

# **GENERAL AVIATION REQUIREMENTS**

**Part I - General Aviation Operations (Aeroplanes)**

**Part II - Large and Turbojet Aeroplanes Operations**

**Part III - General Aviation Operations (Helicopter)**

**The Civil Aviation Authority of Thailand**

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## ABBREVIATIONS AND SYMBOLS

(used in this requirements)

<b>Abbreviations</b>		<b>Abbreviations</b>	
ACAS	Airborne collision avoidance systems	EUROCAE	European Organisation for Civil Aviation Equipment
ADRS	Aircraft data recording systems	EVS	Enhanced vision system
ADS-C	Automatic dependent surveillance-contract	FANS	Future air navigation system
AFCS	Automatic flight control system	FATO	Final approach and take-off area
AIR	Airborne image recorder	FDR	Flight data recorder
AIRS	Airborne image recording system	FM	Frequency modulation
APCH	Approach	ft	Foot
AR	Authorization required		
ATC	Air traffic control	g	Normal acceleration
		GAR	General Aviation Requirement
ATM	Air traffic management		
ATM	Aeronautical telecommunication network	hPa	Hectopascal
ATS	Air traffic services	HUD	Head-up display
		IFR	Instrument flight rules
CAAT	Civil Aviation Authority	ILS	Instrument landing system
CARS	Cockpit audio recording system	IMC	Instrument meteorological conditions
CAT I	Category I	inHg	Inch of mercury
CAT II	Category II		
CAT III	Category III	kg	Kilogram
CAT IIIA	Category IIIA	km	Kilometre
CAT IIIB	Category IIIB	kN	Kilonewton
CAT IIIC	Category IIIC	kt	Knot
CFIT	Controlled flight into terrain		
cm	Centimetre	LDAH	Landing distance available
CPDLC	Controller-pilot data link communications	LDP	Landing decision point
CVR	Cockpit voice recorder	LDRH	Landing distance required
CVS	Combined vision system	LED	Light emitting diode
DA	Decision altitude	m	Metre
DA/H	Decision altitude/height	mb	Millibar
DH	Decision height	MDA	Minimum descent altitude
DLR	Data link recorder	MDA/H	Minimum descent altitude/height
DLRS	Data link recording system	MDH	Minimum descent height
DME	Distance measuring equipment	MEL	Minimum equipment list
		MHz	Megahertz
EFB	Electronic flight bag	MLS	Microwave landing system
EFIS	Electronic flight instrument system	MMEL	Master minimum equipment list
EGT	Exhaust gas temperature	MOPS	Minimum operational performance specification
EICAS	Engine indication and crew alerting system		
ELT(AD)	Automatic deployable ELT	NM	Nautical mile
ELT(AF)	Automatic fixed ELT	NVIS	Night vision imaging systems
ELT(AP)	Automatic portable ELT		
EPR	Engine pressure ratio	OCA	Obstacle clearance altitude

OCA/H	Obstacle clearance altitude/height	VOR	VHF omnidirectional radio range
OCH	OCH Obstacle clearance height	VSM	Vertical separation minima
PANS	Procedures for Air Navigation Services	WXR	Weather radar
PBC	Performance-based communication		
PBN	Performance-based navigation	<b>Symbols</b>	
PBS	Performance-based surveillance	°C	Degrees Celsius
PNR	Point of no return	%	Per cent
psi	Pound per square inch		
R	Rotor radius		
RCP	Required communication performance		
RNAV	Area navigation		
RNP	Required navigation performance		
RSP	Required surveillance performance		
RTCA	Radio Technical Commission for Aeronautics		
RVR	Runway visual range		
RVSM	Reduced vertical separation minima		
SBAS	Satellite-based augmentation system		
SI	International System of Units		
SOP	Standard operating procedure		
SVS	Synthetic vision system		
TAWS	Terrain awareness system		
TCAS	Traffic alert and collision avoidance system		
TLA	Thrust lever angle		
TLS	Target level of safety		
TVE	Total vertical error		
T <sub>4</sub>	Engine exhaust gas temperature		
TDP	Take-off decision point		
TIT	Turbine inlet temperature		
TLOF	Touchdown and lift-off area		
TODAH	Take-off distance available		
TODRH	Take-off distance required		
UTC	Coordinated universal time		
V <sub>D</sub>	Design diving speed		
V <sub>SO</sub>	Stalling speed or the minimum steady flight speed in the landing configuration		
VFR	Visual flight rules		
VMC	Visual meteorological conditions		
VNAV	Vertical navigation		
V <sub>ROSS</sub>	Take-off safety speed		
V <sub>y</sub>	Best rate of climb speed		





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## DEFINITIONS

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

For the purpose of this requirement, the following definitions shall apply in Part I, Part II and Part III:

**Accident.** An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

- a) a person is fatally or seriously injured as a result of:
  - being in the aircraft, or
  - direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
  - direct exposure to jet blast,

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or
- b) the aircraft sustains damage or structural failure which:
  - adversely affects the structural strength, performance or flight characteristics of the aircraft, and
  - would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or
- c) the aircraft is missing or is completely inaccessible.

**Acts of unlawful interference.** Acts or attempted acts such as to jeopardize the safety of civil aviation and air transport, i.e.

- a) unlawful seizure of aircraft in flight,
- b) unlawful seizure of aircraft on the ground,
- c) hostage-taking on board an aircraft or on aerodromes,
- d) forcible intrusion on board an aircraft, at an airport or on the premises of an aeronautical facility,
- e) introduction on board an aircraft or at an airport of a weapon or hazardous device or material intended for criminal purposes,
- f) communication of false information as to jeopardise the safety of an aircraft in flight or on the ground, of passengers, crew, ground personnel or the general public, at an airport or on the premises of a civil aviation facility.

**Aerial work.** An aircraft operation in which an aircraft is used for specialized services such as agriculture, construction, photography, surveying, observation and patrol, search and rescue, aerial advertisement, etc.

**Aerodrome.** A defined area on land or water (including any building, installation and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

**Aerodrome operating minima.** The limits of usability of an aerodrome for:

- a) take-off, expressed in terms of runway visual range and/or visibility and, if necessary, cloud conditions;
- b) landing in 2D instrument approach operations, expressed in terms of visibility or runway visual range, or both, minimum descent altitude or height (MDA/H) and, if necessary, cloud conditions;
- c) landing in 3D instrument approach operations, expressed in terms of visibility or runway visual range, or both, and decision altitude or height (DA/H) as appropriate to the type and/or category of the operation.

**Aeroplane.** A power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

**Aircraft.** Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface and includes a helicopter.

**Aircraft operating manual.** A manual, acceptable to the State of the Operator, containing normal, abnormal and emergency procedures, checklists, limitations, performance information, details of the aircraft systems and other material relevant to the operation of the aircraft.

*Note.— The aircraft operating manual is part of the operations manual.*

**Air Operator License.** A certificate issued by Minister of Transport to authorising an operator to carry out a scheduled or non-scheduled air transport services.

**Air operator certificate (AOC).** A certificate authorizing an operator to carry out specified commercial air transport operations.

**Air traffic service (ATS).** A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).

**Airworthy.** The status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation.

**Alternate aerodrome.** An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to, or to land at, the aerodrome of intended landing and which meets all of the following requirements:

- a) the necessary services and facilities are available;
- b) the aircraft performance requirements can be met;
- c) the aerodrome is operational at the expected time of use.

**Alternate aerodromes** include the following:

- a) **'Take-off alternate'** means an alternate aerodrome at which an aircraft would be able to land if landing becomes necessary shortly after take-off and it is not possible to use the aerodrome of departure.
- b) **'En-route alternate'** means an alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route.
- c) **'Destination alternate'** means an alternate aerodrome to which an aircraft would be able to land in

the event that it becomes either impossible or inadvisable to land at the aerodrome of intended landing.

*Note.* - *The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight.*

**Alternate heliport.** A heliport to which a helicopter may proceed when it becomes either impossible or inadvisable to proceed to or to land at the heliport of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate heliports include the following:

**Take-off alternate.** An alternate heliport at which a helicopter would be able to land should this become necessary shortly after take-off and it is not possible to use the heliport of departure.

**En-route alternate.** An alternate heliport at which a helicopter would be able to land in the event that a diversion becomes necessary while en route.

**Destination alternate.** An alternate heliport at which a helicopter would be able to land should it become either impossible or inadvisable to land at the heliport of intended landing.

*Note.*— *The heliport from which a flight departs may be an en-route or a destination alternate heliport for that flight.*

**Altimetry system error (ASE).** The difference between the altitude indicated by the altimeter display, assuming a correct altimeter barometric setting, and the pressure altitude corresponding to the undisturbed ambient pressure.

**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.

**Appropriate airworthiness requirements.** The comprehensive and detailed airworthiness codes established, adopted or accepted by a Contracting State for the class of aircraft, engine or propeller under consideration.

**Area Navigation (RNAV).** A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or spaced-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

*Note.* - *Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.*

**Authority.** The Civil Aviation Authority of Thailand (CAAT) established under Section 5 of the Civil Aviation Authority of Thailand Emergency Decree B.E. 2558

**Cabin crew member.** A crew member who performs, in the interest of safety of passengers, duties assigned by the operator or the pilot-in-command of the aircraft, but who shall not act as a flight crew member.

**Combined vision system (CVS).** A system to display images from a combination of an enhanced vision system (EVS) and asynthetic vision system (SVS).

**Commercial air transport operation.** An aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire or other valuable consideration.

**Non-Commercial air transport operations.** An aircraft operation other than commercial air transport operation.

**Continuous descent final approach (CDFA).** A technique, consistent with stabilized approach procedures, for flying the final approach segment of a non-precision instrument approach 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 15m (50 ft) above the landing runway threshold or the point where the flare manoeuvre should begin for the type of aircraft flown.

**Configuration deviation list (CDL).** A list established by the organization responsible for the type design with the approval of the State of Design which identifies any external parts of an aircraft type which may be missing at the commencement of a flight, and which contains, where necessary, any information on associated operating limitations and performance correction.

**Congested area.** In relation to a city, town or settlement, any area which is substantially used for residential, commercial or recreational purposes.

**Congested hostile environment.** A hostile environment within a congested area.

**Corporate aviation operation .** The non-commercial operation or use of aircraft by a company for the carriage of passengers or goods as an aid to the conduct of company business, flown by a professional pilot(s) employed to fly the aircraft.

**Continuing airworthiness.** The set of processes by which all *aircraft* comply with the applicable airworthiness requirements and remain in a condition for safe operation throughout their operating life.

**Continuing airworthiness records.** Records which are related to the continuing airworthiness status of an aircraft, engine, propeller or associated part.

**Crew member.** A person assigned by an operator to duty on an aircraft during a flight duty period.

**Dangerous goods.** Any article or substance which is capable of posing a risk to health, safety, property or the environment and which is identified in the list of dangerous goods in the Technical Instructions or is classified according to the Technical Instructions for the Safe Transport of Dangerous Goods by Air approved and published by decision of the Council of the International Civil Aviation Organisation for the time being in force.

**Decision altitude (DA) or decision height (DH).** In relation to the operation of an aircraft at an aerodrome, means a specified altitude or height in a 3D instrument approach operation at which the pilot-in-command must initiate a missed approach if the visual reference to continue the approach has not been established.

*Note.1 - Decision altitude (DA) is referenced to mean sea level and decision height (DH) is referenced to the threshold elevation.*

*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 Category III operations with a decision height the required visual reference is that specified for the particular procedure and operation.*

*Note.3 - For convenience where both expressions are used they may be written in the form “decision altitude/height” and abbreviated “DA/H”.*

**Defined point after take-off (DPATO).** 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.

*Note.— Defined points apply to helicopters operating in performance Class 2 only.*

**Defined point before landing (DPBL).** 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.

**Duty.** Any task that flight or cabin crew members are required by the operator to perform, including, for example, flight duty, administrative work, training, positioning and standby when it is likely to induce fatigue.

**Duty period.** A period which starts when a flight or cabin crew member is required by an operator to report for or to commence a duty and ends when that person is free from all duties.

**Director General of the Civil Aviation Authority of Thailand (DGCA).** The Director General of the Authority appointed under section 23 of the Civil Aviation Authority of Thailand Emergency Decree B.E. 2558, and includes any person authorised by him to act on his behalf and any person acting in that capacity.

**Electronic flight bag (EFB).** An electronic information system, comprised of equipment and applications for flight crew, which allows for the storing, updating, displaying and processing of EFB functions to support flight operations or duties.

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

**Emergency locator transmitter (ELT).** A generic term describing equipment which broadcast distinctive signals on designated frequencies and depending on application, may be automatically activated by impact or be manually activated. An ELT may be any of the following:

- a) **Automatic fixed ELT (ELT(AF)).** An automatically activated ELT which is permanently attached to an aircraft.
- b) **Automatic portable ELT(ELT(AP)).** An automatically activated ELT which is rigidly attached to an aircraft but readily removable from an aircraft.
- c) **Automatic deployable ELT (ELT(AD)).** An ELT which is rigidly attached to an aircraft and which is automatically deployed and activated by impact, and, in some cases, also by hydrostatic sensors. Manual deployment is also provided.
- d) **Survival ELT (ELT(S)).** An ELT which is removable from an aircraft, stowed so as to facilitate its ready use in an emergency, and manually activated by survivors.

**Engine.** A unit used or intended to be used for aircraft propulsion. It consists of at least those components and equipment necessary for functioning and control, but excludes the propeller/rotors (if applicable).

**Enhanced vision system (EVS).** A system to display electronic real-time images of the external scene achieved through the use of image sensors.

*Note.— EVS does not include night vision imaging systems (NVIS).*

**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.

*Note.— Where adequate obstacle clearance cannot be guaranteed visually, flights must be planned to ensure that obstacles can be cleared by an appropriate margin. In the event of failure of the critical engine, operators may need to adopt alternative procedures.*

**Extended flight over water.** A flight operated over water at a distance of more than 93 km (50 NM), or 30 minutes at normal cruising speed, whichever is the lesser, away from land suitable for making an emergency landing.

**Fatigue.** A physiological state of reduced mental or physical performance capability resulting from sleep loss, extended wakefulness, circadian phase, and/or workload (mental and/or physical activity) that can impair a person's alertness and ability to adequately perform safety-related operational duties.

**Fatigue risk management system (FRMS).** A data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.

**Final approach and take-off area (FATO).** A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by helicopters operating in performance Class 1, the defined area includes the rejected take-off area available.

**Final approach segment (FAS).** That segment of an instrument approach procedure in which alignment and descent for landing are accomplished.

**Flight crew member.** A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.

**Flight duty period.** The total time from the moment a flight crew member commences duty, immediately subsequent to a rest period and prior to making a flight or a series of flights, to the moment the flight crew member is relieved of all duties having completed such flight or series of flights.

**Flight manual.** A manual, associated with the certificate of airworthiness, containing limitations within which the aircraft is to be considered airworthy, and instructions and information necessary to the flight crew members for the safe operation of the aircraft.

**Flight operations officer/flight dispatcher.** A person designated by the operator to engage in the control and supervision of flight operations, whether licensed or not, suitably qualified in accordance with Annex 1, who supports, briefs and/or assists the pilot-in-command in the safe conduct of the flight.

**Flight plan.** Specified information provided to air traffic services units relating to an intended flight or portion of a flight of an aircraft.

**Flight recorder.** Any type of recorder installed in the aircraft for the purpose of complementing accident/incident investigation.

**Automatic deployable flight recorder (ADFR).** A combination flight recorder installed on the aircraft which is capable of automatically deploying from the aircraft.

**Flight safety documents system.** A set of interrelated documentation established by the operator, compiling and organizing information necessary for flight and ground operations, and comprising, as a minimum, the operations manual and the operator's maintenance control manual.

**Flight simulation training device.** An apparatus in which flight conditions are simulated on the ground and includes any one of the following:

- a) *A flight simulator*, which provides an accurate representation of the flight deck of a particular aircraft type to the extent that the mechanical, electrical, electronic, etc. aircraft systems control functions, the normal environment of flight crew members, and the performance and flight characteristics of that type of aircraft are realistically simulated;



- b) *A flight procedures trainer*, which provides a realistic flight deck environment, and which simulates instrument responses, simple control functions of mechanical, electrical, electronic, etc. aircraft systems, and the performance and flight characteristics of aircraft of a particular class;
- c) *A basic instrument flight trainer*, which is equipped with appropriate instruments, and which simulates the flight deck environment of an aircraft in flight in instrument flight conditions.

**Flight time – aeroplanes.** The total time from the moment an aeroplane first moves for the purpose of taking off until the moment it finally comes to rest at the end of the flight.

*Note.* - *Flight time as here defined is synonymous with the term “block to block” time or “chock to chock” time in general usage which is measured from the time an aeroplane first moves for the purpose of taking off until it finally stops at the end of the flight.*

**Flight time — helicopters.** The total time from the moment a helicopter’s rotor blades start turning until the moment the helicopter finally comes to rest at the end of the flight, and the rotor blades are stopped.

*Note 1.— The State may provide guidance in those cases where the definition of flight time does not describe or permit normal practices. Examples are: crew change without stopping the rotors; and rotors running engine wash procedure following a flight. In any case, the time when rotors are running between sectors of a flight is included within the calculation of flight time.*

*Note 2.— This definition is intended only for the purpose of flight and duty time regulations.*

**Final approach segment (FAS).** That segment of an instrument approach procedure in which alignment and descent for landing are accomplished.

**General aviation operation.** An aircraft operation other than a commercial air transport operation or an aerial work operation.

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

**Helicopter.** A heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.

*Note.— Some States use the term “rotorcraft” as an alternative to “helicopter”.*

**Helideck.** A heliport located on a floating or fixed offshore structure.

**Heliport.** An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

*Note 1.— Throughout this Part, when the term “heliport” is used, it is intended that the term also applies to aerodromes primarily meant for the use of aeroplanes.*

*Note 2.— Helicopters may be operated to and from areas other than heliports.*

**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 2D instrument approach operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions; and
- c) landing in 3D instrument approach operations, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appropriate to the type and/or category of the operation.

**Hostile environment.** An environment in which:

- a) a safe forced landing cannot be accomplished because the surface and surrounding environment are inadequate; or
- b) the helicopter occupants cannot be adequately protected from the elements; or
- c) search and rescue response/capability are not provided consistent with anticipated exposure; or
- d) there is an unacceptable risk of endangering persons or property on the ground.

**Human Factors principles.** Principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.

**Human performance.** Human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.

**Head-up display (HUD).** A display system that presents flight information into the pilot's forward external field of view.

**Industry codes of practice.** Guidance material developed by an industry body, for a particular sector of the aviation industry to comply with the requirements of the International Civil Aviation Organisation's Standards and Recommended Practices, other aviation safety requirements and the best practices deemed appropriate.

**Instrument approach operations.** An approach and landing using instruments for navigation guidance based on an instrument approach procedure, executed by a 2D or 3D instrument approach operation which are defined as follows:

- a) a two-dimensional (2D) instrument approach operation is an instrument approach operation using lateral navigation guidance only;
- b) a three-dimensional (3D) instrument approach operation is an instrument approach operation using both lateral and vertical navigation guidance.

*Note.- Lateral and vertical navigation guidance refers to the guidance provided either by:*

- a) a ground-based radio navigation aid; or
- b) computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of these.

**Instrument approach procedure (IAP).** A series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from –

- a) the initial approach fix; or
- b) the beginning of a defined arrival route, where applicable,

to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply. Instrument approach procedures are classified as follows:

- a) Non-precision approach (NPA) procedure. An instrument approach procedure designed for 2D instrument approach operations Type A.

*Note.* - *Non-precision approach procedures may be flown using a continuous descent final approach technique (CDFA). CDFA with advisory VNAV guidance calculated by on-board equipment (See PANS-OPS (Doc 8168), Volume I, Part I, Section 4, Chapter 1, paragraph 1.8.1) are considered 3D instrument approach operations. CDFA with manual calculation of the required rate of descent are considered 2D instrument approach operations. For more information on CDFA refer to PANS-OPS (Doc 8168) Volume I, Section 1.7 and 1.8.*

- b) Approach procedure with vertical guidance (APV). A performance- based navigation (PBN) instrument approach procedure designed for 3D instrument approach operations Type A.
- c) Precision approach (PA) procedure. An instrument approach procedure based on navigation systems (ILS, MLS, GLS and SBAS Cat I) designed for 3D instrument approach operations Type A or B.

*Note.*— *Refer to Section II, Chapter 2, 2.2.8.3, for instrument approach operation types.*

**Instrument meteorological conditions (IMC).** Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.

*Note.*— *The specified minima for visual meteorological conditions are contained in Chapter 4 of Annex 2.*

**Isolated aerodrome.** A destination aerodrome for which there is no destination alternate aerodrome suitable for a given aeroplane type.

**Integrated survival suit.** A survival suit which meets the combined requirements of the survival suit and life jacket.

**Landing decision point (LDP).** The point used in determining landing performance from which, an engine failure occurring at this point, the landing may be safely continued or a bailed landing initiated.

*Note.*— *LDP applies only to helicopters operating in performance Class 1.*

**Large aeroplane.** An aeroplane of a maximum certificated take-off mass of over 5700 kg.

**Maintenance.** The performance of tasks on an aircraft, engine, propeller or associated part required to ensure the continuing airworthiness of an aircraft, engine, propeller or associated part including any one or combination of overhaul, inspection, replacement, defect rectification, and the embodiment of a modification or repair.

**Maintenance organization's procedures manual.** A document endorsed by the head of the maintenance organization which details the maintenance organization's structure and management responsibilities, scope of work, description of facilities, maintenance procedures and quality assurance or inspection systems.

**Maintenance programme.** A document which describes the specific scheduled maintenance tasks and their frequency of completion and related procedures, such as a reliability programme, necessary for the safe operation of those aircraft to which it applies.

**Maintenance release.** A document which contains a certification confirming that the maintenance work to which it relates has been completed in a satisfactory manner in accordance with appropriate airworthiness requirements.

**Master minimum equipment list (MMEL).** A list established for a particular aircraft type by the organization responsible for the type design with the approval of the State of Design containing items, one or more of which is permitted to be unserviceable at the commencement of a flight. The MMEL may be associated with special operating conditions, limitations or procedures.

**Maximum mass.** Maximum certificated take-off mass.

**Minimum equipment list (MEL).** A list which provides for the operation of aircraft, subject to specified conditions, with particular equipment inoperative, prepared by an operator in conformity with, or more restrictive than, the MMEL established for the aircraft type.

**Meteorological information.** A meteorological report, analysis, forecast, and any other statement relating to existing or expected meteorological conditions.

**Minimum descent altitude (MDA) or minimum descent height (MDH).** A specified altitude or height in 2D instrument approach operation or circling approach operation below which the pilot-in-command must not continue the descent without the required visual reference.

*Note.1. - Minimum descent altitude (MDA) is referenced to mean sea level and minimum descent height (MDH) is referenced to the aerodrome elevation or to the threshold elevation if that is more than 2 m (7 ft) below the aerodrome elevation. A minimum descent height for a circling approach is referenced to the aerodrome elevation.*

*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 the required visual reference is the runway environment.*

*Note.3. - For convenience when both expressions are used they may be written in the form “minimum descent altitude/height” and abbreviated “MDA/H”.*

**Modification.** A change to the type design of an aircraft, engine or propeller.

**Navigation specification.** A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications:

- a) **Required navigation performance (RNP specification).** A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.
- b) **Area navigation (RNAV specification).** A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

*Note 1.— The Performance-based Navigation (PBN) Manual (Doc 9613), Volume II, contains detailed guidance on navigation specifications.*

*Note 2.— The term RNP, previously defined as “a statement of the navigation performance necessary for operation within a defined airspace”, has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613.*

**Night.** The hours between the end of evening civil twilight and the beginning of morning civil twilight or such other period between sunset and sunrise, as may be prescribed by the appropriate authority.

*Note.— Civil twilight ends in the evening when the centre of the sun’s disc is 6 degrees below the horizon and begins in the morning when the centre of the sun’s disc is 6 degrees below the horizon.*

**Non-congested hostile environment.** A hostile environment outside a congested area.

**Non-hostile environment.** An environment in which:

- a) a safe forced landing can be accomplished because the surface and surrounding environment are adequate;
- b) the helicopter occupants can be adequately protected from the elements;
- c) search and rescue response/capability is provided consistent with anticipated exposure; and
- d) the assessed risk of endangering persons or property on the ground is acceptable.

*Note.— Those parts of a congested area satisfying the above requirements are considered non-hostile.*

**Obstacle clearance altitude (OCA) or obstacle clearance height (OCH).** The lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria.

*Note. 1. - Obstacle clearance altitude is referenced to mean sea level and obstacle clearance height is referenced to the threshold elevation or in the case of non-precision approach procedures to the aerodrome elevation or the threshold elevation if that is more than 2 m (7 ft) below the aerodrome elevation. An obstacle clearance height for a circling approach procedure is referenced to the aerodrome elevation.*

*Note. 2. - For convenience when both expressions are used they may be written in the form “obstacle clearance altitude/height” and abbreviated “OCA/H”.*

**Offshore operation.** Operations which routinely have a substantial proportion of the flight conducted over sea areas to or from offshore locations. Such operations include, but are not limited to, support of offshore oil, gas and mineral exploitation and sea-pilot transfer.

**Operation.** An activity or group of activities which are subject to the same or similar hazards and which require a set of equipment to be specified, or the achievement and maintenance of a set of pilot competencies, to eliminate or mitigate the risk of such hazards.

*Note.— Such activities could include, but would not be limited to, offshore operations, heli-hoist operations or emergency medical service.*

**Operating base.** The location from which operational control is exercised.

*Note. - An operating base is normally the location where personnel involved in the operation of the aeroplane work and the records associated with the operation are located. An operating base has a degree of*

*permanency beyond that of a regular point of call.*

**Operational control.** The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight.

**Operational flight plan.** The operator's plan for the safe conduct of the flight based on considerations of aeroplane performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes concerned.

**Operations in performance Class 1.** Operations with performance such that, in the event of a critical engine failure, performance is available to enable the helicopter to safely continue the flight to an appropriate landing area, unless the failure occurs prior to reaching the take-off decision point (TDP) or after passing the landing decision point (LDP), in which cases the helicopter must be able to land within the rejected take-off or landing area.

**Operations in performance Class 2.** Operations with performance such that, in the event of critical engine failure, performance is available to enable the helicopter to safely continue the flight to an appropriate landing area, except when the failure occurs early during the take-off manoeuvre or late in the landing manoeuvre, in which cases a forced landing may be required.

**Operations in performance Class 3.** Operations with performance such that, in the event of an engine failure at any time during the flight, a forced landing will be required.

**Operations manual.** A manual containing procedures, instructions and guidance for use by operational personnel in the execution of their duties.

**Operator.** A person, organization, flying association or flying club and approved training organisation engaged in or offering to engage in an aircraft general aviation operation.

*Note.* - In the context of the requirements contained in this publication, the operator is not engaged in the transport of passengers, cargo or mail for remuneration or hire.

**Operator's maintenance control manual.** A document which describes the operator's procedures necessary to ensure that all scheduled and unscheduled maintenance is performed on the operator's aircraft on time and in a controlled and satisfactory manner.

**Owner.** Thai aircraft owner who which to used or intended to be used for the purpose for non-remuneration.

**Performance-based communication (PBC).** Communication based on performance specifications applied to the provision of air traffic services.

*Note.* — An RCP specification includes communication performance requirements that are allocated to system components in terms of the communication to be provided and associated transaction time, continuity, availability, integrity, safety and functionality needed for the proposed operation in the context of a particular airspace concept.

**Performance-based navigation (PBN).** Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

*Note.* - Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.

**Performance-based surveillance (PBS).** Surveillance based on performance specifications applied to the provision of air traffic services.

*Note.* — An RSP specification includes surveillance performance requirements that are allocated to system components in terms of the surveillance to be provided and associated data delivery time, continuity, availability, integrity, accuracy of the surveillance data, safety and functionality needed for the proposed operation in the context of a particular airspace concept.

**Person.** Any individual, partnership, corporation, company, association, joint-stock association, or other similar representative of these entities.

**Private aircraft.** An Aircraft used or intended to be used for the purpose of non-remuneration.

**Private Aircraft Operating License.** A licence authorizing an owner of aircraft to used or intended to be used aircraft for the purpose of non-remuneration.

**Private Flight.** A flight which is not an aerial work flight, a public transport flight or a flight for the purpose of commercial air transport.

**Pilot-in-command.** The pilot designated by the operator as being in command and charged with the safe conduct of a flight.

**Point of no return.** The last possible geographic point at which an aircraft can proceed to the destination aerodrome as well as to an available en-route alternate aerodrome for a given flight.

**Psychoactive substances.** Alcohol, opioids, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens, and volatile solvents, but excludes coffee and tobacco.

**RCP type.** A label (e.g. RCP 240) that represents the values assigned to RCP parameters for communication transaction time, continuity, availability and integrity.

**Repair.** The restoration of an aircraft, engine, propeller or associated part to an airworthy condition in accordance with the appropriate airworthiness requirements after it has been damaged or subjected to wear.

**Required communication performance (RCP).** A statement of the performance requirements for operational communication in support of specific air traffic management (ATM) functions.

**Required communication performance (RCP) specification.** A set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based communication.

**Required surveillance performance (RSP) specification.** A set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based surveillance.

**Rest period.** A continuous and defined period of time, subsequent to and/or prior to duty, during which flight or cabin crew members are free of all duties.

**Runway visual range (RVR).** The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

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

**Safety management system (SMS)**. A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

**Series of flights**. Series of flights are consecutive flights that:

- a) begin and end within a period of 24 hours; and
- b) are all conducted by the same pilot-in-command.

**Serious incident**. An incident involving circumstances indicating that an accident nearly occurred.

**State of Registry**. The State on whose register the aircraft is entered.

**State of the Aerodrome**. The State in whose territory the aerodrome is located.

**State of the Operator**. The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

**Synthetic vision system (SVS)**. A system to display data-derived synthetic images of the external scene from the perspective of the flight deck.

**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, an engine failure occurring at this point, either a rejected take-off may be made or a take-off safely continued.

*Note.— TDP applies only to helicopters operating in performance Class 1.*

**Target level of safety (TLS)**. A generic term representing the level of risk which is considered acceptable in particular circumstances.

**Total vertical error (TVE)**. The vertical geometric difference between the actual pressure altitude flown by an aircraft and its assigned pressure altitude (flight level).

**Visual meteorological conditions (VMC)**. Meteorological conditions expressed in terms of visibility, distances from cloud, and ceiling, equal to or better than specified minima.

*Note.— The specified minima are contained in Chapter 4 of Annex 2.*

**VTOSS**. The minimum speed at which climb shall be achieved with the critical engine inoperative, the remaining engines operating within approved operating limits.

*Note.— The speed referred to above may be measured by instrument indications or achieved by a procedure specified in the flight manual.*



## **PART I**

### **GENERAL AVIATION OPERATIONS (AEROPLANE)**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

#### **CHAPTER 1**

#### **GENERAL**

##### **GA-P1A.101 APPLICABILITY**

101.1 The provisions of this requirements are applicable to Thai registered aeroplanes with Standard Certificate of Airworthiness (Standard C of A) engaged in general aviation operations. Except for aeroplane are engaged in commercial air transport operations, aerial work or aeroplane which to operate by military services, police services and other government services as specified in the Ministerial Regulations.

101.2 Part I applies to all general aviation aeroplane operations, including those covered in Part II. Part II adds additional requirements for large aeroplanes, turbojet.

##### **GA-P1A.102 COMPLIANCE WITH LAWS, REGULATIONS AND PROCEDURES**

- 102.1 The pilot-in-command of a Thai registered aeroplane to which this Chapter applies shall –
- (a) comply with the laws, regulations and procedures of those States in which operations are conducted;
  - (b) be familiar with the laws, regulations and procedures, pertinent to the performance of his or her duties, prescribed for the areas to be traversed, the aerodromes to be used and the air navigation facilities relating thereto. The pilot-in-command 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*;
  - (c) have responsibility for *operational control*;
  - (d) notify the appropriate local authority without delay, if an emergency situation which endangers the safety or security of the aeroplane or persons necessitates the taking of action which involves a violation of local regulations or procedures. If required by the State in which the incident occurs, the pilot-in-command shall submit a report on any such violation to the appropriate authority of such State; in that event, the pilot-in-command shall also submit a copy of it to the CAAT during the next working day from the time of landing;
  - (e) have available on board the aeroplane the essential information concerning the search and rescue services in the area over which the aeroplane will be flown;

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

#### **GA-P1A.103 PROHIBITIONS OF USE OF PSYCHOACTIVE SUBSTANCES**

- 103.1 No member of a flight crew shall perform any function specified in the privileges applicable to this license if he is under the influence of any psychoactive substance which may render him unable to perform such functions in a safe and proper manner. Provisions concerning the use of psychoactive substance are contained in Regulation of Civil Aviation Board No. 67

#### **GA-P1A.104 OPERATIONS INSPECTIONS**

- 104.1 To determine continued competence and compliance by the owner/ operator with the applicable requirements, the Owner/Operator shall permit access by Authorised Officers to its premises, aircraft, equipment and document, including those landing agents appointed by the Owner/Opeator.
- 104.2 All Authorised Officers are authorised to be on-board the operator's aircraft, including its flight deck, during normal aircraft operations. Arrangements for such flights will normally be made in advance, but Authorised Officers may also board the aircraft without prior notice to conduct unscheduled inspection. For identifications, all Authorised Officers will carry a credential card which will be produced on request.
- 104.3 Owners/Operators will be visited from time to time by Authorised Officers. The primary purpose of their visits will be to observe the operations of aircraft of its Owners/Operators. This will include the training and checking and qualifications of the operating staff and agents/contractors of its Owners/Operators.
- 104.4 The Authorised Officers are also empowered to inspect the licenses of the flight crew and aircraft maintenance engineers, and records of the Owners/Operators and their agents.

