KEMENTERIAN PERHUBUNGAN
DIREKTORAT JENDERAL PERHUBUNGAN UDARA

PERATURAN DIREKTUR JENDERAL PERHUBUNGAN UDARA

NOMOR : KP 308 TAHUN 2015

TENTANG

STANDAR TEKNIS DAN OPERASI (*MANUAL OF STANDARD CASR 170 - 01*) PELAYANAN PENGAMATAN PENERBANGAN (*MANUAL ON SURVEILLANCE SERVICE)*

DENGAN RAHMAT TUHAN YANG MAHA ESA

DIREKTUR JENDERAL PERHUBUNGAN UDARA,

Menimbang : a. bahwa dalam Peraturan Menteri Nomor 14 Tahun 2009 tentang Peraturan Keselamatan Penerbangan Sipil Bagian 170 (*Civil Aviation Safety Regulation Part 170*) tentang Peraturan Lalu Lintas Penerbangan (*Air Traffic Rules*) mengenai *Provision of radar and ADS-B* diatur lebih lanjut dengan Peraturan Direktur Jenderal;

b. bahwa untuk melaksanakan ketentuan sebagaimana dimaksud dalam huruf a, dipandang perlu mengatur Standar Teknis dan Operasi (*Manual of Standard CASR 170-01)* Pelayanan Pengamatan Penerbangan *(Manual On Surveillance Service)*, dengan Peraturan Direktur Jenderal Perhubungan Udara;

Mengingat : 1. Undang-undang Nomor 1 Tahun 2009 tentang Penerbangan (Lembaran Negara Republik Indonesia Tahun 2009 Nomor 1 Tambahan Lembaran Negara Republik Indonesia Nomor 4956);

2. Peraturan Presiden Nomor 47 Tahun 2009 tentang Pembentukan Organisasi Kementerian Negara sebagaimana diubah terakhir dengan Peraturan Presiden Nomor 7 Tahun 2015;

3. Peraturan Presiden Nomor 24 Tahun 2010 tentang Kedudukan, Tugas, dan Fungsi Kementerian Negara serta Susunan Organisasi, Tugas, dan Fungsi Eselon I Kementerian Negara sebagaimana telah diubah dengan Peraturan Presiden Nomor 135 Tahun 2014;

4. Peraturan Menteri Perhubungan Nomor KM 14 Tahun 2009 tentang Peraturan Keselamatan Penerbangan Sipil Bagian 170 (*Civil Aviation Safety Regulation Part* 170) tentang Peraturan Lalu Lintas Penerbangan (*Air Traffic Rules*);

5. Peraturan Menteri Perhubungan Nomor KM 24 Tahun 2009 tentang Peraturan Keselamatan Penerbangan Sipil Bagian 139 (*Civil Aviation Safety Regulation Part 139*) tentang Bandar Udara (*Aerodrome*) sebagaimana diubah terakhir dengan Peraturan Menteri Perhubungan Nomor PM 47 Tahun 2013;
6. Peraturan Menteri Perhubungan Nomor 60 Tahun 2010 tentang Organisasi dan Tata Kerja Kementerian Perhubungan sebagaimana diubah terakhir dengan Peraturan Menteri Perhubungan Nomor PM 68 Tahun 2013;
7. Peraturan Menteri Perhubungan Nomor 57 Tahun 2011 tentang Peraturan Keselamatan Penerbangan Sipil Bagian 171 (*Civil Aviation Safety Regulation Part 171*) tentang Penyelenggara Pelayanan Telekomunikasi Penerbangan (*Aeronautical Telecommunication Service Provider*) sebagaimana diubah terakhir dengan Peraturan Menteri Perhubungan Nomor PM 38 Tahun 2014;
8. Peraturan Menteri Perhubungan Nomor PM 44 Tahun 2015 tentang Peraturan Keselamatan Penerbangan Sipil Bagian 173 (*Civil Aviation Safety Regulation Part* 173) tentang Perancangan Prosedur Penerbangan *(Flight Procedure Design);*
9. Peraturan Direktur Jenderal Perhubungan Udara Nomor SKEP/25/II/2009 tentang Advisory Circular (AC 170-02) *Manual of Air Traffic Services Operational Procedures.*

MEMUTUSKAN :

Menetapkan : PERATURAN DIREKTUR JENDERAL PERHUBUNGAN UDARA TENTANG STANDAR TEKNIS DAN OPERASI (*MANUAL OF STANDARD CASR 170-01)* PELAYANAN PENGAMATAN PENERBANGAN *(MANUAL ON SURVEILLANCE SERVICE*).

Pasal 1

Memberlakukan ketentuan-ketentuan Standar Teknis dan Operasi Bagian 170-01 (*Manual of Standard Part 170-01*) Pelayanan Pengamatan Penerbangan (*Manual On Surveillance Service*) sebagaimana tercantum dalam lampiran dan merupakan bagian tidak terpisahkan dari Peraturan ini.

Pasal 2

Direktur Navigasi Penerbangan mengawasi pelaksanaan Peraturan ini.

Pasal 3

Dengan berlakunya Peraturan ini, ketentuan mengenai Radar Services yang diatur dalam Peraturan Direktur Jenderal Perhubungan Udara Nomor SKEP/25/II/2009 tentang AC 170-02 *Manual of Air Traffic Services Operational Procedures* dinyatakan tidak berlaku.

Pasal 4

Peraturan ini berlaku pada tanggal ditetapkan.

Ditetapkan di J A K A R T A
Pada tanggal 8 Mei 2015

DIREKTUR JENDERAL PERHUBUNGAN UDARA

ttd

SUPRASETYO

SALINAN Peraturan ini disampaikan kepada :
1. Menteri Perhubungan;
2. Sekretaris Jenderal, Inspektur Jenderal dan Para Kepala Badan di lingkungan Kementerian Perhubungan;
3. Para Direktur di Lingkungan Ditjen Perhubungan Udara;
4. Para Kepala Kantor Otoritas Bandar Udara di Lingkungan Ditjen Perhubungan Udara;
5. Para Kepala Bandar Udara di Lingkungan Ditjen Perhubungan Udara;
6. Kepala Balai Besar Kalibrasi Penerbangan;
7. Kepala Balai Teknik Penerbangan;
8. Direktur Utama Perum LPPNPI.

Salinan sesuai dengan aslinya
KEPALA BAGIAN HUKUM DAN HUMAS

DIREKTORAT JENDERAL PERHUBUNGAN UDARA

HEMI PAMURAHARJO
Pembina Tk I (IV/b)
NIP. 19660508 199003 1 001

Lampiran Peraturan Direktur Jenderal Perhubungan Udara
Nomor : KP 308 TAHUN 2015
Tanggal : 8 MEI 2015

STANDAR TEKNIS DAN OPERASI (*MANUAL OF STANDARD CASR 170-01*) PELAYANAN PENGAMATAN PENERBANGAN (*MANUAL ON SURVEILLANCE SERVICES*)

REPUBLIC OF INDONESIA – MINISTRY OF TRANSPORTATIONS
DIRECTORATE GENERAL OF CIVIL AVIATION
JAKARTA – INDONESIA

RECORD OF AMENDMENTS

AMENDMENTS			
No.	Date of Issue	Date of Entered	Entered By

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CHAPTER I

DEFINITIONS

Note 1.— Throughout the text of this document the term "service" is used as an abstract noun to designate functions, or service rendered; the term "unit" is used to designate a collective body performing a service.

Accepting unit/controller. Air traffic control unit/air traffic controller next to take control of an aircraft.
Note.— See definition of "transferring unit/controller".

Aerodrome. 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.
Note.— The term "aerodrome" where used in the provisions relating to flight plans and ATS messages is intended to cover also sites other than aerodromes which may be used by certain types of aircraft, e.g. helicopters or balloons.

Aerodrome control service. Air traffic control service for aerodrome traffic.

Aerodrome control tower. A unit established to provide air traffic control service to aerodrome
traffic.

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

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

Aircraft address. A unique combination of 24 bits available for assignment to an aircraft for the purpose of air-ground communications, navigation and surveillance.

Aircraft identification. A group of letters, figures or a combination thereof which is either identical to, or the coded equivalent of, the aircraft call sign to be used in air-ground communications, and which is used to identify the aircraft in ground-ground air traffic services communications.

Aircraft proximity. A situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised. An aircraft proximity is classified as follows:
Risk of collision. The risk classification of an aircraft proximity in which serious risk of collision has existed.
Safety not assured. The risk classification of an aircraft proximity in which the safety of the aircraft may have been compromised.

No risk of collision. The risk classification of an aircraft proximity in which no risk of collision has existed.
Risk not determined. The risk classification of an aircraft proximity in which insufficient information was available to determine the risk involved, or inconclusive or conflicting evidence precluded such determination.

Air-ground communication. Two-way communication between aircraft and stations or locations on the surface of the earth.

AIRPROX. The code word used in an air traffic incident report to designate aircraft proximity.

Air-report. A report from an aircraft in flight prepared in conformity with requirements for position, and operational and/or meteorological reporting.

Air traffic. All aircraft in flight or operating on the manoeuvring area of an aerodrome.

Air traffic control clearance. Authorization for an aircraft to proceed under conditions specified by an air traffic control unit.
Note 1.— For convenience, the term "air traffic control clearance" is frequently abbreviated to "clearance" when used in appropriate contexts.
Note 2.— The abbreviated term "clearance" may be prefixed by the words "taxi", "take-off", "departure", "en-route", "approach" or "landing" to indicate the particular portion of flight to which the air traffic control clearance relates.

Air traffic control instruction. Directives issued by air traffic control for the purpose of requiring a pilot to take a specific action.

Air traffic control service. A service provided for the purpose of:
a) preventing collisions:
1) between aircraft, and
2) on the manoeuvring area between aircraft and obstructions; and
b) expediting and maintaining an orderly flow of air traffic.

Air traffic control unit. A generic term meaning variously, area control centre, approach control unit or aerodrome control tower.

Air traffic flow management (ATFM). A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible, and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

Air traffic management (ATM). The dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

Air traffic management system. A system that provides ATM through the collaborative integration of humans, information, technology, facilities and services, supported by air and ground- and/or space-based communications, navigation and surveillance.

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

Air traffic services unit. A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

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

ALERFA. The code word used to designate an alert phase.

Alerting service. A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

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

Allocation, allocate. Distribution of frequencies, SSR codes, etc. to a State, unit or service. Distribution of 24-bit aircraft addresses to a State or common mark registering authority.

Alternate aerodrome. An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing 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:
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.
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.
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.
Note.— The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight.

Altitude. The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).

Approach control service. Air traffic control service for arriving or departing controlled flights.

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

Approach sequence. The order in which two or more aircraft are cleared to approach to land at the aerodrome.

Apron. 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.

Area control centre (ACC). A unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction.

Area control service. Air traffic control service for controlled flights in control areas.

Area navigation (RNAV). 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. An ATS route established for the use of aircraft capable of employing area navigation.

Assignment, assign. Distribution of frequencies to stations. Distribution of SSR codes or 24-bit aircraft addresses to aircraft.

ATIS. The symbol used to designate automatic terminal information service.

ATS route. A specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services.
Note 1.— The term "ATS route" is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure route, etc.
Note 2.— An ATS route is defined by route specifications which include an ATS route designator, the track to or from significant points (waypoints), distance between significant points, reporting requirements and, as determined by the appropriate ATS authority, the lowest safe altitude.

ATS surveillance service. A term used to indicate a service provided directly by means of an ATS surveillance system.

ATS surveillance system. A generic term meaning variously, ADS-B, PSR, SSR or any comparable ground-based system that enables the identification of aircraft.
Note.— A comparable ground-based system is one that has been demonstrated, by comparative assessment or other methodology, to have a level of safety and performance equal to or better than monopulse SSR.

Automatic dependent surveillance — broadcast (ADS-B). 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). 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.
Note.— The abbreviated term "ADS contract" is commonly used to refer to ADS event contract, ADS demand contract, ADS periodic contract or an emergency mode.

Automatic terminal information service (ATIS). The automatic provision of current, routine information to arriving and departing aircraft throughout 24 hours or a specified portion thereof:
Data link-automatic terminal information service (D-ATIS). The provision of ATIS via data link.
Voice-automatic terminal information service (Voice-ATIS). The provision of ATIS by means of continuous and repetitive voice broadcasts.

Broadcast. A transmission of information relating to air navigation that is not addressed to a specific station or stations.

Ceiling. The height above the ground or water of the base of the lowest layer of cloud below 6 000 m (20 000 ft) covering more than half the sky.

Clearance limit. The point to which an aircraft is granted an air traffic control clearance.

Code (SSR). The number assigned to a particular multiple pulse reply signal transmitted by a transponder in Mode A or Mode C.

Common point. A point on the surface of the earth common to the tracks of two aircraft, used as a basis for the application of separation (e.g. significant point, waypoint, navigation aid, fix).

Control area. A controlled airspace extending upwards from a specified limit above the earth.

Controlled aerodrome. An aerodrome at which air traffic control service is provided to aerodrome traffic.
Note.— The term "controlled aerodrome" indicates that air traffic control service is provided to aerodrome traffic but does not necessarily imply that a control zone exists.

Controlled airspace. An airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification.

Controlled flight. Any flight which is subject to an air traffic control clearance.

Controller-pilot data link communications (CPDLC). A means of communication between controller and pilot, using data link for ATC communications.

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

Cruise climb. An aeroplane cruising technique resulting in a net increase in altitude as the aeroplane mass decreases.

Cruising level. A level maintained during a significant portion of a flight.

Current data authority. The designated ground system through which a CPDLC dialogue between a pilot and a controller currently responsible for the flight is permitted to take place.

Current flight plan (CPL). The flight plan, including changes, if any, brought about by subsequent clearances.
Note.— When the word "message" is used as a suffix to this term, it denotes the content and format of the current flight plan data sent from one unit to another.

