By Seth G. Jones, Jared Thompson, Danielle Ngo, Brian McSorley, and Joseph S. Bermudez Jr.

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THE ISSUE

The number of Houthi attacks against predominantly civilian targets in Saudi Arabia doubled over the first nine months of 2021 compared to the same period in 2020, according to new CSIS analysis. Iran's Islamic Revolutionary Guard Corps-Quds Force and Lebanese Hezbollah have played a critical role in providing weapons, technology, training, and other assistance to the Yemen-based Houthis. In response, the United States should provide Saudi Arabia additional aid to defend the country against stand-off attacks.

ran and Ansar Allah (Partisans of God), better known as the Houthi movement, have conducted a campaign of high-profile attacks against civilian Saudi Arabian and coalition targets in the Gulf, beginning after the Saudi-led intervention in Yemen in 2015.1 On December 6, 2021, for example, Saudi air defenses intercepted a ballistic missile above Riyadh, causing shrapnel to fall in several residential districts. In November 2021, Houthi militants fired over a dozen unmanned aerial vehicles (UAVs) with explosives at several Saudi cities, including oil refineries in Jeddah. Saudi Arabia responded by targeting Houthi weapons depots, air defense systems, and UAV infrastructure in Yemen.² In September 2021, a Houthi missile struck Saudi Arabia's Eastern Province, injuring two children and damaging several homes.³ In March 2021, Houthi militants launched multiple UAVs and missiles at the southern city of Jazan, striking a facility of Saudi Arabia's state-owned oil company, Saudi Aramco (see Figures 1a, 1b, and 1c). Saudi Arabia's military has also intercepted thousands of Houthi ballistic and cruise missiles, UAVs, and other stand-off weapons.4

While these incidents are concerning, there has been little data analysis about trends over time. To better understand the Houthi campaign, this CSIS Brief asks several questions. What are the primary military capabilities of Houthis and their security partners, especially Iran, to conduct attacks against Saudi Arabia and other targets, and how have these capabilities evolved? Has there been a change in the number or sophistication of Houthi attacks against Saudi Arabia and other targets? What are the main policy implications, including the use of specific countermeasures to defend against stand-off attacks? To answer these questions, CSIS analyzed 4,103 Houthi attacks against Saudi Arabia, within Yemen and against other targets, such as maritime targets, in the Gulf between January 1, 2016, and October 20, 2021.

Based on the data, this analysis has several primary findings. First, the Houthis are orchestrating an increasingly intense irregular warfare campaign against Saudi Arabia and other countries in the Gulf using sophisticated cruise and ballistic missiles, UAVs, and

other stand-off weapons. These actions are occurring in the context of escalating violence in Yemen between the Houthis and Saudi Arabia. The number of Houthi attacks per month doubled against Saudi Arabia and other targets over the first nine months of 2021 compared to the same period in 2020.5 Second, Iran's Islamic Revolutionary Guard Corps-Quds Force has provided the Houthis with training and a growing arsenal of sophisticated weapons and technology for anti-tank guided missiles, sea mines, explosive-laden UAVs, ballistic and cruise missiles, unmanned maritime vehicles (UMVs), and other weapons and systems. The Quds Force and Lebanese Hezbollah have improved Houthi capabilities at a relatively low cost, especially compared to Saudi expenditures on air defense to protect its territory.6 Third, the United States and its

partners should conduct a more aggressive campaign to publicly highlight Iranian and Houthi actions and provide additional security assistance to Saudi Arabia and other Gulf states.

The rest of this brief is divided into four main sections. First, it summarizes Iranian and Houthi objectives and strategies to provide context on the regional conflict in the Gulf. Second, it assesses the evolving military capabilities of Iran and the Houthis, with emphasis on extraterritorial capabilities. Third, it provides an overview of the irregular campaign by Iran and the Houthis against Saudi Arabia and other countries to assess attack trends and patterns. Fourth, it outlines policy implications, including for the United States and its partners.

Figure 1a: Pre-strike Satellite Imagery of Jazan Attack, February 2021



Figure 1b: Post-strike Satellite Imagery of Jazan Attack, April 2021



Figure 1c: Post-strike Close-Up Satellite Imagery of Jazan Attack, April 2021



OBJECTIVES AND STRATEGIES

This section begins by examining Iranian and Houthi objectives and strategies.

Iran: Over the past several years, Iran has increasingly resorted to irregular warfare as an important means of expanding its influence. Rather than conducting attacks directly against its adversaries, Iran operates indirectly through partners and proxies for several reasons.