#### **GA-P1A.105 DECISIONS OF THE AUTHORITY**

- 105.1 Pursuant to the Regulation on Civil Aviation Authority of Thailand on Operations of General Aviation Requirement and the Authority Announcements as appropriate, the Authority may refuse to grant or renew a Specific Approval.
- 105.2 If an operator of Thai aeroplane ceases operations for which the Specific Approval Certificate was issued, or if the Authority revokes or suspends the Apecific Approval Certificate, the Owner/Operator is to be immediately returned to the Authority.

#### **GA-P1A.106 CARRIAGE OF DANGEROUS GOODS**

- 106.1 For the purpose of this paragraph GA-P1A.106 and its sub-paragraphs;

**Exception** means a provision which excludes a specific item of dangerous goods from the requirements normally applicable to that item.

**Exemption** means an authorisation granted by the Authority providing relief from the provisions of Technical Instructions.

**Passenger aircraft** means an aircraft that carries any person other than a crew member, employee of the operator in an official capacity, an Authorised Officer or a person accompanying a consignment or other cargo.

**Incompatible** means in relation to dangerous goods, if mixed, would be liable to cause a dangerous evolution of heat or gas or produce a corrosive substance.

106.2 A Thai-registered aeroplane to which this chapter applies shall not carry any dangerous goods unless-

- (a) The CAAT has granted to the operator a dangerous goods permit, subject to such conditions as he thinks fit, to carry dangerous goods on board its aeroplane; and
- (b) such goods are carried or loaded as cargo in accordance with the provision of the Regulation of Civil Aviation Authority on the safe transport of Dangerous Goods by air and any conditions to which such approval may be subject and in accordance with the Technical Instruction for the safe Transport of Dangerous Goods by Air approved and published by decision of the Council of the International Civil Aviation Organisation for the time being in force.

106.3 Paragraph 106.2 shall not apply to dangerous goods that are-

- (a) required to be aboard the aeroplane in accordance with the relevant airworthiness requirements and operating regulations or that are authority by the State of the operator to meet special requirements;
- (b) required to provide, during flight, medical aid to a patient;
- (c) required to provide, during flight, veterinary aid or a humane killer for an animal;
- (d) required to provide, during flight, aid in connection with search and rescue operations;
- (e) permitted for carriage by passengers or crew members;
- (f) vehicals carried in aeroplane designed or modified for vehicle ferry operations;

and are carried in compliance with the Technical Instructions.

106.4 An owner, operators of Thai aeroplane who do not seek permission to carry dangerous goods must state the prohibition of dangerous goods carriage in the operations manual and give guidance to staff and agents concerning which goods may not be carried.

106.5 The operations manual shall indicate whether or not a general permission for the carriage of dangerous goods is held and what conditions apply to that permission. An owner, operators who do carry dangerous good shall also include in their operations manual information regarding the means of identifying dangerous goods, their manner of loading and the responsibilities of crew members concerning such goods.

106.6 The Regulation on the Civil Aviation Authority of Thailand No.4 on Transportation of Dangerous Goods by Air sets out the requirements to be complied by an operator carrying dangerous goods. The carriage of dangerous goods shall be in accordance with the latest edition of the ICAO Doc 9284 Technical Instructions for the Safe Transport of Dangerous Goods by Air, here-in referred to as Technical Instructions (TI).

- 106.7 The content of operation manual of the operator, whether approved or non-approved dangerous goods carrier, shall be in accordance with appendix D, Paragraph 2.1.35 and the Advisory Circular for Operations Manual Contains Dangerous Goods Section (OM-A, OM-D) for Requirements-Aeroplane.
- 106.8 An owner/operator of Thai aeroplane holding a Dangerous Goods approval must include in its Operations Manual procedures on the use of an acceptance checklist. The use of such a checklist is to prevent the inadvertent acceptance of dangerous goods for carriage by air unless they are accompanied by a completed dangerous goods transport document and to verify that, as far as is practical, the package or freight container complies with the requirements of the Technical Instructions.
- 106.9 An owner/operator of Thai aeroplane holding a Dangerous Goods approval must also develop procedures to enable its staff or the ground handling agent to carry out their duties, including appropriate loading, segregation of incompatible dangerous goods and inspection for damage and performing of leakage procedures. Other procedures to be developed by the operator includes the provision of written Notification To Captain (NOTOC) as specified in the TI, retention of a copy of the NOTOC on the ground and for the NOTOC to be readily accessible to the aerodrome of last departure and next scheduled arrival for each of its flights on which the dangerous goods are carried. These procedures and instructions shall apply from the time dangerous goods are accepted for carriage until they cease to be in the care of the operator or its ground handling agent.
- 106.10 There are general exceptions for certain types of dangerous goods which do not require a approval for carriage. These include installed aircraft equipment, certain items carried by passengers or crew and items required for use in flight to provide veterinary aid to an animal or medical aid to a person. All owner and operator, regardless if it holds a Dangerous Goods approval, are required to provide guidance to its crew on what items constitute dangerous goods and what items can be carried on-board the aircraft in all circumstances.
- 106.11 All owner /operators of Thai aeroplane are required to provide initial and recurrent training to flight and cabin crew on the transportation of dangerous goods by air as specified in the TI. This training applies even if the operator does not hold a Dangerous Goods approval, since incidents may arise from dangerous goods taken on board an aircraft unwittingly. In addition, all owner and operators shall also ensure that all other relevant staff including staff of his handling agent involved with the carriage of passengers or cargo by air, has received initial and recurrent dangerous goods training as specified in the TI.
- 106.12 All owner and operators of Thai aeroplane approved for the public transport of passengers, including those that do not hold a dangerous Goods approval, shall ensure that dangerous goods notices for passengers, advising on the type of dangerous goods that are prohibited to be brought on-board the aircraft, are displayed prominently at places visible to passengers (such as check-in desks, ticket sales desks and aircraft boarding areas). All owner and operators shall ensure that information on the carriage of dangerous goods is brought to the attention of passengers during check-in. As passengers may, either in ignorance or deliberately, try to take prohibited items onto the aircraft in either their checked or carry-on baggage, all owner and operator shall train its agents and check-in staff accordingly and put in place procedures to address this issue.

*Note: The list of items that passengers can carry is found in Part 8, Chapter 1 of the TI.*

#### **GA-P1A.107 CARRIAGE OF WEAPONS AND MUNITIONS OF WARS**

- 107.1 Pursuant to Section 26 of Air Navigation Act B.E. 2497, no person shall send or carry munitions of war under the law on controlling munitions of war on board and Aircraft unless written

permission has been obtained from the Minister and the conditions specified by the Minister are complied with.

#### **GA-P1A.108 DANGEROUS GOODS TRAINING**

108.1 An Owner/operators of Thai aeroplane are required to establish and maintain dangerous goods training programmes for those aircraft crew and ground staff concerned. Refer to Appendix H for details.

#### **GA-P1A.109 SPECIFIC APPROVAL**

109.1 The pilot-in-command shall not conduct operations for which a specific approval is required unless such approval has been issued by the CAAT.

#### **GA-P1A.110 APPLICATIONS FOR SPECIFIC APPROVAL**

##### **110.1 Initial Application for the Specific Approval**

110.1.1 An owner/operator for Thai aeroplane to which this part applies to use an aircraft for general aviation operations shall obtain the specific approval from the CAAT.

110.1.2 The owner/operator must be submitted the following document together with the completed application for Specific Approval form together to the CAAT:

- (a) Operations Manual;
- (b) Master Minimum Equipment Lists (MMEL), Minimum Equipment Lists (MEL);
- (c) Aircraft Flight Manual or equivalent documents;
- (d) Flight Crew Training Records;
- (e) Maintenance Programme; and
- (f) Additional document as may be prescribed by the CAAT.

110.1.3 The application for and grant of the Specific Approval is a complicated process involving much effort and detailed work by both the applicant and the Authority. Hence, an applicant shall contact the Authority as far in advance as possible, and submit all required manuals and documents, at least 60 working day before the anticipated start of operations. The time taken to process an application will depend on the completeness of the information submitted and the progress the applicant makes in demonstrating an adequate organisation, method of control and supervision of flight operations, training programme and maintenance arrangements consistent with the nature and extent of the operations specified. Nevertheless, no undertaking can be given for the Specific Approval to be granted within any requested timeframe.

#### **GA-P1A.111 FORM OF SPECIFIC APPROVAL**

111.1 The Specific Approval is normally valid for not more than 5 years for initial issued. Thereafter, it may be renewed for not more than 5 years subject to the satisfaction on the Authority. The Type(s) of aircraft that may be specified in the operations Approval.

- 111.2 Refer to Appendix A for the format of Specific Approval.
- 111.3 Refer to Appendix B for application form for Specific Approval.
- 111.4 When the operations to be conducted International non-commercial air transport operation as require a Specific Approval, a copy of the document(s) needs to be carried on board.

## CHAPTER 2

### FLIGHT OPERATIONS

#### GA-P1A.201 OPERATING FACILITIES

201.1 The pilot-in-command of Thai aeroplane to which this part applies 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.

*Note - “Reasonable means” in this paragraph is intended to denote the use, at the point of departure, of information available to the pilot-in-command either through official information published by the aeronautical information services or readily obtainable from other sources.*

#### GA-P1A.202 OPERATIONAL MANAGEMENT

##### 202.1 Operating instructions – general

202.1.1 An aeroplane shall not be taxied on the movement area of an aerodrome unless the person at the controls is an appropriately qualified pilot or:

- (a) has been duly authorized by the owner or operator or in case where it is leased the lessee, or a designated agent;
- (b) is fully competent to taxi the aeroplane;
- (c) is qualified to use the radio 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 aeroplane movement at the aerodrome.

##### 202.2 Aerodrome operating minima

202.2.1 The pilot-in-command of Thai aeroplane to which this chapter shall establish aerodrome operating minima in accordance with criteria specified in ICAO Document 9365 – Manual of All Weather Operations, for each aerodrome to be used in operations. When establishing aerodrome operating minima, any conditions that may be prescribed in the list of specific approval 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: The State of the Aerodrome is not required to establish aerodrome operating minima*

202.2.1.1 The CAAT 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:*

- a) for the purposes of an approach ban (Ref to para 204.1.2), minima below the heliport

*or landing location operating minima;*

- b) reducing or satisfying the visibility requirements; or*
- c) 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 I 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).*

### 202.3 **Passengers**

202.3.1 The pilot-in-command of Thai aeroplane to which this chapter shall ensure that passengers are made familiar with the location and use of:

- (a) seat belts;
- (b) emergency exits;
- (c) life jackets;
- (d) oxygen dispensing equipment; and
- (e) other emergency equipment provided for individual use,
- (f) including passenger emergency briefing cards.

202.3.2 The pilot-in-command of a Thai aeroplane to which this chapter applies shall ensure that:

- (a) all persons on board are aware of the location and general manner of use of the principal emergency equipment carried for collective use;
- (b) passengers are instructed in such emergency action as may be appropriate to the circumstances in an emergency during flight; and
- (c) during take-off and landing and whenever considered necessary by reason of turbulence or any emergency occurring during flight, all passengers on board an aeroplane shall be secured in their seats by means of the seat belts or harnesses provided.

### **GA-P1A.203 FLIGHT PREPARATION**

203.1 A flight shall not be commenced until the pilot-in-command of a Thai aeroplane to which this chapter applies is satisfied that:

- (a) the aeroplane is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the aeroplane;
- (b) the instruments and equipment installed in the aeroplane are appropriate, taking into account the expected flight conditions;



- (c) any necessary maintenance has been performed;
- (d) the mass of the aeroplane and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;
- (e) any load carried is properly distributed and safely secured;
- (f) the aeroplane operating limitations, contained in the flight manual, or its equivalent, will not be exceeded; and

## 203.2 **Flight Planning**

203.2.1 Before commencing a flight the pilot-in-command of a Thai aeroplane to which this chapter applies shall be familiar with all available meteorological information appropriate to the intended flight. Preparation for a flight away from the vicinity of the place of departure, and for every flight under the instrument flight rules, shall include:

- (a) a study of available current weather reports and forecasts; and
- (b) 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.

*Note 1.— It is the practice in some States to declare, for flight planning purposes, higher minima for an aerodrome when nominated as an alternate, than for the same aerodrome when planned as that of intended landing.*

*Note 2.— The requirements for flight plans are contained in Annex 2 — Rules of the Air and Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444).*

## 203.4 **Meteorological conditions**

203.4.1 A flight to be conducted in accordance with VFR shall not be commenced unless 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 VFR will, at the appropriate time, be such as to enable compliance with these rules.

203.4.2 A flight to be conducted in accordance with the instrument flight rules shall not:

- (a) 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
- (b) 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 3.6.1, 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.

203.4.3 The Owner/Operator of Thai aeroplane 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).*

204.4.4 A flight 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.

203.4.5 A flight to be planned or expected to operate in suspected or known ground icing conditions shall not take off unless the aeroplane 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 aeroplane 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).*

### 203.5 **Weather conditions**

203.5.1 A flight to be conducted in accordance with the visual flight rules shall not be commenced unless 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.

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

203.5.3 A flight 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.

203.5.4 A flight to be planned or expected to operate in suspected or known ground icing conditions shall not take off unless the aeroplane 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 aeroplane is kept in an airworthy condition prior to take-off.

### 203.6 **Alternate aerodromes**

203.6.1 A flight to be conducted in accordance with the instrument flight rules shall not be commenced without at least one destination alternate aerodrome 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 there is no suitable destination alternate aerodrome; and

- 1) a standard instrument approach procedure is prescribed for the aerodrome of intended landing; and

- 2) available current meteorological information indicates that the following meteorological conditions will exist from two hours before time of arrival:
  - (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 or of 4 km more than the minimum associated with the procedure.

## 203.7 **Fuel and oil supply**

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

- (a) when the flight is conducted in accordance with the instrument flight rules and a destination alternate aerodrome is not required, flight to the aerodrome of intended landing, and after that, for at least 45 minutes at normal cruising altitude; or
- (b) when the flight is conducted in accordance with the instrument flight rules and a destination alternate aerodrome is required, flight from the aerodrome of intended landing to an alternate aerodrome, and after that, for at least 45 minutes at normal cruising altitude; or
- (c) when the flight is conducted in accordance with VFR, flight to the aerodrome of intended landing, and after that, for at least 30 minutes at normal cruising altitude; or
- (d) when the flight is conducted in accordance with the visual flight rules by night, flight to the aerodrome of intended landing and thereafter for at least 45 minutes at normal cruising altitude.

*Note 1.— Nothing in 203.7 precludes amendment of a flight plan in flight in order to replan the flight to another aerodrome, provided that the requirements of 203.7 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).*

203.7.2 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.

## 203.8 **Refuelling with passengers on board**

203.8.1 An aeroplane shall not be refuelled when passengers are embarking, on board or disembarking unless it is attended by the pilot-in-command or other qualified personnel ready to initiate and direct an evacuation of the aeroplane by the most practical and expeditious means available. When refuelling with passengers embarking, on board or disembarking, two-way communications shall be maintained by the aeroplane's intercommunication system or other suitable means between the ground crew supervising the refuelling and the pilot-in-command.

203.8.2 The pilot-in-command shall ensure that breathing oxygen is available to crew members and passenger in sufficient quantities for all flight at such altitudes where a lack of oxygen might result in impairment of the faculties of crew member or harmfully affect passengers.

203.9 **Oxygen supply**

203.9.1 The pilot-in-command shall ensure that breathing oxygen is available to crew members and passengers in sufficient quantities for all flights at such altitudes where a lack of oxygen might result in impairment of the faculties of crew members or harmfully affect passengers.

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

203.9.2 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.

203.9.3 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.

203.9.4 Cabin crew shall be safeguarded so as to ensure reasonable probability of their retaining consciousness during any emergency descent which may be necessary in the event of loss of pressurisation and, in addition, they shall have such means of protection as will enable them to administer first aid to passengers during stabilized flight following the emergency. Passengers shall be safeguarded by such devices or operational procedures as will ensure reasonable probability of their surviving the effects of hypoxia in the event of loss of pressurisation.

203.10 **Use of Oxygen**

203.10.1 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 para 203.9.

- 203.10.2 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.

## **GA-PIA.204 IN-FLIGHT PROCEDURES**

### **204.1 Aerodrome operating minima**

- 204.1.1 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 para 202.2 of this Chapter.

- 204.1.2 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.*

- 204.1.3 The pilot-in-command of a Thai aeroplane to which this chapter applies shall satisfied that, with the runway surface condition information available, the aeroplane performance information indicates that a safe landing can be made.

*Note – Guidance procedures for using runway surface condition information on board aircraft are contained in the ICAO PANS-Aerodromes (Doc 9981) and in the performance section of the aeroplane flight manual.*

- 204.1.4 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.*

### **205.2 Weather reporting by pilot**

- 205.2.1 When meteorological conditions likely to affect the safety of other aircraft are encountered, they shall be reported as soon as possible.

- 204.2.2 The pilot-in-command shall report runway braking action when the runway breaking action encountered is not as good as reported.

### **204.3 Hazardous flight conditions**

- 204.3.1 When hazardous flight conditions encountered, other than those associated with meteorological conditions, shall be reported to the appropriate aeronautical station as soon as possible. The reports so rendered shall give such details as may be pertinent to the safety of other aircraft.

### **204.4 Flight crew members at duty stations**

- 204.4.1 **Take-off and landing.** All flight crew members required to be on flight deck duty shall be at their stations.
- 204.4.2 **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.
- 204.4.3 **Seat belts.** All flight crew members shall keep their seat belts fastened when at their stations.
- 204.4.4 **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.*

204.5 **Safeguarding of cabin crew and passengers in pressurized aeroplanes in the event of loss of pressurization**

- 204.5.1 A flight shall not be commenced unless cabin crew are safeguarded so as to ensure reasonable probability of their retaining consciousness during any emergency descent which may be necessary in the event of loss of pressurization and, in addition, they shall have such means of protection as will enable them to administer first aid to passenger during stabilized flight following the emergency. Passenger shall also be safeguarded by such devices or operational procedures as will ensure reasonable probability of their surviving the effects of hypoxia in the event of loss of pressurisation.

204.6 **In-flight fuel management**

- 204.6.1 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
- 204.6.2 The pilot-in-command of a Thai aeroplane to which this chapter applies 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.
- 204.6.3 The pilot-in-command of a Thai aeroplane to which this chapter applies 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.*

- 204.6.4 The pilot-in-command of a Thai aeroplane to which this chapter applies 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 para 204.7 of this chapter 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.*

#### **204.7 Instrument approach procedures**

204.7.1 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.

204.7.2 Aeroplanes operated in accordance with the instrument flight rules shall comply with the instrument approach procedures approved by the State in which the aerodrome is located.

*Note 1.—See para 204.7 of chapter 9 of this part I for instrument approach operation classifications.*

*Note 2.—Information for pilots on flight procedure parameters and operational procedures is contained in PANS-OPS, Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS, 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.*

#### **GA-P1A.205 DUTIES OF PILOT-IN-COMMAND**

205.1 The pilot-in-command of a Thai aeroplane to which this chapter applies shall be responsible for-

- (a) the operation, safety and security of the aeroplane and the safety of all crew members, passengers and cargo on board;
- (b) ensuring that a flight-
  - 1) 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 any psychoactive substance; and
  - 2) will not be continued beyond the nearest suitable aerodrome when flight crew members' capacity to perform functions is significantly reduced by impairment of faculties from causes such as fatigue, sickness or lack of oxygen
- (c) notifying the nearest appropriate authority by the quickest available means of any accident involving the aeroplane, resulting in serious injury or death of any person or substantial damage to the aeroplane or property.

#### **GA-P1A.206 CABIN BAGGAGE (TAKE-OFF AND LANDING)**

206.1 The pilot-in-command of a Thai aeroplane to which this chapter applies shall ensure that all baggage carried onto an aeroplane and taken into the passenger cabin is securely stowed.





## CHAPTER 3

### MANUALS, LOGS AND RECORDS

#### **GA-P1A.301 AIRCRAFT FLIGHT MANUAL**

- 301.1 No pilot-in-command shall operate a Thai aeroplane unless it is operated in compliance with the operating limitations specified in the aircraft flight manual (AFM), or an equivalent document approved by the CAAT.

*Note.— The aircraft flight manual contains the information specified in Annex 8.*

- 301.2 The owner or lessee (where applicable) of a Thai aeroplane to which this part applies shall ensure that the aircraft flight manual is updated and amended to implement any change mandated by the CAAT.

#### **GA-P1A.302 JOURNEY LOG BOOK OR EQUIVALENT RECORD**

- 302.1 A journey log / technical log book shall be maintained for every aeroplane engaged in general aviation in which shall be entered particulars of the aeroplane, its crew and each journey.

- 302.2 The aeroplane journey / technical log shall contain at least the following items and the corresponding Roman numerals:

I — aeroplane nationality and registration;

II — date;

III — Name of crew members;

IV — duty assignments of crew members;

V — Place of departure;

VI — Place of arrival;

VII — Time of departure;

VIII — Time arrival;

IX — Hours of flight;

X — Nature of flight (Private, Scheduled or Non-scheduled).

XI — Incidents, observations regarding the flight (if applicable); and

XII — signature of the pilot-in-command.

- 302.3 Entries in the journey log book shall be made currently and in ink or indelible pencil.

- 302.4 The owner/operator of Thai aeroplane to which this part applies shall retain each

daily flight record for a period of 6 months after the date of the record.

**GA-P1A.303 DOCUMENTS TO BE CARRIED**

303.1 Each pilot-in-command of Thai aeroplane to which this part applies shall ensure that the following documents are carried on each flight:

- (a) The valid certificate of airworthiness; and
- (b) such documentation as will enable the pilot-in-command to record the information required. This may include items such as the operational flight plan, aeroplane technical log etc; and
- (c) the aircraft radio station licence; and
- (d) the flight crew licences of each member of the flight crew; and
- (e) essential data relating to the search and rescue facilities in the areas in which the flight will be operated including the ground-air signal codes; and
- (f) a copy of any permissions, authorisations or exemptions relevant to the flight; and
- (g) the certificate of registration for the aircraft; and
- (h) a noise certification document (if applicable); and
- (i) other documents required in para 501.3.1 (d) of chapter 5 of this part.

303.2 Before any flight is commenced the pilot-in-command shall ensure that the documents listed in para 303.1 of this Chapter are in force and will remain so for the duration of the flight.

**GA-P1A.304 CORRECTING LENSES**

304.1 Any flight crew member assessed as fit to exercise the privileges of a licence subject to the use of suitable correcting lenses, shall have a spare set of the correcting lenses readily available when exercising those privileges.

**GA-P1A.305 WEIGHT AND BALANCE**

305.1 A flight shall not be commenced unless the pilot-in-command is satisfied that the flight can be safely made in the expected flight conditions, taking account of:

- (a) gross weight of the aircraft; and
- (b) location of centre of gravity.

305.2 The pilot-in-command of Thai aeroplane to which this part applies shall ensure that any load carried is properly distributed and safely secured.

**GA-P1A.306 AIRCRAFT PERFORMANCE**

306.1 A flight shall not be commenced unless the pilot-in-command is satisfied that the flight can be safely made in the expected conditions, taking account of at least the following:

- (a) approved operating limitations contained in the Aircraft Flight Manual; and
- (b) environmental conditions, including but not limited to:
  - 1) outside air temperature; and
  - 2) pressure altitude; and
  - 3) wind component; and
- (c) aircraft configuration; and
- (d) aircraft gross weight, including landing weight at the planned destination and any planned alternate; and
- (e) use of aircraft operating systems; and
- (f) aircraft operating techniques; and
- (g) runway slope, surface and condition; and
- (h) water surface condition, current and water density where relevant; and
- (i) any other factors which may significantly affect the performance of the aircraft.

**GA-P1A.307 COMPOSITION OF FLIGHT CREW**

- 307.1 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.
- 307.2 The pilot-in-command of Thai aeroplane to which this part applies shall:
- (a) ensure that each flight crew member holds a valid licence issued by the CAAT, or if issued by another Contracting State, rendered valid by the CAAT; and
  - (b) ensure that flight crew members are properly rated; and
  - (c) be satisfied that flight crew members have maintained competency.

**GA-P1A.308 RADIO LICENCES**

- 308.1 Each pilot-in-command of Thai aeroplane to which this part applies shall ensure that where an aircraft is fitted with radio transmitting equipment, that radio transmitting equipment shall only be operated by crew members who are appropriately qualified.

**GA-P1A.309 PORTABLE ELECTRONIC DEVICES**

- 309.1 A pilot-in-command of Thai aeroplane to which this part applies shall not operate, or allow the operation, of any mobile phone or other portable electronic device that is designed to transmit electromagnetic energy, on any aircraft unless it has been determined that the portable electronic device to be used will not cause interference with any aircraft system or equipment of the aircraft on which it is used.

309.2 The prohibition in para 309.1 shall not apply to:

- (a) hearing aids; and
- (b) heart pacemakers; and
- (c) portable voice recorders; and
- (d) electric shavers; and
- (e) electronic watches.

**GA-P1A.310 FLIGHT INSTRUCTION AND TESTING**

310.1 No pilot-in-command shall give flight instruction in an aircraft, unless that aircraft is equipped with fully functioning dual control.

**GA-P1A.311 RECORDS OF EMERGENCY AND SURVIVAL EQUIPMENT CARRIED**

311.1 The owner/operator of the Thai aeroplane, or in the case where it is leased, the lessee, shall at all times have available for immediate communication to rescue coordination centre, lists containing information on the emergency and survival equipment carried on board the aeroplane. The information shall include, as applicable, the number, colour and type of life rafts and pyrotechnics, details of emergency medical supplies, water supplies and the type and frequencies of the emergency portable radio equipment.

## CHAPTER 4

### GENERAL FLIGHT REQUIREMENT

#### GA-P1A.401 FLIGHT CREW MEMBER AT DUTY STATIONS

- 401.1 During take-off and landing all flight crew members required to be on flight deck duty shall be at their stations.
- 401.2 When enroute 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.
- 401.3 All flight crew members shall keep their seat belts fastened when at their stations
- 401.4 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.

#### GA-P1A.402 CREW MEMBER AT STATIONS

- 402.1 The pilot-in-command of Thai aeroplane to which this part applies shall ensure that each crew member on duty in an aircraft during take-off and landing or when he so directs, shall:
- (a) be at their crew member station unless their absence is necessary to perform duties in connection with the operation of the aircraft; and
  - (b) have their safety belt, or harness where so equipped, fastened while at the crew member station.
- 402.2 The pilot-in-command of Thai aeroplane to which this part applies shall ensure that all flight crew members required to be on flight deck duty in an aircraft other than during take-off and landing shall remain at their stations with their safety belt fastened except when their absence is necessary for the performance of duties in connection with the operation of the aircraft or for physiological needs.

#### GA-P1A.403 OCCUPATION OF SEATS AND WEARING OF RESTRAINTS

- 403.1 Each pilot-in-command of Thai aeroplane to which this part applies shall require each person on the aeroplane to occupy a seat or berth and to fasten his safety belt, or restraining belt, or if equipped, shoulder harness or single diagonal shoulder belt:
- (a) during each take-off and landing; and
  - (b) at other times when the pilot-in-command considers it necessary for his safety.
- 403.2 Each pilot-in-command of Thai aeroplane to which this part applies shall require each passenger to place his seat in the take-off and landing configuration during take-off and landing.

- 403.3 Paragraph 403.1 (a) and (b) of this Chapter shall not apply to a child of less than 2 years of age if the child:
- (a) is held by an adult who is occupying a seat or berth, provided the child is secured by a safety belt attached to the adult's safety belt; or
  - (b) occupies a seat equipped with an approved child restraint system, if the child does not exceed the specified weight limit for that system and is accompanied by a parent, guardian, or attendant designated by the child's parent or guardian to attend to the safety of the child during the flight.

**GA-P1A.404 CARRIAGES OF BAGGAGE AND CARGO**

- 404.1 A pilot-in-command of Thai aeroplane to which this part applies shall not permit baggage or cargo to be carried in an aircraft unless it is:
- (a) stowed and restrained in accordance with any instructions given in the aircraft flight manual; and
  - (b) packaged to avoid injury to any person on board.
- 404.2 A pilot-in-command of Thai aeroplane to which this part applies shall not permit any baggage or cargo carried to:
- (a) exceed the load limitation for the seats, berths, or floor structure as prescribed by the aircraft flight manual, or by placards; or
  - (b) be located in a position that restricts the access to or use of any required emergency exit; or
  - (c) be located in a position where it may restrict access to any flight control or part of the aircraft cockpit or may restrict visibility of any flight instrument.

**GA-P1A.405 FAMILIARITY WITH OPERATING LIMITATIONS AND EMERGENCY EQUIPMENT**

- 405.1 Each crew member of an aircraft shall before beginning a flight, be familiar with:
- (a) the aircraft flight manual and operations manual for that aircraft; and
  - (b) any placards, listings, or instrument markings containing any operating limitation prescribed for that aircraft by the manufacturer; and
  - (c) the emergency equipment installed on the aircraft; and
  - (d) which crew member is assigned to operate each item of emergency equipment; and
  - (e) the procedures to be followed for the use of normal and emergency equipment in an emergency situation.

**GA-P1A.406 OPERATING IN ICING CONDITIONS**

- 406.1 A pilot-in-command of Thai aeroplane to which this part applies shall not:

- (a) operate an aircraft in conditions where ground icing is known or suspected to be present, unless the aircraft has been inspected for icing and if necessary given such de-ice and anti-ice treatment as may be required; and
- (b) perform a take-off in an aircraft that has snow, ice, or frost adhering to the wings, rotors, stabilisers, or control surfaces; and
- (c) perform a take-off in an aircraft that has snow, ice, or frost adhering to any propeller, windscreen, or powerplant installation, or to an airspeed, altimeter, rate of climb, or flight attitude instrument system, unless in accordance with para 406.2 of this Chapter; and
- (d) fly an aircraft into known or forecast icing conditions unless the aircraft is certificated and equipped for flight in the type of known icing conditions; and

406.2 A pilot-in-command of Thai aeroplane to which this part applies may only perform a take-off in an aircraft that has frost adhering to a propeller, windscreen, or powerplant installation if such action is specifically permitted by the aircraft flight manual and the take-off is performed in accordance with the aircraft flight manual procedures.

#### **GA-P1A.407 PROHIBITED, RESTRICTED AND DANGER AREAS**

407.1 No pilot-in-command shall operate an aircraft within a prohibited, restricted and danger areas unless that person is acting in accordance with notified procedures for the prohibited, restricted and danger areas.

#### **GA-P1A.408 RIGHT OF WAY**

408.1 Each pilot-in-command of Thai aeroplane to which this part applies shall:

- (a) when weather conditions permit, regardless of whether the flight is performed under IFR or under VFR, maintain a visual lookout so as to see and avoid other aircraft; and
- (b) that has the right of way, shall take such action in accordance with the Rules of the Air, including collision-avoidance manoeuvres based on resolution advisories provided by ACAS equipment, that will best avert collision but otherwise maintain heading and speed; and
- (c) that is obliged to give way to another aircraft, shall avoid passing over, under, or in front of the other aircraft, unless passing well clear of the aircraft, taking into account the effect of wake turbulence.

#### **GA-P1A.409 RADIO COMMUNICATIONS**

409.1 Each pilot-in-command of Thai aeroplane to which this part applies, when required to communicate by radio with any air traffic service shall:

- (a) do so using the phraseology and procedures in ICAO Annex 10 Vol. 2 Aeronautical Telecommunications – Communications Procedures, ICAO Doc 4444 Procedures for Air Navigation Services – Air Traffic Management and those based on the examples contained in ICAO Doc 9432 Manual of Radiotelephony; and
- (b) unless otherwise authorised by ATC, read back any of the following issued by ATC:

- (i) any clearance or instruction issued by ATC for IFR flight; and
  - (ii) any clearance to enter, land on, take-off on, cross or back-track on a runway; and
  - (iii) any altimeter pressure settings; and
- (c) acknowledge any other clearance or instruction issued by ATC.

**GA-P1A.410 COMPLIANCES WITH ATC CLEARANCES AND INSTRUCTIONS**

410.1 Each pilot-in-command of Thai aeroplane to which this part applies shall:

- (a) comply with any ATC clearance or instruction; and
- (b) when a deviation from an ATC clearance or instruction is required for the safe operation of the aircraft, notify ATC of that deviation as soon as possible; and
- (c) be responsible for the safety of that aircraft regardless of any ATC instructions that may be given.

