A BRIEF HISTORY OF THE SEA-BASED X-BAND RADAR-1

PREFACE

The Missile Defense Agency (MDA) History Office documents the official history of America's missile defense programs and provides historical support to the MDA Director and staff. Our goal is to provide a factually accurate portrayal of significant events affecting the agency's mission.

"A Brief History of the Sea-Based X-Band Radar-1" provides readers with a summary of the radar's construction history and offers interesting facts about the advanced sensor's capability to enhance the agency's Ballistic Missile Defense System. This pamphlet also includes a sequential photograph display with captions.

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A BRIEF HISTORY

In January 2003, the United States government purchased a semi-submersible 50,000-ton seagoing platform from Moss Maritime, a Norwegian company specializing in special purpose offshore vessels and platforms, for use in the Missile Defense Agency's (MDA's) layered Ballistic Missile Defense System (BMDS). MDA's Ground-based Midcourse Defense Joint Program Office, a BMDS component, oversaw platform modifications at the Keppel AMFELS shipyard in Brownsville, Texas; assembly and installation of the world's largest X-band radar onto the platform at Kiewit Offshore Services in Ingleside, Texas; and additional modifications at Pearl Harbor Naval Shipyard in Honolulu, Hawaii.

The self-propelled vessel, in addition to the X-band radar, includes a bridge, control rooms, living quarters, workspaces, storage areas, a power generation area, and a helicopter landing pad. It also contains a command, control and communications system and an In-flight Interceptor Communication System Data Terminal. The platform maintains 60-days of supplies and fuel.

In July 2005, MDA officially named the vessel the "Sea-Based X-Band Radar-1," or "SBX-1." The SBX-1 underwent a wide range of sea trials and exercises in the Gulf of Mexico prior to beginning its journey around South America to its home port of Adak, Alaska. Moreover, the mobility of the SBX-1 allows its movement throughout ocean areas to support both missile defense advanced testing and defensive operations.

Integrating the SBX-1 into the BMDS provides an advanced tracking and countermeasures discrimination capability to assist interceptor missiles located at Fort Greely, Alaska, and Vandenberg Air Force Base, California, in defending against a limited long-range missile attack aimed at the United States. Furthermore, the SBX-1 will support other missile defense elements designed to intercept and destroy shorter range ballistic missiles that might be used against the United States, its deployed forces, its friends, and its allies.

FAST FACTS

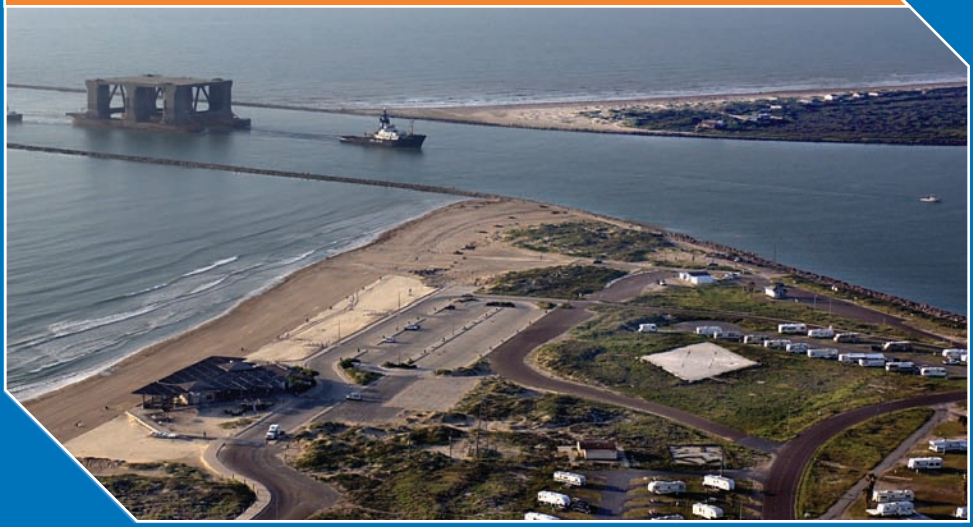
- The SBX-1 serves as the largest and most sophisticated phased array electro-mechanically steered X-band radar in the world. Steering electronically within its field of coverage and mechanically in azimuth and elevation allows the radar to track a full 360 degrees in azimuth and about 90 degrees in elevation from near the horizon to the zenith. As a result, the radar can track objects as they fly toward, over, and away from the vessel.
- Approximately 45,000 transmit/receive modules in the radar operate together to form the radar beam, which is capable of seeing an object the size of a baseball at a distance of 2,500 miles. Each module consists of the final transmit stage and initial receive stage from each antenna element. The radar also uses 69,632 multi-sectional circuits to transmit, receive, and amplify signals.
- The SBX-1, which is capable of traveling 8 knots under its own power, measures 240 feet wide, 390 feet long, and 280 feet high from its keel to the top of the radar dome (radome).
- Air pressure alone supports the radome that surrounds the radar. The radome weighs 18,000 pounds, stands more than 103 feet high, and measures 120 feet in diameter. Moreover, the high-tech synthetic fabric allows the radome to withstand winds in excess of 130 miles per hour.
- The SBX-1 crew includes approximately 86 officers, civilians, and contractor personnel to carry out its mission.
- In addition to the inherent stability of the vessel, the radar itself provides electronic stabilization of the radar beam to continue mission operations as the vessel responds to changing sea conditions.
- The marine diesel fuel capacity of the SBX-1 is 1.8 million gallons.
- As the principle midcourse sensor for the BMDS, the radar's major functions are cued search, precision tracking, object discrimination, and providing a missile kill assessment. The In-flight Interceptor Communication System Data Terminal communicates instructions from the GMD Fire Control system to the interceptor missile when it engages a target missile.

