



***Stagger Around #3:  
AGM-129 Advanced Cruise  
Missile, Abridged Edition***



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*Aerospace Projects Review* Presents: *Stagger Around #3: AGM-129 Advanced Cruise Missile, Abridged Edition*

First Edition, 2012

## AGM-129 Advanced Cruise Missile

The Advanced Research Projects Agency (DARPA) began work on the TEAL DAWN program circa 1979, developing technologies to reduce the radar cross section and infra-red visibility of cruise missiles. By the early 1980s cruise missiles such as the AGM-86 Air Launched Cruise Missile were expected to be vulnerable to Soviet air defense radar systems. And so building upon TEAL DAWN, development began on the Advanced Cruise Missile in 1982, with contractors such as Lockheed, Boeing and General Dynamics entering designs. In 1983 General Dynamics won the development contract, and began detailed design and development of the AGM-129 Advanced Cruise Missile.

The AGM-129 was visibly different from existing cruise missiles. The nose was sharply faceted to virtually eliminate radar returns from the forward half of the vehicle. The fuselage was largely cylindrical except for a flattened underside; the wings, which were stored internally and only extended outwards after launch from the carried aircraft, were distinctly forward swept. The horizontal stabilizers which folded down for storage were also forward swept. The inlet and exhaust were both on the underside of the craft; the inlet was a flush NACA-style inlet, the exhaust was a wide rectangle underneath a wide "beaver tail." Fitting these featured to the underside was a design necessity, since the AGM-129 was meant to fly nap-of-the-Earth mission,

closely hugging the terrain. This meant that unless it happened to fly directly over a radar site, the only radar systems that could see it would be those fitted to aircraft, looking down from above. Putting the inlet and exhaust on the underside meant that they were for all intents and purposes invisible to radar. The vertical stabilizer was also mounted on the underside to hide it from overhead radars; it was offset to the left so as to not interfere with the engine exhaust.

The wings were stored folded aft, hidden within the fuselage. When the missile was deployed, the entire top-rear cover of the fuselage would lift up several inches to allow the wings to extend; the cover would then clamp back down. Thus there would only be a small seam around the cover, rather than a large opening. The wings were solid, devoid of any control surfaces. Steering and stability were entirely via the horizontal and vertical stabilizers.

The Advanced Cruise Missile was guided by a combination of inertial guidance, terrain contour mapping radar (TERCOM) and a laser Doppler velocimeter. The TERCOM system would probably be used sparingly to reduce electromagnetic emissions. It is reasonable to assume that GPS capability was also added.

All available photos show operational AGM-129s to have been devoid of any markings, and with few surface features.

While the AGM-129 was intended to be carried by a number of aircraft (the B-1B, for instance, flew with experimental "cocoon" which would encapsulate the missiles in flight), in the end it only saw service on the B-52H, being carried on inboard wing pylons. The AGM-129 was never fired in anger. While it was initially hoped that 1,500 of these missiles would be produced, in the end only 460 or so were completed. Due to the collapse of the Soviet Union, the AGM-129 never really had an enemy worthy of its considerable cost, and the decision was made in 2007 to retire the AGM-129. After that, airframes started appearing in military aviation museums, stripped of most interior equipment and often with "sanitized" surface features.

Dimensions:

Span (wings extended): 10 ft 3 in

Length: 20 ft 10 in

Fuselage diameter: 2 ft 5 in

Weight: >3,500 lbs

Airspeed: ~500 mph

Range: >1,300 n.mi

Warhead: W-80-1 thermonuclear

Yield: selectable from 5 to 150 kilotons

Engine: Williams International F112-WR-100 turbofan

Thrust: 732 lbs

Fuel: JP-10 High Density Synthetic Hydrocarbon

Initial Operational Capability: October 1992

Last Production: August 1993



B-52H carrying a full load of twelve external AGM-129 Advanced Cruise Missiles. A further eight could be carried internally on a rotary launcher.(USAF)

