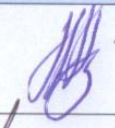
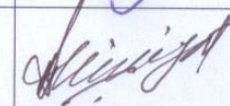
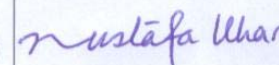
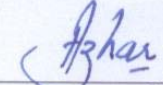
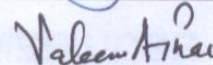
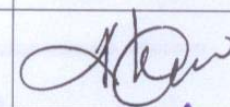
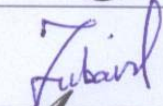
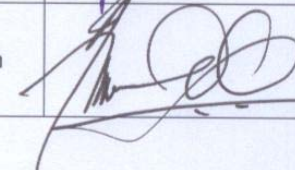




**REQUIREMENTS OF “CNS ENGINEERING MANUAL”
FOR AIRPORT / LOCATION**

AIR NAVIGATION ORDER

VERSION : 1.0
DATE OF IMPLEMENTATION : 15-09-2013
OFFICE OF PRIME INTEREST : Technical Standards Branch
(Directorate of Airspace & Aerodrome Regulations)

	NAME	DESIGNATION	SIGNATURE
PREPARED BY	Engr. HASSAN ASHRAF	C.M. Technical Standards (FDPS/RDPS)	
	Engr. MUZAFFAR ALI	C.M. Technical Standards (Nav-Aids)	
	Engr. MUSTAFA KHAN	C.M. Technical Standards (Surveillance)	
REVIEWED BY	Engr. M. AZHAR SALEEM	G.M. Technical Standards	
	MUHAMMAD SALEEM ATHAR	Director Airspace & Aerodrome Regulations	
	MUHAMMAD ZIA KHAN Air Cdre	Principal Director (Regulatory)	
VERIFIED BY	ZUBAIR H. PARACHA	G.M. Legal Services (S&A)	
APPROVED BY	KHALID CHOUDHRY Air Marshal (R)	Director General, Pakistan Civil Aviation Authority	
TYPE OF DOCUMENT	AIR NAVIGATION ORDER (ANO)		
STATUS OF DOCUMENT	CONTROLLED		

A. AUTHORITY:

A1. This Air Navigation Order (ANO) is issued by the Director General, Pakistan Civil Aviation Authority in pursuance of Rules 5, 70, 74, 75, 84, 164, 360 and other enabling provisions of Civil Aviation Rules, 1994 (CARs, 94).

B. PURPOSE:

B1. This ANO is being issued for development of CNS Engineering manual for each CNS location where any essential Communication, Navigation, Surveillance (CNS) facility is installed. It provides basic framework to the CNS service providers for preparation of a "CNS Engineering Manual" in the light of various ANO(s), and other guidance material issued by TS branch of the Directorate of Airspace & Aerodrome Regulations (DAAR), HQCAA, from time to time.

B2. This Document also defines the Target dates for development of CNS Engineering manuals for all locations currently providing CNS Engineering services in Pakistan.

B3. It will be mandatory for the CNS Engineering service providers to present the CNS Engineering Manual to CNS Inspectors of the TS branch of Directorate of Airspace and Aerodrome Regulations on demand whenever they visit any CNS Engineering facility for the purpose of Oversight Inspections / scheduled annual Audit after 31st December, 2013.

C. SCOPE:

C1. This ANO is applicable to all CNS Service providers, rendering services, in the field of Aeronautical Telecommunications, under the Regulatory umbrella of Pakistan CAA. It will be mandatory for all CNS service providers to prepare Station's CNS Engineering Manual, which will ultimately act as the principle guidance document for that particular Airport/Location, and will serve as the basic reference document for future performance check and National Aviation Legislation related audit/inspections with respect to Communication, Navigation and Surveillance facilities and their operation/maintenance services.

