

# ARCHIVED REPORT

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## AGM-84E SLAM

### Outlook

- Production concluded
- Further orders to support line did not appear
- Demand shifting to newer stand-off strike missiles
- Weak interest in SLAM and SLAM-ER has long existed
- Customers for the SLAM and SLAM-ER include the U.S., South Korea and Turkey
- Prospects for future orders are very few
- SLAM-ER was used in combat in Iraq

### Orientation

**Description.** Stand-off attack missiles.

**Sponsor.** The United States Department of Defense through the U.S. Navy. Management is by the Joint Cruise Missile Project Office and the Naval Air Systems Command, Washington, DC.

**Status.** Fabrication of the SLAM-ER missile is continuing. Full-scale production was approved in May 2000.

**Total Produced.** The first Stand-off Land Attack Missile (SLAM) was rolled out in November 1988.

Approximately 755 SLAM and 714 SLAM-ER missiles were completed.

**Application.** Air- and surface-launched missile system for attacks on land-based targets.

**Price Range.** The SLAM is expected to cost approximately \$655,000 per unit, although some sources have placed the price as high as \$800,000. The SLAM-ER will have a price in the area of \$400,000 to \$450,000.

### Contractors

#### Prime

<b>Boeing Defense, Space &amp; Security</b>	<a href="http://www.boeing.com">http://www.boeing.com</a> , PO Box 516, St Louis, MO 63166 United States, Tel: + 1 (314) 232-0232, Fax: + 1 (314) 777-1096, Prime
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#### Subcontractor

<b>General Dynamics OTS DRI Inc</b>	<a href="http://www.gd-ots.com">http://www.gd-ots.com</a> , 1425 Commerce Blvd, Anniston, AL 36207-9407 United States, Tel: + 1 (256) 835-1660, Fax: + 1 (256) 835-0473 (SLAM-ER Warhead Casings)
<b>M/A-COM Inc</b>	<a href="http://www.macom.com">http://www.macom.com</a> , 1011 Pawtucket Blvd, Lowell, MA 01853 United States, Tel: + 1 (978) 442-5000 (Antenna)

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<b>Rockwell Collins Inc</b>	http://www.rockwellcollins.com, 400 Collins Rd NE, Cedar Rapids, IA 52498-0001 United States, Tel: + 1 (319) 295-1000, Fax: + 1 (319) 295-5429 (Global Positioning System (GPS) Receiver)
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## Technical Data

**Design Features.** The SLAM is very similar in appearance to the Harpoon, although it is longer and heavier. However, the SLAM-ER has a redesigned airframe and is outfitted with planar wings.

	<u>Metric</u> SLAM	<u>Metric</u> SLAM-ER	<u>Metric</u> Sea SLAM	<u>U.S.</u> SLAM	<u>U.S.</u> SLAM-ER	<u>U.S.</u> Sea SLAM
<b>Dimensions</b>						
Length	4.49 m	4.369 m	5.28 m	14.72 ft	14.33 ft	17.33 ft
Diameter	34.29 cm	34.29 cm	34.29 cm	13.5 in	13.5 in	13.5 in
Weight	629.5 kg	635 kg	783.64 kg	1,385 lb	1,397 lb	1,724 lb
Wingspan	91.44 cm	218.2 cm	N/A	36.03 in	85.97 in	N/A
<b>Performance</b>						
Speed	Mach 0.75	Mach 0.75	Mach 0.75	Mach 0.75	Mach 0.75	Mach 0.75
Range (min)	13-15 km	13-15 km	N/A	7-8.09 nm	7-8.09 nm	N/A
Range (max)	100 km	277.8 km	92.6+ km	54 nm	150 nm	50+ nm

N/A = Not Available.

**Propulsion.** Teledyne CAE J402-CA-400 turbojet with 2.97 kN (660 lbst). The Sea SLAM version is equipped with an additional solid-propellant tandem booster jointly produced by Thiokol and Aerojet. The thrust of this booster is 59.4 kN (13,200 lbst) for 2.9 seconds.