First, the United States and other Iranian adversaries including Saudi Arabia and Israel—enjoy a substantial advantage in conventional military power. Iran's aging inventory of conventional ground, air, and maritime capabilities lags well behind the United States and some U.S. partners in the region. A significant portion of Iran's aging air force inventory consists of U.S.-supplied aircraft that predates the 1979 revolution.⁷

Second, most of Iran's adversaries are vulnerable to an irregular warfare campaign, which is difficult to defend against. With Saudi Arabia, for example, the oil and gas sectors account for roughly 50 percent of the country's gross domestic product.8 Oil and gas facilities are susceptible to disruption by cyberattacks and stand-off weapons. Over the past two decades, Iranian-linked groups have conducted a substantial number of stand-off attacks against Israel from Lebanon, Syria, and Palestinian territory; against U.S. forces in Iraq; and against Saudi Arabia and other Gulf states. The Quds Force has also provided aid to such groups as the Houthis in Yemen, Lebanese Hezbollah, Shia militias in Syria, the Hashd al-Shaabi (Popular Mobilization Forces) in Iraq, local militias in Afghanistan, and groups from Pakistan, Palestinian territory, and other locations.

Third, irregular warfare is an efficient way to fight without expending significant resources and without risking escalation to conventional war. For Iran, the Quds Force has considerable experience in waging irregular warfare, with a long history of supporting non-state actors throughout the Middle East.9

The Houthi Movement: Houthi military strategy has evolved since 2014, but its overall political objective has remained constant: gain international recognition of a Houthi-led government in Yemen. The Houthis have adapted their strategy partly due to tactical and operational successes and partly due to technological advancements. In 2015, the Houthis began directing their military efforts at Saudi and coalition military targets using stockpiles of ballistic missiles acquired by Yemen before the crisis and seized from Yemeni military stockpiles by the Houthis

during the 2014-15 coup d'état. In 2016, the Houthis shifted to a strategy that increasingly targeted critical infrastructure, designed to undermine the Saudi-led coalition. Around the same time, the Houthis also began targeting civilian maritime assets near the Bab el-Mandeb Strait, a key maritime choke point.

From 2017 to 2020, the Houthis increasingly leveraged improvements in UAV technology, advanced Iranian munitions, UMVs, and land and naval mine warfare. The Houthis also targeted other states participating in the Saudi military coalition, such as the United Arab Emirates. 10 While the Houthis have attacked coalition partners, their main target remains Saudi Arabia. They have expanded targeting of Saudi oil tankers, seeking to disrupt the Saudi supply chain and impact the flow of oil. As highlighted in the next section, the Houthis continue this strategy today since it has proven highly effective. Throughout the civil war, the Houthis have designed their objectives around an attrition strategy designed to force an end to Saudi coalition military activities in Yemen while sidelining potential political competitors to the Houthis.

Beginning in February of 2021, the Houthis launched an offensive to seize Marib, an economically and politically important Yemeni province. Marib would provide the Houthis near-total control of northern Yemen, including key oil and gas infrastructure, and improve its political negotiating position.¹¹ If the Houthis gain control of the region, they will be able to shift their focus toward the Gulf of Aden and seek to control the Bab el-Mandeb Strait. In June 2021, the Saudi-led coalition and Houthis made some progress in signing a peace deal, but current efforts have thus far failed to produce a durable end to the conflict. The deal focused on steps to lift a blockade on Houthi-held ports and the Sana'a airport in return for a promise from the Houthis for further talks. ¹² In November 2021, Houthi forces breached the U.S. Embassy compound in Sana'a, detaining locally employed staff and drawing swift condemnation from the U.S. government.¹³ While no U.S. personnel were detained, as U.S. diplomatic staff were relocated to Saudi Arabia in 2015, the breach represents a direct escalation against the United States potentially designed to gain leverage in negotiations with the Saudi coalition. The Houthis have stated their intention to continue their military advance to Marib city itself, further dimming the prospects for peace negotiations as the Houthis continue to demonstrate battlefield momentum.14

In the short term, the Houthis want to maintain their influence and power within Yemen and on the international

stage. They want to continue building legitimacy through engagement with various UN envoys and agencies while continuing to attrit coalition forces. 15 In the long term, the Houthis seek the establishment of a theocratic Yemen under Houthi leadership.