D. DESCRIPTION:

D1. DEFINITIONS:

The following terms used in this ANO, have the meanings assigned to them respectively. However, any term used in this ANO but not defined herein shall have the same meaning as given in the Civil Aviation Ordinance, 1960, Pakistan Civil Aviation Authority Ordinance, 1982, Civil Aviation Rules, 1994 (CARs 94) and relevant ANO's/ICAO Annexes, as the case may be accordingly.

D1.1 AIR NAVIGATION ORDER (ANO):

Orders issued by Director General of PCAA under Civil Aviation Rules (CARs) 1994.

D1.2 STANDARDS AND RECOMMENDED PRACTICES (SARPs):

The Council of ICAO under the provisions of the convention adopts Standards and Recommended Practices (SARPs). They are defined as follows:

D1.2.1 STANDARDS:

Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of International Air Navigation and to which Contracting States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 38.

D1.2.2 RECOMMENDED PRACTICES:

Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognized as desirable in the interest of Safety, Regularity or Efficiency of International Air Navigation and to which Contracting States will endeavor to conform in accordance with the Convention.

D1.2.3 STANDARD OPERATING PROCEDURES (SOP):

Standard Operating Procedures are specific instructions / ways to perform various activities, processes and practices used by Aviation related service providers, private or state owned, such as Directorates / Branches at HQCAA and sections at Airports / Locations. These SOPs shall be in line with the relevant Standards / CARs / ANOs / CAAOs. SOPs are issued by the General Manager concerned with the approval of respective Director, where applicable or by the Chief Technical Officer / Electronic In-charge concerned with the approval of respective General Manager CNS.

D1.3 AIR NAVIGATION SERVICES (ANS):

Services provided to air traffic during all phases of operations including Air Traffic Management (ATM), Communications, Navigation and Surveillance (CNS), Meteorological services for air navigation (MET), Search and Rescue (SAR) and Aeronautical Information Services (AIS).

D1.4 ATM SERVICE:

A service for the purpose of Air Traffic Management.

D1.5 CONTENT:

The individual items or topics that are dealt with in a publication or document.

D1.6 CONFORMANCE:

The state of meeting the requirements of a Standard, and/or a recommended practice.

D1.7 DEFICIENCY:

Lacking of something essential, imperfect, defective and if such hazards allowed to exist within a system, result in a system deficiency.

D1.8 EVENT:

Any incident that occurs or a situation arises at a particular place during a particular interval of time.

D1.9 HAZARD:

Conditions, object or activity with the potential of causing injuries to personnel, damage

to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.

D1.10 HAZARD IDENTIFICATION:

The process of determining what can happen, why and how.

D1.11 HUMAN FACTOR:

The factor pertaining to human’s capabilities, limitations, and behaviors and its integration into the design of a system to enhance the safety performance.

D1.12 HUMAN PERFORMANCE:

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

D1.13 INCIDENT:

An occurrence, other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operation.

D1.14 INSPECTION:

The basic activity of an audit, which involves examination of the specific characteristics of the safety oversight program/function.

D1.15 MAINTENANCE LEVELS:

Organization’s maintenance operations on three unique levels: (Level 1) organizational level maintenance, (Level 2) intermediate level maintenance, and (Level 3) depot level maintenance. The scope of maintenance activity at each maintenance level requires equipment, facilities, funding, personnel’s, and technical data at specific levels of sophistication.

D1.15.1 MAINTENANCE LEVEL 1 (ORGANIZATIONAL LEVEL MAINTENANCE):

Organizational level maintenance is typically optimized for quick turn-around, to enhance operational availability. Maintenance at this level typically consists of immediate remove and replace (R&R) operations that replace failed/unserviceable line replaceable units (LRUs) with spare/serviceable.

D1.15.2 MAINTENANCE LEVEL 2 (INTERMEDIATE LEVEL MAINTENANCE):

Intermediate level maintenance occurs in specialized backshops that are typically allocated to multiple operating units residing at a common operating location. This maintenance level allows for more thorough and time-consuming diagnostic testing and repair procedures, usually in support of unserviceable items removed at the organizational level of repair. Test equipment is more common at this level of repair, and is used to automate many test procedures.

