS, GNSS

4. Operational credits

4.1 Aerodrome operating minima are expressed in terms of minimum visibility/RVR and MDA/H or DA/H. With respect to operational credit this means that the visibility/RVR requirements, established in the instrument approach procedure, may be reduced or satisfied for aircraft equipped with appropriately approved vision systems such as EVS. Reasons for granting operational credit may be when aircraft are better equipped than what was originally considered when designing the instrument approach procedure or when runway visual aids considered in the design of the procedure are not available but can be compensated for by on-board equipment.

4.2 Credits related to visibility/RVR can be given using at least three concepts. The first concept is to reduce the required RVR which will allow the aircraft to continue the approach beyond the approach ban point with a reported RVR lower than what was established for the approach procedure. Where a minimum visibility is prescribed, a second concept to grant operational credit may be used. In this case, the required minimum visibility is kept unchanged, but it is satisfied by means of the on-board equipment, typically an EVS. The result of both these concepts is that operations are allowed in meteorological conditions where otherwise they would not be possible. A third concept is to give operational credit by allowing operations in visibility/RVR which are not lower than those established for the approach procedure, but the approach operation is conducted with less facilities on the ground. One example of the latter is to allow Category II operations without touchdown and/or centre line lights, compensated for by additional on-board equipment, e.g. a HUD.

4.3 Granting operational credits does not affect the classification of an instrument approach procedure since, as described in Standard 4.2.8.3, instrument approach procedures are designed to support a given instrument approach operation (i.e. type, category). However, the design of those procedures may not take into consideration on-board equipment that may compensate for facilities on the ground.

4.4 In orders to provide optimum service, the ATS may have to be informed about the capabilities of better-equipped aircraft, e.g. which is the minimum RVR required.

4.5 In addition to the operational credit that a HUD, vision systems and hybrid systems are able to provide, these systems will also provide an operational and safety advantage through improved situational awareness, earlier acquisition of visual references and smoother transition to references by natural vision. These advantages are more pronounced for 3D Type A approach operations than for Type B approach operations.

5. Operational procedures

5.1 It is not prohibited to use vision systems in connection with circling. However, due to the system layout of a vision system and the nature of a circling procedure, key visual references can be obtained only by natural vision, and operational credit is not feasible for existing vision systems. The vision system may provide additional situational awareness.

5.2 The operational procedures associated with the use of a HUD, vision systems and hybrid systems should be included in the operations manual. The instructions in the operations manual should include:

a) Any limitation that is imposed by the airworthiness or operational approvals;

b) How operational credit affects:

1) Flight planning with respect to destination and alternate aerodromes;
2) Ground operations;
3) Flight execution, e.g. approach ban and minimum visibility;
4) Crew resource management that takes into account the equipment configuration, e.g. the pilots may have different presentation equipment;
5) Standard operating procedures, e.g. use of auto flight systems, call-outs that may be particular to the vision system or hybrid system, criteria for stabilized approach;
6) ATS flight plans and radio communication.

6. Approvals

6.1 General

6.1.1 An operator that wishes to conduct operations with a HUD or equivalent display, vision system or hybrid system will need to obtain certain approvals (i.e. 4.2.8.1.1 and 6.23). The extent of the approvals will depend on the intended operation and the complexity of the equipment.

6.1.2 Enhanced vision imagery may be used to improve situational awareness without a specific operational approval. However, the standard operating procedures for these types of operations need to be specified in the operations manual. An example of this type of operation may include an EVS or an SVS on a head-down display that is used only for situational awareness of the surrounding area of the aircraft during ground operations where the display is not in the pilot's primary field of view. For enhanced situational awareness, the installation and operational procedures need to ensure that the operation of the vision system does not interfere with normal procedures or the operation or use of other aircraft systems. In some cases, modifications to these normal procedures for other aircraft systems or equipment may be necessary to ensure compatibility.

6.1.3 When a vision system or a hybrid system with vision systems imagery is used for operational credit, operational approvals will typically require that the imagery be combined with flight guidance and presented on a HUD. Operational approvals may require that this information also be presented on a head-down display. Operational credit may be applied or any flight operation, but credit for instrument approach and take-off operations is most common.

6.1.4 When the application for approval relates to operational credits for systems not including a vision system, the guidance in this appendix may be used to the extent applicable as determined by ECAA.

6.1.5 Operators should be aware that some States may require some information about the operational credit(s) which has been granted by ECAA. Typically the approval

from that State will have to be presented, and in some cases the State of the Aerodrome may wish to issue an approval or to validate the original approval.

6.2 Approvals for operational credit

To obtain operational credit the operator will need to specify the desired operational credit and submit a suitable application.