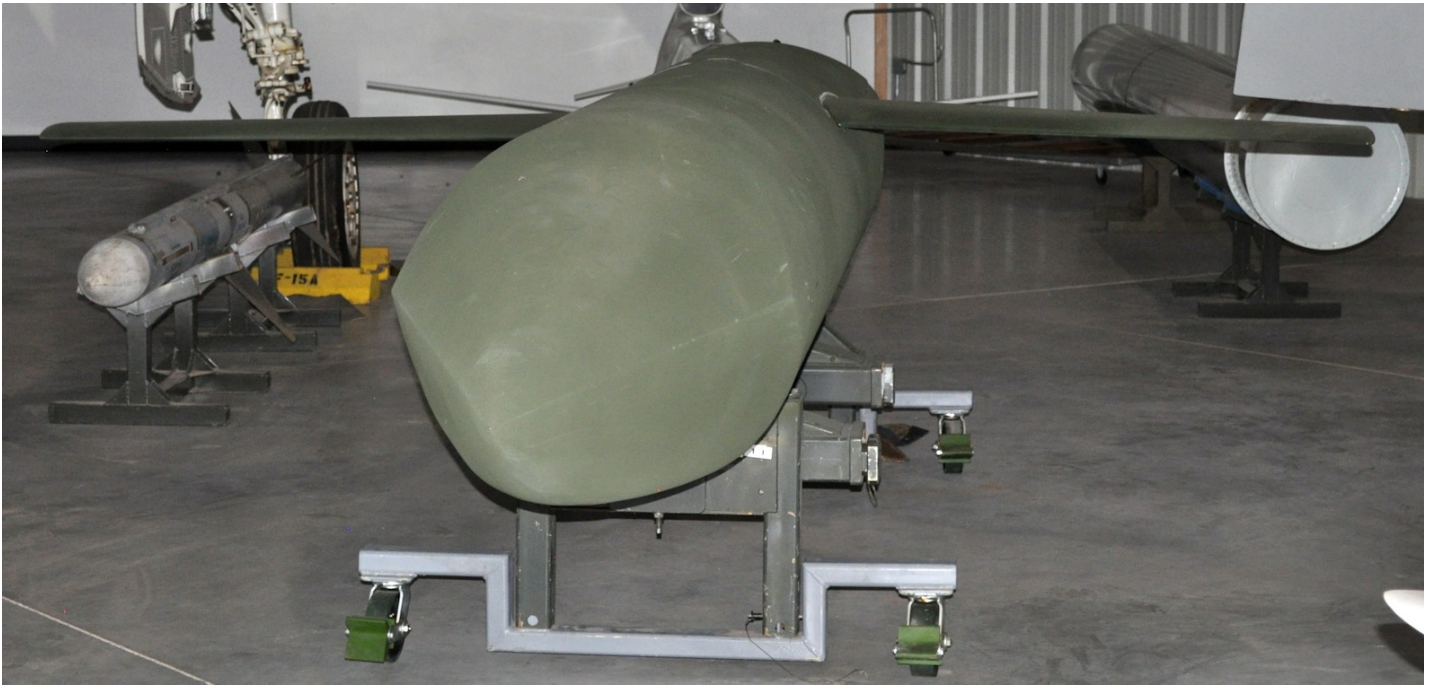


## Hill Aerospace Museum, Riverdale, Utah

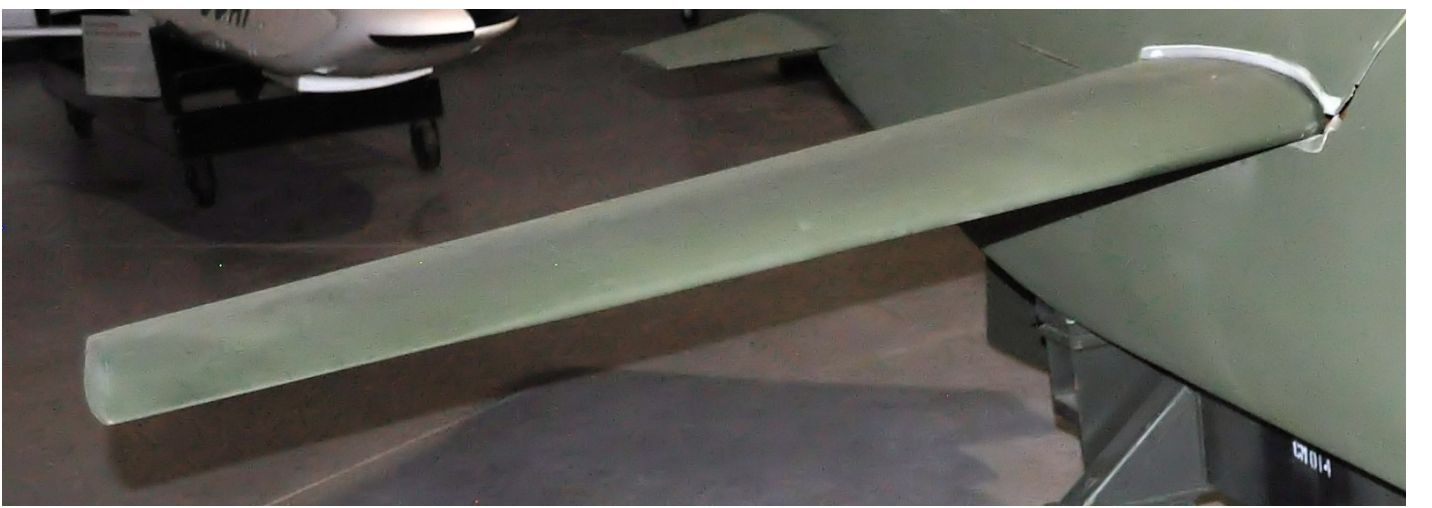


An AGM-129 has recently been put on display at the Hill Aerospace Museum in Riverdale, Utah. This particular airframe seems to have been extensively restored... surface details have been erased. It is in a dimly-lit, far corner of an interior building. These photos were taken in September, 2012. (copyright 2012 Scott Lowther)





Front view of the Hill AGM-129. (copyright 2012 Scott Lowther)



