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JLENS Future Bleak, But Need for Capability Remains

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Missile defense is not just about ballistic missiles. The wider problem of integrated air and missile defense, to include cruise missiles, has received growing attention in recent years. Last May, for instance, then-Vice Chair of the Joint Chiefs of Staff Admiral James A. Winnefeld remarked that "homeland cruise missile defense is shifting above regional ballistic missile defense, in my mind, as far as importance goes."¹

The attempt to design and field an architecture to detect and track cruise missiles, however, has proven challenging, as seen with the recent history of the cruise-missile detecting Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS). There are alternatives for the mission, such as with a fleet of AWACS E-3 aircraft, but manned systems lack the same range and have higher operating cost than a persistent and tethered radar.

The JLENS program's recent history exemplifies both the political and strategic demand for the capability, but also technical and political challenges. Whatever the ultimate fate of JLENS, the cruise missile threat and the need to address it remains an ongoing concern.

The Cruise Missile Challenge

The technics of cruise missile defense are quite different from those for ballistics. Ballistic missiles fly high and along a predictable trajectory. This makes them easier to detect and track, but more challenging to intercept because of their speed, altitude, and the presence of debris or decoys. Cruise missiles, by contrast, are comparatively harder to find but easier to intercept. They are slower, fly low, and are therefore very difficult to detect and track from ground-based radars. They are also maneuverable, making their flight path and destination harder to predict. For a traditional ground-based radar to track a cruise missile, it must be pointed forward and toward the horizon, but the curvature of the Earth limits their range significantly. Radar lines of sight can also be complicated by terrain or even tall buildings.

¹ James Winnefeld, "Missile Defense and U.S. National Security" (remarks at the Center for Strategic and International Studies, Washington, DC, May 19, 2015), <http://csis.org/event/missile-defense-and-us-national-security>.

As such, the better way to detect and track a cruise missile is from overhead, with a sensor looking down. The JLENS concept consists of two tethered aerostats equipped with 360-degree radars, suspended at an altitude of 10,000 feet.² Working in pairs, one aerostat provides blanket radar coverage over a wide area, while the second uses an X-band radar to lock onto a particular threat and provide targeting information to interceptors in the area. The ability to station aerostats at high altitude allows them to search persistently for fast, low-flying threats over extensive ranges and with less ground obstruction than a ground-based radar.

The October Failure

With much media attention, one of the two aerostats broke free of its mooring at the Aberdeen Proving Grounds on October 28, 2015. According to the post-October investigation, the JLENS test faced challenges in vulnerability to high winds and bad weather. This vulnerability is hardly unique; the military deploys similar aerostat-based reconnaissance systems that have similar limitations.

Defense Secretary Ashton Carter pointed out this common issue during remarks following the JLENS October mishap, saying that “from having seen these break loose in Afghanistan on a number of occasions, we could get it to descend and then we’ll recover it and put it back up...this happens in bad weather.”³ In Afghanistan, tethered aerostats carrying cameras were used to surveil and protect forward operating bases, but these were significantly smaller and lower altitude.

According to the Army Failure Review Board’s report on the October 28 incident, the winds above Aberdeen Proving Grounds reached upwards of 69 miles per hour, near the upper limit of JLENS’s design threshold. The Army report notes that certain key system malfunctions were to blame. In particular, a fault in the aerostat’s air pressure sensor caused one of the aerostat’s tail fins partially to deflate. This contributed to unstable flight “until the tether tension reached extreme levels and broke away” from its mooring station.

Budget Background

Since October, the Defense Department has had a difficult but understandable time convincing appropriators to continue the program. Although there is every indication that the Pentagon will fight to preserve JLENS in the FY17 budget process, last October’s mishap encouraged lawmakers to look askance.

² Director, Operational Test and Evaluation, *FY 2013 Annual Report* (Washington, DC: Office of the Secretary of Defense, January 2014), 107–110.

<http://www.dote.osd.mil/pub/reports/FY2013/pdf/other/2013DOTEAnnualReport.pdf>.

³ Matthew H. Brown and Ian Duncan, “JLENS Blimp Returns to Earth in Central Pennsylvania; Military Recovery ‘in Progress.’” *Baltimore Sun*, October 28, 2015,

<http://www.baltimoresun.com/news/maryland/harford/aberdeen-havre-de-grace/bs-md-jlens-blimp-loose-20151028-story.html>.

The Army had suspended its three-year operational test of the radar blimps over the U.S. National Capital Region in November, awaiting the findings of an investigation into the October accident.⁴ Amidst that investigation, Congress cut funding to JLENS by \$30 million in the FY16 omnibus bill released on December 16.⁵ Upon completion of the Department of Defense (DoD) investigation in February, Defense Secretary Carter approved resuming the program.⁶

JLENS Budget Background: 2014-2016

Dec. 27, 2014: JLENS aerostat deployed above Aberdeen Proving Grounds (APG), MD.

Aug. 19, 2015: Second JLENS aerostat deployed to APG.

October 28, 2015: JLENS aerostat breaks free of mooring, recovered in Pennsylvania, program suspended pending investigation.