The content of a suitable application should include:

(a) Applicant details — required for all approval requests. The official name and business or trading name(s), address, mailing address, e-mail address and contact telephone/fax numbers of the applicant.

Note. — For AOC holders, the company name, AOC number and e-mail address should be required.

(b) Aircraft details — required for all approval requests. Aircraft make(s), model(s) and registration mark(s).

(c) Operator's vision system compliance list. The contents of the compliance list are included in Table K-3. The compliance list should include the information that is relevant to the approval requested and the registration marks of the aircraft involved. If more than one type of aircraft/fleet is included in a single application a completed compliance list should be included for each aircraft/fleet.

(d) Documents to be included with the application. Copies of all documents referred to in column 4 of the operator's vision system compliance list (Table K-3) should be included when returning the completed application form to the civil aviation authority. There should be no need to send complete manuals; only the relevant sections/pages should be required.

(e) Name, title and signature.

Table K-3. Example of an AOC vision system compliance list

Main heading	Expanded areas to be addressed by the application	Sub-requirements	Operator's operations manual reference or document reference
1.0 Reference documents used in compiling the submission	The submission should be based on current up-to-date regulatory material. A compliance statement showing how the criteria of the applicable regulations and requirements have been satisfied.		
2.0 Aircraft flight manual (AFM)	A copy of the relevant AFM entry showing the aircraft certification basis for the vision system and any operational conditions.		
3.0 Feedback and reporting of significant problems	An outline of the process for the reporting of failures in the operational use of procedures. *Note.— In particular, significant problems with the vision system/HUD system, reporting on circumstances/ locations where the vision system was unsatisfactory.*		

Main heading	Expanded areas to be addressed by the application	Sub-requirements	Operator's operations manual reference or document reference
4.0 Instrument approach chart provider and operating minima	The name of the provider of the relevant instrument approach charts. Confirmation that all aerodrome operating minima are established in accordance with the method acceptable to the relevant authority.		
5.0 Operations manual entries and standard operating procedures	Manufacturer/operator-developed. Manufacturer's procedures are recommended as a starting point and should include at least the items in the sub-requirements column.	Definitions. Check that crew members are qualified for vision system/HUD operations. MEL handling. Equipment required for vision system operations. Types of approach where vision systems can be used. Statement that the autopilot/flight director should be used whenever possible.	

Main heading	Expanded areas to be addressed by the application	Sub-requirements	Operator's operations manual reference or document reference
		Minimum visual references for landing. Approach ban and RVR. Stabilized approach criteria. Correct seating and eye position. Crew coordination, e.g. duties of the pilot flying and the pilot not flying: • limitations; • designation of handling and non-handling pilots; • use of automatic flight control system; • checklist handling; • approach briefing; • radio communications handling; • monitoring and cross-checking of instruments and radio aids; and • use of the repeater display by the pilot not flying. Contingency procedures including: • failures above and below decision height; • ILS deviation warnings; • autopilot disconnect; • auto-throttle disconnect; • electrical failures; • engine failure; • failures and loss of visual references at or below decision height; • vision system/HUD failure below normal decision height; • wind shear; • ACAS warnings; • EGPWS warnings.	
6.0 Safety risk assessment		Operator's safety risk assessment.	

Appendix L
OPERATIONS MANUAL

The following is the suggested content of a company operations manual. It may be issued in separate parts corresponding to specific aspects of an operation. It should include the instructions and information necessary to enable the personnel concerned to perform their duties safely and shall contain at least the following information:

(a) Table of contents;
(b) Amendment controls page and list of effective pages, unless the entire document is reissued with each amendment and the document has an effective date on it;
(c) Duties, responsibilities and succession of management and operating personnel;
(d) Operator safety management system;
(e) Operational control system;
(f) MEL procedures (where applicable);
(g) Normal flight operations;
(h) SOPs;
(i) Weather limitations;
(j) Flight and duty time limitations;
(k) Emergency operations;
(l) Accident/incident considerations;
(m) Personnel qualifications and training;
(n) Record keeping;
(o) A description of the maintenance control system;
(p) Security procedures (where applicable);
(q) Performance operating limitations;
(r) Use/protection of FDR/CVR records (where applicable);
(s) Handling of dangerous goods; and
(t) Use of automatic landing systems, a (HUDor equivalent displays) (and EVS, SVS or CVS equipment as applicable).

APPENDIX M
General Aviation Specific Approvals

1. PURPOSE AND SCOPE

1.1 Specific approvals shall have a standardized format which contains the minimum information required in the specific approval template.

