

Iran Takes Another Step Toward Fielding S-300 Missiles

by [Farzin Nadimi \(/experts/farzin-nadimi\)](#)

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ABOUT THE AUTHORS



[Farzin Nadimi \(/experts/farzin-nadimi\)](#)

Farzin Nadimi, an associate fellow with The Washington Institute, is a Washington-based analyst specializing in the security and defense affairs of Iran and the Persian Gulf region.



Brief Analysis

If this and other recent air defense developments bear fruit, Iran might soon become self-sufficient in such technology and could even begin offering it for export.

On March 4, Iranian television outlets broadcast previously classified video showing the country's first live-fire test of the S-300 high-altitude air defense system, conducted in the central Semnan region. The footage showed two Fakel 48N6E/E2 missiles initiating interception of what appeared to be target drones. In their export configuration, these missiles have a range of around 150 km and are compatible with the PMU-1 and 2 versions of the S-300 system.

Iranian media declared the test a total success, as did Gen. Farzad Ismaili, commander of the Khatam al-Anbia Air Defense Headquarters (KADHQ). The general also claimed that one of the intercepted targets was a ballistic missile. The video seemed to show two launches and two detonations at high altitude/long distance, as well as jubilation on the ground, but the footage was not conclusive, so these claims should be taken with a grain of salt.

Also used during the test was a 30N6E1 fire-control radar developed for the older S-300 PMU-1. This radar was recently delivered from Russia, but similar systems have been displayed in Iranian military parades since 2011. The 30N6E1 can monitor six targets at a range of 200 km and provide midcourse guidance and track-via-missile terminal homing for 48N6E missiles.

Footage also showed a 64N6E/E2 Big Bird long-range acquisition radar and a 96L6E 3D phased-array mobile acquisition and engagement radar. The Big Bird can detect up to 200 targets at a range of 300 km and engage up to 12 of them simultaneously. The 96L6E is standard with Russia's frontline S-400 system but is also available as an upgrade option for older types such as the PMU-1/2. It can function as both a low-altitude detection surveillance

radar and a battery command post. Its maximum detection range is 300 km, and it can track up to 100 targets simultaneously. If required, the radar antenna assembly can be fitted to a 40V6M tower unit for better low-altitude coverage.

Iran's S-300s seem to be an amalgam of different generations of Russian air defense systems, reflecting either Tehran's unique operational requirements or patchy availability from Moscow. In any case, Iran is now equipped with a potentially formidable system that can threaten even fifth-generation low-observable aircraft if used properly. The S-300's 64N6E radar can be paired with the 1L119 Nebo electronic beam-steering VHF radar previously delivered by Russia, which could help Iranian operators discriminate between low-observable and conventional radar targets and adjust their response accordingly. Iran also bought the sophisticated Avtobaza-M passive surveillance system from Russia in 2011. According to the manufacturer, the mobile Avtobaza can detect low-probability-of-intercept (LPI) radars associated with stealth aircraft at a range of 150 km. Moreover, the S-300 can operate in "silent mode" with the help of passive systems such as Avtobaza and Kolchuga (also reportedly in Iranian service), which allows it to keep its radar turned off until the end of engagement.

It is not known how many more live tests will be required for Tehran to declare the S-300 fully operational -- probably not many more given the limited number of missiles it has purchased, according to the SIPRI Arms Transfers Database. Between four and five battalions have reportedly been delivered; a battalion consists of four batteries with six to twelve launchers each. They can be expected to assume protection of strategic locations in a matter of months, including the capital, nuclear sites, major oil/gas facilities, and the Strait of Hormuz -- with potentially serious **[security implications for neighboring countries \(http://www.washingtoninstitute.org/policy-analysis/view/the-counterintuitive-role-of-air-defense-in-irans-anti-status-quo-regional\)](http://www.washingtoninstitute.org/policy-analysis/view/the-counterintuitive-role-of-air-defense-in-irans-anti-status-quo-regional)**. Iran might also be able to use the Altek-300 simulator to dispense with further live tests and reduce the wait time. Yet the challenge of integrating all of its different systems from various generations may cause delays.

As for the possibility of further purchases from Russia, both Tehran and Moscow dispute reports that they are negotiating a deal for more-advanced S-400s. Iran has declared that its indigenous Bavar-373, under development since 2012, will be even more capable than the S-300 and will eliminate the need for further expensive foreign air defense purchases; Supreme Leader Ali Khamenei himself has repeatedly emphasized the importance of that development program. Little is known about the Bavar's internals, but the Iranians claim the missile can engage targets at an altitude of 27 km (much like the S-300); they have made similar assertions about the Sayyad missile, developed for the indigenous Talash air defense system. On March 5, Defense Minister Hossein Dehghan announced that the Bavar would complete its development program before the end of May by intercepting a ballistic missile at its maximum engagement altitude. He also hinted that the widely reported **[ballistic missile failure \(http://www.washingtoninstitute.org/policy-analysis/view/irans-latest-missile-test-scenarios-and-implications-for-the-new-administra\)](http://www.washingtoninstitute.org/policy-analysis/view/irans-latest-missile-test-scenarios-and-implications-for-the-new-administra)** on January 29 was part of the Bavar test program, without going into detail.

Meanwhile, the Islamic Revolutionary Guard Corps conducted a separate exercise in February to test their own mostly indigenous air defense and radar systems. At the time, IRGC Aerospace Force commander Amir Ali Hajizadeh declared total self-sufficiency in the "extremely complex and interconnected" air defense field, calling on the Rouhani government to use his force's progress as an example for national development.

To be sure, very few countries have been able to develop their own complex radar-guided medium-to-high-altitude air defense systems, so it remains unclear if Iran's defense industry can actually deliver in this regard, and if KADHQ can integrate all of the relevant systems tightly enough. Tehran's apparent inability to develop similarly complex modern fighter aircraft raises further doubts. Yet if the Iranians do surmount these obstacles in the near term as promised, they would not only become self-sufficient on air defense for the foreseeable future, they might also position themselves to offer indigenous systems such as the Bavar and Talash for export.

Farzin Nadimi is a Washington-based analyst specializing in the security and defense affairs of Iran and the Persian Gulf region. ❖

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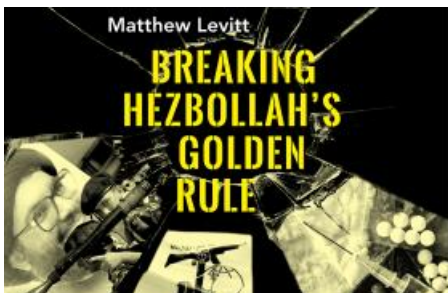
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