Executive Summary

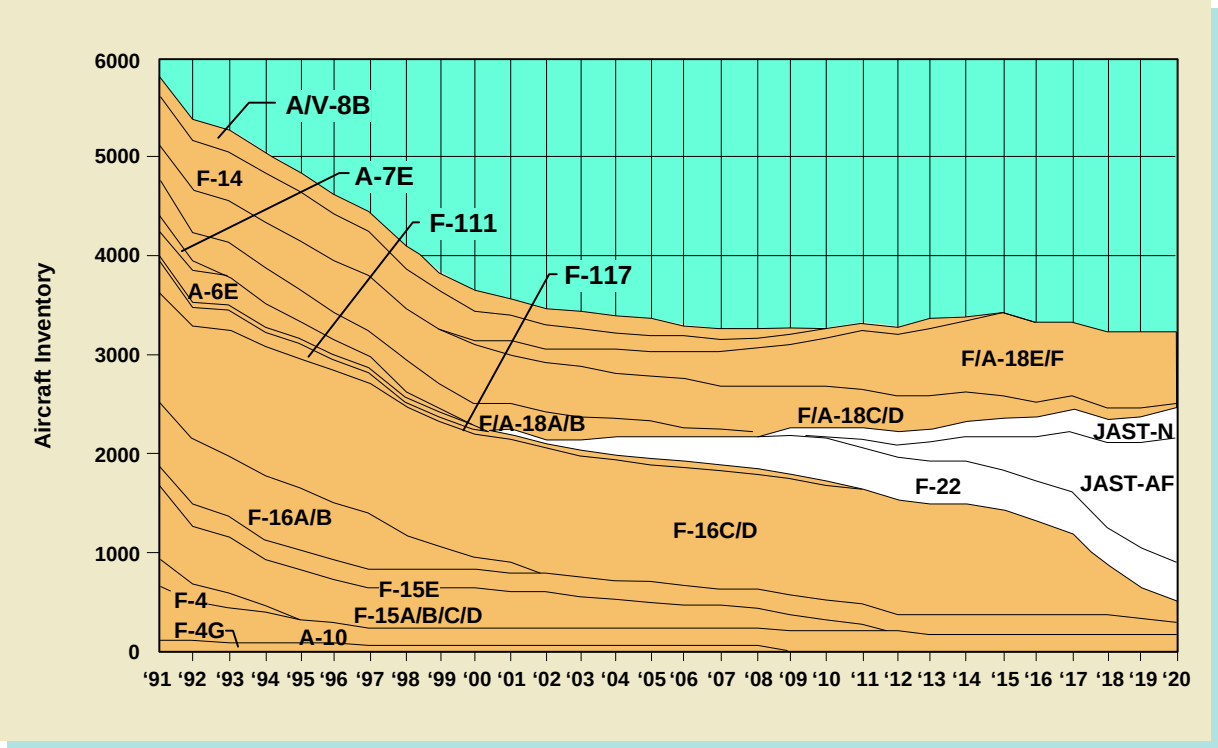
Open Systems Architecture for Legacy Aircraft (OSALA)

PNUM 28

Background: Affordability is the key challenge for upgrading our legacy military weapon systems. Lockheed Martin has initiated a comprehensive effort in support of the Open Systems Joint Task Force (OS-JTF) to assess and demonstrate the benefits of an open system approach to legacy military systems. This program addresses affordable weapon system design, manufacture, support and transition of commercially-based open system approaches to legacy weapon systems, while exceeding the weapon system mission needs and requirements.

Our Nation's warfighters are in need of modern weapon systems that are not only interoperable and adaptable, but can be rapidly changed to meet evolving mission needs. Our forces are capable, but their electronic systems are rapidly aging, becoming quickly outdated, and rapidly reaching obsolescence. Our warfighters need shorter delivery times to field and change their weapon systems. This can be made possible in part through small incremental upgrades, and through the introduction of an open systems approach.

In the post 2000 era, legacy aircraft will experience world wide deployment in support of our active front-line forces. The tactical fighter fleet is aging rapidly in large numbers, with the projected average age of all fighters in the USAF and Navy inventories estimated to be 18 years by the year 2010. This will not improve until the Joint Strike Fighter begins deployment in significant numbers. The majority of our Nation's tactical and transport airlift forces through 2020 will be legacy aircraft as shown below.