**GA-P1A.411 OPERATIONS IN REQUIRED NAVIGATION PERFORMANCE DESIGNATED AIRSPACE**

411.1 No pilot-in-command of Thai aeroplane shall operate an aircraft in RNP designated airspace unless:

- (a) there is available in the aircraft an operations manual detailing the RNP procedures, incorporating all amendments, approved for that aircraft and aircraft navigation system; and
- (b) the operations in RNP designated airspace are performed in accordance with the procedures, instructions, and limitations in the approved manual; and
- (c) each flight crew member has adequate knowledge of, and familiarity with:
  - (i) the aircraft; and
  - (ii) the aircraft navigation system; and
  - (iii) the procedures to be used, including the applicable contingency procedures; and
- (d) the pilot-in-command has ensured that the aircraft and aircraft navigation system are both approved for RNP operations; that an Operational Approval issued by the CAAT for the corresponding RNP specification is obtained; and that the RNP can be met for the planned route and any alternate routes; and
- (e) a flight plan is submitted to the appropriate ATS unit that includes in the appropriate field of the ICAO standard flight plan:
  - (i) the letter 'R' when indicating an aircraft approved for RNP operations; and
  - (ii) the letter 'G' when indicating an aircraft equipped with an approved GNSS capability.

411.2 Each pilot-in-command of Thai aeroplane to which this part applies shall comply with all notified procedures relating to the designated RNP airspace.



**GA-P1A.412 USE OF SSR TRANSPONDER AND ALTITUDE REPORTING EQUIPMENT**

- 412.1 Where an aircraft carries a serviceable transponder the pilot-in-command shall ensure that the transponder is operated at all stages of flight, regardless of whether the aircraft is within or outside airspace where SSR is used for ATC purposes.
- 412.2 Where an aircraft carries serviceable Mode C transponder equipment, the pilot-in-command shall operate the transponder continuously in this mode, unless instructed by ATC.
- 412.3 Whenever Mode C is operated and when pilots are required to transmit level information, such level information shall be given by stating the level to the nearest full 100 ft as indicated on the pilot's altimeter.
- 412.4 Wherever Mode S is operated the aircraft identification shall be set on the transponder.
- 412.5 No pilot-in-command shall operate an aircraft with Mode S transponder equipment installed unless that aircraft has been assigned a unique Mode S address code.
- 412.6 Each pilot-in-command of Thai aeroplane to which this part applies to operating in transponder-mandatory airspace shall immediately advise the ATC unit having jurisdiction over the relevant airspace of any failure or partial failure of the transponder equipment.

**GA-P1A.413 REQUIREMENTS FOR VFR**

- 413.1 A pilot-in-command of Thai aeroplane to which this part applies shall not operate an aircraft under VFR:
- (a) when the flight visibility is less than that prescribed for the corresponding class of airspace; or
  - (b) at a distance from clouds that is less than that prescribed for the corresponding class of airspace; or
  - (c) when meteorological reports and forecasts indicate that it will not be possible, at the appropriate time, to operate the aircraft in accordance with the visual flight rules.

**GA-P1A.414 POSITION REPORTS**

- 414.1 Each pilot-in-command of Thai aeroplane to which this part applies on a VFR flight shall, when operating in controlled airspace, report the position of the aircraft to ATC at the times or reporting points required by ATC.

**GA-P1A.415 FLIGHT PLANS**

- 415.1 Each pilot-in-command of Thai aeroplane to which this part applies shall submit a flight plan to an appropriate ATS unit prior to the start of each flight under VFR that proceeds over water more than 10 nm from shore or is operating over any other remote or hazardous terrain.
- 415.2 Each pilot-in-command of Thai aeroplane to which this part applies that will be operating under IFR shall:

- (a) submit a flight plan to an appropriate ATS unit prior to each flight under IFR; and
- (b) unless otherwise authorized by ATS, submit that flight plan at least 30 minutes prior to the beginning of the flight; and
- (c) unless otherwise authorized by ATS, include the following information in the flight plan, in addition to that required by para 415.2 (b) of this Chapter:
  - (i) the wake turbulence category of the aircraft to be used; and
  - (ii) include in the navigation and approach aid equipment any applicable GPS and RNP approved equipment; and
  - (iii) the cruising speed and altitude; and
  - (iv) any other information the pilot-in-command believes necessary for ATS purposes; and
- (d) advise an ATS unit, as soon as possible, of any delay exceeding 30 minutes in beginning the flight or departing from any aerodrome of intended landing.

**GA-P1A.416 CONTINUED FLIGHT WITH REDUCED METEOROLOGICAL MINIMA**

416.1 A pilot-in-command of Thai aeroplane to which this part applies shall ensure that a flight is not continued towards an aerodrome of intended landing unless the latest available meteorological information indicates that conditions at that aerodrome, or at least one destination alternate aerodrome, will, at the estimated time of arrival, be at or above the specified aerodrome operating minima.

**GA-P1A.417 IFR RADIO COMMUNICATIONS**

417.1 Each pilot-in-command of Thai aeroplane to which this part applies that operating under IFR shall, unless otherwise authorised by ATC:

- (a) maintain a continuous listening watch on the appropriate frequency; and
- (b) report as soon as possible to an appropriate ATS unit:
  - (i) the time and altitude of passing each designated reporting point, or the reporting points or the times specified by ATC; and
  - (ii) any other information relating to the safety of the flight.

417.2 Each pilot-in-command of Thai aeroplane to which this part applies under radar control while operating under IFR shall report passing only those reporting points specifically requested by ATC.

417.3 Each pilot-in-command of Thai aeroplane to which this part applies operating under IFR within controlled airspace shall, unless otherwise authorised by ATC, report as soon as possible to the appropriate ATC unit:

- (a) on departure after take-off; and
- (b) on reaching and leaving levels assigned by ATC; and

- (c) when entering a holding pattern; and
- (d) during an instrument approach procedure, when:
  - (i) overhead the navigation aid prior to commencing a reversal turn; and
  - (ii) commencing initial approach overhead the navigation aid or fix, or established on the DME arc; and
  - (iii) commencing the turn of a reversal procedure to intercept final approach; and
  - (iv) commencing final approach; or
  - (v) established on final approach after radar vectoring.

**GA-P1A.418 AEROPLANCE COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT**

**418.1 Communication equipment**

418.1.1 A Thai 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 para 418.1.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.*

418.1.2 When compliance with para 418.1.1 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.

418.1.3 A Thai 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.

418.1.4 A Thai aeroplane to be operated on a flight to which the provisions of Chapter 5 GA-P1A.503 para 503.3.1 or GA-P1A.504 para 504.1 of this part, 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.

418.1.5 The radio communication equipment required in accordance with para 418.1.1 to 418.1.4 of this chapter shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

418.1.6 For operations where communication equipment is required to meet a required communication performance (RCP) specification for performance-based communication (PBC), an aeroplane shall, in addition to the requirements specified in para 418.1.1 to 418.1.5 of this chapter:

- (a) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s);
- (b) 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 CAAT; and
- (c) where the aeroplane is operated in accordance with a MEL, have information relevant to the aeroplane RCP specification capabilities included in the MEL.

418.1.7 For operations where communication is required to meet an RCP specification for PBC, the following shall be established and documented by the operator/owner:

- (a) normal and abnormal procedures, including contingency procedures;
- (b) flight crew qualification and proficiency requirements, in accordance with the appropriate RCP specifications;
- (c) a training programme for relevant personnel consistent with the intended operations; and
- (d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RCP specifications.

*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 (Doc9869), which is expected to be published by ICAO in November 2016.*

418.1.8 In respect of those aeroplanes mentioned in para 418.1.6 of this chapter, the owner/operator shall ensure adequate provisions exist for:

- (a) submitting the reports to the CAAT regarding observed communication performance issued by monitoring programmes established in accordance with ICAO Annex 11, Chapter 3, 3.3.5.2 to the International Convention on Civil Aviation; and
- (b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RCP specification.

## 418.2 **Navigation equipment**

418.2.1 A flight shall not be commenced unless the aeroplane is provided with navigation equipment which will enable it to proceed:

- (a) in accordance with its flight plan; and
- (b) 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.

418.2.2 For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, an aeroplane shall, in addition to the requirements specified in para 418.2.1 of this chapter:

- (a) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specifications;
- (b) 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 CAAT; and
- (c) 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 ICAO Performance-based Navigation (PBN) Manual (Doc 9613).*

418.2.3 For operations where a navigation specification for PBN has been prescribed, the following shall be established and documented by the operator/owner:

- (a) normal and abnormal procedures including contingency procedures;
- (b) flight crew qualification and proficiency requirements in accordance with the appropriate navigation specifications;
- (c) training for relevant personnel consistent with the intended operations; and
- (d) 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 the Annex 19 to the International Convention on Civil Aviation, are contained in the ICAO Performance-based Navigation (PBN) Operational Approval Manual (Doc 9997).*

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

418.2.4 The CAAT 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 (ICAO Doc 9997).*

418.2.5 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:

- (a) 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
- (b) has been authorized by the State of Registry 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).*

418.2.6 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, shall not be commenced unless the aeroplane:

- (a) 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  $\pm 90$  m (300 ft); and
  - (iv) automatically reporting pressure-altitude;
- (b) shall be authorized by the CAAT for operation in the airspace concerned; and
- (c) shall demonstrate a vertical navigation performance in accordance with Appendix E.

418.2.7 Prior to granting the RVSM approval required in accordance with para 418.2.6 (b), A Thai aeroplane to which this chapter applies shall:

- (a) ensure that the vertical navigation performance capability of the aeroplane satisfies the requirements specified in Appendix E;
- (b) instituted appropriate procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; and
- (c) instituted appropriate flight crew procedures for operations in RVSM airspace.

*Note.*— *An RVSM 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.*

418.2.8 In respect of those aeroplanes mentioned in para 418.2.6, the owner/operator shall ensure adequate provisions exist for:

- (a) receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with ICAO Annex 11 , 3.3.5.1 to the International Civil Aviation; and
- (b) 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.

418.2.9 The owner/operator of Thai aeroplane to which this part applies 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 the Annex 11, Chapter 3, 3.3.5.2 to the International Convention on Civil Aviation, may be used to satisfy the requirement.*

- 418.2.10 The owners/operators of Thai aeroplane to which this part applies 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 approval.

*Note 1.— These provisions and procedures need to address both the situation where the aircraft in question was operating without 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 approval in the airspace of another State.*

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

- 418.2.11 The Thai aeroplane to which this part applies 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 para 418.2.1 and where applicable para 418.2.2, 418.2.5 and 418.2.6 of this chapter.

*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 a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574).*

- 418.2.12 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.

### **418.3 Surveillance equipment**

- 418.3.1 An aeroplane shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services.

- 418.3.2 For operations where surveillance equipment is required to meet a required surveillance performance (RSP) specification for performance-based surveillance (PBS), an aeroplane shall, in addition to the requirements specified in para 418.3.1:

- (a) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specifications;
- (b) have information relevant to the aeroplane RSP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of the Design or the CAAT; and
- (c) 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).*

418.3.3 For operations where surveillance is required to meet an RSP specification for the prescribed PBS, the following shall be established and documented by the operator/owner:

- (a) normal and abnormal procedures, including contingency procedures;
- (b) flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;
- (c) a training programme for relevant personnel consistent with the intended operations; and
- (d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RSP specifications.

*Note: Further 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), which is expected to be published by ICAO in November 2016.*

418.3.4 In respect of those aeroplanes mentioned in para 418.3.2, the owner/operator shall ensure adequate provisions exist for:

- (a) submitting the reports to the CAAT regarding observed surveillance performance issued by monitoring programmes established in accordance with the ICAO Annex 11, Chapter 3, 3.3.5.2 to the International Convention on Civil Aviation; and
- (b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RSP specification(s).



## CHAPTER 5

### AEROPLANES INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

#### GA-P1A.501 ALL AEROPLANE ON ALL FLIGHTS

##### 501.1 General

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, in aeroplanes according to the aeroplane used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be accepted by the CAAT.

##### 501.2 Instruments

A Thai aeroplane shall be equipped with instruments which will enable the flight crew to control the flight path of the aeroplane, carry out any required procedural manoeuvre, and observe the operating limitations of the aeroplane in the expected operating conditions.

##### 501.3 Equipment

501.3.1 A Thai aeroplane shall be equipped with or carry on board:

- (a) an accessible first-aid kit;
- (b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the aeroplane. At least one shall be located in:
  - 1) the pilot's compartment; and
  - 2) each passenger compartment that is separate from the pilot's compartment and that is not readily accessible to the flight crew;

*Note.— Refer to 501.3.2 for fire extinguishing agents.*

- (c)
  - 1) a seat or berth for each person over an age of two years; and
  - 2) a seat belt for each seat and restraining belts for each berth;
  - 3) a safety harness for each flight crew seat.

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

- (d) the following manuals, charts and information:
  - 1) the flight manual or other documents or information concerning any operating limitations prescribed for the aeroplane by the CAAT or Manufacturer, required for the application in accordance with Chapter 6 of this part.
  - 2) any specific approval issued by the CAAT, if applicable, for the operation(s) to be

conducted;

- 3) current and suitable charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;
- 4) procedures for pilots-in-command of intercepted aircraft;
- 5) a list of visual signals for use by intercepting and intercepted aircraft, as prescribed in Regulation of the Civil Aviation Board No.94 on Rule of the Air;
- 6) the journey log book for the aeroplane; and
- 7) other documents prescribed for the aeroplane by the CAAT.

(e) where the aeroplane is fitted with fuses that are accessible in flight, spare electrical fuses of appropriate ratings for replacement of those fuses.

(f) ground-air signal codes for search and rescue purposes.

501.3.2 Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in an aeroplane 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 aeroplane for which the individual certificate of airworthiness is first issued on or after 31 December 2018 shall not be of a type listed in the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as it appears in the Eighth Edition of the Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer, Annex A, Group II.

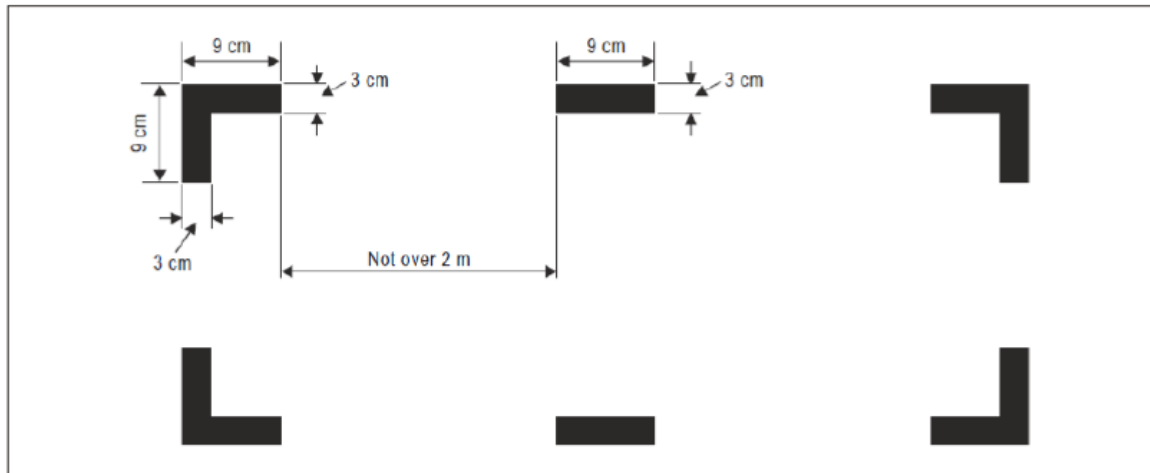
*Note.— Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.*

#### 501.4 **Marking of break-in points**

501.4.1 If areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on an aeroplane, such areas shall be marked as shown below (see figure following). The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.

501.4.2 If the corner markings are more than 2 m apart, intermediate lines 9 cm × 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

*Note.* –This Standard does not require any aeroplane to have break-in areas.



Marking of Break-In Points

**GA-P1A.502 ALL AEROPLANE OPERATED AS VFR FLIGHT**

502.1 All aeroplane when operated as VFR flights shall be:

- (a) equipped with a means of measuring and displaying:
  - 1) magnetic heading;
  - 2) barometric altitude;
  - 3) indicated airspeed;
- (b) equipped with, or shall carry, a means of measuring and displaying time in hours, minutes and seconds; and
- (c) equipped with such additional equipment as may be prescribed by the CAAT.

502.2 VFR flight which are operated as controlled flights should be equipped in accordance with GA-P1A.506, para 506.1.

**GA-P1A.503 AEROPLANE ON FLIGHT OVER WATER**

503.1 *Seaplanes.* Seaplanes for all flights shall be equipped with:

- (a) one life jacket, or equivalent individual floatation device, for each person on board, stowed in a position readily accessible from the seat or berth;
- (b) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable;
- (c) one anchor; and
- (d) one sea anchor (drogue), when necessary to assist in manoeuvring.

*Note.- 'Seaplanes' includes amphibians operated as seaplanes.*

503.2 **Landplanes.** All single-engine landplanes:

- (a) when flying en-route over water beyond gliding distance from the shore; or
- (b) 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;

shall 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.- 'Landlanes' includes amphibians operated as landplanes.*

503.3 **Aeroplane on extended flight over water**

503.3.1 All aeroplane operated on extended flights over water shall be equipped with, at a minimum, 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.

503.3.2 The pilot-in-command of an aeroplane operated on an extended flight over water shall determine the risks to survival of the occupants of the aeroplane in the event of a ditching. The pilot-in-command shall take into account the operating environment and conditions such as, but not limited to, sea state and sea and air temperatures, the distance from land suitable for making an emergency landing, and the availability of search and rescue facilities. Based upon the assessment of the risks, the PIC shall, in addition to the equipment required in para 503.3.1, ensure that the aeroplane is equipped with:

- (a) 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
- (b) equipment for making the distress signal described in Regulation of Civil Aviation Board No. 94 on Rule of the Air.

**GA-P1A.504 AEROPLANES ON FLIGHT OVER DESIGNATED LAND AREAS**

504.1 An aeroplane, when operated across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, shall be equipped with such signaling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

**GA-P1A.505 AEROPLANES ON HIGH ALTITUDE FLIGHTS**

505.1 Aeroplane intended to be operated at high altitudes shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies as required in accordance with GA-P1A.203, para 203.9.

505.2 Pressurized aeroplanes shall not be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa unless it is equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

**GA-P1A.506 ALL AEROPLANES OPERATED IN ACCORDANCE WITH THE INSTRUMENT FLIGHT RULES**

506.1 All aeroplanes when operated in accordance with the instrument flight rules, or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be:

- (a) equipped with a means of measuring and displaying:
  - 1) magnetic heading (standby compass);
  - 2) barometric altitude;
  - 3) indicated airspeed, with a means of preventing malfunctioning due to either condensation or icing;
  - 4) turn and slip;
  - 5) aircraft attitude;
  - 6) stabilized aircraft heading;  
*Note.- The requirements of 4), 5), and 6) may be met by combinations of instruments or by integrated flight director systems provided that the safeguards against total failure, inherent in the three separate instruments, are retained.*
  - 7) whether the supply of power to the gyroscopic instruments is adequate;
  - 8) the outside air temperature;
  - 9) rate-of-climb and descent;
- (b) equipped with, or shall carry, a means of measuring and displaying time in hours, minutes and seconds; and
- (c) equipped with such additional instruments or equipment as may be prescribed by the CAAT.

**GA-P1A.507 AEROPLANE WHEN OPERATED AT NIGHT**

507.1 An aeroplane, when operated at night, shall be equipped with:

- (a) the equipment specified in GA-P1A.506; and
- (b) the lights required by Regulation of Civil Aviation Board No. 94, for aeroplane in flight or operating on the movement area of an aerodrome;
- (c) a landing light;
- (d) illumination for all flight instruments and equipment that are essential for the safe operation of the aeroplane that are used by the flight crew;
- (e) light in all passenger compartments; and
- (f) an independent portable light for each crew member station.

**GA-P1A.508 AEROPLANES COMPLYING WITH THE NOISE CERTIFICATION STANDARDS IN ANNEX 16, VOLUME I**

508.1 An aeroplane shall carry a document attesting noise certification.

*Note.- The attestation may be contained in any document, carried on board, approved by the CAAT.*

**GA-P1A.509 MACH NUMBER INDICATOR**

An aeroplane with speed limitations expressed in terms of Mach number shall be equipped with a means of displaying Mach number.

**GA-P1A.510 AEROPLANE REQUIRED TO BE EQUIPPED WITH GROUND PROXIMITY WARNING SYSTEMS (GPWS)**

510.1 All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700kg or authorized to carry than nine passengers shall be equipped with a ground proximit warning system which has a forward-looking terrain avoidance function.

510.2 A ground proximity warning system shall provide automatically a timely and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface.

510.3 A ground proximity warning system shall provide, at a minimum, warnings of at least the following circumstances:

- (a) excessive descent rate;
- (b) excessive altitude loss after take-off or go-around; and
- (c) unsafe terrain clearance.

510.4 A ground proximity warning system installed in turcine – engine aeroplanes of a maximum certificate take-off mass in excessding of 5 700kg or authorized to carry more than nine passengers for which the individual certificate of airworthiness was first issued after 1 January 2011 shall provide, as a minimum, warning of at least the following circumstances:

- (a) excessive descent rate
- (b) excessive terrain closure rate
- (c) excessive altitude loss after take-off or go-around
- (d) unsafe terrain clearance while not in landing configuration
  - 1) gear not locked down
  - 2) flaps not in a landing position; and
- (e) excessive decent below the instrument glide path.

#### **GA-P1A.511 EMERGENCY LOCATOR TRANSMITTER (ELT)**

- 511.1 Except as provided for in para 511.2, all aeroplanes shall be equipped with at least one ELT of any type.
- 511.2 All aeroplane for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with at least one automatic ELT.
- 511.3 All aeroplane shall carry an automatic emergency locator transmitter (ELT) that operated simultaneously on 406 MHz and 121.5 MHz.
- 511.4 ELT equipment carried to satisfy the requirements of para 511.1, 511.2 and 511.3 shall operate in accordance with the relevant provision of Volume III to Annex 10 to the Convention on International Civil Aviation.

#### **GA-P1A.512 AEROPLANE REQUIRED TO BE EQUIPPED WITH A PRESSURE-ALTITUDE REPORTING TRANSPONDER**

- 512.1 All aeroplane shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provision of volume IV to the Annex 10 to the Convention on International Civil Aviation.
- 512.2 Unless exempted by the appropriate authorities, aeroplanes operating as VFR flights shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provision of Annex 10, Volume IV to the Convention on International Civil Aviation.

*Note.- These provisions are intended to support the effectiveness of ACAS as well as to improve the effectiveness of air traffic services.*

#### **GA-P1A.513 MICROPHONES**

When operating under the instrument flight rules all flight crew members required to be on flight deck duty should communicate through boom or throat microphones below the transition level/altitude.

#### **GA-P1A.514 FLIGHT RECORDERS**

*Note 1.— Crash protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.*

*Note 2.— Lightweight flight recorders comprise one or more of the following systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS), a data link recording system (DLRS). Image and data link information may be recorded on either the CARS or the ADRS.*

*Note 3.— Detailed guidance on flight recorders is contained in Appendix K.*

#### **514.1 Flight data recorders and aircraft data recording systems**

*Note.— Parameters to be recorded are listed in Tables K-1 and K-3 of Appendix K.*

#### 514.1.1 **Applicability**

- (a) All turbine-engined aeroplane with a seating configuration of more than five passenger seats and 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 2016 shall be equipped with:
- 1) an FDR which shall record at least the first 16 parameters in Table K-1 of Appendix K; or
  - 2) a Class C AIR or AIRS which shall record at least the flight path and speed parameters displayed to the pilot(s), as defined in 2.2.2 of Appendix K; or
  - 3) an ADRS which shall record at least the first 7 parameters listed in Table K-3 of Appendix K.

*Note.- AIR or AIRS classification is defined in 4.1 of Appendix K.*

- (b) 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 K-1 of Appendix K.
- (c) 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 K-1 of Appendix K.

#### 514.1.2 **Recording technology**

FDRs, ADRS, AIRs or AIRS shall not use engraving metal foil, frequency modulation (FM), photographic film or magnetic tape.

#### 514.1.3 **Duration**

All FDRs shall retain the information recorded during at least the last 25 hours of their operation.

### **514.2 Cockpit voice recorders and cockpit audio recording systems**

#### 514.2.1 **Applicability**

All turbine-engined aeroplane with a seating configuration of more than five passenger seats and a maximum certificated take-off mass of over 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 shall be equipped with either a CVR or a CARS

#### 514.2.2 **Recording technology**

CVRs and CARS shall not use magnetic tape or wire.



### 514.2.3 **Duration**

All CVRs shall retain the information recorded during at least the last 2 hours of their operation.

## 514.3 **Data link recorders**

### 514.3.1 **Applicability**

- (a) All aeroplanes 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 para 5.1.2 of Appendix K, and are required to carry a CVR, shall record on a crash-protected flight recorder all data link communications messages.
- (b) All aeroplanes which are modified on or after 1 January 2016, to install and utilize any of the data link communications applications listed in para 5.1.2 of the Appendix K and are required to carry a CVR, shall record on a crashprotected flight recorder the data link communications messages.

*Note 1.— Data link communications are currently conducted by either ATNbased 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 prohibitively expensive to record those data link communications applications messages on FDR or CVR.*

### 514.3.2 **Duration**

The minimum recording duration shall be equal to the duration of the CVR.

### 514.3.3 **Correlation**

Data link recording shall be able to be correlated to the recorded cockpit audio.

## 514.4 **Flight recorders — general**

### 514.4.1 **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.

### 514.4.2 **Operation**

- (a) Flight recorders shall not be switched off during flight time.
- (b) 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 prescribed by the aircraft accident investigation committee of thailand.

*Note 1.— The need for removal of the flight recorder records from the aircraft will be determined by the aircraft accident investigation committee of Thailand 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/owner's responsibilities regarding the retention of flight recorder records are contained in paragraph 514.4.3.*

#### 514.4.3 **Flight recorder records**

The pilot-in-command, and/or the owner/operator, shall ensure, to the extent possible, in the event the aeroplane 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.

#### 514.4.4 **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 K.*

### **GA-P1A.515 Electronic Flight Bags (EFBs)**

*Note.— Guidance on EFB equipment, functions and establishing criteria for their operational use is contained in the CAAT Guidance Material for Electronic Flight Bags.*

#### 515.1 **EFB equipment**

Where portable EFBs are used on board an aeroplane, the pilot-in-command and/or the operator/owner shall ensure that they do not affect the performance of the aeroplane systems, equipment or the ability to operate the aeroplane.

#### 515.2 **EFB functions**

515.2.1 Where EFBs are used on board an aeroplane the pilot-in-command and/or the owner/operator shall:

- (a) assess the safety risk(s) associated with each EFB function;
- (b) establish the procedures for the use of, and training requirements for, the device and each EFB function; and
- (c) 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 CAAT Guidance Material for Safety Management System.*

**515.3 EFB operational criteria**

515.3.1 The operational criteria for the use of EFBs are as follows:

- (a) the EFB equipment and its associated installation hardware, including interaction with aeroplane systems if applicable, meet the appropriate airworthiness certification requirements;
- (b) the operator/owner has assessed the risks associated with the operations supported by the EFB function(s);
- (c) the operator/owner has established requirements for redundancy of the information (if appropriate) contained in and displayed by the EFB function(s);
- (d) the operator/owner has established and documented procedures for the management of the EFB function(s) including any databases it may use; and
- (e) the operator/owner has established and documented the procedures for the use of, and training requirements for, the EFB function(s).

*Note.—Guidance on safety risk assessments is contained in the CAAT Guidance Material for Safety Management System.*

## CHAPTER 6

### AEROPLANE PERFORMANCE OPERATING LIMITATIONS

#### GA-P1A.601 GENERAL

- 601.1 A Thai aeroplane to which this part applies shall be operated:
- (a) in compliance with the terms of its airworthiness certificate or equivalent approved document;
  - (b) within the operating limitations prescribed by the CAAT; and
  - (c) if applicable, within the mass limitations imposed by compliance with the applicable Noise Certification Standards in Annex 16, Volume I, unless otherwise authorized in exceptional circumstances for a certain aerodrome or runway where there is no noise disturbance program, by the CAAT.
- 601.2 Placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed by the CAAT for visual presentation, shall be displayed in the aeroplane.
- 601.3 The pilot-in-command shall determine that aeroplane performance will permit the take-off and departure to be carried out safely.

## CHAPTER 7

### AEROPLANE FLIGHT CREW

#### GA-P1A.701 COMPOSITION OF THE FLIGHT CREW

701.1 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.

701.2 The Pilot-in-command of Thai aeroplane to which this part applies shall:

- (a) ensure that each flight crew member holds a valid licence issued by the CAAT, or if issued by another Contracting State, rendered valid by the CAAT;
- (b) ensure that flight crew members are properly rated; and
- (d) be satisfied that flight crew members have maintained competency; and
- (d) ensure that when passengers are to be carried at night, he shall have carried out within a period of six months immediately preceding the date of the intended flight not less than ten take-offs and ten landings by night as PIC as applicable.

701.3 The pilot-in-command of Thai aeroplane 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.

#### GA-P1A.702 QUALIFICATIONS

702.1 The pilot-in-command of Thai aeroplane to which this part applies shall:

- (a) ensure that each flight crew member holds a valid licence issued by the CAAT, or if issued by another Contracting State, rendered valid by the CAAT;
- (b) ensure that flight crew members are properly rated; and
- (c) be satisfied that flight crew members have maintained competency.

702.2 The pilot-in-command of an aeroplane 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 A 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:*

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

- (b) *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*
- (c) *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.*

## **CHAPTER 8**

### **SECURITY**

#### **GA-P1A.801 SECURITY OF AIRCRAFT**

801.1 The pilot-in-command of Thai aeroplane to which this part applies shall be responsible for the security of the aircraft during its operation.

#### **GA-P1A.802 REPORTING OF UNLAWFUL INTERFERENCE**

802.1 Following an act of unlawful interference, the pilot-in-command of Thai aeroplane to which this part applies shall submit a report of such an act to the designated local authority.

*Note:- In the context of this Chapter, the work “security” is used in the sense of prevention of acts unlawful interference against civil aviation.*

## CHAPTER 9

### AEROPLANES EQUIPPED WITH AUTOMATIC LANDING SYSTEMS, HUD OR EQUIVALENT DISPLAYS, SVS OR CVS

#### GA-P1A.901 OPERATIONAL CRITERIA

901.1 In establishing operational criteria for operations with aeroplanes equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, operator/owner shall demonstrate to the CAAT that:

- (a) the equipment meets the appropriate airworthiness certification requirements;
- (b) the operator/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;
- (c) the operator/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) (Doc 9859).*

*Note 2: Guidance on establishing operational criteria is contained in Appendix L.*

#### 901.2 Instrument approach operations

901.2.1 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:

- (a) Type A: a minimum descent height or decision height at or above 75 m (250 ft); and
- (b) Type B: a decision height below 75 m (250 ft). Type B instrument approach operations are categorized as:
  - 1) **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;
  - 2) **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;
  - 3) **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;
  - 4) **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
  - 5) **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).*

901.2.2 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.*

901.2.3 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.

## CHAPTER 10

### AEROPLANE CONTINUING AIRWORTHINESS

*Note.- For the purpose of this chapter 'aeroplane' includes: engines, propellers, components, accessories, instruments, equipment and apparatus including emergency equipment.*

#### **GA-PIA.1001 OWNER'S CONTINUING AIRWORTHINESS RESPONSIBILITIES**

1001.1 The owner/operator of Thai aeroplane to which this part applies or in the case where it is leased, the lessee, shall ensure that, in accordance with procedures acceptable to the CAAT:

- (a) the aeroplane is maintenance in an airwothy condition;
- (b) the operational and emergency equipment necessary for an intended flight is serviceable; and
- (c) the certificate of airworthiness of the aeroplane remains valid..

1001.2 The owner/operator of Thai aeroplane shall not operate an aeroplane unless maintenance on the aeroplane, including any associated engine, propeller and part, is carried out:

- (a) by an organization complying with Annoucement of the CAAT on Repair station approval that is either approved by the CAAT or is approved by another Contracting State and is accepted by the CAAT; or
- (b) by a person or organization in accordance with procedures that are authorized by the CAAT;

and there is a maintenance release in relation to the maintenance carried out.

1001.3 The owner/operator of Thai aeroplane to which this part applies or the lessee shall ensure that the maintenance of the aeroplane is performed in accordance with a maintenance programme acceptable to the CAAT.

1001.4 As of 5 November 2020, The owner/operator of Thai aeroplane to which this part applies or the lessee shall appoint a person or an organization accepted by CAAT that is responsible for ensuring that appropriate arrangements (commensurate with the number, type and complexity of the aircraft and the type of operations) are in place for continuing airworthiness management..

#### **GA-PIA.1002 CONTINUING AIRWORTHINESS RECORDS**

1002.1 The owner/operator of Thai aeroplane to which this part applies or in case where it is leased, the lessee, shall ensure that the following records are kept for the periods mentioned in para 1002.2:

- (a) the total time in service (hour, calendar time and cycles, as appropriate) of the aeroplane and all life-limited components;
- (b) the current status of complicance with all applicable mandatory continuing airworthiness information;

- (c) appropriate details of modification and repairs;
  - (d) the time in service (hour, calendar time and cycles, as appropriate) since the last overhaul of the aeroplane or its components subject to a mandatory overhaul life;
  - (e) the current status of the aeroplane's compliance with the maintenance programme; and
  - (f) the detailed maintenance records to show all requirements for the signing of a maintenance release have been met.
- 1002.2 the records in para 1002.1 (a) and (e) shall be kept for a minimum period of 90 days after the unit to which they refer has been permanently withdrawn from services, and the records in para 1002.1 (f) for a minimum period of two years after the signing of the maintenance release in accordance with the requirement contained in Announcement of the CAAT on Maintenance, Preventive Maintenance, Rebuilding and Alteration.
- 1002.3 In the event of a temporary change of owner or lessee, the records shall be made available to the new owner/operator or lessee. In the event of any permanent change of owner/operator or lessee, the records shall be transferred to the new owner/operator or lessee.
- 1002.4 As of 5 November 2020, records kept and transferred in accordance with GA-P1A.1002 shall be maintained in a form and format that ensures readability, security and integrity of the records at all times.

