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How Many Domes Does Beer Sheva Need?

Yiftah Shapir

Recent events have placed the Iron Dome system back on the public agenda. In a barrage that continued for several days following the terror attack in Eilat, over one hundred Grad and Qassam rockets – aimed at Beer Sheva, Ashdod, Ashkelon, Sderot, Kiryat Gat, Gedera, Kiryat Malachi, and adjacent towns – landed in Israel.

Two recently deployed Iron Dome batteries, one in Beer Sheva and the other in Ashkelon, operated during this barrage and managed to intercept some eighteen rockets fired at the two cities. However, alongside this success – one that the heads of the defense establishment and security industries can rightly be proud of – there is also a feeling of disappointment, as some of the rockets caused damage to property and took a human toll, with one fatality in Beer Sheva and a number of injuries elsewhere.

The first responses to these results were predictable. Besides announcements about debriefings at the technical level that will be carried out within the combat units themselves in cooperation with industry representatives, the heads of the defense establishment stressed that Israel still does not have enough batteries. Defense Minister Ehud Barak noted that two additional batteries are scheduled to be incorporated into the fighting forces within the next few months, and added that he has called for a national effort to increase acquisitions, the final goal being the deployment of nine batteries by the end of 2013. Even this ORBAT is smaller than what is needed according to the defense establishment, which would like to see the deployment of fifteen batteries.

The Iron Dome system, supposed to intercept short-range (5-70 km) artillery rockets, is new in service, innovative, and unique. There is nothing like it anywhere in the world, neither already in operational use nor even in development. One Iron Dome battery includes radar, a fire control center, and three launchers, each carrying twenty Tamir interceptors. One battery is supposed to protect an area of up 150 sq km (equivalent to a circle with a 7-km radius). The process of its development was amazingly short relative to other sophisticated weapon systems. The system is experiencing some growing pains, and technical debriefings will help improve its future use. These improvements will be

facilitated by the close cooperation between the units operating the system and the system developers and manufacturers.

The heads of the defense establishment are correct in saying that two batteries are not enough to protect all civilian targets, and certainly one battery is not enough to protect a city the size of Beer Sheva, the second largest city in Israel in terms of area – 117.5 sq km.

However, the "failure" in Beer Sheva is more than a technical problem or system immaturity, or a function of too few batteries or interceptors. Rather, the failure stems from the fact that there isn't – and indeed cannot be – any system good enough to provide 100 percent protection. Specifically, a system such as Iron Dome has limitations in terms of the protection it can provide; there is also a limit to the area it can protect (its "footprint"). A statement such as "a battery is capable of protecting an area of 150 sq km" does not indicate the shape of that area (e.g., it is not necessarily a circle), nor does it say that there is equal protection extended to every spot within that area. The interception capability for any given point within the area depends on components such as the speed of the intercepted rockets, their altitude, and their particular flight trajectory.

More importantly, the defensive capabilities are limited to the number of interceptions the system can undertake at any given moment. If more rockets are launched at the protected area than the battery can handle, some will necessarily penetrate. Technical improvements or improved training or drilling of the personnel manning the batteries may alter this fact, but they cannot change the principle: the protective system has a saturation point.

What, then, is the significance of this data? When the target being protected is a city, the operational benefit of deploying the system is relatively small, because although deploying a battery to protect a civilian area will surely reduce the number of casualties and the damage to property, the residents of the protected city will not feel the difference. They will still have to heed Home Front Command announcements and will still have to run to protected locations the moment they hear the siren, because rockets will still fall within city limits. Israel's experience shows that it takes only a few rockets to disrupt the normal routine.

By contrast, Iron Dome batteries can make a significant operational difference in defending non-civilian targets, especially in an era in which the threat is gradually changing from unguided, imprecise rockets, representing a "statistical" weapon, to guided rockets and missiles with growing accuracy. The acquisition of the latter may make the enemy change tactics. There is little point in firing precision rockets (apparently more expensive) in a spray over an entire city. There is, however, great point in firing them at selected strategic targets, whose area is usually small: army bases, power stations, transportation hubs, and other strategic infrastructure installations. It will be easier to

protect these types of targets, precisely because they are smaller, and protecting these important targets may make a real operational difference.

However, the Iron Dome system is first and foremost a political system. The heads of the IDF did not understand this when for years they were opposed to its development. They knew the operational considerations, but did not understand that political leaders in a democratic country would find it very difficult to tell the citizens that the technical capabilities for protecting them existed but they were deciding against putting them in place. Once the system was delivered to the IDF, the army demanded it be deployed not to protect the cities but rather to position it to protect certain locations as dictated by the needs of the hour. Only directives from the political echelon forced the army to change its position. There is no better illustration of this point than the number of appeals presented by municipal leaders before the Supreme Court regarding deployment of the Iron Dome system.

So too for the demand to acquire another nine or fifteen Iron Dome systems, and so too for the David's Sling system still in development: the reasons for the development of these systems are first political and only then operational. Such considerations will determine the number of deployed systems and their locations, and in the set of considerations about protecting the civilian home front, these are indeed important factors.

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