The Future of Marine Electronic Warfare

Subject Area Electronic Warfare

EWS 2006

The Future of Marine Electronic Warfare

Contemporary Issues Paper
Submitted by Captain M. D. Williams
CG #6, FACAD: Major D. J. Verda
7 February 2006

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
07 FEB 2006		**00-00-2006 to 00-00-2006**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
The Future of Marine Electronic Warfare	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **United States Marine Corps,Command Staff College Marine Corps University,2076 South Street, Marine Corps Combat Development Command,Quantico,VA,22134-5068**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**13**	

By providing electronic warfare for not only the Marine Corps and Navy, but for all branches of service, the EA-6B “Prowler” has withstood the test of time. However, because EA-6B is the only tactical radar and communications jamming aircraft of its kind, it has become apparent that a replacement is needed for the aging EA-6B fleet. The Navy has already established a replacement aircraft for the Prowler, the E/A-18G Growler, and production and testing is already underway. The Marine Corps is looking beyond the Growler and further into the future with the electronic warfare variant of the F-35 Short Take-Off Vertical Landing (STOVL) Joint Strike Fighter (JSF). Meanwhile, while the Marine Corps is waiting for the electronic warfare variant of the JSF, the service life of the Prowler is going to expire. Because of the research and development that the Navy has already put into the Growler and to take advantage of the enhanced capabilities (weaponry, electronics suite, supersonic ability) it will bring to the fight, the Marine Corps should follow the Navy’s lead and field the E/A-18G as a replacement for the soon-to-be outdated Prowlers.

EA-6B Prowler

History

Since the first Prowler’s inception in 1991, it has gone through several upgrades to enhance it capabilities. The standard version of the original aircraft was replaced in 1973

with the “expanded capability” (EXCAP) EA-6B. In 1976, the “improved capability” (ICAP) version of the EA-6B surfaced and performed the mission until 1985, when the more sophisticated ICAP II version was employed. The ICAP III version is still undergoing testing and evaluation and will be the final upgrade to the EA-6B before it is put out of production and replaced by the Growler.

In 1994, when the Air Force’s EF-111A Raven electronic warfare aircraft retired, the Prowler became the only tactical radar jamming platform. As the Department of Defense’s sole proprietor of airborne tactical electronic warfare, the Prowler has received the nickname of “National Asset” and is used on occasion as a joint asset. Since the retirement of the Raven, the Prowler has been pushed to its limits due to the current operational tempo. As a result, the Prowler has suffered several limitations to its performance capabilities, such as wing fatigue and engine replacement and is ready to retire its duties to the more capable Growler.

EA-18G Growler

Overview

In December 2003, the Navy awarded Boeing a one billion dollar contract for system design and development (SDD) of the E/A-18G airborne electronic attack (AEA) aircraft.[1] The SDD contract runs from 2004 through early 2009, and encompasses all

laboratory, ground and flight tests from component level testing through full-up Growler weapons system performance flight testing.

Capabilities

Transforming the F/A-18F Hornet into the Growler will require minimal structural changes and aircraft growth margin impacts are negligible.[2] Additionally, the Growler's flexible design provides the war fighter with a weapon system capable of performing multiple missions. For example, unlike its sub-sonic predecessor, the Growler has the capability to keep up with current strike aircraft by flying supersonic speeds up to Mach 1.8. The unique electronics of the AEA are installed on a gun bay pallet and in two wingtip pods which minimize the impact to the existing growth provisions in the aircraft. The Growler will house eleven wingtip stations as opposed to the five that are currently on the Prowler. These features will provide the added capability of AEA jamming pods, self-protect weapons, and other stores to meet the needs of Joint Force Commanders intent during times of crisis. With the added weaponry it brings to the fight, the Growler will have the capability to perform the common capabilities of standoff jamming, escort jamming, or something new to the electronic warfare community, self-employment time critical strike missions.

The Growler will also possess the new ALQ-218 AEA electronic suite (ICAP III) that is being produced by Northrup Grumman Corporation and incorporated into the final upgrade of the Prowlers. ICAP III will provide the Growler with state-of-the-art selective-reactive and pre-emptive jamming capability. Additionally, the AEA communications receiver and jamming electronics will provide electronic suppression and attack against communication threats. With the added feature of the advanced electronically scanned array radar (AESA), the Growler offers increased electronic warfare support and is capable of utilizing cues from the ALQ-218 precision receiver system to enable precision targeting capability.

The Growler will have self-protection equipment so that, unlike the Prowler, it will not have to rely on High Value Asset Aircraft Protection (HVAAP) for its protection. This development will free up HVAAP assets to perform other missions and will also allow the Growler to provide Suppression of Enemy Air Defenses (SEAD) for other strike aircraft and to perform other missions.

Limitations

As advanced and modern as the Growler will be, there are several Prowler capabilities that will be changed in the Growler. For example, the reduction in aircrew, from one pilot and three electronic countermeasures officers in the Prowler to

one pilot and one electronic countermeasures officer in the Growler, will increase the workload of the two-person crew. Additionally, testing is currently being performed on the stability of the receivers that will be placed in the wingtips of the Growler vice the very stable placement of the receivers on the top of the vertical stabilizer (“football”) of the Prowler.