*Note — The form and format of the records may include, for example, paper records, film records, electronic records or any combination thereof.*

### **GA-P1A.1003 MODIFICATIONS AND REPAIRS**

- 1003.1 All modifications and repairs shall comply with the requirements contained in Announcement of the CAAT on Air Operator Certificate Requirements (AOCR), Chapter 8, and Announcement of the CAAT on Maintenance, Preventive Maintenance, Rebuilding and Alteration.

### **GA-P1A.1004 MAINTENANCE RELEASE**

- 1004.1 A maintenance release shall be completed and signed to certify that the maintenance work performed has been completed satisfactorily and in accordance with data and procedure in accordance with the requirements contained in Announcement of the CAAT on Repair Station Approval and Announcement of the CAAT on Maintenance, Preventive Maintenance, Rebuilding and Alteration.
- 1004.2 A maintenance release shall contain a certification including:
- (a) basic details of the maintenance performed;
  - (b) the date such maintenance was completed;
  - (c) when applicable, the identity of the approved maintenance organization; and
  - (d) the identity of the authorized person or persons signing the release.

As detailed in accordance with the requirement contained in Announcement of the CAAT on Repair

Station Approval and Announcement of the CAAT on Maintenance, Preventive Maintenance, Rebuilding and Alteration.

**GA-P1A.1005 CONTINUING AIRWORTHINESS INFORMATION**

1005.1 An owner/operator of Thai aeroplane shall, submit a written report on the occurrences of faults, malfunctions, defects or other occurrences that cause or might cause adverse effects on the continuing airworthiness of the aircraft concerning but not limited to the occurrence or detection of each failure, malfunction, or defect contained in Announcement of CAAT subject: Service Difficulty Reporting System, within 72 hours of the occurrence, to the CAAT.

1005.2 Such reports as detailed in para 1005.1 may be transmitted by any method i.e. electronically (email: [safetyreport@caat.or.th](mailto:safetyreport@caat.or.th)), by post or by facsimile. Each report should contain at least the following information in accordance with Announcement of CAAT subject: Service Difficulty Reporting System.

**GA-P1A.1006 ALTIMETER SYSTEM AND ALTITUDE REPORTING EQUIPMENT TESTS AND INSPECTIONS**

1006.1 No person may operate an aeroplane, in controlled airspace under IFR unless—

- 1) Within the preceding 36 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 appendices D and E of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration;
- 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 in accordance with paragraph (a), appendix D, of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration; and
- 3) Following installation or maintenance on the automatic pressure altitude reporting system of the ATC transponder where data correspondence error could be introduced, the integrated system has been tested, inspected, and found to comply in accordance with paragraph (c), appendix D, of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration.

1006.2 The tests required by para 1006.1 of this section must be conducted by—

- 1) The manufacturer of the aeroplane, 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 mechanical instruments;
  - (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, to be tested; or
  - 3) A certificated mechanic with an airframe rating (static pressure system tests and inspections only).
- 1006.3 Altimeter and altitude reporting equipment approved under Technical Standard Orders are considered to be tested and inspected as of the date of their manufacture.
- 1006.4 No person may operate an aeroplane, in controlled airspace under IFR at an altitude above the maximum altitude at which all altimeters and the automatic altitude reporting system of that aeroplane, have been tested.

**GA-P1A.1007 ATC TRANSPONDER TESTS AND INSPECTIONS**

- 1007.1 No persons may use an ATC transponder unless, within the preceding 36 calendar months, the ATC transponder has been tested and inspected and found to comply in accordance with appendix E of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration; and
- 1007.2 Following any installation or maintenance on an ATC transponder where data correspondence error could be introduced, the integrated system has been tested, inspected, and found to comply in accordance with paragraph (c), appendix D of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration.
- 1007.3 The tests and inspections specified in para 1007.1, 1007.2 must be conducted by—
- 1) A certificated repair station properly equipped to perform those functions and holding—
    - (i) A radio rating, Class radar equipment;
    - (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;
  - 2) The manufacturer of the aircraft on which the transponder to be tested is installed, if the transponder was installed by that manufacturer.

## PART II

# LARGE AND TURBOJET AEROPLANE OPERATIONS

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

### CHAPTER 1

#### GENERAL

#### **GA-P2A.101 APPLICABILITY**

101.1 The following operations shall be subject to the requirements of Part II, and those of Part I, General aviation operations with:

- (a) aeroplane with a maximum certificated take-off weight exceeding 5,700 kg; or
- (b) aeroplane certificated for a maximum seating configuration of more than nine; or
- (c) aeroplane equipped with one or more turbojet engine.

**Except** for those flights operated in accordance with the terms of:-

- a) the AOC by a holder of such certificate granted in accordance with Regulation of Civil Aviation Board No.85 and Air Operator Certificate Requirements which is required to upkeep a general standard equivalent to those maintained by an AOC holder; or
- b) for flights operated by military services, police services and other government services as specified in the Ministerial Regulations.

The above applicability does not preclude a general aviation operator from satisfying the requirements of Part II where it may be to the operator's advantage or in the interest of safety.

#### **GA-P2A.102 COMPLIANCE WITH LAWS, REGULATIONS AND PROCEDURES**

102.1 An owner/operator of Thai aeroplane to which this part applies 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 ICAO Doc 8168 Procedures for Air Navigation Service Aircraft Operations (PANS-OPS), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS, 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.*

- 102.2 An owner/operator of Thai aeroplane to which this part applies 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 pilot-in-command 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.
- 102.3 The pilot-in-command of Thai aeroplane to which this part applies 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.
- 102.4 An owner/operator of Thai aeroplane to which this part applies shall ensure that the pilot-in-command has available on board the aeroplane all the essential information concerning the search and rescue services in the area over which the aeroplane will be flown. This information may be made available to the pilot by means of the operations manual or such other means as is considered appropriate.
- 102.5 An owner/operator of Thai aeroplane to which this part applies shall ensure that flight crew members demonstrate the ability to speak and understand the language used for aeronautical radiotelephony communications as specified in ICAO Annex 1.

#### **GA-P2A.103 SAFETY MANAGEMENT SYSTEM**

- 103.1 An Owner/Operator of Thai aeroplane to which this part applies wish to use an aeroplane for general aviation operations shall establish and maintain a safety management system that is appropriate to the size and complexity of the operation.

*Note 1: The provision on safety management systems is contained in Annex 19 the Safety Management Manual (SMM) (Doc 9859) and industry codes of practices.*

#### **GA-P2A.104 SPECIFIC APPROVAL**

- 104.1 The pilot-in-command shall not conduct operations for which a specific approval is required unless such approval has been issued by the CAAT.
- 104.2 An owner/operator of Thai aeroplane to which this part applies wish to apply specific approval shall comply in accordance with GA-P1A.109, GA-P1A.110 and GA-P1A.111.

#### **GA-P2A.105 CARRIAGE OF DANGEROUS GOODS**

- 105.1 An owner/operator of Thai aeroplane to which this part applies wish to carried of dangerous goods on board of aeroplane shall comply in accordance with GA-P1A.106.

## CHAPTER 2

### OPERATIONAL REQUIREMENTS

#### GA-P2A.201 ORGANISATIONAL STRUCTURE

- 201.1 The owner/operator of Thai aeroplane to which this part applies shall:
- (a) establish an organisation capable of managing the safe operation of its aircraft; and
  - (b) clearly define the duties and accountabilities of those staff responsible for managing the safe operation of aircraft.

#### GA-P2A.202 OPERATIONAL CONTROL

- 202.1 Each owner/operator of Thai aeroplane to which this part applies shall ensure that the system for operational control of the aircraft is clearly defined, including the duties and accountabilities of all personnel involved.
- 202.2 Where contracted and sub-contract staff are used by the operator to carry out functions that relate to the safety of aircraft, the operator shall ensure that the relevant duties and accountabilities of those staff are clearly defined by the operator. The owner/operator shall also ensure that the responsibilities of any contracting organisation and their staff are clearly defined and confirmed within the contract or agreement.
- 202.3 The operational control system used by the operator shall recognize the legal responsibility of the pilot-in-command for the operational control of the aircraft.

#### GA-P2A.203 STANDARD OPERATING PROCEDURES

- 203.1 The operator of Thai aeroplane to which this part applies shall provide standard operating procedures for the use of aircraft crew and operations staff for every aircraft type operated.
- 203.2 The standard operating procedures shall contain the normal, abnormal and emergency procedures relating to the operation of aircraft.
- 203.3 Standard operating procedures shall be consistent with the aircraft flight manual and the aircraft checklists to be used.
- 203.4 Standard operating procedures shall take account of human factor principles.



## CHAPTER 3

### FLIGHT OPERATIONS

#### **GA-P2A.301 OPERATING FACILITIES**

- 301.1 An owner/operator of Thai aeroplane to which this part 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.

*Note.* — “Reasonable means” in this Standard is intended to denote the use, at the point of departure, of information available to the operator either through official information published by the aeronautical information services or readily obtainable from other sources.

#### **GA-P2A.302 OPERATIONAL MANAGEMENT**

##### **302.1 Operator notification**

- 302.1.1 If an owner/operator of Thai aeroplane to which this part has an operating base in a State other than Thailand, the owner/operator shall notify the CAAT in which the operating base is located.
- 302.1.2 Upon notification in accordance with para 302.1.1 , safety and security oversight shall be coordinated between the State in which the operating base is located and CAAT.

##### **302.2 Operations manual**

- 302.2.1 Each Owner/operator of Thai aeroplane to which this part shall provide an operations manual containing all the instructions and information necessary for operations personnel to perform their duties.
- 302.2.2 The Owner/operator of Thai aeroplane to which this part shall ensure that all staff members have ready access to the operations manual, or to those parts of the operations manual that relate to their duties.
- 302.2.3 The Owner/operator of Thai aeroplane to which this part shall ensure that the operations manual is kept up to date in a timely manner
- 302.2.4 Amendments and revisions shall be issued to all staff members required to use the Manual.
- 302.2.5 The operations manual shall normally include at least the following details in Appendix C.
- 302.2.6 The CAAT may consider any documentation incorporating the above elements as equivalent to operations manual.

##### **302.3 Operating instructions**

- 302.3.1 An owner/operator of Thai aeroplane to which this part shall:

- (a) 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;
- (b) ensure that when passengers are being carried, no emergency or abnormal situations shall be simulated;
- (c) specify, for flights that are to be conducted in accordance with the instrument flight rules, the method of establishing terrain clearance altitudes;
- (d) 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;
- (e) establish and implement a fatigue management programme that ensures that all operator personnel involved in the operation and maintenance of aircraft do not carry out their duties when fatigued. The programme shall address flight and duty times and be included in the operations manual;

*Note.—Guidance on fatigue management programmes can be found in the Fatigue Management Manual for General Aviation (Doc 10033).*

- (f) ensure that passengers are made familiar with the location and use of:
  - 1) seat belts;
  - 2) emergency exits;
  - 3) life jackets, if the carriage of life jackets is prescribed;
  - 4) oxygen dispensing equipment, if the provision of oxygen for the use of passengers is prescribed;
  - 5) other emergency equipment provided for individual use, including passenger emergency briefing cards;
- (g) 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;
- (h) ensure that in an emergency during flight, passengers are instructed in such emergency action as may be appropriate to the circumstances; and
- (i) 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 aeroplane are secured in their seats by means of the seat belts or harnesses provided.

302.3.2 Checklists shall be used by flight crews prior to, during and after all phases of operations, and in emergencies, to ensure compliance with the operating procedures contained in the aircraft operating manual and the aeroplane flight manual or other documents associated with the certificate of airworthiness and otherwise in the operations manual, are followed. The design and utilisation of checklists shall observe Human Factors principles.

### **GA-P2A.303 FLIGHT PREPARATION**

303.1 The owner/operator of Thai aeroplane to which this part applies shall develop procedures to ensure that a flight is not commenced unless:

- (a) the aeroplane is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the aeroplane;
- (b) the instruments and equipment installed in the aeroplane are appropriate, taking into account the expected flight conditions;
- (c) any necessary maintenance has been performed in accordance with Chapter 10;
- (d) the mass of the aeroplane and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;
- (e) any load carried is properly distributed and safely secured;
- (f) the aeroplane operating limitations, contained in the flight manual, or its equivalent, will not be exceeded.

303.2 An owner/operator of Thai aeroplane to which this part applies shall specify flight planning procedures to provide for the safe conduct of the flight based on considerations of aeroplane 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.

#### **303.3 Take-off alternate aerodrome**

303.3.1 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.

303.3.2 The take-off alternate aerodrome shall be located within the following distance from the aerodrome of departure:

- (a) 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.

303.3.3 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 aerodrome operating minima for that operation.

#### **303.4 Destination alternate aerodromes**

303.4.1 An owner/operator of Thai aeroplane to which this part applies shall ensure that for any aircraft operated under IFR, at least one alternate aerodrome is nominated.

- 303.4.2 An aerodrome shall not be nominated as an alternate unless the aerodrome has a notified instrument approach procedure and weather forecasts indicate that at the estimated time of arrival at the alternate aerodrome the cloud ceiling and visibility will be at or above the minima prescribed.
- 303.4.3 Where a destination is isolated and no suitable alternate is available, an alternate is not required if:
- (a) an instrument approach procedure is available for use at the aerodrome of intended landing; and
  - (b) weather forecasts indicate that for at least 2 hours before and 2 hours after the estimated time of arrival and:
    - (i) the cloud base at the aerodrome will be at least 1,000 feet above the minima prescribed for the instrument procedure likely to be used, and visibility will be at least 5.5 km, or 4 km more than the minimum associated with the procedure; or
    - (ii) a point of no return (PNR) is determined; and
    - (iii) additional fuel reserves are carried to take account of any likely delays or the increased consumption that may result from system or powerplant failures.

### **303.5 Fuel requirements**

303.5.1 An aeroplane shall carry a sufficient amount of usable fuel to complete the planned flight safely and to allow for deviations from the planned operation

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

- (a) fuel consumption data:
  - 1) provided by the aeroplane manufacturer; or
  - 2) if available, current aeroplane-specific data derived from a fuel consumption monitoring system; and
- (b) the operating conditions for the planned flight including:
  - 1) anticipated aeroplane 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.*

303.5.3 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 take-off 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 aeroplane to fly from take-off until landing at the destination aerodrome taking into account the operating conditions of 3.6.2 b) in this chapter;
- (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 aeroplane 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 aeroplane 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 aeroplane 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 aeroplane, 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-engined aeroplane, 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:

- (1) for a reciprocating engine aeroplane, the amount of fuel required to fly for 45 minutes; or

(2) for a turbine-engined aeroplane, 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.

*Notes: An owner/ operator should determine one final reserve fuel value for each aeroplane type and variant in their fleet rounded up to an easily recalled figure.*

303.5.4 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.

*Notes: Nothing under paragraph 303.5 in this Chapter precludes the in-flight amendment of a flight plan to re-plan that flight to another aerodrome, provided that the requirements of paragraph 303.5 can be complied with from the point where the flight is re-planned.*

### 303.6 **In-flight fuel management**

303.6.1 An owner/operator of Thai aeroplane to which this part applies shall establish policies and procedures to ensure that in-flight fuel checks and fuel management are performed.

303.6.2 The pilot-in-command of Thai aeroplane to which this part applies shall:

- (a) 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 take-off or enroute, is contained in the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).*

- (b) 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;
- (c) 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; and

*Note:* 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. This is not an emergency situation but an indication that an emergency situation is possible shall any additional delay occur.

- (d) 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 paragraph 303.5.3 (e) 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 ICAO Annex 10, Volume II, 5.3.2.1.1, b)

### **303.7 Additional requirements for operations beyond 60 minutes to an en-route alternate aerodrome**

303.7.1 When conducting operations beyond 60 minutes from a point on a route to an en-route alternate aerodrome owner/operator shall 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.

### **303.8 Refuelling with passengers on board**

303.8.1 A Thai aeroplane shall not be refuelled when passengers are embarking, on board or disembarking unless it is properly attended by qualified personnel ready to initiate and direct an evacuation of the aeroplane by the most practical and expeditious means available.

303.8.2 When refuelling with passengers embarking, on board or disembarking, two-way communication shall be maintained by the aeroplane's intercommunication system or other suitable means between the ground crew supervising the refuelling and the qualified personnel on board the aeroplane.

*Note 1.* — The provisions of 303.8.1 do not necessarily require the deployment of integral aeroplane stairs or the opening of emergency exits as a prerequisite to refuelling.

*Note 2.* — Provisions concerning aircraft refuelling are contained in Annex 14, Volume I, and guidance on safe refuelling practices is contained in the Airport Services Manual (Doc 9137), Parts 1 and 8.

*Note 3.* — Additional precautions are required when refuelling with fuels other than aviation kerosene or when refueling results in a mixture of aviation kerosene with other aviation turbine fuels, or when an open line is used.

## **GA-P2A.304 IN-FLIGHT PROCEDURES**

### **304.1 Oxygen supply**

304.1.1 A flight to be operated at flight altitudes at which the atmospheric pressure in personnel compartments will be less than 700 hPa shall not be commenced unless sufficient stored breathing oxygen is carried to supply:

- (a) 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
- (b) the crew and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 hPa.

304.1.2 A flight to be operated with a pressurized aeroplane shall not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all the 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.

### **304.2 Use of oxygen**

304.2.1 All flight crew members, when engaged in performing duties essential to the safe operation of an aeroplane in flight, shall use breathing oxygen continuously whenever the circumstances prevail for which its supply has been required in para304.1.1 or 304.1.2 of this chapter

304.2.2 All flight crew members of pressurized aeroplanes 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.

### **304.3 Aeroplane operating procedures for noise abatement**

304.3.1 All aeroplane shall carry a document attesting noise certification on board.

304.3.2 Aeroplane operating procedures for noise abatement shall comply with the provisions of PANS-OPS (ICAO Doc 8168), Volume I.

304.3.3 Noise abatement procedures specified by an owner/operator for any one aeroplane type shall be the same for all aerodromes.

*Note: see details of Noise abatement procedures in Appendix F.*

304.4 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 shall 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.

**GA-P2A.305 DUTIES OF PILOT-IN-COMMAND**

- 305.1 The pilot-in-command of Thai aeroplane to which this part applies shall;
- (a) ensure that the checklists specified in para 302.3.2 of this Chapter are complied with in detail;
  - (b) be responsible for notifying the nearest appropriate authority by the quickest available means of any accident involving the aeroplane, resulting in serious injury or death of any person or substantial damage to the aeroplane or property. In the event that the pilot-in-command is incapacitated the owner/operator shall take the forgoing action;
  - (c) be responsible for reporting all known or suspected defects in the aeroplane, to the owner/operator, at the termination of the flight; and
  - (d) be responsible for the journey log book or the general declaration.

**GA-P2A.306 FLIGHT CREW RESPONSIBILITIES**

- 306.1 Each owner/operator of Thai aeroplane to which this part applies shall ensure that all flight crew are familiar with and comply with the laws, regulations and procedures necessary to a flight, including but not limited to the following:
- (a) any applicable conditions on the owner/operator's instructions; and
  - (b) the procedures specified in the owner/operator's required documentation; and
  - (c) such laws, regulations and procedures that may be relevant in those States in which the operation is to be conducted, including in particular those flight procedures and obstacle clearance criteria that may differ from those established by PANS-OPS; and
  - (d) procedures required at any aerodrome planned to be used as a destination or as an alternate, and procedures for air navigation facilities relating to such aerodromes.

**GA-P2A.307 CABIN BAGGAGE (TAKE-OFF AND LANDING)**

- 307.1 An owner/operator of Thai aeroplane to which this part applies shall specify procedures to ensure that all baggage carried onto an aeroplane and taken into the passenger cabin is adequately and securely stowed.

**GA-P2A.308 SIMULATING IN-FLIGHT SITUATIONS**

- 308.1 An owner/operator of Thai aeroplane to which this part applies shall ensure that on a flight when passengers are being carried:
- (a) no emergency or abnormal situations are simulated; and
  - (b) no simulated instrument flight is conducted.

**GA-P2A.309 MINIMUM FLIGHT ALTITUDES**

309.1 An owner/operator of Thai aeroplane to which this part applies shall specify the method for establishing terrain clearance altitudes.

**GA-P2A.310 FLIGHT PLANNING**

310.1 An owner/operator of Thai aeroplane to which this part applies shall specify all flight planning procedures necessary for the safe conduct of the flight, taking account of, but not limited to, the following elements:

- (a) aeroplane performance, taking account of any unserviceability; and
- (b) operating limitations; and
- (c) expected flight conditions on the route planned for the destination and any alternates; and
- (d) the aerodromes planned to be used for landing or in the event of a diversion, and taking account of:
  - (i) ground facilities and/or water facilities; and
  - (ii) communications facilities; and
  - (iii) navigation aids
- (e) such ATS requirements as may apply.

310.2 The owner/operator of Thai aeroplane to which this part applies shall plan, perform, and control flights using meteorological information:

- (a) provided for aviation purposes; or
- (b) provided from a source that has been assessed by the owner/operator for its reliability and accuracy and considered acceptable for the purpose of the flight.

310.3 The flight planning procedures shall be detailed in the operations manual.

**GA-P2A.311 USE OF AERODROMES**

311.1 An owner/operator of Thai aeroplane to which this part applies shall ensure that an aircraft is not operated to or from an aerodrome unless the owner/operator's procedures have identified that aerodrome as suitable for the purpose of taking-off or landing in that aircraft.

**GA-P2A.312 AERODROME OPERATING MINIMA**

312.1 An owner/operator of Thai aeroplane to which this part applies shall ensure that no pilot in command operates to or from an aerodrome, or plans the use of an aerodrome as a diversion or alternate aerodrome, using operating minima lower than those that may be established for that aerodrome by the State in which it is located, except with the specific approval of that State.

312.2 In determining aerodrome operating minima to be used by flight crew for a particular operation, the owner/operator shall take account of the following:

- (a) the type, performance and handling characteristics of the aircraft; and
- (b) the composition of the flight deck crew, their competence and experience; and
- (c) the dimensions and characteristics of the runways or touch-down areas which may be selected for use; and
- (d) the adequacy and performance of the available visual and non-visual ground aids; and
- (e) the equipment available in the aircraft for the purpose of navigation or control of the flight path, as appropriate, during the take-off, approach, flare, landing or missed approach; and
- (f) the obstacles in the approach and missed approach areas and the climbout areas and necessary clearance; and
- (g) the obstacle clearance altitude or height for the instrument approach procedures; and
- (h) the means to determine and report meteorological conditions; and
- (i) the availability and adequacy of emergency services.

**GA-P2A.313 OPERATING IN ICING CONDITIONS**

313.1 An owner/operator of Thai aeroplane to which this part applies shall ensure that procedures are in place to prevent:

- (a) a take-off of an aircraft that has snow, ice, or frost adhering to the wings, rotors, stabilizers, or control surfaces; and
- (b) a take-off in an aircraft that has snow, ice, or frost adhering to any propeller, windscreen, or powerplant installation, or to an airspeed, altimeter, rate of climb, or flight attitude instrument system; and
- (c) an aircraft into known or forecast icing conditions unless the aircraft is certificated and equipped for flight in the type of known icing conditions; and
- (d) take-off in an aircraft that has frost adhering to a propeller, windscreen, or powerplant installation unless such action is specifically permitted by the aircraft flight manual and the take-off is performed in accordance with the aircraft flight manual procedures.

## CHAPTER 4

### AEROPLANE PERFORMANCE OPERATING LIMITATIONS

#### **GA-P2A.401 APPLICABLE TO AEROPLANES CERTIFICATED IN ACCORDANCE WITH PARTS IIIA AND IIIB OF ICAO ANNEX 8**

- 401.1 The requirements contained in para 401.2 to 401.9 inclusive are applicable to all aeroplanes of over 5700 kg maximum certificated take-off mass.
- 401.2 A Thai aeroplane shall be operated in compliance with the terms of its certificate of airworthiness and within the approved operating limitations contained in its flight manual.
- 401.3 An owner/operator of Thai aeroplane 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.
- 401.4 A flight shall not be commenced unless the performance information provided in the flight manual indicates that the Standards of para 401.5 to 401.9 can be complied with for the flight to be undertaken.
- 401.5 In applying the standards of this chapter, account 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, the slope of the runway, the ambient temperature, wind, and surface condition of 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.

#### **401.6 Mass limitations**

- 401.6.1 The mass of the aeroplane at the start of take-off shall not exceed the mass at which para 401.7 of this Chapter is complied with, nor the mass at which para 401.8 and 401.9 of this Chapter are complied with, allowing for expected reductions in mass as the flight proceeds, and for such fuel jettisoning as is envisaged in applying para 401.8 and 401.9 of this Chapter and, in respect of alternate aerodromes, para 401.6.3 and 401.9.
- 401.6.2 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.
- 401.6.3 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.
- 401.6.4 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.

#### **401.7 Take-off**

401.7.1 The aeroplane shall be able, in the event of a critical power-unit 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 aeroplane is in a position to comply with para 401.8 of this Chapter. In determining the length of the runway available, account shall be taken of the loss, if any, of runway length due to alignment of the aeroplane prior to take-off.

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

#### **401.8 En route — one engine inoperative**

401.8.1 The Thai aeroplane shall be able, in the event of the critical engine becoming inoperative at any point along the route or planned diversions therefrom, to continue the flight to an aerodrome at which the standard of para 401.9 of this Chapter can be met, without flying below the minimum obstacle clearance altitude at any point.

#### **401.9 Landing**

401.9.1 The Thai aeroplane 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 at the time of landing assessment are contained in the Aeroplane Performance Manual (Doc 10064).*

### **GA-P2A.402 PERFORMANCE DATA**

402.1 Each owner/operator of Thai aeroplane to which this part applies shall ensure that for each aircraft it operates the performance data used is:

- (a) contained in the aircraft flight manual; or
- (b) where provided by the aircraft manufacturer or other source, contained in an equivalent document; and
- (c) available to all flight crew or other persons responsible for flight planning or aircraft dispatch.

**GA-P2A.403 PERFORMANCES**

403.1 An owner/operator of Thai aeroplane to which this part applies shall ensure that no flight is commenced unless account has been taken of all factors that significantly affect the performance of the aircraft, including but not limited to:

- (a) Weight; and
- (b) Operating procedures; and
- (c) Pressure altitude of aerodrome; and
- (d) Temperature; and
- (e) Wind; and
- (f) Runway gradient; and
- (g) Condition of runway; and
- (h) Water surface state (where relevant); and
- (i) Aircraft configuration

403.2 An owner/operator of Thai aeroplane to which this part applies shall take account of the accuracy of charts and other data used during performance planning, when assessing whether a flight can be safely operated.

**GA-P2A.404 WET AND CONTAMINATED RUNWAY SURFACES**

404.1 Each owner/operator of Thai aeroplane to which this part applies shall ensure that where it is necessary for a take-off to be made on a runway contaminated with water, slush, snow or ice the pilot-incommand shall take account of:

- (a) the runway overrun area; and
- (b) local wind conditions, including any element of tailwind or crosswind; and
- (c) height of any snow banks adjacent to the runway.

## CHAPTER 5

### AEROPLANE FLIGHT CREW

#### GA-P2A.501 COMPOSITION OF FLIGHT CREW

501.1 An Operator of Thai aeroplane to which this part applies shall ensure that:

- (a) the composition of the flight crew and the number of flight crew members at designated crew stations are both in compliance with CAAT regulations, and no less than the minimum specified in the Aeroplane Flight Manual (AFM) and Certificate of Airworthiness (C of A).
- (b) the flight crew includes additional flight crew members when required by the type of operation and is not reduced below the number specified in the approved Operation Manual.
- (c) all flight crew members hold valid licenses and ratings acceptable to the CAAT and are suitably qualified and competent to conduct the duties assigned to them;
- (d) the operator of an aeroplane 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.

#### 501.2 Designation as Pilot-In-Command

501.1. The Operator of Thai aeroplane to which this part applies shall:

- (a) ensure that each flight crew member holds a valid licence issued by the CAAT, or of issued by another Contracting State, rendered valid by the CAAT.
- (b) ensure that flight crew members are properly rated; and
- (c) be satisfied that flight crew members are competent to carry out assigned duties.

501.2 The Pilot-in-command or the pilot of Thai aeroplane to which this part applies, to whom the conduct of the flight may be delegated, shall have had initial familiarisation training of the route or area to be flown and of the aerodromes, facilities and procedures to be used.

#### GA-P2A.502 PROFICIENCY IN THE ENGLISH LANGUAGE

502.1 An owner/operator of Thai aeroplane to which this part applies shall ensure that flight crew members demonstrate the ability to speak and understand the English Language to the proficiency level required by Announcement of the CAAT on language proficiency.

502.2 An owner/operator of Thai aeroplane to which this part applies shall ensure that all crew members have the ability to speak and understand the English Language to the extent necessary for effective communication to occur between flight crew and other crewmembers.

### **GA-P2A.503 FLIGHT CREW MEMBER EMERGENCY DUTIES**

503.1 An owner/operator of Thai aeroplane to which this part applies shall, for each type of aeroplane, 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 owner/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 aeroplane.

### **GA-P2A.504 FLIGHT CREW MEMBER TRAINING PROGRAMMES**

#### **504.1 General Requirements:**

504.1.1 An owner/operator of Thai aeroplane to which this part applies 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 operations manual. The training programme shall include training to competency for all equipment installed.

504.1.2 The training programme required by para 504.1.1 of this Chapter shall be designed to ensure that any person assigned duties in relation to the safe operation of the owner/operator's aircraft has achieved the necessary level of competency and is able to maintain that level of competency.

504.1.3 The Training Institute / facility and its simulators shall be approved by the CAAT. Prior to commencement of training for an Thai Pilot License holder, the Approved Training Organisation (ATO) shall ensure that the training requirements are accomplished and required documents are submitted in accordance with the CAAT Regulations. In case of any clarification is required the ATO may contact the CAAT.

504.1.4 The trainee pilot shall pass either the CAAT or the ATO examination authorised by the CAAT. The trainee pilot should have passed all requisite written examinations including technical examination on type before commencement of the flying training and that must be valid during entire training and checks.

504.1.5 Where training is done overseas, Ground and simulator training shall be completed in the same ATO. If the trainee wishes to undertake ground training at a different ATO prior permission shall be obtained from CAAT which will only be considered when ground training facilities do not exist in Thailand. In such case the trainee shall pass the CAAT.

504.1.6 Aircraft Ground Training to ensure that each flight crew member has knowledgeable of aircraft systems and all normal, abnormal, and emergency procedures. The following subjects shall be included:

- (a) aircraft systems operation and limitations as contained in the aircraft flight manual and aircraft operating manual and standard operating procedures;
- (b) operation of all the aircraft equipment;
- (c) differences in equipment, operation, and layout between aircraft of the same type, if applicable;



- (d) normal, abnormal and emergency procedures for the aircraft;
- (e) aircraft performance and limitations;
- (f) weight/mass and balance system procedures;
- (g) MEL training (when a MEL has been established); and
- (h) aircraft servicing and ground handling.

504.1.7 The use of flight simulators for flight training is highly recommended. An owner/operator with a programme that uses an approved Level C or higher simulator is normally permitted to conduct initial and upgrade training in the simulator. This level of simulator usually meets the requirements for recurrent and six-month take-off and landing day/night currency requirements to carry passengers. An owner/operator shall confirm this with CAAT.

504.1.8 Flight simulator programmes shall cover the following subjects as contained in the Aircraft Flight Manual and the aircraft operating manual used by the owner/operator.

- (a) Procedures for normal, abnormal and emergency operation of the aircraft systems and components including:
  - (i) use of aircraft checklists;
  - (ii) flight and cabin crew resource management training;
  - (iii) aircraft fire on the ground and while airborne;
  - (iv) engine fire or failure;
  - (v) effects of engine icing and anti-ice operation;
  - (vi) take-off, landing and when applicable, flight with critical engine inoperative including driftdown and engine inoperative performance capabilities;
  - (vii) loss of pressurisation and emergency descent (as applicable);
  - (viii) flight control failures and degraded states of operation;
  - (ix) hydraulic, electrical and other system failures;
  - (x) failure of navigation and communication equipment;
  - (xi) pilot incapacitation;
  - (xii) approach to the stall (ground contact imminent and ground contact not a factor) (as applicable);
  - (xiii) normal and abnormal flight characteristics applicable to the aircraft category and type. These may include such items as: dutch roll, buffet boundary onset, jet upset, steep turns, static & dynamic rollovers, loss of tail rotor

effectiveness, vortex ring, etc. (as applicable to the category, class and type of aircraft);

- (xiv) aircraft performance for climb, cruise, holding, descent, landing and diversion;
- (xv) normal, noise abatement and maximum performance take-off;
- (xvi) aircraft performance calculations, including take-off and landing speeds, weight and balance, height velocity curve, settling with power, and centre of gravity (as applicable);
- (xvii) rejected take-off procedures and rejected landings;
- (xviii) passenger and crew evacuation; and
- (xix) FMS, GPWS/ TAWS, TCAS, ACAS and other specialized equipment installed in the aircraft, as applicable.

