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NATIONAL SECURITY WATCH

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NATIONAL SECURITY WATCH

The Cruise Missile Threat: Prospects for Homeland Defense

Increasing attention is being focused on current Department of Defense (DoD) plans for an integrated, joint cruise missile defense (CMD) capability to protect the United States. The threat posed by the shorter-range, relatively inexpensive cruise missile has long been considered primarily a theater/geographic combatant commander issue. The services have devoted considerable resources to addressing this theater mission area based on their respective service needs. However, with the advent of more easily attainable missile guidance and weapons technology, a wide variety of potential adversaries can now buy or build a cruise missile to directly attack the United States. The missiles' proven effectiveness and the ease of obtaining cruise missiles are especially attractive to terrorists or other non-state actors, making proliferation even more disconcerting. Given these trends, the threat of an attack by a cruise missile on the United States is ever more plausible and the necessity for a coherent defense against this threat is increasingly urgent. The challenge will be to integrate all the service-focused capabilities into a joint integrated warfighting architecture that develops synergy and efficiency from weapon system engineering, risk mitigation and cost effective development processes. Current efforts to create this focus include designating a single integrating authority with a lead agency or organization with the authority to facilitate joint, interagency and multinational CMD integration.

DoD defines a cruise missile as "a guided missile, the major portion of whose flight path to its target is conducted at approximate constant velocity; depends on the dynamic reaction of air for lift and upon propulsion forces to balance drag." Cruise missiles can be launched from the air, from ships and submarines at sea or from land. While cruise missiles are not new weapons, the technology now available is making them much more accurate, versatile and lethal.

Cruise missiles are an especially difficult target for current active defenses to detect, track and intercept. Defenses that exist today protect only small areas or unique, high-value assets. The best defense against a cruise missile would be—as for protecting against ballistic missile attack—to destroy the launch platform prior to launch. However, because of the relatively small size and modest launching infrastructure needed to support a cruise missile, finding and neutralizing it with offensive, preemptive counterforces may be problematic for any joint force commander.

Deployed forces of the United States and its allies have typically been regarded as the primary targets of a cruise missile threat. In Operation Iraqi Freedom, U.S. forces were targeted by Land Attack Cruise Missiles (LACMs) for the first time. However, the fact that LACMs historically have been used in overseas areas does not preclude their use against the U.S. homeland. While current cruise missile inventories have mostly modest ranges, it is very feasible to launch cruise missiles using asymmetrical tactics and

locations. For example, some 75 percent of the population of the United States and 80 percent of its economic power are located within 200 miles of a coastline. With increasing threats of cruise missiles armed with Weapon of Mass Destruction (WMD) warheads, there is a real possibility of significant damage to key population centers and vital, homeland-based military assets.

DoD recognizes the pressing need for an improved active defensive capability to protect the homeland from attack by cruise missiles. At the same time, any improvements in homeland defense capabilities will also improve CMD of deployed forces, friends and allies. While some CMD capability already exists and technology for improvement is being developed by the services, the processes necessary to integrate into a holistic, warfighter operational and system architecture are lagging.

Cruise Missile – Weapon of Choice

Technological advances have greatly improved the accuracy of cruise missiles, turning them into precision weapons capable of effectively destroying specific targets. The Global Positioning System (GPS) and its Russian counterpart, the Global Orbiting Navigation Satellite System (GLONASS), have made cruise missiles much more effective at longer distances. Because technology such as GPS is available commercially, anyone who can obtain an older cruise missile can greatly improve its precision at a relatively low cost.

A number of other factors make cruise missiles attractive to U.S. adversaries. Cruise missiles are cheaper to build and buy than ballistic missiles, making them attractive to countries with less advanced militaries and to non-state actors as well. Tracking proliferation of cruise missiles is difficult because the materials and technology involved have multiple uses. They are also easy to hide and transport/relocate because of their smaller size. Once launched, these low-flying missiles are especially difficult to detect/engage in the clutter of ground objects. The restrictions of line-of-sight, due to the earth's curvature, on surface-based sensors also make detection and engagement extremely difficult; that is, a low-flying CM cannot be seen until it breaks the sensor's horizon, usually at close range. Current technology also makes cruise missiles more versatile by making it easier to convert one type to another (e.g., an anti-ship cruise missile for use against targets on land).