**Control & Guidance.** The SLAM is equipped with the same inertial guidance system, featuring an active radar seeker, as the Harpoon, but it adds the imaging infrared seeker assembly from the AGM-65D Maverick and a GPS receiver provided by Rockwell Collins, Cedar Rapids, Iowa. The missile is equipped with a link originally provided by the U.S. Naval Avionics Center and taken from a Walleye glide bomb. New datalinks are being manufactured for the SLAM by Harris Corporation. The control surfaces are electro-mechanically actuated.

The SLAM-ER has been equipped with an automatic-target-recognition (ATR) capability that allows the missile to use pixel- or scene-matching algorithms.

This enables pilots to find targets in cluttered environments or bad weather.

**Launcher Mode.** The SLAM missiles are capable of being launched from aircraft or surface combatants. The initial launch platform for the SLAM was the F/A-18 Hornet. The missile has also been integrated with the P-3C Orion maritime patrol aircraft, the S-3 Viking, and South Korea's F-15K fighters. Other aircraft could be added to this list in the future.

**Warhead.** High-explosive type, weighing 221.86 kilograms (488.1 lb) developed by Naval Weapons Center, China Lake, California. Fuzing is contact, proximity, and delay. One fuze is the FMU-109/B. The AGM-84E SLAM may carry the improved I-800 or even the U.K.'s BROACH (Bomb Royal Ordnance Augmented Charge) penetrator warhead. Boeing is examining a submunition dispensing warhead option for the SLAM (work started in August 1994).

## Variants/Upgrades

The SLAM has been manufactured in two versions: the AGM-84E, which includes the SLAM P<sup>3</sup>I, providing an improved datalink and higher altitude launch capability,

and the AGM-84H Expanded Response (ER), which includes enhanced warhead effectiveness, planar wings, and improved terminal sensors. A modified version of

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the SLAM-ER, which includes further capability upgrades, is known as the AGM-84K.

The U.S. is also studying a Sea SLAM version that can be fired from existing Harpoon box launchers or a vertical launch system (VLS). Further upgrades enable

the SLAM-ER to engage moving targets, such as missile launchers and mobile radars.

For additional information on these and other SLAM upgrades, please see the entries in the **Program Review** section.



SLAM-ER

Source: Boeing

## Program Review

**Background.** The AGM-84E Stand-off Land Attack Missile (SLAM) was the result of the experience the U.S. gained during the April 1986 raid against Libya. During that attack, the U.S. Navy found that it lacked a missile capable of being deployed from a carrier-based aircraft that could strike high-value, near-shore targets, such as port facilities and ships at anchor.

### *Navy Enhancing Stand-Off Capability*

In mid-1986, the U.S. Navy announced its requirement for the SLAM. The weapon would have to be more effective and accurate than conventional iron bombs, but less expensive than the BGM-109 Tomahawk, bridging the gap between the AGM-65 Maverick and Tomahawk missiles. At the time, the SLAM was expected to be an interim solution until the (then) new Advanced Interdiction Weapon Systems (AIWS) became available (AIWS is now known as the Joint Stand-Off Weapon).

The U.S. decided that the best way to meet this need was with a derivative of the Harpoon anti-ship missile (see separate "AGM/RGM/UGM-84 Harpoon" report, located in Tab E).

**Missile Models.** The Harpoon anti-ship missile was used as the basis for the SLAM. Originally an interim program, this effort has slowly evolved, providing an increasing number of requirements for various systems.

**AGM-84E SLAM.** Basically, the new missile is a slightly longer and heavier version of the standard AGM-65D Maverick and a GPS receiver to attain a high degree of accuracy. The guidance system is assisted by the use of a mid-course update using the datalink from the Phase II Walleye-guided bomb (this datalink will be replaced by a new unit). All of the hardware used in the initial SLAM was already in existence or modified from standard equipment.

