MANUAL OF STANDARDS
(172 – AIR TRAFFIC SERVICES) 2024

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In exercise of the powers conferred by paragraph 5(2) of the Civil Aviation Authority of Singapore (Air Navigation Services) Directions 2010 (Ministerial Direction No.1/2010), the Civil Aviation Authority of Singapore ("the Authority") issues the following Manual of Standards.

PART 1

PRELIMINARY

Citation and commencement

1. This Manual is the Manual of Standards (172 – Air Traffic Services) 2024 and comes into operation on 15 April 2024.

Definitions

2. In this Manual, unless the context otherwise requires, any term defined in the First Schedule has the meaning given to that term in that Schedule.

Application of this Manual

3. This Manual applies to the provider of air navigation services within the Singapore Flight Information Region and such other area as the Minister for Transport may authorise (called in this Manual the Air Navigation Services Provider or "ANSP") in its provision of air traffic services.

PART 2

Division 1 — General

Establishment of air traffic service units

4.— (1) The ANSP must establish air traffic service units to provide air traffic control service, flight information service and alerting service.

(2) In providing air traffic services, the ANSP must take into consideration:

(a) the types of air traffic involved;

(b) the density of air traffic;

(c) the meteorological conditions; and

(d) such other factors as may be relevant; but

(e) not the carriage of airborne collision avoidance systems ("ACAS") by aircraft.

Identification and delineation of prohibited, restricted and danger areas

5.— (1) The ANSP must ensure that each prohibited area, restricted area, or danger area established within the ANSP's airspace of responsibility is given an identification code composed of a group of letters and figures in sequence as follows:

(a) WS – nationality letters as contained in ICAO Document Doc 7910 (Location Indicators) for location indicators assigned to the State;

(b) a letter P for prohibited area, R for restricted area or D for danger area as appropriate; and

(c) a number, unduplicated within Singapore.

(2) The ANSP must use the identification code assigned to identify that area in all subsequent notifications pertaining to that area.

(3) The ANSP must ensure that a notification of every area that is declared as a prohibited area, restricted area, or danger area is published in the Aeronautical Information Publication ("AIP") or in Notices to Airmen ("NOTAM") with such details and particulars as to clearly identify such an area.

(4) Despite sub-paragraph (1), the ANSP must not use an identification code that had been given to a prohibited area, a danger area or a restricted area for a period of at least one year after that area is no longer declared as a prohibited area, a restricted area or a danger area.

Division 2 — Airspace and Routes

Designation of the portions of the airspace and controlled aerodromes where air traffic service will be provided

6.— (1) The ANSP must designate such portions of the airspace within its airspace of responsibility where the ANSP intends to provide or is providing flight information service and alerting service respectively.

(2) The ANSP must designate as a control area or a control zone such portions of the airspace within its airspace of responsibility where the ANSP intends to provide or is providing air traffic control service to an IFR flight.

(3) Despite sub-paragraph (2), the ANSP must designate and classify as a Class B, Class C or Class D airspace those portions of the airspace within its airspace of responsibility where the ANSP intends to provide or is providing air traffic control service to both IFR flights and VFR flights, in accordance with paragraph 7(1)(b), (1)(c) or (1)(d).

(4) To avoid doubt, a portion of airspace designated under sub-paragraph (2) as a control area or a control zone that is situated within the ANSP's airspace of responsibility forms part of that flight information region.

(5) The ANSP must designate an aerodrome as a controlled aerodrome where the ANSP intends to provide or is providing air traffic control service to aerodrome traffic.

Classification of airspace

7.— (1) The ANSP must classify the airspace within its airspace of responsibility within which air traffic service will be provided as follows:

(a) Class A

(i) only IFR flights are permitted;

(ii) all IFR flights are provided with air traffic control service and are separated from each other.

(b) Class B

(i) both IFR and VFR flights are permitted;

(ii) all flights are provided with air traffic control service and are separated from each other.

(c) Class C

(i) both IFR and VFR flights are permitted;

(ii) all flights are provided with air traffic control service;

(iii) there is separation between each IFR flight and separation of each IFR flight from a VFR flights;

(iv) VFR flights receive traffic information in respect of other VFR flights.

(d) Class D

(i) both IFR and VFR flights are permitted;

(ii) all flights are provided with air traffic control service;

(iii) there is separation between each IFR flight and IFR flights receive traffic information in respect of VFR flights;

(iv) VFR flights receive traffic information in respect of all other flights.

(e) Class E

(i) both IFR and VFR flights are permitted;

(ii) there is separation between each IFR flight and all IFR flights are provided with air traffic control service;

(iii) all flights receive traffic information as far as is practical;

(iv) Class E must not be used for control zones.

(f) Class F

(i) both IFR and VFR flights are permitted;

(ii) all participating IFR flights receive an air traffic advisory service;

(iii) all flights receive flight information service if requested.

(g) Class G

(i) both IFR and VFR flights are permitted and receive flight information service if requested.

(2) The ANSP must provide the air traffic service appropriate to the class of airspace.

(3) The ANSP must comply with the flight requirements within each class of airspace in accordance with Appendix 4 of Annex 11 to the Convention on International Civil Aviation (called in this Manual Chicago Convention).

Establishment and identification of air traffic service routes

8.— (1) The ANSP must —

(a) establish air traffic service routes;

(b) provide a protected airspace along each established air traffic service route; and

(c) provide a safe spacing between an established air traffic service route and adjacent air traffic service routes.

(2) The ANSP must select a designator to identify each air traffic service route in accordance with the principles specified in Appendix 1 of Annex 11 to the Chicago Convention.

(3) Despite sub-paragraph (2), the ANSP must identify standard departure and arrival routes and associated procedures in accordance with the principles specified in Appendix 3 of Annex 11 to the Chicago Convention.

Specifications for control areas

9.— (1) The ANSP must delineate control areas, including airways and terminal control areas, so as to encompass sufficient airspace to contain the flight paths of those IFR flights or portions thereof to which it is desired to provide the applicable parts of the air traffic control service, taking into account the capabilities of the navigation aids normally used in that area.

(2) The ANSP must ensure that the control areas delineated pursuant to sub-paragraph (1) are published in the AIP.

(3) The ANSP must establish the lower limit of a control area at a height above the ground or water of not less than 200m (700 feet).

(4) The ANSP must establish an upper limit of a control area when —

(a) air traffic control service will not be provided above such upper limit; or

(b) the control area is situated below an upper control area, in which case the upper limit must coincide with the lower limit of the upper control area.

(5) When established, the upper limit of a control area must coincide with a VFR cruising level specified in the tables in Appendix 3 of Annex 2 to the Chicago Convention.

Specifications for control zones

10.— (1) The ANSP must establish the lateral limits of control zones —

(a) to encompass at least those portions of the airspace, which are not within control areas, containing the paths of IFR flights arriving at and departing from aerodromes to be used under instrument meteorological conditions;

(b) to extend to at least 9.3 km (5 NM) from the centre of the aerodrome or aerodromes concerned in the directions from which approaches may be made; and

(c) to extend upwards from the surface of the earth to at least the lower limit of the control area, if the control zone is located within the lateral limits of a control area.

(2) The lateral limits established pursuant to sub-paragraph (1) must be published in the AIP.

Establishment and identification of significant points

11.— (1) The ANSP must establish significant points to define an air traffic service route or an instrument approach procedure or in relation to the requirements of air traffic service for the purpose of providing information regarding the progress of aircraft in flight.

(2) The ANSP must ensure that the significant points are established and identified with designators in accordance with the principles set forth in Appendix 2 of Annex 11 to the Chicago Convention.

Minimum flight altitudes

12.— (1) The ANSP must determine minimum flight altitudes for each air traffic service route and control area over the ANSP's airspace of responsibility.

(2) The minimum flight altitudes determined pursuant to sub-paragraph (1) must provide a minimum clearance above the controlling obstacle located within the areas concerned, in

accordance with obstacle clearance criteria contained in Procedures for Air Navigation Services – Aircraft Operations Doc 8168 Volume II.

(3) The minimum flight altitudes determined pursuant to sub-paragraph (1) must be published in the AIP.

Division 3 — Performance-Based Operations

Performance-based navigation (PBN) operations

13.— (1) Prior to implementing performance-based navigation, the ANSP must —

(a) establish navigation specifications; and

(b) publish the navigation specifications in the AIP and in the ANSP's operations manual.

(2) The navigation specifications mentioned in sub-paragraph (1) must —

(a) include the designated areas, tracks or air traffic service routes on the basis of regional air navigation agreements when applicable; and

(b) be appropriate to the level of communications, navigation and air traffic service provided in the airspace concerned.

Performance-based communication (PBC) operations

14.— (1) Prior to implementing performance-based communication ("PBC"), the ANSP must establish the required communication performance (called in this Manual RCP) specifications that are —

(a) based on regional air navigation agreements, when applicable; and

(b) appropriate to the air traffic service provided.

(2) The RCP specifications established pursuant to sub-paragraph (1) must be published in the AIP.

Performance-based surveillance (PBS) operations

15.— (1) Prior to implementing performance-based surveillance ("PBS"), the ANSP must —

(a) establish the required surveillance performance (RSP) specifications that are:

(i) based on regional air navigation agreements, when applicable;

(ii) appropriate to the air traffic service provided; and

(b) ensure that it is equipped with systems capable of performance consistent with the established RSP specifications.

(2) The RSP specifications established pursuant to sub-paragraph (1) must be published in the AIP.

Division 4 — Coordination

Coordination between the air operator, aerodrome operator and air traffic service

16.— (1) The ANSP must make available to an air operator or aerodrome operator, when requested, such information as may be available to enable the air operator or aerodrome operator, as the case may be, to carry out their responsibilities.

(2) When so requested by an air operator, messages (including position reports) received by the ANSP and relating to the operation of the aircraft must be made available as soon as practicable to the air operator in accordance with agreed procedures.

Coordination between the military and air traffic service

17.— (1) The ANSP must maintain close cooperation with the military for military activities that may affect flights of civil aircraft.

(2) The ANSP must coordinate with the military in the conduct of activities that are potentially hazardous to civil aircraft in accordance with paragraph 18.

(3) The ANSP must make arrangements to permit information relevant to the safe and expeditious conduct of flights of civil aircraft to be promptly exchanged between the ANSP and the military.

(4) The ANSP must provide the military, in accordance with agreed procedures between the ANSP and the military, with pertinent flight plan and other data concerning flights of civil aircraft.

(5) To reduce or eliminate the need for interceptions, the ANSP must designate any areas or routes where the standards in Chapter 3 of Annex 2 to the Chicago Convention concerning flight plans, two-way communications and position reporting apply to all flights.

(6) The ANSP must implement special procedures with the military to ensure that —

(a) the ANSP is notified if the military observes that an aircraft which is, or might be, a civil aircraft is approaching, or has entered, any area in which interception might become necessary; and

(b) all possible efforts are made to confirm the identity of the civil aircraft mentioned in sub-paragraph (a) and to provide this aircraft with the navigational guidance necessary to avoid the need for interception.

Coordination of activities potentially hazardous to civil aircraft

18. The ANSP must develop and apply appropriate procedures to —

(a) identify activities that it considers to be potentially hazardous to civil aircraft in the ANSP's airspace of responsibility;

(b) coordinate the activities identified in sub-paragraph (a) to achieve the best arrangements to avoid hazards to civil aircraft and minimise interference with the normal operations of such aircraft;

(c) effect the coordination in sub-paragraph (b) expeditiously in order to permit the timely promulgation of information regarding the activities in accordance with Chapter 6 of PANS-AIM (Doc 10066); and

(d) conduct a safety risk assessment, as soon as reasonably practicable, for the activities identified in sub-paragraph (a) to ensure that appropriate risk mitigation measures are implemented.

Coordination between the ANSP and the Singapore meteorological service provider

19.— (1) The ANSP must establish arrangements with the Singapore meteorological service provider for its air traffic service personnel to expeditiously report to the Singapore meteorological service provider on —

(a) meteorological phenomena of operational significance, if observed by air traffic service personnel or communicated by a pilot, which have not been included in the aerodrome meteorological report; and

(b) pertinent information concerning pre-eruption volcanic activity, volcanic eruptions and information concerning volcanic ash cloud.

(2) The ANSP must establish and maintain close coordination with the Singapore meteorological service provider to ensure that information on volcanic ash included in NOTAM and SIGMET messages is consistent.

