



**MENTERI PERHUBUNGAN
REPUBLIK INDONESIA**

PERATURAN MENTERI PERHUBUNGAN

NOMOR : KM. 43 TAHUN 2009

TENTANG

**PERUBAHAN KEEMPAT ATAS KEPUTUSAN MENTERI PERHUBUNGAN
NOMOR KM 22 TAHUN 2002 TENTANG PERSYARATAN-PERSYARATAN
SERTIFIKASI DAN OPERASI BAGI PERUSAHAAN ANGKUTAN UDARA YANG
MELAKUKAN PENERBANGAN DALAM NEGERI, INTERNASIONAL DAN
ANGKUTAN UDARA NIAGA TIDAK BERJADWAL**

DENGAN RAHMAT TUHAN YANG MAHA ESA

MENTERI PERHUBUNGAN,

- Menimbang :
- a. bahwa dalam Peraturan Menteri Perhubungan Nomor KM 19 Tahun 2009 tentang Perubahan Ketiga atas Keputusan Menteri Perhubungan Nomor KM 22 Tahun 2002 telah diatur mengenai persyaratan sertifikasi dan operasi bagi perusahaan angkutan udara yang melakukan penerbangan dalam negeri, internasional dan angkutan udara niaga tidak berjadwal, dengan mengacu kepada ketentuan yang dipersyaratkan oleh *International Civil Aviation Organization*;
 - b. bahwa sebagai antisipasi terhadap perkembangan teknologi dan untuk lebih menjamin keamanan serta keselamatan penerbangan perlu dilakukan perubahan terhadap standar kelaikan udara dengan Peraturan Menteri Perhubungan;
 - c. bahwa berdasarkan pertimbangan sebagaimana dimaksud dalam huruf a dan huruf b, perlu dilakukan perubahan atas Keputusan Menteri Perhubungan Nomor KM 22 Tahun 2002 tentang Persyaratan-Persyaratan Sertifikasi dan Operasi Bagi Perusahaan Angkutan Udara yang Melakukan Penerbangan Dalam Negeri, Internasional dan Angkutan Udara Niaga tidak Berjadwal;
- Mengingat :
- 1. Undang-Undang Nomor 1 Tahun 2009 tentang Penerbangan (Lembaran Negara Republik Indonesia Tahun 2009 Nomor 1, Tambahan Lembaran Negara Republik Indonesia Nomor 4956);

2. Peraturan Presiden Nomor 9 Tahun 2005 tentang Kedudukan, Tugas, Fungsi, Kewenangan, Susunan Organisasi dan Tata Kerja Kementerian Negara Republik Indonesia sebagaimana telah diubah terakhir dengan Peraturan Presiden Nomor 20 Tahun 2008;
3. Peraturan Presiden Nomor 10 Tahun 2005 tentang Unit Organisasi dan Tugas Eselon I Kementerian Negara Republik Indonesia sebagaimana telah diubah terakhir dengan Peraturan Presiden Nomor 50 Tahun 2008;
4. Keputusan Menteri Perhubungan Udara Nomor KM 22 Tahun 2002 tentang Persyaratan-Persyaratan Sertifikasi dan Operasi Bagi Perusahaan Angkutan Udara yang Melakukan Penerbangan Dalam Negeri, Internasional dan Angkutan Udara Niaga Tidak Berjadwal sebagaimana telah diubah terakhir dengan Peraturan Menteri Perhubungan Nomor KM 19 Tahun 2009;
5. Peraturan Menteri Perhubungan Nomor KM 43 Tahun 2005 tentang Organisasi dan Tata Kerja Departemen Perhubungan sebagaimana telah diubah terakhir dengan Peraturan Menteri Perhubungan Nomor KM 20 Tahun 2008;

MEMUTUSKAN :

Menetapkan : **PERATURAN MENTERI PERHUBUNGAN TENTANG PERUBAHAN KEEMPAT ATAS KEPUTUSAN MENTERI PERHUBUNGAN NOMOR KM 22 TAHUN 2002 TENTANG PERSYARATAN-PERSYARATAN SERTIFIKASI DAN OPERASI BAGI PERUSAHAAN ANGKUTAN UDARA YANG MELAKUKAN PENERBANGAN DALAM NEGERI, INTERNASIONAL DAN ANGKUTAN UDARA NIAGA TIDAK BERJADWAL.**

Pasal I

Beberapa ketentuan dalam Lampiran Keputusan Menteri Perhubungan Nomor KM 22 Tahun 2002 tentang Persyaratan-persyaratan Sertifikasi dan Operasi bagi Perusahaan Angkutan Udara yang Melakukan Penerbangan Dalam Negeri, Internasional dan Angkutan Udara Niaga Tidak Berjadwal (*Civil Aviation safety Regulations (CASR) Part 121*), diubah dan ditambah sebagai berikut:

1. Mengubah Sub Bagian C - 121.63

This subpart prescribes the standards for each air carrier authorized to operate under this part, required to maintain a flight safety program and safety management system. (Pada sub bagian ini menjelaskan standarisasi kepada perusahaan penerbangan yang memiliki otorisasi operasi sesuai dengan bagian ini, yang mempersyaratkan memiliki program keselamatan dan manajemen sistem keselamatan).

2. Mengubah Sub Bagian C - 121.67

121.67 *Safety Management System* (Sistem Manajemen Keselamatan)

- (a) *Effective 1 January 2009, each certificated holder shall have in place a Safety Management System (SMS) that is acceptable to DGCA that, as a minimum* (Efektif mulai 1 Januari 2009, AMO bersertifikat wajib memiliki Sistem Manajemen Keselamatan (*Safety Management System/SMS*) yang disahkan oleh Dirjen Perhubungan Udara yang memiliki minimal):
- (1) *Identifies safety hazards and assesses and mitigates risks;* (Mengidentifikasi bahaya keselamatan dan mengkaji dan mengurangi resiko)
 - (2) *Ensures that remedial action necessary to maintain an acceptable level of safety is implemented;* (Memastikan bahwa tindakan perbaikan diperlukan untuk menjaga suatu implikasi tingkat keselamatan yang dilaksanakan)
 - (3) *Provides for continuous monitoring and regular assessment of the safety level achieved; and* (Memberikan pengawasan terus menerus dan reguler kesepakatan dari tingkat keselamatan yang dicapai; dan)
 - (4) *Aims to make continuous improvement to the overall level of safety.* (Bertujuan untuk pengembangan berkelanjutan untuk seluruh tingkatan keselamatan).
- (b) *In order to be acceptable to the DGCA, the SMS shall meet the requirements set forth in Appendix G of this Part.* (Agar dapat diterima oleh Dirjen Perhubungan Udara, SMS harus memenuhi persyaratan ditetapkan dalam *Appendix G* dari bagian ini).

3. Menambah 121.306 pada Sub Bagian K, sehingga berbunyi sebagai berikut:

121.306 *Portable electronic devices.* (Peralatan elektronik yang mudah dipindah-pindah)

- a. *Except as provided in paragraph (b) of this section, no person may operate, nor may any operator or pilot in command of an aircraft allow the operation of, any portable electronic device on any Republic of Indonesia-registered civil aircraft operating under this Part.* (Kecuali seperti yang diatur pada butir (b), tidak seorangpun yang boleh mengoperasikan, tidak pula suatu pemegang sertifikat perusahaan penerbangan atau kapten pilot pesawat udara boleh mengijinkan pengoperasian jenis apapun dari

peralatan elektronik yang mudah dipindah-pindahkan, pada pesawat udara sipil Indonesia yang dioperasikan sesuai ketentuan PKPS Bagian 121).

- b. *Paragraph (a) of this section does not apply to—* (Butir (a) pasal ini tidak yang berlaku terhadap)
- (1) *Portable voice recorders* (Perekam suara yang mudah dipindah-pindahkan);
 - (2) *Hearing aids* (Alat bantu pendengaran);
 - (3) *Heart pacemakers* (Alat pacu jantung);
 - (4) *Electric shavers* (Pencukur listrik); or (atau)
 - (5) *Any other portable electronic device that certificate holder has determined will not cause interference with the navigation or communication system of the aircraft on which it is to be used* (Peralatan elektronik yang mudah dipindah-pindahkan lainnya, yang telah ditetapkan oleh pemegang sertifikat perusahaan penerbangan tidak akan menyebabkan gangguan terhadap sistem navigasi dan komunikasi pesawat yang digunakan).
- c. *The determination required by paragraph (b)(5) of this section shall be made by that certificate holder operating the particular device to be used* (Penetapan yang dipersyaratkan oleh butir (b)(5) pasal ini harus dibuat oleh pemegang sertifikat perusahaan penerbangan yang mengoperasikan peralatan tertentu yang digunakan).

4. Mengubah Sub Bagian K - 121.313

No person may conduct any operation unless the following equipment is installed in the aeroplane (Tidak seorangpun yang boleh beroperasi kecuali jika peralatan berikut dipasang pada pesawat terbang):

- (a) *If protective fuses are installed on an aeroplane, the number of spare fuses approved for that aeroplane and appropriately described in the certificate holder's manual* (Jika pesawat udara dilengkapi dengan sikring pengaman, jumlah sikring yang disetujui untuk pesawat terbang tersebut dan diuraikan dengan jelas pada buku panduan pemegang sertifikat perusahaan penerbangan tersebut).
- (b) *A windshield wiper or equivalent for each pilot station* (Sebuah penyeka kaca kaca depan untuk masing-masing pilot).

- (c) *A power supply and distribution system that meets the requirements 25.1309, 25.1331, 25.1351(a) and (b)(1) through (4), 25.1353, 25.1355, and 25.1431(b) of CASR or that is able to produce and distribute the load for the required instruments and equipment, with use of an external power supply if any one power source or component of the power distribution system fails. The use of common elements in the system may be approved if the DGCA finds that they are designed to be reasonably protected against malfunctioning. Engine-driven sources of energy, when used, must be on separate engines* (Pemasok tenaga dan sistem distribusi yang memenuhi ketentuan-ketentuan PKPS Pasal 25.1309, 25.1331, 25.1351(a) and (b)(1) sampai dengan (4), 25.1353, 25.1355, dan 25.1431(b), atau yang mampu menghasilkan tenaga dan mendistribusikan beban untuk instrumen dan peralatan yang diperlukan dengan menggunakan sumber tenaga dari luar, jika salah satu sumber tenaga atau komponen sistem distribusi tenaga rusak. Penggunaan komponen-komponen secara bersama-sama dapat disetujui jika Direktorat Jenderal Perhubungan Udara mendapatkan bahwa rancangan komponen-komponen tersebut cukup dapat melindungi dari kerusakan. Apabila dipergunakan, sumber-sumber energi yang dibangkitkan oleh mesin, maka harus diambil dari mesin terpisah).
- (d) *A means for indicating the adequacy of the power being supplied to required flight instruments* (Sarana untuk mengindikasikan kecukupan dari tenaga yang dipasok ke instrument-instrument penerbangan).
- (e) *Two independent static pressure systems, vented to the outside atmospheric pressure so that they will be least affected by air flow variation or moisture or other foreign matter, and installed so as to be airtight except for the vent. When a means is provided for transferring an instrument from its primary operating system to an alternate system, the means must include a positive positioning control and must be marked to indicate clearly which system is being used* (Dua sistem tekanan statis yang terpisah, yang dilengkapi saluran ventilasi ke tekanan atmosfer luar sehingga sistem-sistem tersebut hanya akan sedikit terpengaruh oleh variasi aliran atau butiran-butiran air atau benda-benda lain, dan dipasang secara kedap udara, kecuali ventilasi tersebut. Jika dipasang alat untuk mengoper suatu instrument dari sistem utama ke sistem alternatif, maka alat tersebut harus memiliki sebuah pengontrol penempatan positif dan harus memiliki tanda yang dapat menunjukkan secara jelas sistem mana yang sedang dipergunakan).

- (f) *On or before 30 November 2009, a door between the passenger and pilot compartments (i.e., flightdeck door), with a locking means to prevent passengers from opening it without the pilot's permission, except that nontransport category aeroplanes certificated after December 31, 1964, are not required to comply with this paragraph. For aeroplanes equipped with a crew rest area having separate entries from the flightdeck and the passenger compartment, a door with such a locking means must be provided between the crew rest area and the passenger compartment .* (Pada atau sebelum tanggal 30 November 2009, sebuah pintu antara ruang penumpang dan ruang pilot (yaitu pintu ruang kemudi), yang dilengkapi alat pengunci untuk mencegah penumpang membukanya tanpa ijin dari pilot, kecuali pesawat terbang kategori nontransport yang disertifikasi setelah 31 Desember 1964 tidak diwajibkan memenuhi butir ini. Untuk pesawat terbang yang dilengkapi ruang istirahat awak pesawat yang memiliki jalan masuk terpisah dari ruang kemudi dan ruang penumpang, maka antara ruangan tersebut dengan ruang penumpang harus dilengkapi pintu yang memiliki alat pengunci).
- (g) *A key for each door that separates a passenger compartment from another compartment that has emergency exit provisions. Except for flightdeck doors, a key must be readily available for each crewmember. No person other than a person who is assigned to perform duty on the flightdeck may have a key to the flightdeck door* (Sebuah kunci untuk masing-masing pintu yang memisahkan ruangan penumpang dengan ruangan lainnya yang dilengkapi jalan keluar darurat. Kecuali untuk pintu-pintu ruang kemudi, sebuah kunci harus tersedia untuk segera dapat digunakan oleh masing-masing awak pesawat. Tidak seorangpun boleh memiliki kunci pintu ruang kemudi, selain yang bertugas di ruang kemudi).
- (h) *A placard on each door that is the means of access to a required passenger emergency exit, to indicate that it must be open during takeoff and landing* (Sebuah plakat pada setiap pintu yang menjadi jalan menuju pintu darurat, yang mengindikasikan harus dibuka pada saat tinggal landas dan mendarat) .
- (i) *A means for the crew, in an emergency to unlock each door that leads to a compartment that is normally accessible to passengers and that can be locked by passengers* (Alat untuk digunakan awak pesawat pada saat darurat untuk membuka kunci setiap pintu yang mengarah ke ruangan yang biasanya dapat dimasuki penumpang dan dapat dikunci oleh penumpang).