Closeup photos of the wings of the Hill AGM-129. Clearly visible is the change in wing cross section about  $\frac{3}{4}$  out along the span... most of the wing has a rounded leading edge, but the outer end of the wing has a sharp leading edge. (copyright 2012 Scott Lowther)





Aft view of the Hill AGM-129. Note that the exhaust nozzle has been closed off. (copyright 2012 Scott Lowther)



Side view of the tail of the Hill AGM-129. Note that the wing deployment hatch does not seem to be latched down. (copyright 2012 Scott Lowther)

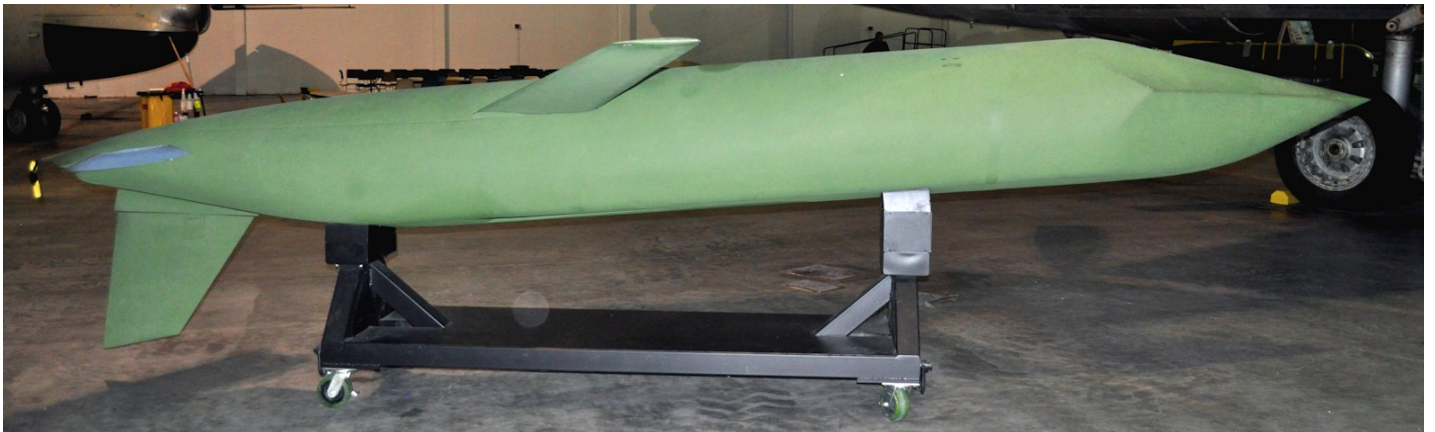
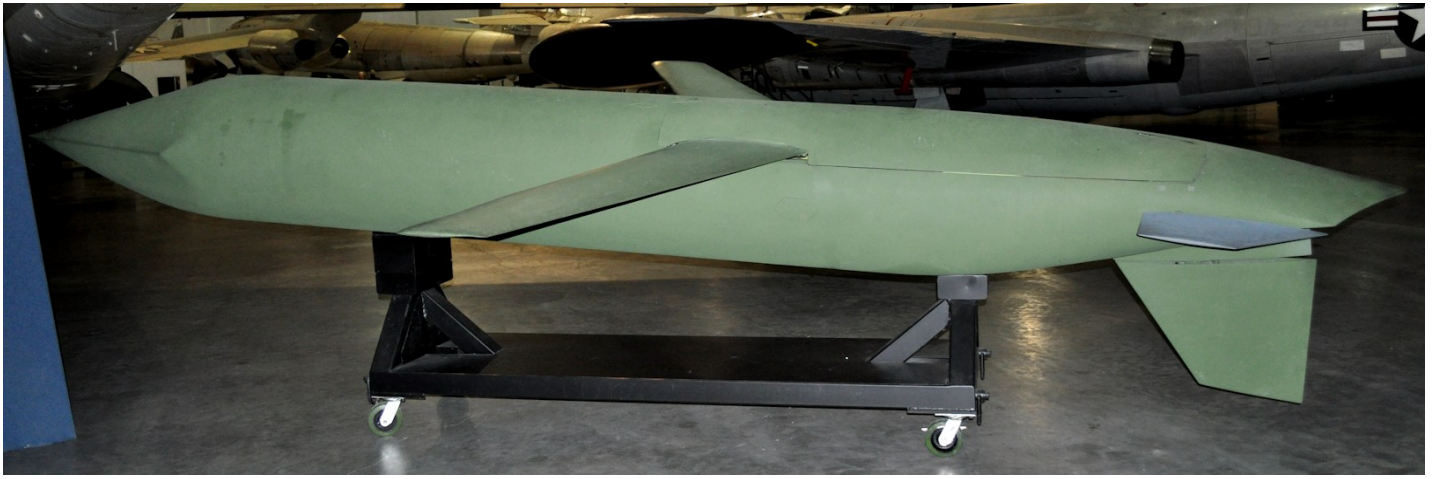


