

IRANIAN BALLISTIC MISSILE TESTS SINCE THE NUCLEAR DEAL

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EXECUTIVE SUMMARY

Since the July 2015 announcement of the nuclear deal known as the Joint Comprehensive Plan of Action (JCPOA), Iran has tested as many as 14 ballistic missiles. This number is based on aggregated open-source reporting,¹ as no official government or United Nations numbers have been made available to the public. Although the deal did not address ballistic missiles² – the likeliest delivery mechanisms for nuclear warheads – the UN Security Council resolution endorsing the deal called on Iran to refrain from testing nuclear-capable missiles.³ This memo explains how the Foundation for Defense of Democracies (FDD) has calculated the number of ballistic missiles Iran has fired and explains the policy implications of these tests.

THE CHALLENGE OF CALCULATING THE NUMBER OF TESTS

While Iran has tested ballistic missiles on multiple occasions since July 2015, there does not appear to be a consensus in Washington, or in the international community, on how many it has tested, which platforms were tested, and when they were launched.⁴ The challenge derives from trying to navigate multiple conflicting sources, including reports by Western media outlets that rely on government officials, Persian-language open-source material, reports by non-governmental and international organizations, and congressional testimony.

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 1. Despite being able to carry an unconventional payload, this assessment ignores cruise missiles like the Soumar, which Iran reportedly tested in late January. See: “Iran tested nuclear-capable cruise missile: German newspaper,” *Reuters*, February 2, 2017. (<http://www.reuters.com/article/us-iran-missiles-cruise-idUSKBN15H0WR>). For more on the Soumar, see: Behnam Ben Taleblu and Patrick Megahan, “Iran Fires Cruise Missile Through Sanctions Loophole,” *Foundation for Defense of Democracies*, March 11, 2015. (<http://www.defenddemocracy.org/media-hit/behnam-ben-taleblu-iran-fires-cruise-missile-through-sanctions-loophole/>)

2. Despite advice from analysts. See, for example: Behnam Ben Taleblu, “Don’t Forget Iran’s Ballistic Missiles,” *War on the Rocks*, August 25, 2014. (<https://warontherocks.com/2014/08/dont-forget-irans-ballistic-missiles/>)

3. United Nations Security Council, “Resolution 2231 (2015): Ballistic missile-related transfers and activities,” accessed February 3, 2017. (<http://www.un.org/en/sc/2231/restrictions-ballistic.shtml>)

4. The numbers usually cited range from five to eight. For example, see “Statement on Iranian Ballistic Missile Test,” *Website of Congressman Brad Schneider*, January 31, 2017. (<https://schneider.house.gov/media/press-releases/statement-iranian-ballistic-missile-test>); Michael Elleman, “Iran’s Ballistic Missile Program,” *Written Statement Presented to U.S. Senate Committee on Banking, Housing, and Urban Affairs*, May 24, 2016, page 6. (http://www.banking.senate.gov/public/_cache/files/f64d023a-d6fc-4dc4-84a7-ea10ba8192cf/90DC029490361D182584B92FCAD76111.052416-elleman-testimony.pdf); Lucas Tomlinson and Jennifer Griffin, “Iran launched another ballistic missile in secret last month, US officials say,” *Fox News*, January 31, 2017. (<http://www.foxnews.com/world/2017/01/31/iran-launched-another-ballistic-missile-in-secret-last-month-us-officials-say.html>)

The primary reason for this lack of clarity is apparent: The Obama administration provided little, if any, public information on Iranian ballistic missile launches in the post-deal environment. It responded with scant condemnations, and in one case, sanctions.⁵ Had the U.S. intelligence community, USSTRATCOM, or other combatant commands supported by the U.S. Missile Defense Agency or Department of Defense weighed in publically, the international community would know the answer to the question of how many ballistic missiles Iran has tested since July 2015.

REPORTED MISSILE TESTS

FDD tracked the number of ballistic missiles reportedly launched since the JCPOA's announcement rather than the number of missile drills – each of which may include launches of multiple missiles. We believe this is a more accurate way to determine Iran's capabilities because each tested missile, whether a success or failure, provides Tehran with data it can use to further its conventional and unconventional military capabilities. Additionally, with a few exceptions noted below, we include every incident reported in Persian- and English-language media. We include ballistic missiles that meet and do not meet the Missile Technology Control Regime's (MTCR) metric for “nuclear-capable” missiles.⁶ Indeed, missiles that fall short of the MTCR's range threshold could still potentially serve as a delivery vehicle for a tactical nuclear weapon in the future.⁷