Data convention. An agreed set of rules governing the manner or sequence in which a set of data may be combined into a meaningful communication.

Data link initiation capability (DLIC). A data link application that provides the ability to exchange addresses, names and version numbers necessary to initiate data link applications.

Data processing. A systematic sequence of operations performed on data.
Note.— Examples of operations are the merging, sorting, computing or any other transformation or rearrangement with the object of extracting or revising information, or of altering the representation of information.

Decision altitude (DA) or decision height (DH). A specified altitude or height in the precision approach or approach with vertical guidance at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.
Note 1.— Decision altitude (DA) is referenced to mean sea level and decision height (DH) is referenced to the threshold elevation.
Note 2.— The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In Category III operations with a decision height the required visual reference is that specified for the particular procedure and operation.
Note 3.— For convenience where both expressions are used they may be written in the form "decision altitude/ height" and abbreviated "DA/H".

Dependent parallel approaches. Simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are prescribed.

DETRESFA. The code word used to designate a distress phase.

Discrete code. A four-digit SSR code with the last two digits not being "00".

Distress phase. 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 data authority. A designated ground system, different from the current data authority through which the pilot can contact an appropriate ATC unit for the purposes of receiving a downstream clearance.

Elevation. The vertical distance of a point or a level, on or affixed to the surface of the earth, measured from mean sea level.

Emergency phase. A generic term meaning, as the case may be, uncertainty phase, alert phase or distress phase.

Estimated elapsed time. The estimated time required to proceed from one significant point to another.

Estimated off-block time. The estimated time at which the aircraft will commence movement associated with departure.

Estimated time of arrival. For IFR flights, the time at which it is estimated that the aircraft will arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the aerodrome, the time at which the aircraft will arrive over the aerodrome. For VFR flights, the time at which it is estimated that the aircraft will arrive over the aerodrome.

Expected approach time. The time at which ATC expects that an arriving aircraft, following a delay, will leave the holding fix to complete its approach for a landing.
Note.— The actual time of leaving the holding fix will depend upon the approach clearance.

Filed flight plan (FPL). The flight plan as filed with an ATS unit by the pilot or a designated representative, without any subsequent changes.
Note.— When the word "message" is used as a suffix to this term, it denotes the content and format of the filed flight plan data as transmitted.

Final approach. 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:
1) a landing can be made; or
2) a missed approach procedure is initiated.

Flight information centre. A unit established to provide flight information service and alerting service.

Flight information region (FIR). An airspace of defined dimensions within which flight information service and alerting service are provided.

Flight information service. A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

Flight level. 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.
Note 1.— A pressure type altimeter calibrated in accordance with the Standard Atmosphere:
a) when set to a QNH altimeter setting, will indicate altitude;
b) when set to QFE altimeter setting, will indicate height above the QFE reference datum;
c) when set to a pressure of 1 013.2 hPa, may be used to indicate flight levels.
Note 2.— The terms "height" and "altitude", used in Note 1 above, indicate altimetric rather than geometric heights and altitudes.

Flight path monitoring. The use of ATS surveillance systems for the purpose of providing aircraft with information and advice relative to significant deviations from nominal flight path, including deviations from the terms of their air traffic control clearances.
Note.— Some applications may require a specific technology, e.g. radar, to support the function of flight path monitoring.

Flight plan. Specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft.
Note.— Specifications for flight plans are contained in Annex 2. A Model Flight Plan Form is contained in Appendix 2 to this document

Flow control. Measures designed to adjust the flow of traffic into a given airspace, along a given route, or bound for a given aerodrome, so as to ensure the most effective utilization of the airspace.

Heading. The direction in which the longitudinal axis of an aircraft is pointed, usually expressed in degrees from North (true, magnetic, compass or grid).

Height. The vertical distance of a level, a point or an object considered as a point, measured from a specified datum.

Holding fix. A geographical location that serves as a reference for a holding procedure.

Holding procedure. A predetermined manoeuvre which keeps an aircraft within a specified airspace while awaiting further clearance.

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

Identification. The situation which exists when the position indication of a particular aircraft is seen on a situation display and positively identified.

IFR. The symbol used to designate the instrument flight rules.

IFR flight. A flight conducted in accordance with the instrument flight rules.

IMC. The symbol used to designate instrument meteorological conditions.

INCERFA. The code word used to designate an uncertainty phase.

Incident. An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.
Note.— The type of incidents which are of main interest to the International Civil Aviation Organization for accident prevention studies can be found at http://www.icao.int/anb/aig.

Independent parallel approaches. Simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are not prescribed.

Independent parallel departures. Simultaneous departures from parallel or near-parallel instrument runways.

Initial approach segment. That segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fix or point.

Instrument approach procedure (IAP). A series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply. Instrument approach procedures are classified as follows:
Non-precision approach (NPA) procedure. An instrument approach procedure which utilizes lateral guidance but does not utilize vertical guidance.
Approach procedure with vertical guidance (APV). An instrument procedure which utilizes lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations.
Precision approach (PA) procedure. An instrument approach procedure using precision lateral and vertical guidance with minima as determined by the category of operation.
Note.— Lateral and vertical guidance refers to the guidance provided either by:
a) a ground-based navigation aid; or
b) computer-generated navigation data.

Instrument meteorological conditions (IMC). Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.
Note 1.— The specified minima for visual meteorological conditions are contained in Chapter 3 of Annex 2.
Note 2.— In a control zone, a VFR flight may proceed under instrument meteorological conditions if and as authorized by air traffic control.

Location indicator. A four-letter code group formulated in accordance with rules prescribed by ICAO and assigned to the location of an aeronautical fixed station.

Manoeuvring area. That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

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

Meteorological office. An office designated to provide meteorological service for international air navigation.

Meteorological report. A statement of observed meteorological conditions related to a specified time and location.

Mode (SSR). The conventional identifier related to specific functions of the interrogation signals transmitted by an SSR interrogator. There are four modes specified in Annex 10: A, C, S and intermode.

Multilateration (MLAT) system. A group of equipment configured to provide position derived from the secondary surveillance radar (SSR) transponder signals (replies or squitters) primarily using time difference of arrival (TDOA) techniques. Additional information, including identification, can be extracted from the received signals.

Near-parallel runways. Non-intersecting runways whose extended centre lines have an angle of convergence/divergence of 15 degrees or less.

Next data authority. The ground system so designated by the current data authority through which an onward transfer of communications and control can take place.

Normal operating zone (NOZ). Airspace of defined dimensions extending to either side of an ILS localizer course and/or MLS final approach track. Only the inner half of the normal operating zone is taken into account in independent parallel approaches.

NOTAM. 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.

No transgression zone (NTZ). In the context of independent parallel approaches, a corridor of airspace of defined dimensions located centrally between the two extended runway centre lines, where a penetration by an aircraft requires a controller intervention to manoeuvre any threatened aircraft on the adjacent approach.

Obstacle clearance altitude (OCA) or obstacle clearance height (OCH). The lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria.
Note 1.— Obstacle clearance altitude is referenced to mean sea level and obstacle clearance height is referenced to the threshold elevation or in the case of non-precision approaches to the aerodrome elevation or the threshold elevation if that is more than 2 m (7 ft) below the aerodrome elevation. An obstacle clearance height for a circling approach is referenced to the aerodrome elevation.
Note 2.— For convenience when both expressions are used they may be written in the form "obstacle clearance altitude/height" and abbreviated "OCA/H".

Operator. A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Pilot-in-command. The pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight.

Position indication. The visual indication, in non-symbolic and/or symbolic form, on a situation display, of the position of an aircraft, aerodrome vehicle or other object.

Position symbol. The visual indication in symbolic form, on a situation display, of the position of an aircraft, aerodrome vehicle or other object, obtained after automatic processing of positional data derived from any source.

Pressure-altitude. An atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the Standard Atmosphere.*
* As defined in Annex 8.

Primary radar. A radar system which uses reflected radio signals.

Primary surveillance radar (PSR). A surveillance radar system which uses reflected radio signals.

Procedural control. Term used to indicate that information derived from an ATS surveillance system is not required for the provision of air traffic control service.

Procedural separation. The separation used when providing procedural control.

PSR blip. The visual indication, in non-symbolic form, on a situation display of the position of an aircraft obtained by primary radar.

Radar. A radio detection device which provides information on range, azimuth and/or elevation of objects.

Radar approach. An approach in which the final approach phase is executed under the direction of a controller using radar.

Radar clutter. The visual indication on a situation display of unwanted signals.

Radar contact. The situation which exists when the radar position of a particular aircraft is seen and identified on a situation display.

Radar separation. The separation used when aircraft position information is derived from radar sources.

Receiving unit/controller. Air traffic services unit/air traffic controller to which a message is sent.
Note.— See definition of "sending unit/controller".

Repetitive flight plan (RPL). A flight plan related to a series of frequently recurring, regularly operated individual flights with identical basic features, submitted by an operator for retention and repetitive use by ATS units.

Reporting point. A specified geographical location in relation to which the position of an aircraft can be reported.

Required navigation performance (RNP). A statement of the navigation performance necessary for operation within a defined airspace.
Note.— Navigation performance and requirements are defined for a particular RNP type and/or application.

RNP type. A containment value expressed as a distance in nautical miles from the intended position within which flights would be for at least 95 per cent of the total flying time.
Example.— RNP 4 represents a navigation accuracy of plus or minus 7.4 km (4 NM) on a 95 per cent containment basis.

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

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

Secondary radar. A radar system wherein a radio signal transmitted from the radar station initiates the transmission of a radio signal from another station.

Secondary surveillance radar (SSR). A surveillance radar system which uses transmitters/receivers (interrogators) and transponders.

Segregated parallel operations. Simultaneous operations on parallel or near-parallel instrument runways in which one runway is used exclusively for approaches and the other runway is used exclusively for departures.

Sending unit/controller. Air traffic services unit/air traffic controller transmitting a message.
Note.— See definition of "receiving unit/controller".

SIGMET information. 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 aircraft operations.

Significant point. A specified geographical location used in defining an ATS route or the flight path of an aircraft and for other navigation and ATS purposes.
Note.— There are three categories of significant points: ground-based navigation aid, intersection and waypoint. In the context of this definition, intersection is a significant point expressed as radials, bearings and/or distances from ground-based navigation aids.

Situation display. An electronic display depicting the position and movement of aircraft and other information as required.

Slush. Water-saturated snow which with a heel-and-toe slap-down motion against the ground will be displaced with a splatter; specific gravity: 0.5 up to 0.8.
Note.— Combinations of ice, snow and/or standing water may, especially when rain, rain and snow, or snow is falling, produce substances with specific gravities in excess of 0.8. These substances, due to their high water/ice content, will have a transparent rather than a cloudy appearance and, at the higher specific gravities, will be readily distinguishable from slush.

Snow (on the ground).
a) *Dry snow.* Snow which can be blown if loose or, if compacted by hand, will fall apart upon release; specific gravity: up to but not including 0.35.
b) *Wet snow.* Snow which, if compacted by hand, will stick together and tend to or form a snowball; specific gravity: 0.35 up to but not including 0.5.
c) *Compacted snow.* Snow which has been compressed into a solid mass that resists further compression and will hold together or break up into lumps if picked up; specific gravity: 0.5 and over.

Special VFR flight. A VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC.

SSR response. The visual indication, in non-symbolic form, on a situation display, of a response from an SSR transponder in reply to an interrogation.

Standard instrument arrival (STAR). A designated instrument flight rule (IFR) arrival route linking a significant point, normally on an ATS route, with a point from which a published instrument approach procedure can be commenced.

Standard instrument departure (SID). A designated instrument flight rule (IFR) departure route linking the aerodrome or a specified runway of the aerodrome with a specified significant point, normally on a designated ATS route, at which the en-route phase of a flight commences.

Surveillance radar. Radar equipment used to determine the position of an aircraft in range and azimuth.

Taxiing. Movement of an aircraft on the surface of an aerodrome under its own power, excluding take-off and landing.

Taxiway. A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including:
a) *Aircraft stand taxilane.* A portion of an apron designated as a taxiway and intended to provide access to aircraft stands only.
b) *Apron taxiway.* A portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron.
c) *Rapid exit taxiway.* A taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times.

Terminal control area (TMA). A control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes.

Threshold. The beginning of that portion of the runway usable for landing.

Time difference of arrival (TDOA). The difference in relative time that a transponder signal from the same aircraft (or ground vehicle) is received at different receivers.

Total estimated elapsed time. For IFR flights, the estimated time required from take-off to arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the destination aerodrome, to arrive over the destination aerodrome. For VFR flights, the estimated time required from take-off to arrive over the destination aerodrome.

Touchdown. The point where the nominal glide path intercepts the runway.
Note.— "Touchdown" as defined above is only a datum and is not necessarily the actual point at which the aircraft will touch the runway.

Track. 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 avoidance advice. Advice provided by an air traffic services unit specifying manoeuvres to assist a pilot to avoid a collision.

Traffic information. Information issued by an air traffic services 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. 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.

Transferring unit/controller. Air traffic control unit/air traffic controller in the process of transferring the responsibility for providing air traffic control service to an aircraft to the next air traffic control unit/air traffic controller along the route of flight.
Note.— See definition of "accepting unit/controller".

Uncertainty phase. A situation wherein uncertainty exists as to the safety of an aircraft and its occupants.

Vectoring. Provision of navigational guidance to aircraft in the form of specific headings, based on the use of an ATS surveillance system.

VFR. The symbol used to designate the visual flight rules.

VFR flight. A flight conducted in accordance with the visual flight rules.

