



Extra! Extra! Extra!

The Eagle

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Special Edition



Photo by Lockheed Martin

The Army's new THAAD missile system records first target intercept 50 miles above White Sands Missile Range, N.M.

Take THAAD!!

by LuAnne Fantasia
Huntsville, Ala.



Photo by LuAnne Fantasia

Col. Lou Deeter, project manager for THAAD, returned to Huntsville a happy man after THAAD's successful intercept. At the end of a 26-year Army career, Deeter said, "We knew where we were going and just had to be allowed to complete that journey."

It's as sweet as a fourth-quarter touchdown, and as emotional as that three-point shot with 10 seconds left on the clock.

At the end of a 26-year career in Army uniform, Col. Lou Deeter stood in the desert of New Mexico at 7:19 a.m., Thursday morning, June 10, 1999, and watched the Theater High Altitude Area Defense—a beast called THAAD—intercept its rival, the Hera target.

"It was incredible euphoria," Deeter said. "We were watching traces come together on the displays in the control room. Then there was a huge host of cheering voices coming from the back room where they were watching the telemetry tapes," explaining that loss of telemetry means the target is destroyed.

"That's how we knew we had a hit."

Deeter is the project manager in the THAAD Project Office. The program is managed and funded by the Ballistic Missile Defense Organization at the Pentagon, and executed by the Army Program Executive Office for Air and Missile Defense.

With a perfect hit-to-kill—one symbolically heard half way around the world and certainly throughout all of Department of Defense—many people on THAAD's sidelines and in the stands cheered when something they always knew would happen, happened.

"When an interceptor hits the target, it creates kinetic energy, which has

to convert to something," Deeter explained some quick physics. "We watched a fireball of about 4.5 million watts of light...of instantaneous energy that morning."

Deeter said that the success of flight 10 is the realization of a journey for a lot of people.

"This team of government, contractors and subcontractors has finally now realized a journey," Deeter said. "This team has accomplished what it set out to do. We knew where we were going and just had to be allowed to complete that journey."

"I'm thankful for everyone who stuck with us," Deeter said. "The commanders and staff of the Army Space and Missile Defense Command never gave up on us. First, General Anderson and now General Costello have always been there with their support and we needed that," he said.

"They knew we could produce. The Army knew we could produce. The nation needs this, and believe me, an accomplishment of this magnitude is well worth the journey," Deeter said.

Deeter said THAAD's successful intercept would be hard to top as a perfect ending to his Army career. "I haven't had time to reflect personally yet," he said, "so the personal impact is hard to describe at this point. But, for the THAAD team that succeeded at this, I am thrilled."

Deeter hangs up his uniform in July and plans to stay in this area. "I just want to find a job here and stay in the missile defense business."

Hera target: happy to have been killed

Crashes and burns in mid-air during THAAD flight 10

by Gerda Sherrill
Huntsville, Ala.

This time everything came together: The target was launched on June 10 at White Sands Missile Range, N.M., performed flawlessly, and was hit and destroyed on impact by the interceptor missile ten minutes later.

This was the first time a weapon system developed specifically to defend against theater ballistic missiles had a successful intercept, and for that to happen, a successful target is equally essential during the flight test program.

"We're just extremely pleased that the Ballistic Missile Targets Joint Project Office was able to do our part with the Hera target in helping THAAD achieve this outstanding success," said Joe Stegmaier, deputy project manager.

The Hera target, managed by the Army Space and Missile Defense Command for the Ballistic Missile Defense Organization, is a tactical ballistic missile target typically used for test and evaluation of BMDO interceptor systems.

The Hera flown for this test was modified to present a signature that is more like a medium-range threat, similar to the Iraqi Scud missiles flown during the Gulf war. This modification was necessary because target flights at WSMR are severely limited by the size of the range.

"The target flew a conventional ballistic trajectory with a range of 127 kilometers, an apogee of 314 kilometers, and a velocity of almost two kilometers per second," said Lt. Col. James D. Matthewson, Jr., Theater Targets Product Manager, "which is by no means an easy task. It worked perfectly and we owe it all to our great team — everyone was a contributor."

