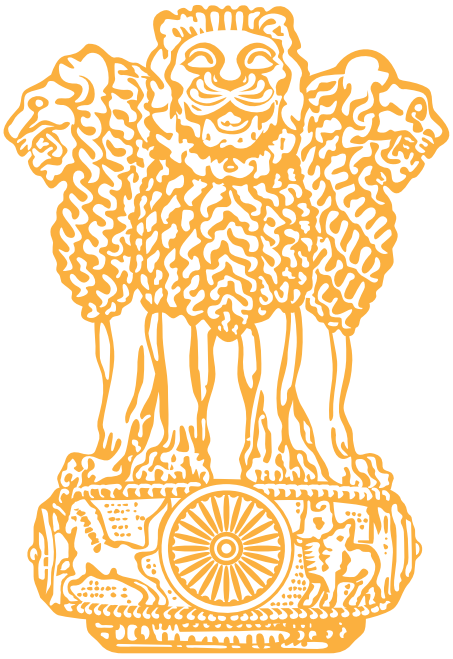
FRAMEWORK AND PROCEDURE FOR

DESIGN, DEVELOPMENT AND PRODUCTION OF MILITARY AIR SYSTEMS AND AIRBORNE STORES

DDPMAS

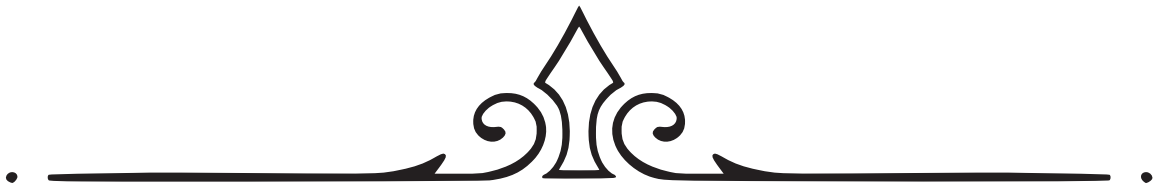
Version 1.0



सत्यमेव जयते

MINISTRY OF DEFENCE
GOVT. OF INDIA

FEBRUARY 2021



DDPMAS - Version 1.0

Suggestions for improvement of this document should be addressed to:-

The Member Secretary

Joint Airworthiness Committee (JAC)

Centre for Military Airworthiness & Certification

DRDO, Ministry of Defence (R & D)

Marathahalli Colony Post

Bengaluru-560 037

FOREWORD

The last two decades have seen rapid advancements in Indian military aeronautical scenario, with significant expansion in the design, development and production activities, increasing ascent on self-reliance, indigenisation activities with more and more public sector undertakings, private entrepreneurs and small-scale industries participation in-line with the Make-in-India policy of the Government.

The activities in the design, development and production of military air systems and airborne stores have so far been regulated largely by the Ministry of Defence document DDPMAS which was first released in 1975 and later revised in 2002. The stakeholders comprising of Government Organisations, Public Sector Undertakings, User Services, Private industries and the Regulatory Authorities have joined together to revise this document to make it current and more appropriate to meet the changing military aviation scenario of the country.

The efforts have resulted in making the present DDPMAS document contemporary, facilitating private industry participation and Make-in-India policy, presenting it in a clear, structured, coherent and a hierarchical manner comprising of Framework and Procedure, Requirements and Manuals, thereby making it process dependent and in-line with the international approach. This revised DDPMAS Version 1.0 document supersedes DDPMAS 2002.

DDPMAS Version 1.0 is conceived to be a live document with provisions for updates. The amendments will be issued formally by CEMILAC, with the approval of a high-level committee empowered for the purpose.

All design, development and production and other activities related to military aviation shall comply with the provisions stipulated in this document.

(Raj Kumar)
Secretary (Defence Production)
Dated: 03 **February 2021**

(Dr G Satheesh Reddy)
Secretary (Defence R&D)
Dated: 03 **February 2021**

Intentionally Left Blank

CONTENTS

PROCEDURE FOR AMENDMENT

Any agency may propose an amendment. Proposals for amendments are to be sent to the Member Secretary, Joint Airworthiness Committee (JAC), CEMILAC. The proposals will be discussed in the Joint Airworthiness Committee (JAC) before approval.

The amendments will be serially numbered. Incorporation of an amendment in this document is to be recorded by inserting the amendment number, signing in the appropriate column and inserting the date of making the amendment. The original document shall be under the custody of CE (A), CEMILAC. The copy of the amendment sheet along with the amendment pages will be made available to the stakeholders.

Sl. No	Amendment No	Date of Amendment	Amended Page Nos	Remarks (Details of Amendment)	Signature of Competent Authority

Intentionally Left Blank

ABBREVIATIONS

AA - - - - -	Army Aviation
AATT - - - -	Army Aviation Test Team
ACAS - - - -	Assistant Chief of Air Staff
ACNS - - - -	Assistant Chief of Naval Staff
ACP - - - -	Airworthiness Certification Plan
ADA - - - -	Aeronautical Development Agency
ADG - - - -	Additional Director General
AFQMS - - -	Approval of a Firm and its Quality Management System
AHSP - - - -	Authority Holding Sealed Particulars
ALGM - - -	Air Launched Guided Munition
ALM - - - -	Air Launched Missile
AMC - - - -	Acceptable Means of Compliance
AMTC- - - -	Amended Military Type Certificate
ASDO - - - -	Air System Design Organisation
ASDOA - - -	Air System Design Organisation Approval
ASMO- - - -	Air System Maintenance Organisation
ASMOA - - -	Air System Maintenance Organisation Approval
ASPO - - - -	Air System Production Organisation
ASPOA - - -	Air System Production Organisation Approval
ASR - - - -	Air Staff Requirements
ASTE - - - -	Aircraft and Systems Testing Establishment
ATC - - - -	Air Traffic Control
ATP- - - - -	Acceptance Test Procedure
AUW - - - -	All Up Weight
BEL - - - -	Bharat Electronics Limited
BNE - - - -	Buyer Nominated Equipment
BRD - - - -	Base Repair Depot
CAMO - - -	Continuing Airworthiness Management Organisation
CCP - - - -	Configuration Change Process
CEMILAC - -	Centre for Military Airworthiness and Certification
CFE- - - - -	Customer Furnished Equipment
CGAIS - - -	Coast Guard Aeronautical Inspection Service
CMDS- - - -	Counter Measure Dispensing System
CoA- - - - -	Certificate of Airworthiness
CoC- - - - -	Certificate of Conformity
CoD - - - -	Certificate of Design
CONOPS- - -	Concept of Operations
COTS - - - -	Commercial Off-The Shelf
CQA (IAF) - -	Chief Quality Assurance (IAF)

CRPO - - - -	Chief Research and Project Officer
CR&J - - - -	Carriage Release and Jettison
CSDO - - - -	Central Servicing Development Organisation
CSE- - - - -	Customer Specified Equipment
CSIR - - - -	Council for Scientific and Industrial Research
CSU - - - -	Clearance for Service Use
CTP- - - - -	Chief Test Pilot
DAP - - - -	Defence Acquisition Procedure
D&D - - - -	Design and Development
DDG - - - -	Deputy Director General
DFC - - - -	Development Flight Clearance
DG - - - - -	Director General
DGAQA - - -	Directorate General of Aeronautical Quality Assurance
DGCA- - - -	Directorate General of Civil Aviation
DOA - - - -	Design Organisation Approval
DOAS - - - -	Design Organisation Approval Scheme
DOE - - - -	Design Organisation Exposition
DPSU - - - -	Defence Public Sector Undertaking
DPM - - - -	Defence Procurement Manual
DRDO- - - -	Defence Research and Development Organisation
ECS- - - - -	Electronics and Communication System
ESOP - - - -	Equipment Standard of Preparation
FC - - - - -	Flight Clearance
FCC - - - -	Flight Clearance Certificate
FOC - - - -	Final Operational Clearance
FOL - - - -	Fuel Oils and Lubricants
FONA - - - -	Flag Officer Naval Aviation
FPCM - - - -	Flight Program Clearance Memo
FQT - - - -	Full Qualification Tests
GoI - - - - -	Government of India
GOS - - - -	Ground Operating System
GSQR - - - -	General Staff Qualitative Requirements
GSS- - - - -	Ground Support System
HAL - - - -	Hindustan Aeronautics Limited
HQ - - - - -	Head Quarters
IA - - - - -	Indian Army
IAF - - - - -	Indian Air Force
ICG - - - - -	Indian Coast Guard
ICGSQR - - -	Indian Coast Guard Staff Qualitative Requirements
IDDM - - - -	Indigenously Designed Developed & Manufactured
IMATSO - - -	Indian Military Aviation Technical Standard Order

IMATSOA - -	Indian Military Aviation Technical Standard Order Approval
IMTAR - - -	Indian Military Technical Airworthiness Requirements
IN - - - - -	Indian Navy
IOC - - - - -	Initial Operational Clearance
IPR - - - - -	Intellectual Property Rights
JAC - - - - -	Joint Airworthiness Committee
JRI - - - - -	Joint Receipt Inspection
JSQR - - - -	Joint Services Qualitative Requirements
LCC - - - -	Local Concession Committee
LMC - - - -	Local Modification Committee
LoTA - - - -	Letter of Technical Approval
LQT - - - -	Limited Qualification Tests
LRU - - - -	Line Replaceable Unit
LTC - - - - -	Local Technical Committee
LTCC - - - -	Local Type Certification Committee
MAG (Avn) - -	Maintainability Advisory Group (Aviation)
MDI - - - -	Master Drawing Index
MIDHANI - -	Mishra Dhatu Nigam Limited
MMO - - - -	Military-run Maintenance Organisation
MOA - - - -	Maintenance Organisation Approval
MOAS - - - -	Maintenance Organisation Approval Scheme
MoD - - - -	Ministry of Defence
MOE - - - -	Maintenance Organisation Exposition
MoM - - - -	Minutes of Meeting
MoU - - - -	Memorandum of Understanding
MSS - - - -	Missile & Strategic Systems
MTC - - - -	Military Type Certificate
NAL - - - -	National Aerospace Laboratory
NASDO - - -	Naval Aircraft Servicing and Development Organisation
NAQAS - - -	Naval Aeronautical Quality Assurance Service
NAY - - - -	Naval Aviation Yard
NCRB - - - -	Non Conformance Review Board
NCRP - - - -	Non Conformance Review Process
NFTC - - - -	National Flight Test Centre
NFTS - - - -	Naval Flight Test Squadron
NSQR - - - -	Naval Staff Qualitative Requirements
OEM - - - -	Original Equipment Manufacturer
OFB - - - -	Ordnance Factory Board
ORDAQA - -	Office of Regional Director, Aeronautical Quality Assurance
PAT - - - - -	Production Acceptance Test
PATP - - - -	Production Acceptance Test Plan

PC - - - - -	Provisional Clearance
PDI - - - - -	Pre-Dispatch Inspection
POA - - - -	Production Organisation Approval
POAS - - - -	Production Organisation Approval Scheme
POE - - - -	Production Organisation Exposition
PQT - - - -	Periodic Quality Test
PSU- - - - -	Public Sector Undertaking
QA - - - - -	Quality Assurance
QAP - - - -	Quality Assurance Plan
QTP - - - -	Qualification Test Procedure
RCMA- - - -	Regional Centre for Military Airworthiness
RFP- - - - -	Request for Proposal
RSD - - - -	Release to Service Document
RMTC- - - -	Restricted Military Type Certificate
SB - - - - -	Service Bulletin
SCRB - - - -	System Certification Review Board
SDO - - - -	Store Design Organisation
SDOA - - - -	Store Design Organisation Approval
SI - - - - -	Servicing Instructions
SMO - - - -	Store Maintenance Organisation
SMOA- - - -	Store Maintenance Organisation Approval
SMTC - - - -	Supplemental Military Type Certificate
SOC - - - -	Signal Out Certificate
SOE - - - -	Standard of Equipment
SOFT - - - -	Safety of Flight Tests
SOP- - - - -	Standard of Preparation
SPO - - - -	Store Production Organisation
SPOA - - - -	Store Production Organisation Approval
SQR - - - -	Staff Qualitative Requirements
STI - - - - -	Special Technical Instruction
TA - - - - -	Type Approval
TAA - - - -	Technical Airworthiness Authorities
TAB - - - -	Type Approval Basis
TARB - - - -	Test Adequacy Review Board
TCB - - - -	Type Certification Basis
TCDS - - - -	Type Certificate Data Sheet
TC&PI - - -	Technical Coordination & Public Interface
ToT - - - - -	Transfer of Technology
TTGE - - - -	Tools Testers and Ground Equipment
UAS - - - -	Unmanned Aircraft System
UAV - - - -	Unmanned Aerial Vehicle
UON - - - -	Urgent Operating Notice

DEFINITIONS

Acceptable Means of Compliance (AMC)

AMC represents the preferred means by which the Technical Airworthiness Authorities (TAA) expect the intented requirement / criteria to be met.

Air System

Air Systems include fixed or rotary wing Aircraft, Unmanned Aircraft, Air Launched Missiles and Aero Engines.

Airborne Stores

Airborne Stores include all Parts & Appliances, Airborne General Stores, Propeller, Aero Materials, Air Armaments, Crew Personal Protection Equipment, Fuel Oil Lubricants (FOL), Parachutes etc, used in an Air System.

Air Armament

Air Armament is a type of Airborne Stores. Air Armament includes air-dropped bombs (including smart bombs), rockets and similar air dropped weapons. This definition covers both live and inert variants of the Air Armament. Counter measure dispensing systems, Air-dropped torpedoes, depth charges, sonobuoys, rescue boats and similar items which are deployed from Air Systems are included as Air Armament.

Air Launched Missiles (ALMs)

ALMs are defined as those missiles which are required to be carried, released and jettisoned (CR&J) from a military airborne platform. This definition covers both live and inert variants of the ALMs. Air Launched Missiles are characterized by own propulsion system and guidance system. ALM is an Air System unlike air armament which is an Airborne Store.

Airworthiness

Airworthiness is the continued capability of the military Air Systems and Airborne Stores to perform satisfactorily and fulfill mission requirements, throughout the specified life in the specified environments with acceptable levels of safety and reliability. The acceptable levels are to be mutually agreed between Users, Main Contractor and Technical Airworthiness Authorities.

Airworthiness Certification Plan (ACP)

ACP is a document that brings out the details towards compliance to the agreed Type Certification Basis (TCB)/Type Approval Basis (TAB) of the Air System/Airborne Stores and the level and stage of involvement of TAA and other stakeholders at various stages of the development.

Airworthiness Certification Criteria

It is a foundational and a guidance document that contains the relevant standards/tailored standards/codes to be used by the Main Contractors to define their Air Systems and Airborne Stores airworthiness certification basis.

Air System Design Organisation (ASDO)

ASDOs are organisations involved in design & development and modification of an Air System. ASDO shall be responsible for the overall design or through-life configuration management of the design of the Air System, and for co-coordinating the design and integration of the Airborne Stores designed by other design organisations.

Air System Maintenance Organisation (ASMO)

ASMOs are organisations involved in the maintenance of an Air System. ASMO shall be responsible for the overall maintenance of the Air System, and for co-ordinating the overhauling & maintenance of the Airborne Stores maintained by other organisations.

Air System Production Organisation (ASPO)

ASPOs are organisations involved in manufacturing of an Air System. ASPO shall be responsible for the overall manufacturing of the Air System, and for integration of the Airborne Stores manufactured by other organisations.

Amended Military Type Certificate (AMTC)

AMTC is an approval of a change to a Type design/Military Type Certificate, carried out by the Type Certificate Holder/Original Equipment Manufacturer (OEM).

Applicant

An organisation seeking Airworthiness Approvals/Clearances/Certificates or Organisation Approvals from TAA.

Authority Holding Sealed Particulars (AHSP)

AHSP is the authority responsible for collecting, collating, developing, updating, holding and supplying sealed particulars of the defence items in accordance with the laid down procedure. AHSP for aviation stores is being held by various DPSUs, Ordnance Factories, DGAQA, DRDO labs, individual Services for different aviation stores.

Certificate of Airworthiness (CoA)

CoA is the formal document issued by competent authority to certify that an Air System is airworthy. Every individual Aircraft has to gain its own Certificate of Airworthiness which is achieved when it can be shown to conform to the Type Design and is in a condition for safe operation.

Certificate of Design (CoD)

CoD is the declaration by the authorized personnel of the Main Contractor that the system/subsystem/Airborne Store complies with all the requirements laid down in the technical specification with the exceptions quoted therein.

Clearance for Service Use (CSU)

CSU is an approval by CEMILAC for use of an Airborne Store by the User Services. CSU shall be the basis for operation of the Airborne Store by the services. Maintenance manuals, manuals on TTGE, and all other documents/training requirements required for ensuring the continuing airworthiness shall be the part of the CSU.

Continued Airworthiness

All processes to be carried-out to verify that the conditions under which the initial airworthiness approvals have been granted, continue to be fulfilled at any time during its period of validity; this includes all upgrades/modifications to the in-service Air Systems to enhance its usefulness & capability and to also address obsolescence.

Continuing Airworthiness

All of the processes ensuring that, at any time in its operating life, an Air System and the Airborne Stores complies with the airworthiness requirements in force and is in a condition for safe operation. This includes following the prescribed scheduled maintenance practices, implementing the servicing & technical instructions and daily inspections practices to ensure that the Air System is airworthy for operations.

Continuing Airworthiness Management Organisation (CAMO)

Servicing/maintenance management organisation/department/mechanism within the Air Systems operator's organisational structure to track, monitor and manage the servicing/ maintenance related activities of the Air Systems to ensure their continuing airworthiness.

Concurrent Certification

Concurrent Certification is an approach where TAA are associated with a project, from the beginning of the project through all stages of development i.e., from the requirement stage, the design, development, test and evaluation process, so that the certification activities are progressed concurrently with the design and development.

Design Organisation Approval (DOA)

An approval given to an organisation as competent to carry out design, development, modification and repair of Air Systems or Airborne Stores.

Design Organisation Approval Scheme (DOAS)

DOAS is a mechanism by which the design competence of an organisation is assessed.

Development Flight Clearance (DFC)

DFC is an approval given to an Airborne Store for integration onto an Air System to carry out development flight trials.

