

# Iran Threat Assessment: Introducing the Iran Threat Geiger Counter

Institute for Science and International Security

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A national security threat is typically a combination of hostile intentions and capabilities. The threat from Iran’s nuclear program is no exception. The new Iran Threat Geiger Counter from the Institute for Science and International Security measures on a regular basis Iran’s hostile intentions toward the United States and U.S. allies, and its capability to turn these hostile intentions into action through the potential deployment and use of a nuclear weapon.

As with the radiation levels measured by a Geiger counter, any level above zero represents a degree of danger. As of October 2022, we assign Iran a total threat score of 130 out of 180, assessed as **High Danger**.



## Iran Threat Geiger Counter: Methodology and Results

The Institute assigns the following threat level using a zero to 180 scale on the Iran Threat Geiger Counter:

0-30:	Least Danger
31-60:	Low Danger
61-90:	Moderate Danger
91-120:	Considerable Danger
121-150:	High Danger
151-180:	Extreme Danger

The Iran Threat Geiger Counter measures the threat level posed by Iran on a scale from zero to 180, divided into six categories that each carry a maximum score of 30:

- Hostile Actions (30 Points Max)
- Hostile Rhetoric (30 Points Max)
- Lack of Transparency (30 Points Max)
- Nuclear Breakout (30 Points Max)
- Sensitive Nuclear Capabilities (30 Points Max)
- Beyond Breakout (30 Points Max)

The scoring system for each category is the following:

0-5:	Least Danger
6-10:	Low Danger
11-15:	Moderate Danger
16-20:	Considerable Danger
21-25:	High Danger
26-30:	Extreme Danger

### Current Threat Environment

The current score of 130 is in High Danger territory and is mainly the result of Iran's hostile actions (22 points) and rhetoric (28 points) against the United States and its allies, combined with the fact that Iran's nuclear breakout time is now at zero for the first time ever (30 points). Further Iranian progress on developing sensitive nuclear capabilities (current score of 17 points) or increasing its nuclear weaponization efforts beyond breakout (current score of 16 points) would move the assessment toward Extreme Danger, as would additional steps to undermine transparency and oversight over its nuclear program (current score of 17 points).

The following sections discuss the allocation of points to each category.

## Hostile Actions

### Score: 22 points

Iran remained engaged in a wide range of hostile activities against the United States and its allies, indicating an extreme level of hostility and warranting a threat assessment score of 22 points (High Danger). Notable recent developments include the following:

#### *Iran Has Plotted Assassinations, Bombings, and Kidnappings on U.S. and Allied Territory*

In August 2022, the U.S. Department of Justice [charged](#) Shahram Poursafi, a member of Iran's Islamic Revolutionary Guards Corps, with plotting to assassinate former U.S. National Security Advisor John Bolton. Former Secretary of State Mike Pompeo was [reportedly](#) a second assassination target. Poursafi remains at large.

The plots against former high-level officials such as Bolton and Pompeo indicate that Iran has become bolder in its attempts to carry out deadly covert operations on U.S. and allied soil, following a long history of similar actions. These operations include a 2021 plot to [kidnap](#) Iranian-American journalist [Masih Alinejad](#) in New York, the 2020 kidnapping of Iranian dissident [Habib Chaab](#) in Turkey, and the 2019 assassination of dissident [Masoud Molavi](#) Vardanjani in Turkey. All three operations were reportedly orchestrated by Iranian intelligence officers. In 2018, Belgian police charged a Vienna-based Iranian diplomat with plotting a bomb attack at a rally held by an Iranian opposition group in France and attended by former high-level Western and Middle Eastern officials. The Iranian diplomat was [convicted](#) and sentenced to 20 years in prison.

#### *Iran Holds U.S. and Allied Nationals Hostage*

Iran continues to hold American and allied nationals hostage in Iranian prisons. Often the individuals are charged under false pretenses and trumped-up claims of [espionage](#) or foreign influence, and other purported crimes. Many of the hostages have been held for years in poor and often inhumane living conditions, without proper legal representation, and in some cases, captives experienced direct abuses at the hands of their captors. Iran uses its hostages as [bargaining chips](#) in prisoner swaps to exchange for, amongst other things, Iranian nationals detained overseas that have been tried and prosecuted by due process in legal courts.