(j) *For aeroplanes required by paragraph (f) of this section to have a door between the passenger and pilot or crew rest compartments, and for transport category, all-cargo aeroplanes that have a door installed between the pilot compartment and any other occupied compartment* (Untuk pesawat terbang yang sesuai persyaratan butir (f) harus memiliki pintu antara ruangan penumpang dan ruangan tempat istirahat awak pesawat, dan untuk pesawat terbang kategori transport pengangkut kargo seluruhnya, yang memiliki pintu antara ruang kemudi dan setiap ruang lainnya yang berpenghuni);

(1) *For aeroplanes required by paragraph (f) of this section to have a door between the passenger and pilot or crew rest compartments* (Untuk pesawat terbang yang sesuai butir (f) harus memiliki pintu antara ruang penumpang dan ruang istirahat awak pesawat),

(i) *Each such door must meet the following requirements* (Masing-masing pintu harus memenuhi persyaratan sebagai berikut)

- *Resist forcible intrusion by unauthorized persons and be capable of withstanding impacts of 300 Joules (221.3 foot-pounds) at the critical locations on the door, as well as a 250 pound (1113 Newtons) constant tensile load on the knob or handle; and* (Dapat menahan masuk secara paksa orang-orang yang tidak berwenang, dan dapat menahan benturan berkekuatan 300 Joules (221.3 foot-pounds) di lokasi-lokasi kritis pada pintu, dan beban tarik konstan sebesar 250 pound (1113 Newtons) pada kenop atau pegangan; dan)
- *Resist penetration by small arms fire and fragmentation devices to a level equivalent to level IIIa of the US National Institute of Justice Standard (NIJ) 0101.04 or its equivalent; and* (Dapat menahan penetrasi senjata api kecil dan peralatan fragmentasi ke tingkat yang setara dengan Tingkat IIIa dari National Institute of Justice Standard (NIJ) 0101.04 Amerika Serikat atau padanannya; dan)

(ii) *Each operator must establish methods to enable a flight attendant to enter the pilot compartment in the event that a flight crew member becomes incapacitated. Any associated signal or confirmation system must be operable by each*

flight crew member from that flight crew member's duty station (Masing-masing perusahaan penerbangan harus membuat metoda yang memungkinkan awak kabin memasuki ruang kemudi apabila pilot tidak dapat menjalankan tugasnya. Setiap tanda yang berkaitan atau sistem konfirmasi harus dapat diperasikan para pilot dari tempatnya bertugas).

- (2) *For transport category, all-cargo aeroplanes that had a door installed between the pilot compartment and any other occupied compartment on or after January 15, 2002, each such door must meet the requirements of (j)(1)(i) above; or the operator must implement a security program approved by the DGCA for the operation of all aeroplanes in that operator's fleet.* (Untuk pesawat terbang kategori transport pengangkut kargo seluruhnya, yang memiliki pintu antara ruang kemudi dan ruang lainnya yang berpenghuni, pada atau sebelum tanggal 30 November 2009, masing-masing pintu tersebut harus memenuhi persyaratan-persyaratan butir (j)(1)(i) di atas; atau perusahaan penerbangan tersebut harus menerapkan sistem keamanan yang disetujui Direktorat Jenderal Perhubungan Udara untuk pengoperasian seluruh pesawat terbang armada perusahaan penerbangan tersebut)

- (k) *Except for all-cargo operations as defined the CASR, for all passenger-carrying aeroplanes that require a lockable flight deck door in accordance with paragraph (f) of this section, a means to monitor from the flight deck side of the door the area outside the flight deck door to identify persons requesting entry and to detect suspicious behavior and potential threats* (Kecuali untuk pesawat terbang kategori transport pengangkut kargo seluruhnya, semua pesawat terbang kategori transport pengangkut penumpang seluruhnya yang dipersyaratkan memiliki pintu ruang kemudi yang dapat dikunci sesuai butir (f), sebuah sarana untuk memonitor area bagian luar pintu ruang kemudi dari pintu di sisi ruang kemudi, untuk mengidentifikasi orang yang meminta ijin masuk ruang kemudi dan mendeteksi perilaku mencurigakan dan potensi ancaman).

5. Mengubah Sub Bagian K - 121.339

- (a) *Except as noted in Paragraph (5), below, no person may operate an aeroplane in extended overwater operations without having on the aeroplane the following equipment* (Kecuali jika memenuhi catatan butir (5), tidak seorangpun

boleh mengoperasikan pesawat terbang pada klasifikasi pengoperasian jarak jauh diatas air tanpa memiliki peralatan berikut yang terpasang pada pesawat terbang):

- (1) *A life preserver equipped with an approved survivor locator light, for each occupant of the aeroplane.* (Sebuah alat penyelamat dilengkapi sebuah lampu penanda lokasi, untuk setiap penumpang pesawat tersebut)
- (2) *Enough life rafts (each equipped with an approved survivor locator light) of a rated capacity and buoyancy to accommodate the occupants of the aeroplane. Unless excess rafts of enough capacity are provided, the buoyancy and seating capacity of the rafts must accommodate all occupants of the aeroplane in the event of a loss of one raft of the largest rated capacity.* (Perahu penyelamat dengan jumlah yang cukup (masing-masing dilengkapi dengan lampu penanda lokasi) yang memiliki tingkat kapasitas dan kemampuan mengapung untuk menampung penumpang pesawat terbang tersebut. Kecuali jika dilengkapi dengan perahu penyelamat yang kapasitasnya cukup, tingkat kemampuan mengapung dan kapasitas tempat duduk dari perahu penyelamat harus mencukupi semua penumpang jika pesawat tersebut kehilangan perahu penyelamat dengan kapasitas terbesar).
- (3) *At least one pyrotechnic signalling device for each life raft.* (Setidaknya sebuah alat pengirim tanda pyrotechnic untuk setiap perahu penyelamat)
- (4) *Two approved survival type emergency locator transmitters, one of which shall be automatic. Batteries used in the transmitters must be replaced (or recharged, if the battery is rechargeable) when the transmitters has been in use for more than 1 cumulative hour, or when 50 percent of their useful life (or for rechargeable batteries, 50 percent of their useful life of charge) has expired, as established by the transmitter manufacturer under its approval. The new expiration date for replacing (or recharging) the battery must be legibly marked on the outside of the transmitters. The battery useful life (or useful life of charge) requirements of this Paragraph do not apply to batteries (such as water activated batteries) that are essentially unaffected during probable storage intervals.* (Dua unit pemancar penanda lokasi darurat jenis penyelamat yang disetujui, satu diantaranya harus otomatis. Baterai yang dipergunakan untuk pemancar harus diganti (atau diisi kembali, jika baterai

dapat diisi ulang) jika pemancar telah digunakan satu jam secara kumulatif, atau jika 50 persen dari waktu dapat digunakan (atau untuk baterai yang dapat diisi kembali, 50 persen dari waktu pengisian kembali yang dapat digunakan) telah habis, sebagaimana ditetapkan oleh pabrik pembuatnya. Tanggal kadaluwarsa baru untuk mengganti (atau mengisi kembali) baterai harus dapat dibaca secara jelas dibagian luar pemancar. Persyaratan-persyaratan masa hidup berguna (atau masa hidup berguna dari pengisian) baterai pada butir ini tidak yang berlaku terhadap baterai (seperti baterai yang diaktifkan oleh air) yang pada dasarnya tidak terpengaruh selama interval penyimpanan yang mungkin harus dilalui).

- (5) *By amending the operations specifications of the certificate holder, the Director General may authorize less than all the items of equipment listed above be carried for all overwater operations. Or, after application by the certificate holder, the Director General may issue a Letter of Deviation Authority granting relief from carrying specific items of equipment listed above for a specific extended overwater operations.* (Dengan merubah spesifikasi pengoperasian dari pemegang sertifikat, Direktur Jenderal dapat memberikan ijin membawa peralatan kurang dari yang ditetapkan diatas untuk seluruh pengoperasian diatas air. Atau, setelah permohonan diajukan oleh pemegang sertifikat, Direktur Jenderal dapat menerbitkan Surat Ijin Penyimpangan, membebaskan dari kewajiban membawa peralatan tertentu yang terdaftar diatas untuk pengoperasian jarak jauh diatas air)
- (b) *The required life rafts, life preservers, and survival type emergency locator transmitter must be easily accessible in the event of a ditching without appreciable time for preparatory procedures. This equipment must be installed in conspicuously marked, approved locations.* (Perahu penyelamat, alat penyelamat, dan pemancar penanda lokasi darurat jenis penyelamat yang dipersyaratkan, harus mudah dicapai pada saat mendarat di air dan harus tidak memerlukan waktu lama untuk prosedur persiapan. Peralatan ini harus dipasang ditempat yang ditandai dengan nyata dan disetujui)
- (c) *A survival kit, appropriately equipped for the route to be flown, must be attached to each required life raft.* (Seperangkat alat penyelamat, yang dilengkapi sesuai

dengan rute yang diterbangi, harus dipasang pada setiap perahu penyelamat yang dipersyaratkan).

6. Menambah 121.344 pada Sub Bagian K, sehingga berbunyi sebagai berikut:

121.344. *Digital flight data recorders for transport category aeroplanes.* (Perekam data penerbangan digital untuk pesawat terbang kategori transpor).

- (a) *Except as provided in paragraph (l) of this section, no person may operate under this Part a turbine-engine-powered transport category aeroplane unless it is equipped with one or more approved flight recorders that use a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. The operational parameters required to be recorded by digital flight data recorders required by this section are as follows: The phrase "when an information source is installed" following a parameter indicates that recording of that parameter is not intended to require a change in installed equipment:* (Kecuali sesuai dengan yang diatur pada butir (l), tidak seorangpun boleh mengoperasikan sesuai ketentuan CASR Bagian 121, pesawat terbang kategori transpor bermesin turbin kecuali jika dilengkapi dengan satu atau lebih perekam penerbangan yang disetujui yang menggunakan metoda perekaman dan penyimpanan data digital dan metoda yang siap untuk mengeluarkan data tersebut dari tempat penyimpanan. Parameter operational yang wajib direkam oleh perekam data penerbangan digital yang diwajibkan pasal ini adalah sebagai berikut : Frasa "jika sebuah sumber informasi dipasang" ditulis setelah sebuah parameter, menunjukkan bahwa perekaman parameter tersebut tidak dimaksudkan untuk mengharuskan perubahan pada peralatan yang dipasang):

- (1) *Time (Waktu);*
- (2) *Pressure altitude (Tekanan ketinggian);*
- (3) *Indicated airspeed (Kecepatan udara terbaca pada alat penunjuk kecepatan udara);*
- (4) *Heading-primary flight crew reference (if selectable, record discrete, true or magnetic);* (Arah-referensi awak terbang utama (jika dapat dipilih, catat terpisah, sesungguhnya atau magnetis))
- (5) *Normal acceleration (Vertical) (Percepatan normal (vertikal))*

- (6) *Pitch attitude* (Posisi *pitch*);
- (7) *Roll attitude* (Posisi terhadap poros guling);
- (8) *Manual radio transmitter keying, or CVR/DFDR synchronization reference*; (Masukan manual pemancar radio, atau referensi sinkronisasi CVR/DFDR)
- (9) *Thrust/power of each engine-primary flight crew reference* (Tenaga pendorong/tenaga masing-masing mesin-referensi awak terbang utama;)
- (10) *Autopilot engagement status*; (Status ketersambungan autopilot);
- (11) *Longitudinal acceleration*; (Percepatan longitudinal);
- (12) *Pitch control input* (Masukan pengendali *pitch*);
- (13) *Lateral control input* (Masukan pengendali lateral)
- (14) *Rudder pedal input* (Masukan pedal rudder)
- (15) *Primary pitch control surface position* (Posisi bidang pengendali utama *pitch*)
- (16) *Primary lateral control surface position* (Posisi bidang pengendali utama *lateral*);
- (17) *Primary yaw control surface position* (Posisi bidang pengendali utama *yaw*);
- (18) *Lateral acceleration*;(Percepatan lateral)
- (19) *Pitch trim surface position or parameters of paragraph (a)(82) of this section if currently recorded*;(Posisi atau parameter bidang *pitch trim* butir a (82) jika saat ini direkam)(Sisi belakang *flap* atau penyetelan pengontrol *flap* di ruang kemudi (kecuali jika mempergunakan parameter-parameter butir (a)(85));
- (20) *Trailing edge flap or cockpit flap control selection (except when parameters of paragraph (a)(85) of this section apply)*;(Sisi belakang *flap* atau penyetelan pengontrol *flap* di ruang kemudi (kecuali jika mempergunakan parameter-parameter butir (a)(85));
- (21) *Leading edge flap or cockpit flap control selection (except when parameters of paragraph (a)(86) of this section apply)*; (Sisi depan *flap* atau penyetelan pengontrol *flap* di ruang kemudi (kecuali jika mempergunakan parameter-parameter butir (a)(86));
- (22) *Each thrust reverser position (or equivalent for propeller aeroplane)* (Masing-masing posisi *thrust*

reverser (atau yang sepadan untuk pesawat terbang baling-baling);

- (23) *Ground spoiler position or speed brake selection (except when parameters of paragraph (a)(87) of this section apply)* (Posisi *ground spoiler* atau penyetelan *speed brake* (kecuali jika mempergunakan parameter-parameter butir (a)(87)));
- (24) *Outside or total air temperature* (Suhu udara luar atau total);
- (25) *Automatic Flight Control System (AFCS) modes and engagement status, including autothrottle* (Mode dan status ketersambungan *Automatic Flight Control System (AFCS)*, termasuk *autothrottle*);
- (26) *Radio altitude (when an information source is installed)* (Radio pengukur ketinggian (jika sebuah sumber informasi dipasang));
- (27) *Localizer deviation, MLS Azimuth*; (Penyimpangan *localizer*, *MLS Azimuth*);
- (28) *Glideslope deviation, MLS Elevation*; (Penyimpangan *glideslope*, *MLS Elevation*);
- (29) *Marker beacon passage*; (Lorong *Marker beacon*);
- (30) *Master warning*; (*Master warning*);
- (31) *Air/ground sensor (primary aeroplane system reference nose or main gear)*; (Sensor udara/darat (referensi sistem utama pesawat terbang, roda pendarat hidung atau utama));
- (32) *Angle of attack (when information source is installed)* (*Angle of attack* (jika sebuah sumber informasi dipasang));
- (33) *Hydraulic pressure low (each system)*; (Tekanan hidraulik rendah (masing-masing sistem));
- (34) *Ground speed (when an information source is installed)*; (Kecepatan darat (jika sebuah sumber informasi dipasang));
- (35) *Ground proximity warning system*; (*Ground proximity warning system*);
- (36) *Landing gear position or landing gear cockpit control selection*; (Posisi roda pendarat atau penyetelan pengontrol roda pendarat di ruang kemudi);
- (37) *Drift angle (when an information source is installed)*; (Sudut *drift* (jika sebuah sumber informasi dipasang));