December 2015: FY16 omnibus bill cuts JLENS funding by \$30 million.

Feb. 2016: SECDEF Carter approves resumption of JLENS testing at APG.

Feb. 24, 2016: President's FY17 budget request unveiled, includes \$45.5 million for JLENS.

March 8, 2016: Army submits \$27.2 million FY16 reprogramming request to Congress.

March 10: NORTHCOM Commander ADM William Gortney supports JLENS during congressional testimony.

March 12, 2016: SAC-D denies Army FY16 budget reprogramming request to continue JLENS program uninterrupted.



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⁴ David Willman, "Pentagon Suspends Troubled Missile Defense System at Center of 'runaway Blimp,'" *Los Angeles Times*, November 3, 2015, <http://www.latimes.com/nation/la-na-pentagon-suspends-jlens-runaway-blimp-20151103-story.html>.

⁵ Jen Judson, "JLENS Takes Hit in Omnibus '16 Spending Bill," *Defense News*, December 16, 2015, <http://www.defensenews.com/story/defense/air-space/isr/2015/12/16/jlens-takes-hit-omnibus-16-spending-bill/77437204/>.

⁶ Ian Duncan, "Defense Secretary Backs Raising Balloons over APG Again," *Baltimore Sun*, February 11, 2016, <http://www.baltimoresun.com/news/maryland/harford/aberdeen-havre-de-grace/bs-md-jlens-balloon-investigation-20160211-story.html>.

On March 8, the Army submitted a \$27.2 million budget reprogramming request to congressional appropriators to get JLENS back in the air in FY16. Much of this request would have come from reallocating funds that had been appropriated for other programs that had fallen behind schedule, such as the Joint Light Tactical Vehicle. NORTHCOM commander Admiral William Gortney supported JLENS during his March 10 congressional testimony, commenting that "we look forward to completing it, because should it bear out, it defeats a threat that I don't have a capability against today." The Senate Appropriations Committee nevertheless denied the reprogramming request.⁷

Despite the setback, the Army and the combatant commanders seem persistent in creating room for JLENS even in a tight defense budget, including for President Obama's \$45.5 JLENS budget request for FY17. At a March 22 press conference, however, Lieutenant General David Mann, commander of the U.S. Army Space and Missile Defense Command, conceded that "The onus is on us, quite frankly, to continue to engage Congress and to provide them with the data to make the case as to why it's important to support this effort."⁸

Capability Gap

The Army's persistence with JLENS is understandable. Defense planners have become increasingly concerned about the threat from cruise missiles to U.S. forces overseas and the U.S. homeland. Regarding Russia's demonstration of over 20 cruise missile launches into Syria, Admiral William Gortney testified about their significance: "There's no operational or tactical requirement to do it [use cruise missiles in Syria]. They're messaging us that they have this capability."⁹

China, too, has also been investing in its cruise missile capability as part of its anti-access/area denial strategy in the Asia-Pacific region in a major way.¹⁰ Even Iran is now in the cruise missile business, unveiling its Soumar cruise missile last year, with a reported range of 2,500 kilometers.¹¹

There is also serious concern about the global proliferation of cruise missile systems such as the 3M-54 Club-K, a Russian export that can be stored and fired from a cargo container. The potential for a

⁷ David Willman, "Two Key Senators Turn against Pentagon's Radar-carrying Blimps," *Los Angeles Times*, March 12, 2016, <http://www.latimes.com/nation/la-na-blimps-funding-20160311-story.html>.

⁸ Jen Judson, "Amid Lack of Congressional Support, Army Hopes for 2017 JLENS Funding," *Defense News*, March 22, 2016, <http://www.defensenews.com/story/defense/land/army/2016/03/22/amid-lack-congressional-support-army-hopes-2017-jlens-funding/82134216/>.

⁹ Joe Gould, "NORAD Chief: JLENS Surveillance Blimp 'Fills Gap,'" *Defense News*, March 10, 2016, <http://www.defensenews.com/story/defense/2016/03/10/norad-chief-jlens-surveillance-blimp-fills-gap/81585054/>.

¹⁰ Dennis M. Gormley, Andrew S. Erickson, and Jingdong Yuan, "A Potent Vector: Assessing Chinese Cruise Missile Developments," *Joint Forces Quarterly* 75 (4th Quarter, 2014), http://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-75/jfq-75_98-105_Gormley-et-al.pdf.

¹¹ Alon Ben-David, "Iran Produces First Long-Range Missile," *Aviation Week*, March 14, 2016, <http://aviationweek.com/defense/iran-produces-first-long-range-missile>.

surprise attack on U.S. command and control threatens to hurt strategic stability, a point made last May by Admiral Winnefeld.¹²

So where does this leave cruise missile detection? The Senate Appropriation Committee's prompt denial of the Army's budget reprogramming request does not seem to bode well for the fate of the president's \$45.5 million request for FY17, but time will tell. The military's persistence on the cruise missile detection problem, however, should probably be seen less about any particular program or system, and more about the larger capability gap for both the homeland and forces abroad. If not JLENS, demand will recur for some other means to detect and track cruise missiles.

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¹² Winnefeld, "Missile Defense and U.S. National Security."