



COMMUNICATION, NAVIGATION & SURVEILLANCE

AIR NAVIGATION ORDER

VERSION : 1.0
DATE OF IMPLEMENTATION : 01-09-2009
OFFICE OF PRIME INTEREST : Technical Standards Branch



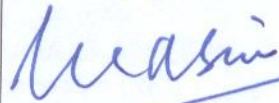
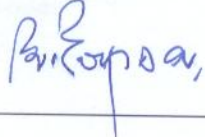
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TYPE OF DOCUMENT	AIR NAVIGATION ORDER (ANO).		
STATUS OF DOCUMENT	CONTROLLED		

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A. AUTHORITY:

A1. The Director General, Civil Aviation Authority issues this ANO in pursuance of Rule 2(1) (xvi), (xvii)(xxix), 4(3),59,66,70,84,244 and all other enabling provisions of the Civil Aviation Rules, 1994(CARs,94).

B. PURPOSE:

B1. To provide general guidance on requirements and responsibilities of the **Communication, Navigation & Surveillance (CNS)** Service Providers under above-referred provisions of the Civil Aviation Rules, 1994. This ANO is being enforced in line with requirements as laid down in ICAO SARPS as mentioned in Annex-10 to the Convention on International Civil Aviation Organization (**Aeronautical Telecommunications**), and CNS Manual that will follow this ANO is being devised in line with ICAO Annex-10 which provides general guidance on requirements and implementation process concerning establishment, operation and implementation of Communication, Navigation and Surveillance in Pakistan Airspace .

B2. To maintain / operate a unit for **Development of Standards** for the implementation of Communication, Navigation and Surveillance (CNS) procedures and practices for Installations and operation by CNS service providers, through oversight audit / inspection in line with requirements of CNS Manual .

C. SCOPE:

C1. This ANO shall apply to **Communication, Navigation and Surveillance (CNS)** Service Providers responsible for:

C1.1 efficient provisioning of **CNS Services** in the Pakistan airspace.

C1.2 implementation of procedures and practices as detailed in CNS Manual for smooth and uninterrupted operation of CNS facilities in Pakistan Airspace and at Aerodromes engaged in the operation of air traffic.

D. DESCRIPTION:

D1. DEFINITIONS:

The following terms shall have the meaning describe herein below. The terms not defined here shall have the same meaning as in Civil Aviation Ordinance, 1960, Pakistan Civil Aviation Authority Ordinance, 1982 and Civil Aviation Rules, 1994 (CARs,94).

D1.1 AIR ROUTE FACILITIES:

Facilities provided to permit safe navigation of aircraft within the airspace of an air route and includes Navigation aids along the route, visual and non-visual aids to approach and landing at aerodromes, communication services, meteorological services and air traffic service and facilities;

D1.2 AIRWAY:

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

D1.3 AIRWAY FACILITIES:

All facilities provided to permit safe navigation of aircraft within the airspace of an airway and includes Navigation aids along the airway, visual and non-visual aids to approach and landing at aerodromes, communication services, meteorological services and air traffic services and facilities;

D1.4 AERONAUTICAL TELECOMMUNICATION NETWORK (ATN):

An internetwork architecture that allows ground, air-ground and avionic data sub-networks to interoperate by adopting common interface services and protocols based on the International Organization for Standardization (ISO) Open Systems Interconnection (OSI) reference model;

D1.5 AERONAUTICAL BROADCASTING SERVICE:

A broadcasting service intended for the transmission of information relating to air navigation;

D1.6 AERONAUTICAL FIXED SERVICE (AFS):

A telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services;

D1.7 AERONAUTICAL FIXED TELECOMMUNICATION NETWORK (AFTN):

A worldwide system of aeronautical fixed circuits provided, as part of the aeronautical fixed service, for the exchange of messages and/or digital data between aeronautical fixed stations having the same or compatible communications characteristics.