SLAM is not a fire-and-forget weapon, although the system can be preprogrammed with as many as three flight plans. The missile is loaded before takeoff with the coordinates of several targets, and the operator selects the target before the missile releases. The GPS receiver then guides the missile to a point where the target should be within its IIR seeker's field of view. The inertial system will then point the seeker at the target and the datalink will automatically activate, transmitting a video image to the launch aircraft. The operator adjusts the aimpoint and keeps the missile on target. Once this is completed, the launch aircraft can disengage. The SLAM is expected to have a maximum range of 60 kilometers.

A contract was signed in February 1987 for integration, test, and first-year limited production. Also included in the award were three options for additional production lots. In late 1987, McDonnell Douglas was awarded a \$20 million increment for the development and limited

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production of 14 SLAMs. In June 1988, the U.S. Navy awarded McDonnell Douglas a \$27.1 million contract for the production of 25 SLAMs. In April 1989, it awarded an additional \$60 million contract for the production of 72 SLAMs for FY89. Procurement for FY90 was 125, and for FY91, 167.

The SLAM was used for the first time in combat during Operation Desert Storm.

**AGM-84E P<sup>3</sup>I.** The U.S. Navy has also initiated a SLAM P<sup>3</sup>I (Pre-Planned Product Improvement) effort, also known as Improved SLAM or SLAM II, which will take advantage of technological advancements and correct problems encountered during Operation Desert Storm. The service has already installed new guidance computer software, which increased the allowable altitude and ambient temperatures for SLAM flights. Previously, the SLAM could be launched only at high altitudes over water. Other improvements include simplifying the missile's launch and target designation, improving over-land performance, and increasing range by up to 20 percent through the installation of energy management guidance (the missile would glide toward the target before initiating powered flight). The Improved SLAM became available for service with the U.S. Navy in March 1993.

**AGM-84H SLAM-ER.** A more ambitious upgrade program is the SLAM-ER (Expanded Response), which includes an enhanced warhead, better range, an advanced datalink and target opportunity mode, and a jam-resistant five-channel GPS navigation capability. This smaller and more accurate GPS unit replaces the current GPS receiver/processor, mid-course guidance unit, and guidance interface unit. Also, this upgrade will allow the pilot to target the missile from the cockpit. Additional upgrades include an improved real-time target designation. New software is provided that freezes the video image and cuts acquisition time to about three seconds. This feature also allows the pilot to continue scanning after the initial target lock-on. The SLAM-ER's enhanced warhead will provide better penetration of non-buried hard targets. The new warhead will be similar to that used in the Tomahawk Block III missile, but scaled down to fit the SLAM airframe. Software will allow SLAM-ER flights to be generated on tactical mission planning systems, thereby reducing current mission planning times from two to three hours to just 20 to 60 minutes.

Planned airframe changes include a new V-shaped weather-resistant germanium fairing window around the Maverick IIR seeker, a datalink antenna relocated from the bottom of the missile's boat tail to the aft area of this section, and the substitution of gull-like planar wings (being developed by Midcast Engineering, Wellman, U.K.) for the current cruciform wings. The wings are

attached to gull-wing root fairings that allow the swing-out panels to be stowed under the aft fuselage. The improved aerodynamics of the planar wings will more than double the missile's range at high altitudes and boost it by 50 percent at lower altitudes.

The SLAM-ER will be fitted with a variable-throttle engine control to permit fuel efficiency, which will be integrated with a new air data system that provides more precise velocity data. When used with automated mission-planning software that shows the height of obstacles, these systems will allow the missile to fly mission profiles that parallel terrain contours. Current weapons fly relatively level profiles.

### ***SLAM-ER Selected Over TSSAM***

The U.S. Navy received a single bid for the SLAM-ER from McDonnell Douglas (now part of Boeing). The program entered an engineering and manufacturing development phase in FY94. The SLAM-ER program received a boost with the cancellation of the Tri-Service Stand-off Attack Missile (TSSAM) development effort, since it was the U.S. Navy's only near-term alternative to the TSSAM.

The SLAM-ER capabilities will be retrofitted into the baseline SLAMs. Further improvements are being incorporated into the SLAM-ER, including an automatic target acquisition system. This would turn the SLAM-ER into SLAM-ER Plus (SLAM-ER+). This upgrade allows the missile to select its target and aimpoint without guidance from the aircraft's pilot, based on data provided during the SLAM-ER's mission planning phase. Also, SLAM-ER now has the capability to be retargeted during flight and to engage moving targets. Deployment of these new capabilities occurred in 2005.

