The Impending Impasse: Iran's Nuclear and Ballistic Missile Potential

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Key Points

- The development of the Iranian nuclear bomb would cause severe regional instability in the Middle East, as it will greatly limit the responses of states against Iran's actions without major escalation. Also, other regional actors may pursue the bomb, thus causing a nuclear arms race.
- The real motivations behind Tehran's nuclear programme may not necessarily be centred on acquiring the bomb, but rather on retaining the option and leveraging the possibility for political concessions internationally.
- The potential of Iran to develop missiles with an effective range beyond the 2000km limit remains prohibitory from a technological and motivational standpoint.

Introduction

Iran's commitment to acquiring a nuclear weapon has been a major concern for the Western community, which prompted the enactment of crippling economic sanctions against the Islamic regime and the negotiation of the Joint Comprehensive Plan of Action (JCPOA); an agreement where the sanctions would be lifted in exchange for curbs on its nuclear programme.[1] Yet while the deal's fate remains uncertain after the US unilaterally left it,[2] the issue of Iran's expansive and developing missile arsenal remains persistent. Iran's missile arsenal remains a complementing concern to the nuclear weapons controversy, since it can already carry nuclear warheads in missile models such as the Shahab-3,[3] despite being subjected to a self-imposed limit of 2000km.[4] However, the establishment of a national space agency and the experimentation with Satellite Launch Vehicles (SLVs) sparked a debate about Tehran's ambition to develop ICBMs. If the development of Iranian nuclear weapons and ICBMs occurs, then this can result not only in severe destabilisation of the Middle Eastern power dynamics

1 Council of the European Union, "Joint Comprehensive Plan of Action and restrictive measures", European Union Council, 20 July 2015, Available at: https://www.consilium.europa.eu/en/policies/sanctions/iran/jcpoa-restrictive-measures/
2 BBC, "Iran nuclear deal: Trump pulls US out in break with Europe allies", BBC, 9 May 2018, Available at: https://www.bbc.co.uk/news/world-us-canada-44045957
3 Center for Strategic and International Studies, "Shahab 3", CSIS, 16 September 2021, Available at: https://missilethreat.csis.org/missile/shahab-3/
4 Gambrell J., "Iran says supreme leader limiting ballistic missile range", AP News, 31 October 2017, Available at: https://apnews.com/article/ali-khamenei-ap-top-news-north-korea-international-news-iran-a9b9ff80f4424ce5be3a4a81e04dc8dc

and regional politics, but also limit the means through which states can react to Tehran's actions. Yet, the former is more possible than the latter.

Between Bombs and Blackmail: Iran's Nuclear Programme

The JCPOA, meant to greatly slow Tehran's development of a nuclear weapon, involve the removal of crippling economic sanctions. In return, Iran would follow with various concessions on its nuclear program designed to curb the speed with which the country would acquire the nuclear weapon.[5] The United States, under President Trump, pulled out of the deal in 2018, which angered Tehran to the extent where it began to breach the deal by greatly upping the tempo on one key element the deal tried to subvert: uranium enrichment. **To create a nuclear weapon, a state must own "weapons-grade" uranium that is purified at 90%. The deal had a specific requirement in its terms where Iran would not be allowed to exceed the maximum uranium purity of 3.67%.**[6] In December 2020, it vowed to reach near 20% enrichment.[7] In April 2021, it vowed to proceed with 60% enrichment as a response to a power cut and explosion at the Natanz nuclear site.[8] The disruptive events were perceived by Iran as an act of sabotage from Israel, but more importantly, Tehran stated it was a move to showcase technical prowess and that it is reversible.[9]

The 60% point is not pure enough for weapons-grade material, thus the decision to enrich at this point, which was done with the backdrop of JCPOA negotiations in Vienna, had political motivations more than military ones; **it suggests an attempt to demonstrate that Iran is willing to escalate its nuclear programme in response to aggression, despite having declared to the IAEA that the 19.5% enrichment was still the priority.**[10] The 60% point

