

Iranian Ballistic Missiles

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Background

Since the Iran-Iraq War (1980-1988), the Islamic Republic of Iran has had an active ballistic missile program.¹ Since its initial efforts, Iran has progressed from importing low end Scuds and variants, to developing new missiles in partnership with North Korea and Syria, to having the technical expertise to independently build a variety of missile technologies including short range and intermediate range ballistic missiles and space delivery vehicles.²

Additionally, Iran's space program, supposedly a civilian agency, and the technological development associated with it appears to fall increasingly under the control of the Guardian Corps of the Islamic Revolution.³

Despite its long history of requiring foreign assistance for its programs, Iran is now actively pushing its missile technologies forward with its own expertise and resources.



Iran's missile programs are also accompanied by a certain amount of propaganda. For instance, Iran has a tendency to showcase technical achievements and feats that appear beyond its ability, as evidenced by episodes like the Photoshopped missile launches of 2008.⁴ Iranian reports on the nation's missile systems also often exaggerate capabilities such as weapon accuracy.⁵ Furthermore, Iran routinely uses naming schemes that make it difficult to know if a specific missile is new, a different name for the same system, or an evolutionary step for that system.

This fact sheet compiles information from a number of open source resources, ranging from US military reports to translated non-English media, to create a useful inventory of the ballistic missiles and space delivery vehicles that the Islamic Republic of Iran deploys and has developed.



Missile Types

Name: Fateh-110

Role: Short Range Ballistic Missile
 Range: 200-300km⁶
 Fuel/Platform: Solid/Road-mobile



Notes: Development began in 1995 inside Iran as a replacement for the older Scud-based systems.⁷ While development was based in Iran it appears Syria and North Korea may have participated in the design of the missile along with a state-run Chinese company, China Great Wall Industry.⁸ The missile, currently in its fourth generation, entered production in 2002 in Iran and has undergone numerous upgrades since.⁹

Name: Shahab-1

Role: Short Range Ballistic Missile
 Range: 300km¹⁰
 Fuel/Platform: Liquid/Road-mobile



Notes: Based on the Soviet Union's Scud-B (R-17), which were acquired from various sources during the Iran-Iraq War.¹¹ By the early 1990s, Iran had acquired the ability to produce these missiles on its own.¹²

Name: Shahab-2

Role: Short Range Ballistic Missile
 Range: 700km¹³
 Fuel/Platform: Liquid/Road-mobile

Notes: This is a modified version of the North Korean produced Scud-C, now built by Iran. Iran obtained unmodified Scud-Cs from North Korea in 1990 and purchased the modified versions with an increased range (700km up from 500km) from North Korea in 1994.¹⁴ North Korea later assisted with converting an Iranian missile maintenance facility to a production facility for the missiles in the mid-1990s.¹⁵



Name: CSS-8 (M-7)(Tondar-69)

Role: Short Range Ballistic Missile
 Range: 150km¹⁶
 Fuel/Platform: Solid/Road-mobile



Notes: This is an export version of the Chinese HQ-2 surface-to-air missile, which itself is a version of the Soviet SA-2, modified for surface-to-surface operations.¹⁷ Iran imported the missiles from China in the 1990s.¹⁸ China provided technical assistance in regards to these missiles which was later used in the development of other Iranian missiles.¹⁹

Name: Qiam-1

Role: Short Range Ballistic Missile
Range: 750km (reported by Iranian media)²⁰
Fuel/Platform: Liquid/Road-mobile

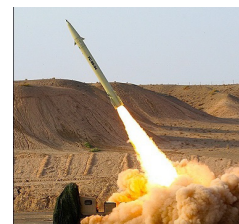
Notes: Becoming operational in 2011, Iranian sources claim that unlike other missile programs in which Iran had partners, the Qiam is an example of self-sufficiency.²¹ The Iranians claim the lack of exterior fins decreases the chance of the missile being intercepted by countermeasures,²² and that its design aids in radar evasion.²³