MILITARY CAPABILITIES

Around 2014, Iran began increasing its aid to the Houthis as the war in Yemen intensified. Led by the Quds Force, Iran has provided numerous types of weapons and systems to the Houthis, as highlighted in more detail below. 16 The Quds Force and Lebanese Hezbollah have also provided training to Houthi fighters, including to improve their military tactics and to help in the assembly, use, and maintenance of missiles, UAVs, and other weapons and systems. While the Quds Force cannot rely on air and land bridges to transport weapons and materiel to Yemen-which it can for its partners in Lebanon, Syria, Iraq, and Afghanistan—it uses several maritime smuggling routes. Iran frequently disassembled weapons systems, placed them on boats, and moved them through Omani and Yemeni ports such as Nishtun and Al-Ghaydah in Al-Mahrah Governorate.¹⁷ The rest of this section is divided into three main

subsections that cover Iranian and Houthi capabilities: missiles and other stand-off weapons, cyber capabilities, and maritime anti-access/area denial (A2/AD) capabilities.

MISSILES AND OTHER STAND-OFF WEAPONS

Iran has provided the Houthis with weapons and technology for anti-tank guided missiles; sea mines; UAVs, such as the Qasef family; 122-millimeter Katyusha rockets; Misagh-2 man-portable air defense systems (MANPADS); RDX high explosives; ballistic and cruise missiles; and UMVs.¹⁸ One specific example is the Houthi use of Borkan-2H mobile, short-range ballistic missiles, which they have used to strike Riyadh and other targets in Saudi Arabia. A UN panel of experts concluded that the missiles were "a derived lighter version" of Iran's Qiam-1 missile and that Iran provided key missile parts to the Houthis.¹⁹ Iranian components were also integrated into Yemeni SA-2 surface-to-air missiles to construct the Qaher series of surface-to-surface missiles.²⁰ The Houthis have also developed a modified version of the Iranian Quds-1 and Ouds-2 cruise missiles, with Iranian assistance.²¹ In addition, the Houthis have developed increasingly sophisticated UAVs laden with explosives, such as Qasef-1

Figure 2: Satellite Imagery Analysis of Abqaiq Oil Processing Plant, November 2021



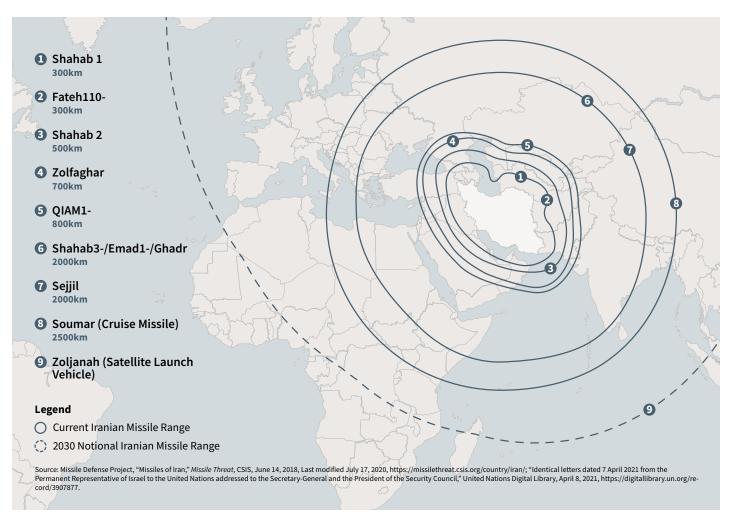
UAVs, to hit Saudi and other targets.²² Some UAVs, such as the Qasef family, likely originated in Iran, as they share numerous similarities and capabilities with the Iranian Ababil-T UAV.²³ Analyses of the flight performance of the Samad family of UAVs, regularly used by the Houthis in attacks, show that newer generations of the UAVs can reach strategic targets deep within Saudi Arabia. For example, the Samad-3 model, when launched from Saada in Yemen, is capable of flying approximately 1,000 kilometers to such targets as the Khurais oil field and the Saudi Aramco facility in Abqaiq.²⁴ Abqaiq is the world's largest oil processing plant and has previously been targeted by Iran.²⁵ Abgaig's stabilization process is concentrated in specific areas highlighted in Figure 2 on the previous page, including storage tanks and processing and compressor trains.

The Houthis have publicly showcased new UAV models, such as the Samad-4, which can be used to drop ordnance on targets, enabling their reuse in multiple attacks.²⁶ The

ability to reliably target infrastructure that was previously out of range when launching UAVs from Yemen could make Houthi targeting less predictable and further stress Saudi air defenses by increasing the number of sensitive sites that must be protected.

