



สำนักงานการบินพลเรือนแห่งประเทศไทย  
The Civil Aviation Authority of Thailand

## GENERAL AVIATION REQUIREMENTS (GAR)

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Approved by

Air Chief Marshal

A handwritten signature in blue ink, appearing to be 'M. Chavanaprayoon'.

Manat Chavanaprayoon

Director General

The Civil Aviation Authority of Thailand

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## Introduction

- 1 Pursuant to Regulation of Civil Aviation Authority of Thailand No.13 on General Aviation Operations and the Authority Announcements as appropriate, General Aviation Operator shall act in accordance the requirements issued by the Authority.
- 2 This General Aviation Requirements (GARs) states the necessary conditond, qualities, qualifications, standards and procedures necessary to qualify for and maintain a Thai private operator, as well as to incorporate new practices or procedures to ensure the safe of operations.
- 3 The Civil Aviation Authority of Thailand is know in these regulations as the “Authority”.
- 4 Authorised officers means that the Authority officers who authorised to check documents, inspect premises and equipment and to board aircraft in the course of discharging their duties.
- 5 Supplementary requirements or advisory materials will be notified in the form of Notices to Airmen (NOTAM), Aeronautical Information Circulars (AIC), Guidance Material (GM), Aeronautical Information Publications (AIP), Airworthiness Notices (AN), the Authority Announcements, and Manual of Standards - Units of Measurement to be used for Air and Ground Operations or any other official publication so issued by the Authority.
- 6 In these Regulations, the editing practices used in these Regulations are as follows:
  - (a) “Shall” is used to indicate a mandatory requiriements.
  - (b) “Should” is used to indicate a recommendation.
  - (c) “May” is used to indicate discretion by the Authority, the industry or the applicant, as appropriate.
  - (d) “Will” is used to indicate a mandatory requirements.
- 7 The Civil Aviation Authority of Thailand  
Flight Operations Standards Department (OPS)  
General Aviation and Aerial Work Division (GA)  
222 Soi Vibhavadi Rangsit 28, Vibhavadi Rangsit Rd., Khwaeng Chatuchak, Chatuchak,  
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## Abbreviations and Symbols

Abbreviations		Abbreviations	
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	FPL or eFPL	Filed flight plan
AR	Authorization required	ft	Foot
ATC	Air traffic control		
		g	Normal acceleration
ATM	Air traffic management	GAR	General Aviation Requirement
ATM	Aeronautical telecommunication network		
ATS	Air traffic services	hPa	Hectopascal
		HUD	Head-up display
CAAT	Civil Aviation Authority	IFR	Instrument flight rules
CARS	Cockpit audio recording system	ILS	Instrument landing system
CAT I	Category I	IMC	Instrument meteorological conditions
CAT II	Category II	inHg	Inch of mercury
CAT III	Category III		
CAT IIIA	Category IIIA	kg	Kilogram
CAT IIIB	Category IIIB	km	Kilometre
CAT IIIC	Category IIIC	kN	Kilonewton
CFIT	Controlled flight into terrain	kt	Knot
cm	Centimetre		
CPDLC	Controller-pilot data link communications	LDAH	Landing distance available
CVR	Cockpit voice recorder	LDP	Landing decision point
CVS	Combined vision system	LDRH	Landing distance required
		LED	Light emitting diode
DA	Decision altitude		
DA/H	Decision altitude/height	m	Metre
DH	Decision height	mb	Millibar
DLR	Data link recorder	MDA	Minimum descent altitude
DLRS	Data link recording system	MDA/H	Minimum descent altitude/height
DME	Distance measuring equipment	MDH	Minimum descent height
		MEL	Minimum equipment list
EFB	Electronic flight bag	MHz	Megahertz

EFIS	Electronic flight instrument system	MLS	Microwave landing system
EGT	Exhaust gas temperature	MMEL	Master minimum equipment list
EICAS	Engine indication and crew alerting system	MOPS	Minimum operational performance specification
ELT(AD)	Automatic deployable ELT		
ELT(AF)	Automatic fixed ELT	NM	Nautical mile
ELT(AP)	Automatic portable ELT	NVIS	Night vision imaging systems
EPR	Engine pressure ratio		
OCA/H	Obstacle clearance altitude/height	OCA	Obstacle clearance altitude
OCH	OCH Obstacle clearance height	Vy	Best rate of climb speed
		VOR	VHF omnidirectional radio range
PANS	Procedures for Air Navigation Services	VSM	Vertical separation minima
PBC	Performance-based communication		
PBN	Performance-based navigation	WXR	Weather radar
PBS	Performance-based surveillance	<b>Symbols</b>	
PFP	Preliminary flight plan	°C	Degrees Celsius
PNR	Point of no return	%	Per cent
psi	Pound per square inch		
R	Rotor radius		
RCP	Required communication Performance		
RFFS	Rescue and fire-fighting services[JS1]		
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		
T4	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		
VD	Design diving speed		
VSO	Stalling speed or the minimum steady flight speed in the landing configuration		
VFR	Visual flight rules		
VMC	Visual meteorological conditions		
VNAV	Vertical navigation		
VTOSS	Take-off safety speed		

## Definitions

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

### A

**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.

**Advance aircraft.** An aircraft with equipment in addition to that required for a basic aircraft for a given take-off, approach or landing operation.

**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

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

## **B**

**Basic aircraft.** An aircraft which has the minimum equipment required to perform the intended take-off, approach or landing operation.

## **C**

**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 a synthetic vision system (SVS).

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

**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.

## D

**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.

## E

**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.

## F

**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.

**Filed flight plan (FPL or eFPL).** The latest flight plan as submitted by the pilot, an operator or a designated representative for use by ATS units.

*Note.*— *The FPL denotes a filed flight plan exchanged using aeronautical fixed service while eFPL denotes a filed flight plan exchanged using FF-ICE services. The eFPL allows for the exchange of additional information not contained within the FPL.*

**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 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 relative to an intended flight or portion of a flight of an aircraft.

Note 1.— *The term flight plan may be prefixed by the words “preliminary”, “filed”, “current” or “operational” to indicate the context and different stages of a flight.*

Note 2.— *When the word “message” is used as a suffix to this term, it denotes the content and format of the flight plan data as transmitted.*

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

**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 — 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.

## G

**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.

## H

**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.

## I

**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.

**L**

**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 balked 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.

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

**M**

**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 a 2D instrument approach operation or circling approach operation below which descent must not be made 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.

## **N**

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

**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.*

**O**

**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 credit.** A credit authorized for operations with an advanced aircraft enabling a lower aerodrome operating minimum than would normally be authorized for a basic aircraft, based upon the performance of advanced aircraft systems utilizing the available external infrastructure. Lower operating minima may include a lower decision height/altitude or minimum descent height/altitude, reduced visibility requirements or reduced ground facilities or a combination of these

**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 organization 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.

**P**

**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 presentative of these entities.

**Preliminary flight plan (PFP).** The information related to a flight submitted by an operator or a designated representative to conduct collaborative planning of a flight, prior to filing a flight plan.

**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.

**Private Operator.** The holder of a private aircraft operating license issued under the Air Navigation Act B.E. 2497, Article 29 bis.

**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.

## R

**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.

## S

**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.

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

**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.

## T

**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).

## V

**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)

#### CHAPTER 1

#### GENERAL

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

- 101.1 The requirements of these Regulations apply to all local and international general aviation operations conducted by a Thai registered aeroplane with a Standards Certificate of Airworthiness (Standards C of A).
- 101.2 In these Regulations, “aeroplane” does not include a balloon or free flight aerial object, ultralight, a parasail, a paramotor, paraplane, hangglider under the Regulation of Civil Aviation Board (RCAB) No. 43 and RCAB No.70, and an unmanned aircraft and unmanned aircraft system.
- 101.3 The Authority may exceptionally grant an exemption from the provision of paragraph 101.1 when satisfactory that there is a need and subject to compliance with any supplementary condition the Authority considers necessary in order to ensure an acceptable level of safety in the particular case.

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

- 102.1 The pilot-in-command of a Thai 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) If an emergency situation which endangers the safety of the aeroplane or persons necessitates the taking of action which involves a violation of local regulations or procedures, the pilot-in-command shall notify the appropriate local authority without delay. 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 in accordance with the Civil Aviation Authority of Thailand Requirements No. 22 on Occurrence Reporting in Civil Aviation;
  - (e) when intercepted, immediately follow the instructions given by the intercepting;

- (f) 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;
- (g) ensure that flight crew members demonstrate the ability to speak and understand the language used for aeronautical radiotelephony communications in accordance with the flight crew licensing requirements.

**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 substances are contained in the Requirement of the Civil Aviation Authority of Thailand No.32 Disciplines personnel.

**GA-P1A.104 CARRIAGE OF DANGEROUS GOODS**

104.1 The Thai private operator shall ensure that any dangerous goods should not be carried on an aeroplane unless the conditions of carriage of such dangerous goods meet the requirements in accordance with the Regulation of the Civil Aviation Authority of Thailand on the transport of dangerous goods by air.

**GA-P1A.105 GENERAL AVIATION - SPECIFIC APPROVAL**

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

105.2 The Specific Approval required for approval from the Authority as mentioned in 105.1 details as follows:

- (a) a performance base navigation operation;
- (b) an operation in RVSM Airspace;
- (c) a low visibility operation;
- (d) an operation using an automatic landing system, a HUD or equivalent displayed, EVS, SVS or CVS, or any combination of those systems into a hybrid system;
- (e) Operations in the North Atlantic ( NAT) Minimum Navigation Performance Specifications (MNPS) Airspace;
- (f) Use of Electronic Flight Bags (EFBs).

**105.3 Application for Specific Approval**

105.3.1 The pilot-in-command shall apply to the Authority for an approval to conduct any Specific Approval operation listed in 105.2 shall: -

- (a) Made an application such time and in such form and manner as the Authority may require;
- (b) comply with the requirements as described in these Regulations for an application for the particular Specific Approval; and;
- (c) proposed the equivalent all documentation that are necessary for the Specific Approval to be conducted safely.

105.3.2 The application for and grant of Specific Approval is a complicated process that requires a great deal of effort and detail work on the part of both the applicant and the authorities. As a result, an applicant shall contact the Authority as early as possible and submit all necessary manuals and documents at least 90 working days 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 organization, 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 time frame.

105.4 **Format of a General Aviation - Specific Approval**

Refer to Appendix 1D for the format of General Aviation - Specific Approval

105.5 **The process initially issued for Specific Approval**

International standards require the Authority to ensure, before granting the Specific Approval, that the applicant's proposed program, systems, arrangements, documentation, personnel, and intended method of compliance are thoroughly reviewed, evaluated, and tested using the five-phase process:

The applicant should follow a five-step approval process, which is as follows:

- (a) **The Pre-Application Phase** is a meeting between the applicant and the Authority to discuss any questions about the Specific Approval process, regulatory requirements, the relevant guidance materials, the application form, and any other related issues
- (b) **The Formal Application Phase** is when the applicant submits all the required information for Specific Approval to the Authority. The information will include personnel detailed as a flight crew and accountable manager, the details of the aircraft to be used, and applications for any 'Specific Approval' required (e.g. RVSM, NAT- HLA, CAT II/ III, etc. ) such as aircraft/ equipment certification, operating procedures, flight crew training program, and aircraft maintenance arrangements and to ensure that all documents have been submitted and are complete.
- (c) **The Document Compliance Phase** is the application package submitted in the formal application phase that has been reviewed in- depth for regulatory compliance by the Authority.  

An applicant will not be able to finalize operating procedures, maintenance arrangements, management processes or crew training programmes until the applicable documentation has been reviewed and (if necessary) approved.
- (d) **The Demonstration and Inspection Phase** is where the Authority will verify that the applicant is going to operate in the way that's described in the documentation, by conducting inspections or visiting facilities, observing the training flight crew in the training simulation devices and reviewing records, and making a systems evaluation of particular processes.
- (e) **The Approval Phase** is internal to the Authority. All inspections and audits have been completed, and the identified non- compliance has been addressed,

allowing the application to proceed to the approval phase.

**105.6 Grant or refuse of Specific Approval**

After considering any application made under 105.5, the Authority shall: -

- (a) refuse to consider an application for a Specific Approval that is incomplete or not made in the form or manner required by 105.5 or as required by the Authority; or
- (b) grant the Specific Approval, subject to such condition, restriction, and limitations as the Authority thinks fit.

**105.7 Validity of Specific Approval**

The Specific Approval is normally valid for not more than 5 years for initially issued. Thereafter, it may be renewed for not more than 5 years subject to the satisfaction of the Authority.

The type(s) of aircraft and the registration mark of aircraft may be specified in the approve of operations.

**105.8 Variation of Specific Approval**

If a Thai private operator wishes to apply for a variation of its Specific Approval in order to change or add to a specific approval such as RVSM, EFB, PBN, AWO, and so on, the Thai private operator must complete the form with full details of the requested amendments and submit all required manuals and documents at least 90 days in advance. No undertaking can be given that an application will be dealt with within any requested timeframe. The process for variation of existing specific approval should be adaptable to a 5-phase process as mentioned in 105.5.

**105.9 General requirements of the Thai private operator with Specific Approval**

105.9.1 The Thai private operator who which to apply the Specific Approval in accordance with 105.5, shall: -

- (a) comply with:
  - (i) the requirements in these Regulations for those operations;
  - (ii) the documents approved for those operations; and
  - (iii) the conditions, restrictions and limitations for the special operations approval; and
- (b) specify in the details subject to the Specific Approval as required in documented, include any training programme, procedure, or system established for the Specific Approval that is approval/acceptable to the Authority;
- (c) where the Specific Approval is varied under 105.8, Thai private operator shall update the relevant document mentioned in 105.3.2 with the details of the approved variation and the conditions, restrictions or limitations that the approved variation is subject to.

105.9.2 The Thai private operator and the pilot-in-command with Specific Approval shall maintain:

- (a) training programme established for every person who is to be involved in the Specific Approval as a flight crew member;
- (b) the procedures, programme or systems established compliance with: -
  - (i) the conditions, restrictions and limitations of the Specific Approval; and
  - (ii) the requirements prescribed in these Regulations for the operations.

**105.9.3 Consequences of non-compliance**

The Authority shall vary, suspend, or revoke a Specific Approval if the Director-General of Civil Aviation is satisfied that the Thai private operator granted the Specific Approval has failed to comply with a condition, restriction, or limitation of the Specific Approval; or a provision of these regulations.

## General Aviation – Specific Approval

### 105.10 Performance base navigation Operations

#### 105.10.1 **General Requirements for Performance base navigation Operations**

A Thai private operator who wishes to apply for a Specific Approval to conduct a Performance base navigation Operations, as part of the application under 105.4, shall identify, specify and provide the documents submitted together with the completed application for the Specific Approval Form to the CAAT:

- (a) identify the particular aircraft to be used for the specified navigation performance operation;
- (b) specify the equipment to be carried on the identified aeroplane that equipped to perform in accordance with the relevant navigation specification;
- (c) specify the composition and experience requirements of the flight crew for a flight involving the specified navigation performance operation; and
- (d) provide details of: -
  - (i) the operating procedures required under 105.10.2 (a);
  - (ii) the training programme required under 105.10.2 (b);
  - (iii) the procedures required under 105.10.2 (d); and
  - (iv) the programme required under 105.10.4.

#### 105.10.2 **Additional details for application**

The Thai private operator with a Specific Approval to conduct a Performance base navigation Operations shall: -

- (a) have the following operating procedures for the Performance base navigation Operations:
  - (i) procedures for normal and contingency situations;
  - (ii) incident reporting procedures;
- (b) have a training programme for every person to be involved in the Performance base navigation Operations as a flight crew member or a member of the operations personnel;
- (c) ensure that every aircraft identified for such operations is appropriately equipped to perform in accordance with the navigation specification; and
- (d) have procedures and the conditions of the special operations approval to ensure that These Regulation are met.

### 105.10.3 Flight crew requirements

The Thai private operator with a Specific Approval to conduct a specified navigation performance operation shall ensure that the aeroplane used to conduct the specified navigation performance operation has a flight crew comprising member: -

- (a) that are of the composition and experience required for such operations; and
- (b) that have completed the training programme established under 105.10.2 (b), for every flight crew member involved in such operations.

### 105.10.4 Continuous Monitoring

The Thai private operator with a Specific Approval to conduct a specified navigation performance operation shall have a programme to monitor the aircraft to be used for specified navigation performance operations to ensure the required level of navigation performance is maintained.

