



HONEST PERFORMANCE ANALYSIS: A NOT-ALWAYS MET REQUIREMENT

Over a decade after Operation Desert Storm and months after Operation Iraqi Freedom, questions remain unanswered about Patriot missile performance during combat operations. The continuing dispute over claims about and analysis of Patriot success (and failures) during Desert Storm has helped drive what seems likely to be a more robust analysis of Iraqi Freedom activity.

J. Daniel Sherman's article on Patriot PAC-2 development in the Winter 2003 *Acquisition Review Quarterly* failed to capture appropriately the validity issues in analysis of the Desert Storm experience. Understanding the dispute over Patriot claims and analysis suggests the criticality of robust analysis of operational performance for an acquisition community that is being asked to focus on spiral development and acquisition—a focus that implies the ability to bring real-world lessons into programs in an effective and efficient manner.

To start with, the PAC-2 article does not put the Desert Storm experience in a correct historical context. Sherman asserts that Iraqi “use of its weapon of terror by launching Scud missile attacks” represented “the first time that tactical ballistic missiles would be used in hostile wartime attacks on civilian populations” (Sherman, 2003, p. 41–42).

In fact, use of missiles during wartime goes back centuries. The British Army used rockets to attack and set ablaze Boulogne, France, in 1806. During World War II, the Germans launched 2,952 V-2 ballistic missiles at cities in England and on the Continent. (These missiles killed 2,724 and wounded 6,467 in England and killed 4,152 in Belgium.) During the Iran-Iraq War, the two sides shot a total of 266 missiles during the “War of the Cities” (Greenwald, 1995). Missiles have long been used to threaten and attack civilians. Prior to Desert Storm, there seemed to be no effective active defense against this threat. The Patriot seemed to offer a path to change this calculus.

During Operation Desert Shield, the United States deployed Patriot batteries to Saudi Arabia and Israel. At the end of Desert Storm, both within the U.S. military and in the public discussion, the impression was that Patriot had performed spectacularly, effectively blunting the Iraqi Scud missile threat. Sherman cites February 28, 1991, estimates of successful Patriot interception rates of 70 percent in Saudi Arabia and 40 percent in Israel (Sherman, 2003). Thus, despite the death of 28 Americans in a February 25, 1991 Scud strike on Dhahran, Saudi Arabia, and other deaths, the Patriot performance was being rated a stunning technological success in the rapid adaptation of a system to undertake a more demanding mission than that for which it was originally designed.

In the 12 years since, however, the open analysis of Patriot performance has called into question the conclusion of tactical success. Questions have been raised about data collection, evidence standards, and measures of effectiveness. For example, some have challenged the standard for success.

The Army classified an engagement as a success if it could satisfy three criteria. (1) An engageable Scud must be present, (2) The “PATRIOT must intercept the Scud (i.e., detect, launch, and guide to intercept),” and (3) “There must be no significant ground damage.”

The first criterion—requiring that an engageable Scud be present—clearly is trivial.

Criterion 2 ... might sound like a more demanding requirement. However, the term “intercept” does not imply that the Scud was hit or in any way damaged, it only means that at least one Patriot flew out to the general vicinity of the Scud. ...

By satisfying criteria 1 and 2, the Army is in effect establishing that a Scud was present and that at least one Patriot fired against it did not grossly malfunction. All that is needed ... to declare such an engagement to be a success is that ... no significant ground damage occurred. ... Even in cases where Patriot radar tracking data indicates that the Scud would have impacted in a completely uninhabited area ... resulting lack of damage is taken as positive evidence ... even if there is unambiguous evidence that a Scud warhead hit the ground and exploded, the Army’s methodology would still allow the engagement to be classified as a success. (Lewis & Postal, 2000, pp. 385–386)

Try applying this logic to other systems. Flak jackets, for example, are overwhelmingly effective simply because the vast majority of bullets fired on the battlefield miss.

This author has detailed knowledge of just one Scud missile incident—the February 16, 1991 attack against Al Jubayl, Saudi Arabia. At the time the missile struck, 0207, February 16, the Patriot Battery was down for maintenance. It came back on line at 0212. This maintenance downtime, however, did not affect the effectiveness statistics as it was excluded from the post-war analysis.

For this case, post-war Patriot analysis asserted that there was no detection and that the missile impacted 10 miles north of F/2-7 Battery (F battery of the 2-7 battalion (F/2-7) under the 11th Air Defense Artillery (ADA) Brigade). The missile landed “outside the defended area...confirming that this was a non-threatening SCUD.” (CAS Inc, 1992, as cited in Siegel, 2003, pp 31–32) In fact, the missile landed just 150 meters from the pier, less than 1000 meters from USS *Tarawa* (with 2,793 sailors, Marines, soldiers, and civilians [including this author] aboard),

and roughly three kilometers from the battery site. The actual location of the impact was readily available (the missile having been recovered nearly intact from the harbor bottom) yet the Patriot analysis excluded this as a case of potential interest (Siegel, 2003).

