

Design Characteristics of Iran's Ballistic and Cruise Missiles

Last update: January 2013

Missile	Nato or	Type/	Length	Diameter	Payload	Range (km)	Accuracy -	Propellant	Guidance
	Other Name	System	(m)	(m)	(kg)/warhead		CEP (m)	/Stages	
				Artille	γ*				
Hasib/Fajr-1 ¹ *		Rocket artillery (O)	0.83	0.107	6; HE	8.5	-	Solid	Spin stabilized
Falaq-1 ² *		Rocket artillery (O)	1.29	0.244	50; HE	10		Solid	Spin stabilized
Falaq-2 ³ *		Rocket artillery (O)	1.82	0.333	120; HE	11		Solid	Spin stabilized
Arash-1 ⁴ *		Rocket artillery (O)	2.8	0.122	18.3; HE	21.5		Solid	Spin stabilized
Arash-2 ⁵ *		Rocket artillery (O)	3.2	0.122	18.3; HE	30		Solid	Spin stabilized
Arash-3 ⁶ *		Rocket artillery (O)	2	0.122	18.3; HE	18		Solid	Spin stabilized
Shahin-1 ⁷ *		Rocket artillery (O)	2.9	0.33	190; HE	13		Solid	Spin stabilized
Shahin-2 ⁸ *		Rocket artillery (O)	3.9	0.33	190; HE	20		Solid	Spin stabilized
Oghab ⁹ *		Rocket artillery (O)	4.82	0.233	70; HE	40		Solid	Spin stabilized
Fajr-3 ¹⁰ *		Rocket artillery (O)	5.2	0.24	45; HE	45		Solid	Spin stabilized
Fajr-5 ¹¹ *		Rocket artillery (O)	6.6	0.33	90; HE	75		Solid	Spin stabilized
Falaq-1 ¹² *		Rocket artillery (O)	1.38	0.24	50; HE	10		Solid	Spin stabilized
Falaq-2 ¹³ *		Rocket artillery (O)	1.8	0.333	60; HE	11		Solid	Spin stabilized
Nazeat-6 ¹⁴ *		Rocket artillery (O)	6.3	0.355	150; HE	100		Solid	Spin stabilized
Nazeat ¹⁵ *		Rocket artillery (O)	5.9	0.355	150; HE	120		Solid	Spin stabilized
Zelzal-1 ¹⁶ *	Iran-130	Rocket artillery (O)	8.3	0.61	500-600; HE	100-125		Solid	Spin stabilized
Zelzal-1A ¹⁷ *	Mushak-120	Rocket artillery (O)	8.3	0.61	500-600; HE	160		Solid	Spin stabilized
Nazeat-10 ¹⁸ *	Mushak-160	Rocket artillery (O)	8.3	0.45	250; HE	150		Solid	Spin stabilized

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Missile	Nato or Other Name	Type/ System	Length (m)	Diameter (m)	Payload (kg)/warhead	Range (km)	Accuracy - CEP (m)	Propellant /Stages	Guidance
				BSRBI					•
**Dongfeng-11 (DF-11/M-11) ¹⁹	CSS-7 (NATO)	BSRBM/ Road mobile (U)	7.5	0.8	500; HE	280-350	500-600	Solid; 1	Inertial
Fateh A-110/ Fateh-1 ²⁰		BSRBM/ Road mobile (O)	8.86	0.61	500-600; HE, C	170	100	Solid; 1	Inertial; GPS
Fateh A-110A/ Fateh-2 ²¹		BSRBM/ Road mobile (O)	8.86	0.61	500-600;HE, C	200		Solid; 1	Inertial; GPS
Fateh A- 110B/Fateh-3 ²²		BSRBM/ Road mobile (O)	8.86	0.61	480; HE, C	250	250	Solid; 1	Inertial; GPS
Fateh A- 110C/Fateh-4 ²³		BSRBM/ Road mobile (O)	8.86	0.61	HE, C	300		Solid; 1	Inertial; GPS
Zelzal-2 ²⁴	Mushak-200	BSRBM/ Road mobile (O)	8.46	0.61	500-600	300		Solid; 1	
Zelzal-3 ²⁵		BSRBM/ Road mobile (O)	9.58	0.61	900	150-400		Solid; 1	
Zelzal-3B ²⁶		BSRBM/ Road mobile (O)	9	0.61	600	260		Solid; 1	
				SRBN	1				
Tondar-69 ²⁷	M-7, Project 8610 (PRC); CSS-8 (NATO)	SRBM/ Road mobile (U)	10.8	1	190-200	150-180	50-100	Solid	Inertial
Shahab-1 ²⁸	R-17/R-300 Elbrus (RUS); Hwasong-5 (DPRK); SS-1-C Scud-B (NATO)	SRBM/ Road mobile (O)	10.94	0.88	1000/ single, HE, CBN	300		Liquid, 1	
Shahab-2 ²⁹	R-17M Elbrus (RUS); Hwasong-6 (DPRK); SS-1-D Scud-C (NATO)	SRBM/ Road mobile			730	500	>1500		