*Note.- The Criteria for Authority Approval for RNAP 10, RNAP 5, RNAP 1, RNAP 2, RNP 4, RNP 2, RNP 1, RNP APCH and RNP AR APCH refer to Guidance Material for Performance-based Navigation (PBN).*

## 105.11 Operations in RVSM Airspace

### 105.11.1 General Requirements for RVSM operations

The Thai private operator who wishes to apply for a Specific Approval to conduct an aeroplane in RVSM airspace, as part of the application under 105.4, shall identify and provide the documents submitted together with the completed application form for Specific Approval to CAAT:

- (a) identify a particular aeroplane to be operated;
- (b) provide evidence that the identified aeroplane has a vertical navigation performance in accordance with the Second Schedule;
- (c) specify the equipment to be carried on the identified aeroplane for compliance with 105.11.3; and
- (d) provide details of: -
  - (i) the training programme required under 105.11.2 (b);
  - (ii) the procedures required under 105.11.2 (c);
  - (iii) the RVSM maintenance and inspection programme required under 105.11.4; and
  - (iv) the programme required under 105.11.5.

### 105.11.2 Additional details for application

The Thai private operator with a Specific Approval to conduct an aeroplane in RVSM airspace shall: -

- (a) equip an aeroplane intended to be used for RVSM operations in accordance with 105.11.3;
- (b) have a training programme for person to be involved in such operations as a flight crew member;
- (c) have procedures for ensure that the requirements for these requirements to be met, including matters relating to; -
  - (i) the equipment to be carried on an aeroplane to be used, including aeroplane operating limitations and appropriate entries in the minimum equipment list;
  - (ii) flight crew composition and experience requirements;
  - (iii) flight planning;
  - (iv) pre-flight procedures;
  - (v) procedures prior to entry into RVSM airspace;
  - (vi) in-flight procedures;
  - (vii) post-flight procedures;
  - (viii) Airworthiness maintenance programmes included maintenance and inspection programme for the altimeter system and altitude reporting equipment on an aeroplane that is used for such operations;
  - (ix) incident reporting; and
  - (x) specific regional operating procedures.

### 105.11.3 Equipment requirements for RVSM operations

The Thai private operator with a Specific Approval to conduct an aeroplane in RVSM airspace shall equip an aeroplane used for such operations with navigation equipment capable of: -

- (a) indicating to the flight crew the flight level to be flown;
- (b) automatically maintaining a select flight level;
- (c) provide an alert to the flight crew when the aeroplane deviates from the selected flight level with a deviation exceeding the threshold of 90m (300 ft.) above or below the selected flight level; and
- (d) automatically reporting to the flight crew, the pressure-altitude if the pressure-altitude is not automatically reported by the pressure altimeters required for the aeroplane.

#### 105.11.4 Maintenance and Inspection programme

The Thai private operator with a Specific Approval to conduct an aeroplane in RVSM airspace shall have a maintenance and inspection programme for the altimeter system and altitude reporting equipment on an aeroplane that is used for such operation.

#### 105.11.5 Height-keeping performance monitoring

The Thai private operator with a Specific Approval to conduct an aeroplane in RVSM airspace shall established a programme to monitor the height-keeping performance of the aeroplane used for such operations at least once every 2 years or every 1 000 flight hours, whichever period is longer.

#### 105.11.6 Flight crew requirements for operations in RVSM airspace

The Thai private operator with a Specific Approval to conduct RVSM airspace shall ensure that, when its aeroplane is used to conduct such operations, the flight crew comprises at least 2 pilots.

If the aeroplane intended to be used for RVSM operations required a one-man crew, the flight crew shall have received training through the approved RVSM Training programme by the Authority.

*Note. - The Criteria for Authority Approval refer to Guidance Material for Reduced Vertical Separation Minima (RVSM).*

### 105.12 The Application for approving Low visibility operations

#### 105.12.1 General requirements for Low visibility operations

The Thai private operator who wishes to apply for a Specific Approval to conduct low visibility operations, as part of the application under 105.4, shall identify, conduct and provide the documents submitted together with the completed application form for Specific Approval to CAAT:

- (a) identify the aircraft type to be used for such operations;
- (b) conduct the operational demonstration specified in 105.12.4 (a), using an aeroplane for the type to be used for the operations;
- (c) specify the equipment to be carried on the identified aircraft types for compliance with 105.12.8 (a);
- (d) specify the composition of, and experience requirements for, the flight crew assigned to such operations; and
- (e) provide details of: -

- (i) the systems required under 105.12.2 (c);
- (ii) the training programme required under 105.12.2 (d);
- (iii) the syllabus required under 105.12.2 (e);
- (iv) the procedures required under 105.12.2 (f);
- (v) the operating procedure required under 105.12.7 (a);
- (vi) the flight crew recency requirements required under 105.12.11.

#### 105.12.2 Additional details for application

The Thai private operator with a Specific Approval to conduct a low visibility operation shall:

- (a) ensure that the aeroplane to be used for such an operation is certified under its type certificate for low visibility operations with a decision height not exceeding 200 ft.;
- (b) ensure that a person assigned as a flight crew member to such an operation is appropriately qualified;
- (c) have a suitable system for recording the success and failure of automatic approach and automatic landing to monitor the overall safety of the operation;
- (d) have a training programme for every person to be involved in such an operation as a flight crew member;
- (e) have a detailed training syllabus for such operations; and
- (f) have a procedure for ensuring the requirements of these regulations are met.

#### 105.12.3 Other required approvals

The Thai private operator with a Specific Approval to conduct a low visibility operation shall not use a runway for Category II or III operation unless the State of the Aerodrome for the aerodrome in which the runway is located has approved the use of the runway for such an operation.

#### 105.12.4 Operational demonstration

The Thai private operator shall: -

- (a) conduct, to the satisfaction of the Authority, an operational demonstration using an aeroplane of the aircraft type to be used for a low visibility operation as required under 105.12.1 (b); and
- (b) the operational demonstration required under ( a ) above, shall allow the Authority to determine and validate the effectiveness of: -
  - (i) the aircraft system of the type to be used for the low visibility operation;
  - (ii) the operator's operating procedures and policies;

- (iii) the operator's training and maintenance programme; and
- (iv) any relevant operational control mechanism of the Thai general aviation operator.

#### 105.12.5 Aerodrome considerations

The Thai private operator with a Specific Approval to conduct a low visibility operation shall:

- (a) before conduct a low visibility operation commence the operations at a runway, Thai private operator shall verify that low visibility procedures have been established at the runway and are in use;
- (b) before conduct a Category III operation commences the operations at the runway, Thai private operator shall verify that an aeroplane intended to be use for CAT III operations, has successful completed at least one approach and landing at the runway in conditions that are Category II or better;
- (c) before conduct a Category III operation commences the operations at the runway with irregular pre- threshold terrain, or with other perceived or known deficiencies for low visibility operations, Thai private operator shall verify that the runway is suitable for such use by using an aircraft, in the following order, at least one landing at the runway:
  - (i) in condition that are Category I or better;
  - (ii) in Category II conditions;
  - (iii) in Category III conditions.

#### 105.12.6 Flight Crew Training

The Thai private operator with a Specific Approval to conduct a low visibility operation shall:

- (a) ensure that every person assigned flight crew member duty as a pilot in the operation has completed the training programme provided in accordance with 105.12.2 (d), which includes training in an approved flight simulation training device in operating the aircraft to the limiting values of RVR and decision height appropriate to the operator's approval, and has undergone the relevant competency and proficiency checks to conduct the operation.
- (b) conduct the training and checks mentioned in paragraph (a) above in accordance with a detailed syllabus in accordance with 105.12.1 (e), (iii).
- (c) in this regulation, "approved flight simulation training devices" means that a flight simulation training devices that is representative for the type of aircraft that is to be used to conduct the low visibility operation and is specifically approved by the CAAT.

#### 105.12.7 Operating Procedures

The Thai private operator with a Specific Approval to conduct a low visibility operation shall:

- (a) ensure that the operating procedures and instructions for the operation are designed such that any aircraft used to conduct a 3D instrument approach operation crosses the threshold by a safe margin with the aircraft in the landing configuration and attitude;
- (b) does not commence the operation unless the pilot-in-command is satisfied that:
  - (i) the visual and non-visual facilities at the aerodrome of take-off or approach is sufficient;
  - (ii) the appropriate low visibility procedures are in force according to information received from the relevant air traffic service authority; and
  - (iii) every flight crew member assigned to the operation has completed the necessary training, and meets the recency requirements prescribed in 105.12.11.

#### 105.12.8 Minimum equipment requirements.

The Thai private operator with a Specific Approval to conduct a low visibility operation shall:

- (a) ensure that an aeroplane that is to be used for the operations, the minimum equipment that has to be serviceable at the commencement of the low visibility operations is in accordance with the aircraft flight manual, minimum equipment list, or equivalent document acceptable to the Authority.
- (b) not commence the operation unless the pilot-in-command is satisfied that the status of the aircraft, and the status of the relevant airborne systems, are appropriate for the specific operation to be conducted.

#### 105.12.9 Continuing Airworthiness Maintenance Procedures

The Thai private operator with a Specific Approval to conduct a low visibility operation shall:

- (a) ensure that an aeroplane that is to be used for the operations, the minimum equipment that has to be serviceable at the commencement of the low visibility operations is in accordance with the aircraft flight manual, minimum equipment list, or equivalent document acceptable to the Authority.
- (b) not commence the operation unless the pilot-in-command is satisfied that the status of the aircraft, and the status of the relevant airborne systems, are appropriate for the specific operation to be conducted.
- (c) maintain every aeroplane approved for such an operation in accordance with the

Continuing Airworthiness Maintenance Procedures established by the manufacturer of the aeroplane with specific programme for lower landing minima or low visibility operations, as applicable.

#### 105.12.10 Continuous monitoring

The Thai private operator with a Specific Approval to conduct a low visibility operation shall:

- (a) monitor every flight with such an operation to ensure that any undesirable trends are promptly detected and responded to.
- (b) the obligations under paragraph (a) include: -
  - (i) monitoring the performance of the automatic landing system or Head-Up Display Landing System or both ( as appropriate) to touchdown of an aircraft;
  - (ii) ensuring every unsatisfactory report is investigated; and
  - (iii) taking positive steps following an unsatisfactory report to ensure safety of operations, such as the suspension of all low visibility operations until remedial action has been taken.
- (c) retain, for a period of 12 months starting one the date immediately after any such operation is completed, information and reports on the following matters:
  - (i) the aircraft type used for the operation;
  - (ii) the aircraft registration;
  - (iii) the aerodrome used for the operation;
  - (iv) the type of approach ( Category II or III) and whether the approach was satisfactory;
- (d) if the approach or automatic landing was unsatisfactory the reason for the unsatisfactory approach or landing, such as:
  - (i) an airborne equipment fault;
  - (ii) any difficulties with the ground facility;
  - (iii) any missed approach due to air traffic control instruction; or
  - (iv) any other reason.

#### 105.12.11 Aircraft and crew recency

The Thai private operator with a Specific Approval to conduct a low visibility operation shall:

- (a) not use an aircraft for a flight with a Category III approach and automatic landing unless a pilot has successfully completed at least one automatic landing with the aircraft in the 28 days immediately preceding the flight.
- (b) not assign a person to flight crew member duty as a pilot-in-command or co-pilot

for a flight with low visibility operations unless the person meets the recency requirements approved by the Authority.

105.12.12 For the purpose of the regulation 105.12.2 (b), the Thai private operator with a Specific Approval to conduct a low visibility operation shall specify in the documentation of: -

- (a) the syllabus mentions in 105.12.2 (e);
- (b) the operating procedure established in accordance with 105.12.7 (a), which include the duties of each flight crew member during taxiing, take-off, approach, flare, landing, roll-out and missed approach, as appropriate; and
- (c) the minimum equipment that has to be serviceable at the commencement of any low visibility operation.

*Note. - The Criteria for Authority Approval refer to Guidance Material for All Weather Operations (AWO).*

105.13 **An operation using an automatic landing system, a HUD or equivalent displayed, EVS, SVS or CVS, or any combination of those systems into a hybrid system**

105.13.1 An operation using an automatic landing system, a HUD or equivalent displayed, EVS, SVS or CVS, or any combination of those systems into a hybrid system is meant that the aeroplane conducts operations using: -

- (a) a head-up display or equivalent;
- (b) an automatic landing system;
- (c) an enhanced vision system;
- (d) a synthetic vision system;
- (e) a combined vision system;
- (f) a hybrid system comprising any combination of a display or system mentioned in subparagraph (a) to (e).

105.13.2 **General requirements for application**

Where aeroplanes are equipped with automatic landing system, a HUD or equivalent displayed, EVS, SVS or CVS, or any combination of those systems into a hybrid system, The procedure for use of such systems for the safe operation of an aeroplane shall be established by the Thai private operator and submit to CAAT for approval.

105.13.3 **Additional details for application**

The Thai private operator with a Specific Approval to use a system or display mentioned in 105.13.1 (a) – (f) in its operation shall ensure 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 normal and abnormal procedures and MEL;
- (d) the operator/ owner has established a training programme for the flight crew members and relevant personnel involved in the flight preparation;

*Note1.- Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859).*

*Note2.- Information regarding automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, is contained in the Manual of All-Weather Operations (Doc 9365)*

**105.15 Operations in the North Atlantic ( NAT) Minimum Navigation Performance Specifications (MNPS) Airspace**

105.15.1 The Thai private operator shall not file a flight plan indicating that an aircraft is to conduct a North Atlantic minimum navigation performance specification (NAT-MNPS) unless the Thai private operator is authorized by the Authority to operate the aircraft in accordance with these regulations.

105.15.2 For flights in defined portions of airspace where, based on Regional Air Navigation

105.15.3 Minimum Navigation Performance Specifications ( MNPS) and Required Navigation Performance (RNP)

105.15.3.1 The operator requesting MNPS specific approval shall submit navigational equipment used, together with its installation and maintenance procedures.

105.15.3.2 Aircraft operating within MNPS Airspace are required to meet a Minimum Navigation Performance Specification (MNPS) in the horizontal plane through the mandatory carriage and use of a specified level of navigation equipment which has been approved by the Authority. Such approvals encompass all aspects affecting the expected navigation performance of the aircraft.

105.15.3.3 Approval for MNPS operations will require the checking by the Authority of various aspects affecting navigation performance. These aspects include the navigation equipment used, together with its installation and maintenance procedures, crew navigation procedures employed and training requirements.

105.15.3.4 Longitudinal separations between subsequent aircraft following the same track (in-trail) and between aircraft on intersecting tracks in the NAT MNPS Airspace are assessed in terms of differences in ATAs/ETAs at common waypoints. The longitudinal separation minima currently used in the NAT MNPS Airspace are thus expressed in clock minutes. The maintenance of in-trail separations is aided by the application of

the Mach Number Technique. However, aircraft clock errors resulting in waypoint ATA report errors can lead to an erosion of actual longitudinal separations between an aircraft. It is thus vitally important that the time-keeping device intended to be used to indicate waypoint passing times is accurate, and is synchronized to an acceptable UTC time signal before commencing flight in MNPS Airspace. Thus, the pre-flight procedures for any NAT MNPS operation must include a UTC time check and resynchronization of the aircraft Master Clock.

105.15.3.5 There are two navigational requirements for aircraft planning to operate in MNPS Airspace. One refers to the navigation performance which shall be achieved, in terms of accuracy. The second refers to the need to carry standby equipment with comparable performance characteristics. Thus, in order to justify consideration for approval of unrestricted operation in the MNPS Airspace an aircraft must be equipped with the following:

- (a) Two fully serviceable Long Range Navigation Systems (LRNSS). A LRNS may be one of the following:
  - (i) One Inertial Navigation System (INS);
  - (ii) One Global Navigation Satellite System (GNSS); or
  - (iii) One navigation system using the inputs from one or more Inertial Reference System (IRS) or any other sensor system complying with the MNPS requirement.
- (b) Each LRNS must be capable of providing to the flight crew a continuous indication of the aircraft position relative to desired track.
- (c) It is highly desirable that the navigation system employed for the provision of steering guidance is capable of being coupled to the autopilot.

105.15.3.6 Operators requesting for specific approval where a navigation specification for PBN or an RCP or RSP specification for PBCS has been prescribed must be equipped with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s), and also have appropriate maintenance procedures to ensure continued airworthiness in accordance with the prescribed specification(s).