5 Arms Control Association, "The Joint Comprehensive Plan of Action (JCPOA) at a Glance", Arms Control Association, July 2021, Available at: https://www.armscontrol.org/factsheets/JCPOA-at-a-glance
6 BBC, "Iran nuclear deal: Why do the limits on uranium enrichment matter?", BBC, 30 April 2021, Available at: https://www.bbc.co.uk/news/world-middle-east-48776695
7 BBC, "Iran resumes enriching uranium to 20% purity at Fordo facility", 4 January 2021, Available at: https://www.bbc.co.uk/news/world-middle-east-55530366
8 Reuters, "Iran Says 60% Uranium Enrichment To Show Nuclear Prowess, Is Reversible", NTV, 20 April 2021, Available at: https://www.ndtv.com/world-news/iran-says-60-uranium-enrichment-to-show-nuclear-prowess-is-reversible-2417895
9 BBC, "Iran says key Natanz nuclear facility hit by 'sabotage'", BBC, 12 April 2021, Available at: https://www.bbc.co.uk/news/world-middle-east-56708778
10 Kelley E. R., "Why is Iran producing 60 per cent-enriched uranium?", Stockholm International Peace Research Institute, 29 April 2021, Available at: https://www.sipri.org/commentary/essay/2021/why-iran-producing-60-cent-enriched-uranium

can pave the way to faster enrichment to 90%, so it acts as a good warning for aggressors.[11] On the other hand, the IAEA also confirmed that the Islamic regime cut down the number of centrifuges it needs to make 60% uranium.[12]

This behaviour indicates that Iran is swaggering their nuclear prowess to force concessions out of other nuclear actors interested in preventing nuclear proliferation.[13] The JCPOA is a good example of how Tehran's temporarily trades its nuclear weapons potential for sanction relief, especially due to the fact that they remain a primary obstacle to the country's development. It may choose to use the programme as a way to lessen the sanctions bestowed on it and use the emancipated economy to bolster its military power in other areas, such as further ballistic missile development or the desperately-needed modernisation of its air force. The lifting of sanctions through this type of blackmail will also help Iran bolster its economy and offer more leeway in answering to the needs of a disgruntled population who is protesting for better conditions.[14] As a result, the notion of Iran acquiring a nuclear weapon is still a reality, but Iran may also consider hedging the option unless there are urgent threats. Furthermore, nuclear weapons demand high costs, with other examples such as Israel or Pakistan spending approximately $1 billion in 2019 to maintain them.[15] Whether or not Iran would be willing to spend such an amount of money or more, in light of the present or future sanctions which affect Tehran's military budget,[16] remains an important topic to consider.

However, this is not to say that Iran is not seeking the bomb. According to some nuclear archives extracted by Israel's intelligence agency, if accurate, Tehran's nuclear programme is more advanced than it was previously believed and in a far more developed position to kickstart

11 Times of Israel, "Ex-IAEA official: In theory, Iran could reach weapons-grade enrichment in a week", Times of Israel, 16 April 2021, Available at: https://www.timesofisrael.com/ex-iaea-official-in-theory-iran-could-reach-weapons-grade-enrichment-in-a-week/
12 Reuters, Murphy F, "Iran cuts number of centrifuges enriching uranium to 60% purity, IAEA report says", Reuters, 22 April 2021, Available at: https://www.reuters.com/world/middle-east/iran-cuts-number-centrifuges-enriching-uranium-60-purity-iaea-report-says-2021-04-22/
13 Fukushima M., "No-Go Negotiations: Iran May Not Be in a Rush to Get Nuclear Weapons", The National Interest, 27 June 2021, Available at: https://nationalinterest.org/feature/no-go-negotiations-iran-may-not-be-rush-get-nuclear-weapons-188540
14 Kenyon P., "Protests In Iran Over Power Cuts And Water Shortages Have Been Met With Violence", NPR, 24 August 2021, Available at: https://www.npr.org/2021/08/24/1030723329/protests-in-iran-over-power-cuts-and-water-shortages-have-been-met-with-violence
15 International Campaign Against Nuclear Weapons, "Enough is Enough: Global Nuclear Weapons Spending 2019", ICAN, May 2020, Available at: https://www.icanw.org/report_73_billion_nuclear_weapons_spending_2020
16 Farzanegan R. M., (2021), "The Effects of International Sanctions on Iran's military spending: A Synthetic Control Analysis", Defence and Peace Economics, Available at: https://doi.org/10.1080/10242694.2021.1941548

