

# JCPOA Sunset Alert: Missile Restrictions

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## INTRODUCTION

The Joint Comprehensive Plan of Action (JCPOA) does not restrict Iran’s missile program. But the U.N. Security Council Resolution (UNSCR) 2231, which endorsed the JCPOA, does impose limitations. These restrictions expire on [October 18, 2023](#).

After expiration, Iran will no longer be “called upon” to [abstain](#) from undertaking activities related to nuclear-capable ballistic missiles, including testing. Furthermore, the U.N. Security Council will no longer be [obligated](#) to approve Iran’s import and export of items that could contribute to the development of a nuclear weapon delivery system.



## BACKGROUND: IRAN'S BALLISTIC MISSILE PROGRAM

In February 2022, the U.S. intelligence community's [annual threat assessment](#) highlighted that Iran possesses the largest and potentially most diverse ballistic missile arsenal in the Middle East. Iran has built and tested a wide range of liquid- and solid-propellant short- and medium-range ballistic missiles. In the absence of a modern air force, Iran relies on its ballistic missile arsenal to maintain a credible long-range strike capability. Moreover, Iran proliferates ballistic missiles and related technologies to its regional proxy network. Iran's production and proliferation of ballistic missiles pose an immediate threat to regional security and U.S. regional interests, particularly given Iran's willingness to deploy these weapons against [U.S. military personnel](#) and U.S. partners and allies in the region.

Iran currently prioritizes the size of its arsenal, scope of missile salvos, and destructiveness of its warheads to compensate for its less advanced guidance mechanisms and radars. Iran's investments in flight control, terminal guidance, and satellite navigation systems for its ballistic missiles would greatly increase its targeting capabilities. For example, Iran's capability to strike high-value targets in Israel [from secure positions](#) deep in Iran will improve if it develops medium-range ballistic missiles (MRBM) equipped with such guidance and navigation systems.



## IRAN'S VIOLATIONS OF UNSCR 2231

Iran's testing and development of ballistic missiles and space launch vehicles (SLVs); its foreign procurement of banned technologies for its ballistic missile and SLV programs; and its proliferation of ballistic missiles and related technologies abroad, including to its regional proxy network, each constitute violations of the spirit and intent of UNSCR 2231.

### Testing and Development

Paragraph 3 of Annex B of UNSCR 2231 "[calls upon](#)" Iran to refrain from *any* activity related to ballistic missiles designed to be capable of delivering nuclear weapons, including launches using such ballistic missile technology. This provision has patently failed to prevent Iran from obtaining nuclear-capable ballistic missiles. [The Missile Technology Control Regime \(MTCR\)](#) is an internationally-recognized standard that identifies nuclear-capable ballistic missiles as those which can deliver a payload over 500 kilograms to a distance greater than 300 kilometers. The Nuclear Threat Initiative estimated that while the JCPOA was in effect, Iran conducted [over twenty launches](#) of ballistic missiles and SLVs that exceeded that threshold. Prior to the U.S. withdrawal from the JCPOA, [eight of Iran's thirteen](#) existing ballistic missile systems were nuclear-capable.

Iran tests ballistic missile multistage separation and propulsion systems in SLVs that far surpass the MTCR threshold. For example, Iran [built](#) the 74-ton thrust solid-fueled engine used in its three-stage *Zoljanah*. This SLV's vertical range and payload capability [translates](#) to a 5,000-kilometer range if launched on a missile trajectory armed with a one-ton warhead.

Weapons researchers at the Middlebury Institute of International Studies [discovered](#) in 2018 that activities at Iran's Shahrud desert facility – where the *Zoljanah* engine was [likely built](#) – indicated ongoing experiments to increase the range of its ballistic missiles. The researchers analyzed radar and satellite imagery of stands and burn marks in the sand from the test-firing of engines. They [found that](#) in 2017 an engine with a potential 93-ton thrust was tested. The absence of liquid fuel storage tanks on the campus indicated that the engine was likely solid-fueled. The researchers also confirmed that the facility was operational as of 2018.

