

AFTER THE WAR

AFTER THE WAR; Army Is Blaming Patriot's Computer For Failure to Stop the Dhahran Scud

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May 20, 1991



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The Iraqi missile that slammed into an American military barracks in Saudi Arabia during the Persian Gulf war, killing 28 people, penetrated air defenses because a computer failure shut down the American missile system designed to counter it, two Army investigations have concluded.

The Iraqi Scud missile hit the barracks in Al Khobar near Dhahran on Feb. 25, causing the war's single worst casualty toll for Americans. The allied Central Command said the next day that no Patriot missile had been fired to intercept the Scud, adding that the Scud had broken into pieces as it descended and was not identified as a threat by the Patriot radar system.

But further investigations determined that the Scud was intact when it hit the barracks, and was not detected because the Patriot's radar system was rendered inoperable by the computer failure.

"The radar system never saw the incoming missile," said Col. Bruce Garnett, who conducted one of the investigations. He recently retired as the Patriot project manager at the Army's Missile Command in Huntsville, Ala.. Support From Separate Study

The 11th Air Defense Artillery Brigade at Fort Bliss, Tex., which operated all 20 Patriot batteries in Saudi Arabia, prepared a separate report that reached the same conclusions, an officer familiar with the inquiry said.

Army experts said in interviews that they knew within days that the Scud was intact when it hit, and that a technical flaw in the radar system was probably to blame.

The problem was identified and corrected in all the Patriot batteries within weeks of the attack, officials said.

The Army investigations raise questions why the Pentagon and Central Command perpetuated the explanation that the Scud broke up.

Central Command officials denied that they were aware of the Army's initial findings of computer malfunction. "It was not something we had at all," said Lieut. Col. Michael Gallagher, who was a command spokesman in Riyadh.

During the war, American military officers were reluctant to discuss any weapon failings. But even after the cease-fire, many officers were averse to say anything that might tarnish the one-sided allied victory over Baghdad's forces.

The senior Army official familiar with the investigations said the service would not comment on the inquiries until top-level service officials had reviewed the conclusions.

Family members of some of the victims of the Dhahran attack have tried to get more information from the Army but say the Pentagon has refused to release any details.

Rita Bongiorni of Hickory, Pa., whose 20-year-old son, Joseph, was killed in the attack, said she had written the Secretary of the Army, Michael P. W. Stone, for an explanation, but had received only a form letter saying a comrade was at her son's side when he died.

When Mrs. Bongiorni requested a detailed autopsy report, she said the cause of death was listed simply as "Scud attack."

"I just want to know the truth, and I'm not sure we'll ever know," Mrs. Bongiorni said in a telephone interview. "I don't feel the Army's been up front with us."

The performance of the Patriot system, hailed as one of the high-technology success stories of the war, has since undergone some re-evaluation.

Some scientists recently asserted that use of the Patriot in Israel and Saudi Arabia might actually have increased the amount of explosive debris scattered over the landscape as Patriot as well as Scud warheads fell to earth.

Nevertheless, the weapon succeeded in intercepting virtually all of the Iraqi Scuds fired toward cities or military installations during the war, and several countries are rushing to buy Patriots at a cost of about \$1 million each. The sales could yield billions of dollars in new orders for its manufacturer, Raytheon.

Since the beginning of the air war on Jan. 17, Raytheon's stock has increased in value to \$81.88 a share from \$68.50. No Comment From Raytheon

A spokesman for Raytheon, Larry McCracken, declined to comment until the Army makes public the inquiry findings.

The Patriot's performance is also an issue in the debate over the Pentagon's proposals for a missile defense system, commonly known as "Star Wars." Backers of the program point to the Patriot's success to bolster their argument for greater spending on research and development of missile defenses.

The Patriot works by locking its ground radar on an incoming missile and relaying the signals to a computer at a control station that tracks the target's speed, trajectory and predicted course.

Using a series of complex, split-second computations, the computer calculates when to launch its missiles and, in the case of Scuds, fires two Patriots -- each with a 200-pound conventional warhead traveling at 2,000 miles an hour -- at each Scud. The Scuds travel at more than 4,000 miles per hour.

In Dhahran the night of the fatal attack, there were two Patriot batteries -- Alpha and Bravo batteries of the Second Battalion, Seventh Air Defense Artillery Regiment -- whose protective reach extended well beyond the American military barracks in nearby Al Khobar, Army investigators said.

Four hours before the Scud firing, Bravo battery was shut down to repair a radar malfunction, a senior officer in the 11th Air Defense Brigade said.

The remaining battery was thought to provide adequate protection, but multiple computer problems, including four days of continuous operation, combined to cause a shutdown just a few minutes before the Scud attack, the officer said. As the Scud streaked toward the Persian Gulf city, Patriot batteries north of Dhahran detected the incoming missile on their radars but assumed that Alpha battery in Dhahran would attack, said Colonel Garnett, the former Patriot program director.

No Patriots were fired, Army investigators said, and the Scud crashed into the barracks, killing 28 people and wounding 97 others. Focus on Computer Software

Army investigators quickly ruled out operator error or problems with the launchers, and focused on the complex computer software program, made by Raytheon, that translated signals from the functioning radar to aim and fire the Patriots.

Colonel Garnett and other senior Army officials familiar with the investigations said an unforeseen combination of "dozens" of variables -- including the Scud's speed, altitude and trajectory -- had caused the radar system's failure.

Colonel Garnett described the case as "an anomaly that never showed up in thousands of hours of testing." His comments were first published in a recent edition of *The Army Times*, a weekly publication.

Col. Joseph Garrett, commander of the 11th Air Defense Brigade, refused to comment on his inquiry, which has been forwarded to Lieut. Gen. John J. Yeosock, commander of Army forces in Saudi Arabia during the war.

Although investigators determined within 72 hours that a technical problem had caused the failure, Colonel Garnett said it took "several weeks" to pinpoint the precise error "buried deep" in computer tapes made of the engagement on the radar system's high-speed, digital data recorder.

He and other investigators refused to provide more details of the problem, citing the classified nature of the system. Once identified, though, the problem was easy to fix, Army investigators said, and software was replaced in all 20 batteries in the war zone.

Colonel Garnett said the Army upgraded the Patriot's software program three times during the fighting. The fine-tuning improved the system's ability to shoot down Scuds at higher altitudes -- lessening the chances that explosive debris would fall on friendly cities -- and to discriminate between the explosive warhead and other parts that broke off during an attack.

As it turned out, the Scud that fell on the barracks was the last one fired in the war.

A version of this article appears in print on , Section A, Page 6 of the National edition with the headline: AFTER THE WAR; Army Is Blaming Patriot's Computer For Failure to Stop the Dhahran Scud