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Russia's S-400 Missile System



According to the *Missile Defense Project* of the *Center for Strategic and International Studies* (CSIS), the S-400 *Triumph* (NATO name SA-21 Growler) Missile System was developed during the late 1990s and was first deployed in Moscow in August 2007.

The concept behind S-400 can be traced back to the S-75 (NATO name SA-2 Guideline) Surface to Air Missile (SAM) that actually shot down the United States Air Force (USAF) Lockheed U-2 Ladybird – (U-2 Incident) – over the Soviet Union on May 1, 1960.

S-400: Constituent Elements and Capabilities

The S-400 is one of the most advanced anti-air missile systems in the world. It has the tracking range of 600 kilometres while it can engage targets at the range of 400

kilometres. The 91N6E target acquisition and battle management radar, 92N6E target engagement and fire control radar and N6L6E all-altitude acquisition radar – actually serve as the centre of gravity of the S-400. This combination of multiple radars adds credibility and versatility to the S-400.

These radars are jam resistant and can **withstand** strong electromagnetic spectrum aimed at them. Apart from this, S-400 radars can conduct Electronic Warfare (EW) to jam, sabotage, and even disable enemy airborne radars. According to *RAND Corporation*, these radars have another **capability** that they can work and operate in active as well as passive manners.

Franz-Stefan Gady **argued** that the newer version of S-400 has the capability to engage targets at the maximum altitude of 185 kilometres (607,000 feet): however, it is unclear that these missiles are operational in Syria or not. Gady also argued that Russia might use S-400 for Anti-Access and Area Denial (A2-AD) purposes. On the other hand, *Sputnik News* **reported** that S-400 can engage targets up to the altitude of 27 kilometres (almost 90,000 feet) and retains the capacity of engaging almost every air asset and arsenal including B-52 Stratofortress, BGM-109 Tomahawk cruise missile and various tactical ballistic missiles of the U.S.-led Allied Forces.

TASS – a Russian news agency **reported** that S-400 missile system can engage targets flying above 95,000 feet Above Ground Level (AGL). This capability enables S-400 to not only engage any fighter-bomber, strategic, and stealth bomber in possession of North Atlantic Treaty Organization (NATO), but can also track and destroy incoming ballistic missiles. Since cruise missiles fly at a low level primarily to avoid detection, but the N6L6E radar retains the capability to track and subsequently destroy such threats. The Unmanned Aerial Vehicles (UAVs) are low observable aircraft, fundamentally due to their relatively small size and less radar signature. They also emit low heat from their respective engines – hence are difficult to be tracked by Infra-Red Search and Track (IRST) systems. The missiles of S-400 are versatile and highly manoeuvrable. The **velocity** of these missiles is nearly Mach 14. Yet again, the N6L6E radar is capable enough to track and acquire these low observable air targets. These declared **capabilities** along with many classified capabilities of Russian S-400 make it a real force multiplier on the battlefield.

The S-400 Missile System attracted many pundits since its inception in April 2007. Further, its deployment in Syria while keeping in view the shooting down of a Russian Su-24 fighter-bomber by a Turkish – NATO fighter – gained the attention of journalists and defence analysts around the globe.

Analysis and Afterthought

Apart from Suppression of Enemy Air Defence (SEAD), the Electronic Countermeasure Counter Measures (ECCM), and EW capabilities can be used to jam, sabotage, and even paralyze radars such as the S-400's target acquisition and fire control radars. For this, purpose, among a few – the U.S. E-3 Sentry Airborne Warning and Control System (AWACS) could play a vital role. Yet again, S-400 possesses the capability to not only withstand such intense electromagnetic spectrums, but it can respond in two different ways. One, the S-400 can create a strong electromagnetic spectrum of its own to sabotage and confuse enemy radars. Second, the range of S-400 makes it a perfect 'AWACS Killer' – since the maximum range of Boeing E-3 Sentry is 320 kilometres, whereas the tracking range of S-400 is 600 kilometres, and it can engage targets up to 400 kilometres. This equation clearly indicates the superiority of the Russian S-400 over the flagship American E-3 Sentry AWACS. One's analysis is supported by John Stillion of the *Center for Strategic and Budgetary Assessments* (CSBA).

Unlike many anti-air systems around the globe, the S-400 takes only 5 minutes to fully deploy and ready to engage targets. The Transporter Erector Launcher (TEL) and wheeled platform for radars, command post, and other supporting vehicles of the S-400 system makes it a perfect mobile, manoeuvrable, and flexible anti-air system suitable to be deployed almost anywhere regardless of the terrain. This versatility makes it an ideal weapon against a whole range of air-borne targets.

S-400 – Offence and Defence Phenomenon:

Keir Giles averred that the older versions of Russian SAMs were more or less similar to the American MIM-104 Patriot Missile System. The Patriot, however, evolved in the Patriot Advanced Capability-1 (PAC-1) and PAC-2, nevertheless, the capabilities of Russian SAMs were quite comparable to American SAMs. According to Giles, the portability and better functioning of S-400 makes it different from the Patriot Missile System. Giles also argued that the S-400's radar makes it strong primarily due to its electronic warfare capabilities – using “rapid frequency-hopping and agile beam-steering”. It can be argued while keeping in view Giles's arguments that S-400 is not only an anti-air missile system – but it can also be used for Anti-Ballistic Missile (ABM) purposes. This versatility combined with mobility in almost any terrain makes the S-400 a defensive as well as an offensive weapon system.

One's belief in S-400 of being capable enough to perform ABM purposes is also supported by the researches of *Carnegie Moscow Centre*, who **argued** that the newer version of S-400 deployed in Moscow, is primarily for ABM purposes.

According to analysts from *RAND Corporation*, Russia can use S-400 for A2-AD purposes, especially in the Baltic Region. While keeping in view this argument, it can be averred that the long range of the S-400 combined with speed and its versatile EW-capable radars are actually compromising U.S.-led Allied Forces' Operations Security (OPSEC) in Syria. It can also be conceived that actually Russia is using A2-AD tactics in Syria in a successful manner.

Conclusions

It is not very much difficult to conclude that Russians whilst employing Clausewitzian notion of achieving high-end political objectives while using low to medium range military means – have clearly achieved tactical, operational and strategic superiority over the U.S.-led Allied Forces in Syria by the deployment of S-400 Missile System. OPSEC of any military force remains dependent upon operational vulnerability and operational capability.

The deployment of the S-400 Missile System was not only audacious, but it was actually a psychological tactic by the Russians that put the U.S.-led Allied Forces in utter fear. There is no doubt that the capabilities of S-400 psyched-out the Americans and put a halt to their air raids in Syria. On the other hand, the Russians not only achieved military objectives but also political objectives, i.e., the survival of the Assad Regime.

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