#### *Iran Has Provided Military Hardware and Hundreds of Complete Drones to Russia, in Support of its Invasion of Ukraine—it is reported that Iran will supply precision ballistic missiles.*

Iran has supplied Shahed-136 kamikaze-type drones and Mohajer-6 drones to the Russian military for use in combat operations in Ukraine in violation of U.S. and EU sanctions. The [first shipment](#) of these drones was delivered to Russia in late August 2022 and [overflew Georgia](#). Russia regularly uses these drones in [combat operations](#) in Ukraine and has also frequently used them against civilian targets. The Western powers have recently taken the position that

these drone shipments are a violation of the missile embargo currently existing on Iran under the JCPOA-related UNSC resolution 2231, although Iran has been selling drones to a variety of customers since the end of the arms embargo under UNSC resolution 2231 in 2015 without any protests by the Western powers. Nonetheless, countries should enforce the missile embargo in order to prevent the delivery of further drone shipments from Iran to Russia.

[The Washington Post](#) and [Reuters](#) have reported that Iran has agreed to supply hundreds of short range surface-to-surface missiles to Russia. Such actions would further cement Iran's hostile intentions, increasing the threat assessment score. It should be noted that the UN embargo on Iran exporting ballistic missiles will not expire until October 2023 under UNSC resolution 2231. Iran's missiles could be of great value to a faltering Russia and highly destructive to Ukraine. Iran has the distinction of having the largest conventionally armed ballistic missile force in the world; others with comparable missile forces have put nuclear weapons on them. It possesses thousands of ballistic missiles of various ranges up to 2000 kilometers, with many precision-guided. About 90 percent of current missile production is precision-guided missiles. During the last two decades, Iran prioritized achieving a high degree of precision and accuracy in its missiles, a goal it has demonstrated visibly in recent years.

#### *Iran Has Engaged in Attacks Against Regional U.S. Maritime Assets and Violations of International Treaties and Standards in Regards to Freedom of Navigation of the Seas*

Iran continues to engage in hostile and intimidation tactics in the Persian Gulf and Strait of Hormuz, interdicting and threatening foreign-flagged vessels, including the U.S. Navy and other regional actors navigating international waters. Iran has repeatedly seized and interdicted foreign-flagged oil tankers in the Persian Gulf in the Persian Gulf and Strait of Hormuz. Iranian Naval vessels have engaged in dangerous and provocative maneuvers near U.S. Navy warships and maritime assets in the region, most recently [seizing](#) two U.S. Navy drone vessels in September 2022.

#### *Iran Has Targeted and Attacked U.S. Regional Partners' Critical Infrastructure and U.S. Military Assets in the Middle East and North Africa (MENA)*

Iran has carried out direct attacks against adversarial assets in the MENA region using ballistic missiles and drones. In 2019, Iran carried out an attack against critical oil refining and processing facilities in Saudi Arabia using a swarm of kamikaze-type drones, crippling Saudi oil production capacity.

Following the U.S. drone strike on Qasem Soleimani in January 2020, Iran launched a ballistic missile strike against U.S. forces stationed in Iraq, [injuring dozens](#) of U.S. combat personnel and damaging a military base. Since then, Iran and its proxies have carried out additional attacks in Iraq and Syria.

### *Iran Continues Its Support for Various Proxy Groups in the MENA region*

Iran continues to provide financial and military aid to proxy groups, including militias, U.S. designated terrorist organizations, and pariah regimes throughout the MENA region. Iran continues to violate national and international sanctions and exports conventional weapons to terrorist organizations and proxy forces, including Hezbollah, which maintains an estimated arsenal of more than 100,000 rockets threatening Israel.

### *Iran Has Engaged in Cyberattacks*

On September 9, 2022, the United States imposed sanctions against Iran's Ministry of Intelligence for its connection to a cyberattack on the Albanian government in July 2022. This cyberattack follows a [long list](#) of similar actions during the past decade, including attacks against [water infrastructure](#) in Israel in 2020 and the [Boston Children's Hospital](#) in 2021. Iran was also deeply involved in using cyber means to try to sow confusion and disrupt the presidential election in the United States in 2020.

