The Next Generation Jammer and Distributed Electronic Warfare

Written by: **Jan Tegler** on June 15, 2011

Categories: **Aviation**, **Naval**

Tags: **Electronic Warfare**, **Military News**, **Research and Development**, **US Military**

Comments: **No Comments**

Share this Story Tweet Like More »

An EA-18G carrying three ALQ-99 jamming pods. The Next Generation Jammer is intended to equip the Growler as well as a number of other platforms. U.S. Navy photo by Jamie Hunter/Aviacom

The U.S. has lost its edge in electronic warfare. That's the message Defense Secretary Robert Gates sent out with the January 2011 release of the 2012 defense budget which calls for significantly increased funding for electronic warfare (EW) programs.

It's a theme military leaders and defense commentators have also been trumpeting.

"We've used up our technological margin," says defense analyst and Lexington Institute CEO Loren Thompson. "China passed the United States in the manufacture of electronics in 2006. I think the message there is that the rest of the world now understands the electromagnetic spectrum as well as we do. They may not be spending as much on EW but they're going to be pretty imaginative. You can no longer assume that the threat is going to be isolated in a handful of waveforms or frequencies. You need to be ready to cover the entire spectrum."

The U.S. Navy-led Next Generation Jammer (NGJ) program is at the leading edge of an expanding effort by DoD to conduct EW on a much broader, more integrated basis in coming years.

"We're building the NGJ to be a wide spectrum jammer," Capt. John K. Green explains. Green is the Navy's Airborne Electronic Attack (AEA) and EA-6B Prowler Program Office (PMA-234) program manager, effectively responsible for management of all Navy AEA assets and EW systems.

Green emphasizes that NGJ will be a stand-alone asset, capable of performing a variety of functions over a wide swath of the electromagnetic spectrum.

"That is what sets it apart from many of the other assets that [the Navy] is pursuing like Intrepid Tiger II [AN/ALQ-228, a reprogrammable communications jammer for Marine Corps fixed-wing and rotary-wing platforms] and like the Air Force's use of the expendable MALD-J [Miniature Air Launched Decoy - Jammer]. They perform niche functions in very specific warfare areas or cover specific pieces of the spectrum. The NGJ, like the ALQ-99 that it will replace, is designed to be a wide-spectrum jammer that can be used in a lot of different mission and CONOPS [concept of operations] scenarios."

NGJ is currently the flagship program for EW, managed by the Navy but intended as a joint force capability and ultimately as part of a distributive system of electronic warfare. The new jammer will be the basis for a family of open-architecture, software-driven, easily updated EW/EA systems able to conduct electronic attack from longer ranges than possible today.

Initially, NGJ will be a standoff electronic jammer, according to Green, not meant to "spend a lot of time in the actual threat envelopes of surface-to-air missiles." Penetration and escort jamming roles may materialize later, but for now the Navy is choosing from a menu of emerging technologies

Latest Edition

View all Publications »

Air Power at Sea: A Century of U.S. Naval Aviation

Recent Comments

Aleric commented on Oops! Kicking a Complaint Upstairs – And Getting Kicked Back

Chuck Oldham (Editor) commented on Military Security Issues of Social Media: Army

Ann commented on U.S. Navy Submarine Rescue System Mates With Russian Sub

Ann commented on Military Security Issues of Social Media: Army

Featured Industry Profiles / White Papers

View all Naval Profiles / Papers »

Leupold & Stevens, Inc.

Leupold & Stevens, Inc., is an American, fifth-generation, family-owned company that

that will allow NGJ to perform multiple functions from a safe distance.

Intrepid Tiger communications jammer mounted on an F-16 aircraft. NAVAIR photo

Four industry teams – Northrop-Grumman, BAE Systems, ITT/Boeing and Raytheon – are engaged in what is referred to as the technology maturation (TM) phase of the NGJ program, contracted under a broad agency announcement process.

"That allowed each of the four vendors who were awarded contracts to invest in technology areas that they felt would give their companies the biggest bang for the buck in terms of advancing the state of the art," Green notes. "We have guidelines; five critical technology areas that we are most interested in and that we think represent the most risk."

There is no formalized set of requirements for NGJ just yet, but Green says a draft CDD (capabilities description document) will soon be released for the JROC (Joint Requirements Oversight Council) process. In addition to decisions about what technologies the NGJ will incorporate, the joint nature of the system poses a challenge.

An EA-6B Prowler assigned to Electronic Attack Squadron (VAQ) 134 banks over the Nimitz-class aircraft carrier USS Carl Vinson (CVN 70) as it enters the landing pattern. NGJ is intended to equip legacy Prowlers as long as they remain in service, as well as other platforms. U.S. Navy photo by Mass Communication Specialist 2nd Class James R. Evans

"The services' priorities are very different in terms of CONOPS," Green admits. "We all look at the kill chain, both offensively and defensively, in different ways. The NGJ will be optimized towards the way the Navy views the kill chain and the way we execute electronic warfare, but I think you'll see that the technologies will cross boundaries quite well."

Green doubts that the NGJ will be used "wholesale by the Air Force or Army," suggesting that the likelihood of those services flying the same pod on one of their platforms is low.

"I think they would optimize it a little differently to suit the way they conduct warfare," he adds.