## Strategic Air & Space Museum, Ashland, Nebraska



The AGM-129A on display at the Strategic Air & Space Museum is displayed indoors under fairly dim light for photography, but is out in the open and appears to be externally intact. Curiously, it was, at the time of these photos (October 2008 and April 2011), displayed underneath the wing of a B-36 bomber, a design separated from the AGM-129 by 40 years. Due to the lighting, varying degrees of manipulation to the photos was performed to bring out details, with the result that the colors in the following images are quite variable. (copyright 2012 Scott Lowther)



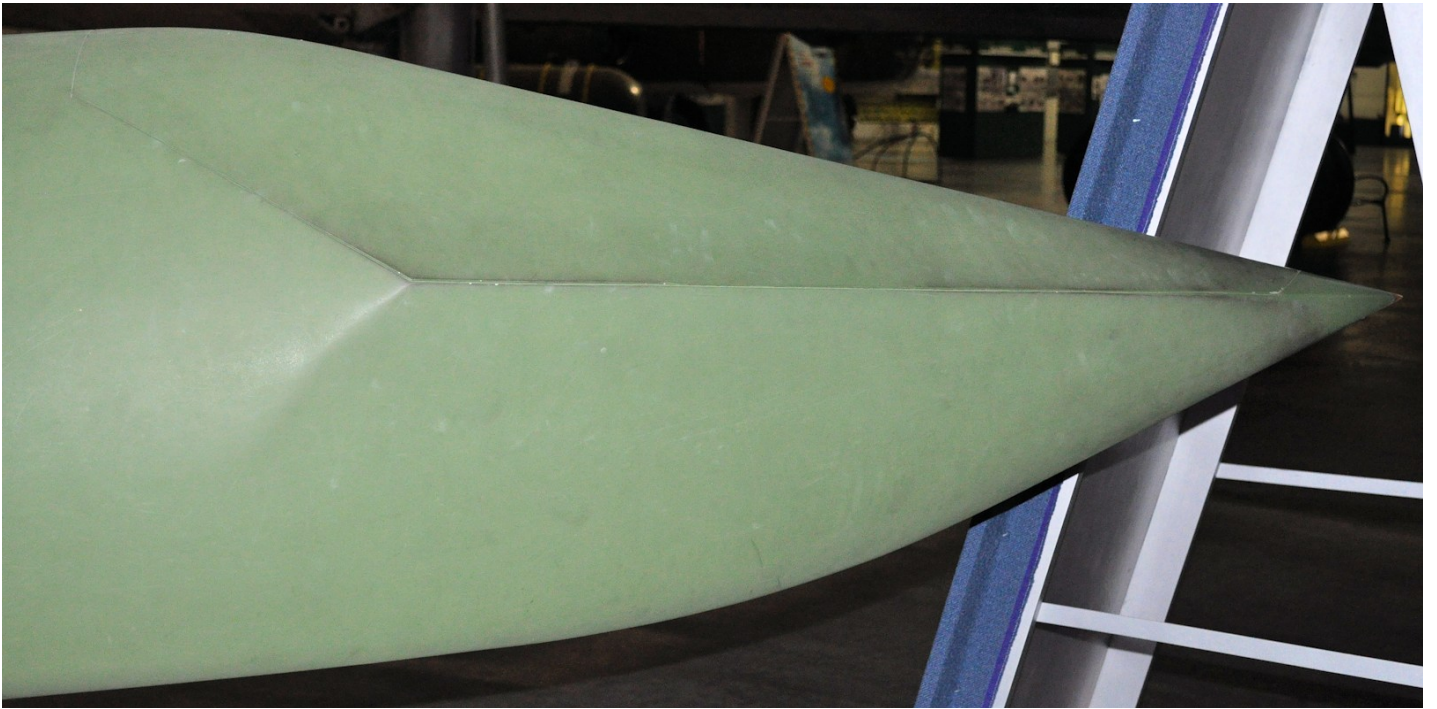


Several overall views of the SASM AGM-129A. (copyright 2012 Scott Lowther)



An off view of the SAASM AGM-129A (copyright 2012 Scott Lowther)





Side view of nose of the SAASM AGM-129A (copyright 2012 Scott Lowther)



Forward view of the SASM AGM-129A, showing the staggered wing layout to good effect. (copyright 2012 Scott Lowther)





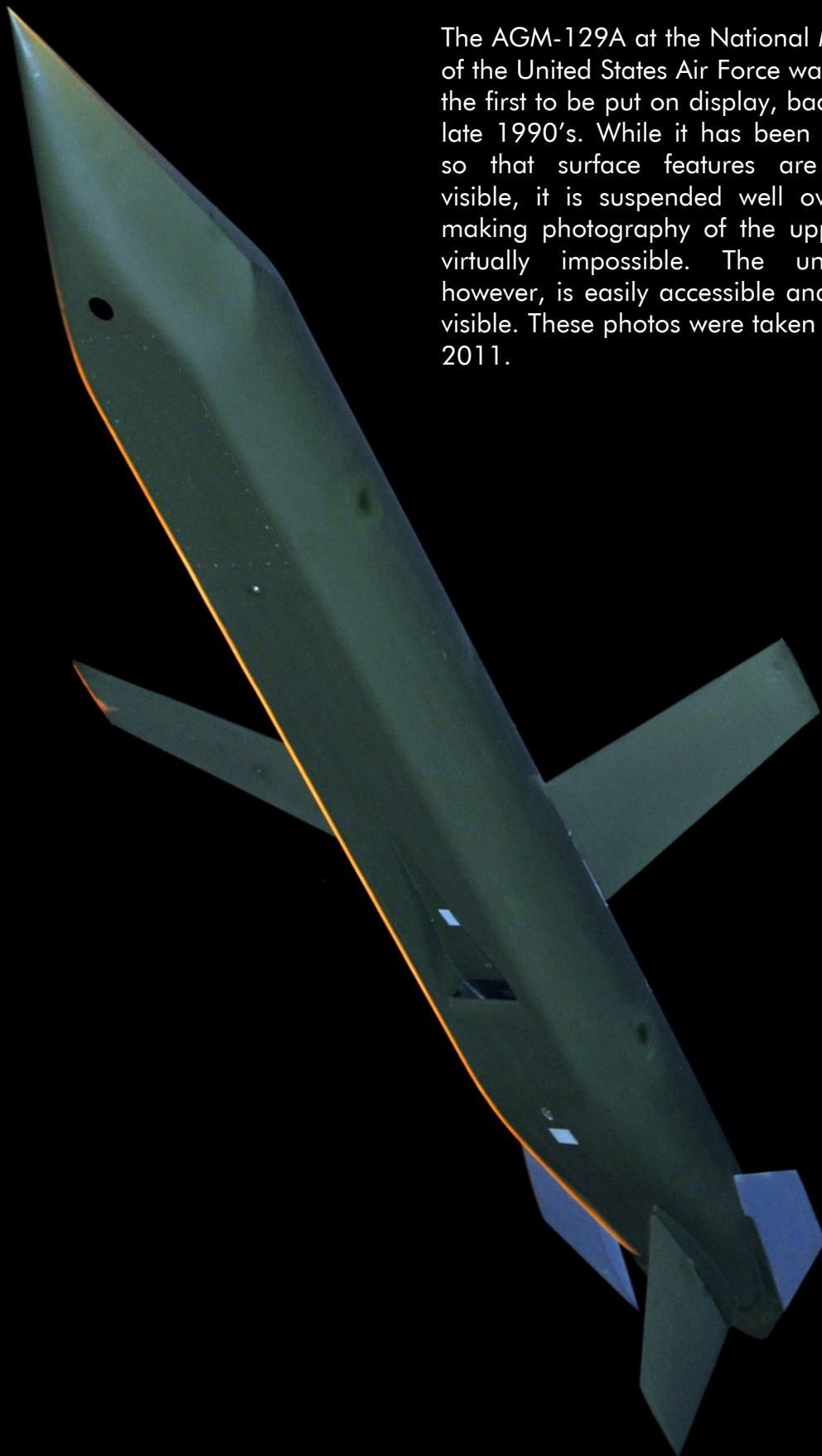
Aft view showing the underside of the "beaver tail." (copyright 2012 Scott Lowther)