D1.8 AERONAUTICAL MOBILE SERVICE (RR S1.32):

A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies;

D1.9 AERONAUTICAL RADIO NAVIGATION SERVICE (RR S1.46):

A radio navigation service intended for the benefit and for the safe operation of aircraft;

D1.10 AERONAUTICAL TELECOMMUNICATION SERVICE:

A telecommunication service provided for any aeronautical purpose;

D1.11 AFTN COMMUNICATION CENTRE:

An AFTN station whose primary function is the relay or retransmission of AFTN traffic from (or to) a number of other AFTN stations connected to it;

D1.12 AFTN DESTINATION STATION:

An AFTN station to which messages and/or digital data are addressed for processing for delivery to the addressee;

D1.13 AFTN ORIGIN STATION:

An AFTN station where messages and/or digital data are accepted for transmission over the AFTN;

D1.14 AFTN STATION:

A station forming part of the aeronautical fixed telecommunication network (AFTN) and operating as such under the authority or control of a State;

D1.15 AIR-GROUND COMMUNICATION:

Two-way communication between aircraft and stations or locations on the surface of the earth;

D1.16 AIR-TO-GROUND COMMUNICATION:

One-way communication from aircraft to stations or locations on the surface of the earth;

D1.17 AERONAUTICAL TELECOMMUNICATION AGENCY:

An agency responsible for operating a station or stations in the aeronautical telecommunication service;

D1.18 AIRCRAFT OPERATING AGENCY:

The person, organization or enterprise engaged in, or offering to engage in, an aircraft operation;

D1.19 AIRBORNE COLLISION AVOIDANCE SYSTEM (ACAS):

An aircraft system based on secondary surveillance radar (SSR) transponder signals which operates independently of ground-based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponders;

D1.20 AIRCRAFT ADDRESS:

A unique combination of twenty-four bits available for assignment to an aircraft for the purpose of air-ground communications, navigation and surveillance;

D1.21 ATS MESSAGE HANDLING SERVICES (AMHS):

Procedures used to exchange ATS messages over the ATN so that the conveyance of an ATS message is in general not correlated with the conveyance of another ATS message by the service provider;

D1.22 BLIND TRANSMISSION:

A transmission from one station to another station in circumstances where two-way communication cannot be established, but where it is believed that the called station is able to receive the transmission;

D1.23 BROADCAST:

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

D1.24 COLLISION AVOIDANCE LOGIC:

The sub-system or part of ACAS that analyses data relating to an intruder and own aircraft; decides whether or not advisories are appropriate and, if so, generates the advisories. It includes the following functions: range and altitude tracking, threat detection and RA generation. It excludes surveillance;

D1.25 COMMUNICATION CENTRE:

An aeronautical fixed station which relays or retransmits telecommunication traffic from (or to) a number of other aeronautical fixed stations directly connected to it;

D1.26 DISTANCE MEASURING EQUIPMENT (DME):

A transponder-based radio navigation technology that measures distance by timing the propagation delay of VHF or UHF radio signals. Aircraft use DME to determine their distance from a land-based transponder by sending and receiving pulse pairs - two pulses of fixed duration and separation. The ground stations are typically collocated with VORs. When co-located with ILS DME can also be used as "Terminal" DME replacing Marker Beacons;

D1.27 DUPLEX:

A method in which telecommunication between two stations can take place in both directions simultaneously;

D1.28 FLIGHT LEVEL:

A surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals;

D1.29 FREQUENCY CHANNEL:

A continuous portion of the frequency spectrum appropriate for a transmission utilizing a specified class of emission;

D1.30 GROUND-TO-AIR COMMUNICATION:

One-way communication from stations or locations on the surface of the earth to aircraft;

D1.31 HEIGHT:

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

D1.32 INSTRUMENT LANDING SYSTEM (ILS):

A ground-based instrument approach system that provides precision guidance to an aircraft approaching a runway, using a combination of radio signals and, in many cases, high-intensity lighting arrays to enable a safe landing;

D1.33 INTERNATIONAL TELECOMMUNICATION SERVICE:

A telecommunication service between offices or stations of different States, or between mobile stations which are not in the same State or are subject to different States;

