Iran's Zolfaghar SRBM: Mobility, Terminal Maneuver, Precision, & Magazine Depth

MDAA Spotlight Series on Iran's Threat and Potential Countermeasures

In our mission to illuminate, elevate, and educate, we are honored to announce a new MDAA series.

5 Key Points

- Prior to recent hostilities, Iran's missile force was equipped with ~ 400 road-mobile, solid-propelled Zolfaghar SRBMs. An unknown number of these were successfully employed on 23 March 2026 with liquid-fueled missiles and one-way attack drones against U.S. and Allied logistics, command nodes, enablers, and high-value assets in the region.
- Zolfaghar missiles are capable of pre-launch survivability, defense penetration, precision strike, and probably anti-jam protection. An unknown number of these mostly road-mobile SRBMs rely on vulnerable fixed silo launchers, and they are vulnerable to electronic attack of their use of GPS satellites navigation aid and kinetic attacks on critical nodes in their transportation network.
- If hostilities resume, U.S and Allied forces should prioritize Iran's Zolfaghar SRBM force in offensive attack plans to reduce their potential to cause additional damage to our bases, forces, and high-value assets in theater.
- If we fail to neutralize this force, Iran's Zolfaghar SRBM inventory is like to challenge U.S. and Allied base defense and interception operations, given its ability to rely on mobility, terminal maneuver, precision, and magazine depth to evade elimination as a target set.
- The proven ability of Zolfaghar SRBMs to be successfully employed in combination with one-way attack drones to complicate our defenses reinforces their criticality as a target set in our attack and defense operations.

Dangerous Missile Inventory Depth

Iran's Fattah-2 Medium-Range Ballistic Missile (MRBM) is often cited as its most dangerous missile because of its range (1,500 kilometers), speed (Mach 13), and the ability of its hypersonic glide vehicle to evade interceptors.[1] However, Iran's inventory of Fattah's was limited to an estimated 30 missiles, prior to the outbreak of hostilities on 28 February 2026. In contrast, Iran's Zolfaghar Short-Range Ballistic Missile (SRBM) inventory of approximately 400 missiles has more target set depth. While shorter in range (~ 700 km) than the Fatteh-2, Iran's Zolfaghar SRBMs are difficult to intercept because the missile's warhead detaches during midcourse flight and its guidance technique enables terminal phase adjustments to the warhead's trajectory. The danger posed by Zolfaghar SRBMS to U.S. and Allied base defense was demonstrated on 23 March 2026, when Iran successfully attacked multiple U.S. force assets at forward locations in the Middle East in two attack waves involving the coordinated use of Zolfaghar SRBMs in combination with other SRBMs and one-way drones.

[1] See Iran Missile & Drone Tracker, 29 April 2026. Available at missiletracker.com.

Background and Technical Specifications

Named for the sword of Ali ibn Abu Talib (the cousin and son-in-law of the Prophet Muhammad), Iran's Zolfaghar[2] SRBM is essentially one of two variants of the Fateh family of solid-fueled SRBMs featuring improved range and guidance.[3] It was first paraded and flight-tested in 2016. The Zolfaghar SRBM is a single-stage, solid-propelled, road-mobile capable missile with a maximum estimated range of up to 770 kilometers. It can deliver a high explosive or cluster/submunition payload with an accuracy of 100-meter circular error probable. Its flight trajectory is ballistic, but it is capable of maneuvers during terminal flight.

Zolfaghar SRBMs are controlled by the Islamic Revolutionary Guard Corps Aerospace Force, and they were reportedly produced by the Aerospace Industries Organization element of the Iran Ministry of Defense and Armed Logistics Organization. The Zolfaghar SRBM has been flight tested nine times between September 2016 and December 2021. This missile has also featured in many Iranian missile drills including the Great Prophet 15 drill in January 2021 and the Great Prophet 17 in December 2021.[4]

Zolfaghar SRBM & Launcher on Display

[2] The Zolfaghar can also be translated as "Zulfiqar."
[3] Congressional Research Service, In Focus Report (IF13035), "Iran's Ballistic Missile Programs: Background and Context," 17 June 2025.
[4] Benham Ben Taleblu, *Arsenal: Assessing the Islamic Republic of Iran's Ballistic Missile Program*, Foundation for Defense of Democracies Monograph, February 2023.