Since 2018, Iran's testing and development activities have continued. On its fourth test launch of the *Khorramshahr* MRBM in 2020, Iran [finally claimed](#) that it had developed a missile capable of delivering a 1,800-kilogram payload to a distance of 2,000 kilometers. In February 2021, France, Germany, and the United Kingdom ("the E3") [wrote a letter](#) to the U.N. secretary-general, charging that Iran's testing of solid-propellant technologies in its *Zoljanah* SLV launch constituted a violation of UNSCR 2231's missile restrictions. Later that year, they [filed](#) similar complaints concerning Iran's *Simorgh* SLV test launch. U.S. and Israel's permanent representatives to the U.N. identified the technologies as Category I systems banned under the MTCR.

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Iran never suffered consequences for these launches, which the E3 called “[inconsistent](#)” with Paragraph 3. UNSCR 2231 suffered from weak implementation, because it failed to explicitly define “nuclear capable” by citing the MTCR. Moreover, the resolution did not delegate enforcement authority to the same entity responsible for determining whether Iran’s missiles were nuclear-capable. The U.N. cannot access Iran’s military sites, which Iran dubiously claims are exclusively intended for conventional weapons. Therefore, the U.N. cannot know whether Iran’s ballistic missile [production, storage, and launch](#) facilities are used for nuclear-capable ballistic missiles. Finally, the watering down of the language used in past U.N. Security Council resolutions – particularly the [previous](#) stipulation that Iran “shall not” be permitted to undertake any activity related to nuclear-capable ballistic missiles to now merely “calls upon” not to do so – confined the JCPOA signatories’ potential recourse to mere complaints about “inconsistency” with the spirit and intent of UNSCR 2231. Likewise, the language under UNSCR 2231’s predecessor resolutions, like UNSCR 1929, stated that “Iran shall not undertake any activity related to ballistic missiles capable of delivering nuclear weapons, including launches using ballistic missile technology” lacked 2231’s insertion of “ballistic missiles *designed* to be capable of delivering nuclear weapons.” The word “designed” has been exploited by Iranian officials to try to exculpate Tehran’s missile activity as the regime likes to claim it has no intention of building nuclear weapons, even though the missile technology they employ is capable of being applied to nuclear weapons.

The absence of a rigorous monitoring and enforcement mechanism based on the MTCR for Iran’s testing, development, and production activities, and the weak language of the resolution, allowed Iran simply to deny that the SLV technologies were designed or intended for a nuclear weapon. Iran added that UNSCR 2231’s missile testing restrictions do not reference the MTCR. These shortcomings have emboldened Iran to continue its development programs. In [February 2022](#), Iran announced that a new 1,450-kilometer range missile was operational. Named *Kheibar Shekan*, the missile is fueled by solid-propellant, so it [can be stored](#) and transported with its fuel, making it less vulnerable than liquid-propellant missiles to enemy detection and destruction during launch preparation. The 1,400-kilometer range liquid-fueled *Rezvan* missile [was unveiled](#) for the first time in a military parade in September 2022. These missiles indicate ongoing solid- and liquid-fueled ballistic missile production in Iran, potentially violating UNSCR 2231.

## Foreign Procurement

A 2019 U.S. Defense Intelligence Agency (DIA) report [states](#) that “decades of international sanctions have hampered Iran’s ability to modernize its military forces through foreign procurement, but Tehran has invested heavily in its domestic infrastructure, equipment, and expertise to develop and produce increasingly capable ballistic missiles and cruise missiles.” In other words, Iran has sought to render its defense industry – especially the state entities which develop Iran’s ballistic missiles – independent from foreign supply-chains. Iran’s partnerships

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with China and North Korea, who were willing to contravene the provision in UNSCR 2231 that requires U.N. Security Council approval for the transfer to Iran of items that could be used in a nuclear weapon delivery system, including those listed in [S/2015/546](#) of Paragraph 4 of Annex B of the resolution, were essential to Iran's development of indigenous production capabilities.