**Sea SLAM.** This is a ship-launched variant of the SLAM being studied by the U.S. Navy. Sea SLAM is seen as possibly filling an operational need within the U.S. and allied armed forces for an affordable ship-launched missile with surgical strike capability against high-value fixed-land targets, ships in port, and ships in the littoral environment at stand-off ranges greater than 50 nautical miles.

Demonstrations of a shipborne SLAM have taken place since 1990. On August 24 of that year, a successful launch was completed against a target ship. An SH-60B LAMPS Mk III helicopter assigned to the ship was fitted with a data pod to receive the video image transmitted by the missile. The helicopter employed the data pod to designate the aimpoint for the weapon in its final moments of flight.

In April 1996, Sea SLAM performed precision strikes against a small land target in two successful

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back-to-back tests. The first missile, controlled in the terminal phase by an SH-60 LAMPS helicopter, impacted the target precisely according to plan. The following day, a second missile, controlled by a U.S. Marine Corps F/A-18 Hornet, flew through the hole made by the first missile.

Sea SLAM can carry submunitions or unitary payloads. Potential submunition payloads include eight Brilliant Anti-Tank munitions and 153 Combined Effects

Bomblets. Sea SLAM is compatible with the existing Harpoon command and launch infrastructure. Software modifications and a Harpoon missile booster kit convert air-launched SLAMs to Sea SLAMs. The missile was offered to meet the U.S. Navy's Naval Surface Fire Support (NSFS) 84 Harpoon requirement. The new missile uses the same inertial guidance system, with active radar, but it adds an imaging infrared seeker assembly.

## Related News

**UAE Wants Rafale Fighters to Carry SLAM-ER** – The United Arab Emirates wants any Rafale fighters it purchases to carry the Boeing AGM-84H Stand-off Land-Attack Missile - Expanded Response. Dassault is offering the Rafale fighter equipped with the AM39 Exocet missile. The SLAM-ER has much greater range than the Exocet (160 miles vs 60 miles). The UAE does not currently have the SLAM-ER in its inventory.

France is attempting to convince the UAE to purchase 60 Rafale fighters. Dassault is working hard to win its first export order for the Rafale. An agreement to sell the Rafale to Brazil appears unlikely to happen. (UPI, 2/10)

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## Funding

U.S. procurement of the SLAM and SLAM-ER has concluded. Full-scale production for the SLAM-ER was approved in May 2000. In FY98 and prior years, SLAM-ER funding was part of the Harpoon Mods line. Under this budget line, 60 SLAMs were modified at a total cost of \$20.7 million. Approximately \$24.3 million of the FY99 funding (48 missiles) rode on the FY00 contract. The FY00 quantity also included Kosovo supplemental funds to buy 12 replacement missiles. Three SLAM-ERs were used during Operation Iraqi Freedom.

Further funding for SLAM-ER was provided in FY07. This funding supports development of a modification to the SLAM-ER missile and the AWW-13 Data Link Pod to comply with the datalink frequency sell-off mandated by the Commercial Spectrum Enhancement Act (CSEA). This effort will establish a retrofit kit for the missile and pod. All of the SLAM-ER missiles, projected at approximately 490, will be retrofit to the new configuration, with the installation occurring at the recertification interval. The number of pods to be converted will be determined by the fleet and is expected to be between 150 and 190.

### U.S. FUNDING

	FY05 QTY	FY05 AMT	FY06 QTY	FY06 AMT	FY07 QTY	FY07 AMT	FY08 QTY	FY08 AMT
<b>U.S. Navy</b>								
<b>Proc</b>								
SLAM-ER	-	-	-	-	-	60.7	-	-
<b>RDT&amp;E</b>								
Proj - 1	-	-	-	-	-	-	-	-
<b>Total</b>	-	-	-	-	-	<b>60.7</b>	-	-

All \$ are in millions.