Visibility. Visibility for aeronautical purposes is the greater of:
a) the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background;
b) the greatest distance at which lights in the vicinity of 1 000 candelas can be seen and identified against an unlit background.
Note 1.— The two distances have different values in air of a given extinction coefficient, and the latter b) varies with the background illumination. The former a) is represented by the meteorological optical range (MOR).
Note 2.— The definition applies to the observations of visibility in local routine and special reports, to the observations of prevailing and minimum visibility reported in METAR and SPECI and to the observations of ground visibility.

Visual approach. An approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain.

Visual meteorological conditions. Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.
Note.— The specified minima are contained in Annex 2, Chapter 4.

VMC. The symbol used to designate visual meteorological conditions.

Waypoint. 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:
Fly-by waypoint. A waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure, or
Flyover waypoint. A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.

CHAPTER II

ATS SURVEILLANCE SYSTEMS CAPABILITIES

2.1 ATS surveillance systems used in the provision of air traffic services shall have a very high level of reliability, availability and integrity. The possibility of system failures or significant system degradations which may cause complete or partial interruptions of service shall be very remote. Backup facilities shall be provided.

2.2 ATS surveillance systems should have the capability to receive, process and display, in an integrated manner, data from all the connected sources.

2.3 ATS surveillance systems should be capable of integration with other automated systems used in the provision of ATS, and should provide for an appropriate level of automation with the objectives of improving the accuracy and timeliness of data displayed to the controller and reducing controller workload and the need for verbal coordination between adjacent control positions and ATC units.

2.4 ATS surveillance systems should provide for the display of safety-related alerts and warnings, including conflict alert, minimum safe altitude warning, conflict prediction and unintentionally duplicated SSR codes and aircraft identification.

2.5 DGCA should, to the extent possible, facilitate the sharing of information derived from ATS surveillance systems in order to extend and improve surveillance coverage in adjacent State control areas.

2.6 DGCA should, on the basis of regional air navigation agreements, provide for the automated exchange of coordination data relevant to aircraft being provided with ATS surveillance services, and establish automated coordination procedures.

2.7 ATS surveillance systems, such as primary surveillance radar (PSR), secondary surveillance radar (SSR), ADS-B and MLAT systems may be used either alone or in combination in the provision of air traffic services, including in the provision of separation between aircraft, provided:

a) reliable coverage exists in the area;
b) the probability of detection, the accuracy and the integrity of the ATS surveillance system(s) are satisfactory; and
c) in the case of ADS-B, the availability of data from participating aircraft is adequate.

2.8 PSR systems should be used in circumstances where other ATS surveillance systems alone would not meet the air traffic services requirements

2.9 SSR systems, especially those utilizing monopulse techniques or having Mode S capability or MLAT, may be used alone, including in the provision of separation between aircraft, provided:

a) the carriage of SSR transponders is mandatory within the area; and
b) identification is established and maintained.

2.10 ADS-B shall only be used for the provision of air traffic control service provided the quality of the information contained in the ADS-B message figure of merit (FOM) exceeds the value of four.

2.11 ADS-B may be used alone, including in the provision of separation between aircraft, provided:

a) identification of ADS-B-equipped aircraft is established and maintained;
b) the data integrity measure in the ADS-B message is adequate to support the separation minimum;
c) there is no requirement for detection of aircraft not transmitting ADS-B; and
d) there is no requirement for determination of aircraft position independent of the position-determining elements of the aircraft navigation system.

2.12 The provision of ATS surveillance services shall be limited to specified areas of coverage and shall be subject to such other limitations as have been specified by DGCA. Adequate information on the operating methods used shall be published in aeronautical information publications, as well as operating practices and/or equipment limitations having direct effects on the operation of the air traffic services. information on the area or areas where PSR, SSR, ADS-B and MLAT systems are in use as well as ATS surveillance services and procedures will be provided in accordance with CASR Part 175.

2.12.1 The provision of ATS surveillance services shall be limited when position data quality degrades below a level specified by DGCA

2.13 Where PSR and SSR are required to be used in combination, SSR alone may be used in the event of PSR failure to provide separation between identified transponder-equipped aircraft, provided the accuracy of the SSR position indications has been verified by monitor equipment or other means.

CHAPTER III

SITUATION DISPLAY

3.1 A situation display providing surveillance information to the controller shall, as a minimum, include position indications, map information required to provide ATS surveillance services and, where available, information concerning the identity of the aircraft and the aircraft level.

3.2 The ATS surveillance system shall provide for a continuously updated presentation of surveillance information, including position indications.

3.3 Position indications may be displayed as:
a) individual position symbols, e.g. PSR, SSR, ADS-B or MLAT symbols, or combined symbols;
b) PSR blips; and
c) SSR responses.

3.4 Distinct symbols shall be used for presentation of:
a) unintentionally duplicated SSR codes and/or aircraft identification that are unintentionally duplicated;
b) predicted positions for a non-updated track; and
c) plot and track data.

3.5 Where surveillance data quality degrades such that services need to be limited, symbology or other means shall be used to provide the controller with an indication of the condition.

3.6 Reserved SSR codes, including 7500, 7600 and 7700, operation of IDENT, ADS-B emergency and/or urgency modes, safety-related alerts and warnings as well as information related to automated coordination shall be presented in a clear and distinct manner, providing for ease of recognition.

3.7 Labels associated with displayed targets should be used to provide, in alphanumeric form, relevant information derived from the means of surveillance and, where necessary, the flight data processing system.

3.8 Labels shall, as a minimum, include information relating to the identity of the aircraft, e.g. SSR code or aircraft identification and, if available, pressure-altitude-derived level information. This information may be obtained from SSR Mode A, SSR Mode C, SSR Mode S and/or ADS-B.

3.9 Labels shall be associated with their position indications in a manner precluding erroneous identification by or confusion on the part of the controller. All label information shall be presented in a clear and concise manner.

CHAPTER IV

COMMUNICATIONS

4.1 The level of reliability and availability of communications systems shall be such that the possibility of system failures or significant degradations is very remote. Adequate backup facilities shall be provided.
Note.— the requirement of system reliability and availability are contained in CASR Part 171

4.2 Direct pilot-controller communications shall be established prior to the provision of ATS surveillance services, unless special circumstances, such as emergencies, dictate otherwise.

CHAPTER V

PROVISION OF ATS SURVEILLANCE SERVICES

5.1 Information derived from ATS surveillance systems, including safety-related alerts and warnings such as conflict alert and minimum safe altitude warning, should be used to the extent possible in the provision of air traffic control service in order to improve capacity and efficiency as well as to enhance safety.

5.2 The number of aircraft simultaneously provided with ATS surveillance services shall not exceed that which can safely be handled under the prevailing circumstances, taking into account:

a) the structural complexity of the control area or sector concerned;
b) the functions to be performed within the control area or sector concerned;
c) assessments of controller workloads, taking into account different aircraft capabilities, and sector capacity; and
d) the degree of technical reliability and availability of the primary and backup communications, navigation and surveillance systems, both in the aircraft and on the ground.

CHAPTER VI

USE OF SSR TRANSPONDERS AND ADS-B TRANSMITTERS

6.1 General

To ensure the safe and efficient use of ATS surveillance services, pilots and controllers shall strictly adhere to published operating procedures and standard radiotelephony phraseology as prescribed on appendix 1 of this regulation shall be used. The correct setting of transponder codes and/or aircraft identification shall be ensured at all times.

6.2 SSR code management

6.2.1 Codes 7700, 7600 and 7500 shall be reserved internationally for use by pilots encountering a state of emergency, radio communication failure or unlawful interference, respectively.

6.2.2 SSR codes are to be allocated and assigned in accordance with the following principles:

6.2.2.1DGCA allocate codes to areas in accordance with regional air navigation agreements, taking into account overlapping radar coverage over adjacent airspaces.

6.2.2.2DGCA shall establish a plan and procedures for the allocation of codes to ATS units.

6.2.2.3The plan and procedures should be compatible with those practiced in adjacent States.

6.2.2.4 The allocation of a code should preclude the use of this code for any other function within the area of coverage of the same SSR for a prescribed time period.

6.2.2.5To reduce pilot and controller workload and the need for controller/pilot communications, the number of code changes required of the pilot should be kept to the minimum.

6.2.2.6 Codes shall be assigned to aircraft in accordance with the plan and procedures laid down by DGCA

6.2.2.7 Where there is a need for individual aircraft identification, each aircraft shall be assigned a discrete code which should, whenever possible, be retained throughout the flight.

6.2.2.8 Except for aircraft in a state of emergency, or during communication failure or unlawful interference situations, and unless otherwise agreed by regional air navigation agreement or between a transferring and an accepting ATC unit, the transferring unit shall assign Code A2000 to a controlled flight prior to transfer of communications.

6.2.3 SSR codes shall be reserved, as necessary, for exclusive use by medical aircraft operating in areas of international armed conflict. SSR codes shall be allocated by ICAO through its Regional Offices in coordination with States concerned and should be assigned to aircraft for use within the area of conflict.

Note.— The term "medical aircraft" refers to aircraft protected under the Geneva Conventions of 1949 and under the Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the protection of victims of international armed conflicts (Protocol I).

6.3 Operation of SSR transponders

6.3.1 When it is observed that the Mode A code shown on the situation display is different to what has been assigned to the aircraft, the pilot shall be requested to confirm the code selected and, if the situation warrants (e.g. not being a case of unlawful interference), to reselect the correct code.

6.3.2 If the discrepancy between assigned and displayed Mode A codes still persists, the pilot may be requested to stop the operation of the aircraft's transponder. The next control position and any other affected unit using SSR and/or MLAT in the provision of ATS shall be informed accordingly.

6.3.3 Aircraft equipped with Mode S having an aircraft identification feature shall transmit the aircraft identification as specified in Item 7 of the ICAO flight plan as described on Appendix II of this regulation or, when no flight plan has been filed, the aircraft registration.

Note.— All Mode S-equipped aircraft engaged in international civil aviation are required to have an aircraft identification feature (Annex 10, Volume IV, Chapter 2, 2.1.5.2, refers).

6.3.4 Whenever it is observed on the situation display that the aircraft identification transmitted by a Mode S-equipped aircraft is different from that expected from the aircraft, the pilot shall be requested to confirm and, if necessary, re-enter the correct aircraft identification.

6.3.5 If, following confirmation by the pilot that the correct aircraft identification has been set on the Mode S identification feature, the discrepancy continues to exist, the following actions shall be taken by the controller:

a) inform the pilot of the persistent discrepancy;
b) where possible, correct the label showing the aircraft identification on the situation display; and
c) notify the erroneous aircraft identification transmitted by the aircraft to the next control position and any other interested unit using Mode S for identification purposes.

6.4 Operation of ADS-B transmitters

Note 1.— To indicate that it is in a state of emergency or to transmit other urgent information, an aircraft equipped with ADS-B might operate the emergency and/or urgency mode as follows:
a) emergency;
b) communication failure;
c) unlawful interference;
d) minimum fuel; and/or
e) medical.
Note 2.— Some aircraft equipped with first generation ADS-B avionics do not have the capability described in Note 1 above and only have the capability to transmit a general emergency alert regardless of the code selected by the Pilot

6.4.1 Aircraft equipped with ADS-B having an aircraft identification feature shall transmit the aircraft identification as specified in Item 7 of the ICAO flight plan or, when no flight plan has been filed, the aircraft registration.

6.4.2 Whenever it is observed on the situation display that the aircraft identification transmitted by an ADS-B-equipped aircraft is different from that expected from the aircraft, the pilot shall be requested to confirm and, if necessary, re-enter the correct aircraft identification.

6.4.3 If, following confirmation by the pilot that the correct aircraft identification has been set on the ADS-B identification feature, the discrepancy continues to exist, the following actions shall be taken by the controller:
a) inform the pilot of the persistent discrepancy;
b) where possible, correct the label showing the aircraft identification on the situation display; and
c) notify the next control position and any other unit concerned of the erroneous aircraft identification transmitted by the aircraft.

6.5 Level information based on the use of pressure-altitude information

6.5.1 Verification Of Level Information

6.5.1.1 The tolerance value used to determine that pressure-altitude-derived level information displayed to the controller is accurate shall be ±60 m (±200 ft) in RVSM airspace. In other airspace, it shall be ±90 m (±300 ft). Geometric height information shall not be used for separation.

6.5.1.2 Verification of pressure-altitude-derived level information displayed to the controller shall be effected at least once by each suitably equipped ATC unit on initial contact with the aircraft concerned or, if this is not feasible, as soon as possible thereafter. The verification shall be effected by simultaneous comparison with altimeter-derived level information received from the same aircraft by radiotelephony. The pilot of the aircraft whose pressure-altitude-derived level information is within the approved tolerance value need not be advised of such verification. Geometric height information shall not be used to determine if altitude differences exist.

6.5.1.3 If the displayed level information is not within the approved tolerance value or when a discrepancy in excess of the approved tolerance value is detected subsequent to verification, the pilot shall be advised accordingly and requested to check the pressure setting and confirm the aircraft's level.

6.5.1.4 If, following confirmation of the correct pressure setting the discrepancy continues to exist, the following action should be taken according to circumstances:

a) request the pilot to stop Mode C or ADS-B altitude data transmission, provided this does not cause the loss of position and identity information, and notify the next control positions or ATC unit concerned with the aircraft of the action taken; or

b) inform the pilot of the discrepancy and request that the relevant operation continue in order to prevent loss of position and identity information of the aircraft and, override the label-displayed level information with the reported level. Notify the next control position or ATC unit concerned with the aircraft of the action taken.

6.5.2 Determination Of Level Occupancy

6.5.2.1 The criterion which shall be used to determine that a specific level is occupied by an aircraft shall be ±60 m (±200 ft) in RVSM airspace. In other airspace, it shall be ±90 m (±300 ft).

Note.— For a brief explanation of the considerations underlying this value, see the Air Traffic Services Planning Manual (Doc 9426).