the process of procuring the bomb. They have received access to substantial foreign resources (not necessarily governments), including a significant amount of foreign experts and even numerous nuclear weapon designs (out of which they have selected a hypothetical one).[17] **They have also involved high-level officials in it, and a 2003 order to cease work on the project was only partially effective, with feasibility studies and other research being split between their civilian and secretive operations based on their degree of public justification, while also maintaining highly organised recordings of past research into nuclear weapons potentially for future reference.**[18] If Iran was willing to use the nuclear programme exclusively for political leverage, the extent of which the regime has gone to virtually "freeze" the progress of towards gaining the bomb would suggest that there is a persisting interest in having the option open.

In the eventuality that Iran does get it, this will destabilise the Middle East and severely aggravate its rivalry with Israel. However, Iran may not be poised to use nuclear weapons against Israel despite the tensions between the two countries due to Israel's superior military and nuclear capability and also due to the Iranian opposition against Israel not having self-destructive features.[19] Furthermore, the two countries with nuclear weapons threatening each other is not a new concept; where vague and boisterous threats being thrown against one another without large scale military action not occurring out of fear of nuclear annihilation.[20] However, escalations in tensions will result in further regional instability and unnerve other Middle Eastern states into taking matters into their own hands. Iran does not need to threaten the use of the bomb at all to push other states to seek one. Saudi Arabia declared in June 2018 that it will seek a nuclear arsenal if Iran gets one.[21] This can potentially lock the region into a nuclear arms race as actors would seek deterrence against nuclear strikes as a means to ensure their security. This escalation in Middle Eastern tensions, already riddled with proxy conflicts and terrorist organisations, can lead to a political and military impasse, where no preventative military action occurs, no actor is able to gain the upper hand on each other or at worst, can

17 Arnold A. et al., (2021) "The Iran nuclear archive: impressions and implications", Intelligence and National Security, 36:2, p230-242, Available at: https://doi.org/10.1080/02684527.2021.1857086
18 Arnold, The Iran Nuclear Archive, Taylor and Francis Online.
19 Nader A., "Iran After the Bomb: How Would a Nuclear-Armed Tehran Behave?", RAND, 2013, Available at: https://www.rand.org/pubs/research_reports/RR310.html
20 Bracken P., "Blackmail Under A Nuclear Umbrella", War on the Rocks, 7 February 2017, Available at: https://warontherocks.com/2017/02/blackmail-under-a-nuclear-umbrella/
21 Reif K., "Saudi Arabia Threatens to Seek Nuclear Weapons", Arms Control Association, June 2018, Available at: https://www.armscontrol.org/act/2018-06/news/saudi-arabia-threatens-seek-nuclear-weapons

raise the prospects of nuclear terrorism if the states act in an irrational manner or wage nuclear weapons due to misunderstandings, misfires or accidents.

Beyond Regional: The Treacherous Road to ICBMs

As it currently stands, Iran's missile arsenal, which has both defensive and offensive capabilities, has a range which covers all the Middle East and parts of Southeast Europe.[22] However, while efforts to improve the arsenal are underway, Iran has also been researching rockets that exceed the range limit under a space program that Tehran declared was for peaceful purposes.[23]

The Iranian Space Agency (ISA) was founded in 2003, and received substantial support from Russia (which provided it with various benefits, including satellite parts and launch sites) before Iran would eventually develop its domestic capabilities in 2009.[24] Three key missiles are used when conducting space experiments: the Safir-class missile (which had 4 successes out of 9 tests[25]), the Simorgh-class missile (a heavier missile which had only 1 success out of five[26]) and the newest Zuljanar-class missile (1 success).[27]

However, the ISA's peaceful mission does not appear to cover the Iranian Revolutionary Guard Corps' (IRGC) own space projects, such as the Noor-1 launch (a military reconnaissance satellite) from one of its bases.[28] **The launch, which was at the 41st anniversary of the IRGC, differs from the launches made by the ISA due to the fact that this is the first military launch of a satellite in space for Iran, more so when one considers it has used the "Qased" missile: a new three-stage rocket that combines the use of both solid and liquid**