Current CMD Responsibilities/Capabilities

Prior to 11 September 2001, the North American Aerospace Defense Command (NORAD), the combined U.S.-Canadian headquarters located in Colorado Springs, Colorado, was the leading element responsible for cruise missile defense of North America. Following the terrorist attacks on the U.S. homeland, NORAD's mission was expanded to include all low-altitude threats to North America (i.e., civil aircraft and unmanned aerial vehicles, or UAVs) and was renamed Homeland Air and Cruise Missile Defense of North America (HACMD of NA). The Joint Requirements Oversight Council (JROC) charged NORAD with creating the Joint Capabilities Document (JCD) for HACMD. The document, staffed within the Canadian and United States militaries, identifies the need for interoperability and cooperation among Canadian and United States defenses and other governmental interagency entities responsible for both homeland security and homeland defense.

Within DoD, each branch of the armed services has responsibility to develop and field cruise missile defense capabilities. In addition, the Assistant Secretary of Defense for Homeland Defense, Joint Forces Command, the Defense Advanced Research Projects Agency and the Defense Intelligence Agency all have roles in CMD. Outside DoD, the Central Intelligence Agency, the Coast Guard and the Federal Aviation Administration also have responsibilities regarding CMD. Specific service and agency responsibilities include:

Army. The Army is the lead service for development of a ground-based defense against air-breathing threats, including aircraft and missiles:

- The Patriot Capability 3 (PAC-3) missile, used during Operation Iraqi Freedom, can intercept and destroy incoming cruise and ballistic missiles. An extended-range version of the PAC-3 interceptor is under development. PAC-3 defense is limited to relatively small areas, or point defenses.
- The Medium Extended Air Defense System (MEADS), jointly undertaken by the American, German and Italian militaries, will be operational in the post-2010 timeframe. MEADS will provide 360-degree surveillance and tracking against airborne and ballistic missile threats. MEADS technology will be integrated into the force(s) as it becomes available. Like PAC-3, MEADS will be limited to small-area or point defenses.
- The Joint Land Attack Cruise Missile Defense Elevated Netted Sensor (JLENS) is an aerial sensor that will detect and identify cruise missiles and other low-flying objects at greater ranges and provide engagement-quality data to shooters. JLENS provides sustainable, long-term tracking and identification, as it can remain airborne for many days at a time at a relatively low cost. This system will combine with PAC-3 and MEADS to greatly increase intercept range, thereby allowing in-depth defense of larger areas.
- The Army's Short-Range Air-Defense (SHORAD) system will also have a role in CMD. SHORAD has the ability to fire surface-to-air missiles (SAMs) from various platforms to engage all air-breathing targets, albeit at very close ranges.

Navy. The Navy also has extensive experience in defending against low-flying weapons like cruise missiles. The Aegis Combat System, the E-2C Hawkeye aircraft and the Cooperative Engagement Capability (CEC) make up the Navy's main CMD capability.

- The Aegis Combat System is used primarily in the fleet air and missile protection mode but can provide limited shore-based asset defense.
- CEC is a sensor networking technology integrated on Navy assets to allow the merging of radar data from many different CEC-equipped sources. With the completed installation of CEC in the fleet, all members of battle groups will have an integrated air picture, resulting in enhanced reaction time and weapons performance. Weapons will also be able to engage more quickly and at greater ranges than when they relied on local sensors.
- The airborne E-2C Hawkeye detects long-range, over-the-horizon cruise missiles and directs fighter intercept of the hostile tracks at greater ranges.

These three capabilities combined can provide a comprehensive, single integrated air picture that greatly extends the detection, tracking and engagement of cruise missiles.

Air Force. The Air Force traditionally has been the lead in defending the homeland from the air. Today, the Air Force uses surface and airborne sensors data-linked to airborne interceptors and their air-to-air missiles. The fighter interceptors and the Airborne Warning and Control System (AWACS) are the foundation of the Air Force's current CMD capabilities.

- The fighter interceptors carry air-to-air missiles. The F/A-22, the replacement for the F-15, is designed (in addition to other missions) to defend against cruise missiles at home and in forward areas.
- AWACS can provide surveillance data on low-flying objects in the range of most cruise missiles, detect and identify potential threats and interact with fighters to intercept and neutralize the threat.

