CEMILAC/6003
Issue No. Dated : 2020

Policy for Design Development and Production of Military Airsystems and Airborne Stores

DDPMAS – POLICY V 0.0

(Supersedes DDPMAS – 2002)

Ministry of Defence
Govt. of India

DDPMAS – Policy V 0.0

Suggestions for improvement of this document in the form of additions, deletions or changes should be addressed to:-

The Secretary
Joint Airworthiness Committee
Centre for Military Airworthiness & Certification
Ministry of Defence (R & D)
Marathahalli Colony Post
Bengaluru 560 037

FOREWORD

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1. Contents

Preface

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Procedure for Amendment

i. Any agency may propose an amendment. Proposals for amendments are to be sent to Chief Executive (Airworthiness) CEMILAC. The proposals will be discussed in the Joint Airworthiness Committee (JAC). If JAC recommends, then these amendments will be further discussed by the Empowered Committee. On approval by the Empowered Committee, the amendments will be issued by Chief Executive (Airworthiness) CEMILAC.

ii. The amendments will be serially numbered. Incorporation of an amendment list in this publication is to be recorded by inserting the amendment list number, signing in the appropriate column and inserting the date of making the amendments.

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

Glossary

ACP	Airworthiness Certification Plan
AHSP	Authority Holding of Sealed Particulars
ALM	Air Launched Missile
AMC	Acceptable Means of Compliance
AMTC	Amended Military Type Certificate
ASDO	Airsystem Design Organisation
ASMO	Airsystem Maintenance Organisation
ASPO	Airsystem Production Organisation
ASR	Air Staff Requirements
ATC	Air Traffic Control
ATP	Acceptance Test Procedure
AUW	All Up Weight
CAMO	Continuing Airworthiness Maintenance Organisation
CEMILAC	Centre for Military Airworthiness and Certification
CCP	Configuration Change Process
CoA	Certificate of Airworthiness
CoD	Certificate of Design
Con-Ops	Concept of Operations
CFE	Customer Furnished Equipment
CR&J	Carriage Release and Jettison
CSIR	Council for Scientific and industrial Research
CSU	Clearance for Service Use
CTP	Chief Test Pilot
D&D	Design and Development
DGAQA	Directorate General for Aeronautical Quality Assurance
DGCA	Directorate General of Civil Aviation
DO	Design Organisation
DOA	Design Organisation Approval
DOAS	Design Organisation Approval Scheme
DOE	Design Organisation Exposition
DPSU	Defence Public Sector Undertaking
DPM	Defence Procurement Manual
DPP	Defence Procurement Procedure

DRDO	Defence Research and Development Organisation
FC	Flight Clearance
FCN	Flight Clearance Note
FOC	Final Operational Clearance
FOL	Fuel Oils and Lubricants
FQT	Full Qualification Tests
GOS	Ground Operating System
GSQR	General Staff Qualitative Requirements
GSS	Ground Support System
HQ	Head Quarters
IA	Indigenisation Agency
IAF	Indian Air Force
IDDM	Indigenously Designed Developed & Manufactured
IN	Indian Navy
IOC	Initial Operational Clearance
ISQR	Inter Services Qualitative Requirements
IMTSO	Indian Military Technical Standard Order
IMTSOA	Indian Military Technical Standard Order Approval
IMTAR	Indian Military Technical Airworthiness Regulation
JAC	Joint Airworthiness Council
LoA	Letter of Approval
LMC	Local Modification Committee
LQT	Limited Qualification Tests
LTC	Local Technical Committee
LTCC	Local Type Certification Committee
LRU	Line Replaceable Unit
MO	Maintenance Organisation
MOA	Maintenance Organisation Approval
MOAS	Maintenance Organisation Approval Scheme
MoD	Ministry of Defence
MOE	Maintenance Organisation Exposition
MoU	Memorandum of Understanding
MPTF	Military Permit to Fly
MTC	Military Type Certificate

NCRP	Non Conformance Review Process
NABL	National Accreditation Board for Testing & Calibration Laboratories
NSQR	Naval Staff Qualitative Requirements
OEM	Original Equipment Manufacturer
OFB	Ordinance Factory Bureau
ORDAQA	Office of Regional Director, Aeronautical Quality Assurance
PAT	Production Acceptance Test
PO	Production Organisation
POA	Production Organisation Approval
POAS	Production Organisation Approval Scheme
POE	Production Organisation Exposition
PQT	Production 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
SI	Servicing Instructions
SMTC	Supplemental Military Type Certificate
SOFT	Safety of Flight Tests
SOP	Standard of Preparation
STI	Special Technical Instruction
TA	Type Approval
TAA	Technical Airworthiness Authorities
TAB	Type Approval Basis
TCB	Type Certification Basis
TCDS	Type Certificate Data Sheet
ToT	Transfer of Technology
TTGE	Tools Testers and Ground Equipment
UAS	Unmanned Aerial System

UAV	Unmanned Aerial Vehicle
UoN	Urgent Operating Notice
VTO	Visiting Technical Officer

Definitions

Acceptable Means of Compliance
Acceptable Means of Compliance (AMC) represents the preferred means by which the TAA expect the intent a regulation / criteria to be met.

Airsystem
Airsystems include fixed or rotary wing Aircraft, Unmanned Airsystems, Aero Engines, and Air launched Missiles.

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

Air Launched Missiles (ALMs)
Air launched missiles 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 Airsystem unlike Air armament which is an airborne store.

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, sonobouys, rescue boats and similar items which are deployed from Air-vehicles are included as Air armament.

Airworthiness
Airworthiness is the continued capability of the military Airsystems and airborne stores to perform satisfactorily and fulfill mission requirements, throughout the specified life in the prevailing environments with acceptable levels of safety and reliability. The acceptable levels to be mutually agreed between users, designers and the certification authority.

Airworthiness Certification Plan (ACP)
ACP is a document that brings out the details towards compliance to the agreed Type Certification Basis of the Airsystem along with the 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 airsystem’s airworthiness certification basis.

Amended Military Type Certificate (AMTC)

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

Airsystem Design Organisation (ASDO)

ASDOs are Organizations involved in Design & Development, Repair and Modification of an Airsystem. ASDO shall be responsible for the overall design or through-life configuration management of the design of the Airsystem, and for co-coordinating the design and integration of the airborne stores designed by other Design Organizations.

Airsystem Maintenance Organisation (ASMO)

ASMOs are Organizations involved in the Maintenance of an Airsystem. ASMO shall be responsible for the overall Maintenance of the Airsystem, and for co-ordinating the overhauling &maintenance of the airborne stores maintained by other Organizations**.**

Airsystem Production Organisation (ASPO)

ASPOs are Organizations involved in Manufacturing and Repair of an Airsystem. ASPO shall be responsible for the overall Manufacturing of the Airsystem, and for integration of the airborne stores manufactured by other Organizations**.**

ASR/NSQR/GSQR/ISQR/JSQR

The ASR/NSQR/GSQR/ISQR/JSQR is a document released by the Indian Airforce, Indian Navy, Indian Army and Inter Services respectively, which describes in qualitative and quantitative terms, the requirements for an airsystem or airborne store.

Applicant
An individual or organization seeking approval from TAA for a specific Airsystem or airborne store.

Authority Holding Sealed Particulars
AHSP is the authority responsible for collecting, collating, developing, amending, updating, holding and supplying sealed particulars of the defence items in accordance with the laid down procedure. DGAQA is the AHSP for aviation stores of all the Services and the Coast Guard.

Continuing Airworthiness Maintenance Organisation (CAMO)
Maintenance Organisation within the Services to ensure Continuing Airworthiness.

Certificate of Airworthiness (CoA)

The Certificate of Airworthiness (CoA) is the formal document issued by DGAQA or competent authority to certify that an airsystem is airworthy. Every individual airsystem 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

The Certificate of Design 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.

Continued Airworthiness

All tasks to be carried-out to verify that the conditions under which a type-certificate or a supplemental type-certificate has been granted, continue to be fulfilled at any time during its period of validity.

Clearance for Service Use (CSU)

Clearance for Service Use (CSU) is an approval by CEMILAC for use of an airborne store by the User Services.

Continuing Airworthiness

All of the processes ensuring that, at any time in its operating life, an Airsystem and the airborne stores complies with the airworthiness requirements in force and is in a condition for safe operation.

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 concurrent with the design and development.

Design Organisation (DO)

DOs are Organizations involved in the Design & Development, Repair and Modification of airborne stores used in an Airsystem. DO shall be responsible for the through-life configuration management of the designed airborne stores.

Design Organisation Approval (DOA)

An approval given to an organization as competent to carry out Design, Development and Modification and Repair of airsystems or airborne stores.

Design Approved Organisation Scheme (DAOS)

The Design Approved Organization Scheme (DAOS) is a mechanism by which the design competence of an Organization is assessed.

Development Flight Clearance (DFC)

An approval given to an airborne store for integration on to an airsystem to carry out development flight trials.

Flight Clearance Note (FCN)
FCN is an approval given to an airsystem and is an authorization for the flight test department to carry out development flight trials within the listed system/operating limitations and cleared envelopes.

Impact Kinetic Energy

Kinetic Energy of the 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.

Final Operational Clearance (FOC)
Clearance issued to an airsystem for regular operations by the services, when a type design has complied with and demonstrated all the requirements of Design and Safety.

Indian Military Technical Standard Order (IMTSO)

An Indian Military Technical Standard Order (IMTSO) is a minimum performance standard/Specification issued by CEMILAC for specified airborne stores to be used on Military airsystem. Airborne stores with IMTSO approval are eligible for use on any airsystem, provided the IMTSO standard meets the airsystem requirements.

Indian Military Technical Standard Order Approval (IMTSOA)

An approval given to an airborne store that meets the relevant IMTSO standard/specification. However an IMTSOA, by itself, is not an authorization for installation on any airsystem.

Indian Military Technical Airworthiness Regulation (IMTAR)

IMTAR is a procedural document that mandates the processes to be followed by organizations/stakeholders involved, under which necessary Clearances, Approvals and Certificates related to Airworthiness and Certification of Indian Military Airsystem for various scenarios and aspects of Aircraft Life cycle, will be issued by the Technical Airworthiness Authorities of India.