Some may argue that the additional capabilities apparent in the Growler could potentially expand the role of the electronic warfare platform. These additional responsibilities could distract the Growler from its primary mission of electronic warfare and create just another strike aircraft in the Marine Corps and Navy inventory. However, despite the potential of additional secondary missions and the current threat environment, the Growler could play a pivotal role in the war on terrorism and should be fielded by the Marine Corps.

Research and Development

One advantage that should sell the Marine Corps on the Growler concept is that the Navy has already spent valuable time and money in research and development (R&D) and production is already underway for the new electronic warfare platform. On 15 November, 2001, the first flight test took place with the F/A-18F1 version aircraft with a payload of three ALQ-99 jamming pods and two auxiliary tanks and tested to .9 Mach, 30,000 feet

and 3 Gs.[3] Four subsequent flight tests were carried out between December 2001 and August 2002 and the results were extremely promising.

During June through December 2004, various R&D was taking place that included the first chip-cutting for an EA-18G part. Additionally, mechanics at Northrop Grumman's Integrated Systems sector were assembling the center/aft fuselage for the first of two SDD test EA-18Gs by loading the aircraft's first bulkhead into tooling on the company's F/A-18E/F production lines in El Segundo, California, and St. Louis, Missouri. The first production APG-79 AESA radar was shipped from Raytheon facilities in El Segundo, California, and arrived in St. Louis in January 2005.[4] The Marine Corps would be required to only invest minimally in Growler fielding as the bulk of the work has already been completed.

Training and Maintenance

With the future stand-down of Navy Prowler squadrons as they transfer to Growler squadrons, the Marine Corps will have to undertake the added responsibility of providing their own Fleet Replacement Squadron (FRS) to train newly winged and refresher aviators coming to the Prowler community. The cost of implementing a new FRS and taking on the additional aging fleet of Prowler aircraft from the Navy as they transition could also cause a concern. This additional responsibility will take away

more of the limited quantity of aviators and maintenance personnel already deficient at the four Prowler squadrons to operate and train aviators and maintenance personnel at a new FRS. The Marine Corps appears to have the required number of Prowler pilots and electronic countermeasures officers in its inventory. However, due to the nature of the Prowler community and the requirement for all aviators to possess a top-secret clearance, key operational billets outside the squadron requiring such a clearance look to the Prowler community to fulfill a majority of those billets.

However, by investing into the Growler concept, the Marine Corps could continue their tradition of FRS training with the Navy. This cost efficient strategy would maintain the same or possibly reduce the number of Marine FRS instructors that are currently required to train aircrew and maintenance personnel in the Prowler FRS. The Navy has already commenced the transition of some of their aircrew away from the Prowler community in preparation for the upcoming Growler training. Allowing the Marine Corps FRS instructors to slowly transition with the Navy will allow Marine Corps' instructors to keep abreast of their fellow naval aviators and will make the Marine Corp's transition to the Growler easier. As part of the Growler community, the aviators will continue to augment billets outside the squadron with high-level clearance requirements. However, with the

reduction in aircrew per aircraft, the absence of aviators within the Growler community will be less obvious than that of the Prowler community.

Conclusion

As the aging Prowler's service life is about to reach its end, the arrival of the Growler will provide the future in electronic warfare to both the Marine Corps and Navy. The capabilities that the Growler possesses will extend well beyond those of the Prowler. With its supersonic ability and additional weapon systems, the Growler will be able to perform a variety of missions in conjunction with its primary mission of electronic warfare. The Growler's advanced electronic suite will provide it with radar and communications jamming and precision targeting capability that the Prowler lacks. As the Armed Forces's sole provider of a tactical radar and communications jamming platform, the Growler will continue to meet and enhance the needs of the electronic warfare community – at least until the Marine Corps is ready to field the JSF.

WORD COUNT = 1627

Notes

1. “EA-18G Airborne Electronic Attack Aircraft,” *Boeing*, 2004, http://www.boeing.com/defense-space/military/ea18g/ea18g_back.html (10 November 2005).

2. “EA-18G Airborne Electronic Attack Aircraft,” *Boeing*, 2004, http://www.boeing.com/defense-space/military/ea18g/ea18g_back.html (10 November 2005).

3. “EA-18G Airborne Electronic Attack Aircraft,” *Boeing*, 2004, http://www.boeing.com/defense-space/military/ea18g/ea18g_back.html (10 November 2005).

4. “EA-18G Airborne Electronic Attack Aircraft,” *Boeing*, 2004, http://www.boeing.com/defense-space/military/ea18g/ea18g_back.html (10 November 2005).

Bibliography

“EA-6B Prowler.” *Northrop Grumman*. 2003. <http://www.is.northropgrumman.com/products/navy_products/ea6b/ea6b.html> (27 November 2005)

“EA-6B Prowler.” *Naval Historical Center*. 2000. <http://www.history.navy.mil/planes/ea6.htm.> (27 November 2005).

“EA-18G Airborne Electronic Attack Aircraft.” *Boeing*. 2004. <http://www.boeing.com/defense-space/military/ea18g/ea18g_back.html> (10 November 2005).

“ON THE PROWL: The EA-18G Growler.” *Military.com*. 2004. <http://www.military.com/soldiertech/0,14632,Soldiertech_EA18G,,00.html> (29 November 2005).

“Prowler Replacement Sought.” *FLUG REVUE*. 2003. <http://www.flugrevue.rotor.com/FRheft/FRH0303/FR0303b.htm> (29 November 2005).