

Sole U.S. Air Force Nuclear Cruise Missile Showing Its Age

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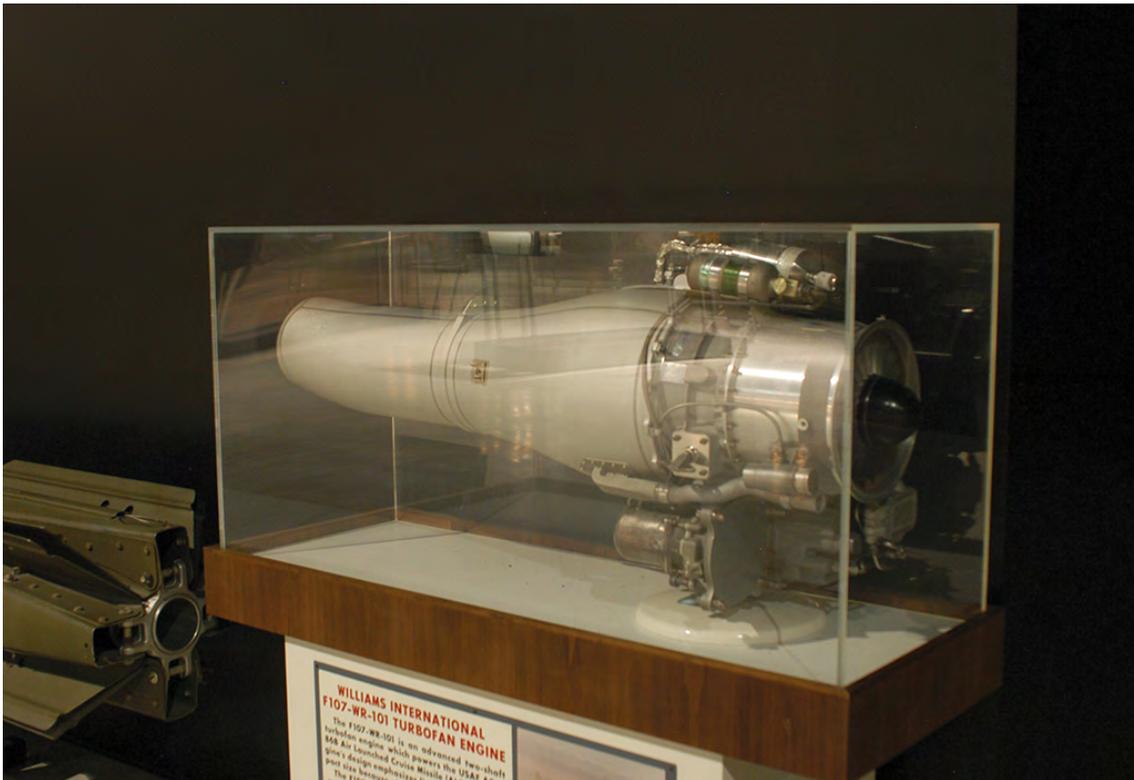
The U.S. Air Force appears to be struggling to preserve its only nuclear-armed cruise missile, the Williams International F107-powered Boeing AGM-86B air-launched cruise missile (ALCM).

The Air Force tells Aviation Week that the “Williams F107 engine is and continues to be very reliable,” with only two flight-test failures recorded in 1985 and 1990, respectively, but a contracting notice published on Oct. 17 paints a different picture. It says the current health of the F107 two-spool turbofan is in “jeopardy” due to aging and a lack of organic knowledge about how to maintain it.

The engine was developed in the 1970s for the ALCM and Raytheon Tomahawk missile. The air service maintains its F107s in-house, but will now partner with Teledyne Turbine Engines for accelerated mission-testing services as well as the reverse engineering and production of critical F107 parts under an ongoing component improvement program. Although Teledyne was not the OEM, it was qualified as a second source in 1978.

Plan B?

“The current status of the F107 engine in the [ALCM] is at jeopardy due to an aging engine fleet and a lack of knowledge associated with the sustainment of the engine,” the Air Force says in its justification for contracting Teledyne, dated March 15 and signed in June. “Currently, the [Air Force] is exclusively performing maintenance support and sustainment of the F107 engine [and] is unable to diagnose the issues surrounding multiple test failures associated with the F107 engine. The OEM has indicated that it will not support efforts to begin manufacturing critical components for this legacy platform. Considering the nuclear aspect of this contract action and the potential for a break in service, only one engine Component Improvement Program contractor, Teledyne, is eligible for this contract, as they are the only company able to analyze existing hardware drawings, produce and test F107 components fast enough to meet requirements.”