Note.— When the operations to be conducted require a specific approval, a copy of the document(s) needs to be carried on board (see 2.4.2.2).

SPECIFIC APPROVAL TEMPLATE

SPECIFIC APPROVAL				
ISSUING AUTHORITY and CONTACT DETAILS[1]				
Issuing authority[1] : Egyptian Civil Aviation Authority Address : Signature of ECAA Representative : Date[2]: Telephone : _____ Fax: E-mail:				
OWNER/OPERATOR				
Name[3]: Address: Telephone: Fax : Email :				
Aircraft Model[4] and registration marks				
SPECIFIC APPROVAL	YES	NO	DESCRIPTION[5]	REMARKS
Low Visibility Operations Approach and Landing Take-off Operational credit(s)	□ □ □	□ □ □	CAT[6] ..... RVR: … m DH: ….. ft RVR[7]: ……. m 8	
RVSM	□	□		
AR Navigation Specifications for PBN Operations	□	□	9	
EFB	□	□	10	
Others[11]	□	□		

Notes.—
1. Civil Aviation Authority name and contact details, including the telephone country code and email if available.
2. Issuance date of the specific approval (dd-mm-yyyy) and signature of the authority representative.
3. Owner or operator's name and address.
4. Insert the aeroplane make, model and series, or master series, if a series has been designated. The CAST/ICAO taxonomy is available at:
http://www.intlaviationstandards.org/.
5. List in this column the most permissive criteria for each specific approval (with appropriate criteria).
6. Insert the applicable precision approach category (CAT II, III). Insert the minimum RVR in metres and decision height in feet. One line is used per listed
approach category.
7. Insert the approved minimum take-off RVR in metres, or the equivalent horizontal visibility if RVR is not used. One line per approval may be used if
different approvals are granted.
8. List the airborne capabilities (e.g. automatic landing, HUD, EVS, SVS, CVS) and associated operational credit(s) granted.
9. Performance-based navigation (PBN): one line is used for each PBN AR navigation specification approval (e.g. RNP AR APCH), with appropriate
limitations listed in the "Description" column.
10. List the EFB functions used for the safe operation of aeroplanes and any applicable limitations
11. Other specific approvals or data can be entered here, using one line (or one multi-line block) per approval (e.g. specific approach operations approval).

APPENDIX N
ARTICLE 83 bis AGREEMENT SUMMARY

Note.— Chapter 2.4, 2.4.18.1, requires a certified true copy of the agreement summary to be carried on board.

i. PURPOSE AND SCOPE

Recommendation.— The Article 83 bis agreement summary should contain the information in the template at paragraph 2, in a standardized format.

ARTICLE 83 bis AGREEMENT SUMMARY

Note.— Annex 6 part ii Chapter 6, 6.1.5.1, requires a certified true copy of the agreement summary to be carried on board.

1. Purpose and scope

Recommendation.— The Article 83 bis agreement summary should contain the information in the template at paragraph 2, in a standardized format.

1. Article 83 bis agreement summary for commercial air transport

ARTICLE 83 bis AGREEMENT SUMMARY		
Title of the Agreement:		
State of Registry		Focal point:
State of the principal location of a general aviation operator:		Focal point:
Date of signature:	By State of Registry1 :	
	By State of the principal location of a general aviation operator1 :	
Duration	Start Date1 :	End Date (if applicable)2 :
Languages of the Agreement		
ICAO Registration No.:		
Umbrella Agreement (if any) with ICAO Registration number:		

Chicago Convention	ICAO Annexes affected by the transfer to the State of the principal location of a general aviation operator of responsibility in respect of certain functions and duties		
Article 12: Rules of the Air	Annex 2, all chapters	Yes ☐ No ☐	
Article 30 a): Aircraft radio equipment	Radio Station Licence	Yes ☐ No ☐	
Articles 30 b) and 32 a): Personnel Licensing	Annex 1, Chapters 1, 2, 3 and 6 and Annex 6 Part I, Radio Operator or Part III, section II, Composition of the flight crew (radio operator) and/or Part II, Qualifications and/or Flight crew member licensing or Part III, Section III, Qualifications	No ☐	Annex 6: [Specify Part and paragraph]3
Article 31: Certificates of Airworthiness	Annex 6 Part I or Part III, Section II	Yes ☐ No ☐	Specify Part and chapters]3
	Annex 6 Part II or Part III, Section III	Yes ☐ No ☐	Specify Part and chapters]3
	Annex 8 Part II, Chapters 3 and 4	Yes ☐ No ☐	[Specify chapters]3