The UAV threat to Gulf countries extends beyond the Houthis, as Iran has also made significant use of the technology. Iran has trained Houthi fighters in the use of UAVs within its borders, including at the Kashan base near the city of Esfahan.²⁷ A delta-wing UAV with a wingspan of approximately two meters was seen on a launch vehicle at Kashan in April 2020.28 On July 30, 2021, Saudi Arabia intercepted a UAV intended to target a Saudi commercial vessel in the southern Red Sea, near the Bab el-Mandeb Strait.²⁹ Iran has also conducted UAV strikes against Israeli maritime targets. On July 29, 2021, for example, multiple UAVs struck the tanker MT Mercer Street northeast of Oman's Dugm port, outside Omani territorial waters. The

Figure 3: Iran's Notional Ballistic and Cruise Missile Ranges through 2030



Liberian-flagged vessel was managed by an Israeli-owned shipping company, Zodiac Maritime.³⁰

In addition to technology and capability transfers to the Houthis, Iran maintains the largest ballistic and cruise missile force in the Middle East, which poses a serious threat to Saudi Arabia and other countries. Iranian missiles are continually improving in range, speed, flight profile, and destructiveness.31 Iran's ballistic missile inventory was procured with notable Chinese, Russian, and North Korean assistance. Iran possesses a family of liquid-fueled propellant missiles (the Shahab series), based on former Soviet Scud technology, and has also produced indigenously designed solid-propellant missiles (the Fateh series), based on Chinese technology. In addition, Iran possesses land-attack cruise missiles such as the Soumar/Meshkat with a range of approximately 2,000 kilometers. As Figure 3 highlights, Iran could likely develop the technology to expand its missile ranges over the next decade.32

CYBER CAPABILITIES

To complement these Houthi attacks, Iran and Iranianlinked groups present an offensive cyber threat to Saudi Arabia and other Gulf states. As one U.S. intelligence assessment concluded, "Iran's expertise and willingness to conduct aggressive cyber operations make it a significant threat to the security of U.S. and allied networks and data. Iran has the ability to conduct attacks on critical infrastructure, as well as to conduct influence and espionage activities."33 Iran has also conducted offensive cyberattacks against foreign parliaments, government agencies, and companies, including Saudi Aramco. Iran has further developed destructive malware through one of its state-sponsored hacking groups, Elfin. One example was "Shamoon," a malware first used in 2012 in an attack against Saudi Aramco that deleted files from an infected computer and then wiped the computer's master boot record, making it unusable.34 Many of Saudi Aramco's critical actions—such as drilling oil wells, pumping oil, and loading fuel onto tankers—are managed and monitored electronically.³⁵ Despite improvements in Aramco's cybersecurity defenses, these digital systems will remain attractive targets for Iranian offensive cyberattacks.36

Moving forward, Iran and Iranian-linked groups will likely use offensive cyber operations as a major instrument against Saudi critical infrastructure in the Gulf, such as oil facilities. In the event of an escalation in hostilities, however, Iran and Iranian-linked groups

also have the capability to target desalination facilities, the electrical grid, SCADA systems, and other critical infrastructure using offensive cyber operations. Potential applications of these cyber capabilities include an attempted April 2020 cyberattack on Israeli water treatment plants.³⁷ These cyber capabilities allow Iran to support the Houthis in areas where the Houthis do not possess notable indigenous capabilities. Particularly when combined with the Houthi threat from missiles and drones to Saudi critical infrastructure, Iranian cyberattacks have the potential to cause major disruptions across multiple infrastructure sectors.

MARITIME ANTI-ACCESS/AREA DENIAL CAPABILITIES

Iran also has layered area denial and anti-surface warfare capabilities, including naval mining (e.g., moored contact, drifting contact, and limpet mines), UAVs, small boat swarming tactics, and coastal defenses.³⁸ Iran employs a range of other irregular weapons and tactics to threaten critical infrastructure transiting strategic waterways such as the Strait of Hormuz and the Bab el-Mandeb Strait.

