Iron Dome Protection: Missile Defense in Israel's Security Concept

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The limited number of Israeli civilian casualties in the latest round of warfare between Israel and Hamas was attributed in the main to the remarkable performance of the Iron Dome anti-missile shield. According to figures released by Israeli defense officials, Iron Dome achieved a success rate of approximately 90 percent in intercepting rockets fired at Israel's residential areas. This was an improvement in its performance over Operation Pillar of Defense in November 2012, when figures showed that the Iron Dome system had an interception rate of 84 percent.[1] However, Iron Dome is unable to provide an effective response to the short range rockets and mortar rounds fired at Israeli communities bordering Gaza. Israel is now working on a new rocket and mortar defense system, known as Iron Beam, which is designed to address this threat. The system utilizes lasers to shoot down short range threats such as mortar rounds.[2]

Iron Dome Performance: Critique and Response

Despite Israel's data regarding the performance of the Iron Dome system, some specialists in the field have doubted the high rate of interceptions. Theodore Postol of MIT, a controversial critic of missile defense systems, claims that a detailed analysis of photographs of interceptor contrails during Operation Pillar of Defense demonstrates that the interceptor rate was as low as 5 percent, with little improvement during Operation Protective Edge. He claims that successful interception would require the rocket to be approached head-on, whereas photographs of Iron Dome contrails appear to show that this has not occurred. Furthermore, he attributes low casualties from Hamas rockets to Israeli civil defense preparations such as early warnings

and shelters. According to Postol, there is no public evidence to show that Iron Dome is performing at an interception rate of 90 percent.[3] Postol's dismissal of the IDF findings on Iron Dome's rate of interception is somewhat puzzling, especially since in the past he has shown a readiness to rely on the conclusions of Israeli defense officials when they correspond with his own thinking. In the wake of the 1991 Gulf War, for example, Postol endorsed the findings of the Israeli military that showed that the Patriot anti-missile system did not offer additional security for Israel after Iraq began firing Scud missiles.[4] Other skeptics such as Richard M. Lloyd suggest that Iron Dome has been able to destroy no more than 40 percent of incoming warheads.[5] While lower than the interception rate reported by the IDF, this number is still considerably higher than the figure suggested by Postol.

Subrata Ghoshroy, also from MIT, presents a more nuanced perspective on Iron Dome's performance. Unlike Postol, Ghoshroy suggests that once detailed information on the performance of Iron Dome becomes more accessible, the missile defense system may in time be viewed as "a step forward in defense systems of its type." At present, the lack of comprehensive data on Iron Dome interceptions means that outside observers have difficulty in evaluating the performance of the Israeli system. Moreover, even if Iron Dome succeeded in intercepting around 90 percent of the Hamas rockets, this does not necessarily mean that Israel's other missile defense systems such as David's Sling and Arrow will perform as effectively.[6] The point is instructive given that during Operation Protective Edge, many of the interceptors were not utilized since Iron Dome was able to detect that a large proportion of the rockets would not reach urban centers. In the event that Israel were to face a war on several fronts, with enemies firing many hundreds of ballistic missiles a day, including missiles such as the Iranian Shehab and Sejil models, Israel's Arrow system would be required to utilize a larger number of interceptors with the attendant risk that the system is saturated and therefore unable to perform as effectively.[7]

Precise data on Iron Dome performance from the IDF is still lacking,[8] but Israelis certainly do not doubt the success of the defensive system. Indeed, it quickly became the overwhelming success story of the operation, and many people witnessed and documented interceptions first hand. The mid-atmosphere explosions during many rocket barrages became familiar sights, and whether Iron Dome hit the incoming rockets head-on (detonating the warhead) or from the side, the rockets did not reach their civilian targets.

Ironically, the success of the system was affirmed by the bizarre accusation hurled at Israel by the outgoing UN High Commissioner for Human Rights, Navi Pillay, whereby Israel was guilty of not sharing Iron Dome with Hamas in order to protect Palestinian civilians.[9] As to Postol's idea that low civilian casualties were due to other defensive measures, he provides no explanation for the very minimal damage to property as well.

