Improving the Surface Launched Advanced Medium Range Air-to-Air Missile (SLAMRAAM) System

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Improving the Surface Launched Advanced Medium Range Air-to-Air Missile (SLAMRAAM) System

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In a statement to *The Washington Post*, 18 August 2002:

> "Defense Secretary Donald H. Rumsfeld has sent the White House a classified memo warning of the spread of cruise missiles among hostile nations… ready availability around the world of cruise missile technology and the continued vulnerability of U.S. troops and population centers to attack by low-flying, hard-to-detect weapons… 'We see this as a potential near-term threat, a poor man's cruise missile- a UAV acquired off the shelf and then modified to deliver chemical or biological agents,' the official said."[1]

As evident from the U.S. experiences in Afghanistan and Iraq, having the best technology does not always give a state the tactical advantage in today's complex, low-intensity operational environment. The enemy has adjusted their tactics to combat the United States' superior technological advantage on the ground and in the air successfully using many low tech solutions. Since the collapse of the Soviet Union the United States has not been threatened by an enemy from the air using advanced aircraft and helicopters. The trend has shifted to less expensive, low tech aerial weapons, and just as with ground combat the United States must adapt to the new threats. The current U.S. air defense weapons systems are not capable of meeting all of these new threats, so the U.S. Army and Marine

Corps have developed the Surface Launched-Advanced Medium-Range Air-to-Air Missile System (SLAMRAAM) as the answer. This system is a highly capable but technically complex weapon and is an example of the United States using technology to meet all problems. The SLAMRAAM must have the capability to operate manually in a degraded environment likely used by the current less technical enemy. However, in order to defend effectively against today's emerging air threat, the SLAMRAAM needs a manual engagement capability.

Threat

Since the end of the Cold War, the US has seen a decrease in the procurement of expensive fighters, bombers, and attack helicopters by other countries in favor of cheaper tactical ballistic missiles (TBM), the cruise missile (CM), and unmanned aerial vehicles (UAV). Many countries have realized that these lower tech weapons get them more "bang for the buck" from their defense spending. In fact, the cruise missile threat to U.S. forces will increase over the next decade. "At least nine foreign countries will be involved in LACM production during the next decade, and several of the LACM producers will make their missiles available for export."[2] TBMs, CMs, and UAVs do not require the burden of training pilots and mechanics to maintain their effectiveness, and these systems can still deliver conventional, chemical, biological, and even nuclear payloads.

"In the Future Operational Environment (FOE), U.S. forces will face adversaries who have observed U.S. operations and adapted to counter strengths and exploit actual or perceived U.S. weaknesses."[3] The enemy will employ asymmetric aerial threats in the future and the U.S. air and missile defense force needs to be prepared the counter this threat. (See Figure 1)[4]