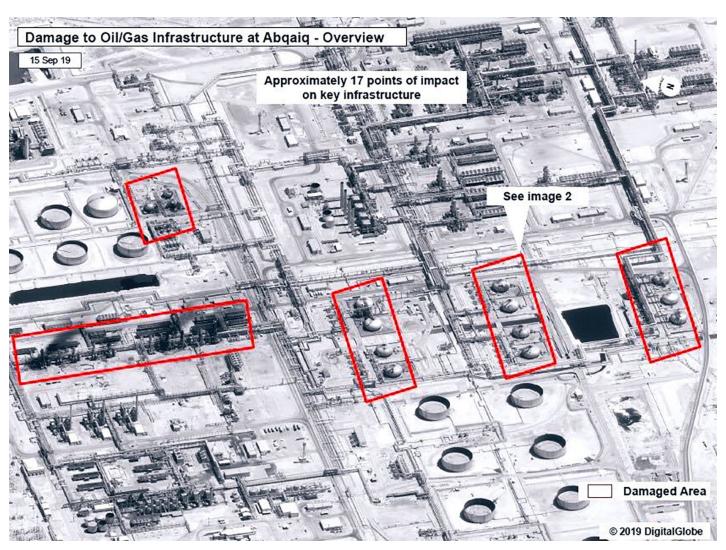
Iranian mobile coastal-defense cruise missile launchers can readily be deployed along the Iranian coast, on Iranianclaimed islands in the Gulf, and potentially even on oil platforms.³⁹ Iran has expanded its inventory of coastaldefense cruise missiles from Chinese C802 and C700 series cruise missiles to domestically produced variants, such as the Noor, Ghader, and Ghadir.⁴⁰ Iran's coastaldefense cruise missile threat is also extraterritorial.⁴¹ Iran is the only Gulf country that possesses submarines. Iran's submarine force consists of three Kilo-class submarines capable of laying mines and launching torpedoes, as well as other imported and domestically produced midgetclass submarines.⁴² As part of its naval doctrine, which emphasizes irregular warfare, Iran employs smaller vessels that emphasize speed and mobility. Iran could employ fastattack vessels to fire on oil tankers, lay mines, or conduct swarming tactics to isolate and overwhelm targets.⁴³ Iranian acquisition of the Houdong-class missile boats, C-14-class missile boats, and MK 13-class patrol craft (all from China) further highlights its focus on irregular capabilities. 44 Iran also produces domestic variants, such as the Peykaap I-/II-class patrol craft and missile boats.⁴⁵

In sum, Houthi attacks against Saudi Arabia need to be understood as part of a broader Iranian irregular warfare campaign that includes offensive cyber operations and maritime A2/AD capabilities.

AN IRREGULAR WARFARE CAMPAIGN

The pace of Houthi attacks has increased in recent months, indicating an intensification of the conflict in the Arabian Peninsula. To better understand historical patterns, CSIS analyzed 4,103 Houthi attacks against Saudi Arabia, in Yemen, and against other targets in the Gulf between January 1, 2016, and October 20, 2021. It is possible—and perhaps likely—that this data underreports the actual number of attacks, since some were not publicly reported by Saudi Arabia or were unclaimed by the Houthis. 46 In addition, the Houthis falsely claimed some attacks, such as the September 19 strikes against Abqaiq and Khurais in Saudi Arabia highlighted in Figures 4a and 4b, which were perpetrated in part by Iran. Nevertheless, this data is likely the most comprehensive and accurate overview of Houthi attacks.

Figure 4a: Broad Satellite Imagery of Attack against Abqaiq, September 2019



Source: U.S. government/DigitalGlobe.

Damage to Oil/Gas Infrastructure at Abgaig 15 Sep 19

Figure 4b: Close-Up Satellite Imagery of Attack against Abgaig, September 2019

Source: U.S. government/DigitalGlobe.

During the first nine months of 2020, Houthi forces executed a monthly average of 38 attacks.⁴⁷ During the same period in 2021, that number rose to an average of 78 attacks per month, for a total of 702 attacks across the total nine-month period. 48 This increase was largely driven by the Houthi offensive in Marib, where 199 attacks took place during the first nine months of 2021.⁴⁹ Houthi forces also carried out 133 total attacks in August 2021 alone the highest single-month tally since at least January 2016. These attacks, however, were not equally distributed across geographic areas.

The attacks had been trending downward but rose in 2021. The number of Houthi attacks against Saudi Arabia were highest in 2016 and 2018, declined in 2019 and 2020, and then increased in 2021.50 In fact, the total number of

attacks in the first nine months of 2021 were higher than the entire year of 2020. Recent trends are disturbing for several reasons. First, the increase in attacks from 2020 to 2021 shows that Houthi forces retain the ability and desire to conduct stand-off attacks. Second, the Houthis are utilizing more advanced weapons, such as cruise and ballistic missiles, which suggests that their capabilities are improving. Third, the Houthis continue to complement their actions in Saudi Arabia with military offensives in some areas of Yemen, including in Marib Province.