D1.34 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;

D1.35 MARKER BEACON:

A beacon used in aviation in conjunction with an instrument landing system (ILS), to give pilots a means to determine distance to the runway. There are three types of marker beacons on an ILS Marker Beacons namely, **Inner Marker, Middle Marker & Outer Marker**;

D1.36 NON-DIRECTIONAL BEACON (NDB):

Which is a radio transmitter at a known location used for aviation are standardized by ICAO Annex 10 which specifies that NDBs be operated on a frequency between 190 kHz and 535 kHz. Each NDB is identified by a one, two, or three-letter Morse code call sign;

D1.37 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;

D1.38 PRIMARY FREQUENCY:

The radiotelephony frequency assigned to an aircraft as a first choice for air-ground communication in a radiotelephony network;

D1.39 PRIMARY MEANS OF COMMUNICATION:

Denotes the means of communication to be adopted normally by aircraft and ground stations as a first choice where alternative means of communication exist;

D1.40 RADIO TELEPHONY NETWORK:

A group of radiotelephony aeronautical stations which operate on and guard frequencies from the same family and which support each other in a defined manner to ensure maximum dependability of air-ground communications and dissemination of air-ground traffic;

D1.41 READBACK:

A procedure whereby the receiving station repeats a received message or an appropriate part thereof back to the transmitting station so as to obtain confirmation of correct reception;

D1.42 REGULAR STATION:

A station selected from those forming an en-route air-ground radiotelephony network to communicate with or to intercept communications from aircraft in normal conditions;

D1.43 ROUTE SEGMENT:

A route or portion of route usually flown without an intermediate stop;

D1.44 ROUTING DIRECTORY:

A list in a communication centre indicating for each addressee the outgoing circuit to be used;

D1.45 SECONDARY FREQUENCY:

The radiotelephony frequency assigned to an aircraft as a second choice for air-ground communication in a radiotelephony network;

D1.46 SECONDARY SURVEILLANCE RADAR (SSR):

A surveillance radar system which uses transmitters/receivers (interrogators) and transponders;

D1.47 SERVICE PROVIDERS:

Directorate of Technical Services HQCAA in case of CAA owned /operated airports or any other aerodrome authorized by CAA to run aerodrome operation in Pakistan.

D1.48 SIMPLEX:

A method in which telecommunication between two stations takes place in one direction at a time.

D1.49 SNOWTAM:

A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format.

D1.50 SURVEILLANCE RADAR:

A radar equipment used to determine the position of an aircraft in range and azimuth by using following modes:

Mode A. Used in Secondary Radar to elicit transponder replies for identification and surveillance.

Mode C. Used in Secondary Radar to elicit transponder replies for automatic pressure – altitude transmission and surveillance.

D1.51 TELECOMMUNICATION:

Any transmission, emission, or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems;

D1.52 TRIBUTARY STATION:

An aeronautical fixed station that may receive or transmit messages and/or digital data, but does not relay except for the purpose of serving similar stations connected through it to a communication centre.

D1.53 NETWORK STATION:

An aeronautical station forming part of a radiotelephony network.

D2. GENERAL REQUIREMENTS:

D2.1 SERVICE PROVIDERS:

The service providers shall ensure that:

D2.1.1 All CNS Systems are operating in accordance with the requirements of CNS Standards as set by Technical standards Branch of Directorate of Air Navigation & Aerodrome Regulations, HQCAA in the CNS Manual. Service Providers shall implement, the Operational procedures as laid down in CNS Manual and also ensure the Maintenance of equipment in accordance with the procedures and guidelines contained in Original Equipment Manufacturer (OEM) Manuals.

D2.1.2 All Personnel deployed in the operation/maintenance of CNS Equipment & Systems be technically qualified and experienced/trained for the job;

D2.1.3 All technical units and personnel involved in the operation/maintenance of CNS systems have an individual safety responsibility; and

D2.1.4 All the unit/sectional heads concerned are responsible for the smooth performance of their own systems.