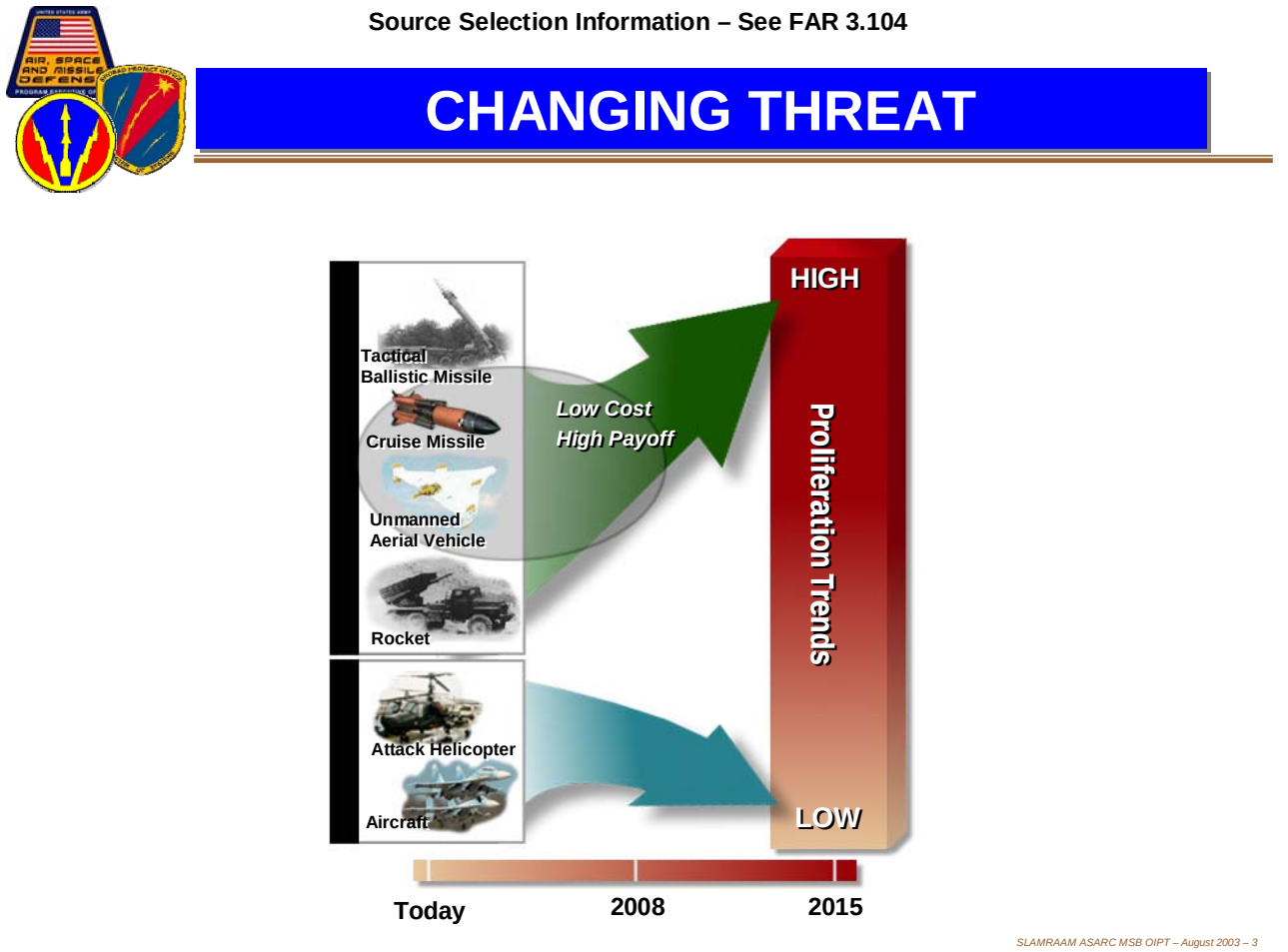

Figure 1

Unfortunately, although the US has made tremendous strides in countering the TBM threat with the development of the Patriot Missile System, the U.S. still lacks an effective counter for the CM threat. The current Stinger-based air defense systems(Avenger and MANPADS) used by the U.S. Army and Marine Corps have a very limited CM capability and lack the engagement range to protect the ground forces effectively from a CM air attack.

The cruise missiles in operation today fly at high speeds and can remain below many air defense radars. Most Avenger units within the Army and Marine Corps do not have the capability to locate and track cruise missiles far enough in advance to destroy them before they cause damage to a defended asset. Avenger gunners simply cannot manually track and engage small and fast targets like the current CM threat. Seeing this decrease in manned aircraft procurement and the inability of current air defense artillery systems to counter a CM attack effectively, the U.S. decided they needed a system capable of defeating these new threats. This system would need to be capable of being able to deploy anywhere in the world on short notice and provide continued protection for selected assets from the current enemy air threat[5].

Current SLAMRAAM Configuration

SLAMRAAM, with its advanced medium range air-to-air missile (AMRAAM), can track and engage CM and other aerial targets up to twenty kilometers away. This capability is exactly what the Army and Marine Corps need to defeat the current enemy air threat, but this enhanced capability has its disadvantages as well. The current configuration for the SLAMRAAM is a fairly complex system. Unlike the Avenger, which can be operated manually by a two-man crew collocated with the fire unit, the SLAMRAAM must be linked together in a network consisting of a sensor, a fire control center, and launcher platform. (See Figure 2)[6]

To employ the SLAMRAAM, each of these three elements must be operational. The sensor, which can be a Sentinel radar, a Patriot radar, or airborne platform, must acquire the target and continue to track it. Once the target has been acquired, the information is sent back to a Fire Direction Center (FDC) where the target is processed against engagement criteria. Once the determination has been made to engage the target, the FDC fires a missile from one of the launcher stations. If any one of the three main components of the SLAMRAAM system is destroyed or neutralized, the whole system is combat ineffective. This is a critical vulnerability the enemy is sure to exploit.