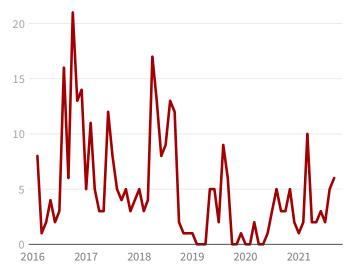
Over the first nine months of 2021, the Houthis conducted 33 attacks against Saudi Arabia—a monthly average of 3.7 attacks, as shown in Figure 5. By comparison, the Houthis orchestrated 14 attacks over the same period in 2020, for a monthly average of 1.6 attacks.⁵¹ This increase in attacks,

Impact point

while largely driven by relatively large single-month attack totals in February and August 2021, is notable for its demonstration of Houthi resilience and ability to translate qualitative improvements in weapons and capabilities into quantitative increases in attacks. The Houthis' recent ability to ramp up attacks indicates that they pose an enduring threat to Saudi Arabia.

Houthi attacks against Saudi Arabia have been concentrated in the country's southwest provinces and along the Red Sea, particularly in the provinces of Asir, Jazan, and Najran, as highlighted in Figure 6. Together, these three provinces accounted for more than 80 percent of Houthi attacks within Saudi Arabia from January 2016 to September 2021, with Jazan alone accounting for approximately 38 percent of attacks.⁵² These three Saudi provinces share a land border with the Yemen's Saada Governorate, a Houthi stronghold and home to a large number of Houthi ballistic missile launch sites.⁵³ Given the close geographic proximity between Houthi-controlled provinces in Yemen and Azir, Jazan, and Najran, these Saudi provinces are likely to remain under continued threat of Houthi missile and UAV attacks.

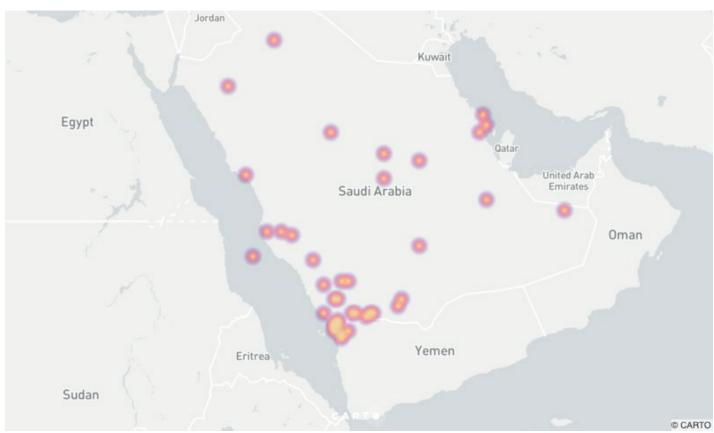
Figure 5: Houthi Attacks against Saudi Arabia, January 2016 to September 2021



Source: Data from Janes Terrorism and Insurgency Centre, https://www.janes.com/ military-threat-intelligence/terrorism-and-insurgency.

The proximity of these provinces to Yemen also limits the reaction time of Saudi air defense systems.

Figure 6: Houthi Attacks in Saudi Arabia, January 2016-September 2021



Source: Data from Janes Terrorism and Insurgency Centre, https://www.janes.com/military-threat-intelligence/terrorism-and-insurgency.

The primary Houthi method of attack, particularly against Saudi Arabia, has been the use of ballistic and cruise missiles, as well as UAVs. 54 Houthi missiles and UAVs have been repeatedly used against critical infrastructure inside Saudi Arabia. For example, the Houthis claimed responsibility for launching 10 Badr-1 ballistic missiles at the civilian airport in Jazan on August 25, 2019.55 While UAVs do not cause significant physical damage on their own, they demonstrate the continued vulnerability of civilian infrastructure, such as airports, to Houthi attack despite the systems being relatively low-tech.⁵⁶ These attacks also contribute to Houthi strategic aims by attempting to pressure the Saudi government to end the conflict and impose significant financial costs on Saudi Arabia to defend itself from stand-off attacks.⁵⁷

In addition to attacks against land-based targets in both Yemen and Saudi Arabia, Houthi forces have attacked maritime targets such as oil tankers. One recent data analysis found that Houthi forces executed 24 successful or attempted maritime UAV attacks from January 2017 to June 2021, with a majority of those attacks clustered around Yemeni ports such as al-Hudaydah and as-Salif and directed at commercial vessels such as oil tankers.⁵⁸ There are other emerging tactics, such as the use of unmanned explosive-laden UMVs against commercial vessels. On March 3, 2020, remotely controlled skiffs bearing militarygrade explosives attempted to attack the Saudi-flagged ship Gladiolus approximately 90 nautical miles off the Yemeni coast.⁵⁹ In a subsequent letter to the United Nations, the Saudi government alleged that the Houthis orchestrated the attempted attack.⁶⁰