Hera was scheduled for use against the Theater High Altitude Area Defense system—the first hit-to-kill weapon system ever used—10 times. Three tests are now remaining. Hera's infrared signature and radar cross section can be tailored to the

requirements of a particular test. The reentry vehicle can be positioned in flight with a nitrogen-powered attitude control system that uses six nozzles on the guidance and control section. The system also can be programmed to cause the target to tumble at a specified rate.

This mimics the flight characteristics that have been observed with some tactical ballistic missile reentry vehicles.

And the players are...

The contract for Hera was awarded in 1992 for \$150 million. Hera can achieve ranges on the order of 1,100 kilometers using modified second and third stages from the Minuteman II missile, a modified Pershing II guidance and control section, various interstage hardware, and an instrumented ballistic reentry vehicle. A third stage could be added to boost the range up to greater than 3,000 kilometers, but no contract has been signed for this target as yet.

Coleman Aerospace Company of Orlando, Fla., is the Hera prime contractor, supported by principal subcontractors Space Vector Corporation of Fountain Valley, Calif., and Aerotherm Corporation of Mountain View, Calif.

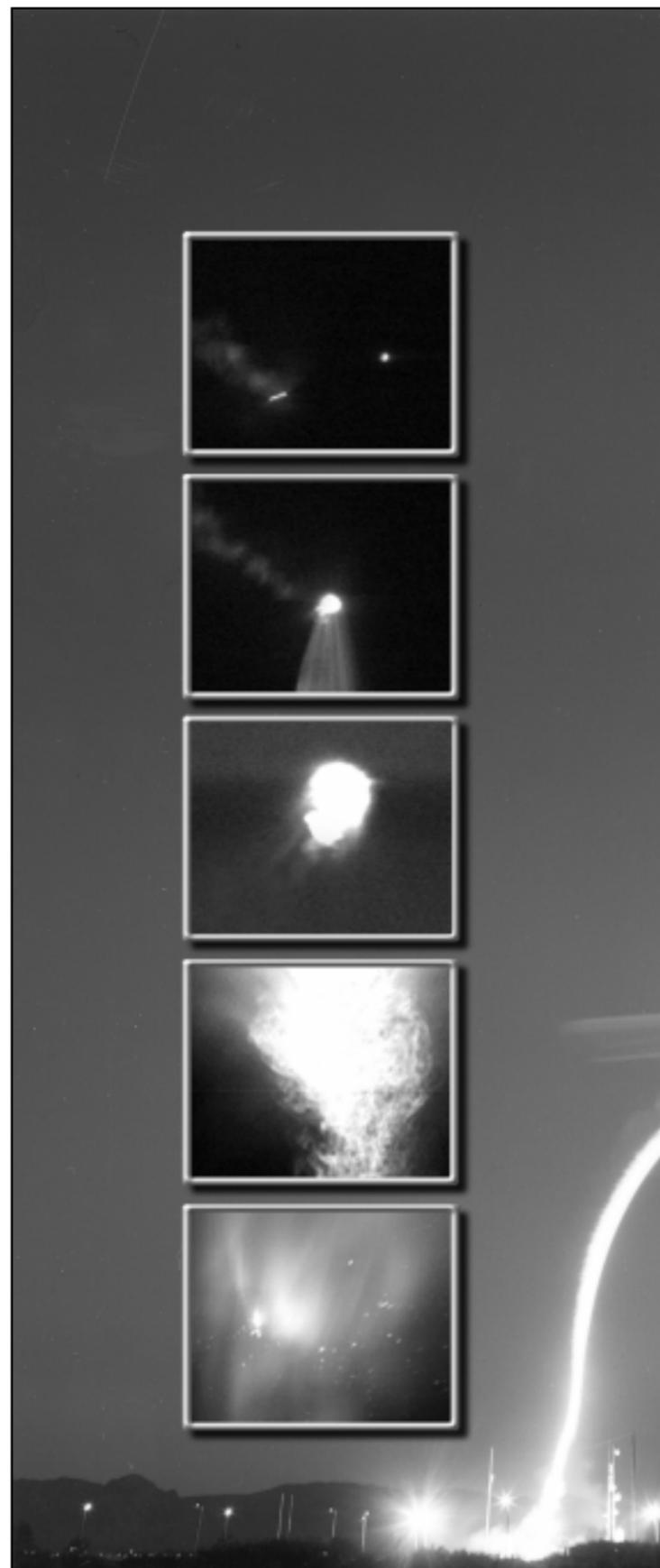
"We at Coleman Aerospace are delighted to have been a part of this remarkable accomplishment," said the company's president, E. A. Gallagher.