6.5.2.2 Aircraft maintaining a level. An aircraft is considered to be maintaining its assigned level as long as the pressure-altitude-derived level information indicates that it is within the appropriate tolerances of the assigned level, as specified in 6.5.2.1.

6.5.2.3 Aircraft vacating a level. An aircraft cleared to leave a

level is considered to have commenced its manoeuvre and vacated the previously occupied level when the pressure-altitude-derived level information indicates a change of more than 90 m (300 ft) in the anticipated direction from its previously assigned level.

6.5.2.4 Aircraft passing a level in climb or descent. An aircraft in climb or descent is considered to have crossed a level when the pressure-altitude-derived level information indicates that it has passed this level in the required direction by more than 90 m (300 ft).

6.5.2.5 Aircraft reaching a level. An aircraft is considered to have reached the level to which it has been cleared when the elapsed time of three display updates, three sensor updates or 15 seconds, whichever is the greater, has passed since the pressure-altitude-derived level information has indicated that it is within the appropriate tolerances of the assigned level, as specified in 6.5.2.1.

6.5.2.6 Intervention by a controller shall only be required if differences in level information between that displayed to the controller and that used for control purposes are in excess of the values stated above.

CHAPTER VII

GENERAL PROCEDURES

7.1 Performance checks

7.1.1 The controller shall adjust the situation display(s) and carry out adequate checks on the accuracy thereof, in accordance with the technical instructions prescribed by the appropriate authority for the equipment concerned.

7.1.2 The controller shall be satisfied that the available functional capabilities of the ATS surveillance system as well as the information presented on the situation display(s) is adequate for the functions to be performed.

7.1.3 The controller shall report, in accordance with local procedures, any fault in the equipment, or any incident requiring investigation, or any circumstances which make it difficult or impractical to provide ATS surveillance services.

7.2 Identification of aircraft

7.2.1 Establishment of identification

7.2.1.1 Before providing an ATS surveillance service to an aircraft, identification shall be established and the pilot informed. Thereafter, identification shall be maintained until termination of the ATS surveillance service.

7.2.1.2 If identification is subsequently lost, the pilot shall be informed accordingly and, when applicable, appropriate instructions issued.

7.2.1.3 Identification shall be established by at least one of the methods specified in 7.2.2, 7.2.3, 7.2.4 and 7.2.5.

7.2.2 ADS-B identification procedures

Where ADS-B is used for identification, aircraft may be identified by one or more of the following procedures:

a) direct recognition of the aircraft identification in an ADS-B label;

b) transfer of ADS-B identification (see 8.6.3); and

c) observation of compliance with an instruction to TRANSMIT ADS-B IDENT.

Note 1.— Some aircraft equipped with first generation ADS-B avionics do not have the capability of squawking IDENT while the emergency and/or urgency mode is selected.

Note 2.— In automated systems, the "IDENT" feature may be presented in different ways, e.g. as a flashing of all or part of the position indication and associated label.

7.2.3 SSR and/or MLAT IDENTIFICATION PROCEDURES

7.2.3.1 Where SSR and/or MLAT is used for identification, aircraft may be identified by one or more of the following procedures:

a) recognition of the aircraft identification in an SSR and/or MLAT label;
Note.— The use of this procedure requires that the code/call sign correlation is achieved successfully ,taking into account the Note following b) below.

b) recognition of an assigned discrete code, the setting of which has been verified, in an SSR and/or MLAT label; and
Note.— The use of this procedure requires a system of code assignment which ensures that each aircraft in a given portion of airspace is assigned a discrete code (see 6.2.2.7).

c) direct recognition of the aircraft identification of a Mode S-equipped aircraft in an SSR and/or MLAT label;
Note.— The aircraft identification feature available in Mode S transponders provides the means to identify directly individual aircraft on situation displays and thus offers the potential to eliminate ultimately the recourse to Mode A discrete codes for individual identification. This elimination will only be achieved in a progressive manner depending on the state of deployment of suitable ground and airborne installations.

d) by transfer of identification (see 7.3);

e) observation of compliance with an instruction to set a specific code;

f) observation of compliance with an instruction to squawk IDENT.
Note 1.— In automated radar systems, the "IDENT" feature may be presented in different ways, e.g. as a flashing of all or part of the position indication and associated label.
Note 2.— Garbling of transponder replies may produce "IDENT"-type of indications. Nearly simultaneous "IDENT" transmissions within the same area may give rise to errors in identification.

7.2.3.2 When a discrete code has been assigned to an aircraft, a check shall be made at the earliest opportunity to ensure that the code set by the pilot is identical to that assigned for the flight. Only after this check has been made shall the discrete code be used as a basis for identification.

7.2.4 PSR identification procedures

7.2.4.1 Where PSR is used for identification, aircraft may be identified by one or more of the following procedures:

a) by correlating a particular radar position indication with an aircraft reporting its position over, or as bearing and distance from, a point shown on the situation display, and by ascertaining that the track of the particular radar position is consistent with the aircraft path or reported heading;

Note 1.— Caution must be exercised when employing this method since a position reported in relation to a point may not coincide precisely with the radar position indication of the aircraft on the situation display.
Note 2.— The term "a point" refers to a geographical point suitable for the purposes of identification. It is normally a reporting point defined by reference to a radio navigation aid or aids.

b) by correlating an observed radar position indication with an aircraft which is known to have just departed, provided that the identification is established within 2 km (1 NM) from the end of the runway used. Particular care should be taken to avoid confusion with aircraft holding over or overflying the aerodrome, or with aircraft departing from or making a missed approach over adjacent runways;

c) by transfer of identification (7.3);

d) d) by ascertaining the aircraft heading, if circumstances require, and following a period of track observation:
— instructing the pilot to execute one or more changes of heading of 30 degrees or more and correlating the movements of one particular radar position indication with the aircraft's acknowledged execution of the instructions given; or
— correlating the movements of a particular radar position indication with manoeuvres currently executed by an aircraft having so reported.

When using these methods, the controller shall:

i) verify that the movements of not more than one radar position indication correspond with those of the aircraft; and

ii) ensure that the manoeuvre(s) will not carry the aircraft outside the coverage of the radar or the situation display.

Note 1.— Caution must be exercised when employing these methods in areas where route changes normally take place.

Note 2.— With reference to ii) above, see also 7.5.1 regarding vectoring of controlled aircraft.

7.2.4.2 Use may be made of direction-finding bearings to assist in identification of an aircraft. This method, however, shall not be used as the sole means of establishing identification,

7.2.5 Additional identification method

When two or more position indications are observed in close proximity, or are observed to be making similar movements at the same time, or when doubt exists as to the identity of a position indication for any other reason, changes of heading should be prescribed or repeated as many times as necessary, or additional methods of identification should be employed, until all risk of error in identification is eliminated.

7.3 Transfer of identification

7.3.1 Transfer of identification from one controller to another should only be attempted when it is considered that the aircraft is within the accepting controller's surveillance coverage.

7.3.2 Transfer of identification shall be effected by one of the following methods:

a) designation of the position indication by automated means, provided that only one position indication is thereby indicated and there is no possible doubt of correct identification;

b) notification of the aircraft's discrete SSR code or aircraft address;

Note 1.— The use of a discrete SSR code requires a system of code assignment which ensures that each aircraft in a given portion of airspace is assigned a discrete code (see 6.2.2.7).

Note 2.— Aircraft address would be expressed in the form of the alphanumerical code of six hexadecimal characters.

c) notification that the aircraft is SSR Mode S-equipped with an aircraft identification feature when SSR Mode S coverage is available;

d) notification that the aircraft is ADS-B-equipped with an aircraft identification feature when compatible ADS-B coverage is available;

e) direct designation (pointing with the finger) of the position indication, if the two situation displays are adjacent, or if a common "conference" type of situation display is used;

Note.— Attention must be given to any errors which might occur due to parallax effects.

f) designation of the position indication by reference to, or in terms of bearing and distance from, a geographical position or navigational facility accurately indicated on both situation displays, together with the track of the observed position indication if the route of the aircraft is not known to both controllers;

Note.— Caution must be exercised before transferring identification using this method, particularly if other position indications are observed on similar headings and in close proximity to the aircraft under control. Inherent radar deficiencies, such as inaccuracies in bearing and distance of the radar position indications displayed on individual situation displays and parallax errors, may cause the indicated position of an aircraft in relation to the known point to differ between the two situation displays.

g) where applicable, issuance of an instruction to the aircraft by the transferring controller to change SSR code and the observation of the change by the accepting controller; or

h) issuance of an instruction to the aircraft by the transferring controller to squawk/transmit IDENT and observation of this response by the accepting controller.

Note.— Use of procedures g) and h) requires prior coordination between the controllers, since the indications to be observed by the accepting controller are of short duration.

7.4 Position information

7.4.1 An aircraft provided with ATS surveillance service should be informed of its position in the following circumstances:

a) upon identification, except when the identification is established:

i) based on the pilot's report of the aircraft position or within one nautical mile of the runway upon departure and the observed position on the situation display is consistent with the aircraft's time of departure; or

ii) by use of ADS-B aircraft identification, Mode S aircraft identification or assigned discrete SSR codes and the location of the observed position indication is consistent with the current flight plan of the aircraft; or

iii) by transfer of identification;

b) when the pilot requests this information;

c) when a pilot's estimate differs significantly from the controller's estimate based on the observed position;

d) when the pilot is instructed to resume own navigation after vectoring if the current instructions had diverted the aircraft from a previously assigned route (see 7.5.5);

e) immediately before termination of ATS surveillance service, if the aircraft is observed to deviate from its intended route

7.4.2 Position information shall be passed to aircraft in one of the following forms:

a) as a well-known geographical position;
b) magnetic track and distance to a significant point, an en-route navigation aid, or an approach aid;
c) direction (using points of the compass) and distance from a known position;
d) distance to touchdown, if the aircraft is on final approach; or
e) distance and direction from the centre line of an ATS route.

7.4.3 Whenever practicable, position information shall relate to positions or routes pertinent to the navigation of the aircraft concerned and shown on the situation display map.

7.4.4 When so informed, the pilot may omit position reports at compulsory reporting points or report only over those reporting points specified by the air traffic services unit concerned. Unless automated position reporting is in effect (e.g. ADS-C), pilots shall resume voice or CPDLC position reporting:

a) when so instructed;
b) when advised that the ATS surveillance service has been terminated; or
c) when advised that identification is lost.

7.5 Vectoring

7.5.1 Vectoring shall be achieved by issuing to the pilot specific headings which will enable the aircraft to maintain the desired track. When vectoring an aircraft, a controller shall comply with the following:

a) whenever practicable, the aircraft shall be vectored along tracks on which the pilot can monitor the aircraft position with reference to pilot-interpreted navigation aids (this will minimize the amount of navigational assistance required and alleviate the consequences resulting from an ATS surveillance system failure);
b) when an aircraft is given its initial vector diverting it from a previously assigned route, the pilot shall be informed what the vector is to accomplish, and the limit of the vector shall be specified (e.g. to ... position, for ... approach);
c) except when transfer of control is to be effected, aircraft shall not be vectored closer than 4.6 km (2.5 NM) or, where the minimum permissible separation is greater than 9.3 km (5 NM), a distance equivalent to one-half of the prescribed separation minimum, from the limit of the airspace for which the controller is responsible, unless local arrangements have been made to ensure that separation will exist with aircraft operating in adjoining areas;
d) controlled flights shall not be vectored into uncontrolled airspace except in the case of emergency or in order to circumnavigate adverse meteorological conditions (in which case the pilot should be so informed), or at the specific request of the pilot; and

e) when an aircraft has reported unreliable directional instruments, the pilot shall be requested, prior to the issuance of manoeuvring instructions, to make all turns at an agreed rate and to carry out the instructions immediately upon receipt.

7.5.2 When vectoring an IFR flight and when giving an IFR flight a direct routing which takes the aircraft off an ATS route, the controller shall issue clearances such that the prescribed obstacle clearance will exist at all times until the aircraft reaches the point where the pilot will resume own navigation. When necessary, the relevant minimum vectoring altitude shall include a correction for low temperature effect.

Note 1.— When an IFR flight is being vectored, the pilot may be unable to determine the aircraft's exact position in respect to obstacles in this area and consequently the altitude which provides the required obstacle clearance. Detailed obstacle clearance criteria are contained in Manual of Standard Part 173. See also 6.8.2.
Note 2.— It is the responsibility of DGCA to provide the controller with minimum altitudes corrected for temperature effect.

7.5.3 Whenever possible, minimum vectoring altitudes should be sufficiently high to minimize activation of aircraft ground proximity warning systems.
Note.— Activation of such systems will induce aircraft to pull up immediately and climb steeply to avoid hazardous terrain, possibly compromising separation between aircraft.

7.5.4 In terminating vectoring of an aircraft, the controller shall instruct the pilot to resume own navigation, giving the pilot the aircraft's position and appropriate instructions, as necessary, in the form prescribed in 7.4.2 b), if the current instructions had diverted the aircraft from a previously assigned route.

7.6 Navigation assistance

7.6.1 An identified aircraft observed to deviate significantly from its intended route or designated holding pattern shall be advised accordingly. Appropriate action shall also be taken if, in the opinion of the controller, such deviation is likely to affect the service being provided.

7.6.2 The pilot of an aircraft requesting navigation assistance from an air traffic control unit providing ATS surveillance services shall state the reason (e.g. to avoid areas of adverse weather or unreliable navigational instruments) and shall give as much information as possible in the circumstances.

7.7 Interruption or termination of ATS surveillance service

7.7.1 An aircraft which has been informed that it is provided with ATS surveillance service should be informed immediately when, for any reason, the service is interrupted or terminated.
Note.— The transition of an aircraft across adjoining areas of radar and/or ADS-B and/or MLAT systems coverage will not normally constitute an interruption or termination of the ATS surveillance service.