- (38) *Wind speed and direction (when an information source is installed)*; (Kecepatan dan arah angin (jika sebuah sumber informasi dipasang);
- (39) *Latitude and longitude (when an information source is installed)* (Bujur dan lintang (jika sebuah sumber informasi dipasang);
- (40) *Stick shaker/pusher (when an information source is installed)* (Stick shaker/pusher (jika sebuah sumber informasi dipasang);
- (41) *Windshear (when an information source is installed)* (Windshear (jika sebuah sumber informasi dipasang);
- (42) *Throttle/power lever position*; (Posisi throttle/power lever)
- (43) *Additional engine parameters (as designated in Appendix M of this Part)*; (Parameter tambahan untuk mesin (seperti ditetapkan pada Appendix M pada CASR Bagian ini);
- (44) *Traffic alert and collision avoidance system* (Traffic alert and collision avoidance system);
- (45) *DME 1 and 2 distances* (Jarak-jarak DME 1 dan 2);
- (46) *Nav 1 and 2 selected frequency* (Penyetelan Frekuensi dari Nav 1 dan 2);
- (47) *Selected barometric setting (when an information source is installed)* (Penyetelan barometrik yang dipilih (jika sebuah sumber informasi dipasang);
- (48) *Selected altitude (when an information source is installed)* (Penyetelan ketinggian (jika sebuah sumber informasi dipasang);
- (49) *Selected speed (when an information source is installed)* (Penyetelan kecepatan (jika sebuah sumber informasi dipasang);
- (50) *Selected mach (when an information source is installed)* (Penyetelan kecepatan (jika sebuah sumber informasi dipasang);
- (51) *Selected vertical speed (when an information source is installed)* (Penyetelan kecepatan (jika sebuah sumber informasi dipasang);
- (52) *Selected heading (when an information source is installed)* (Penyetelan arah (jika sebuah sumber informasi dipasang);

- (53) *Selected flight path (when an information source is installed)*(Penyetelan jalur penerbangan (jika sebuah sumber informasi dipasang);
- (54) *Selected decision height (when an information source is installed)*(Penyetelan pengambilan keputusan ketinggian (jika sebuah sumber informasi dipasang);
- (55) *EFIS display format*(Format penampilan EFIS);
- (56) *Multi-function/engine/alerts display format*(Format penampilan multifungsi/mesin/peringatan);
- (57) *Thrust command (when an information source is installed)*(Thrust command (jika sebuah sumber informasi dipasang);
- (58) *Thrust target (when an information source is installed)*(Thrust target (jika sebuah sumber informasi dipasang);
- (59) *Fuel quantity in CG trim tank (when an information source is installed)*(Isi bahan bakar didalam tangki CG trim (jika sebuah sumber informasi dipasang);
- (60) *Primary Navigation System Reference*(Referensi sistem navigasi utama);
- (61) *Icing (when an information source is installed)*(Pembentukan es (jika sebuah sumber informasi dipasang);
- (62) *Engine warning each engine vibration (when an information source is installed)* (Peringatan vibrasi masing-masing mesin (jika sebuah sumber informasi dipasang);
- (63) *Engine warning each engine over temp. (when an information source is installed)* (Peringatan melampaui batas temperatur masing-masing mesin (jika sebuah sumber informasi dipasang);
- (64) *Engine warning each engine oil pressure low (when an information source is installed)* (Peringatan tekanan oli rendah masing-masing mesin (jika sebuah sumber informasi dipasang);
- (65) *Engine warning each engine over speed (when an information source is installed)* (Peringatan melampaui batas kecepatan putaran masing-masing mesin (jika sebuah sumber informasi dipasang);

- (66) *Yaw trim surface position* (Posisi bidang yaw trim);
- (67) *Roll trim surface position* (Posisi bidang roll trim);
- (68) *Brake pressure (selected system)* (Tekanan rem (sistem yang dipilih));
- (69) *Brake pedal application (left and right)* (Penggunaan pedal rem (kiri dan kanan));
- (70) *Yaw or sideslip angle (when an information source is installed)* (Sudut yaw atau sideslip (jika sebuah sumber informasi dipasang));
- (71) *Engine bleed valve position (when an information source is installed)* (Posisi klep engine bleed (jika sebuah sumber informasi dipasang));
- (72) *De-icing or anti-icing system selection (when an information source is installed)* (Pemilihan sistem de-icing atau anti-icing (jika sebuah sumber informasi dipasang));
- (73) *Computed center of gravity (when an information source is installed)* (Pusat gravitasi berdasarkan perhitungan (jika sebuah sumber informasi dipasang));
- (74) *AC electrical bus status* (Status AC electrical bus);
- (75) *DC electrical bus status* (Status DC electrical bus);
- (76) *APU bleed valve position (when an information source is installed)* (Posisi klep APU bleed (jika sebuah sumber informasi dipasang));
- (77) *Hydraulic pressure (each system)* (Tekanan hidraulik (masing-masing sistem));
- (78) *Loss of cabin pressure* (Kehilangan tekanan kabin);
- (79) *Computer failure* (Kerusakan komputer);
- (80) *Heads-up display (when an information source is installed)* (Penampilan Head-up (jika sebuah sumber informasi dipasang));
- (81) *Para-visual display (when an information source is installed)* (Penampilan para-visual (jika sebuah sumber informasi dipasang));
- (82) *Cockpit trim control input position—pitch* (Posisi masukan cockpit trim control-pitch)
- (83) *Cockpit trim control input position—roll* (Posisi masukan cockpit trim control-roll);

- (84) *Cockpit trim control input position—yaw* (Posisi masukan cockpit trim control-yaw);
 - (85) *Trailing edge flap and cockpit flap control position* (Sisi belakang flap dan penyetelan pengontrol flap di ruang kemudi);
 - (86) *Leading edge flap and cockpit flap control position* (Sisi depan flap atau penyetelan pengontrol flap di ruang kemudi);
 - (87) *Ground spoiler position and speed brake selection; and* (Posisi ground spoiler dan penyetelan speed brake)
 - (88) *All cockpit flight control input forces (control wheel, control column, rudder pedal)* (Kekuatan-kekuatan masukan semua flight control di ruang kemudi (control wheel, control column, rudder pedal).
- (b) *For all turbine-engine powered transport category aeroplanes manufactured on or before October 11, 1991.* (Untuk semua pesawat kategori transport bermesin turbin yang dibuat pada atau sebelum tanggal 11 Oktober 1991).
- (1) *For aeroplanes not equipped as of July 16, 1996, with a flight data acquisition unit (FDAU), the parameters listed in paragraphs (a)(1) through (a)(18) of this section must be recorded within the ranges and accuracies specified in Appendix B of this Part, and—* (Untuk pesawat terbang yang pada tanggal 16 Juli 1996 tidak dilengkapi dengan satu unit flight data acquisition (FDAU), parameter-parameter yang tertera pada butir (a)(1) sampai (a)(18) harus direkam di dalam rentang dan ketepatan seperti yang ditetapkan pada Appendix B CASR Bagian ini, dan —)
 - (i) *For aeroplanes with more than two engines, the parameter described in paragraph (a)(18) is not required unless sufficient capacity is available on the existing recorder to record that parameter* (Untuk pesawat terbang bermesin lebih dari dua mesin; parameter yang didaftar pada butir (a)(18) tidak diharuskan untuk direkam kecuali jika tersedia cukup kapasitas pada perekam terpasang untuk mencatat parameter tersebut);
 - (ii) *Parameters listed in paragraphs (a)(12) through (a)(17) each may be recorded from a single source.* (Parameter-parameter yang didaftar pada butir (a)(12) sampai (a)(17) masing-masing boleh direkam dari sumber tunggal).

- (2) *For aeroplanes that were equipped as of July 16, 1996, with a flight data acquisition unit (FDAU), the parameters listed in paragraphs (a)(1) through (a)(22) of this section must be recorded within the ranges, accuracies, and recording intervals specified in Appendix M of this Part. Parameters listed in paragraphs (a)(12) through (a)(17) each may be recorded from a single source. (Untuk pesawat terbang yang pada tanggal 16 Juli 1996 telah dilengkapi dengan unit flight data acquisition (FDAU), parameter-parameter yang terdaftar pada butir (a)(1) sampai (a)(22) harus direkam di dalam rentang, ketepatan dan interval perekaman seperti yang ditetapkan pada Appendix M CASR Bagian ini, parameter-parameter yang terdaftar pada butir (a)(12) sampai (a)(17) masing-masing boleh direkam dari sumber tunggal).*
- (3) *The approved flight recorder required by this section must be installed at the earliest time practicable, but no later than the next heavy maintenance check after August 31, 2009 and no later than August 31, 2010. A heavy maintenance check is considered to be any time an aeroplane is scheduled to be out of service for 4 or more days and is scheduled to include access to major structural components. (Perekam data penerbangan yang disetujui yang dipersyaratkan pasal ini harus dipasang sesegera mungkin, tapi tidak boleh lebih lambat dari pemeriksaan perawatan berat berikutnya setelah tanggal 31 Agustus 2009 dan tidak boleh melewati tanggal 31 Agustus 2010. Dianggap pemeriksaan perawatan berat adalah apabila pesawat terbang dijadwalkan untuk tidak dipergunakan memberikan pelayanan selama 4 (empat) hari atau lebih dan dijadwalkan mencakup untuk mencapai komponen-komponen struktural utama).*
- (c) *For all turbine-engine powered transport category aeroplanes manufactured on or before October 11, 1991— (Untuk semua pesawat kategori transport bermesin turbin yang dibuat pada atau sebelum tanggal 11 Oktober 1991 —)*
- (1) *That were equipped as of July 16, 1996, with one or more digital data bus(es) and an ARINC 717 digital flight data acquisition unit (DFDAU) or equivalent, the parameters specified in paragraphs (a)(1) through (a)(22) of this section must be recorded within the ranges, accuracies, resolutions, and sampling intervals specified in Appendix M of this Part by August 31, 2009. Parameters listed in paragraphs*

(a)(12) through (a)(14) each may be recorded from a single source (Yang pada tanggal 16 Juli 1996 telah dilengkapi dengan satu atau lebih data bus digital dan satu unit ARINC 717 flight data acquisition (FDAU), atau yang sepadan, parameter-parameter yang didaftar pada butir (a)(1) sampai (a)(22) harus direkam di dalam rentang, ketepatan, resolusi dan sampling interval seperti yang ditetapkan pada Appendix M CASR Bagian ini menjelang tanggal 31 Agustus 2009, Parameter-parameter yang didaftar pada butir (a)(12) sampai (a)(14) masing-masing boleh direkam dari sumber tunggal).

- (2) *Commensurate with the capacity of the recording system (DFDAU or equivalent and the DFDR), all additional parameters for which information sources are installed and which are connected to the recording system must be recorded within the ranges, accuracies, resolutions, and sampling intervals specified in Appendix M of this Part by August 31, 2009.* (Sesuai dengan kapasitas sistem perekaman (DFDAU atau yang sepadan dan DFDR), semua parameter tambahan yang sumber-sumber informasinya terpasang dan tersambung ke sistem perekaman harus direkam di dalam rentang, ketepatan, resolusi dan sampling interval seperti yang ditetapkan pada Appendix M CASR Bagian ini menjelang tanggal 31 Agustus 2009).
- (3) *That were subject to 121.343(e) of this Part, all conditions of 121.343(e) must continue to be met until compliance with paragraph (c)(1) of this section is accomplished.* (Yang harus memenuhi butir 121.343(e) CASR Bagian ini, seumua persyaratan butir 121.343(e) harus tetap dipenuhi sampai pemenuhan butir (c)(1) selesai dilaksanakan).

(d) *For all turbine-engine-powered transport category aeroplanes that were manufactured after October 11, 1991—* (Untuk semua pesawat kategori transport bermesin turbin yang dibuat pada atau setelah tanggal 11 Oktober 1991 –)

- (1) *The parameters listed in paragraph (a)(1) through (a)(34) of this section must be recorded within the ranges, accuracies, resolutions, and recording intervals specified in Appendix M of this Part by August 31, 2009. Parameters listed in paragraphs (a)(12) through (a)(14) each may be recorded from a single source.* (Parameter-parameter yang didaftar

pada butir (a)(1) sampai (a)(34) harus direkam di dalam rentang, ketepatan, resolusi dan interval perekaman seperti yang ditetapkan pada *Appendix M CASR* Bagian ini menjelang tanggal 31 Agustus 2009. Parameter-parameter yang terdaftar pada butir (a)(12) sampai (a)(14) masing-masing boleh direkam dari sumber tunggal).

- (2) *Commensurate with the capacity of the recording system, all additional parameters for which information sources are installed and which are connected to the recording system must be recorded within the ranges, accuracies, resolutions, and sampling intervals specified in Appendix M of this Part by August 31, 2009.* (Sesuai dengan kapasitas sistem perekaman, semua parameter tambahan yang sumber-sumber informasinya terpasang dan tersambung ke sistem, harus direkam di dalam rentang, ketepatan, resolusi dan sampling interval seperti yang ditetapkan pada *Appendix M CASR* Bagian ini menjelang tanggal 31 Agustus 2009).
- (e) *For all turbine-engine-powered transport category aeroplanes that are manufactured after August 18, 2000—* (Untuk semua pesawat kategori transport bermesin turbin yang dibuat pada atau setelah tanggal 18 Agustus 2000 —)
- (1) *The parameters listed in paragraph (a)(1) through (a)(57) of this section must be recorded within the ranges, accuracies, resolutions, and recording intervals specified in Appendix M of this Part.* (Parameter-parameter yang terdaftar pada butir (a)(1) sampai (a)(57) harus direkam di dalam rentang, ketepatan, resolusi dan interval perekaman seperti yang ditetapkan pada *Appendix M CASR* Bagian ini).
 - (2) *Commensurate with the capacity of the recording system, all additional parameters for which information sources are installed and which are connected to the recording system, must be recorded within the ranges, accuracies, resolutions, and sampling intervals specified in Appendix M of this Part.* (Sesuai dengan kapasitas sistem perekaman, semua parameter tambahan yang sumber-sumber informasinya terpasang dan tersambung ke sistem perekaman, harus direkam di dalam rentang, ketepatan, resolusi dan sampling interval seperti yang ditetapkan pada *Appendix M CASR* Bagian ini).