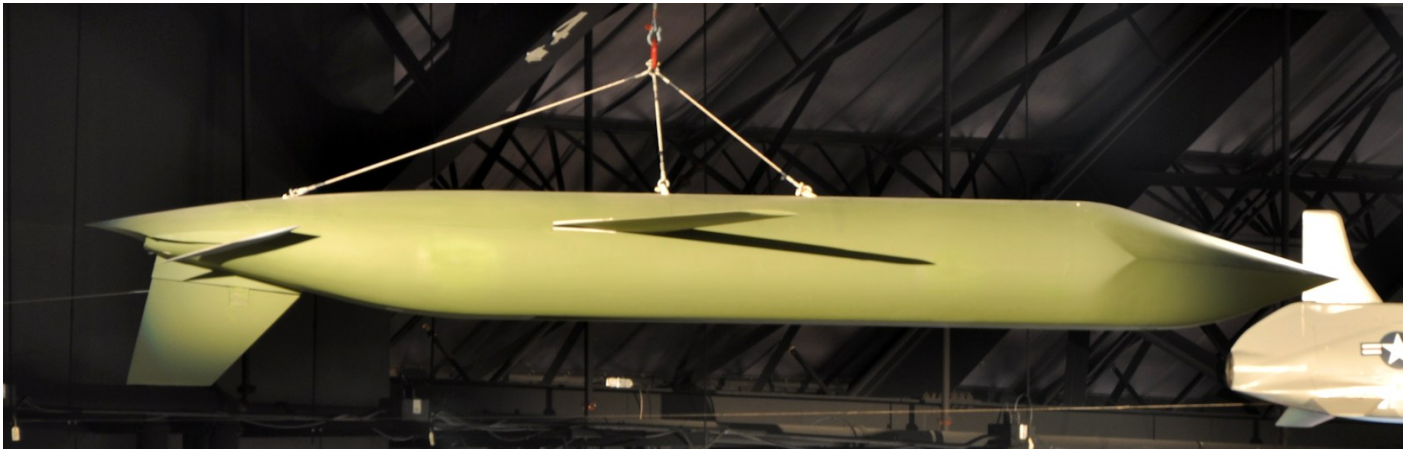


The flush NACA inlet on the underside. (copyright 2012 Scott Lowther)