### *Iran Continues to Violate National and International Trade Controls and Sanctions*

Iran depends extensively on illicitly procuring goods for its nuclear, missile, conventional arms, and drone programs from abroad. It has a long history of breaking other countries' national trade control laws and violating sanctions. Because of its poor record, Iran ranks in the bottom five countries in the Institute's [Peddling Peril Index for 2021/2022](#), which evaluates strategic trade control systems of 200 countries and entities.

## **Hostile Rhetoric**

### **Point Score: 28 points**

Public statements from Iranian officials indicate an extreme level of hostility (28 points) towards the United States and its allies. Notable recent statements include the following:

Ali Khamenei, Supreme Leader, October 3, 2022: "I openly state that the recent riots and unrest in Iran were schemes by the US; the usurping, fake Zionist regime; their mercenaries; and some treasonous Iranians abroad who helped them."

Hossein Salami, Revolutionary Guards commander-in-chief, August 22, 2022: "The Zionists have no safe haven in occupied Palestine and all parts of the land are within the reach of Palestinians resistance movements' firepower. When Lebanese resistance movement Hezbollah is added to this equation, the conclusion is the deployment of hundreds of thousands of missiles that are pointed at the Zionist regime."

Mohammad Marandi, adviser to the Iranian nuclear negotiations team in Vienna, following the August 12, 2022 assassination attempt against Salman Rushdie: "I won't

be shedding tears for a writer who spouts endless hatred and contempt for Muslims and Islam. A pawn of empire who poses as a Postcolonial novelist.”

Ali Khamenei, Supreme Leader, July 27, 2022: “The Western powers are a mafia. The reality of this power is a mafia. At the top of this mafia stand prominent Zionist merchants, and the politicians obey them. The US is their showcase, and they’re spread out everywhere.”

On April 29, 2022, President Raisi and senior military commanders attended state-organized Quds Day rallies marked by chants of “Death to America! Death to Israel!” and the burning of the Israeli flag. In a speech, Revolutionary Guards commander Hossein Salami said of Israel: “Stop your vicious deeds. You know well that we are people of action and reaction... Our responses are painful. You create the seeds of your own destruction. We will not leave you alone... You know well what will befall you if you take evil action.”

These most recent statements must be seen against the backdrop of more than four decades of extreme anti-American, anti-Israel, and anti-Western rhetoric from Iranian officials. “Death to America! Death to Israel!” are routine utterances at state-sponsored rallies and remain core pillars of the Iranian regime’s ideology, with no sign of change.

## **Lack of Transparency**

### **Score: 17**

Iran continues to deceive the International Atomic Energy Agency (IAEA) and violate its safeguards agreement, warranting a threat assessment score of 17 points (Considerable Danger).

Iran has consistently violated its obligations under its comprehensive safeguards agreement (CSA), a key part of the verification of the Nuclear Non-Proliferation Treaty (NPT). It has refused to cooperate with the IAEA and fully account for its past and present nuclear activities, and obstructed IAEA inspections by razing and sanitizing related nuclear sites. For over three years, [the IAEA](#) has been investigating the presence of anthropogenic (of human origin) uranium particles it detected at three Iranian sites, and was seeking information about nuclear material and activities at a fourth site. The four sites are Turqez Abad, Varamin, Marivan, and Lavisian-Shian. Out of these four sites, three were discussed in Iran’s Nuclear Archive, and all four are related to Iran’s former and possibly ongoing work on nuclear weapons. In March 2022, the IAEA found Iran in breach of its safeguards obligations for failing to declare its use of nuclear material at Lavisian-Shian. In June 2022, the IAEA’s 35-nation Board of Governors overwhelmingly passed a censure resolution against Iran for non-cooperation with the IAEA, with only China and Russia voting against.