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Missile	Nato or Other Name	Type/ System	Length (m)	Diameter (m)	Payload (kg)/warhead	Range (km)	Accuracy - CEP (m)	Propellant /Stages	Guidance
Shahab-3 ³⁰		SRBM/ Road mobile (O)	16.58	1.38	760-1100/single, HE, CBN	800-1000	2500		Inertial
Qiam ³¹		SRBM/ Road mobile (U)							
Dongfeng-15 ** (DF-9/M-9) ³²	CSS-6 (NATO)	SRBM/ Road mobile (U)	9.1	1	Single, 320-500; HE	600-800	150-500	Solid; 1	Inertial
				MRBN	//				
Ghadr-1 [33]	Shahab-3A	MRBM/ Road mobile (D)	15.6	1.25	750/single, HE, submunition, CBN	1500-1600- 1800		Liquid, 1	
				IRBIV	Ì				
Sajjil/Sejjil [34]	Ashura, Shahab-3D, Shahab-4 (D)	IRBM	18	1.25	750	2200- 2400/3000		Solid; 2	
BM-25 [35]	Musudan (DPRK); R- 27 Zyb (Russia); SS-N- 6 (NATO) (U)	IRBM			2000	3500			
				ICBN	Ì				
***Shahab-5 ³⁶		ICBM (T)				10000/ 4000+		2/3 Stage	
***Shahab-6 ³⁷		ICBM (T)				6000+		2/3; Solid/liquid	
				SLV					
Kavoshgar ³⁸		Sounding Rocket (O)							
IRIS ³⁹		Sounding Rocket (O)							
Safir ⁴⁰		SLV (O)	22	1.25					
Simorgh ⁴¹		SLV (A)							

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Missile	Nato or Other Name	Type/ System	Length (m)	Diameter (m)	Payload (kg)/warhead	Range (km)	Accuracy - CEP (m)	Propellant /Stages	Guidance
				Cruis	е				
Kosar ⁴²	YJ-7/C-701 (PRC)	ASCM (O)	2.5 or 2.69	0.18	29kg HE/SAP	18		Solid	TV Seeker/ Active radar seeker
Nasr ⁴³	YJ-7/C-704 (PRC)	ASCM (O)	3.28	0.28	130kg HE/SAP	27-35		Solid	TV seeker/IIR seeker
Qader/Ghader ⁴⁴		ASCM (O)				200			
Ra'ad ⁴⁵	HY-2/C-201 (PRC); "Seersucker" (NATO)	ASCM (O)				360			
Ghadir ⁴⁶		ASCM (O)							
Zafar ⁴⁷		ASCM (AL, SL, LL)(O)							Radar guided
Noor/Nour ⁴⁸	YJ-8/C-802 (PRC); CSS- N-8 Saccade (NATO)	ASCM (AL, SL, LL)(O)	6.39*	0.36*		130-200		Turbojet	Active radar
X-55 (Russia, Ukraine) ⁴⁹	Kh-55; AS-15 Kent (NATO)	ASCM (R)	7.1	0.51	Single, 250kt N	2500		Turbofan	INS, TERCOM guidance
Meshkat ⁵⁰		Unknown (D)				2500			

Notes:

- * Rocket artillery is presented here as it has provided Iran significant value in accrued infrastructure and tacit knowledge in solid fuel development that led to the Sejjil missile.
- ** Unknown/Unconfirmed
- *** The names Shahab-5 and Shahab-6 have been mentioned in media reports and literature on Iranian missiles. It is possible that the titles initially referred to programs that developed into the Safir SLV and Sejjil. Today, the names refer to theorectical or conceptual Iranian long rang ballistic missiles.