Aircraft affected by the transfer of responsibilities to the State of the Operator					
Aircraft make, model, series	Nationality and Registration marks	Serial No	AOC # (Commercial air transport)	Dates of transfer of responsibilities	
				From1	To (if applicable)2

Notes.—

1. dd/mm/yyyy.
2. dd/mm/yyyy or N/A if not applicable.
3. Square brackets indicate information that needs to be provided

ATTACHMENT 1
CARRIAGE AND USE OF OXYGEN

INTRODUCTION

The performance of crew members and the well-being of passengers during flights at such altitudes where a lack of oxygen might result in impairment of faculties are of major concern. Research conducted in altitude chambers or by exposure to mountain elevations indicates that human tolerance could be related to the altitude concerned and the exposure time. The subject is dealt with in detail in the Manual of Civil Aviation Medicine (Doc 8984). In light of the above and to further assist the pilot-in-command in providing the oxygen supply intended by 2.2.3.8 of this Annex, the following guidelines, which take into account the requirements already established in Annex 6, Part I, are considered relevant.

1. OXYGEN SUPPLY

1.1 A flight to be operated at altitudes at which the atmospheric pressure in personnel compartments will be less than 700 HPA should not be commenced unless sufficient stored breathing oxygen is carried to supply:

a) all crew members and at least 10 per cent of the passengers for any period in excess of 30 minutes that the pressure in compartments occupied by them will be between 700 HPA and 620 HPA; and

b) all crew members and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 HPA.

1.2 A flight to be operated with a pressurized aeroplane should not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all crew members and passengers, as is appropriate to the circumstances of the flight being undertaken, in the event of loss of pressurization, for any period that the atmospheric pressure in any compartment occupied by them would be less than 700 HPA. In addition, when an aeroplane is operated at flight altitudes at which the atmospheric pressure is less than 376 HPA, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa and cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 HPA, there shall be no less than a 10-minute supply for the occupants of the passenger compartment.

2. USE OF OXYGEN

2.1 All flight crew members, when engaged in performing duties essential to the safe operation of an aeroplane in flight, should use breathing oxygen continuously whenever the circumstances prevail for which its supply has been indicated to be necessary in 1.1 or 1.2.

2.2 All flight crew members of pressurized aeroplanes operating above an altitude where the atmospheric pressure is less than 376 hPa should have available at the flight duty station a quick donning type of mask which will readily supply oxygen upon demand

Note.— Approximate altitudes in the Standard Atmosphere corresponding to the values of absolute pressure used in the text are as follows:

Absolute pressure	Metres	Feet
700 hPa	3 000	10 000
620 hPa	4 000	13 000
376 hPa	7 600	25 000

Attachment 2
Automatic Landing Systems, Head-Up Display (Hud) Or Equivalent Displays And Vision Systems

INTRODUCTION

The material in this attachment provides guidance for certified automatic landing systems, HUD or equivalent displays and vision systems intended for operational use in aircraft engaged in international air navigation. These systems and hybrid systems may be installed and operated to reduce workload, improve guidance, reduce flight technical error and enhance situational awareness and/or to obtain operational credits. Automatic landing systems, HUD or equivalent displays and vision systems may be installed separately or together as part of a hybrid system. Any operational credit for their use requires a specific approval from the State of Registry.

Note 1.— "Vision systems" is a generic term referring to the existing systems designed to provide images, i.e. enhanced vision systems (EVS), synthetic vision systems (SVS) and combined vision systems (CVS).

Note 2.— Operational credit can be granted only within the limits of the airworthiness approval.

Note 3.— Currently, operational credit has been given only to vision systems containing an image sensor providing a real-time image of the actual external scene on a HUD.

Note 4.— More detailed information and guidance on automatic landing systems, HUD or equivalent displays and vision systems are contained in the Manual of All-Weather Operations (Doc 9365). This manual should be consulted in conjunction with this attachment.

ii. HUD And Equivalent Displays

1.1 General

1.1.1 A HUD presents flight information into the pilot's forward external field of view without significantly restricting that external view.

1.1.2 Flight information should be presented on a HUD or an equivalent display, as required for the intended use.

1.2 Operational applications

1.2.1 Flight operations with a HUD can improve situational awareness by combining flight information located on head-down displays with the external view to provide pilots with more immediate awareness of relevant flight parameters and situation information while they continuously view the external scene. This improved situational awareness can also reduce errors in flight operations and improve the pilot's ability to transition between instrument and visual references as meteorological conditions change.

1.2.2 A HUD may be used to supplement conventional flight deck instrumentation or as primary flight displays if certified for this purpose.

1.2.3 An approval HUD may:
a) qualify for operations with reduced visibility or reduced RVR; or
b) replace some parts of the ground facilities such as touchdown zone and/or centre line lights.

