

F-22 Assertions and Facts

July 2009

Assertion: F-22 maintenance man-hours per flying hour have increased, recently requiring more than 30 hours of maintenance for every hour airborne.

Facts: The F-22 is required to achieve 12.0 direct maintenance man-hours per flight hour (DMMH/FH) at system maturity, which is defined to be when the F-22 fleet has accumulated 100,000 flight hours. In 2008 the F-22 achieved 18.1 DMMH/FH which then improved to 10.5 DMMH/FH in 2009. It's important to recognize this metric is to be met at system maturity, which is projected to occur in late 2010. So the F-22 is better than the requirement well before maturity.

Assertion: The airplane is proving very expensive to operate with a cost per flying hour far higher than for the warplane it replaces, the F-15.

Facts: USAF data shows that in 2008 the F-22 costs \$44K per flying hour and the F-15 costs \$30K per flying hour. But it is important to recognize the F-22 flight hour costs include base standup and other one-time costs associated with deploying a new weapon system. The F-15 is mature and does not have these same non-recurring costs. A more valid comparison is variable cost per flying hour, which for the F-22 in 2008 was \$19K while for the F-15 was \$17K.

Assertion: The aircraft's radar-absorbing metallic skin is the principal cause of its maintenance troubles, with unexpected shortcomings.

Fact: Stealth is a breakthrough system capability and it requires regular maintenance, just like electronics or hydraulics. The skin of the F-22 is a part of the stealth capability and it requires routine maintenance. About one-third of the F-22's current maintenance activity is associated with the stealth system, including the skin. It is important to recognize the F-22 currently meets or exceeds its maintenance requirements, and the operational capability of the F-22 is outstanding, in part due to its stealth system.

Assertion: The F-22 is vulnerable to rain and other elements due to its stealthy skin.

Facts: The F-22 is an all-weather fighter and rain is not an issue. The F-22 is currently based and operating in the harshest climates in the world ranging from the desert in Nevada and California, to extreme cold in Alaska, and rain/humidity in Florida, Okinawa and Guam. In all of these environments the F-22 has performed extremely well.

Assertion: We're not seeing the mission capable rates expected and key maintenance trends for the F-22 have been negative in recent years.

Facts: The mission capable (MC) rate has improved from 62% in 2004 to 68% percent in 2009. And it continues to improve, the current MC Rate in the F-22 fleet is 70% fleet wide.

Assertion: The F-22 can only fly an average of 1.7 hours before it gets a critical failure that jeopardizes success of the aircraft's mission.

Facts: Reliability is measured by Mean Time Between Maintenance (MTBM). One of the F-22 Key Performance Parameters (KPPs) is to have an MTBM of 3.0 hours at system maturity, which is defined to be when the F-22 fleet has accumulated 100,000 flight hours. Through 2008, F-22s averaged 2.0 hours MTBM while the fleet has accumulated 50,000 flight hours. The F-22 is on-track to meet or exceed 3.0 hours of MTBM at system maturity, projected to occur in late 2010, and the latest delivered F-22s, known as Lot 6 jets, are exhibiting an MTBM of 3.2 hours.

Assertion: The plane's million-dollar radar-absorbing canopy delaminates and loses its strength and finish.

Facts: The F-22 canopy balances multiple requirements: mechanical strength, environmental resistance, optical clarity and other requirements. Initial designs for the canopy did not achieve the full life expectancy of 800 hours. The canopy has been redesigned and currently two companies are producing qualified canopy transparencies that meet full service life durability of 800 hours.

Assertion: The F-22 has significant structural design problems that forced expensive retrofits to the airframe.

Facts: The F-22 had a series of structural models that were tested throughout its development in a building block manner. Lockheed Martin completed static and fatigue testing in 2005 on two early production representative airframes. The results of those tests required upgrades to the airframe in a few highly stressed locations. Follow up component level testing was completed and structural redesigns were verified and implemented into the production line. For aircraft that were delivered prior to design change implementation, structural retrofit repairs are being implemented by a funded program called the F-22 Structural Retrofit Program. Structural reinforcements are common during the life of all fighters and have occurred, or are occurring, on the F-15, F-16 and F/A-18.

Assertion: The F-22 has a significant design flaw in the fuel flow system that forced expensive retrofits to the airframe.

Facts: The F-22 fuel system has not required redesign. Similar to other aircraft, the systems on the F-22 are continually being enhanced by a reliability and maintainability improvement program. For example, early fuel pumps turned out to not be as reliable as desired and have subsequently been replaced by more reliable pumps.

Assertion: Follow-on operational tests in 2007 raised operational suitability issues and noted that the airplane still does not meet most of its KPPs.

Facts: The F-22 has 11 Key Performance Parameters (KPPs). The F-22 exceeds 5 KPPs (Radar Cross Section, Supercruise, Acceleration, Flight Radius, and Radar Detection Range). The F-22 meets 4 KPPs (Maneuverability, Payload, Sortie Generation and Interoperability). The remaining 2 KPPs are sustainment metrics (MTBM and C-17 Loads) that are to be evaluated at weapon system maturity -- which is defined as 100,000 total flight hours and is projected to occur in late 2010. These two sustainment metrics are on-track to be met at 100,000 flight hours.

Assertion: The F-22 costs \$350M per aircraft.

Facts: The F-22s currently being delivered have a flyaway cost of \$142.6M each, which is the cost to build and deliver each aircraft. This number does not include the costs for research and development (that were incurred since 1991), military construction to house the aircraft, or operations and maintenance costs.

Assertion: The F-22 needs \$8 billion of improvements in order to operate properly.

Facts: Similar to every other fighter in the U.S. inventory, there is a plan to regularly incorporate upgrades into the F-22. F-22s in their current configuration are able to dominate today's battlefield and future upgrades are planned to ensure the F-22 remains the world's most dominant fighter. F-22 Increment 3.1, which will begin entering the field in late 2010, adds synthetic aperture radar (SAR) mode in the APG-77 radar, and a capability to employ small diameter bomb (SDB). Increment 3.1 is in flight test today at Edwards AFB, CA. Increment 3.2 is being planned and will add AIM-120D and AIM-9X weapons along with additional capabilities.

Assertion: F-22 production uses a shim line and national spreading of suppliers has cut quality, thus the F-22 lacks interchangeable parts.

Fact: The F-22 does not have a shim line. During the earliest stages of production while tooling was undergoing development, there were a few aircraft with slight differences which were subsequently modified. The F-22 supplier base is the best in the industry, as demonstrated by the aircraft's high quality and operational performance. All operational F-22s today have interchangeable parts.

Assertion: Are these accusations in the recent lawsuit valid?

Facts: We believe the allegations are without merit. While we are aware of the Olsen lawsuit, the Corporation has not yet been served in this matter. We deny Mr. Olsen's allegations and will vigorously defend this matter if and when it is served.

Assertion: The F-22 has never been flown over Iraq or Afghanistan.

Facts: The F-22 was declared operational in 2005, after air dominance was achieved in South West Asian Theater of conflict. Due to the absence of air-to-air or surface-to-air threats in these two theaters, stealthy air dominance assets were not an imperative. 4th

generation fighters operate safely and effectively supporting the ground war in Iraq and Afghanistan. The best weapon may be the one that isn't used but instead deters a conflict before it begins. Just as we have Trident submarines with nuclear weapons, and intercontinental ballistic missiles that were not used in the current conflicts, we need air superiority capabilities that provide deterrence. The F-22 provides those capabilities for today's contingencies as well as for future conflict. It is important to remember that the F-15 was operational for 15 years before it was first used in combat by the USAF.