(A) Announced (O) Operational (R) Research (D) Development (U) Unknown (T) Theoretical

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Sources:

- [1] Galen Wright, "Rocket (MLRS) Artillery," The Arkenstone, thearkenstone.blogspot.com.
- [2] Galen Wright, "Rocket (MLRS) Artillery," The Arkenstone, thearkenstone.blogspot.com.
- [3] Galen Wright, "Rocket (MLRS) Artillery," The Arkenstone, thearkenstone.blogspot.com.
- [4] Jane's Armour and Artillery, "122 mm Arash artillery rockets (Iran), Multiple rocket launchers," Jane's Information Group, 6 March 2012, www.janes.com; Galen Wright, "Rocket (MLRS) Artillery," *The Arkenstone*, thearkenstone.blogspot.com.
- [5] Jane's Armour and Artillery, "122 mm Arash artillery rockets (Iran), Multiple rocket launchers," Jane's Information Group, 6 March 2012, www.janes.com; Galen Wright, "Rocket (MLRS) Artillery," *The Arkenstone*, thearkenstone.blogspot.com.
- [6] Jane's Armour and Artillery, "122 mm Arash artillery rockets (Iran), Multiple rocket launchers," Jane's Information Group, 6 March 2012, www.janes.com; Galen Wright, "Rocket (MLRS) Artillery," The Arkenstone, thearkenstone.blogspot.com.
- [7] Jane's Armour and Artillery, "333 mm Shahin Iranian rockets (Iran), Artillery Rockets," Jane's Information Group, 11 May 2011, www.janes.com; Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45; "Rocket (MLRS) Artillery," *The Arkenstone*, thearkenstone.blogspot.com.
- [8] Jane's Armour and Artillery, "333 mm Shahin Iranian rockets (Iran), Artillery Rockets," Jane's Information Group, 11 May 2011, www.janes.com; Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45; "Rocket (MLRS) Artillery," *The Arkenstone*, thearkenstone.blogspot.com.
- [9] Jane's Ammunition Handbook, "233 mm Oghab artillery rocket (Iran), Fuzes Rocket fuzes," Jane's Information Group, 25 June 2012, www.janes.com; Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45; "Rocket (MLRS) Artillery," *The Arkenstone*, thearkenstone.blogspot.com.
- [10] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45.; "Rocket (MLRS) Artillery," *The Arkenstone*, thearkenstone.blogspot.com.
- [11] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45.; "Rocket (MLRS) Artillery," *The Arkenstone*, thearkenstone.blogspot.com.
- [12] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45.; "Rocket (MLRS) Artillery," *The Arkenstone*, thearkenstone.blogspot.com.
- [13] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45.; "Rocket (MLRS) Artillery," *The Arkenstone*, thearkenstone.blogspot.com.
- [14] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45; *Jane's Armour and Artillery*, "Nazeat Artillery Rocket System (ARS) family (Iran), multiple rocket launchers," Jane's Information Group, 6 March 2012.
- [15] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45; Jane's Armour and Artillery, "Nazeat Artillery Rocket System (ARS) family (Iran), multiple rocket launchers," Jane's Information Group, 6 March 2012.

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.