105.15.3.7 The applicable navigation specification(s) approval will be issued by The Authority when satisfied that the aircraft equipment together with the maintenance and operating procedures are sufficient to support such operations.

#### 105.16 **Electronic Flight Bags (EFBs)**

*Note. - Guidance on EFB equipment, functions and specific approval is contained in the Manual on Electronic Flight Bags (EFBs) (Doc 10020) and CAAT EFB guidance material.*

### 105.16.1 EFB equipment

Where portable EFBs are used on board an aeroplane, the Thai private operator shall ensure that they do not affect the performance of the aeroplane systems, equipment or the ability to operate the aeroplane.

### 105.16.2 EFB functions

#### 105.16.2.1 Where EFBs are used on board an aeroplane the Thai private operator shall:

- (a) Assess the safety risk(s) associated with each EFB function;
- (b) Establish and document 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 Safety Management Manual (SMM) (ICAO Doc 9859).*

#### 105.16.2.2 The operational use of EFB functions shall be authorized by the Authority under specific approval to be used for the safe operation of aeroplanes.

#### 105.16.2.3 EFB specific approval to obtain a specific approval from the Authority, the Thai private operator shall provide evidence that:

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

*Note.- Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (ICAO Doc 9859).*

**GA-P1A.106    OVERSIGHT ACTIVITIES BY THE AUTHORITY**

- 106.1 To determine continued competence and compliance by the Thai private operator with the applicable requirements, shall permit access by Authorised Officers /CAAT Inspector to its premises, aeroplane, equipment and document, including those landing agents appointed by the Thai private operator.
- 106.2 All Authorised Officers/CAAT Inspector are authorised to be on-board the operator's aeroplane, including its flight deck, during normal aeroplane operations. Arrangements for such flights will normally be made in advance, but Authorised Officers may also board the aeroplane without prior notice to conduct unscheduled inspection.
- 106.3 The Thai private operator will be visited from time to time by Authorised Officers/CAAT Inspector. The primary purpose of their visits will be to observe the operations of aeroplane of its Thai private operator. This will include the training and checking and qualifications of the operating staff and agents/contractors of its Thai private operator.
- 106.4 The Authorised Officers/CAAT Inspector are also empowered to inspect the licenses of the flight crew and aircraft maintenance engineers, and records of the Thai private operator and their agents.
- 106.5 Subject to paragraph 106.1 – 106.4, When the Authority issues a Specific Approval, the Thai private operator is subject to performing a function that, continuing surveillance, or any assessment, examination, test, inspection or investigation, for any purpose of these regulations (in every year) to ensure that the Thai private operator remains competent to undertake the safe operations, as a result of which an authorized officer/CAAT Inspector must travel outside Thailand to perform that function, the Thai private operator shall be borne subject to the functions as mentioned above.

## CHAPTER 2

### FLIGHT OPERATION

#### GA-P1A.201 OPERATING FACILITIES

The pilot-in-command of Thai aeroplane 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 taxed 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 Thai private 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 shall establish aerodrome operating minima in accordance with criteria specified in Aeronautical Publication Information, 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.

202.2.2 Operational credit(s) for aeroplanes equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS shall be authorized by the authority. Where the operational credit relates to low visibility operations, the pilot-in-command or Thai private operator shall obtain a specific approval from the authority. Such authorizations shall not affect the classification of the instrument approach procedure.

To obtain a specific approval for the operational credit, the Thai private operator shall demonstrate to CAAT that;

- (a) the aeroplane meet the appropriate airworthiness certification requirements;

- (b) the information necessary to support effective crew tasks for the operation is appropriately available to both pilots where the number of flight crew members specified in the operations manual (or other documents associated with the certificate of airworthiness) is more than one;
- (c) Thai private operator has carried out a safety risk assessment of the operations supported by the equipment;
- (d) Thai private operator has established and documented normal and abnormal procedures and MEL;
- (e) Thai private operator has established a training programme for the flight crew members and relevant personnel involved in the flight preparation;
- (f) Thai private operator has established a system for data collection, evaluation and trend monitoring for low visibility operations for which there is an operational credit; and
- (g) Thai private operator has instituted appropriate procedures with respect to continuing airworthiness (maintenance and repair) practices and programmes.

*Note:1 The safety risk assessment shall be conducted in accordance with the guideline in CAAT GM for Safety Management System.*

*Note:2 CAAT GM for All Weather Operations (AWO), FAA AC 120-118 or AMC and GM to Part SPA to Commission Regulation (EU) No 965/2012 may be used as a guidance for operational credits specific approval.*

202.2.3 In establishing the aerodrome operating minima which will apply to any particular operation, the Thai private operator shall take into full account the following:

- (a) The type, performance and handling characteristics of the aeroplane and any conditions or limitations stated in the flight manual;
- (b) The composition of the flight crew, their experience and competence;
- (c) The dimension and characteristic of the runway which may be selected for use;
- (d) The adequacy and performance of available visual and non-visual ground aids;
- (e) The equipment available on the aeroplane for the purpose of navigation and/or control of flight path during the approach to landing and the missed approach;
- (f) The means used to determine and report meteorological conditions;
- (g) The obstacles in the climb-out areas and necessary clearance margin;
- (h) The conditions prescribed in the specific approval;
- (i) Any minima that may be promulgated by the state of the aerodrome.

202.2.4 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 and required to be approved by the Authority, the details 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:
- (i) Category I (CAT I): a decision height not lower than 60 m (200 ft) and with either a visibility not less than 800 m or a runway visual range not less than 550 m;
  - (ii) Category II (CAT II): a decision height lower than 60 m ( 200 ft) but not lower than 30 m (100 ft) and a runway visual range not less than 300 m;
  - (iii) Category III (CAT III): a decision height lower than 30 m (100 ft) or no decision height and a runway visual range less than 300 m or no runway visual range limitations.

*Note 1. - Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach operation would be conducted in accordance with the 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). This does not apply if the RVR and/or DH has been approved as operational credits.*

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

*Note 3. - Guidance on approach classification as it relates to instrument approach operations, procedures, runways and navigation systems is contained in the CAAT GM for All Weather Operations (AWO).*

202.2.5 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.*

202.2.6 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.

202.2.7 An instrument approach operation should not be authorised, when the aerodrome operating minima is below 800 m visibility unless RVR information is provided.

*Note.- Guidance on low visibility operations is contained in the CAAT GM for All Weather Operations (AWO).*

202.2.8 For take-off in low visibility, the Thai private operator shall obtain a specific approval for the minimum take-off RVR from the CAAT.

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

### 202.3 Passengers

202.3.1 The pilot-in-command of Thai aeroplane 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;
- (e) other emergency equipment provided for individual use, including passenger emergency briefing cards.

202.3.2 The pilot-in-command of a Thai aeroplane 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 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; and
- (f) the aeroplane operating limitations, contained in the flight manual, or its equivalent, will not be exceeded
- (g) the climb performance with all engines operating to enable determination of the climb gradient that can be achieved during the departure phase for the exiting take-off condition and intended take-off technique.

## 203.2 flight planning

203.2.1 Before commencing a flight, the pilot-in-command of a Thai aeroplane 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 Regulation of the Civil Aviation Authority of Thailand — Rules of the Air and Requirement of the Civil Aviation Authority of Thailand No. 72 - the procedures relating to flight plans and associated services are contained in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444).*

*Note 3.- Detailed guidance on the use of the FF-ICE services, including the use of a preliminary flight plan, can be found in the Manual on Flight and Flow — Information for a Collaborative Environment (FF-ICE) (Doc 9965).*

203.2.2 The pilot-in-command of Thai aeroplane shall not commence a flight unless the pilot-in-command has obtained, become familiar with, and acted on all the relevant information concerning the flight.

203.2.3 The information that a pilot-in-command of Thai aeroplane is required to obtain, become familiar with, and the Regulations on, under paragraph 203.2.2 includes:

- (a) the current and forecast meteorological information;
- (b) the fuel and oil requirements for the flight;
- (c) all relevant details of the planned load;
- (d) the alternatives available if the flight cannot be completed as planned;
- (e) any known or likely traffic delays as informed by the appropriate air traffic services unit in an official publication issued by the appropriate air traffic services unit (such as an AIC, AIP or NOTAM);
- (f) the status of the communication and navigation facilities to be used for the flight;
- (g) for the aerodrome of intended use, the current conditions, restrictions and runway lengths;
- (h) all airspace restrictions that may apply on or adjacent to the planned route and alternatives available
- (i) and any volcanic activity within the vicinity of the planned route

#### 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 paragraph 203.6.1, 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 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.

203.4.4 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.

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

#### 203.5 Use of aerodromes and landing sites

203.5.1 For every flight, the pilot-in-command of Thai aeroplane must not operate the aeroplane at any aerodrome or landing sites for aeroplane unless the aerodrome or landing sites for Aircraft is adequate, taking into account the performance of the aeroplane and the characteristics of the runway.

#### 203.6 Destination Alternate aerodromes

203.6.1 For 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:
  - (i) the approach and landing may be made under visual meteorological conditions; and

- (ii) 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
  - (i) a standard instrument approach procedure is prescribed for the aerodrome of intended landing;
  - (ii) a point of no return has been determined; and
  - (iii) a flight shall not be continued past the point of no return unless available current meteorological information indicates that the following meteorological conditions will exist at the estimated time of use:
    - (A) a cloud base of at least 300 m (1,000 ft) above the minimum associated with the instrument approach procedure; and
    - (B) visibility of at least 5.5 km (3 nm) or of 4 km (2 nm) more than the minimum associated with the procedure.

## 203.7 Fuel and oil Requirements

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 (IFR) 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 VFR 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 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 preflight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

**203.8 Refueling with passengers on board**

203.8.1 An aeroplane shall not be refueled 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.

203.8.2 When refueling 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 refueling and the pilot-in-command.

**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 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.

**203.10 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, shall use breathing oxygen continuously whenever the circumstances prevail for which its supply has been indicated to be necessary in paragraph 203.9.1

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-P1A.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 affected at that aerodrome or at least one destination alternate aerodrome, in compliance with the operating minima established in accordance with paragraph 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 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.*

**204.2 Meteorological and Operating observations by pilots**

204.2.1 when meteorological conditions likely to affect the safety of other aircraft are encountered, a pilot-in-command shall report to Air Traffic Control as soon as possible.

*Note.- The procedures for making meteorological observations on board aircraft in flight and for recording and reporting them are contained in Annex 3, the PANS-ATM (Doc 4444), the PANS-MET (Doc 10157) and the appropriate Regional Supplementary Procedures (Doc 7030).*

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

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

**204.3 Hazardous flight conditions**

204.3.1 When hazardous flight conditions encountered, other than those associated with meteorological conditions, pilot-in-command shall reported to the appropriate aeronautical station as soon as possible. The reports so rendered shall gibe 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 Aeroplane operating procedures for landing performance**

204.5.1 When an approach to land should not be continued below 300 m (1,000 ft.) above aerodrome elevation unless the pilot-in-command of a Thai aeroplane shall satisfied that, with the runway surface condition information available, the aeroplane performance information indicates that a safe landing can be made.

*Note. — 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.*

**204.6 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 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 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 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 203.7 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 paragraph 202.2 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 shall be responsible for-

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

(i) the aeroplane is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the aeroplane;

- (ii) the instruments and equipment installed in the aeroplane are appropriate, taking into account the expected flight conditions;
  - (iii) any necessary maintenance has been performed in accordance with this Part I;
  - (iv) 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;
  - (v) any load carried is properly distributed and safely secured; and
  - (vi) the aeroplane operating limitations, contained in the flight manual, or its equivalent, will not be exceeded.
- (b) the operation, safety and security of the aeroplane and the safety of all crew members, passengers and cargo on board;
- (c) ensuring that a flight-
- (i) 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
  - (ii) 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
- (d) notifying the office, 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.

205.2 The pilot-in-command of a Thai aeroplane shall comply with the Regulation of the Civil Aviation Authority of Thailand on Rule of the Air.

205.3 The pilot-in-command of Thai aeroplane shall comply in accordance with the Regulation of Civil Aviation Authority of Thailand No. 7 on Privilege of holder of Pilot, Air Traffic Controller and Dispatcher License

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

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

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**CHAPTER 3**

**GENERAL FLIGHT REQUIREMENT**

**GA-P1A.301 FLIGHT CREW MEMBER AT DUTY STATIONS**

- 301.1 During take-off and landing all flight crew members required to be on flight deck duty shall be at their stations.
- 301.2 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.
- 301.3 All flight crew members shall keep their seat belts fastened when at their stations
- 301.4 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.302 CREW MEMBER AT STATIONS**

- 302.1 The pilot-in-command of Thai aeroplane 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.
- 302.2 The pilot-in-command of Thai aeroplane 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.303 OCCUPATION OF SEATS AND WEARING OF RESTRAINTS**

- 303.1 Each pilot-in-command of Thai aeroplane 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.
- 303.2 Each pilot-in-command of Thai aeroplane shall require each passenger to place his seat in the take-off and landing configuration during take-off and landing.

- 303.3 Paragraph 303.1 (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.304 CARRIAGES OF BAGGAGE AND CARGO**

- 304.1 A pilot-in-command of Thai aeroplane 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.
- 304.2 A pilot-in-command of Thai aeroplane 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.305 FAMILIARITY WITH OPERATING LIMITATIONS AND EMERGENCY EQUIPMENT**

- 305.1 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.306 OPERATING IN ICING CONDITIONS**

306.1 A pilot-in-command of Thai aeroplane 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, stabilizers, 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 paragraph 306.2 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

306.2 A pilot-in-command of Thai aeroplane 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.307 PROHIBITED, RESTRICTED AND DANGER AREAS**

307.1 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.308 RIGHT OF WAY**

308.1 Each pilot-in-command of Thai aeroplane 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 maneuvers 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.309 RADIO COMMUNICATIONS**

309.1 Each pilot-in-command of Thai aeroplane, 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;
  - (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.310 COMPLIANCES WITH ATC CLEARANCES AND INSTRUCTIONS**

310.1 Each pilot-in-command of Thai aeroplane 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.311 OPERATIONS IN REQUIRED NAVIGATION PERFORMANCE DESIGNATED AIRSPACE**

311.1 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.

311.2 Each pilot-in-command of Thai aeroplane shall comply with all notified procedures relating to the designated RNP airspace.

#### **GA-P1A.312 USE OF SSR TRANSPONDER AND ALTITUDE REPORTING EQUIPMENT**

312.1 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.

312.2 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.

312.3 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.

312.4 Wherever Mode S is operated the aircraft identification shall be set on the transponder.

312.5 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.

312.6 Each pilot-in-command of Thai aeroplane 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.313 REQUIREMENTS FOR VFR**

313.1 A pilot-in-command of Thai aeroplane 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.314 POSITION REPORTS**

314.1 Each pilot-in-command of Thai aeroplane 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.315 FLIGHT PLANS**

315.1 Each pilot-in-command of Thai aeroplane 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.

315.2 Each pilot-in-command of Thai aeroplane 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 paragraph 315.2 (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.316 CONTINUED FLIGHT WITH REDUCED METEOROLOGICAL MINIMA**

316.1 A pilot-in-command of Thai aeroplane 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.317 IFR RADIO COMMUNICATIONS**

317.1 Each pilot-in-command of Thai aeroplane 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.
- 317.2 Each pilot-in-command of Thai aeroplane under radar control while operating under IFR shall report passing only those reporting points specifically requested by ATC.
- 317.3 Each pilot-in-command of Thai aeroplane 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.

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## CHAPTER 4

### AEROPLANE PERFORMANCE OPERATING LIMITATIONS

#### GA-P1A.401 GENERAL

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

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## CHAPTER 5

### AEROPLANE 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 Authority.

##### 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 maneuver, 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:
  - (i) the pilot's compartment; and
  - (ii) 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)
  - (i) a seat or berth for each person over an age of two years; and
  - (ii) a seat belt for each seat and restraining belts for each berth;

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

- (d) the following manuals, charts and information:
  - (i) the flight manual or other documents or information concerning any operating limitations prescribed for the aeroplane by the Authority or Manufacturer, required for the application in accordance with Chapter 8 of this part.

- (ii) any specific approval issued by the Authority, if applicable, for the operation(s) to be conducted;
  - (iii) 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;
  - (iv) procedures for pilots-in-command of intercepted aircraft;
  - (v) a list of visual signals for use by intercepting and intercepted aircraft, as prescribed in Regulation of the Civil Aviation Authority of Thailand on Rule of the Air;
  - (vi) the journey log book for the aeroplane; and
  - (vii) other documents prescribed for the aeroplane by the Authority.
- (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.