D2.2 CNS STANDARDS MANUAL:

CNS Standards Manual which is to follow this ANO shall be

D2.2.1 Recommended by the Directorate of Air Navigation and Aerodrome Regulations (DAAR), HQCAA for subsequent approval of the Competent Authority i.e DGCAA.

D2.2.2 In a format that is easy to revise.

D2.2.3 Having a system for recording the currency of page and amendments thereto including a page for logging revisions.

D2.2.4 Organized in a manner that will facilitate the preparation, review and acceptance / approval process, and shall include documentation, identification and control procedures for the following:

- D2.2.4.1 Radio Navigation Aids Procedures.
- D2.2.4.2 Communication Operation Procedures.
- D2.2.4.3 Communication Systems Procedures.
- D2.2.4.4 Surveillance Procedures.
- D2.2.4.5 Frequency Management Procedures; and

D2.2.5 Including all information required under this ANO and conditions imposed from time to time by the Authority or Director General CAA.

D2.2.6 And be consistent with CAA document control procedures already prescribed or will be prescribed from time to time.

D2.3 REVISION OF MANUAL:

2.3.1 In case of any revisions in operational procedures / SARPs in Annex 10 as circulated by ICAO, Director Air Navigation & Aerodrome Regulations HQCAA shall incorporate the same in CNS Manual Devised by Technical Standards Branch under D.AAR and shall issue written directive to CNS service providers to alter or amend the CNS Standards Manual to maintain its accuracy. It is an obligation on Technical Standards branch to pursue and confirm that CNS service providers have incorporated the said amendments in their CNS Manuals.

D3. OVERSIGHT FUNCTION:

D3.1 CNS officials of Technical Standards branch shall be responsible for oversight function i.e. Inspection & Monitoring / Surveillance of CNS installations & operations independently in accordance with CNS Standards Manual and are to ensure that:

D3.1.1 All amendments in line with requirements of Annex 10 shall be incorporated in CNS Standards manual and implemented accordingly;

D3.1.2 If any non-compliance of the amendment(s) is inevitable by Service Provider, it shall be communicated by filing difference(s) through procedures as defined in ICAO guidelines;

D3.1.3 Changes, as a result of compliance or filing of difference, shall be duly incorporated in CNS Standards Manual.

D3.2 INSPECTIONS:

D3.2.1 The General Manager Technical Standards or CNS Inspectors are authorized at all times as deemed reasonable to them to enter any place to which access is necessary; and carry out their inspection in the area of CNS with or without prior intimation to the service provider.

D3.2.2 G.M. Technical Standards or his representative CNS inspectors while conducting inspections in the area of CNS has to ensure the following:

D3.2.2.1 the Communications, Navigation and Surveillance (CNS) systems and facilities are operated in line with the procedures / requirements as defined in CNS Standards Manual;

D3.2.2.2 oversight over the entity operating CNS systems and facilities is effectively conducted and to printout /highlight any deficiencies if observed during inspection/ surveillance visit;

D3.2.2.3 verify steps taken by CNS service provider in response to previous Inspection report.

D3.2.2.4 the information of operational status of the CNS equipment is promptly forwarded to appropriate ATS unit and

D3.2.2.5 manpower deployed to operate / maintain the CNS equipment / System has adequate training / qualification / experience and to highlight any deficiency in this regard.

D3.3 MONITORING/SURVEILLANCE:

D3.3.1 All operations and services of CNS equipment shall be monitored as per CNS Standards Manual and any occurrence reported against the CNS Standards are to be assessed by Technical Standard branch and reported to all concerned for resolution.

D3.3.2 CNS service provider/users at all locations shall be encouraged by every means to systematically and consistently report such occurrences.

D3.3.3 All relevant data that would aid understanding of the circumstances / surrounding such occurrences will be adequately identified and it is to be ensured that the data is secured, recorded and stored in a manner, which protects their quality and confidentiality as well as permitting subsequent collation and assessment.