Initial Operational Clearance (IOC)

Clearance issued to an airsystem 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 safety.

Initial Airworthiness Approval

The approval issued by CEMILAC for the Initial Type Design. Initial Airworthiness Approval includes, MTC, RMTC, RSD, Type Approval, IMTSOA, LoA.

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 Approval (LoA)

LoA is an approval given to a class of airborne stores like Materials, Standard Parts and other items that are not covered under Type Approval or IMTSOA.

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 and Quality department of the 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 organization of the respective user services, Service Headquarters, DGAQA, Contractors representatives in Design, Production Engineering, Methods Engineering and Quality Control.

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 airborne stores to be indigenised. It is chaired by CEMILAC with members from, Head of indigenization, the Main Contractor's Head, Design& Quality representatives, DGAQA and User representative.

Loss of Control

A failure (or a combination of failures) which results in loss of control of an UAS and may lead to impacting the ground at high velocity.

Main contractor

Main contractor is the development and or production agency who is entrusted with the total responsibility for development and/or productionisation of the airsystem/airborne store.

Maintenance Organisation (MO)

MOs are Organization is involved in Maintenance of airborne stores used in an Airsystem. MO shall be responsible for the through-life configuration management of the Maintenance of airborne stores installed in an Airsystem**.**

Maintenance Organisation Approval (MOA)

An approval given to an organization as competent to carry out Maintenance of airsystems or airborne stores.

Maintenance Approved Organisation Scheme (MAOS)

Maintenance Approved Organization Scheme (MAOS) is a mechanism by which the competence of an Organization to undertake Maintenance of airsystem and airborne stores can be assessed.

Make –I
Military Airsystem/airborne store projects funded by the Government
Make –II
Military Airsystem/airborne store projects funded by the Private Firms
Make-III
Military Airsystem/airborne store projects that are indigenously manufactured for import substitution.

Military Aircraft

Military aircraft includes Army, Navy, Air Force and Coast Guard aircraft, and every aircraft commanded by personnel of the Armed Services. These includes Fixed or rotary wing Aircraft, piloted or unmanned 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 airsystem of a particular type design complies with all the agreed Design, Safety and Airworthiness requirements.

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 there in.

Production Organisation (PO)

POs are Organization is involved in Manufacturing and Repair of airborne stores used in an Airsystem. PO shall be responsible for the through-life configuration management of the airborne stores produced and installed in an Airsystem.

Production Organisation Approval (POA)

An approval given to an organization as competent to carry out Manufacture and repair of ofairsystems or airborne stores

Production Approved Organisation Scheme (PAOS)

PAOS is a mechanism by which the competence of an Organization to undertake Manufacture and Repair of airsystem and airborne stores can be assessed.

Quality Assurance Plan

A document that details the involvement of DGAQA for the quality assurance related activities throughout the design &development and production of the Airsystem and airborne stores.

Regional Centre for Military Airworthiness (RCMA)

Regional Centre for Military Airworthiness is afield unit of CEMILAC which progresses, on behalf of CEMILAC, all aspects of technical clearance of the airsystems/airborne stores during design and development, production and In-service phase. In such places where no establishment of RCMA exists, such authority may be delegated to Visiting Technical Officers (VTOs) of CEMILAC.

Office of Regional Director-AQA (ORDAQA)

The Office of Regional Director-AQA is afield unit of Directorate General of Aeronautical Quality Assurance (DGAQA) to ensure Quality Assurance of the airsystems/airborne stores during Design, Development and production phases.

Original Equipment Manufacturer (OEM)
The original equipment manufacturer which is the only firm manufacturing the specified Airsystem/Airborne Store of a specific make, as distinguished from the stockiest/distributors or suppliers of such items/equipment and no other manufacturer exists for that item.

Recognition
Recognition is a structured process by which Indian TAA can evaluate a foreign National Airworthiness Authorities and assess the potential to use their certification approvals for Indian Military. Recognition can be undertaken on a reciprocal basis, known as 'Mutual', or on a unilateral/multilateral basis.

Release to Service Document (RSD)

Document issued to the services during IOC or FOC of an airsystem that authorizes regular flying by the service 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.

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.

Safety of Flight Tests (SOFT)
An abridged version of the Qualification tests for a non safety critical system, 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 based on SOFT will be decided by CEMILAC on a case to case basis.

Standard of preparation (SOP)
The frozen build standard of the airsystem/airborne store including its approved drawings, list of approved equipments/items.

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.

Technical Airworthiness Authorities (TAA)

CEMILAC and DGAQA, the organizations dealing with Technical Airworthiness of the airsystems/airborne stores are called TAA.

Tools, Testers and Ground Equipment (TTGE)

TTGE includes the following
Tools: All mechanical/special tools required to maintain the airsystem.
Testers: All testers and Test Equipments which are used to test/verify functions/ parameters of the parts/equipments/LRUs/airsystem.
Ground Equipment: Ground handling and Ground support equipment required to operate / maintain the airsystem.

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 Design Authority/Main Contractor submits a full type record with all relevant documents, to the satisfaction of CEMILAC.

Type Approval Basis (TAB)

The Type Approval Basis (TAB) is an agreed set of airworthiness requirements that an airborne store must be compliant with, in order to be issued a Type Approval.

Type Certification Basis (TCB)

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

Type Certificate Data Sheet (TCDS)

TCDS, is a document that contains information of the airsystem type design, operating limitations, applicable regulations/standards of compliance, and any other conditions or limitations prescribed for the Type design. The MTC is issued to the type design based on the TCDS submitted by the main contractor.

Type Record

Type Record is a document giving a description of the airborne store, its functional and performance characteristics, summary of strength and other calculations along with reserve factors, environmental envelope of operation and storage of the store, results of all tests including environmental, functional and performance tests, weight data, list of applicable drawings, lifing details and includes the Certificate of Design. It includes all documents and specifications approved by CEMILAC, information on dimensions, materials and processes necessary to define the structural strength of the aeronautical product. It should also indicate instructions for continued airworthiness of the product, operating limitations and other information for the safe operation of the product.

Unmanned Aircraft System (UAS)
An unmanned airsystem and associated elements (including communication links and the components that control the unmanned aircraft) 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.

Unpremeditated Descent
A Failure (or a combination of failures) occurs which results in inability of the airsystem to maintain a safe altitude above the surface.

User Services

User Services refers to Indian Army, Indian Navy, Indian Airforce, Indian Coast Guard and such Services under the Ministry of Defence, that engage with CEMILAC in respect of Airworthiness and Certification of their products.

PART – I

AIRWORTHINESS MANAGEMENT FRAMEWORK

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 airsystem/airborne stores to perform satisfactorily and fulfill mission requirements, throughout the specified life in the prevailing 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 aircraft, and secondly, it introduces the key players or the stake-holders in the Indian Military Aviation scenario, namely, the Users (Services), Designers (main contractor or OEM) and the Airworthiness authorities.

Ensuring airworthiness throughout the life cycle of the aircraft, implies that, the aircraft 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.

There are three major players in the Indian Military Aviation Scenario. The user, or the services, who wishes to acquire a product based on the strategic needs, the designer or the main contractor or the OEM who develops the product, and the 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 organization responsible for the Airworthiness Certification of Military airsystem and airborne stores, and, Director General of Aeronautical Quality Assurance, DGAQA, under Secretary Defence Production, Ministry of Defence, Govt. of India, is the organization responsible for the Quality assurance. Together, CEMILAC and DGAQA are the Technical Airworthiness Authorities for Indian Military Aircraft 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 aircraft acquisition models in place, as per Defence Procurement Procedure (DPP) and Defence Procurement Manual (DPM). DPP 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 airsystem, “Buy and Make” refers to License Manufactured airsystem and “Make” refers to ab-initio developed airsystem.

The Airworthiness authorities have a major role to play in each of the acquisition models. In ab-initio development, the activities center around

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 Airsystem, to the main contractor, which is a statement that the Military Airsystem Type meets the type design safety requirements and is ready to enter Series Production. Induction of the Airsystem 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 Airsystem. 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 Technical Standard Order Approval (IMTSOA), or a Letter of Approval (LoA) depending on the type of the airborne store.

The Certificates and the approvals issued for the Airsystem 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 aircraft, 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-intio, licensed produced and Bought out aircraft, as and when required by the services. The airworthiness certification coverage offered by the airworthiness authorities to the airsystem 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 in its operating life, ensuring that the airsystem 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 Organization Approval (DOA), which is a recognition that the designer has the ability to design an aircraft/equipment that meets the airworthiness requirements; the production agency will have to be Production approved, leading to the issuance of Production Organization Approval (POA), which is a statement that the production agency has the necessary wherewithal to produce the aircraft as per the approved standard of preparation ; and the Maintenance organization will have be issued with Maintenance Organization 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.

Aircraft Safety is paramount. Therefore, airworthiness has to be ensured. It is ensured through a structured, coherent and a hierarchical manner, comprising of Policy, Regulations and Manuals.

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

The Regulations are technical procedures for technical and operational airworthiness, that have to be adhered to, by the main contractor and the User in order to ensure airworthiness. The regulations cover, technical airworthiness during design & development, continued airworthiness, quality assurance aspects during development, production, organizational approvals and operational/continuing airworthiness. The Regulations pertaining to Technical Airworthiness are prepared by the TAA, i.e, CEMILAC and DGAQA, and approved by the respective Department Heads. The Regulations pertaining to Operational Airworthiness are prepared and promulgated by the respective User Head Quarters.

The manuals refer to templates, forms, circulars, airworthiness directives and airworthiness certification criteria documents, that may be referred to by the main contractor and facilitates in implementing the regulations towards ensuring airworthiness. These are released by the respective Organization Heads.

This Document titled, DDPMAS Policy V0.0, is a Policy Document on Technical Airworthiness, covering roles and responsibilities and the empowerment of the stakeholders to ensure airworthiness of Indian Military aircraft.

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.

While the Part 2, consists of 12 chapters to exclusively cover the airworthiness policies for Ab-initio development, License production, Bought out and Continuing/ Continued airworthiness and flight Testing of Airsystem/airborne stores. Chapters on policies for Exports, Research and Civil certified military aircraft have also been newly addressed. That apart, policies for Airsystems such as UAVs and Air Launched Missiles have also been newly added in exclusive chapters. The policies 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 Airsystem/ Airborne store for the Indian Military, shall follow the policies as outlined in the applicable chapters of this DDPMAS Policy V 0.0 document.