We assess that Iran has tested up to 14 ballistic missiles since the JCPOA was announced in July 2015.⁸

FATEH-313

- **Reported test date:** August 22, 2015⁹
- **Type:** Single-stage, solid-fueled short-range ballistic missile (SRBM)
- **Source and comments:** Iran's *Tasnim News Agency* notes that the missile was successfully tested and provided images to prove it. Days later, Iranian parliamentarians cited the test in speeches.¹⁰

5. As noted in: Behnam Ben Taleblu, “Sanctions Delay Lets Tehran Expand Missile Power,” *Foundation for Defense of Democracies*, January 11, 2016. (<http://www.defenddemocracy.org/media-hit/behnam-ben-taleblu-sanctions-delay-lets-tehran-expand-missile-power/>). For sanctions, see: U.S. Department of the Treasury, Press Release, “Treasury Sanctions Those Involved in Ballistic Missile Procurement for Iran,” January 17, 2016. (<https://www.treasury.gov/press-center/press-releases/Pages/jl0322.aspx>)

6. Noted in Footnote 2 in: Kelsey Davenport, “The Missile Technology Control Regime at a Glance,” *Arms Control Association*, August 2016. (<https://www.armscontrol.org/factsheets/mtrc>)

7. For non-Iranian examples of this, see the Pluton, Lance, and Hatf-9 missiles, in: “Pluton,” *Federation of American Scientists*, accessed February 9, 2017. (<https://fas.org/nuke/guide/france/theater/pluton.htm>); “Israel Missile Update – 2005,” *Wisconsin Project on Nuclear Arms Control*, November-December 2005. (<http://www.wisconsinproject.org/countries/israel/IsraelMissile2005.html>); “Hatf 9 ‘Nasr’,” *Missile Threat*, September 16, 2016. (<https://missilethreat.csis.org/missile/hatf-9/>). It also ignores the broader WMD threat, and overall purpose of Iran's ballistic missile arsenal that was noted by former Director of National Intelligence James Clapper in February 2016. See: James R. Clapper, “Worldwide Threat Assessment of the U.S. Intelligence Community,” *Statement for the Record Submitted to Senate Armed Services Committee*, February 9, 2016, page 8. (https://www.armed-services.senate.gov/imo/media/doc/Clapper_02-09-16.pdf)

8. Additional information detailing these missiles' manufacturer, range, payload, translation of their name, as well as other related data is available upon request.

9. “لحظه شلیک موشک فاتح-313 + تصاویر” (The Moment of Firing the Fateh-313 Missile + Images), *Tasnim News Agency* (Iran), August 22, 2015. (<https://www.tasnimnews.com/fa/news/1394/05/31/836241/تصاویر-313-فاتح-موشک-لحظه-شلیک>); “Iran unveils solid-fuel precision-guided missile,” *Press TV* (Iran), August 22, 2015. (<http://www.presstv.com/Detail/2015/08/22/425819/Iran-Fateh-missile-Hassan-Rouhani-Defense-Ministry>)

10. “آزمایش موفقیت آمیز فاتح ۳۱۳ پاسخی به پاره گویان طراح تحریم” (The Successful Test of the Fateh-313 is a Response to the Absurdity-Sayers Who Devise Sanctions), *Islamic Consultative Assembly News Agency* (Iran), August 26, 2015. (<http://www.icana.ir/fa/news/283466>)

EMAD¹¹

- **Reported test date:** October 11, 2015¹²
- **Type:** Precision-guided,¹³ liquid-fueled medium-range ballistic missile (MRBM)
- **Source and comments:** Iranian and Western media provided similar reporting, although the Iranian media mistakenly called it a long-range missile.

GHADR-110 (AKA GHADR-1/GHADR-101)

- **Reported test date:** November 21, 2015¹⁴
- **Type:** Liquid-fueled MRBM¹⁵
- **Source and comments:** On December 8, 2016, a number of Western media outlets reported that Iran had tested the Ghadr in late November. *The New York Times* said “outside analysts” believe it was a Ghadr-110 missile.¹⁶ *UPI* claimed, “U.S. officials believe the test was conducted Nov. 21 from the city of Chabahar.”¹⁷ Reporting from Iranian outlets drew entirely from the Western press.¹⁸

GHADR-F

- **Reported test date:** March 8 or 9, 2016¹⁹
- **Type:** Liquid-fueled MRBM

11. Likely a new warhead atop the Ghadr missile’s body. This is discernable from images, see: http://media.farsnews.com/media/Uploaded/Files/Images/1394/07/19/13940719000226_PhotoL.jpg