- (f) *For all turbine-engine-powered transport category aeroplanes that are manufactured after August 19, 2002 the parameters listed in paragraph (a)(1) through (a)(88) of this section must be recorded within the ranges, accuracies, resolutions, and recording intervals specified in Appendix M of this Part. (Untuk semua pesawat kategori transport bermesin turbin yang dibuat pada atau setelah tanggal 19 Agustus 2002, parameter-parameter yang terdaftar pada butir (a)(1) sampai (a)(88) harus direkam di dalam rentang, ketepatan, resolusi dan interval perekaman seperti yang ditetapkan pada Appendix M CASR Bagian ini).*
- (g) *Whenever a flight data recorder required by this section is installed, it must be operated continuously from the instant the aeroplane begins its takeoff roll until it has completed its landing roll. (Ketika perekam data penerbangan yang dipersyaratkan pasal ini dipasang, maka perekam tersebut harus dioperasikan secara berkelanjutan sejak saat pesawat terbang mulai bergerak untuk tinggal landas sampai selesai pendaratan).*
- (h) *Except as provided in paragraph (i) of this section, and except for recorded data erased as authorized in this paragraph, each certificate holder shall keep the recorded data prescribed by this section, as appropriate, until the aeroplane has been operated for at least 25 hours of the operating time specified in 121.359(a) of this Part. A total of 1 hour of recorded data may be erased for the purpose of testing the flight recorder or the flight recorder system. Any erasure made in accordance with this paragraph must be of the oldest recorded data accumulated at the time of testing. Except as provided in paragraph (i) of this section, no record need be kept more than 60 days. (Kecuali sesuai dengan yang diatur pada butir (j), dan kecuali untuk data yang dihapus sesuai dengan izin yang diberikan pada butir ini, masing-masing pemegang sertifikat harus menyimpan rekaman data yang diuraikan pada pasal ini yang berkaitan, sampai dengan pesawat terbang telah dioperasikan untuk sekurang-kurangnya 25 jam dari waktu pengoperasian yang ditetapkan pada CASR Bagian 121 butir 121.359(a). Sebanyak 1 jam secara keseluruhan dari data yang direkam boleh dipergunakan untuk keperluan pengetesan perekam penerbangan atau sistem perekam penerbangan. Setiap penghapusan sesuai dengan butir ini harus dilakukan terhadap rekaman data bagian tertua yang terakumulasi pada saat pengetesan. Kecuali sesuai dengan yang diatur pada butir (j), setiap rekaman tidak perlu disimpan lebih dari 60 hari).*

- (i) *In the event of an accident or occurrence that requires immediate notification of the National Transportation Safety Committee (NTSC) under CASR Part 830 that results in termination of the flight, the certificate holder shall remove the recorder from the aeroplane and keep the recorder data prescribed by this section, as appropriate, for at least 60 days or for a longer period upon the request of the Committee (NTSC) or the DGCA (Jika terjadi kecelakaan atau kejadian yang memerlukan pemberitahuan kepada Komisi Nasional Keselamatan Transportasi (KNKT) sesuai CASR Bagian 830 yang menyebabkan harus diakhirinya penerbangan, pemegang sertifikat harus melepas perekam dari pesawat terbang dan menyimpan data perekaman yang ditetapkan pasal ini, yang berkaitan, untuk sedikitnya 60 hari atau periode lebih lama lagi sesuai permintaan KNKT atau Direktorat Jenderal Perhubungan Udara).*
- (j) *Each flight data recorder system required by this section must be installed in accordance with the requirements 25.1459 (a), (b), (d), and (e) of the CASR. A correlation must be established between the values recorded by the flight data recorder and the corresponding values being measured. The correlation must contain a sufficient number of correlation points to accurately establish the conversion from the recorded values to engineering units or discrete state over the full operating range of the parameter. Except for aeroplanes having separate altitude and airspeed sensors that are an integral part of the flight data recorder system, a single correlation may be established for any group of aeroplanes— (Masing-masing sistem perekam data penerbangan yang dipersyaratkan pasal ini harus dipasang sesuai dengan persyaratan-persyaratan CASR Bagian 25 butir 25.1459(a), (b), (d), dan (e). Korelasi harus dibuat antara nilai yang direkam perekam data penerbangan dengan nilai berhubungan yang sedang diukur. Korelasi harus berisi cukup jumlah titik-titik korelasi untuk dapat secara akurat melakukan konversi dari nilai yang direkam menjadi unit rekayasa atau bentuk yang dapat dibedakan, dari keseluruhan rentang pengoperasian dari parameter. Kecuali untuk pesawat terbang yang memiliki sensor-sensor ketinggian dan kecepatan udara terpisah yang menjadi bagian integral sistem perekam data penerbangan, korelasi tunggal boleh dibuat untuk suatu kelompok pesawat terbang —)*

- (1) *That are of the same type (Bertipe sama);*
- (2) *On which the flight recorder system and its installation are the same; and (Pada pesawat tersebut memiliki*

sistem perekam data penerbangan dan instalasi yang sama; dan)

- (3) *On which there is no difference in the type design with respect to the installation of those sensors associated with the flight data recorder system. Documentation sufficient to convert recorded data into the engineering units and discrete values specified in the applicable appendix must be maintained by the certificate holder.* (Pada pesawat terbang tersebut tidak ada perbedaan desain tipe pada instalasi sensor-sensor untuk sistem perekam data penerbangan. Dokumentasi yang memadai untuk mengkonversi data yang direkam menjadi unit rekayasa atau bentuk yang dapat dibedakan seperti yang ditetapkan pada appendix yang berlaku, harus dipelihara oleh pemegang sertifikat)
- (k) *Each flight data recorder required by this section must have an approved device to assist in locating that recorder under water.* (Masing-masing perekam data penerbangan yang dipersyaratkan pasal ini harus memiliki peralatan yang disetujui untuk membantu menemukan rekorder tersebut dibawah air).
- (l) *The following aeroplanes that were manufactured before August 18, 1997 need not comply with this section, but must continue to comply with applicable paragraphs 121.343 of the CASR, as appropriate:* (Pesawat-pesawat terbang berikut ini, yang dibuat sebelum tanggal 18 Agustus 1997 tidak perlu memenuhi persyaratan-persyaratan pasal ini, tetapi harus tetap terus memenuhi butir yang berlaku CASR Bagian 121 pasal 121.343):
- (1) [Reserved] ([Dicadangkan])
- (2) *British Aerospace 1-11, General Dynamics Convair 580, General Dynamics Convair 600, General Dynamics Convair 640, deHavilland Aircraft Company Ltd. DHC-7, Fairchild Industries FH 227, Fokker F-27 (except Mark 50), F-28 Mark 1000 and Mark 4000, Gulfstream Aerospace G-159, Jetstream 4100 Series, Lockheed Aircraft Corporation Electra 10-A, Lockheed Aircraft Corporation Electra 10-B, Lockheed Aircraft Corporation Electra 10-E, Lockheed Aircraft Corporation Electra L-188, Lockheed Martin Model 382 (L-100) Hercules, Maryland Air Industries, Inc. F27, Mitsubishi Heavy Industries, Ltd. YS-11, Short Bros. Limited SD3-30, Short Bros. Limited SD3-60. (British Aerospace 1-11,*

General Dynamics Convair 580, General Dynamics Convair 600, General Dynamics Convair 640, deHavilland Aircraft Company Ltd. DHC-7, Fairchild Industries FH 227, Fokker F-27 (except Mark 50), F-28 Mark 1000 and Mark 4000, Gulfstream Aerospace G-159, Jetstream 4100 Series, Lockheed Aircraft Corporation Electra 10-A, Lockheed Aircraft Corporation Electra 10-B, Lockheed Aircraft Corporation Electra 10-E, Lockheed Aircraft Corporation Electra L-188, Lockheed Martin Model 382 (L-100) Hercules, Maryland Air Industries, Inc. F27, Mitsubishi Heavy Industries, Ltd. YS-11, Short Bros. Limited SD3-30, Short Bros. Limited SD3-60).

7. Menambah 121.344a pada Sub Bagian K, sehingga berbunyi sebagai berikut:

121.344a Digital flight data recorders for 10-19 seat aeroplanes. (Perekam data penerbangan digital untuk pesawat terbang berkursi penumpang 10-19).

- (a) *Except as provided in paragraph (f) of this section, no person may operate under this Part a turbine-engine-powered aeroplane having a passenger seating configuration, excluding any required crewmember seat, of 10 to 19 seats, that was brought onto the Republic of Indonesia register, or was registered outside the Republic of Indonesia and added to the operator's Republic of Indonesia Operations Specifications after August 31, 2009, unless it is equipped with one or more approved flight recorders that use a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. The aeroplane must comply with either the requirements in this section or the applicable paragraphs in 135.152 of the CASR, and in addition –* (Kecuali sesuai dengan yang diatur pada butir (f), tidak seorangpun boleh mengoperasikan sesuai ketentuan CASR Bagian 121, pesawat terbang bermesin turbin dengan konfigurasi kursi penumpang, di luar kursi yang diperlukan awak pesawat, 10 sampai 19 kursi, yang terdaftar di dalam daftar pesawat sipil Republik Indonesia, atau yang terdaftar diluar Republik Indonesia dan ditambahkan kedalam Spesifikasi Operasi perusahaan penerbangan Republik Indonesia setelah tanggal 31 Agustus 2009, kecuali jika dilengkapi dengan satu atau lebih perekam penerbangan yang disetujui yang menggunakan metoda perekaman dan penyimpanan data digital dan metoda yang siap untuk mengeluarkan data

tersebut dari tempat penyimpanan. Pesawat terbang tersebut harus memenuhi persyaratan-persyaratan pasal ini atau butir-butir yang berlaku pasal 135.152 PKPS Bagian 135, dan selain itu –)

(1) *The parameters listed in 121.344(a)(1) through 121.344(a)(18) of this Part must be recorded with the ranges, accuracies, and resolutions specified in Appendix B of Part 135 of the CASR, except that—* (Parameter-parameter yang terdaftar di dalam butir-butir 121.344(a)(1) sampai 121.344(a)(18) dari PKPS Bagian 121 harus direkam dalam rentang, ketepatan dan resolusi seperti yang diuraikan dalam Appendix B PKPS Bagian 135, kecuali -)

- (i) *Either the parameter listed in 121.344 (a)(12) or (a)(15) of this Part must be recorded; either the parameters listed in 121.344(a)(13) or (a)(16) of this Part must be recorded; and either the parameter listed in 121.344(a)(14) or (a)(17) of this Part must be recorded.* (Salah satu parameter yang terdaftar di dalam butir-butir 121.344 (a)(12) or (a)(15) PKPS Bagian ini harus direkam; salah satu parameter yang terdaftar di dalam 121.344(a)(13) or (a)(16) PKPS Bagian ini harus direkam; dan salah satu parameter yang terdaftar di dalam 121.344(a)(14) or (a)(17) PKPS Bagian ini harus direkam).
- (ii) *For aeroplanes with more than two engines, the parameter described in 121.344(a)(18) of this Part must also be recorded if sufficient capacity is available on the existing recorder to record that parameter;* (Untuk pesawat terbang dengan lebih dari dua mesin, parameter yang diuraikan di dalam butir-butir 121.344 (a)(18) PKPS Bagian ini harus direkam jika tersedia kapasitas yang cukup pada perekam terpasang untuk merekam parameter tersebut);
- (iii) *Parameters listed in 121.344(a)(12) through 121.344(a)(17) of this Part each may be recorded from a single source;* (Parameter-parameter yang terdaftar di dalam butir-butir 121.344(a)(12) sampai 121.344(a)(17) dari PKPS Bagian 121 ini boleh direkam dari sumber tunggal);

- (iv) *Any parameter for which no value is contained in Appendix B of Part 135 of the CASR must be recorded within the ranges, accuracies, and resolutions specified in Appendix M of this Part.* (Untuk parameter yang nilainya tidak tercantum di dalam Appendix B PKPS Bagian 135 harus direkam di dalam rentang, ketepatan, dan resolusi seperti yang ditetapkan pada Appendix M CASR Bagian ini).
- (2) *Commensurate with the capacity of the recording system (DFDAU or equivalent and the DFDR), the parameters listed in 121.344(a)(19) through 121.344(a)(22) of this Part also must be recorded within the ranges, accuracies, resolutions, and recording intervals specified in Appendix B of Part 135 of the CASR.* (Sesuai dengan kapasitas sistem perekaman, (DFDAU atau yang sepadan dan DFDR), semua parameter yang terdaftar di dalam butir-butir 121.344(a)(19) sampai 121.344(a)(22) dari PKPS Bagian ini harus direkam di dalam rentang, ketepatan, resolusi dan interval perekaman seperti yang ditetapkan pada Appendix B CASR Bagian 135).
- (3) *The approved flight recorder required by this section must be installed as soon as practicable, but no later than the next heavy maintenance check or equivalent after August 31, 2009. A heavy maintenance check is considered to be any time an aeroplane is scheduled to be out of service for 4 more days and is scheduled to include access to major structural components.* (Perekam data penerbangan yang disetujui yang dipersyaratkan pasal ini harus dipasang sesegera mungkin, tapi tidak boleh lebih lambat dari pemeriksaan perawatan berat berikutnya setelah tanggal 31 Agustus 2009. Dianggap pemeriksaan perawatan berat adalah apabila pesawat terbang dijadwalkan untuk tidak dipergunakan memberikan pelayanan selama empat hari atau lebih dan dijadwalkan mencakup untuk mencapai komponen-komponen struktural utama)
- (b) *For a turbine-engine-powered aeroplanes having a passenger seating configuration, excluding any required crewmember seat, of 10 to 19 seats, that are manufactured after August 18, 2000.* (Untuk pesawat terbang bermesin turbin dengan konfigurasi kursi penumpang, diluar kursi yang diperlukan awak pesawat, 10 sampai 19 kursi, yang dibuat setelah 18 Agustus 2000).