Final Operational Clearance (FOC)

Clearance issued by CEMILAC to an Air System for regular operations by the Services, when a type design has complied with and demonstrated all of the User requirements and the requirements of design and safety.

Flight Clearance Certificate (FCC)

FCC is an approval given to an Air System and is an authorization for the flight test agency to carry out development flight trials within the listed system/operating limitations and cleared envelopes.

Flight Test Agency of the Respective User Services
Flight Test Agency within the services, that is authorized by the Service HQ to carry out flight testing of Air System/ Airborne Stores for the Services, such as ASTE, NFTS, AATT, etc,. herein referred to as the flight testing agency of the respective User Services.

Flight Test Plan
A flight test plan typically defines the flight testing requirements for a particular phase of flight, including objectives, Air System, trial dates, venue, pre-requisites, SOP, configuration, tests to be conducted, environment, support and instrumentation needs. Flight Test Plans are prepared for important phases of flight tests.

Flight Test Schedule
A flight test schedule is like a flight test plan at individual sortie level. It contains details of specific tests to be conducted during the sortie. Flight Test Schedule includes Taxi Test Schedule also, which is intended for taxi tests.

Flight Test Specification
Flight test specification is the flight test demonstration requirements for an Air System/ Airborne Store that are to be verified through flight tests towards compliance of requirements in TCB/TAB. These are a set of tests that have to be successfully flown to comply with TCB/ TAB.

Impact Kinetic Energy
Kinetic Energy of an Unmanned Aerial Vehicle (UAV) upon impact, taking into account the maximum All Up Weight (AUW) for the UAV mass and a factor of the stall speed or maximum operating speed for the UAV velocity, for an unpremeditated descent scenario or a loss of control descent scenario respectively. This is explicitly applicable to UAS certification, wherein the impact kinetic energy is one of the criteria for certification.

Indian Military Aviation Technical Standard Order (IMATSO)
An IMATSO is a minimum performance standard/specification issued by CEMILAC for specified Airborne Stores to be used on military Air System. Airborne Stores with IMATSO approval are eligible for use on any Air System, provided the IMATSO standard meets the Air System requirements.

Indian Military Aviation Technical Standard Order Approval (IMATSOA)
An approval given to an Airborne Store that meets the relevant IMATSO standard/ specification. However, an IMATSOA, by itself, is not an authorization for installation on any Air System.

Indian Military Technical Airworthiness Requirements (IMTAR)
IMTAR is a procedural document that mandates the processes to be followed by organisations/stakeholders involved, under which necessary Clearances, Approvals and Certificates related to airworthiness and certification of Indian Military Air System for various scenarios and aspects of Air System life cycle, shall be issued by the Technical Airworthiness Authorities (TAA) of India.

Initial Operational Clearance (IOC)
Clearance issued to an Air System by CEMILAC with restrictions of intended use for operations by the Services, when a type design has complied and demonstrated most of the requirements of design and safety, wherein it has been assessed that the non-complied requirements have no impact on Air System. The restrictions are due to non-compliance to some of the User requirements.

Initial Airworthiness Approval
The approval issued by CEMILAC for the initial type design. Initial Airworthiness Approval includes, Military Type Certificate (MTC), Restricted Military Type Certificate (RMTC), Release to Service Document (RSD), Type Approval, Clearance for Service Use (CSU), Indian Military Aviation Technical Standard Order Approval (IMATSOA) and Letter of Technical Approval (LoTA).

Inspection Note
Each and every produced and released aeronautical equipment or Airborne Stores is accompanied with an Inspection Note issued by DGAQA, stating satisfactory inspection of the equipment or Airborne Stores.

Letter of Technical Approval (LoTA)
LoTA is an approval given to a class of Airborne Stores like Materials, Electronic modules, finished parts and other items that are not covered under Type Approval or IMATSOA.

Licensee
The organisation to whom the license to produce an Air System/Airborne Store has been conferred upon by the licensor.

Licensor
The Original Equipment Manufacturer (OEM) of the Air System/Airborne Store, issuing the license for production, is referred to as the Licensor.

Local Concession Committee (LCC)
LCC is a technical committee for discussions on the non-compliance of modifications and Service Instructions. LCC is chaired by CEMILAC and shall have members from DGAQA, design, production planning department, quality department of the Main Contractor firm and User representatives.

Local Modification Committee (LMC)
LMC is a forum for technical discussions and associated aspects of introduction and applicability of modifications. It is constituted by the Government. LMC shall be chaired by CEMILAC, with members from maintenance organisation of the respective User Services, Service Headquarters, DGAQA, Contractors representatives in Design, Production Engineering, Methods Engineering and Quality Control. Wherever flight testing is involved, flight testing agency representative may also be a co-opted member. LMC chairman may constitute LTC for technical evaluation of modification.

Local Technical Committee (LTC)
LTC is a sub-committee constituted by the chairman of the LMC, to technically evaluate the modifications in the absence of detailed information and documentation from the licensor or the OEM. LTC shall gives its recommendations to the LMC.

Local Type Certification Committee (LTCC)
LTCC is a committee to technically discuss the indigenisation aspects of identified Airborne Stores. It is chaired by CEMILAC with members from, department of indigenization, the Design & Quality departments of Main Contractor, DGAQA and User Services. Wherever flight testing is involved, flight testing agency representative may also be a co-opted member.

Loss of Control
A failure (or a combination of failures) which results in loss of control of an Air System and may lead to impacting the ground at high velocity. The energy on impact (Impact kinetic energy) due to loss of control is one of the criteria for UAS certification.

Main Contractor
Main Contractor is the development/modification/ production agency who is entrusted with the total responsibility for development/modification/production/delivery and follow on support of the Air System/ Airborne Store. When multiple agencies are involved, the respective roles and responsibilities may be defined in an agreement/ MoU among the agencies involved. Where there is no ambiguity or when used in a generic sense, the term Main Contractor is used throughout this document.

Maintenance Organisation (MO)
MOs are organisations involved in maintenance of Airborne Stores used in an Air System. MO shall be responsible for the through-life configuration management of the maintenance of Airborne Stores installed in an Air System.

Maintenance Organisation Approval (MOA)
An approval given to an organisation competent to carry out maintenance of Air Systems or Airborne Stores.

Maintenance Organisation Approval Scheme (MOAS)
MOAS is a mechanism by which the competence of an organisation to undertake maintenance of Air System and Airborne Stores can be assessed.

Maintenance Organisations of the respective User Services
Organisations within the Services, that are authorized by the Service HQ to perform the servicing development related activities of the Air System/ Airborne Stores for the Services, such as CSDO, NASDO, MAG(Avn), etc. herein referred to as the Maintenance Organisations of the respective User Services.

Military Aircraft

Military Aircraft includes Army, Navy, Air Force and Coast Guard aircraft, and every Aircraft commanded by personnel of the Armed Services. These include Fixed or Rotary Wing Aircraft, Piloted or Remotely Piloted Aircraft during development or during operations for military use, registered or intended to be registered with Ministry of Defence.

Military Type Certificate (MTC)

MTC is a certificate that the Air System of a particular type design complies with all the agreed Design, Safety and Airworthiness requirements.

Military Type Certificate Holder

The ASDO to whom the Military Type Certificate (MTC/RMTC) is awarded is the Military Type Certificate Holder.

Original Equipment Manufacturer (OEM)

The original equipment manufacturer is the original and the only firm manufacturing the specified Air System/Airborne Store of a specific make, as distinguished from the stockist/distributors or suppliers of such items/equipment and no other manufacturer exists for that item.

Production Organisation (PO)

POs are organisations involved in manufacturing and repair of Airborne Stores that are used in an Air System. PO shall be responsible for the through-life configuration management of the Airborne Stores produced and installed in an Air System.

Production Organisation Approval (POA)

An approval given to an organisation as competent to carry out manufacture and repair of Air Systems or Airborne Stores.

Production Organisation Approval Scheme (POAS)

POAS is a mechanism by which the competence of an organisation to undertake manufacture and repair of Air System and Airborne Stores can be assessed.

Provisional Clearance

A provisional clearance is issued to an Airborne Store for a limited period, pending issue of Type Approval by CEMILAC. A provisional clearance is issued to the effect that the Airborne Store under development meets all the laid down specifications and test requirements with the exceptions stated therein.

Quality Assurance Plan (QAP)

QAP is a document that details the quality assurance related activities throughout the design & development, production and maintenance of the Air System and Airborne Stores with the involvement of DGAQA or the QA departments of the Main Contractor/User Services.

Quality Assurance departments of the User Services

The departments within the respective User Services, that perform the Quality Assurance

activities for the Services, such as NAQAS, CGAIS, CQA etc, herein referred to as the Quality Assurance department of the respective User Services.

Regional Centre for Military Airworthiness (RCMA)
RCMA is a field unit of CEMILAC which progresses, on behalf of CEMILAC, all aspects of technical clearance of the Air Systems/Airborne Stores during design and development, production and in-service phase.

Recognition
Recognition is a structured process by which Indian TAA can evaluate foreign National Airworthiness Authorities (counterpart of CEMILAC and DGAQA) and assess the potential to use their certification approvals for Indian military applications. Recognition can be undertaken on a reciprocal basis, known as 'mutual', or on a unilateral/multilateral basis.

Release to Service Document (RSD)
Document issued by CEMILAC to the Services during IOC or FOC of an Air System that authorizes regular flying by the Services within the stipulated limitations and cleared envelopes.

Restricted Military Type Certificate (RMTC)
When an Air System has not completely demonstrated compliance to the design and safety requirements, wherein it has been assessed that the non-complied requirements have no impact on air safety, a RMTC can be issued for a provisional period until the Type Design can be demonstrated to be accurate and complete.

Safety of Flight Tests (SOFT)
An abridged version of the qualification tests for a non-safety critical Airborne Store, sufficient enough to establish confidence in the safety of a few development flights, for the purpose of data gathering to facilitate further development activities. Development Flight Clearance will be used by CEMILAC based on SOFT reports duly coordinated by DGAQA.

Service Bulletin (SB)
Service Bulletin is a document issued by the Air System/Airborne Store OEM to communicate details of modifcations which can be embodied in the Air System/Airborne Store.

Servicing Instructions (SIs)
SIs are instructions by the Air System manufacturer to the Air System operator, regarding additional/renewed servicing and maintainability aspects of the Air System.

Special Technical Instructions (STIs)
Special Technical Instructions are instructions by the Air System manufacturer to authorise remedial actions by the Air System operator when a fault or a potential fault impairs the safety, serviceability or operational capabilities of an Air System.

Staff Qualitative Requirements (SQR)
SQR is the document released by the User Services, which describes in qualitative and quantitative terms, the requirements for an Air System or Airborne Store, viz, ASR/NSQR/GSQR/ICGSQR/JSQR/PSQR.

Standard Part
A part manufactured in complete compliance with an established industry or Indian Government specification which includes design, manufacturing, test and acceptance criteria, and uniform identification requirements; the specification must include all information necessary to produce and conform to the part and be published so that any party may manufacture the part.

Standard of Preparation (SOP)
The frozen build standard of the Air System/Airborne Store including its approved drawings and list of approved equipment/items.

Store Design Organisation (SDO)
SDOs are organisations involved in the design & development and modification of Airborne Stores used in an Air System. SDO shall be responsible for the through-life configuration management of the designed Air borne Stores.

Supplier
An agency/person in the supply chain who provides a product, article, or service that is used or consumed in the design or manufacture of, or installed on, a product or article.

Supplemental Military Type Certificate (SMTC)
SMTC is an approval of a change to a Type design/Military Type Certificate, carried out by any party other than the Type Certificate Holder.

System Certification Review Board (SCRB)
SCRB is a board constituted by CE(A) CEMILAC, if required, to address issues related to design and certification. The board will be chaired by CE(A) with system domain specialists from CEMILAC and co-opted experts in the field, as members.

Test Adequacy Review Board (TARB)
TARB is a board constituted by the Main Contractor to review the adequacy of ground testing of systems/subsystem as part of design validation. The board will be chaired by a domain expert and will have system experts, CEMILAC, DGAQA as members. Flight testing agency of User Services may also be co-opted wherever required.

Technical Airworthiness Authorities (TAA)
CEMILAC and DGAQA, the organisations dealing with Technical Airworthiness of the Air Systems/Airborne Stores are jointly called TAA.

Tools, Testers and Ground Equipment (TTGE)
TTGE includes the following:

Tools: All mechanical/special tools required to maintain the Air System.

Testers: All testers and Test Equipment which are used to test/verify functions/ parameters of the parts/equipment/LRUs/Air System.

Ground Equipment: Ground handling and Ground support equipment required to operate / maintain the Air System.

Type Approval

Type Approval is a certificate issued by CEMILAC to the effect that the Airborne Store under reference meets all design specifications and test requirements laid down by CEMILAC. The type approval is issued after the Main Contractor submits the Type Record with all relevant documents, to the satisfaction of CEMILAC.The test reports along with compliance document shall be duly coordinated by DGAQA.

Type Approval Basis (TAB)

The TAB is an agreed set of airworthiness requirements and technical specifications that an Airborne Store must be compliant with, in order to be issued a Type Approval.

Type Certificate Holder

A Type Certificate Holder is the custodian of the Air System's type design approved under a Military Type Certificate.

Type Certification Basis (TCB)

The TCB is an agreed set of airworthiness requirements that an Air System must be compliant with, in order to be issued a Military Type Certificate (MTC).

Type Certificate Data Sheet (TCDS)

TCDS, is a document that contains information of the Air System type design, operating limitations, applicable requirements/standards of compliance, and any other conditions or limitations prescribed for the Type design. The TCDS of the type design is issued along with the MTC based on the Air System type record submitted by the Main Contractor.

Type Record

Type Record is a collection of documents giving a description of the Air System/Airborne Store, Technical Specifications, Qualification/Type Test details, results of all applicable tests, applicable drawings, lifing details and the Certificate of Design. It also includes information on dimensions, materials and processes necessary to define & produce the product. It should also indicate the instructions for continued airworthiness, operating limitations and other information for the safe operation.

Unmanned Aircraft System (UAS)

An Unmanned Aircraft System comprises of unmanned air system and associated elements (including communication links and the components that control the Unmanned Air System) that are required for the crew in command to operate safely and efficiently.

Unmanned Aerial Vehicle (UAV)

A UAV is a powered aerial vehicle that does not carry an onboard human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, can be expendable or recoverable and can carry lethal or nonlethal payload. UAV is a component of UAS.

Unpremeditated Descent

A failure (or a combination of failures) occurs which results in inability of the UAV to maintain a safe altitude above the surface. This term is exclusively applicable to UAS.

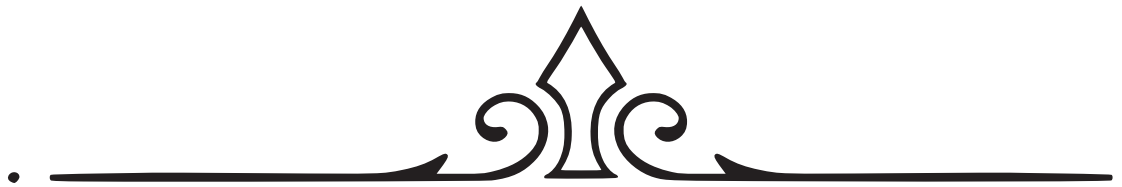
Urgent Operating Notice (UON)

Any operating instruction that is critical to the safety of flight and where updating of applicable publications may take time, shall be immediately intimated to applicable operating bases through an Urgent Operating Notice (UON).

User Services

User Services refers to Indian Army, Indian Navy, Indian Airforce, Indian Coast Guard and such Services under the Ministry of Defence.

Intentionally Left Blank



PART - 1

AIRWORTHINESS MANAGEMENT FRAMEWORK

Intentionally Left Blank

CHAPTER 1
INTRODUCTION TO INDIAN MILITARY AIRWORTHINESS

Airworthiness is 'fitness to fly'. A comprehensive definition of military airworthiness encompasses that, it is the continued capability of the Air System/Airborne Stores to perform satisfactorily and fulfill mission requirements, throughout the specified life in the specified environments with acceptable levels of safety and reliability. The acceptable levels to be mutually agreed between Users, designers and the certification authorities.

The definition unfolds two important aspects. Firstly, it accentuates that airworthiness is to be ensured throughout the life cycle of the Air System, and secondly, it introduces the key players or the stakeholders in the Indian military aviation scenario, namely, the Users (Services), Designers (Main Contractor) and the Airworthiness authorities.

Ensuring airworthiness throughout the life cycle of the Air System, implies that, the Air System is airworthy by design, it is manufactured as per the approved standard of preparation (SOP), and is maintained as per the approved procedure during its development and in service operation.

There are three major players in the Indian military aviation scenario. The User Services, who wishes to acquire a product based on the specific needs, the designer or the Main Contractor or the OEM who develops the product, and the technical airworthiness authorities, who certify that the product meets the requirements of airworthiness. In India, Centre for Military Airworthiness and Certification, CEMILAC, under Secretary (DD R&D), Ministry of Defence, Govt of India, is the organisation responsible for the Airworthiness Certification of military Air System and Airborne Stores and Directorate General of Aeronautical Quality Assurance, DGAQA, under Secretary (Defence Production), Ministry of Defence, Govt. of India, is the organisation responsible for the Quality Assurance. Together, CEMILAC and DGAQA are the Technical Airworthiness Authorities for Indian military Air Systems and Airborne Stores. In particular, CEMILAC is the design approval authority and DGAQA is the quality assurance approval authority.

In order to meet the strategic and tactical aviation needs of the country, the Services have various Air System/Airborne Stores acquisition models in place as per Defence Acquisition Procedure (DAP) and Defence Procurement Manual (DPM). DAP broadly classifies the acquisition modes as the "Buy", "Buy and Make" and "Make", with reference to both Indian and Global. Broadly speaking, "Buy" refers to an outright purchase, while "Buy and Make" refers to purchase followed by license to produce, and "Make" refers to indigenous design & development. From airworthiness perspective, "Buy" refers to bought-out, "Buy and Make" refers to License manufactured and "Make" refers to ab-initio developed Air System/Airborne Stores.