Coordination between the ANSP and the aeronautical information services (AIS) provider

20.— (1) The ANSP must ensure that its air traffic service units expeditiously report to its aeronautical information services provider on —

(a) information on aerodrome conditions;

(b) the operational status of associated facilities, services and navigation aids within each air traffic service unit's area of responsibility;

(c) the occurrence of volcanic activity observed by air traffic service personnel or reported by aircraft; and

(d) any other information considered to be of operational significance.

(2) Before introducing changes to the air navigation system, the ANSP must ensure that aeronautical information or data is provided to its aeronautical information services provider to enable the aeronautical information services provider to prepare, produce and issue relevant aeronautical information for promulgation.

(3) The ANSP must observe the predetermined, internationally agreed Aeronautical Information Regulation and Control (AIRAC) effective dates when submitting the raw aeronautical information or data to the aeronautical information services provider in accordance with the requirements in the Manual of Standards (175 – Aeronautical Information Services) 2024.

(4) In its provision of raw aeronautical information or data to the aeronautical information services provider, the ANSP must take into account accuracy and integrity requirements necessary to meet the operational needs of the user of the aeronautical data, as specified in Appendix 1 of PANS-AIM (Doc 10066).

Division 5 — Emergencies and Contingencies

Service to aircraft in the event of an emergency

21.— (1) The ANSP must ensure that its air traffic service personnel give the pilot of an aircraft that is known or is believed to be in a state of emergency, including being subjected to unlawful interference, all consideration, assistance and priority over other aircraft as may be necessitated by the circumstances.

(2) When an occurrence of unlawful interference with an aircraft takes place or is suspected in its airspace of responsibility, the ANSP must —

(a) attend promptly to requests by the aircraft;

(b) continue to transmit information pertinent to the safe conduct of the flight;

(c) take necessary action to expedite the conduct of all phases of the flight, and especially the safe landing of the aircraft;

(d) immediately inform the relevant party or parties in accordance with the agreed procedures established between the ANSP and that party or those parties; and

(e) exchange necessary information with the air operator of that aircraft or its designated representative.

In-flight contingencies: Strayed or unidentified aircraft

22.— (1) As soon as the ANSP becomes aware of an aircraft that has strayed into its airspace of responsibility, the ANSP must take the following actions as are appropriate in the circumstances to assist the aircraft and to safeguard its flight —

(a) if the aircraft's position is not known, the ANSP must —

(i) attempt to establish two-way communication with the aircraft;

(ii) use all available means to determine its position;

(iii) inform, the relevant military authority, in accordance with procedures agreed between the ANSP and the military authority, and provide it with the pertinent flight plan and other data concerning strayed aircraft;

(iv) inform other ANSPs into whose area the aircraft may have strayed or may stray, taking into account all the factors which may have affected the navigation of the aircraft in the circumstances;

(v) request assistance from other ANSPs and other aircraft in flight in the ANSP's airspace of responsibility in establishing communication with the aircraft and determining its position;

(b) when the aircraft's position is established, the ANSP must —

(i) advise the aircraft of its position and corrective action to be taken by the pilot; and

(ii) provide other ANSPs and relevant military authority with relevant information concerning the strayed aircraft and any advice given to the pilot of that aircraft.

(2) As soon as the ANSP becomes aware of an unidentified aircraft in the ANSP's airspace of responsibility, it must take the following actions as are appropriate in the circumstances —

(a) attempt to establish the identity of the aircraft;

(b) attempt to establish two-way communication with the aircraft;

(c) inform the relevant military authority, in accordance with procedures agreed between the ANSP and the military authority, about the unidentified aircraft;

(d) attempt to obtain information from other aircraft in the ANSP's airspace of responsibility;

(e) inquire of other ANSPs about the flight and request their assistance in establishing two-way communication with the aircraft.

(3) The ANSP must inform the military as soon as the identity of the aircraft has been established.

(4) If the ANSP considers that a strayed or unidentified aircraft may be the subject of unlawful interference, the ANSP must immediately inform the relevant authorities in accordance with procedures for unlawful interference, as agreed between the ANSP and such authorities.

In-flight contingencies: Interception of civil aircraft

23.— (1) As soon as the ANSP learns that an aircraft is being intercepted in its airspace of responsibility, it must take the following actions as are appropriate in the circumstances —

(a) attempt to establish two-way communication with the intercepted aircraft via any means available, including the emergency radio frequency of 121.5 MHz;

(b) inform the pilot of the intercepted aircraft of the interception;

(c) establish contact with the intercept control unit and provide it with available information concerning the aircraft;

(d) relay messages between the intercepting aircraft or the intercept control unit and the intercepted aircraft;

(e) in close coordination with the intercept control unit, take all necessary steps to ensure the safety of the intercepted aircraft;

(f) inform air traffic service units serving adjacent flight information regions if it appears that the intercepted aircraft has strayed from such adjacent flight information regions.

(2) As soon as the ANSP learns that an aircraft is being intercepted outside its airspace of responsibility, it must take the following actions as appropriate in the circumstances —

(a) inform the air traffic service unit serving the airspace in which the interception is taking place, providing this air traffic service unit with available information that will assist in identifying the aircraft and requesting it to take action in accordance with sub-paragraph (1);

(b) relay messages between the intercepted aircraft and the air traffic service unit, the intercept control unit or the intercepting aircraft.

Contingency arrangements

24.— (1) The ANSP must develop and apply appropriate contingency plans to address disruption, or potential disruption, of the ANSP's air traffic service and related supporting services in the airspace that the ANSP is responsible for.

(2) The ANSP must ensure that the contingency plans developed pursuant to sub-paragraph (1) provide for continuity of operations in the event of natural disasters and public health emergencies.

(3) The ANSP must include the following in the contingency plans mentioned in sub-paragraph (1):

(a) contingency plans for each of its air traffic service units; and

(b) contingency plans for operations involving adjacent flight information regions.

(4) The ANSP must ensure that the contingency plans in sub-paragraph (3)(a) describe the transition from normal operations to contingency operations, and transition from contingency operations back to normal operations.

(5) The ANSP must conduct regular exercises to assess the contingency plans in sub-paragraph (3)(a) and to ensure that these contingency plans continue to be relevant, and that the relevant ANS personnel continue to be familiar with these contingency plans.

(6) The ANSP must develop the contingency plans in sub-paragraph (3)(b) in close coordination with the ANSPs responsible for the provision of services in adjacent flight information regions and with the airspace users concerned, with the assistance of the International Civil Aviation Organisation as necessary.

Division 6 — Standardisation of References

Time in air traffic service

25.— (1) The ANSP must use Coordinated Universal Time ("UTC") and express the time in hours and minutes of the 24-hour day in its provision of air traffic service.

(2) The ANSP's air traffic service units, including the air traffic service units that may be used in the event of disruption to the main units, must be equipped with clocks indicating the time in hours, minutes and seconds, clearly visible from each operating position in the unit concerned.

(3) Every clock and other time-recording device installed at each air traffic service unit must be checked as necessary to ensure that the clock or time-recording device shows the correct time.

(4) The ANSP must obtain the correct time from a standard time station.

(5) The ANSP's aerodrome control units must, prior to an aircraft taxiing for take-off, provide the pilot with the correct time, unless arrangements have been made for the pilot to obtain it from other sources.

(6) The ANSP's air traffic service units must provide aircraft with the correct time on request, which must be to the nearest half minute.

(7) In automated recordings of data related to the provision of air traffic service, the ANSP must use UTC and express the time of these recordings in hours and minutes and seconds of the 24-hour day.

(8) In sub-paragraph (3), "correct time" means —

(a) a time that is not less than or not more than 30 seconds of the UTC; or

(b) where data link communications are utilised by an air traffic service unit, a time that is not less than or not more than 1 second of the UTC.

Common reference systems: Horizontal reference system

26. The ANSP must use the World Geodetic System — 1984 (WGS-84) as the horizontal (geodetic) reference system for air navigation.

Common reference systems: Vertical reference system

27. The ANSP must use mean sea level (MSL) datum as the vertical reference system for air navigation.

Common reference systems: Temporal reference system

28. The ANSP must use the Gregorian calendar and UTC as the temporal reference system for air navigation.

Language for communications

29. The ANSP must use the English language for all radiotelephony communications and for all communications between the ANSP's air traffic service units.

Division 7 — Air Traffic Control Service

Provision of air traffic control service

30.— (1) The ANSP must provide air traffic control service to:

(a) all IFR flights in airspace Classes A, B, C, D and E;

(b) all VFR flights in airspace Classes B, C and D;

(c) all special VFR flights; and

(d) all aerodrome traffic at controlled aerodromes.

(2) The ANSP must ensure that the parts of air traffic control service mentioned in paragraph 4 are provided as follows:

(a) the area control service must be provided by an area control centre;

(b) the approach control service must be provided by an approach control unit; and

(c) the aerodrome control service must be provided by an aerodrome control unit or a unit capable of providing aerodrome control remotely.

Procedures of the provision of area control service

31. The ANSP must develop and apply appropriate procedures for the provision of area control service by its area control centre in accordance with Chapters 4, 5, 10, 13, 14 and 15 of the PANS-ATM (Doc 4444).

Procedures for the provision of approach control service

32. The ANSP must develop and apply appropriate procedures for the provision of approach control service by its approach control unit in accordance with Chapters 4, 5, 6, 7, 10, 14 and 15 of the PANS-ATM (Doc 4444).

Procedures for the provision of aerodrome control service

33.— (1) The ANSP must develop and apply appropriate procedures for the provision of aerodrome control service by its aerodrome control units in accordance with Chapters 4, 5, 6, 7, 10, 14 and 15 of the PANS-ATM (Doc 4444).

(2) The ANSP must not use a visual surveillance system for its provision of aerodrome control service unless —

(a) the ANSP has conducted a safety risk assessment that demonstrates that the visual surveillance system is of an acceptable level of reliability, availability and integrity;

(b) the technical capabilities of the system will enable the ANSP to provide the service at a level that is commensurate with the traffic density and complexity at the aerodrome;

(c) there are backup facilities or alternative operational procedures; and

(d) the ANS Regulator is satisfied, before the system is used by the ANSP, that the system is of an acceptable level of reliability, availability and integrity.

(3) Where a runway safety team for the purpose of improving safety of runway operations is formed at any aerodrome at which the ANSP provides aerodrome control service, the ANSP must be a participating member of the team.

Provision of air traffic control service

34.— (1) The ANSP must ensure that in providing air traffic control service, its air traffic control units —

(a) are provided with information on the intended movement of each aircraft, or variations from such information, and with current information on the actual progress of each aircraft;

(b) are able to determine from the information mentioned in sub-paragraph (1)(a), the relative positions of known aircraft to each other;

(c) have implemented procedures to issue clearances and provide information for the purpose of —

(i) preventing collision between aircraft under its control; and

(ii) expediting and maintaining an orderly flow of air traffic;

(d) have implemented procedures to coordinate clearances as necessary with other air traffic control units —

(i) whenever an aircraft might otherwise conflict with traffic operated under the control of such other air traffic control units; and

(ii) before transferring control of an aircraft to such other air traffic control units.

(2) The ANSP must ensure that information on aircraft movements, together with a record of air traffic control clearances issued to such aircraft, is displayed so as to permit ready analysis in order to maintain an efficient flow of air traffic with adequate separation between aircraft.

(3) The ANSP must ensure that clearances issued by its air traffic control units provide separation between:

(a) all flights in airspace Classes A and B;

(b) IFR flights in airspace Classes C, D and E;

(c) IFR flights and VFR flights in airspace Class C;

(d) IFR flights and special VFR flights; and

(e) special VFR flights when so specified by the ANSP.

(4) Unless otherwise specified by the AIS provider of the ANSP, the ANSP must ensure that its air traffic control units obtain separation by providing at least one of the following:

(a) vertical separation, obtained by assigning different levels selected from:

(i) the appropriate table of cruising levels in Appendix 3 of Annex 2 to the Chicago Convention; or

(ii) a modified table of cruising levels, as the ANSP may specify in accordance with Appendix 3 of Annex 2 to the Chicago Convention, for flights above FL 410;

(b) horizontal separation, obtained by providing:

(i) longitudinal separation, by maintaining an interval between aircraft operating along the same, converging or reciprocal tracks, expressed in time or distance; or

(ii) lateral separation, by maintaining aircraft on different routes or in different geographical areas.

(5) Despite sub-paragraph (4)(a), the air traffic controller providing the separation is not required to apply the cruising levels specified in Appendix 3 of Annex 2 to the Chicago Convention if he or she determines that there exists an exceptional situation and the application of the correlation of levels to track will not ensure the safe operation of the aircraft.