Note: Inputs from various stakeholders regarding the impediments and difficulties in following the DDPMAS have been addressed in the Policy and Regulations wherever technically found to be in order without compromising the philosophy of airworthiness.

Any suggestions or improvements on this document may be sent to,

The Secretary

Joint Airworthiness Committee

Centre for Military Airworthiness and Certification

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

This Document DDPMAS Policy V 0.0 shall supersede, DDPMAS 2002. This document does **not** apply to Military Airsystem /Airborne stores, designed prior to the approval and release of this document.

Chapter 2 - INDIAN MILITARY AIRWORTHINESS FRAMEWORK

2.1 Concept of Airworthiness

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

ii. In military aviation, airworthiness is not only the ability of aircraft 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 Airsystem to perform satisfactorily and fulfill mission requirements, throughout the specified life in the prevailing environment with acceptable levels of safety and reliability.

iii. To fulfill the above definition of airworthiness the following two aspects are important**:**

Technical Airworthiness: Technical airworthiness is concerned with ensuring airsystems are designed, developed and maintained to approved airworthiness criteria by competent authorities, and working within approved organizations under a system of certification and acceptance. Technical Airworthiness includes Initial Airworthiness and Continued Airworthiness.

Operational Airworthiness: Operational airworthiness is concerned with ensuring airsystems 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. Continuing Airworthiness is a part of Operational Airworthiness.

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

v. For an airsystem to be airworthy over its entire lifecycle, it is imperative that the airsystem/airborne store is :

- Designed to be airworthy
- Built to be airworthy
- Operated and Maintained to be airworthy

The successful completion of design, development and evaluation leads to freezing of the type design of an Airsystem/Airborne store. Every Airsystem/Airborne store produced as per the type design, is said to possess Initial Airworthiness. Subsequently, during the exploitation by the services, the Airsystem/Airborne Store will be available and dependable only when it continues to be airworthy. Figure 2-1belowillustrates the concept of airworthiness throughout the design, development, production and service use of an airsystem.

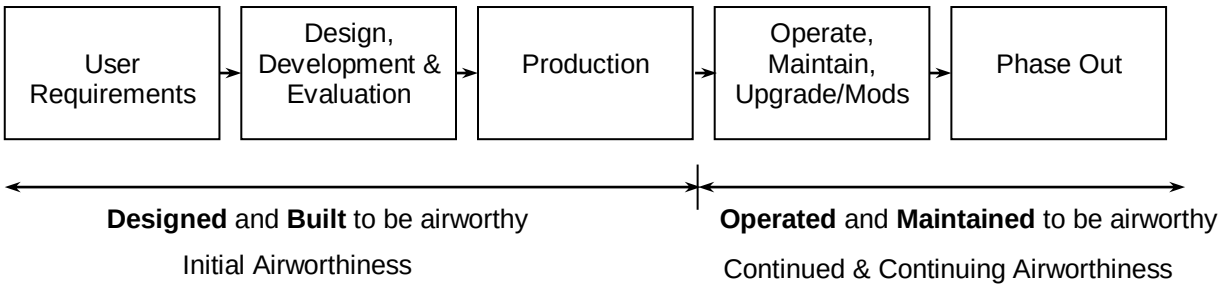

Figure 2-1 : Airworthiness Concept during Airsystem Life Cycle

2.2 Indian Military Airworthiness – Stakeholders

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

ii. For the defence forces to execute their operational requirements, the airsystem has to be airworthy at all points of time. All the stakeholders in military aviation have a key role to play in ensuring airworthiness. Table 2-1 enlists the roles and responsibilities of all the stakeholders concerned with Indian Military Airworthiness.

Table 2-1 : Roles and Responsibilities of Major Stakeholders

Stakeholder	Roles & Responsibilities
Indian Defence Forces • Service & Command Headquarters • Operational Units • Flight Testing Establishments • Maintenance Organizations • D&D organisations • Training Organizations	• Specify requirements • Part of Integrated Project Teams during D&D, upgrades & Modification • Carry out Development Testing and User Evaluation Testing • Operate Airsystems and airborne stores • Service and Maintain Airsystems and airborne stores • Carry out accident/incident investigations and periodic safety assessment. • Indigenous Substitution activities.
Design, Development and Production Agencies • DRDO • DPSUs and Other PSU • CSIR • OFBs • Indian Private Industries • Foreign OEMs	• Carry out feasibility study, design, develop and test Airsystems and airborne stores • Produce indigenous and licensed Airsystems and airborne stores • Maintain-Repair-Overhaul Airsystems and airborne stores

	• Carry out Upgradation and Modifications
Indian Technical Airworthiness Authorities • CEMILAC – Design Approval Authority • DGAQA – Quality Assurance Approval Authority	• Carry out technical airworthiness activities during design, development and production of Airsystems and airborne stores • Participate in continued airworthiness activities. • Issue instruments of technical airworthiness approvals

2.3 Technical Airworthiness Authorities

Technical Airworthiness Authorities are organizations that are independent of the User Services and Main Contractor. The TAAs, established by the Ministry of Defence, are responsible for the regulation of the technical airworthiness aspects of design& development, production and maintenance of airsystems/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:**

Center 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 units known as Regional Centres for Military Airworthiness (RCMAs) and Visiting Technical Officers (VTOs)

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 Airsystems and Airborne stores during development and production. DGAQA carries out these activities through its field units known as Office of Regional Director, Aeronautical Quality Assurance (ORDAQA).

2.4 Indian Military Airworthiness Framework

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

- To ensure that Airsystems and Airborne Stores acquired by the User Services, comply with the applicable airworthiness requirements.

- To ensure that the Airsystems inducted to the services continue to be airworthy throughout their operational life.
- To facilitate an ecosystem of approved organizations that can design, develop, manufacture and maintain military airsystems.
- To enable technical airworthiness certification based on technical airworthiness criteria.
- To harmonize the military airworthiness activities with other national level policies like Defence Procurement Policy, Make-In-India Policy etc.

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

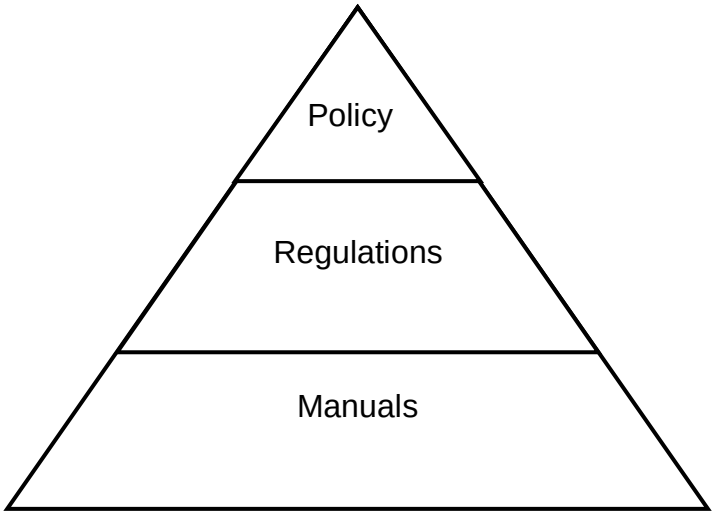

Figure 2-2 : Indian Military Airworthiness Regulatory Framework

2.5 Airworthiness Policy

The airworthiness policy document called as DDPMAS-POLICY V0.0 (this document) is the apex governing document for Indian Military Airworthiness. The document is drafted by CEMILAC, reviewed by Joint Airworthiness Committee. After approval of the Empowered Committee the Airworthiness Policy is approved by Secretary, Defence, Govt of India. The Policy document covers the following aspects:

i. Introduction to the military airworthiness framework and its relationship with the acquisitions models of the services

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

iii. Airworthiness policies for military acquisitions for scenarios such as ab-initio development, license production, Bought out Airsystems and airborne stores and their flight testing

iv. Policies related to continued and continuing airworthiness

v. Organization Approvals

2.6 Airworthiness Regulations

i. Airworthiness Regulations are procedural documents that provide detailed regulatory requirements for both technical and operational airworthiness. The Airworthiness regulations are aligned to the Airworthiness Policy.

ii. The Indian Military Technical Airworthiness Regulations (IMTARs) are drafted by Technical Airworthiness Authorities i.e. CEMILAC and DGAQA and approved by Joint Airworthiness Committee(JAC). IMTAR comprises of dedicated subparts with regulatory articles, acceptable means of compliance and necessary guidance materials

iii. The Operational Airworthiness Regulations are drafted and promulgated by the respective Service Headquarters.

2.7 Manuals

i. Manuals are the guideline documents that are required at the working level to implement the procedures given in regulations. 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 Directives, Circulars.

2.8 Indian Military Airworthiness Management Structure

i. In order to guide and oversee the military airworthiness of the country, it is important to establish airworthiness governing bodies. The figure below provides the structure for Indian Military Airworthiness Management Structure.