1.2.4 The functions of a HUD may be provided by a suitable equivalent display. However, before such systems can be used, the appropriate airworthiness approval should be obtained

1.3 HUD training

Training and recent experience requirements for operations using HUD or equivalent displays should be established by the State of Registry. The training should address all flight operations for which the HUD or equivalent display is used

iii. VISION SYSTEMS

2.1 General

2.1.1 Vision systems can display electronic real-time images of the actual external scene achieved through the use of image sensors, i.e. EVS, or display synthetic images, which are derived from the on-board avionic systems, i.e. SVS. Vision systems can also consist of a combination of these two systems called combined vision systems (CVS). Such a system may display electronic real-time images of the external scene using the EVS component of the system. The information from vision systems may be displayed head-up and/or head-down. Operational credit may be granted to vision systems which are appropriately qualified.

2.1.2 Light emitting diode (LED) lights may not be visible to infrared-based vision systems. Operators of such vision systems will need to acquire information about the LED implementation programmes at aerodromes where they intend to operate. More details about the consequences of LED lights are contained in the Manual of All-Weather Operations (Doc 9365).

2.2 Operational applications
2.2.1 Flight operations with EVS allow the pilot to view an image of the external scene obscured by darkness or other visibility restrictions. The use of EVS will also allow acquisition of an image of the external scene earlier than with natural, unaided vision, hence providing for a smoother transition to references by natural vision. The improved acquisition of an image of the external scene may improve situational awareness. It may also qualify for operational credit if the information from the vision system is presented to the pilots in a suitable way and the necessary airworthiness approval and specific approval by the State of Registry have been obtained for the combined system.

2.2.2 Vision system imagery may also enable pilots to detect other aircraft on the ground, terrain or obstructions on the or adjacent to runways or taxiways.

2.3 Operational concepts

2.3.1 Instrument approach operations include an instrument phase and a visual phase. The instrument phase ends at the published MDA/H or DA/H unless a missed approach is initiated. Using the EVS or CVS does not change the applicable MDA/H or DA/H. The continued approach to landing from MDA/H or DA/H will be conducted using visual references. This also applies to operations with vision systems. The difference is that the visual references will be acquired by use of an EVS or CVS, natural vision or the vision system in combination with natural vision.

2.3.2 Down to a defined height in the visual segment, typically at or above 30 m (100 ft), the visual references may be acquired solely by means of the vision system. The defined height depends on the airworthiness approval and the specific approval by the State of Registry. Below this height the visual references should be solely based on natural vision. In the most advanced applications, the vision system may be used down to touchdown without the requirement for natural vision acquisition of visual references. This means that such a vision system may be the sole means of acquiring visual references and can be used without natural vision.

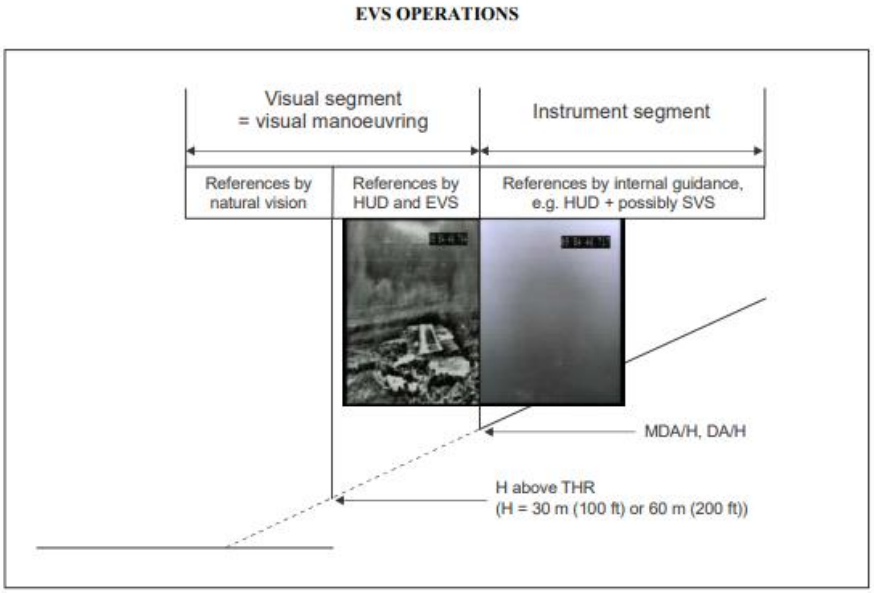


Figure 1.1. EVS operations — transition from instrument to visual references