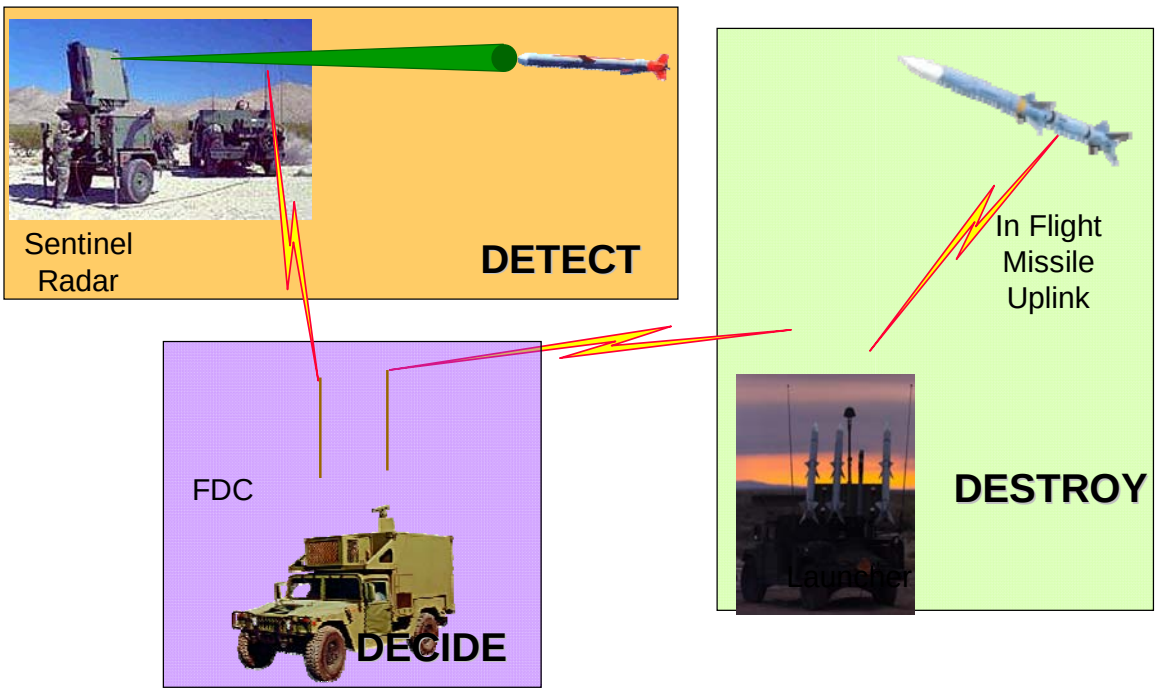

Figure 2

For example, "During Operation Iraqi Freedom, the Iraqis fired at least five Seersucker cruise missiles against targets on land. The Seersucker attacks were an improvisation that caught American commanders by surprise. None of the missiles were detected by the American warning systems and the American military was powerless to intercept them. 'This was a glimpse of the future threats. It is a poor man's air force. A thinking enemy will use uncommon means such as CMs and UAVs to fight on multiple fronts.'" COL(P) Chuck Anderson, Chief of Staff, 32nd

AAMDC.[7] The enemy has adapted to the U.S. technological advantage and developed ways to counter it. Air and missile defense forces can expect the same tactics to be applied to defeat U.S. air defense systems.

Proposed Manual Engagement Capability

Although the SLAMRAAM can track and engage small, fast moving aerial targets out to twenty kilometers it presently does not have the capability to operate without one of the three key components in the system. The Avenger system the SLAMRAAM is set to replace, although limited in engagement range, can be operated manually in a degraded environment. "The Avenger weapon system, like all other modern-day weapons systems, must have a backup system when the main system is nonfunctional."[8] The two-man crew collocated at each fire unit, can manually track and engage targets either using sensors or using visual contact. However, this manual capability is not an option built into the current three-part SLAMRAAM structure.

With the rise in lower cost unmanned aerial threats that will be employed by an enemy fighting in an asymmetric operating environment, U.S. air and missile defense forces must maintain the ability to fight using centralized command and decentralized control. This concept means that air defense fire units need to

be able to operate and engage targets independently across the battle space. Realizing that the preferred method of employing the SLAMRAAM would be in an intergraded network which would maximize the use of multiple sensors and enable the missile to engage targets at maximum range, just as the system has been tested, SLAMRAAM must also have the capability to engage targets from the fire unit by the crew that is collocated with the system. This would provide redundant coverage across the area of operations even if one or more of the three elements is neutralized or destroyed. By giving the SLAMRAAM a manual engagement capability, U.S. air and missile defense forces would combine the increased engagement range of the current SLAMRAAM system with the optional manual engagement capability of the Avenger.

Conclusion

Today's air threats, such as CMs and UAVs, require complex air defense systems like the SLAMRAAM to protect U.S. assets. Technology can provide many of the solutions needed to combat these threats, but the enemy is constantly evolving to defeat technology based systems. In response, the U.S. air and missile defense forces must have systems that can still provide effective air defense coverage in a degraded environment.

SLAMRAAM can be this system if its enhanced engagement capability were combined with the ability to operate degraded in a manual mode.

Word Count: 1,451

[1]*SLAMRAAM ASARC MSB OIPT* (August 2003), 2.

[2]*Ballistic and Cruise Missile Threat* (Wright-Patterson Air Force Base, Ohio: National Air and Space Intelligence Center, [August 2003]), 22.

[3] *TRADOC Pamphlet 525-3-01.94 O&O, The United States Army Air and Missile Defense Concept and Operational and Organizational (O&O) Plan for the Future Force* (Ft. Bliss, TX: Directorate of Combat Developments US Army ADA School, [August 2004]), 2-2.

[4] *SLAMRAAM ASARC MSB OIPT* (August 2003), 2.

[5]*Mission Need Statement (MNS) For Land Attack Cruise Missile Defense (LACMD)* (2003), 3.

[6] *Surface Launched AMRAAM Air Defense Guided Missile System* (April 2005), 8.

[7] *SLAMRAAM ASARC MSB OIPT* (August 2003), 2.

[8]*FM 44-44 Avenger Platoon, Section, and Squad Operations* (Washington, DC: Department of the Army, [October 1995]), K-6.

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