Loren Thompson goes further, opining that NGJ won't always be fielded in the form of a traditional electronics pod hung on the wing of an airborne platform.

"We're not designing a pod," he maintains. "We're designing an electronic architecture that will be sufficiently modular to arrange in various ways depending on the host."

Thompson also feels the Navy's lead role in making decisions about NGJ is appropriate.

"The nice thing about the Navy keeping its focus on electronic warfare is that it gets the final say on most of the key tradeoffs because in some ways it's the only serious player. The Air Force has been all over the map on EW and the Marines seem to look at it through the lens of other concerns. That leaves the Navy as not just the main repository of expertise but probably the most credible decider of key technical questions."

Among the initial challenges for the new jammer will be its packaging and the provision of an abundant source of power. Any pods housing NGJ must be small enough not to add significant weight and drag to the EA-18G and incorporate a potent power generator such as an advanced ram-air turbine.

Power will be key to the NGJ's ability to perform "advanced techniques" says Green.

"Rather than jamming across a broad range of frequencies we want to narrow our jamming so that it's more effective against the emitter that we're prosecuting, making the beam smaller and utilizing active arrays. Each of the four vendor teams we're working with seem to be going towards active arrays, which do a particularly good job of focusing energy."

MALDs on the port inner pylon of a B-52. Unlike the MALD-J jammer variant of the MALD, NGJ is intended to take on a wide range of jamming tasks. Photo courtesy of Raytheon

"Some radars are 'coherent,'" Green explains. "They utilize very specific pulse trains and there are advanced techniques for dealing with coherent radars that we want to be able to utilize in the future. When you look at some of the critical technologies like beam-formers and amplifiers, we're talking about an incredible amount of power employed with incredible rapidity so that we can execute advanced techniques. It's not so much that the technologies themselves are a stretch as the way that we're using them that is a stretch."

The newer array-based technologies Green mentions dovetail with the AESA radars (APG-79 and APG-81) utilized by the Super Hornet and JSF (another candidate for NGJ). These units have jamming capabilities of their own. Green describes the systems as partners in the AEA mission and says that NGJ must augment them, not duplicate them.

More importantly, NGJ is just one element in a larger concept of EW the Navy calls Electromagnetic Battle Management (EMBM) – a networked system of EW assets that could allow even less capable jammers than NGJ to be up to two orders of magnitude more effective than they are as stand-alone devices.

"I think EMBM is going to represent a bigger change in electronic warfare than NGJ per se," Green asserts. "Next Generation Jammer is really a software/hardware focused entity. EWBM will take us into a new area.

While the Navy conducts warfare a certain way and we may have a certain set of hardware, that hardware is now applicable across the services. So an asset carried on a Prowler, Growler, Hornet, AV-8B or UAV can now be available for use in the joint warfare area, not just by the Navy-Marine Corps team."

The Navy likens the combined effect of NGJ and other EW assets such as Intrepid Tiger II (ALQ-231) networked to provide a scalable EMBM capability (with visibility and control of air, ground and sea assets, enabling real-time command and control of joint EW) to what the Link-16 tactical data exchange system did for air-to-air warfare.

Given the scale and complexity of the NGJ, and the longevity the Navy expects of it, the system must be reprogrammable to allow it to incorporate new technologies.

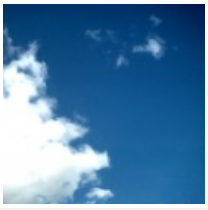
"We envision using NGJ across two, three, even four decades," Green affirms. "It's critical that we have a modular, open architecture system both on the hardware and software side. We have to be able to upgrade subcomponents of the jammer and its software."

Targeted for initial fielding in 2019, the timely delivery of NGJ will depend on the Navy's ability to prioritize investment in EW and an incremental or 'block' approach to its introduction according to Green.

"The incremental question is what platforms are we going to go after and in what order? EA-18G is first. It's already a jamming system and we just need to replace the ALQ-99 on it. Then we'll go after F-35 and maybe a UAV platform. We're taking a block approach to capability and we're going to address that band by band. We're not going to field the whole system at one time. That allows us to get some of the capability out there sooner without waiting for the whole system to be ready."

"The Navy and other services want to make a significant EW investment but we're all very budget-constrained right now," Green observes. "The Navy is wrestling with how much it can invest in EW to keep it on schedule to aggressively replace the ALQ-99. I can tell you there's a significant effort behind the scenes."



Leave a Comment

Categories

- Defense-Wide
- Aerospace
- Land Forces
- Naval
- Spec Ops
- Homeland Security
- VA / MILMED

Tag Cloud

Military News, Issues, Military History, US Navy, US Army, US Military, US Marine Corps, US Air Force, Research and Development, Programs, US Coast Guard, Rotary-wing Aircraft, Fighter Aircraft, C4ISR, Surface Ships, Small Arms, Desert Storm Anniversary, World War II: 70 Years, Attack Aircraft

DefenseMediaNet: DMN wishes the @USArmy a happy 236th birthday. To all those who have served so valiantly we thank you and your families for your sacrifices.
Tuesday, June 14, 2011

Multimedia

Profiles / Papers

Commentary, Logistics, Armored Fighting Vehicles, Training and Simulation, Centennial of Naval Aviation, US Army Corps of Engineers