12. (فیلم لحظه شلیک و اصابت موشک دوربرد عماد / فیلم لحظه شلیک و اصابت موشک دوربرد عماد) (Film/The Long Range Emad Missile’s Moment of Firing and [Target] Destruction),” *Mashregh News* (Iran), October 11, 2015. (<http://www.mashreghnews.ir/fa/news/479752/اصابت-موشک-دوربرد-عماد>); Tim Hume, “Iran test-fires new generation long-range ballistic missiles, state media report,” *CNN*, October 11, 2015. (<http://www.cnn.com/2015/10/11/middleeast/iran-ballistic-missile-test/>)

13. Most likely due to the warhead. Combining the logics of: Anthony H. Cordesman, “Iran, Missiles, and Nuclear Weapons,” *Center for Strategic and International Studies*, December 9, 2015. (<https://www.csis.org/analysis/iran-missiles-and-nuclear-weapons>) and Tamir Eshel, “Could Tehran’s EMAD Missile Outsmart Israel’s Arrow 3?” *Defense Update* (Israel), October 12, 2015. (http://defense-update.com/20151012_emad_missile.html)

14. Louis Charbonneau and Michelle Nichols, “U.S. conducting ‘serious review’ of alleged Iran missile test,” *Reuters*, December 8, 2015. (<http://www.reuters.com/article/us-iran-missiles-usa-idUSKBN0TR2G920151208>)

15. We assess this missile to be liquid-fueled because it is based off the liquid-fueled Shahab-3 and NoDong-A. Also, while missile experts have mentioned the increased amount of propellant in this missile, they do not mention changes to it. See: *Missile Defence Cooperation in the Gulf* (London: The International Institute for Strategic Studies, 2016), page 19. However, we are aware that other sources cite the Ghadr as being two-staged and hybrid (first stage liquid, second stage solid) fueled. See: John Middleton, “Ghadr -110,” *Missile Defense Advocacy*, November 2016. (<http://missiledefenseadvocacy.org/missile-threat-and-proliferation/todays-missile-threat/iran/ghadr-110/>); “Emad, Ghadr (Shahab-3 Variants),” *Missile Threat*, August 8, 2016. (<https://missilethreat.csis.org/missile/emad/>). As such, this caveat about propellant and staging about the Ghadr platform should apply to all Ghadr’s mentioned in this memo.

16. David E. Sanger, “U.S. Cautious on Iran Missile Test Claim,” *The New York Times*, December 8, 2015. (https://www.nytimes.com/2015/12/09/world/middleeast/us-cautious-on-iran-missile-test-claim.html?_r=0)

17. Doug G. Ware, “Iran violated nuclear deal with second ballistic missile test last month, U.S. officials say,” *United Press International*, December 8, 2015. (http://www.upi.com/Top_News/World-News/2015/12/08/Iran-violated-nuclear-deal-with-second-ballistic-missile-test-last-month-US-officials-say/3371449620806/)

18. “آزمایش موشک جدید بالستیک در ایران” (Testing A New Ballistic Missile in Iran),” *Young Journalists Club* (Iran), December 8, 2015. (<http://www.yjc.ir/fa/news/5419272/جنگال-ادعای-آزمایش-موشکی-ایران-در-رسانه-های-آمریکایی>); “جنگال ادعای آزمایش موشکی ایران در رسانه های آمریکایی” (The Controversy[Over] the Claim of Iranian Missile Tests in American Newspapers),” *Asr Iran* (Iran), December 9, 2015. (<http://www.asriran.com/fa/news/436924/جنگال-ادعای-آزمایش-موشکی-ایران-در-رسانه-های-آمریکایی>)

19. “First Missile Test after Nuclear Deal,” *Iranian Diplomacy* (Iran), March 9, 2016. (<http://irdiplomacy.ir/en/page/1957075/First+Missile+Test+after+Nuclear+Deal.html>)

- **Source and comments:** The March 2016 tests are the most complicated to assess. English- and Persian-language media outlets in Iran, the United Nations, and a prominent arms-control organization disagreed over which platforms were tested, but there is a general consensus that the Ghadr-F was tested. There is, however, inconsistent reporting on the other missiles (discussed below in the section on the Ghadr-H).²⁰ Surprisingly, the UN Secretary General failed to mention any of the Ghadr platforms in his July 2016 report.²¹

GHADR-H (TWO MISSILES)