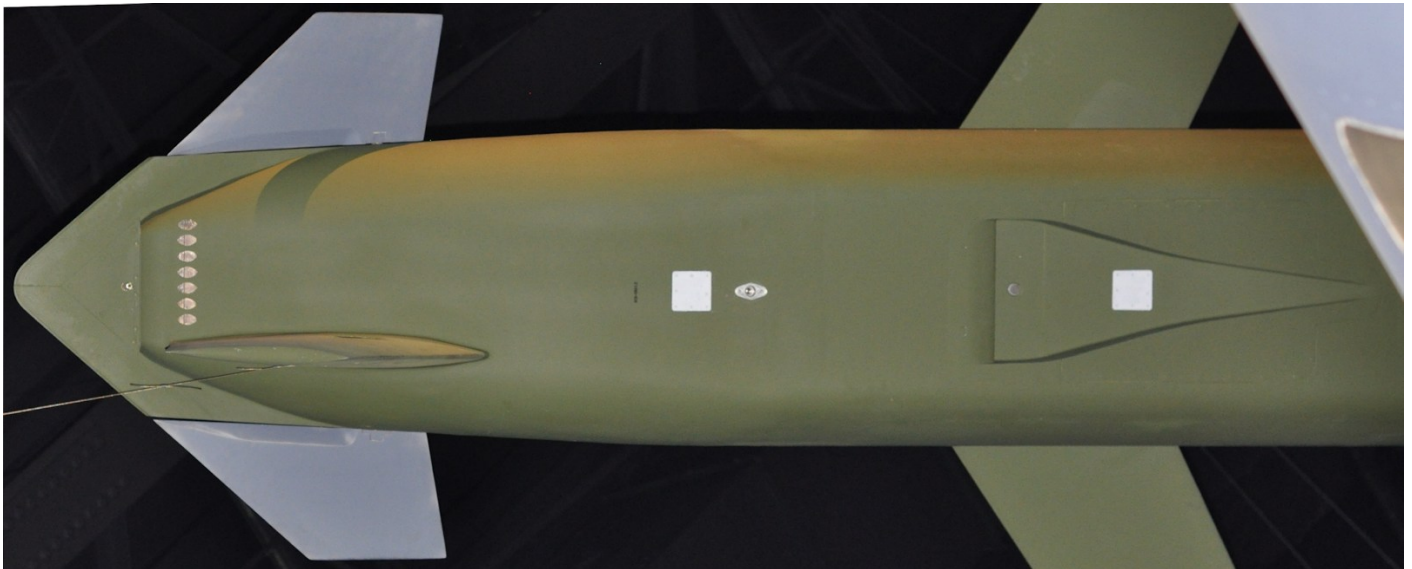


The AGM-129A at the National Museum of the United States Air Force was one of the first to be put on display, back in the late 1990's. While it has been restored so that surface features are plainly visible, it is suspended well overhead, making photography of the upper side virtually impossible. The underside, however, is easily accessible and clearly visible. These photos were taken in April, 2011.





Side view of the AGM-129 taken at some distance. Notice that the starboard horizontal stabilizer is angled somewhat. (copyright 2012 Scott Lowther)