- (1) *The parameters listed in 121.344(a)(1) through 121.344(a)(57) of this Part, must be recorded within the ranges, accuracies, resolutions, and recording intervals specified in Appendix M of this Part (Parameter-parameter yang terdaftar di dalam butir-butir 121.344(a)(1) sampai 121.344(a)(57) dari PKPS Bagian 121 ini harus direkam dalam rentang, ketepatan, resolusi dan interval perekaman seperti yang diuraikan dalam Appendix M PKPS Bagian ini).*
- (2) *Commensurate with the capacity of the recording system, all additional parameters listed in 121.344(a) of this Part for which information sources are installed and which are connected to the recording system, must be recorded within the ranges, accuracies, resolutions, and sampling intervals specified in Appendix M of this Part by August 31, 2009. (Sesuai dengan kapasitas sistem perekaman, semua parameter tambahan yang terdaftar di dalam butir 121.344(a) PKPS Bagian ini dimana sumber-sumber informasinya terpasang dan tersambung ke sistem perekaman, harus direkam di dalam rentang, ketepatan, resolusi dan sampling interval seperti yang ditetapkan pada Appendix M CASR Bagian ini menjelang 31 Agustus 2009).*
- (c) *For all turbine-engine-powered aeroplanes having a passenger seating configuration, excluding any required crewmember seats, of 10 to 19 seats, that are manufactured after August 19, 2002, the parameters listed in 121.344(a)(1) through (a)(88) of this Part must be recorded within the ranges, accuracies, resolutions, and recording intervals specified in Appendix M of this Part. (Untuk semua pesawat terbang bermesin turbin dengan konfigurasi kursi penumpang, diluar kursi yang diperlukan awak pesawat, 10 sampai 19 kursi, yang dibuat setelah 19 Agustus 2002, parameter-parameter yang terdaftar di dalam butir-butir 121.344(a)(1) sampai 121.344(a)(88) dari PKPS Bagian 121 ini harus direkam dalam rentang, ketepatan, resolusi dan interval perekaman seperti yang diuraikan dalam Appendix M PKPS Bagian ini).*
- (d) *Each flight data recorder system required by this section must be installed in accordance with the requirements of 23.1459 (a), (b), (d), and (e) of the CASR. A correlation must be established between the values recorded by the flight data recorder and the corresponding values being measured. The correlation must contain a sufficient number of correlation points to accurately establish the conversion*

from the recorded values to engineering units or discrete state over the full operating range of the parameter. A single correlation may be established for any group of aeroplanes— (Masing-masing sistem perekam data penerbangan yang dipersyaratkan pasal ini harus dipasang sesuai dengan persyaratan-persyaratan CASR Bagian 23 butir 23.1459(a), (b), (d), dan (e). Korelasi harus dibuat antara nilai yang direkam perekam data penerbangan dengan nilai berhubungan yang sedang diukur. Korelasi harus berisi cukup jumlah titik-titik korelasi untuk dapat secara akurat melakukan konversi dari nilai yang direkam menjadi unit rekayasa atau bentuk yang dapat dibedakan, dari keseluruhan rentang pengoperasian dari parameter. Korelasi tunggal boleh dibuat untuk suatu kelompok pesawat terbang —)

- (1) *That are of the same type* (Bertipe sama);
 - (2) *On which the flight recorder system and its installation are the same; and* (Pada pesawat tersebut memiliki sistem perekam data penerbangan dan instalasi yang sama; dan)
 - (3) *On which there is no difference in the type design with respect to the installation of those sensors associated with the flight data recorder system. Correlation documentation must be maintained by the certificate holder.* (Pada pesawat terbang tersebut tidak ada perbedaan desain tipe pada instalasi sensor-sensor untuk sistem perekam data penerbangan. Dokumentasi korelasi harus dipelihara oleh pemegang sertifikat)
- (e) *All aeroplanes subject to this section are also subject to the requirements and exceptions stated in 121.344(g) through 121.344(k) of this Part.* (Semua pesawat terbang yang terkena persyaratan pasal ini juga terkena persyaratan dan pengecualian seperti yang diuraikan pada butir-butir 121.344(g) sampai 121.344(k) CASR Bagian ini).
- (f) *For aeroplanes that were manufactured before August 18, 1997, the following aeroplane types need not comply with this section, but must continue to comply with applicable paragraphs of 135.152 of the CASR, as appropriate: Beech Aircraft-99 Series, Beech Aircraft 1300, Beech Aircraft 1900C, Construcciones Aeronauticas, S.A. (CASA) C-212, deHavilland DHC-6, Dornier 228, HS-748, Embraer EMB 110, Jetstream 3101, Jetstream 3201, Fairchild Aircraft SA-226, Fairchild Metro SA-227.* (Untuk pesawat-pesawat terbang yang dibuat sebelum tanggal 18 Agustus 1997,

pesawat terbang tipe-tipe berikut tidak perlu memenuhi persyaratan-persyaratan pasal ini, tetapi harus tetap terus memenuhi butir yang berlaku CASR Bagian 135 pasal 121.152 : *Beech Aircraft-99 Series, Beech Aircraft 1300, Beech Aircraft 1900C, Construcciones Aeronauticas, S.A. (CASA) C-212, deHavilland DHC-6, Dornier 228, HS-748, Embraer EMB 110, Jetstream 3101, Jetstream 3201, Fairchild Aircraft SA-226, Fairchild Metro SA-227*)

8. Menambah 121.352 pada Sub Bagian K, sehingga berbunyi sebagai berikut

121.352 *Low-altitude windshear system equipment requirements. (Persyaratan peralatan Low-altitude windshear system)*

- (a) *Aeroplanes manufactured after January 2, 1991. (Pesawat terbang yang dibuat setelah tanggal 2 Januari 1991)*

After November 30, 2009, no person may operate a turbine-powered aeroplane manufactured after January 2, 1991, unless it is equipped with either an approved airborne windshear warning and flight guidance system, an approved airborne detection and avoidance system, or an approved combination of these systems. (Setelah tanggal 30 November 2009, tidak seorangpun boleh mengoperasikan pesawat terbang bermesin turbin yang dibuat setelah tanggal 2 Januari 1991, kecuali jika pesawat terbang tersebut dilengkapi dengan airborne windshear warning and flight guidance system yang disetujui, atau airborne detection and avoidance system yang disetujui, atau kombinasi dari sistem-sistem tersebut).

- (b) *Aeroplanes manufactured before January 3, 1991. (Pesawat terbang yang dibuat sebelum tanggal 3 Januari 1991).*

After November 30, 2009, no person may operate a turbine-powered aeroplane manufactured before January 3, 1991 unless it meets one of the following requirements as applicable. (Setelah tanggal 30 November 2009, tidak seorangpun boleh mengoperasikan pesawat terbang bermesin turbin yang dibuat sebelum tanggal 3 Januari 1991, kecuali jika pesawat terbang tersebut memenuhi persyaratan yang berlaku sebagai berikut).

- (1) *The makes/models/series listed below must be equipped with either an approved airborne windshear warning and flight guidance system, an approved airborne detection and avoidance system, or an*

approved combination of these systems: (Pesawat terbang buatan/model/seri seperti daftar dibawah ini harus dilengkapi dengan airborne windshear warning and flight guidance system yang disetujui, atau airborne detection and avoidance system yang disetujui, atau kombinasi dari sistem-sistem tersebut):

(i) A-300-600;

(ii) A-310—all series;

(iii) A-320—all series;

(iv) B-737-300, 400, and 500 series;

(v) B-747-400;

(vi) B-757—all series;

(vii) B-767—all series;

(viii) F-100—all series;

(ix) MD-11—all series; and

(x) MD-80 series equipped with an EFIS and Honeywell-970 digital flight guidance computer.

- (2) All other turbine-powered aeroplanes not listed above must be equipped with as a minimum requirement, an approved airborne windshear warning system. These aeroplanes may be equipped with an approved airborne windshear detection and avoidance system, or an approved combination of these systems. (Semua pesawat terbang bermesin turbin lainnya yang tidak terdaftar di atas harus dilengkapi sebagai persyaratan minimum dengan airborne windshear warning and flight guidance system yang disetujui. Pesawat-pesawat terbang ini boleh dilengkapi dengan airborne windshear detection and avoidance system yang disetujui, atau kombinasi dari sistem-sistem tersebut yang disetujui).*

(c) [Reserved] ([Dicadangkan])

(d) Definitions. (Definisi)

For the purposes of this section the following definitions apply— (Untuk keperluan pasal ini berlaku definisi-definisi sebagai berikut —)

- (1) Turbine-powered aeroplane includes, e.g., turbofan-, turbojet-, propfan-, and ultra-high bypass fan-powered*

aeroplanes. The definition specifically excludes turbopropeller-powered aeroplanes. (Pesawat terbang bermesin turbin meliputi pesawat terbang bermesin turbofan, turbojet, propfan, dan ultra-high bypass fan. Definisi ini secara spesifik mengecualikan pesawat terbang bermesin turbopropeller).

- (2) *An aeroplane is considered manufactured on the date the inspection acceptance records reflect that the aeroplane is complete and meets the DGCA Approved Type Design data. (Pesawat terbang dianggap dibuat pada tanggal dokumen-dokumen inspeksi penerimaan mencerminkan bahwa pesawat terbang tersebut selesai dan memenuhi data desain tipe yang disetujui Direktorat Jenderal Perhubungan Udara).*

9. Mengubah Sub Bagian K - 121.353

Unless the aeroplane has the following equipment, no person may conduct a flag or supplemental operation over an uninhabited area or any other area that (in its operations specifications) the Director General specifies required equipment for search and rescue in case of an emergency: (Kecuali jika pesawat terbang memiliki peralatan sebagai berikut, tidak seorangpun boleh melakukan penerbangan internasional atau tidak berjadwal di atas daerah tidak berpenghuni atau daerah lainnya yang (di dalam Spesifikasi Operasi-nya) Direktur Jenderal menetapkan peralatan yang diperlukan untuk pencarian dan penyelamatan jika terjadi keadaan darurat)

- (a) *Suitable pyrotechnic signaling devices (Peralatan-peralatan alat pengirim tanda pyrotechnic yang sesuai).*
- (b) *Two approved survival type emergency locator transmitters, one of which shall be automatic. Batteries used in the transmitters must be replaced (or recharged, if the battery is rechargeable) when the transmitter has been in use for more than 1 cumulative hour, or when 50 percent of their useful life (or for rechargeable batteries, 50 percent of their useful life of charge) has expired, as established by the transmitter manufacturer under its approval. The new expiration date for replacing (or recharging) the battery must be legibly marked on the outside of the transmitter. The battery useful life (or useful life of charge) requirements of this paragraph do not apply to batteries (such as water activated batteries) that are essentially unaffected during probable storage intervals (Dua unit pemancar penanda lokasi darurat jenis penyelamat yang disetujui, satu diantaranya harus otomatis. Baterai yang dipergunakan*

untuk pemancar harus diganti (atau diisi kembali, jika baterai dapat diisi ulang) jika pemancar telah digunakan satu jam secara kumulatif, atau jika 50 persen dari waktu dapat digunakan (atau untuk baterai yang dapat diisi kembali, 50 persen dari waktu pengisian kembali yang dapat digunakan) telah habis, sebagaimana ditetapkan oleh pabrik pembuatnya. Tanggal kadaluwarsa baru untuk mengganti (atau mengisi kembali) baterai harus dapat dibaca secara jelas di bagian luar pemancar. Persyaratan-persyaratan masa hidup berguna (atau masa hidup berguna dari pengisian) baterai pada butir ini tidak yang berlaku terhadap baterai (seperti baterai yang diaktifkan oleh air) yang pada dasarnya tidak terpengaruh selama interval penyimpanan yang mungkin harus dilalui).

- (c) *Enough survival kits, appropriately equipped for the route to be flown for the number of occupants of the aeroplane* (Peralatan penyelamat yang cukup untuk jumlah penumpang pesawat, dilengkapi dengan benar sesuai dengan rute yang diterbangi).

10. Menambah 121.354 pada Sub Bagian K, sehingga berbunyi sebagai berikut:

121.354 Terrain Awareness and Warning System.

- (a) *No person may operate a turbine-powered aeroplane after November 30, 2009, unless that aeroplane is equipped with an approved Terrain Awareness and Warning System (TAWS) that meets the requirements for Class A equipment in the FAA Technical Standard Order (TSO)–C151 or its equivalent. The aeroplane must also include an approved terrain situational awareness display.* (Tidak seorangpun boleh mengoperasikan pesawat terbang bermesin turbin setelah tanggal 30 November 2009, kecuali jika pesawat terbang tersebut dilengkapi dengan *Terrain Awareness and Warning System (TAWS)* yang disetujui yang memenuhi persyaratan-persyaratan peralatan *Class A* di dalam *FAA Technical Standard Order (TSO)–C151* atau padanannya. Pesawat terbang tersebut harus pula dilengkapi dengan satu unit tampilan *terrain situational awareness* yang disetujui).
- (b) *[Reserved]* ([Dicadangkan])
- (c) *Aeroplane Flight Manual* (Buku panduan terbang pesawat terbang).

The aeroplane Flight Manual shall contain appropriate procedures for (Buku panduan terbang pesawat terbang harus berisi prosedur yang sesuai untuk) —

- (1) *The use of the Terrain Awareness and Warning System (TAWS); and (Penggunaan Terrain Awareness and Warning System (TAWS); dan)*
- (2) *Proper flight crew reaction in response to the Terrain Awareness and Warning System (TAWS) audio and visual warnings (Reaksi yang benar dari awak ruang kemudi dalam merespon peringatan-peringatan audio dan visual dari Terrain Awareness and Warning System (TAWS))*

11. Menambah 121.356 pada Sub Bagian K, sehingga berbunyi sebagai berikut:

121.356 Collision avoidance system (Sistem Penghindar Tabrakan)

After November 30, 2009, any aeroplane operated under this Part must be equipped and operated according to the following table (Setelah tanggal 30 November 2009, setiap pesawat terbang yang dioperasikan sesuai persyaratan-persyaratan Bagian ini harus dilengkapi dan dioperasikan sesuai dengan table berikut):

Collision Avoidance Systems (Sistem Penghindar Tabrakan)

<i>Aeroplane operated</i>	<i>The aeroplane must be equipped with—</i>
<i>(a) Turbine-powered aeroplane of more than 33,000 pounds maximum certificated takeoff weight(a) (Pesawat terbang bermesin turbin yang disertifikasi dengan berat tinggal landas maksimum lebih dari 33,000 pon)</i>	<i>(1) An appropriate class of Mode S transponder that meets FAA Technical Standard Order (TSO) C-112, or a later version, or its equivalent, and one of the following approved units:</i> <i>(i) TCAS II that meets FAA TSO C-119b (version 7.0), or a later version, or its equivalent.</i> <i>(ii) TCAS II that meets FAA TSO C-119a (version 6.04A Enhanced) , or its equivalent , that was installed in that aeroplane before May 1, 2003. If that TCAS II version 6.04A Enhanced no longer can be repaired to FAA TSO C-119a standards, it must be replaced with a TCAS II that meets FAA TSO C-119b (version 7.0), or a later version, or its equivalent.</i>

	(iii) A collision avoidance system equivalent to FAA TSO C-119b (version 7.0), or a later version, , or its equivalent, capable of coordinating with units that meet TSO C-119a (version 6.04A Enhanced), or a later version, or its equivalent.
(b) Passenger or combination cargo/passenger (combi) aeroplane that has a passenger seat configuration of 10-30 seats (Pesawat terbang penumpang atau kombinasi kargo / penumpang (combi) dengan konfigurasi kursi penumpang 10-30 kursi)	(1) TCAS I that meets FAA TSO C-118, or a later version, or its equivalent, or (2) A collision avoidance system equivalent to has an FAA TSO C-118, or a later version, or its equivalent or (3) A collision avoidance system and Mode S transponder that meet paragraph (a)(1) of this section.
(c) Piston-powered aeroplane of more than 33,000 pounds maximum certificated takeoff weight (Pesawat terbang bermesin piston yang disertifikasi dengan berat tinggal landas maksimum lebih dari 33,000 pon)	(1) TCAS I that meets FAA TSO C-118, or a later version, or its equivalent or (2) A collision avoidance system equivalent to maximum FAA TSO C-118, or a later version, or its equivalent or (3) A collision avoidance system and Mode S transponder that meet paragraph (a)(1) of this section.