The airworthiness authorities have a major role to play in each of the acquisition models. In ab-initio development, the activities center around the demonstration of design safety standards by design evaluation, analysis & simulation, ground & flight testing and quality assurance, leading to the issuance of a Military Type Certificate (MTC) for an Air System, to the Main Contractor, which is a statement that the military Air System Type meets the type design safety requirements and is ready to enter Series Production. Induction of the Air System to the Services thereafter, marks the Final Operation Clearance (FOC), which culminates in Release to Service Document (RSD), issued to the User, to facilitate operations and to ensure airworthiness throughout lifecycle of the Air System. In some cases, a Restricted Military Type Certificate (RMTC) is issued, pending a few non-safety compliance demonstration. The User may still choose to induct and operate it, wherein, an Initial Operation Clearance (IOC) is issued.

Likewise, the Airborne Stores are evaluated for their compliance to safety and performance, leading to the issuance of a Type Approval (TA) or an Indian Military Aviation Technical Standard Order Approval (IMATSOA), or a Letter of Technical Approval (LoTA) depending on the type of the Airborne Store.

The certificates and the approvals issued for the Air System and the Airborne Stores respectively, are together called the Initial Airworthiness Approvals or instruments of airworthiness. Ensuring airworthiness thereafter, is all about ensuring that all tasks carried out are towards maintaining the conditions under which Initial Airworthiness Approvals have been granted and continue to be fulfilled during their validity period.

In bought-out, and in license produced Air System, the major activities revolve around demonstration by analysis, simulation and testing that the modification to the existing MTC, does not infringe safety of flight. If the modification is performed by the Original Equipment Manufacturer (OEM), wherein all the design details are available, the task culminates in the issuance of Amended Military Type Certificate (AMTC) to the OEM. In some cases, a Supplemental Military Type Certificate (SMTC) is issued, if the modification is carried out by any party other than the OEM. In general, technical activities like, Modifications, Upgradation and Life extension are applicable to ab-initio, licensed produced and bought-out Air System/Airborne Store as and when required by the Services. The airworthiness certification coverage offered by the airworthiness authorities to the Air System in-service amounts to Continued Airworthiness.

Technical airworthiness is based on the fundamental principle of achieving safety and performance, by ensuring adequate margins/redundancies in design, comprehensive testing/ analysis and evidence generation for compliance to safety, performance and quality assurance standards.

Also, at any time during its operating life, ensuring that the Air System complies with the airworthiness requirements by way of daily checks & inspection and scheduled maintenance, and is in a condition for safe operation, amounts to continuing airworthiness.

Primarily, if airworthiness amounts to the design being technically airworthy, and then produced to the approved standard of preparation and continually maintained during its in-service life to the required standards and periodicity, then, it is impending that the designer or the Main Contractor will have to be design approved, leading to the issuance of Design Organisation Approval (DOA), which is a recognition that the designer has the ability to design an Air System/equipment that meets the airworthiness requirements; the production agency will have to be production approved, leading to the issuance of Production Organisation Approval (POA), which is a statement that the production agency has the necessary wherewithal to produce the Air System as per the approved standard of preparation, and the maintenance organisation will have be issued with Maintenance Organisation Approval (MOA), which is a recognition of the ability to undertake various levels of maintenance activities towards establishing airworthiness at any point in the service life. The Design Approval is the responsibility of CEMILAC, the Production and Maintenance Approvals are the responsibility of DGAQA.

Air System safety is paramount. Therefore, airworthiness has to be ensured. It is ensured through a structured, coherent and a hierarchical manner, comprising of Procedure, Requirements and Manuals.

The Procedure is enforced by Ministry of Defence, Government of India, that defines roles, responsibilities and empowerment of stakeholders to address airworthiness in various scenarios and facets of the Air System life cycle.

The Requirements are Airworthiness technical mandates for technical and operational airworthiness, that have to be adhered to, by all the stakeholders in order to ensure airworthiness. The requirements cover, technical airworthiness during design & development, continued airworthiness, quality assurance aspects during development, production, organisational approvals and operational/continuing airworthiness. The requirements pertaining to Technical Airworthiness are prepared by the TAA, i.e, CEMILAC and DGAQA, and approved by Ministry of Defence, Government of India. The Requirements pertaining to Operational Airworthiness are prepared and promulgated by the respective User Head Quarters.

The manuals refer to templates, forms, circulars, airworthiness directives, AQA directives and airworthiness certification criteria documents, that may be referred to by the Main Contractor which facilitates in implementing the requirements towards ensuring airworthiness. These are released by the respective Organisation Heads i.e CEMILAC & DGAQA.

This document titled, DDPMAS Version 1.0, is a Procedural document on Technical Airworthiness, covering roles and responsibilities and the empowerment of the stakeholders to ensure airworthiness of Indian military Air Systems.

The document is structured in two parts, Part-1 and Part-2. Part-1 consists of three chapters, the present introduction chapter, the military airworthiness framework chapter and the military acquisitions chapter. These three chapters are aimed at introducing the readers

to a prelude of various activities of military airworthiness in the country, the airworthiness framework and the acquisitions models of the Services, that needs to be addressed for its airworthiness.

Part-2, consists of 12 chapters to exclusively cover the airworthiness procedures for Ab-initio development, License production, Bought-Out and Continuing/Continued airworthiness and Flight Testing of Air System/Airborne Stores. Chapters on procedures for Exports, Research and Civil certified military Air System have also been addressed here. Further, procedures for Air Systems such as UAS and Air Launched Missiles have also been added through exclusive chapters. The procedures pertinent to indigenous substitution and organisation approvals for design, production and maintenance have also been explicitly addressed in individual chapters.

In short, the activities related to design, development, manufacture and procurement of Air System/Airborne Store for the Indian military, shall follow the procedures as outlined in the applicable chapters of this DDPMAS Version 1.0 document.

This document shall be reviewed by the advisory bodies every 3 years for possible updates keeping in mind the contemporary advancements in military aviation and the suggestions received.

This document DDPMAS Version 1.0 shall supersede, DDPMAS 2002 Vol 1 and Vol 2. DDPMAS Version 1.0 shall apply to the new projects initiated post its release. The applicability of this document to the ongoing Air Systems/Airborne Stores programmes, shall be decided based on the stage of completion and in consultation with the stakeholders.

CHAPTER 2
INDIAN MILITARY AIRWORTHINESS FRAMEWORK

2.1 Concept of Airworthiness

a. Airworthiness is a concept, the application of which ensures that the condition of an Air System is suitable to safely carry out the mission for which it has been designed, built, maintained and operated. In generic terms, an Air System is said to be airworthy when the Air System and all of its components meet their type design and is in a 'condition for safe operation'.

b. In military aviation, airworthiness is not only the ability of Air System to take-off, sustain flight and safely land but also the ability to fulfill its mission. Hence military airworthiness is defined as the continued capability of an Air System to perform satisfactorily and fulfill mission requirements, throughout the specified life in the specified environment with acceptable levels of safety and reliability.

c. To fulfill the above defin ition of airworthiness the following two aspects are important:

   i. Technical Airworthiness: Technical airworthiness is concerned with ensuring Air Systems are designed, developed, produced and maintained to the approved airworthiness criteria by competent authorities, and working within approved organisations under a system of certification and acceptance. Technical Airworthiness includes Initial Airworthiness of Air Systems during development phase and Continued Airworthiness during in-service phase.

   ii. Operational Airworthiness: Operational airworthiness is concerned with ensuring Air Systems are serviced, maintained and operated in approved roles, with correct mission equipment, by competent and authorised individuals, according to approved manuals, procedures and instructions, under a system of supervision and monitoring. Operational Airworthiness includes Continuing Airworthiness activities of Air Systems in-service.

d. Aviation safety and mission accomplishment are dependent upon the effective and synergetic implementation of both technical and operational airworthiness.

e. For an Air System to be airworthy over its entire lifecycle, it is imperative that the Air System/Airborne Store is :

i. Designed to be airworthy

ii. Built to be airworthy

iii. Operated and Maintained to be airworthy

The successful completion of design, development and evaluation leads to freezing of the type design of an Air System/Airborne Store. Every Air System/Airborne Store produced as per the type design, is said to possess Initial Airworthiness. Subsequently, during the exploitation by the Services, the Air System/Airborne Store will be available and dependable only when it continues to be airworthy. Figure 1 below illustrates the concept of airworthiness throughout the design, development, production and service use of an Air System.

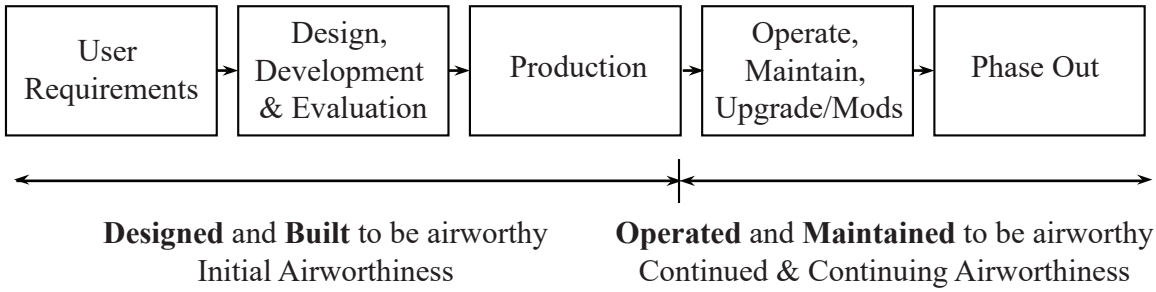


Figure 1 : Airworthiness Concept during Air System Life Cycle

2.2 Indian Military Airworthiness – Stakeholders

a. Indian Military Airworthiness Framework covers military Air Systems registered under the Indian Military Register. Air Systems operated by the Indian Tri-services and the Indian Coast Guard, Air Systems under development for military application, Air Systems for testing military products and Air Systems owned and operated by the MoD are covered in this framework.

b. For the defence forces to execute their operational requirements, the Air System has to be airworthy at any given time. All the stakeholders in military aviation have a key role to play in ensuring airworthiness. Table 1 enlists broadly, but not limited to, the roles and responsibilities of all the stakeholders concerned with Indian Military Airworthiness.

Table 1 : Roles and Responsibilities of Major Stakeholders

Stakeholder	Roles & Responsibilities
Indian Defence Forces a. Service & Command Headquarters b. Operational Units c. Flight Testing Establishments d. MRO Organisations e. D&D Organisations f. Training Organisations	a. Specify requirements b. Part of Integrated Project Teams during D&D, upgrades & modification c. Carry out development testing/ modification testing/upgrade testing and User Evaluation Testing d. Carry out maintenance -repair-overhaul. Carry out upgradation, modification & life extension, flight testing & obsolescence management of Air System and Airborne Stores. e. Operate Air Systems and Airborne Stores f. Service and Maintain Air Systems and Airborne Stores g. Carry out accident/incident investigations and periodic safety assessment h. Indigenous substitution activities
Design, Development and Production Agencies a. DRDO b. DPSUs and Other PSU c. CSIR d. OFBs e. Indian Private Industries f. Foreign OEMs	a. Carry out feasibility study, design, develop and test Air Systems and Airborne Stores b. Produce indigenous and licensed Air Systems and Airborne Stores c. Maintain-Repair-Overhaul Air Systems and Airborne Stores d. Carry out Upgradation, Modifications and Life Extension e. Carry out accident/incident investigations f. Flight Testing of Air Systems g. Obsolescence Management
Indian Technical Airworthiness Authorities a. CEMILAC – Regulatory Authority for Design Approval b. DGAQA – Regulatory Authority for Quality Assurance Approval	a. Carry out technical airworthiness activities during design, development and production of Air Systems and Airborne Stores b. Participate in continued airworthiness activities c. Issue instruments of technical airworthiness approvals

2.3 Technical Airworthiness Authorities

Technical Airworthiness Authorities are organisations that are independent of the User Services and Main Contractor. The TAA, established by the Ministry of Defence, are responsible for the regulation of the technical airworthiness aspects of design & development, production and maintenance of Air Systems/Airborne Stores and the determination of the airworthiness acceptability of those products prior to operational service. This includes the authority to prescribe, interpret, and revise airworthiness requirements. In India, the role of Technical Airworthiness Authorities is executed by CEMILAC and DGAQA.

i. CEMILAC:

Centre for Military Airworthiness and Certification (CEMILAC), under the Dept. of Defence Research and Development, is the military airworthiness certification authority responsible for grant of initial airworthiness approvals and continued airworthiness approvals. CEMILAC carries out these activities through its field establishments known as Regional Centres for Military Airworthiness (RCMAs).

ii. DGAQA:

The Directorate General of Aeronautical Quality Assurance (DGAQA), under the Dept. of Defence Production is the authority responsible for ensuring quality assurance for military Air Systems and Airborne Stores during development and production. DGAQA carries out these activities through its field establishments like ORDAQA and other offices of aeronautical quality assurance.

2.4 Indian Military Airworthiness Framework

a. The Indian Military Airworthiness framework is a comprehensive approach:

i. To ensure that Air Systems and Airborne Stores acquired by the User Services, comply with the applicable airworthiness requirements.

ii. To ensure that the Air Systems inducted to the Services continue to be airworthy throughout their operational life.

iii. To facilitate an ecosystem of approved organisations that can design, develop, manufacture and maintain military Air Systems.

iv. To enable technical airworthiness certification based on technical airworthiness criteria.

v. To harmonize the military airworthiness activities with other national level policies like Defence Acquisition Policy, Make-In-India Policy etc.

b. The Indian Military Airworthiness approach is facilitated through a structured, coherent and a hierarchical set of documentation. The apex of the hierarchy is the DDPMAS. Requirements form the second tier concerned with Technical and Operational Airworthiness. The final layer is the Manuals, that are specific to implementation aspects of DDPMAS and Requirements.

2.5 Airworthiness Procedure

The airworthiness procedure document called the DDPMAS Version 1.0 is the apex governing document for Indian Military Airworthiness. The document is drafted by CEMILAC and reviewed by Joint Airworthiness Committee. The procedure document covers the following aspects:

a. Introduction to the military airworthiness framework and its relationship with the acquisitions models of the Services.

b. Empowerment and roles & responsibilities of all stakeholders concerned with military airworthiness in India.

c. Airworthiness procedures for military acquisitions for scenarios such as ab-initio development, license production, bought-out Air Systems and Airborne Stores and their flight testing.

d. Procedures related to continuing and continued airworthiness.

e. Organisation Approvals.

2.6 Airworthiness Requirements

a. Airworthiness Requirements provide detailed requirements for both technical and operational airworthiness. The airworthiness requirements are aligned to the airworthiness procedure.

b. The Indian Military Technical Airworthiness Requirements (IMTAR) are drafted by Technical Airworthiness Authorities i.e. CEMILAC and DGAQA and reviewed by Joint Airworthiness Committee (JAC). IMTAR comprises of dedicated Subparts with regulation, acceptable means of compliance and necessary guidance material.

c. The Operational Airworthiness Requirements are drafted and promulgated by the respective Service Headquarters.

2.7 Manuals

Manuals are the guideline documents that are required at the working level to implement the procedures given in DDPMAS and Requirements. These manuals are to be released by the respective competent authorities of the TAA and the User Services. Examples of manuals include, but not limited to, Service Orders, Airworthiness Certification Criteria, Forms, Templates, Airworthiness & AQA Directives, and Circulars.

2.8 Indian Military Airworthiness Advisory Body

a. In order to guide and advice on the military airworthiness of the country, it is important to establish an airworthiness advisory body. A Joint Airworthiness Committee (JAC) is constituted for this purpose.

Table 2 : Joint Airworthiness Committee Constitution

Joint Airworthiness Committee	
Chairman – CE (A), CEMILAC	Director, R&D, BEL
Co Chairman - DG, DGAQA	Director, ADA
Member Secretary – Director (TC&PI), CEMILAC	Director, NAL, CSIR
ACNS (Air), IN	CMD, MIDHANI
FONA, IN	Rep OFB
ACAS (Proj), IAF	Rep DG (Aero), DRDO
ACAS (Plans), IAF	Rep DG (MSS), DRDO
ACAS (MP), IAF	Rep DG (ECS), DRDO
ADG (AA), IA	
DDG (Aviation), ICG	
Director D&D, HAL	
Director Operations, HAL	

b. Roles & responsibilties of Joint Airworthiness Committee (JAC)

The responsibilities of JAC are,

i. Review airworthiness procedures & requirements and recommend to Secretary (DD R&D) and Secretary (DP) for approval.

ii. JAC shall meet as and when required, but at least once in a calendar year.

c. Constitution of JAC

JAC is constituted with representatives from all major stakeholders of Indian military aviation. The standing JAC constitution is listed in Table 2.

2.9 Instruments of Technical Airworthiness Approvals

The airworthiness requirements are applied at two levels: Air System & Airborne Stores. On compliance to a set of planned activities, the Air Systems and Airborne Stores are issued formal Clearances/Approvals/Certificates by Technical Airworthiness Authorities. These formal Clearances/Approvals/Certificates are called as Instruments of Technical Airworthiness Approvals. Various categories of instruments for technical airworthiness approvals are as follows:

a. Air Systems shall have a military type certificate. The military type certificate, and certification of changes to the military type certificate, shall be issued when the applicant or the design organisation has shown that the Air System complies with a Type Certification Basis (TCB), established to ensure compliance with the essential requirements and when it has no feature or characteristic making it unsafe for operation. The military type certificate shall cover the Air System with all Airborne Stores fitted thereon. Release to Service Document (RSD) shall be the basis of operation of Air System by the User Services.

b. Airborne Stores may be issued with IMATSOA, Type Approval or Letter of Technical Approval (LoTA) depending on the type of the Airborne Stores. Clearance for Service Use (CSU) shall be the basis for use of Airborne Stores by the User Services.

c. Each Air System shall be issued with an individual Certificate of Airworthiness (CoA), in the form of Signal out Certificate, when it is shown that it conforms to the type design approved in its military type certificate and that, relevant documentation, inspections and tests to demonstrate that the Air System is in condition for safe operation and can be delivered to User Services.

d. For Air System during the development phase, a Flight Clearance Certificate (FCC) is issued when it is shown that the Air System is capable of performing safely the type of flights defined therein. It shall be issued with appropriate conditions and

limitations. Likewise, for an Airborne Store, a Development Flight Clearance (DFC) is issued for the development flight trials.

e. Organisations responsible for the design, development and production of Air Systems and Airborne Stores shall demonstrate their capability and means to discharge the responsibilities associated with their approval.

f. Organisations responsible for the maintenance of Air Systems and Airborne Stores shall demonstrate their capability and means to fulfil the responsibilities associated with their approval.