22 Elleman M., "Iran's Ballistic Missile Program", The Iran Primer, 13 January 2021, Available at: https://iranprimer.usip.org/resource/irans-ballistic-missile-program
23 Aljazeera, "'Peaceful use of space': Iran to launch observation satellite", Aljazeera, 3 February 2020, Available at: https://www.aljazeera.com/news/2020/2/3/peaceful-use-of-space-iran-to-launch-observation-satellite
24 Hanna A., "Iran's Ambitious Space Program", The Iran Primer, 23 June 2021, Available at: https://iranprimer.usip.org/blog/2020/jun/23/iran%E2%80%99s-ambitious-space-program
25 Centre for Strategic and International Studies, "Safir", CSIS, 2 August 2021, Available at: https://missilethreat.csis.org/missile/safir/
26 Gambrell J., Vahdat A., "Iran again fails to put satellite into orbit amid US worries", AP News, 9 February 2021, Available at: https://apnews.com/article/iran-tehran-ap-top-news-middle-east-7c8247674c294c23d408b034e9d4ee5a
27 Motamedi M., "Iran completes satellite-carrying rocket launch", Aljazeera, 1 February 2021, Available at: https://www.aljazeera.com/news/2021/2/1/iran-completes-satellite-launch-test-with-new-rocket
28 Associated Press, "Iran's IRGC says it launched satellite amid US tensions", Alarabiya News, 20 May 2020, Available at: https://english.alarabiya.net/News/middle-east/2020/04/22/Iran-s-IRGC-says-it-launched-satellite-amid-US-tensions

fuel. [29] Furthermore, the message of the launch was targeted towards the US since the launch had a photo of Qassem Souleimani, the Iranian general assassinated via a drone strike, and the IRGC's public statement relayed that "the world's powerful armies do not have a comprehensive defence plan without being in space".[30] Those two factors imply that Iran's objectives in space go beyond peaceful means. The Noor-1 satellite will provide Iran with a new way to gather intelligence that would be difficult to counteract compared to other means due to fewer geographical obstacles. The intelligence gathered by the satellite can serve Iran's military decision-making both for itself and for its proxies, such as satellite images of possible targets being used as a reference point for how many missiles should a proxy receive or to garner a much clearer understanding of strategic targets.

It is debated that SLVs may be a path to obtaining ICBMs. Then-US Secretary of State Mike Pompeo accused Iran's launch of the Qased missile as being militarily motivated and that SLVs and ICBMs use "basically the same technology".[31] An earlier, 2019 Defence Intelligence Report echoes this assumption as well, saying that the technology between the two is interchangeable and that the development of larger SLVs with boosters is a matter of concern.[32]

However, the shared technological and design features between SLVs and ICBMs are limited. Michael Elleman argues that while the devices share similar features such as relying on the rocket engines, inertial guidance, and lightweight frames, equally they share fundamental differences especially as far as their re-entry requirements are (ICBM payloads need to be able to re-enter orbit, whereas SLVs do not have such a requirement).[33] Moreover, Iran's current missile arsenal is based on outdated Scud technology that Tehran gained during the Iran-Iraq War of the 1980s and has since focused itself on modernising the arsenal.[34] The extensive cooperation between Iran and North Korea may showcase some insights on the ability of Iran

29 Todd D., "Iran launches new Qased rocket type with Noor military sat aboard", Seradata, 22 April 2020, Available at: https://www.seradata.com/iran-launches-new-qased-rocket-type-with-noor-military-sat-aboard/
30 Dareini A. A., "Into Orbit: Iran's Nour 1 Satellite and the Two-Wing Doctrine", Aljazeera Centre for Studies, 7 May 2020, Available at: https://studies.aljazeera.net/en/reports/orbit-iran%E2%80%99s-nour-1-satellite-and-two-wing-doctrine#a3
31 Pompeo M., "Iran plans to fire off Space Launch Vehicles with virtually same technology as ICBMs.", Twitter, 3 January 2019, Available at: https://twitter.com/SecPompeo/status/1080823105306718209
32 Defence Intelligence Agency Public Affairs, "Defense Intelligence Agency Releases Report on Challenges to U.S. Security in Space", Defence Intelligence Agency, 11 February 2019, Avaialble at: https://www.dia.mil/news/articles/article-view/article/1754150/defense-intelligence-agency-releases-report-on-challenges-to-us-security-in-spa/
33 Elleman M., "Why Iran's satellite launch does not amount to an ICBM test", International Institute for Security Studies, 17 January 2019, Available at: https://www.iiss.org/blogs/analysis/2019/01/iran-satellite-launch
34 Elleman, Iran's Ballistic Missile Program, Iran Primer