Despite these actions, Houthi attacks have had mixed strategic, political, and economic effects. The attacks have not significantly impacted global oil markets or domestic oil production in Saudi Arabia despite some acute price shocks, such as when oil prices rose to more than \$70 per barrel following a March 2021 attack on the Ras Tanura oil refinery. 61 Furthermore, only a limited number of ballistic missile attacks have resulted in losses among the Saudi-led coalition. 62 Saudi ground and air forces have shot down roughly 90 percent of UAVs and missiles launched from Yemen.63

POLICY RECOMMENDATIONS

Despite Saudi successes in shooting down Houthi missiles and drones, Iran and the Houthis have demonstrated a persistent ability to threaten Saudi Arabia and other countries in the Gulf. The sustained campaign has forced

the Saudi coalition to devote valuable military resources to tracking and targeting Houthi missile sites, storage facilities, and assembly locations. Houthi attacks against civilian infrastructure have also raised the pressure on the Saudi government to end the conflict.⁶⁴ Attacks on Saudi infrastructure, particularly with UAVs, represent an effective way to impose maximum economic and reputational consequences for the Saudi government at a relatively low cost. Patriot interceptors can cost over \$1 million, while Houthi UAVs may cost only a few hundred dollars. 65 Consequently, there is a growing need to provide Saudi Arabia and other Gulf states with several types of assistance.

First, the United States and other partners should more aggressively highlight the Houthi and Iranian military campaign against Saudi Arabia. Not only has there been a rise in the number of attacks against Saudi Arabia over the past year, but Iran and Lebanese Hezbollah continue to provide the Houthis with increasingly sophisticated weapons systems. The Houthis now have a growing assortment of cruise and ballistic missiles, UAVs, and other stand-off weapons capable of striking targets throughout the Gulf—and beyond. Yet there has been little systematic media coverage or sustained public condemnation. The U.S. State Department has periodically condemned specific incidents. In August 2021, for example, the Houthis fired a missile at a civilian airport in Abha, wounding eight civilians. The U.S. State Department strongly condemned the strikes, noting that "Houthi attacks are perpetuating the conflict, prolonging the suffering of the Yemeni people, and jeopardizing peace efforts at a critical moment."66 But the United States and other governments have not adequately highlighted the extent of the problem.

Growing public awareness of the extent of Iranian support for the Houthis could also put pressure on multilateral organizations, such as the United Nations, to condemn Iranian intervention more forcefully in the conflict and demand that the Houthis renounce Iranian support as a part of peace negotiations. Growing public awareness could be helpful with the U.S. Congress, where arms sales to Saudi Arabia have come under criticism. A better understanding of the Houthi and Iranian campaign in the Gulf also has implications for other U.S. partners, such as Israel, which face a significant stand-off threat from Iranian-linked groups in Lebanon, Syria, Iraq, and Palestinian territory.

Second, the United States and its partners should provide additional security assistance to Saudi Arabia to defend

itself-including airports, oil and gas facilities, and other critical infrastructure targets—against these attacks and to counter Iranian actions in Yemen. In November 2021, for example, the United States authorized the sale of 280 AIM-120C-7/C-8 variant air-to-air missiles to Saudi Arabia, in addition to spare parts, support, and training. AIM-120C missiles, deployed from Saudi aircraft, have been instrumental in intercepting persistent UAV attacks against Saudi Arabia, where both Saudi civilians and foreign nationals are at risk of harm in such attacks.⁶⁷ Broader arms sales to Saudi Arabia have been controversial because some U.S. weapons have been used to conduct airstrikes in Yemen that have killed civilians. While previous criticism of U.S. arms sales to Saudi Arabia has centered on the risk for civilian harm in air-to-ground strikes, these air-to-air missile capabilities provide Saudi Arabia a valuable resource for defending civilian populations and infrastructure without the same humanitarian risks.

Patriot missile batteries remain critical, as Saudi surfaceto-air missiles intercept a significant number of attempted missile strikes on Saudi Arabia.⁶⁸ But the United States removed some of its Patriot batteries from Saudi Arabia in 2020 and pulled additional Patriot batteries from the country in 2021, raising concerns across the Gulf about U.S. commitment to the region. ⁶⁹ Since Saudi Arabia has run dangerously low on ammunition it uses to defend against Houthi attacks, the United States should provide Saudi Arabia additional supplies of Patriot interceptors.⁷⁰ In addition, the United States should consider providing additional counter-UAV technology, since Patriot systems have limited utility against small UAVs. Examples might include Coyote UAVs, which can be used in counter-UAV campaigns; Phaser high-power microwave systems; and high-energy laser systems to counter stand-off weapons.