25 April 2003

The *SmitWijs Rotterdam*, a Dutch-owned oceangoing tugboat, transports the 50,000-ton seagoing platform from Moss Maritime in Norway across the Atlantic Ocean.

30 May 2003

The platform enters the Keppel AMFELS shipyard channel at Brownsville, Texas, with the western tip of South Padre Island, Texas, visible in the foreground.



30 May 2003

The *SmitWijs Rotterdam* vessel tugs the SBX platform through the Keppel AMFELS Shipyard channel in Brownsville, Texas.

1 January 2004

Construction of the SBX radar ringwall assembly in the Keppel AMFELS Shipyard at Brownsville, Texas.

6 April 2004

Aerial view (looking south) of SBX construction in the Keppel AMFELS Shipyard at Brownsville, Texas, with a view of northern Mexico.

6 April 2004

Aerial view of SBX construction in the Keppel AMFELS Shipyard at Brownsville, Texas.

7 April 2004

Construction of the SBX "hotel" in the Keppel AMFELS Shipyard at Brownsville, Texas.

7 April 2004

Aerial view of SBX construction in the Keppel AMFELS Shipyard at Brownsville, Texas.

13 October 2004

The newly constructed “helopad” and ongoing SBX construction in the Keppel AMFELS Shipyard at Brownsville, Texas.

15 October 2004

This welder from Kiewit Offshore Services at Ingleside, Texas, joins pieces of metal during radar construction.

15 October 2004

The radar construction and emplacement team stands in front of the SBX radar in Kiewit Offshore Services at Ingleside, Texas.

12 March 2005

The SBX platform passes South Padre Island, Texas, enroute to Kiewit Offshore Services at Ingleside, Texas.

2 April 2005

The Heavy Lift Device, capable of lifting more than 13,000 tons, raises the huge radar in Kiewit Offshore Services at Ingleside, Texas.

29 April 2005

The SBX radar was secured and integrated onto the seagoing platform in Kiewit Offshore Services at Ingleside, Texas.

15 May 2005

The radome installation construction team in Kiewit Offshore Services at Ingleside, Texas.

1 July 2005

Motor vessel *Dove*, chartered to support the SBX while operating offshore of Adak, Alaska, tows it during “sea trials” on the Gulf of Mexico.

1 July 2005

View of the SBX passing through a residential area of Corpus Christi, Texas, on its way to "sea trials."

26 July 2005

Colonel Mike Smith, SBX Project Manager (center, in white hardhat), Colonel John Fellows, incoming SBX Project Manager (in black beret), and associates stand before the newly designated SBX-1 at its dedication ceremony in Kiewit Offshore Services at Ingleside, Texas.

18 November 2005

The SBX-1 aboard the *Blue Marlin*, a Dutch-owned semi-submersible heavy lift ship, exits Aransas Pass in the Gulf of Mexico.

17 December 2005

The SBX-1 passes through the Strait of Magellan, which separates the southernmost tip of the South American mainland. The archipelago of Tierra Del Fuego, Chile, and its capital city, Punta Arenas, are in the foreground.

18 December 2005

The SBX-1 passes through the western portion of the Strait of Magellan on its way to the Pacific Ocean.

10 January 2006

The SBX-1 aboard the *Blue Marlin* at Pearl Harbor, Hawaii, with the U.S.S. Arizona Memorial in the foreground.

21 January 2006

The SBX-1 aboard the *Blue Marlin* in the Pacific Ocean with the Hawaiian island of Maui in the background.