The Williams International F-107 is on display at the National Museum of the U.S. Air Force in Dayton, Ohio. Credit: U.S. Air Force

Having scrapped the last of 395 AGM-129A Advanced Cruise Missiles on April 10, 2012, the Air Force has no backup option if there were to be a gap in ALCM service due to age-related component failures. It is the primary strategic armament of the Boeing B-52H, which represents the bulk of the Air Force's nuclear-capable bomber leg alongside 19 stealthy Northrop Grumman B-2 Spirits.

The B-2 is armed with non-nuclear AGM-158 Joint Air-to-Surface Standoff Missiles, but must rely on stealth to deliver free-fall B61s and megaton-class B83s to their targets without getting shot down, if the nightmare scenario of nuclear war with Russia, China or some other nuclear-armed state played out. There are currently 76 B-52s in the Air Force's active inventory, and each can carry 20 AGM-86Bs with W80-1 thermonuclear warheads. Not every Stratofortress is kept in nuclear-ready status, but without a nuclear cruise missile, the combat capability of the bomber leg of America's nuclear triad would be diminished.



The B-52H can carry a total of 20 AGM-86B air-launched cruise missiles with W80-1 nuclear warheads on its wings and internally. Here, crews load ALCMs onto a “Stratofortress” bomber at Minot AFB, North Dakota. Credit: U.S. Air Force

Exactly 1,715 AGM-86Bs were built and delivered by Boeing through 1986, but the Air Force does not disclose how many remain in its inventory. The service says the ALCM was designed for 10 years of operational service, but will sustain it out to 2030, its 48th anniversary. It will be replaced by the Long-Range Standoff (LRSO) missile, carrying a repackaged and life-extended W80-4 warhead. The program is paced by delivery of the warhead, and the National Nuclear Security Administration will deliver the first example in fiscal 2025. Meanwhile, Russia’s Tupolev Tu-160 Blackjack and Tu-95 strategic bombers are already being armed with new Kh-102 cruise missiles and can strike targets more than 2,700 nm away, according to the service’s 2016 assessment of airborne threats.

Over the past few years, dozens of Air Force and government officials have expressed concern about the reliability of the ALCM as they seek funding from Congress for the next-generation LRSO weapon, which will arm the B-52, B-2 and Northrop B-21 Raider. “It was a 10-year missile,” Global Strike Command chief Gen. Robin Rand said at an Air Force Association event in July. “It’s in its 30th year of service and needs to be replaced.” Asked if there is a backup plan should there be a break in ALCM service, the service’s Office for Strategic Deterrence and Nuclear Integration said: “The Air Force has a planned program of record replacement, the Long Range Stand Off weapon. Until LRSO is fielded, the ALCM has three ongoing Service Life Extension Programs that will ensure maximum viability of the missile until its scheduled phase-out.”

Several lawmakers such as Sen. Dianne Feinstein (D-Calif.) and some former government officials have campaigned against the \$8.3 billion follow-on cruise missile program, saying it is destabilizing and that the mission can be accomplished with existing non-nuclear cruise missiles and penetrating, nuclear-armed stealth bombers with free-fall bombs. Democratic presidential nominee Hillary Clinton has also said she would be “inclined” to cancel LRSO. Nuclear policy expert Peter Huessy of the Mitchell Institute says old systems such as the ALCM can occasionally fail or have problems, and nuclear-capable weapon systems were typically starved of funding in favor of other priorities through the 1990s.



The B-52H has been in service since 1961 and carries a variety of nuclear and conventional weaponry, both internally and on its wings. Credit: U.S. Air Force

“Failure to modernize our conventional and nuclear deterrent in a timely manner has been correctly characterized as the procurement holiday we undertook at the end of the Cold War,” he says. “This affects our nuclear triad in particular. As retiring Adm. Cecil Haney of Strategic Command has repeatedly warned us across the board, we have to replace nuclear-capable systems, especially where sustainment has become increasingly costly.”

In July, the Air Force launched a competition to build LRSO, issuing a classified request for proposals to industry for a 54-month technology maturation and risk-reduction phase after receiving Milestone A approval from the Pentagon to launch an acquisition program. Meanwhile, the service will spend \$30 million per year on average sustaining the ALCM.

Much work has already started on the propulsion side for LRSO. Rolls-Royce North American Technologies of Indianapolis, aka LibertyWorks, and Williams International of Walled Lake, Michigan, were put on contract in 2011 to demonstrate Mach 3-capable propulsion

systems under the supersonic turbine engine for long range (STELR) program, with periods of performance running into 2016 and 2017, respectively.

The Air Force considered three alternatives for LRSO propulsion, a subsonic derivative of an existing engine with 5% better performance over current engine technology; an advanced subsonic engine with 15-20% greater performance; or a STELR-class supersonic engine.