- [16] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45.
- [17] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45.
- [18] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 44-45.; Jane's Armour and Artillery, "Nazeat Artillery Rocket System (ARS) family (Iran), multiple rocket launchers," Jane's Information Group, 6 March 2012.
- [19] "Dongfeng 11 (Css-7) Short-Range Ballistic Missile," Sino Defence, www.sinodefence.com.; Missile Threat, "M-11 Variant," The Claremont Institute, www.missilethreat.com.
- [20] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 51-53.; "Fatah 110 Fatah A-110 short range ground-to-ground ballistic missile," *Army Recognition*, www.armyrecognition.com.
- [21] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 51-53.; "Fatah 110 Fatah A-110 short range ground-to-ground ballistic missile," *Army Recognition*, www.armyrecognition.com.
- [22] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 51-53.; "Fatah 110 Fatah A-110 short range ground-to-ground ballistic missile," *Army Recognition*, www.armyrecognition.com.
- [23] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 51-53.; "Fatah 110 Fatah A-110 short range ground-to-ground ballistic missile," *Army Recognition*, www.armyrecognition.com.
- [24] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 48-50.; *Jane's Strategic Weapons Systems*, "Zelzal-1/-2/-3 (Iran), Offensive Weapons," Jane's Information Group, 28 July 2011, www.janes.com.
- [25] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 48-50.; *Jane's Strategic Weapons Systems*, "Zelzal-1/-2/-3 (Iran), Offensive Weapons," Jane's Information Group, 28 July 2011, www.janes.com.
- [26] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 48-50.; *Jane's Strategic Weapons Systems*, "Zelzal-1/-2/-3 (Iran), Offensive Weapons," Jane's Information Group, 28 July 2011, www.janes.com.
- [27] Jane's Strategic Weapons Systems, "Tondar-69 (CSS-8) (Iran), Offensive Weapons," Jane's Information Group, 28 July 2011, www.janes.com.
- [28] Jane's Strategic Weapons Systems, "Shahab 1 (R-17 (SS-1C 'Scub B') variant)," Jane's Information Group, 7 September 2012, www.janes.com.; Theodore Postol, "A Technical Assessment of Iran's Ballistic Missile Program," Technical Addendum to the Joint Threat Assessment on Iran's Nuclear and Missile Potential, 6 May 2009,, www.ewi.info.; Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 13-16.
- [29] Theodore Postol, "A Technical Assessment of Iran's Ballistic Missile Program," Technical Addendum to the Joint Threat Assessment on Iran's Nuclear and Missile Potential, 6 May 2009,, www.ewi.info.; "Iran's Ballistic Missile Capabilities: A Net Assessment," Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 13-16.; *Jane's Strategic Weapons Systems*, "Shahab 2 (Qiam, SS-1D 'Scud C variant)," Jane's Information Group, 12 February 2012, www.janes.com.
- [30] Theodore Postol, "A Technical Assessment of Iran's Ballistic Missile Program," Technical Addendum to the Joint Threat Assessment on Iran's Nuclear and Missile Potential, 6 May 2009,, www.ewi.info.; "Iran's Ballistic Missile Capabilities: A Net Assessment," Dossier, London: IISS: International Institute for

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.





Strategic Studies, 2010, pp. 13-16.; Jane's Strategic Weapons Systems, "Shahab 2 (Qiam, SS-1D 'Scud C variant)," Jane's Information Group, 12 February 2012, www.janes.com.

[31] Michael Elleman, "IISS Experts' Commentary – Generation Qiam: Iran's New Missile," The International Institute for Strategic Studies, 26 August 2010, www.iiss.org.; Steven A. Hildreth, "Iran's Ballistic Missile and Space Launch Programs," Congressional Research Service, Report for Congress R42849, 6 December 2012, p. 18, www.fas.org.; Jeffrey Lewis, "Schmucker/Schiller on Iran's Qiam," *ArmsControlWonk*, 25 August 2010, www.armscontrolwonk.com.; *Jane's Strategic Weapons Systems*, "Shahab 2 (Qiam, SS-1D 'Scud C variant)," Jane's Information Group, 12 February 2012, www.janes.com.

[32] "Dongfeng 15 (CSS-6) Short-Range Ballistic Missile," Sino Defence, www.sinodefence.com; *Missile Threat*, "M-9 Variant." The Claremont Institute, www.missilethreat.com.

[33] Theodore Postol, "A Technical Assessment of Iran's Ballistic Missile Program," Technical Addendum to the Joint Threat Assessment on Iran's Nuclear and Missile Potential, 6 May 2009,, www.ewi.info.; "Iran's Ballistic Missile Capabilities: A Net Assessment," Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 17-23.; Jane's Strategic Weapons Systems, "Shahab ¾ (Ghadr-1)," Jane's Information Group, 12 February 2012, www.janes.com. [34] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 54-63.; Ted Postol, "Technical Addendum to the Joint Threat Assessment on Iran's Nuclear and Missile Potential – The Sejjil Ballistic Missile," EastWest Institute, 31 May 2009, www.ewi.info.; "Sejil (Ashoura)," Jane's Strategic Weapon Systems, 12 February 2012, www.janes.com.