12. Mengubah Sub Bagian K - 121.360

- (a) After November 30, 2009, no person may operate a turbine-powered aeroplane unless it is equipped with a Ground Proximity Warning System (GPWS) that meets the performance and environmental standards of FAA TSO-C92 , or its equivalent. This requirement does not apply to: (Setelah tanggal 30 November 2009, tidak seorangpun boleh mengoperasikan pesawat terbang bermesin turbin kecuali jika pesawat terbang tersebut dilengkapi dengan Ground Proximity Warning System (GPWS) yang memenuhi standar-standar kinerja dan lingkungan dari FAA TSO-C92, atau padanannya. Persyaratan-persyaratan ini tidak berlaku terhadap):
- (1) An aeroplane that was type certificated before 1 January 1980; (Pesawat terbang yang memiliki sertifikat tipe sebelum 1 Januari 1980);

- (2) *An aeroplane operated under Visual Flight Rules when take off and landing in the mountainous area.* (Pesawat terbang yang dioperasikan berdasarkan *Visual Flight Rules* jika tinggal landas dan mendarat di daerah bergunung-gunung).
- (b) *For the Ground Proximity Warning System (GPWS) required by this section, the aeroplane Flight Manual shall contain—* (Untuk *Ground Proximity Warning System (GPWS)* yang dipersyaratkan pasal ini, Buku Panduan Terbang pesawat terbang harus berisi –)
- (1) *Appropriate procedures for—* (Prosedur yang sesuai untuk) –
- (i) *The use of the equipment;* (Penggunaan peralatan tersebut);
 - (ii) *Proper flight crew action with respect to the equipment* (Tindakan yang benar dari awak ruang kemudi atas peralatan tersebut);
 - (iii) *Deactivation for planned abnormal and emergency conditions* (Deaktivasi untuk kondisi abnormal dan kondisi darurat yang direncanakan);
 - (iv) *Inhibition of Mode 4 warnings based on flaps being in other than the landing configuration if the system incorporates a Mode 4 flap warning inhibition control; and* (Mencegah aktifnya peringatan Mode 4 berdasarkan posisi *flaps* selain pada konfigurasi mendarat jika sistem tersebut dilengkapi Mode 4 flap warning inhibition control; dan)
- (2) *An outline of all input sources that must be operating.* (Garis besar dari semua sumber-sumber masukan yang harus beroperasi)
- (c) *No person may deactivate a Ground Proximity Warning System (GPWS) required by this section except in accordance with the procedures contained in the Aeroplane Flight Manual.* (Tidak seorangpun yang boleh mendeaktivasi *Ground Proximity Warning System (GPWS)* yang dipersyaratkan pada pasal ini kecuali sesuai dengan prosedur pada Buku Panduan Terbang pesawat terbang).

- (d) *Whenever a Ground Proximity Warning System (GPWS) required by this section is deactivated, an entry shall be made in the aeroplane maintenance record that includes the date and time of deactivation.* (Kapan saja Ground Proximity Warning System (GPWS) yang dipersyaratkan pada pasal ini dideaktivasi, maka hal tersebut harus dicatat di dalam buku catatan perawatan dan harus termasuk tanggal dan waktu deaktivasi).
- (e) *No person may operate a turbine-powered aeroplane unless it is equipped with a Ground Proximity Warning/Glide Slope Deviation Alerting System that meets the performance and environmental standards contained in FAA TSO-C92a or TSO-C92b, or incorporates TSO-approved Ground Proximity Warning-Glide Slope Deviation Alerting Equipment or its equivalent* (Tidak seorangpun boleh mengoperasikan pesawat terbang bermesin turbin kecuali jika pesawat terbang tersebut dilengkapi dengan Ground Proximity Warning System (GPWS)/Glide Slope Deviation Alerting System yang memenuhi standar-standar kinerja dan lingkungan yang tercantum di dalam FAA TSO-C92a atau TSO-C92b, atau dilengkapi dengan Ground Proximity Warning-Glide Slope Deviation Alerting Equipment yang disetujui berdasarkan TSO atau padanannya).
- (f) *No person may operate a turbojet powered aeroplane equipped with a system required by paragraph (e) of this section, that incorporates equipment that meets the performance and environmental standards of FAA TSO-C92b, or is approved under that TSO or its equivalent, using other than Warning Envelopes 1 or 3 for Warning Modes 1 and 4.* (Tidak seorangpun boleh mengoperasikan pesawat terbang bermesin turbin yang dilengkapi dengan sistem sesuai butir (e) pasal ini, yang dilengkapi peralatan yang memenuhi standar-standar kinerja dan lingkungan yang tercantum di dalam FAA TSO-C92b, atau yang disetujui berdasarkan TSO atau padanannya, menggunakan selain Warning Envelopes 1 atau 3 untuk Warning Modes 1 dan 4).
- (g) *[Reserved]* ([Dicadangkan])

13. Menambah Lampiran B, dengan tambahan sebagai berikut:

meters	Range	Accuracy sensor input to DFDR readout	Sampling interval (per second)	Resolution⁴ read out
Time (GMT or Frame Counter) (range 0 to 4095, sampled 1 per frame)	24 Hrs	±0.125% Per Hour	0.25 (1 per 4 seconds)	1 sec.
Altitude	-1,000 ft to max certificated altitude of aircraft	±100 to ±700 ft (See Table 1, TSO-C51a)	1	5' to 35' ¹
Airspeed	50 KIAS to V_{SO} , and V_{SO} to $1.2V_D$	±5%, ±3%	1	1 kt.
Heading	360°	±2°	1	0.5°
Normal Acceleration (Vertical)	-3g to +6g	±1% of max range excluding datum error of ±5%	8	0.01g.
Pitch Attitude	±75°	±2°	1	0.5°
Roll Attitude	±180°	±2°	1	0.5°
Radio Transmitter Keying	On-Off (Discrete)	±2°	±2%	
Thrust/Power on Each Engine	Full Range Forward	±2°	1 (per engine)	0.2% ²
Trailing Edge Flap or Cockpit Control Selection	Full Range or Each Discrete Position	±3° or as Pilot's Indicator	0.5	0.5% ²
Leading Edge Flap or Cockpit Control Selection	Full Range or Each Discrete Position	±3° or as Pilot's Indicator	0.5	0.5% ²
Thrust Reverser Position	Stowed, In Transit, and Reverse (Discrete)		1 (per 4 seconds per engine)	
Ground Spoiler Position/Speed Brake Selection	Full Range or Each Discrete Position	±2% Unless Higher Accuracy Uniquely Required	1	0.2% ² .
Marker Beacon Passage	Discrete		1	
Autopilot Engagement	Discrete		1	
Longitudinal Acceleration	±1g	±1.5% max range excluding datum error of ±5%	4	0.01g.

Pilot Input and/or Surface Position—Primary Controls (Pitch, Roll, Yaw) ³	Full Range	±2° Unless Higher Accuracy Uniquely Required	1	0.2% ² .
Lateral Acceleration	±1g	±1.5% max range excluding datum error of ±5%	4	0.01g.
Pitch Trim Position	Full Range	±3% Unless Higher Accuracy Uniquely Required	1	0.3% ² .
Glideslope Deviation	±400 Microamps	±3%	1	0.3% ² .
Localizer Deviation	±400 Microamps	±3%	1	0.3% ² .
AFCS Mode and Engagement Status	Discrete		1	
Radio Altitude	-20 ft to 2,500 ft	±2 Ft or ±3% Whichever is Greater Below 500 Ft and ±5% Above 500 Ft	1	1 ft + 5% ² above 500'.
Master Warning	Discrete		1	
Main Gear Squat Switch Status	Discrete		1	
Angle of Attack (if recorded directly).	As installed	As installed	2	0.3% ²
Outside Air Temperature or Total Air Temperature.	-50° C to +90° C	±2° c	0.5	0.3° c
Hydraulics, Each System Low Pressure	Discrete		0.5	or 0.5% ²
Groundspeed.	As installed	Most Accurate Systems Installed (IMS Equipped Aircraft Only)	1	0.2% ²
If additional recording capacity is available, recording of the following parameters is recommended. The parameters are listed in order of significance:				
Drift Angle	When available, As installed	As installed	4	
Wind Speed and Direction	When available, As installed	As installed	4	
Latitude and Longitude	When available, As installed	As installed	4	
Brake pressure/Brake pedal position	As installed	As installed	1	

Additional engine parameters:				
EPR	As installed	As installed	1 (per engine).	
N1	As installed	As installed	1 (per engine).	
N2	As installed	As installed	1 (per engine).	
EGT	As installed	As installed	1 (per engine).	
Throttle Lever Position	As installed	As installed	1 (per engine).	
Fuel Flow	As installed	As installed	1 (per engine).	
TCAS:				
TA	As installed	As installed	1	
RA	As installed	As installed	1	
Sensitivity level (as selected by crew)	As installed	As installed	2	
GPWS (ground proximity warning system)	Discrete		1	
Landing gear or gear selector position	Discrete		0.25 (1 per 4 seconds)	
DME 1 and 2 Distance	0-200 NM;	As installed	0.25	1 mi.
Nav 1 and 2 Frequency Selection	Full range	As installed	0.25	

¹When altitude rate is recorded. Altitude rate must have sufficient resolution and sampling to permit the derivation of altitude to 5 feet.

²Per cent of full range.

³For aeroplanes that can demonstrate the capability of deriving either the control input on control movement (one from the other) for all modes of operation and flight regimes, the "or" applies. For aeroplanes with non-mechanical control systems (fly-by-wire) the "and" applies. In aeroplanes with split surfaces, suitable combination of inputs is acceptable in lieu of recording each surface separately.

⁴This column applies to aircraft manufactured after October 11, 1991.

14. Menambah Lampiran G, dengan tambahan sebagai berikut:

APPENDIX G. SAFETY MANAGEMENT SYSTEM

1. Statutory basis

This regulation is promulgated under the statutory authority in the Civil Aviation Act No. 15 /1992 concerning Aviation, Government Regulation 3/2001 concerning Aviation Safety and Security, and Ministry of Transportation Decree 37/2006 concerning Organization and Work Procedures of Ministry of Transportation.

2. Scope and applicability

a. Scope

- (1) This regulation describes the requirements for a service provider Safety Management System (SMS) operating in accordance with ICAO Annex 6 — Operation of Aircraft, ICAO Annex 11 — Air Traffic Services, and ICAO Annex 14 — Aerodromes.*
- (2) Within the context of this regulation the term “service provider” must be understood to designate any organization providing aviation related services. The term encompasses aircraft operators, maintenance organizations, air traffic service providers and aerodrome operators, as applicable.*
- (3) This regulation addresses aviation safety related processes and activities rather than occupational safety, environmental protection, or customer service quality.*
- (4) The service provider is responsible for the safety of services or products contracted to or purchased from other organizations.*
- (5) This regulation establishes the minimum acceptable requirements; the service provider can establish more stringent requirements.*

b. Applicability and acceptance

Effective 1 January 2009, a service provider shall have in place a Safety Management System (SMS) that is acceptable to the Directorate General of Civil Aviation (DGCA) that, as a minimum:

- (1) identifies safety hazards and assesses and mitigates risks;*
- (2) ensures that remedial action necessary to maintain an acceptable level of safety is implemented;*
- (3) provides for continuous monitoring and regular assessment of the safety level achieved; and*

- (4) aims to make continuous improvement to the overall level of safety.

3. References

ICAO Annex 6 — Operation of Aircraft, ICAO Annex 11 — Air Traffic Services, and ICAO Annex 14 — Aerodromes, and the ICAO Safety Management Manual (Doc 9859).

4. Definitions

For the purpose of this Decree, the term :

Acceptable level of safety means minimum safety performance that service providers should achieve while conducting their core business functions, expressed by a number of safety performance indicators and safety performance targets.

Accountability means obligation or willingness to account for one's actions.

Accountable Executive means a single, identifiable person which might be a Chief Executive Officer, a Chairperson Board of Directors, a partner or a proprietor who has full responsibility for the organization's SMS and have full authority for human resources issues, major financial issues, direct responsibility for the conduct of the organization's affairs, final authority over operations under certificate, and final responsibility for all safety issues.

Consequence means potential outcome(s) of the hazard.

Hazard means condition, object or activity with the potential of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.

Mitigation means measures to address the potential hazard or to reduce the risk probability or severity.

Predictive means a method that captures system performance as it happens in real-time normal operations.

Proactive means the adoption of an approach which emphasizes prevention through the identification of hazards and the introduction of risk mitigation measures before the risk-bearing event occurs and adversely affects safety performance.

Probability means the likelihood that an unsafe event or condition might occur.

Reactive means the adoption of an approach where safety measurement is as a responds to the events that already happened, such as incidents and accidents.

Risk means the assessment, expressed in terms of predicted probability and severity, of the consequence(s) of a hazard taking as reference the worst foreseeable situation.

Risk management means the identification, analysis and elimination, and/or mitigation to an acceptable level of risks that threaten the capabilities of an organization.

Safety means the state in which the risk of harm to persons or property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management.

Safety assessment means a systematic analysis of a proposed changes to equipment or procedures to identify and mitigate weaknesses before change is implemented.

Safety assurance means what the service providers do with regard to safety performance monitoring and measurement.

Safety audit means what the Civil Aviation Authority performs with regard to its safety programme, and the service providers perform with regard to the SMS.

Safety Management System (SMS) means a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.

Safety manager means a person who is responsible for providing guidance and direction for the operation of the organization's safety management system.

Safety oversight means the activities of Civil Aviation Authority as part of its safety programme, performed with regard to the service providers SMS, in order to confirm the organization's continuing fulfilment of its corporate safety policy, objectives, goals and standards.

Safety performance indicator means established objectives of a services provider SMS, linked to major components of a services provider SMS, and expressed in numerical terms.

Safety performance monitoring means the activities of a service provider as part of its SMS, in order to confirm the organization's continuing fulfilment of its corporate safety policy, objectives, goals and standards.

Safety performance target means medium or long-term objectives of a services provider SMS, determined weighing what is desirable and what is realistic for an individual services provider, and expressed in numerical terms.

Safety policy means a statement reflecting the organization's philosophy of safety management, and become the foundation on which the organization's SMS is built. The safety policy outlines the methods and processes that the organization will use to achieve desired safety outcomes.

Safety programme means an integrated set of regulations and activities aimed at improving safety.

Safety requirement means the operational procedures, technology, systems and programmes to which measures of reliability, availability, performance and/or accuracy can be specified. are needed to achieve the safety performance indicators and safety performance targets.

Severity means the possible consequences of an unsafe event or condition, taking as reference the worst foreseeable situation.

System means organized set of processes and procedures.

Systematic means that safety management activities will be conducted in accordance with a pre-determined plan, and applied in a consistent manner throughout the organization.

5. General

Service provider shall establish, maintain and adhere to a Safety Management System (SMS) that is appropriate to the size, nature and complexity of the operations authorized to be conducted under its operations certificate and the safety hazards and risks related to the operations.

6. Safety policy and objectives

a. General requirements

- (1) A service provider shall define the organization's safety policy.
- (2) The safety policy shall be signed by the Accountable Executive of the organization.
- (3) The safety policy shall be in accordance with all applicable legal requirements and international standards, best industry practices and shall reflect organizational commitments regarding safety.

