

## Era of modern defense systems begins

Marking the continuation of the evolutionary path from the Sayyad 2 and Sayyad 3 missiles, the Khordad-15 air defense missile system was unveiled in 2019. Initially, these two missiles were deployed under the Talash missile system alongside the Russian S-200 air defense system, allowing them to engage one to two targets.

These missiles later gained independence from the S-200 system and ultimately became part of the Khordad-15 system, which offered significantly enhanced capabilities. The Sayyad-2 and -3 missiles have a length of 6.1 meters, a body diameter of 40 centimeters, a mass of approximately 1,000 kilograms, and respective ranges of 75 and 120 kilometers. The advanced solid fuel used in these missiles enables them to engage targets at altitudes of up to 27 kilometers, and they are launched from mobile launchers with canisters. However, in these systems, thanks to its advanced indigenous radar technology known as Najm-804, the capability for engaging up to 6 simultaneous targets was developed. These targets include aerodynamic objects such as aircraft, helicopters, drones, missiles, and certain types of ballistic missiles. This system can detect standard targets at distances exceeding 150 kilometers and hidden or stealthy targets within an 85-kilometer range. Due to its advanced design, it can be rapidly deployed from a stationary or motionless state, with readiness achieved in approximately 5 minutes.

Additionally, it can accommodate an added primary search radar and is integrated into a unified air defense network. With the incorporation of the Joushun radar, this system has gained further capabilities. The Khordad-15 system has been used in recent military exercises.

Today, the country is also pursuing the enhancement of its 2,000-km-range missiles, according to a senior official from the Islamic Revolution Guards Corps (IRGC).

"Today, we are pursuing to improve the quality and capabilities of our missiles within the range of 2,000 kilometers, like the recently-unveiled "Fattah" hypersonic missile," IRGC's Deputy Commander for Operations Abbas Nilforoushan has said recently. However, he emphasized that Iran has the technological capability to increase missile range, but such advancements are determined based on operational doctrines and threats.

The IRGC's Aerospace Force in June unveiled the Fattah hypersonic missile, which boasts an impressive range of 1,400 kilometers, attains speeds of Mach 13-15, and possesses the ability to penetrate and neutralize anti-missile defenses.



Tactical Sayyad air defense system can detect 24 targets at a distance of 180 kilometers and simultaneously engage 12 targets.



## Evolutionary route leads to Tactical Sayyad

Once again, the valuable collective experience of the Ministry of Defense Aerospace Industries Organization and the Army's Air Defense Forces in the process of research, design, construction and testing of the Bavar-373 system was used to develop a medium-range system with concepts that meet the needs of modern battlefields. Furthermore, with new advancements in software, electronics, signal processing, and target detection, improvements were

achieved, ultimately resulting in the creation of a system known as Tactical Sayyad.

Iran unveiled Bavar-373 in August 2019. The long-range air defense system is capable of detecting up to 100 targets, tracking 60 of them, and engaging with six concurrently. In November this year, Iran's Defense Ministry also unveiled the upgraded version of the Bavar-373 (Belief-373) surface-to-air missile system.

## Features of Tactical Sayyad

The Tactical Sayyad air defense system is a medium-range defense system developed by the Ministry of Defense and Armed Forces Logistics, utilizing modern technologies. It was first unveiled in the Iranian Army Day parade on April 18, 2022.

The attendance of the defense system at Russia's International Military Forum ARMY-2023 has provided new information about the defense system. It is generally an operational system with medium and high-altitude capabilities, consisting of a minimum set of components, including a radar-equipped vehicle and three vertical missile launchers (TELAR: Transporter Erector Launcher and Radar).

The mentioned TELAR is mounted on an off-road capable transporter truck, enabling better mobility of the system in operational environments. The missiles, Sayyad-2 and Sayyad-3, have a range of 75 to 120 kilometers, with potential for upgrades to reach up to 150 kilometers. The TELAR's mobility allows for better maneuverability in operational environments, including off-road capabilities.

In addition to the main components of the system, there are mobile launchers without radar that can carry 6 vertical-launch missiles and can be connected to the system.

One of the distinguishing features of the Tactical Sayyad system is its advanced radar, believed to be an active phased-array radar from the Najm-804 family. This

radar enables the system to detect both conventional and stealthy targets at a range of over 150 kilometers and detect low-profile targets within an 85-kilometer range.

The system also benefits from vertical launch capabilities, which means it can respond rapidly to threats due to the variable angle of attack from the enemy. It can simultaneously engage multiple targets without needing adjustments to the launch platform.

Moreover, the Tactical Sayyad system includes a self-protection subsystem, with short-range defense capabilities to protect against low-altitude threats. This self-protection system distinguishes it from previous air defense systems like Khordad-3 and Khordad-15.

According to the Iranian deputy defense minister for research and industrial affairs, Tactical Sayyad air defense system can detect 24 targets at a distance of 180 kilometers and simultaneously engage 12 targets.

Afshin Naderi Sharif has recently said that "an advantage of the new missile system over the Khordad-3 and Khordad-15 air defense systems is its self-protection system".

The system's flexibility is enhanced by its ability to connect to a network of integrated air defense systems and its compatibility with various launchers, including those without radar.

Overall, the Tactical Sayyad air defense system represents a significant advancement in Iran's air defense capabilities, providing enhanced mobility, detection, and self-protection features. It is a crucial addition to the country's defense against a variety of airborne threats, including aircraft, helicopters, drones, and ballistic missiles.