- **Reported test date:** March 8 or 9, 2016²²
- **Types:** Liquid-fueled MRBM
- **Sources and comments:** The Persian-language *Fars News Agency* reported that an unnamed Ghadr (which we assume is the Ghadr-F) was flight-tested the day before two Ghadr-H's were launched in early March.²³ That same *Fars* report notes that two Ghadr-Hs were the ones that bore an anti-Israel slogan uttered by former Supreme Leader Ruhollah Khomeini. Persian-language Iranian sources also note that two Ghadr-H's were fired in early March during an Islamic Revolutionary Guard Corps (IRGC) drill.²⁴ The missiles were pictured together at the location in central Iran from which they were fired.²⁵
- **Incorrect reporting in English-language media:** The English-language *Iranian Diplomacy* reported that the Ghadr-F and H were both fired on March 8.²⁶ The English-language *Mehr News Agency* reported that Iran fired four missiles, one Ghadr-F, one Ghadr-H, one Shahab-1, and one Shahab-2.²⁷ The arms control website *Iran Watch* also listed the same four missiles,²⁸ drawing from the *Mehr* report.²⁹ English-language reports alleging that Iran tested an extremely old projectile (the Shahab-1), however, appears to be incorrect. The Shahab-1 is a Scud-B missile, which Iran first procured during the Iran-Iraq War.³⁰ We assess that it is highly unlikely Iran would test the obsolete Shahab-1.

20. For instance, also noted in: "Iran test-fires two ballistic missiles during large-scale drills," *Press TV* (Iran), March 9, 2016. (<http://www.presstv.com/Detail/2016/03/09/454681/iran-irgc-ballistic-missile->)

21. United Nations Security Council, "Report of the Secretary General on the Implementation of Security Council Resolution 2231 (2015)," July 12, 2016, page 6. (http://www.un.org/en/ga/search/view_doc.asp?symbol=S/2016/589&Lang=E)

22. "Iran test-fires two ballistic missiles during large-scale drills," *Press TV* (Iran), March 9, 2016. (<http://www.presstv.com/Detail/2016/03/09/454681/iran-irgc-ballistic-missile->)

23. "پیام موشکی سپاه به زبان «عبری» مخابره شد: «اسرائیل» از ریکه لهدیمחק مععل+تصویر» (The IRGC's Missile Message was Transmitted in 'Hebrew' : Images)," *Fars News Agency* (Iran), March 9, 2016. (<http://www.farsnews.com/newstext.php?nn=13941219000316>)

24. "پیام موشکی سپاه به زبان «عبری» مخابره شد: «اسرائیل» از ریکه لهدیمחק مععل+تصویر» (The IRGC's Missile Message was Transmitted in 'Hebrew' : Images)," *Fars News Agency* (Iran), March 9, 2016. (<http://www.farsnews.com/newstext.php?nn=13941219000316>)

25. As seen in this image: http://media.farsnews.com/media/Uploaded/Files/Images/1394/12/19/13941219000209_PhotoL.jpg

26. "First Missile Test after Nuclear Deal," *Iranian Diplomacy* (Iran), March 9, 2016. (<http://irdiplomacy.ir/en/page/1957075/First+Missile+Test+after+Nuclear+Deal.html>)

27. "Iran successfully test-fires Ghadr missiles," *Mehr News Agency* (Iran), March 9, 2016. (<http://en.mehrnews.com/news/115104/Iran-successfully-test-fires-Ghadr-missiles>)

28. "Iran Missile Milestones: 1985-2016," *Iran Watch*, July 13, 2016. (<http://www.iranwatch.org/our-publications/weapon-program-background-report/iran-missile-milestones-1985-2016>)

29. "Iran Successfully Test-Fires Ghadr Missiles," *Iran Watch*, March 9, 2016. (<http://www.iranwatch.org/news-brief/iran-successfully-test-fires-ghadr-missiles>)

30. This was originally called the Scud-B. See: "Scud B (Shahab-1/Hwasong-5)," *Military Edge*, accessed February 1, 2017. (<http://militaryedge.org/armaments/scud-b/>)

QIAM-1

- **Reported test date:** March 8 or 9, 2016³¹
- **Type:** Liquid-fueled SRBM
- **Source and comments:** The Persian-language *Fars News Agency* reported that Iran fired a Qiam missile during its March drills.³² The Qiam-1 is explicitly mentioned, though not pictured, in the ballistic missile section of the UN Secretary General's summer 2016 report on Security Council Resolution 2231.³³ The Qiam-1 is an upgraded (and finless) Shahab-2/Scud-C with a different warhead.³⁴ We deduce that the *Mehr* report from March 9, 2016 and the arms control websites summary of Iran's March tests likely intended to refer to the Qiam-1, an upgraded version of the Shahab-2.