(6) In implementing a reduced vertical separation minimum (RVSM) of 1,000 ft between FL 290 and FL 410 (both FLs included), the ANSP must —

(a) ensure that it monitors and collects data on the height-keeping performance and any height deviation of aircraft operating at these RVSM levels; and

(b) participate in, and submit to, a regional programme the data collected pursuant to sub-paragraph (a) for the purpose of conducting analyses of aircraft group performances.

(7) Where the ANSP implements RCP or RSP specifications or both, the ANSP must participate in regional programmes instituted for monitoring the performance of the infrastructure and the participating aircraft against the appropriate RCP or RSP specifications or both.

(8) The ANSP must ensure that the scope of the programmes mentioned in sub-paragraph (7) is adequate to evaluate communication or surveillance performance or both, as applicable.

Separation methods and minima

35.— (1) The ANSP must develop and apply appropriate procedures for its air traffic control units to apply separation methods and minima in accordance with the PANS-ATM (Doc 4444) and the Regional Supplementary Procedures (ICAO Doc 7030) as applicable.

(2) The ANSP must, in circumstances which are not covered by the provisions of the PANS-ATM (Doc 4444) and the Regional Supplementary Procedures (ICAO Doc 7030) in force at the relevant time —

(a) establish separation minima in consultation with air operators, for routes or portions of routes contained within its airspace of responsibility, and implement such separation minima; and

(b) implement separation minima in accordance with the applicable regional air navigation agreements for routes or portions of routes contained within airspace over the high seas or over areas of undetermined sovereignty.

(3) The ANSP must agree with, and implement, separation minima with the appropriate air traffic service authorities responsible for the provision of air traffic service in neighbouring flight information regions for —

(a) areas where traffic enters or exits the ANSP's airspace of responsibility; and

(b) routes within the ANSP's airspace of responsibility where the applicable separation minima for these routes extends beyond the common boundary with the neighbouring flight information regions.

(4) The ANSP must ensure that the information pertaining to the separation minima and the areas where the separation minima are implemented are notified to:

(a) its air traffic service units; and

(b) pilots and air operators through the AIP, where the separation minima established or implemented under sub-paragraph (1) or (2) will require a pilot to use navigation aids or navigation techniques as are specified in such separation minima.

Responsibility for control of flights

36. The ANSP must ensure that every controlled flight, whether as an individual flight or flights in formation, are under the control of only one air traffic control unit at any given time.

Responsibility for control within a given block of airspace

37.— (1) The ANSP must ensure that the responsibility for the control of all aircraft operating within a given block of airspace is assigned to one air traffic control unit at any given time.

(2) When delegating control of an aircraft or groups of aircraft to other air traffic control units, the ANSP must ensure that coordination between all air traffic control units concerned is assured.

Transfer of responsibility for control: Place or time of transfer

38. The ANSP must ensure that the responsibility for the control of an aircraft is transferred from one air traffic control unit to another as follows:

(a) between two area control centres, the responsibility for the control of an aircraft must be transferred from an area control centre to the other area control centre at the time of crossing the common control area boundary as estimated by the transferring area control centre or at such other point or time agreed between the two centres;

(b) between an area control centre and an approach control unit, the responsibility for the control of an aircraft must be transferred at a point or time agreed between the two units;

(c) between an approach control unit and an aerodrome control unit, the responsibility for the control of an arriving aircraft from the approach control unit to the aerodrome control unit must be transferred:

(i) when the aircraft is in the vicinity of the aerodrome:

(A) it is considered that approach and landing will be completed in visual reference to the ground; or

(B) it has reached uninterrupted visual meteorological conditions;

(ii) when the aircraft is at a point or level specified in:

(A) any letter of agreement with another ANSP; or

(B) the ANSP's air traffic service unit's instructions; or

(iii) when the aircraft has landed.

(d) between an aerodrome control unit and an approach control unit, the responsibility for the control of a departing aircraft must be transferred from the aerodrome control unit to the approach control unit, in accordance with letters of agreement with other ANSPs or its air traffic service unit's instructions:

(i) when visual meteorological conditions prevail in the vicinity of the aerodrome:

(A) prior to the time the aircraft leaves the vicinity of the aerodrome; or

(B) prior to the aircraft entering instrument meteorological conditions; or

(C) at a point or level specified in:

(I) a relevant letter of agreement with another ANSP; or

(II) the ANSP's air traffic service unit's instructions;

(ii) when instrument meteorological conditions prevail at the aerodrome:

(A) immediately after the aircraft is airborne; or

(B) at a point or level specified in:

(I) a relevant letter of agreement with another ANSP; or

(II) the ANSP's air traffic service unit's instructions.

(e) between control sectors or positions within the same air traffic control unit, the responsibility for control of an aircraft must be transferred from one control sector or position to another control sector or position within the same air traffic control unit at a point, level or time, as established by the ANSP.

Transfer of responsibility for control: Coordination of transfer

39.— (1) The ANSP must ensure that the responsibility for control of an aircraft is transferred from one air traffic control unit only with the consent of the accepting control unit in accordance with sub-paragraphs (2), (3), (4) and (5).

(2) The ANSP must ensure that the transferring air traffic control unit communicates to the accepting air traffic control unit the appropriate parts of the current flight plan and any control information pertinent to the transfer requested.

(3) Where transfer of control is to be effected using radar or ADS-B data, the ANSP must ensure the control information pertinent to the transfer includes information regarding the position and, if required, the track and speed of the aircraft, as observed by radar or ADS-B immediately prior to the transfer.

(4) Where transfer of control is to be effected using ADS-C data, the ANSP must ensure the control information pertinent to the transfer includes the four-dimensional position and other information as necessary.

(5) The ANSP must ensure that the accepting control unit —

(a) indicates its ability to accept control of the aircraft on the terms specified by the transferring control unit, unless by prior agreement between the two units concerned, the absence of any such indication is understood to signify acceptance of the terms specified, or indicate any necessary changes to such terms; and

(b) specifies any other information or clearance for a subsequent portion of the flight, which it requires the aircraft to have at the time of transfer.

(6) Unless otherwise specified in an agreement between the accepting control unit and the transferring control unit, the ANSP must ensure that the accepting control unit notifies the transferring control unit that it has —

(a) established two-way voice or data link communications or both with the aircraft concerned; and

(b) assumed control of the aircraft.

(7) The ANSP must specify the applicable coordination procedures, including transfer of control points, in letters of agreement with other ANSPs or its air traffic service unit's instructions as appropriate.

Contents of air traffic control clearances

40. The ANSP must ensure that an air traffic control clearance indicates:

(a) the aircraft identification as shown in the flight plan;

(b) the clearance limit;

(c) the route of flight;

(d) the level(s) of flight for the entire route or part thereof and changes of levels if required; and

(e) any necessary instructions or information on other matters such as approach or departure manoeuvres, communications and the time of expiry of the clearance.

Air traffic control clearances for transonic flight

41. The ANSP must ensure that the air traffic control clearance relating to the transonic acceleration phase of a supersonic flight must extend at least to the end of that phase.

Readback of air traffic control clearances and safety-related information

42.— (1) The ANSP must develop and apply appropriate procedures to ensure that its air traffic controllers obtain:

(a) read-back from the flight crew on the following safety-related parts of air traffic control clearances and instructions, which are transmitted by voice from the air traffic controller to the flight crew:

(i) air traffic control route clearances;

(ii) clearances and instructions to enter, land on, take off from, hold short of, cross, taxi and backtrack on any runway; and

(iii) runway-in-use, altimeter settings, SSR codes, level instructions, heading and speed instructions and, transition levels even if contained in automatic terminal information service (ATIS) broadcasts;

(b) read-back or acknowledgement from the flight crew in a manner to clearly indicate that other clearances or instructions, including conditional clearances, have been understood and will be complied with;

(c) read-back from the vehicle drivers operating or intending to operate on the manoeuvring area, on safety-related parts of instructions including instructions to enter, hold short of, cross and operate on any operational runway or taxiway, which are transmitted by voice from the air traffic controller to the vehicle drivers.

(2) The ANSP must develop and apply appropriate procedures to ensure that its air traffic controllers listen to the read-back in sub-paragraphs (1)(a), (b) and (c); and take immediate action to correct any discrepancies revealed by the read-back.

Coordination of air traffic control clearances

43.— (1) The ANSP must ensure that an air traffic control clearance is coordinated between the ANSP's air traffic control unit and every other air traffic control unit under whose control the aircraft will come:

(a) throughout the entire route to the aerodrome of first intended landing —

(i) if it is possible to coordinate the clearance prior to the aircraft's departure; or

(ii) if the ANSP has reasonable assurance that such coordination will be effected;

or

(b) throughout the route up to the point where the ANSP has reasonable assurance that such coordination can be reasonably assured.

(2) Where air traffic control clearance is coordinated between air traffic control units under sub-paragraph (1)(b), the ANSP must issue further clearance or holding instructions to the aircraft as appropriate prior to or when the aircraft reaches the point where coordination can be reasonably assured.

(3) Despite sub-paragraph (1), where a departure clearance is not coordinated in accordance with sub-paragraph (1), the ANSP must ensure its approach control unit does not issue a departure clearance until an air traffic control route clearance is issued.

(4) Where the ANSP permits an aircraft to receive a downstream clearance, the ANSP must ensure that —

(a) the aircraft contacts a downstream air traffic control unit, for the purpose of receiving the downstream clearance prior to the transfer of control point; and

(b) its air traffic control unit maintains 2-way communication with that aircraft while the aircraft obtains a downstream clearance.

(5) The ANSP must not give a downstream clearance to an aircraft unless that aircraft is under the ANSP's control.

(6) The ANSP must not issue any clearance to an aircraft for a portion of a flight where the aircraft is operating in uncontrolled airspace.

Air traffic service system capacity and air traffic flow management

44.— (1) The ANSP must ensure that the number of aircraft provided with an air traffic control service by the ANSP's air traffic control units does not exceed that which can be safely handled under the prevailing circumstances.

(2) The ANSP must declare in its operations manual the ANSP's capacity for providing air traffic control service with respect to each area and approach control sector and each aerodrome.

(3) For the purpose of declaring the capacity of the air traffic control units mentioned in sub-paragraph (2), the ANSP must take into consideration factors such as weather, air traffic control unit configuration, available personnel and equipment, and any other factors that may affect the workload of a controller responsible for that control sector or aerodrome.

(4) The ANSP must document the methodology for determining the capacity of the air traffic control services declared under sub-paragraph (2).

(5) The ANSP must implement air traffic flow management measures for any airspace or aerodrome where air traffic demand may exceed the declared capacity of the control sector or aerodrome concerned.

(6) The measures to be implemented pursuant to sub-paragraph (5) must include:

(a) measures for informing the air traffic service units concerned; and

(b) advising flight crews of affected aircraft about the delays expected or the restrictions that will be applied.

(7) In implementing any measures to increase its declared capacity, the ANSP must apply its SMS procedures to ensure that safety levels are not jeopardised.

(8) The ANSP must periodically review its declared capacities to ensure that the declared capacities continue to be relevant.

Phraseologies and communication procedures

45. The ANSP must develop and apply appropriate procedures for communication and the use of phraseologies in accordance with Volume 2 of Annex 10 to the Chicago Convention and Chapter 12 of the PANS-ATM (Doc 4444).

Ramp control service

46. The ANSP must establish the following for the provision of Ramp Control Service ("RCS"):

(a) standards and operating conditions for the provision of RCS;

(b) clearly defined areas specified in the ANSP's operations manual where RCS is provided;

(c) a training programme for each of its RCS personnel who do not possess a valid air traffic controller licence in accordance with paragraph 86; and

(d) a competency programme for RCS personnel in accordance with paragraph 86.

Control of persons and vehicles at aerodromes

47.— (1) The ANSP must establish procedures with the aerodrome operator to ensure that its aerodrome control units have control over the movement of persons, vehicles and towed aircraft on the manoeuvring area of an aerodrome to avoid hazard to them or to aircraft landing, taxiing or taking off.

(2) The ANSP must establish low visibility procedures with the aerodrome operator for its aerodromes.

(3) The low visibility procedures mentioned in sub-paragraph (2) must describe:

(a) the additional restrictions that the ANSP will put in place on the movement of persons and vehicles operating on the manoeuvring area;

(b) the additional measures to protect the sensitive area of the instrument landing system (ILS) when Category II or Category III precision instrument operations are in progress;

(c) subject to sub-paragraph (4), the minimum separation between vehicles and taxiing aircraft, taking into account the aids available to detect and display the movement of all aircraft and vehicles on the manoeuvring area in a clear and unambiguous manner.