- (4) The safety policy shall be communicated, with visible endorsement, throughout the organization.
- (5) The safety policy shall include a clear statement about the provision of the necessary human and financial resources for its implementation.
- (6) The safety policy shall, among other things, include the following objectives:
 - (a) Commitment to implement an SMS;
 - (b) Commitment to continual improvement in the level of safety;
 - (c) Commitment to the management of safety risks;
 - (d) Commitment to encourage employees to report safety issues;
 - (e) Establishment of clear standards for acceptable behaviour; and
 - (f) Identification of responsibilities of management and employees with respect to safety performance.
- (7) The safety policy shall be reviewed periodically to ensure it remains relevant and appropriate to the organization.
- (8) A service provider shall establish safety objectives for the SMS.
- (9) The safety objectives should be linked to the safety performance indicators, safety performance targets and safety requirements of the service provider SMS.

b. Organizational structure and responsibilities

- (1) A service provider shall identify an Accountable Executive to be responsible and accountable on behalf of the service provider for meeting the requirements of this regulation, and shall notify the DGCA the name of the person.
- (2) The Accountable Executive shall be a single, identifiable person who, irrespective of other functions, shall have the ultimate responsibility for the implementation and maintenance of the SMS.
- (3) The Accountable Executive shall have:
 - (a) Full control of the human resources required for the operations authorized to be conducted under the operations certificate;
 - (b) Full control of the financial resources required for the operations authorized to be conducted under the operations certificate;

- (c) *Final authority over operations authorized to be conducted under the operations certificate;*
- (d) *Direct responsibility for the conduct of the organization's affairs; and*
- (e) *Final responsibility for all safety issues.*
- (4) *A service provider shall establish the safety structure necessary for the implementation and maintenance of the organization's SMS.*
- (5) *A service provider shall identify the safety responsibilities of all members of senior management, irrespective of other responsibilities.*
- (6) *Safety-related positions, responsibilities and authorities shall be defined, documented and communicated throughout the organization.*
- (7) *A service provider shall identify a Safety Manager to be the member of management who shall be the responsible individual and focal point for the development and maintenance of an effective SMS.*
- (8) *The Safety Manager shall:*
 - (a) *Ensure that processes needed for the SMS are established, implemented and maintained;*
 - (b) *Report to the Accountable Executive on the performance of the SMS and on any need for improvement; and*
 - (c) *Ensure safety promotion throughout the organization.*

c. SMS implementation plan

- (1) *A service provider shall develop and maintain an SMS implementation plan.*
- (2) *The SMS implementation plan shall be the definition of the approach the organization will adopt for managing safety in a manner that will meet the organization's safety needs.*
- (3) *The SMS implementation plan shall include the following:*
 - (a) *Safety policy and objectives;*
 - (b) *Safety planning,*
 - (c) *System description;*
 - (d) *Gap analysis;*
 - (e) *SMS components;*
 - (f) *Safety roles and responsibilities;*
 - (g) *Safety reporting policy;*

- (h) Means of employee involvement;
 - (i) Safety training;
 - (j) Safety communication;
 - (k) Safety performance measurement; and
 - (l) Management review of safety performance.
- (4) The SMS implementation plan shall be endorsed by senior management of the organization.
- (5) A service provider shall, as part of the development of the SMS implementation plan, complete a system description.
- (6) The system description shall include the following:
- (a) The system interactions with other systems in the air transportation system;
 - (b) The system functions;
 - (c) Required human performance considerations of the system operation;
 - (d) Hardware components of the system;
 - (e) Software components of the system;
 - (f) Related procedures that define guidance for the operation and use of the system;
 - (g) Operational environment; and
 - (h) Contracted and purchased products and services.
- (7) A service provider shall, as part of the development of the SMS implementation plan, complete a gap analysis, in order to:
- (a) identify the safety arrangements and structures that may be already exist throughout an organization; and
 - (b) determine additional safety arrangements required to implement and maintain the organization's SMS.
- (8) The SMS implementation plan shall explicitly address the coordination between the SMS of the service provider and the SMS of other organizations the service provider must interface with during the provision of services.

d. Coordination of emergency response planning

A service provider shall develop and maintain, or coordinate, as appropriate, an emergency response/contingency plan that shall ensure:

- (1) Orderly and efficient transition from normal to emergency operations;

- (2) Designation of emergency authority;
- (3) Assignment of emergency responsibilities;
- (4) Coordination of efforts to cope with the emergency; and
- (5) Safe continuation of operations, or return to normal operations as soon as possible.

e. Documentation

- (1) A service provider shall develop and maintain SMS documentation, in paper or electronic form, to describe the following:
 - (a) Safety policy;
 - (b) Safety objectives;
 - (c) SMS requirements, procedures and processes;
 - (d) Responsibilities and authorities for procedures and processes; and
 - (e) SMS outputs.
- (2) A service provider shall, as part of the SMS documentation, develop and maintain a Safety Management System Manual (SMSM), to communicate the organization's approach to safety throughout the organization.
- (3) The SMSM shall document all aspects of the SMS, and its contents shall include the following:
 - (a) Scope of the Safety Management System;
 - (b) Safety policy and objectives;
 - (c) Safety accountabilities;
 - (d) Key safety personnel;
 - (e) Documentation control procedures;
 - (f) Hazard identification and risk management schemes;
 - (g) Safety performance monitoring;
 - (h) Emergency response/contingency planning;
 - (i) Management of change; and
 - (j) Safety promotion.

7. Safety risk management

a. General

- (1) A service provider shall develop and maintain Safety Data Collection and Processing systems (SDCPS) that provide

for the identification of hazards and the analysis, assessment and mitigation of safety risks.

- (2) A service provider's SDCPS shall include reactive, proactive and predictive methods of safety data collection.

b. Hazard identification

- (1) A service provider shall develop and maintain formal means for effectively collecting, recording, acting on and generating feedback about hazards in operations, which combine reactive, proactive and predictive methods of safety data collection. Formal means of safety data collection shall include mandatory, voluntary and confidential reporting systems.
- (2) The hazard identification process shall include the following steps:
- (a) Reporting of hazards, events or safety concerns;
 - (b) Collection and storing the safety data;
 - (c) Analysis of the safety data; and
 - (d) Distribution of the safety information distilled from the safety data.

c. Risk management

- (1) A service provider shall develop and maintain a formal risk management process that ensures the analysis, assessment and mitigation of risks of consequences of hazards to an acceptable level.
- (2) The risks of the consequences of each hazard identified through the hazard identification processes described in section 7.2 of this regulation shall be analysed in terms of probability and severity of occurrence, and assessed for their tolerability.
- (3) The organization shall define the levels of management with authority to make safety risk tolerability decisions.
- (4) The organization shall define safety controls for each risk assessed as tolerable.

8. Safety assurance

a. General

- (1) A service provider shall develop and maintain safety assurance processes to ensure that the safety risks controls developed as a consequence of the hazard

identification and risk management activities under paragraph 7 achieve their intended objectives.

- (2) Safety assurance processes shall apply to an SMS whether the activities and/or operations are accomplished internally or outsourced.

b. Safety performance monitoring and measurement

- (1) A service provider shall, as part of the SMS safety assurance activities, develop and maintain the necessary means to verify safety performance of the organization in comparison with the approved safety policies and objectives, and to validate the effectiveness of implemented safety risk controls.
- (2) Safety performance monitoring and measurement means shall include the following:
 - (a) Safety reporting;
 - (b) Safety audits;
 - (c) Safety surveys;
 - (d) Safety reviews;
 - (e) Safety studies; and
 - (f) Internal safety investigations.
- (3) The safety reporting procedure shall set out the conditions to ensure effective safety reporting, including the conditions under protection from disciplinary/administrative action shall apply.

c. Management of change

- (1) A service provider shall, as part of the SMS safety assurance activities, develop and maintain a formal process for the management of change.
- (2) The formal process for the management of change shall:
 - (a) Identify changes within the organization which may affect established processes and services;
 - (b) Describe the arrangements to ensure safety performance before implementing changes; and
 - (c) Eliminate or modify safety risk controls that are no longer needed due to changes in the operational environment.

d. Continuous improvement of the safety system

- (1) A service provider shall, as part of the SMS safety assurance activities, develop and maintain formal processes to identify the causes of under-performance of the SMS, determine the implications in its operation, and to rectify situations involving below standard performance in order to ensure the continual improvement of the SMS.
- (2) Continuous improvement of the service provider SMS shall include:
 - (a) Proactive and reactive evaluations of facilities, equipment, documentation and procedures, to verify the effectiveness of strategies for control of safety risks; and
 - (b) Proactive evaluation of the individuals' performance, to verify the fulfilment of safety responsibilities.

9. Safety promotion

a. General

Service providers shall develop and maintain formal safety training and safety communication activities to create an environment where the safety objectives of the organization can be achieved.

b. Safety training

- (1) A service provider shall, as part of its safety promotion activities, develop and maintain a safety training programme that ensures that personnel are trained and competent to perform the SMS duties.
- (2) The scope of the safety training shall be appropriate to the individual's involvement in the SMS.
- (3) The Accountable Executive shall receive safety awareness training regarding:
 - (a) Safety policy and objectives;
 - (b) SMS roles and responsibilities; and
 - (c) Safety assurance.

c. Safety communication

- (1) A service provider shall, as part of its safety promotion activities, develop and maintain formal means for safety communication, to:

- (a) Ensure that all staff is fully aware of the SMS;
 - (b) Convey safety critical information;
 - (c) Explain why particular safety actions are taken;
 - (d) Explain why safety procedures are introduced or changed; and
 - (e) Convey generic safety information.
- (2) Formal means of safety communication shall include:
- (a) Safety policies and procedures;
 - (b) News letters; and
 - (c) Bulletins.

d. Quality policy

A service provider shall ensure that the organization quality policy is consistent with, and supports the fulfilment of the activities of the SMS.

e. Implementation of the SMS

- (1) A service provider may implement SMS by a phased approach, which encompasses four phases as described in subparagraph (2) through subparagraph (5) of this paragraph.
- (2) Phase 1 should provide a blueprint on how the SMS requirements will be met and integrated to the organization's work activities, and an accountability framework for the implementation of the SMS:
 - (a) Identify the Accountable Executive and the safety accountabilities of managers;
 - (b) Identify the person (or planning group) within the organization responsible for implementing the SMS;
 - (c) Describe the system (air operator, ATC services provider, approved maintenance organization, certified aerodrome operator);
 - (d) Conduct a gap analysis of the organization's existing resources compared with the national and international requirements for establishing an SMS;
 - (e) Develop an SMS implementation plan that explains how the organization will implement the SMS on the basis of national requirements and international Standards and Recommended Practices (SARPs), the system description and the results of the gap analysis;

- (f) Develop documentation relevant to safety policy and objectives; and
 - (g) Develop and establish means for safety communication.
- (3) Phase 2 should put into practice those elements of the SMS implementation plan that refer to the safety risk management reactive processes:
- (a) Hazard identification and risk management using reactive processes;
 - (b) Training relevant to:
 - i. SMS implementation plan components; and
 - ii. Safety risk management (reactive processes).
 - (c) Documentation relevant to:
 - i. SMS implementation plan components; and
 - ii. Safety risk management (reactive processes).
- (4) Phase 3 should put into practice those elements of the SMS implementation plan that refer to the safety risk management proactive and predictive processes:
- (a) Hazard identification and risk management using proactive and predictive processes
 - (b) Training relevant to:
 - i. SMS implementation plan components; and
 - ii. Safety risk management (proactive and predictive processes).
 - (c) documentation relevant to:
 - i. SMS implementation plan components; and
 - ii. Safety risk management (proactive and predictive processes).
- (5) Phase 4 should put into practice operational safety assurance:
- (a) Development of acceptable level (s) of safety;
 - (b) Development of safety indicators and targets;
 - (c) SMS continuous improvement;
 - (d) Training relevant to operational safety assurance; and
 - (e) Documentation relevant to operational safety assurance.

15. Menambah Lampiran M, dengan tambahan sebagai berikut:

The recorded values must meet the designated range, resolution, and accuracy requirements during dynamic and static conditions. All data recorded must be correlated in time to within one second.

Parameters	Range	Accuracy (sensor input)	Seconds per sampling interval	Resolutio n	Remarks
1. Time or Relative Times Counts. ¹	24 Hrs, 0 to 4095	±0.125% Per Hour	4	1 sec	UTC time preferred when available. Count increments each 4 second of system operation.
2. Pressure Altitude	-1000 ft to max certifica ted altitude of aircraft. +5000 ft	±100 to ±700 ft (see table, TSO C124a or TSO C51a)	1	5' to 35'	Data should be obtained from the air data computer when practicable.
3. Indicated airspeed or Calibrated airspeed	50 KIAS or minimu m value to Max V _{so} to 1.2 V _D	±5% and ±3%	1	1 kt	Data should be obtained from the air data computer when practicable.
4. Heading (Primary flight crew reference)	0-360° and Discrete "true" or "mag"	±2°	1	0.5°	When true or magnetic heading can be selected as the primary heading reference, a discrete indicating selection must be recorded.
5. Normal acceleration (vertical) ⁹	-3g to +6g	±1% of max range excluding datum error of ±5%	0.125	0.004g	
6. Pitch Attitude	±75°	±2°	1 or 0.25 for aeroplanes operated under 121.344(f)	0.5°	A sampling rate of 0.25 is recommended.
7. Roll attitude ²	±180°	±2°	1 or 0.5 for aeroplanes operated under 121.344(f)	0.5	A sampling rate of 0.5 is recommended.
8. Manual	On-Off		1		Preferably each crew member

Radio Transmitter Keying or CVR/DFDR synchronization reference	(Discrete) None				but one discrete acceptable for all transmission provided the CVR/FDR system complies with TSO C124a CVR synchronization requirements (paragraph 4.2.1 ED-55).
9. Thrust/power on each engine—primary flight crew reference	Full range forward	$\pm 2\%$	1 (per engine)	0.3% of full range	Sufficient parameters (e.g. EPR, N1 or Torque, NP) as appropriate to the particular engine being recorded to determine power in forward and reverse thrust, including potential overspeed condition.
10. Autopilot Engagement	Discrete "on" or "off"		1		
11. Longitudinal Acceleration	$\pm 1g$	$\pm 1.5\%$ max. range excluding datum error of $\pm 5\%$	0.25	0.004g	
12a. Pitch Control(s) position (non-fly-by-wire systems)	Full Range	$\pm 2^\circ$ Unless Higher Accuracy Uniquely Required	0.5 or 0.25 for aeroplanes operated under 121.344(f)	0.5% of full range	For aeroplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5 or 0.25, as applicable.
12b. Pitch Control(s) position (fly-by-wire systems). ³	Full Range	$\pm 2^\circ$ Unless Higher Accuracy Uniquely Required.	0.5 or 0.25 for aeroplanes operated under 121.344(f).	0.2% of full range	
13a. Lateral Control position(s) (non-fly-by-wire)	Full Range	$\pm 2^\circ$ Unless Higher Accuracy Uniquely Required	0.5 or 0.25 for aeroplanes operated under 121.344(f)	0.2% of full range	For aeroplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5 or 0.25, as applicable.
13b. Lateral Control position(s) (fly-by-wire). ⁴	Full Range	$\pm 2^\circ$ Unless Higher Accuracy Uniquely Required	0.5 or 0.25 for aeroplanes operated under 121.344(f)	0.2% of full range	
14a. Yaw	Full	$\pm 2^\circ$ Unless	0.5	0.3% of	For aeroplanes that have a

control position(s) (non-fly-by-wire) ⁵	range	higher accuracy uniquely required		full range	flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5.
14b. Yaw Control position(s) (fly-by-wire)	Full Range	±2° Unless Higher Accuracy Uniquely Required	0.5	0.2% of full range	
15. Pitch Control Surface(s) Position. ⁶	Full Range	±2° Unless Higher Accuracy Uniquely Required.	0.5 or 0.25 for aeroplanes operated under §121.344(f).	0.3% of full range.	For aeroplanes fitted with multiple or split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5 or 0.25.
16. Lateral control surface(s) position ⁷	Full range	±2° Unless higher accuracy uniquely required	0.5 or 0.25 for aeroplanes operated under §121.344(f)	0.3% of full range	A suitable combination of surface position sensors is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5 or 0.25.
17. Yaw Control Surface(s) Position. ⁸	Full Range	±2° Unless Higher Accuracy Uniquely Required	0.5	0.2% of full range	For aeroplanes with multiple or split surfaces, a suitable combination of surface position sensors is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5.
18. Lateral Acceleration	±1g	±1.5% max. range excluding datum error of ±5%	0.25	0.004g	
19. Pitch Trim Surface Position	Full Range	±3° Unless Higher Accuracy Uniquely Required	1	0.6% of full range	
20. Trailing Edge Flap or Cockpit Control	Full Range or Each Position	±3° or as Pilot's indicator	2	0.5% of full range	Flap position and cockpit control may each be sampled at 4 second intervals, to give a data point every 2 seconds.