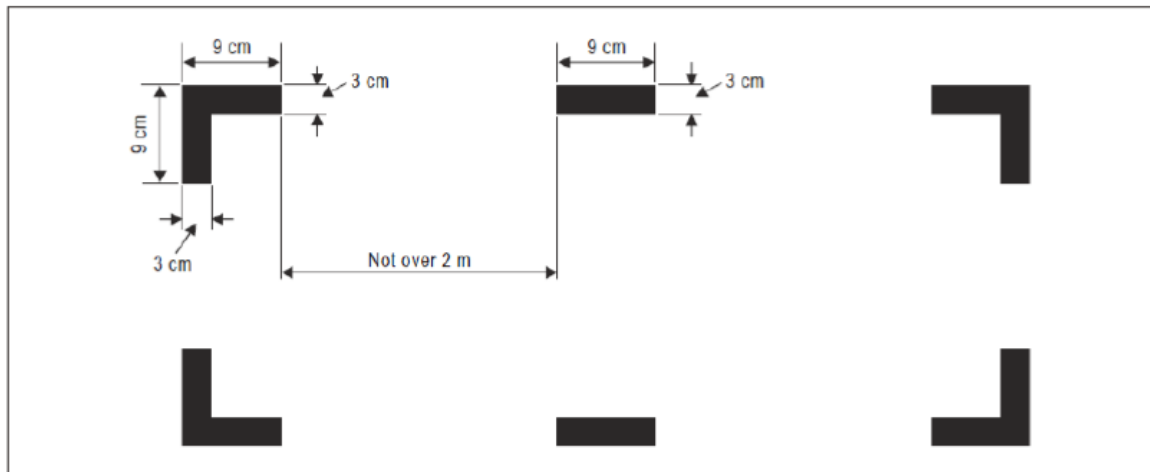
*Note.- Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.*

#### 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:
  - (i) magnetic heading;
  - (ii) barometric altitude;
  - (iii) 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 shall be equipped in accordance with GA-P1A.506, paragraph 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 maneuvering.

*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.- Landplanes' includes amphibians operated as landplanes.*

**503.3 Aeroplane on extended flight over water**

503.3.1 All a Thai 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 a Thai 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 pilot-in-command shall, in addition to the equipment required in paragraph 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 lifesaving 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 the Civil Aviation Authority of Thailand 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, paragraph 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:
- (i) magnetic heading (standby compass);
  - (ii) barometric altitude;
  - (iii) indicated airspeed, with a means of preventing malfunctioning due to either condensation or icing;
  - (iv) turn and slip;
  - (v) aircraft attitude;
  - (vi) 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.*

- (vii) whether the supply of power to the gyroscopic instruments is adequate;
  - (viii) the outside air temperature;
  - (ix) 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 Authority.

**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 the Civil Aviation Authority of Thailand on Rule of the Air, 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 Authority.*

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

509.1 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 5,700 kg or authorized to carry than nine passengers shall be equipped with a ground proximity 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 turbine – engine aeroplanes of a maximum certificate take- off mass in exceeding of 5,700 kg 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
  - (i) gear not locked down
  - (ii) 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 paragraph 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 paragraph 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 position 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**

- 513.1 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: 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: 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 1C.*

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

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

#### 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:
- (i) an FDR which shall record at least the first 16 parameters in Table 1C-1 of Appendix 1C; or
  - (ii) 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 1C; or
  - (iii) an ADRS which shall record at least the first 7 parameters listed in Table 1C-3 of Appendix 1C.

*Note.- AIR or AIRS classification is defined in 4.1 of Appendix 1C.*

- (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 1C-1 of Appendix 1C.
- (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 1C-1 of Appendix 1C.

*Note.- Refer to Table 1C-A1 of Appendix 1C for summarize the current flight recorders carriage requirements*

#### 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 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.

*Note.- Refer to Table 1C-A2 of Appendix 1C for summarize the current flight recorders carriage requirements.*

#### 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.

All Thai aeroplanes that are required to be equipped with CARS, and for which the individual certificate of airworthiness is first issued on after 1 January 2025, shall be equipped with a CARS which shall retain the information recorded during at least the last two hours of their operation.

### 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 use any of the data link communications applications referred to in paragraph 5.1.2 of Appendix 1C, and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder.
- (b) All aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016, to install and use any of the data link communications applications referred to in paragraph 5.1.2 of the Appendix 1C, shall record the data link communications messages on a crash-protected flight recorder unless the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 1 January 2016.

*Note 1.- Refer to Table 1C-A3 of Appendix 1C for example of data link communication recording requirements.*

*Note 2.- A Class B AIR could be a means for recording data link communications applications messages to and from the aeroplanes where it is not practical or prohibitively expensive to record those data link communications applications messages on FDR or CVR.*

*Note 3.- The “ aircraft modifications” refer to modifications to install the data link communications equipment on the aircraft (e.g., structural, wiring).*

#### 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.- Thai private operator'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 Thai private 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 1C.*

## CHAPTER 6

### AEROPLANCE COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT

#### GA-P1A.601 COMMUNICATION EQUIPMENT

601.1 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 paragraph 601.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.*

601.2 When compliance with paragraph 601.1 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.

601.3 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.

601.4 A Thai aeroplane to be operated on a flight to which the provisions of Chapter 5 GA-P1A.503, paragraph 503.3.1 or GA-P1A.504, paragraph 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.

601.5 The radio communication equipment required in accordance with paragraph 601.1 to 601.4 of this chapter shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

601.6 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 paragraph 601.1 to 601.5 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.

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

- (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 Guidance Material for PBCS Operational Approval.*

601.8 In respect of those aeroplanes mentioned in paragraph 601.6 of this chapter, Thai private 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.

#### **GA-P1A.602 NAVIGATION EQUIPMENT**

602.1 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.

602.2 For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, an aeroplane shall, in addition to the requirements specified in paragraph 602.1 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 Guidance Material for Performance-Based Navigation (PBN).*

602.3 For operations based on PBN authorization required (AR) navigation specification (AR) has been prescribed, the following shall be established and documented by Thai private operator and shall approved by the CAAT:

- (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.*

602.4 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 CAAT 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).*

602.5 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 Thai 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 approved a specific approval for RVSM operations by the CAAT.

602.6 For RVSM specific approval as mentioned in paragraph 602.5 (b), Thai private operator shall submit the application and comply with the process for issuing a Specific Approval as required in accordance with GA.P1A.106.

602.7 Prior to granting the RVSM specific approval required in accordance with paragraph 602.5 (b) above, A Thai aeroplane shall:

- (a) ensure that the vertical navigation performance capability of the aeroplane satisfies the requirements specified in Appendix 1B;
- (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 specific approval is valid globally on the understanding that any operating procedures specific to a given region will be stated in the operations manual or appropriate crew guidance.*

602.8 In respect of those aeroplanes mentioned in paragraph 602.5, Thai private 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.

602.9 Thai private operator shall establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of Thai private operator have their height keeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per aeroplane, whichever period is longer. If Thai private 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.*

602.10 Thai private operator shall establish provisions and procedures which ensure that appropriate action will be taken in respect of aircraft and Thai private operator found to be operating in RVSM airspace without a valid RVSM specific approval.

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

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

602.11 The Thai aeroplane shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the aeroplane to navigate in accordance with paragraph 602.1 and where applicable paragraph 602.2, 602.5 and 602.6 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) RVSM 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).*

602.12 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 affected. 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.

#### **GA-P1A.603 SURVEILLANCE EQUIPMENT**

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

603.2 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 paragraph 603.1:

- (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).*

603.3 For operations where surveillance is required to meet an RSP specification for the prescribed PBS, Thai private operator shall be established and documented as following:

- (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.*

603.4 In respect of those aeroplanes mentioned in paragraph 603.2, the Thai private 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 7

### AEROPLANE FLIGHT CREW

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

701.1 Thai private operator shall ensure that 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-P1A.702 QUALIFICATIONS

702.1 The pilot-in-command of Thai aeroplane shall:

- (a) ensure that each flight crew member holds a valid licence issued by the Authority, or if issued by another Contracting State, rendered valid by the Authority;
- (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.*

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## CHAPTER 8

### MANUALS, LOGS AND RECORDS

#### **GA-P1A.801 AIRCRAFT FLIGHT MANUAL**

- 801.1 A pilot-in-command shall operate a Thai registered aeroplane in compliance with operating limitations specified in the aircraft flight manual (AFM).
- 801.2 The aircraft flight manual shall be kept up to date and implementing changes made mandatory by the aircraft manufacturer and/or by the Authority and carried on-board every flight operated for general aviation operations.

#### **GA-P1A.802 JOURNEY LOG BOOK OR EQUIVALENT RECORD**

- 802.1 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.
- 802.2 For every flight mentioned in paragraph 802.1, Thai private operator shall keep an accurate journey log book or equivalent record that contains the following information for every flight or series of flights operated by it:
- (a) the aircraft's nationality and registration;
  - (b) the date of the flight;
  - (c) the name of every person acting as a crew member;
  - (d) the duty assignment to each crew member;
  - (e) the place of departure;
  - (f) the place of arrival;
  - (g) the time of departure;
  - (h) the time of arrival;
  - (i) the duration of the flight;
  - (j) the nature of the flight ( e. g. , private, aerial work, scheduled or non-scheduled commercial air transport);
  - (k) an incident or observations;
  - (l) the 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 All entries in the journey log book or equivalent record are permanent in nature.
- 802.5 The pilot-in-command of Thai aeroplane shall enter the following details in a technical log on the determination of each flight:
- (a) the time of the take-off and the time of the landing;
  - (b) the particulars of any defect known to the pilot-in-command and which affects

the airworthiness or safe operation of the aircraft;

- (c) such other particulars in respect of the airworthiness or operations of the aircraft that the Authority may specify.

802.6 For the purposes of paragraph 802.5 (b), if no defect of Thai aeroplane is known to the pilot-in-command at the termination of a flight, the pilot-in-command shall make an entry to that effective in the technical log.

802.7 The pilot-in-command of Thai aeroplane may make the entries mentioned in paragraph 802.5 at the end of the last flight of a series of flights unless a defect of the Thai registered aircraft becomes known to the pilot-in-command during an earlier flight.

“Series of flights” means consecutive flights within a period of 24 consecutive hours by a pilot-in-command who uses the same aeroplane for every such flight, and each flight begins and ends at the same aerodrome.

802.8 Thai private operator shall retain each daily flight record for a period of 12 months after the date of the record.

#### **GA-P1A.803 DOCUMENTS TO BE CARRIED**

803.1 Each pilot-in-command of Thai registered aeroplane shall ensure that the following documents are carried on each flight:

- (a) The valid certificate of airworthiness;
- (b) the certificate of registration for the aircraft; and
- (c) the valid flight crew licenses of each member of the flight crew;
- (d) a noise certification document (if applicable); and
- (e) the aircraft radio station license;
- (f) 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;

803.2 Before any flight is commenced the pilot-in-command shall ensure that the documents listed in para 803.1 of this Chapter are in force and will remain so for the duration of the flight.

#### **GA-P1A.804 CORRECTING LENSES**

804.1 Any flight crew member assessed as fit to exercise the privileges of a license 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.805 WEIGHT AND BALANCE**

805.1 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.

805.2 The pilot-in-command of Thai aeroplane shall ensure that any load carried is properly distributed and safely secured.

**GA-P1A.806 AIRCRAFT PERFORMANCE**

806.1 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:
  - (i) outside air temperature; and
  - (ii) pressure altitude; and
  - (iii) 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.807 COMPOSITION OF FLIGHT CREW**

807.1 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.

807.2 The pilot-in-command of Thai aeroplane shall:

- (a) ensure that each flight crew member holds a valid license issued by the Authority, or if issued by another Contracting State, rendered valid by the Authority; and

ensure that flight crew members are properly rated; and

- (b) be satisfied that flight crew members have maintained competency.

**GA-P1A.808 RADIO LICENCES**

808.1 Each pilot-in-command of Thai aeroplane 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.809 PORTABLE ELECTRONIC DEVICES**

809.1 A pilot-in-command of Thai aeroplane 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.

809.2 The prohibition in paragraph 809.1 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.810 FLIGHT INSTRUCTION AND TESTING**

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

**GA-P1A.811 RECORDS OF EMERGENCY AND SURVIVAL EQUIPMENT CARRIED**

811.1 Thai private operator, 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 9

### SECURITY

#### **GA-P1A.901 SECURITY OF AIRCRAFT**

901.1 The pilot-in-command of Thai aeroplane shall be responsible for the security of the aircraft during its operation.

#### **GA-P1A.902 REPORTING OF UNLAWFUL INTERFERENCE**

902.1 Following an act of unlawful interference, the pilot-in-command of Thai aeroplane to shall submit a report of such an act to the designated local authority (if applicable).

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

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## 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-P1A.1001 OWNER'S CONTINUING AIRWORTHINESS RESPONSIBILITIES**

1001.1 Thai private operator or in the case where it is leased, the lessee, shall ensure that, in accordance with procedures acceptable to the Authority that:

- (a) the aeroplane is maintenance in an airworthy 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 Thai private operator 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.

1001.3 Thai private operator shall ensure that the maintenance of the aeroplane is performed in accordance with a maintenance programme acceptable to the Authority.

1001.4 Thai private operator or the lessee shall appoint a person or an organization accepted by Authority 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-P1A.1002 CONTINUING AIRWORTHINESS RECORDS**

1002.1 Thai private operator or in case where it is leased, the lessee, shall ensure that the following records are kept for the periods mentioned in paragraph 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 compliance 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 paragraph 1002.1 (a) - (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 paragraph 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 Thai private operator or lessee. In the event of any permanent change of Thai private operator or lessee, the records shall be transferred to the new Thai private operator or lessee.

1002.4 The Thai private operator shall maintain records kept and transferred in accordance with GA-P1A.1002, in a form and format that to ensure 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 12, and Announcement of the CAAT on Maintenance, Preventive Maintenance, Rebuilding and Alteration.

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

1004.1 When maintenance is carried out by an approved maintenance organization, the maintenance release shall be issued by the approved maintenance organization in accordance with the TCAR AIR Part-145 or TCAR AIR Part-CAO, as applicable.

1004.2 When maintenance is not carried out by an approved maintenance organization, the maintenance release shall be completed and signed by a person appropriately licensed according to CAAT requirement 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 the Announcement of the CAAT on Maintenance, Preventive Maintenance, Rebuilding and Alteration or TCAR AIR Part-M/ML, as applicable.

1004.3 When maintenance is not carried out by an approved maintenance organization, the maintenance release shall contain a certification including:

- (a) basic details of the maintenance performed;

- (b) the date such maintenance was completed; and
- (c) the identity of the authorized person or persons signing the release.

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

- 1005.1 Thai private operator 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 the Civil Aviation Authority of Thailand Requirements No. 22 on Occurrence Reporting in Civil Aviation.
- 1005.2 Such reports as detailed in paragraph 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 contained in the Civil Aviation Authority of Thailand Requirements No. 22 on Occurrence Reporting in Civil Aviation.

**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—
- (a) 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;
  - (b) 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
  - (c) 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 paragraph 1006.1 of this section must be conducted by—
- (a) The manufacturer of the aeroplane, on which the tests and inspections are to be performed;
  - (b) 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
- (c) 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 paragraph 1007.1, 1007.2 must be conducted by—
- (a) 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;
  - (b) The manufacturer of the aircraft on which the transponder to be tested is installed, if the transponder was installed by that manufacturer.

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## PART II

### LARGE AND TURBOJET AEROPLANE OPERATIONS

#### CHAPTER 1

##### GENERAL

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

101.1 These General Aviation Requirements (GAR) Part II state additional requirements for large and turbojet aeroplanes with Standard Certification of Airworthiness (Standard C of A) and apply to domestic and international general aviation operations with:

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

101.2 In addition, large and turbojet aeroplane as mentioned in paragraph 101.1 shall also comply with the Regulations contained in GAR Part I.

101.3 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 The Thai private operator shall ensure that all employees know that they must comply with the laws, regulations and procedures of those States in which operations are conducted.

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

102.3 The pilot-in-command of Thai aeroplane is responsible for operational control. The Thai private 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 The Thai private operator 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.

102.5 The Thai private operator shall ensure that flight crew members demonstrate the ability to speak and understand the language used for aeronautical radiotelephony communications in accordance with Announcement of the Civil Aviation Authority of Thailand on language proficiency.