In [October 2015](#), Iranian and Chinese electronics companies established commercial relations for military purposes. Chinese tech firms [sold](#) U.S.-designated Iranian company Shiraz Electronics Industries millions of dollars-worth of satellite positioning, navigation, and timing equipment around July 2017. The Trump administration sought to prevent the flow of sensitive technologies from Beijing, [designating](#) entities and individuals in China for their support of Iran's missile program. In 2019, a senior White House advisor alleged that China [was protecting](#) the Chinese arms dealer Li Fangwei who [had allegedly used](#) U.S. financial institutions to facilitate Iran's purchase of various U.N.-banned metallurgic materials and related components worth \$8.5 million. Beijing never intervened to stop the illegal transactions and later [opposed](#) U.S. sanctions against Li. In March 2022, the U.S. Treasury Department revealed that Iran [procured](#) from Chinese suppliers machines to process nitrile butadiene rubber and an inert gas jet milling system used for making solid propellant.

North Korea is another procurement partner of Iran. The U.S.-designated Korea Mining Development Trading Corporation (KOMID), North Korea's primary exporter of ballistic missile equipment, [has offices](#) in Tehran. A network of manufacturing facilities in Iran set up by North Korea to support missile development [cannot function](#) without North Korean technical assistance and parts. Hundreds of North Korean missile experts were [reportedly](#) stationed in Iran as the JCPOA was inked. At the same time, Iran's cash payments to North Korea for missile cooperation [had reached](#) \$3 billion annually. JCPOA sanctions relief is believed to have resulted in an increase in these payments. A year after the JCPOA was finalized, the U.S. Treasury Department [designated](#) an official from Iran's chief developer of liquid-fueled missiles (i.e., Shahid Hemat Industrial Group or SHIG) who was involved in negotiations with KOMID. In 2020, the Trump administration [designated](#) current and former senior SHIG officials for their role in negotiations with North Korea on long-range missile development. Moreover, Iran has purchased missile blueprints from North Korea based upon which it developed ballistic missiles that were "[virtually identical](#)" to North Korean missiles, according to Israeli aeronautical expert Tal Inbar. That North Korea and Iran possess virtually identical missiles – the *Rodong* and *Emad*, respectively – underscores the mutually beneficial nature of the exchange, as it turned out that the *Emad* represented an improvement on the North Korean design in its forward section. The *Emad*'s forward section contained a set of moveable fins and guidance equipment.

## Proliferation Abroad

Paragraph 4 of Annex B of UNSCR 2231 bans Iran's proliferation of ballistic missiles and related technologies abroad. More specifically, Iran is prohibited from exporting *any* item listed in



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S/2015/546 unless expressly approved by the U.N. Security Council. In 2021, the U.N. [found](#) that Iran and North Korea had [resumed their cooperation](#) on ballistic missiles, though it was unclear if that cooperation had ever ended. The report alleged that Iran sent valves, electronics, and measuring equipment to North Korea for its ballistic missile program as recently as December 2020. Their unapproved transfer clearly violated the resolution's spirit and intent.

In the past, North Korea provided Iran with expertise, technology, and even complete missile systems in exchange for much needed cash. Today, the relationship is increasingly marked by Iran's support for North Korea – particularly in the areas in which the latter has lagged. The relationship is no longer merely transactional. Iran [helped](#) North Korea advance its solid-propellant propulsion systems – an area in which, unlike Iran, it did not heavily invest. North Korea focused, instead, on liquid-fueled engines. But Iran's expertise is not only limited to solid-fuel engines. In 2013, as U.S. officials were negotiating the JCPOA, [reports alleged](#) that Iranian technicians were in North Korea working on the RD-250 liquid-fueled rocket engine [used](#) in the first-stage of North Korea's *Hwasong-15* ICBM. The U.S. Treasury Department [confirmed](#) the allegations in 2016. The International Institute for Strategic Studies conducted an [open-source analysis](#) of Iran's ballistic missile arsenal in April 2021 and did not find definitive evidence that Iran possesses the engine, but suggested that if Iran did acquire the engine, it would be capable of producing an ICBM modeled on North Korea's *Hwasong-15*. Their report also found that Iran's liquid-fueled MRBM, known as the *Khorramshahr*, is derived from North Korea's *Hwasong-10*.