(4) The ANSP must establish procedures with the aerodrome operator to ensure that emergency vehicles responding to emergencies are accorded priority over all other surface movement traffic.

(5) Subject to sub-paragraph (4), the ANSP must establish procedures with the aerodrome operator to ensure that vehicles on the manoeuvring area comply with the following:

(a) vehicles and vehicles that are towing aircraft must give way to an aircraft which is landing, taking off or taxiing;

(b) vehicles must give way to other vehicles towing aircraft;

(c) vehicles must give way to each other in accordance with instructions given by the ANSP's air traffic service unit;

(d) despite sub-paragraphs (a), (b) and (c), all vehicles, including vehicles towing aircraft, must comply with any instructions issued by the aerodrome control unit.

Aerodrome lights

48. The ANSP must develop and apply appropriate procedures to ensure that its aerodrome control units operate aerodrome lights between sunset and sunrise or in the instrument meteorological conditions.

Designation of hotspots

49.— (1) The ANSP must establish procedures with the aerodrome operator to designate and publish in the AIP, whenever necessary, such locations on the movement area of the aerodrome as a hot spot.

(2) Every hot spot must be charted in accordance with paragraphs 13.6, 14.6, 15.6 and Appendix 2 of Annex 4 to the Chicago Convention.

Division 8 — Air Traffic Service Surveillance Systems

Use of air traffic service surveillance systems in the air traffic control service

50.— (1) The ANSP must develop and apply appropriate procedures for the use of air traffic service surveillance systems in its provision of air traffic control service in accordance with Chapter 8 of the PANS-ATM (Doc 4444).

(2) The ANSP must ensure that direct controller-pilot communications are established prior to the provision of air traffic control services using air traffic service surveillance systems, unless special circumstances such as an emergency dictate otherwise.

Air traffic service surveillance systems capabilities

51.— (1) The ANSP must ensure that each air traffic service surveillance system used in its provision of air traffic control service have a level of reliability, availability and integrity as specified by the ANSP's safety performance indicators.

(2) The ANSP must provide back-up facilities for its air traffic service surveillance systems.

(3) Where ADS-B is used for the provision of air traffic control service, the ANSP must ensure that the quality of the information contained in the ADS-B message exceeds the values determined by the ANSP in accordance with the ADS-B Implementation and Operations Guidance Document published by the ICAO.

Situation display

52.— (1) The ANSP must ensure that its air traffic controllers providing air traffic control service using air traffic service surveillance systems are each equipped with a situation display providing surveillance information.

(2) The surveillance information mentioned in sub-paragraph (1) must at least include position indications, map information required to provide air traffic service surveillance services and, where available, information concerning the identity of the aircraft and the aircraft level.

(3) The ANSP must ensure that its air traffic service surveillance system provides for a continuously updated presentation of surveillance information, including position indications.

Division 9 — Flight Information Service

Provision of flight information service

53.— (1) The ANSP must provide flight information service to all aircraft operating in the ANSP's area of responsibility which are —

(a) provided with air traffic control service; or

(b) otherwise known to the relevant air traffic service units.

(2) Where the ANSP provides both flight information service and air traffic control service to an aircraft, the ANSP must ensure that the provision of air traffic control service has precedence over the provision of flight information service whenever the provision of air traffic control service so requires.

Scope of flight information service

54.— (1) When providing flight information service, the ANSP must include pertinent:

(a) meteorological information, such as SIGMET and AIRMET information, and weather conditions reported or forecast at departure, destination and alternate aerodromes;

(b) information concerning pre-eruption volcanic activity, volcanic eruptions and volcanic ash clouds;

(c) information concerning the release into the atmosphere of radioactive materials or toxic chemicals;

(d) information on changes in the availability of radio navigation services;

(e) information on changes in aerodrome conditions and conditions of associated facilities; including information on the state of the aerodrome movement areas when they are affected by significant depth of water;

(f) information on hazards to aircraft, such as unmanned free balloons or unmanned aircraft and of any other information likely to affect safety of aircraft operations;

(g) information concerning collision hazards, to aircraft operating in airspace Classes C, D, E, F and G;

(h) in so far as practicable and when requested by a pilot for flight over waters, information such as radio callsign, position, true track, speed, etc., of surface vessels in the area.

(2) When providing flight information service to VFR flights, the ANSP must include, in addition to the information specified in sub-paragraph (1), available information concerning traffic and weather conditions along the route of flight that are likely to make operation under the visual flight rules impracticable.

Application of operational flight information service (OFIS) broadcasts

55.— (1) The ANSP must provide, whenever available, meteorological information and operational information concerning radio navigation services and aerodromes in an operationally integrated form.

(2) The ANSP must provide the applicable operational flight information service (“OFIS”) messages when requested by the pilot of an aircraft.

OFIS broadcasts: Voice-automatic terminal information service broadcasts

56.— (1) Where the ANSP requires the communication load on the air traffic service VHF air-ground communication channels at an aerodrome to be reduced, the ANSP must provide Voice- Automatic terminal information service ("ATIS”) that comprise:

(a) one broadcast serving arriving aircraft;

(b) one broadcast serving departing aircraft;

(c) one broadcast serving both arriving and departing aircraft; or

(d) two broadcasts serving arriving and departing aircraft respectively at each aerodrome where the length of a broadcast serving both arriving and departing aircraft would be excessively long.

(2) The ANSP must use a dedicated VHF frequency for Voice-ATIS broadcast.

(3) The ANSP must ensure that Voice-ATIS broadcasts are —

(a) not transmitted on the voice channel of an ILS;

(b) continuous and repetitive;

(c) in the English language.

(4) The ANSP must make available to its air traffic service units the information contained in the ATIS broadcast relating to approach, landing and take-off.

OFIS broadcasts: Data link-automatic terminal information service

57.— (1) Where the ANSP utilises a data link-automatic terminal information service-ATIS (called in this Manual D-ATIS) to supplement a Voice-ATIS, the ANSP must ensure that the information is identical in both content and format to the applicable Voice-ATIS broadcast.

(2) Where data on real time meteorological information is included in a D-ATIS and the data changes but remains within the parameters of the significant change criteria, the ANSP must consider the content of the D-ATIS, for the purpose of maintaining the same designator, as identical.

(3) Where a D-ATIS is supplemented by Voice-ATIS, the ANSP must ensure that the D-ATIS is updated at the same time as the updating of the Voice-ATIS.

OFIS broadcasts: Automatic terminal information service (voice or data link or both)

58.— (1) The ANSP must be responsible for the preparation and dissemination of ATIS messages.

(2) Whenever a Voice-ATIS or D-ATIS, or both, are provided by the ANSP, the ANSP must ensure that:

(a) the information communicated relates to a single aerodrome;

(b) the information communicated is updated immediately when a significant change occurs, as determined by the standards in paragraph 2.3.2 of Appendix 3 of Annex 3 to the Chicago Convention;

(c) individual ATIS messages are identified by a designator in the form of a letter of the ICAO spelling alphabet in Volume 2 of Annex 10 to the Chicago Convention;

(d) designators assigned to consecutive ATIS messages are in alphabetical order;

(e) when an aircraft establishes communication with the ANSP's air traffic service unit providing approach control service or the aerodrome control unit, as the case may be, and receives information, the aircraft acknowledges receipt of such information to that air traffic service unit or aerodrome control unit;

(f) its air traffic service units provide the aircraft with the current altimeter setting when replying to the aircraft's acknowledgement in sub-paragraph (e); and

(g) the meteorological information is extracted from the local meteorological routine or special report.

(3) Where an ATIS message provided by the ANSP does not contain weather information due to rapidly changing meteorological conditions, that ATIS message must indicate that the relevant weather information will be given on initial contact with the appropriate air traffic service unit.

(4) If an aircraft acknowledges receipt of an ATIS that is no longer current, the ANSP's air traffic service units must transmit without delay to the aircraft any element of information that needs updating.

OFIS broadcasts: ATIS for arriving and departing aircraft

59. The ANSP must ensure that ATIS messages containing both arrival and departure information contain the following elements in the order listed:

(a) name of aerodrome;

(b) arrival and/or departure indicator;

(c) contract type, if communication is via D-ATIS;

(d) designator;

(e) time of observation, if appropriate;

(f) types of approach to be expected;

(g) runway in use and status of arresting system constituting a potential hazard, if any;

(h) significant runway surface conditions and, if appropriate, braking action;

(i) holding delay, if appropriate;

(j) transition level, if applicable;

(k) other essential operational information;

(l) surface wind direction and speed, including —

(i) significant variations; and

(ii) if surface wind sensors related specifically to the sections of runway in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;

(m) visibility and, when applicable —

(i) RVR;

(ii) if visibility or RVR sensors related specifically to the sections of a runway in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers; but

(iii) if the conditions specified in Chapter 11 of the PANS-ATM (Doc 4444) prevail, "CAVOK";

(n) present weather or, if the conditions specified in Chapter 11 of the PANS-ATM (Doc 4444) prevail, "CAVOK";

(o) cloud below 1,500m (5,000 ft) or below the highest minimum sector altitude, whichever is greater, including —

(i) cumulonimbus, if present; and

(ii) if the sky is obscured, vertical visibility where available; but

(iii) if the conditions specified in Chapter 11 of the PANS-ATM (Doc 4444) prevail, "CAVOK";

(p) air temperature;

(q) dew point temperature as determined on the basis of regional air navigation agreements;

(r) altimeter setting;

(s) any available information on significant meteorological phenomena in the approach and climb-out areas, including wind shear and information on recent weather of operational significance;

(t) trend forecast, when available; and

(u) specific ATIS instructions.

OFIS broadcasts: ATIS for arriving aircraft

60. The ANSP must ensure that ATIS messages containing arrival information only contain the elements in the order listed below:

(a) name of aerodrome;

(b) arrival indicator;

(c) contract type, if communication is via D-ATIS;

(d) designator;

(e) time of observation, if appropriate;

(f) type of approach(es) to be expected;

(g) main landing runway(s); status of arresting system constituting a potential hazard, if any;

(h) significant runway surface conditions and, if appropriate, braking action;

(i) holding delay, if appropriate;

(j) transition level, if applicable;

(k) other essential operational information;

(l) surface wind direction (in degrees magnetic) and speed, including —

(i) significant variations; and

(ii) if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;

(m) visibility and, when applicable —

(i) RVR; and

(ii) if visibility or RVR sensors related specifically to the sections of any runway in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers; but

(iii) if the conditions specified in Chapter 11 of the PANS-ATM (Doc 4444) prevail, "CAVOK";

(n) present weather or, if the conditions specified in Chapter 11 of the PANS-ATM (Doc 4444) prevail, "CAVOK";

(o) cloud below 1,500m (5,000 ft) or below the highest minimum sector altitude, whichever is greater, including —

(i) cumulonimbus, if present; and

(ii) if the sky is obscured, vertical visibility when available; but

(iii) if the conditions specified in Chapter 11 of the PANS-ATM (Doc 4444) prevail, "CAVOK";

(p) air temperature;

(q) dew point temperature as determined on the basis of regional air navigation agreements;

(r) altimeter setting(s);

(s) any available information on significant meteorological phenomena in the approach area including wind shear, and information on recent weather of operational significance;

(t) trend forecast, when available; and

(u) specific ATIS instructions.

OFIS broadcasts: ATIS for departing aircraft

61. The ANSP must ensure that ATIS messages containing departure information only contain the elements in the order listed below:

(a) name of aerodrome;

(b) departure indicator;

(c) contract type, if communication is via D-ATIS;

(d) designator;

(e) time of observation, if appropriate;

(f) runway(s) to be used for take-off; status of arresting system constituting a potential hazard, if any;

(g) significant surface conditions of runway(s) to be used for take-off and, if appropriate, braking action;

(h) departure delay, if appropriate;

(i) transition level, if applicable;

(j) other essential operational information;

(k) surface wind direction (in degrees magnetic) and speed, including —

(i) significant variations; and

(ii) if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;

(l) visibility and, when applicable —

(i) RVR; and

(ii) if visibility or RVR sensors related specifically to the section of a runway in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers; but

(iii) if the conditions specified in Chapter 11 of the PANS-ATM (Doc 4444) prevail, "CAVOK";

(m) present weather or, if the conditions specified in Chapter 11 of the PANS-ATM (Doc 4444) prevail, "CAVOK";

(n) cloud below 1,500m (5,000 ft) or below the highest minimum sector altitude, whichever is greater, and —

(i) cumulonimbus, if present; and

(ii) if the sky is obscured, vertical visibility when available; but

(iii) if the conditions specified in Chapter 11 of the PANS-ATM (Doc 4444) prevail, "CAVOK";

(o) air temperature;

(p) dew point temperature as determined on the basis of regional air navigation agreements;

(q) altimeter setting(s);

(r) any available information on significant meteorological phenomena in the climb-out area including wind shear;

(s) trend forecast, when available; and

(t) specific ATIS instructions.