Name: Naziat-10

Role: Short Range Ballistic Missile
Range: 130-150km²⁴
Fuel/Platform: na/Road-mobile

Notes: Western media has not presented much information about this missile. Reportedly, the Iranian army has taken delivery of an improved version of this missile with a range of 150km; up from an earlier range of 130km.²⁵



Name: Khalij-e Fars

Role: Anti-Ship Ballistic Missile
Range: 300km²⁶
Fuel/Platform: Solid/Road-mobile

Notes: Based on the Fateh-110, this missile is considered to be an anti-access and area denial system.²⁷ It was reported in June of this year that this system received improvements to its accuracy.²⁸ Successful use of this weapons system could potentially deny the U.S. Navy access to the Persian Gulf region and possibly allow Iran to control access to the Strait of Hormuz. The Iranian military claims that it has an accuracy of 8.5 or less meters—improved from the earlier version's 30 meters.²⁹ Comments made by Iran and others suggest that this missile is specifically meant to target aircraft carriers.³⁰



Name: Shahab-3

Role: Intermediate Range Ballistic Missile
 Range: 2,000km³¹
 Fuel/Platform: Liquid/Silo and Road-mobile

Notes: Development began in the late 1990s and the missile was delivered to the Iranian armed forces in 2003. The Shahab-3 is believed to be a modified version of North Korea's No Dong-1 missile.³²



Its more recent variants were possibly developed with some assistance from Russia and China,³³ but alternate naming schemes and a lack of reliable information has made clear distinctions between several models difficult to point out.³⁴ The Shahab-3A and 3B variants employ completely different types of re-entry vehicles from each other. The B variant has greater accuracy but a lower payload capacity than the A variant.³⁵ The re-entry vehicle on the B variant is believed to have a rocket nozzle control system which allows for guided control at each stage of flight and for the evasion of certain types anti-ballistic missile systems.³⁶ Such a system is necessary for the Shahab-3 since it seems unlikely that Iran has sufficient launchers to overwhelm a missile defense system with a mass wave of Shahab-3As.³⁷ Some reports indicate that it takes 14 hours to prepare a Shahab-3 missile for launch, thus limiting their utility in time-sensitive situations.³⁸

Name: Ghadr-110 (Ashura)

Role: Intermediate Range Ballistic Missile
 Range: 1,800km³⁹
 Fuel/Platform: Liquid first stage solid second stage/Silo and Road-mobile

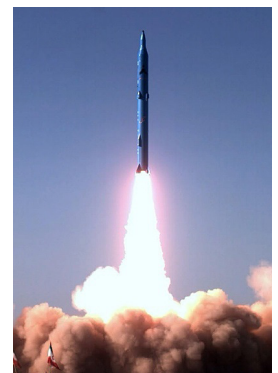


Notes: An improved version of the Shahab-3A with better maneuverability and a set up time of 30 minutes. Little else is known or has been reported. Some sources list the Ghadr-110 as also being linked to the Ashoura, though it is unclear if they are the same missile system or one is an advanced design based off of the other.⁴⁰ There is also some disagreement as to whether the missile has 3 stages instead of 2 and if they are all solid fuel or not.⁴¹ This could be a misunderstanding or improper reporting on this missile as a new missile given Iran's habit of ambiguous naming schemes when discussing them. In a recent Air Force review of international missile programs, this one was not listed.⁴² This could however account for a line in the report that seems to list an unknown IMRB/ICBM in Iran's arsenal for which no details are provided.⁴³

Name: Sejil 1/2/3

Role: Intermediate Range Ballistic Missile
 Range: 2,000km⁴⁴
 Fuel/Platform: Solid two-stage/ Road-mobile

Notes: Meant as an eventual replacement for the Shahab-3 missiles. One of its key features is a solid fuel system which allows for a much faster preparation and launch