**GA-P2A.103 SAFETY MANAGEMENT**

- 103.1 The Thai private operator shall be established and implement a safety management system in accordance with paragraph 103.3 vary to size, nature, and complexity of the operations, activities, hazards, and risks associated with the operations.
- 103.2 A safety management system shall clearly define lines of safety accountability throughout the owner/operator's organization, including a direct accountability for safety on the part of senior management.
- 103.3 The framework for implement and maintenance of Safety management system shall include the following 4 components and 12 elements:

**Safety Policy and Objective**

- 1) Management commitment and responsibility
- 2) Safety accountabilities
- 3) Appointment of key safety personnel
- 4) Coordination of Emergency response planning
- 5) SMS Documentation

**Safety Risk Management**

- 1) Hazard identification
- 2) Safety risk assessment and mitigations processes

**Safety Assurance**

- 1) Safety performance monitoring and measurement
- 2) Management of change
- 3) Continuous improvement of the SMS

**Safety Promotion**

- 1) Training and education
- 2) Safety Communication

*Note.- Refer to Guidance Material Safety Management System (SMS).*

103.4 The Thai private operator shall not allow the use of recordings or transcripts of CVR, CARS, Class A AIR and Class A AIRS for purposes other than the investigation of an accident or incident as per Annex 13, except where the recordings or transcripts are:

- (a) related to a safety-related event identified in the context of a safety management system; are restricted to the relevant portions of a de-identified transcript of the recording; and are subject to the protections accorded by Annex 19;
- (b) sought for use in criminal proceedings not related to an event involving an accident or incident investigation and are subject to the protections accorded by Annex 19; or
- (c) used for inspections of flight recorder systems.

*Note.- Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19. When an investigation under Annex 13 is instituted, investigation records are subject to the protections accorded by Annex 13.*

103.5 The use of recordings or transcripts of FDR, ADRS, Class B and C AIR, and Class B and C AIRS for purposes other than the investigation of an accident or incident as per Annex 13 shall not be allowed, except where the recordings or transcripts are subject to the protections accorded by Annex 19 and are:

- (a) used by the operator for airworthiness or maintenance purposes;
- (b) sought for use in proceedings not related to an event involving an accident or incident investigation;
- (c) de-identified; or
- (d) disclosed under secure procedures.

*Note.- Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19.*

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## CHAPTER 2

### OPERATIONAL REQUIREMENTS

#### GA-P2A.201 ORGANISATIONAL STRUCTURE

- 201.1 To ensure the Thai private operator continued compliance with the requirements of these Regulations concerned with aircraft operations, the Thai private operator must:
- (a) establish and maintain an organizational structure that is appropriate, having regard to the size and complexity of the aircraft operations;
  - (b) clearly define the duties and accountabilities of those operations personnel responsible for managing the safe operation of aircraft.
- 201.2 The Thai private operator must clearly define the duties and accountabilities of every member of its operations personnel that is responsible for the safe operations of its aircraft.

#### GA-P2A.202 STANDARD OPERATING PROCEDURES

- 202.1 The Thai private operator shall provide standard operating procedures for the use of aircraft crew and operations staff for every aircraft type operated.
- 202.2 The standard operating procedures shall contain the normal, abnormal and emergency procedures relating to the operation of aircraft.
- 202.3 Standard operating procedures shall be consistent with the aircraft flight manual and the aircraft checklists to be used.
- 202.4 Standard operating procedures shall take account of human factor principles.

#### GA-P2A.203 DOCUMENTS AND MANUAL TO BE CARRIED ON BOARD AN AEROPLANE

- 203.1 The Thai private operator shall ensure that all the following documents are carried on board every aircraft operated for general aviation operations:
- (a) its certificate of registration;
  - (b) its valid certificate of airworthiness;
  - (c) the appropriate license for each flight crew member
  - (d) the aircraft radio station license;
  - (e) the journey log book or equivalent record;
  - (f) a noise certificate (if applicable);

- (g) a specific approval certificate and any other document containing the relevant approvals, authorisations, conditions and limitations;
- (h) operational information and form to be carried on every flight:
  - (i) the technical log;
  - (ii) the operational flight plan;
  - (iii) a copy of the ATS flight plan;
  - (iv) the route-specific NOTAM and AIS briefing documentation;
  - (v) any information on search and rescue services covering the route of the proposed flight;
  - (vi) the passenger and cargo manifests.

203.2 The Thai private operator shall ensure that the following manuals are kept fully up to date and carried on board every aircraft operated for general aviation operations:

- (a) the aircraft's flight manual or equivalent;
- (b) the Operations Manual, or those parts of it that pertain to flight operations.

## CHAPTER 3

### FLIGHT OPERATIONS

#### GA-P2A.301 OPERATING FACILITIES

301.1 The Thai private operator shall ensure that a flight will not be commenced unless it has been ascertained by every reasonable means available that the ground and/or water facilities including communication facilities and navigation aids available and directly required on such flight, for the safe operation of the aeroplane, are adequate for the type of operation under which the flight is to be conducted.

*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.*

301.2 The Thai private operator or the pilot-in-command, in making a decision on the adequacy of facilities and services available at an aerodrome of intended operation, shall assess the level of safety risk associated with the aircraft type and nature of the operation, in relation to the availability of rescue and firefighting services (RFFS).

#### GA-P2A.302 OPERATIONAL MANAGEMENT

##### 302.1 Operator notification

302.1.1 If The Thai private operator has an operational base in a State other than Thailand, the Thai private operator shall notify the State in which the operating base is located.

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

*Note.- The content of company operations manual shall be described in Appendix 3.A*

##### 302.3 Operating instructions – general

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

### **302.4 In-flight simulation of emergency situations**

The Thai private operator shall ensure that when passengers are being carried, no emergency or abnormal situations shall be simulated.

### **302.5 Checklists**

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.

### **302.6 Minimum flight altitudes**

The Thai private operator shall specify, for flights which are to be conducted in accordance with the instrument flight rules, the method of establishing terrain clearance altitudes.

### **302.7 Aerodrome operating minima**

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

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

### **302.8 Fatigue management programme**

The Thai private operator shall 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).*

### **302.9 Passengers**

302.9.1 The Thai private operator shall ensure that passengers are made familiar with the location and use of:

- (a) seat belts;
- (b) emergency exits;
- (c) life jackets, if the carriage of life jackets is prescribed;

- (d) oxygen dispensing equipment, if the provision of oxygen for the use of passengers is prescribed; and
- (e) other emergency equipment provided for individual use, including passenger emergency briefing cards.

302.9.2 The Thai private operator 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.

302.9.3 The Thai private operator shall ensure that in an emergency during flight, passengers are instructed in such emergency action as may be appropriate to the circumstances.

302.9.4 The Thai private operator shall ensure that during take-off and landing and whenever considered necessary, by reason of turbulence or any emergency occurring during flight, all passengers on board an aeroplane are secured in their seats by means of the seat belts or harnesses provided

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

303.1 The Thai private operator 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 Operational flight planning**

The Thai private operator 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.

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

*Note 2 - The requirements for flight plans are contained in Regulation of the Civil Aviation Authority of Thailand — Rules of the Air and Requirement of the Civil Aviation Authority of Thailand No. 72 - the procedures relating to flight plans and associated services are contained in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444).*

*Note 3.- Detailed guidance on the use of the FF-ICE services, including the use of a preliminary flight plan, can be found in the Manual on Flight and Flow - Information for a Collaborative Environment (FF-ICE) (Doc 9965).*

### 303.3 Alternate aerodrome

#### 303.3.1 Take-off alternate aerodrome

- (a) 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.
- (b) The take-off alternate aerodrome shall be located within the following distance from the aerodrome of departure:
  - (i) for aeroplanes with two engines, one hour of flight time at a one-engine-inoperative cruising speed, determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass; or
  - (ii) 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.
- (c) 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 Fuel requirements

303.4.1 A Thai aeroplane shall carry a sufficient amount of usable fuel to complete the planned flight safely and to allow for deviations from the planned operation.

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

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

- (ii) Notices to Airmen;
- (iii) current meteorological reports or a combination of current reports and forecasts;
- (iv) air traffic services procedures, restrictions and anticipated delays; and 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.*

303.4.3 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:

- (i) where a destination alternate aerodrome is required, the amount of fuel required to enable the aeroplane to:
  - (A) Perform a missed approach at the destination aerodrome;
  - (B) climb to the expected cruising altitude;
  - (C) fly the expected routing;
  - (D) descend to the point where the expected approach is initiated; and
  - (E) conduct the approach and landing at the destination alternate aerodrome; or
- (ii) 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
- (iii) where the aerodrome of intended landing is an isolated aerodrome:
  - (A) 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

- (B) 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:
  - (i) for a reciprocating engine aeroplane, the amount of fuel required to fly for 45 minutes; or
  - (ii) 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.

303.4.4 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.

*Note.- 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.*

### **303.5 In-flight fuel management**

303.5.1 The Thai private operator shall establish policies and procedures to ensure that in-flight fuel checks and fuel management are performed.

303.5.2 The pilot-in-command of Thai aeroplane 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 303.5.1 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)*

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

303.6.1 When conducting operations beyond 60 minutes from a point on a route to an en-route alternate aerodrome, the Thai private 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.

### **303.7 Refuelling with passengers on board**

303.7.1 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.

303.7.2 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.*

### **303.8 Oxygen supply**

303.8.1 A flight to be operated at flight altitudes at which the cabin pressure in personnel compartments will be higher than 10 000 ft. 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 cabin pressure in compartments occupied by them will be between 10 000 ft. and 13 000 ft.; and
- (b) the crew and passengers for any period that the cabin pressure in compartments occupied by them will be greater than 13 000 ft.

303.8.2 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 cabin pressure in any compartment occupied by them would be more than 10 000 ft. In addition, when an aeroplane is operated at flight altitudes at which the atmospheric pressure is less than 376 hPa (25 000 ft.), or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa (25 000 ft.) and cannot descend safely within four minutes to a flight altitude at which the cabin pressure is equal to 13 000 ft., there shall be no less than a 10-minute supply for the occupants of the passenger compartment.

### **GA-P2A.304 In-flight procedures**

#### **304.1 Use of oxygen**

304.1.1 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 paragraph 304.1.1 or 304.1.2 of this chapter

304.1.2 All flight crew members of pressurized aeroplanes operating above an altitude where the atmospheric pressure is less than 376 hPa (25 000 ft.) shall have available at the flight duty station a quick-donning type of oxygen mask which will readily supply oxygen upon demand.

**304.2 Aeroplane operating procedures for landing performance**

An approach to land shall not be continued below 300 m (1 000 ft.) above aerodrome elevation unless the pilot-in-command of Thai aeroplane shall satisfied that, with the runway surface condition information available, the aeroplane performance information indicates that a safe landing can be made.

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

305.1 The pilot-in-command of Thai aeroplane shall;

- (a) ensure that the checklists specified in paragraph 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 Thai private operator shall take the forgoing action;
- (c) be responsible for reporting all known or suspected defects in the aeroplane, to the Thai private 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 The Thai private operator 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 Thai private operator's instructions;
- (b) the procedures specified in the Thai private operator's instructions;
- (c) such laws, regulations and procedures that may be relevant in those State 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 The Thai private operator shall specify procedures to ensure that all baggage carried onto an aeroplane and taken into the passenger cabin is adequately and securely stowed.

## 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 paragraph 401.2 to 401.9 inclusive are applicable to all aeroplanes of over 5 700 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 The Thai private operator 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 paragraph 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, runway slope, the ambient temperature, wind, and surface conditions of the runway at the expected time of use, i.e. presence of slush, water and/or ice, for landplanes, water surface condition for seaplanes). Such factors shall be taken into account directly as operational parameters or indirectly by means of allowances or margins, which may be provided in the scheduling of performance data or in the comprehensive and detailed code of performance in accordance with which the aeroplane is being operated.

#### **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 paragraph 401.7 of this Chapter is complied with, nor the mass at which paragraph 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 paragraph 401.8 and 401.9 of this Chapter and, in respect of alternate aerodromes, paragraph 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 paragraph 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 A 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 paragraph 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 A 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).*

## CHAPTER 5

### AEROPLANE FLIGHT CREW

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

##### 501.1 Designation of pilot-in-command

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

501.1.2 The Thai private operator shall:

- (a) ensure that each flight crew member holds a valid license 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 Flight crew duty assignment

The Thai private operator shall designated: -

- (a) a flight crew member as the pilot-in-command; and
- (b) the number of individuals required as additional flight crew members to augment the minimum flight crew specified in the aircraft's flight manual due to the type of aircraft operated or the type of operation to be performed; and the duration of the flight.

#### GA-P2A.502 FLIGHT CREW MEMBER EMERGENCY DUTIES

502.1 The Thai private operator 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.503 FLIGHT CREW MEMBER TRAINING PROGRAMMES

503.1 The Thai private operator shall establish and maintain a training programme that a person who receives training acquires and maintains the competency to perform assigned duties, including skills related to human performance.

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

503.3 The training program shall include training to competency for all equipment installed.

503.4 The training programme mentioned in 503.1 shall include training in:-

- (a) the procedures for normal, abnormal and emergency situations (including the emergency evacuation of the aircraft);
- (b) the use of the standard operating procedures;
- (c) the required competency for all equipment installed on the aircraft, on a permanent or temporary basis, or for the purpose of carrying out a specific task;
- (d) the required training for Specific Approval; and
- (e) knowledge of crew resource management, threat and error management, the carriage of dangerous goods. such particular Specific Approval training required.

The pilot training mentioned in (a) – (e) above does not include any training that leads to an endorsement of new rating for the pilot.

503.5 The Thai private operator shall not assign a person to duty as a flight crew member for any of its aircraft operations unless the person has satisfactorily completed the training programme mentioned in 503.4

#### **GA-P2A.504 FLIGHT CREW QUALIFICATIONS**

##### **504.1 Flight crew member licensing**

504.1.1 The Thai private operator shall:

- (a) ensure that each flight crew member assigned to duty holds a valid license issued by the Authority; or under special circumstances, holds a valid license issued by another Contracting State, and rendered valid by the Authority. (Refer to the Regulation of Civil Aviation Authority of Thailand on rendered valid license);
- (b) ensure that flight crew members are properly rated; and
- (c) be satisfied that flight crew members are competent to carry out assigned duties.

504.1.2 When an aeroplane equipped with an airborne collision avoidance system (ACAS II), the Thai private operator 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.*

#### **504.2 Flight Crew recency**

**(a) Recent experience – Pilot-in-command**

The Thai private operator 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.

**(b) Recent experience – co-pilot**

The Thai private operator 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.

#### **504.3 Pilot's proficiency checks (PPC):**

The Thai private operator shall ensure that piloting technique and the ability to execute emergency procedures is checked periodically, within 12 months, in such a way as to demonstrate the pilot's competence. Where the operation may be conducted under the instrument flight rules, the Thai private operator shall ensure that the pilot's competence to comply with such rules is demonstrated to either a check pilot of the operator or a representative of the State issuing the pilot licence.

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## CHAPTER 6

### FLIGHT TIME AND FLIGHT DUTY PERIOD FOR PRIVATE OPERATOR

#### DEFINITIONS

In this Chapter

**“Flight time”** means 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 duty period”** means the period that begins when the earliest of the following events occurs and ends at engines off or rotors stopped at the end of a flight: -

- (a) the flight crew member carries out any duties assigned by the private operator or the air operator or delegated by the Minister before reporting for a flight,
- (b) the member reports for a flight or, if there is more than one flight during the flight duty period, reports for the first flight,
- (c) the member reports for positioning, and
- (d) the member reports as a flight crew member on standby

**“Flight crew member on standby”** means a flight crew member who has been designated by private operator to remain at a specified location in order to be available to report for flight duty on notice of one hour or less.

**“ Unforeseen operational circumstance”** means an unplanned event, such as aircraft unserviceability, industrial action, operational contingencies and other such unforeseeable occurrences. It excludes circumstances that are known sufficiently in advance such as scheduled charters, planned runway shortening etc.

#### GA-P2A.601 FLIGHT TIME LIMITS

601.1 Subject to GA. P2A. 602 - GA. P2A. 604, The Thai private operator shall not assign flight time to a flight crew member, and no flight crew member shall accept such an assignment, if the flight crew member’s total flight time in all flights conducts under these Regulations would, as a result, exceed: -

- (a) 1,000 hours in a period of 12 consecutive months;
- (b) 300 hours in a period of 120 consecutive days;
- (c) 120 hours in a period of 28 consecutive days; or
- (d) 8 hours in a period 24 consecutive hours, if the assignment is for a single-pilot IFR flight.