Rocket motor assembly is supported by the Space and Missile Systems Center of the U.S. Air Force.

When asked how he felt about the spectacular intercept, Lt. Gen. John Costello, commanding general of SMDC said, "We have worked the THAAD program for many years and I have been personally involved with it in this and in my previous job.

"I am extremely happy and gratified for all the members of the THAAD team who have withstood extreme scrutiny to reach the success of today's flight. We need THAAD now. Our soldiers deserve no less."

And that's what our soldiers will have in the field, hopefully by the year 2007, in part thanks to a target program that is dedicated to mission success.



(Small photos, top to bottom)

1. Shows interceptor (left) with exhaust from the thrusters as it approaches the target.

2. Initial impact of the interceptor with the target

3. Shows target destruct.

4 & 5. Photos of the total target destruct.

The Eagle ...

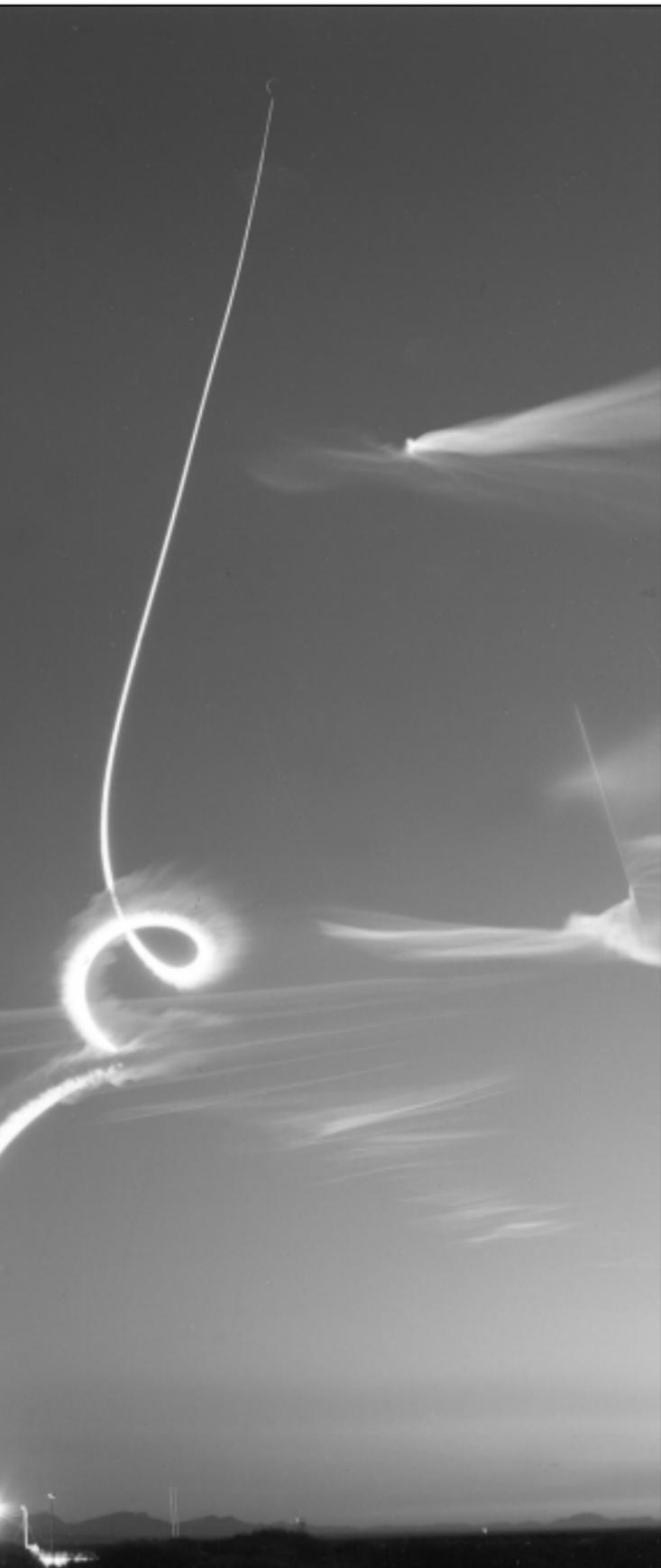
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Courtesy Photo