D3.3.4 The severity of each such occurrence is to be determined, the risk posed by each such occurrence classified and the results recorded.

D3.3.5 To the extent possible, mechanisms shall be in place which ensure that experience, based upon collected occurrence data and assessment, is exchanged between relevant parties (CNS service providers / Aerodrome Operators / Aircraft Operators, etc.) in order to develop strategy for immediate and effective remedial actions through Technical Standard Branch.

D3.3.6 Any operational or technical occurrence, considered to have significant safety implications, is to be investigated immediately by service provider for taking necessary corrective action under intimation to Technical Standard branch .

D3.3.7 For such occurrence, the result of the investigation and the corrective action taken by concern quarters is to be notified to the concerned Authority or Director General without delay.

D3.3.8 Safety recommendations, interventions and corrective actions taken, be recorded where necessary and their implementation shall be monitored.

D4. PROTECTION & SAFE CUSTODY OF DOCUMENTS:

D4.1 All documents and information received by the Authority or the Director General relating to the safety management process and/or otherwise during the process of continuing supervision is subject to protection from public disclosure.

D4.2 The Authority or the Director General will keep all documentation and information, safely in their record, received during the initial implementation of Safety Management System, during changes in this system and use during the supervision of the Service Provider.

D5. DELEGATION OF POWERS:

The Authority or the Director General may delegate all or any powers under this ANO to one or more subordinate officers of the Authority or any other person designated by the Director General in pursuance of Rule 5 of CARs, 94.

D6. AMENDMENTS & MODIFICATION:

Any subsequent amendment or modifications to this ANO, as deemed necessary or expedient, may be effected with prior approval of the Director General or in case of large-scale amendments revised/ new issue of this ANO may be initiated.

D7. EXEMPTION / WAIVER:

The Director General, may grant exemption/waiver from compliances with any of the provisions/requirements of this ANO as deemed appropriate on case to case basis.

E. EVIDENCES (ACRONYMS / RECORDS / REFERENCES):

E1. ACRONYMS:

ACAS	Airborne Collision Avoidance System
AFTN	Aeronautical Fix Telecommunication Network
AMHS	ATS Message Handling System
ANO :	Air Navigation Order
ANP	Air Navigation Plan.
ATN	Aeronautical telecommunication Network
ATS	Air Traffic Service
CAARs	Civil Aviation Rules
CNS:	Communication, Navigation & Surveillance
DAAR	Directorate of Air Navigation and Aerodrome Regulations
DGCAA	The Director General Civil Aviation Authority.
DME	Distance Measuring Equipment
FACID	Facilities And Services Implementation Document
FIR	Flight Information Region
hPa	Hectopascals
HQCAA	Headquarters Civil Aviation Authority
ICAO	International Civil Aviation Organization.
ILS	Instrument Landing System
ISO	International Organization for Standards
NDB	Non Directional Beacon
NOTAM	Notice To Airman
OEM	Original Equipment Manufacturer
OSI	Open Systems Interconnections
SARPs	Standard And Recommended Practices
SSR	Secondary Surveillance Radar

UHF Ultra High Frequency
VHF Very High Frequency
VOR VHF Omni Range

E2. RECORDS:


E2.1 Nil

E3. REFERENCES:

- E3.1 Annex-10 volume I, II, III, IV and V,
- E3.2 ICAO Document 8071 Volume-I.
- E3.3 ICAO Document 8259.
- E3.4 ICAO Document 9684.
- E3.5 ICAO Document 9718.
- E3.6 ICAO Document 9741
- E3.7 ICAO Document 9776.
- E3.8 ICAO Document 9805.

IMPLEMENTATION:

This Air Navigation Order shall be implemented with effect from 05th October 2009.


(M. JUNAID AMEEN)
Air Commodore (Retd.)
Director General
Pakistan Civil Aviation Authority

Dated: - 07th October, 2009

(SYED YOUSUF/ABBAS)

Director Air Navigation & Aerodrome Regulations

Dated- October, 2009

File No. HQCAA/6428/13/TECH.STD