SHAHAB-3

- **Reported test date:** March 8 or 9, 2016³⁵
- **Type:** Liquid-fueled MRBM
- **Source and comments:** The Shahab-3 is explicitly mentioned and pictured in the ballistic missile section of the UN Secretary General's summer 2016 report on UNSCR 2231.³⁶ A Shahab (which we assess to be the Shahab-3) is also listed in the *Fars* report as having been tested during the March 2016 drills.³⁷

SIMORGH

- **Reported test date:** April 19, 2016³⁸
- **Type:** Space-launch vehicle (SLV)³⁹

31. United Nations Security Council, "Report of the Secretary General on the Implementation of Security Council Resolution 2231 (2015)," July 12, 2016, page 6. (http://www.un.org/en/ga/search/view_doc.asp?symbol=S/2016/589&Lang=E)

32. پیام موشکی سپاه به زبان «عبری» مخابره شد: «إسرائيل» צריכה להימחק מעל+تصوير. (The IRGC's Missile Message was Transmitted in 'Hebrew': «إسرائيل» צריכה להימחק מעל+Images), *Fars News Agency* (Iran), March 9, 2016. (<http://www.farsnews.com/newstext.php?nn=13941219000316>)

33. United Nations Security Council, "Report of the Secretary General on the Implementation of Security Council Resolution 2231 (2015)," July 12, 2016, page 6. (http://www.un.org/en/ga/search/view_doc.asp?symbol=S/2016/589&Lang=E)

34. This is confirmed by multiple expert sources. See: Michael Elleman, "Iran's Ballistic Missile Program," *Written Statement Presented to U.S. Senate Committee on Banking, Housing, and Urban Affairs*, May 24, 2016, page 3. (http://www.banking.senate.gov/public/_cache/files/f64d023a-d6fc-4dc4-84a7-ea10ba8192cf/90DC029490361D182584B92FCAD76111.052416-elleman-testimony.pdf); Anthony H. Cordesman, *Iran's Rocket and Missile Forces and Strategic Options*, (Washington, DC: Center for Strategic & International Studies, 2014), page 73. (<https://books.google.com/books?id=nBeMBgAAQBAJ&pg=PA73&lpg=PA73&dq=Qiam-1+missile+SHahab+2&source=bl&ots=v1kcskipdU&sig=OHkOoG3OC4uWK7dtuyfTH3QWhVE&hl=en&sa=X&ved=0ahUKEwj3rbP5nvDRAhXoLcAKHXkIAkQQ6AEIVzAO#v=onepage&q=Qiam-1%20missile%20SHahab%202&f=false>); "Shahab 2 (Scud-C variant)," *Center for Strategic & International Studies*, August 9, 2016. (<https://missilethreat.csis.org/missile/shahab-2/>) "Qiam-1," *Military Edge*, accessed February 1, 2017. (<http://militaryedge.org/armaments/qiam-1/>); "Scud C (Shahab-2/Hwasong-6)," *Military Edge*, accessed February 1, 2017. (<http://militaryedge.org/armaments/scud-c/>)

35. United Nations Security Council, "Report of the Secretary General on the Implementation of Security Council Resolution 2231 (2015)," July 12, 2016, page 6. (http://www.un.org/en/ga/search/view_doc.asp?symbol=S/2016/589&Lang=E)

36. United Nations Security Council, "Report of the Secretary General on the Implementation of Security Council Resolution 2231 (2015)," July 12, 2016, page 6. (http://www.un.org/en/ga/search/view_doc.asp?symbol=S/2016/589&Lang=E)

37. پیام موشکی سپاه به زبان «عبری» مخابره شد: «إسرائيل» צריכה להימחק מעל+تصوير. (The IRGC's Missile Message was Transmitted in 'Hebrew': «إسرائيل» צריכה להימחק מעל+Images), *Fars News Agency* (Iran), March 9, 2016. (<http://www.farsnews.com/newstext.php?nn=13941219000316>)

38. Bill Gertz, "Iran Conducts Space Launch," *The Washington Free Beacon*, April 20, 2016. (<http://freebeacon.com/national-security/iran-conducts-space-launch/>)

39. Tamir Eshel, "Simorgh First Launch – an Iranian Success or Failure?" *Defense Update* (Israel), April 24, 2016. (http://defense-update.com/20160424_simorgh.html)