**Proj - 1** PE#0604603N Unguided Conventional Air-Launched Weapons Project A2183 SLAM-ER.

## Contracts/Orders & Options

On Feb 11, 2009, McDonnell Douglas Corp, a wholly owned subsidiary of The Boeing Co, St. Louis, MO, was awarded a \$5,736,345 firm fixed price order against a previously issued basic ordering agreement for logistic services in support of the Harpoon and SLAM-ER Programs for the U.S. Navy (\$1,961,744; 34.20 percent); and the

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Governments of Korea-Navy (\$349,610; 6.10 percent); Korea-Air Force (\$338,840; 5.90 percent); the United Kingdom (\$291,957; 5.10 percent); Egypt (\$270,347; 4.70 percent); Japan (\$252,557; 4.40 percent); Turkey (\$229,548; 4.00 percent); Australia (\$212,949; 3.70 percent); Pakistan (\$206,581; 3.60 percent); Saudi Arabia (\$196,095; 3.40 percent); Greece (\$190,668; 3.30 percent); Taiwan-Navy (\$189,218; 3.30 percent); Israel (\$171,896; 3.00 percent); Singapore (\$168,585; 2.90 percent); Canada (\$140,777; 2.50 percent); Thailand (\$119,635; 2.10 percent); Taiwan-Air Force (\$98,705; 1.70 percent); United Arab Emirates (\$90,808; 1.60 percent); Kuwait (\$66,822; 1.20 percent); Malaysia (\$62,492, 1.10 percent); Oman (\$61,218; 1.10 percent); Bahrain (\$57,142; 1.00 percent); and Chile (\$8,151; .10 percent) under the Foreign Military Sales Program. Work was performed in St. Charles, MO, and completed in Nov 2009. Contract funds in the amount of \$1,961,744 will expire at the end of the current fiscal year. The Naval Air Systems Command, Patuxent River, MD, is the contracting activity. Contract Number N00019-05-G-0026

On Aug 25, 2008, McDonnell Douglas Corp, a wholly-owned subsidiary of The Boeing Co, St. Louis, MO, was awarded a \$149,801,176 firm-fixed-priced contract for the procurement of nine SLAM-ER exercise missiles retrofitted and certified from SLAMs to SLAM-ERs for the U.S. Navy. This contract also provides for the procurement of 60 Harpoon Air Launch (Tactical) All-Up-Rounds (AURs) and associated hardware for Taiwan; nine Air Launch (Tactical) AUR missiles and associated hardware, and one missile exercise section with associated hardware, for South Korea; four Tactical Block II Selective Availability Anti-Spoofing Module (SAASM) TARTER AURs and associated hardware for Turkey; four Exercise Block II Grade B canister AURs for Canada; and one Harpoon Exercise Section and associated hardware for Japan. Work was performed in St. Charles, MO (55.32 percent); McKinney, TX (10.71 percent); various locations across the United States (9.10 percent); Toledo, OH (6.28 percent); Huntsville, AL (4.58 percent); Lititz, PA (3.76 percent); Middletown, CT (2.68 percent); Grove, OK (2.25 percent); Galena, KS (1.55 percent); Minneapolis, MN (1.52 percent); the United Kingdom, (1.17 percent); and Elkton, MD (1.08 percent). It was expected to be completed in Jun 2010. The Naval Air Systems Command, Patuxent River, MD, is the contracting agency. Contract Number N00019-08-C-0042

On Jun 5, 2008, McDonnell Douglas Corp, St. Louis, MO, received an indefinite delivery, indefinite quantity contract with an estimated value of \$8,134,542 for engineering, logistics, and technical services in support of the Harpoon weapon systems and SLAM-ER missile system for the U.S. Navy, as well as Australia, Canada, Chile, Egypt, Greece, Israel, Japan, Korea, Malaysia, Netherlands, Oman, Pakistan, Portugal, Saudi Arabia, Singapore, Spain, Taiwan, Thailand, Turkey, United Kingdom, and United Arab Emirates under the Foreign Military Sales program. Work was performed in St. Louis, MO, and was expected to be completed in Dec 2010. The Naval Air Systems Command, Patuxent River, MD, is the contracting agency. Contract Number N00091-08-D-0011