Over the summer, there was no progress or cooperation from Iran to resolve the outstanding safeguards issues. The Institute published a [study about a potential fifth site](#) that likely handled unsecured uranium called Golab Dareh, one of four sites involved in testing related to nuclear weapons component development. The IAEA concluded in September 2022, it is “not in a position to provide assurance that Iran’s nuclear program is exclusively peaceful.” This means the IAEA cannot verify Iran’s compliance with its CSA and the NPT and is implying Iran is violating both agreements.

In September 2022, IAEA Director General Grossi [stated](#) that Iran has not engaged with the IAEA since June 2022. Reports subsequently emerged that dialogue between the IAEA and Iran re-started, however, it was merely a repeat of earlier unsuccessful meetings. In parallel, reinforcing Iran’s lack of sincerity to address the safeguards issues, AEOI head [Mohammad Eslami stated](#), “all allegations are strictly based on fabricated and false information,” signaling that Iran maintained no intention to answer the IAEA’s questions truthfully. Unsurprisingly, no progress was reported by Grossi.

Iran has reduced the monitoring of advanced centrifuge production under the Joint Comprehensive Plan of Action. The IAEA has stated that due to gaps in relevant monitoring, it has concerns about its ability to verify Iran’s declared centrifuge numbers even if Iran fully cooperated. This adds to the concern about Iran’s ability to sneak-out to a nuclear weapon, using only a small number of secretly-produced advanced centrifuges.

Combined with Iran’s refusal to resolve outstanding NPT safeguards violations, the IAEA has a significantly reduced ability to monitor Iran’s complex and growing nuclear program, which notably has unresolved nuclear weapons dimensions. The IAEA’s ability to detect diversion of nuclear materials, equipment, and other capabilities to undeclared facilities remains greatly diminished. However, the transparency situation could worsen even further, if, for example, Iran withdrew from the NPT, asked the inspectors to leave critical sites or the country, or fabricated excuses to deny inspectors access temporarily.

## **Nuclear Breakout**

### **Score: 30 points**

In 2022, for the first time ever, Iran’s breakout time has become zero, indicating an extreme threat and a score of 30 (Extreme Danger).

Iran has more than enough 60 percent enriched uranium, or highly enriched uranium (HEU) to directly fashion a nuclear explosive. If Iran wanted to further enrich its 60 percent enriched uranium up to 90 percent weapon-grade uranium (WGU), used in Iran’s known nuclear weapons designs from the Amad Plan, it could do so within a few weeks, utilizing only a few advanced centrifuge cascades.

Due to the growth of Iran's 60 percent and 20 percent enriched uranium stocks, as of September 2022, Iran could produce enough weapon-grade uranium for three nuclear weapons in one month. Within four months, it could produce enough for five nuclear weapons. (Five nuclear weapons were the original goal of Iran's Amad Plan.)

Moreover, over the last few years, Iran has learned important lessons in breaking out to nuclear weapons by experimenting with and practicing shortcuts in multi-step enrichment.

- Iran started from a level below 5 percent enriched uranium and enriched directly to near 60 percent in one cascade, rather than using two steps in between, a slower process entailing the intermediate production of 20 percent enriched uranium.
- It built and tested equipment to feed 20 percent enriched uranium and withdraw HEU, possibly enriched to higher than 60 percent, but the exact level is unknown. Iran remixed the enriched product with the less enriched waste tails after measuring the product's enrichment level.
- Iran prepared advanced centrifuge cascades to switch more easily from the production of five percent enriched uranium to 20 percent enriched uranium.
- It further developed a multi-cascade, set up to produce 20 percent enriched uranium from natural uranium by making 5 percent enriched uranium in advanced centrifuges and then directly feeding this product, still in gaseous hexafluoride form, into IR-1 centrifuge cascades to make near 20 percent enriched uranium. As such, Iran was experimenting with multi-step enrichment needed to produce weapon-grade uranium while seeking to shortcut the process.

## **Sensitive Nuclear Capabilities**

### **Score: 17**

Iran remains engaged in a wide range of escalating sensitive nuclear activities. These activities receive a score of 17, reflecting the strong possibility that Iran's nuclear buildup could continue (Considerable Danger). In fact, Iran has ambitious goals to increase its enrichment program, aiming for tens of thousands of advanced centrifuges, producing a range of enrichment levels, and producing tens of thousands of kilograms of enriched uranium. By 2030, Iran plans to have an enrichment capacity of 125,000 separative work units (SWU) per year. As Iran makes progress toward its goals, these activities will affect the score in this section even if they are allowed by a possible revived JCPOA. Likewise, if Iran's most threatening nuclear activities were reduced, the score would go down.