The IRGC's expanding footprint in Syria following the Arab Spring allowed Iran to forward-deploy missile bases and production facilities in Syria to threaten Israel. At the start of the anti-Assad uprising, key missile manufacturing operations [were moved](#) to Masyaf, Syria. The IRGC and Hezbollah are suspected of working with Assad regime forces at the new facility. Additionally, an operational facility in Hama, known as [Institute 4000](#), has allegedly [manufactured](#) missile engines, SCUD missiles, and M600 rockets on behalf of Iran. [Depending on their range and payload capability](#)—if at least 300 kilometers and 500 kilograms, respectively—the M600 infrastructure, a Syrian variant of Iran's *Fateh-110*, may violate the explicit bans on production facilities laid out in Category I of S/2015/546.

Iran's transfers to Hezbollah of banned missile technologies, such as [GPS systems](#), can enhance rockets' accuracy. A more accurate Katyusha rocket – the most prevalent in Hezbollah's arsenal – would be a game-changer. Tehran trains its proxy on how to equip its munitions with precision technology at [secret facilities](#) in Lebanon. Hezbollah [runs](#) a guided missile factory in Lebanon's Bekaa Valley. The IRGC's Quds Force Unit 340 [facilitates](#) technology transfer and the missile development of Iran's proxies. During JCPOA negotiations in late 2014, it was reported that Hezbollah had [received](#) the *Fateh-110* ballistic missile, a balance-altering weapon equipped with sensors that significantly enhanced the terrorist organization's capability to accurately strike targets deep within Israel. The Houthis possess the *Qiam-1* and *Burkan-3* ballistic missiles along with [fuel storage tanks](#) and UAVs from Iran. In 2018, Iran [transferred](#) an unknown number of



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*Fateh-110* and *Zolfaghar* ballistic missiles to its Iraqi proxies and supported their [production capabilities](#). The IRGC assisted Iran-backed Iraqi proxies in operationalizing a facility that Saddam Hussein had used to design warheads and ceramic missile molds. In 2020, the U.S. military [struck](#) missile depots and propellant facilities controlled by Iran-backed proxies around Baghdad. Transfers of the *Fateh-110* may [violate](#) UNSCR 2231, as their range extends to 300 kilometers and can carry a payload of 500 kilograms. Likewise, transfers of the *Zolfaghar* [violate](#) UNSCR 2231, as their range extends to 700 kilometers and can carry a payload of 500 kilograms.

More recently, the U.S. State Department, France, and Britain [contended](#) that Iran's [drone transfers](#) to Russia for use in its invasion of Ukraine violate UNSCR 2231. Although the U.N. arms embargo on Iran expired in [October 2020](#), the [Iranian UAVs](#), including the Shahed-136, Shahed-131, and Mohajer-6, that are being sent to Moscow are embargoed as complete delivery systems listed in the MTCR. For the same reason, Iran's [plan to transfer](#) its *Fateh-110* and *Zolfaghar* surface-to-surface missiles to Moscow requires U.N. Security Council approval.