On Mar 30, 2007, McDonnell Douglas Corp, St. Louis, MO, was awarded a \$191,362,762 firm-fixed-priced contract for the procurement of four SLAM-ER exercise missiles retrofitted from SLAMs to SLAM-ERs for the U.S. Navy. This contract also provides for the procurement of 48 SLAM-ER tactical missiles (Turkey) and two each SLAM-ER Guidance Sections (Turkey); SLAM-ER Warhead Sections (Turkey); SLAM-ER Sustainer Sections (Turkey); SLAM-ER Control Sections (Turkey); SLAM-ER Exercise Missiles (Turkey); SLAM-ER Captive Air Training Missiles (Turkey); Harpoon exercise sections (Japan); Harpoon exercise/warhead containers (Japan); and Harpoon Captive Air Training Missile (CATM-84) (Ballistic Air Test Vehicle-uninstrumented) (Korea) for Foreign Military Sales. In addition, this contract provides for the procurement of three SLAM-ER Instrumented Recoverable Air Test Vehicles (Turkey); 59 SLAM-ER AUR Missile Containers (Turkey); 40 Harpoon Tactical Block II Encapsulated AURs (Pakistan (30) and Korea (10)); 15 Harpoon Tactical Block II Air Launch AURs (Korea); 40 Harpoon Encapsulated AUR containers (Pakistan 30 and Korea 10); nine Harpoon Air Launch AUR containers (Korea), and six Harpoon guidance section containers (Japan). Work will be performed in St. Charles, MO (45.75 percent); various locations across the United States (9.35 percent); McKinney, TX (8.29 percent); the United Kingdom (8.03 percent); Toledo, OH (5.44 percent); Tucson, AZ (4.18 percent); Huntsville, AL (3.59 percent); Melbourne, FL (3.31 percent); Fort Washington, PA (2.74 percent); Middletown, CT (1.91 percent); Galena, KS (1.80 percent); Erlanger, KY (1.44 percent); Elkton, MD (1.44 percent); Clearwater, FL (1.44 percent); and Kirkwood, MO (1.29 percent), and is expected to be completed in Dec 2011. This contract combines purchases for the U.S. Navy (\$3,749,208; 1.96 percent) and Turkey (\$79,150,963, 41.36 percent); Pakistan (\$63,666,450, 33.27 percent); Korea (\$43,974,637); and Japan (\$821,504, 0.43 percent) under the Foreign Military Sales Program. The Naval Air Systems Command, Patuxent River, MD, is the contracting agency. Contract Number N00019-07-C-0037

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Mid-	1986	Development of Stand-off Land Attack Missile begun
Feb	1987	Program go-ahead for Stand-off Land Attack Missile
	1988	First SLAM rolled out
	1992	SLAM procurement funding re-entered into budget
	1993	Improved SLAM model available
	1998	First SLAM-ER units delivered to the U.S. Navy
Nov	2001	SLAM-ER available for service in Afghanistan
Mar	2003	SLAM-ER used during Operation Iraqi Freedom

## Worldwide Distribution/Inventories

While the Harpoon missile has been exported to more than 20 countries worldwide, the SLAM has yet to receive its first foreign order. Boeing has the approval of the U.S. government to sell the SLAM overseas. There is a good deal of foreign interest in the SLAM.

**Australia** may place an order for the SLAM-ER. The missile would equip existing Royal Australian Air Force (RAAF) aircraft. Other candidates to meet this need include the TAURUS and JASSM (Joint Air-to-Surface Stand-off Missile).

In 2000, **Canada** mentioned an interest in a new stand-off attack missile for its naval surface combatants. The SLAM-ER was among the systems being considered to meet this need. The acquisition of this new missile is expected to improve the Canadian Navy's long-range land-attack capability.