Division 10 — Alerting Service

Provision of alerting service

62.— (1) The ANSP must provide alerting service for —

(a) every aircraft provided with air traffic control service by the ANSP within its area of responsibility;

(b) every aircraft having filed a flight plan or otherwise known to the ANSP, in so far as is practicable; and

(c) any aircraft known or believed to be the subject of unlawful interference.

(2) The ANSP must assign the area control centre as the central unit for collecting all information relevant to a state of emergency of an aircraft operating within the ANSP's area of responsibility and for forwarding such information to the rescue coordination centre.

(3) Where an aircraft undergoes a state of emergency while it is under the control of the ANSP's aerodrome control unit or approach control unit, the ANSP must ensure that that unit

immediately notifies the ANSP's area control centre, which must in turn notify the rescue coordination centre.

(4) For the purpose of sub-paragraph (3), the notification to the ANSP's area control centre or the rescue coordination centre is not required when the nature of the emergency is such that the notification will be superfluous.

(5) When the urgency of the situation so requires, the ANSP must ensure that its aerodrome control unit or the approach control unit first activates the appropriate local rescue and emergency organisations which can provide the immediate assistance required.

Notification of rescue coordination centre

63.— (1) Subject to paragraph 66(1), the ANSP must notify the rescue coordination centre immediately when it becomes aware of an aircraft in a state of emergency at each phase of the emergency as follows:

(a) uncertainty phase (unless no doubt exists as to the safety of the aircraft and its occupants) when —

(i) no communication has been received from an aircraft within a period of 30 minutes after the time a communication should have been received, or from the time an unsuccessful attempt to establish communication with such aircraft was first made, whichever is the earlier; or

(ii) an aircraft fails to arrive within 30 minutes of the estimated time of arrival last notified to or estimated by the air traffic service unit, whichever is the later.

(b) subject to sub-paragraph (2), alert phase when —

(i) following the uncertainty phase, subsequent attempts to establish communication with the aircraft or inquiries to other relevant sources have failed to reveal any news of the aircraft;

(ii) an aircraft has been cleared to land and fails to land within five minutes of the estimated time of landing and communication has not been re-established with the aircraft;

(iii) information has been received which indicates that the operating efficiency of the aircraft has been impaired, but not to the extent that a forced landing is likely; or

(iv) an aircraft is known or believed to be the subject of unlawful interference.

(c) distress phase (unless there is reasonable certainty that the aircraft and its occupants are not threatened by grave and imminent danger and do not require immediate assistance) when —

(i) following the alert phase, further unsuccessful attempts to establish communication with the aircraft and more widespread unsuccessful inquiries point to the probability that the aircraft is in distress; or

(ii) the fuel on board is considered to be exhausted, or to be insufficient to enable the aircraft to reach safety; or

(iii) information is received which indicates that the operating efficiency of the aircraft has been impaired to the extent that a forced landing is likely; or

(iv) information is received, or it is reasonably certain that the aircraft is about to make or has made a forced landing.

(2) Sub-paragraphs (1)(b)(i) to (iii) do not apply when evidence exists that would allay apprehension as to the safety of the aircraft and its occupants.

(3) The notification mentioned in sub-paragraph (1) must contain the following information (as available) in the order listed:

(a) INCERFA, ALERFA or DETRESFA, as appropriate to the phase of the emergency;

(b) agency and person calling;

(c) nature of the emergency;

(d) significant information from the flight plan;

(e) unit which made last contact, time and means used;

(f) last position report and how determined;

(g) colour and distinctive marks of aircraft;

(h) dangerous goods carried as cargo;

(i) any action taken by reporting office; and

(j) any other pertinent remarks.

(4) In addition to the notification mentioned in sub-paragraph (1), the ANSP must furnish, without delay, to the rescue coordination centre:

(a) any useful additional information, especially on the development of the state of emergency through subsequent phases; or

(b) information that the state of emergency no longer exists.

Use of communication facilities

64. The ANSP must use, as necessary, all available communication facilities to establish and maintain communication with an aircraft in a state of emergency, and to request news of the aircraft.

Plotting aircraft in a state of emergency

65.— (1) The ANSP must ensure that, when it considers a state of emergency to exist, the flight of the aircraft involved is plotted on a chart to determine the last known position, probable future positions and its maximum range of action from its last known position.

(2) The ANSP must plot the flights of other aircraft known to be operating in the vicinity of the aircraft that is in a state of emergency to determine their probable future positions and maximum endurance in order to decide which of those aircraft would be most suitable to render assistance.

Information to the operator

66.— (1) When the ANSP becomes aware that an aircraft is in a state of emergency in the uncertainty or alert phase, the ANSP must, when practicable, inform the operator prior to notifying the rescue coordination centre.

(2) Whenever practicable, the ANSP must also communicate, without delay, to the operator all information notified to the rescue coordination centre by the area control centre.

Information to aircraft operating in the vicinity of an aircraft in a state of emergency

67.— (1) When it has been established by the ANSP that an aircraft is in a state of emergency, the ANSP must inform other aircraft known to be in the vicinity of the aircraft involved of the nature of the emergency as soon as practicable.

(2) Despite sub-paragraph (1), if the ANSP knows or believes that a situation of unlawful interference with an aircraft exists, the ANSP must not make any reference in air traffic service air-ground communications to the nature of the emergency unless —

(a) the aircraft involved has already referred to the nature of the emergency in its communications with the ANSP; and

(b) the ANSP is certain that such reference will not aggravate the situation.

Division 11 — Communications Requirements for Air Traffic Service

General

68.— (1) The ANSP must ensure that the communications facilities used in its provision of air traffic service have a level of reliability, availability and integrity as specified by the ANSP's safety performance indicators.

(2) The ANSP must provide back-up facilities for its communications systems.

Aeronautical mobile service (air-ground communications)

69.— (1) The ANSP must provide its air traffic service units with —

(a) air-ground communication facilities and use radiotelephony, data link or both for all air-ground communications;

(b) the aircraft emergency channel;

(c) communication equipment in accordance with the RCP specifications specified in paragraph 14(1).

(2) The ANSP must monitor the aircraft emergency channel.

(3) When direct pilot-controller two-way radiotelephony or data link communications channels are used for the provision of air traffic control service, the ANSP must —

(a) record all such air-ground communications channels; and

(b) provide facilities for the recording of such communications channels.

(4) The ANSP must ensure that recordings of communications channels done pursuant to sub-paragraph (3) are retained for a period of at least 30 days.

(5) The ANSP must ensure that its air-ground communication facilities can enable —

(a) two-way communications between the ANSP's area control centre and appropriately equipped aircraft flying anywhere within the control area;

(b) direct, rapid, continuous and static-free two-way communications to take place between the ANSP's approach control unit and appropriately equipped aircraft under its control;

(c) direct, rapid, continuous and static-free two-way communications to take place between the ANSP's aerodrome control unit and appropriately equipped aircraft operating at any distance within 45 km (25 NM) of the aerodrome concerned.

(6) Where the approach control unit functions as a separate unit, the ANSP must ensure that air-ground communications are conducted over communication channels provided for its approach control unit's exclusive use.

Aeronautical fixed service (ground-ground communications): General

70. The ANSP must use direct-speech or data link communications in ground-ground communications for air traffic service purposes.

Aeronautical fixed service (ground-ground communications): Communications between air traffic service units

71.— (1) The ANSP must ensure that its air traffic service units have facilities for communications with:

(a) each other;

(b) the military;

(c) the Singapore meteorological service provider;

(d) the fault reporting centre; and

(e) the AIS provider.

(2) The ANSP's area control centre and approach control unit must also have facilities for communications with:

(a) air traffic service units of adjacent FIRs;

(b) approach control units and aerodrome control units outside Singapore that are within the ANSP's area of responsibility; and

(c) the rescue coordination centre.

(3) The ANSP's aerodrome control units must also have facilities for communications with:

(a) airport emergency services; and

(b) apron management service.

Aeronautical fixed service (ground-ground communications): Description of communication facilities

72.— (1) The ANSP must ensure that the communication facilities required under paragraph 71 include provisions for:

(a) communications by direct speech or data link to enable —

(i) the communication to be established instantaneously for the purpose of transfer of control of aircraft using radar or ADS-B; and

(ii) the communications to be established within 15 seconds for any other purpose;

(b) the time taken for a message in written communication such as email or fax to be transmitted from the sender to the receiver ("transit time") is not longer than 5 minutes.

(2) The ANSP must ensure that the following data and communications are automatically recorded:

(a) data that is automatically transferred to or from air traffic service computers;

(b) data and communications between air traffic service units and between air traffic service units and other units described in paragraph 71 transmitted by the facilities for direct-speech or data link communications.

(3) The ANSP must ensure that all recordings of data and communications required by sub-paragraph (2) are retained for a period of at least 30 days.

Surface movement control service: Communications for the control of vehicles other than aircraft on maneuvering areas at controlled aerodromes

73.— (1) The ANSP's aerodrome control unit must be provided with two-way radiotelephony communication facilities for the communication with and control of vehicles on the manoeuvring area.

(2) Where conditions warrant, the ANSP must provide separate communication channels for the control of vehicles on the manoeuvring area.

(3) The ANSP must provide automatic recording facilities on all such channels.

(4) The ANSP must ensure that recordings of communications required by sub-paragraph (3) are retained for a period of at least 30 days.

Aeronautical radio navigation service: Automatic recording of surveillance data

74.— (1) The ANSP must ensure that surveillance data from primary and secondary radar equipment or other systems (for example, ADS-B or ADS-C), used as an aid to air traffic service, is automatically recorded for use in accident and incident investigations, search and rescue, air traffic control and surveillance systems evaluation and training.

(2) The ANSP must ensure that the automatic recordings required by sub-paragraph (1) are retained for a period of at least 30 days.

(3) When the recordings required under sub-paragraph (1) are pertinent to an accident or incident investigation, the ANSP must ensure that the recordings are retained until:

(a) the investigation is completed;

(b) it is evident that the recordings will no longer be required; and

(c) the ANSP is informed by the investigator-in-charge or the Authority that the recordings are no longer required for the investigation;

whichever is later.

Division 12 — Information Requirements for Air Traffic Service

Aeronautical Meteorological information: General

75.— (1) The ANSP must establish arrangements with the aeronautical meteorological service provider for its air traffic service units to be supplied with up-to-date information on existing and forecast aeronautical meteorological conditions.

(2) The information to be provided under sub-paragraph (1) must be given —

(a) at a frequency which satisfies the requirements of the air traffic service units concerned for the provision of air traffic service; and

(b) in a format that requires minimum interpretation by the ANSP.

Aeronautical Meteorological information: Area control centre

76.— (1) The ANSP must establish arrangements with the aeronautical meteorological service provider for its area control centre to be supplied with aeronautical meteorological information as described in paragraph 1.3 of Appendix 9 of Annex 3 to the Chicago Convention with emphasis on the occurrence or expected occurrence of weather deterioration as soon as this can be determined.

(2) The ANSP must ensure that the information in sub-paragraph (1) cover the flight information region and such other areas as may be determined on the basis of regional air navigation agreements.

(3) The ANSP must establish arrangements with the aeronautical meteorological service provider for its area control centre to be provided, at suitable intervals, with current pressure data for setting altimeters for locations specified by the area control centre.

Aeronautical Meteorological information: Approach control unit

77.— (1) The ANSP must establish arrangements with the aeronautical meteorological service provider for its approach control unit to be provided with —

(a) aeronautical meteorological information as described in paragraph 1.2 of Appendix 9 of Annex 3 to the Chicago Convention for the relevant airspace and the aerodromes;

(b) current pressure data for setting altimeters for locations specified by the approach control unit;

(c) information on wind shear which could adversely affect aircraft on the approach or take-off paths or during circling approach;

(d) special reports and amendments to forecasts as soon as they are considered necessary in accordance with criteria specified in the arrangements.

(2) Where multiple anemometers are used, the ANSP must ensure the indicators to which they are related are clearly marked to identify the runway and section of the runway monitored by each anemometer.

(3) The ANSP must equip its approach control unit providing service for final approach, landing and take-off with —

(a) surface wind display;

(b) display permitting read-out of the current runway visual range value at aerodromes where runway visual range values are assessed by instrumental means.