Indeed, a comparison of data from the Second Lebanon War of 2006 (when the Iron Dome system was not in place) and Operation Protective Edge shows that that in 2006, some 4000 Hizbollah rockets hit Israel, resulting in the deaths of 53 Israelis,[10] whereas during Operation Protective Edge, at least 3360 rockets were fired from Gaza,[11] with two Israelis killed from the rocket fire. Moreover, in 2006 there were 30,000 insurance claims for damage (each rocket generated around seven damage claims), while during the Gaza war of 2014 (as of September 3, 2014), approximately 2400 claims were filed (less than one claim per rocket).[12] Critics of the Iron Dome system will need to account for the significantly higher rate of civilian casualties and insurance claims during the 2006 war when Iron Dome was not in operation. The claim that the low civilian casualties during Operation Protective Edge were a result of civil defense measures is not persuasive, since these measures also applied in 2006 when many more were killed from similar types of rockets.[13]

Defensive Measures in Israel's Security Thinking

What does all of this mean for the defensive pillar in Israel's security doctrine, specifically with regard to the best means to confront rocket, missile, and nonconventional threats? Traditionally, Israeli military planners have favored developing flexible offensive capabilities to deal with long term strategic threats. Moreover, technological uncertainties surrounding the development and deployment of the Arrow ballistic missile defense system and its high cost were commonly cited objections to its development. Nevertheless, during the 1980s, in the face of fierce opposition by the IDF, then-Defense Minister Yitzhak Rabin approved the development of the Arrow, and today the balance is moving increasingly toward defensive capabilities.[14]

Missile and rocket defense has become a crucial element of Israel's approach in defending the country, alongside offensive capabilities and passive defense. Israel is developing multiple layers of missile defense to face the rising threats of ballistic missiles and rockets from Lebanon, Syria, and Iran.

In the coming years, it is likely that Israel will develop an integrated system that will cover the entire country to address multiple threats, activating the different systems in the most efficient and cost-effective manner.[15]

The late Reuven Pedatzur, an Israeli defense specialist, argued against defense systems due to their inability to provide adequate protection in the face of nuclear threats. If but one nuclear missile were to penetrate the system and hit Tel Aviv, the consequences, he argued, would be unbearable for Israel – therefore, to be effective, the Arrow missile defense system would have to provide hermetic protection, which it cannot. Moreover, Pedatzur viewed development of defensive measures as an Israeli message to its enemies that it was preparing to defend itself against a nuclear attack, rather than relying on its deterrence to ward off the prospect of such an attack. By sending the wrong signal to Iran, Israel would in effect be damaging its own deterrent image, projecting that its deterrence is less than robust.[16]

However, this has not been the predominant line of thinking; rather, the model whereby deterrence is actually reinforced by defense has been adopted by Israel's military planners, as it has been by the United States and NATO. Uzi Rubin, a leading Israeli defense expert and a former director of Israel's missile defense organization, has a take on deterrence that diverges from Pedatzur's Cold War thinking. Deterrence against nuclear threats relies on a survivable retaliatory force, and survivability requires that a sufficient number of retaliatory forces are still operational after an initial attack. This is where missile defense comes into the picture. Rubin concludes that while missile defenses cannot provide a hermetic shield against ballistic missiles, even a partially successful missile shield can significantly complicate the planning of an adversary.[17]

Public Mood and Flexibility for Decision Makers

Additional benefits of missile defense systems relate to the public mood. Critics of Iron Dome have overlooked the positive impact that successful missile defense has had on Israeli national morale, and its contribution to strengthening public resolve in a war situation. This is borne out by the very positive response of the Israeli public to the Iron Dome system's success in intercepting missiles from Gaza, both in 2012[18] and 2014.

Public mood can translate into concrete strategic benefits. In Operation Protective Edge, the public's sense of protection by Iron Dome gave time and space for the government to make calculated decisions on how to proceed in

response to the rocket fire, while reducing the pressure to move quickly to a ground offensive in Gaza. When the decision was finally taken to conduct a ground operation, it was not directly linked to the rocket attacks, but rather to the efforts by Hamas to infiltrate into Israel through the numerous attack tunnels. On the more negative side, Israel's success in limiting civilian casualties has been cynically turned against it in the international debate by those who have accused Israel of a disproportionate response.

