



**Council of Scientific and Industrial Research
National Aerospace Laboratories
and
9 Base Repair Depot – Indian Air Force**



**Industry Interaction for
Avionics indigenisation, repair and overhaul**



9BRD

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INDIGENOUS REPLACEMENT OF AVIONICS SYSTEMS

Big Opportunity for Indian Electronics Development Industry to participate in indigenization of Avionics system development program along with Indian Air Force

Prelude

The project entails development of functional replacements of avionic aggregates of Mi-17 and Mig-29 aircraft fleets. Unlike the traditional approach of developing one to one replacement solution for each of the identified LRUs, the requirement is to identify a common hardware architecture by following Modular Open Source Approach (MOSA) for each of the LRUs and realize the LRU specific functionality through appropriate software control, if necessary. The aspect of the mentioned commonality of hardware is envisaged to be expanded and blended with other replacement solutions of technologically different aggregates in both immediate term and future.

The details of this grouping is tabulated below and the group wise composition of modules that can be potentially used to build the replacement hardware.

Opportunity at Hand

Group	Core Technology
I	Signal Processing & Data Acquisition
II	RF Signal Processing & Data Acquisition
III	Power Supply : Generation, Distribution ,& Protection
IV	A/D & D/A Conversion
V	Multifunctional Displays.
VI	Sensors
VII	Electromechanical
VIII	Hybrid

The Grand Design

Presenting the bigger picture first, it is our intent that we adopt a strategy for ensuring commonality of hardware for replacement solutions of technologically divergent aggregates, potentially across all fleets, and in this adopt to the extent feasible COTS technology, globally adopted Open VPX standards, and other Open standards. Towards ensuring this, through a consultative mechanism with research partner designated by IAF, we have divided all avionics aggregates into eight groups based on the core technology that drives each of the LRUs / SRUs.

CSIR-NAL will be the design consultant while executing this project. There are 15 aggregates of Mi-17 fleet and 42 aggregates of Mig-29 fleets to be indigenized. Once the prototype development is successfully developed, flight tested and certified the same would be fitted as a replacement system across all aircraft of the fleet

Mi 17 and
MiG 29 fleet

Total around 57 Systems

Build to Specifications

Indigenization of Avionics
system development program



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REPAIR AND OVERHAUL OF AVIONICS SYSTEMS

Opportunity for Indian Electronics Development Industry to participate in development of Repair and Overhaul (ROH) solutions for various avionics systems with Indian Air Force.

Prelude

The project will involve building ROH solution for 68 lines of avionics aggregates of Su-30 MKI, MI 17, An-32 and IL 76 / 78 using the standard PCB fault diagnostics procedures implemented in the form of Test Program Suites (TPS) on Automated Test Equipment (ATE) which mimics the role of a avionics system test bench and are built using PXI based modular instrumentation architecture.

The Grand Design

- The ROH setup for the identified LRUs across the fleets needs to be established at the fleet owning Base Repair Depots. Four Universal ATEs are to be built using PXI based modular instrumentation and LabVIEW software, an industry gold standard for Test & Measurement setup .
- The Test Program Suite (TPS) for executing the ROH task is to be built using the standard diagnostic strategies of Functional Testing (FT), In-Circuit Functional Testing (ICFT), Out of Circuit Functional Testing (OCFT), In Circuit Testing (ICT), and Boundary Scan Testing (BST).
- The ROH solution is to be built using a black box approach where in using a golden LRU (serviceable reference LRU) the necessary signals of the LRU along with their signal characteristics

is captured using the ATE setup and the generated data is used for the ROH / diagnostic task.

- The developed ROH technology needs to be deployed on the ATE in the form of a fully automated Test Program Suite (TPS). The TPS is to be so designed that the component level fault isolation of the aggregate is achieved with bare minimal intervention of the operator.
- As part of the process involved in formulating the ROH technology, the BoM of the aggregate needs to be developed and source of their supply or their commercial equivalent needs to be identified and supplied. .
- Facilities required for undertaking repairs and qualification work need to be identified and established at the owning depot complying to IPC 7711 / IPC 7721 standards which in turn should ensure that post execution of the repair tasks the repair work is MIL-STD-810 (ESS), MIL-STD-461 (EMI/EMC) compliant or is in conformance with compliance requirements specified in CEMILAC and DGAQA directives.
- There are 13 LRUs of An-32, 56 LRUs of Mi-17,IL-76/78 and Su-30 combined which has yearly arising of 100 units for repair on average.

Development of Repair and Overhaul (ROH) solutions for various avionics

Opportunity for Public, Private, MSMEs

PXI Based Modular Instrumentation Architecture



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**Date & Time : 8th Nov 2023, 2.00 PM
Venue : S R Valluri Auditorium, CSIR-NAL, Bengaluru**

Program Schedule

2.00 PM	Registration
2.15 PM	Welcome Address by 9BRD and NAL
2.30 PM	Indigenization Requirement of Avionics system by 9 BRD
3.00 PM	Repair and Overhaul(ROH) Requirement by 9 BRD
3.30 PM	Tea Break
3.50 PM	Presentation on the Qualification and Certification Requirement
5.00 PM	Discussion, Question Answers

[Registration](#)



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