Selection. ¹⁰	(discrete)				
21. Leading Edge Flap or Cockpit Control Selection. ¹¹	Full Range or Each Discrete Position	$\pm 3^\circ$ or as Pilot's indicator and sufficient to determine each discrete position	2	0.5% of full range	Left and right sides, or flap position and cockpit control may each be sampled at 4 second intervals, so as to give a data point every 2 seconds.
22. Each Thrust Reverser Position (or equivalent for propeller aeroplane)	Stowed, In Transit, and Reverse (Discrete)		1 (per engine)		Turbo-jet—2 discretely enable the 3 states to be determined. Turbo-prop—discrete.
23. Ground spoiler position or brake selection ¹²	Full range or each position (discrete)	$\pm 2^\circ$ Unless higher accuracy uniquely required	1 or 0.5 for aeroplanes operated under §121.344(f)	0.5% of full range	
24. Outside Air Temperature or Total Air Temperature. ¹³	-50°C to $+90^\circ\text{C}$	$\pm 2^\circ\text{C}$	2	0.3°C	
25. Autopilot/Autotrottle/AFCS Mode and Engagement Status	A suitable combination of discretely		1		Discretely should show which systems are engaged and which primary modes are controlling the flight path and speed of the aircraft.
26. Radio Altitude ¹⁴	-20 ft to $2,500\text{ ft}$	$\pm 2\text{ ft}$ or $\pm 3\%$ whichever is greater below 500 ft and $\pm 5\%$ above 500 ft	1	$1\text{ ft} + 5\%$ above 500 ft	For autoland/category 3 operations. Each radio altimeter should be recorded, but arranged so that at least one is recorded each second.
27. Localizer Deviation, MLS Azimuth, or GPS Latitude Deviation	$\pm 400\text{ Microamps}$ or available sensor range as installed $\pm 62^\circ$	As installed $\pm 3\%$ recommended	1	0.3% of full range	For autoland/category 3 operations. Each system should be recorded but arranged so that at least one is recorded each second. It is not necessary to record ILS and MLS at the same time, only the approach aid in use need be recorded.
28. Glideslope Deviation, MLS Elevation, or GPS Vertical Deviation	$\pm 400\text{ Microamps}$ or available sensor range	As installed $\pm 3\%$ recommended	1	0.3% of full range	For autoland/category 3 operations. Each system should be recorded but arranged so that at least one is recorded each second. It is not necessary to record ILS and MLS at the same time, only the

	as installed 0.9 to +30°				approach aid in use need be recorded.
29. Marker Beacon Passage	Discrete "on" or "off"		1		A single discrete is acceptable for all markers.
30. Master Warning	Discrete		1		Record the master warning and record each "red" warning that cannot be determined from other parameters or from the cockpit voice recorder.
31. Air/ground sensor (primary aeroplane system reference nose or main gear)	Discrete "air" or "ground"		1 (0.25 recommended)		
32. Angle of Attack (If measured directly)	As installed	As installed	2 or 0.5 for aeroplanes operated under 121.344(f)	0.3% of full range	If left and right sensors are available, each may be recorded at 4 or 1 second intervals, as appropriate, so as to give a data point at 2 seconds or 0.5 second, as required.
33. Hydraulic Pressure Low, Each System	Discrete or available sensor range, "low" or "normal"	±5%	2	0.5% of full range	
34. Groundspeed	As Installed	Most Accurate Systems Installed	1	0.2% of full range	
35. GPWS (ground proximity warning system)	Discrete "warning" or "off"		1		A suitable combination of discretes unless recorder capacity is limited in which case a single discrete for all modes is acceptable.
36. Landing Gear Position or Landing gear cockpit control selection	Discrete		4		A suitable combination of discretes should be recorded.
37. Drift Angle. ¹⁵	As installed	As installed	4	0.1°	
38. Wind Speed and	As installed	As installed	4	1 knot, and 1.0°	

<i>Direction</i>					
39. Latitude and Longitude	As installed	As installed	4	0.002°, or as installed	Provided by the Primary Navigation System Reference. Where capacity permits Latitude/longitude resolution should be 0.0002°.
40. Stick shaker and pusher activation	Discrete (s) "on" or "off"		1		A suitable combination of discretes to determine activation.
41. Windshear Detection	Discrete "warning" or "off"		1		
42. Throttle/power Lever position. ¹⁶	Full Range	±2%	1 for each lever	2% of full range	For aeroplanes with non-mechanically linked cockpit engine controls.
43. Additional Engine Parameters	As installed	As installed	Each engine each second	2% of full range	Where capacity permits, the preferred priority is indicated vibration level, N2, EGT, Fuel Flow, Fuel Cut-off lever position and N3, unless engine manufacturer recommends otherwise.
44. Traffic Alert and Collision Avoidance System (TCAS)	Discretes	As installed	1		A suitable combination of discretes should be recorded to determine the status of— Combined Control, Vertical Control, Up Advisory, and Down Advisory. (ref. ARINC Characteristic 735 Attachment 6E, TCAS VERTICAL RA DATA OUTPUT WORD.)
45. DME 1 and 2 Distance	0–200 NM	As installed	4	1 NM	1 mile
46. Nav 1 and 2 Selected Frequency	Full Range	As installed	4		Sufficient to determine selected frequency
47. Selected barometric setting	Full Range	±5%	(1 per 64 sec.)	0.2% of full range	
48. Selected Altitude	Full Range	±5%	1	100 ft	
49. Selected speed	Full Range	±5%	1	1 knot	
50. Selected Mach	Full Range	±5%	1	.01	
51. Selected vertical speed	Full Range	±5%	1	100 ft/min	

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52. Selected heading	Full Range	±5%	1	1°	
53. Selected flight path	Full Range	±5%	1	1°	
54. Selected decision height	Full Range	±5%	64	1 ft	
55. EFIS display format	Discrete (s)		4		Discretes should show the display system status (e.g., off, normal, fail, composite, sector, plan, nav aids, weather radar, range, copy.
56. Multi-function/Engine Alerts Display format	Discrete (s)		4		Discretes should show the display system status (e.g., off, normal, fail, and the identity of display pages for emergency procedures, need not be recorded.
57. Thrust command. ¹⁷	Full Range	±2%	2	2% of full range	
58. Thrust target	Full Range	±2%	4	2% of full range	
59. Fuel quantity in CG trim tank	Full Range	±5%	(1 per 64 sec.)	1% of full range	
60. Primary Navigation System Reference	Discrete GPS, INS, VOR/DME, MLS, Loran C, Omega, Localizer Glideslope		4		A suitable combination of discretes to determine the Primary Navigation System reference.
61. Ice Detection	Discrete "ice" or "no ice"		4		
62. Engine warning each engine vibration	Discrete		1		
63. Engine warning each engine over temp	Discrete		1		
64. Engine warning each engine oil	Discrete		1		

pressure low					
65. Engine warning each engine over speed	Discrete		1		
66. Yaw Trim Surface Position	Full Range	±3% Unless Higher Accuracy Uniquely Required	2	0.3% of full range	
67. Roll Trim Surface Position	Full Range	±3% Unless Higher Accuracy Uniquely Required	2	0.3% of full range	
68. Brake Pressure (left and right)	As installed	±5%	1		To determine braking effort applied by pilots or by autobrakes.
69. Brake Pedal Application (left and right)	Discrete or Analog "applied" or "off"	±5% (Analog)	1		To determine braking applied by pilots.
70. Yaw or sideslip angle	Full Range	±5%	1	0.5°	
71. Engine bleed valve position	Discrete "open" or "closed"		4		
72. De-icing or anti-icing system selection	Discrete "on" or "off"		4		
73. Computed center of gravity	Full Range	±5%	(1 per 64 sec.)	1% of full range	
74. AC electrical bus status	Discrete "power" or "off"		4		Each bus.
75. DC electrical bus status	Discrete "power" or "off"		4		Each bus.
76 APU bleed valve position	Discrete "open" or "closed"		4		
77. Hydraulic Pressure (each system)	Full range	±5%	2	100 psi	
78. Loss of	Discrete		1		

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cabin pressure	"loss" or "normal"				
79. Computer failure (critical flight and engine control systems)	Discrete "fail" or "normal"		4		
80. Heads-up display (when an information source is installed)	Discrete (s) "on" or "off"		4		
81. Para-visual display (when an information source is installed)	Discrete (s) "on" or "off"				
82. Cockpit trim control input position—pitch	Full Range	±5%	1	0.2% of full range	Where mechanical means for control inputs are not available, cockpit display trim positions should be recorded.
83. Cockpit trim control input position—roll	Full Range	±5%	1	0.7% of full range	Where mechanical means for control inputs are not available, cockpit display trim position should be recorded.
84. Cockpit trim control input position—yaw	Full range	±5%	1	0.3% of full range	Where mechanical means for control input are not available, cockpit display trim positions should be recorded.
85. Trailing edge flap and cockpit flap control position	Full Range	±5%	2	0.5% of full range	Trailing edge flaps and cockpit flap control position may each be sampled alternately at 4 second intervals to provide a sample each 0.5 second.
86. Leading edge flap and cockpit flap control position	Full Range or Discrete	±5%	1	0.5% of full range	
87. Ground spoiler position and speed brake selection	Full range or discrete	±5%	0.5	0.3% of full range	
88. All cockpit flight control input forces (control wheel, control column, rudder pedal)	Full range control wheel ±70 lb control column ±85 rudder pedal	±5%	1	0.3% full range	For fly-by-wire flight control systems, where flight control surface position is a function of the displacement of the control input device only, it is not necessary to record this parameter. For aeroplanes that have a flight control break away). capability that allows either pilot to operate the

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	±165				control independently, record both control force inputs. The control force inputs may be sampled alternately once per 2 seconds to produce the sampling interval of 1.
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¹For A300 B2/B4 aeroplanes, resolution=6 seconds.

²For A330/A340 series aeroplanes, resolution=0.703°.

³For A318/A319/A320/A321 series aeroplanes, resolution=0.275% (0.088°>0.064°).

For A330/A340 series aeroplanes, resolution=2.20%(0.703°>0.064°).

⁴For A318/A319/A320/A321 series aeroplanes, resolution=0.22% (0.088°>0.080°).

For A330/A340 series aeroplanes, resolution=1.76% (0.703°>0.080°).

⁵For A330/A340 series aeroplanes, resolution = 1.18% (0.703°>0.120°).

⁶For A330/A340 series aeroplanes, resolution=0.783% (0.352°>0.090°).

⁷For A330/A340 series aeroplanes, aileron resolution = 0.704% (0.352°>0.100°). For A330/A340 series aeroplanes, spoiler resolution = 1.406% (0.703°>0.100°).

⁸For A330/A340 series aeroplanes, resolution=0.30% (0.176°>0.12°).

For A330/A340 series aeroplanes, seconds per sampling interval=1.

⁹For B-717 series aeroplanes, resolution = .005g. For Dassault F900C/F900EX aeroplanes, resolution = .007g.

¹⁰For A330/A340 series aeroplanes, resolution=1.05% (0.250°>0.120°).

¹¹For A330/A340 series aeroplanes, resolution = 1.05% (0.250°>0.120°). For A300 B2/B4 series aeroplanes, resolution = 0.92% (0.230°>0.125°).

¹²For A330/A340 series aeroplanes, spoiler resolution = 1.406% (0.703°>0.100°).

¹³For A330/A340 series aeroplanes, resolution=0.5°C.

¹⁴For Dassault F900C/F900EX aeroplanes, Radio altitude resolution = 1.25 ft.

¹⁵For A330/A340 series aeroplanes, resolution = 0.352 degrees.

¹⁶For A318/A319/A320/A321 series aeroplanes, resolution = 4.32%. For A330/A340 series aeroplanes, resolution is 3.27% of full range for throttle lever angle (TLA); for reverse thrust, reverse throttle lever angle (RLA) resolution is nonlinear over the active reverse thrust range, which is 51.54 degrees to 96.14 degrees. The resolved element is 2.8 degrees uniformly over the entire active reverse thrust range, or 2.9% of the full range value of 96.14 degrees.

¹⁷For A318/A319/A320/A321 series aeroplanes, with IAE engines, resolution = 2.58%.

Pasal II

Peraturan ini mulai berlaku pada tanggal ditetapkan.

Ditetapkan di : Jakarta
Pada tanggal : 8 Mei 2009

MENTERI PERHUBUNGAN

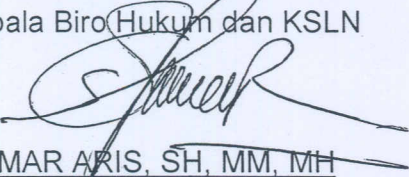
ttd

Ir. JUSMAN SYAFII DJAMAL

SALINAN Peraturan ini disampaikan kepada:

1. Sekretaris Jenderal, Inspektur Jenderal, Direktur Jenderal Perhubungan Udara, dan Para Kepala Badan di Lingkungan Departemen Perhubungan;
2. Ketua KNKT;
3. DPP INACA.

Salinan sesuai dengan aslinya
Kepala Biro Hukum dan KSLN


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