Lessons from Operation Protective Edge are instructive as Israeli military planners place increasing emphasis on the development of defensive capabilities in facing missile and strategic threats from Israel's enemies. No serious military expert would claim that missile defense systems are able to provide hermetic protection, but missile defenses do create conditions for enhanced freedom of action for decision makers – defense systems ensure that they have time, and are not compelled to resort automatically to pre-emption and retaliation.[19] Missile defense systems give political leaders various options, and provide time for diplomacy to work. This may help to explain why the United States has invested vast sums of money in Israel's various defense systems. It is not just about protecting the Israeli public, but also about enhancing stability and deescalation efforts.

Notes

1 Amos Harel, "Iron Dome Racks Up 90 % Success Rate So Far," *Haaretz*, July 9, 2014, http://www.haaretz.com/news/diplomacy-defense/1.604039.

2 Yaakov Lappin, "Israeli Iron Beam Laser Air Defense System 'Brings Down Mortars Like Flies' Creator Says," *Jerusalem Post*, April 2, 2014.

3 Theodore A. Postol, "The Evidence that Shows Iron Dome is not Working," *Bulletin of the Atomic Scientists*, July 19, 2014.

4 Patrick E. Tyler, "After the War; Did Patriot Missiles Work? Not So Well, Scientists Say," *New York Times*, April 17, 1991.

5 William J. Broad, "Weapons Experts Raise Doubts About Israel's Antimissile System," *International New York Times*, March 20, 2013.

6 Subrata Ghoshroy, "Iron Dome: Behind the Hoopla, a Familiar Story of Missile-Defense Hype," *Bulletin of the Atomic Scientists*, December 13, 2012.

7 Nathan Farber, "Is the State of Israel Safe from Missiles and Rockets?" *Magen Laoref*, September 30, 2013, http://www.magenlaoref.org.il/doesIsraelsafe.pdf; Yossi Melman, "Israel's Missile Defense System Could Crumble at the Moment of Truth," *Jerusalem Post*, October 26, 2013.

8 The most recent data as of writing is from after nine days of the operation, when the IDF put the success rate at 86 percent: See Jeremy Binnie, "IDF Releases Iron Dome Interception Rate," *IHS Jane's 360*, July 20, 2014, http://www.janes.com/article/40943/idf-releases-iron-dome-interception-rate.

9 For the report on this see: http://www.breitbart.com/Big-Peace/2014/07/31/UN-Condemns-Israel-s-Latest-War-Crime-Not-Sharing-Iron-Dome-with-Hamas.
10 Uzi Rubin, "The Rocket Campaign against Israel during the 2006 Lebanon War," *Begin-Sadat Center for Strategic Studies*, Bar-Ilan University, June 2007, pp. 10-14.
11 "Operation Protective Edge By the Numbers," IDF website, August 5, 2014, http://www.idfblog.com/blog/2014/08/05/operation-protective-edge-numbers/.
12 Uzi Rubin, "Israeli Air Defense," Presentation to US Air Force Association, September 12, 2014, http://www.c-span.org/video/?321453-1/discussion-israeli-air-defense.
13 Ibid.
14 Efraim Inbar, *Rabin and Israel's National Security* (Washington, DC: Woodrow Wilson Center Press, 1999), p. 76. See also: Uzi Rubin, "Israel's Short-Range Missile Defense in Action" (audio), Carnegie Endowment for International Peace, September 10, 2013; Uzi Arad, presentation at INSS conference "Complex Nonconventional Deterrence Equations," May 22, 2014.
15 Yaakov Amidror, "Missile Defense: An Israeli Perspective," presentation at INSS conference "Missile Defense: Asset or Liability for Regional and International Stability," January 15, 2014.
16 Reuven Pedatzur, "How Missile Defense Undermines Deterrence: The Israeli Case," presentation at INSS conference "Missile Defense: Asset or Liability for Regional and International Stability."
17 Uzi Rubin, "Israel's Missile Defense: An Asset or a Drawback in a Nonconventional Scenario," presentation at INSS conference "Missile Defense: Asset or Liability for Regional and International Stability."
18 Paul Schulte, "Interactions between Missile Defense, Deterrence and Disarmament: A Relativist Approach," presentation at INSS conference "Missile Defense: Asset or Liability for Regional and International Stability."
19 Bruno Tertrais, "Beyond US Nuclear Weapons? NATO and Strategic Deterrence by 2020," in *NATO's Non-Strategic Nuclear Weapons after Chicago*, eds. Hugh Chalmers, Malcolm Chalmers, and Andrea Berger, Whitehall Report 4-12 (Royal United Services Institute, October 2012), p. 20.