(4) The displays mentioned in sub-paragraph (3)(a) and (b) must be related to the same location of observation and be fed from the same sensor as the corresponding display in the aerodrome control tower and in the meteorological station.

Aeronautical Meteorological information: Aerodrome control unit

78.— (1) The ANSP must establish arrangements with the aeronautical meteorological service provider for its aerodrome control units to be provided with —

(a) aeronautical meteorological information as described in paragraph 1.1 of Appendix 9 of Annex 3 to the Chicago Convention;

(b) current pressure data for setting altimeters for the aerodrome concerned;

(c) information on wind shear which could adversely affect aircraft on the approach or take-off paths or during circling approach and aircraft on the runway during the landing roll or take-off run; and

(d) special reports and amendments to forecasts as soon as they are considered necessary in accordance with criteria established in the arrangements specified in sub-paragraph (1).

(2) The ANSP must equip its aerodrome control units with —

(a) surface wind display; and

(b) display permitting read-out of the current runway visual range value where runway visual range values are measured by instrumental means.

(3) The displays mentioned in sub-paragraph (2)(a) and (b) must be related to the same location of observation and be fed from the same sensor as the corresponding display in the meteorological station.

(4) The ANSP must ensure that when a multiple sensor is used, the display of such a multiple sensor is clearly marked to identify the runway and section of the runway monitored by that sensor.

Information on aerodrome conditions and operational status of associated facilities

79. The ANSP must ensure that its aerodrome control units and approach control units are provided with up-to-date information by the aerodrome operator on operationally significant conditions of the movement area, including the existence of temporary hazards, and the operational status of any associated facilities at the aerodromes with which they are concerned.

Information on the operational status of navigation services

80. The ANSP must provide its air traffic service units with up-to-date information on the operational status of radio navigation services and visual aids essential for take-off, departure, approach and landing procedures within their area of responsibility and those radio navigation services and visual aids essential for surface movement.

Information on unmanned free balloons

81. The ANSP must arrange for the information concerning unmanned free balloons to be disseminated to its air traffic service units upon receipt of such information.

Information concerning volcanic activity

82.— (1) The ANSP must inform its air traffic service units of pre-eruption volcanic activity, volcanic eruptions and volcanic ash cloud which could affect airspace used by flights within its area of responsibility.

(2) The ANSP must provide its area control centre with volcanic ash advisory information issued by the Volcanic Ash Advisory Centre that is responsible for providing volcanic ash advisories to the ANSP.

Information concerning radioactive materials and toxic chemical "clouds"

83. The ANSP must inform its air traffic control services units of the release into the atmosphere of radioactive materials or toxic chemicals which could affect airspace used by flights within their area of responsibility.

Division 13 — Personnel Requirements

General

84.— (1) The ANSP must appoint a sufficient number of employees or officers of the Authority to provide air traffic control services at the air traffic control units.

(2) Subject to sub-paragraph (3), the ANSP must not permit any person to provide air traffic control service unless that person holds a valid air traffic controller licence that permits

that holder to provide air traffic control service in accordance with the rating as endorsed on his or her licence.

(3) Sub-paragraph (2) does not apply to a person who is undergoing on-the-job training in accordance with the ANSP's procedures to act as an air traffic controller and is directly supervised by a person who holds an air traffic controller licence with the appropriate rating.

Requirements for HF station operators

85.— (1) The ANSP must ensure that its personnel who are deployed as High Frequency ("HF") station operators —

(a) are not less than 18 years of age;

(b) must have completed training, and demonstrated a level of knowledge that is acceptable to the ANSP, in at least the following subjects —

(i) general knowledge of air traffic service provided within its airspace of responsibility;

(ii) operational procedures (radiotelephony procedures, phraseology, telecommunication network);

(iii) telecommunication equipment (principles, use and limitations of relevant telecommunication equipment);

(c) must have demonstrated the ability to speak and understand the language used for radiotelephony communications minimally at Operational Level (Level 4) on the ICAO Language Proficiency Rating Scale;

(d) must have completed on-the-job training and have demonstrated a level of competency that is acceptable to the ANSP in at least the following areas —

(i) operating the relevant telecommunications equipment in use; and

(ii) transmitting and receiving radiotelephony messages with efficiency and accuracy.

(2) The ANSP must develop and apply a method for the formal evaluation of the language proficiency of its HF station operators who have demonstrated a language proficiency below Expert Level (Level 6) on the ICAO Language Proficiency Rating Scale at the following intervals —

(a) those demonstrating language proficiency at Operational Level (Level 4) must be evaluated at least once every three years; and

(b) those demonstrating language proficiency at Extended Level (Level 5) must be evaluated at least once every six years.

Requirements for Ramp Control Service personnel

86.— (1) The ANSP must establish an appropriate training programme for each of its Ramp Control Service personnel.

(2) The training programme established under sub-paragraph (1) must —

(a) be reviewed periodically to ensure that the training remains relevant;

(b) include the provision of refresher training to maintain the competency of its Ramp Control Service personnel;

(c) include appropriate training and instruction prior to the implementation of new or amended Ramp Control Service systems and procedures; and

(d) include the handling of aircraft emergencies and operations under conditions with failed and degraded facilities and systems.

(3) The ANSP must establish a competency programme for its Ramp Control Service personnel in the operations manual or other document which includes:

(a) the minimum hours accumulated through the provision of Ramp Control Service over a period specified by the ANSP to ensure that each Ramp Control Service personnel continues to possess the required competencies;

(b) an annual assessment by means of proficiency checks on every Ramp Control Service personnel.

(4) For the purpose of sub-paragraph (3), the ANSP must —

(a) establish a method to monitor the operational performance of its Ramp Control Service personnel;

(b) ensure that each of its operational Ramp Control Service personnel satisfies the competency requirements specified by the ANSP; and

(c) ensure that any Ramp Control Service personnel who does not satisfy the competency requirements is required to undergo appropriate re-training, supervision and assessment programmes specified by the ANSP in the relevant operations manual or other document before being deployed for Ramp Control Service duties.

Fatigue management for air traffic controllers

87.— (1) For the purpose of managing fatigue-related safety risks, the ANSP must implement and maintain a fatigue management programme ("FMP").

(2) The FMP established under sub-paragraph (1) must —

(a) develop a roster —

(i) that is commensurate with the air traffic control service provided; and

(ii) that specifies:

(A) the scheduling limits, which must be in accordance with the scheduling limits specified in the Second Schedule; or

(B) any variation to the scheduling limits that is approved by the ANS Regulator under sub-paragraph (9);

(b) include procedures for compiling evidence to be submitted to the ANS Regulator to demonstrate compliance with the scheduling limits mentioned in sub-paragraph (2)(a)(ii);

(c) include procedures to familiarise the ANSP's personnel with the principles of fatigue management and the ANSP's policies with regard to fatigue management;

(d) include procedures for assigning unscheduled duties that ensure that air traffic controllers are able to avoid extended periods of being awake; and

(e) include procedures to deviate from the scheduling limits mentioned in sub-paragraph (2)(a)(ii) to address any additional risks associated with sudden and unforeseen operational circumstances.

(3) The ANSP must provide the following information to the ANS Regulator within 72 hours of making a deviation from the scheduling limits mentioned in sub-paragraph (2)(a)(ii):

(a) the reason for the deviation;

(b) the extent of the deviation;

(c) when the deviation took place; and

(d) the mitigation measures carried out to attain an equivalent level of safety after the deviation took place.

(4) The ANSP must submit the FMP established under sub-paragraph (2) for the approval of the ANS Regulator, and the ANS Regulator may approve the FMP subject to such conditions as the ANS Regulator considers necessary.

(5) The ANSP must —

(a) make such amendments, as may be approved by the ANS Regulator, to the FMP as may be necessary to maintain the accuracy of the information in the FMP and keep its contents up-to-date; and

(b) where required by the ANS Regulator, make such amendments to the FMP within such time as the ANS Regulator may specify, for the purpose of —

(i) maintaining the accuracy of the FMP; or

(ii) managing any fatigue-related risks in the provision of air traffic control.

(6) The ANSP must not vary the scheduling limits specified in the FMP to address strategic operational needs unless it has obtained the approval of the ANS Regulator.

(7) An application for approval to vary a scheduling limit specified in the FMP must contain the following details:

(a) the information set out in sub-paragraph (8);

(b) an implementation plan to demonstrate how the ANSP intends to implement the variation during the period in which the variation will be effective;

(c) the procedures to document and record the variation.

(8) For the purpose of sub-paragraph (7)(a), the ANSP must provide the following information:

(a) the reason for the variation;

(b) the extent of the variation;

(c) when the variation is to take effect; and

(d) a risk assessment that demonstrates that any associated risk will be managed to attain an equivalent level of safety.

(9) The ANS Regulator may approve an application to vary a scheduling limit in the FMP subject to such conditions as the ANS Regulator considers appropriate.

Division 14 — Training and Assessment of Air Traffic Controllers

General

88.— (1) The ANSP must document its policies and procedures on training and assessment of its air traffic controllers in an appropriate manual.

(2) The ANSP must develop and apply a process for the timely amendment of the manual mentioned in sub-paragraph (1) and bringing the amendments to the notice of the relevant personnel and to the ANS Regulator within a reasonable period of time.

(3) The ANSP must establish the competencies and performance criteria required of its air traffic controllers.

Training of air traffic controllers

89.— (1) The ANSP must establish an appropriate training programme for its air traffic controllers to maintain the competency of its air traffic controllers.

(2) The training programme mentioned in sub-paragraph (1) must include —

(a) recurrent training for its air traffic controllers where appropriate, which must include the handling of aircraft emergencies and operations under conditions with failed and degraded facilities and systems;

(b) appropriate training to ensure efficient teamwork;

(c) appropriate training prior to the implementation of changes to air traffic control systems and procedures.

(3) The ANSP must review its training programme periodically to ensure that the training programme remains relevant.

(4) The ANSP must ensure that an air traffic controller who performs operational instructional duties, including those related to the recency requirements under paragraph 91, fulfils the requirements of an On-The-Job Training Instructor specified in paragraph 3.1.3.3 of the Manual of Standards – Licensing of Air Traffic Control Personnel.

Assessment of air traffic controllers

90.— (1) The ANSP must ensure that an annual assessment by means of proficiency checks is conducted on each of its air traffic controllers during their deployment as operational air traffic controllers.

(2) The ANSP must develop and apply a method to monitor the operational performance of its air traffic controllers.

(3) The ANSP must submit a monthly report to the ANS Regulator containing —

(a) a summary of the results of the annual assessments done in the month pursuant to sub-paragraph (1) and the follow-up actions where appropriate; and

(b) a summary of the operational performance monitoring done in the month pursuant to sub-paragraph (2) and the follow-up actions where appropriate.

Recency of air traffic controllers

91.— (1) The ANSP must ensure that each air traffic controller who is deployed to provide air traffic service fulfils the recency requirements for the skill sets required for the air traffic controller ratings specified in the air traffic controller's air traffic control licence.

(2) For the purpose of sub-paragraph (1), the ANSP must establish a recency programme which specifies:

(a) the air traffic control skill sets required for each rating;

(b) a minimum of 10 hours of duty to be accumulated for each rating in a preceding 60-day period by the air traffic controller;

(c) the mechanism, which may include re-training, supervision and assessment, for ensuring that an air traffic controller fulfils the requirements referred to in sub-paragraph (b); and

(d) the mechanism to monitor an air traffic controller's suitability to be deployed.

(3) The ANSP must —

(a) submit the recency programme mentioned in sub-paragraph (2) to the ANS Regulator for the ANS Regulator's acceptance before the programme is implemented;

(b) document the recency programme in the ANSP's operations manual; and

(c) submit details of any change to the recency programme to the ANS Regulator for acceptance prior to the implementation of the changes.

Division 15 — Safety Reviews and Management of Safety Occurrences

Conduct of safety reviews

92.— (1) The ANSP must conduct a systematic safety review of each of its air traffic service units at least once a year.

(2) The ANSP must ensure that every safety review is conducted by qualified personnel who are trained and experienced in the unit under review and are familiar with the relevant Standards and Recommended Practices (SARPs), Procedures for Air Navigation Services (PANS), safe operating practices and Human Factors principles.

(3) The ANSP must conduct the safety reviews in accordance with paragraph 2.5 of Chapter 2 of the PANS-ATM (Doc 4444).

Managing occurrences

93.— (1) The ANSP must develop and apply appropriate procedures to respond to the occurrences mentioned in paragraph 94(4).