- **Source and comments:** Defense and news outlets reported the Simorgh's launch in April 2016.⁴⁰ We include this as part of our ongoing collecting of reported missile tests. Indeed, Iran's satellite program⁴¹ is a mask for its intercontinental ballistic missile program.⁴² For example, a 2013 National Air and Space Intelligence Center report noted that this launch vehicle "could serve as a test bed for developing ICBM technologies."⁴³

UNKNOWN BALLISTIC MISSILE

- **Reported test date:** April 2016⁴⁴
- **Type:** Unknown, but likely MRBM or intermediate-range ballistic missile (IRBM)
- **Source and comments:** In May, the *Associated Press* (citing the Iranian press) reported that Iran tested another ballistic missile in late April, but did not provide any data other than the stated range, in addition to reporting that Iran was confident of the missile's margin of error.⁴⁵ According to more recent analysis, the missile allegedly featured "North Korean ... construction or design," and an unnamed U.S. official said that it was similar to the missile Iran tested in January 2017.⁴⁶ According to other Western media sources, Iran's minister of defense denied the April 2016 test.⁴⁷

BM-25 MUSUDAN

- **Reported test date:** July 11 or 12, 2016⁴⁸
- **Type:** Liquid-fueled IRBM
- **Source and comments:** *Fox News'* Lucas Tomlinson had the exclusive story that drew on "multiple intelligence

40. Tamir Eshel, "Simorgh First Launch – an Iranian Success or Failure?" *Defense Update* (Israel), April 24, 2016. (http://defense-update.com/20160424_simorgh.html)

41. Note, the most recent news whereby Iran reportedly removed its Safir SLV from a launch pad does not impact this assessment. See: Lucas Tomlinson and Jennifer Griffin, "Exclusive: Iran pulls missile from launchpad after apparent prep for launch, US officials say," *Fox News*, February 7, 2017. (<http://www.foxnews.com/world/2017/02/07/exclusive-iran-pulls-missile-from-launch-pad-after-apparent-prep-for-launch-u-s-officials-say.html>). However, had this launch hypothetically taken place, it would be included because according to the U.S. National Air and Space Intelligence Center, the Safir is a "multi-stage SLV that can serve as a test bed for long-range ballistic missile technologies." See: U.S. National Air and Space Intelligence Center, "Ballistic & Cruise Missile Threat," 2013, page 15. (https://fas.org/programs/ssp/nukes/nuclearweapons/NASIC2013_050813.pdf)

42. See, for instance: "Iran's Satellite Technology Increases Potential of ICBM Attack," *Middle East Institute*, December 21, 2016. (<http://www.mei.edu/content/is/iran-s-satellite-technology-increases-potential-icbm-attack>); Barbara Opall-Rome, "Israeli Missile Experts: Simorgh Sets Iran on Path to ICBM," *Space News*, February 15, 2010. (<http://spacenews.com/israeli-missile-experts-simorgh-sets-iran-path-icbm/>); Laura Grego, "Iran's Upcoming Simorgh Rocket Launch," *Union of Concerned Scientists*, February 14, 2016. (<http://allthingsnuclear.org/lgrego/irans-upcoming-simorgh-rocket-launch>)

43. U.S. National Air and Space Intelligence Center, "Ballistic & Cruise Missile Threat," 2013, page 3. (https://fas.org/programs/ssp/nukes/nuclearweapons/NASIC2013_050813.pdf)

44. "Iran tests missile capable of reaching Israel," *Associated Press*, May 9, 2016. (<http://www.cbsnews.com/news/iran-ballistic-missile-test-launch-nuclear-deal-israel-middle-east/>)

45. The report cited an Iranian military official as saying it was accurate within 8 meters.

46. Kyle Mizokami, "Pentagon: Iran Tested a Ballistic Missile With North Korean Origins," *Popular Mechanics*, January 31, 2017. (<http://www.popularmechanics.com/military/weapons/a24986/iran-missile-north-korea/?platform=hootsuite>). That missile is the Khorramshahr.