The United States can also help provide actionable intelligence on the location of Houthi stand-off infrastructure in Yemen. Identifying and conducting precision strikes against the locations where the Houthis are launching, storing, and assembling cruise missiles, ballistic missiles, explosive-laden UAVs, and other standoff weapons requires all-source intelligence and analysis.

Third, the United States and its partners should continue aggressive interdiction efforts against Iranian weapons and components to Yemen. There are several routes used by Iran and Iranian-linked smuggling networks. The first follows the coastlines of Oman and Yemen and is used to smuggle high-value military cargo, such as missile

components, anti-tank guided missile containers, and UAV and UMV components. A second route involves transshipment at sea off the coast of Somalia and seems to mostly supply small arms and light weapons. A third route goes through the Bab el-Mandeb Strait.71 Previous U.S. interdiction efforts have yielded some successes, such as a May 2021 seizure at sea of Iranian illicit arms, likely bound for Yemen, by a U.S. Coast Guard Advanced Interdiction Team working from a U.S. Navy ship.⁷²

In December 2021, the U.S. Department of Justice announced that the U.S. District Court for the District of Columbia upheld the seizure of 171 surface-to-air missiles, eight anti-tank missiles, and over 1.1 million barrels of petroleum products from six separate at-sea boardings in 2019 and 2020.73 While the seizures from these boardings are significant, the Department of Justice provided valuable credibility to the counter-smuggling actions by verifying the sources and intended destinations of these shipments as coming from Iran and bound for such organizations as the Houthis. The United States should continue to dedicate Department of Justice resources to publicly validate any future weapons or materiel seizures, which helps strengthen international legal norms and rules while publicly exposing and condemning the role Iran plays in supporting the Houthis and other foreign terrorist groups.

United States Central Command has utilized the Coast Guard's deployable Maritime Security Response Team (MSRT) for opposed boardings in the Arabian Sea and Northern Arabian Gulf; however, the targets of opportunity for boardings are greater than the number of MSRTs available for such operations at any given time. Additionally, six new 154-foot Coast Guard Fast Response Cutters (FRC) are intended to replace the aging 110-foot Patrol Boats (WPBs) in Bahrain to support U.S. Central Command, with the fourth of six being commissioned in October 2021.⁷⁴ Given the increased capabilities of the FRCs over the legacy WPBs, U.S. Central Command could use these vessels as effective counter-smuggling assets further south in the Arabian Gulf, targeting traditional smuggling transit zones.

Despite seizure successes using organic and deployed ships and boarding teams, these efforts have not been commensurate with the scale and scope of the weapons smuggling problem. The United States and its partners should devote additional resources to collect and analyze intelligence on Iranian smuggling routes, as well as conduct maritime and air patrols to interdict weapons shipments to the Houthis. An important component of

these efforts could be renewed bilateral security assistance to build the capacity of the Yemeni coast guard, which works to counter smuggling and other illicit activities under the auspices of the internationally recognized government.

Iran and the Houthis have demonstrated a persistent ability to threaten Saudi Arabia and other countries in the Gulf. With the use of relatively cheap stand-off weapons such as UAVs, ballistic missiles, and cruise missiles, Houthi forces can impose political and financial costs on Saudi Arabia. The Quds Force and Lebanese Hezbollah have played a critical role in improving Houthi capabilities. This irregular warfare campaign is occurring in a broader context in which Iran is increasing its stockpile of enriched uranium, supporting a growing number of non-state partners in the region, and developing longer-range and more accurate missiles. Without a more effective campaign to publicly highlight and counter these attacks and help Saudi Arabia defend itself, however, Iran and the Houthis will continue to destabilize the region. ■

Seth G. Jones is senior vice president and director of the International Security Program at the Center for Strategic and International Studies (CSIS) in Washington, D.C., and author most recently of Three Dangerous Men: Russia, China, Iran, and the Rise of Irregular Warfare (W.W. Norton, 2021). Jared **Thompson** is a research associate with the Transnational Threats Project at CSIS. **Danielle Ngo** is a military fellow in the International Security Program at CSIS. Brian McSorley is a military fellow in the International Security Program at CSIS. Joseph S. Bermudez Jr. is senior fellow for imagery analysis with the iDeas Lab and Korea Chair at CSIS.

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ENDNOTES

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