[35] Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 32-33.; Markus Schiller and Robert H. Schmucker, "Explaining the Musudan: New Insights on the North Korean SS-N-6 Technology," 31 May 2012.

[36] Missile Threat, "Shahab 5," Claremont Institute, 16 July 2012, www.missilethreat.com.; Jane's Strategic Weapon Systems, "Shahab 5/5 (Iran), Offensive weapons," Jane's Information Group, 28 July 2011, www.janes.com.

[37] Missile Threat, "Shahab 6," Claremont Institute, 16 July 2012, www.missilethreat.com.; Jane's Strategic Weapon Systems, "Shahab 5/5 (Iran), Offensive weapons," Jane's Information Group, 28 July 2011, www.janes.com.

[38] Jane's Strategic Weapons Systems, "Kavosh/Kavoshgar (Iran), Satellite Launch Vehicle Programmes," Jane's Information Group, 22 July 2012, www.janes.com.; Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 26-31. [39] Charles P. Vick, "IRIS & Iran's Emerging Space Program," Federation of American Scientists, www.fas.org.

[40] Theodore Postol, "A Technical Assessment of Iran's Ballistic Missile Program," Technical Addendum to the Joint Threat Assessment on Iran's Nuclear and Missile Potential, 6 May 2009, www.ewi.info.; Iran's Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, pp. 26-31.; "Safir Data Sheet," *Space Launch Report*, www.spacelaunchreport.com.

[41] Ballistic Missile Capabilities: A Net Assessment, Dossier, London: IISS: International Institute for Strategic Studies, 2010, p. 105.

[42] Jane's Strategic Weapon Systems, "Kosar (C-701) and Nasr (C-704) (Iran), Offensive Weapons," Jane's Information Group, 12 February 2012, www.janes.com.; Jane's Air-Launched Weapons, "Kosar missile series (Iran), Air-to-surface missiles, Anti-ship," Jane's Information Group, 27 April 2010, www.janes.com.; Galen Wright, "Iran's Anti-Ship Missiles," *The Arkenstone*, 15 July 2011, www.thearkenstone.blogspot.com.

[43] Jane's Strategic Weapon Systems, "Kosar (C-701) and Nasr (C-704) (Iran), Offensive Weapons," Jane's Information Group, 12 February 2012,

Related content is available on the website for the Nuclear Threat Initiative, www.nti.org.





www.janes.com.; Galen Wright, "Iran's Anti-Ship Missiles," The Arkenstone, 15 July 2011, www.thearkenstone.blogspot.com.

- [44] Deutsche Welle, "Iran Tests 'Ghader' cruise missile during naval exercises," Terminal X, 2 January 2012, www.terminalx.org.
- [45] Jane's Air Launched Weapons, "Ra'ad cruise missile (Iran), Air-to-surface missiles Stand-off and cruise," Jane's Information Group, 20 April 2012, www.janes.com.; Galen Wright, "Iran's Anti-Ship Missiles," *The Arkenstone*, 15 July 2011, www.thearkenstone.blogspot.com.
- [46] "Commander: Iran's Speedboats Capable of Launching Cruise Missiles," Fars News Agency, 15 October 2012, www.english.farsnews.com.
- [47] "Iran to Unveil New Cruise Missile," Fars News Agency, 7 October 2011, www.english.farsnews.com.; "Iran to Equip Armed Forces with New Naval Cruise Missile," Fars News Agency, 29 October 2011, www.english.farsnews.com.
- [48] "Iran successfully test fires cruise missile," *Al-Akhbar*, 2 January 2012, www.english.al-akhbar.com.; Galen Wright, "Anti-Ship Weapons," *The Arkenstone*, 9 October 2010, www.thearkenstone.blogspot.com.
- [49] Carlo Kopp, "Soviet/Russian Cruise Missiles," Air Power Australia, Technical Report APAO-TR-2009-0805, 2008, www.ausairpower.net.
- [50] "Iran to unveil Meshkat medium-range cruise missile," Press TV, 9 September 2012, www.presstv.ir.; "Iran to unveil 2000km Meshkat Cruise Missile in near future," *The Iran Project*, 9 September 2012, theinraproject.com.

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