7.7.2 When the control of an identified aircraft is to be transferred to a control sector that will provide the aircraft with procedural separation, the transferring controller shall ensure that appropriate procedural separation is established between that aircraft and any other controlled aircraft before the transfer is effected.

7.8 Minimum levels

7.8.1 The controller shall at all times be in possession of full and up-to-date information regarding:
a) established minimum flight altitudes within the area of responsibility;
b) the lowest usable flight level or levels determined in accordance with AC 170-02 Chapters 4 and 5; and
c) established minimum altitudes applicable to procedures based on tactical vectoring.

7.8.2 Unless otherwise specified by DGCA, minimum altitudes for procedures based on tactical vectoring with any ATS surveillance system shall be determined using the criteria applicable to tactical radar vectoring.
Note.— Criteria for the determination of minimum altitudes applicable to procedures based on tactical radar vectoring are contained in Manual of Standard Part 173.

7.9 Information regarding adverse weather

7.9.1 Information that an aircraft appears likely to penetrate an area of adverse weather should be issued in sufficient time to permit the pilot to decide on an appropriate course of action, including that of requesting advice on how best to circumnavigate the adverse weather area, if so desired.
Note.— Depending on the capabilities of the ATS surveillance system, areas of adverse weather may not be presented on the situation display. An aircraft's weather radar will normally provide better detection and definition of adverse weather than radar sensors in use by ATS.

7.9.2 In vectoring an aircraft for circumnavigating any area of adverse weather, the controller should ascertain that the aircraft can be returned to its intended or assigned flight path within the coverage of the ATS surveillance system and, if this does not appear possible, inform the pilot of the circumstances.
Note.— Attention must be given to the fact that under certain circumstances the most active area of adverse weather may not be displayed.

7.10 Reporting of significant meteorological information to meteorological offices

Although a controller is not required to keep a special watch for heavy precipitation, etc., information on the position, intensity, extent and movement of significant meteorological conditions (i.e. heavy showers or well-defined frontal surfaces) as observed on situation displays should, when practicable, be reported to the associated meteorological office.

CHAPTER VIII

USE OF ATS SURVEILLANCE SYSTEMS IN THE AIR TRAFFIC CONTROL SERVICE

Note.— The procedures in this Section are general procedures applicable when an ATS surveillance system is used in the provision of area control service or approach control service. Additional procedures applicable in the provision of approach control service are detailed in Section 9.9.

8.1 Functions

The information provided by ATS surveillance systems and presented on a situation display may be used to perform the following functions in the provision of air traffic control service:

a) provide ATS surveillance services as necessary in order to improve airspace utilization, reduce delays, provide for direct routings and more optimum flight profiles, as well as to enhance safety;

b) provide vectoring to departing aircraft for the purpose of facilitating an expeditious and efficient departure flow and expediting climb to cruising level;

c) provide vectoring to aircraft for the purpose of resolving potential conflicts;

d) provide vectoring to arriving aircraft for the purpose of establishing an expeditious and efficient approach sequence;

e) provide vectoring to assist pilots in their navigation, e.g. to or from a radio navigation aid, away from or around areas of adverse weather;

f) provide separation and maintain normal traffic flow when an aircraft experiences communication failure within the area of coverage;

g) maintain flight path monitoring of air traffic;

h) when applicable, maintain a watch on the progress of air traffic, in order to provide a procedural controller with:

   i) improved position information regarding aircraft under control;

   ii) supplementary information regarding other traffic; and

   iii) information regarding any significant deviations by aircraft from the terms of their respective air traffic control clearances, including their cleared routes as well as levels, when appropriate.

8.2 Separation application

Note.— Factors which the controller using an ATS surveillance system must take into account in determining the spacing to be applied in particular circumstances in order to ensure that the separation minimum is not infringed include aircraft relative headings and speeds, ATS surveillance system technical limitations, controller workload and any difficulties caused by communication congestion. Guidance material on this subject is contained in the Air Traffic Services Planning Manual (Doc 9426).

8.2.1 Except as provided for in 8.2.8, 8.2.9 and 9.2.2, the separation minima specified in 8.3 shall only be applied between identified aircraft when there is reasonable assurance that identification will be maintained.

8.2.2 When control of an identified aircraft is to be transferred to a control sector that will provide the aircraft with procedural separation, such separation shall be established by the transferring controller before the aircraft reaches the limits of the transferring controller's area of responsibility, or before the aircraft leaves the relevant area of surveillance coverage.

8.2.3 Separation based on the use of ADS-B, SSR and/or MLAT, and/or PSR position symbols and/or PSR blips shall be applied so that the distance between the centres of the position symbols and/or PSR blips, representing the positions of the aircraft concerned, is never less than a prescribed minimum.

8.2.4 Separation based on the use of PSR blips and SSR responses shall be applied so that the distance between the centre of the PSR blip and the centre of the SSR response is never less than a prescribed minimum.

8.2.5 Separation based on the use of ADS-B position symbols and SSR responses shall be applied so that the distance between the centre of the ADS-B position symbol and the centre of the SSR response is never less than a prescribed minimum.

8.2.6 Separation based on the use of SSR responses shall be applied so that the distance between the centres of the SSR is never less than a prescribed minimum.

8.2.7 In no circumstances shall the edges of the position indications touch or overlap unless vertical separation is applied between the aircraft concerned, irrespective of the type of position indication displayed and separation minimum applied.

8.2.8 In the event that the controller has been notified of a controlled flight entering or about to enter the airspace within which the separation minima specified in 8.3 is applied, but has not identified the aircraft, the controller may, continue to provide an ATS surveillance service to identified aircraft provided that:

a) reasonable assurance exists that the unidentified controlled flight will be identified using SSR and/or ADS-B and/or MLAT or the flight is being operated by an aircraft of a type which may be expected to give an adequate return on primary radar in the airspace within which the separation is applied; and

b) the separation is maintained between identified flights and any other observed ATS surveillance system position indications until either the unidentified controlled flight has been identified or procedural separation has been established.

8.2.9 The separation minima specified in 8.3 may be applied between an aircraft taking off and a preceding departing aircraft or other identified traffic provided there is reasonable assurance that the departing aircraft will be identified within 2 km (1 NM) from the end of the runway, and that, at the time, the required separation will exist.

8.2.10 The separation minima specified in 8.3 shall not be applied between aircraft holding over the same holding fix. Application of ATS surveillance system separation minima based on radar and/or ADS-B and/or MLAT systems between holding aircraft and other flights shall be subject to requirements and procedures prescribed by DGCA.

8.3 Separation minima based on ATS surveillance systems

8.3.1 Unless otherwise prescribed in accordance with 8.3.2, 8.3.3 or 8.3.4, or AC 170-02 Chapter 6 (with respect to independent and dependent parallel approaches), the horizontal separation minimum based on radar and/or ADS-B and/or MLAT systems shall be 9.3 km (5.0 NM).

8.3.2 When authorized by DGCA the separation minimum in 8.3.1 may be reduced, but not below:

a) 5.6 km (3.0 NM) when radar and/or ADS-B and/or MLAT systems'capabilities at a given location so permit; and

b) 4.6 km (2.5 NM) between succeeding aircraft which are established on the same final approach track within 18.5 km (10 NM) of the runway threshold. A reduced separation minimum of 4.6 km (2.5 NM) may be applied, provided:

i) the average runway occupancy time of landing aircraft is proven, by means such as data collection and statistical analysis and methods based on a theoretical model, not to exceed 50 seconds;

ii) braking action is reported as good and runway occupancy times are not adversely affected by runway contaminants such as slush, snow or ice;

iii) an ATS surveillance system with appropriate azimuth and range resolution and an update rate of 5 seconds or less is used in combination with suitable displays;

iv) the aerodrome controller is able to observe, visually or by means of surface movement radar (SMR), MLAT system or a surface movement guidance and control system (SMGCS), the runway-in-use and associated exit and entry taxiways;

v) distance-based wake turbulence separation minima in 8.3.4, do not apply;

vi) aircraft approach speeds are closely monitored by the controller and when necessary adjusted so as to ensure that separation is not reduced below the minimum.

vii) aircraft operators and pilots have been made fully aware of the need to exit the runway in an expeditious manner whenever the reduced separation minimum on final approach is applied; and

viii) procedures concerning the application of the reduced minimum are published in AIPs.

8.3.3 The separation minimum or minima based on radar and/or ADS-B and/or MLAT systems to be applied shall be according to the capability of the particular ATS surveillance system or sensor to accurately identify the aircraft position in relation to the centre of a position symbol, PSR blip, SSR response and taking into account factors which may affect the accuracy of the ATS surveillance system-derived information, such as aircraft range from the radar site and the range scale of the situation display in use

8.3.4 The following distance-based wake turbulence separation minima shall be applied to aircraft being provided with an ATS surveillance service in the approach and departure phases of flight in the circumstances given in 7.3.4.1.

Aircraft category		
Preceding aircraft	*Succeeding aircraft*	*Distance-based wake turbulence separation minima*
HEAVY	HEAVY	7.4 km (4.0 NM)
	MEDIUM	9.3 km (5.0 NM)
	LIGHT	11.1 km (6.0 NM)
MEDIUM	LIGHT	9.3 km (5.0 NM)

Note.— The provisions governing wake turbulence aircraft categorization are set forth in AC 170-02 Chapter 4, Section 4.9.

8.3.4.1 The minima set out in 8.3.4 shall be applied when:

a) an aircraft is operating directly behind another aircraft at the same altitude or less than 300 m (1 000 ft) below; or

b) both aircraft are using the same runway, or parallel runways separated by less than 760 m (2 500 ft); or

c) an aircraft is crossing behind another aircraft, at the same altitude or less than 300 m (1 000 ft) below.

Note.— See Figures 1A and 1B.

8.4 Transfer of control

8.4.1 Where an ATS surveillance service is being provided, transfer of control should be effected, whenever practicable, so as to enable the uninterrupted provision of the ATS surveillance service.

8.4.2 Where SSR and/or ADS-B and/or MLAT is used and the display of position indications with associated labels is provided for, transfer of control of aircraft between adjacent control positions or between adjacent ATC units may be effected without prior coordination, provided that:

a) updated flight plan information on the aircraft about to be transferred, including the discrete assigned SSR code or, with respect to Mode S and ADS-B, the aircraft identification, is provided to the accepting controller prior to transfer;

b) the ATS surveillance system coverage provided to the accepting controller is such that the aircraft concerned is presented on the situation display before the transfer is effected and is identified on, but preferably before, receipt of the initial call;

c) when the controllers are not physically adjacent, two-way direct speech facilities, which permit communications to be established instantaneously, are available between them at all times;
Note.— "Instantaneous" refers to communications which effectively provide for immediate access between controllers.

d) the transfer point or points and all other conditions of application, such as direction of flight, specified levels, transfer of communication points, and especially an agreed minimum separation between aircraft, including that applicable to succeeding aircraft on the same route, about to be transferred as observed on the situation display, have been made the subject of specific instructions (for intra-unit transfer) or of a specific letter of agreement between two adjacent ATC units;

e) the instructions or letter of agreement specify explicitly that the application of this type of transfer of control may be terminated at any time by the accepting controller, normally with an agreed advance notice;

f) the accepting controller is informed of any level, speed or vectoring instructions given to the aircraft prior to its transfer and which modify its anticipated flight progress at the point of transfer.

8.4.3 The minimum agreed separation between aircraft about to be transferred (8.4.2 d) refers) and the advance notice (8.4.2 e) refers) shall be determined taking into account all relevant technical, operational and other circumstances. If circumstances arise in which these agreed conditions can no longer be satisfied, controllers shall revert to the procedure in 8.4.4 until the situation is resolved.

8.4.4 Where primary radar is being used, and where another type of ATS surveillance system is employed but the provisions of 8.4.2 are not applied, the transfer of control of aircraft between adjacent control positions or between two adjacent ATS units may be effected, provided that:

a) identification has been transferred to or has been established directly by the accepting controller;

b) when the controllers are not physically adjacent, two-way direct-speech facilities between them are at all times available which permit communications to be established instantaneously;

c) separation from other controlled flights conforms to the minima authorized for use during transfer of control between the sectors or units concerned;

d) the accepting controller is informed of any level, speed or vectoring instructions applicable to the aircraft at the point of transfer;

e) radio communication with the aircraft is retained by the transferring controller until the accepting controller has agreed to assume responsibility for providing the ATS surveillance service to the aircraft. Thereafter, the aircraft should be instructed to change over to the appropriate channel and from that point is the responsibility of the accepting controller.

8.5 Speed control

With consideration of aircraft performance limitations, a controller may, in order to facilitate sequencing or to reduce the need for vectoring, request aircraft to adjust their speed in a specified manner.
Note.— Procedures for speed control instructions are contained in AC 170-02 Chapter 4, Section 4.6.

