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A \$10 Billion Bet Gone Bad

Post-9/11 Anxieties, **Defense Worries Have** Led To Weaponry Flops

BY DAVID WILLMAN Tribune Washington Bureau

WASHINGTON — Leaders of the U.S. Missile Defense Agency were effusive about the new technology.

It was the most powerful radar of its kind in the world, they told Congress. So powerful it could detect a baseball over San Francisco from the other side of the country.

If North Korea launched a sneak attack, the Sea-Based X-Band Radar — SBX for short - would spot the incoming missiles, track them through space and guide U.S. rocketinterceptors to destroy them.

Crucially, the system would be able to distinguish between actual missiles and decoys.

SBX "represents a capability that is unmatched," the director of the Missile Defense Agency told a Senate subcommittee in 2007.

In reality, the giant floating radar has been a \$2.2 billion flop, a *Los Angeles Times* investigation found.

Although it can powerfully magnify distant objects, its field of vision is so narrow that it would be of little use against what experts consider the likeliest attack: a stream of missiles interspersed with decovs.

SBX was supposed to be operational by 2005. Instead, it spends most of the year mothballed at Pearl Harbor in Hawaii.

The project not only wasted taxpayer money but left a hole in the nation's defenses. The money spent on it could have gone toward landbased radars with a greater capability to track long-range missiles, according to experts who studied the issue.

Expensive missteps have become a trademark of the Missile Defense Agency, an arm of the Pentagon charged with protecting U.S. troops and ships and the American homeland.

Over the last decade, the agency has sunk nearly \$10 billion into SBX and three other programs that had to be killed or sidelined after they proved unworkable, *The* Times found.

You can spend an awful lot of money and end up with nothing," said Mike Corbett, a retired Air Force colonel who oversaw the agency's condeveloping long-range missiles capable of reaching the United States.

President George W. Bush, in 2002, ordered an urgent effort to field a homeland missile defense system within two years. In their rush to make that deadline, Missile Defense Agency officials latched onto exotic, unproved concepts without doing a rigorous analysis of their cost and feasibility.

Members of Congress whose states and districts benefited from the spending tenaciously defended the programs, even after their deficiencies became evident.

These conclusions emerge from a review of thousands of pages of expert reports, congressional testimony and other government records, along with interviews with dozens of aerospace and military affairs specialists.

"The management of the organization is one of technologists in their hobby shop," said L. David Montague, a former president of missile systems for Lockheed Corp. and co-chairman of a National Academy of Sciencessponsored review of the agency. "They don't know the nitty-gritty of what it takes to make something work."

This leads, he said, to programs that "defy the limits of physics and economic logic.' Of the SBX radar, Mon-

tague said: "It should never have been built. Retired Air Force Gen.

Eugene E. Habiger, former head of the U.S. Strategic Command and a member of the National Academy panel, said the agency's blunders reflected a failure to analyze alternatives or seek independent cost estimates.

They are totally off in la-la land," Habiger said.

Senior officials who promoted the four programs defend their actions as having helped to create a new missile defense "architecture." Regarding SBX, they said it was much less expensive than a network of land-based radars and could be put in place

more rapidly. Henry A. Obering III, a retired director of the Missile Defense Agency, said any unfulfilled expectations for SBX and the other projects were the fault of the Obama administration and Congress



On July 21, 2009, at Edwards AFB, Calif., the Airborne Laser completed a test flight over the Mojave Desert. The Airborne Laser program was envisioned as a fleet of converted Boeing 747s that would fire laser beams to destroy enemy missiles soon after launch, before they could release decoys. It turned out that the lasers could not be fired over sufficient distances, so the planes would have to fly within or near an enemy's borders continuously. This posed an insurmountable problem because the 747s would have been all but defenseless against anti-aircraft missiles. The program was canceled in 2012, after a decade of testing. The cost: \$5.3 billion.

troops in the field.

The third component is the Ground-Based Midcourse Defense system, or GMD, designed to protect the U.S. homeland from long-range missiles. All four of the troubled programs examined by *The Times* were intended to bolster GMD.

The country's defense against a massive missile strike by Russia or China still depends on deterrence: the Cold War notion that neither nuclear power would attack the U.S. for fear of a devastating response.

GMD is intended to protect against a limited attack by a less-imposing adversary, such as North Korea or Iran, by destroying enemy warheads in flight, a supreme technical challenge.

Rocket-interceptors would climb into space from silos at Vandenberg Air Force Base in Santa Barbara County and Fort Greely, Alaska. At the tip of each interceptor is a heatseeking "kill vehicle" designed to separate from its boost rocket in space, fly on its own and crash into an incoming warhead.

GMD's roots go back to the Clinton administration. Its development was accelerated after Bush, in December 2002, ordered the Pentagon to field "an initial set of missile defense capabilities" to protect the U.S. homeland by 2004.