47. John Bacon, "Iran disputes report of missile test," *USA Today*, May 9, 2016. (<http://www.usatoday.com/story/news/world/2016/05/09/defiant-iran-test-fires-ballistic-missile/84130912/>)

48. Lucas Tomlinson, "Exclusive: Iran conducts 4th missile test since signing nuke deal," *Fox News*, July 15, 2016. (<http://www.foxnews.com/world/2016/07/15/exclusive-iran-conducts-4th-missile-test-since-signing-uke-deal.html>)

officials” who told him that Iran had tried to test-launch the BM-25 Musudan.⁴⁹ Although the story did not get picked up elsewhere, given the journalist’s sources – and later reporting discussed in the section below on Khorramshahr – it is believed to be credible.⁵⁰

ZULFIQAR (AKA THE ZOLFAGHAR)

- **Reported test date:** September 2016⁵¹
- **Type:** Single-stage, solid-fueled SRBM
- **Source and comments:** Iranian outlets claim this missile has a submunitions warhead,⁵² and carried video⁵³ and images from the flight test.⁵⁴

SHAHAB-3

- **Reported test date:** December 6, 2016⁵⁵
- **Type:** Liquid-fueled MRBM
- **Source and comments:** On January 31, 2017, Lucas Tomlinson and Jennifer Griffin cited “two U.S. military officials” confirming Iran’s flight test of the Shahab-3 MRBM on December 6, 2016.⁵⁶

KHORRAMSHAHR

- **Reported test date:** January 29, 2017⁵⁷
- **Type:** Unknown, but likely MRBM
- **Source and comments:** On January 30, Tomlinson and Griffin were the first to break this story and cited “U.S. officials” as their source.⁵⁸ This story was picked up several hours later in other Western media outlets, which

49. Lucas Tomlinson, “Exclusive: Iran conducts 4th missile test since signing nuke deal,” *Fox News*, July 15, 2016. (<http://www.foxnews.com/world/2016/07/15/exclusive-iran-conducts-4th-missile-test-since-signing-nuke-deal.html>)

50. For additional analysis on the significance and implications of this test, see Behnam Ben Taleblu, “Iran’s Latest Test Shows It Is Doubling Down on Ballistic Missiles,” *Foundation for Defense of Democracies*, July 20, 2016. (<http://www.defenddemocracy.org/media-hit/behnam-ben-taleblu-irans-latest-test-shows-it-doubling-down-on-ballistic-missiles/>)

51. Jeremy Binnie, “Iran claims Zolfaghar missile has 700 km range,” *IHS Jane’s* (UK), September 26, 2016. (<http://www.janes.com/article/64149/iran-claims-zolfaghar-missile-has-700-km-range>)

52. “موشک ذوالفقار-جدیدترین موشک ایرانی رونمایی شد + تصاویر” (The Zulfiqar Missile ‘Iran’s Newest Missile is Unveiled + Images),” *Tasnim News Agency* (Iran), September 21, 2016. (<https://www.tasnimnews.com/fa/news/1395/06/31/1191852/-ایرانی-موشک-ذوالفقار-جدیدترین-موشک-ایرانی-رونمایی-شد-تصاویر>)

53. A screenshot from the video can be found in this article: Behnam Ben Taleblu, “Assessing the Latest Iranian Ballistic Missile: The Zulfiqar,” *Military Edge*, September 29, 2016. (<http://militaryedge.org/analysis-articles/assessing-latest-iranian-ballistic-missile-zulfiqar/>)

54. “ویژگی‌های موشک ذوالفقار-تصاویر» (Features of the ‘Zulfiqar Missile’ + Images),” *Defa Press* (Iran), September 25, 2016. (<http://defapress.ir/fa/news/105445/ویژگی‌های-موشک-ذوالفقار-تصاویر>)

55. Lucas Tomlinson and Jennifer Griffin, “Iran launched another ballistic missile in secret last month, US officials say,” *Fox News*, January 31, 2017. (<http://www.foxnews.com/world/2017/01/31/iran-launched-another-ballistic-missile-in-secret-last-month-us-officials-say.html>)

56. Lucas Tomlinson and Jennifer Griffin, “Iran launched another ballistic missile in secret last month, US officials say,” *Fox News*, January 31, 2017. (<http://www.foxnews.com/world/2017/01/31/iran-launched-another-ballistic-missile-in-secret-last-month-us-officials-say.html>)

57. Lucas Tomlinson and Jennifer Griffin, “Iran tests ballistic missile in defiance of UN resolution, US officials say,” *Fox News*, January 30, 2017. (<http://www.foxnews.com/world/2017/01/30/iran-conducts-ballistic-missile-test-us-officials-say.html>)