As of early September 2022, Iran continued to increase the quantity and quality of its enriched uranium stock and bolster its ability to enrich uranium. Uranium enrichment remains the most sensitive nuclear activity in Iran today. Iran may also develop an ability to produce and separate weapon-grade plutonium, although that effort is largely dormant today.

### *Increased Stocks of 20 and 60 Percent Enriched Uranium and Increased Capacity to Make 20 Percent Enriched Uranium*

Over the summer of 2022, Iran increased its capacity to produce 20 percent enriched uranium at the deeply buried Fordow enrichment plant by almost 50 percent, due to advanced IR-6 centrifuges producing near 20 percent enriched uranium.

Iran continued to produce 60 percent enriched uranium. So far, Iran may have briefly experimented with the production of highly enriched uranium above 60 percent (see above), but it has not accumulated any 90 percent enriched uranium. No other country without a nuclear weapons program enriches uranium to 60 percent HEU.

### *Increase in Enrichment Capacity*

As of early September 2022, Iran had a total installed nominal enrichment capacity of about 18,300 SWU per year, where advanced centrifuges account for about 11,900 SWU per year and IR-1 centrifuges account for 6400 SWU per year. The amount of separative work achieved in practice is lower, sometimes far lower, due to inefficiencies in centrifuge construction and operation.<sup>1</sup> Nonetheless, its enrichment output increased due to [ongoing installations](#) of additional advanced centrifuges. Significant increases in enrichment capacity would raise the score of this section.

### *Shortened Timeline to Breakout and Produce Enough Weapon-grade Uranium for Five Nuclear Weapons*

An indicator of sensitive nuclear activities is a change in the amount of weapon-grade uranium Iran can produce in a breakout. As discussed in the previous section, as of early September 2022, Iran can not only rapidly produce weapon-grade uranium for its first nuclear weapon, it can produce enough weapon-grade uranium for five nuclear weapons in four months.

### *Large Deployments of Advanced Centrifuges*

Iran's advanced centrifuges deserve special attention because they pose a grave risk to international security, allowing Iran to produce weapon-grade uranium for a nuclear weapon more quickly either at declared nuclear sites or at clandestine ones. The presence of advanced centrifuges at Fordow enhances Iran's ability to break out using a declared but highly fortified facility.

As of early September 2022, Iran had 2780 advanced centrifuges of various types installed at its three enrichment facilities at Natanz and Fordow, as well as 7110 installed IR-1 centrifuges. Iran has demonstrated its ability to build up its advanced centrifuge numbers rapidly: over half

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<sup>1</sup> The achieved enrichment capacity varies considerably over time. For more information, see the Institute series on surveying Iran's IR-1 and advanced centrifuges at [www.isis-online.org](http://www.isis-online.org).

of the newly installed advanced centrifuges are estimated to have been newly built since 2018; the rest are assumed to be redeployments of advanced centrifuges Iran was allowed to dismantle and store under the JCPOA in 2015. Work continued on a new, large, heavily fortified underground site near the Natanz enrichment plant to assemble advanced centrifuges. This site may also be slated to hold another enrichment plant.

#### *Iran Has Installed a Capability to Produce Highly Enriched Uranium Metal*

Iran has in the last few years developed capabilities at the Esfahan site to produce enriched uranium metal, a necessary step in building nuclear weapons. It has developed a capability to convert enriched uranium hexafluoride, the output of its centrifuge plants, into enriched uranium metal. On a small scale it has converted 20 percent enriched uranium hexafluoride into metal. This accomplishment means that it could do the same with weapon-grade uranium hexafluoride.