601.2 If flight crew's flight duty period is extended under GA-P2A.604, each flight crew member accumulates, for the purpose of 601.1, the total flight time for the flight or the total flight time for the series of flights, as the case may be.

**GA-P2A.602 FLIGHT DUTY PERIOD LIMITS AND REST PERIODS**

602.1 The Thai private operator shall assign flight duty period to the flight crew member, and no flight member shall accept such an assign, if the flight crew member's flight duty period would, as a result, exceed: -

- (a) 12 consecutive hours in a period of 24 consecutive hours; or
- (b) 15 consecutive hours in a period of 24 consecutive hours, if: -
  - (i) the flight crew member's total flight duty period in the previous 30 consecutive days does not exceed 70 hours, or
  - (ii) the rest period before the flight is at least 24 hours.

602.2 The Thai private operator shall ensure that, prior to reporting for flight duty, a flight crew member is provided with the minimum rest period and with any additional rest period required by these Regulation.

602.3 A flight crew member shall use the following period to be adequately rested prior reporting for flight duty:

- (a) the minimum rest period provided under 602.2;
- (b) any additional rest period required by these Regulation; and
- (c) any period with no assigned duties provided under GA-P2A.607

**GA-P2A.603 SPLIT FLIGHT DUTY PERIOD**

603.1 Flight duty period may be extended by one half of the length of the rest period, to a maximum of four hours, if: -

- (a) before a flight crew member reports for the first flight or reports as a flight crew member on standby, as the case may be, the private operator provides the flight crew member with notice of the extension of the flight duty period;
- (b) the Thai private operator provides the flight crew member with a rest period of at least four consecutive hours in suitable accommodation; and
- (c) the flight crew member's next minimum rest period is increased by an amount of time at least equal to the length of the extension of the flight duty period.

**GA-P2A.604 EXTENSION OF FLIGHT DUTY PERIOD**

604.1 If a flight crew is augmented by at least one flight crew member, if there is a balanced distribution of flight deck duty time and rest periods among the flight crew members, and if the next minimum rest period is at least equal to the length of the preceding flight

duty period, the flight crew's flight duty period may be extended: -

- (a) to 17 hours with a maximum flight deck duty time of 12 hours, a flight relief facility with a forward or rearward facing (within 150 degrees of the longitudinal axis of the aeroplane) seat is provided.
- (b) to 20 hours with a maximum flight deck duty time of 14 hours, if a flight relief facility — bunk is provided.

**GA-P2A.605 UNFORESEEN OPERATIONAL CIRCUMSTANCES**

605.1 Flight duty period may be extended by up to three hours if: -

- (a) the pilot-in-command, after consultation with the other flight crew members, considers it safe to do so;
- (b) the flight duty period is extended as a result of an unforeseen operational circumstance that occurs after the beginning of the flight duty period;
- (c) the next minimum rest period is extended by an amount of time that is at least equal to the length of the extension of the flight duty period; and
- (d) the pilot-in-command notifies the private operator of the unforeseen operational circumstances and of the length of the extension of the flight duty period.

605.2 The Thai private operator shall retain a copy of the notification for one year.

**GA-P2A.606 DELAYED REPORTING TIME**

606.1 When a Thai private operator delays a flight crew member's reporting time by more than three hours, the flight crew member's flight duty period is considered to start three hours after the original reporting time if the private operator notifies the flight crew member of the delay.

- (a) within 12 hours before the original reporting time; and
- (b) at least one hour before the flight crew member leaves a rest facility.

**GA-P2A.607 TIME WITH NO ASSIGN DUTIES**

607.1 A Thai private operator shall not assign duties to a flight crew member, and no flight crew member shall not accept those duties, unless the Thai private operator provides the flight crew member with one of the following periods with no assigned duties:

- (a) at least 36 consecutive hours in a period of seven consecutive days; or
- (b) at least three consecutive calendar days in a period of 17 consecutive days.

**GA-P2A.608 FLIGHT CREW MEMBER POSITIONING**

608.1 If a flight crew member is required by a Thai private operator to travel for the purpose of positioning after the completion of flight duty period, the Thai private operator shall

provide the flight crew member with an additional rest period that is at least equal to one half of the time spent for that purpose that is in excess of the flight duty period referred to in section 602.1.

**GA-P2A.609 CONTROLLED REST ON THE FLIGHT DECK**

609.1 A Thai private operator shall not allow a flight crew member to take a controlled rest on the flight deck of an aircraft operated by the Thai private operator unless: -

- (a) the Thai private operator has a controlled-rest-on-the-flight-deck program that includes the following elements:
  - (i) guidelines on the use of controlled rest, including the factors allowing or preventing its use,
  - (ii) the general principles relating to fatigue and fatigue countermeasures, and
  - (iii) the procedures to be followed by participating crew members before, during and after a controlled rest; and
- (b) every participating crew member has received training relating to the elements of the controlled-rest-on-the-flight-deck program.

609.2 The pilot-in-command of an aircraft operated by a Thai private operator shall determine whether the flight conditions, the duration of the flight and the physiological condition of the crew members allow a controlled rest on the flight deck to be taken by a flight crew member.

609.3 The pilot-in-command of an aircraft operated by a Thai private operator shall give participating crew members a briefing that includes the following elements:

- (a) the order in which the periods of controlled rest are to be taken by the flight crew members;
- (b) the planned duration of each period of controlled rest;
- (c) the circumstances under which a resting flight crew member is to be woken;
- (d) the procedures for the transfer of flight controls and duties; and
- (e) flight attendant duties in relation to a controlled rest.

609.4 The flight crew members on board an aircraft operated by a Thai private operator shall:-

- (a) prior to each controlled rest on the flight deck,
  - (i) participate in an operational briefing,
  - (ii) carry out the transfer of duties, and
  - (iii) inform the flight attendants of the controlled rest; and
- (b) remain on the flight deck during the controlled rest.

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## CHAPTER 7

### DOCUMENTS AND RECORDS

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

- 701.1 A maintenance programme for each aeroplane as required by GA-P2A.1002 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 Thai private operator, shall comply with the requirements of Chapter 5 of Part I, GA-P1A.514, paragraph 514.4.3.

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## CHAPTER 8

### CABIN CREW

#### **GA-P2A.801 ASSIGNMENT OF EMERGENCY DUITES**

801.1 The requirement for cabin crew for each type of aeroplane shall be determined by the operator, based on seating capacity or the number of passengers carried, in order to effect a safe and expeditious evacuation of the aeroplane, and the necessary functions to be performed in an emergency or a situation requiring emergency evacuation. The Thai private operator shall assign these functions for each type of aeroplane.

#### **GA-P2A.802 CABIN CREW AT EMERGENCY EVACUATION STATIONS**

802.1 When cabin crew are required by a State authority, each cabin crew member assigned to emergency evacuation duties shall occupy a seat provided in accordance with GA-P2A.910 during take-off and landing and whenever the pilot-in-command so directs.

#### **GA-P2A.803 PROTECTION OF CABIN CREW DURING FLIGHT**

803.1 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.

#### **GA-P2A.804 TRAINING**

804.1 The Thai private operator shall ensure that a training programme is completed by all persons before being assigned as a cabin crew member.

*Note.- Guidance material on the application of Human Factors principles can be found in the Cabin Crew Safety Training Manual (Doc 10002).*

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## CHAPTER 9

### AEROPLANES INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

#### GA-P2A.901 GENERAL

901.1 Where a master minimum equipment list (MMEL) is established for the aircraft type, the Thai private operator to which this Chapter applies shall include in the operations manual a minimum equipment list (MEL) approved by CAAT 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 2B contains guidance on the minimum equipment list.*

#### GA-P2A.902 AEROPLANE ON ALL FLIGHTS

902.1 In addition to the requirements contained in Chapter 5, GA.P1A.501, paragraph 501.3.1, the aeroplane is equipped with:

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

*Note.-*

- *Medical supplies should comprise one or more first-aid kits.*
- *Guidance on the types, number, location and contents of the medical supplies is given in Air Operator Certificate Requirements Appendix S Medical Supplies.*

- (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.

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

- (a) the operations manual prescribed in Chapter 3 of this part, paragraph 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, GA-P2A.302, paragraph 302.3.2, refers.

#### **GA-P2A.903 FLIGHT RECORDERS**

##### **903.1 Flight data recorders**

###### **903.1.1 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 1C-1 of Appendix 1C.
- (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 1C-1 of Appendix 1C.

##### **903.2 Cockpit voice recorders**

###### **903.2.1 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.

###### **903.2.2 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 2022 shall be equipped with a CVR capable of retaining the information recorded during at least the last twenty-five hours of its operation.

###### **903.2.3 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.904 AEROPLANES ON LONG-RANGE OVER WATER FLIGHTS**

904.1 The Thai private operator, when 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 Thai private 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 Thai private operator shall, in addition to the equipment required in Chapter 5 of Part I, GA-P1A.503, paragraph 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 the Civil Aviation Authority of Thailand Regulation on Rule of the Air.

904.2 Each life jacket and equivalent individual flotation device, when carried in accordance with Chapter 5 of Part I, GA-P1A.503, paragraph 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, paragraph 503.3.1 is met by the provision of individual flotation devices other than life jackets.

**GA-P2A.905 AEROPLANES FOR WHICH THE INDIVIDUAL CERTIFICATE OF AIRWORTHINESS WAS FIRST ISSUED BEFORE 1 JANUARY 1990.**

905.1 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, GA-P1A.203, paragraph 203.9.2.

905.2 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, GA-P1A.203, paragraph 203.9.3.

**GA-P2A.906 AEROPLANE IN ICING CONDITIONS**

906.1 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.907 AEROPLANES OPERATED IN ACCORDANCE WITH THE INSTRUMENT FLIGHT RULES**

907.1 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.

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

907.2.1 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.

907.2.2 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.908 PRESSURISED AEROPLANES WHEN CARRYING PASSENGERS — WEATHER-DETECTING EQUIPMENT**

908.1 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.909 AEROPLANES OPERATED ABOVE 15 000 M (49 000 ft.) — RADIATION INDICATOR**

909.1 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.910 AEROPLANE CARRYING PASSENGERS — CABIN CREW SEATS**

910.1 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.802 paragraph 802.1 of this part in respect of emergency evacuation.

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

910.2 Cabin crew seats provided in accordance with paragraph 910.1 shall be located near floor level and other emergency exits as required by the Authority for emergency evacuation.

**GA-P2A.911 AEROPLANES REQUIRED TO BE EQUIPPED WITH AN AIRBORNE COLLISION AVOIDANCE SYSTEM (ACAS)**

911.1 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.912 AEROPLANE REQUIRED TO BE EQUIPPED WITH A PRESSURE- ALTITUDE REPORTING TRANSPONDER**

912.1 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.913 MICROPHONES**

913.1 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.914 AEROPLANE COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT**

**914.1 Communication equipment**

914.1.1 In addition to the requirements of Chapter 6 of Part I, GA-P1A.601, paragraph 601.1 to 605.5, 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 paragraph 914.1.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route*

## **914.2 Installation**

914.2.1 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.

## **914.3 Electronic navigation data management**

914.3.1 The Thai private operator 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 10

### AEROPLANE CONTINUING AIRWORTHINESS

#### GA-P2A.1001 OPERATOR'S CONTINUING AIRWORTHINESS RESPONSIBILITIES

1001.1 The Thai private operator shall comply with the requirements in accordance with Chapter 10 of Part I, GA-P1A.1001.

#### GA-P2A. 1002 MAINTENANCE PROGRAMME

1002.1 The Thai private operator shall provide, for the use and guidance of maintenance and operational personnel concerned, a maintenance programme, acceptable to the Authority, containing the information required GA-P2A.701. The design and application of the Thai private 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).*

1002.2 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. 1003 CONTINUING AIRWORTHINESS INFORMATION

1003.1 In addition to the requirements contained in Part I, GA-P1A.1005, the Thai private operator, 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 the Civil Aviation Authority of Thailand Requirements No. 22 on Occurrence Reporting in Civil Aviation.

1003.2 In addition to the requirements contained in 1003.1 of this chapter, the operator of an aeroplane over 5700 kg maximum certificated take-off mass, ensure that the information resulting from maintenance and operational experience with respect to continuing airworthiness and report information as detailed in 1003.1 of this chapter 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 organization 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.

1003.3 When the Thai private operator 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. 1004 MAINTENANCE RELEASE**

1004.1 The Thai private operator shall comply with the requirements in accordance with Chapter 10 of Part I, GA-P1A.1004.

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## PART III

### GENERAL AVIATION OPERATIONS (HELICOPTER)

#### CHAPTER 1

#### GENERAL

##### GA-P3H.101 APPLICABILITY

- 101.1 The requirements of these Regulations apply to all local and international general aviation operations conducted by a Thai registered helicopter with a Standards Certificate of Airworthiness (Standards C of A).
- 101.2 The Authority may exceptionally grant an exemption from the provision of paragraph 101.1 when satisfactory that there is a need and subject to compliance with any supplementary condition the Authority considers necessary in order to ensure an acceptable level of safety in the particular case.

##### GA-P3H.102 COMPLIANCE WITH LAWS, REGULATIONS AND PROCEDURE

- 102.1 The pilot-in-command of Thai helicopter 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 the Civil Aviation Authority of Thailand 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 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 in accordance with the Civil Aviation Authority of Thailand Requirements No. 22 on Occurrence Reporting in Civil Aviation.

- 102.4 The pilot-in-command of Thai helicopter shall be responsible for notifying the nearest appropriate authority by the quickest available means of any accident involving the helicopter, resulting in serious injury or death of any person or substantial damage to the helicopter or property.

*Note.- A definition of the term "serious injury" is contained in Annex 13.*

- 102.5 The pilot-in-command of Thai helicopter 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.

- 102.6 The Pilot-in-command of Thai helicopter 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.

- 102.7 The pilot-in-command of Thai helicopter, when intercepted, shall immediately follow the instructions given by the intercepting aircraft and comply with the interception orders.

### **GA-P3H.103      OVERSIGHT ACTIVITIES BY THE AUTHORITY**

- 103.1 To determine continued competence and compliance with the applicable requirements, Thai helicopter private operator shall permit access by Authorised Officers /CAAT Inspector to its premises, aeroplane, equipment and document, including those landing agents appointed by the Thai private operator.

- 103.2 All Authorised Officers/ CAAT Inspector are authorised to be on-board the operator's helicopter, including its flight deck, during normal helicopter operations. Arrangements for such flights will normally be made in advance, but Authorised Officers may also board the helicopter without prior notice to conduct unscheduled inspection.

- 103.3 The Thai private operator will be visited, from time to time, by Authorised Officers/CAAT Inspector. The primary purpose of their visits is to observe the operations of helicopter of Thai private operator. This will include the training and checking and qualifications of the operating staff and agents/contractors of its Thai private operator.

- 103.4 The Authorised Officers/CAAT Inspector are also empowered to inspect the licenses of the flight crew and aircraft maintenance engineers, and records of the Thai private operator and their agents.

- 103.5 Subject to paragraph 103.1 – 103.4, When the Authority issues a Specific Approval, the Thai private operator is subject to performing a function that, continuing surveillance, or any assessment, examination, test, inspection or investigation, for any purpose of these regulations (in every year) to ensure that the Thai private operator remains competent to undertake the safe operations, as a result of which an authorized officer/CAAT Inspector must travel outside Thailand to perform that function, the Thai private operator shall be borne subject to the functions as mentioned above.

**GA-P3H.104 CARRIAGE OF DANGEROUS GOODS**

104.1 Thai helicopter private operator shall obtain Dangerous Goods specific approval issued by CAAT. The carriage of dangerous goods shall be complied with Annex 18 and Technical Instruction for the Safe Transport of Dangerous Goods by Air (Doc 9284).

**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 Personnel Disciplines.

**GA-P3H.106 GENERAL AVIATION - SPECIFIC APPROVAL**

106.1 A Thai private operator who wishes to apply for a General Aviation-Specific Approval shall comply in accordance with the Regulations prescribed in GA-P1A.105.

