

Terms of Reference Aging Aircraft Study

Objective

Identify the current state of need of "legacy" Naval Air Systems for inspection, repair and overhaul due to aging. Identify known mitigation opportunities for "legacy" systems, systems in either development or Limited Rate Initial Production (LRIP), and future Naval Air Systems along with critical timing and product insertion milestones. Link both the needs and the mitigation opportunities to Science and Technology (S&T) objectives for platforms, subsystems and processes in the current Naval Technology Plan and provide recommendations for: (1) Technology Transition across the board; (2) Naval technology planning; and (3) Product/process technology insertion opportunities for the future.

Background

Aircraft modernization opportunities are limited at best. Modernization budgets demand that a large percentage of our existing Naval Air Systems be operational for decades to come. Many of these platforms are experiencing difficulties (maintenance needs, both scheduled and unscheduled) due to structural fatigue, corrosion of structural components and wiring, subsystems aging, and technology obsolescence. This is exacerbated by the demand for introduction of new weapons and capabilities and recurring updates of the operational flight programs (computer hardware and software additions to capacity accounting for introduction of new operational capabilities; for example, sensors and weapons). A diminishing supplier base adds to maintenance and readiness concerns.

Total Ownership Costs are, in large measure, driven by Operations and Support (O&S) costs. Maintenance and training manpower issues, reduced modernization budget, and both higher Operating Tempo (OPTEMPO) and Personnel Tempo (PERSTEMPO) than ever seen before drive these, in turn. One further exacerbation is that virtually all of the present systems exist in a non-singular, paper-based database. Common practice is to repair on the basis of "build to print" versus "functional replacement." Conventional wisdom is that functional replacement can be very time consuming and expensive; the proven cases are where an open systems architecture do not exist.

Specific Tasking

It is prudent to examine the current state of affairs in the context of ongoing technology developments in the fields of Non-Destructive Inspection and Evaluation, modernized, structural, wiring and systems repairs or replacements, and open systems architecture on an opportunistic basis.

For the future, it would be prudent to examine the continued progress in: (1) Non-destructive Inspection (NDI) and Non-destructive Evaluation (NDE) technologies; (2) diagnostic and prognostic technologies; (3) relationships to open systems architecture; (4) improvements in defined (computer-based, single digital data base, solid geometry, three dimensional modeling) technology, manufacturing technology, training, automated work instructions, and remote liaison, or tele-maintenance, as portable to the maintenance environment; and (5) the benefits offered for all.

- a. Provide an "as-is" state of need for legacy-aging systems.
- b. Provide equivalent status and mitigation plans/opportunities for emerging systems.
- c. Determine current refurbishment/upgrade plans for these systems. Recommend appropriate changes to plan.
- d. Determine the relevant technologies and their readiness levels for immediate and time-phased transition to the Fleet.
- e. Determine the relevant technologies applicable to future readiness improvements; both for existing and planned systems, over a 20-year life cycle, including total asset management and tracking for sustainment.
- f. Determine candidate transition paths and recommended techniques for existing and future technology developments, including potential "business case techniques" related to the end objective.
- g. Suggest Acquisition and accompanying Logistics Reform Initiatives for the Department of the Navy to facilitate reduced Total Operational Costs.

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Study Administrator: Chief of Naval Research and NRAC Executive Director

Study Coordinator: Assistant Commander for Logistics, AIR-3.0, NAVAIRSYSCOM