to develop ICBMs from its current roster. This cooperation extends to the development of an 80-ton missile engine that would have a use in an ICBM.[35] However, the North Koreans would fail repeatedly to improve and increase the range of their missile arsenal, eventually leading to the development of the Hwasong-12/14/15 systems.[36] Iran's Khorramshahr-class missile is based on the Hwasong-10 missile; yet Khorramshahr was not successfully tested yet.[37] The Khorramshahr is a model that shares many similarities with other failed North Korean models that attempted to gain an ICBM status. This marks the model as unreliable, especially with a lack of testing and upgraded design features that can be closely associated with an ICBM rather than an SLV. Iran would also arguably be more interested in modernising its current roster, as it is militarily more urgent to its strategy to ensure it is improved, as it is also based on old technology. Therefore, Iran's ICBM's future is less likely to be based on current possible SLV designs.

Conclusion

Iran's nuclear and ballistic missile future remain a subject of debate involving many experts. The imminent possibility of an Iran that owns nuclear weapons is a more urgent and destabilising threat than the risk of the country developing ICBMs in the near future. A nuclear-wielding Iran would not only result in an impasse between Tehran and its adversaries in terms of military skirmishes or clashes (especially with Israel), but also cause more instability in the Middle East by providing an incentive for other competing regional states, like Saudi Arabia, to gain the bomb as a means to have an equal deterrence. On the other hand, Iran would be hard pressed to ensure that its missile arsenal is modernised before it can pursue rockets beyond the 2000km limit, not least due to the fact that the military and political threats in the region should take priority based on its doctrine, but also since the development of new missiles at longer ranges would be unreliable if based on current designs. Nevertheless, one cannot remain ignorant of Tehran's attempts to experiment with SLVs, especially due to the other military

35 Gertz B., "Iran, North Korea Secretly Developing New Long-Range Rocket Booster for ICBMs", The Washington Free Beacon, 26 November 2021, Available at: https://freebeacon.com/national-security/iran-north-korea-secretly-developing-new-long-range-rocket-booster-for-icbms/
36 Elleman M., Fitzpatrick M., "No, Iran Does Not Have An Icbm Program", War on the Rocks, 5 March 2018, Available at; https://warontherocks.com/2018/03/no-iran-not-icbm-program/
37 Schmerler D., "Iran's Launch: ICBM or Space Program Development?", Foreign Policy Research Institute, 22 January 2019, Available at: https://www.fpri.org/article/2019/01/irans-space-launch-icbm-or-space-program-development/

benefits it can receive (such as from surveillance satellites) and the experience it gains from undertaking such tests leaving to a potential pathway to missiles that would have features that can be described as ICBM-worthy.

Recommendations for the EU

1. The revival of the JCPOA is the quickest way to ensure that Iran would be prevented from pursuing the nuclear bomb. In this light, the signatories should continue the pursuit of renewing the Iran Deal with terms that would extend the time required by Tehran to develop a nuclear bomb in exchange for legally binding agreements and sanction relief. This should be done with consideration towards the new Raisi administration, and apply diplomatic pressure to ensure they return to the negotiation as quickly as possible.

2. In the event of Iran showing signs of developing the nuclear bomb, the EU should apply a stricter sanctions regime against Iran in a similar fashion to that of North Korea, in order to dissuade them from continuing the pursuit, with the sanctions in question designed to affect the economy (especially the military spending) by targeting relevant organisations supporting the pursuit; given the fact that nuclear weapons are high-maintenance.

3. Similarly, the signs of development of new ICBMs or MRBMs models should be perceived less as an attempt to bolster the security of Iran (of whose regional security is covered by the missile arsenal) and more as an attempt to broaden its strategic options in a similar manner with how Iran could use its nuclear programme to blackmail the international community. EU diplomatic efforts and sanctions, as well as UN Security Council resolutions, should be considered in order to curb the threat of such missiles coming to fruition.

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