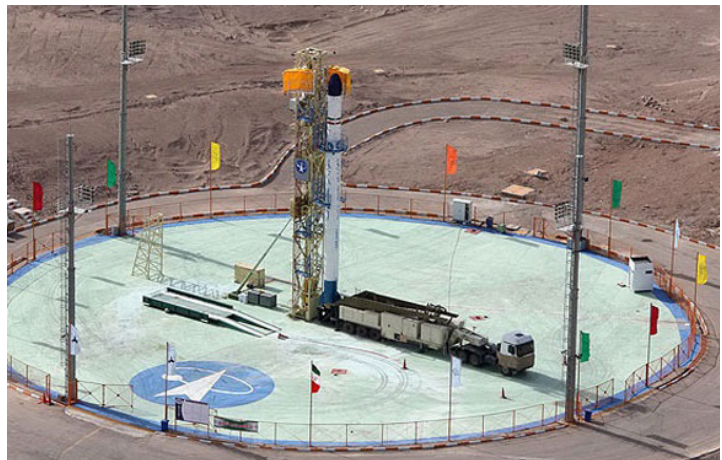


than the Shahab-3⁴⁵ which can take up to 14 hours to ready. There are already three generations of this missile that have been developed. There is an active debate about whether this missile was fully domestically designed and developed in Iran⁴⁶ or is taking advantage of foreign assistance or technology.⁴⁷ Regardless, it is assumed given the differences between the Sejil and the Shahab-3, that development had some degree of foreign technical assistance.⁴⁸ Development of a solid fuel, multiple stage missile of this type has been interpreted by some observers as evidence that Iran is reaching or has reached the point where it has the technical capacity to develop a true ICBM.

Name: Safir SLV

Role: Single Use Satellite Launch Vehicle

Notes: Developed as a satellite launch vehicle, it is a two-stage rocket that has its first stage based upon a modified Shahab-3C.⁴⁹ Testing for the system began in 2007.⁵⁰ In mid-2008 the program suffered a possible launch failure with the destruction of one of the earliest versions of the Safir being tested prior to a satellite launch. US officials allege that the test failed catastrophically with the craft's destruction shortly after launch while Iranian TV continued to show scenes indicating a successful launch for minutes afterwards; Iran denies that the test suffered any failure.⁵¹



In February 2009, Iran used a Safir-2 to successfully launch the Omid satellite (a Russian firm launched Iran's first satellite in 2005).⁵² Iran continues to upgrade this system, producing a second generation that has already proven to be much more capable in terms of payload capacity and is able to deliver payloads to much higher orbits. In 2012 and 2013 there were also three alleged failed launches of Safirs carrying Fajr spy satellites— Iran has denied that any of the three launches ever occurred.⁵³

Name: Simorgh SLV

Role: Single Use Satellite Launch Vehicle

Notes: Announced in 2010 as space delivery system that could deliver heavier payloads than the Safir into low earth orbit.⁵⁴ Tests of its engine systems were carried out in 2010 and the system will reportedly carry an experimental communications satellite for its maiden voyage some time in 2013.⁵⁵



Conclusion

US intelligence estimates claiming that “with sufficient foreign assistance, Iran may be technically capable of flight testing” an ICBM by 2015⁵⁶ may not be overblown when one considers the rate and breadth of what Iran has accomplished. It would appear that the vast majority of new Iranian ballistic missiles and associated technologies are now designed and produced domestically, including the major milestone of a multistage solid fuel missile. In some cases, the success rate of Iran’s missile technology is questionable. While Iran appears to have not yet developed an ICBM or demonstrated any technology capable of reaching the US mainland, its current capabilities should be kept in mind given the large number of US forces and bases in the region, American space assets, and allies that could come under attack.



Endnotes

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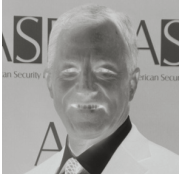
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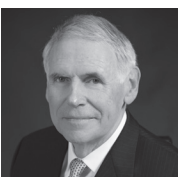
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