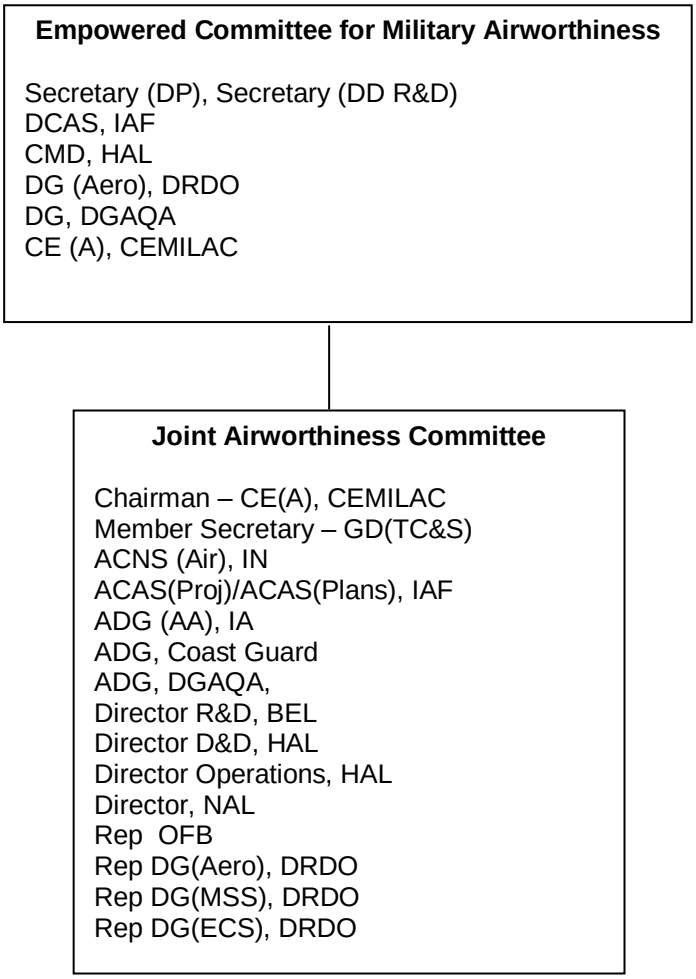

Figure 2-3 : Indian Military Airworthiness Management Structure

ii. Empowered Committee for Military Airworthiness:

The Empowered Committee is the apex governing body for Indian Military Airworthiness. The committee is headed by Secretary, Defence. The main responsibility of the body is to approve the Indian Military Airworthiness policy of the country. The Committee may meet once in three years or as an when required.

iii. Joint Airworthiness Committee (JAC) :

Joint Airworthiness Committee (JAC) is the executive body for formulating technical regulations. The responsibilities of JAC are:

a) Review Airworthiness policy and recommend to Empowered Committee for Approval

b) Review and Approve Technical Airworthiness Regulations

c) JAC shall meet as and when required, but atleast once in a calendar year.

2.9 Instruments of Technical Airworthiness Approvals

The airworthiness requirements are applied at two levels: Airsystem & Airborne Stores. On compliance to a set of planned activities, the Airsystems 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 broad categories of instruments for technical airworthiness approvals are given below:

i. Airsystems shall have a military type certificate. The military type certificate, and certification of changes to that military type certificate, shall be issued when the applicant or the design organization has shown that the airsystem 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 airsystem with all airborne stores fitted thereon. Release to Service Document (RSD) shall be the basis of operation of Airsystem within User Services.

ii. Airborne stores may be issued with IMTSOA, Type Approval or Letter of Approval(LoA) 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.

iii. Each airsystem shall be issued with an individual certificate of airworthiness (CoA) 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 airsystem is in condition for safe operation.

iv. For Airsystem during the development phase, a Flight Clearance Note (FCN) is issued when it is shown that the aircraft 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.

v. Organizations responsible for the design and Production of Airsystems and Airborne stores shall demonstrate their capability and means to discharge the responsibilities associated with their approval.

vi. Organizations responsible for the maintenance of Airsystems and Airborne stores shall demonstrate their capability and means to fulfil the responsibilities associated with their approval.

Chapter 3 - MILITARY AIRSYSTEM /AIRBORNE STORE ACQUISITION

3.1 Introduction

Governing documents for the acquisition of Airsystems, Accessories, Appliances and other associated products for the Indian Defence and Services are the Defence Procurement Procedure (DPP) document and Defence Procurement Manual (DPM) for capital and revenue acquisitions respectively. It is pertinent that the Airsystems 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 Airsystem Airworthy throughout its operational life.

3.2 Acquisition Categories as per Defence Procurement Procedure (DPP)

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

ii. 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.

iii. 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.

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

v. D&D

vi. Strategic Partnership Model (SPM)

vii. Make -III

3.3 Ensuring Airworthiness Requirements during Acquisition

i. From the Airworthiness Certification perspective, the Airsystems and Airborne Stores are generally classified into three categories:

   a. Ab-initio design and developed,

b. License production and

c. 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 Airsystems and Airborne Stores. The “Buy(Global)” category is equivalent to Bought Out Systems. The airworthiness policy provisions detailed in the subsequent part of this document shall be followed in each of these acquisition modes.

Table 3-1 : Equivalence of Acquisition Models to DDPMAS

DPP Acquisition Category	Equivalence in DDPMAS
Make (Make–I, Make–II& Make -III) Buy (Indian – IDDM)	Ab Initio design & development
Buy(Indian) Buy & Make (Indian), Buy & Make Strategic Partnership Model (SPM)	Licensed Production
Buy(Global)	Bought Out

3.4 Revenue Acquisitions:

i. 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 policies for Airworthiness elaborated in this document shall be followed.

3.5 Airworthiness clearances:

i. Any product procured for use in Airborne Applications shall have a Certificate of Airworthiness (CoA). The Airworthiness requirements detailed in subsequent chapters are applicable for the respective categories of procurement.

ii. For Airworthiness coverage, the following shall apply,

All products categorized as ab-initio designed & developed shall go through Airworthiness Certification by CEMILAC and Inspection Clearance & Acceptance by DGAQA.

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.

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 Inspection & Acceptance by DGAQA to cater for the airworthiness and certification needs throughout the service life of the product, provided all the documents necessary for ensuring Airworthiness are made available.

iii. CEMILAC / 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, so that the product can readily meet the user requirement. The support shall be extended even if there is no Request for Proposal (RFP)/ Operational Requirement existing during the design and development stage.

iv. 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. 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

i. 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

i. If civil certified airsystem 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.

Part 2

Policies for Design, Development, Production and Certification of Military Airsystems and Airborne Stores

Chapter 1 - Ab-Initio Design, Development, Production and Certification of Airsystems & Airborne Stores

1.1 Introduction

i. The Policies related to design, development, Production and Airworthiness Certification of ab-initio design and development of Airsystems/Airborne stores for Indian Defence Forces are discussed herein.

ii. Development of these Airsystems/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

i. 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.

ii. Airsystems/Airborne stores development shall generally be taken up based on requirements such as GSQR/ASR/NSQR/ISQR/JSQR from User Services.

iii. In some cases, main contractors may also take up Airsystem/Airborne store development without any specific requirements from User Services. However these Airsystems/Airborne stores shall have potential application in Indian Defence Services.

1.3 Certification Approach

i. The main contractor shall bring out the certification requirements in consultation with the TAA in the project proposal stage.

ii. 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 certification basis.

iii. Main contractor shall propose to the TAA during the finalization of the 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 airworthiness requirements as stipulated by the TAA.

iv. The TAA shall 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.

1.4 Design, Development and Production of Airsystems

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

1.4.1 Design Organization Approval (DOA)

i. Design &Development of Airsystem shallbe taken up by an Organization approved under Design Approved Organization Scheme (DAOS) of CEMILAC.

1.4.2 Airworthiness Certification Criteria

i. Main Contractor shall ensure that the Airsystem is designed to an applicable Airworthiness Criteria. The Airworthiness Criteria can be either specified by the user services or mutually agreed amongst user services, CEMILAC and the Main Contractor.

ii. The Main contractor, in consultation with the Users services shallseek formal approval from CEMILAC for use of alternative Airworthiness Criteria.

iii. If Airworthiness Criteria do not exist for an Airsystem that is proposed to be developed, a set of standards/ requirements that CEMILAC finds necessary to establish the required level of safety shall be followed.

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

1.4.3 Concept of Operations (Con-Ops)

i. Main contractor shall finalise the Concept of Operation in consultation with the User services. The Con-Ops shall be made available to TAA for finalization of the TCB/TAB.

1.4.4 Type Certification basis (TCB)

i. A Type Certification basis (TCB) for the Airsystem shall be evolved by the main contractor in consultation with CEMILAC based on the User requirements, Concept of Operations and applicable Airworthiness Criteria. TCB shall also include the Acceptable Means of Compliance for every requirement.

1.4.5 Airworthiness Certification Plan (ACP)

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

1.4.6 Quality Assurance Plan (QAP)

i. 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 Airsystem along with the involvement of TAA and other stakeholders at various stages. This plan shall be approved by DGAQA.

1.4.7 Development and Prototype phase

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

ii. Technical reviews at appropriate stages of development shall be conducted with the participation of relevant stake holders.

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

iv. The main contractor shall have an internal Quality Assurance Process.

1.4.8 System Certification Review Board (SCRB)

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

1.4.9 Test and Evaluation

i. The main contractor to establish working rigs for systems/subsystems to functionally test and demonstrate compliance to requirements.

ii. The Technical Specifications of Test rigs used during development and production for verification & validation of the Air system/air borne store shall be approved by CEMILAC and Rigs shall be certified by DGAQA.

iii. 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. The main contractor shall involve DGAQA for participation during the testing and approval of the test data as planned in the ACP and D&D QAP document

iv. CEMILAC shall accord developmental flight clearance of Prototype Airsystem 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), shall be the basis.

v. During development phase, Development Flight Testing & Evaluation shall be carried by flight test department of the main contractor/Services/Service authorized Flight Testing agencies.

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

vii. Maintenance Evaluation Trials (MET) of an Airsystem shall be conducted by the designated agencies within User Services.

viii. Detailed provisions for flight testing is given in Part 2 Chapter 5.

1.4.10 Test Adequacy Review Board (TARB)

i. During development, whenever required, CE(A) may constitute a Test Adequacy Review Board (TARB) to finalise/review the test adequacy in the certification process

1.4.11 Configuration Management

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

ii. 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 .

1.4.12 Initial Airworthiness Approvals

a. Military Type Certificate (MTC)

i. On completion of design, development, testing and evaluation of Airsystem, Main contractor shall prepare Type Certificate Data Sheet (TCDS) along with a Certificate of Design (CoD) and submit to CEMILAC. CEMILAC shall issue the MTC for the Airsystem to the main contractor when compliance to approved TCB has been achieved.

ii. MTC signifies that the Airsystem 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 end User is ready to accept the Airsystem based on the operational requirements.

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

c. Join Holders of MTC / RMTC

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

ii. A MoU / Agreements shall be signed for defining the extent of involvement in D&D of the Airsystem. One of the agencies shall be a lead D&D agency for liaison with the TAAs. Such details shall be clearly brought out in the ACP and QAP documents.

iii. All the 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 the agencies.