In-Service History	2016/2017
Variants	Zolfaghar Basir Maritime Strike (Anti-Ship) Houthi (Yemen) Burkan-3/Zolfaghar extended-range MRBM
Length	10.3 meters
Diameter	0.68 meters
Launch Weight	~ 4,600 kilograms
Propulsion	Single-State, Solid-Fuel Rocket Motor
Launch Platform	Road-Mobile Transporter-Erector-Launcher or Fixed Launch Facility
Operational Range	700 kilometers (430 miles)
Maximum Range	750-770 kilometers (estimated)
Guidance System	Inertial Navigation; Global Positioning System; Terminal Guidance (Electro-Optical Seeker - Bashir variant)
Accuracy	100-meter (300 feet) Circular Error Probable
Warhead Weight	~450-600 kilograms
Payload Type	High-Explosive or Cluster/Submunition
Flight Profile	Ballistic Trajectory with Terminal Maneuvers
Mobility	Road-Mobile, Quick-Launch Capability

Zolfaghar SRBM Characteristics & Performance Table[5]

Employment History

Iran's escalation to the use of Zolfaghar SRBMS against forward U.S. and Allied bases, forces, and enablers on 23 March 2026 is not the first time Iran has employed this missile against U.S. assets or interests in the region. Iran or its proxies in Yemen have employed Zolfaghar SRBMs at least four times since 2017 against either ISIS targets in Syria or U.S. and Allied assets or bases.[6]

- In June 2017, Iran's Operation Laylat al-Qadr employed less than 5 Zolfaghar SRBMs and a small number of Qiam-1 SRBMs against ISIS targets in Deir ez Zour in eastern Syria. This operation was done to retaliate for ISIS terror attacks on the Iranian parliament and Ayatollah Ruhollah Khomeini's shrine.

[5] This table is derived from a compilation of data from the following sources: Benham Ben Taleblu, *Arsenal: Assessing the Islamic Republic of Iran's Ballistic Missile Program,* ibid; Missile Defense Project, "Zolfaghar (Dezful, Qasem), *Missile Threat*, Center for Strategic and International Studies, June 2017; and, Iran Deploys Zolfaghar Solid-Fueled Ballistic Missiles in True Promise 4 Waves, Targeting US Gulf Base in Rapid-Launch Strike Escalation, *Defense Security Asia*, 24 March 2026.

[6] Benham Ben Taleblu, *Arsenal: Assessing the Islamic Republic of Iran's Ballistic Missile Program*, ibid.

- In October 2018, Iran's Operation Zarbat al-Moharram employed 3-4 Zolfaghar SRBMS and a few modified Qiam-1s against ISIS targets in the eastern Syrian city of Hajin. This operation was done to retaliate for an ISIS terror attack in the Iraniab city of Ahvaz.

- In 2019, the Iranian backed Houthi launched their first MRBM, the Burkan 3, at targets in eastern Saudi Arabia. This extended range missile would reappear in 2021 as the Zolfaghar. In conjunction with drone and cruise missiles, Houthi Zolfaghar use has broadened beyond Saudia Area with attempts to target critical infrastructure and even a U.S. base in the United Arab Emirates in early 2022.

- Some sources alleged the IRGC used Zolfaghar SRBMS in their 8 January 2020 attack against U.S. forces stationed at Ayn al Asad Airbase in Iraq, code named Operation Martyr Soleimani.[7] However, at the time, Iran's Tasnim News Agency reported the IRGC used Fateh 313 and Qiam ballistic missiles in the attack.

In response to the U.S. initiation of Operation EPIC FURY and Israeli's initiation of Operation Roaring Lion, Iran quickly initiated its own campaign of coordinated unmanned ballistic missile, cruise missile and one-way attack drone attacks against a wide range of military and civilian targets in the Middle East. Iran's Operation True Promise IV campaign has involved dozens of strike "waves" as part of an attrition strategy against U.S. and Israeli assets.

Earlier waves reportedly involved the use of liquid-fueled systems, such as the Qiam-1 SRBM, which are more vulnerable than solid-propelled systems to pre-launch attacks due to the time required to fuel them prior to their use. However, Waves 76 and 77 allegedly involved a deliberate adjustment in Iran's strategy to reduce the vulnerability of its missile force to preemptive strikes while maintaining the tempo of long-range ballistic, cruise, and drone attacks across multiple regional bases.[8] The use of solid-fueled, road-mobile Zolfaghar SRBMS are the primary indicators of this change in strategy. Targets cited in IRGC statements included an emphasis on high-value assets, logistics, command nodes, and support infrastructure—indicating an attempt to degrade or destroy high value assets and enablers.

- According to IRGC statements, Wave 76 was conducted on 23 March 2026 under the code-name "Ya Aba Abdillah al-Hussein. Drones, liquid-fueled Qiams, and Zolfaghar missiles were employed.[9] They were used to attack the U.S. Fifth Naval Fleet Command Bahrain, Al Dhafra Air Base in the United Arab Emirates, Victoria Base near Baghdad International Airport, and Prince Sultan Air Base in Saudi Arabia.

- Wave 77 commenced later that day, and it involved the employment of attack drones and Zolfaghar SRBMs against Ali Al-Salem Air Base, which is operated by the Kuwaiti Air Force and used heavily by

[7] Michael Elleman, "Iran's Ballistic Missile Program," United States Institute of Peace, 12 April 2024.
[8] Iran Deploys Zolfaghar Solid-Fueled Ballistic Missiles in True Promise 4 Waves, Targeting US Gulf Base in Rapid-Launch Strike Escalation, *Defense Security Asia*, 24 March 2026.
[9] "IRGC Targets US Fifth Fleet in 76th Wace of "True Promise IV Strikes," Farsnews, 23 March 2026.

the U.S. Air Force.[10] Additional bases attacked in this wave includes Al-Dhafra in the United Arab Emirates, and Prince Sultan Air Base in Al-Kharj, Saudi Arabia.