This time lapse photo shows the target intercept in the upper right corner. The THAAD missile launch is in the foreground.

“We have worked the THAAD program for many years and I have been personally involved with it in this and in my previous job. I am extremely happy and gratified for all the members of the THAAD team who have withstood extreme scrutiny to reach this success. We need THAAD now. Our soldiers deserve no less.”

Lt. Gen. John Costello
Commanding General
US Army Space and Missile Defense Command

“The very successful THAAD test represents a critical milestone demonstrating a hit-to-kill technology in a unique altitude regime. The end game data collected on this mission will be valuable to all the Ballistic Missile Defense Organization interceptor programs. The entire THAAD team—government and contractor—did an incredible job under tremendous pressure, resulting in what can only be termed a total success. We have many more challenges in the years ahead, but we are resolute in our pursuit of ensuring THAAD and other theater missile defense systems will be there to provide the best protection possible for our deployed forces, as well as our friends and allies.”

Air Force Brig. Gen. Richard Davis
Deputy, Theater Air and Missile Defense
Ballistic Missile Defense Organization

“This was more than just a shot that will be heard around the world, it convincingly demonstrates that this nation can produce the systems necessary to protect its soldiers, critical assets, and national interests around the world. A two-tiered defense is doable and a team of dedicated folks from the combat developers, materiel developers, to the industry team have made it happen.

“We have much more to do, but we know the road ahead and it will be done.”

Maj. Gen. Dennis Cavin
Commanding General
US Army Air Defense Artillery Center
and Fort Bliss, Texas



Lockheed Martin Corporation elated

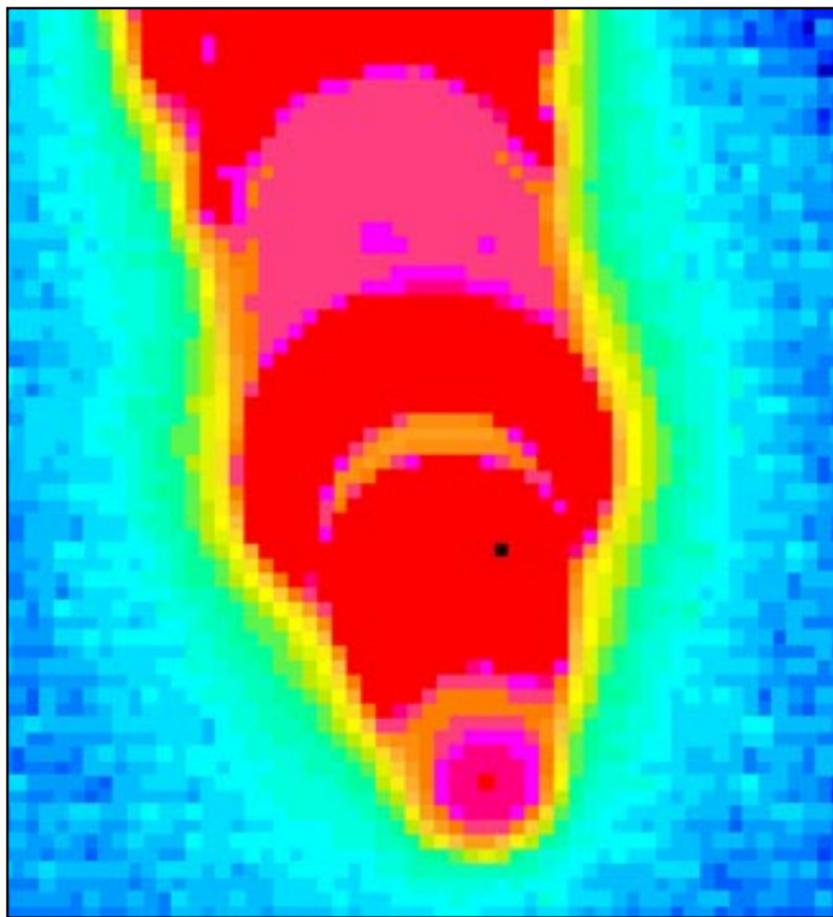
by Marco Morales
Huntsville, Ala.