(b) Flight planning and instrument flight procedures:

- (i) departure, en-route, holding, arrival and in-flight diversion;
- (ii) precision, non- precision and missed approaches in minimum visibility conditions;
- (iii) precision, non- precision and missed approaches using automatic, flight director and degraded states of operation;
- (iv) Category II and Category III approaches, as applicable; and
- (v) testing and reviews.

504.1.9 The flight crew member training programmes shall be conducted as per the syllabus stipulated in Appendix J or the CAAT accepted ATO/Manufacturer syllabus.

504.1.10 PPC Check forms as applicable shall be used, which is available on the CAAT web site: ([www.caat.or.th](http://www.caat.or.th))

504.1.11 The final training checks / skill tests of the trainee pilot shall be carried out by CAAT or Authorised Examiner.

504.1.12 Training and checks must be carried out with the CAAT approved Instructor(s) and Examiner(s) only.

#### **504.2 Crew Resource Management (CRM) Training**

504.2.1 Before operating, the flight crew member shall have received CRM training, appropriate to his/her role, as specified in the operations manual.

504.2.2 Elements of CRM training shall be included in the aircraft type or class training and recurrent training as well as in the command course.

### **504.3 Conversion Training**

504.3.1 An owner/operator of Thai aeroplane to which this part applies shall ensure that:

- (a) A flight crew member completes the operator conversion training course before commencing unsupervised line flying:
  - 1) when changing to an aircraft for which a new type or class rating is required;
  - 2) when joining an operator.
- (b) The operator conversion training course shall include training on the equipment installed on the aircraft as relevant to flight crew members' roles.

### **504.4 Differences Training and Familiarisation Training**

504.4.1 An operator of Thai aeroplane to which this part applies shall ensure that a flight crew member completes:

- (a) Differences training which requires additional knowledge and training on an appropriate training device or the aeroplane:
  - 1) When operating another variant of an aeroplane of the same type or another type of the same class currently operated; or
  - 2) When changing equipment and/or procedures on types or variants currently operated;
- (b) Familiarization training which requires the acquisition of additional knowledge:
  - 1) When operating another aeroplane of the same type or variant; or
  - 2) When changing equipment and/or procedures on types or variants currently operated.

504.4.2 The operator of Thai aeroplane to which this part applies shall specify in the Operations Manual when such differences training or familiarization training is required.

### **504.5 Recurrent Training and Checking**

504.5.1 **General.** An operator of Thai aeroplane to which this part applies shall ensure that:

- (a) Each flight crew member completes annual recurrent flight and ground training relevant to the type or variant of aeroplane on which the flight crew member operates, including training on the location and use of all emergency and safety equipment carried. The duration of annual ground training will not be less than 16 hours training consisting of technical, performance, CRM, safety and emergency procedures training. The validity of the annual recurrent training shall be for a period of 12 months and shall commence from the date following the date of expiry of the previous validity subject to the condition that the recurrent training has been conducted within three months preceding the date of expiry.
- (b) Each flight crew member shall be periodically checked to demonstrate competence in carrying out normal, abnormal and emergency procedures.

504.5.2 **Pilot's proficiency check (PPC):** An operator of Thai aeroplane to which this part applies shall ensure that:

- (a) Each flight crew member undergoes PPC to demonstrate his/her competence in carrying out normal, abnormal and emergency procedures on each type or variant of a type of aeroplane. When an operator schedules flight crew on several variants of the same type of aeroplane, the PPC for each variant can be combined. When an operator schedules flight crew on different types of aeroplanes with similar characteristics in terms of operating procedures, systems and handling, the PPC for each type shall be carried out separately without any credits for the other rated type; and
- (b) The check is conducted without external visual reference when the flight crew member will be required to operate under IFR;
- (c) The period of validity of a PPC shall be 12 months and shall be counted from the end of date when the check was taken. When the check is undertaken within the last three months of the validity period, the new validity period shall be counted from the original expiry date. A PPC may be carried out on an aeroplane or a Flight Simulator Training Device (FSTD), however at least once in two years, it must be carried out in a FSTD.

*Note 1: For aeroplanes with less than 5 qualified simulators globally, the operator may obtain approval from DGCA to carry out PPC in the aeroplane.*

*Note 2: PPC or PPC/IR on simulator shall be of minimum duration 2:00 hrs as PF while if conducted on aeroplane, minimum duration shall be 1:30 hrs as PF.*

*Note 3: For turboprop aeroplanes with seating capacity less than 9 passengers, para 9.2 and 9.3 can be complied with PPC/IR done on aeroplane.*

504.5.3 **Instrument rating (IR) check.** An operator shall ensure that:

- (a) Each flight crew member undergoes IR checks to demonstrate his/her competence in carrying out normal, abnormal and emergency procedures under instrument conditions. An IR check for renewal of IR may be carried out on an aeroplane or flight simulator training device. When an operator schedules flight crew on several variants of the same type of aeroplane, the IR check for each variant can be combined. When an operator schedules flight crew on different types of aeroplanes, the IR check for each type shall be carried out separately without any credits for each rated type; and
- (b) The check is conducted without external visual reference;
- (c) The period of validity of an IR shall be 12 months and shall be counted from the end of date when the check was taken. When the check is undertaken within the last three months of the validity period, the new validity period shall be counted from the original expiry date. A PPC may be carried out on an aeroplane or a Flight Simulator Training Device (FSTD), however at least once in two years, it must be carried out in a FSTD.

#### **504.6 Pilot Qualification to operate in either pilot's seat**

504.6.1 Flight crew members who may be assigned to operate in either pilot's seat shall complete appropriate training and checking as specified in the Operation Manual.

**504.7 Operation on more than one type or variant**

504.7.1 Flight crew members operating more than one type or variant of aircraft shall comply with the requirement prescribed in AOCR Appendix V Mixed Fleet Flying (MFF).

**GA-P2A.505 FLIGHT CREW QUALIFICATIONS**

**505.1 Flight crew member licensing**

505.1.1 An owner/operator of Thai aeroplane to which this part applies shall:

- (a) ensure that each flight crew member assigned to duty holds a valid licence issued by the CAAT; or under special circumstances, holds a valid licence issued by another Contracting State, and rendered valid by the CAAT. (for details refer to Air Navigation Act, Section 42);
- (b) ensure that flight crew members are properly rated; and
- (c) be satisfied that flight crew members are competent to carry out assigned duties.
- (d) Ensure that flight crew members assigned to duty hold a Aircraft Type Rating

505.1.2 The owner/operator of Thai aeroplane to which this part applies of an aeroplane 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 A 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:*

- a) possession of a type rating for an aeroplane equipped with ACAS II, where the operation and use of ACAS II are included in the training syllabus for the type rating; or*
- b) 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*
- c) 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.*

**505.2 Recent experience — pilot-in-command**

505.3.1 An owner/operator of Thai aeroplane to which this part applies shall not assign a pilot to act as pilot-in-command of an aeroplane unless that pilot has made at least three take-offs and landings within the preceding 90 days on the same type of aeroplane or in a flight simulator approved for the purpose.

**505.3 Recent experience — co-pilot**

505.4.1 An owner/operator of Thai aeroplane to which this part applies shall not assign a co-pilot to operate at the flight controls of an aeroplane 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 aeroplane or in a flight simulator approved for the purpose.

**GA-P2A.506 CABIN CREW**

**506.1 Assignment of emergency duties**

506.1 .1 The owner/operator of Thai aeroplane to which this part applies shall determine the number of cabin crew required for each aircraft operation. The determination of the number of cabin crew required shall take account of:

- (a) seating capacity of the aircraft; and
- (b) number of passengers carried; and
- (c) the necessary functions to be performed in an emergency or a situation requiring emergency evacuation; and
- (d) the need to effect a safe and expeditious evacuation of the aircraft; and
- (e) Adding or as required by the AFM.

**506.2 Cabin crew at emergency evacuation stations**

506.2.1 The owner/operator of Thai aeroplane to which this part applies shall assign to cabin crew the functions to be carried out in the event of an aircraft emergency and of an emergency evacuation becoming necessary.

**506.3 Protection of cabin crew during flight**

506.3.1 Each cabin crew member shall be seated with seat belt or, when provided, safety harness fastened during take-off and landing and whenever the pilot-in-command so directs.

**506.4 Training**

506.4.1 An owner/operator of Thai aeroplane to which this part applies shall ensure that a training programme is completed by all persons before being assigned as a cabin crew member.

## **CHAPTER 6**

### **FLIGHT AND DUTY TIME LIMITS**

#### **GA-P2A.601 FLIGHT AND DUTY TIME MLIMITS**

- 601.1 Refer to the Authority Announcement on Flight Time and Flight Duty Period Limitation for detail of prescriptive method.

## **CHAPTER 7**

### **DOCUMENTS AND RECORDS**

#### **GA-P2A.701 MAINTENANCE PROGRAMME**

- 701.1 A maintenance programme for each aeroplane as required by GA-P2A.902 shall contain the following information:
- (a) maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilization of the aeroplane;
  - (b) when applicable, a continuing structural integrity programme;
  - (c) procedures for changing or deviating from (a) and (b) above as approved by the CAAT; and
  - (d) when applicable and approved by the CAAT, condition monitoring and reliability programme descriptions for aircraft systems, components and engines.
- 701.2 Maintenance tasks and intervals that have been specified as mandatory in approval of the type design, or approved changes to the maintenance programme, shall be identified as such.
- 701.3 The maintenance programme shall be based on maintenance programme information made available by the State of Design or by the organization responsible for the type design, and any additional applicable experience.

#### **GA-P2A.702 FLIGHT RECORDER RECORDS**

- 702.1 The pilot-in-command, and/or the owner/operator, shall comply with the requirements of Chapter 5 of Part I, GA-P1A.514, 514.4.3.



## CHAPTER 8

### AEROPLANES INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

#### GA-P2A.801 GENERAL

801.1 Where a master minimum equipment list (MMEL) is established for the aircraft type, the operator of a Thai aeroplane to which this Chapter applies shall include in the operations manual a minimum equipment list (MEL) which will enable the pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop shall any instrument, equipment or systems become inoperative.

*Note.* - Appendix G contains guidance on the minimum equipment list.

#### GA-P2A.802 AEROPLANE ON ALL FLIGHTS

802.1 In addition to the requirements contained in Chapter 5 of Part I, para 501.3.1, a flight shall be not commenced unless the aeroplane is equipped with:

- (a) accessible and adequate medical supplies appropriate to the number of passengers the aeroplane is authorised to carry;

*Note.* - Guidance on the types, number, location and contents of the medical supplies can be found in Appendix I.

- (b) a safety harness for each flight crew seat. The safety harness for each pilot seat shall incorporate a device which will automatically restrain the occupant's torso in the event of rapid deceleration;

*Note.* - Safety harness includes shoulder straps and a seat belt which may be used independently.

- (c) means of ensuring that the following information and instructions are conveyed to passengers:

- i) when seat belts are to be fastened;
- ii) when and how oxygen equipment is to be used if the carriage of oxygen is required;
- iii) restrictions on smoking;
- iv) location and use of life jackets or equivalent individual flotation devices where their carriage is required;
- v) location of emergency equipment; and
- vi) location and method of opening emergency exits.

802.2 A flight shall not be commenced unless the aeroplane carries:

- (a) the operations manual prescribed in Chapter 3 of this part, para 302.2, or those parts of it that pertain to flight operations;

- (b) the flight manual for the aeroplane, or other documents containing the aeroplane performance operating limitations and any other information necessary for the operation of the aeroplane within the terms of its certificate of airworthiness, unless these data are available in the operations manual; and
- (c) the checklists to which Chapter 3 of this part, para 302.3.2, refers.

## **GA-P2A.803 FLIGHT RECORDERS**

### **803.1 Flight data recorders**

#### **803.1.1 Operation**

- (a) 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 78 parameters listed in Table K-1 of Appendix K.
- (b) 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 K-1 of Appendix K.

### **803.2 Cockpit voice recorders**

#### **803.2.1 Operation**

- (a) All turbine-engined aeroplanes of a maximum certificated take-off mass of over 5 700kg 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.
- (b) All aeroplanes of a maximum certificate take-off mass of over 27 000kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR.

#### **803.2.2 Duration**

All aeroplane of a maximum certificated take-off mass of over 27 000kg for which the individual certificate of airworthiness is first issued on or after 1 January 2021 shall be equipped with a CVR capable of retaining the information recorded during at least the last twenty-five hours of its operation.

#### **803.2.3 Combination recorders**

All aeroplane of a maximum certificated take-off mass of over 5 700kg for which the application for type certificate is submitting 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).

## **GA-P2A.804 AEROPLANES ON LONG-RANGE OVER WATER FLIGHTS**

- 804.1 The operator of a thai registered aeroplane to which this Chapter applies, operating an extended flight over water, shall determine the risks to survival of the occupants of the

*aeroplane* in the event of a ditching. The operator shall consider the operating environment and conditions such as, but not limited to, sea state and sea and air temperatures, the distance from land suitable for making an emergency landing, and the availability of search and rescue facilities. Based upon the assessment of these risks, the *operator* shall, in addition to the equipment required in Chapter 5 of Part I, GA-P1A.503, para 503.3 to ensure that the *aeroplane* is appropriately equipped with:

- (a) 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 lifesaving equipment, including means of sustaining life, as is appropriate to the flight to be undertaken; and
- (b) equipment for making the distress signals in accordance with the Regulation of Civil Aviation Board No. 94 on Rule of the Air.

804.2 Each life jacket and equivalent individual flotation device, when carried in accordance with Chapter 5 of Part I, GA-P1A.503, para 503.3 shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement of Chapter 5 of Part I, GA-P1A.503, para 503.3.1 is met by the provision of individual flotation devices other than life jackets.

**GA-P2A.805 AEROPLANES FOR WHICH THE INDIVIDUAL CERTIFICATE OF AIRWORTHINESS WAS FIRST ISSUED BEFORE 1 JANUARY 1990.**

805.1 An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure in personnel compartments is less than 700 hPa in personnel compartments shall not be commenced unless the aeroplane is equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in Chapter 2 of Part I, para 203.9.2.

805.2 A flight intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa but which is provided with means of maintaining pressures greater than 700 hPa shall not be commenced unless the aeroplane is provided with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in Chapter 2 of Part I, para 203.9.3.

**GA-P2A.806 AEROPLANE IN ICING CONDITIONS**

806.1 Aeroplanes shall be equipped with suitable de-icing and/or anti-icing devices when operated in circumstances in which icing conditions are reported to exist or are expected to be encountered.

**GA-P2A.807 AEROPLANES OPERATED IN ACCORDANCE WITH THE INSTRUMENT FLIGHT RULES**

807.1 In addition to the requirements contained in Chapter 5 of Part I, GA-P1A.506, a flight operated in accordance with the instrument flight rules or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall not be commenced unless the aeroplane is equipped with two independent altitude measuring and display systems.

807.2 Aeroplanes over 5 700 kg —Emergency power supply for electrically operated attitude indicating instruments

- 807.2.1 Aeroplanes 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.
- 807.2.2 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.

**GA-P2A.808 PRESSURISED AEROPLANES WHEN CARRYING PASSENGERS — WEATHER-DETECTING EQUIPMENT**

- 808.1 A flight operated with pressurised aeroplanes carrying passengers shall not be commenced unless the aeroplane is 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.

**GA-P2A.809 AEROPLANES OPERATED ABOVE 15 000 M (49 000 ft) — RADIATION INDICATOR**

- 809.1 A flight operated with an aeroplane intending to be primarily operated above 15 000 m (49 000 ft) shall not be commenced unless the aeroplane carries equipment to measure and indicate continuously the dose rate of total cosmic radiation being received (i.e. the total of ionising and neutron radiation of galactic and solar origin) and the cumulative dose on each flight. The display unit of the equipment shall be readily visible to a flight crew member.

**GA-P2A.810 AEROPLANE CARRYING PASSENGERS — CABIN CREW SEATS**

- 810.1 Aeroplanes 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 seat (within 15 degrees of the longitudinal axis of the aeroplane), fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of GA-P2A.506 para 506.1 of this part in respect of emergency evacuation.

*Note.— Safety harness includes shoulder straps and a seat belt which may be used independently.*

- 810.2 Cabin crew seats provided in accordance with para 810.1 shall be located near floor level and other emergency exits as required by the CAAT for emergency evacuation.

**GA-P2A.811 AEROPLANES REQUIRED TO BE EQUIPPED WITH AN AIRBORNE COLLISION AVOIDANCE SYSTEM (ACAS)**

- 811.1 All turbine - engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg, or authorised 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).

**GA-P2A.812 AEROPLANE REQUIRED TO BE EQUIPPED WITH A PRESSURE-ALTITUDE REPORTING TRANSPONDER**

812.1 A flight shall not be commenced unless the aeroplane is equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of Annex 10 to the Convention on International Civil Aviation, Volume IV to the International Convention on Civil Aviation.

*Note.— This provision is intended to improve the effectiveness of air traffic services as well as airborne collision avoidance systems.*

**GA-P2A.813 MICROPHONES**

813.1 All flight crew members required to be on flight deck duty shall communicate through boom or throat microphones below the transition level/altitude.

**GA-P2A.814 AEROPLANE COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT**

**814.1 Communication equipment**

814.1.1 In addition to the requirements of Chapter 4 of Part I, GA-P1A.418, para 418.1.1 to 418.1.5, a flight shall not be commenced unless the aeroplane is provided with radio communication equipment capable of:

- (a) conducting two-way communication for aerodrome control purposes;
- (b) receiving meteorological information at any time during flight; and
- (c) 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 para 814.1.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.*

**814.2 Installation**

814.2.1 A flight shall not be commenced unless the equipment installation on the aeroplane is such that the failure of any single unit required for either communications or navigation purposes or both will not result in the failure of another unit required for communications or navigation purposes.

**814.3 Electronic navigation data management**

814.3.1 An operator of a Thai aeroplane to which this Part II applies shall:

- (a) not employ electronic navigation data products that have been processed for application in the air and on the ground unless the CAAT has approved the operator's procedures for ensuring that the process applied and the products delivered have met acceptable standards of integrity and that the products are compatible with the intended function of the equipment that will use them.

- (b) continue to monitor both process and products; and
- (c) implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all aeroplanes that require it.

## CHAPTER 9

### AEROPLANE CONTINUING AIRWORTHINESS

#### **GA-P2A.901 OPERATOR'S CONTINUING AIRWORTHINESS RESPONSIBILITIES**

901.1 An owner/operator of Thai aeroplane to which this part II applies shall comply with the requirements in accordance with Chapter 10 of Part I, GA-P1A.1001.

#### **GA-P2A.902 MAINTENANCE PROGRAMME**

902.1 An owner/operator of Thai aeroplane to which this part II applies shall provide, for the use and guidance of maintenance and operational personnel concerned, a maintenance programme, acceptable to the CAAT, containing the information required GA-P2A.701. The design and application of the owner/operator's maintenance programme shall observe Human Factors principles.

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

902.2 Copies of all amendments to the maintenance programme shall be furnished promptly to all organisations or persons to whom the maintenance programme has been issued.

#### **GA-P2A.903 CONTINUING AIRWORTHINESS INFORMATION**

903.1 In addition to the requirements contained in Part I, GA-P1A.1005, An owner/operator of Thai aeroplane over 5 700 kg maximum certificated take-off mass, shall submit a written report on the occurrences of faults, malfunctions, defects or other occurrences as detailed in Part I, GA-P1A.1005, para 1005.1 to the following persons:

- (a) the aircraft type certificate holder; or
- (b) in the case where information on faults, malfunctions, defects and other occurrences relates to an engine or propeller, the aircraft type certificate holder and the organisation responsible for the engine or propeller design; or
- (c) in the case of an occurrence associated with a modification, the organization responsible for the design of the modification.

903.2 When an owner/operator of Thai aeroplane over 5 700 kg maximum certificated take-off mass receives additional information, including information from the manufacturer or other agency, concerning a report required by this section, must expeditiously submit it as a supplement to the first report and reference the date and place of submission of the first report.

#### **GA-P2A.904 MAINTENANCE RELEASE**

904.1 An owner/operator of Thai aeroplane to which this part II applies shall comply with the requirements in accordance with Chapter 10 of Part I, GA-P1A.1004.

## **PART III**

### **GENERAL AVIATION OPERATIONS (HELICOPTER)**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

#### **CHAPTER 1**

#### **GENERAL**

##### **GA-P3H.101 APPLICABILITY**

101.1 The provisions of this requirements are applicable to Thai registered Helicopter with Standard Certificate of Airworthiness (Standard C of A) engaged in general aviation operations. Except for helicopter are engaged in commercial air transport operations, aerial work or helicopter which to operate by military services, police services and other government services as specified in the Ministerial Regulations.

##### **GA-P3H.102 COMPLIANCE WITH LAWS, REGULATIONS AND PROCEDURE**

102.1 The pilot-in-command of Thai helicopter to which this part applies shall comply with the relevant laws, regulations and procedures of the States in which the helicopter is operated.

*Note 1.— Compliance with more restrictive measures, not in contravention of the provisions of 1.1.1, may be required by the State of Registry.*

*Note 2.— Rules covering flight over the high seas are contained in Regulation of Civil Aviation Board No. 94 on Rule of The Air .*

*Note 3.— 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.*

102.2 The pilot-in-command of Thai helicopter to which this part applies shall be responsible for the operation and safety of the helicopter and for the safety of all crew members, passengers and cargo on board, from the moment the engine(s) are started until the helicopter finally comes to rest at the end of the flight, with the engine(s) shut down and the rotor blades stopped.

102.3 If an emergency situation which endangers the safety of the helicopter or persons and necessitates the taking of action which involves a violation of regulations or procedures occurs within Thailand, the pilot-in-command shall notify the CAAT without delay. In the event such emergency situation occurs outside Thailand, the pilot-in command shall notify the appropriate local authority without delay and if required by the State in which the



incident occurs, the pilot-in-command shall also submit a report of the occurrence on any such violation to the appropriate authority of such State. The pilot-in-command shall submit a copy of the occurrence to the CAAT. Such reports shall be submitted within *ten days*.

- 102.4 The Pilot-in-command of Thai helicopter to which this part applies shall ensure that;
- (a) flight crew members demonstrate the ability to speak and understand the language used for aeronautical radiotelephony communications; and
  - (b) all baggage carried onto a helicopter and taken into the passenger cabin is securely stowed.
- 102.5 The pilot-in-command of Thai helicopter to which this part applies should have available on board the helicopter essential information concerning the search and rescue services in the areas over which it is intended the helicopter will be flown.

**GA-P3H.103 SPECIFIC APPROVAL**

- 103.1 The pilot-in-command shall not conduct operations for which a specific approval is required unless such approval has been issued by the CAAT.
- 103.2 An owner/operator of Thai helicopter to which this part applies wish to apply specific approval shall comply in accordance with GA-P1A.109, GA-P1A.110 and GA-P1A.111.

**GA-P3H.104 CARRIAGE OF DANGEROUS GOODS**

- 104.1 An owner/operator of Thai helicopter to which this part applies wish to carried dangerous goods on board of its aeroplane shall comply in accordance with Chapter 1 of Part I, GA-P1A.106.

**GA-P3H.105 USE OF PSYCHOACTIVE SUBSTANCES**

- 105.1 No member of a flight crew shall perform any function specified in the privileges applicable to this license if he is under the influence of any psychoactive substance which may render him unable to perform such functions in a safe and proper manner. Provisions concerning the use of psychoactive substance are contained in Regulation of Civil Aviation Board No. 67

## CHAPTER 2

### FLIGHT OPERATIONS

#### GA-P3H.201 ADEQUACY OF OPERATING FACILITIES

201.1 The pilot-in-command of Thai helicopter to which this part applies shall not commence a flight unless it has been ascertained by every reasonable means available that the ground and/or water facilities available and directly required for such flight and for the safe operation of the helicopter are adequate including communication facilities and navigation aids.

*Note.— “Reasonable means” in this Standard requirement is intended to denote the use, at the point of departure, of information available to the pilot-in-command either through official information published by the aeronautical information services or readily obtainable from other sources.*

#### GA-P3H.201A OPERATIONAL MANAGEMENT

##### 201A.1 Operator notification

201A.1.1 If an owner/operator of Thai helicopter to which this part has an operating base in a State other than Thailand, the owner/operator shall notify the CAAT in which the operating base is located.

##### 201A.3 Operating instructions

201A.3.1 An owner/operator of Thai helicopter to which this part shall:

- (a) 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;
- (b) ensure that when passengers are being carried, no emergency or abnormal situations shall be simulated;
- (c) specify, for flights that are to be conducted in accordance with the instrument flight rules, the method of establishing terrain clearance altitudes;
- (d) ensure that no pilot-in-command operates to or from an aerodrome or helipad 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;
- (e) ensure that passengers are made familiar with the location and use of:
  - 1) seat belts;
  - 2) emergency exits;
  - 3) life jackets, if the carriage of life jackets is prescribed;
  - 4) oxygen dispensing equipment, if the provision of oxygen for the use of passengers is prescribed;

- 5) other emergency equipment provided for individual use, including passenger emergency briefing cards;
- (f) 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;
- (g) ensure that in an emergency during flight, passengers are instructed in such emergency action as may be appropriate to the circumstances; and
- (h) 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 aeroplane are secured in their seats by means of the seat belts or harnesses provided.

201A.3.2 Checklists shall be used by flight crews prior to, during and after all phases of operations, and in emergencies, to ensure compliance with the operating procedures contained in the aircraft operating manual, the rotocraft flight manual or other documents associated with the certificate of airworthiness and otherwise in the operations manual, are followed. The design and utilisation of checklists shall observe Human Factors principles.

#### **GA-P3H.202 HELIPORT OR LANDING LOCATION OPERATING MINIMA**

202.1 The pilot-in-command of Thai helicopter to which this part applies shall establish operating minima follow the layout and contain at least the information listed in para 202.2 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 the CAAT or the State of the Aerodrome.

#### **202.2 Heliport operating minima**

202.2.1 The pilot-in-command shall establish operating minima follow the layout and contain at least the information listed in AOCR Chapter 9 for each heliport or landing location to be used in operations. Such minima shall not be lower than any that may be established for such heliports by the State in which the heliport is located, except when specifically approved by that State.

*Note: This standard does not require the State of the Aerodrome to establish operating minima.*

202.2.1.1 The CAAT 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:*

- a) for the purposes of an approach ban (Ref to para 206.3.2), minima below the heliport or landing location operating minima;*
- b) reducing or satisfying the visibility requirements; or*
- c) 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 I 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).*

*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.*

### **GA-P3H.203 BRIEFING**

203.1 The pilot-in-command of Thai helicopter to which this part applies shall ensure that crew members and passengers are made familiar, by means of an oral briefing or by other means, with the location and the use of:

- (a) seat belts or harnesses; and, as appropriate,
- (b) emergency exits;
- (c) life jackets;
- (d) oxygen dispensing equipment; and
- (e) other emergency equipment provided for individual use, including passenger emergency briefing cards.

203.2 The pilot-in-command of Thai helicopter to which this part applies 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.

### **GA-P3H.204 HELICOPTER AIRWORTHINESS AND SAFETY PRECUATIONS**

204.1 A flight shall not be commenced until flight preparation forms have been completed certifying that the pilot-in-command is satisfied that:

- (a) the helicopter is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the helicopter;
- (b) the instruments and equipment installed in the helicopter are appropriate, taking into account the expected flight conditions;
- (c) any necessary maintenance has been performed in accordance with CAAT airworthiness requirement;
- (d) the mass of the helicopter and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;
- (e) any load carried is properly distributed and safely secured; and

- (f) the helicopter operating limitations contained in the flight manual, or its equivalent, will not be exceeded.

204.2 Completed flight preparation forms shall be kept by the operator for a period of three months.

#### **GA-P3H.205 WEATHER REPORTS AND FORECASTS**

205.1 Before commencing a flight, the pilot-in-command shall be familiar with all available meteorological information appropriate to the intended flight. Preparation for a flight away from the vicinity of the place of departure, and for every flight under IFR, shall include:

- (a) a study of available current weather reports and forecasts; and
- (b) 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.

*Note.— The requirements for flight plans are contained in Regulation of Civil Aviation Board No. 94 on Rule of The Air and ICAO Document, the PANS-ATM (Doc 4444).*

#### **GA-P3H.206 LIMITATIONS IMPOSED BY WEATHER CONDITIONS**

##### **206.1 Flight in accordance with VFR**

A flight, except one of purely local character in visual meteorological conditions, to be conducted in accordance with VFR shall not be commenced unless 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 VFR, will, at the appropriate time, be such as to enable compliance with these rules.

##### **206.2 Flight in accordance with IFR**

206.2.1 *When an alternate is required.* A flight to be conducted in accordance with IFR shall not be commenced unless the available information indicates that conditions, at the heliport of intended landing and at least one alternate heliport will, at the estimated time of arrival, be at or above the heliport operating minima.

206.2.2 *When no alternate is required.* A flight to be conducted in accordance with IFR to a heliport when no alternate heliport is required shall not be commenced unless available current meteorological information indicates that the following meteorological conditions will exist from two hours before to two hours after the estimated time of arrival, or from the actual time of departure to two hours after the estimated time of arrival, whichever is the shorter period:

- (a) a cloud base of at least 120 m (400 ft) above the minimum associated with the instrument approach procedure; and
- (b) visibility of at least 1.5 km more than the minimum associated with the procedure.

*Note.— These should be considered as minimum values where a reliable and continuous meteorological watch is maintained. When only an “area” type forecast is available these values should be increased accordingly.*

**206.3 Helicopter operating minima**

206.3.1 A flight shall not be continued towards the heliport of intended landing unless the latest available meteorological information indicates that conditions at that heliport, or at least one alternate heliport, will, at the estimated time of arrival, be at or above the specified heliport operating minima.

206.3.2 An instrument approach shall not be continued below 300 m (1 000 ft) above the heliport elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the heliport operating minima.

*Note.— Criteria for the final approach segment is contained in PANS-OPS (Doc 8168), Volume II.*

206.3.3 If, after entering the final approach segment or after descending below 300 m (1 000 ft) above the heliport 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, a helicopter shall not continue its approach-to-land beyond a point at which the limits of the heliport operating minima would be infringed.

**206.4 Flight in icing conditions**

206.4.1 A flight to be operated in known or expected icing conditions shall not be commenced unless the helicopter is certificated and equipped to cope with such conditions.

**GA-P3H.207 ALTERNATE HELIPORTS**

207.1 For a flight to be conducted in accordance with IFR, at least one alternate heliport or landing location shall be specified in the operational flight plan and the flight plan, unless:

- (a) the weather conditions in para 206.2.2 prevail; or
- (b) 1) the heliport or landing location of intended landing is isolated and no alternate heliport or landing location is available; and  
2) an instrument approach procedure is prescribed for the isolated heliport of intended landing; and  
3) a point of no return (PNR) is determined in case of an offshore destination.

207.2 Suitable offshore alternates may be specified subject to the following:

- (a) the offshore alternates shall be used only after passing a PNR. Prior to a PNR, onshore alternates shall be used;
- (b) mechanical reliability of critical control systems and critical components shall be considered and taken into account when determining the suitability of the alternate;
- (c) one engine inoperative performance capability shall be attainable prior to arrival at the alternate;
- (d) to the extent possible, deck availability shall be guaranteed; and
- (e) weather information must be reliable and accurate.

Note.— The landing technique specified in the flight manual following control system failure may preclude the nomination of certain helidecks as alternate heliports.

- 207.3 Offshore alternates should not be used when it is possible to carry enough fuel to have an onshore alternate. Offshore alternates should not be used in a hostile environment.

#### **GA-P3H.208 FUEL AND OIL REQUIREMENTS**

208.1 **All helicopters.** A flight shall not be commenced unless, taking into account both the meteorological conditions and any delays that are expected in flight, the helicopter carries sufficient fuel and oil to ensure that it can safely complete the flight. In addition, a reserve shall be carried to provide for contingencies.

208.2 **VFR operations.** The fuel and oil carried in order to comply with paragraph 208.1 shall, in the case of VFR operations, be at least the amount to allow the helicopter to:

- (a) fly to the landing site to which the flight is planned;
- (b) have a final reserve fuel to fly thereafter for a period of 20 minutes at best-range speed; and
- (c) for contingency purposes. Contingency reserve should be 5% of fuel require for the route. Extra fuel may be carried at the discretion of the pilot-in- command.

208.3 **IFR operations.** The fuel and oil carried in order to comply with para 208.1 shall, in the case of IFR operations, be at least the amount to allow the helicopter:

208.3.1 When no alternate is required, in terms of para 206.2.2, to fly to and execute an approach at the heliport or landing location to which the flight is planned, and thereafter to have:

- (a) final reserve fuel to fly 30 minutes at holding speed at 450 m (1 500 ft) above the destination heliport or landing location under standard temperature conditions and approach and land; and
- (b) an additional amount of fuel to provide for the increased consumption on the occurrence of potential contingencies.

