



***INSS Insight*** No. 414, March 21, 2013

## **How Many Rockets Did Iron Dome Shoot Down?**

**Yiftah Shapir**

A number of articles published recently in Israel and abroad – including an article in Haaretz by Reuven Pedatzur – have questioned the actual number of rockets shot down by Iron Dome during Operation Pillar of Defense. The source of these articles is a study conducted by Professor Theodore Postol, a well-known expert at MIT, together with Israeli researcher Dr. Mordechai Shefer and an unnamed engineer from Raytheon.<sup>1</sup>

The report claims that Iron Dome was able to intercept only 5 percent of all the rockets fired at Israel during Operation Pillar of Defense in November 2012, a far cry from the 87 percent success rate boasted by Israel. The principal claim here is that Iron Dome did not succeed in hitting the warheads of the enemy rockets and shooting them out of the sky, a conclusion reached mainly from an analysis of video footage of interceptions. According to the report's authors, most of the explosions appear spherical, which indicates that the interceptor missile warhead is exploding, and that this is not a secondary explosion of the rocket's warhead. Otherwise, they contend, there would have been two explosions visible, or at least something asymmetrical. They also identified Iron Dome interceptors exploding shortly after they made a sharp turn. In their opinion, this was a pre-programmed trajectory and not pursuit of a target. The authors also cite Property Tax Authority reports indicating that 3,200 claims were made for damages caused by the rockets, as well as a report from the southern district of the Israel Police that 109 rockets fell in built-up areas, which is almost double the 58 reported by the IDF.<sup>2</sup>

The report's claims appear puzzling, to say the least, particularly the contention that Iron Dome did not succeed in causing the rocket's warhead to explode. This claim is reminiscent of claims from the 1991 Gulf War, directed then at the Patriot missiles, which in fact were not successful in hitting the Scud warheads, for the simple reason that the Patriot was designed to intercept and shoot down planes, not missiles. It appears that criticism of Iron Dome draws on claims made against US missile defense systems and pasting them on to the Israeli system, while ignoring the clear differences between the systems and between the different strategic situations.

Indeed, a Grad rocket is not a Scud, let alone an intercontinental ballistic missile. Its warhead is not that of a one-ton missile. Professor Postol claims that he knows exactly what happens when an Iron Dome Tamir interceptor explodes next to a pipe several meters long with a 20 kilo warhead. However, the fact is that the defense establishment has understandably not published this information, and therefore we can only guess what actually occurs.

The report's findings are based on an analysis of dozens of video clips. These clips were not filmed during sophisticated trials; they were taken by civilians who photographed them using their smartphones and uploaded them to YouTube. In general, it is not possible to know where they were filmed or the direction in which the person filming was looking. It could be that the dozens of clips on Youtube belonged to a single interception and were filmed by different people from different directions. It is very difficult to conduct precise analyses, and it is generally difficult to learn from the film about the geometry of the missile's flight. The researchers also looked for double explosions and failed to find them. This is not surprising, since such explosions are very close to each other both in distance and in time – less than a thousandth of a second. There is no way that a smartphone camera could distinguish between a double and a single explosion.

It is also important to remember that not all the rockets that fell in built-up areas were failures of Iron Dome, for the simple reason that not all cities in Israel were protected in the first place by Iron Dome. A rocket hitting an unprotected target, painful though it may be, does not indicate that Iron Dome failed.

As for the police reports, it is not clear what they indicate. The critics see them as proof that the defense establishment is lying: 109, not 58. However, the Israel Police reports on calls from citizens, and these include reports on falling fragments, rocket parts, and duds. How many of the reports were really about rockets? It is difficult to know (beyond the fact that out of 1,500 rockets launched, 109 falling in built-up areas is a not inconsiderable achievement in and of itself).

It is even less possible to make conclusions from the Property Tax Authority's reports. Clearly some of the claims are very significant (consider the pictures of the apartment in Rishon Lezion). But how many claims does one rocket hit produce? Certainly more than one. A rocket hit is likely to shake foundations and cause damage to a number of buildings, and any such building is likely to have a number of apartments. Even a person whose window was broken at a distance of fifty meters from the rocket hit is likely to submit a claim. How many of the 3,200 claims are for minor damage? It is difficult to tell, but it is doubtful that the researchers know.

It appears, then, that critics are happy to disparage the Iron Dome system and belittle the lessons from Operation Pillar of Defense, using only dubious research without access to credible data. Debating various aspects related to Israel's defense establishment, weapon systems, and strategic choices is both legitimate and welcome, if deliberations are based on reliable data. However, there is a major difference between legitimate criticism and adamant claims that the Israel defense establishment's claims about Iron Dome are fraudulent, and that these lies are typical of the defense establishment. Such mudslinging is unreasonable and unacceptable.

---

<sup>1</sup> Reuven Pedatzur How Many Rockets has Iron Dome Really Intercepted? *Haaretz*, March 9, 2013, <http://www.haaretz.com/opinion/how-many-rockets-has-iron-dome-really-intercepted.premium-1.508277>. Original article in Hebrew at [www.haaretz.co.il/opinions/1.1954176](http://www.haaretz.co.il/opinions/1.1954176). See also Richard Silverstein, Tikun Olam blog, "Iron Dome System Failed Miserably," posted on March 8, 2013, <http://richardsilverstein.com/2013/03/08/iron-dome-system-failed-miserably/>; and Jonathan Marcus, "Israel's Iron Dome: Doubts over Success Rate," *BBC News Middle East*, March 12, 2013, <http://www.bbc.co.uk/news/world-middle-east/21751766>.

<sup>2</sup> Israeli Police website summary of 8 days of fighting, <http://www.police.gov.il/articlePage.aspx?aid=877>.