CHAPTER 3
MILITARY AIR SYSTEM/AIRBORNE STORE ACQUISITION

3.1 Introduction

Governing documents for the acquisition of Air Systems, Accessories, Appliances and other associated products for the Indian Defence Services are the Defence Acquisition Procedure (DAP) and Defence Procurement Manual (DPM) for capital and revenue acquisitions respectively. It is pertinent that the Air Systems procured are meeting the airworthiness requirement during the procurement as well as its operational life cycle. Hence, adequate measures need to be taken during the procurement process to obtain the details to ensure that necessary information is available to keep the Air System airworthy throughout its operational life.

3.2 Acquisition Categories as Per Defence Acquisition Procedure (DAP)

a. As per DAP, Capital Acquisition schemes of Ministry of Defence, Defence Services and Indian Coast Guard are broadly classified as “Buy”, “Buy and Make” and “Make”.

b. Under the “Buy” scheme procurements are categorized into three types as “Buy (Indian - IDDM - Indigenously Designed, Developed & Manufactured)”, “Buy (Indian)” and “Buy (Global)”. The three categories under the “Buy” scheme refer to an outright purchase of the system.

c. Under the “Buy and Make” scheme, the procurements are categorized as “Buy and Make (Indian)” and “Buy and Make”. The two categories under “Buy and Make” scheme refer to an initial procurement of system in Fully Formed (FF) state in quantities as considered necessary, from the appropriate source, followed by indigenous production in a phased manner through comprehensive Transfer of Technology (ToT), pertaining to critical technologies as per the specified range, depth and scope.

d. The “Make” categorization aims at the development of long-term indigenous defence capabilities. It focuses on Indigenous design and development of products either funded by Government (Make – I) or funded by the Industry (Make – II).

3.3 Ensuring Airworthiness Requirements during Acquisition

a. From the airworthiness certification perspective, the Air Systems and Airborne Stores are generally classified into three categories:

i. Ab-initio design and developed

ii. License production

iii. Bought-out

The "Make" categories and the "Buy (Indian-IDDM)" category can be equated to "Ab-Initio design and developed". The "Buy (Indian)" and "Buy and make" categories can be equated to license manufacture of the Air Systems and Airborne Stores. The "Buy (Global)" category is equivalent to Bought-Out Systems. The airworthiness procedure provisions detailed in the subsequent part of this document shall be followed in each of these acquisition modes.

Table 3 : Equivalence of Acquisition Models to DDPMAS

DAP Acquisition Category	**Equivalence in DDPMAS**
Make (Make–I, Make–II) Buy (Indian – IDDM)	Ab-initio design & development Indigenous Substitution
Buy (Indian) Buy & Make (Indian), Buy & Make Strategic Partnership Model (SPM)	Licensed Production
Buy (Global)	Bought-Out

3.4 Revenue Acquisitions

In case of Revenue Acquisitions as per DPM, the product shall be categorized into any one of the above three categories (Ab-initio, Licensed or Bought-Out) and the respective procedures for airworthiness elaborated in this document shall be followed.

3.5 Airworthiness Clearances

a. Any product procured for use in Airborne applications shall have an airworthiness certificate. The airworthiness requirements detailed in subsequent chapters are applicable to the respective categories of procurement.

b. For Airworthiness coverage, the following shall apply:

i. All products categorized as ab-initio design & developed shall go through airworthiness certification by CEMILAC and QA including inspection clearance & acceptance by DGAQA.

ii. Products categorized under licensed production categories shall undergo inspection and acceptance by DGAQA. Role of CEMILAC in defining the build standard for "Licensed Production" categories can be decided on a case to case basis.

iii. Products under "Buy (Global) category shall have the airworthiness certification from the country of origin. However, the products under "Buy (Global)" and "Buy & Make" categories can also go through airworthiness certification by CEMILAC and QA including inspection & acceptance by DGAQA to cater for the airworthiness and certification needs throughout the service life of the product, provided all the details necessary for ensuring airworthiness are made available. Any changes to the product to meet the User requirements can be approved by Indian TAA. Apart from this DGAQA shall provide QA coverage such as finalisation of ATP, PDI & JRI activities etc. as envisaged in the relevant DAP/DPM.

c. CEMILAC and DGAQA shall provide the necessary coverage for the design and development agencies during the design & development phase, where the products are having potential applications with the Defence Services and User requirement. The support may be extended even if there is no Request for Proposal (RFP)/Operational Requirement existing during the design and development stage.

d. In case of Licensed Production or Bought-Out items, if any indigenous modification/ upgrade is envisaged at a later stage for the product, the necessary know-how required for the certification and QA coverage for the upgrades need to be obtained at the Transfer of Technology stage itself. The indigenous manufacturer shall liaise with the certification and QA agencies for the necessary requirements. Even in the absence of such details, the certification and QA agencies may decide on the feasibility of providing the coverage for such upgrades.

3.6 Mutual Recognition

CEMILAC shall have provisions for mutual recognition with certification agencies of other countries in a unilateral, bilateral or multilateral mode for products taken under joint ventures or consortium, with distinct work packages, for application by the Indian User Services or Govt of India.

3.7 Civil Certified Aircraft

If civil certified aircraft for military use are originally certified by civil certification agencies either in India or from the country of origin, the products may be accepted by the User agencies if the certified configuration satisfies the end User requirements. However, in case of any modification to the certified configuration, additional certification to the required extent shall be carried out either in India or from the country of origin by civil or military certification agencies. This includes civil aviation certified COTS equipment for military application.

PART - 2

PROCEDURE FOR DESIGN, DEVELOPMENT, PRODUCTION AND CERTIFICATION OF MILITARY AIR SYSTEMS AND AIRBORNE STORES

Intentionally Left Blank

CHAPTER 1
AB-INITIO DESIGN, DEVELOPMENT, PRODUCTION AND CERTIFICATION OF AIR SYSTEMS &AIRBORNE STORES

1.1 INTRODUCTION

a. The procedures related to design, development, production and airworthiness certification of ab-initio design and development of Air Systems/Airborne Stores for Indian Defence Forces are discussed herein.

b. Development of these Air Systems/Airborne Stores can be based on either User requirements or the requirements generated by a Main Contractor for an end use of the User Services.

1.2 REQUIREMENTS

a. Feasibility study and finalization of qualitative requirements shall be done in consultation with development agencies and other Government organisations as requested by Ministry of Defence.

b. Air Systems/Airborne Stores development shall generally be taken up based on Staff Qualitative requirements (SQR) from User Services.

c. In some cases, Main Contractors may also take up Air System/Airborne Store development without any specific requirements from User Services. However these Air Systems/Airborne Stores shall have potential application in Indian Defence Services.

1.3 CERTIFICATION APPROACH

a. The Main Contractor shall include the requirements for certification in consultation with the TAA in the project proposal stage.

b. As CEMILAC and DGAQA are the Technical Airworthiness Authorities for Indian military aviation, the Main Contractor shall apply for certification and QA coverage at early stages of the system development. The TAA, Main Contractor and the User Services shall finalize the Type Certification Basis (TCB).

c. Main Contractor shall propose to the TAA during the finalization of the type certification basis whether the compliance would be demonstrated concurrently (Concurrent Certification) during the development lifecycle or at the end of all developmental activities. Irrespective of the option exercised by the Main Contractor, certification would be issued only on demonstrating the compliance to the User requirements and airworthiness requirements as stipulated by the TAA.

i. Concurrent Certification Approach

A. In this method, CEMILAC is associated from the beginning of the project i.e., from the requirement stage itself and all design and development activities are progressed concurrent with certification activities such as design adequacy and test adequacy.

B. CEMILAC may decide on the degree of involvement / level of delegation, based on the product and the maturity of the design and quality assurance system of the Main Contractor.

ii. Certification commences after completion of all design activities

For adopting this method, the contract with the Government shall be explicit in regard to:

A. The performance parameters to be achieved

B. Technical publications to be submitted

C. Build standard of the Air System and its store configuration

D. Certification norms to be followed

E. The test plans and procedures

F. List of deliverable documents to be submitted to CEMILAC

G. Time schedules including time slot for certification activities

H. List of sub contractors

After completing all design and testing activities, the contractor shall submit all applicable documents. CEMILAC verification and evaluation of the documents will happen within the agreed time allotted for certification. The contractor must be prepared to repeat some analysis or tests on demand from CEMILAC. Certification is complete only after CEMILAC is satisfied that all performance parameters and certification norms as per the contract have been met.

d. If an Air System is being developed for both Military and Civil purposes, in order to avoid duplication of certification activities, necessary MoU on airworthiness and certification aspects shall be signed between CEMILAC/DGAQA and the corresponding divisions of DGCA that look into design and QA aspects of airworthiness respectively.

1.4 Design, Development and Production of Air Systems

The design, development, testing and evaluation of a complete Air System leading to issue of initial airworthiness approval for concurrent certification is given in this section. If the Air System development includes development of Airborne Stores, then section 1.5 shall also be followed.

1.4.1 Design Organisation Approval (DOA)

a. Design & Development of Air System shall be taken up by an organisation approved under Design Organisation Approval Scheme (DOAS) of CEMILAC.

b. CEMILAC may approve setting up of Airworthiness Groups in approved design and development agencies for progression of airworthiness certification on behalf of CEMILAC.

1.4.2 Airworthiness Certification Criteria

a. Main Contractor shall ensure that the Air System is designed to an applicable Airworthiness Certification Criteria. The Airworthiness Certification Criteria can be either specified by the User Services or mutually agreed amongst User Services, CEMILAC and the Main Contractor.

b. If necessary, for technical reasons justified, the Main Contractor, may use alternative airworthiness criteria as against the agreed airworthiness criteria in consultation with all the stakeholders.

c. If Airworthiness Certification Criteria does not exist for an Air System that is proposed to be developed, a set of standards/ requirements mutually agreed amongst the Users, Main Contractor and CEMILAC, that establishes the required level of safety shall be followed.

d. Military Air Systems that require inter-operability with Civil Air Systems/Air space/ ATC shall comply with relevant Civil Aviation Requirements mandated by DGCA from time to time.

1.4.3 Concept of Operations (CONOPS)

Relevant information from the CONOPS document that impacts design and certification, shall be provided by the User Services to the Main Contractor & CEMILAC on a need-to-know basis.

1.4.4 Air System Requirement Specification

Based on the User requirements, relevant information from the CONOPS , system level requirements, its dependency on the other systems and certification requirements the Main Contractor shall prepare the Air System Requirement Specification of Air System in consultation with the User Services. The Air System Requirement Specification shall be approved by CEMILAC.

1.4.5 Type Certification Basis (TCB)

A Type Certification Basis (TCB) for the Air System shall be evolved by the Main Contractor in consultation with TAA based on the Air System Requirement Specifications and applicable Airworthiness Certification Criteria. TCB shall also include the Acceptable Means of Compliance for every requirement

1.4.6 Airworthiness Certification Plan (ACP)

Main Contractor shall prepare an Airworthiness Certification Plan (ACP) bringing out the design & development, test & evaluation details towards compliance to TCB of the Air System along with the involvement of TAA and other stakeholders at various stages. This plan shall be approved by CEMILAC after confirming its adequacy.

1.4.7 Quality Assurance Plan (QAP)

Main Contractor shall prepare a D&D Quality Assurance Plan (QAP) bringing out the stage of development, QA roles, delegation related to development of the Air System along with the involvement of TAA and other stakeholders at various stages. This plan shall be approved by DGAQA. DGAQA may delegate QA activities for non-critical systems/ sub-systems/LRUs to the Quality Assurance department of the Main Contractor.

1.4.8 Development and Prototype Phase

a. Design & Development of Air System shall be carried out as per System Engineering Process leading to finalization of build standard and fabrication of prototypes. The Main Contractor shall develop all the planning documents necessary for realization of the project.

b. Technical reviews at appropriate stages of development shall be conducted with the participation of relevant stakeholders.

c. Main Contractor shall establish processes for configuration control and defect investigation/failure analysis, during this phase.

d. The Main Contractor shall have an internal Quality Assurance process.

1.4.9 System Certification Review Board (SCRB)

During development, whenever required, CE(A) may constitute a System Certification Review Board (SCRB) to facilitate in the certification process.

1.4.10 Test and Evaluation

a. The Main Contractor to establish working rigs for systems/subsystems to functionally test and demonstrate compliance to requirements.

b. The technical specifications of test rigs used during development and production for verification & validation of the Air System/Airborne store shall be approved by CEMILAC and rigs shall be certified by CEMILAC /DGAQA.

c. The test plans and procedure documents as planned in the ACP shall be reviewed and approved by CEMILAC. CEMILAC may seek review from subject matter experts for ensuring adequacy of the test coverage towards meeting the airworthiness requirements.

d. The Main Contractor shall involve DGAQA for participation during the ground testing and approval of the test data as planned in the ACP and D&D, QAP document.

e. CEMILAC shall accord developmental flight clearance of prototype Air System based on compliance to the airworthiness requirements deemed necessary and sufficient to carry out flight testing safely. Functional & qualification testing of subsystems/ LRUs, rig integration checks and ground test as applicable along with submission of a Certificate of Design (CoD) duly signed by Chief of Design, shall be the basis.

f. During development phase, development flight testing & evaluation shall be carried out by the flight test department of the Main Contractor/Service HQ authorised flight testing agency.

g. Operational Test & Evaluation shall be carried out by flight test agency of the User Services for accepting the Air Systems on behalf of Services. If required, this may be carried out during the development flight trials phase.

h. Maintenance Evaluation Trials (MET) of an Air System shall be conducted by the designated agencies within User Services.

i. Flight testing shall follow provisions given in Chapter 5.

j. Any deviations on the product during Design & Development phase shall be addressed by a Non Conformance Review Process (NCRP) established by the main contractor. TAA shall be a part of NCRP.

1.4.11 Test Adequacy Review Board (TARB)

a. During development, TARB may be constituted by the Main Contractor to review the adequacy of ground testing of systems/subsystem as part of design validation. The board shall be chaired by a domain expert and will have system experts, CEMILAC, DGAQA as members.

b. Tests that cannot be demonstrated on ground, shall be demonstrated by Flight testing after ensuring that carrying out such tests will not affect flight safety. Flight test agency representatives shall also be members of TARB.

1.4.12 Configuration Management

a. Main Contractor shall establish and implement a means by which the configuration of the Air Systems is managed over the development life cycle.

b. The configuration management will include processes by which the configuration is identified, change is managed, configuration status is accounted for, disseminated to all stakeholders and verification & audit of configuration changes are conducted.

1.4.13 Initial Airworthiness Approvals

a. Military Type Certificate (MTC)

i. On completion of design, development, testing and evaluation of Air System, Main Contractor shall prepare the Air System Type Record and submit to CEMILAC. CEMILAC shall issue the MTC and the TCDS for the Air System to the Main Contractor when compliance to approved TCB has been achieved.

ii. MTC signifies that the Air System as defined by the TCDS has achieved Initial Airworthiness Approval and that series production can be initiated as per approved SOP.

b. Restricted Military Type Certificate (RMTC)

i. If compliance to TCB is achieved partially, Restricted Military Type Certificate (RMTC) may be issued by CEMILAC provided all the safety requirements as per approved TCB have been complied with and the User is ready to accept the Air System based on the operational requirements.

ii. Procurement activities for Limited Series Production of the Air System may be initiated after the issue of RMTC.

c. Joint Holders of MTC / RMTC

i. If multiple design and development agencies jointly develop an Air System, all those agencies may be Joint holders for MTC/RMTC with one agency as the lead MTC/RMTC Holder.

ii. A MoU / Agreements shall be signed for defining the extent of involvement in D&D, Production, delivery and follow on support of the Air System. One of the agencies shall be a lead agency for the above activities for liaison with the TAA. Such details shall be clearly brought out in the ACP and QAP documents.

iii. All agencies shall have DOA under DOAS scheme with scope pertaining to their role in D&D.

iv. The CODs shall be signed by the authorized personnel of all agencies.

v. At the time of applying for MTC the lead agency shall be the main applicant with other agencies acting as co-applicants. All the agencies are called the Joint Holders of MTC.

vi. Any change to the MTC requires concurrence from Joint Holders of the MTC.

1.4.14 Tools, Testers and Ground Equipment (TTGE)

a. Tools, Testers & Ground Equipment (TTGE) are those equipments which are used by the ground/aircraft carrier/ air crew for preparation, service, upkeep and maintenance of Air System / Airborne Store during their operational use.

b. The technical specifications of the TTGE which are to be delivered to the Users shall be approved by CEMILAC and TTGE shall be certified by DGAQA. Maintenance Organisations of User Services shall be involved during the development.

1.4.15 Release to Service Document (RSD)

a. Air System delivered to User Services shall have Release to Service Document (RSD) prepared by the Main Contractor and approved by CEMILAC. RSD shall be the basis for operation of the Air System by the Services.

b. RSD shall be issued before or along with the delivery of the first Air System to the User Services.

c. The Main Contractor shall deliver the applicable publications along with the RSD to the User Services for ensuring operational airworthiness.

d. The Main Contractor shall also deliver the TTGEs along with the Air System to the User Services to ensure operational airworthiness.

1.4.16 Transfer of Initial Airworthiness Approvals

If Initial Airworthiness Approvals related to technical airworthiness are to be transferred, the transfer shall be made only to a Design Organisation within India and who has a Design Organisation Approval & shall be able to perform the responsibilities of an Initial Airworthiness Approval Holder. CEMILAC shall issue clearance for transfer of Initial Airworthiness Approvals.