Lockheed Martin companies are intensely involved with ballistic missile defense programs. And the first target intercept on June 10 of the Theater High Altitude Area Defense, or THAAD, missile over White Sands Missile Range, N.M., has sent a ring of much anticipated excitement at Lockheed Martin's Missiles and Space team.

"We are proud to be part of the government and industry team that has demonstrated effective theater missile defense is technically feasible," said Thomas A. Corcoran, president and chief operating officer of the Lockheed Martin Space & Strategic Missiles Sector, with headquarters in Bethesda, Md. "I am very pleased with our Missiles and Space unit based in Sunnyvale, California. The perseverance and dedicated effort by everyone on this team has resulted in a successful test," he said.

"Given the growing theater ballistic missile threat, we feel a special responsibility to be successful in developing and testing this vital weapon system," said Ed Squires, THAAD vice president at Lockheed Martin. "The THAAD team has shown remarkable resolve and is now focused on achieving similar success during the weapon system's next flight test."

Secretary of Defense William S. Cohen announced Jan. 20 the Defense Department's plans to allocate additional funds to National Missile Defense and Theater Missile Defense programs to meet the growing ballistic missile threats from rogue states to U.S. forces deployed overseas and to U.S. territory.



Courtesy photo

Infra-red imagery from the THAAD seeker shows THAAD closing with the HERA target during the successful June 10 flight test. The imagery shows THAAD zeroing in on a specific spot on the Hera target, a feat of incredible accuracy due to the high closing speed involved.

"We are affirming that there is a growing threat and that it will pose a danger not only to our troops overseas, but also to Americans here at home," said Cohen.

"Ballistic missile defense is clearly vital to our future — for our Corporation

and for our nation," said Dr. Mal O'Neill, vice president for mission success and operations for the Space & Strategic Missiles Sector, Lockheed Martin Corp. As a former lieutenant general in the Army, O'Neill served as director of the Ballistic

Missile Defense Organization from 1993 to 1996.

"The need for effective ballistic missile defense systems will continue to grow," O'Neill said, adding, "That doesn't mean meeting the challenge is going to be easy," he said.

Two global events in '98 increased the urgency of upper-tier theater missile defense, and served as a warning that missiles capable of reaching the United States from rogue nations are a growing threat: Development of intermediate-range missiles by North Korea, which fired a Taepo-Dong missile over Japan in August; and Iraq, which test fired a Shahab-3 in July.

These events have turned up the heat on all fronts of missile defense and demonstrated the need for the "family of systems" approach being taken by the United States, which now has systems under development for air, land and sea.

"Our missile defense architecture has been precisely designed and carefully planned to protect against the wide range of threats that exist today and will be developed in the future," O'Neill said. "Each system has an important role, with the ultimate goal being a layered approach that assures nothing can slip through our defenses."

However, O'Neill stated that the same technology challenges, shifting political realities and changing threats that have characterized the history of ballistic missile defense will continue to shape its future.

"As a corporation, we will be faced with many challenges," he said. "We must be prepared to respond quickly to new opportunities, because they most assuredly will come."