D1.15.3 MAINTENANCE LEVEL 3 (DEPOT LEVEL MAINTENANCE):

Depot level maintenance typically occurs in highly specialized repair depots, or at original equipment manufacturer (OEM) facilities. These sites are typically not at operating locations, and extensive diagnostic equipment and possibly even manufacturing capabilities exist. Equipment overhauls and modifications are typically executed at this repair level.

D1.16 MONITORING:

The processes to check, supervise, observe critically, or record the progress of an activity/function or system on a regular basis in order to identify change.

D1.17 OPERATION MANUAL:

A manual containing procedures, instructions and guidance for use by the operational personnel in the execution of their duties.

D1.18 SAFETY:

Safety is the state in which the risk of harm to persons or of property damage is reduced to, and maintained at or below an acceptable level through a continuing process of hazard identification and risk management. Safety may also be defined: as a condition in which the risk of harm or damage is limited to an acceptable level.

D2. ELEMENTS OF COMMUNICATION, NAVIGATION & SURVEILLANCE FACILITIES:

D2.1 COMMUNICATION:

D2.1.1 COMMUNICATION SYSTEMS FOR AERONAUTICAL BROADCAST SERVICE:

D2.1.1.1 Meteorological information for aircraft in flight (VOLMET).

D2.1.1.2 Automatic Terminal Information Service (ATIS).

D2.1.2 COMMUNICATION SYSTEMS FOR AERONAUTICAL FIXED SERVICES:

D2.1.2.1 ATS Direct Speech Circuits (DSC).

D2.1.2.2 Aeronautical Fixed Telecommunication Network (AFTN).

D2.1.2.3 Aeronautical Message Handling System (AMHS)

D2.1.3 COMMUNICATION SYSTEMS FOR AERONAUTICAL RADIO NAVIGATION SERVICES:

D2.1.3.1 HF SSB air-ground two way communication

D2.1.3.2 HF SSB ground-ground two way communication

D2.1.3.3 VHF air-ground two way communication

D2.1.3.4 VHF ground-ground two way communication

D2.1.3.5 UHF air-ground two way communication

D2.1.3.6 VHF Extended Range

D2.1.3.7 UHF Extended Range

D2.2 NAVIGATION:

D2.2.1 INSTRUMENT LANDING SYSTEM (ILS):

D2.2.1.1 Localizer

D2.2.1.2 Glide Slope

- D2.2.1.3 Terminal Distance Measuring Equipment (TDME)
- D2.2.1.4 Markers

- D2.2.2 VHF OMNI-DIRECTIONAL RADIO RANGE (VOR):**
 - D2.2.2.1 Conventional VOR
 - D2.2.2.2 Doppler VOR
 - D2.2.2.3 Distance Measuring Equipment (DME)

- D2.2.3 BEACONS:**
 - D2.2.3.1 Non-Directional Beacon (NDB)
 - D2.2.3.2 Locater Beacon
 - D2.2.3.3 Holding beacon

- D2.3 SURVEILLANCE:**
 - D2.3.1 RADAR SENSORS:**
 - D2.3.1.1 Primary Surveillance Radar (PSR)
 - D2.3.1.2 Secondary Surveillance Radar (SSR)

 - D2.3.2 RADAR DISPLAYS AND AUTOMATION SYSTEMS:**
 - D2.3.2.1 Air Traffic Management System (ATM)
 - D2.3.2.2 Voice Communication & Control System (VCCS)

 - D2.3.3 VOICE AND DATA RECORDERS:**
 - D2.3.3.1 ATM Data Recorder
 - D2.3.3.2 VCCS Audio Recorder
 - D2.3.3.3 Voice logging systems