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

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

1.4.13 Tools, Testers and Ground Equipment (TTGE)

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

ii. 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 Organizations of User Services shall be involved during the development.

1.4.14 Release to Service Document (RSD)

i. Airsystem 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 Airsystem by the Services.

ii. RSD shall be issued before or along with the delivery of the first airsystem to the user services.

iii. The Main contractor shall deliver the applicable publications along with the RSD to the User services for ensuring operational airworthiness.

iv. The Main Contractor shall also deliver the TTGEs along with the airsystem to the user Services to ensure operational airworthiness.

1.4.15 Transfer of Initial Airworthiness Approvals

i. If Initial Airworthiness Approvals related to technical airworthiness is to be transferred, the transfer shall be made only to a Design Organization within India and who is a Design approved Organization & shall be able to perform the

responsibilities of an Initial Airworthiness Approval Holder. CEMILAC shall issue clearance for transfer of Initial Airworthiness Approvals.

1.4.16 Transition into Production

i. Manufacturing of Airsystem shall be taken up by a main contractor approved under Production Approved Organization Scheme (PAOS) of DGAQA.

ii. 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.

iii. 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.

iv. All the necessary Jigs, Fixtures Tools, Testers and processes required for Series Production shall be identified, developed and accepted by the Production Organization of the Airsystem/airborne stores. DGAQA shall certify them.

v. The SOP consisting of Drawing Applicability List (DAL) and Equipment Standard of Preparation (ESOP) is approved by CEMILAC.

vi. Sealing of Standard of Preparation (SOP) has to be carried out before transition from Development to Production. DGAQA/Quality assurance agencies from User Services shall be Authority Holding of Sealed Particulars (AHSP).

vii. Production Transition before issue of RMTC/MTC : In order procure long-lead items and shorten the delivery time of the first set of Airsystem, the production agency may plan and carry out procurement and concurrent production before the issue of RMTC/TC. 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 Airsystem 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 concurrent production before issue of TC solely lies with the production organization.

1.4.17 Production

i. The Production agency shall manufacture the Airsystems as per the Standard of Preparation released as a part of Initial Airworthiness Approval.

ii. The Production Agency shall prepare a Quality Assurance Plan (QAP) for Production with the consultation of DGAQA. Quality Assurance aspects during production shall be ensured by DGAQA as per the Quality Assurance Plan.

iii. **Production Acceptance test and Periodic Quality Test (PQT)**:Main Contractor shall conduct the necessary tests on the Airsystems produced with the involvement of relevant stakeholders. In addition Periodic Quality Test during production shall be carried out at defined interval, wherever applicable, as stipulated by DGAQA.

iv. **Certificate of Airworthiness (CoA):** DGAQA shall issue a CoA in the form of Release Note to each Airsystem manufactured by the Main Contractor conforming to a Military type-certificate.

v. 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.

vi. **Deviations**: Deviations in the production during Design& Development phase and during the Limited Series Production phase shall be addressed by DGAQA or by CEMILAC, if referred to by DGAQA. In which case the decision of CEMILAC shall be treated as final. Deviations during the Series Production Phases hall be addressed by DGAQA.

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

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

ix. **Tail Numbering / Serial Number** : The service headquarter may allocate a tail-number to each of the air-system that is produced.

x. **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 airsystem shall be accompanied by documents/manuals required for ensuring continuing and continued airworthiness after obtaining necessary endorsement by DGAQA.

1.5 Design Development and Production of Airborne stores

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

ii. Design development of an airborne stores could be taken up as part of development of an airystem, upgrade of an Airsystem, 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.

iii. The airborne stores need to be airworthy for the complete Airsystem to be airworthy. Hence, all airborne stores need airworthiness approval before installation/use in an Airsystem or in another airborne store. The initial airworthiness approval for an airborne store can be one of the following:

- Type approval for Airborne stores which are specific in nature and not covered in above two categories

- Letter of Approval (LoA) for Airborne stores which are standard parts/materials in accordance with officially recognized Standards. LoA

shall be also issued for parts/materials not specific to any platform for which specifications are approved by CEMILAC.

- IMTSO approval (IMTSOA) for Airborne stores for which Indian Military Technical Standard Order (IMTSO) exists**.**

1.5.1 Design Organization Approval (DOA)

Design & Development of Airborne stores shall be taken up by an organization approved under Design Approved Organization Scheme (DAOS) of CEMILAC.

1.5.2 Airworthiness Certification Criteria

i. 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.

ii. The Main contractor, in consultation with the Users services shall seek formal approval from CEMILAC for use of alternative Airworthiness Criteria.

iii. If Airworthiness Certification Criteria do not exist for an Airborne store that is proposed to be developed, a set of standards/ requirements that CEMILAC finds necessary to establish a level of safety for the Airborne stores shall be followed.

iv. Incase of IMTSO stores, the Airworthiness Criteria is included in the IMTSOA.

1.5.3 Type approval basis (TAB)

For the Airborne stores and applicable Airworthiness Criteria ,a Type Approval Basis (TAB) shall be evolved by the main contractor in consultation with CEMILAC. 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 the stages of development, 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

i. 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.

ii. Technical reviews at appropriate stages of development shall be conducted by the Main Contractor with the participation of relevant stake holders.

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

iv. The main contractor shall have an internal Quality Assurance Process.

1.5.7 Test and Evaluation

i. The main contractor to establish working rigs for all airborne stores to functionally test and demonstrate compliance to requirements.

ii. The Technical Specifications for the test rigs shall be approved by CEMILAC.

iii. The rigs shall be certified as per these approved Specifications, by DGAQA.

iv. 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.

v. CEMILAC shall issue a Development Flight Clearance (DFC) for the Airborne Store or the Sub-system 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 basis document are to have been pre-approved by TAA.

vi. During development phase, Flight Testing & Evaluation shall be carried by flight test department of the main contractor/Services/Service authorized Flight Testing agencies.

vii. 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.

viii. Operational Test & Evaluation shall be carried out by User Services for accepting Airborne stores for on behalf of Services.

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

x. Detailed provisions for flight testing is given in Part 2 Chapter 5.

xi. The Main contractor shall prepare all the applicable publications for the users to ensure operational and continuing airworthiness.

1.5.8 Configuration Management

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

ii. 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

Type Approval/IMTSOA/LoA 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. CEMILAC shall issue Type Approval/ IMTSOA/ LoA for airborne stores to the main contractor when compliance to approved TAB has been achieved.

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 Store based on the operational requirements.

1.5.10 Clearance for Service Use (CSU) of an Airborne Store:

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 Organizations.

1.5.11 Customer Furnished Equipment (CFE) / Buyer Nominated Equipment (BNE)

i. User Services may sometimes identify or procure and furnish certain airborne store for installation on the airsystem.

ii. Responsibility for ensuring its performance, life etc will be that of the user services. The main contractor responsible for integration should however evaluate the equipment and bring out he short falls if any, in terms of functional, performance, environment parameters and the life of the equipment and their effect on the airsystem where such equipment are used. TAA shall provide airworthiness coverage to the extent of addressing the integration aspects.

iii. The Main contractor shall inform the concerned service HQ of such shortfalls and the implications of using such equipment

1.5.12 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 Organization within India and who is a Design Approved Organization & shall be able to perform the responsibilities of an Initial Airworthiness Approval Holder.

1.5.13 Transition into Production

i. Manufacturing of airborne stores shall be taken up by a production agency approved under Production Approved Organization Scheme (PAOS) of DGAQA.

ii. All the necessary Jigs, Fixtures, Tools, Testers and processes required for Series Production shall be identified, developed by the Production Organization of the airborne stores and approved by DGAQA.

iii. Sealing of Standard of Preparation (SOP) has to be carried out before transition from Development to Production. DGAQA/Quality assurance agencies from User Services shall be Authority Holding Sealed Particulars (AHSP).

iv. 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.

v. 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.

vi. Production Transition before issue of PC/TA/LOA : 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/LOA. 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/LOA. The provision may be adopted on case-by-case basis depending on the maturity of the product. The liabilities arising out concurrent production before issue of PC/TA/LOA solely lies with the production organization.

1.5.14 Production

i. 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.

ii. Quality Assurance aspects during production shall be ensured by DGAQA as per the Quality Assurance Plan mutually agreed between DGAQA and Production Agency.

iii. **Production Acceptance test and Periodic Quality Test**: Main Contractor shall conduct the necessary tests on the Airborne stores produced with the involvement of relevant stakeholders. In addition Periodic Quality Test during production shall be carried out at defined interval, wherever applicable, as stipulated by DGAQA in the QAP.

iv. **Certificate of Airworthiness (CoA):** DGAQA shall issue a CoA in the form of Release Note to each Airborne stores manufactured by the Main Contractor conforming to a Type Approval/IMTSOA/LoA.

v. 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.

vi. **Deviations** :Deviations in the production during Design & Development phase and during the Limited Series Production phase shall be addressed by DGAQA or by CEMILAC, if referred to by DGAQA. In which case the decision of CEMILAC shall be treated as final. Deviations during the Series Production Phase shall be addressed by DGAQA.

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

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

ix. **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 specific, 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 Progressive/ Incremental Clearances

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

1.7 Right to use of data

i. CE(A) reserves the right to circulate for Government of India purposes, data contained in any of the reports, tests relating to the design of the airsystem/airborne store that may be undertaken on the Government’s behalf. This does not include, Patented data, Algorithms, Intellectual Property Rights data.

1.8 Intellectual Property Rights Violation

i. It is the responsibility of the Main Contractor to ensure that rules protecting the Intellectual Property Rights (IPR) are not violated in any manner whatsoever.

i. CEMILAC shall not be held liable for IPR violation by the applicants seeking airworthiness clearances, Certificates and Approvals from CEMILAC, for the developed products.

Chapter 2 - LICENSED PRODUCTION OF AIRSYSTEMS AND AIRBORNE STORES

2.1 Introduction

i. There may be instances where there is a license agreement between OEMs of Airsystems / Airborne Stores (Foreign/Indian) and the Indian production organizations for license production of such products in India. The policies 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 organization to be designated as the executor of the License agreement, will be referred to as "Licensee".