208.3.2 When an alternate is required, in terms of para 206.2.1, to fly to and execute an approach, and a missed approach, at the heliport or landing location to which the flight is planned, and thereafter:

- (a) fly to and execute an approach at the alternate specified in the flight plan; and then
- (b) have a final reserve fuel to fly for 30 minutes at holding speed at 450 m (1 500 ft) above the alternate under standard temperature conditions, and approach and land; and
- (c) have an additional amount of fuel to provide for the increased consumption on the occurrence of potential contingencies.

- 208.3.3 When no alternate heliport or landing location is available (i.e. the heliport of intended landing is isolated and no alternate is available), to fly to the heliport to which the flight is planned and thereafter for a period that will, based on geographic and environmental considerations, enable a safe landing to be made.
- 208.4 In computing the fuel and oil required in para 208.1, at least the following shall be considered:
- (a) meteorological conditions forecast;
  - (b) expected air traffic control routings and traffic delays;
  - (c) for IFR flight, one instrument approach at the destination heliport, including a missed approach;
  - (d) the procedures for loss of pressurization, where applicable, or failure of one engine while en route; and
  - (e) any other conditions that may delay the landing of the helicopter or increase fuel and/or oil consumption.

*Note.— Nothing in 208 precludes amendment of a flight plan in flight in order to replan the flight to another heliport, provided that the requirements of 2.8 can be complied with from the point where the flight has been replanned*

- 208.5 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.

#### **GA-P3H.209 INFLIGHT FUEL MANAGEMENT**

- 209.1 The pilot-in-command of Thai helicopter to which this part applies shall:
- (a) 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;
- Note.— The protection of final reserve fuel is intended to ensure safe landing at any heliport or landing location when unforeseen occurrences may not permit a safe completion of an operation as originally planned.*
- (b) advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific landing site, the pilot calculates that any change to the existing clearance to that landing site, or other air traffic delays, may result in landing with less than the planned final reserve fuel; and

*Note 1.—The declaration of MINIMUM FUEL informs ATC that all planned landing site options have been reduced to a specific landing site of intended landing, that no precautionary landing site is available, 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.*

*Note 2.—A precautionary landing site refers to a landing site, other than the site of*



*intended landing, where it is expected that a safe landing can be made prior to the consumption of the planned final reserve fuel.*

- (c) declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the usable fuel estimated to be available upon landing at the nearest landing site where a safe landing can be made is less than the required final reserve fuel in compliance with GA-P3H.208.

*Note 1.— The planned final reserve fuel refers to the value calculated in 2.8 and is the minimum amount of fuel required upon landing at any landing site. The declaration of MAYDAY MAYDAY MAYDAY FUEL informs ATC that all available landing options have been reduced to a specific site and a portion of the final reserve fuel may be consumed prior to landing.*

*Note 2.— The pilot estimates with reasonable certainty that the fuel remaining upon landing at the nearest safe landing site will be less than the final reserve fuel taking into consideration the latest information available to the pilot, the area to be overflown (i.e. with respect to the availability of precautionary landing areas), meteorological conditions and other reasonable contingencies.*

*Note 3.— 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).*

#### **GA-P3H.210 OXYGEN SUPPLY**

210.1 A flight to be operated at altitudes at which the atmospheric pressure in personnel compartments will be less than 700 hPa shall not be commenced unless sufficient stored breathing oxygen is carried to supply:

- (a) 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;
- (b) the crew and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 hPa.

*Note.- Approximate altitudes in the Standard Atmosphere corresponding to the values of absolute pressure used in the text as follows:*

<i>Absolute pressure</i>	<i>Metres</i>	<i>Feet</i>
<i>700 hPa</i>	<i>3 000</i>	<i>10 000</i>
<i>620 hPa</i>	<i>4 000</i>	<i>13 000</i>

210.2 A flight to be operated with a pressurized helicopter shall not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all the crew members and a proportion of the 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.

#### **GA-P3H.211 USE OF OXYGEN**

211.1 All flight crew members, when engaged in performing duties essential to the safe operation of a helicopter in flight, shall use breathing oxygen continuously whenever the circumstances prevail for which its supply has been required in para 210.1 or 210.2.

#### **GA-P3H.212 IN-FLIGHT EMERGENCY INSTRUCTION**

212.1 In an emergency during flight, the pilot-in-command shall ensure that all persons on board are instructed in such emergency action as may be appropriate to the circumstances.

#### **GA-P3H.213 WEATHER REPORTING BY PILOTS**

213.1 When weather conditions likely to affect the safety of other aircraft are encountered, they should be reported as soon as possible.

#### **GA-P3H.214 HAZARDOUS FLIGHT CONDITIONS**

214.1 Hazardous flight conditions, other than those associated with meteorological conditions, encountered en route should be reported as soon as possible. The reports so rendered should give such details as may be pertinent to the safety of other aircraft.

#### **GA-P3H.215 FITNESS OF FLIGHT CREW MEMBERS**

215.1 The pilot-in-command shall be responsible for ensuring that a flight:

- (a) 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
- (b) will not be continued beyond the nearest suitable 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.

#### **GA-P3H.216 FLIGHT CREW MEMBERS AT DUTY STATIONS**

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

216.2 **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 helicopter, or for physiological needs.

216.3 **Seat belts.** All flight crew members shall keep their seat belt fastened when at their stations.

216.4 **Safety harness.** When safety harnesses are provided, any flight crew member occupying a pilot's seat should keep the safety harness fastened during the take-off and landing phases; all other flight crew members should keep their safety harness 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.*

#### **GA-P3H.217 INSTRUMENT FLIGHT PROCEDURES**

217.1 The CAAT promulgates instrument approach procedures designed in accordance with the

classification of instrument approach and landing operations to serve each instrument runway or heliport utilized for instrument flight operations.

- 217.2 All Thai helicopters operated in accordance with instrument flight rules shall comply with the instrument flight procedures approved by CAAT if the heliport is located in Thailand, or by the state which is responsible for the heliport when located outside the territory of Thailand.

*Note 1.— See Section II, Chapter 2, 2.2.8.3, for instrument approach operation classifications.*

*Note 2. — Information for pilots on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of instrument flight procedures for the guidance of procedure specialists are provided 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 (see Section II, Chapter 1, 1.1.1).*

#### **GA-P3H.218 INSTRUCTION-GENERAL**

- 218.1 A Thai helicopter rotor shall not be turned under power without a qualified pilot at the controls.

#### **GA-P3H.219 REFUELLING WITH PASSENGERS ON BOARD OR ROTORS TURNING**

- 219.1 A Thai helicopter shall not be refuelled when passengers are embarking, on board or disembarking or when the rotor is turning unless it is attended by the pilot-in-command or other qualified personnel ready to initiate and direct an evacuation of the helicopter by the most practical and expeditious means available.
- 219.2 When refuelling with passengers embarking, on board or disembarking, two-way communications shall be maintained by helicopter inter-communications system or other suitable means between the ground crew supervising the refuelling and the pilot-in-command or other qualified personnel required by GA-P3H.218.

*Note 1.— Provisions concerning aircraft refuelling are contained in Annex 14, Volume I, and guidance on safe refuelling practices is contained in the Airport Services Manual (Doc 9137), Parts 1 and 8.*

*Note 2.— Additional precautions are required when refuelling with fuels other than aviation kerosene or when refueling results in a mixture of aviation kerosene with other aviation turbine fuels, or when an open line is used.*

#### **GA-P3H.220 OVER-WATER FLIGHTS**

- 220.1 All Thai helicopters on flights over water in a hostile environment in accordance with GA-P3H.403, para 403.1 shall be certificated for ditching. Sea state shall be an integral part of ditching information.

## CHAPTER 3

### HELICOPTER PERFORMANCE OPERATING LIMITATIONS

#### GA-P3H.301 GENERAL

301.1 A Thai helicopter shall be operated:

- (a) in compliance with the terms of its airworthiness certificate or equivalent approved document;
- (b) within the operating limitations prescribed by the CAAT or Manufacturer; and
- (c) within the mass limitations imposed by compliance with the applicable noise certification Standards in Annex 16, Volume I, unless otherwise authorized, in exceptional circumstances for a certain heliport where there is no noise disturbance problem, by the CAAT.

301.2 The Thai helicopter shall have displayed on it such placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed by the CAAT for visual presentation, shall be displayed in the helicopter.

*Note.— The Standards of ICAO Annex 8, Part IV, apply to all helicopters intended for the carriage of passengers or cargo or mail in international air navigation.*

301.3 The Thai helicopter shall be operated in accordance with Performance Class 1, Class 2 or Class 3 in compliance with the AOCR chapter 9 section 10.

## CHAPTER 4

### HELICOPTER INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

#### GA-P3H.401 ALL HELICOPTER ON ALL FLIGHTS

##### 401.1 General

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, in helicopters according to the helicopter used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be accepted by the CAAT.

##### 401.2 Instruments

A Thai helicopter shall be equipped with instruments which will enable the flight crew to control the flight path of the helicopter, carry out any required procedural manoeuvre, and observe the operating limitations of the helicopter in the expected operating conditions.

##### 401.3 Equipment

401.3.1 A Thai helicopter shall be equipped with or carry on board:

- (a) an accessible first-aid kit;
- (b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the helicopter. At least one shall be located in:
  - 1) the pilot's compartment; and
  - 2) each passenger compartment that is separate from the pilot's compartment and that is not readily accessible to the flight crew;

*Note.— Refer to paragraph 401.3.2 for fire extinguishing agents.*

- (c)
  - 1) a seat or berth for each person over an age of two years; and
  - 2) a seat belt for each seat and restraining belts for each berth;
  - 3) a safety harness for each flight crew seat.

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

- (d) the following manuals, charts and information:
  - 1) the flight manual or other documents or information concerning any operating limitations prescribed for the helicopter by the CAAT or Manufacturer, required for the application of in accordance with Chapter 3 of Part III.
  - 2) any specific approval issued by the CAAT, if applicable, for the operation(s) to be

conducted;

- 3) current and suitable charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;
- 4) procedures for pilots-in-command of intercepted aircraft;
- 5) a list of visual signals for use by intercepting and intercepted aircraft, as prescribed in Regulation of Civil Aviation Board No. 94 on Rule of the Air;
- 6) the journey log book for the helicopter; and
- 7) other documents prescribed for the helicopter by the CAAT.

(e) if fuses are used, spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

(f) ground-air signal codes for search and rescue purposes.

401.3.2 Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in a helicopter 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 a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2018 shall not be of a type listed in the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as it appears in the Eighth Edition of the Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer, Annex A, Group II.

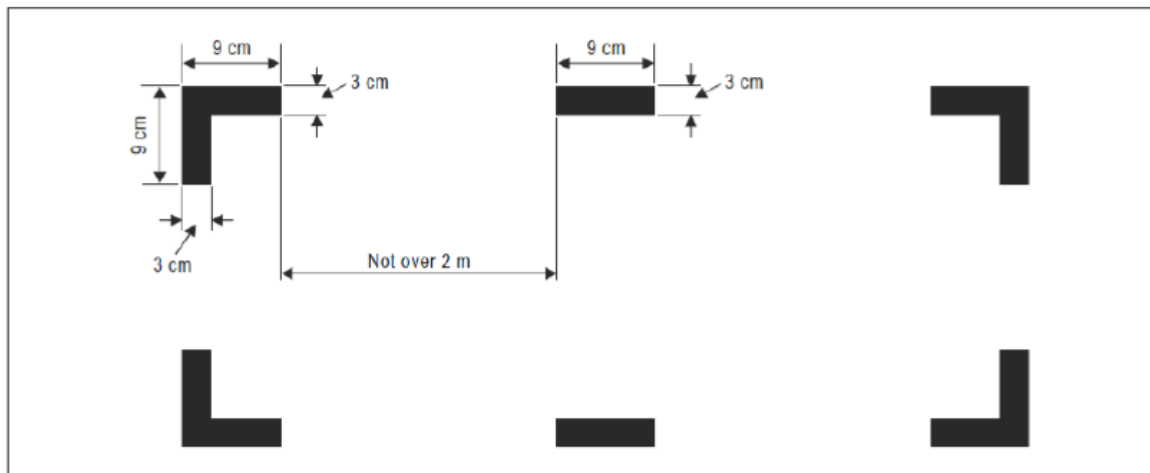
*Note.— Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.*

#### 401.4 **Marking of break-in points**

401.4.1 If areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on a helicopter, such areas shall be marked as shown below (see figure following). The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.

401.4.2 If the corner markings are more than 2 m apart, intermediate lines 9 cm × 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

*Note.—This Standard does not require any helicopter to have break-in areas.*



Marking of Break-In Points

**GA-P3H.402 INSTRUMENT AND EQUIPMENT FOR FLIGHTS OPERATED UNDER VFR AND IFR –BY DAY AND NIGHT**

*Note. — The flight instrument requirements in para 402.1, 402.2 and 402.3 may be met by combinations of instruments or by electronic displays*

402.1 All Thai helicopters when operating in accordance with VFR by day shall be:

- (a) equipped with: 1) a magnetic compass  
2) a sensitive pressure altimeter;  
3) an airspeed indicator;  
4) such additional instruments or equipment as may be prescribed by the CAAT; and
- (b) equipped with, or shall carry, a means of measuring and displaying the time in hours, minutes and seconds.

402.2 All Thai helicopters when operating in accordance with VFR at night shall be equipped with:

- (a) the equipment specified in para 402.1;
- (b) an attitude indicator (artificial horizon) for each required pilot;
- (c) a slip indicator;
- (d) a heading indicator (directional gyroscope);
- (e) a rate of climb and descent indicator;
- (f) such additional instruments or equipment as may be prescribed by CAAT; and the following lights:
- (g) the lights required by the Regulations of Civil Aviation Board No. 94 on Rule of The Air for aircraft in flight or operating on the movement area of a heliport;

- (h) a landing light;
- (i) illumination for all flight instruments and equipment that are essential for the safe operation of the helicopter;
- (j) lights in all passenger compartments; and
- (k) a flashlight for each crew member station.

402.3 All Thai helicopters, when operating in accordance with IFR, or when the helicopter cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be:

- (a) equipped with:
  - 1) a magnetic compass;
  - 2) a sensitive pressure altimeter;
  - 3) an airspeed indicating system with a means of preventing malfunctioning due to either condensation or icing;
  - 4) a slip indicator;
  - 5) an attitude indicator (artificial horizon) for each required pilot and one additional attitude indicator;
  - 6) a heading indicator (directional gyroscope);
  - 7) a means of indicating whether the supply of power to the gyroscopic instruments is adequate;
  - 8) a means of indicating on the flight deck the outside air temperature;
  - 9) a rate of climb and descent indicator;
  - 10) such additional instruments or equipment as may be prescribed by the appropriate authority;
  - 11) if operated by night, the lights specified in para 402.2 g) to k); and
- (b) equipped with, or shall carry, a means of measuring and displaying the time in hours, minutes and seconds.

#### **GA-P3H.403 ALL HELICOPTERS ON FLIGHTS OVER WATER**

##### **403.1 Means of flotation**

All Thai helicopters intended to be flown over water shall be fitted with a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter when:

- (a) engaged in offshore operations or other over-water operations as prescribed by the CAAT; or
- (b) flying at a distance from land specified in Regulation of CAAT on Helicopter Operations Requirements B.E. 2561.



*Note.— When determining the distance from land referred to in 403.1, consideration should be given to environmental conditions and the availability of search and rescue facilities.*

**403.2 Emergency equipment**

403.2.1 Thai helicopters operating in accordance with the provisions of para 403.1 shall be equipped with:

- (a) one life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat of the person for whose use it is provided;
- (b) when not precluded by consideration related to the type of helicopter used, 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
- (c) equipment for making the pyrotechnical distress signals described in Regulations of Civil Aviation Board No. 94 on Rule of The Air.

403.2.2 When taking off or landing at a heliport where 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 para 403.2.1 a) shall be carried.

403.2.3 Each life jacket and equivalent individual flotation device, when carried in accordance with para 403.2, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.

**GA-P3H.404 ALL HELICOPTERS ON FLIGHTS OVER DESIGNATED LAND AREAS**

404.1 Thai helicopters, when operated across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, shall be equipped with such signaling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

**GA-P3H.405 ALL HELICOPTERS ON HIGH ALTITUDE FLIGHTS**

405.1 Unpressurized helicopters intended to be operated at high altitudes shall carry equipment for storing and dispensing the oxygen supplies required in accordance with Chapter 2 of This part III, para 210.1.

405.2 Pressurized helicopters intended to be operated at high altitudes shall carry emergency oxygen storage and dispensing equipment capable of storing and dispensing the oxygen supplies required in accordance with Chapter 2 of part III, para 210.2.

**GA-P3H.406 ALL HELICOPTERS REQUIRED TO COMPLY WITH THE NOISE CERTIFICATION STANDARDS**

406.1 All Thai helicopters required to comply with the noise certification Standards of Annex 16, Volume I to the International Convention on Civil Aviation, shall carry a document attesting noise certification. When the document, or a suitable statement attesting noise certification as contained in another document approved by the CAAT, is issued in a language other than English, it shall include an English translation.

## **GA-P3H.407 FLIGHT RECORDERS**

*Note 1.— Crash protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.*

*Note 2.— Combination recorders (FDR/CVR) may be used to meet the flight recorder equipage requirements.*

*Note 3.— Detailed guidance on flight recorders is contained in Appendix M.*

*Note 4.— Lightweight flight recorders comprise one or more of the following systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS), a data link recording system (DLRS). Image and data link information may be recorded on either the CARS or the ADRS.*

### **407.1 Flight data recorders and aircraft data recording systems**

*Note.— Parameters to be recorded are listed in Table M-1 of Appendix M.*

#### **407.1.1 Applicability**

- (a) 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 M-1 of Appendix M.
- (b) 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 M-1 of Appendix M.

#### **407.1.2 Recording technology**

FDRs shall not use engraving metal foil, frequency modulation (FM), photographic film or magnetic tape.

#### **407.1.3 Duration**

All FDRs shall retain the information recorded during at least the last 10 hours of their operation.

### **407.2 Cockpit voice recorders and cockpit audio recording systems**

#### **407.2.1 Applicability**

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.

#### **407.2.2 Recording technology**

CVRs shall not use magnetic tape or wire.

#### 407.2.3 **Duration**

All helicopters required to be equipped with a CVR shall be equipped with a CVR capable of retaining the information recorded during the last two hours of its operation.

#### 407.3 **Data link recorders**

##### 407.3.1 **Applicability**

- (a) All 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 para 5.1.2 of Appendix M, and are required to carry a CVR, shall record on a flight recorder, the data link communications messages.
- (b) All helicopters which are modified on or after 1 January 2016, to install and utilize any of the data link communications applications listed in para 5.1.2 of the Appendix M and are required to carry a CVR, shall record on a flight recorder the data link communications messages.

*Note — 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 prohibitively expensive to record those data link communications applications messages on FDR or CVR.*

##### 407.3.2 **Duration**

The minimum recording duration shall be equal to the duration of the CVR.

##### 407.3.3 **Correlation**

Data link recording shall be able to be correlated to the recorded cockpit audio.

#### 407.4 **Flight recorders — general**

##### 407.4.1 **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.

##### 407.4.2 **Operation**

- (a) Flight recorders shall not be switched off during flight time.
- (b) 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 prescribed by the aircraft accident investigation committee of thailand.

*Note 1.— The need for removal of the flight recorder records from the aircraft will be determined by the aircraft accident investigation committee of Thailand 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/owner's responsibilities regarding the retention of flight recorder records are contained in para 407.4.3.*

#### **407.4.3 Flight recorder records**

The pilot-in-command, and/or the owner/operator, shall ensure, to the extent possible, in the event the aeroplane 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.

#### **407.4.4 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 M.*

### **GA-P3H.408 EMERGENCY LOCATOR TRANSMITTER (ELT)**

- 408.1 All helicopters shall carry an automatic emergency locator transmitter (ELT) that operates simultaneously on 406 MHz and 121.5 MHz.
- 408.2 All helicopters, when operating on flights over water as described in para 403.1 (a) or (b), with at least one automatic ELT and one Survival ELT (ELT(S)) in a raft or life jacket.
- 408.3 ELT equipment carried to satisfy the requirements of para 408.1 and 408.2 shall operate in accordance with the relevant provisions of Volume III to Annex 10 to the Convention on International Civil Aviation.

### **GA-P3H.409 HELICOPTERS REQUIRED TO BE EQUIPPED WITH A PRESSURE-ALTITUDE REPORTING TRANSPONDER**

- 409.1 unless exempted by the CAAT, all Thai helicopters shall be equipped with a pressure-altitude reporting transponder with operates in accordance with the relevant provisions of Annex 10, Volume IV to the International Convention on Civil Aviation.

### **GA-P3H.410 MICROPHONES**

- 410.1 All flight crew members required to be on flight deck duty should communicate through boom and throat microphones.

**GA-P3H.411 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)**

411.1 In establishing operational criteria for the use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, operator/owner shall demonstrate to the CAAT that:

- (a) the equipment meets the appropriate airworthiness certification requirements;
- (b) the operator/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;
- (c) the operator/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 CAAT Guidance Material for Safety Management System.*

*Note 2: Guidance on establishing operational criteria is contained in Appendix L.*

**GA-P3H.412 ELECTRONIC FLIGHT BAGS (EFBS)**

412.1 An owner/operator of Thai helicopter which this chapter applies shall comply a regulation for electronic flight bags (EFBs) in accordance with Chapter 5 of Part I, GA-P1A.515.

## CHAPTER 5

### HELICOPTER COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT

#### GA-P3H.501 COMMUNICATION EQUIPMENT

501.1 A Thai helicopter to be operated in accordance with IFR 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 para 501.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.*

501.2 When compliance with para 501.1 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.

501.3 A Thai helicopter 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.

501.4 A Thai helicopter to be operated on a flight to which the provisions of GA-P3H.403 or GA-P3H.404 of this chapter 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.

501.5 The radio communication equipment required in accordance with para 501.1 to 501.4 shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

501.6 For operations where communication equipment is required to meet an RCP specification for performance-based communication (PBC), a helicopter shall, in addition to the requirements specified in para 501.1 to 501.5:

- (a) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s);
- (b) have information relevant to the helicopter RCP specification capabilities listed in the flight manual or other helicopter documentation, approved by the State of Design or the CAAT; and
- (c) where the helicopter is operated in accordance with a MEL, have information relevant to the helicopter 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 ICAO Doc 9869 Performance-based Communication and Surveillance (PBCS) Manual.*

501.7 For operations where communication is required to meet an Required Communication Performance (RCP) specification for PBC, the following shall be established and documented by the operator/owner:

- (a) normal and abnormal procedures, including contingency procedures;

- (b) flight crew qualification and proficiency requirements, in accordance with appropriate RCP specifications;
  - (c) a training programme for relevant personnel consistent with the intended operations; and
  - (d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RCP specifications.
- 501.8 In respect of those helicopters mentioned in para 501.6, the owner/operator shall ensure adequate provisions exist for:
- (a) submitting the reports to the CAAT regarding to observed communication performance issued by monitoring programmes established in accordance with ICAO Annex 11, Chapter 3, 3.3.5.2 to the International Convention on Civil Aviation; and
  - (b) taking immediate corrective action for individual helicopters, helicopter types or operators, identified in such reports as not complying with the RCP specification(s).

#### **GA-P3H.502 NAVIGATION EQUIPMENT**

- 502.1 A Thai helicopter shall be provided with navigation equipment which will enable it to proceed:
- (a) in accordance with its flight plan; and
  - (b) 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. For international general aviation, landmarks shall be located at least every 110 km (60 NM).
- 502.2 For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, a Thai helicopter shall, in addition to the requirements specified in para 502.1:
- (a) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s);
  - (b) have information relevant to the helicopter navigation specification capabilities listed in the flight manual or other helicopter documentation approved by the State of Design or the CAAT; and
  - (c) where the helicopter is operated in accordance with a MEL, have information relevant to the helicopter navigation specification capabilities included in the MEL.

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

- 502.3 For operations where a navigation specification for PBN has been prescribed, the following shall be established and documented by the operator/owner:
- (a) normal and abnormal procedures, including contingency procedures;
  - (b) flight crew qualification and proficiency requirements, in accordance with the appropriate navigation specifications;
  - (c) training for relevant personnel consistent with the intended operations; and
  - (d) 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 ICAO Annex 19, are contained in CAAT Guidance Material for Performance-Based Navigation (PBN).*

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

- 502.4 The CAAT 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 CAAT Guidance Material for Performance-based Navigation (PBN) and ICAO Doc 9997 PBN Operational Approval Manual.*

- 502.5 The Thai helicopter 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 helicopter to navigate in accordance with paragraph 502.1 and, where applicable, para 502.2

*Note.— For international general aviation, this requirement may be met by means other than the duplication of equipment*

- 502.6 On flights in which it is intended to land in instrument meteorological conditions, a helicopter shall be provided with appropriate navigation equipment providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance at each heliport at which it is intended to land in instrument meteorological conditions and at any designated alternate heliports.

### **GA-P3H.503 SURVEILLANCE EQUIPMENT**

- 503.1 A Thai helicopter shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services.

- 503.2 For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance (PBS), a helicopter shall, in addition to the requirements specified in para 503.1:

- (a) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification(s);
- (b) have information relevant to the helicopter RSP specification capabilities listed in the flight manual or other helicopter documentation approved by the State of Design or CAAT; and
- (c) where the helicopter is operated in accordance with a MEL, have information relevant to the helicopter RSP specification capabilities included in the MEL.

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

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

- 503.3 For operations where an RSP specification for PBS has been prescribed, the following shall be established and documented by the operator/owner of Thai helicopter:

- (a) normal and abnormal procedures, including contingency procedures;



- (b) flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;
- (c) a training programme for relevant personnel consistent with the intended operations; and
- (d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RSP specifications.

503.4 In respect of those helicopters mentioned in para 503.2, the operator/owner of Thai helicopter to which this part applies shall ensure adequate provisions exist for:

- (a) submitting the reports to the CAAT regarding observed surveillance performance issued by monitoring programmes established in accordance with ICAO Annex 11, Chapter 3, 3.3.5.2 to the International Convention on Civil Aviation; and
- (b) taking immediate corrective action for individual helicopter, helicopter types or operators, identified in such reports as not complying with the RSP specification(s).

## CHAPTER 6

### HELICOPTER FLIGHT CREW

#### GA-P3H.601 QUALIFICATIONS

- 601.1 The pilot-in-command of Thai helicopter to which this part applies shall ensure that the licences of each flight crew member have been issued or rendered valid by the CAAT, and are properly rated and of current validity, and shall be satisfied that flight crew members have maintained competence.

*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.*

#### GA-P3H.602 COMPOSITION OF THE FLIGHT CREW

- 602.1 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.

#### GA-P3H.603 RECURRENT CHECKS

- 603.1 ***Pilot's Proficiency Check (PPC)***. Each flight crew member shall undergo PPC to demonstrate his/her competence in carrying out normal, abnormal and emergency procedures on each type of helicopter. PPCs shall be required to be carried out on each type and not each variant. When a flight crew operates different types of helicopters even with similar characteristics in terms of operating procedures, systems and handling, the PPC for each type shall be carried out separately without any credits for the other rated type. In case of PPC perform on helicopter, the PPC Check shall not be carried out with passengers on board. The period of validity of a PPC shall be 12 months and shall be counted form the end of date when the check was taken. When the check is undertaken within the last three months of the validity period, the new validity period shall be counted form the original expiry date.
- 603.2 ***Instrument Rating (IR) Check***. Each flight crew member shall undergo IR checks, if applicable to the type of helicopter being flown, to demonstrate his/her competence in carrying out normal, abnormal and emergency procedures under instrument flying conditions. When a flight crew operates several variants of the same type of helicopter, the IR check done on a specific type shall be valid for all its variants. When the flight crew operates different types of helicopters, the IR check for each type shall be carried out separately without any credits for each rated type. The IR Check shall not be carried out with passengers on board. The period of validity of IR Checks shall be 24 months and shall be counted form the end of date when the check was taken. When the check is undertaken within the last three months of the validity period, the new validity period shall be counted form the original expiry date.
- 603.3 The checks specified in para 603.1 and 603.2 above shall be conducted by CAAT Inspector or an Authorised Flight Examiner.

**GA-P3H.604 RECURRENT TRAINING**

604.1 **Flying Recurrent Training.** All pilots shall undergo recurrent training at least once in two years, on a Full Flight Simulator (FFS) or in helicopter with a CAAT accepted Instructor/ATO. Instrument Flying (only for IR pilots) and the practice of those parts of emergencies such as touchdowns in engine failure, hydraulic failure, multiple system failures, tail rotor failure/control failure, loss of tail rotor effectiveness (LTE), Vortex Ring etc. which cannot be practiced in actual flying shall be carried out. All major failures of systems and associated procedures shall be covered in a period of two years.

- (a) The minimum duration of this training shall be 8:00 hrs for IFR operations. This breakdown shall be 4:00 + 4:00 hrs (Instrument Flying + Critical Emergencies) respectively.
- (b) The minimum duration of this training shall be 4:00 hrs for VFR operations for practice of critical emergencies. For pilots flying Single Engine helicopters this duration shall be 3:00 hrs.

604.2 **Ground Recurrent Training.** The training placed at Module I and II may be undertaken with a type trained Flight Instructor/Check Airmen/Chief pilot. Training placed at Module II may be undertaken with a Flight Instructor/Check Airmen / Chief pilot/SEP Instructor/ATO except item Module II, (e) shall be undertaken with SEP Instructor. Training placed at Module III, V, IV and VI may be undertaken with a CAAT accepted Instructor/ATO.

**Training Programme:**

Module	Training	Prediodicity	Duration	Topics to be covered
I	Technical and Performance Refresher	Once a year	08 hrs.	Rotorcraft Flight Manual, Helicopter Systems and performance, Type emergencies and recovery actions, and any changes to Operations Manual / Regulations
II	SEP Training	Once a year	02hrs.	Safety and Emergency Procedures Training on the helicopter shall include: (a) Actual donning of life jackets/breathing equipment, where fitted. (b) Actual handling of fire extinguishers. (c) Location and use of all emergency and safety equipment. (d) Instructions on the location and use of all types of exits. (e) Once every three years actual operation of fire extinguishers and emergency exits, actual fire-fighting using eqpt representative of that carried in the helicopter on an actual or simulated

				fire (except with Halon extinguishers), shall be practiced by all crew.
III	Specific Ground Training	Once a year	04 hrs.	Adverse Weather, Effects of Monsoons, Disorientation, Situational Awareness & CFIT.
IV	CRM Training	Once in two years	As applicable	
V	AVSEC Training	Once in two years	As applicable	
VI	DGR Training	Once in two years	As applicable	

## CHAPTER 7

### HELICOPTER CONTINUING AIRWORTHINESS

*Note.— For the purpose of this chapter “helicopter” includes: engines, power transmissions, rotors, components, accessories, instruments, equipment and apparatus including emergency equipment.*

#### **GA-P3H.701 OPERATOR’S CONTINUING AIRWORTHINESS RESPONSIBILITIES**

- 701.1 The owner of a helicopter, or in the case where it is leased, the lessee, shall ensure that:
- (a) the helicopter is maintained in an airworthy condition;
  - (b) the operational and emergency equipment necessary for the intended flight is serviceable;
  - (c) the certificate of airworthiness of the helicopter remains valid; and
  - (d) the maintenance of the helicopter is performed in accordance with a maintenance programme acceptable to the CAAT.
- 701.2 The owner/operator of Thai aeroplane shall not operate an aeroplane unless maintenance on the aeroplane, including any associated engine, propeller and part, is carried out:
- (a) by an organization complying with Announcement of the CAAT on Repair station approval that is either approved by the CAAT or is approved by another Contracting State and is accepted by the CAAT; or
  - (b) by a person or organization in accordance with procedures that are authorized by the CAAT;
- and there is a maintenance release in relation to the maintenance carried out..
- 701.3 As of 5 November 2020, The owner/operator of Thai helicopter to which this part applies or the lessee shall appoint a person or an organization accepted by CAAT that is responsible for ensuring that appropriate arrangements (commensurate with the number, type and complexity of the aircraft and the type of operations) are in place for continuing airworthiness management..

#### **GA-P3H.702 CONTINUING AIRWORTHINESS RECORDS**

- 702.1 The owner/operator of Thai helicopter to which this part applies or in case where it is leased, the lessee, shall ensure that the following records are kept for the periods mentioned in para 702.2:
- (a) the total time in service (hours, calendar time and cycles, as appropriate) of the helicopter and all life-limited components;
  - (b) the current status of compliance with all mandatory continuing airworthiness information;
  - (c) appropriate details of modifications and repairs to the helicopter;

- (d) the time in service (hours, calendar time and cycles, as appropriate) since last overhaul of the helicopter or its components subject to a mandatory overhaul life;
- (e) the current status of the helicopter's compliance with the maintenance programme; and
- (f) the detailed maintenance records to show that all requirements for signing of a maintenance release have been met.

702.2 The records in para 702.1 a) to e) shall be kept for a minimum period of 90 days after the unit to which they refer has been permanently withdrawn from service, and the records in para 702.1 f) for a minimum period of two years after the signing of the maintenance release in accordance with the requirements contained in the Announcement of CAAT on Maintenance, Preventive Maintenance, Rebuilding and Alteration.

702.3 In the event of a temporary change of owner or lessee, the records shall be made available to the new owner or lessee. In the event of any permanent change of owner or lessee, the records shall be transferred to the new owner or lessee.