## THE EXPIRATION OF MISSILE RESTRICTIONS ON IRAN

The expiration of UNSCR 2231's missile restrictions in October 2023 would allow Iran to develop nuclear weapon delivery systems, including ICBMs, that [could reach](#) the U.S. homeland as soon as 2025. Iran never abided by the missile restrictions outlined in UNSCR 2231, but their expiration would further empower Iran to advance its missile program. Iran would gain access to items it cannot easily acquire domestically, such as [gyroscopes](#), sensors, and accelerometers for guidance systems; valves, electronics, and measuring equipment [for ground-testing](#) liquid-propellant ballistic missiles; and heat-resistant parts like nozzle throats and reentry vehicle nose tips. Iran may also seek high-grade oscillators for missile guidance from abroad, as it is unable to [reliably manufacture](#) them. Iran could reverse engineer these technologies and develop indigenous production capabilities, [as it did](#) with Soviet *Scud* missiles and Chinese-origin propellant and guidance technology.

China may limit its supply of military technology to Iran, given the risk of creating instability in the region that could affect the flow of oil. Such transfers would also jeopardize China's relations with the Gulf states. But without a U.N. Security Council approval mechanism for Iran's imports, it is more likely China would deepen its military partnership with Iran under the auspices of the open-ended 25-year agreement between the two countries to counter U.S. regional influence. A leaked proposal [revealed plans](#) for joint research and weapons development.

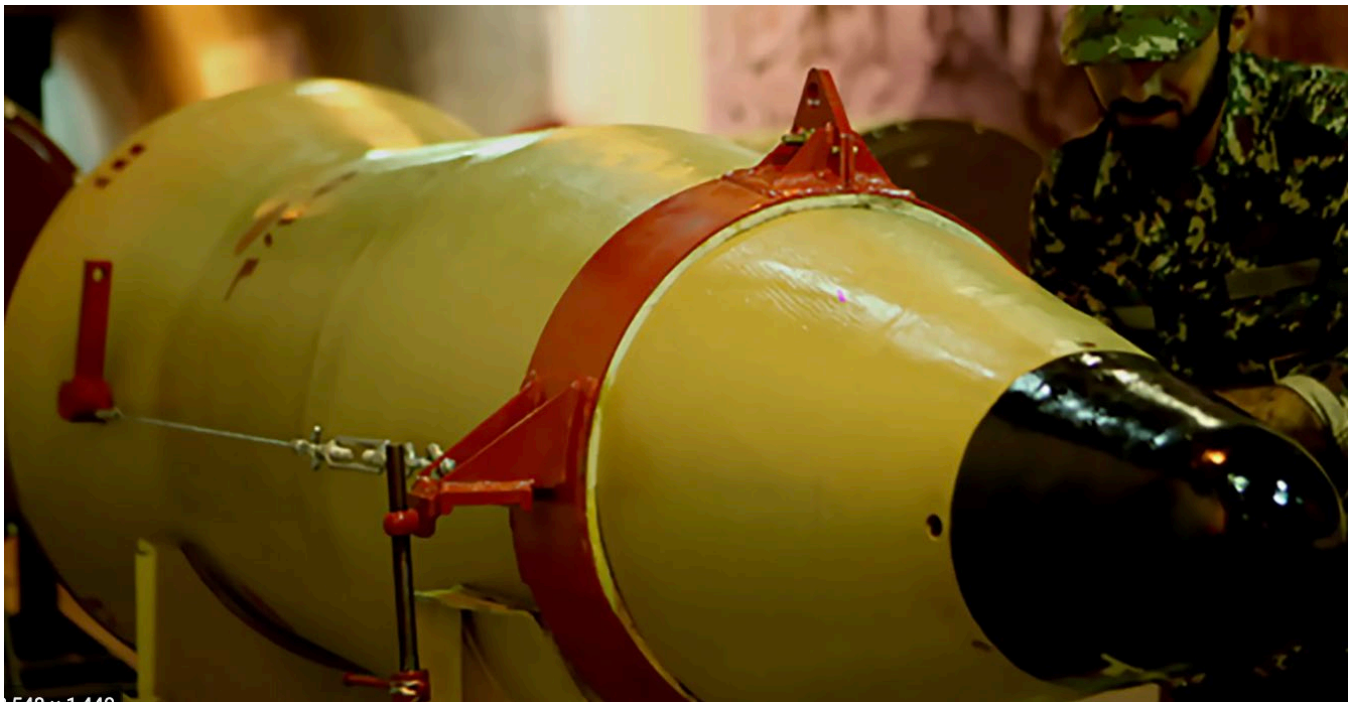
Weak as UNSCR 2231's approval, inspection, and enforcement mechanisms on Iran's missile program were, granting Iran international legitimacy to acquire a nuclear weapon delivery system would make it even easier for the regime to produce, test, procure, and transfer missiles, related technologies, and technical expertise. The international legal basis for countries to counter these activities through sanctions and export controls would disappear. The