Warfighters

Combatant commands, in coordination with the services, are responsible for identifying capabilities needed for cruise missile defense. Currently, the Joint Staff's Joint Theater Air and Missile Defense Organization (JTAMDO) and United States Northern Command (USNORTHCOM) are the two lead agencies charged with ensuring that joint doctrine and operational concepts support a national CMD. JTAMDO was established in 1997 to serve as a coordinator for defense against ballistic missiles; since 2001, it has also served as the main planning body for defining joint command and control (C2) relationships for cruise missile defense. In a dual-hatted role, USNORTHCOM presently leverages NORAD air defense forces for homeland air defense within the United States. USNORTHCOM is also participating in the joint Integrated Air Missile Defense (IAMD) study being led by Army's Air Defense and Artillery Center at Fort Bliss, Texas. The study's focus is on providing the roadmap for evolving the civil-military relationships to enhance HACMD of NA. As part of this endeavor, USNORTHCOM is responsible for developing a methodology/capability to identify and engage airborne cruise missiles. This methodology will include a net-centric approach in which military and defense agencies can cooperate seamlessly with other governmental agencies as well as with allies.

The United States Coast Guard (part of the Department of Homeland Security) and the Federal Aviation Administration (FAA, under the Department of Transportation) also have capabilities important to a national CMD. Their roles will expand exponentially with the maturation of the HACMD of NA.

Action toward creating a coordinated effort within DoD for CMD was made law as part of the Fiscal Year 2006 National Defense Authorization Act. The legislation creates a designated official (known as an executive agent) in DoD responsible for coordinating, integrating, funding and acquiring the needed programs to provide a coherent CMD. The executive agent will work with the U.S. Strategic Command, the Missile Defense Agency, JTAMDO, USNORTHCOM and other agencies both within and outside DoD that play a role in CMD. As part of the legislation, within six months of its enactment the Secretary of Defense will compose, for submission to appropriate committees within Congress, a comprehensive plan to defend against cruise missiles, UAVs and other low-altitude aircraft. The CMD plan will focus on how DoD will counter cruise missile attacks by identifying the capabilities required to provide a comprehensive CMD. It will have an implementation schedule and an estimate of required funding. The plan will identify CMD roles and missions for non-DoD entities and will be coordinated with the already existing plan to defend against ballistic missiles. Passage of the legislation was a mark of significant progress for a coordinated, integrated, multiagency CMD.

Conclusion

The key to a good CMD defense is integrating the active defensive and offensive counter-air capabilities into a seamless, holistic command, control, battle management and communications (C2BMC)-based operational architecture. Therefore, a net-centric C2 architecture is essential. Such a network would be able to use real-time intelligence and other key data in a timely matter. The holistic defense would provide constant and persistent surveillance of potential avenues of attack. The surveillance and tracking capabilities would also be able to differentiate, at the earliest time and greatest range possible, the various platforms from which a cruise missile could be launched. This would enable the real-time application of offensive capabilities to provide prelaunch interdiction whenever and wherever possible. These 24/7/365 capabilities will be critical since a cruise missile can be launched from the air, sea or land, potentially originating from a commercial or civilian vehicle.

The active defense capabilities must also be brought to bear at the earliest opportunity so that intercepts take place at ranges that preclude residual damage from weapons of mass destruction (WMD) whenever

possible. These active defense resources will also rely on the real-time data provided by long-range, persistent sensor capabilities distributed by the net-centric operational architecture. The primary means of active defense are based on engagement sequence groups (ESGs), also known as “kill chains.” ESGs are a combination or grouping of sensor(s), weapons (interceptors) and command and control nodes used to execute the engagement. ESGs must be provided to the commander(s) responsible for the protection of the homeland at the right time and for adequate duration. Ideally, ESGs will reach over the horizon to intercept as well as execute the traditional, closer in, point-defense engagement.

However, cruise missile defense of the homeland must be more than just a DoD function. This must be a total effort by all government agencies that can bring appropriate resources to bear. An integrated information network is required to enhance the dedicated, focused cooperation among the military services and other government agencies that will design and emplace an effective defense. A lead agent or agency to facilitate joint, interagency and multinational CMD integration is paramount to ensure this cooperative effort. A single integrating authority must be established to ensure an expeditious, efficient, cost-effective effort to provide the resources, leadership and planning to accomplish the CMD mission. It will be absolutely critical that focused, integrated development and fielding processes for CMD capabilities be established and enforced. The defense must be an integrated combination of active defense and offensive efforts. In sum, for this nation to have a coordinated and effective cruise missile defense, senior leaders must move expeditiously to provide all necessary resources, especially funding, as quickly as possible.