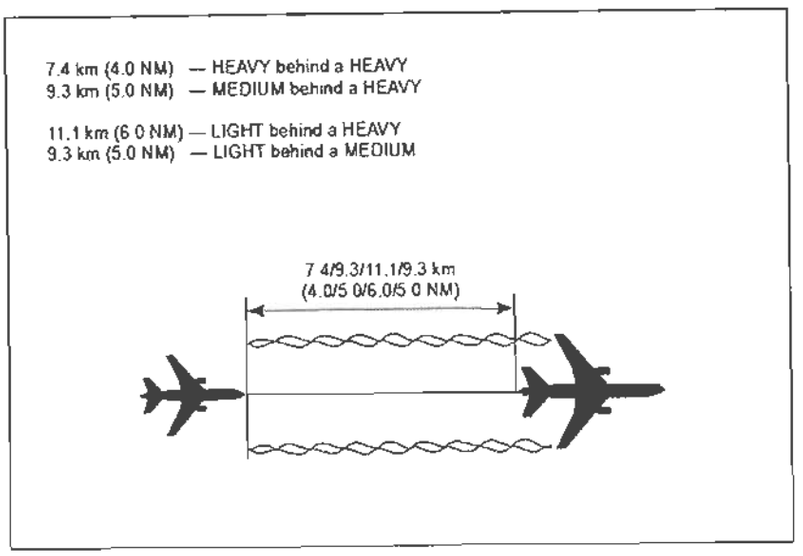


Figure 8-1A. Operating directly behind (see 8.7.3.4 and 8.7.3.4.1)

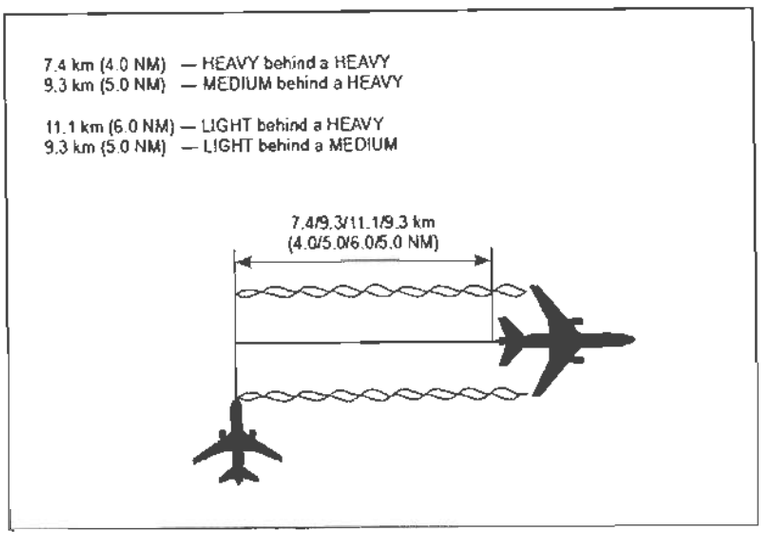


Figure 8-1B. Crossing behind (see 8.7.3.4 and 8.7.3.4.1)

CHAPTER IX

EMERGENCIES, HAZARDS AND EQUIPMENT FAILURES

Note.— See also AC 170-02 Chapter 15.

9.1 Emergencies

9.1.1 In the event of an aircraft in, or appearing to be in, any form of emergency, every assistance shall be provided by the controller, and the procedures prescribed herein may be varied according to the situation.

9.1.2 The progress of an aircraft in emergency shall be monitored and (whenever possible) plotted on the situation display until the aircraft passes out of coverage of the ATS surveillance system, and position information shall be provided to all air traffic services units which may be able to give assistance to the aircraft. Transfer to adjacent sectors shall also be effected when appropriate.

Note.— If the pilot of an aircraft encountering a state of emergency has previously been directed by ATC to select a specific transponder code and/or an ADS-B emergency mode, that code/mode will normally be maintained unless, in special circumstances, the pilot has decided or has been advised otherwise. Where ATC has not requested a code or emergency mode to be set, the pilot will set the transponder to Mode A Code 7700 and/or the appropriate ADS-B emergency mode.

9.1.3 Whenever a general ADS-B emergency alert is observed on the situation display and there is no other indication of the particular nature of the emergency, the controller shall take the following action:

a) attempt to establish communication with the aircraft to verify the nature of the emergency; or

b) if no response is received from the aircraft, the controller shall attempt to ascertain if the aircraft is able to receive transmissions from the air traffic control unit by requesting it to execute a specified manoeuvre which can be observed on the situation display.

Note 1.— Some aircraft equipped with first generation ADS-B avionics have the capability to transmit a general emergency alert only, regardless of the code selected by the pilot.

Note 2.— Some aircraft equipped with first generation ADS-B avionics do not have the capability of squawking IDENT while the emergency and/or urgency mode is selected.

9.2 Collision hazard information

9.2.1 When an identified controlled flight is observed to be on a conflicting path with an unknown aircraft deemed to constitute a collision hazard, the pilot of the controlled flight should:

a) be informed of the unknown aircraft, and if so requested by the controlled flight or if, in the opinion of the controller, the situation warrants, a course of avoiding action should be suggested; and

b) be notified when the conflict no longer exists.

9.2.2 When an identified IFR flight operating outside controlled airspace is observed to be on a conflicting path with another aircraft, the pilot should:

a) be informed as to the need for collision avoidance action to be initiated, and if so requested by the pilot or if, in the opinion of the controller, the situation warrants, a course of avoiding action should be suggested; and

b) be notified when the conflict no longer exists.

9.2.3 Information regarding traffic on a conflicting path should be given, whenever practicable, in the following form:

a) relative bearing of the conflicting traffic in terms of the 12-hour clock;

b) distance from the conflicting traffic in kilometres (nautical miles);

c) direction in which the conflicting traffic appears to be proceeding;

d) level and type of aircraft or, if unknown, relative speed of the conflicting traffic, e.g. slow or fast.

9.2.4 Pressure-altitude-derived level information, even when unverified, should be used in the provision of collision hazard information because such information, particularly if available from an otherwise unknown aircraft (e.g. a VFR flight) and given to the pilot of a known aircraft, could facilitate the location of a collision hazard.

9.2.4.1 When the pressure-altitude-derived level information has been verified, the information shall be passed to pilots in a clear and unambiguous manner. If the level information has not been verified, the accuracy of the information should be considered uncertain and the pilot shall be informed accordingly.

9.3 Failure of equipment

9.3.1 Aircraft radio transmitter failure

9.3.1.1 If two-way communication is lost with an aircraft, the controller should determine whether or not the aircraft's receiver is functioning by instructing the aircraft on the channel so far used to acknowledge by making a specified

manoeuvre and by observing the aircraft's track, or by instructing the aircraft to operate IDENT or to make SSR code and/or ADS-B transmission changes.

Note 1.— Transponder-equipped aircraft experiencing radiocommunication failure will operate the transponder on Mode A Code 7600.

Note 2.— ADS-B-equipped aircraft experiencing radiocommunication failure may transmit the appropriate ADS-B emergency and/or urgency mode.

9.3.1.2 If the action prescribed in 9.3.1.1 is unsuccessful, it shall be repeated on any other available channel on which it is believed that the aircraft might be listening.

9.3.1.3 In both the cases covered by 9.3.1.1 and 9.3.1.2, any manoeuvring instructions shall be such that the aircraft would regain its current cleared track after having complied with the instructions received.

9.3.1.4 Where it has been established by the action in 9.3.1.1 that the aircraft's radio receiver is functioning, continued control can be effected using SSR code/ADS-B transmission changes or IDENT transmissions to obtain acknowledgement of clearances issued to the aircraft.

9.3.2 Complete aircraft communication failure

When a controlled aircraft experiencing complete communication failure is operating or expected to operate in an area and at flight levels where an ATS surveillance service is applied, separation specified in 8.3 may continue to be used. However, if the aircraft experiencing the communication failure is not identified, separation shall be applied between identified aircraft and all unidentified aircraft observed along the expected route of the aircraft with the communication failure, until such time as it is known, or can safely be assumed, that the aircraft with radiocommunication failure has passed through the airspace concerned, has landed, or has proceeded elsewhere.

9.3.3 Aircraft transponder failure in areas where the carriage of a functioning transponder is mandatory

9.3.3.1 When an aircraft experiencing transponder failure after departure is operating or expected to operate in an area where the carriage of a functioning transponder with specified capabilities is mandatory, the ATC units concerned should endeavour to provide for continuation of the flight to the aerodrome of first intended landing in accordance with the flight plan. However, in certain traffic situations, either in terminal areas or en-route, continuation of the flight may not be possible, particularly when failure is detected shortly after take-off. The aircraft may then be required to return to the departure aerodrome or to land at the nearest suitable aerodrome acceptable to the operator concerned and to ATC.

9.3.3.2 In case of a transponder failure which is detected before departure from an aerodrome where it is not practicable to effect a repair, the aircraft concerned should be permitted to proceed, as directly as possible, to the nearest suitable aerodrome where repair can be made. When granting clearance to such aircraft, ATC should take into consideration the existing or anticipated traffic situation and may have to modify the time of departure, flight level or route of the intended flight. Subsequent adjustments may become necessary during the course of the flight.

9.4 ATS surveillance system failure

9.4.1 In the event of complete failure of the ATS surveillance system where air-ground communications remain, the controller shall plot the positions of all aircraft already identified, take the necessary action to establish procedural separation between the aircraft and, if necessary, limit the number of aircraft permitted to enter the area.

9.4.2 As an emergency measure, use of flight levels spaced by half the applicable vertical separation minimum may be resorted to temporarily if standard procedural separation cannot be provided immediately.

9.5 Degradation of aircraft position source data

In order to reduce the impact of a degradation of aircraft position source data, for example, a receiver autonomous integrity monitoring (RAIM) outage for GNSS, DGCA shall establish contingency procedures to be followed by control positions and ATC units in the event of data degradation.

9.6 Ground radio failure

9.6.1 In the event of complete failure of the ground radio equipment used for control, the controller shall, unless able to continue to provide the ATS surveillance service by means of other available communication channels, proceed as follows:

a) without delay inform all adjacent control positions or ATC units, as applicable, of the failure;

b) apprise such positions or units of the current traffic situation;

c) request their assistance, in respect of aircraft which may establish communications with those positions or units, in establishing and maintaining separation between such aircraft; and

d) instruct adjacent control positions or ATC units to hold or re-route all controlled flights outside the area of responsibility of the position or ATC unit that has experienced the failure until such time that the provision of normal services can be resumed.

9.6.2 In order to reduce the impact of complete ground radio equipment failure on the safety of air traffic, DGCA should establish contingency procedures to be followed by control positions and ATC units in the event of such failures. Where feasible and practicable, such contingency procedures should provide for the delegation of control to an adjacent control position or ATC unit in order to permit a minimum level of services to be provided as soon as possible, following the ground radio failure and until normal operations can be resumed.

CHAPTER X

USE OF ATS SURVEILLANCE SYSTEMS IN THE APPROACH CONTROL SERVICE

10.1 General provisions

10.1.1 ATS surveillance systems used in the provision of approach control service shall be appropriate to the functions and level of service to be provided.

10.1.2 ATS surveillance systems used to monitor parallel ILS approaches shall meet the requirements for such operations specified in AC 170-02 Chapter 6.

10.2 Functions

The position indications presented on a situation display may be used to perform the following additional functions in the provision of approach control service:

a) provide vectoring of arriving traffic on to pilot-interpreted final approach aids;

b) provide flight path monitoring of parallel ILS approaches and instruct aircraft to take appropriate action in the event of possible or actual penetrations of the no transgression zone (NTZ);
Note.— See AC 170-02 Chapter 6, Section 6.7.

c) provide vectoring of arriving traffic to a point from which a visual approach can be completed;

d) provide vectoring of arriving traffic to a point from which a precision radar approach or a surveillance radar approach can be made;

e) provide flight path monitoring of other pilot-interpreted approaches;

f) in accordance with prescribed procedures, conduct:
i) surveillance radar approaches;
ii) precision radar (PAR) approaches; and

g) provide separation between:
i) succeeding departing aircraft;
ii) succeeding arriving aircraft; and
iii) a departing aircraft and a succeeding arriving aircraft.

10.3 General approach control procedures using ATS surveillance systems

10.3.1 DGCA shall establish procedures to ensure that the aerodrome controller is kept informed of the sequence of arriving aircraft, as well as any instructions and restrictions which have been issued to such aircraft in order to maintain separation after transfer of control to the aerodrome controller.

10.3.2 Prior to, or upon commencement of, vectoring for approach, the pilot shall be advised of the type of approach as well as the runway to be used.

10.3.3 The controller shall advise an aircraft being vectored for an instrument approach of its position at least once prior to commencement of final approach.

10.3.4 When giving distance information, the controller shall specify the point or navigation aid to which the information refers.

10.3.5 The initial and intermediate approach phases of an approach executed under the direction of a controller comprise those parts of the approach from the time vectoring is initiated for the purpose of positioning the aircraft for a final approach, until the aircraft is on final approach and:

a) established on the final approach path of a pilot-interpreted aid; or
b) reports that it is able to complete a visual approach; or
c) ready to commence a surveillance radar approach; or
d) transferred to the precision radar approach controller.

10.3.6 Aircraft vectored for final approach should be given a heading or a series of headings calculated to close with the final approach track. The final vector shall enable the aircraft to be established in level flight on the final approach track prior to intercepting the specified or nominal glide path if an MLS, ILS or radar approach is to be made, and should provide an intercept angle with the final approach track of 45 degrees or less.

Note.— See AC 170-02 Chapter 6, Section 6.7.3.2, concerning vectoring of independent parallel approaches.

10.3.7 Whenever an aircraft is assigned a vector which will take it through the final approach track, it should be advised accordingly, stating the reason for the vector.

10.4 Vectoring to pilot-interpreted final approach aid

10.4.1 An aircraft vectored to intercept a pilot-interpreted final approach aid shall be instructed to report when established on the final approach track. Clearance for the approach should be issued prior to when the aircraft reports established, unless circumstances preclude the issuance of the clearance at such time. Vectoring will normally terminate at the time the aircraft leaves the last assigned heading to intercept the final approach track.

10.4.2 The controller shall be responsible for maintaining separation specified in 8.3 between succeeding aircraft on the same final approach.

10.4.3 Transfer of communications to the aerodrome controller should be effected at such a point or time that clearance to land or alternative instructions can be issued to the aircraft in a timely manner.

10.5 Vectoring for visual approach

Note.— See also AC 170-02 Chapter 6, Section 6.5.3.

10.5.1 The controller may initiate vectoring of an aircraft for visual approach provided the reported ceiling is above the minimum altitude applicable to vectoring and meteorological conditions are such that, with reasonable assurance, a visual approach and landing can be completed.