Sherman asserts that “Regardless of any controversy regarding the number of Scuds that were destroyed, disabled or diverted, the fact remains: Patriots saved many lives, both civilian and military” (Sherman, 2003, p. 42). In terms of the open discussion regarding Patriot performance, the fact remains that it is unproven whether Patriot saved any lives, whether civilian or military. In fact, some might suggest that unwarranted confidence in the Patriot system and performance failures aggravated by operator processes may have contributed to the death of 28 Americans in the February 25, 1991 Scud attack against Dhahran.

The *fact* of Desert Storm Patriot performance is that the contractor and the Army attempted—within a very tight timeline—to adapt a system from fixed-wing air defense to a far more demanding mission of missile defense with the penalties of doing this with poorly understood parameters of the actual threat (Iraqi Scud) performance. They sought to solve a very real capabilities gap through modifying the existing system. In terms of technical performance, the jury remains out 12 years later, although the question is whether the Patriots had some, minimal, or no tactical capability against the Iraqi missile threat rather than the cited 70 percent success rate. (A robust literature exists on these issues. See, for example: Government Accounting Office (GAO), 1992a; GAO, 1992b; Hildreth, 1992; Lewis & Postal, 1993; Lewis & Postal, 2000; Postal, 1991; Postal, 1992; Stein, 2000; Sullivan, 1998.)

On the other hand, the Patriot was likely of great policy and operational importance. Patriot deployments in Saudi Arabia and Israel reassured both of these governments and their people. The deployment to Israel might have prevented the Israelis from striking back at Iraq and thus helped keep the coalition together. Thus, the Patriot performance during Operation Desert Storm might be a case of a system with minimal tactical effectiveness but great policy and operational effectiveness.

While such details might seem footnotes to an obscure history, they point to an important issue for the acquisition community. The challenges of the 21st century, the global war on terrorism, and transformation suggest that the U.S. military will frequently go into battle using non-IOC (Initial Operating Capability) systems, will often seek to employ these systems adaptively to confront emergent challenges or exploit new operational concepts, and will seek to bring operational *lessons learned* back into the procurement system as rapidly as possible to enhance future operational capabilities.

To do such adaptive procurement requires that analytically rigorous and objective analysis be applied to mission performance—in technological, procedural, operational, and even policy terms. When done right, this analysis should begin prior to actual employment (potentially deploying analysts with deployed units and systems) and must build on effective data collection during operations. Unfortunately, beginning data collection and analysis after-the-fact increases the potential for skewed analy-

sis and mistaken conclusions. This analytical process and its results should be shared with all stakeholders—the operators, procurement community, contractors, and oversight process (whether DoD, administration, or Congressional). In addition, to the extent that security allows, this analysis should be available to the larger defense community to help focus development priorities where merited.

Following Desert Storm, this did occur with some Air Force and Navy programs that were perhaps similarly *experimental*. The Joint STARS program, also deployed for Desert Shield/Storm well before official IOC, closely monitored platform performance during the conflict. The program made a studied effort to learn from the experience in both the technical and procedural realms. On the other hand, the deployed experience was specifically excluded from the Operational, Test and Evaluation (OT&E) process. Rather than using the real-world experience to accelerate the formal fielding of the program, this experience was viewed by at least some as an inhibitor to program development (Fowler, 1998).

When Iraq invaded Kuwait in 1990, the Navy Tomahawk cruise missile had never been fired in anger. From Desert Storm until today, the U.S. Navy has had a team at the Center for Naval Analyses (key members have included Richard Brody, Stuart Dunn, and Robbin Holliday) to attempt to reconstruct the events and effectiveness of virtually every Tomahawk strike. Their Desert Storm work was at odds with original performance claims during the *heat of battle* (Holliday, 1994), but the analytical rigor led the Navy to accept and eventually embrace their work to help drive future program decisions.

For neither the Joint STARS nor the Tomahawk community were all lessons necessarily *pleasant*. Both communities undertook, however, a serious effort to assess system capabilities as honestly as possible to enhance future performance of what was in one case essentially an experimental platform and, in the other, an untried weapon system when Iraq invaded Kuwait.

As far as this author is aware, this did not occur with Patriot performance during Operation Desert Storm. Sherman's article on PAC-2 development continues a too-strong tradition of failing to evaluate Desert Storm Patriot performance in an open, honest, forthright, and analytically defensible manner. The assignment of a Defense Science Board (DSB) to examine Patriot performance during Operation Iraqi Freedom (Wall, 2003; Wynne, 2003) provides grounds for hope that this error will not be repeated with this Gulf War's Patriot employment analysis.

The acquisition community should place a high priority on capturing meaningful lessons from operations—especially for systems that have not yet achieved IOC. This experience should be leveraged to expedite fielding the most effective systems in the most appropriate fashion amid the challenges of 21st century spiral development.

Adam B. Siegel
Senior Analyst
Northrop Grumman Analysis Center

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