Then-Secretary of Defense Donald H. Rumsfeld exempted the Missile Defense Agency

place of the winds." radio wave spectrum — allows for more detailed imagery, and thus better discrimination. Missile defense plans

drawn during the Clinton administration envisioned as many as nine land-based X-band radars to complement the early-warning radars and provide complete coverage across the Atlantic and Pacific oceans

In 2002, faced with Bush's deadline for deploying GMD by 2004, Missile Defense Agency officials chose not to add multiple X-band radars on land and opted instead for a single, seaborne version.

It would be based at a specially prepared berth in Alaska's Aleutian Islands, an ideal location for detecting a North Korean missile attack, and would be moved around as needed.

Thus was born SBX.

Boeing's designs called for the huge radar to be seated atop a specially modified offshore drilling platform.

The Missile Defense Agency acquired the platform from a Norwegian company in 2003 and had it towed across the Atlantic to a shipyard in Brownsville, Texas. There, it was fitted with a propulsion system, a helicopter landing pad and living quarters for a crew of about 100. Cranes lifted the radar and its pearlwhite protective dome into place.

The semi-submersible structure was nearly 400 feet long and 26 stories high. It weighed 50,000 tons.

"It's an extremely powerful soda straw, but that's not what we needed," said Harvey L. Lynch, a physicist who served on the National Academy of Sciences panel.

In the event of an attack, land-based early warning radars could. in theory identify a specific point in the sky for SBX to focus on. But aiming and re-aiming the giant radar's beam is a cumbersome manual exercise. In combat conditions, SBX could not be relied on to adjust quickly enough to track a stream of separate missiles, radar specialists said.

SBX's limitations make it "irrelevant to ballistic mis-sile defense," said David K. Barton, a physicist and radar engineer who took part in the National Academy review and who has advised U.S. intelligence agencies.

Wherever that beam can be pointed, it can cover whatever is within it," Barton said. "But obviously that isn't going to cover the whole Pacific for a stream of attacking missiles that are separated by many minutes. ... Even if there are only four missiles, (an adversary) could separate them."

One of SBX's intended functions was to participate in tests of the GMD system. A mock enemy missile would be launched over the Pacific, and SBX would track the target and guide rocket-interceptors.

The radar's performance in those exercises has fallen short.

During a 2007 test, "SBX exhibited some anomalous behavior," requiring "adjusted software," the Pentagon's Operational Test and Evaluation Office said in a report. The report said SBX had

not served as the primary radar for any test in which an interceptor had managed to destroy a target. In January 2010, SBX was

the sole radar for a test in which an interceptor tried to knock out a target launched from the Marshall Islands. SBX 'exhibited undesirable performances that contributed to the failure to intercept," the Pentagon evaluation office reported.

Outside experts who had access to flight-test data from the 2010 test told The Times that SBX failed to "discriminate," mistaking falling chunks of unspent rocket fuel or other material for the target missile.

In a June 2014 test, an interceptor destroyed its target, but SBX's "hit assessment" did not reach commanders in control of the system, according to a report by the Pentagon's evaluation office.

tracting for weapons systems from 2006 to 2009. "MDA spent billions and billions on these programs that didn't lead anywhere.'

The four ill-fated pro-grams were all intended to address a key vulnerability in U.S. defenses: If an enemy launched decoys along with real missiles, U.S. radars could be fooled, causing rocket-interceptors to be fired at the wrong objects — and increasing the risk that actual warheads would slip through. In addition to SBX, the

programs were:

The Airborne Laser, envi-sioned as a fleet of converted Boeing 747s that would fire laser beams to destroy enemy missiles soon after launch, before they could release decoys.

It turned out that the lasers could not be fired over sufficient distances, so the planes would have to fly within or near an enemy's borders continuously. That would leave the 747s all but defenseless against antiaircraft missiles. The program was canceled in 2012, after a decade of testing. The cost: \$5.3 billion.

The Kinetic Energy Interceptor, a rocket designed to be fired from land or sea to destroy enemy missiles during their early stage of flight. But the interceptor was too long to fit on Navy ships, and on land, it would have to be positioned so close to its target that it would be vulnerable to attack. The program was killed in 2009, after six years of development.

The cost: \$1.7 billion. The Multiple Kill Vehicle, a cluster of miniature interceptors that would destroy enemy missiles along with any decoys. In 2007 and 2008, the Missile Defense Agency trumpeted it as a "transformational program" and a cost-effective force multiplier." After four years of development, the agency's contractors had not conducted a single test flight, and the program was shelved. The cost: nearly \$700

million.

These expensive flops stem in part from a climate of anxiety after Sept. 11, 2001, heightened by warnings from defense hawks that North Korea and Iran were close to

- for not doubling down with more spending.

"If we can stop one missile from destroying one American city," said Obering, a former Air Force lieutenant general, "we have justified the entire program many times over from its initiation in terms of cost.'