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## CHAPTER 2

### FLIGHT OPERATIONS

#### GA-P3H.200 ADEQUACY OF OPERATING FACILITIES

200.1 The pilot-in-command of Thai helicopter 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.201 OPERATIONAL MANAGEMENT

##### 201.1 Operating instructions

201.1.1 Thai private operator 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:
  - (i) seat belts;
  - (ii) emergency exits;
  - (iii) life jackets, if the carriage of life jackets is prescribed;
  - (iv) oxygen dispensing equipment, if the provision of oxygen for the use of passengers is prescribed;
  - (v) 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 a helicopter are secured in their seats by means of the seat belts or harnesses provided.
- 201.1.2 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 rotorcraft 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 Thai private operator shall establish operating minima follow the layout and contain at least the information listed in paragraph 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 Authority or the State of the Aerodrome.

#### **202.2 Heliport operating minima**

- 202.2.1 The pilot-in-command of Thai helicopter shall establish operating minima follow the layout and contain at least the information listed in AOCR Chapter 8 for each heliport or landing location to be used in operations. When establishing aerodrome operating minima, any conditions that may be prescribed in the list of specific approval. 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.*

- 202.2.2 The operational credit(s) for operations with helicopter equipped with automatic landing, Head-Up Display (HUD), Enhanced Vision System (EVS), Synthetic Vision Display System (SVS), or Combined Vision System (CVS), shall be authorized by CAAT- The specific approval shall be issued by CAAT, wherethe operational credit relates to low visibility operations. Such authorization shall not affect the classification of instrument approach procedure.

*Note 1.- Operational credit includes:*

- (a) for the purposes of an approach ban (Ref to para 206.3.2) or dispatch considerations, a minimum 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 and how to express the operational credit in the specific approvals template is contained 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.*

202.2.3 To obtain a specific approval for the operational credit, Thai private helicopter operator shall demonstrate to the CAAT that:

- (a) the aircraft meets the appropriate airworthiness certification requirements;
- (b) the information necessary to support effective crew tasks for the operation is appropriately available to both pilots where the number of flight crew members specified in the operations manual ( or other documents associated with the certificate of airworthiness) is more than one;
- (c) the operator/owner has carried out a safety risk assessment of the operations supported by the equipment;
- (d) the operator/ owner has established and documented normal and abnormal procedures and MEL;
- (e) the operator/ owner has established a training programme for the flight crew members and relevant personnel involved in the flight preparation;
- (f) the operator/owner has established a system for data collection, evaluation and trend monitoring for low visibility operations for which there is an operational credit; and
- (g) the operator has instituted appropriate procedures in respect of continuing airworthiness (maintenance and repair) practices and programmes.

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

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

202.2.4 For operations with operational credit with minima above those related to low visibility operations, the criteria for the safe operation of the aircraft shall be approved by CAAT.

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

202.2.5 For authorize operational credit(s) and instrument approach operations as mentioned in paragraph 202.2.1 and 202.2.2 above, Thai private operator shall submit the application and comply with the process for issuing a Specific Approval as required in accordance with GA.P3H.106.

**GA-P3H.203 BRIEFING**

203.1 The pilot- in- command of Thai helicopter 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 (as appropriate); and
- (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 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. 1.- The requirements for flight plans are contained in Regulation of the Civil Aviation Authority of Thailand — Rules of the Air and Requirement of the Civil Aviation Authority of Thailand No. 72 - the procedures relating to flight plans and associated services are contained in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444).*

*Note. 2.- Detailed guidance on the use of the FF-ICE services, including the use of a preliminary flight plan, can be found in the Manual on Flight and Flow — Information for a Collaborative Environment (FF-ICE) (Doc 9965).*

## **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.

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

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 paragraph 206.2.2 prevail; or

(b);

(i) the heliport or landing location of intended landing is isolated and no alternate heliport or landing location is available; and

(ii) an instrument approach procedure is prescribed for the isolated heliport of intended landing; and

(iii) 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 paragraph 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 paragraph 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 paragraph 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 paragraph 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 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 overflowed (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 paragraph 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, paragraph 403.1 shall be certificated for ditching. Sea state shall be an integral part of ditching information.

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## 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 8 section 10.

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## 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:
  - (i) the pilot's compartment; and
  - (ii) 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) (i) a seat or berth for each person over an age of two years; and
- (ii) a seat belt for each seat and restraining belts for each berth;
- (iii) 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:
  - (i) 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

- (ii) any specific approval issued by the CAAT, if applicable, for the operation(s) to be conducted;
  - (iii) 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;
  - (iv) procedures for pilots-in-command of intercepted aircraft;
  - (v) a list of visual signals for use by intercepting and intercepted aircraft, as prescribed in Regulation of the Civil Aviation Authority of Thailand on Rule of the Air;
  - (vi) the journey log book for the helicopter; and
  - (vii) 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.

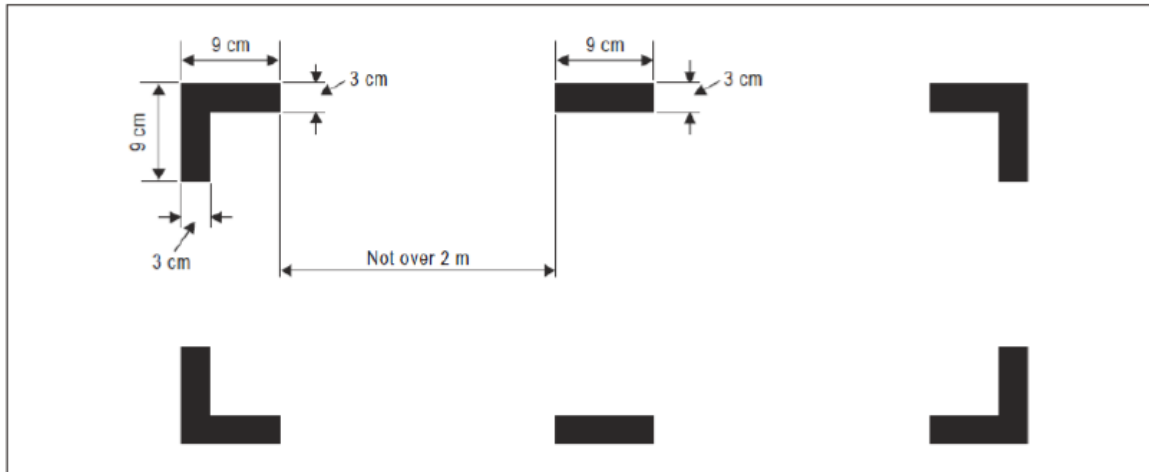
*Note.- Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.*

#### 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 paragraph 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: (i) a magnetic compass
  - (ii) a sensitive pressure altimeter;
  - (iii) an airspeed indicator;
  - (iv) 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 paragraph 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 Regulation of the Civil Aviation Authority of Thailand on Rule of the Air for aircraft in flight or operating on the movement area of a heliport;
- (h) the landing light. The landing light should be trainable, at least in the vertical plane;
- (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:
  - (i) a magnetic compass;
  - (ii) a sensitive pressure altimeter;
  - (iii) an airspeed indicating system with a means of preventing malfunctioning due to either condensation or icing;
  - (iv) a slip indicator;
  - (v) an attitude indicator (artificial horizon) for each required pilot and one additional attitude indicator;
  - (vi) a heading indicator (directional gyroscope);
  - (vii) a means of indicating whether the supply of power to the gyroscopic instruments is adequate;
  - (viii) a means of indicating on the flight deck the outside air temperature;
  - (ix) a rate of climb and descent indicator;
  - (x) such additional instruments or equipment as may be prescribed by the appropriate authority;
  - (xi) if operated by night, the lights specified in paragraph 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 paragraph 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 Regulation of the Civil Aviation Authority of Thailand 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 paragraph 403.2.1 a) shall be carried.

403.2.3 Each life jacket and equivalent individual flotation device, when carried in accordance with paragraph 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, paragraph 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, paragraph 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.

**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 3A.*

*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 3A.*

**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 3A.
- (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 3A.

*Note.- Refer to parameters to be recorded as listed in Table M-A1 of Appendix 3A.*

#### 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.

*Note.- Refer to installation of CVR/CVRS listed in Table M-A2 of Appendix 3A.*

#### 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 use any of the data link communications applications referred to in paragraph 5.1.2 of Appendix 3A, and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder.
- (b) All helicopters for which the individual certificate of airworthiness was first issued before 1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016, to use any of the data link communications applications referred to in paragraph 5.1.2 of the Appendix 3A, shall record the data link communications messages on a crash-protected flight recorder unless the installed data link communications equipment is compliant with a type design or aircraft modification first approved prior to 1 January 2016.

*Note 1.- Refer to Table M-A3 of Appendix 3A for examples of data link communication recording requirements.*

*Note 2.- A Class B AIR could be a means for recording data link communications applications messages to and from the helicopters where it is not practical or prohibitively expensive to record those data link communications applications messages on FDR or CVR.*

*Note 3.- The “aircraft modifications” refer to modifications to install the data link communications equipment on the aircraft (e.g. structural, wiring)*

#### 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 paragraph 407.4.3.*

##### 407.4.3 **Flight recorder records**

The pilot-in-command, and/ or Thai private operator, shall ensure, to the extent possible, in the event the helicopter 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 3A.*

#### 407.4.5 Flight recorders electronic documentation

The documentation requirement concerning FDR parameters provided by operator/owners to accident investigation authorities should be in electronic format and take account of industry specifications.

*Note.- Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.*

#### **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 paragraph 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 paragraph 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 Authority, 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 Notwithstanding Chapter 2, 202.2.2 to 202.2.4, where helicopters are equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, the use of such systems for the safe operation of a helicopter shall be approved by the CAAT.

*Note 1.- Information regarding automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS is contained in the Manual of All-Weather Operations (Doc 9365).*

*Note 2.- 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.412 ELECTRONIC FLIGHT BAGS (EFBS)**

412.1 Thai private operator which this chapter applies shall comply a regulation for electronic flight bags (EFBs) in accordance with Chapter 1 of Part I, GA-P105, paragraph 105.16.

## 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 paragraph 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 paragraph 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 paragraph 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 paragraph 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 a 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 paragraph 501.6, Thai private 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 paragraph 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, paragraph 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 paragraph 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 Thai private operator:

- (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 paragraph 503.2, Thai private 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 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 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 paragraph 603.1 and 603.2 above shall be conducted by CAAT Inspector or an Authorised Flight Examiner.

## 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 Thai private operator 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 Thai private operator shall not operate a helicopter unless maintenance on the helicopter, 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 Thai private operator 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 Thai private operator or in case where it is leased, the lessee, shall ensure that the following records are kept for the periods mentioned in paragraph 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 paragraph 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 paragraph 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 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 Thai private operator, 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 the Civil Aviation Authority of Thailand Requirements No. 22 on Occurrence Reporting in Civil Aviation.
- 703.2 In addition to the requirements contained in paragraph 703.1, Thai private operator 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 paragraph 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 paragraph 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 the Civil Aviation Authority of Thailand Requirements No. 22 on Occurrence Reporting in Civil Aviation.
- 703.4 When Thai private operator 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 When maintenance is carried out by an approved maintenance organization, the maintenance release shall be issued by the approved maintenance organization in accordance with the TCAR AIR Part-145 or TCAR AIR Part-CAO, as applicable.
- 705.2 When maintenance is not carried out by an approved maintenance organization, the maintenance release shall be completed and signed by a person appropriately licensed according to CAAT requirement 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 the CAAT on Maintenance, Preventive Maintenance, Rebuilding and Alteration or TCAR AIR Part-M/ML, as applicable.
- 705.3 When maintenance is not carried out by an approved maintenance organization, the maintenance release shall contain a certification including:
- (a) basic details of the maintenance performed;
  - (b) the date such maintenance was completed; and
  - (c) the identity of the authorised person or persons signing the release.

**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—
- (a) 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 2A and appendix 1B of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration

- (b) 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 2A, of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration; and
- (c) 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 2A, of the Announcement of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration.

706.2 The tests required by paragraph 706.1 of this section must be conducted by—

- (a) The manufacturer of the helicopter, on which the tests and inspections are to be performed;
- (b) 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
- (c) 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 helicopter, in controlled airspace under IFR at an altitude above the maximum altitude at which all altimeters and the automatic altitude reporting system of that 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 1B 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 2A, of the Announcement

of CAAT Subject: Maintenance, Preventive Maintenance, Rebuilding and Alteration.

707.3 The tests and inspections specified in paragraph 707.1, 707.2 must be conducted by—

- (a) 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;
- (b) The manufacturer of the aircraft on which the transponder to be tested is installed, if the transponder was installed by that manufacturer.

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## 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 Authority.

#### 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:

- (a) helicopter nationality and registration;
- (b) date;
- (c) Name of crew members;
- (d) duty assignments of crew members;
- (e) Place of departure;
- (f) Place of arrival;
- (g) Time of departure;
- (h) Time arrival;
- (i) Hours of flight;
- (j) Nature of flight (Private, Scheduled or Non-scheduled).
- (k) Incidents, observations (if applicable); and
- (l) 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 Thai private operator shall retain each daily flight record for a period of six months after the date of the record.

## APPENDIX 1A – LIGHTS TO BE DISPLAYED BY AEROPLANES

### 1. TERMINOLOGY

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

**Angles of coverage.**

- (a) Angle of coverage A is formed by two intersecting vertical planes making angles of 70 degrees to the right and 70 degrees to the left respectively, looking aft along the longitudinal axis to a vertical plane passing through the longitudinal axis.
- (b) Angle of coverage F is formed by two intersecting vertical planes making angles of 110 degrees to the right and 110 degrees to the left respectively, looking forward along the longitudinal axis to a vertical plane passing through the longitudinal axis.
- (c) Angle of coverage L is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the left of the first, when looking forward along the longitudinal axis.
- (d) Angle of coverage R is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the right of the first, when looking forward along the longitudinal axis.

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

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

**Making way.** An aeroplane on the surface of the water is “making way” when it is under way and has a velocity relative to the water.

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

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

**Vertical planes.** Planes perpendicular to the horizontal plane.

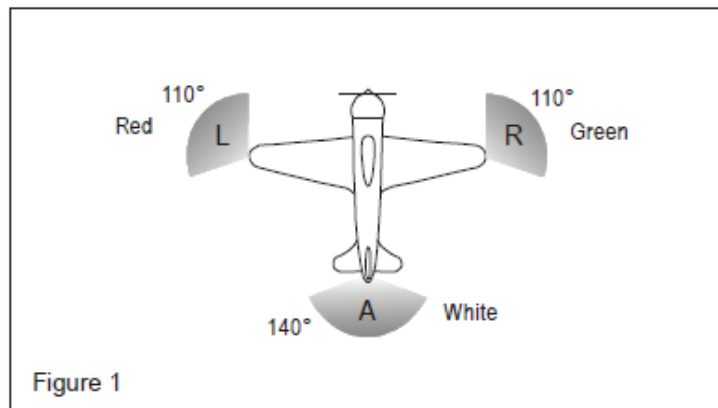
**Visible.** Visible on a dark night with a clear atmosphere.

## 2. NAVIGATION LIGHTS TO BE DISPLAYED IN THE AIR

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

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

- (a) a red light projected above and below the horizontal plane through angle of coverage L;
- (b) a green light projected above and below the horizontal plane through angle of coverage R;
- (c) a white light projected above and below the horizontal plane rearward through angle of coverage A.



## 3. LIGHTS TO BE DISPLAYED ON THE WATER

### 3.1 General

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

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

- (a) when under way;
- (b) when towing another vessel or aeroplane;
- (c) when being towed;
- (d) when not under command and not making way;
- (e) when making way but not under command;
- (f) when at anchor;
- (g) when aground.

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

### 3.2 When under way

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

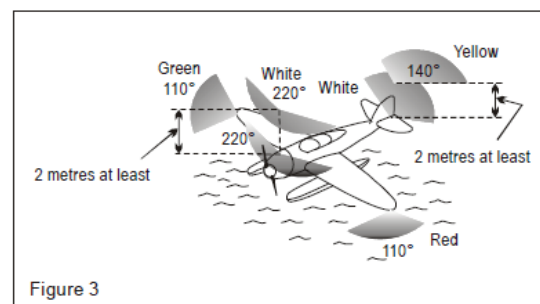
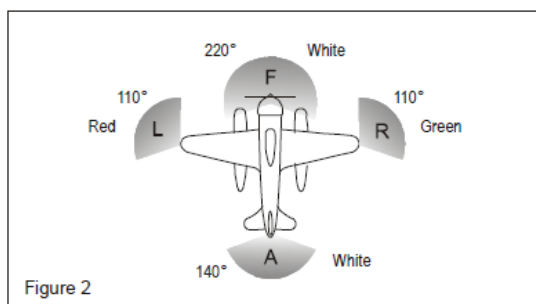
- (a) a red light projected above and below the horizontal through angle of coverage L;
- (b) a green light projected above and below the horizontal through angle of coverage R;
- (c) a white light projected above and below the horizontal through angle of coverage A; and
- (d) a white light projected through angle of coverage F.