2.2 Availability of MTC / TA

i. The Licensor shall be in the possession of the Military Type Certificate or equivalent document for the Airsystem or the Type Approval or equivalent document for the airborne store that is to be produced under License .

ii. 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.

iii. TAA may be associated in the negotiation during licence agreement and in familiarization process keeping future modifications and upgradations in view.

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

2.3 Organization Approvals

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

2.4 First Article Evaluation

i. 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

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

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

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

2.6 Certificate of Airworthiness (CoA):

i. DGAQA shall issue a CoA in the form of appropriate Release Note/ Inspection Note to each Airsystem/airborne stores manufactured by the licensee conforming to a Military Type Certificate/TA or equivalent.

2.7 Changes to Standard of Preparation

i. The Licensee shall retain the same list of suppliers for manufacturing of the Airsystem/ airborne store as held by the licensor at the time of procuring the MTC / TA.

ii. 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 stake holders.

2.8 Indigenous substitution

i. Indigenous substitution is permitted. Part 2 Chapter 12 is applicable.

2.9 Design Modifications:

i. All Design Modifications introduced by the licensor in the form of mod leaflets, bulletins, change notices shall be addressed in Local Modification Committee (LMC).

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

2.10 Production Deviations

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

2.11 Continued and Continuing Airworthiness Support from Licensor

i. The Licensee to ensure in the License agreement that all the necessary documents required for ensuring Continued and Continuing Airworthiness of the airsystem/airborne store are made available during the product life cycle.

2.12 SOP Updation

i. The Licencee shall update the SOP of the Airsystem/airborne stores for the Modifications incorporated, in consultation with CEMILAC.

2.13 Role of Licensor

i. The role of licensor in Configuration Change Process(CCP) and in the addressing of production deviations shall be addressed during the TOT.

ii. In case the licensor coverage for the above is not available. The same shall be addressed through a Local Technical Committee(LTC).

Chapter 3 - BOUGHT- OUT AIRSYSTEMS AND AIRBORNE STORES

3.1 Introduction

i. Bought out Airsystems and Airborne stores are those which Government of India/PSUs/ Private organizations may, buy from foreign companies (Supplier) for Indian Military applications. The policy for such cases of buying Military Airsystem and airborne stores are explained below.

3.2 Availability of MTC / TA and CoA

i. The Supplier shall be in the possession of the Military Type Certificate(MTC) / equivalent document for the Airsystem 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.

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

iii. TAA may be associated in the negotiation during procurement, to ensure that all the necessary documents required for future modifications/Upgradations are included in the requirements.

iv. Any modifications to the initial Certified Configuration of the Airsystem 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

i. Necessary documents shall be made available for TAA to provide Technical Airworthiness coverage for Modification/upgradation of Airsystems & 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

i. TAA shall provide Continued Airworthiness coverage for the bought out Airsystems / Airborne Stores as per policy provisions provided in Part 2 Chapter 4 on Continued and Continuing airworthiness.

ii. Procurement contract shall include supply of all necessary documents such as Sevice Bulletins, Servicing Instruction, Alert Notices etc released by OEM as a part of continued airworthiness activity of Airsystem / Airborne stores during its Operational life.

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

3.5 Continuing Airworthiness Support

i. It is the responsibility of the User Services/Main Contractor to ensure that all the necessary documents required for ensuring Continuing Airworthiness of the Airsystem/airborne stores being procured are included as part of the Contract.

3.6 Customer Furnished Equipment/Buyer Nominated Equipment (CFE/BNE)

i. For use of CFE/BNE for integration on a Bought Out Airsystem, the integrator to follow the provisions of Part 2 , Chapter 1, Section 1.5.11

3.7 Civil certified aircraft for Military use

i. Civil certified airsystem/airborne store for military application shall follow the provisions detailed in Part 2 Chapter 9.

3.8 Gifted Airsystems/ Airborne Stores

i. Airsystem/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:

i. An Airsystem 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 point of time over its entire operating life. An Airsystem 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 the philosophy of ensuring airworthiness in operational scenario through the process of Continuing and Continued airworthiness.

4.2 Continuing Airworthiness

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

ii. The continuing airworthiness shall be achieved by

   a. Periodic servicing and maintenance of the Airsystem& airborne stores by crew / organizations of user services as per the OEMs manual.
   b. The servicing and maintenance of the Airsystem& airborne stores by crew / organizations of main contractor.
   c. The servicing and maintenance of the Airsystem& airborne stores by third parties other than the main contractor or the user services.
   d. Periodic review of the reliability of the Airsystem/airborne store.

iii. In order to carry out continuing airworthiness, the main contractor shall :

   a. Incorporate all the servicing and maintenance requirements at the time of initial airworthiness.
   b. Provide all necessary TTGEs and calibration schedules.
   c. Provide technical publications with proper illustrations
   d. Provide adequate training material with regular SOP updates.

iv. To ensure that continuing airworthiness is incorporated properly the user services shall:

   a. Have proper provisioning mechanisms and process for stocking and storage of all spares & material required for servicing and maintenance
   b. In addition to carrying out scheduled maintenance and servicing as per the OEM approved schedules, the services have to ensure that the all the Servicing Instructions (SI), Special Technical

Instructions(STIs)issued by OEM/TAA are implemented on the fleet.

c. Train, evaluate and certify all maintenance crew by OEM or user Training Centers.

d. 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.

e. Carry out adequate audits to ensure that the continuing airworthiness organizations are carrying out activities properly

f. To ensure that the airworthiness of in-service aircraft is managed correctly, the service headquarters shall form a Continuing Airworthiness Management Organization (CAMO) within the aircraft operators organizational structure

v. The maintenance can be carried out by third party organizations that have a Maintenance Organization Approval under Maintenance Approved Organization Scheme (MAOS).

vi. The user services shall follow well documented, airsystem specific, day-to-day inspection/checking, snag rectification procedures of the services to ensure that, at any given time the airsystem is airworthy to undertake flying.

4.3 Continued Airworthiness:

i. Continued Airworthiness covers,

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

b. All tasks that are carried out to upgrade the existing in-service airsystems to enhance its usefulness and capability and to also address in-service obsolescence.

ii. TAA shall provide Continued Airworthiness coverage to in-service airsystems.

4.3.1 Failure/Incident Reporting

i. 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.

4.3.2 Service Instructions

i. The main contractor shall, with TAA approval, 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

i. The main contractor shall have an obsolescence management plan to mitigate and inform services to stockpile stores or procure alternates for stores that may face obsolescence.

4.3.4 Life Extension

ii. If any Airsystem 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.

4.4 Modifications

i. For airsystems and airborne stores undergoing modification, the main contractor shall establish means by which the production processes are evaluated and controlled such that each product meets the airworthiness requirements for the specific configuration without violating the Initial airworthiness approval.

4.4.1 Local Modification Committee(LMC)

i. A Local Modification Committee (LMC) shall be constituted to address the In-Service modifications carried out on Airsystems and Airborne Stores.

4.4.2 Minor Modification by the User services

i. Minor modifications not affecting Strength, Safety, Reliability, Interchange-ability, Functionality and Operational effectiveness may be carried out bythe serviceswith the Clearance from the designated authorities within the User Services. TAA and the Maintenance organisations of the respective user services shall be informed of the modifications. Proper record keeping of the modifications carried out is the responsibility of the User Services.

4.4.3 Major Modification by the User Services

i. Major Modification on Indigenously/licensed produced airsystem/airborne store by the User service is permitted under the following conditions.

a) The unit of the User Services undertaking the modification shall demonstrate competence within the scope of the modification to CEMILAC, leading to Design Organisation Approval.

b) The modification proposal shall be approved by the Type Certificate holder/Licencee, CEMILAC and DGAQA.

c) The User Services to ensure that the Type Certificate/Type Approval holder or the Licencee, shall agree to collaborate with the User services to provide all necessary information and ensures to discharge of all obligations for continued airworthiness of the changed product.

4.5 Upgradation

i. Upgrading the in-service airsystem shall be taken up by the OEM or by any third party organization that has a military design organization approval.

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

iii. The 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 the user QA, as per the specification approved by CEMILAC.

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

vi. Flight test plan shall be approved by CEMILAC and undertaken by the user.

vii. The upgrade will be 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.

viii. The contractor shall update the SOP and provide additional publication wherever necessary to the user services.

Chapter 5 - FLIGHT TESTING OF AIRSYSTEMS AND AIRBORNE STORES

5.1 Introduction

i. Every Airsystem under development, production, modification or in-service upgradation has to undergo flight testing to validate the design, to obtain the actual performance of the Airsystem and to ensure its airworthiness & safety.

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

5.2 Flight Testing Platform

i. Flight testing shall to be carried out on an Airsystem registered under Indian Military Register with the User Services or which has been issued with a Military Tail Number.

ii. 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 airsystems for military applications, the registration shall be obtained from relevant branch of user services.

5.3 Flight Testing Agencies

i. The flight test department of the main contractor/Services/Service authorized Flight Testing agencies are responsible for the flight testing of Airsystems and airborne stores.

5.4 Flight Testing Personnel

i. Chief Test Pilot (CTP)/Head of the Flight Testing Agencies and crew authorized by them are the responsible personnel to undertake the flight testing. Such authorization letter/certificate may be provided to CEMILAC.

5.5 Air Space for Flight Testing

i. Flight testing shall be carried out in Air space designated to undertake military Flight testing activities.

5.6 Flight Test Schedule

i. The Flight test schedule for each sortie shall be prepared by the flight testing agency in consultation with CEMILAC.

5.7 Flight Test Instrumentation

i. Flight testing shall be carried out on an instrumented platform. The flight testing equipment shall be calibrated. The instrumentation scheme shall be approved by CEMILAC.

5.8 Clearances for undertaking Flight Testing

i. Flight testing of Airsystem stores shall be under taken based on Clearances issued by Technical Airworthiness Authorities (CEMILAC& DGAQA).

ii. For development flight testing CEMILAC shall issue Certificate of Flight Trials in the form of Flight Clearance Note (FCN). The FCN shall be prepared by the Main Contractor and Approved by CEMILAC.

iii. CEMILAC shall clear the Flight Plan Coordination Memo (FPCM)/ flight test schedule of individual sorties. The FPCM shall be prepared by the Flight test agency with the involvement of the Main contractor and approved by CEMILAC.

iv. 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.

v. DGAQA shall issue Safety of Flight through Form 1090 for undertaking flight testing for airsystem/airborne store.