1.4.17 Transition Into Production

a. Manufacturing of Air System shall be taken up by a Main Contractor approved under Production Organisation Approval Scheme (POAS) of DGAQA.

b. Transfer of Technology (ToT): The cases where there is a need to transfer the technology from design & development agency to a production agency, the necessary ToT related requirements shall be completed.

c. If the production Main Contractor is outsourcing manufacturing / assembly / process/ services to supplier, then the Main Contractor shall ensure that suppliers have the required capability and development maturity. The responsibility of ensuring the product/services from the supplier lies solely on the Main Contractor.

d. All necessary Jigs, Fixtures Tools, Testers and processes required for Series Production shall be identified, developed and accepted by the Production Organisation of the Air System/Airborne Stores. DGAQA shall certify them.

e. The SOP consisting of Master Drawing Index and Equipment Standard of Preparation (ESOP)/Standard of Equipment (SOE) shall be approved by CEMILAC.

f. Sealing of Standard of Preparation (SOP) has to be carried out before transition from development to production. DGAQA/Main Contractor with AFQMS Approval/ quality assurance agencies from User Services shall be Authority Holding Sealed Particulars (AHSP).

g. Production transition before issue of RMTC/MTC: In order procure long-lead items and shorten the delivery time of the first set of Air System, the production agency may plan and carry out procurement and concurrent production before the issue of RMTC/MTC. To facilitate such transition, CEMILAC may provisionally approve a standard of preparation; and DGAQA may provide QA coverage; with an undertaking from the production agency that the deliverable Air System shall be as per the SOP defined in the RMTC/MTC. The provision may be adopted on case-by-case basis depending on the maturity of the product. The liabilities arising out of concurrent production before the issue of MTC solely lies with the production organisation.

1.4.18 Production

a. The production agency shall manufacture the Air Systems as per the Standard of Preparation released as a part of Initial Airworthiness Approval.

b. The production agency shall prepare a Quality Assurance Plan (QAP) for production with the approval of DGAQA. Quality Assurance aspects during production shall be ensured by DGAQA as per the Quality Assurance Plan. The QAP shall also contain the activities that will be independently undertaken by the QA of the Main Contractor. The QAP shall be approved by DGAQA.

c. Production Acceptance Test Plan and Periodic Quality Test: Main Contractor shall conduct the necessary tests on the Air Systems produced as per the approved PAT schedule with the involvement of relevant stakeholders. Users may carry out acceptance testing of the Air Systems as per User acceptance schedules if User has not been involved in the PAT. These test schedules will be promulgated by the Users and will normally be a subset of the mutually agreed PAT ratified by TAA with the same acceptance criteria. Where additional acceptance testing is envisaged by the User, the same must be mutually agreed by User and production agency and acceptance criteria ratified by TAA.

d. Certificate of Airworthiness (CoA): DGAQA shall issue a CoA in the form of Signal Out Certificate (SOC) to each Air System manufactured by the Main Contractor conforming to a military type-certificate.

e. All deliveries and releases of aeronautical equipment and stores shall be accompanied with appropriate Release Note/ Inspection Note signed by signatories authorized and approved by DGAQA.

f. The Main Contractor shall establish a Non Conformance Review Process (NCRP) to address the deviations during Limited Series Production (LSP) and Series Production (SP) phases. The Main Contractor shall put up the deviations to DGAQA. DGAQA may refer the deviation to CEMILAC/Non Conformance Review Board (NCRB) for disposition. The NCRB shall have members from Main Contractor, TAA, User representative and co-opted experts.

g. Modifications: Modifications to the SOP shall be addressed in Local Modification Committee (LMC).

h. Concessions: Concessions to non-compliance of modifications/service bulletin/ service instructions shall be addressed in the Local Concession Committee.

i. Tail Numbering / Serial Number: The Service Headquarters may allocate a tail-number to each of the Air System that is produced.

j. Documents: The documents, data, test reports generated during the production of each Air System shall be archived for the period stipulated by TAA. Each delivered Air System shall be accompanied by documents/manuals required for ensuring continuing and continued airworthiness after obtaining necessary endorsement by signatories authorised and approved by DGAQA.

1.5 Design, Development and Production of Airborne Stores

a. Airborne Stores include all Parts & Appliances, Airborne General Stores, Propeller, Aero Materials, Air Armaments, Crew Personal Protection Equipment, Fuel Oil Lubricants (FOL), Parachutes etc, used in an Air System.

b. Design development of Airborne Stores could be taken up as part of development of an Air System, upgrade of an Air System, indigenous substitute or obsolescence management. The Airborne Store may be developed by Public Sector Undertaking, Laboratories of R&D Organisation of Government or Non-Government Institutions or by Private sector, even when an Expression of Interest or a Supply Order from the User Services does not exist.

c. The Airborne Stores need to be airworthy for the complete Air System to be airworthy. Hence, all Airborne Stores need airworthiness approval before installation/use in an Air System or in another Airborne Store. The initial airworthiness approval for an Airborne Store can be one of the following:

i Letter of Technical Approval (LoTA) for Airborne Stores such as materials, electronic modules and finished parts.

ii IMATSO approval (IMATSOA) for Airborne Stores for which Indian Military Aviation Technical Standard Order (IMATSO) exists.

iii Type Approval (TA) for Airborne Stores which are specific/custom designed for use in an Air System and which are not covered by the above two categories.

1.5.1 Design Organisation Approval (DOA)

Design & Development of Airborne Stores shall be taken up by an organisation approved under Design Organisation Approval Scheme (DOAS) of CEMILAC.

1.5.2 Airworthiness Certification Criteria

a. Main Contractor shall ensure that the Airborne Stores is designed to an applicable Airworthiness Certification Criteria. The Airworthiness Certification Criteria can be either specified by the User Services or mutually agreed amongst User Services, CEMILAC and the Main Contractor.

b. If necessary, the Main Contractor, in consultation with the Users Services shall seek formal approval from CEMILAC for use of alternative Aiworthiness Certification Criteria.

c. If Airworthiness Certification Criteria does not exist for an Airborne Store that is proposed to be developed, a set of standards/ requirements mutually agreed amongst the User Services, Main Contractor and CEMILAC, that establishes the required level of safety shall be followed.

d. In case of IMATSO stores, the airworthiness criteria is included in the IMATSO.

1.5.3 Type Approval Basis (TAB)

A Type Approval Basis (TAB) shall be evolved by the Main Contractor in consultation with CEMILAC based on the store specification and applicable Airworthiness Certification Criteria, The TAB shall include the Acceptable Means of Compliance. TAB shall be evolved for all types of Airborne Stores.

1.5.4 Airworthiness Certification Plan (ACP)

Main Contractor shall prepare an Airworthiness Certification Plan (ACP) bringing out the design & development details towards compliance to TAB of the Airborne Stores along with the involvement of TAA and other stakeholders at various stages. This plan shall be approved by CEMILAC.

1.5.5 Quality Assurance Plan (QAP)

Main Contractor shall prepare a Design Quality Assurance Plan (QAP) bringing out QC & QA stages of inspection/testing, QA roles, delegation related to development of the Airborne Stores along with the involvement of TAA and other stakeholders at various stages. This plan shall be approved by DGAQA.

1.5.6 Development and Prototype Phase

a. Development of Airborne Stores shall be carried out as per identified System Engineering Process leading to finalization of build standard and fabrication of prototypes. The Main Contractor shall develop all the planning documents necessary for realization of the Airborne Store.

b. Technical reviews at appropriate stages of development shall be conducted by the Main Contractor with the participation of relevant stakeholders.

c. Main Contractor shall establish a process for configuration control and defect investigation/failure analysis process during this phase.

d. The Main Contractor shall have an internal Quality Assurance process preferably to AS 9100 standard or equivalent.

e. Any deviations on the product during Design and Development phase shall be addressed by a Non Conformance Review Process (NCRP) established by the main contractor. TAA shall be a part of NCRP.

1.5.7 Test and Evaluation

a. The Main Contractor shall establish working rigs for all Airborne Stores to functionally test and demonstrate compliance to requirements.

b. The technical specifications for the test rigs shall be approved by CEMILAC.

c. The rigs shall be certified as per these approved specifications, by CEMILAC/ DGAQA.

d. The test plans and procedure documents that includes equipment functional test plans,QTP, ATP, integration test plan and other tests deemed necessary as planned in the ACP shall be reviewed and approved by CEMILAC. CEMILAC may seek review from subject matter experts for ensuring adequacy of the test coverage towards meeting the airworthiness requirements. The Main Contractor shall involve DGAQA for participation during the testing as planned in the ACP and D&D QAP document. The test reports shall be approved by DGAQA.

e. CEMILAC shall issue a Development Flight Clearance (DFC) for the Airborne Store or the Subsystem of which the Airborne Store is a part of, based on compliance to the airworthiness requirements deemed necessary and sufficient to carry out flight testing safely. Functional & Qualification testing (SOFT/Limited Qualification Tests (LQT)/ Full Qualification Tests (FQT)), rig integration checks and ground test as applicable along with design details shall be the basis for DFC. All the relevant documents are to be approved by TAA.

f. During development phase, flight testing & evaluation shall be carried by flight test department of the Main Contractor/Service HQ authorized flight testing agency.

g. If found necessary, data from initial flight testing may be used by Main Contractor to refine the design and/or the functional & qualification test plans and procedure documents.

h. Operational Test & Evaluation shall be carried out by flight testing agency of the User Services for accepting Airborne Stores on behalf of Services.

i. In some cases, if a store is developed without an Expression of Interest or a Supply Order from the User Services, but has potential military application, as deemed desirable by the User Services, then the Service HQ may authorize a flight test agency of the respective User Services to flight evaluate the store, if necessary, on a No Cost – No Commitment (NC-NC) basis. The DFC for the Store will be issued by CEMILAC.

j. Maintenance Evaluation Trials (MET) of an Airborne Stores shall be conducted by the designated agencies within User Services.

k. Flight testing shall follow provisions given in Part-2 Chapter 5.

l. The Main Contractor shall prepare all the applicable publications for the Users to ensure operational and continuing airworthiness.

1.5.8 Configuration Management

a. Main Contractor shall establish and implement a means by which the configuration of the Airborne Stores is managed over the life cycle.

b. The configuration management will include processes by which the configuration is identified, change is managed, configuration status is accounted for, disseminated to all stakeholders and verification and audit of configuration changes are conducted.

1.5.9 Initial Airworthiness Approvals

a. Provisional Clearance for Airborne Stores

Provisional Clearance with restrictions may be issued pending a few time drawn tests and documentation, provided all the safety requirements as per approved TAB has been complied with and end User is ready to accept the Airborne Stores based on the operational requirements.

b. Type Approval/IMATSOA/LoTA for Airborne Stores

On completion of design, development and evaluation of Airborne Stores including its associated software, Main Contractor shall prepare Type Record and submit to CEMILAC. The test reports along with compliance shall be duly coordinated by DGAQA. CEMILAC shall issue Type Approval/ IMATSOA/ LoTA for Airborne Stores to the Main Contractor when compliance to approved TAB has been achieved.

c. Clearance for Service Use (CSU) for Airborne Stores

i. An Airborne Store delivered to User Services shall have a Clearance for Service Use accorded by CEMILAC. CSU shall be the basis for operation of the Airborne Store by the Services. Maintenance manuals, Manuals on TTGE, and all other documents/training requirements required for ensuring the continuing airworthiness shall be the part of the CSU.

ii. The contents of the manuals shall be verified by the appropriate Design Organisations.

1.5.10 Transfer of Initial Airworthiness Approvals

If Initial Airworthiness Approvals related to technical airworthiness is to be transferred, the transfer shall be made only to a Design Organisation within India and who has a Design Organisation Approval and is capable to perform the responsibilities of an Initial Airworthiness Approval Holder. Clearance for transfer shall be issued by CEMILAC.

1.5.11 Transition into Production

a. Manufacturing of Airborne Stores shall be taken up by a production agency approved under Production Organisation Approval Scheme (POAS) of DGAQA.

b. All necessary Jigs, Fixtures, Tools, Testers and processes required for Series Production shall be identified, developed by the Production Organisation of the Airborne Stores and approved by DGAQA.

c. Sealing of Standard of Preparation (SOP) has to be carried out before transition from development to production. DGAQA/Main Contractor with AFQMS approval/ quality assurance agencies from User Services shall be Authority Holding Sealed Particulars (AHSP).

d. Transfer of Technology (ToT): The cases where there is a need to transfer the technology from design & development agency to a production agency, the necessary ToT related requirements shall be completed.

e. If production Main Contractor is outsourcing manufacturing / assembly / process / services to supplier, then the Main Contractor shall ensure that suppliers have the required capability and maturity. The responsibility of ensuring the product/services from the supplier lies solely on the Main Contractor.

f. Production Transition before issue of PC/TA/LoTA: In order procure long-lead items and shorten the delivery time of the first set of Airborne Store, the production agency may plan and carry out procurement and concurrent production before the issue of TA/ LoTA. To facilitate such transition, CEMILAC may provisionally approve a standard of preparation; and DGAQA may provide QA coverage; with an undertaking from the production agency that the deliverable Airborne Store shall be as per the SOP defined in the PC/TA/LoTA. The provision may be adopted on case-by-case basis depending on the maturity of the product. The liabilities arising out of concurrent production before the issue of PC/TA/LoTA solely lies with the production organisation.

1.5.12 Production

a. The Main Contractor shall ensure manufacturing of the Airborne Stores by the production agency as per the Standard of Preparation released as a part of Initial Airworthiness Approval.

b. Quality Assurance aspects during production shall be ensured by DGAQA as per the Quality Assurance Plan mutually approved by DGAQA.

1.5.13 Production Acceptance test and Periodic Quality Test

a. Main Contractor shall conduct the necessary tests on the Airborne Stores produced as per approved Production Acceptance Test Plan (PATP) with the involvement of relevant stakeholders.

b. In addition, Periodic Quality Test during production shall be carried out at a defined interval, or when there is break in production for a defined period as stipulated by DGAQA in the QAP. These are additional tests out of QTP to ensure/confirm requisite quality standards as achieved during QT stage are maintained during production.

1.5.14 Release Note

a. DGAQA shall issue a Release Note/Inspection note to each Airborne Stores manufactured by the Main Contractor conforming to a Type Approval/IMATSOA/ LoTA.

b. All deliveries and releases of aeronautical equipment and stores shall be accompanied with appropriate Release Note/ Inspection Note signed by signatories authorized and approved by DGAQA.

1.5.15 Deviations

The Main Contractor shall establish a Non Conformance Review Process (NCRP) to address the deviations during Limited Series Production (LSP) and Series Production (SP) phase. The Main Contractor shall put up the deviations to DGAQA. DGAQA may refer the deviation to CEMILAC/Non Conformance Review Board (NCRB) for disposition. The NCRB shall have members from Main Contractor, TAA, User representative and co-opted experts.

1.5.16 Modifications

Modifications to the Standard of Preparation (SoP) shall be addressed in Local Modification Committee (LMC).

1.5.17 Concessions

Concessions to non-compliance to modifications/service bulletin/service instructions shall be addressed in the Local Concession Committee.

1.5.18 Documents

The documents, data, test reports generated during the production of each Airborne Store shall be archived for the period stipulated by TAA. Each delivered Airborne Stores/ production batch, shall be accompanied by documents/manuals required for ensuring continuing and continued airworthiness after obtaining necessary endorsement by DGAQA. The document accompanying the Store should specify, but not limited to, Manufacturing Date, Part number, Serial Number, SOP (Hardware/Software), Overhaul, Time Between Overhaul, Total Technical Life and Total Calendar Life, Special instructions for handling and storage, initial parameter setting (if applicable), calibration and maintenance details.

1.6 Customer Furnished Equipment (CFE) and Customer Specified Equipment (CSE)/Buyer Nominated Equipment (BNE)

a. User Services may furnish or specify certain Airborne Stores, Engines and ALM for installation/integration on an Air System. Such items shall be categorized as below:

   i. Customer Furnished Equipment (CFE): Items already held in the inventory of User Services or to be procured by them directly for installation on Air Systems.

   ii. Customer Specified Equipment (CSE)/Buyer Nominated Equipment (BNE): Items specified by the User Services to the Main Contractor for installation on Air Systems to meet specific operational requirements or to have commonality with other platforms in the inventory.

b. For CFE and CSE/BNE, during the selection of the item, the User Services shall specify the need for airworthiness coverage by Indian TAA. If airworthiness coverage is needed, User Services/Main Contractor shall involve/obtain necessary inputs from TAA during the procurement stage to ensure the availability of airworthiness certification requirements.

c. For CFE, where Indian TAA is not involved during the selection of the equipment, the responsibility for ensuring the performance, reliability, maintainability, life and providing necessary documentation to ensure airworthiness of the equipment, will be that of the User Services. The Main Contractor responsible for integration shall ensure the integration aspects, evaluate the performance and bring out the limitations if any, and their effects on the Air System. User Services shall be intimated about such limitations and recommendation may be sought prior to final clearance. Safety aspects of the integration shall be ensured by TAA.

d. For CSE/BNE equipment, the Main Contractor, in consultation with the User services and TAA, shall ensure that, all the relevant details needed to ensure the safety and performance parameters are obtained from the supplier of the equipment. If the CSE/ BNE item suppliers are of Indian origin, the equipments should have undergone airworthiness certification with Indian TAA. If any change in configurations, additional evaluation deemed necessary shall be carried out. The Main Contractor shall ensure the integration aspects, evaluate the equipment for its performance and bring out the limitations if any, and their effects on the Air System. User Services shall be intimated about such limitations and recommendation may be sought prior to final clearance. Safety aspects of the integration shall be ensured by TAA.

1.7 Progressive / Incremental Clearances

CEMILAC may accord clearances to the extent to which the product has been evaluated in functionality without compromising on safety, to facilitate expediting the development which may require initial flight testing data for further progress. This approach may also be termed 'Spiral / Staircase' Certification.

1.8 Intellectual Property Rights Violation

a. The Main Contractor shall handle/address all the issues related to the Intellectual Property Rights (IPR).

b. TAA shall not be held liable for IPR violation by the applicants seeking airworthiness clearances, certificates and approvals from TAA for the developed products.

CHAPTER 2
LICENSED PRODUCTION OF AIR SYSTEMS AND AIRBORNE STORES

2.1 Introduction

There may be instances where there is a license agreement between OEMs of Air Systems / Airborne Stores (Foreign/Indian) and the Indian production organisations for license production of such products in India. The procedures with respect to licensed production is discussed in this chapter. The OEM giving the licence for production will be referred to as "Licensor" and the Indian organisation to be designated as the executor of the License agreement, will be referred to as "Licensee".