- D2.4 SATELLITE BASED CNS SYSTEMS:**
 - D2.4.1 GLOBAL NAVIGATIONAL SATELLITE SYSTEM (GNSS):**
 - D2.4.1.1 Global Positioning System (GPS)
 - D2.4.1.2 Global Orbiting Navigation Satellite System (GLONASS)
 - D2.4.1.3 Satellite Based Augmentation System (SBAS)
 - D2.4.1.4 Ground Based Augmentation System (GBAS)
 - D2.4.1.5 Ground Based Regional Augmentation System (GRAS)

 - D2.4.2 MULTILATERATION (MLAT):**
 - D2.4.2.1 Automatic Dependent Surveillance – Broadcast (ADS-B)
 - D2.4.2.2 Automatic Dependent Surveillance – Contract (ADS-C)

D2.4.2.3 Controller Pilot Data Link Communication (CPDLC)

Note: Detail on any of the above stated Future Communication, Navigation & Surveillance Systems shall be included by the service provider whenever inducted.

D2.5 TERMINAL FACILITIES:

D2.5.1 Airport Facility Control & Monitoring (AFCoM) system.

D2.5.2 Flight Information Display System (FIDS).

D2.5.3 Automatic Fire Detecting System(AFDS).

D2.5.4 Telecom facilities such as EPABX, Intercom and related facilities.

D2.6 AUXILIARY SYSTEMS USED IN SUPPORT OF CNS AND TERMINAL FACILITIES:

D2.6.1 Main Power Supply system (Primary/Secondary Feeder)

D2.6.2 Standby Power Supply System (Generators)

D2.6.3 Automatic Voltage Regulators (AVR's)

D2.6.4 Uninterrupted Power Supply (UPS)

D2.6.5 Heating, Ventilation & Air Conditioning (HVAC)

D2.7 ANY OTHER SUPPORTING SYSTEMS RELATED TO CNS EQUIPMENT:

Note: Details will be included by the service provider as and when inducted.

D3. CNS ENGINEERING MANUAL:

D3.1 PREPARATION OF THE CNS ENGINEERING MANUAL:

The proposed CNS Engineering Manual shall be prepared by the Chief Technical Officer (CTO)/Electronic In-charge of the Location/Airport or by any CNS Engineering Officer designated by concerned GM CNS, wherever considered necessary, in accordance with the requirements laid down in this ANO & ANO-008-ARTS-1.0, as per format given in CAAO-001-MSXX-2.0.

D3.2 REVIEW OF THE CNS ENGINEERING MANUAL:

The draft of the CNS Engineering Manual shall be reviewed by the respective General Manager CNS North or south respectively for all Airports/Locations owned by PCAA. For private Airports, the respective Airport Managers will review the draft.

D3.3 VERIFICATION OF THE CNS ENGINEERING MANUAL:

The DMR or MR of SQMS Directorate will verify the format of the CNS Engineering Manual in case of PCAA Airports/Locations. While for private Airports by any official other than APM who is well conversant with CAAO-001-MSXX-2.0, ANO-008-ARTS-1.0 and this ANO.

D3.4 APPROVAL OF THE CNS ENGINEERING MANUAL:

The approving authority for the CNS Engineering Manual will be:

D3.4.1 Director CNS Engineering, HQCAA For PCAA Airports/Locations

D3.4.2 CEO of concerned Airport For Private Airports

Note: - Verifying and approving authority of the manual shall not be the same.

D3.5 UPDATING OF THE CNS ENGINEERING MANUAL:

CNS Engineering Manual shall be updated by the service provider, on new Induction/deletion/replacement of major CNS equipment/system in accordance with the guidance given in CAAO-001-MSXX-2.0.

D3.6 CRITICAL ELEMENTS OF CNS ENGINEERING MANUAL:

Following shall be the Critical Elements for CNS Engineering Manual:

- D3.6.1 Organization and CNS manpower of the location.
- D3.6.2 Role and Task/Targets of the CNS unit.
- D3.6.3 Technical description of CNS equipment & facilities.
- D3.6.4 SOP's (functional, maintenance and coordination).
- D3.6.5 Preventive & Corrective Maintenance Plans.
- D3.6.6 Maintenance Management Strategy & Policy.
- D3.6.7 Trainings (Recurrent, specialized & On Job Training).
- D3.6.8 Record Keeping.