The agency's current director, Vice Adm. James D. Syring, declined to be interviewed. In a written response to questions, the agency defended its investment in the four troubled programs and asserted that the nation's missile defense system was reliable.

"We are very confident of our ability ... and we will continue to conduct extensive research, development and testing of new technologies to ensure we keep pace with the threat," the statement said. It called SBX an "excellent investment.'

Boeing Co., the agency's prime contractor for homeland defense, designed SBX. Raytheon Co. built the system's radar components. Both companies are among the world's biggest defense contractors and major political donors.

A Boeing spokesman said that SBX has "sufficient capability to execute its role with speed, precision and accuracy.

Representatives of Raytheon declined to be interviewed.

The Missile Defense Agency came into being during the Reagan administration and has 8,800 employees and a budget of about \$8 billion a year.

The agency oversees three missile defense systems. Aegis defends Navy ships. The Terminal High Altitude Area Defense system consists of Patriot rockets to safeguard

from standard procurement rules, freeing it to buy new technology without the customary vetting. Rocketinterceptors were deployed before the kill vehicle and

other crucial components had been proved reliable through testing. Despite its shortcomings, GMD became operational in 2004. In the nine flight tests conducted since then, the system has successfully intercepted a mock enemy missile only four times.

GMD's ability to distinguish missiles from decovs, debris and other harmless objects _ "discrimination," in missile defense jargon _ has been a persistent concern.

Powerful, precise radar guidance is key to effective missile defense. Without it, the system cannot be depended on to distinguish real from illusory threats and track enemy missiles so the kill vehicles can find and destroy them.

In the event of an attack, radar would also have to provide immediate, accurate 'hit assessments" — confirmation that an enemy missile had been destroyed. Defense experts say that without this information, GMD could rapidly deplete its limited inventory of interceptors: four at Vandenberg and 26 at Fort Greely.

Existing early-warning radars, based on land in Alaska, California, Britain and Greenland and on Navy ships, provide some of the needed capability. But their range is limited by Earth's curvature, and neither they nor orbiting satellites are powerful enough to determine whether approaching objects are benign or threatening.

X-band radar is powerful enough. Its short wavelength located in the X band of the



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Obering and his predecessor as director of the missile agency told Congress that SBX would be operational by the end of 2005. That proved incorrect.

SBX met standards for commercial ships — but agency officials had failed to take into account the Coast Guard's stricter standards for vessels destined for the kind of hazardous conditions found in the Aleutians. To meet the requirements,

the missile agency had to spend tens of millions of dollars to fortify SBX against the sustained 30-foot swells and fierce gales common at its intended home port in Adak, Alaska, known as the "birth-

able to see a baseball at such a distance — about 2,500 miles — unless the ball was 870 or more miles above San Francisco.

That work, completed by

Boeing in September 2007,

included installing eight 75-

ocean floor at Adak.

ton anchors embedded in the

Missile Defense Agency

officials spoke glowingly of

SBX's technical capabilities.

"It is the most powerful radar of its kind in the world

and will provide the (GMD)

system a highly advanced

detection and discrimination

capability," Obering told the

Senate's defense appropria-

tions subcommittee on May

ed SBX's ability to perform

critical "hit assessment func-

rocket-interceptors had taken

At a Senate hearing on

asked about the GMD system's

plied that SBX would help give

the U.S. "a tremendous leg up'

To emphasize his point,

Obering testified repeatedly

that SBX could see a 3-inch-

wide object from across the

peake Bay, we could actu-

ally discriminate and track a

Francisco," he told a Senate

Yet because of Earth's

curvature, SBX would not be

subcommittee on April 25,

baseball-sized object over San

"If we place it in Chesa-

April 11, 2007, Obering was

ability to distinguish enemy

missiles from decoys. He re-

tions," informing U.S. com-

manders instantly whether

out incoming missiles.

in this regard.

continent.

2007.

Agency news releases tout-

10, 2006.

That is about 200 miles higher than the expected maximum altitude of a longrange missile headed for the U.S., technical experts told The Times.

SBX's powers of magnification belied a fundamental shortcoming. The radar's field of vision is extremely narrow: 25 degrees, compared with 90 to 120 degrees for conventional radars.

Experts liken SBX to a soda straw and say that finding a sequence of approaching missiles with it would be impractical.

In an attack, an immediate and accurate hit assessment would be crucial.

Patrick J. O'Reilly, director of the Missile Defense Agency from 2008 to 2012, explained why: Without the assessment, "the commanders could order the soldiers to shoot additional interceptors at targets that have actually already been destroyed - or to stop shooting at targets that haven't been destroyed," he said in an interview.

O'Reilly said it was "worrisome" that commanders did not receive the hit assessment in the 2014 test.

An agency spokesman, Richard Lehner, said an in-vestigation into the matter is "nearing closure."



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