2.2 Availability of MTC / TA

a. The Licensor shall be in the possession of the Military Type Certificate or equivalent document for the Air System or the Type Approval or equivalent document for the Airborne Store that is to be produced under License.

b. In the absence of an MTC/TA or equivalent document from Licensor, the Licensee shall prepare a comprehensive ToT Data set for approval by TAA.

c. The reqirements of TAA may be taken for finalising the licence agreement and TAA representatives may be included in familiarization process keeping production and continued airworthiness support in view.

d. The License agreement, along with the list of procured document titles to be made available to the Indian TAA by the Licensee.

2.3 Organisation Approvals

The Licensee shall have relevant Production Organisation Approval from DGAQA. In addition to this, if the scope of License includes design ToT, the Licensee shall also have the relevant Design Organisation Approval from CEMILAC.

2.4 First Article Evaluation

The Licensee will be granted approval by TAA to undertake manufacturing after successful evaluation of the first article including limited qualification testing and technical evaluation by TAA wherever applicable.

2.5 Production Acceptance Test and Periodic Quality Test

a. Licensee shall carry out Production Acceptance Test of each of the Air System/ Airborne Stores as per the licensor's documentation.

b. In addition, Periodic Quality Test during production shall be carried out at defined intervals, wherever applicable, as stipulated by DGAQA.

c. If required, TAA may call for additional tests on few numbers/batches.

2.6 Certificate of Airworthiness (CoA)

DGAQA shall issue a CoA in the form of appropriate Signal out Certificate/Release Note/Inspection Note to each Air System/Airborne Stores manufactured by the licensee conforming to a Military Type Certificate/TA or equivalent.

2.7 Changes to Standard of Preparation

a. The Licensee shall retain the same list of suppliers for manufacturing of the Air System/ Airborne Store as held by the licensor at the time of procuring the MTC/TA.

b. Any changes to the SOP, including the suppliers, shall be addressed through the Configuration Change Process (CCP) with Licensor, Licensee, CEMILAC, DGAQA and the Users as stakeholders.

2.8 Indigenous Substitution

a. Indigenous substitution of Airborne Stores is permitted. Part-2, Chapter 12 is applicable.

b. Indigenous substitution of TTGEs is permitted. Part-2, Chapter 12 is applicable.

c. Concessions on non-compliance of the mods, bulletins, change notices shall be addressed through Local Concession Committee.

2.9 Design Modifications

All design modifications introduced by the licensor and licensee in the form of mod leaflets, bulletins, change notices shall be addressed in Local Modification Committee (LMC).

2.10 Production Deviations

Production deviations shall have the technical input of the Licensor/Licensee. The deviations may be addressed by DGAQA or by CEMILAC if referred to by DGAQA.

2.11 Continuing and Continued Airworthiness Support From Licensor

The Licensee to ensure in the License agreement that all the necessary documents required for ensuring Continuing and Continued Airworthiness of the Air System/Airborne Stores are made available during the product life cycle.

2.12 SOP Updation

The Licencee shall update the SOP of the Air System/Airborne Stores for the modifications incorporated, in consultation with CEMILAC.

2.13 Role of Licensor

a. The role of licensor in Configuration Change Process(CCP) and in addressing of production deviations shall be addressed during finalising licence agreement.

b. In case the licensor coverage for CCP is not available, the same shall be addressed through a Local Technical Committee (LTC).

CHAPTER 3
BOUGHT-OUT AIR SYSTEMS AND AIRBORNE STORES

3.1 Introduction

Bought-out Air Systems and Airborne Stores are those which Government of India/ PSUs/ Private organisations may buy from foreign companies (Supplier) for Indian military applications. The procedure for such cases of buying military Air System and Airborne Stores is explained below.

3.2 Availability of MTC / TA and CoA

a. The Supplier shall be in the possession of the Military Type Certificate (MTC) / equivalent document for the Air System or the Type Approval / equivalent document for an Airborne Store that is being supplied. This needs to be ensured by the User Services/Main Contractor to the satisfaction of TAA.

b. In the absence of MTC/TA or equivalent from the country of origin, Indian Technical Airworthiness Authorities may provide coverage for Initial and Continued Airworthiness with the support from the supplier.

c. The requirments of TAA may be taken during procurement. TAA representatives may be involved during familiarisation process keeping continued airworthiness support in view.

d. Any modifications to the initial certified configuration of the Air System done in the country of origin, to incorporate the Indian User requirements shall be accepted based on an Amended Military Type Certificate(AMTC)/Supplemental Military Type Certificate (SMTC).

3.3 Technical Airworthiness Coverage

Necessary documents shall be made available for TAA to provide technical airworthiness coverage for modification/upgradation of Air Systems & Airborne Stores. If required CEMILAC may also insist on additional qualification tests/documentation in order to provide the technical airworthiness coverage.

3.4 Continued Airworthiness

a. TAA shall provide continued airworthiness coverage for the bought-out Air Systems/ Airborne Stores as per procedure provisions provided in Part-2 Chapter 4 on continuing and continued airworthiness.

b. Procurement contract shall include supply of all necessary documents such as Service Bulletins, Servicing Instruction etc released by OEM as a part of continued airworthiness activity of Air System/Airborne Stores during its operational life.

c. Indigenous substitution is permitted. The provisions as detailed in Part-2, Chapter 12 shall be followed.

3.5 Continuing Airworthiness Support

It is the responsibility of the User Services/Main Contractor to ensure that all the necessary documents required for ensuring continuing airworthiness of the Air System/ Airborne Stores being procured are included as part of the contract.

3.6 Customer Furnished Equipment (CFE) & Customer Specified Equipment (CSE) / Buyer Nominated Equipment (BNE)

For use of CFE&CSE / BNE for integration on a bought-out Air System, the integrator to follow the provisions of Part-2 , Chapter 1, Section 1.6.

3.7 Civil certified Aircraft for Military use

Civil Certified Air System/Airborne Store for military application shall follow the provisions detailed in Part-2, Chapter 9.

3.8 Gifted Air Systems/Airborne Stores

Air System/Airborne Stores could be received as gifts by Indian Defence Services from other foreign countries based on the bilateral agreement and understanding. It is the responsibility of User Services that all the necessary supporting documents are also obtained, if the continued airworthiness support is expected from Indian TAA.

CHAPTER 4
CONTINUING AIRWORTHINESS & CONTINUED AIRWORTHINESS

4.1 INTRODUCTION

An Air System acquired by User Services is typically operated for a very long period of time spanning few decades. Hence, the product has to continue to stay airworthy at any given time over its entire operating life. An Air System or an Airborne Store is treated to be airworthy when; it is built as per the initial airworthiness certificate and operated & maintained as per the stipulated maintenance documents. Therefore, it is not only imperative to comply with the initial airworthiness requirements but also to ensure that necessary provisions exist for ensuring airworthiness throughout the lifecycle. This is achieved by ensuring airworthiness in operational scenario through the process of continuing and continued airworthiness.

4.2 CONTINUING AIRWORTHINESS

a. Continuing Airworthiness covers all the processes that ensure that, at any time in its operating life, an Air System complies with the airworthiness requirements as applicable and is in a condition for safe operation.

b. Continuing Airworthiness shall be achieved by,

   i. Periodic servicing and maintenance of the Air System & Airborne Stores by crew / organisations of User Services as per the OEMs manual.

   ii. The servicing and maintenance of the Air System & Airborne Stores by crew / organisations of Main Contractor.

   iii. The servicing and maintenance of the Air System & Airborne Stores by third parties other than the Main Contractor or the User Services.

   iv. Periodic review of the reliability of the Air System & Airborne Stores.

c. In order to carry out continuing airworthiness, the Main Contractor shall:

i. Incorporate all the servicing and maintenance requirements at the time of initial airworthiness.

ii. Provide all necessary TTGEs and calibration schedules.

iii. Provide technical publications with proper illustrations.

iv. Provide adequate training material with regular SOP updates.

d. To ensure that continuing airworthiness is incorporated properly the User Services shall:

i. Establish proper provisioning mechanisms and process for stocking and storage of all spares & material required for servicing and maintenance.

ii. In addition to carrying out scheduled maintenance and servicing as per the OEM approved schedules, the services shall ensure that the all the Servicing Instructions (SI), Special Technical Instructions(STIs) issued by OEM/ Licensee/TAA are implemented on the fleet.

iii. Train, evaluate and certify all maintenance crew by OEM or User Training Centers.

iv. In case the OEM mandated activities could not be followed due to operational issues, these may be addressed in Local Concession Committee (LCC) or by the Services.

v. Carry out adequate audits to ensure that the continuing airworthiness organisations are carrying out activities properly.

vi. To ensure that the airworthiness of in-service Air System is managed correctly, the service headquarters may adopt the concept of Continuing Airworthiness Management Organisation (CAMO) within the Air System operators organisational structure.

e. The maintenance can be carried out by third party organisations that have a Maintenance Organisation Approval under Maintenance Organisation Approval Scheme (MOAS).

f. The User Services shall follow well documented, Air System specific, day-to-day inspection/checking, snag rectification procedures of the Services to ensure that, at any given time the Air System is airworthy to undertake flying.

4.3 CONTINUED AIRWORTHINESS

a. Continued Airworthiness covers

i. All those processes that need to be carried out to ensure that the conditions under which Initial Airworthiness Approvals have been granted, continue to be fulfilled during the validity period of these approvals.

ii. All tasks that are carried out to upgrade the existing in-service Air Systems to enhance their usefulness and capability and to also address in-service obsolescence.

b. TAA shall provide continued airworthiness coverage to the Air Systems in service.

4.3.1 FAILURE/INCIDENT REPORTING

a. The User Service and the Main Contractor shall establish formal mechanisms for reporting failure/incident. The Main Contractor shall study the reasons for high failure rates and take corrective/preventive actions to ensure high operational availability of the fleet. Main Contractor may form defect investigation committee in consultation with the User Services, with members from Services, CEMILAC and DGAQA for investigation of failures / incidents, if necessary. The findings and recommendations/ remedial measures shall be culminated in the form of a DI report.

b. A Defect Investigation Review committee shall be formed at the Contractor's workplace to review and ensure that the actions of the defect investigation committee are properly carried out. The constitution of this review committee shall be with Quality Chief of the Main Contractor as Chairman and CEMILAC, DGAQA, User Services, representatives of Quality Department, Production Department of the Main Contractor and Design Organisation of the Air System/ Airborne Store as members. The committee shall meet periodically for analysing all defect investigations and review of the necessary remedial measures.

4.3.2 SERVICE INSTRUCTIONS

The Main Contractor shall, with CEMILAC approval wherever applicable, issue Servicing Instructions (SIs), Service Bulletins (SBs), Urgent Operating Notices (UONs), Special Technical Instructions (STIs) and other promulgation mechanisms to inform User Services about changes that impact servicing, maintenance and operations. Service HQs to ensure that these instructions are promulgated to all applicable field units.

4.3.3 Obsolescence Management

The Main Contractor shall have an obsolescence management plan to monitor, mitigate and inform Services to stockpile stores/components or procure alternates for stores/components that may face obsolescence, in a timely manner. The Main Contractor shall obtain the approval of TAA for the proposed alternate stores/components.

4.3.4 Life Extension

If any Air System or Airborne Stores are to be exploited beyond its prescribed life, CEMILAC shall provide the life extension on progressive/incremental basis, based on study, analysis and additional testing as deemed necessary for life extension. The Main Contractor and the Services shall provide all requested information/documentation for the purpose. A Lifing Committee under the chairmanship of CEMILAC with members from Main Contractor, DGAQA and the User Services shall be constituted for the said purpose.

4.3.5 Modifications & Upgrades

For Air Systems and Airborne Stores undergoing changes to the Type design by way of modifications & upgrades, subsequent to the initial airworthiness approvals (MTC/RMTC for Air Systems & Provisional Clearance/Type Approval for Airbornes Stores), the Main Contractor shall establish means by which the design, testing and production processes are evaluated and controlled such that each product meets the airworthiness requirements.

a. Local Modification Committee (LMC)

   i. A Local Modification Committee (LMC) shall address the major modifications/ upgrades carried out on in-service Air Systems and Airborne Stores.

   ii. Ministry of Defence (MoD) may constitute Local Modification Committee (LMC) with financial powers specific to a Main Contractor/Programme. CE (A), CEMILAC may constitute LMC without financial power if necessary.

   iii. A Local Technical Committee (LTC) comprising of representatives from all the stakeholders shall be formed by chairman LMC to discuss technical aspects of modification, in cases where adequate technical information on the proposed modification are not readily available. LTC shall recommend its proposal to LMC.

b. Classification of modification

i. Any changes to the Type Design shall be classified as Minor or Major.

ii. Minor changes identified as alteration or amendment are the ones not affecting Strength, Safety, Reliability, Interchangeability, Functionality and Operational effectiveness of Air Systems/Airborne Stores. All other changes are classified as major modification.

c. Minor Modification by the Main Contractor

i. Alteration or amendment may be carried out by the Main Contractor under a privilege issued as a part of Design Organisation Approval. SOP amendment and publications are the responsibility of the Main Contractor. TAA shall be informed of the modifications.

d. Minor Modification by the User Services

i. Alteration or amendment may be carried out by the User Services in association with the respective flight test agencies, with the clearance from the designated CRPO/competent authorities within the User Services. TAA and the maintenance organisations of the respective User Services shall be informed of the modifications. It is the responsibility of the User Services to ensure proper record keeping by involving the Main Contractor/licencee, as applicable, for Modification Numbers and Publications.

e. Major Modifications & Upgrades

i. Upgrading the Air System shall be taken up by the OEM/Licensee or by any third party organisation that has demonstrated competence to take up major modification.

ii. The upgrades shall be undertaken in such a manner that the original Type Certification Basis (TCB) of the parent Air System is not violated or compromised.

iii. The Main Contractor shall prepare an Airworthiness Certification Plan (ACP) for the upgrade with the involvement of the TAA and other stakeholders.

iv. Test rigs, if any, to validate the upgrade, shall be certified by DGAQA or Quality Assurance department of the Main Contractor or the Quality Assurance department of the User Services, as per the specification approved by CEMILAC.

v. The ground test plan shall be approved by CEMILAC.

vi. The Quality Assurance coverage shall be by DGAQA or Quality Assurance department of the Main Contractor or the Quality Assurance department of the User Services.

vii. Flight testing shall follow the provisions detailed in Part-2, Chapter 5, Section 5.3.

viii. The upgrade will be ratified through LMC and regularized through an Amended Military Type Certificate (AMTC) or a Supplemental Military Type Certificate (SMTC) depending on whether the upgrade was performed with or without the OEM.

ix. The Main Contractor shall update the SOP and provide additional publication wherever necessary to the User Services.

CHAPTER 5
FLIGHT TESTING OF AIR SYSTEMS AND AIRBORNE STORES

5.1 Introduction

a. Every Aircraft (fixed or rotary wing)/UAS under development, production, or an in-service Air System that has undergone modification/upgrades has to undergo flight testing to validate the design, to obtain the actual performance and to ensure its airworthiness & safety.

b. Also, in the course of development of new Airborne Store or use of existing Airborne Store on another Air System, flight testing may be necessary. This is because the functioning of the store is related intimately to the characteristics of the particular Air System installation or sometimes airborne environmental condition cannot be simulated adequately in the laboratory.

c. Flight testing is a high risk activity and therefore it has to be performed in a judicious and a systematic manner only by competent professionals, taking into account all the necessary processes, procedures and clearances from the competent authorities, for safe testing within the prescribed boundaries of operation.

d. This chapter consists of three parts, sequenced as the procedure for flight testing of ab-initio designed and developed Aircraft and UAS by the flight test agency, the procedure for flight testing of type certified in-service aircraft and UAS for evaluation of modifications and upgrades carried out by a Main Contractor and flight testing of in-service aircraft and UAS for evaluation of modifications carried out by the User Services.

5.2 Flight Testing of Ab-initio Developed Aircraft & UAS

5.2.1 Introduction

The procedure for flight testing of ab-initio designed and developed aircraft by a flight testing agency for design validation and demonstration of airworthiness and safety is detailed in the following paragraphs.

5.2.2 Flight Testing Platform

a. Flight testing shall be carried out on an Air System registered under Indian Military Register with the User Services or which has been issued with a military tail number.

b. If flight testing platform is having a civil tail number, then necessary concurrence from DGCA shall be obtained for undertaking flight testing activities. In case of flight testing of research Air Systems for military applications, the registration shall be obtained from the relevant branch of User Services.

5.2.3 Flight Testing Agencies

The flight test department of the Main Contractor/Services HQ authorized flight testing agency are responsible for the flight testing of Air Systems and Airborne Stores.

5.2.4 Flight Testing Personnel

a. Flight test crew, both the Test Pilot and the Flight Test Engineer, shall be a graduate of a recognized Test Pilot School or shall have undergone a suitable course on flight testing of UAS for undertaking developmental, experimental or production flight testing. Flight testing after production or overhaul may also be undertaken by a pilot who has undergone production flight test course at a recognised Test Pilot School and qualified on the particular aircraft/ UAS type.

b. The Chief Test Pilot (CTP)/Head of the Flight Testing Agency and the Flight Test Crew authorized by them are the responsible personnel to undertake the flight testing of a particular Air System.

c. The name and the signature of the crew shall be filled in Form 1090 before taking custody of the Air System. However, while handing over the Air System from the Main Contractor to the User Services, flying under Form 1090, the User Services shall provide the authorization details of the flight crew to DGAQA.

d. Joint Flight testing during development phase by the User Services concurrently along with the flight test agency is permitted to minimize cost and time. The flight crew of the User Services shall be qualified and authorized by the CTP/Head of the Flight Test Agency.

5.2.5 Airspace & Ground Space for Flight Testing

a. Flight testing shall be carried out in Airspace designated to undertake flight testing activities. The flight test agency is responsible for seeking the air space clearance from the competent authorities to undertake flight testing.

b. It is the responsibility of the Main Contractor to liaise with the proprietor of the ground space/ship space to ensure proper functioning of the facilities such as but not limited to, telemetry, serviceability of the runway/ship deck, the arrestor barrier system/ arrestor recovery system, before undertaking flight testing.

5.2.6 Flight Test Specification

The Flight Test Specification containing the flight test demonstration requirements shall be prepared by the Main Contractor in consultation with the flight test agency and approved by CEMILAC.