58. Lucas Tomlinson and Jennifer Griffin, “Iran tests ballistic missile in defiance of UN resolution, US officials say,” *Fox News*, January 30, 2017. (<http://www.foxnews.com/world/2017/01/30/iran-conducts-ballistic-missile-test-us-officials-say.html>)

quoted American officials as saying that “the last time this type of missile was test launched was in July 2016.”⁵⁹ This statement appears to be a reference to the *Fox* story about the Musudan/BM-25⁶⁰ from July 2016. Iranian media outlets linked to the IRGC re-posted the *Fox News* story without confirming or denying the test.⁶¹ Iranian officials subsequently confirmed the test of a missile they called the Khorramshahr.⁶² Iranian defense officials appear to have first mentioned the Khorramshahr in the Iranian press in September 2016.⁶³

POLICY IMPLICATIONS, RECOMMENDATIONS, AND CONCLUSION

Understanding how many ballistic missiles tests Iran has conducted is highly relevant to U.S. national security and the security of U.S. partners in the Middle East – as well as the viability of the nuclear agreement and the UN Security Council resolution that enshrines it. The U.S. has considerable policy options – diplomatic, informational, military, and economic – at its disposal to respond. Questions of how Washington can combat, deter, or roll back Iran’s ballistic missile capabilities are beyond the scope of this memo.

Looking forward, the administration needs to make public more information, and in a timelier manner, than did its predecessor. The National Defense Authorization Act for Fiscal Year 2017 requires the Director of National Intelligence to submit quarterly reports to Congress on confirmed Iranian ballistic missile launches.⁶⁴ This will provide an important baseline, but must be complemented by additional public information as soon as the Pentagon and intelligence community can confirm that a test has occurred.

Flight tests, even failed ones, teach Iran a great deal about the deficiencies in its missile arsenal. These missiles also bolster Iranian deterrence, providing Tehran with an umbrella of impunity that it uses to further its aggressive regional designs. Even though the nuclear agreement itself does not directly address ballistic missiles, Iran’s actions violate the UN Security Council resolution endorsing the JCPOA. While experts may debate the quality and quantity of Iran’s post-deal missile tests, the actual number should have been zero.

59. Idress Ali, “Iran tested medium-range ballistic missile: U.S. official,” *Reuters*, January 30, 2017. (<http://www.reuters.com/article/us-usa-iran-missiles-idUSKBN15E2EZ>)

60. For more information on this platform, see: Uzi Rubin, “The Global Reach of Iran’s Missiles,” *Institute for National Security Studies*, November 2006, pages 29-36. ([http://www.inss.org.il/uploadimages/Import/\(FILE\)1188302022.pdf](http://www.inss.org.il/uploadimages/Import/(FILE)1188302022.pdf)); “BM-25 Musudan,” *Military Edge*, accessed February 1, 2017. (<http://militaryedge.org/armaments/bm-25/>)

61. That page has now been taken down. See Google Cache version of this page in: (America: Iran Tested a Ballistic Missile on Sunday),” *Tasnim News Agency* (Iran), January 30, 2017. (https://webcache.googleusercontent.com/search?q=cache:EFfY6Jvp2_0J:https://www.tasnimnews.com/fa/news/1395/11/11/1313140/%25D8%25A2%25D9%2585%25D8%25B1%25DB%258C%25DA%25A9%25D8%25A7-%25D8%25A7%25DB%258C%25D8%25B1%25D8%25A7%25D9%2586-%25DB%258C%25DA%25A9%25D8%25B4%25D9%2586%25D8%25A8%25D9%2587-%25D9%2585%25D9%2588%25D8%25B4%25DA%25A9-%25D8%25A8%25D8%25A7%25D9%2584%25D8%25B3%25D8%25AA%25DB%258C%25DA%25A9-%25D8%25A2%25D8%25B2%25D9%2585%25D8%25A7%25DB%258C%25D8%25B4-%25DA%25A9%25D8%25B1%25D8%25AF+%&cd=1&hl=en&ct=clnk&gl=us)

62. Bozorgmehr Sharafedin, “Iran confirms missile test, drawing tough response from Trump aide,” *Reuters*, February 1, 2017. (<http://www.reuters.com/article/us-usa-iran-missiles-idUSKBN15G3ZO>); “Iran: Ballistic Missile Test Successful,” *Fars News Agency* (Iran), February 3, 2017. (<http://en.farsnews.com/newstext.aspx?nn=13951115000502>)

63. “Iran to produce 3 types of missiles by year end: Defense minister,” *Press TV* (Iran), September 25, 2016. (<http://www.presstv.com/Detail/2016/09/25/486287/Iran-Hossein-Dehqan-Qadir>)

64. National Defense Authorization Act for Fiscal Year 2017, 114 U.S.C. §1226, page 488-489. (<https://www.congress.gov/114/bills/s2943/BILLS-114s2943enr.pdf>)