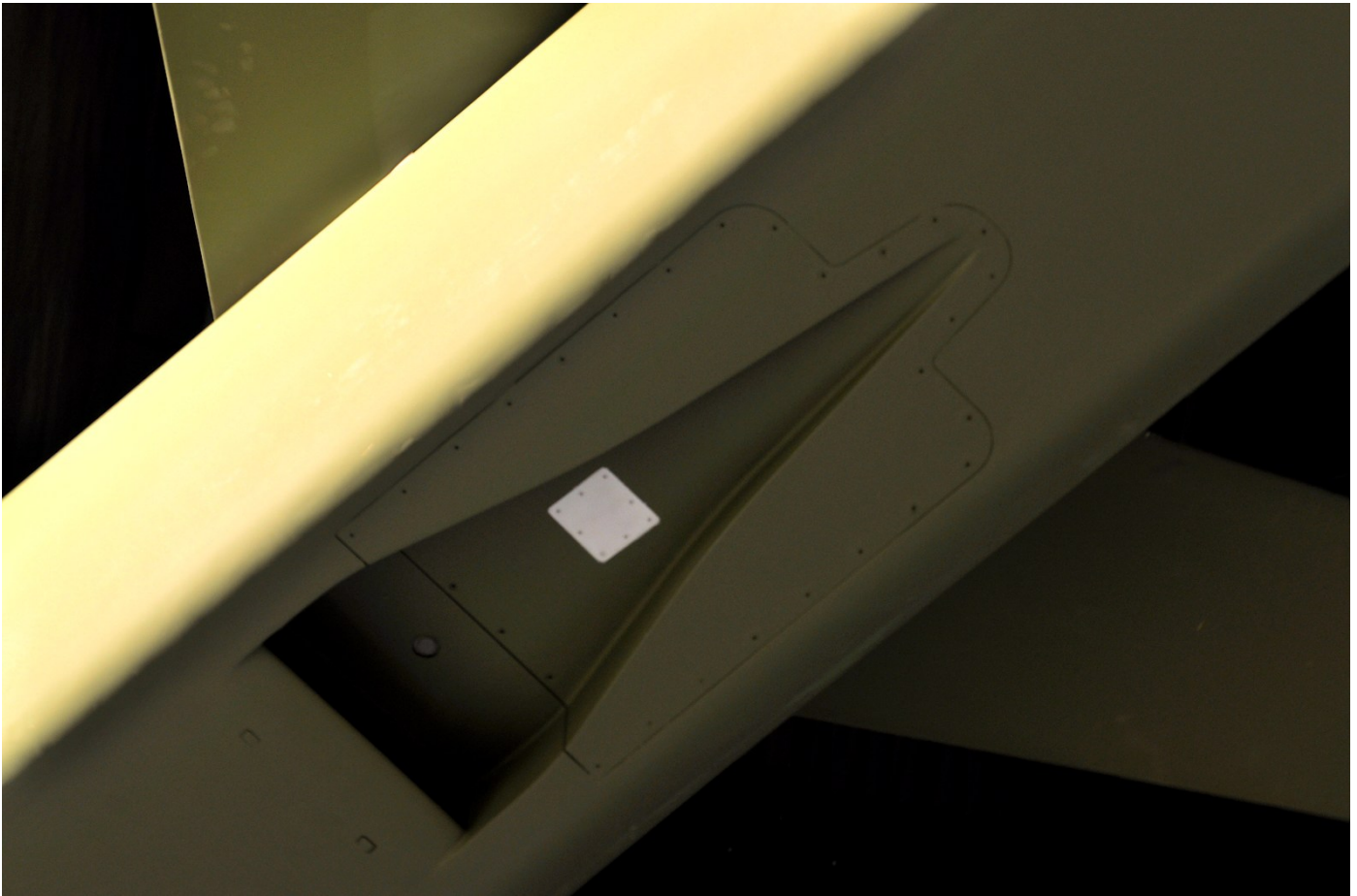


Underside of the rear half of the AGM-129. (copyright 2012 Scott Lowther)

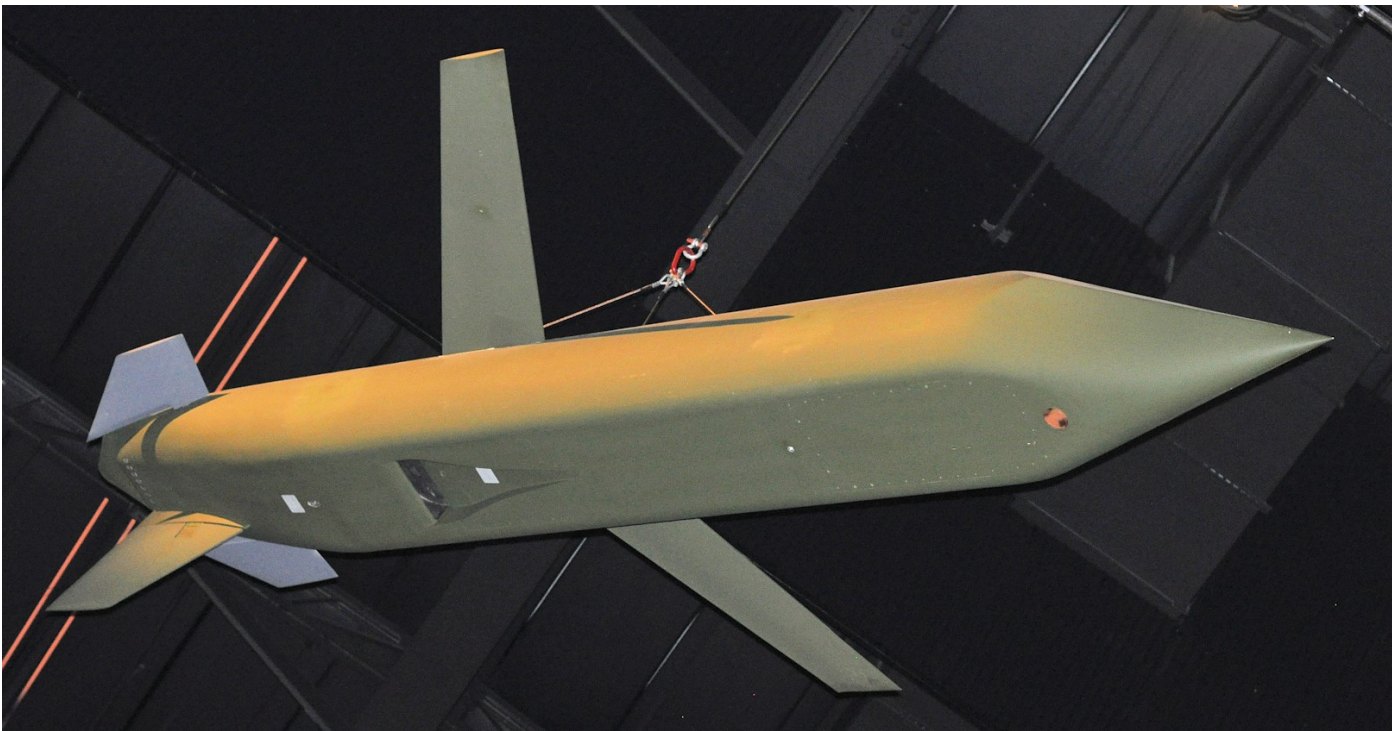


Underside of the nose. Hatch on the underside matched the geometry of the W-80 nuclear device, and is likely how it is installed, accessed and removed from the airframe. Here the circular window for the laser Doppler velocimeter is clearly visible; on other display units it has been painted over. (copyright 2012 Scott Lowther)





Closeup focusing on the inlet. (copyright 2012 Scott Lowther)



Overall view of the underside of the AGM-129 (copyright 2012 Scott Lowther)