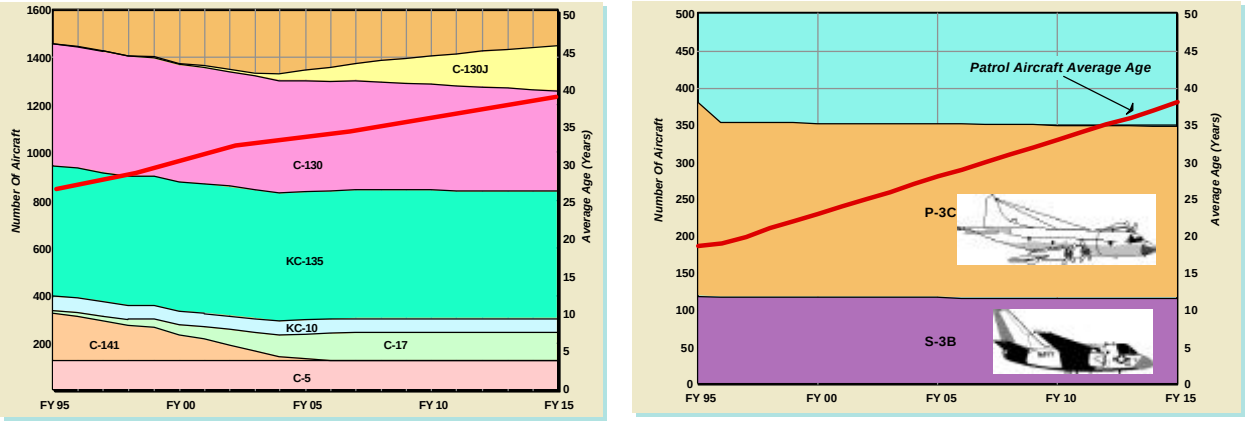


A large number of successful military systems, many of which can benefit from an open systems approach were placed into production during the 1980s and 1990s. The benefits of an open system approach can lead to significant cost savings to modernize inventory aircraft avionics.

Clearly, avionics on these aircraft will require modification during the next decade if these weapon systems are to maintain their readiness status. Future modifications require effective communications with global forces, concurrent use of weapons, compatibility with electronic combat systems, up-to-the-minute access to off-board intelligence, and an effective means of cooperative training among forces. These capabilities must be inserted affordably and within the cost or schedule constraints imposed by the military budget.

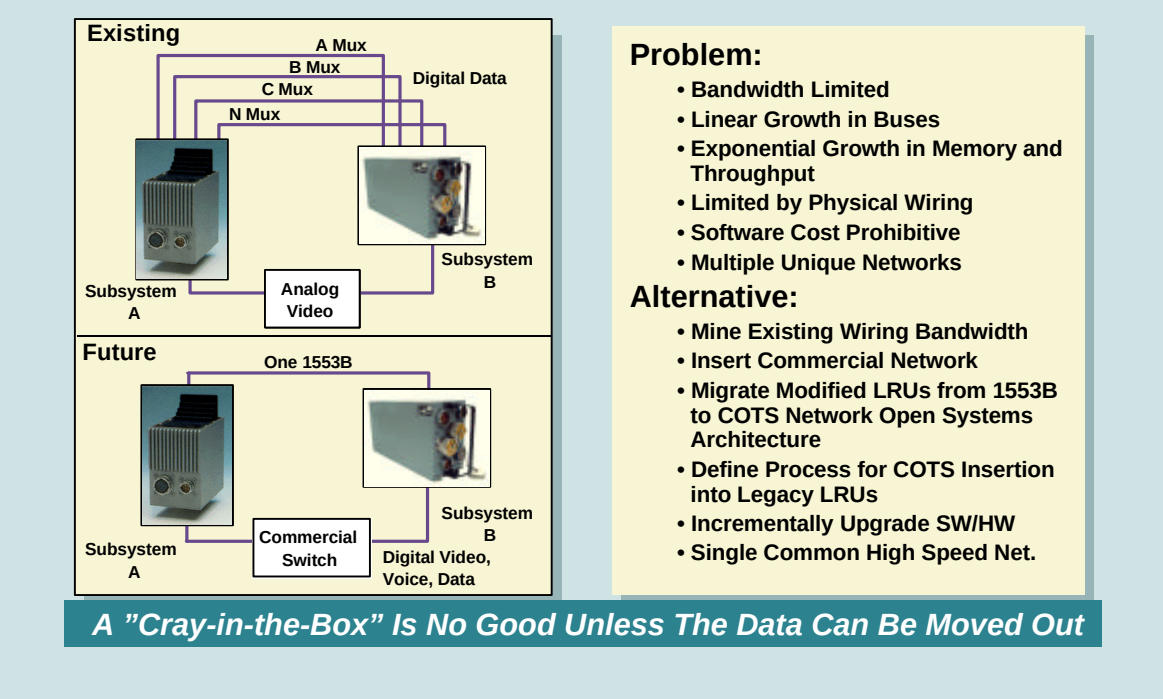
The defense industry realizes that commercial technology by itself is not a panacea for saving money. The challenge is insertion of commercial systems and finding the proper mix of commercial and military systems for

modernization of legacy weapon systems. Specifically, Lockheed Martin is defining the process to evolve federated weapon system avionics to a virtually integrated avionics system, without impacting the infrastructure or functional integrity of the existing avionics system.



The Majority of U.S. Tactical and Strategic Forces Through 2020 Will Be Legacy Aircraft

Lockheed Martin is currently engaged in defining a candidate open system architecture to replace fielded MIL-STD-1553 or federated architecture. Lockheed Martin is also examining the use of commercial high speed network standards to replace the aging MIL-STD-1553B standard. This can be done without significant changes to the production weapon system infrastructure or expensive changes to wiring harnesses, called "Group A" changes. This will significantly lower initial retrofit costs, and shorten the cycle time to modernize an existing weapon system.



An Open Systems Approach Can Be Used To Replace Federated Architectures Without Significant Cost of "Group A" Wiring Modifications to Legacy Aircraft

Lockheed Martin is also investigating wireless network technology for ground support operations, based on commercial airline industry designs and standards. This is a critical open systems approach to simplify support

and maintenance for legacy weapon systems. The result is significantly lower cost of ownership, while simultaneously improving overall weapon system capability and performance.