# AIRWORTHINESS CERTIFICATION CRITERIA : EXTERNAL STORE INTEGRATION ON AIRCRAFT



FMEA, FMECA, SSA

Preliminary Design Review

(Aerodynamic, Structural & System)

Aerodynamic Configuration

CFD analysis & validation

Wind tunnel data

Material selection

Captive load estimation (Inertia, Aerodynamic & landing)

Generation of Experimental Drawings

Advanced Modification Information (AMI) Pre-requisite is Form-33A { IMTAR FORMS } Document is to evolved by the designer from component to system level based on guidelines as per MIL-STD-1629 etc.

To be reviewed with all concerned

This document is to be revised as and when following aspects are investigated / reviewed during design / after sorties or trials

Limitations based on analysis

Defect Investigation based on flight trials

	Estimation of Inertia &	Modal Analysis
•	Aerodynamic loads	GVT & Flutter analysis
	Weight & CG Estimation	Static load test
	Stress Analysis	Random Vibration test
		Shock test

#### Airworthiness Certification Plan

- Document is prepared by the designer based on the details stipulated in ASR / ASQR / PSQR issued by the user.
- Role of each certification centre is defined in work share released by CEMILAC

### Prototype Realization

Realization of prototype based on approved drawings, DAL & BOM

### Safety Of Flight Test (SOFT) / (LQT)

RV1 – Thermal Cycle – RV2 (Pre & Post)

Random Vibration test

Shock Test

GVT & Flutter analysis

EMI /EMC

Static load test

#### Integrated Design Review

Review of LQT/SOFT with all concerned

Structural /Aerodynamic/Electrical & Avionics Analysis



Issuance of Flight Clearance Certificate (FCC) for Carriage & Handling (Symmetric & Asymmetric configuration)

Issuance of the FCC (Form 100) from the airworthiness certification authority to the designer of the store for its integration on the proposed fighter aircraft.



Post Flight Analysis (PFA)

Results of Flight Trials are deliberated in PFA meeting with all the stakeholders to decide:

- Co-relation with analysis & flight data
- Go ahead for further trials
- PFA needs to be undertaken after each FTI sortie

Issuance of Flight Clearance Certificate (FCC) for Avionics Missile

Issuance of Flight Clearance Certificate (FCC) for Dummy Release

# Issuance of Flight Clearance Certificate (FCC) for Live Release

Issuance of the FCC (Form 100) after PFA of every FCC ensuring objectives are met

#### Design Change (if any)

• Changes to the design, if envisaged gets reviewed & absorbed as Project Slips against provisionally approved drawings

### Full Qualification Testing (QT)

- Full Qualification testing builds on the limited QT by adding environmental tests like Rain test, Fungus test, Sand & Dust test & Experimental Fatigue test.
- Full QT is required to be undertaken for the issuance of provisional clearance for the store.

Local Modification Committee (LMC)

Ratification of the MOD

Generation of Production (N-series) Drawings

- After ratification of MOD in LMC
- Conversion of Experimental Drawings to Production Drawings

#### Provisional Clearance (PC)

- Pre-requisite Form-12 (Certificate of Design), satisfactory user trial report
- Provisional Clearance to be issued by RCMA valid for 2 years extension for additional 2 years is given until Full QT is done.

## Type Approval (TA)

Pre-requisites Forms 29, 29A, 29B, 29C {IMTAR FORMS}

Compliance to Full QT

Issued by CEMILAC valid till 10 years

The type approval is issued after the Main Contractor submits the Type Record with all relevant documents, to the satisfaction of CEMILAC

Limited series production of the airborne store is undertaken after issuance of TA

## **Clearance for Service Use (CSU)**