5.9 Bulk Clearance

i. Bulk clearance for a series of flight testing may also be authorized by CEMILAC, if there is no change in the aircraft SOP and cleared flight envelope.

5.10 Flight Test Report

i. Flight data analysis for individual sorties and snag rectification work done report shall be completed before seeking clearance of the next sortie.

a) For development flight testing, copies of the debrief notes and flight data/analysis records of individual flights shall be forwarded to CEMILAC by the Main contractor.

b) For Flight testing by the User services, evaluation reports at the conclusion of every stage of evaluation and a consolidated report after the completion of the evaluation shall be forwarded to CEMILAC by the user services.

Chapter 6 - UNMANNED AIRCRAFT SYSTEMS

6.1 Introduction

i. 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 policy on UAS pertains to operation of military UAS in segregated airspace only.

6.2 UAS Certificationapplicability

i. Not all UAS warrant Airworthiness Certification. UAS shall be certified based on All Up Weight (AUW), Impact energy in both unpremeditated descent scenario and loss of control scenario, Range, Altitude of operation and Complexity/Level of autonomy, as applicable.

6.3 Operations

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

6.4 Certification Policy

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

i. Policy on ab-initio design and development of UAS shall follow the provisions provided in Part 2 chapter 1 with the following additional specific provisions.

ii. The main contractor shall carry out the criticality classification of systems/sub-systems/LRUs of UAS. 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 during the regular series production stage.

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

iv. GOS may be further classified in to GOS (Primary) & GOS (Secondary). GOS (Primary) consists of data link used for controlling the operation of Air Vehicle and rest of the GOS is classified as GOS (Secondary).

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

6.4.2 Policy on Bought out UAS

i. Policy on Bought out UAS shall follow the provisions provided in Part 2 Chapter3 with the following additional specific provisions.

ii. 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 Policy on License Produced UAS

i. Policy on License Produced UAS to follow the provisions provided in Part 2,Chapter2with the following additional specific provisions.

ii. The Quality assurance during License Production maybe provided by the internal QA of Licensee with the authorisation from DGAQA.

6.5 Continued and Continuing Airworthiness

i. Policy on Continued and Continuing Airworthinessof UAS to follow the provisions provided in Part 2 Chapter 4.

6.6 Research UAS

i. Research or Technology Demonstrator UAS that will strictly not be inducted into the services, shall follow the provisions given in Part 2, Chapter 8.

Chapter 7 - Air Launched Missiles (ALM)

7.1 Introduction

i. Air Launched Missiles (ALMs) are treated as an Airsystem in this policy document. Airborne armament stores other than ALMs are treated as Airborne Stores.

ii. ALMs only are covered in this chapter.

iii. 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.

iv. This chapter covers the policy 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 Policy for Airworthiness Certification of Air Launched Missiles (ALMs)

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

- Ab-initio designed & developed ALMs
- Bought out ALMs
- License Produced ALMs

7.2.1 Policy for Ab-Initio Designed & Developed ALMs

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

i. 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.

ii. Complete ALM shall be certified as per the provisions applicable for Airsystem 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.

iii. 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 TAA. 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.

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

7.2.2 Policy for Bought-out ALMs

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

7.2.3 Policy for License Produced ALMs

i. Military airworthiness certification policy on License produced ALMs shall be as per the provisions provided in Part 2, Chapter 4 of this policy.

7.2.4 Policy for Continued and Continuing Airworthiness for All Types of ALMs

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

Chapter 8 - RESEARCH AIRSYSTEMS AND AIRBORNE STORES

8.1 Introduction

i. Any Airsystems/airborne store, that is designed and developed by a development agency either on their own or as a requirement from the services, 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 Airsystems/Airborne Stores or Technology Demonstrators.

8.2 Declaration

i. The man contractor shall provide the technical details of the project to the TAA and shall declare that the proposed Airsystem/Airborne Stores shall be developed for research / experimentation / technology demonstration purpose only and shall not be delivered to the User services for operations.

8.3 Airworthiness Certification Policy

i. There are two approaches,
   a) TAA shall provide airworthiness coverage upon request from the Main Contractor or the Services. (OR)
   b) The Main contractor shall perform the role of TAA during the development through designated personnel within the organization.

8.3.1 Airworthiness coverage by TAA

If TAA has to provide Airworthiness coverage, the following shall be applicable.

i. Research Airsystems/airborne stores or Technology demonstrators will be treated as Ab-initio development, and provisions detailed for Ab-initio development of Airsystems/Airborne Stores as given in Part 2 Chapter 1 is applicable.
ii. However, considering the limited usage and life of the research Airsystems/Airborne Stores, CEMILAC may adapt the certification requirements for design and test adequacy suitably.
iii. 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.

8.3.2 Airworthiness coverage by Main Contractor

If the Main Contractor 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.

i. The airsystem shall be registered under the Indian Military Register, issued with a suitable tail number.
ii. The airsystem shallbe installed with an approved Flight Data Recorder.
iii. Flight testing shall be carried out by Experimental Test pilots of the Flight testing department of the main contractor or the Services.
iv. Flight Testing shall be carried out in a segregated and designated airspace only.
v. No part of the airsystem and its airborne store shall be salvaged or reused for other airborne application, outside the fleet of the research airsystem.
vi. After the completion of the programme objectives, the LRUs may be colour banded with appropriate 'NOT FOR FLIGHT' tags.
vii. The TAA may be informed of the programme status/progress.
viii. Any failures/incidents shall be reported to TAA.

Chapter 9 - CIVIL CERTIFIED MILITARY AIRCRAFT

9.1 Introduction:

i. 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 policy provisions shall be followed for the Airworthiness assurance of such Aircraft.

9.2 Airworthiness Policy

i. If the acquired Aircraft is Type Certified by the Civil Certification Agency of the country of origin and is used by the Military Services, if there are no modifications to the certified configuration, the aircraft shall be inducted, operated and maintained by the services as per the documentations provided by the OEM. Any 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.

ii. 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.

iii. 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 Part2 Chapter 4 of this document.

iv. 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).

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

Chapter 10 - EXPORT OF INDIGENOUS AIRSYSTEMS AND AIRBORNE STORES

10.1 Introduction

i. CEMILAC certification along with DGAQA clearance for indigenously developed military Airsystems & Airborne Stores may be mandated as a requirement for exports/selling to foreign country.

10.2 Clearances from MoD

i. In the case of exports from the India to another country, when it is in the interests of the Indian Government/ MOD, CEMILAC may support the certification of Indigenously developed military Airsystem & Airborne stores on request. However, necessary “approvals” for export of subject item from Ministry of Defence (MoD) shall be obtained by the Vendor.

10.3 TAA involvement

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

10.4 Approach for TAA Approval

i. The contractor shall follow the mutually agreed Provisions provided in Part 2 Chapter 4forAb-Initio Development and Production of Airsystems & Airborne Stores to obtain approval from TAA to facilitate exports.

10.5 Clearance for operation:

i. It is the responsibility of the main contractor to obtain the necessary clearances from the competent authority of the country for operation of the Airsystem/Airborne Stores.

Chapter 11 - ORGANIZATION APPROVALS

11.1 Introduction

i. To ensure that, the organizations taking up Design, Development, Production and Maintenance of AirSystems/Airborne Stores, possesses the requisite capability to undertake such activities, organization approval schemes are established.

ii. Three types of organization approval schemes are proposed. An organization involved in or intended to take up Design and Development activities of Military AirSystems and Airborne Stores shall be assessed through a design approved organization Scheme. Organizations involved in Production of AirSystems and Airborne Stores shall be assessed through a Production approved organization Scheme. Organizations involved in Maintenance of AirSystems and Airborne Stores shall be assessed through a Maintenance approved organization Scheme. It is mandatory that the organization shall possess the necessary approvals prior to taking up the respective activities.

iii. 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 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 APPROVED ORGANIZATION SCHEME (DAOS)

i. The Design Approved Organization Scheme (DAOS) is a mechanism by which the design competence of an Organization is assessed. Two categories of Design Approved Organizations schemes are proposed, namely AirSystem Design Organizations (ASDO) and Design Organizations (DO). Approval under DAOS is subject to adherence with the established procedures and rules governing the responsibilities and privileges for Military Design Approved Organizations**.**

AirSystem Design Organization (ASDO)

i. ASDOs are organizations involved in Design & Development, Repair and Modification of an Airsystem. ASDO shall be responsible for the overall design or through-life configuration management of the design of the Airsystem, and for co-coordinating the design and integration of the airborne stores designed by other Design Organizations.

Design Organization (DO)

ii. DOs are organization involved in the Design & Development, Repair and Modification of airborne stores used in an Airsystem. DO shall be responsible for the through-life configuration management of the designed airborne stores.

11.3 Policy for Design Approved Organization Scheme (DAOS)

i. Organizations involved in Design & Development, Repair and Modification of Airsystems shall have an AirSystem Design Organization approval for the defined scope of work, from CEMILAC under DAOS for carrying out such activities for which CEMILAC has been identified as Airworthiness Certification Authority

ii. Organizations involved in Design & Development, Repair and Modification of airborne stores used in an Airsystem shall have a Design Organization Approval (DOA) for the defined scope of work, from CEMILAC under DAOS for carrying out such activities for which CEMILAC has been identified as Airworthiness Certification Authority.

iii. CEMILAC shall accord Initial Airworthiness Approvals for an Airsystem /airborne stores to an Approved ASDO/DO under DAOS.

iv. The ASDO/DO shall have a Design Organization Exposition (DOE)/Handbook with sufficient information on relevant procedures for Design & Development and Modification of AirSystems& Airborne stores that is relevant to the Terms of Approval sought for their operation

v. The ASDO/DO shall only operate within the scope of their approved Design Organization Exposition (DOE)/Handbook as their competence has been assessed by the CEMILAC and their Terms of Approval will contain the relevant provisions.

vi. CEMILAC may issue Advisory Letter, Corrective Action Requirement, Warning Notice, Partial suspension / withdrawal of approvals and Approval Revocation to the approved Organizations as part of Enforcement actions to ensure the highest level of compliance with approved regulations.