702.4 As of 5 November 2020, records kept and transferred in accordance with GA-P3H.702 shall be maintained in a form and format that ensures readability, security and integrity of the records at all times.

Note — The form and format of the records may include, for example, paper records, film records, electronic records or any combination thereof.

### **GA-P3H.703 CONTINUING AIRWORTHINESS INFORMATION**

703.1 The owner/operator of Thai helicopter, shall submit a written report on the occurrences of faults, malfunctions, defects or other occurrences that cause or might cause adverse effects on the continuing airworthiness of the aircraft concerning but not limited to the occurrence or detection of each failure, malfunction, or defect contained in Announcement of CAAT subject: Service Difficulty Reporting System, within 72 hours of the occurrence, to the CAAT.

703.2 In addition to the requirements contained in para 703.1, The owner/operator of Thai helicopter over 3 175 kg maximum certificated take-off mass, shall submit a written report on the occurrences of faults, malfunctions, defects or other occurrences as detailed in para 703.1 to the following persons:

- (a) the aircraft type certificate holder; or
- (b) in the case where information on faults, malfunctions, defects and other occurrences relates to an engine or propeller, the aircraft type certificate holder and the organisation responsible for the engine or propeller design; or
- (c) in the case of an occurrence associated with a modification, the organization responsible for the design of the modification.

703.3 Such reports as detailed in para 703.1 and 703.2 may be transmitted by any method i.e. electronically (email: [safetyreport@caat.or.th](mailto:safetyreport@caat.or.th)), by post or by facsimile. Each report should contain at least the following information in accordance with Announcement of CAAT subject: Service Difficulty Reporting System.

- 703.4 When the owner/operator of Thai helicopter over 3 175 kg maximum certificated take-off mass, receives additional information, including information from the manufacturer or other agency, concerning a report required by this section, must expeditiously submit it as a supplement to the first report and reference the date and place of submission of the first report.

**GA-P3H.704 MODIFICATIONS AND REPAIRS**

- 704.1 All modifications and repairs shall comply with the requirements contained in the Announcement of CAAT on Air Operator Certificate Requirements (AOCR) Chapter 8 and the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration.

**GA-P3H.705 MAINTENANCE RELEASE**

- 705.1 A maintenance release shall be completed and signed to certify that the maintenance work performed has been completed satisfactorily and in accordance with data and procedures in accordance with the requirements contained in the Announcement of CAAT Subject: Repair Station Approval and the Announcement of CAAT Subject Maintenance, Preventive Maintenance, Rebuilding and Alteration.

- 705.2 A maintenance release shall contain a certification including:

- (a) basic details of the maintenance performed;
- (b) the date such maintenance was completed;
- (c) when applicable, the identity of the approved maintenance organization; and
- (d) the identity of the authorised person or persons signing the release.

As detailed in accordance with the requirements contained in the Announcement of CAAT on Repair Station Approval and the Announcement of CAAT on Maintenance, Preventive Maintenance, Rebuilding and Alteration.

**GA-P3H.706 ALTIMETER SYSTEM AND ALTITUDE REPORTING EQUIPMENT TESTS AND INSPECTIONS**

- 706.1 No person may operate a helicopter, in controlled airspace under IFR unless—
- 1) Within the preceding 36 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 D and appendix E of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration;
  - 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 in accordance with paragraph (a), appendix D, of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration; and
  - 3) Following installation or maintenance on the automatic pressure altitude reporting system of the ATC transponder where data correspondence error could be

introduced, the integrated system has been tested, inspected, and found to comply in accordance with paragraph (c), appendix D, of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration.

- 706.2 The tests required by para 706.1 of this section must be conducted by—
- 1) The manufacturer of the 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 mechanical instruments;
    - (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 helicopter, to be tested; or
  - 3) A certificated mechanic with an airframe rating (static pressure system tests and inspections only).
- 706.3 Altimeter and altitude reporting equipment approved under Technical Standard Orders are considered to be tested and inspected as of the date of their manufacture.
- 706.4 No person may operate an aeroplane, in controlled airspace under IFR at an altitude above the maximum altitude at which all altimeters and the automatic altitude reporting system of that helicopter have been tested.

#### **GA-P3H.707 ATC TRANSPONDER TESTS AND INSPECTIONS**

- 707.1 No persons may use an ATC transponder unless, within the preceding 36 calendar months, the ATC transponder has been tested and inspected and found to comply in accordance with appendix E of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration; and
- 707.2 Following any installation or maintenance on an ATC transponder where data correspondence error could be introduced, the integrated system has been tested, inspected, and found to comply in accordance with paragraph (c), appendix D, of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration.
- 707.3 The tests and inspections specified in para 707.1, 707.2 must be conducted by—
- 1) A certificated repair station properly equipped to perform those functions and holding—
    - (i) A radio rating, Class radar equipment;
    - (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;
  - 2) The manufacturer of the aircraft on which the transponder to be tested is installed, if the transponder was installed by that manufacturer.



## CHAPTER 8

### MANUALS, LOGS AND RECORDS

#### GA-P3H.801 FLIGHT MANUAL

- 801.1 The helicopter flight manual shall be updated by implementing changes made mandatory by the aircraft manufacturer and/or by the CAAT.

#### GA-P3H.802 JOURNEY LOG/TECHNICAL LOG BOOK

- 802.1 A journey log / technical log book shall be maintained for every helicopter engaged in general aviation in which shall be entered particulars of the helicopter, its crew and each journey.
- 802.2 The helicopter journey / technical log shall contain at least the following items and the corresponding Roman numerals:
- I — helicopter nationality and registration;
  - II — date;
  - III — Name of crew members;
  - IV — duty assignments of crew members;
  - V — Place of departure;
  - VI — Place of arrival;
  - VII — Time of departure;
  - VIII — Time arrival;
  - IX — Hours of flight;
  - X — Nature of flight (Private, Scheduled or Non-scheduled).
  - XI — Incidents, observations (if applicable); and
  - XII — signature of the pilot-in-command.
- 802.3 Entries in the journey log book shall be made currently and in ink or indelible pencil.
- 802.4 The owner/operator of the Thai helicopter to which this part applies shall retain each daily flight record for a period of 6 months after the date of the record.

**GA-P3H.803 RECORDS OF EMERGENCY AND SURVIVAL EQUIPMENT CARRIED**

- 803.1 The owner/operator of the Thai helicopter, shall at all times have available for immediate communication to rescue coordination centre, lists containing information on the emergency and survival equipment carried on board the helicopter. The information shall include, as applicable, the number, colour and type of life rafts and pyrotechnics, details of emergency medical supplies, water supplies and the type and frequencies of the emergency portable radio equipment.

**APPENDIX A -- SPECIFIC APPORVAL**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue



**SPECIFIC APPROVAL**

(Subject to the approved conditions in the Operations Manual)

<b>The Civil Aviation Authority of Thailand</b>				
<b>Telephone: +66 2568 8842-3</b>		<b>Fax: +66 2568 8848</b>		<b>E-mail: ops-ga@caat.or.th</b>
Spec App No. <sup>1</sup> : _____		_____ <sup>4</sup> Director General The Civil Aviation Authority of Thailand Date: _____		
Date of Issuance <sup>2</sup> : _____				
Owner/operator name <sup>3</sup> : _____				
Address <sup>3</sup> : _____				
Aircraft model <sup>5</sup> and registration marks: _____				
Type of operation <sup>6</sup> : _____				
Area(s) of operation <sup>7</sup> : _____				
Special limitations <sup>8</sup> : _____				
<b>Specific Approval</b>	<b>Yes</b>	<b>No</b>	<b>Description<sup>9</sup></b>	<b>Remarks</b>
Dangerous goods	<input type="checkbox"/>	<input type="checkbox"/>		
Low visibility operations:				
- Approach and landing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> CAT II <sup>10</sup> RVR__m/DH__ft. <input type="checkbox"/> CAT IIIA <sup>10</sup> RVR__m/DH__ft. <input type="checkbox"/> CAT IIIB <sup>10</sup> RVR__m/DH__ft.	
- Take-off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> RVR <sup>11</sup> __m	
- Operational credit(s)	<input type="checkbox"/>	<input type="checkbox"/>	<sup>12</sup> <input type="checkbox"/> Automatic Landing, <input type="checkbox"/> HUD, <input type="checkbox"/> EVS, <input type="checkbox"/> SVS, <input type="checkbox"/> CVS	
RVSM <sup>13</sup> <input type="checkbox"/> N/A	<input type="checkbox"/>	<input type="checkbox"/>		
EDTO <input type="checkbox"/> N/A	<input type="checkbox"/>	<input type="checkbox"/>		
<sup>11</sup> AR navigation specifications for PBN operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> RNP AR APCH	

<b>SPECIFIC APPROVAL</b>				
(Subject to the approved conditions in the Operations Manual)				
<b>The Civil Aviation Authority of Thailand</b>				
Telephone: +66 2568 8842-3		Fax: +66 2568 8848		E-mail: ops-ga@caat.or.th
Spec App No. <sup>1</sup> : _____		(_____) <sup>4</sup> Director General The Civil Aviation Authority of Thailand Date: _____		
Date of Issuance <sup>2</sup> : _____				
Owner/operator name <sup>3</sup> : _____				
Address <sup>3</sup> : _____				
Specific Approval	Yes	No	Description <sup>7</sup>	Remarks
RVSM <sup>13</sup> <input type="checkbox"/> N/A	<input type="checkbox"/>	<input type="checkbox"/>		
EDTO <input type="checkbox"/> N/A	<input type="checkbox"/>	<input type="checkbox"/>		
<sup>11</sup> AR navigation specifications for PBN operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> RNP AR APCH	
Continuing airworthiness: <sup>17</sup>			Insert the name of the person or position responsibility for ensuring that the continuing Airworthiness of the aircraft and comply with Thai laws and Regulations.	
EFB <sup>18</sup> for A/C _____			APP 1..... APP 2 ..... <sup>18</sup> Specifically, approved EFB hardware and software applications for A/C type are contained in [ operations manual reference]	
Other: <sup>19</sup>			<b><u>Other Navigation specifications for PBN operations:</u></b> <input type="checkbox"/> RNP 1, <input type="checkbox"/> RNP 2, <input type="checkbox"/> RNP 4 <input type="checkbox"/> RNAV1/ RNAV 2, <input type="checkbox"/> RNAV 5, <input type="checkbox"/> RNAV 10 <input type="checkbox"/> RNP APCH: <input type="checkbox"/> LNAV <input type="checkbox"/> LPV <input type="checkbox"/> LNAV/VNAV <input type="checkbox"/> MNPS <b><u>Additional Approval:</u></b> <input type="checkbox"/> CPDLC/ ADS-C <input type="checkbox"/> ADS-B <input type="checkbox"/> PBCS	

**Notes.—**

1. Insert the associated AOC number.
2. Insert the associated Operations Specifications number.
3. Insert the Operator's registered name and the operator's trading name, if different. Insert "dba" before the trading name (for "doing business as").
4. Insert the name, title and the signature of CAAT's authorized representative, and the date of issue of the operations specifications (date-month-year). In addition, the official stamp must be applied.
5. Insert the Commercial Aviation Safety Team (CAST)/ICAO designation of the aircraft make, model and series, or master series, if a series has been designated (e.g. Boeing-737-3K2 or Boeing-777-232). The CAST/ICAO taxonomy is available at: <http://www.intlaviationstandards.org/> and ensure aircrafts nationality and registration mark and all operations shall be in accordance with approved Operations Manual, Part A.
6. Other Special type of transportation (e.g. emergency medical service).
7. List the geographical area(s) of authorized operation (by geographical coordinates or specific routes, flight information region or national or regional boundaries).
8. List the applicable special limitations (e.g. VFR only, day only).
9. List in this column the most permissive criteria for each approval or the approval type (with appropriate criteria).
10. Insert the applicable precision approach category (CAT II, IIIA, IIIB or IIIC). Insert the minimum RVR in meters and decision height in feet. One line is used per listed approach category.
11. Insert the approved minimum take-off RVR in meters. One line per approval may be used if different approvals are granted.
12. List the airborne capabilities (i.e. automatic landing, HUD, EVS, SVS, CVS) and associated operational credit(s) granted.
13. RVSM approval as applicable, "Not applicable (N/A)" box may be checked only if the aircraft maximum ceiling is below FL 290.
14. Extended Diversion Time Operations (EDTO) approval as applicable based on guidance material for Extended Diversion Time Operations (EDTO). Select "N/A", otherwise a threshold time and maximum diversion time must be specified. The aircraft national and registration shall be address in the remarks session.
15. The threshold time and maximum diversion time may be listed in distance (NM), as well as the engine type.
16. 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.
17. Insert the name of the person or position responsible for ensuring that the continuing airworthiness of the aircraft and the compliance of Thai laws and Regulations.
18. List the EFB functions with any applicable limitations.
19. Other authorizations or data can be entered here. Use one line (or one multi-line block) per authorization (e.g. Navigation specifications for PBN operation, special approach authorization, MNPS, PBCS, approved navigation performance).

**APPENDIX B -- APPLICATION FORM FOR SPECIFIC APPROVAL**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

**APPLICATION FOR SPECIAL APPROVAL**



<b>Instructions</b>	<i>Page 1 of 2</i>
<b>General:</b>	
1. All fields in the form must be completed unless otherwise indicated.	
2. The completed form is to be submitted to the CAAT: Flight Operations Standards Department (OPS), 333/105 Lak Si Plaza, Khampheang Phet 6 Rd., Tarad Bang Khen, Lak Si, Bangkok, Thailand 10210 Tel : 66 (0) 256 8842 E-Mail : flightops@caat.or.th	
3. The applicant shall ensure that the supporting documents to be submitted will be attached a copy with this application form be for submitted. Incomplete forms will not be processed.	
4. Assessment of the application would take approximately 7 working days form the date of submission. You will be notified via E-mail when the certification is ready for collection.	
<b>Supporting Document to be submitted</b>	
<input type="checkbox"/> For Initial Issue	
<input type="checkbox"/> For Renewal	
1. <input type="checkbox"/> Operations Manual	
2. <input type="checkbox"/> copy of Certificate of Airworthiness (C of A)	
3. <input type="checkbox"/> copy of Certificate of Registration Mark of Aircraft (C of R)	
4. <input type="checkbox"/> copy of Air Operating License (AOL) or Private Aircraft Operting License	
<b>Part I – Applicant Information</b>	
Name:	
Middle Name:	
Given Name:	
Passport No.	
<input type="checkbox"/> Organization (Name) :	
<input type="checkbox"/> Owner of Aircraft (Name):	
Milling Address:	
Designation:	
Telephone (Mobile):	

<b>Email:</b>				
<b>Part II – Aircraft Information</b>				
Aircraft Model and Registration Marks:		C of A (Date of expiry):		C of R (Date of expire):
<b>Part III - Specific Approval</b>				
	Yes	No	Description	Remarks
1. Dangerous Goods	<input type="checkbox"/>	<input type="checkbox"/>		
2. Low Visibilities Operations:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> CAT II RVR.....m/DH.....ft. <input type="checkbox"/> CAT IIIA RVR.....m/DH.....ft. <input type="checkbox"/> RVR.....m	
- Approach and Landing	<input type="checkbox"/>	<input type="checkbox"/>		
- Take-off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Automatic Landing	
- Operational Credit(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> HUD <input type="checkbox"/> EVS <input type="checkbox"/> SVS <input type="checkbox"/> CVS	
3. RVSM <input type="checkbox"/> N/A	<input type="checkbox"/>	<input type="checkbox"/>		
4. AR navigation specifications for PBN operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> RNP AR APCH	
5. Other	<input type="checkbox"/>	<input type="checkbox"/>		
<b>Part IV - Declaration by Applicant</b>				
<p>I declare to the best of my knowledge and belief that the information supplied in the form are complete and correct. I understand that any false representation made by me for the purpose of obligating the AFE authorization is an offence under the Regulation on Civil Aviation Authority of Thailand on Authorized Flight Examiner and I may be subject to the penalties stipulated there under and the authorization granted pursuant to the application will revoked.</p> <p>Signature: .....</p> <p>(Block letter: .....) )</p> <p>Date:.....</p>				
<b>For Official Use</b>				
Date of Application Received (dd/mm/yyyy):			Received By:	
Date of Notification to Applicant:			authorization Issued By:	

## APPENDIX C -- OPERATIONS MANUAL

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

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 shall 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 control 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) safety management system;
- (e) *operational control* system;
- (f) MEL procedures (where applicable);
- (g) Aircraft Flight Manual (AFM), Pilot Operating Handbook (POH) or Equivalent Documents ;
- (h) normal flight operations;
- (i) Aircraft Maintenance Programme Manual;
- (j) General Maintenance Manual (GMM),
- (k) SOPs;
- (l) weather limitations;
- (m) flight and duty time limitations;
- (n) emergency operations;
- (o) accident/incident considerations;
- (p) personnel qualification and training;
- (q) record keeping;
- (r) a description of the maintenance control system;
- (s) security procedures;
- (t) performance operating limitations;
- (u) for aircraft with a MTWA greater than 5,700kg, details of the security programme;



- (v) useprotection of FDR / CVR records (where applicable);
- (w) handling of *dangerous goods*(where applicable); and
- (x) use of *head-up displays (HUD)* enhanced *vision systems (EVS)* (where applicable).
- (y) Other documents required by the CAAT.

## **APPENDIX D – ORGANISATION AND CONTENTS OF AN OPERATIONS MANUAL (FOR DANGEROUS GOODS)**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

### **1 ORGANISATION**

An operations manual shall be organised with the following structure:

- (a) General;
- (b) Aircraft operating information;
- (c) Routes and aerodromes; and
- (d) Training.

### **2 CONTENTS**

The operations manual shall contain at the least the following:

#### **2.1 General**

- 2.1.1A A statement that the operations manual complies with applicable laws, the air operator certification conditions and corresponding operations specifications;
- 2.1.1B A list and a summarized description of the different parts of the manual, their contents, applicability and utilization;
- 2.1.1C A statement that the operations manual contains operating instructions which must be followed by all personnel;
- 2.1.1D A registration sheet for amendments and revisions, including dates of registration and validity;
- 2.1.1E A list of effective pages; and
- 2.1.1F Amendment and revision changes indicated by marks or signs in text, graphics and diagrams.
- 2.1.1 Instructions outlining the responsibilities of each member of the crew and the other members of the operating staff pertaining to the conduct of flight operations.
- 2.1.2 Flight and duty time limitations and rest schemes for flight and cabin crew members.
- 2.1.3 A list of the navigational equipment to be carried including any requirements relating to operations where performance-based navigation is prescribed.
- 2.1.4 Where relevant to the operations, the long-range navigation procedures, engine failure procedure for ETOPS and the nomination and utilisation of diversion aerodromes.

- 2.1.5 The circumstances in which a radio listening watch is to be maintained.
- 2.1.6 The method for determining minimum flight altitudes.
- 2.1.7 The methods for determining aerodrome operating minima.
- 2.1.8 Safety precautions during refuelling with passengers on board.
- 2.1.9 Ground handling arrangements and procedures.
- 2.1.10 Procedures for pilots-in-command when an accident is observed.
- 2.1.11 The flight crew for each type of operation including the designation of the succession of command.
- 2.1.12 Specific instructions for the computation of the quantities of fuel and oil to be carried, taking into account all circumstances of the operation including the possibility of loss of pressurisation and the failure of one or more engines while en route.
- 2.1.13 The conditions under which oxygen shall be used and the amount of oxygen determined in accordance with the Aircraft Operating manual.
- 2.1.14 Instructions for mass and balance control.
- 2.1.15 Instructions for the conduct and control of ground de-icing/anti-icing operations.
- 2.1.16 The specifications for the operational flight plan.
- 2.1.17 Standard operating procedures (SOP) for each phase of flight. (Refer to ICAO Doc 8168 Volume 1 Part III Section 5 chapter 3 and GM for Standard Operating Procedures.)
- 2.1.18 Instructions on the use of normal checklists and the timing of their use.
- 2.1.19 Departure contingency procedures.
- 2.1.20 Instructions on the maintenance of altitude awareness and the use of automated or flight crew altitude call-out.
- 2.1.21 Instructions on the use of autopilots and auto throttles in IMC.
- Note. Instructions on the use of autopilots and auto-throttles, together with 2.1.26 and 2.1.30, are essential for avoidance of approach and landing accidents and controlled flight into terrain accidents.*
- 2.1.22 Instructions on the clarification and acceptance of ATC clearances, particularly where terrain clearance is involved.
- 2.1.23 Departure and approach briefings.
- 2.1.24 Procedures for familiarisation with areas, route and aerodromes.
- 2.1.25 Stabilised approach procedure.
- 2.1.26 Limitation on high rates of descent near the surface.
- 2.1.27 Conditions required to commence or to continue an instrument approach.
- 2.1.28 Instructions for the conduct of precision and non-precision instrument approach procedures.

- 2.1.29 Allocation of flight crew duties and procedures for the management of crew workload during night and IMC instrument approach and landing operations.
- 2.1.30 Instructions, training or awareness programmes, as appropriate for -
- (a) the avoidance of controlled flight into terrain and policy for the use of the ground proximity warning systems (GPWS); and
  - (b) upset prevention and recovery.
- 2.1.31 Policy, instructions, procedures and training requirements for the avoidance of collisions and the use of the airborne collision avoidance system (ACAS).
- Note: Procedures for the operation of ACAS are contained in PANS-OPS (ICAO Doc 8168), Volume 1, Part VIII, Chapter 3, and in PANS-ATM (ICAO Doc 4444), Chapters 12 and 15.*
- 2.1.32 Information and instructions relating to the interception of civil aircraft including:
- (a) procedures, for pilots-in-command of intercepted aircraft; and
  - (b) visual signals for use by intercepting and intercepted aircraft.
- 2.1.33 For aeroplanes intended to be operated above 49 000 ft (15 000 m):
- (a) information which will enable the pilot to determine the best course of action to take in the event of exposure to solar cosmic radiation; and
  - (b) procedures in the event that a decision to descend is taken, covering:
    - (1) the necessity of giving the appropriate ATS unit prior warning of the situation and of obtaining a provisional descent clearance;
    - (2) the action to be taken in the event that communication with the ATS unit cannot be established or is interrupted; and
  - (c) procedures to maintain records such that the total cosmic radiation dose received by each crew member over a period of 12 consecutive months can be determined.
- 2.1.34 Information on the safety management system and related flight safety programs as are relevant to flight operations
- 2.1.35 Information and instructions on the carriage of dangerous goods, including action to be taken in the event of an emergency. These shall include the labelling and marking of dangerous goods, the manner in which they must be loaded on or suspended beneath an aircraft, the responsibilities of members of the crew in respect of the carriage of dangerous goods and the action to be taken in the event of emergencies arising involving dangerous goods.
- (a) For an approved operator the following content shall be described:
    - The operator's policy on the transport of dangerous goods (e.g. self-imposed prohibition on certain dangerous goods);
    - The policy and procedure for the transport of COMAT (company material, spare parts);
    - Restriction for dangerous goods transportation (e.g. no transport of radioactive material);
    - Person with the company responsible for dangerous and/or dangerous goods coordinator contact;

- Operator's policy for general exceptions for dangerous goods carried by an aircraft (e.g. Airworthiness and operation items, Condition for carriage of portable electronic devices (PEDs) and spare batteries,
  - Veterinary Aid, Medical Aid for [patient, Excess baggage being sent as cargo);
  - Operator's provision for dangerous goods carried by passenger or crew;
  - Operator's procedure for grating approval for items in baggage;
  - Operator's procedure for carriage of battery powered mobility aids;
  - Provision information to passengers;
  - Marking and labelling of packages;
  - Duties of all personnel involved with transport of dangerous goods;
  - Operator's acceptance procedure and acceptance checklists;
  - Operator's loading, including, inspection for damage or leakage, prohibition on passengers when carrying "cargo aircraft only" dangerous goods, prohibition on carriage of dangerous goods on the flight deck or in the cabin occupied by passenger, details of the location and numbering system of cargo compartments, segregation and separation, Securing and orientation, protection against damage, loading of dry ice, loading of magnetized material, loading of radioactive material)
  - External carriage of dangerous goods (if applicable)
  - Information to the PILOT-IN-COMMAND (e.g. NOTOC, The personnel with responsibilities for operational control of an aircraft be provided with the information provided on the NOTOC, Availability on ground for duration of flight);
  - Retention of documents
  - Information to assist in the detection of undeclared dangerous goods and forbidden items in baggage, including, Hidden dangerous goods and GHS;
  - Provision of information for use in responding to dangerous goods incidents in flight;
  - Provision of information by pilot in command in the event of an in-flight emergency;
  - Information to be provided to emergency services in even of aircraft accidents or serious incident and aircraft incident;
  - Reporting of dangerous goods incidents accidents, dangerous goods occurrence and undeclared/mis-declared dangerous goods;
  - Removal of contamination;
- (b) For a non-approved operator, the following content shall be described:
- The operator's policy on the transport of dangerous goods (e.g. self-imposed prohibition on certain dangerous goods);
  - The policy and procedure for the transport of COMAT (company material, spare parts);
  - Person with the company responsible for dangerous and/or dangerous goods coordinator contact;
  - Operator's policy for general exceptions for dangerous goods carried by an aircraft (e.g. Airworthiness and operation items, Condition for carriage of portable electronic devices (PEDs) and spare batteries, Veterinary Aid, Medical Aid for [patient, Excess baggage being sent as cargo);
  - Operator's provision for dangerous goods carried by passenger or crew;
  - Operator's procedure for grating approval for items in baggage;

- Operator's procedure for carriage of battery powered mobility aids;
- Provision information to passengers;
- Marking and labelling of packages;
- Duties of all personnel involved with transport of dangerous goods;
- Operator's loading, quantity of Dry ice in compartment
- Information to assist in the detection of undeclared dangerous goods and forbidden items in baggage, including, Hidden dangerous goods and GHS;
- Reporting of dangerous goods incidents accidents, dangerous goods occurrence and undeclared/mis-declared dangerous goods;
- Removal of contamination;
- Dangerous Goods Training requirement, including, Operator's Dangerous Goods Approval policy, General requirements of training and recurrent training, Syllabus, Instructor qualifications, identification of training and testing material)

*Note: The information in operation manual for dangerous goods given to staff and agents must have minimum information accordance with dangerous goods guidance material "advisory circular for operation manual contains dangerous goods section for requirement – AEROPLANES and/or HELICOPTERS"*

2.1.36 Security instructions and guidance.

2.1.37 A checklist of the procedures to be followed in searching for a bomb in case of suspected sabotage and for inspecting aeroplanes for concealed weapons, explosives or other dangerous devices when a well-founded suspicion exists that the aeroplane may be the object of an act of unlawful interference, supported by guidance on the course of action to be taken should a bomb or suspicious object be found and information on the least-risk bomb location specific to the aircraft.

2.1.38 Instructions and training requirements for the use of head-up displays (HUD) and enhanced vision systems (EVS) equipment as applicable.

2.1.39 Instructions and training requirements for the use of the EFB, as applicable.

## **2.2 Aircraft Operating Information**

2.2.1 Certification limitations and operating limitations.

2.2.2 The normal, abnormal and emergency procedures and checklists to be used by the flight crew

2.2.3 Operating instructions and information on climb performance with all engines operating

2.2.4 Flight planning data for pre-flight and in-flight planning with different thrust/power and speed settings.

2.2.5 The maximum crosswind and tailwind components for each aeroplane type operated and the reductions to be applied to these values having regard to gusts, low visibility, runway surface conditions, crew experience, use of autopilot, abnormal or emergency circumstances, or any other relevant operational factors.

2.2.6 Instructions for aircraft loading and securing of load.

2.2.7 Aircraft systems, associated controls and instructions for their use

2.2.8 The minimum equipment list and configuration deviation list for the aeroplane types operated and

specific operations authorised, including any requirements relating to operations in where performance-based navigation is prescribed.

- 2.2.9 Checklist of emergency and safety equipment and instructions for their use.
- 2.2.10 Emergency evacuation procedures, including type specific procedures, crew coordination, assignment of crew's emergency positions and the emergency duties assigned to each crew member.
- 2.2.11 The normal, abnormal and emergency procedures to be used by the cabin crew, the checklists relating thereto and aircraft systems information as required, including a statement related to the necessary procedures for the coordination between flight and cabin crew.
- 2.2.12 Survival and emergency equipment for different routes and the necessary procedures to verify its normal functioning before take-off, including procedures to determine the required amount of oxygen and the quantity available.
- 2.2.13 The ground-air visual signal code for use by survivors,

### **2.3 Routes, aerodromes and heliports**

- 2.3.1 A route guide to ensure that the flight crew will have, for each flight, information relating to communication facilities, navigation aids, aerodromes, instrument approaches, instrument arrivals and instrument departures as applicable for the operation, and such other information as the operator may deem necessary for the proper conduct of flight operations.
- 2.3.2 The minimum flight altitudes for each route to be flown.
- 2.3.3 Aerodrome operating minima for each of the aerodromes that are likely to be used as aerodromes of intended landing or as alternate aerodromes.
- 2.3.4 The increase of aerodrome operating minima in case of degradation of approach or aerodrome facilities.
- 2.3.5 Instructions for determining aerodrome operating minima for instrument approaches using HUD and EVS.
- 2.3.6 The necessary information for compliance with all flight profiles required by regulations, including but not limited to, the determination of:
  - (a) take-off runway length requirements for dry, wet and contaminated conditions, including those dictated by system failures which affect the take-off distance;
  - (b) take-off climb limitations;
  - (c) en-route climb limitations;
  - (d) approach climb limitations and landing climb limitations;
  - (e) landing runway length requirements for dry, wet and contaminated conditions, including systems failures which affect the landing distance; and
  - (f) supplementary information, such as tire speed limitations.
- 2.3.7 The level of rescue and firefighting service (RFFS) protection available at any aerodrome to ensure that an acceptable level of protection is available for the aeroplane.

### **2.4 Training**

- 2.4.1 Details of the flight crew training programme.

- 2.4.2 Details of the cabin crew training programme.
- 2.4.3 Details of the flight operations officer/flight dispatcher training programme when employed in conjunction with the operator's method of flight supervision.



## APPENDIX E -- ALTIMETRY SYSTEM PERFORMANCE REQUIREMENTS FOR OPERATIONS IN RVSM AIRSPACE

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

- 1 In respect of groups of *aeroplanes* that are nominally of identical design and build with respect to all details that could influence the accuracy of height-keeping performance, the height-keeping performance capability shall be such that the total vertical error (TVE) for the group of *aeroplanes* shall have a mean no greater than 25 in (80 ft) in magnitude and shall have a standard deviation no greater than  $28 - 0.0135z'$  for  $0 < z < 25$  when  $z$  is the magnitude of the mean TVE in metres, or  $92 - 0.004z'$  for  $0 < z \leq 80$  where  $z$  is in feet. In addition, the components of TVE shall have the following characteristics:
  - (a) the mean altimetry system error (ASE) of the group shall not exceed 25 in (80 ft) in magnitude;
  - (b) the sum of the absolute value of the mean ASE and of three standard deviations of ASE shall not exceed 75 in (245 ft); and
  - (c) the differences between cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 in, with a standard deviation no greater than 13.3 in (43.7 ft), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.
  
- 2 In respect of *aeroplanes* for which the characteristics of the airframe and altimetry system fit are unique and so cannot be classified as belonging to a group of *aeroplanes* encompassed by paragraph 1, the height-keeping performance capability shall be such that the components of the TVE of the *aeroplane* have the following characteristics:
  - (a) the ASE of the *aeroplane* shall not exceed 60 in (200 ft) in magnitude under all flight conditions; and
  - (b) the differences between the cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.

## **APPENDIX F -- NOISE ABATEMENT**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

- 1 Noise abatement regulations frequently require special handling techniques and routings after take-off. The flight manuals of the more recently certificated aeroplanes contain performance data related to noise abatement procedures. Details of the procedures for each airfield or runway used by the operator, for which noise abatement regulations exist, should be provided in the operations manual. Instructions to ignore noise abatement procedures in emergency situations should also be included.
  
- 2 Where, in exceptional circumstances, it may be appropriate in the course of noise abatement procedures to start a turn at less than 500 ft agl, pilots should be given suitable instructions about restricting the angle of bank. Pilots should also be instructed not to reduce thrust below 500 ft agl. Above 500 ft agl thrust should be reduced in accordance with the *aircraft* manufacturers' instructions. In the absence of such guidance, thrust should not be reduced to an extent that would result in a gross gradient of climb of less than 4%.