10.5.2 Clearance for visual approach shall be issued only after the pilot has reported the aerodrome or the preceding aircraft in sight, at which time vectoring would normally be terminated.

CHAPTER XI

USE OF ATS SURVEILLANCE SYSTEMS IN THE AERODROME CONTROL SERVICE

11.1 Functions

11.1.1 ATS surveillance systems may be used in the provision of aerodrome control service to perform the following functions:
a) flight path monitoring of aircraft on final approach;
b) flight path monitoring of other aircraft in the vicinity of the aerodrome;
c) establishing separation specified in 8.3 between succeeding departing aircraft; and
d) providing navigation assistance to VFR flights.

11.1.2 Special VFR flights shall not be vectored unless special circumstances, such as emergencies, dictate otherwise.

11.1.3 Caution shall be exercised when vectoring VFR flights so as to ensure that the aircraft concerned does not inadvertently enter instrument meteorological conditions.

11.1.4 In prescribing conditions and procedures for the use of ATS surveillance systems in the provision of aerodrome control service, DGCA shall ensure that the availability and use of an ATS surveillance system will not be detrimental to visual observation of aerodrome traffic.
Note.— Control of aerodrome traffic is in the main based on visual observation of the manoeuvring area and the vicinity of the aerodrome by the aerodrome controller.

11.2 Use of ATS surveillance systems for surface movement control

Note.— Requirements concerning surface movement guidance and control systems (SMGCS) are contained in Annex 14, Volume I, Chapter 9. Guidance on the use of surface movement radar (SMR) and other advanced functions is contained in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476) and in the Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual (Doc 9830).

11.2.1 General provisions

11.2.1.1 The use of SMR should be related to the operational conditions and requirements of the particular aerodrome (i.e. visibility conditions, traffic density and aerodrome layout).

11.2.1.2 SMR systems shall to the extent possible enable the detection and display of the movement of all aircraft and vehicles on the manoeuvring area in a clear and unambiguous manner.

11.2.1.3 Aircraft and vehicle position indications may be displayed in symbolic or non-symbolic form. Where labels are available for display, the capability should be provided for inclusion of aircraft and vehicle identification by manual or automated means.

11.2.2 Functions

11.2.2.1 SMR should be used to augment visual observation of traffic on the manoeuvring area and to provide surveillance of traffic on those parts of the manoeuvring area which cannot be observed visually.

11.2.2.2 The information displayed on an SMR display may be used to assist in:

a) monitoring of aircraft and vehicles on the manoeuvring area for compliance with clearances and instructions;
b) determining that a runway is clear of traffic prior to a landing or take-off;
c) providing information on essential local traffic on or near the manoeuvring area;
d) determining the location of aircraft and vehicles on the manoeuvring area;
e) providing directional taxi information to aircraft when requested by the pilot or deemed necessary by the controller. Except under special circumstances, e.g. emergencies, such information should not be issued in the form of specific heading instructions; and
f) providing assistance and advice to emergency vehicles.

11.2.3 Identification of aircraft

Where an ATS surveillance system is used, aircraft may be identified by one or more of the following procedures:

a) by correlating a particular position indication with:
   i) an aircraft position visually observed by the controller;
   ii) an aircraft position reported by the pilot; or
   iii) an identified position indication displayed on a situation display;
b) by transfer of identification when authorized by DGCA; and
c) by automated identification procedures when authorized by DGCA.

CHAPTER XII

USE OF ATS SURVEILLANCE SYSTEMS IN THE FLIGHT INFORMATION SERVICE

Note.— The use of an ATS surveillance system in the provision of flight information service does not relieve the pilot-in-command of an aircraft of any responsibilities, including the final decision regarding any suggested alteration of the flight plan.

12.1 Functions

The information presented on a situation display may be used to provide identified aircraft with:

a) information regarding any aircraft observed to be on a conflicting path with the identified aircraft and suggestions or advice regarding avoiding action;
b) information on the position of significant weather and, as practicable, advice to the aircraft on how best to circumnavigate any such areas of adverse weather (see 7.9.2, Note);
c) information to assist the aircraft in its navigation.

APPENDIX I

ATS SURVEILLANCE SERVICE PHRASEOLOGIES

a. General ATS Surveillance Phraseologies

CIRCUMSTANCES	PHRASEOLOGIES
IDENTIFICATION OF AIRCRAFT	a) REPORT HEADING [AND FLIGHT LEVEL (*or* ALTITUDE)]; b) FOR IDENTIFICATION TURN LEFT (*or* RIGHT) HEADING *(three digits)*; c) TRANSMIT FOR IDENTIFICATION AND REPORT HEADING; d) RADAR CONTACT *[position]*; e) IDENTIFIED *[position]*; f) NOT IDENTIFIED *[reason]*, [RESUME (*or* CONTINUE) OWN NAVIGATION].
POSITION INFORMATION	POSITION *(distance) (direction)* OF *(significant point)* (*or* OVER *or* ABEAM *(significant point)*).
VECTORING INSTRUCTIONS	a) LEAVE *(significant point)* HEADING *(three digits)*; b) CONTINUE HEADING *(three digits)*; c) CONTINUE PRESENT HEADING; d) FLY HEADING *(three digits)*; e) TURN LEFT (*or* RIGHT) HEADING *(three digits) [reason]*; f) TURN LEFT (*or* RIGHT) *(number of degrees)* DEGREES *[reason]*; g) STOP TURN HEADING *(three digits)*; h) FLY HEADING *(three digits)*, WHEN ABLE PROCEED DIRECT *(name) (significant point)*; i) HEADING IS GOOD.
TERMINATION OF VECTORING	a) RESUME OWN NAVIGATION *(position of aircraft) (specific instructions)*;

	b) RESUME OWN NAVIGATION [DIRECT] *(significant point)* [MAGNETIC TRACK *(three digits)* DISTANCE *(number)* KILOMETRES (*or* MILES)].
MANOEUVRES ... (in case of unreliable directional instruments on board aircraft) *Note.— When it is necessary to specify a reason for vectoring or for the above manoeuvres, the following phraseologies should be used:* *a) DUE TRAFFIC;* *b) FOR SPACING;* *c) FOR DELAY;* *d) FOR DOWNWIND (or BASE, or FINAL).*	a) MAKE A THREE SIXTY TURN LEFT (*or* RIGHT) *[reason]*; b) ORBIT LEFT (*or* RIGHT) *[reason]*; c) MAKE ALL TURNS RATE ONE (*or* RATE HALF, *or (number)* DEGREES PER SECOND) START AND STOP ALL TURNS ON THE COMMAND "NOW"; d) TURN LEFT (*or* RIGHT) NOW; e) STOP TURN NOW.
SPEED CONTROL	a) REPORT SPEED; *b) SPEED *(number)* KILOMETRES PER HOUR (*or* KNOTS); c) MAINTAIN *(number)* KILOMETRES PER HOUR (*or* KNOTS) [OR GREATER (*or* OR LESS)] [UNTIL *(significant point)*]; d) DO NOT EXCEED *(number)* KILOMETRES PER HOUR (*or* KNOTS); e) MAINTAIN PRESENT SPEED; f) INCREASE (*or* REDUCE) SPEED TO *(number)* KILOMETRES PER HOUR (*or* KNOTS) [OR GREATER (*or* OR LESS)]; g) INCREASE (*or* REDUCE) SPEED BY *(number)* KILOMETRES PER HOUR (*or* KNOTS); h) RESUME NORMAL SPEED; i) REDUCE TO MINIMUM APPROACH SPEED;

	j) REDUCE TO MINIMUM CLEAN SPEED; k) NO [ATC] SPEED RESTRICTIONS. * Denotes pilot transmission.
POSITION REPORTING ... to omit position reports	a) OMIT POSITION REPORTS [UNTIL *(specify)*]; b) NEXT REPORT AT *(significant point)*; c) REPORTS REQUIRED ONLY AT *(significant point(s))*; d) RESUME POSITION REPORTING.
TRAFFIC INFORMATION AND AVOIDING ACTION ... (if known) ... to request avoiding action ... when passing unknown traffic ... for avoiding action	a) TRAFFIC *(number)* O'CLOCK *(distance) (direction of flight) [any other pertinent information]*: 1) UNKNOWN; 2) SLOW MOVING; 3) FAST MOVING; 4) CLOSING; 5) OPPOSITE (*or* SAME) DIRECTION; 6) OVERTAKING; 7) CROSSING LEFT TO RIGHT (*or* RIGHT TO LEFT); 8) *(aircraft type)*; 9) *(level)*; 10) CLIMBING (*or* DESCENDING); *b) REQUEST VECTORS; c) DO YOU WANT VECTORS?; d) CLEAR OF TRAFFIC *[appropriate instructions]*; e) TURN LEFT (*or* RIGHT) IMMEDIATELY HEADING *(three digits)* TO AVOID [UNIDENTIFIED] TRAFFIC *(bearing by clock-reference and distance)*; f) TURN LEFT (*or* RIGHT) *(number of degrees)* DEGREES IMMEDIATELY TO AVOID [UNIDENTIFIED] TRAFFIC AT *(bearing by clock-reference and distance)*. * Denotes pilot transmission.
COMMUNICATIONS AND LOSS OF COMMUNICATIONS	a) [IF] RADIO CONTACT LOST *(instructions)*; b) IF NO TRANSMISSIONS RECEIVED FOR *(number)* MINUTES (*or* SECONDS) *(instructions)*; c) REPLY NOT RECEIVED *(instructions)*;

.. if loss of communications suspected	d) IF YOU READ *[manoeuvre instructions or SQUAWK (code or IDENT)]*; e) (*manoeuvre*, SQUAWK *or* IDENT) OBSERVED. POSITION*(position of aircraft). [(instructions)]*.
TERMINATION OF RADAR AND/OR ADS-B SERVICE	a) RADAR SERVICE (*or* IDENTIFICATION) TERMINATED [DUE *(reason)*] *(instructions)*; b) WILL SHORTLY LOSE IDENTIFICATION *(appropriate instructions or information)*; c) IDENTIFICATION LOST *[reasons] (instructions)*.
RADAR AND/OR ADS-B EQUIPMENT DEGRADATION	a) SECONDARY RADAR OUT OF SERVICE *(appropriate information as necessary)*; b) PRIMARY RADAR OUT OF SERVICE *(appropriate information as necessary)*; c) ADS-B OUT OF SERVICE *(appropriate information as necessary)*.

b. Radar in approach control service

CIRCUMSTANCES	PHRASEOLOGIES
VECTORING FOR APPROACH	a) VECTORING FOR *(type of pilot-interpreted aid)* APPROACH RUNWAY *(number)*; b) VECTORING FOR VISUAL APPROACH RUNWAY *(number)* REPORT FIELD (*or* RUNWAY) IN SIGHT; c) VECTORING FOR *(positioning in the circuit)*; d) VECTORING FOR SURVEILLANCE RADAR APPROACH RUNWAY *(number)*; e) VECTORING FOR PRECISION APPROACH RUNWAY *(number)*; f) *(type)* APPROACH NOT AVAILABLE
VECTORING FOR ILS AND OTHER PILOT-INTERPRETED AIDS ... when a pilot wishes to be positioned a specific distance from	a) POSITION *(number)* KILOMETRES (*or* MILES) from *(fix)*. TURN LEFT (*or* RIGHT) HEADING *(three digits)*; b) YOU WILL INTERCEPT *(radio aid or track) (distance)* FROM (*significant point or* TOUCHDOWN); *c) REQUEST *(distance)* FINAL;

touchdown	d) CLEARED FOR *(type of approach)* APPROACH RUNWAY *(number)*;
... instructions and information	e) REPORT ESTABLISHED ON [ILS] LOCALIZER (*or* ON GBAS/SBAS/MLS APPROACH COURSE); f) CLOSING FROM LEFT (*or* RIGHT) [REPORT ESTABLISHED]; g) TURN LEFT (*or* RIGHT) HEADING *(three digits)* [TO INTERCEPT] *or* [REPORT ESTABLISHED]; h) EXPECT VECTOR ACROSS *(localizer course or radio aid) (reason)*; i) THIS TURN WILL TAKE YOU THROUGH *(localizer course or radio aid) [reason]*; j) TAKING YOU THROUGH *(localizer course or radio aid) [reason]*; k) MAINTAIN *(altitude)* UNTIL GLIDE PATH INTERCEPTION; l) REPORT ESTABLISHED ON GLIDE PATH; m) INTERCEPT *(localizer course or radio aid)* [REPORT ESTABLISHED]. * Denotes pilot transmission.
MANOEUVRE DURING INDEPENDENT AND DEPENDENT PARALLEL APPROACHES	a) CLEARED FOR *(type of approach)* APPROACH RUNWAY *(number)* LEFT (*or* RIGHT); b) YOU HAVE CROSSED THE LOCALIZER (*or* GBAS/SBAS/MLS FINAL APPROACH COURSE). TURN LEFT (*or* RIGHT) IMMEDIATELYAND RETURN TO THE LOCALIZER (*or* GBAS/SBAS/MLS FINAL APPROACH COURSE); c) ILS (*or* MLS) RUNWAY *(number)* LEFT (*or* RIGHT) LOCALIZER (*or* MLS) FREQUENCY IS *(frequency)*;
... for avoidance action when an aircraft is observed penetrating the NTZ	d) TURN LEFT (*or* RIGHT) *(number)* DEGREES (*or* HEADING) *(three digits)* IMMEDIATELY TO AVOID TRAFFIC [DEVIATING FROM ADJACENT APPROACH], CLIMB TO *(altitude)*;
... for avoidance action below 120 m (400 ft) above the runway threshold elevation where parallel approach obstacle assessment surfaces (PAOAS) criteria are being applied	e) CLIMB TO *(altitude)* IMMEDIATELY TO AVOID TRAFFIC [DEVIATING FROM ADJACENT APPROACH] *(further instructions)*.