Strengths and Weaknesses

Iran's Zolfaghar missiles possesses the following strengths:

- Pre-Launch Survivability (PLS).
    - The Zolfaghar's reliance on solid-propellant fuel increases its PLS by allowing the missile to remain stored in a ready-to-launch condition with reduced preparation time. This enables Iran to perform short-notice launches aligned with real-time targeting opportunities.
    - Its adoption of solid-fueled systems lowers the support burden associated with fueling equipment, storage safety measures, and chemical handling procedures, thereby enabling its launch units to operate with smaller support convoys and less detectable signatures.[11]
    - Launch operations can be distributed, as launch vehicles disperse across wider areas, which increases the challenging for opposing forces seeking to neutralize missile batteries before fire sequences are initiated.
    - Post launch, road-mobile Zolfaghar missile units can also quickly redeploy to new firing locations or hide sites via roads or highways—so called "shoot and scoot" tactics.

- Anti-Jamming (AJ) Protection. Iran's Zolfaghar SRBMs reportedly possess AJ capability, which would make them resistant to electronic jamming, spoofing, or deception. However, the precise type and form of AJ technique is uncertain. Whether this AJ technique would be effective against the wide range of potential U.S. and Allied electronic attack measures could employ is also unknown.
- Defense Penetration. One of the strongest attributes of the Zolfaghar missile is the ability of its warheads to separate from the missile airframe during the mid-course flight phase—which reduces its radar cross section and complicates adversary efforts to detect, track, and intercept these warheads.
    - This capability enables warheads to adjust their flight profile during the reentry phase by performing terminal maneuvers, thus making their trajectory less predictable than ballistic trajectories.

- Precision Strike. Zolfaghar SRBMS reportedly possess a CEP of 100 meters and their reliance on a mix of inertial navigation, space-based GPS, and terminal guidance enables accurate strikes by allowing adjustments to a warhead's trajectory prior to impact. The Iranian Defense Ministry reportedly released a video depicting a Zolfaghar missile being fired and hitting a small target.[12]

[10] "Dedicated to Abu Obeida – Iran Fires Waves 76-77 With Precision Missiles," Palestine Chronicle Staff, 23 March 2026.
[11] For a good comparison of the attributes of solid and liquid propelled missiles, see pages 6-15 in Clayton S. Chun, Thunder on the Horizon: From V2 Rockets to Ballistic Missiles, 2006.
[12] Benham Ben Taleblu, *Arsenal: Assessing the Islamic Republic of Iran's Ballistic Missile Program*, ibid.

- This level of precision is enough to target airbases, logistics hubs, and radar facilities.
- The missile's payloads are capable of damaging hardened infrastructure, such as fuel depots, runways, hangars, and command centers.
- Cluster submunitions could also be employed against airfields and parked aircraft.

Despite these strengths, Iran's Zolfaghar inventory has some weaknesses.

- An unknown number of these SRBMs would rely a fixed silos as their launch mode, making them more vulnerable to detection and attack than road-mobile Zolfaghars.
- Zolfaghar SRBMs reportedly rely on GPS for some navigation needs, which would make this specific navigation means vulnerable to electronic attacks, spoofing, or deception—complicating flight operations and reducing the accuracy of its strikes.
- The road-mobile vice off-road nature of Zolfaghar transporters creates opportunities to disrupt or deny deployment or redeployment actions via attack operations creating bottlenecks in the highway or road network system.

Implications

- If major hostilities resume, U.S. and Allied forces should prioritize Iran's Zolfaghar SRBM force in offensive attack plans to reduce the potential for these missiles to cause additional damage to forward bases, forces, and high-value assets. The relative mix of road-mobile and fixed silo-based Zolfaghar SRBMs is unclear, based on publicly available information. Pre-war target system development should have created sufficient conditions to perform attack operations against known fixed Zolfaghar positions prior to their use. Road-mobile Zolfaghars would be a more formidable target set; however, their known operating areas, launch positions, hide sites, support nodes, and critical transportation pathways are lucrative targets in their battlefield operating system. Pre-war intelligence preparation of the battlefield should have created target related to each of these areas and specific geolocations.
- Whether Iran's Zolfaghar SRBM force would be effective in countering U.S. and Allied electronic attack measures is unclear, based on existing data sources. At a minimum, there would be some potential to disrupt its reliance on GPS as a navigation aid. Should electromagnetic spectrum or kinetic attack operations fail to neutralize this force, Iran's Zolfaghar SRBMs inventory is likely to challenge U.S. and Allied base defense and intercept operations, based on its ability to rely on mobility, terminal maneuver, precision, and magazine depth to evade elimination as a target set. The fact they have already been successfully employed with drones to penetrate our defenses reinforces their criticality for our attack and defense operations.

Road-Mobile Zolfaghar SRBM & Launcher in Firing Position During Training