Behind every success there is a history

by Sharon Watkins-Lang
Huntsville, Ala.

- September 1988 – The command received the go-ahead for a theater missile program.
- January – October 1989 – A Systems Requirements Study was conducted.
- August 1990 – Concept Definition contracts were awarded to Sparta, Lockheed, and MDSSC.
- September 1990 – Theater High Altitude Area Defense, or THAAD, entered into a 13-month concept definition phase. The THAAD is the first weapon system to be developed specifically to defend against theater ballistic missiles.
- March 1993 - Design revised to produce a "larger kinetic-kill interceptor and a more powerful rocket booster."
- July 1994 – Ribbon cutting ceremony for the THAAD missile assembly facility at Courtland, Ala.
- November 1994 – Aerojet was awarded a two-year, \$15.9 million contract to develop a gel propellant divert and attitude control system for the THAAD.
- April 1995 – First test of the THAAD postponed due "glitches" in the pre-test preparation. This test was itself postponed from March 31, that

time at the request of the White Sands Missile Range.

- April 1995 – First test of the THAAD. The launcher and the missile met all of their test objectives, in this flight test. This flight was a test of the rocket motor, flight controls and warhead separation. There are 13 tests planned for the THAAD missile system.
- July 1995 - Second test focused on missile guidance and control system, to ensure that the missile receives target updates from the radar. Test was terminated due to excessive speed, but three of the four goals were achieved.
- October 1995 – Third test of the THAAD. The primary objective was the collection of seeker data. Its seeker collected data on the Storm target in the acquisition and track modes, accomplishing all the goals of the second test and additional objectives.
- December 1995 – Fourth test was the first planned intercept test of the system. Due to a software error, the system failed to intercept the Storm target.
- March 1996 – Fifth test of the THAAD, second intercept attempt. This was the first test to involve all of the THAAD components. The missile was launched from the THAAD palletized load system launcher. During this test, a lanyard

malfunctioned and reset the avionics computers, as a result the THAAD did not succeed in its primary objective - to intercept the HERA target.

- July 1996 – Sixth test of the THAAD, third intercept attempt. The goal of this test was to intercept the Hera in the high endo-atmosphere. Problems with the focal plane array overloaded the system and prevented target identification.
- March 1997 – Seventh test of the THAAD, fourth intercept attempt. The DACS motors did not operate as designed, as a result the missile was not able to maneuver.
- March 1998 – COLSA Corporation received a \$89 million contract for independent verification and validation of software for the THAAD system.
- May 1998 – Eighth test of the THAAD, fifth intercept attempt. A short circuit in the thrust vector control mechanism forced the THAAD missile to self-destruct in the boost phase.
- May 1998 – The Army issued a cure notice requiring a solution to the missile test failures. This notice could lead to a contract termination. Lockheed Martin responded, in part, with an offer to assume some of the cost risk.
- September 1998 – On the 18th, the THAAD Radar successfully tracked a NASA rocket launch (a

Terror/Black Brant) at White Sands Missile Range. On the 24th, the radar system tracked an Air Force and Army rocket demonstration for over four minutes.

- March 1999 – Ninth test of the THAAD, sixth intercept attempt. In this test, the interceptor came within 30 meters of the target. The error was attributed to a failure of one of the attitude control motors.
- May 1999 – Tenth test of the THAAD, seventh intercept attempt. Test was postponed due to problem with the target.
- May 1999 – Lockheed Missiles and Space Corp. was assessed a \$15 million penalty for not achieving a hit during the intercept test on March 29. Lockheed Martin's contract makes them liable for failures that result from malfunctions in their system.
- June 1999 – Tenth test of the THAAD, seventh intercept attempt. Test was postponed due to commercial power outage at the White Sands Missile Range, NM.
- June 1999 – Tenth test of the THAAD, seventh intercept attempt. The THAAD successfully intercepted a Hera target missile at White Sands Missile Range, N.M.

(Watkins-Lang is a historian in the command's Research Branch.)