22 January 2006

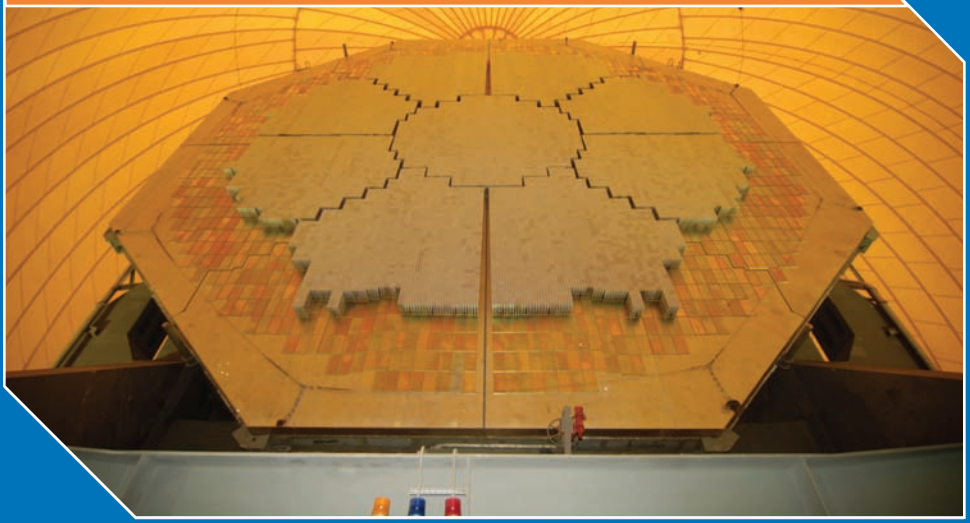
The SBX-1 in the Pacific Ocean adjacent to the Hawaiian island of Maui.

23 January 2006

Maintenance work at the Pearl Harbor Naval Shipyard in Hawaii shows the elevator, scaffolding, stairs, and gangway leading to the vessel's main deck.

28 March 2006

Approximately 45,000 transmit/receive modules operate together to form the radar beam. The radome surrounds the radar and protects it from the weather.

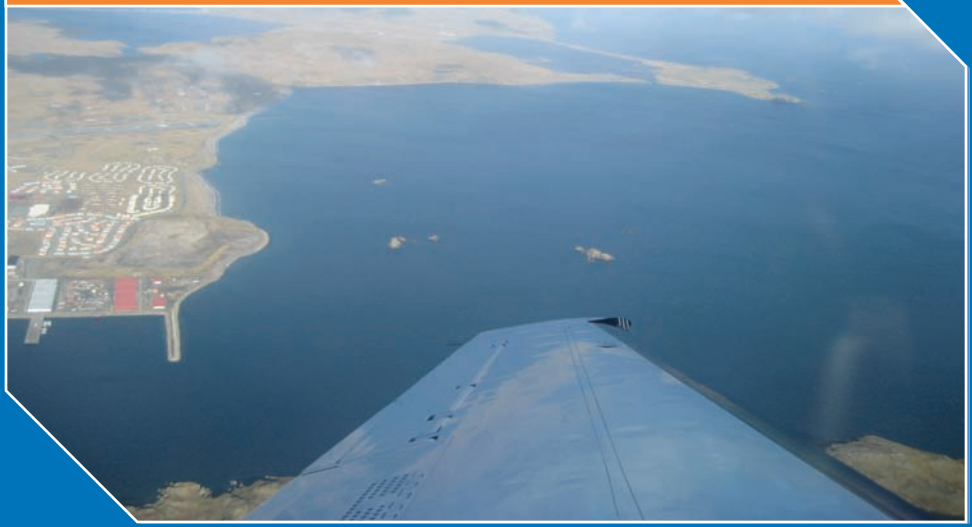


31 March 2006

Motor vessel *Dove* tows the SBX-1 out of Pearl Harbor, Hawaii, for its winter "shakedown."

16 October 2006

Aerial view of the SBX-1 homeport in Kulak Bay, Alaska, prior to the installation of the mooring system designed to make the vessel stationary by chaining it to eight 75-metric-ton anchors embedded into the sea bed.

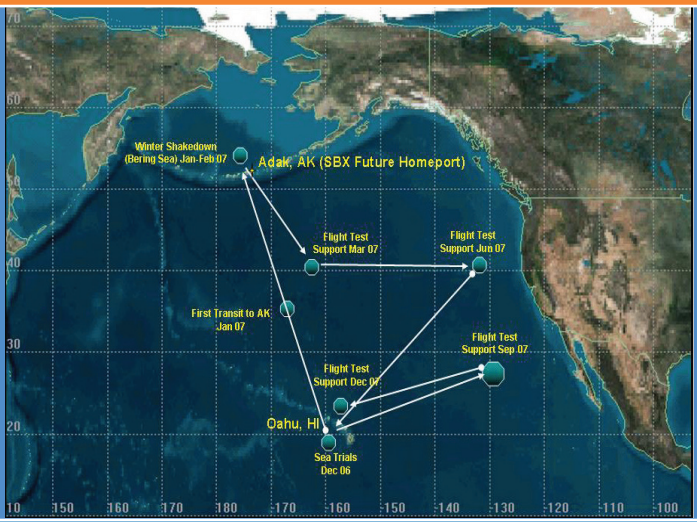


12 February 2007

The SBX-1 in the frigid waters of the Bering Sea north of its port in Adak, Alaska.

12 February 2007

Between 1 December 2007 and 1 April 2008, the SBX-1 traveled more than 4,000 nautical miles across the Pacific Ocean.



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