5.2.7 Flight Test Plan

The Flight Test Plan for the planned block/phase/trial of flight testing capturing the objectives of the sorties planned for the block/phase/trial shall be prepared by the Flight Test Agency in consultation with the Main Contractor.

5.2.8 Flight Test Schedule

A flight test schedule for each taxi or a sortie, capturing the details of the specific tests to be conducted, shall be prepared by the flight test agency.

5.2.9 Flight Test Instrumentation

a. Flight testing shall be carried out on an instrumented platform. Real time transmission of critical data to a ground monitoring/ control station through telemetry may be ensured by the Main Contractor."

b The overall instrumentation plan shall be prepared by the Main Contractor / flight test agency in consultation with CEMILAC. Based on the criticality the plan shall be approved either by CEMILAC or by the flight test department of Main Contractor.

c. The Main Contractor in consultation with the flight test agency is responsible for ensuring that the platform is adequately instrumented as per the agreed instrumentation plan including all On-board Flight Test Instrumentation LRUS. The instrumentation shall satisfactorily facilitate flight test validation of the systems being tested.

5.2.10 Clearances for Undertaking Flight Testing

a. Flight testing of Air System shall be initiated only after the clearance is issued by Technical Airworthiness Authorities (CEMILAC & DGAQA).

b. Flight testing of an Airborne Store to validate its design, functionality and integration aspects shall be cleared by CEMILAC through a Development Flight Clearance (DFC) for the Airborne Store.

c. For development flight testing of Air System, CEMILAC shall issue Certificate of Flight Trials in the form of Flight Clearance Certificate (FCC). The FCC shall be prepared by the Main Contractor in consultation with CEMILAC and shall be jointly approved by the Chief of Design of the Main Contractor and CEMILAC.

d. CEMILAC shall clear individual flights through the Flight Program Clearance Memo (FPCM) after ascertaining airworthiness of the aircraft or UAS. The FPCM shall be prepared by the Main Contractor and approved by CEMILAC. FPCM certifies the aircraft's fitness as per the planned flying program. Flight data analysis for individual sorties and work done report including snag disposition details duly coordinated by DGAQA shall be completed before seeking clearance of the next sortie. However in exceptional cases, if data analysis is not possible before next sortie, it must be completed by end of the day and next sortie may be cleared based on pilot debrief.

e. DGAQA shall issue Certificate of Safety of Flight through Form 1090 for undertaking flight testing for Air System/Airborne Store.

f. Flights shall be conducted by the flight test agency within the boundaries (flight envelope limits and other clearances) defined in FCC. Subject to the availability of the clearances through FPCM and Form 1090, the flight test agency may plan and execute the requisite number of flights as required to complete the planned tasks, within the scope of the FCC.

g. If, as a result of an accident or any untoward incident, if CEMILAC considers that it would be prudent to restrict further trials pending investigation, CEMILAC shall advise Service Head Quarters, DGAQA and Main Contractor and may withdraw the current FCC temporarily.

5.2.11 Block Clearance

a. At an appropriate stage in development flight testing, block FPCM may be authorised by CEMILAC whenever clearance for each flight by CEMILAC is not considered necessary.

b. Block FPCM shall be issued only for mature Air Systems, where sufficient confidence has been gained on airworthiness of the Air System, in general.

c. Block FPCM shall be issued for a specific build (SOP) of the Air System. It ceases to be valid if there are changes to the approved build.

d. Detailed data analysis shall be completed for each sortie. However in exceptional cases, if data analysis is not possible before the next sortie, it must be completed by the end of the day and next sortie may be cleared based on Pilot debrief. CEMILAC may participate in data debriefs (where required) during block FPCM phase.

e. When aircraft are flown under block FPCM, CEMILAC shall be informed of any anomalies that affect safety of flight, major technical snags or defects that occur. If there is any major technical snags or defect at any stage, CEMILAC may withdraw block FPCM temporarily.

5.2.12 Flight Test Report

Flight test reports after a block of flights or after completion of a milestone activity shall be prepared by the Main Contractor in consultation with flight test agency and forwarded to CEMILAC.

5.3 Flight Testing of In-service Aircraft & UAS for Modifications/Upgrades Carried out by a Main Contractor

5.3.1 Introduction

In-service aircraft/UAS are continuously modified/upgraded for increasing their operational effectiveness. In-service aircraft also undergo maintenance and overhaul. Depending on the extent of modification/upgrade, the aircraft may be allotted to the Main Contractor or held on the strength of the User Services. The Flight testing is undertaken via F-1090 in case the aircraft is allotted to the Main Contractor or via Form 700 or equivalent

in case the aircraft is held with the User Services. This section describes the procedure for flight testing the evaluation of such modification/upgrades when undertaken via F- 1090. Section 5.4 discusses the aspects related to flight testing when undertaken on F-700 or equivalent by the user services flight test agency.

5.3.2 Task Directive from Service Headquarters

The Service Head Quarters shall issue a task directive or equivalent, for the modification/upgrade, detailing the roles and responsibilities of the stakeholders involved.

5.3.3 Flight Testing Platform

The flight test platform/tail numbers for the upgrade and flight testing shall be allotted by the Service HQ.

5.3.4 Flight Testing Agency

The flight testing agency shall be in accordance with the authorization as per the task directive of Service HQ.

5.3.5 Airspace & Ground Space for Flight Testing

a. The flight test agency is responsible for seeking the airspace clearance from the competent authorities to undertake flight testing.

b. The Main Contractor shall coordinate with the User Services to ensure proper functioning of ground space/ship space facilities such as but not limited to serviceability of the runway/ship deck, the arrestor barrier system/ arrestor recovery system, before undertaking flight testing.

5.3.6 Flight Testing Personnel

The Chief Test Pilot (CTP)/Head of the Flight Testing Agency and the Flight Test Crew authorized by them are the responsible personnel to undertake the flight testing.

5.3.7 Flight Test Specification

The Flight Test Specification containing the flight test demonstration requirements shall be prepared by the Main Contractor as per the Service HQ task directive, in consultation

with the flight test agency, and approved by CEMILAC.

5.3.8 Flight Test Plan

The Flight Test Plan for the planned block/phase/trial of flight testing capturing the objectives of the sorties for the planned block/phase/trial shall be prepared by the flight test agency.

5.3.9 Flight Test Schedule

A flight test schedule or equivalent for individual sorties, capturing the details of the specific tests to be conducted, shall be prepared by the flight test agency.

5.3.10 Flight Test Instrumentation

a. Depending on the criticality of the modification/upgrade, the nature and the extent of instrumentation may be arrived at, in consultation with CEMILAC.

b. The Main Contractor/ flight test agency of the User Services is responsible for ensuring that the platform is adequately instrumented as per the agreed instrumentation plan. The instrumentation shall satisfactorily facilitate flight test validation of the upgraded systems being tested.

5.3.11 Clearances for Undertaking Flight Testing

a. CEMILAC shall issue Certificate of Flight trials in the form of FCC for the flight evaluation of trial modification/upgrades.

b. Depending on the nature and the criticality of the modification/upgrade, the mode of flight clearance by CEMILAC shall be for individual flights or block clearance or combination of both, i.e individual flights initially and block clearance thereafter. Individual sortie clearance by CEMILAC shall be through the Flight Program Clearance Memo (FPCM). The FPCM shall be prepared by the Contractor/Flight Test Agency and approved by CEMILAC. Data analysis to establish the safety of flight may be carried out before the next sortie.

c. The safety of flight certificate through Form 1090 shall be issued by the competent authority, as applicable.

5.3.12 Block Clearance

Depending on the criticality of the modification/upgrade, block clearance may be authorized by CEMILAC.

5.3.13 Trial Report

Flight evaluation trial reports at the conclusion of every stage of evaluation and a consolidated report after the completion of the evaluation, prepared by the flight testing agency and shall be forwarded by Service HQ to CEMILAC. The trial report forms the basis for clearance for fleet modification.

5.4 Flight Testing of In-service Aircraft & UAS for Modifications Carried out by the User Services Organisation

5.4.1 Airspace & Ground Space for Flight Testing

a. The flight test agency is responsible for seeking the airspace clearance from the competent authorities to undertake flight testing.

b. It is the responsibility of the User Services to ensure proper functioning of ground space/ship space facilities such as, but not limited to, serviceability of the runway/ ship deck, the arrestor barrier system/ arrestor recovery system, before undertaking flight testing.

5.4.2 Flight Testing Personnel

The Chief Test Pilot (CTP)/Head of the Flight Testing Agency and the Flight Test Crew authorized by them are the responsible personnel to undertake the flight testing.

5.4.3 Flight Test Objectives

The objectives of the flight shall be prepared by the flight test agency and provided to CEMILAC.

5.4.4 Flight Test Instrumentation

a. Depending on the criticality of the modification/upgrade, the nature and the extent of instrumentation may be arrived at, in consultation with CEMILAC, if required.

b. The flight test agency of the User Services is responsible for ensuring that the platform is adequately instrumented. The instrumentation shall satisfactorily facilitate flight test validation of the upgraded systems being tested.

c. The instrumentation plan shall be approved by CRPO for the IAF/equivalent for Indian Army and Indian Navy of the flight test agency.

5.4.5 Clearances for Undertaking Flight Testing

a. CEMILAC shall issue Certificate of flight trials in the form of FCC for the flight evaluation of trial modification.

b. The safety of flight certificate through Form 700 or equivalent shall be issued by the competent authority, as applicable.

c. Clearance for flight trial evaluation of minor mods carried out by the User Services may be accorded by CRPO/designated competent authority within the respective User Services.

d. Flight test clearance of certain airborne stores for demonstrations/ NC-NC projects/ Op-Capability enhancement requirements/Fast track procurements may be accorded by CRPO for the IAF/equivalent for Indian Army and Indian Navy for a limited flight envelope. However, if such activities are resulting in fleet modifications, then necessary clearance shall be obtained from CEMILAC by providing requisite data.

5.4.6 Trial Report

Flight evaluation trial reports at the conclusion of every stage of evaluation and a consolidated report after the completion of the evaluation, prepared by the flight testing agency shall be forwarded to CEMILAC. The trial report forms the basis for clearance for fleet modification.

Intentionally Left Blank

CHAPTER 6
UNMANNED AIRCRAFT SYSTEMS

6.1 Introduction

Military Unmanned Aircraft Systems (UAS) needs to be certified for its safety to ensure minimum risk and hazards to other airspace users, personnel and property on ground. The scope of this procedure on UAS pertains to operation of military UAS in segregated airspace only.

6.2 UAS Certification Applicability

Not all UAS warrant airworthiness certification. UAS shall be certified based on All Up Weight (AUW), impact kinetic energy in both unpremeditated descent scenario and loss of control scenario, range, speed, altitude of operation and complexity/level of autonomy/ weaponisation, as applicable.

6.3 Operations

UAS must be operated in a manner that minimizes the risk and hazards to other airspace users, ground crew and persons, over which such UAS are flown and shall abide the Air Traffic Management Regulation and applicable legal frame work. Additionally, necessary permission from the competent authority needs to be obtained for operations.

6.4 Certification Procedure

a. UAS development/acquisition may come under the following categories:

i) Indigenously developed UAS (Ab-initio design & development)

ii) Bought-Out UAS

iii) License Produced UAS

6.4.1 Procedure on Indigenously developed UAS (Ab-initio Design & Development)

a. Procedure on ab-initio design and development of UAS shall follow the provisions provided in Part-2, Chapter 1, with the following additional specific provisions.

b. The Main Contractor shall carry out the criticality classification of systems/sub-systems/LRUs of UAS in consultation with User and CEMILAC. The Quality assurance coverage during development for safety critical systems/subsystems/LRUs shall be provided by DGAQA. The Quality assurance during development for other non safety critical systems/subsystems/LRUs shall be provided by the internal QA of the Main Contractor with the authorisation from DGAQA. However, DGAQA shall provide QA coverage for fully assembled UAS.

c. The ground segment of UAS may be grouped as the Ground Operating System (GOS) and Ground Support System (GSS).

d. GOS may be further classified into GOS (Primary) & GOS (Secondary). GOS (Primary) consists of datalink and GCS used for controlling the operation of Air Vehicle and the rest of the GOS is classified as GOS (Secondary).

e. GOS (Primary) shall be certified by CEMILAC and GOS (Secondary) and GSS shall be certified by DGAQA.

6.4.2 Procedure on Bought-Out UAS

a. Procedure on Bought-out UAS shall follow the provisions provided in Part-2, Chapter 3 with the following additional specific provisions.

b. In case the Bought-out UAS does not have the certification from the country of origin, then the operator to ensure that all necessary documentation to guarantee compliance to safety standards are also procured. This needs to be verified by the User Services or TAA.

6.4.3 Procedure on License Produced UAS

a. Procedure on License Produced UAS to follow the provisions provided in Part-2, Chapter 2 with the following additional specific provisions.

b. The Quality assurance during License Production may be provided by the internal QA of licensee with the authorisation from DGAQA.

6.5 Continuing and Continued Airworthiness

Procedure on Continuing and Continued Airworthiness of UAS to follow the provisions provided in Part-2, Chapter 4

6.6 Research UAS

Research or Technology Demonstrator UAS shall follow the provisions given in Part-2, Chapter 8.

Intentionally Left Blank

CHAPTER 7
AIR LAUNCHED MISSILES (ALM)

7.1 Introduction

a. Air Launched Missiles (ALMs) are treated as an Air System in this procedure document. Airborne armament stores other than ALMs are treated as Airborne Stores.

b. ALMs only are covered in this chapter.

c. The carriage, launch and jettison of air launched missiles (ALMs) from an airborne platform present risks to the airborne platform as well as to the Users who handle such systems and, therefore, the safety of the complete missile system has to be ensured. These ALMs are required to be evaluated for their airworthiness in standalone configuration before allowing their fitment on a military airborne platform. Subsequently, aspects related to their integration on the military airborne platforms are assessed for airworthiness and safety of airborne platform.

d. This chapter covers the procedure provisions for design, development, production and airworthiness certification of air launched missiles. It also includes the airworthiness certification aspects applicable during the acquisition of Bought-out ALMs and License Produced ALMs.

7.2 Procedure for Airworthiness Certification of Air Launched Missiles (ALMs)

Development/acquisition of ALMs may come under the following categories: -

i. Ab-initio designed & developed ALMs

ii. Bought-out ALMs

iii. License Produced ALMs

7.2.1 Procedure for Ab-Initio Designed & Developed ALMs

Procedure for ab-initio design, development, production and airworthiness certification of ALMs shall follow the same provisions which are applicable for ab-initio designed & developed Air Systems and are provided in Part-2, Chapter 1 of this procedure with the following additional specific provisions: -

a. The airworthiness assessment of ALMs shall be carried out first in standalone configuration followed by the assessment of airworthiness of the aspects related to integration / fitment of ALMs on military airborne platforms.

b. Complete ALM shall be certified as per the provisions applicable for Air System whereas the provisions applicable for Airborne Stores shall be used while taking up design & development of sub-systems and LRUs for use in an ALM.

c. The Main Contractor shall carry out the criticality classification of sub-systems/ LRUs of ALMs during the initial stage of design & development of an ALM in consultation with CEMILAC. The quality assurance coverage for safety-critical sub-systems/LRUs of ALMs in standalone configuration during developmental phase shall be the responsibility of DGAQA. For the remaining sub-systems/LRUs of ALMs in standalone configuration, the coverage for quality assurance aspects during developmental phase shall be the responsibility of the internal quality assurance group of the Main Contractor duly authorized by DGAQA.

d. The quality assurance coverage for fully assembled ALMs during the developmental phase shall be the responsibility of DGAQA.

e. The quality assurance coverage during the integration of ALMs on the intended airborne platform phase shall be the responsibility of DGAQA.

7.2.2 Procedure for Bought-out ALMs

Military airworthiness certification procedure on Bought-out ALMs shall be as per the provisions provided in Part-2, Chapter 3 of this procedure.

7.2.3 Procedure for License Produced ALMs

Military airworthiness certification procedure on license produced ALMs shall be as per the provisions provided in Part-2, Chapter 2 of this procedure.

7.2.4 Procedure for Continuing and Continued Airworthiness for all types of ALMs

Military airworthiness certification procedure during Continuing and Continued Airworthiness phases of ALMs shall follow the provisions provided in Part-2, Chapter 4 of this procedure.

CHAPTER 8
RESEARCH AIR SYSTEMS AND AIRBORNE STORES

8.1 Introduction

Any Air System/Airborne Store, that is designed and developed by a development agency or the User Service organisations for the purpose of research/experimentation/ technology demonstration of new technologies as a precursor for a futuristic requirement, which shall be produced in limited numbers and shall strictly not to be used for regular operation by the Services, is defined as a Research Air System/Airborne Store or Technology Demonstrator. Procedures for such Research Air Systems or Airborne Stores are detailed in this chapter.

8.2 Requirement

The Main Contractor undertaking development of Research Air System/Airborne Stores shall possess the Air System Design Organisation Approval (ASDOA) for Air System or Store Design Organisation Approval (SDOA) for Airborne Stores as per the provisions of Part-2, Chapter 11.

8.3 Declaration

The Main Contractor/User Service organisation shall provide the technical details of the project to the TAA and shall declare that the proposed Air System/Airborne Stores shall be developed for research/experimentation/technology demonstration purpose only and shall not be delivered to the User Services for operations.

8.4 Airworthiness Certification Procedure

a. There are two approaches:

   i. TAA shall provide airworthiness coverage upon request from the Main Contractor or the Services. (OR)

ii. The Main Contractor/User Service organisation shall perform the role of TAA during the development through designated personnel within the organisation.

8.4.1 Airworthiness Coverage by TAA

If TAA has to provide airworthiness coverage, the following shall be applicable:

a. Research Air Systems/Airborne Stores or technology demonstrators will be treated as ab-initio development, and provisions detailed for ab-initio development of Air Systems/Airborne Stores as given in Part-2 Chapter 1 are applicable.

b. However, considering the limited usage and life of the research Air Systems/Airborne Stores, CEMILAC may suitably adapt the certification requirements for design and test adequacy.

c. Likewise, quality assurance coverage by DGAQA may be restricted to only safety critical systems/subsystems/LRUs. The internal QA of the Main Contractor shall provide quality assurance for the other systems. The Main Contractor shall carry out the criticality classification of systems/sub-systems/LRUs in consultation with TAA.