(2) The procedures developed under sub-paragraph (1) must include the following —

(a) reporting of reportable occurrences in accordance with paragraph 94;

(b) notifying relevant stakeholders;

(c) determining the cause of the occurrence;

(d) resolution of occurrences;

(e) implement measures to prevent recurrence of the occurrence, where necessary; and

(f) recording of the above actions.

(3) The ANSP must develop and apply appropriate procedures to periodically review occurrences with its appropriate stakeholders to —

(a) determine if the measures implemented to prevent recurrence of the occurrences are still in place and effective;

(b) determine adverse trends; and

(c) implement appropriate measures to improve the safety performance of the air traffic service.

Obligation to report reportable occurrences

94.— (1) The ANSP must make a report to the ANS Regulator if the ANSP has knowledge of any reportable occurrence specified in sub-paragraph (4).

(2) The report must be made to the ANS Regulator immediately through the most expeditious means available, upon becoming aware of the occurrence, or as soon as possible.

(3) The ANSP must submit a formal written notification to the ANS Regulator within 72 hours after a report is made under sub-paragraph (1).

(4) The ANSP must report to the ANS Regulator the following reportable occurrences:

(a) an accident;

(b) an incident or serious incident involving —

(i) near collision that requires avoidance manoeuvre to avoid a collision between:

(A) two or more aircraft; or

(B) an aircraft and a vehicle, person or object;

(ii) a controlled flight into terrain that is marginally avoided; or

(iii) loss of separation or an AIRPROX event;

(c) a take-off, landing, or runway/taxiway incident including —

(i) an aircraft take-off or landing without air traffic control clearance;

(ii) an aircraft taking off, attempting to take off or a rejected take-off on a closed or engaged runway, on a taxiway or an unassigned runway;

(iii) an aircraft landing on or attempting to land on a closed or engaged runway, a taxiway or an unassigned runway;

(iv) a runway excursion;

(v) a runway incursion by an aircraft, vehicle or person(s);

(d) an air traffic control-related or airspace occurrence where —

(i) an aircraft deviates from air traffic control clearance;

(ii) an aircraft deviates from the published airspace restrictions in the Air Navigation Order; or

(iii) an aircraft deviates from applicable air traffic management procedures documented in the Singapore AIP and NOTAMs;

(e) the incapacitation of an air traffic controller while on duty;

(f) any other occurrence of which the ANSP reasonably knows that has a significant safety impact to aircraft operation.

Investigation of occurrences

95.— (1) The ANSP must conduct an investigation for —

(a) an accident or incident mentioned in paragraph 94(4)(b)(iii), (c)(iv) and (c)(v) which occurs on or after 15 April 2024; and

(b) any other occurrence when required by the ANS Regulator.

(2) The ANSP must develop and apply appropriate procedures for the investigation of the occurrences specified in sub-paragraph (1).

(3) The ANSP must preserve all relevant records for the purpose of the investigation mentioned in sub-paragraph (1).

(4) The ANSP must submit to the ANS Regulator within 8 weeks of the occurrence, the completed investigation report of an investigation conducted under sub-paragraph (1).

(5) The investigation report must contain at least the following items:

(a) factual description of the occurrence, including relevant information and evidence;

(b) operational impact to the provision of air traffic service and the ANSP's stakeholders;

(c) analysis of the occurrence, taking into account inputs from the relevant stakeholders;

(d) identification of the causal factors, systemic issues, and safety hazards;

(e) description of any non-adherence of ANSP policies and procedures, where applicable;

(f) assessment of the effectiveness of existing safety nets;

(g) corrective, preventive and safety actions taken; and

(h) any other recommendations to —

(i) enhance the ANSP's safety performance and the safety awareness of the relevant stakeholders; or

(ii) address hazards (for example, in training, procedures, systems and processes).

Division 16 — Manuals, Documents and Records

Air traffic service operations manual

96.— (1) The ANSP must establish an air traffic service operations manual for the provision of its air traffic service.

(2) The air traffic service operations manual established for the purposes of sub-paragraph (1) must include —

(a) a statement by the ANSP confirming that the air traffic service operations manual —

(i) accurately defines the ANSP's organisation and the operating procedures that the ANSP's personnel are required to comply with at all times;

(ii) demonstrates the applicable standards of Annex 11 to the Chicago Convention; and

(iii) demonstrates the means and methods of the ANSP's organisation for ensuring ongoing compliance with this Manual and the applicable requirements in Part II of the Ministerial Direction No. 1/2010;

(b) the name of and the post held by the person who is appointed under paragraph 5(1)(a) of the Manual of Standards (170 – Air Navigation Services Provider) 2024 for the provision of air traffic service and his or her duties and responsibilities;

(c) policies and procedures used for determining its personnel levels to ensure the provision of a safe air traffic service system;

(d) procedures used for determining personnel deployment, operational watch rostering and operational support arrangements;

(e) an organisation chart showing the lines of responsibility of key personnel employed or engaged in its provision of the air traffic service;

(f) a job description of each key personnel which must contain the job function, responsibilities, and outcome to be achieved by its personnel;

(g) the list of the facilities for the provision of air traffic service;

(h) the procedures necessary to ensure compliance with —

(i) this Manual; and

(ii) the Manual of Standards (170 – Air Navigation Services Provider) 2024; and

(i) the procedures to control, amend and distribute the operations manual, including the distribution of the initial copy and all subsequent amendments made to the operations manual.

(3) The ANSP must notify the ANS Regulator of any changes to the operations manual in a timely manner.

(4) The ANSP must ensure that the operations manual is readily available to all personnel concerned with air traffic service.

(5) The ANSP must ensure that the operations manual being used by its personnel contains current information.

(6) The ANSP must update, amend or add to the operations manual as the ANS Regulator may require for ensuring:

(a) the accuracy of the operations manual; and

(b) the safety, efficiency or regularity of air navigation.

Control of documentation

97.— (1) The ANSP must develop and apply appropriate procedures to ensure that its document control system includes the authorisation, standardisation, publication, distribution and amendment of all documentation issued by the ANSP, or required by the ANSP for the provision of air traffic service.

(2) The ANSP must ensure that the procedures implemented pursuant to sub-paragraph (1) achieve the following:

(a) all documentation is reviewed and approved by the person appointed under paragraph 5(1)(a) of the Manual of Standards (170 – Air Navigation Services Provider) 2024 before their issue;

(b) any proposed amendment to the documentation mentioned in sub-paragraph (a) is reviewed and approved by the person appointed under paragraph 5(1)(a) of the Manual of Standards (170 – Air Navigation Services Provider) 2024 before being made;

(c) the current version of each document is identifiable such that the use of superseded material is precluded;

(d) only up-to-date versions of all relevant documents are available at locations where needed by air traffic service personnel;

(e) all obsolete documentation is promptly removed from all points of use.

(3) The ANSP must, at the ANS Regulator’s request, make the current versions of its documentation available in a timely manner.

Control of records

98.— (1) The ANSP must develop and apply appropriate systems to ensure that the records mentioned in paragraph 99 are accurate and up-to-date.

(2) The ANSP must ensure that the systems mentioned in sub-paragraph (1) provide an accurate chronicle of air traffic service activities for the purpose of reconstruction of events for air safety investigation, and for system safety analysis.

(3) The ANSP must ensure that only personnel authorised by the ANSP can correct errors in its records.

(4) The ANSP must ensure that the records mentioned in paragraph 99 are maintained in a form and format that is retrievable and secure against damage and tampering.

(5) Where records are required by any department or Ministry of the Government, or a statutory or regulatory authority for the purposes of investigation, the ANSP must ensure that these records are isolated and kept in a secure place until their release for the investigation.

Records

99.— (1) The ANSP must ensure that the following items used for the provision of air traffic service are recorded automatically and retained for a period of 30 days from the date of recording:

(a) direct pilot-controller two-way radiotelephony or datalink communication;

(b) direct-speech or data link between air traffic service units;

(c) surveillance data from primary and secondary radar equipment or obtained through ADS;

(d) automated flight data processing including on-screen display of aircraft tracks and label blocks.

(2) The ANSP must ensure that the automatic recordings referred to in sub-paragraph (1) have a means of establishing accurately the time, in hours/minutes/seconds, at which any recorded event occurred.

(3) The ANSP must ensure that the following items are kept for a minimum of 30 days from the time of first use of such items by the ANSP:

(a) air traffic service messages, including flight plans;

(b) flight progress strips or documents of a similar nature used for the recording of flight data and the issue of clearances, instructions and directions;

(c) transcripts of automated weather broadcasts (e.g. ATIS);

(d) air traffic service operational logs.

(4) The ANSP must ensure that records of the following items are kept for a minimum of 5 years from the time of creation of the records:

(a) details of interruptions to services;

(b) details of failures of equipment used for the provision of air traffic service;

(c) details of facility unavailability;

(d) personnel duty rosters;

(e) details of actions carried out under the Safety Management System including follow-up corrective and preventative actions;

(f) directions and instructions issued to personnel for the provision of air traffic service.

(5) The ANSP must —

(a) maintain up-to-date records of the licences and competency certificates held by its air traffic service personnel for the entire period of such personnel's employment with the ANSP; and

(b) retain such licences and certificates for a period of at least 5 years from the issuance of such licences or certificates.

(6) The ANSP must ensure that the records mentioned in sub-paragraph (5) include details of:

(a) training;

(b) renewal and currency of ratings, endorsements and qualifications; and

(c) other proficiencies required by the air traffic service provider to be demonstrated.

Maintaining operational logs

100.— (1) The ANSP must maintain operational logs relating to the provision of air traffic service in chronological sequence to record all significant occurrences and actions relating to operations, facilities, equipment and personnel at an air traffic service unit.

(2) When it is necessary to insert an out of sequence entry, the ANSP must ensure that the out of sequence is inserted as soon as possible, and with clear annotation that it is out of sequence.

(3) All log entries must be recorded against the times of the occurrence, or time of the log entry.

FIRST SCHEDULE – DEFINITIONS

Paragraph 2

"Accident" means an occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

(a) a person is fatally or seriously injured as a result of:

(i) being in the aircraft,

(ii) direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or

(iii) direct exposure to jet blast,

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

(b) the aircraft sustains damage or structural failure which —

(i) adversely affects the structural strength, performance or flight characteristics of the aircraft, and

(ii) would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or

(c) the aircraft is missing or is completely inaccessible.

"Automatic dependent surveillance — contract ADS-C agreement" means a reporting plan which establishes the conditions of ADS-C data reporting (i.e. data required by the air traffic service unit and frequency of ADS-C reports which have to be agreed to prior to using ADS-C in the provision of air traffic service).

"Advisory airspace" means an airspace of defined dimensions, or designated route, within which air traffic advisory service is available.

"Aerodrome" means a defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

"Aerodrome control service" means air traffic control service for aerodrome traffic.

"Aerodrome control unit" means a unit that provides air traffic control service to aerodrome traffic.

"Aerodrome lights" means all runway, taxiway, approach and obstruction lights, aerodrome location and aerodrome identification beacons.

"Aerodrome traffic" means all traffic on the manoeuvring area of an aerodrome and all aircraft flying in the vicinity of an aerodrome.

“Aeronautical data” means a representation of aeronautical facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing.

“Aeronautical fixed service (AFS)” means a telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services.

“Aeronautical information” means information resulting from the assembly, analysis and formatting of aeronautical data.

“Aeronautical Information Publication (AIP)” means a publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

“Aeronautical mobile service (RR S1.32)” means a mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies.

“Airborne collision avoidance system (ACAS)” means an aircraft system based on secondary surveillance radar (SSR) transponder signals which operates independently of ground-based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponders.

“Air-ground communication” means two-way communication between aircraft and stations or locations on the surface of the earth.

“AIRMET information” means information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of low-level aircraft operations and which was not already included in the forecast issued for low-level flights in the flight information region concerned or sub area thereof.

“Air traffic advisory service” means a service provided within advisory airspace to ensure separation, in so far as practical, between aircraft which are operating on IFR flight plans.

“Air traffic control clearance” means authorisation for an aircraft to proceed under conditions specified by an air traffic control unit.

“Air traffic control unit” means a generic term meaning variously, area control centre, approach control unit or aerodrome control tower.

“Air traffic flow management (ATFM)” means a service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that air traffic control capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities declared by the ANSP.

“Air traffic service” means:

(a) an air traffic control service comprising of —

(i) an area control service for the provision of air traffic control service for controlled flights, other than controlled flights associated with arrivals or departures or aerodrome traffic;

(ii) an approach control service for the provision of air traffic control service for those parts of controlled flights associated with arrivals or departures;

(iii) an aerodrome control service for the provision of air traffic control service for aerodrome traffic, other than controlled flights associated with arrivals or departures;

(b) a flight information service for the purpose of providing advice and information useful for the safe and efficient conduct of flights;

(c) an alerting service to notify appropriate organisations, including other ANSPs and the military, regarding aircraft in need of search and rescue aid, and assist such organisations as required.