The **Finnish Air Force** wants to place a new strike missile on its F/A-18 Hornet fighters. The MLU2 upgrade package aims to enhance the Hornet's ground attack capability. Options for Finland include the German-Swedish Taurus and the Boeing SLAM-ER.

Boeing is looking to grab a large portion of the **Indian** defense market. Boeing is offering its F/A-18E/F Super Hornet fighters to India. Weapons systems up for sale to India include the SLAM-ER.

In October 2001, the United States offered 45 AGM-84H SLAM-ERs to **South Korea** to arm South Korea's new fleet of F-15Ks, which were selected to meet its F-X advanced fighter requirement. South Korea will procure 40 F-15K fighters. The missile deal is worth an estimated \$115 million. In March 2004, South Korea finalized a contract with Boeing to acquire the SLAM-ER. The contract is worth \$70 million. Now, South Korea is looking for a new stand-off attack missile to replace its SLAM-ERs.

The United States could provide new combat aircraft to **Saudi Arabia**, including 84 additional F-15 fighters and upgrades for 70 in-service F-15 aircraft. This potential deal surfaced in mid-2010. In addition to the aircraft, the United States could provide additional air-launched armaments. The Saudis want to arm these aircraft with new strike missiles. Reports claim that among the options under consideration to meet this need are the AGM-84H SLAM-ER and the Lockheed Martin AGM-158 Joint Air-to-Surface Stand-off Missile (JASSM). A Saudi order for the SLAM-ER would result in a restart of this missile production line.

This missile has also been offered to **Singapore**, which is interested in procuring new fighter aircraft, and **Taiwan**. **Turkey** has procured the SLAM-ER as part of its F-16 upgrade effort. In May 2006, the U.S. offered 50 SLAM-ERs to Turkey. The total value of this contract is \$162 million.

**User Country.** The **United States Navy** was the first operator of the SLAM and SLAM-ER. **South Korea** was the first foreign nation to order the SLAM-ER. **Turkey** is the latest customer for the SLAM-ER.

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## Forecast Rationale

Boeing is quickly running out of potential new customers for the Stand-off Land Attack Missile – Expanded Response (SLAM-ER). Existing customers are not coming forward to purchase additional units, the U.S. military among them.

Up to now, the market performance of the SLAM and SLAM-ER missiles has been mixed. Although more than 1,000 missiles were "produced" for clients, the customer list for these missiles remains very short. Only the United States, South Korea and Turkey have acquired this missile.

With the conclusion of U.S. Navy procurement, Boeing became dependent on foreign purchases to sustain its production line. Finding additional export customers has proven difficult. Still, there is potential for Boeing to win a couple of orders from new clients.

Boeing is trying to win a larger share of the Indian defense market. New Delhi is examining various U.S.-made armaments. Boeing is offering combat fighters to the Indian Air Force, which presents an opportunity for another sale of the SLAM-ER. India has not made its intentions clear concerning the purchase of this missile.

Another possible new customer for the SLAM-ER is Saudi Arabia. Riyadh is planning to purchase billions of dollars worth of American-built weaponry over

several years. The sale of new F-15 fighters to Saudi Arabia is good news for Boeing. In addition, the Saudis want to arm these aircraft with new stand-off attack missiles. Among the options to meet this requirement is the SLAM-ER.

Japan is nervously eyeing the growing threat from North Korea. As a response, Japan may arm its fighter aircraft with a stand-off attack missile to launch pre-emptive strikes on North Korean ballistic missile sites. The SLAM-ER has also been offered to Canada and Singapore. So far, none of these countries are placing orders.

The demand for precision-guided munitions (PGMs) has slowly risen since 1990. Nearly 20,000 PGMs were used during the opening phase of Operation Iraqi Freedom, 68 percent of the total air-launched ordnance expended. Of this amount, only three were AGM 84H SLAM-ERs. In the future, the ratio of guided versus unguided weapons used by the United States in a military operation could increase to favor guided over unguided weapons.

All the same, the potential market for the SLAM-ER is limited. Many countries do not need strike missiles. Also, countries wishing to acquire a strike capability can meet their needs with less sophisticated systems (guided bombs, etc.).

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