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Another Layer of Defense: The Arrow-3 Test

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The first test launch of the Arrow-3 missile interceptor system was conducted by the Israeli defense establishment on the morning of Monday, February 25, 2013. Not many details are available, but the test appears to have been a success.

Israel Aerospace Industries and Boeing have been developing the Arrow-3 system jointly for several years for the Israel Missile Defense Organization, with the participation and funding of the US Missile Defense Agency. The funding for the project is not part of the regular American defense aid for Israel. When the Arrow-3 becomes operational, scheduled for 2014-2015, it will reinforce the existing Arrow-2.

The Threat

The Arrow-3 system is intended to cope mainly with the threat of Iranian missiles, including the old Shehab-3 and the Ghadr-1, which is an upgraded version of the Shehab-3. These missiles use liquid fuel and have a range of some 1,500 kilometers.

The Sajjil-2, currently under development by Iran, is a two-stage solid fuel missile with a range of some 2,000 kilometers. The Sajjil-2 has thus far been tested a number of times, but apparently it has not yet entered production or been deployed operationally. When it enters into service, it is apparently supposed to gradually replace the older missiles.

The Arrow-2 missile system was designed to cope with shorter range missiles: the Scud B, possessed by Syria and Egypt, and the Scud C and D, possessed by Syria (and perhaps also Hizbollah). When the Arrow-2 was under development, there was also a threat from Iraqi al-Hussein missiles. These missiles have ranges of 300 to 600 kilometers, and enter the atmosphere at a speed of some 1,500 meters per second. The Arrow was designed to challenge them and attempt to shoot them down in the upper layers of the atmosphere, at an estimated height of some 90 kilometers (the actual figure has not been published).

Missiles with a greater range, such as the Shehab-3 and the Sajjil, re-enter the atmosphere at much higher speeds – some 4,000 meters per second. The Arrow-2 interceptor would

have a hard time shooting down targets moving at such speeds. The Arrow-3 is intended to be a response to this threat.

The Arrow-3

The Arrow-3 system is the upper tier of the Arrow weapon system. It includes a new communications system, a new guidance system, and a new sensor technology. Its interceptor is a two-stage solid fuel interceptor that destroys its target by means of an exo-atmospheric kill vehicle. It shoots down its target outside the atmosphere (in contrast to the Arrow-2, which works in the upper layers of the atmosphere). The kill vehicle is capable of maneuvering in space using thrust-vectoring. An additional Arrow-3 innovation is that the kill vehicle does not carry explosives, and is designed to make a direct hit on a target and destroy it with only a kinetic hit (hit-to-kill technology). At closing speeds of thousands of meters per second, the energy of impact is sufficient to vaporize the target. The Arrow-3 interceptor is smaller and lighter than that of the Arrow-2, even though it is designed to shoot down its targets at higher and farther levels than was in the previous model.

The Arrow-3 system also includes surveillance systems that can identify approaching threats at greater ranges and with greater precision than in the past. Like the Arrow-2, it can be integrated into the American detection system, which uses radar such as the AN/TPY-2 X-band radar (radar of this type is also deployed in the Negev), or on US Navy Aegis vessels.

The Significance of the Test

Immediately after news of the test was published, some commentators attempted to find a political context for the test and its timing – a message to Iran, a message to Arab countries, or even related to events in Judea and Samaria. The truth is simpler. The development of weapon systems takes many years. The timing of tests is determined not by politicians but by engineers, in accordance with the progress of the development program. The exact timing of the test is set on the basis of the state of development and on factors connected to the test itself, such as the availability of the test site and the necessary support units, or other environmental conditions such as the weather. Only rarely does the political echelon intervene in determining the timing of the test, and only when there is a serious concern that the precise timing will have far reaching political consequences (for example, if a foreign leader is visiting Israel). Generally, the timing of the test has no political meaning.

Conclusion

Once it becomes operational, the Arrow-3 system will add another layer to Israel's multi-tiered missile defense system and will provide Israel with protection against a threat that until now has not been met. And beyond the ability to intercept missiles, the development of the Arrow-3 has aspects that are no less (and perhaps even more) important. The

development of the system represents a technological achievement for the defense industry that will advance it and preserve its leading position on the global technological front. The system is also an important component in Israel's strategic cooperation with the United States. Finally, when deployed, the Arrow-3 will send a dual message to the enemy, conveying Israel's determination to defend itself and relaying a message of technological superiority.