c. Secondary Surveillance Radar (SSR) and ADS-B Phraseologies

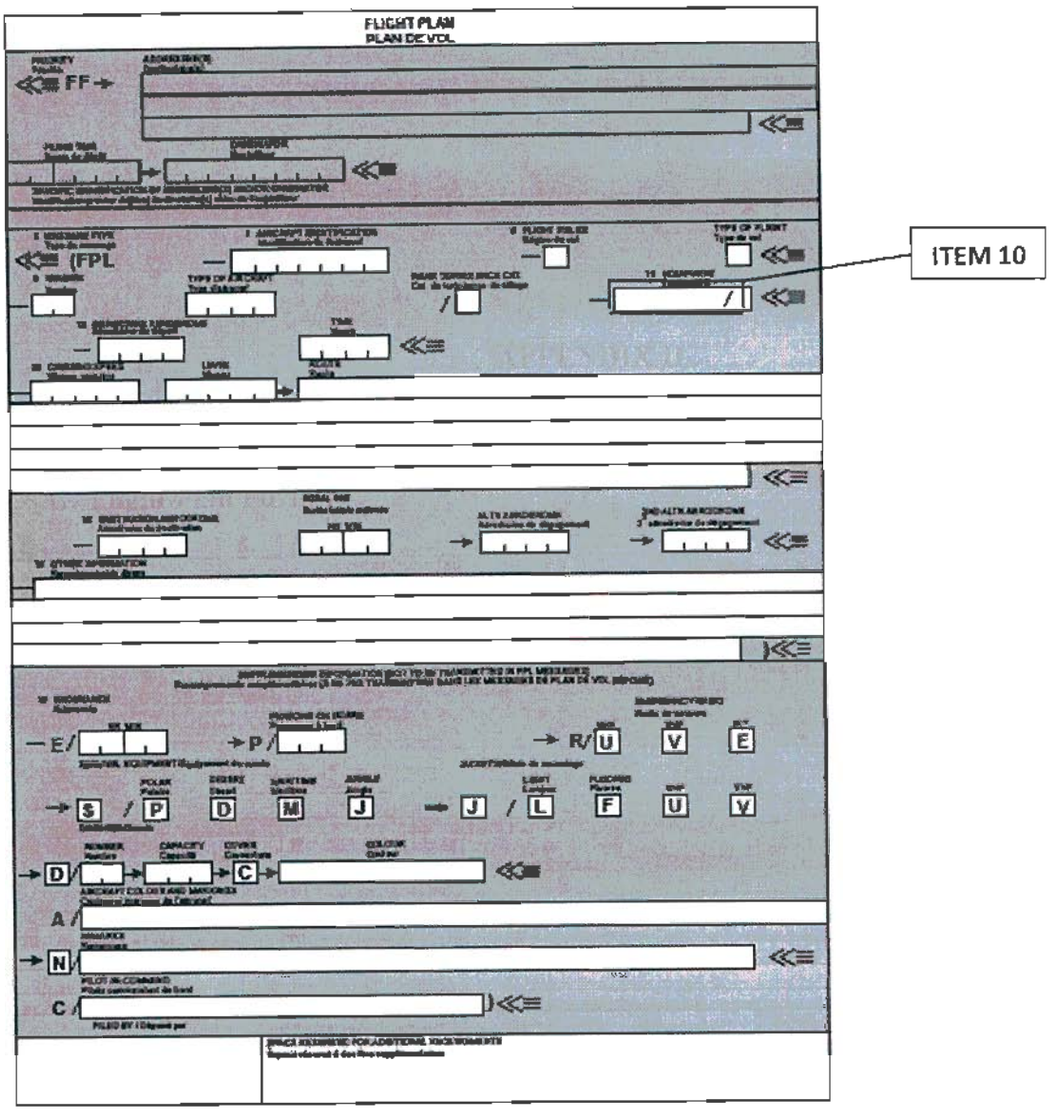
CIRCUMSTANCES	PHRASEOLOGIES
TO REQUEST THE CAPABILITY OF THE SSR EQUIPMENT	a) ADVISE TRANSPONDER CAPABILITY; *b) TRANSPONDER *(as shown in the flight plan)*; *c) NEGATIVE TRANSPONDER. * Denotes pilot transmission.
TO REQUEST THE CAPABILITY OF THE ADS-B EQUIPMENT	a) ADVISE ADS-B CAPABILITY; *b) ADS-B TRANSMITTER *(data link)*; *c) ADS-B RECEIVER *(data link)*; *d) NEGATIVE ADS-B. * Denotes pilot transmission.
TO INSTRUCT SETTING OF TRANSPONDER	a) FOR DEPARTURE SQUAWK *(code)*; b) SQUAWK *(code)*.
TO REQUEST THE PILOT TO RESELECT THE ASSIGNED MODE AND CODE	a) RESET SQUAWK *[(mode)] (code)*; *b) RESETTING *(mode) (code)*. * Denotes pilot transmission.
TO REQUEST RESELECTION OF AIRCRAFT IDENTIFICATION	RE-ENTER [ADS-B *or* MODE S] AIRCRAFT IDENTIFICATION.
TO REQUEST THE PILOT TO CONFIRM THE CODE SELECTED ON THE AIRCRAFT'S TRANSPONDER	a) CONFIRM SQUAWK *(code)*; *b) SQUAWKING *(code)*. * Denotes pilot transmission.
TO REQUEST THE OPERATION OF THE IDENT FEATURE	a) SQUAWK *[(code)]* [AND] IDENT; b) SQUAWK LOW; c) SQUAWK NORMAL; d) TRANSMIT ADS-B IDENT.
TO REQUEST TEMPORARY SUSPENSION OF TRANSPONDER OPERATION	SQUAWK STANDBY.
TO REQUEST EMERGENCY CODE	SQUAWK MAYDAY [CODE SEVEN-SEVEN-ZERO-ZERO].
TO REQUEST TERMINATION OF TRANSPONDER AND/OR ADS-B	a) STOP SQUAWK [TRANSMIT ADS-B ONLY];

TRANSMITTER OPERATION *Note.— Independent operations of Mode S transponder and ADS-B may not be possible in all aircraft (e.g. where ADS-B is solely provided by 1 090 MHz extended squitter emitted from the transponder). In such cases, aircraft may not be able to comply with ATC instructions related to ADS-B operation.*	b) STOP ADS-B TRANSMISSION [SQUAWK *(code)* ONLY].
TO REQUEST TRANSMISSION OF PRESSURE-ALTITUDE	a) SQUAWK CHARLIE; b) TRANSMIT ADS-B ALTITUDE.
TO REQUEST PRESSURE SETTING CHECK AND CONFIRMATION OF LEVEL	CHECK ALTIMETER SETTING AND CONFIRM *(level)*.
TO REQUEST TERMINATION OF PRESSURE-ALTITUDE TRANSMISSION BECAUSE OF FAULTY OPERATION	a) STOP SQUAWK CHARLIE WRONG INDICATION; b) STOP ADS-B ALTITUDE TRANSMISSION [(WRONG INDICATION, *or reason*)].
TO REQUEST LEVEL CHECK	CONFIRM *(level)*.

APPENDIX II

FLIGHT PLAN

1. Flight Plan Form



2. Instructions for the completion of the flight plan form

a. Aircraft operators complying with the ADS-B requirements are to indicate the appropriate ADS-B designator in Item 10 of the ICAO flight plan:

E – Transponder — Mode S, including aircraft identification, pressure-altitude and extended squitter (ADS-B) capability OR

L – Transponder — Mode S, including aircraft identification, pressure-altitude, extended squitter (ADS-B) and enhanced surveillance capability

Together with:

B1 ADS-B with dedicated 1090 MHz ADS-B "out" capability OR

B2 ADS-B with dedicated 1090 MHz ADS-B "out" and "in" capability

b. Aircraft Identification (ACID) not exceeding 7 characters must be accurately indicated in Item 7 of the ICAO flight plan and replicated exactly when set in the aircraft avionics (for transmission as Flight ID) as follows: □either

The three-letter ICAO designator of the aircraft operator followed by the flight number (e.g. GIA234, QFA234, SIA234), when radiotelephony callsign consists of the associated ICAO telephony designator for the aircraft operator followed by the flight number (e.g. INDONESIA234, QANTAS234, SINGAPORE 234).

or

The aircraft registration (e.g. PKABC, VHABC, 9V234) when the radiotelephony callsign consists of the aircraft registration.

Important: ACID entered should not have any leading zeros unless it is part of the flight number as indicated in Item 7 of the ICAO flight plan. Hyphens, dashes or spaces are NOT to be used.

ITEM 10: EQUIPMENT AND CAPABILITIES

Capabilities comprise the following elements:
a) presence of relevant serviceable equipment on board the aircraft;
b) equipment and capabilities commensurate with flight crew qualifications; and
c) where applicable, authorization from the appropriate authority.

Radiocommunication, navigation and approach aid equipment and capabilities

INSERT one letter as follows:
N if no COM/NAV/approach aid equipment for the route to be flown is carried, or the equipment is unserviceable,
OR S if standard COM/NAV/approach aid equipment for the route to be flown is carried and serviceable *(see Note 1),*

AND/OR

INSERT one or more of the following letters to indicate the serviceable COM/NAV/approach aid equipment and capabilities available:

A GBAS landing system
B LPV (APV with SBAS)
C LORAN C
D DME
E1 FMC WPR ACARS
E2 D-FIS ACARS
E3 PDC ACARS
F ADF
G GNSS (See Note 2)
H HF RTF
I Inertial Navigation
J1 CPDLC ATN VDL Mode 2 (See Note 3)
J2 CPDLC FANS 1/A HFDL
J3 CPDLC FANS 1/A VDL Mode 4
J4 CPDLC FANS 1/A VDL Mode 2
J5 CPDLC FANS 1/A SATCOM (INMARSAT)
J6 CPDLC FANS 1/A SATCOM (MTSAT)
J7 CPDLC FANS 1/A SATCOM (Iridium)
K MLS
L ILS
M1 ATC RTF SATCOM (INMARSAT)
M2 ATC RTF (MTSAT)
M3 ATC RTF (Iridium)
O VOR
P1–P9 Reserved for RCP
R PBN approved *(See Note 4)*
T TACAN
U UHF RTF
V VHF RTF
W RVSM approved
X MNPS approved
Y HF with 8.33 kHz channel spacing capability
Z Other equipment carried or other capabilities *(See Note 5)*

Any alphanumeric characters not indicated above are reserved.

Note 1.— If the letter S is used, standard equipment is considered to be VHF RTF, VOR and ILS, unless another combination is prescribed by the appropriate ATS authority.

Note 2.— If the letter G is used, the types of external GNSS augmentation, if any, are specified in Item 18 following the indicator NAV/ and separated by a space.

Note 3.— See RTCA/EUROCAE Interoperability Requirements Standard for ATN Baseline 1 (ATN B1 INTEROP Standard – DO-280B/ED-110B) for data link services air traffic control clearance and information/air traffic control communications management/air traffic control microphone check.

Note 4.— If the letter R is used, the performance-based navigation levels that can be met are specified in Item 18 following the indicator PBN/. Guidance material on the application of performance-based navigation to a specific route segment, route or area is contained in the Performance-based Navigation (PBN) Manual (Doc 9613).

Note 5.— If the letter Z is used, specify in Item 18 the other equipment carried or other capabilities, preceded by COM/ , NAV/ and/or DAT, as appropriate.

Note 6.— Information on navigation capability is provided to ATC for clearance and routing purposes.

Surveillance equipment and capabilities

INSERT N if no surveillance equipment for the route to be flown is carried, or the equipment is unserviceable,

OR

INSERT one or more of the following descriptors, to a maximum of 20 characters, to describe the serviceable surveillance equipment and/or capabilities on board:

SSR Modes A and C

A Transponder — Mode A (4 digits — 4 096 codes)
C Transponder — Mode A (4 digits — 4 096 codes) and Mode C

SSR Mode S

E Transponder — Mode S, including aircraft identification, pressure-altitude and extended squitter (ADS-B) capability
H Transponder — Mode S, including aircraft identification, pressure-altitude and enhanced surveillance capability
I Transponder — Mode S, including aircraft identification, but no pressure-altitude capability
L Transponder — Mode S, including aircraft identification, pressure-altitude, extended squitter (ADS-B) and enhanced surveillance capability
P Transponder — Mode S, including pressure-altitude, but no aircraft identification capability
S Transponder — Mode S, including both pressure altitude and aircraft identification capability
X Transponder — Mode S with neither aircraft identification nor pressure-altitude capability

Note.— Enhanced surveillance capability is the ability of the aircraft to down-link aircraft derived data via a Mode S transponder.

ADS-B

B1 ADS-B with dedicated 1 090 MHz ADS-B "out" capability
B2 ADS-B with dedicated 1 090 MHz ADS-B "out" and "in" capability
U1 ADS-B "out" capability using UAT
U2 ADS-B "out" and "in" capability using UAT
V1 ADS-B "out" capability using VDL Mode 4
V2 ADS-B "out" and "in" capability using VDL Mode 4

ADS-C

D1 ADS-C with FANS 1/A capabilities
G1 ADS-C with ATN capabilities

Alphanumeric characters not indicated above are reserved.

Example: ADE3RV/HB2U2V2G1

Note.— Additional surveillance application should be listed in Item 18 following the indicator SUR/ .

DIREKTUR JENDERAL PERHUBUNGAN UDARA

ttd

SUPRASETYO

Salinan sesuai dengan aslinya
KEPALA BAGIAN HUKUM DAN HUMAS

DIREKTORAT JENDERAL PERHUBUNGAN UDARA

HEMI PAMURAHARJO
Pembina Tk I (IV/b)
NIP. 19660508 199003 1 001