"Air traffic service reporting office" means a unit established for the purpose of receiving reports concerning air traffic service and flight plans submitted before departure.

"Air traffic service route" means a specified route designed for channelling the flow of traffic as necessary for the provision of air traffic service.

"Air traffic service unit" means a generic term meaning variously, air traffic control unit, flight information centre or air traffic service reporting office.

"Airspace of responsibility" means the airspace within the Singapore Flight Information Region and such other area as the Minister for Transport may authorise over which the ANSP provides air traffic service.

"Airway" means a control area or portion thereof established in the form of a corridor.

"ALERFA" means the code word used to designate an alert phase.

"Alert phase" means a situation wherein apprehension exists as to the safety of an aircraft and its occupants.

"Alternate aerodrome" means an aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate aerodromes include the following:

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

(b) En-route alternate. An alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en-route.

(c) Destination alternate. An alternate aerodrome at which an aircraft would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing.

"Altitude" means the vertical distance of a level, a point or an object considered as a point, measured from mean sea level.

"ANS Regulator" means the Division in the Civil Aviation Authority of Singapore charged with the function of exercising safety regulatory oversight of the provision of air navigation services by the Minister for Transport in the CAAS (Air Navigation Services) Directions 2010;

"Approach control service" means air traffic control service for arriving or departing controlled flights.

"Approach control unit" means a unit established to provide air traffic control service to controlled flights arriving at, or departing from, one or more aerodromes.

"Apron" means a defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance.

"Apron management service" means a service provided to regulate the activities and the movement of aircraft and vehicles on an apron.

"Area control centre" means a unit that provides air traffic control service to controlled flights in control areas under its jurisdiction.

“Area control service” means air traffic control service for controlled flights in control areas.

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

“Area navigation route” means an air traffic service route established for the use of aircraft capable of employing area navigation.

“ASHTAM” means a special series NOTAM notifying by means of a specific format change in activity of a volcano, a volcanic eruption and/or volcanic ash cloud that is of significance to aircraft operations.

“Automatic dependent surveillance — broadcast (ADS-B)” means a means by which aircraft, aerodrome vehicles and other objects can automatically transmit and/or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link.

“Automatic dependent surveillance — contract (ADS-C)” means a means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated, and what data would be contained in the reports.

“Automatic terminal information service (ATIS)” means the automatic provision of current, routine information to arriving and departing aircraft throughout 24 hours or a specified portion thereof:

“Base turn” means a turn executed by the aircraft during the initial approach between the end of the outbound track and the beginning of the intermediate or final approach track. The tracks are not reciprocal.

“Calendar” means discrete temporal reference system that provides the basis for defining temporal position to a resolution of one day (ISO 19108*).

“Chicago Convention” means the Convention on International Civil Aviation concluded in Chicago on 7 December 1944 (as in force and amended from time to time).

“Clearance limit” means the point to which an aircraft is granted an air traffic control clearance.

“Control area” means a controlled airspace extending upwards from a specified limit above the earth.

“Control zone” means a controlled airspace extending upwards from the surface of the earth to a specified upper limit.

“Controlled aerodrome” means an aerodrome at which air traffic control service is provided to aerodrome traffic.

“Controlled airspace” means an airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification.

“Controlled flight” means any flight which is subject to an air traffic control clearance.

“Controller-pilot data link communications (CPDLC)” means a means of communication between controller and pilot, using data link for air traffic control communications.

“Cruising level” means a level maintained during a significant portion of a flight.

“Danger area” means an airspace of defined dimensions which is declared by the Director-General of Civil Aviation as an area within which activities dangerous to the flight of aircraft may exist at specified times and is notified as such in the Aeronautical Information Publication or Notice to Airmen.

“Data link-automatic terminal information service (D-ATIS)” means the provision of ATIS via data link.

"Data link communications" means a form of communication intended for the exchange of messages via a data link.

"Datum" means any quantity or set of quantities that may serve as a reference or basis for the calculation of other quantities (ISO 19104*).

"Declared capacity" means a measure of the ability of the air traffic control system or any of its subsystems or operating positions to provide service to aircraft during normal activities. It is expressed as the number of aircraft entering a specified portion of airspace in a given period of time, taking due account of weather, air traffic control unit configuration, personnel and equipment available, and any other factors that may affect the workload of the controller responsible for the airspace.

"DETRESFA" means the code word used to designate a distress phase.

"Distress phase" means a situation wherein there is reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger or require immediate assistance.

"Downstream clearance" means a clearance issued to an aircraft by an air traffic control unit that is not the current controlling authority of that aircraft.

"Duty" means any task that an air traffic controller is required by the air traffic service provider to perform, including tasks performed during time-in-position, administrative work and training.

"Duty period" means a period which starts when an air traffic controller is required by an air traffic service provider to report for or to commence a duty and ends when that person is free from all duties.

"Emergency phase" means the uncertainty phase, alert phase or distress phase.

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

"Final approach" means that part of an instrument approach procedure which commences at the specified final approach fix or point, or where such a fix or point is not specified —

(a) at the end of the last procedure turn, base turn or inbound turn of a racetrack procedure, if specified; or

(b) at the point of interception of the last track specified in the approach procedure; and ends at a point in the vicinity of an aerodrome from which:

(i) a landing can be made; or

(ii) a missed approach procedure is initiated.

"Flight Information Region" (FIR) means an airspace of defined dimensions within which flight information service and alerting service are provided.

"Flight Level" means a surface of constant atmospheric pressure which is related to a specific pressure datum, 1 013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals.

"Flight plan" means specified information provided to air traffic service units, relative to an intended flight or portion of a flight of an aircraft.

"Forecast" means a statement of expected meteorological conditions for a specified time or period, and for a specified area or portion of airspace.

“Gregorian calendar” means the calendar in general use that was first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar (ISO 19108*).

“Height” means the vertical distance of a level, a point or an object considered as a point, measured from a specified datum.

“Hot spot” means a location on the aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary.

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

“Human performance” means human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.

“IFR” means instrument flight rules.

“IFR flight” means a flight conducted in accordance with the instrument flight rules.

“IMC” means instrument meteorological conditions.

“Incapacitation” means any reduction in the well-being of an air traffic controller by any cause such as injury, sickness, fatigue, or the effects of psychoactive substances to a degree or of a nature that adversely affects his or her capacity to maintain vigilant engagement, physically or mentally, when providing air traffic service.

“INCERFA” means the code word used to designate an uncertainty phase.

“Incident” means an occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

“Instrument meteorological conditions” means meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.

“Level” means a generic term relating to the vertical position of an aircraft in flight and meaning variously, height, altitude or flight level.

“Movement area” means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).

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

(a) Required navigation performance (RNP) specification. A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.

(b) Area navigation (RNAV) specification. A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

“Non-duty period” means a continuous and defined period of time, subsequent to or prior to duty periods, during which the air traffic controller is free of all duties.

“NOTAM” or Notice to Airmen means a notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations, and includes a SNOWTAM and an ASHTAM.

"Obstacle" means all fixed (whether temporary or permanent) and mobile objects, or parts thereof, that —

(a) are located on an area intended for the surface movement of aircraft; or

(b) extend above a defined surface intended to protect aircraft in flight; or

(c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

"Operator" means a person, organisation or enterprise engaged in or offering to engage in an aircraft operation.

"PANS-AIM (Doc 10066)" means the Procedures for Air Navigation Services — Aeronautical Information Management (Doc 10066), approved and published in accordance with the procedure established by the Council of the International Civil Aviation Organisation.

"PANS-ATM (Doc 4444)" means the Procedures for Air Navigation Services — Air Traffic Management (Doc 4444), approved and published in accordance with the procedure established by the Council of the International Civil Aviation Organisation.

"Performance-based communication" or PBC means communication based on performance specifications applied to the provision of air traffic service.

"Performance-based navigation" or PBN means area navigation based on performance requirements for aircraft operating along an air traffic service route, on an instrument approach procedure or in a designated airspace.

"Performance-based surveillance" or PBS means surveillance based on performance specifications applied to the provision of air traffic service.

"Prohibited area" means an airspace of defined dimensions which is declared by the Director-General of Civil Aviation as an area above any land or territorial waters of Singapore within which the flight of aircraft is prohibited and is notified as such in the Aeronautical Information Publication or Notice to Airmen.

"Radio navigation service" means a service providing guidance information or position data for the efficient and safe operation of aircraft supported by one or more radio navigation aids.

"Radiotelephony" means a form of radiocommunication primarily intended for the exchange of information in the form of speech.

"Ramp control service" means a service provided by the ANSP to manage the activities and movement of aircraft and vehicles at the apron comprising of the following functions:

(a) start-up clearance to aircraft;

(b) push-back clearance to aircraft;

(c) taxi and towing clearance to aircraft on apron taxiways;

(d) control of vehicular movements on apron taxiways.

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

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

"Rescue coordination centre" means a unit responsible for promoting efficient organisation of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

"Restricted area" means an airspace of defined dimensions which is declared by the Director-General of Civil Aviation as an area above any land or territorial waters of Singapore within which the flight of aircraft is restricted in accordance with certain specified conditions and is notified as such in the Aeronautical Information Publication or Notice to Airmen.

"Runway" means a defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

"Runway-in-use" means the runway or runways that, at a particular time, are considered by the aerodrome control tower to be the most suitable for use by the types of aircraft expected to land or take off at the aerodrome.

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

"Safety management system (SMS)" means a systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures.

"Significant point" means a specified geographical location used in defining an air traffic service route or the flight path of an aircraft and for other navigation and air traffic service purposes.

"SNOWTAM" means a special series NOTAM given in a standard format providing a surface condition report notifying the presence or cessation of hazardous conditions due to snow, ice, slush, frost, standing water or water associated with snow, slush, ice or frost on the movement area.

"Special VFR flight" means a VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC.

"Taxiing" means movement of an aircraft on the surface of an aerodrome under its own power, excluding take-off and landing.

"Terminal control area" means a control area normally established at the confluence of air traffic service routes in the vicinity of one or more major aerodromes.

"Time-in-position" means the period of time when an air traffic controller is exercising the privileges of the air traffic controller's licence at an operational position.

"Track" means the projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (true, magnetic or grid).

"Traffic information" means information issued by an air traffic service unit to alert a pilot to other known or observed air traffic which may be in proximity to the position or intended route of flight and to help the pilot avoid a collision.

"Transfer of control point" means a defined point located along the flight path of an aircraft, at which the responsibility for providing air traffic control service to the aircraft is transferred from one control unit or control position to the next.

"Uncertainty phase" means a situation wherein uncertainty exists as to the safety of an aircraft and its occupants.

"VFR" means visual flight rules.

"VFR flight" means a flight conducted in accordance with the visual flight rules.

"Visual meteorological condition" means Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than the specified minima contained in Annex 2 of the Chicago Convention.

“Visual surveillance system” means an electro-optical system providing an electronic visual presentation of traffic and any other information necessary to maintain situational awareness at an aerodrome and its vicinity.

“VMC” means visual meteorological conditions.

“Voice-automatic terminal information service (Voice-ATIS)” means the provision of ATIS by means of continuous and repetitive voice broadcasts.

“Waypoint” means a specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation. Waypoints are identified as either:

(a) Fly-by waypoint. A waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure, or

(b) Flyover waypoint. A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.

SECOND SCHEDULE – SCHEDULING LIMITS FOR FATIGUE MANAGEMENT

Paragraph 87

1. The ANSP must ensure that the roster mentioned in paragraph 87(2)(a) for normal operations is planned in accordance with the following scheduling limits:

(a) the number of hours of a duty period of each air traffic controller must not exceed 10 hours;

(b) the number of consecutive work days of each air traffic controller must not exceed 6;

(c) the total hours of duty to be performed by each air traffic controller in respect of each period of 30 days must not exceed 200 hours;

(d) each time-in-position at any time during a duty period must not exceed 2.5 hours, except during periods of low traffic when the time-in-position may be up to 4 hours;

(e) the minimum duration of a non-duty period (between the end of one duty period and the start of the next duty period) of each air traffic controller is 10 hours;

(f) the minimum number of non-duty days is 7 blocks of 24 hours each within each period of 30 days; and

(g) the minimum duration of each break between each period of time-in-position in any duty period is 30 minutes.