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

viii. 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 one of the Chief Resident Engineers/Regional Directors of RCMA or Group Directors of 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 APPROVED ORGANIZATION SCHEME (PAOS)

i. The Production Approved Organization Scheme (PAOS) is a mechanism by which the competence of an Organization to carry out production of Airsystems and Airborne Stores is assessed. Two categories of Production Approved Organizations schemes are proposed, namely Airsystem Production Organizations (ASPO) and Production Organizations (PO). Approval under PAOS is subject to adherence with the established procedures and rules governing the responsibilities and privileges for Military Production Approved Organizations

AirSystem Production Organization (ASPO)

i. ASPOs are Organizations involved in Manufacturing and Repair of an Airsystem. ASPO shall be responsible for the overall Manufacturing of the Airsystem, and for co-coordinating the integration of the airborne stores manufactured by other Organizations.

Production Organization (PO)

ii. POs are Organization is involved in Manufacturing and Repair of airborne stores used in an Airsystem. PO shall be responsible for the through-life configuration management of the produced airborne stores during manufacturing

11.5 POLICY FOR PRODUCTION APPROVED ORGANIZATION SCHEME (PAOS)

i. Organizations involved in Manufacturing of Military Airsystems shall have a AirSystem Production Organization approval from DGAQA under PAOS for carrying out such activities for which DGAQA has been identified as Quality Assurance Authority.

ii. DGAQA shall issue Release Note/ *Inspection Note* for an Air System only to a Production Approved ASPO.

iii. Organizations involved in Manufacturing and Repair of airborne stores used in an AirSystem shall have a Production Organization approval (POA) from DGAQA under PAOS for carrying out such activities for which DGAQA has been identified as Quality Assurance Authority.

iv. The ASPO/PO shall have a Production Organization Exposition (POE)/Handbook with sufficient information on relevant procedures for Manufacturing and Repair of AirSystems &Airborne stores that is relevant to the Terms of Approval sought for their operation.

v. The ASPO/PO shall only operate within the scope of their approved Production Organization Exposition (POE)/Handbook as their competence has been assessed by the DGAQA and their Terms of Approval will contain the relevant provision.

vi. DGAQA may issue Advisory Letter, Corrective Action Requirement, Warning Notice, Partial suspension / withdrawal of approvals and Approval Revocation to the approved Organizations as part of Enforcement actions to ensure the highest level of compliance with approved regulations.

11.6 MAINTENANACE APPROVED ORGANIZATION SCHEME (MAOS)

i. There are two Types of Maintenance Organizations namely Airsystem Maintenance Organizations (ASMO), and Maintenance Organizations (MO) involved in Maintenance of airsystems and its associated airborne stores. The Maintenance Approved Organization Scheme (MAOS) is a mechanism by which the competence of an Organization can be assessed. Approval under MAOS is subject to adherence with the established procedures and rules governing the responsibilities and privileges for Maintenance Approved Organizations.

11.7 Airsystem Maintenance Organization (ASMO)

i. ASMOs are Organizations involved in Maintenance of an AirSystem. ASMO shall be responsible for the overall Maintenance of the Airsystem, and for co-coordinating the overhauling &maintenance of the airborne stores maintained by other Organizations**.**

11.8 Maintenance Organization (MO)

i. Organization is involved in Maintenance of airborne stores used in an Airsystem. MO shall be responsible for the through-life configuration management of the Maintenance of airborne stores installed in an Airsystem**.**

11.9 Policy for Maintenance Approved Organization Scheme (MAOS)

i. Organizations other than Military Services involved in Maintenance of Military AirSystems shall have an Airsystem Maintenance Organization approval from DGAQA under MAOS for carrying out such activities for which DGAQA has been identified as Quality Assurance Authority.

ii. Organizations involved in Maintenance of airborne stores used in an Airsystems hall have a Maintenance Organization approval (MOA) from DGAQA under MAOS for carrying out such activities for which DGAQA has been identified as Quality Assurance Authority.

iii. The ASMO/MO shall have a Maintenance Organization Exposition (MOE)/Handbook with sufficient information on relevant procedures for Maintenance &Overhauling of Airsystems & Airborne Stores that is relevant to the Terms of Approval sought for their operation.

iv. The ASMO/MO shall only operate within the scope of their approved Maintenance Organization Exposition (MOE)/Handbook as their competence has been assessed by the DGAQA and their Terms of Approval will contain the relevant provisions.

Chapter 12 - INDIGENOUS SUBSTITUTION OF AIRBORNE STORES

12.1 Introduction

i. Indigenous Substitution chapter mainly deals with development, prototyping, testing, evaluation and clearance of an airborne store as a replacement of the existing airborne stores procured from foreign sources.

ii. Substitution of an indigenously developed airborne stores with another indigenous airborne store shall be in accordance with the policy provisions given in Chapter-1, Part-II on Ab-initio developed airborne stores.

iii. For the purpose of indigenous substitution, assembled components (like PCB assembly, Power Supply modules etc) also shall be treated as an airborne store and shall be handled using these policy provisions.

iv. For Indigenisation of complete Air Systems, the provisions provided in chapter 1, Part-II shall be followed.

12.2 General Provisions

i. 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.

ii. On obtaining necessary approvals from TAA, Indigenized airborne store has to be listed as an alternate item in the Standard of Preparation (SOP) of the Air System on which the indigenized store has to be used.

12.3 Indigenization Agencies (IA)

Indigenous substitution can be taken up by any agency i.e, Public Sector, Private Sector, Government Agencies or the organizations within the User Services such as BRDs, NAYs etc., hereinafter referred as the Indigenization Agencies (IA).

12.4 Responsibilities of Indigenization Agencies

i. The IA 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 IA shall ensure that the vendors comply with the airworthiness certification requirements.

ii. The IA shall ensure that there is no violation of Intellectual Property Rights (IPR) & related issues.

iii. The Indigenisation agency shall ensure that Specifications/ Qualitative Requirements/Service Requirements for the airborne store to be indigenized are available.

iv. IA shall ensure the availability of necessary test facilities at all the applicable levels.

v. IA shall identify the AHSP for the airborne store.

12.5 Local Type Certification Committee (LTCC)

LTCC shall be constituted with relevant stakeholders and shall assess & categorize the criticality of the item. Upon consideration, LTCC shall refer the critical airborne stores to CEMILAC for clearance. Non-critical airborne stores shall be cleared by LTCC itself.

12.6 Classifications of Airborne Stores

i. LTCC is empowered to classify airborne stores as Critical and Non-Critical. The approach to airworthiness clearance including the extent of testing would depend on the criticality of the airborne store.

ii. Critical: Airborne store, whose malfunctioning may affect safety, reliability, maintenance, interchangeability and operational effectiveness is called as a critical airborne store.

iii. Non-Critical: Airborne store, which is not classified as critical, is treated as non-critical.

12.7 Approach for Indigenous Substitution

i. For indigenous manufacturing and acceptance of airborne stores for which Technical Specifications, Qualification Test Procedure (QTP) and Production Acceptance Test (PAT) requirements are available, the policy provisions followed for license manufacture as given in chapter-2 shall be applicable.

ii. Airborne stores for which only Technical Specification is available, the required documents such as QTP, ATP etc need to be proposed by the indigenization agency and shall be finalized with the concurrence of CEMILAC.

iii. Airborne stores, for which no technical information is available, require major efforts from all agencies concerned to generate the required details for proceeding with their indigenization.

12.8 Airworthiness Certification Plan (ACP)

i. IA shall prepare an Airworthiness Certification Plan (ACP) bringing out the design & development details of the airborne store along with the involvement of TAA and other stakeholders at various stages. This plan shall be approved by CEMILAC. ACP shall also cover the details of the proposed Means of Compliance such as safety assessment, design reviews, analysis, simulation, inspection and testing like functional & qualification testing of subsystems/LRUs, rig Integration checks, ground & flight test as applicable on the proto type airborne store.

12.9 Quality Assurance Plan (QAP)

IA shall prepare a Quality Assurance Plan (QAP) bringing out the stages of development, QA roles, delegation related to the Air borne stores along with the involvement of TAA and other stakeholders at various stages. This plan shall be approved by DGAQA.

12.10 Development and Prototype Phase

i. Development of airborne store shall be carried out as per identified System Engineering Process leading to finalization of build standard and fabrication of proto types.

ii. Technical reviews at appropriate stages of development shall be conducted with the participation of relevant stake holders.

iii. IA shall establish a Process for Configuration Control and Defect Investigation during this phase.

12.11 Testing & Evaluation

Functional and Performance Testing

i. Adequate functional and perforce testing for the airborne stores shall be carried out at appropriate levels using testers / simulators and rigs, as applicable.

Qualification Testing

ii. Qualification test plan shall be proposed by the designer of the airborne store in accordance with the technical specification of the store. Comments of DGAQA may be considered before finalization of test schedule. The test plan shall be approved by CEMILAC

iii. Tests shall be carried out at an NABL/ Govt approved test House / Laboratory or the facilities recognized by the CEMILAC approved design agency.

Flight Testing

iv. In regard to airborne stores where flight tests are required for their evaluation, views of the end users shall be taken into consideration before finalizing the flight test plan.

12.12 Deviations

i. The deviations observed if any, during the course of indigenisation are to be discussed amongst representative of CEMILAC, DGAQA and the IA and if agreed to, the test plans needs to be amended accordingly.

12.13 Clearance:

i. Airworthiness clearance for the non-critical airborne stores shall be issued by the LTCC. The clearance for critical airborne stores shall be issued by CEMILAC.

12.14 Production:

i. IA shall produce the airborne store as per the Standard of Preparation released as a part of clearance process.

ii. Quality Assurance aspects during production shall be ensured by DGAQA.

iii. Production Quality Test / Acceptance Tests: IA shall conduct the necessary tests (PQT & AT) on the airborne store produced with the involvement of relevant stakeholders.

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

v. Modifications: Modifications to the approved SOP shall be handled through a Configuration Control Process (CCP) with relevant stakeholders by the IA. Procedure for modifications during production and in-service phase is addressed in Continued Air worthiness chapter of this policy.

12.15 Withdrawal of Clearance:

vi. 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 CEMILAC after due investigation with the involvement of DGAQA and IA.