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international consensus, embodied in decades of U.N. sanctions that Iran should not be allowed to acquire a nuclear weapon would begin to unravel. Both Russia and China, intent on upending the global security architecture, may have priorities that supplant the risk of a nuclear-armed Iran.

## WHAT IF THE JCPOA IS REVIVED?

The Biden administration [signaled](#) its willingness to revoke sanctions deemed “inconsistent” with the JCPOA – possibly including Trump-era sanctions imposed under Executive Order (E.O.) 13949 on conventional arms transfers – to entice Iran to rejoin the accord. If President Biden rejoins the JCPOA, he would guarantee the legitimacy of Iran’s missile program in one year from now. There is no good reason to predict a follow-on deal with longer and more comprehensive restrictions. In the first place, Iran did not abide by the restrictions when the JCPOA was in effect. Further, Iranian officials have made clear that the country’s missile program is [non-negotiable](#). The so-called reformists did not slow Iran’s missile development during the Rouhani-era. The ascendance of hardliners in every branch of Iran’s government should awaken the Biden administration to the regime’s unreasonable negotiating position stemming from the supreme leader and IRGC influence, which remains unchanged. Ballistic missiles have been and will remain central to Iran’s anti-U.S. and anti-Israel military doctrine.



## POLICY RECOMMENDATIONS

1. The U.S. Treasury Department should employ counterproliferation and counterterrorism authorities to unilaterally expand sanctions against individuals and entities that support or enable Iran's missile program, including banks, researchers, technicians, and state and private businesses. Washington should encourage its European allies to do the same and harmonize designations.
2. The sanctions must reach more entities in which Iran's Ministry of Defense and Armed Force Logistics (MODAFL) and the IRGC have financial interests. These government organs have extensive interests in nearly every major sector of Iran's economy. The missile program they oversee [depends on inputs](#) from across many sectors, including the automotive, construction, electronics, and mining sectors.
3. The U.S. State Department should engage in a diplomatic offensive ahead of the October 2023 expiration date to secure an extension of the missile restrictions. But Russia will likely obstruct these and future efforts to pass U.N. Security Council resolutions limiting Iran's missile program, as it did with China when the U.N. [arms embargo](#) expired in October 2020. The U.S. and its European allies should aim for the reimposition of all pre-JCPOA [U.N. sanctions](#) and restrictions on Iran through the "snapback" mechanism, which can be invoked in response to Iran's violations of the JCPOA over the veto of Russia or China. This is especially critical amid speculation that Russia may transfer fighter jets and other hardware to Iran in exchange for the drones Tehran has supplied for use in Ukraine now that the arms embargo expired in October 2020.
4. The U.S. should unilaterally and in coordination with European allies impose diplomatic and economic costs on China for the transfer of processing, propulsion, and guidance technologies to Iran's missile program.
5. The U.S. can enhance its detection and interdiction capabilities on land transit routes in the Levant and sea lanes used for missile proliferation. Israel already regularly strikes Syria's land transport units and production, storage, and launch sites. Covert action against such installations inside and outside Iran can [sabotage](#) and deteriorate Iran's proliferation networks and missile program.