D3.7 CONTENTS OF THE MANUAL:

The proposed CNS Engineering Manual shall be prepared in accordance with the requirements laid down in this ANO & ANO-008-ARTS-1.0 and shall contain:

D3.7.1 ORGANIZATION AND CNS ENGINEERING MANPOWER:

- D3.7.1.1 Organogram of CNS Service Provider (from Chief CNS to sectional heads of the location):
- D3.7.1.2 Position wise Job Descriptions.
- D3.7.1.3 Detail of CNS Manpower existing and approved for the location.
- D3.7.1.4 Staffing need if any.
- D3.7.1.5 Duty hours of maintenance personnel and duty roster(s) if applicable.
- D3.7.1.6 Equipment/responsibility wise deployment of CNS Manpower.

D3.7.2 ROLE AND TASKS/TARGETS:

- D3.7.2.1 Role of CNS engineering unit.
- D3.7.2.2 Overall Task & targets of CNS section (Generic).

D3.7.3 TECHNICAL DESCRIPTION OF CNS EQUIPMENT AND FACILITIES:

- D3.7.3.1 Make / Model / country of origin of major CNS equipment.

- D3.7.3.2 Date of installation, Date of commissioning and Detail where each is installed.
- D3.7.3.3 Expected life span of each CNS equipment defined at the time of induction.
- D3.7.3.4 Frequencies in use where ever applicable.
- D3.7.3.5 Output power & other primary parameters.
- D3.7.3.6 List of test equipment used with each CNS system along with valid calibration certificate.
- D3.7.3.7 List of available tools / fixtures required for routine maintenance.
- D3.7.3.8 List of available operation and maintenance manuals of each CNS equipment.
- D3.7.3.9 Details of auxiliary equipment such as main power supply, UPS, HVAC or any other system directly or indirectly related with the provision of CNS & ANS services shall also be briefly described along with each CNS equipment / facility.
- D3.7.4 STANDARD OPERATING PROCEDURES (SOPs) FOR COORDINATION, OPERATION & MAINTENANCE:**
- D3.7.4.1 General functioning of CNS engineering sections shall be described with their primary Role & Tasks.
- D3.7.4.2 Program / Syllabus for familiarization/orientation of transferees/new inductees.
- D3.7.4.3 SOP(s) on:
- D3.7.4.3.1 operation & maintenance of each CNS equipment.
- D3.7.4.3.2 operation & maintenance of Auxiliary equipment.
- D3.7.4.3.3 periodic inspection & testing of CNS systems installed.
- D3.7.4.3.4 preventive maintenance of each CNS equipment.
- D3.7.4.3.5 air calibration of Nav. Aids facilities (include all actions required before & after air calibration)
- D3.7.4.3.6 actions when maintenance of CNS equipment is beyond the capability of local station.
- D3.7.4.3.7 coordination with GM CNS(N)/(S), CNS Dte., HQCAA, EED, GED for maintenance/logistics support.
- D3.7.4.3.8 coordination with GM CNS (N)/(S) & maintenance contractors for operation & maintenance of outsourced CNS & auxiliary equipment.
- D3.7.4.3.9 protection & safe custody of operational documents, records and essential audio and video data recordings.
- D3.7.4.3.10 re-producing/ replay of audio/video data recordings.
- D3.7.4.3.11 calibration of test equipment in use at the location.
- D3.7.4.3.12 reporting of any primary CNS service disruption.
- D3.7.4.3.13 verification of Surge Protection, Fire Alarms & Extinguishing Systems.
- D3.7.4.3.14 protection and maintenance of critical & sensitive areas related with CNS facilities.
- D3.7.4.3.15 supply and local purchase of essential stores.
- D3.7.4.3.16 activation of OCC in case of hijacking etc. (where applicable)
- D3.7.4.4 Any other SOP considered essential in the functioning of the CNS Engineering Unit of a particular location.