#### *Iran Remains a Serial Violator of National Export Controls and Sanctions*

Iran continued to violate international and national sanctions and strategic trade control laws as it seeks to outfit its nuclear and missile programs. These activities are crucial for Iran, since it does not produce many of the subcomponents and raw materials needed by its nuclear, arms (including drones), and missile programs. Intelligence reports published by Swedish and German authorities in the summer of 2022 highlighted an increase in WMD-related procurement attempts stemming from Iran.

## **Beyond Breakout**

### **Score: 16**

Iran has so far not turned its highly enriched uranium into nuclear weapons. However, it had a large-scale nuclear weapons program in the past, parts of which continue up to today, leading to a score in this category of 16 out of 30 (Considerable Danger). This score acknowledges that further steps in nuclear weaponization are possible, including building nuclear weapons or using them.

#### *Iran Has Maintained an Organizational Structure to Preserve and Possibly Hone Nuclear Weaponization Assets and Skills*

[Iran's nuclear weapons program](#) started slowly, building to a crash nuclear weapons program in the early 2000s, called the Amad Plan, to create five nuclear weapons in an industrial complex capable of producing many more. Under international pressure and fearing a military attack, the program was driven to downsize and deeper secrecy. Iran's decision to halt the Amad Plan merely served as a tactical retreat, not an abandonment of its nuclear weapons ambitions or activities, a step taken earlier by other countries, notably Taiwan and South Africa.

After the closure of the Amad Plan, other organizations continued work on nuclear weapons. The evidence suggests that Iran not only maintained the capability to produce nuclear weapons, but actively worked on efforts to advance that capability in case Iran's leaders made a decision to build them. There is no evidence that such work has halted.

The nuclear weaponization skills continue to be largely harbored in a military organization known by its acronym SPND involved in many military development projects. Core Amad Plan groups remain in SPND, employing many former Amad Plan personnel, preserving and likely improving key nuclear weaponization skills and capabilities. SPND has also launched its own project to develop and build a nuclear propulsion reactor.

The post-Amad reorientation strategy shines a light on controversial Atomic Energy of Iran (AEOI) nuclear activities that followed after 2004, particularly the Fordow enrichment plant, which was originally the Amad Plan's intended facility to produce weapon-grade uranium. After the halt of the Amad Plan, the secret Fordow project was transferred to the AEOI, which was judged as providing a more credible civil cover for ostensibly military activities. This turned out to be true, as witnessed after Western powers revealed the secret project in 2009 and its repurposing to low enriched uranium production. Similarly, recent AEOI uranium metal production activities may include follow-on activities of the Amad Plan, posing as civil activities.

#### *Iran Would Only Need a Short Time to Build a Nuclear Weapon Today*

Today, Iran is closer to being able to build nuclear weapons than it was in 2003 at the end of the Amad Plan, because of the vast uranium enrichment capabilities acquired since then. It does not appear to be building a nuclear weapon today. But it does appear to have a program to be prepared to make nuclear weapons and to do so in short order. Rather than a crash nuclear weapons program, Iran continues to threaten the world with a program ready to produce nuclear weapons "on-demand."

It would not take Iran long to build nuclear weapons today, if it decided to do so. Iran had accumulated enough information and experience by the end of the Amad Plan to be able to design and produce a workable implosion nuclear device. The nuclear weapon design has a diameter roughly the same as a car tire, meaning that it is small enough to fit on a ballistic missile.

Based on all the available information, the Institute has assessed Iran as being able to prepare a nuclear explosive device for underground testing in six months. This device could also be delivered in a crude delivery system, such as a ship or bomber. A missile-delivered warhead would take longer to produce, with estimates ranging from one to two years. Iran could also decide to produce a large arsenal. If it secretly restarted the Amad Plan where it left off, it would likely be able to churn out missile-deliverable nuclear weapons after about two years.

### *The Future is Uncertain*

It remains unclear how Iran's nuclear weaponization program will evolve in the future, whether or not there is a revived nuclear deal. Iran remains on the brink of becoming a nuclear weapons power; its nuclear material production capabilities stronger than ever, its weaponization capabilities lurking under the surface. Iran could part from its nuclear weaponization capabilities, surgically removing any remnants and establishing international confidence that its nuclear program is truly peaceful. But only Iran can make that decision. As such, the score in this section can move in either direction.