8.4.2 Airworthiness Coverage by Main Contractor

If the Main Contractor/User Service organisation decides to undertake the airworthiness coverage, informing the TAA, then apart from following the relevant provisions of Part-2, Chapter 1, the following additional provisions shall also be applicable.

a. The Air System shall be registered under the Indian Military Register, issued with a suitable tail number.

b. The Air System shall be installed with an approved Flight Data Recorder.

c. Flight testing shall be carried out by Flight test crew, both the Test Pilot and the Flight Test Engineer, shall be a graduate of a recognised Test Pilot School or shall have undergone a suitable course on flight testing of UAS.

d. Flight Testing shall be carried out in a segregated and designated airspace only.

e. No part of the Air System and its Airborne Store shall be salvaged or reused for other airborne application, outside the fleet of the research Air System.

f. After the completion of the program objectives, the LRUs shall be colour banded with appropriate ‘NOT FOR FLIGHT’ tags.

g. The TAA may be informed of the programme status/progress.

h. Any failures/incidents shall be reported to TAA.

8.5 Transition to Design and Development

Transition of the research Air System/Airborne Store to regular design and development activity is permitted. The extent of airworthiness and certification coverage shall be in consultation with the TAA.

Intentionally Left Blank

CHAPTER 9
CIVIL CERTIFIED MILITARY AIRCRAFT

9.1 Introduction

Indian Military Services may acquire Civil Certified Transport Category Aircraft for various purposes. The applications include VVIP transport, troop movement, installation of surveillance equipment etc. The following procedure provisions shall be followed for the airworthiness assurance of such Aircraft.

9.2 Airworthiness Procedure

a. If the acquired aircraft is Type Certified by the Civil Certification agency of the country of origin and is used by the Military Services and if there are no modifications to the certified configuration, then the aircraft shall be inducted, operated and maintained by the Services as per the documentation provided by the OEM. All service bulletins/ directives issued by the OEM / Civil Certification agency shall be implemented during the service life. TAA shall provide airworthiness and certification coverage for any modifications and upgradations carried out as per provisions given in Part-2, Chapter 4 of this document.

b. If the certified configuration is modified by the OEM of the aircraft for the installation of certain military equipment to meet the operational requirements and if the Civil Certification agency of the country of origin provides certification coverage and issue necessary Supplemental Type Certification (STC) /or equivalent for the modified aircraft, the same shall be accepted. If there is no provision for the Civil Certification agency of the country of origin to provide coverage for the military modifications, either the Military Certification agency of the country of origin or the Indian TAA shall be involved in the certification of the modified aircraft. Necessary MoU shall be signed between the stakeholders in this regard. Mutual recognition of TAA with the military certification / QA agencies of other countries will help in expediting the certification activities.

c. Airworthiness certification coverage for any subsequent modifications carried out in India by a local agency contracted by the OEM of the aircraft/GoI/Services shall be provided by the Indian TAA as per provisions given in Part-2, Chapter 4 of this document.

d. The provisions of this chapter shall be applicable even in case of military procurement of civil aircraft certified by the Indian Civil Aviation Agency (DGCA).

e. Indian TAA are authorised to provide certifications/QA coverage for all the modifications carried out for the Air Systems and Airborne Stores held in the inventory or contracted by Indian Military Services /DRDO /other Government Agencies. The agencies which are taking up such modifications shall provide necessary information to Indian TAA in this regard.

CHAPTER 10
EXPORT OF INDIGENOUS AIR SYSTEMS AND AIRBORNE STORES

10.1 Introduction

In some cases for indigenously developed military Air Systems & Airborne Stores, if there is a requirement that these products must possess CEMILAC certification along with DGAQA clearance for exports/selling to a foreign country, then the provisions of this chapter are applicable.

10.2 Clearances from MoD

In the case of exports from India to another country, when it is in the interest of the Indian Government/MoD, CEMILAC may support the certification of indigenously developed military Air System & Airborne Stores on request. However, necessary "approvals" for export of subject item from Ministry of Defence (MoD) shall be obtained by the applicant.

10.3 TAA Involvement

TAA support cannot be presumed and shall be supported by a satisfactory agreement with TAA to this effect which shall be in place from the beginning of Air System & Airborne Stores development.

10.4 Approach for TAA Approval

The Main Contractor shall follow the mutually agreed provisions provided in Part-2, Chapter 1 for Ab-Initio Development and Production of Air Systems & Airborne Stores to obtain approval from TAA to facilitate exports.

10.5 Clearance for operation

It is the responsibility of the Main Contractor to obtain the necessary clearances from the competent authority of the country for operation of the Air System/Airborne Stores.

CHAPTER 11
ORGANISATION APPROVALS

11.1 Introduction

a. To ensure that, the organisations taking up design, development, production and maintenance of Air Systems/Airborne Stores, possesses the requisite capability to undertake such activities, organisation approval schemes are established.

b. Three types of organisation approval schemes are proposed. An organisation involved in or intended to take up design and development activities of military Air Systems and Airborne Stores shall be assessed through a Design Organisation Approval Scheme. Organisations involved in production of Air Systems and Airborne Stores shall be assessed through a Production Organisation Approval Scheme. Organisations involved in maintenance of Air Systems and Airborne Stores shall be assessed through a Maintenance Organisation Approval Scheme. It is mandatory that the organisation shall possess the necessary approvals to undertake respective activities.

c. It is to be noted that the Organisation Approval should not be construed as a factor for empowering or facilitating the organisation to bid for a contract, but rather a statement that establishes the competency of the organisation in the relevant domain for the scope stated therein, to perform quality tasks befitting the standards required of a military aviation product. An Organisation Approval is an enabler for the organisation's engagement with CEMILAC and DGAQA for seeking airworthiness and certification of the products.

11.2 Design Organisation Approval Scheme (DOAS)

The Design Organisation Approval Scheme (DOAS) is a mechanism by which the design competence of an organisation is assessed. Two categories of Design Approved Organisations schemes are proposed, namely Air System Design Organisations (ASDO) and Store Design Organisations (SDO). Approval under DOAS is subject to adherence with the established procedures and rules governing the responsibilities and privileges for Military Design Approved Organisations.

a. Air System Design Organisation (ASDO)

ASDOs are organisations involved in Design & Development and Modification of an Air System. ASDO shall be responsible for the overall design or through-life configuration management of the design of the Air System, and for co-coordinating the design and integration of the Airborne Stores designed by other design organisations.

b. Store Design Organisation (SDO)

SDOs are organisations involved in the Design & Development and Modification of Airborne Stores used in an Air System. SDO shall be responsible for the through-life configuration management of the designed Airborne Stores.

11.3 Procedure for Design Organisation Approval Scheme (DOAS)

a. Organisations involved in Design & Development, Repair and Modification of Air Systems shall have an Air System Design Organisation Approval (ASDOA) for the defined scope of work from CEMILAC for carrying out such activities for which CEMILAC has been identified as Airworthiness Certification Authority.

b. Organisations involved in Design & Development of Airborne Stores leading to the issue of Type Approval or IMATSOA and those organisations involved in Repair and Modification of Airborne Stores with Type approval or IMATSOA shall have a Store Design Organisation Approval (SDOA) for the defined scope of work, from CEMILAC under DOAS for carrying out such activities for which CEMILAC has been identified as Airworthiness Certification Authority.

c. CEMILAC shall accord Initial Airworthiness Approvals for an Air System/Airborne Stores to an approved ASDO/SDO under DOAS.

d. The ASDO/SDO shall have a Design Organisation Exposition (DOE)/Handbook with sufficient information on relevant procedures for Design & Development and Modification of Air Systems & Airborne Stores that are relevant to the terms of approval sought for their operation.

e. The ASDO/SDO shall only operate within the scope of their approved Design Organisation Exposition (DOE)/Handbook as their competence has been assessed by CEMILAC and their terms of approval will contain the relevant provisions.

f. CEMILAC may issue advisory letter, corrective action requirement, warning notice, partial suspension / withdrawal of approvals and approval revocation to the approved organisations as part of enforcement actions to ensure the highest level of compliance with approved requirements.

g. If contracts for some design activities are sub-contracted by a Design Approved Organisation (ASDO/SDO) to a firm which is not approved by CEMILAC, the veracity and integrity of design would have to be verified by the approved ASDO/ SDO and procedures to establish the same have to be explained in the DOE of ASDO/ SDO, before its acceptance by CEMILAC, from airworthiness point of view.

h. In case, the design contract with a non-approved design organisation is placed directly by the Ministry of Defence, the procedure for check points would be laid down by CEMILAC in each individual case, defining the extent and scope of control to be maintained by CEMILAC during airworthiness certification process. Necessary organisation approval shall be obtained by the organisation at the beginning of the airworthiness certification process or at any other certification stage as agreed by CEMILAC.

11.4 Production Organisation Approval Scheme (POAS)

The Production Organisation Approval Scheme (POAS) is a mechanism by which the competence of an Organisation to carry out production of Air Systems and Airborne Stores is assessed. Two categories of Production Organisations Approval Schemes are proposed, namely Air System Production Organisations (ASPO) and Store Production Organisations (SPO). Approval under POAS is subject to adherence with the established procedures and rules governing the responsibilities and privileges for Military Production Approved Organisations

a. Air System Production Organisation (ASPO)

ASPOs are organisations involved in Manufacturing of an Air System. ASPO shall be responsible for the overall Manufacturing of the Air System, and for co-coordinating the integration of the Airborne Stores manufactured by other organisations.

b. Store Production Organisation (SPO)

SPOs are organisation is involved in Manufacturing of Airborne Stores used in an Air System. SPO shall be responsible for the through-life configuration management of the produced Airborne Stores during manufacturing.

11.5 Procedure For production Organisation Approval Scheme (POAS)

a. Organisations involved in Manufacturing of military Air Systems shall have a Air System Production Organisation approval (ASPOA) from DGAQA under POAS for carrying out such activities for which DGAQA has been identified as Quality Assurance Authority.

b. DGAQA shall issue Signal Out Certificate for an Air System only to a Production Approved ASPO.

c. Organisations involved in Manufacturing and Repair of Airborne Stores used in an Air System shall have a Store Production Organisation Approval (SPOA) from DGAQA under POAS for carrying out such activities for which DGAQA has been identified as Quality Assurance Authority.

d. The ASPO/SPO shall have a Production Organisation Exposition (POE)/Handbook with sufficient information on relevant procedures for Manufacturing and Repair of Air Systems & Airborne Stores that are relevant to the terms of approval sought for their operation.

e. The ASPO/SPO shall only operate within the scope of their approved Production Organisation Exposition (POE)/Handbook as their competence has been assessed by the DGAQA and their terms of approval will contain the relevant provision.

f. DGAQA may issue advisory letter, corrective action requirement, warning notice, partial suspension / withdrawal of approvals and approval revocation to the approved organisations as part of enforcement actions to ensure the highest level of compliance with approved requirements.

11.6 Maintenance Organisation Approval Scheme (MOAS)

There are two types of maintenance organisations namely Air System Maintenance Organisations (ASMO), and Store Maintenance Organisations (SMO) involved in maintenance of Air Systems and Airborne Stores respectively. The Maintenance Organisation Approval Scheme (MOAS) is a mechanism by which the competence of an organisation can be assessed. Approval under MOAS is subject to adherence with the established procedures and rules governing the responsibilities and privileges for Maintenance Approved Organisations. A military-run maintenance organisation (MMO) does not require a MOAS approval to maintain military registered Air Systems or Airborne Stores, but compliance to the various servicing schedules and maintenance procedure is to be ensured by Service HQ under the management of the relevant Continuing Airworthiness Management Organisation (CAMO).

a. Air System Maintenance Organisation (ASMO)

ASMOs are organisations involved in the maintenance of an Air System. ASMO shall be responsible for the overall maintenance of the Air System, and for co-coordinating the overhauling & maintenance of the Airborne Stores maintained by other organisations.

b. Store Maintenance Organisation (SMO)

SMOs are organisations involved in Maintenance of Airborne Stores used in an Air System. SMO shall be responsible for the through-life configuration management of the maintenance of Airborne Stores installed in an Air System.

11.7 Procedure for Maintenance Organisation Approval Scheme (MOAS)

a. Organisations other than Military Services involved in maintenance of military Air Systems shall have an Air System Maintenance Organisation approval (ASMOA) from DGAQA under MOAS for carrying out such activities for which DGAQA has been identified as Quality Assurance Authority.

b. Organisations involved in maintenance of Airborne Stores used in an Air System shall have a Store Maintenance Organisation Approval (SMOA) from DGAQA under MOAS for carrying out such activities for which DGAQA has been identified as Quality Assurance Authority.

c. The ASMO/SMO shall have a Maintenance Organisation Exposition (MOE)/ Handbook with sufficient information on relevant procedures for maintenance & overhauling of Air Systems & Airborne Stores that are relevant to the terms of approval sought for their operation.

d. The ASMO/SMO shall only operate within the scope of their approved Maintenance Organisation Exposition (MOE)/Handbook as their competence has been assessed by the DGAQA and their terms of approval will contain the relevant provisions.

Intentionally Left Blank

CHAPTER 12
INDIGENOUS SUBSTITUTION OF AIRBORNE STORES

12.1 Introduction

a. Indigenous Substitution mainly deals with development, prototyping, testing, evaluation and clearance of an Airborne Stores/TTGE as a replacement of the existing Airborne Stores/TTGE procured from foreign sources.

b. Substitution of an indigenously developed Airborne Store with another indigenous Airborne Store shall be treated as an ab-initio development and handled in accordance with the procedure provisions given in Part-2, Chapter 1 on ab-initio developed Airborne Stores.

c. For the purpose of indigenous substitution, subassemblies also shall be treated as an Airborne Store and shall be handled using these procedure provisions.

d. Indigenisation of complete Air Systems shall be treated as an ab-initio development and handled in accordance with the provisions provided in Part-2, Chapter 1.

12.2 General Provisions

a. Indigenous substitution process should ensure that functionality, safety, and reliability of the indigenized Airborne Store is adequately verified and validated according to the airworthiness standards applicable.

b. On obtaining necessary approvals, indigenized item has to be listed as an alternate item in the Standard of Preparation (SOP) of the Air System/Airborne Store on which the indigenized store has to be used.

12.3 Indigenization Agencies

Indigenous substitution can be taken up by any agency i.e, Public Sector, Private Sector, Government Agencies or the organisations within the User Services such as BRDs, NAYs, Army Base Workshops etc., henceforth referred to as the Indigenization Agencies.

12.4 Responsibilities of Indigenization Agencies

a. The Indigenization Agency shall be responsible for design, development and production of the indigenized Airborne Stores. In case, some of these activities are achieved by way of sub-contracting to suitable vendors, the Indigenization Agency shall ensure that the vendors comply with the airworthiness certification requirements through oversight by the identified authority responsible for indigenisation.

b. The Indigenization Agency shall handle all the issues related to the Intellectual Property Rights (IPR).

c. The Indigenization Agency shall ensure that, wherever specific requirements in the form of Specifications/Qualitative Requirements/Service Requirements for the Airborne Store to be indigenized have been issued by the User Services, the same are taken into consideration.

d. The Indigenization Agency shall ensure the availability of necessary test facilities at all the applicable levels.

e. The Indigenization Agency shall identify the AHSP for the Airborne Stores, if applicable.

f. Indigenisation agency shall forward the list of indigenized items to TAA at regular intervals.

12.5 Local Type Certification Committee (LTCC)

a. LTCC shall be constituted by CEMILAC for the Indigenization Agency. The LTCC shall have relevant stakeholders to assess & categorize the criticality of the Airborne Store to be indigenized.

b. LTCC shall classify Airborne Stores as Critical and Non-Critical as per the following:

   i. Critical: Airborne Store, whose malfunctioning may affect safety, reliability, maintainability, interchangeability and operational effectiveness is termed as a critical Airborne Store.

   ii. Non-Critical: Airborne Store, which is not classified as critical, is termed as non-critical Airborne Store.

12.5.1 Clearance of Critical Stores

The Airborne Stores, identified as critical by the LTCC, shall follow the activities leading to clearance of the Airborne stores as per Part-2, Chapter 1 applicable to ab-initio development of Airborne Stores with QA coverage by DGAQA / QA agency of User Services.

12.5.2 Clearance of Non Critical Stores

a. The Airborne Stores, identified as non-critical by the LTCC, the airworthiness certification coverage shall be as follows:

   i. The indigenisation agency shall put up the detailed plan for indigenisation including technical specification, development and test plan to the LTCC for review and ratification.

   ii. On completion of the activities, the indigenisation agency shall submit the test reports and compliance to LTCC for clearance.

b. For indigenous substitution of non-critical Airborne Stores and development of TTGEs by the User Services organisations, the respective service HQ may designate appropriate authorities within these organisations who can provide the necessary coverage including clearance based on the criticality classification by LTCC. The clearance by the competent authority within the services shall be treated as final.

12.6 Clearance

Airworthiness clearance for the non-critical Airborne Stores shall be issued by the LTCC through the Minutes of Meeting (MoM). The clearance for critical Airborne Stores shall be issued by CEMILAC.

12.7 Production

a. The Indigenization Agency shall produce the Airborne Store as per the Standard of Preparation released as a part of the clearance process.

b. Quality Assurance aspects during production shall be ensured by the identified QA authority.

c. Periodic Quality Test (PQT)/Acceptance Tests: The Indigenization Agency shall conduct the necessary tests (PQT & AT) on the Airborne Store produced with the involvement of relevant stakeholders.

d. Production Deviations: Deviations in the production shall be addressed through a Non-Conformance Review Process (NCRP).

e. Modifications: Modifications to the approved SOP shall be handled through a Configuration Change Process (CCP) with relevant stakeholders by the Indigenization Agency. Procedure for modifications during production and in-service phase is addressed in Part-2, Chapter 4 of this document.

12.8 Withdrawal of Clearance

If the conditions of clearance of the indigenously substituted Airborne Stores are not satisfied or the field performance as per the feedback provided by Users is not satisfactory, the clearance issued earlier may be withdrawn by LTCC after due investigation with the Indigenization Agency.