## APPENDIX G -- MINIMUM EQUIPMENT LISTS (MEL)

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

- 1 If deviations from the requirements in the certification of *aircraft* were not permitted, an *aircraft* could not be flown unless all systems and equipment were operable. Experience has proved that some unserviceability can be accepted in the short term when the remaining operative systems and equipment provide for continued safe operations.
- 2 To permit an *aeroplane* to fly with certain acceptable component unserviceability, a minimum equipment list, approved by the CAAT, is therefore necessary for each *aircraft*, based on the master minimum equipment list established for the *aircraft* type by the organisation responsible for the type design in conjunction with the State of Design.
- 3 The *operator* is required to prepare a minimum equipment list designed to allow the operation of an *aircraft* with certain systems or equipment inoperative provided an acceptable level of safety is maintained.
- 4 The minimum equipment list is not intended to provide for operation of the *aircraft* for an indefinite period with inoperative systems or equipment. The basic purpose of the minimum equipment list is to permit the safe operation of an *aircraft* with inoperative systems or equipment within the framework of a controlled and sound programme of *repairs* and parts replacement.
- 5 *Operators* are to ensure that no flight is commenced with multiple minimum equipment list items inoperative without determining that any interrelationship between inoperative systems or components will not result in an unacceptable degradation in the level of safety and/or undue increase in the flight crew workload.
- 6 The exposure to additional failures during continued operation with inoperative systems or equipment shall also be considered in determining that an acceptable level of safety is being maintained. The minimum equipment list may not deviate from requirements of the *flight manual* limitations section, emergency procedures or other airworthiness requirements of the CAAT.
- 7 Systems or equipment accepted as inoperative for a flight should be placarded where appropriate and all such items should be noted in the *aircraft* technical log to inform the flight crew and *maintenance* personnel of the inoperative system or equipment.
- 8 For a particular system or item of equipment to be accepted as inoperative, it may be necessary to establish a *maintenance* procedure, for completion prior to flight, to deactivate or isolate the system or equipment. It may similarly be necessary to prepare an appropriate flight crew operating procedure.
- 9 The responsibilities of the *pilot-in-command* in accepting an *aircraft* for operation with deficiencies in accordance with a minimum equipment list are specified in GA-P1A.203 , para 203.1 or GA-P3H.204, para 204.1 as applicable
- 10 Guidelines on the preparation of the MEL can be found in Announcement of Department of Civil Aviation Authority of Thailand on Approval of Master Equipment List.

## **APPENDIX H -- DANGEROUS GOODS TRAINING**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

### **1 DANGEROUS GOODS TRAINING FOR OPERATORS**

- 1.1 An operator, shall establish and maintain staff training programmes, as required by the ICAO Technical Instructions. These training programmes shall be approved by the CAAT.
- 1.2 An operator shall ensure that all staff who receive training undertake a test to verify understanding of their responsibilities.
- 1.3 Training must be provided or verified upon the employment of personnel identified in accordance with the applicable column of Table 1-4 and Table 1-5 as required by ICAO Technical Instructions.
- 1.4 An operator shall ensure that all staff who require dangerous goods training receive recurrent training within 24 months of previous training to ensure knowledge is current as required by ICAO Technical Instructions.
- 1.5 An operator shall ensure that records of dangerous goods training are maintained for all staff trained as required by the ICAO Technical Instructions and shall include the following:
  - (a) the individual's name;
  - (b) the most recent training completion date/month/year;
  - (c) a description, copy or reference to training materials used to meet the training requirements;
  - (d) the name and address of the organisation providing the training; and
  - (e) evidence which shows that a test has been completed satisfactorily.
- 1.6 The records of training must be retained by the employer for a minimum period of 36 months from the most recent training completion month and must be made available upon request by the CAAT.
- 1.7 An operator shall ensure that his handling agent's staff is trained in accordance with the applicable Table 1-4 and 1-5 as required by ICAO Technical Instructions.

### **2 INSTRUCTOR QUALIFICATIONS**

- 2.1 Instructors of initial and recurrent dangerous goods training programmes must have adequate instructional skills and have successfully completed a dangerous goods training programme in the applicable category, or Category 6, prior to delivering such a dangerous goods training programme.

2.2 Instructors delivering initial and recurrent dangerous goods training programmes must at least every 24 months deliver such courses, or in the absence of this, attend recurrent training.

### **3 OPERATORS NOT HOLDING A PERMANENT APPROVAL TO CARRY DANGEROUS GOODS**

3.1 Operators not holding a permanent approval to carry dangerous goods shall ensure that:

3.1 Operators not holding a permanent approval to carry dangerous goods shall ensure that:

3.1.1 Category 1&2, staff who are engaged in the Shippers & Packer and persons undertaking the responsibilities of shippers have received training and are qualified to carry out their duties. As a minimum this training must cover the areas identified in Table 1-4 as required by ICAO Technical Instructions and the depth of training must be sufficient to ensure staff is able to make decisions regarding the identified, Classified, packed, marked, labelled and documented carriage of dangerous goods;

3.1.2 Category 6, staff who are engaged in the acceptance of dangerous goods have received training and are qualified to carry out their duties. As a minimum this training must cover the areas identified in Table 1-4 as required by ICAO Technical Instructions and the depth of training must be sufficient to ensure staff is able to make decisions regarding the acceptance or refusal of the carriage of dangerous goods;

3.1.3 Category 7, staff who are engaged in ground handling, storage and loading of dangerous goods have received training to enable them to carry out their duties in respect of dangerous goods. As a minimum this training must cover the areas identified in Table 1-4 as required by ICAO Technical Instructions and the depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods, identification of dangerous goods and handling and loading of dangerous goods;

3.1.4 Category 8, staff who are engaged in ground general cargo, mail and baggage handling have received training to enable them to carry out their duties in respect of dangerous goods. As a minimum this training must cover the areas identified in Table 1-4 as required by ICAO Technical Instructions and the depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods, identification of dangerous goods, handling and loading of dangerous goods and requirements for the carriage of dangerous goods by passengers;

3.1.5 Category 9, Passenger handling staff; have received training which, as a minimum, must cover the areas identified in Table 1-4 as required by ICAO Technical Instructions. The depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods, requirements for carriage of dangerous goods by passengers or, more generally, their carriage on an aircraft.

3.1.6 Category 10, flight crew members, loadmasters, load planners and flight operations officers /flight dispatchers have received training which, as a minimum, must cover the areas identified in Table 1-4 as required by ICAO Technical Instructions. The depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods and how they should be carried on an aircraft;

3.1.7 Category 11, crew members other than flight crew members; have received training which, as a minimum, must cover the areas identified in Table 1-4 as required by ICAO Technical Instructions. The depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods, requirements for carriage of dangerous goods by passengers or, more generally, their carriage on an aircraft;

3.1.8 Category 12, Security staff employed by the operator who deal with the screening of passengers and their baggage; and cargo or mail, e.g. security screeners, their supervisors and staff involved in implementing security procedures, have received training which, as a minimum, must cover the areas identified in Table 1-4 as required by ICAO Technical Instructions. The depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods, requirements for carriage of dangerous goods by passengers or, more generally, their carriage on an aircraft

*Note: Security staff are required to be trained irrespective of whether the operator on which passenger or cargo is to be transported carries dangerous goods as cargo.*

Table 1-4. Content of training courses

Aspects of transport of dangerous goods by air with which they should be familiar, as a minimum	Shippers and Packer		Freight forwarders			Operators and Ground handling agents						Security staff
	Categories of Staff											
	1	2	3	4	5	6	7	8	9	10	11	12
General philosophy	x	x	x	x	x	x	x	x	x	x	x	x
Limitations	x		x	x	x	x	x	x	x	x	x	x
General requirements for shippers	x		x			x						
Classification	x	x	x			x						x
List of dangerous goods	x	x	x			x				x		
Packing requirements	x	x	x			x						
Labelling and marking	x	x	x	x	x	x	x	x	x	x	x	x
Dangerous goods transport document and other relevant documentation	x		x	x		x	x					
Acceptance procedures						x						
Recognition of undeclared dangerous goods	x	x	x	x	x	x	x	x	x	x	x	x
Storage and loading procedures					x	x		x		x		
Pilots' notification						x		x		x		
Provisions for passengers and crew	x	x	x	x	x	x	x	x	x	x	x	x
Emergency procedures	x	x	x	x	x	x	x	x	x	x	x	x

#### 4 OPERATORS HOLDING A PERMANENT APPROVAL TO CARRY DANGEROUS GOODS

4.1 Operators not holding a permanent approval to carry dangerous goods shall ensure that:

4.1.1 Category 13, staffs who are engaged in accepting cargo or mail (other than dangerous goods) have received training which, as a minimum, must cover the areas identified in Table 1-5 as required by ICAO Technical Instructions and the depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods, identification of dangerous goods and handling and loading of dangerous goods;

- 4.1.2 Category 14, staff who are engaged in involved in the handling, storage and loading of cargo or mail (other than dangerous goods) and baggage have received training which, as a minimum, must cover the areas identified in Table 1-5 as required by ICAO Technical Instructions and the depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods, identification of dangerous goods and requirements for the carriage of dangerous goods by passengers.
- 4.1.3 Category 15, Passenger handling staff; have received training which, as a minimum, must cover the areas identified in Table 1-5 as required by ICAO Technical Instructions. The depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods, requirements for carriage of dangerous goods by passengers or, more generally, their carriage on an aircraft
- 4.1.4 Category 16, Flight crew members, loadmasters, load planners and flight operations officers /flight dispatchers staff: have received training which, as a minimum, must cover the areas identified in Table 1-5 as required by ICAO Technical Instructions. The depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods and how they should be carried on an aircraft;
- 4.1.5 Category 17, Crew members; (other than flight crew member) have received training which, as a minimum, must cover the areas identified in Table 1-5 as required by ICAO Technical Instructions. The depth of training must be sufficient to ensure awareness and knowledge of the hazards associated with dangerous goods, requirements for carriage of dangerous goods by passengers or, more generally, their carriage on an aircraft.

**Table 1-5. Content of training courses for operators not carrying dangerous goods as cargo or mail**

Contents	Categories of staff				
	13	14	15	16	17
General philosophy	x	x	x	x	x
Limitations	x	x	x	x	x
Labelling and marking	x	x	x	x	x
Dangerous goods transport document and other <del>document documentation</del>	x				
Recognition of undeclared dangerous goods	x	x	x	x	x
Provisions for passengers and crew	x	x	x	x	x
Emergency procedures	x	x	x	x	x

## **APPENDIX I -- MEDICAL SUPPLIES**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

### **1 Types, Number, Location and Contents of Medical Supplies**

#### **1.1 Types**

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

1.1.2 Based on the limited available evidence, only a very small number of passengers are likely to benefit from the carriage of automated external defibrillators (AED) on aeroplanes. However, many operators carry them because they offer the only effective treatment for cardiac fibrillation. The likelihood of use, and therefore of potential benefit to a passenger, is greatest in aircraft carrying a large number of passengers, over long duration sector lengths. The carriage of AEDs should be determined by operators on the basis of a risk assessment taking into account the particular needs of the operation.

#### **1.2 Number of First-Aid and Universal Precaution Kits**

##### **1.2.1 First-aid kits**

1.2.1.1 The number of first-aid kits should be appropriate to the number of passengers which the aeroplane is authorized to carry:

Passenger	First-aid kits
0 –100	1
101 – 200	2
201 – 300	3
301 – 400	4
401 – 500	5
More than 500	6

##### **1.2.2 Universal precaution kits**

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

#### **1.3 Location**

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



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

## **1.4 Contents**

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

1.4.1.1 First-aid kit:

- List of contents
- Antiseptic swabs (10/pack)
- Bandage: adhesive strips
- Bandage: gauze 7.5 cm × 4.5 m
- Bandage: triangular; safety pins
- Dressing: burn 10 cm × 10 cm
- Dressing: compress, sterile 7.5 cm × 12 cm
- Dressing: gauze, sterile 10.4 cm × 10.4 cm
- Tape: adhesive 2.5 cm (roll)
- Steri-strips (or equivalent adhesive strip)
- Hand cleanser or cleansing towelettes
- Pad with shield, or tape, for eye
- Scissors: 10 cm
- Tape: Adhesive, surgical 1.2 cm × 4.6 m
- Tweezers: splinter
- Disposable gloves (multiple pairs)
- Thermometers (non-mercury)
- Mouth-to-mouth resuscitation mask with one-way valve
- First-aid manual, current edition
- Incident record form
- Mild to moderate analgesic
- Antiemetic
- Nasal decongestant
- Antacid
- Antihistamine

1.4.1.2 Universal precaution kit:

- Dry powder that can convert small liquid spill into a sterile granulated gel
- Germicidal disinfectant for surface cleaning
- Skin wipes
- Face/eye mask (separate or combined)
- Gloves (disposable)
- Protective apron
- Large absorbent towel
- Pick-up scoop with scraper
- Bio-hazard disposal waste bag
- Instructions

1.4.1.3 Medical kit:

1.4.1.3.1 Equipment

- List of contents
- Stethoscope
- Sphygmomanometer (electronic preferred)
- Airways, oropharyngeal (three sizes)

- Syringes (appropriate range of sizes )
- Needles (appropriate range of sizes)
- Intravenous catheters (appropriate range of sizes)
- Antiseptic wipes
- Gloves (disposable)
- Needle disposal box
- Urinary catheter
- System for delivering intravenous fluids
- Venous tourniquet
- Sponge gauze
- Tape – adhesive
- Surgical mask
- Emergency tracheal catheter (or large gauge intravenous cannula)
- Umbilical cord clamp
- Thermometers (non-mercury)
- Basic life support cards
- Bag-valve mask
- Flashlight and batteries

#### 1.4.1.3.2 Medication

- Epinephrine 1:1 000
- Antihistamine – injectable
- Dextrose 50% (or equivalent) – injectable: 50 ml
- Nitroglycerin tablets, or spray
- Major analgesic
- Sedative anticonvulsant – injectable
- Antiemetic – injectable
- Bronchial dilator – inhaler
- Atropine – injectable
- Adrenocortical steroid – injectable
- Diuretic – injectable
- Medication for postpartum bleeding
- Sodium chloride 0.9% (minimum 250 ml)
- Acetyl salicylic acid (aspirin) for oral use
- Oral beta blocker

If a cardiac monitor is available (with or without an AED) add to the above list:

- Epinephrine 1:10 000 (can be a dilution of epinephrine 1:1 000)

## APPENDIX J – FLIGHT CREW TRAINING PROGRAMME FOR LARGE AND TURBOJET AEROPLANE OPERATIONS

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

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The syllabus for various aeroplanes has been standardised. This appendix described the quantum of training applicable to different type of aeroplanes. The training applicable for different type of aeroplanes are enumerated below;

Type A	Commercial Jet Aeroplane (Narrow body & Wide body) such as - A 220/320/330/340/350/380 etc. - B 737-300/900, B747/B757/B767/B777/B787 etc. - Embraer 170 and above, CRJ etc.
Type B	Turbo Prop Aeroplanes above 5 700 Kg such ATR, Q400, Dornier and other aircraft of similar type.
Type C	Other Jet Aircrafts which are not specified in Type A & B above such as Challenger, Gulf Stream, Global, Falcon, Citation, Phenom series and all similar aircrafts.

SI No.	Training/Check	Description of training/Check	Quantum of training/check		
			Type A	Type B	Type C
1	Pre-requisite Qualification	Minimum hours on multi engine aeroplane *[Additional requirement for Airbus Aircraft : 25 hours of multi-engine aircraft [10 hours can be completed in an approved simulator]	*	-	-
2	Jet Induction Training**	Class room training /CBT	12 hrs	-	12 hrs
		Full Flight Simulator Training Devices (Flight Training Devices Level 5 / Full Flight Simulator with or without motion)	12 hrs	#	12 hrs
3	Ground Training	Ground training must include a minimum of aeroplane systems training, general operational subjects training, performance, safety and emergency equipment theoretical training, systems inclusion/Integrated Training, Weight and Balance Training, Aeroplane Performance training and pre-flight inspection training. The ground training shall not be more than 8 hours in a day. There should not be any FFS simulator sessions during the ground training period. A 'home study' is not approved and no credit could be provided for the same. Approved CBT or e-learning may be used.	72 hrs ***	72 hrs ***	54 hrs ***
	Written Exam	A written exam shall be conducted by the TRTO / ATO on completion of Ground Training. The certified marked answer sheets and tests should be sent to the Directorate of Training and licensing of this office in a sealed cover directly by the training institute for scrutiny and record. (Not applicable in case the trainee has passed the DGCA technical / specific examinations)	Minimum of 70 % pass marks (or higher if stipulated by TRTO / ATO / FTO)		

4	SSF	<p>Minimum number of FFS training sessions to be undertaken after successful completion of 2 and 3 above:</p> <p>Note:</p> <ul style="list-style-type: none"> <li>• Each session shall be of at least 4 hours., of which 2 hours shall be as PF and 2 as PM.</li> <li>• Only one session shall be scheduled on any calendar day.</li> <li>• Sessions shall include circuits and landings.</li> <li>• Training objective of each session shall be achieved, trainee shall be given appropriate additional training till the minimum level of proficiency is achieved.</li> <li>• The records of each simulator with briefing and de-briefing remarks certified by the Instructor / Examiner shall be sent to the Directorate of Training and licensing of this office in a sealed cover directly by the training institute for scrutiny and record.</li> </ul>	8 Sessions	8 Sessions	6 Sessions
5	LOFT	LOFT sessions of 2 hours as Pilot Flying (PF) on Level 'C/'D' simulator.	1 Session	1 Session	1 Session
6	Skill Test	After completion of the above, the trainee pilot should undergo the indicated sessions of skill test (CA 40 checks day/night) of duration of 2 hours, each with an examiner other than the one who imparted training. IR / PPC checks can be combined with skill test in accordance with CAR Section 8 Series F Part II.	1 Day, 1 Night	1 Day, 1 Night	1 Day, 1 Night
License may be submitted for endorsement on successful completion of the above					
7	Other training	All other training such as Adverse Weather/ LVTO / ZFTT/ Base Training, CRM, SEP, DGR training etc that are required as per the relevant CAR's shall be completed before exercising the privileges of the rating. Note: These training except Base Training may also be conducted before skill tests	As required		
<p>* See additional requirement for Airbus A-318 and higher series aircrafts.</p> <p>** Not required for trainees who have adequate Jet experience. Not required for jet aircrafts of AUW less than 5700 Kg.</p> <p>*** Refer to paragraph 3.9 # For Type B aeroplanes, MCC of 12 hours will be required.</p>					

## **APPENDIX K – FLIGHT RECORDERS (AEROPLANE)**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

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The material in this Appendix concerns flight recorders intended for installation in aeroplanes engaged in general aviation operations. Crash-protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). Lightweight flight recorders comprise one or more of the following systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and/or a data link recording system (DLRS).

### **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 kilohertz (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 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 a bulk erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact.
  - (d) 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 flight recorder systems shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorder systems without jeopardizing service to essential or emergency loads.
- 1.6 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.
- 1.7 Means shall be provided for an accurate time correlation between the recorder systems recordings.
- 1.8 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; and
  - (b) parameter origin or source and equations which relate counts to units of measurement; and
  - (b) manufacturer's test reports.

## **2. FLIGHT DATA RECORDER (FDR) AND AIRCRAFT DATA RECORDING SYSTEM (ADRS)**

### **2.1 Start and stop logic**

- 2.1 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 K-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 should be considered:
  - 2.2.2.1 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:

- (a) 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;
- (b) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY;
- (c) warnings and alerts; and
- (d) the identity of displayed pages for emergency procedures and checklists;

2.2.2.2 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 recommendations 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 (\*) are to 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 listed in Table K-3.

## **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/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 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
- (e) digital communications with ATS, unless recorded by the FDR.

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; and
- (c) voice communication of flight crew members on the flight deck using the aeroplane's interphone system, if installed.

3.2.4 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 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.

#### **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 AIR 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 an ADRS, or where an FDR is not required.*

### **5. DATA LINK RECORDER (DLR)**

#### **5.1 Applications 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 K-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. 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 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.
- 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 analysis of the FDR or ADRS recording shall evaluate the quality of the recorded data to determine if the bit error rate (including those errors introduced by recorder, the acquisition unit, the source of the data on the aeroplane and by the tools used to extract the data from the recorder) is within acceptable limits and to determine the nature and distribution of the errors;
  - (c) 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;
  - (d) 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;
  - (e) 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;
  - (f) 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
  - (g) 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.
- 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 K-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%/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 ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max $V_{s_0}$ (Note 1) $V_{s_0}$ 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		-3 g to +6 g	0.125	±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
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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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 discretets	1		
16	Longitudinal acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
17	Lateral acceleration (Note 3)		±1 g	0.25	±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
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 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)

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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, discretized or full range)	1	±5%	2% of full range
35*	Additional engine parameters (EPR, N <sub>1</sub> , indicated vibration level, N <sub>2</sub> , EGT, fuel flow, fuel cut-off lever position, N <sub>3</sub> 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)		Discrete(s)	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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle, final approach path (IRNAV/IAN))			1	As installed	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	2% of full range
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 glide slope)		As installed	4	As installed	
61*	Ice detection		As installed	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
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 pedal)		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		
77*	Date		365 days	64		
78*	Actual navigation performance or estimated position error or estimated position uncertainty		As installed	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
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 full range
81*	Flight director command (left flight director pitch command, left flight director roll command, right flight director pitch command, right flight director roll 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.  $V_{s_0}$  stalling speed or minimum steady flight speed in the landing configuration is in Section “Abbreviations and Symbols”.
2.  $V_D$  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 intervals, accuracy limits or recording resolution guidance description detailed in this Appendix.

**Table K-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
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 aeroplane.

\*: Applications that are to be recorded only as far as is practicable given the architecture of the system.

**Table K-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:					
4	a) Heading (Magnetic or True)	±180°	1	±2°	0.5°	* Heading is preferred, if not available, yaw rate shall be recorded
	b) Yaw rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
2	Pitch:					
	a) Pitch attitude	±90°	0.25	±2°	0.5°	* Pitch attitude is preferred, if not available, pitch rate shall be recorded
	b) Pitch rate	300°/s	0.25	±1% + drift of 360°/h	2°/s	
3	Roll:					
	a) Roll attitude	±180°	0.25	±2°	0.5°	* If not available, roll rate shall be recorded
	b) Roll rate	300°/s	0.25	±1% + drift of 360°/h	2°/s	
4	Positioning system:					
	a) Time	24 hours	1	±0.5 s	0.1 s	UTC time preferred where available
	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 aircraft + 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	

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
	e) Track	0-360°	2 (1 if available)	As installed (±2° 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 range	
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/N <sub>1</sub> or torque/N <sub>p</sub> 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 (N <sub>g</sub> )	0–150%	Each engine each second	As installed	0.2% of full range	
18	Free power turbine speed (N <sub>f</sub> )	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	

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No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
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	

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## **APPENDIX L — AUTOMATIC LANDING SYSTEMS, HEAD-UP DISPLAY (HUD) OR EQUIVALENT DISPLAYS AND VISION SYSTEMS**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

### **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 CAAT.

*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.*

### **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 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 CAAT. The training should address all flight operations for which the HUD or equivalent display is used.

## **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, 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 the Operator or CAAT 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.

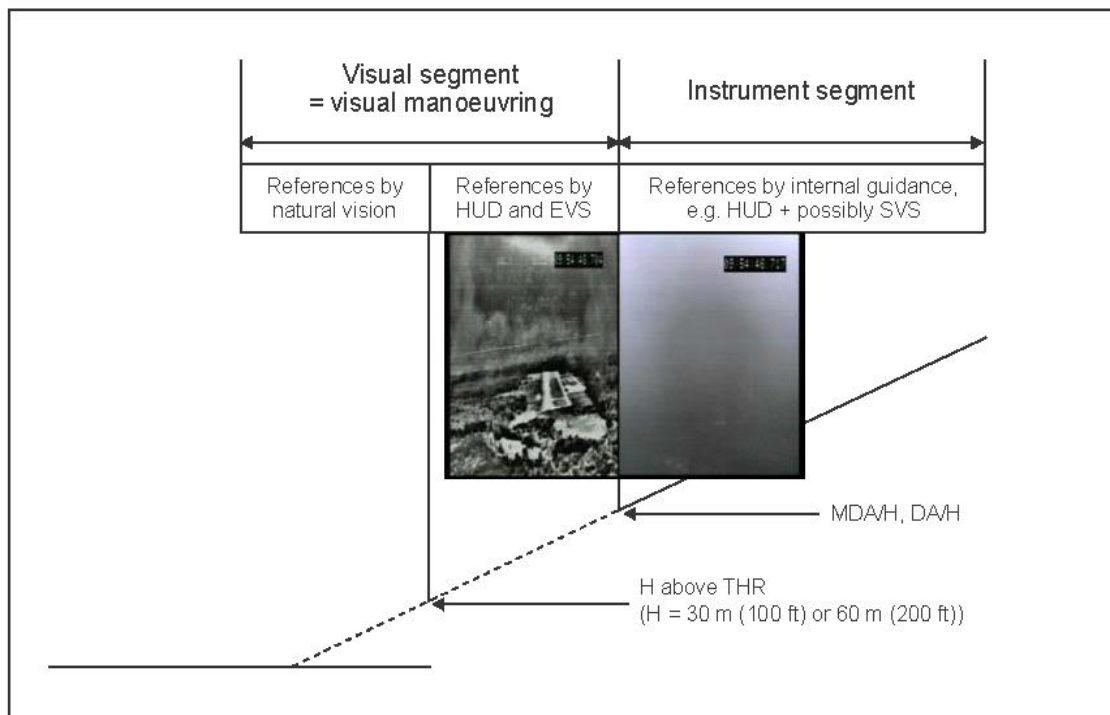
### **2.3 Operational concepts**

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 the Operator or CAA. 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.

### EVS OPERATIONS



**Figure 1. EVS operations — transition from instrument to visual references**

## 2.4 Vision systems training

Training and recent experience requirements should be established by the CAAT. Training should address all flight operations for which the vision system is used.

## 2.5 Visual references

2.5.1 In principle, 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 the vision system until a certain height during the approach as described in 2.3.2 (see Figure 1).

- 2.5.2 In States that have developed requirements for operations with vision systems, the use of visual references have been regulated and examples of this are provided in the *Manual of All-Weather Operations* (Doc 9365).

### 3. **HYBRID SYSTEMS**

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. The inclusion of systems in the hybrid system normally enhances the performance of the system. The *Manual of All-Weather Operations*(Doc 9365) contains some examples of hybrid systems.

### 4. **OPERATIONAL CREDITS**

- 4.1 Aerodrome operating minima are expressed in terms of minimum visibility/RVR and MDA/H or DA/H. When aerodrome operating minima are established, the combined capability of the aircraft equipment and on-ground infrastructure should be taken into account. Better equipped aircraft may be able to operate into lower natural visibility conditions, lower DA/H and/or operate with less ground infrastructure. Operational credit means that the aerodrome operating minima may be reduced in case of suitably equipped aircraft. Another way to grant operational credit is to allow visibility requirements to be fulfilled, wholly or partly, by means of the on-board systems. HUD, automatic landing or vision systems, which were not available at the time the criteria for aerodrome operating minima were originally established.
- 4.2 The granting of operational credits does not affect the classification (i.e. Type or Category) of an instrument approach procedure since they are designed to support instrument approach operations conducted with aircraft with the minimum equipment prescribed.
- 4.3 The relation between the procedure design and the operation can be described as follows. The OCA/H is the end product of the procedure design, which does not contain any RVR or visibility values. Based on the OCA/H and all the other elements such as available runway visual aids, the operator will establish MDA/H or DA/H and RVR/visibility, i. e. the aerodrome operating minima. The values derived should not be less than those that may be prescribed by the State of the Aerodrome.

### 5. **OPERATIONAL PROCEDURES**

In accordance with GA-P1A.901, para 901.1 or GA-P3H.411, para 411.1 as applicable, the operator should develop suitable operational procedures associated with the use of an automatic landing system, a HUD or an equivalent display, vision systems and hybrid systems. These procedures should be included in the operations manual and cover at least the following:

- (a) limitations;
- (b) operational credits;
- (c) flight planning;
- (d) ground and airborne operations;
- (e) crew resource management;
- (f) standard operating procedures; and

- (g) ATS flight plans and communication.

## **6. APPROVALS**

### **6.1 General**

*Note.— When the application for a specific approval relates to operational credits for systems not including a vision system, the guidance on approvals in this attachment may be used to the extent applicable as determined by the CAAT.*

- 6.1.1 The operator that wishes to conduct operations with an automatic landing system, a HUD or equivalent display, vision system or hybrid system will need to meet certain criteria and, in some instances, obtain specific approvals.

The extent of the approvals will depend on the intended operation and the complexity of the equipment.

- 6.1.2 Systems may be used to improve situational awareness without a specific approval. However, the standard operating procedures for these systems should be specified in the operations manual or equivalent document. 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 GA-P1A.202, para 202.2.1.1 or GA-P3H.202, para 202.2.1.1 as applicable, states that operational credits based on the use of an automatic landing system, a HUD or an equivalent display, EVS, SVS or CVS or any combination of those systems into a hybrid system, should be specifically approved.

- 6.1.4 Chapter 9 of Part I or GA-P3H.411 as applicable, requires the CAAT to establish criteria for the use of an automatic landing system, a HUD or an equivalent display, EVS, SVS or CVS or any combination of those systems into a hybrid system "for the safe operation of an aeroplane" and specifies such criteria. When operational credits are granted by the CAAT as per the Standard GA-P1A.202, para 202.2.1.1 or GA-P3H.202, para 202.2.1.1 as applicable, the use of that system becomes essential for the safety of those operations and approval of the use of such systems is part of the operational credit specific approval. The use of these systems solely for enhanced situational awareness, reduced flight technical error and/or reduced workload is an important safety feature, but does not require a specific approval.

- 6.1.5 Any operational credit that has been granted should be reflected in the specific approval template and be carried on board the particular aeroplane.

### **6.2 Specific approvals for operational credit**

- 6.2.1 To obtain operational credit the operator will need to specify the desired operational credit and submit an application in accordance with GA-P1A.109 or GA-P2A.104 as applicable. The content of a suitable application should include:

- (a) *Applicant details.* The official name and any business or trading name(s), address, mailing address, email address and contact telephone/fax numbers of the applicant.
- (b) *Aircraft details.* 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 the *Manual of All-Weather Operations* (Doc 9365). 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 to which the operator has made references should be included in the application. There should be no need to send complete manuals; only the relevant sections/pages should be required. Additional guidance material can be found in the *Manual of All-Weather Operations* (Doc 9365).
- (e) *Name, title and signature.*

6.2.2 The following items should be covered in a vision systems compliance list:

- (a) reference documents used in compiling the submission for approval;
- (b) flight manual;
- (c) feedback and reporting of significant problems;
- (d) requested operational credit and resulting aerodrome operating minima;
- (e) operations manual (or an equivalent document) entries including MEL (where applicable) and standard operating procedures;
- (f) safety risk assessment;
- (g) training programmes; and
- (h) continuing airworthiness.

Expanded guidance on these items is contained in the *Manual of All-Weather Operations* (Doc 9365).

## **APPENDIX M – FLIGHT RECORDERS (HELICOPTER)**

**EFFECTIVE DATE:** 29<sup>th</sup> March 2019

**REVISION:** Initial Issue

The material in this Appendix concerns flight recorders intended for installation in helicopters engaged in general aviation operations. Crash-protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). Lightweight flight recorders comprise one or more of the following systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and/or a data link recording system (DLRS).

### **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 kilohertz (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 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 a bulk erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact.
  - (d) 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 flight recorder systems shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorder systems without jeopardizing service to essential or emergency loads.
- 1.6 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.
- 1.7 Means shall be provided for an accurate time correlation between the recorder systems recordings.
- 1.8 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; and
  - (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**

- 2.1 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 M-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\*

2.2.2 If further FDR recording capacity is available, recording of the following additional information should 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 listed in Table M-3.

### **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/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 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
- (e) voice communication of flight crew members using the passenger address system, if installed.

3.2.2 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.

#### **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 AIR 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 an ADRS, 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 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 M-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. 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 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.

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 analysis of the FDR or ADRS recording shall evaluate the quality of the recorded data to determine if the bit error rate (including those errors introduced by recorder, the acquisition unit, the source of the data on the helicopter and by the tools used to extract the data from the recorder) is within acceptable limits and to determine the nature and distribution of the errors;
- (c) 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;
- (d) 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;

- (e) 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;
  - (f) 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
  - (g) 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.
- 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 M-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% /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 ±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°
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		50–130%	0.51	±2%	0.3% of full range
	Rotor brake		Discrete		—	—
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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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/m <sup>2</sup> (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	—
28*	DME 1 and 2 distances		0-370 km (0-200 NM)	4	As installed	1 852 m (1 NM)

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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 (T <sub>4</sub> )		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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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	—	—
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(s)	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(s)	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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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 M-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
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 helicopter 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 helicopter.

\*: Applications that are to be recorded only as far as is practicable given the architecture of the system.

**Table M-3. Parameter Characteristics for Aircraft Data Recording Systems**

N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading:					
	a) Heading (Magnetic or True)	±180°	1	±2°	0.5°	*Heading is preferred, if not available, yaw rate shall be recorded
	b) Yaw rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
2	Pitch:					
	a) Pitch attitude	±90°	0.25	±2°	0.5°	*Pitch attitude is preferred, if not available, pitch rate shall be recorded
	b) Pitch rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
3	Roll:					
	a) Roll attitude	±180°	0.25	±2°	0.5°	*Roll attitude is preferred, if not available, roll rate shall be recorded
	b) Roll rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
4	Positioning system:					
	a) Time	24 hours	1	±0.5°	0.1°	UTC time preferred where available
	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 aircraft +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	0-360°	2 (1 if available)	As installed (± 2° recommended)	0.5°	
	f) Estimated error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available

N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
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 hPa (1.02 in-Hg) to 310.2 hPa (9.16 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)	
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 piston-engined 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 range	*For piston-engined helicopters

N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
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 turbine-engined 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 piston-engined 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 piston-engined 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	