D3.7.5 MAINTENANCE PLANS:

- D3.7.5.1 Preventive maintenance plan for each CNS equipment and sub-system.
- D3.7.5.2 Corrective maintenance plan for each CNS equipment and sub-system.
- D3.7.5.3 Equipment review plan (e.g. first review after 5 years (mid life) and second review after 10 years with details of review Board members along with Scope & Terms of reference in each case).
- D3.7.5.4 Equipment replacement plan (second & final review should determine equipment replacement if required or not and by when based on its terms of reference).
- D3.7.5.5 Contingency plan in case of any primary CNS facility outage.

D3.7.6 GENERAL MAINTENANCE MANAGEMENT & SCHEDULES OF CNS & ALLIED EQUIPMENT:

- D3.7.6.1 Work instructions of each CNS equipment.
- D3.7.6.2 Basic Flow Charts for corrective maintenance of each CNS equipment.
- D3.7.6.3 Maintenance level capabilities (maintenance level 1 to maintenance level 3) available at Location/Airport for each CNS equipment.
- D3.7.6.4 Detail list of outsourced maintenance contracts of CNS & allied equipment if any with mechanism to contact contractor(s) for preventive/corrective maintenance.
- D3.7.6.5 Description of quality control and management system of the location.
- D3.7.6.6 Equipment preventive maintenance schedules.
- D3.7.6.7 Air Calibration schedules for the current year.

D3.7.7 TRAINING OF CNS MANPOWER:

- D3.7.7.1 Training needs analysis for the development & enhancement in skills for each CNS official.
- D3.7.7.2 Recurrent & specialized training program.
- D3.7.7.3 OJT program for transferee/new inductees for each deployable position as per Organogram.
- D3.7.7.4 Formal training requirement/plan of each CNS official.
- D3.7.7.5 Procedures & syllabus for On Job Training of each CNS position as per deployment and Job Description.

D3.7.8 RECORD KEEPING:

Following records will be maintained by each airport/location regarding CNS: The CNS Manual should briefly describe each record & place & position where it is held/maintained.

- D3.7.8.1 Operational log.
- D3.7.8.2 Preventive maintenance record.
- D3.7.8.3 Ground checks record of Nav. Aids facilities.
- D3.7.8.4 Inventory / Asset details.
- D3.7.8.5 Daily meter reading charts/performas recommended by OEM.
- D3.7.8.6 Training/OJT records of CNS manpower.

- D3.7.8.7 Air calibration record.
D3.7.8.8 Copies of all returns (monthly / quarterly etc.)

D3.8 ACTION REQUIRED:

The proposed CNS Engineering Manuals for Airports/Locations are required to be prepared under the guidance provided above and as in ANO-008-ARTS-1.0 with consultation of GM CNS (S)/(N) as per format given in CAAO-001-MSXX-2.0. Approved copy (one each) of CNS Engineering Manual shall be forwarded to D.AAR & GM Technical Standards for their action/record. The task shall be completed by 31st December, 2013 for inspection by representative of DAAR.

E. EVIDENCES (ACRONYMS/ RECORDS / REFERENCES):

E1. ACRONYMS:

ABS	:	AERONAUTICAL BROADCASTING SERVICE
ACAS	:	AIR BORNE COLLISION AVOIDANCE SYSTEM
ACC	:	AREA CONTROL CENTRE
AFCoM	:	AIRPORT FACILITY CONTROL AND MONITORING
AFS	:	AERONAUTICAL FIXED SERVICE
ALOS	:	ACCEPTABLE LEVEL OF SAFETY
ANO	:	AIR NAVIGATION ORDER
ANS	:	AIR NAVIGATION SERVICES
ANSP	:	AIR NAVIGATION SERVICE PROVIDER
APM	:	AIRPORT MANAGER
ARNS	:	AERONAUTICAL RADIO NAVIGATION SERVICE
ATM	:	AIR TRAFFIC MANAGEMENT
ATS	:	AIR TRAFFIC SERVICE
AVRs	:	AUTOMATIC VOLTAGE REGULATOR
CARGs	:	CIVIL AVIATION REGULATIONS
CE	:	CRITICAL ELEMENTS
CEO	:	CHIEF EXECUTIVE OFFICER
CFAR	:	CONSTANT FALSE ALARM RATE
CNS	:	COMMUNICATIO NAVIGATION, SURVEILLANCE
CPDLC	:	CONTROLLER PILOT DATA LINK COMMUNICATION
CTO	:	CHIEF TECHNICAL OFFICER
CVOR	:	CONVENTIONAL VOR

DAAR	:	DIRECTORATE OF AIR SPACE AND AERODROME REGULATIONS
DGCAA	:	DIRECTOR GENERAL CIVIL AVIATION AUTHORITY
DME	:	DISTANCE MEASURING EQUIPMENT
DRF	:	DATA RECORDING FACILITIES
DVOR	:	DOPPLER VOR
FANS	:	FUTURE AIR NAVIGATION SYSTEM
FIDS	:	FLIGHT INFORMATION DISPLAY SYSTEM
GBAS	:	GROUND BASED AUGMENTATION SYSTEM
GLONASS	:	GLOBAL ORBITING NAVIGATION SATELLITE SYSTEM
GNSS	:	GLOBAL NAVIGATION SURVELLIANCE SYSTEM
GRAS	:	GROUND BASED REGIONAL AUGMENTATION SYSTEM
ICAO	:	INTERNATION CIVIL AVIATION ORGANIZATION
IOU	:	INCIDENT OCCURANCE UNSERVICABILITY
ILS	:	INSTRUMENT LANDING SYSTEM
LAN	:	LOCAL AREA NET WORK
NDB	:	NON-DIRECTIONAL BECON
OJT	:	ON THE JOB TRAINING
PQ	:	PROTOCOL QUESTION
PSR	:	PRIMARY SURVEILLANCE RADAR
R/T	:	RECIEVER/TRANSMITTER
SARPs	:	STANDARD AND RECOMMENDED PRACTICES
SBAS	:	SATTELITE BASED AUGMENTATION SYSTEM
SDD	:	SITUATION DATA DISPLAY
SDP	:	SITUATION DATA PROCESSOR
SOPs	:	STANDARD OPERATING PROCEDURES
SSR	:	SECONDARY SURVELLIANCE RADAR
TDME	:	TERMINAL DME
VOR	:	VERY HIGH FREQUENCY OMNI RANGE


E2. REFERENCES:

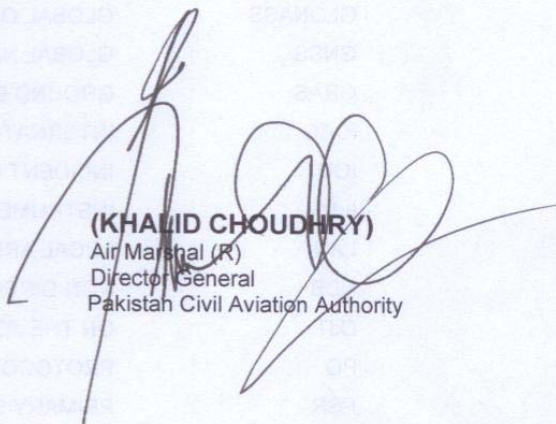
ANO-001-DRTS-1.0

ANO-008-ARTS-1.0

IMPLEMENTATION:

This ANO shall be implemented with effect from 15th September, 2013.

Dated:  September 2013


(KHALID CHOUDHRY)
Air Marshal (R)
Director General
Pakistan Civil Aviation Authority


(Engr. M AZHAR SALEEM)
General Manager
Technical Standards

Dated: 30th August, 2013

File No. HQCAA/1122/510/ARTS/I