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

### 3.3 When towing another vessel or aeroplane

As illustrated in Figure 3, the following appearing as steady, unobstructed lights:

- (a) the lights described in 3.2;
- (b) second light having the same characteristics as the light described in 3.2 d) and mounted in a vertical line at least 2 m above or below it; and
- (c) a yellow light having otherwise the same characteristics as the light described in 3.2 c) and mounted in a vertical line at least 2 m above it.



### 3.4 When being towed

The lights described in 3.2 a), b) and c) appearing as steady, unobstructed lights.

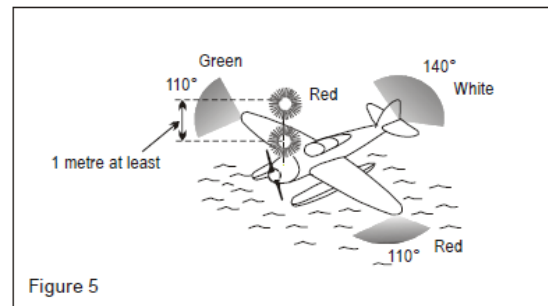
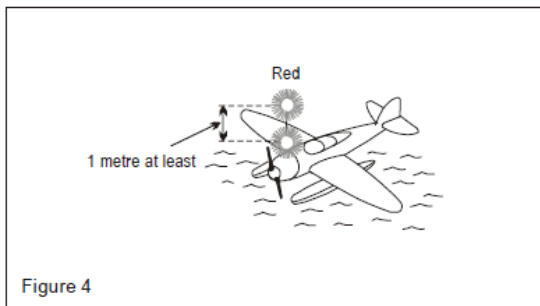
### 3.5 When not under command and not making way

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

### 3.6 When making way but not under command

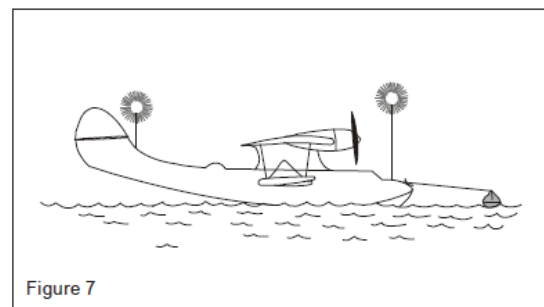
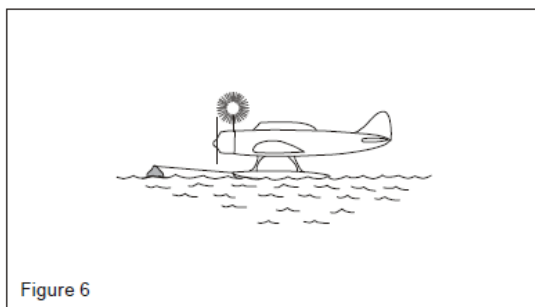
As illustrated in Figure 5, the lights described in 3.5 plus the lights described in 3.2 a), b) and c).

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

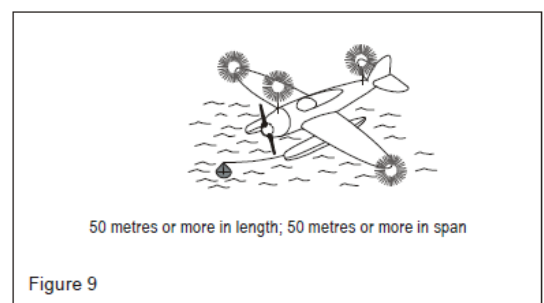
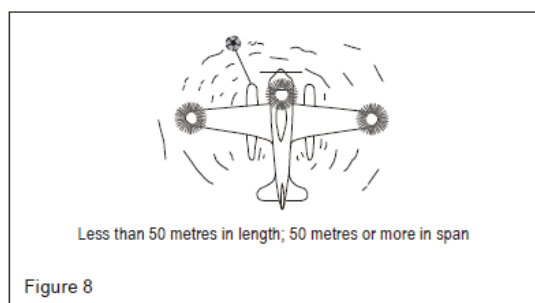


### 3.7 When at anchor

- (a) If less than 50 m in length, where it can best be seen, a steady white light (Figure 6), visible all around the horizon at a distance of at least 3.7 km (2 NM).
- (b) If 50 m or more in length, where they can best be seen, a steady white forward light and a steady white rear light (Figure 7) both visible all around the horizon at a distance of at least 5.6 km (3 NM).



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



### **3.8 When aground**

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

**APPENDIX 1B -           ALTIMETRY SYSTEM PERFORMANCE REQUIREMENTS FOR OPERATIONS  
IN RVSM AIRSPACE**

- 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.

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## **APPENDIX 1C – FLIGHT RECORDERS (AEROPLANE)**

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: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CVR or the FDR. Lightweight flight recorders comprise one or more of the following: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and/or a data link recording system (DLRS). When image data link information is required to be recorded on a lightweight flight recorder, it is permissible to record it on either the CARS or the ADRS.

### **1. GENERAL REQUIREMENTS**

- 1.1 Non-deployable flight recorder containers shall be painted a distinctive orange colour.
- 1.2 Non-deployable crash-protected flight recorder containers shall:
  - (a) carry reflective material to facilitate their location; and
  - (b) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 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 crash-protected flight recorders shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorders without jeopardizing service to essential or emergency loads.
- 1.6 The lightweight flight recorders shall be connected to a power source having the characteristics which ensure proper and reliable recording in the operational environment.
- 1.7 The flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.
- 1.8 Means shall be provided for an accurate time correlation between the recorder systems recordings.
- 1.9 The flight recorder system 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;
  - (c) manufacturer's test reports; and
  - (d) detailed information to ensure the continued serviceability of the flight recorder system.
- 1.10 The holder of the airworthiness approval for the installation design of the flight recorder system shall make available the relevant continuing airworthiness information to the operator of the aeroplane to be incorporated in the continuing airworthiness maintenance programme. This continuing airworthiness information shall cover in detail all the tasks required to ensure the continued serviceability of the flight recorder system.

*Note 1.- The flight recorder system is composed of the flight recorder as well as any dedicated sensors, hardware and software that provide information required per this Appendix.*

*Note 2.- Conditions related to the continued serviceability of a flight recorder system are defined in Section 6 of this Appendix. The Manual on Flight Recorder System Maintenance (FRSM) (Doc 10104) provides guidance on maintenance tasks associated with flight recorder systems.*

## **2. FLIGHT DATA RECORDER (FDR) AND AIRCRAFT DATA RECORDING 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 1C-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 the first 7 parameters listed in Table 1C-3.

2.2.5 If further ADRS recording capacity is available, the recording of any parameters from 8 onwards defined in Table 1C-3 shall be considered.

### **2.3 Additional information**

2.3.1 The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certifying 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;
- (e) additional flight crew positions and time reference; and
- (f) 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 1C- 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) Reserved
  - (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.
  - (h) an examination of the recorded messages on the DLR or DLRS shall be carried out by replay of the DLR or DLRS recording.

- 6.4 A flight recorder system shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.
- 6.5 A report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.
- 6.6 Calibration of the FDR system:
- (a) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every five years. The recalibration shall determine any discrepancies in the engineering conversion routines for the mandatory parameters, and to ensure that parameters are being recorded within the calibration tolerances; and
  - (b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every two years.

**TABLE 1C-1 Parameter Characteristics for flight data recorder**

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
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.

77*	Date		365 days	64		
78*	Actual navigation performance or estimated position error or estimated position uncertainty		As installed	4	As installed	
61*	Loran C, localizer glide slope) Ice detection		As installed	4	As installed	

**TABLE 1C-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 1C-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
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	

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	

The tables below summarize the current flight recorders carriage requirements.

**Table 1C-A1. for the recording of flight parameters in GA-P1A.**

	<b>Maximum certificated take-off mass (MCTOM)</b>
<b>Date</b>	5700 kg and below
	All turbine-engined aeroplanes with more than five passengers – first certificate of airworthiness
<b>2016</b> ⇒	GA-P1A.514, paragraph 514.1.1

**Table 1C-A2. CVR/CARS installation in GA-P1A.**

	<b>Maximum certificated take-off mass (MCTOM)</b>
<b>Date</b>	5700 kg and below
	All turbine-engined aeroplanes with more than five passengers required to be operated by more than one pilot – first certificate of airworthiness
<b>2016</b> ⇒	GA-P1A.514, paragraph 514.2.1

**Table 1C-A3. Data link communications (DLC) recording installation clarification.**

Rows	Date individual certificate of airworthiness was first issued	Date aircraft type certificate issued or modification for DLC equipment first approved	Date of activation for use of DLC equipment	DLC recording required	Refer GA-P1A
1	On or after 1 January 2016	On or after 1 January 2016	On or after 1 January 2016	Yes	514.3.1(a)
2	On or after 1 January 2016	Before 1 January 2016	On or after 1 January 2016	Yes	514.3.1(a)
3	Before 1 January 2016	On or after 1 January 2016	On or after 1 January 2016	Yes	514.3.1(b)
4	Before 1 January 2016	Before 1 January 2016	Before 1 January 2016	No	514.3.1(b)
5	Before 1 January 2016	Before 1 January 2016	On or after 1 January 2016	No	514.3.1(b)

**APPENDIX 1D - GENERAL AVIATION - SPECIFIC APPROVAL FORM**



**SPECIFIC APPROVAL**

(Subject to the approved condition in the Operations Manual and MEL)

<b>The Civil Aviation Authority of Thailand</b>				
Telephone: +66 2568 8842-3		Fax: +66 2568 8848		E-mail: ops_ga@caat.or.th
Specific Approval No. <sup>1</sup> : _____ Revision No. <sup>2</sup> : _____ Date of Issue <sup>2</sup> : _____ Date of Expiration <sup>2</sup> : _____ Operator name <sup>3</sup> : _____ Address <sup>3</sup> : _____ Telephone <sup>3</sup> : _____ Fax <sup>3</sup> : _____			_____ <sup>4</sup> Director General The Civil Aviation Authority of Thailand Date: DD Mmmm yyyy	
Aircraft model <sup>5</sup> : _____				
Registration Mark of Aircraft: _____				
Types 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  - Take-off - Operational credit(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> CAT II <sup>10</sup> RVR ___ m/DH ___ ft. <input type="checkbox"/> CAT III <sup>10</sup> RVR ___ m/DH ___ ft. <input type="checkbox"/> RVR <sup>11</sup> ___ m <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"/>		



**Notes.—**

1. Insert the associated Specific Approval number.
2. Insert the associated Revision number, Date of Issue and Date of Expiration.
3. Insert the Operator's registered name and the operator's trading name, address, telephone and fax simile.
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 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. Type of transportation. (e.g. General Aviation Operations).
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 or III). 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 (e.g. 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. 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.
15. List the EFB functions used for a safe operation of aeroplanes and any applicable limitations.
16. Other authorizations or data can be entered here. Use one line (or one multi-line block) per authorization (e.g. specific approach operations approval).

**APPENDIX 1E -      *RESERVED***

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## **APPENDIX 1F - NOISE ABATEMENT**

- 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%.

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## APPENDIX 2A - COMPANY OPERATIONS MANUAL

### Content of the Operations Manual for certain type of operations

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) Standard Operating Procedures (SOPs);
- (l) weather limitations;
- (m) flight and duty time limitations;
- (n) emergency procedures;
- (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) use/protection of FDR / CVR records (where applicable);
- (w) handling of dangerous goods(where applicable); and
- (x) use of automatic landing systems, a HUD or equivalent displays and EVS, SVS or CVS equipment as applicable.
- (y) Other documents required by the CAAT.

## APPENDIX 2B - MINIMUM EQUIPMENT LISTS (MEL)

- 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 3A – FLIGHT RECORDERS (HELICOPTER)**

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: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CVR or FDR. Lightweight flight recorders comprise one or more of the following: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and/or a data link recording system (DLRS). When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CARS or the ADRS.

### **1. GENERAL REQUIREMENTS**

- 1.1 Non-deployable flight recorder containers shall be painted a distinctive orange colour.
- 1.2 Non-deployable crash-protected flight recorder containers shall:
  - (a) carry reflective material to facilitate their location; and
  - (b) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 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 crash-protected flight recorders shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorders without jeopardizing service to essential or emergency loads.
- 1.6 The lightweight flight recorders shall be connected to a power source having the characteristics which ensure proper and reliable recording in the operational environment.
- 1.7 The flight recorder systems, when tested by methods approved by the appropriate certifying authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.
- 1.8 Means shall be provided for an accurate time correlation between the recorder systems recordings.
- 1.9 The flight recorder system manufacturer shall provide the appropriate certifying 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.; and
  - (d) detailed information to ensure the continued serviceability of the flight recorder system.
- 1.10 The holder of the airworthiness approval for the installation design of the flight recorder system shall make available the relevant continuing airworthiness information to the operator of the helicopter to be incorporated in the continuing airworthiness maintenance programme. This continuing airworthiness information shall cover in detail all the tasks required to ensure the continued serviceability of the flight recorder system.

*Note 1.- The flight recorder system is composed of the flight recorder as well as any dedicated sensors, hardware and software that provide information required per this Appendix.*

*Note 2.- Conditions related to the continued serviceability of a flight recorder system are defined in Section 6 of this Appendix. The Manual on Flight Recorder System Maintenance (FRSM) (Doc 10104) provides guidance on maintenance tasks associated with flight recorder systems.*

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## **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 the first 7 parameters listed in Table M-3.

2.2.5 If further ADRS recording capacity is available, the recording of any parameters from 8 onwards defined in Table M-3 shall be considered.

### **2.3 Additional information**

2.3.1 The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certificating authority.

2.3.2 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator/ 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 FDR or ADRS recording from a complete flight shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR or ADRS. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;
  - (c) *Reserved*
  - (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.
  - (h) an examination of the recorded messages on the DLR or DLRS shall be carried out by replay of the DLR or DLRS recording.

- 
- 6.4 A flight recorder system shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.
- 6.5 A report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.
- 6.6 Calibration of the FDR system:
- (a) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every five years. The recalibration shall determine any discrepancies in the engineering conversion routines for the mandatory parameters, and to ensure that parameters are being recorded within the calibration tolerances; and
  - (b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every two years.

**TABLE 3A-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
14*	Autopilot/ autothrottle/AFCS mode and engagement status		A suitable combination of discrettes	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
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
	----- display format					
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

**TABLE 3A-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 3A-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 certified 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	

The tables below summarize the flight recorders carriage requirements for helicopters.

**Table 3A-A1. the recording of flight parameters in GA-P3H.407**

Date	Maximum certificated take-off mass (MCTOM)	
	Seating configuration of more than 19 passengers or over 7000 kg	Over 3 175 kg
	All helicopters first certificate of airworthiness	All helicopters first certificate of airworthiness
1989 ⇒	407.1.1(b)	
2016 ⇒	407.1.1(a)	407.1.1(a)

**Table 3A-A2. CVR/CARS installation in Section GA-P3H.407**

Date	Maximum certificated take-off mass (MCTOM)	
	Over 7000 kg	Over 3 175 kg
	All helicopters	All helicopters first certificate of airworthiness
1987 ⇒	407.2.1	

**Table 3A-A3. Data link communications (DLC) recording installation clarification GA-P3H.407**

Rows	Date individual certificate of airworthiness was first issued	Date aircraft type certificate issued or modification for DLC equipment first approved	Date of activation for use of DLC equipment	DLC recording required	Refer GA.P3H
1	On or after 1 January 2016	On or after 1 January 2016	On or after 1 January 2016	Yes	407.3.1(a)
2	On or after 1 January 2016	Before 1 January 2016	On or after 1 January 2016	Yes	407.3.1(a)
3	Before 1 January 2016	On or after 1 January 2016	On or after 1 January 2016	Yes	407.3.1(b)
4	Before 1 January 2016	Before 1 January 2016	Before 1 January 2016	No	407.3.1(b)
5	Before 1 January 2016	Before 1 January 2016	On or after 1 January 2016	No	407.3.1(b)

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