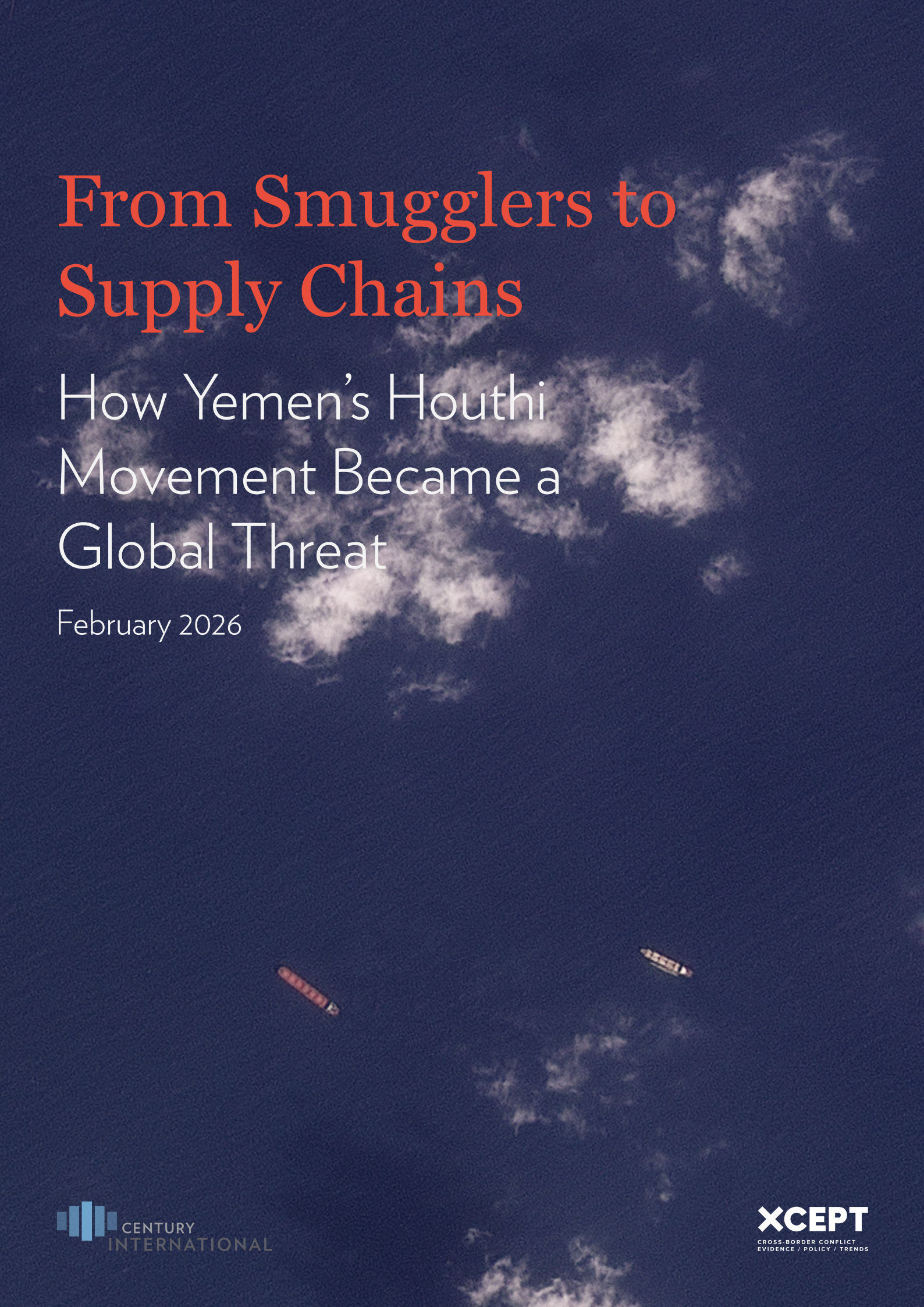
From Smugglers to Supply Chains

How Yemen's Houthi Movement Became a Global Threat

February 2026



CENTURY INTERNATIONAL

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Executive Summary

Over the course of a decade, Yemen's Houthi movement has transformed from local insurgent group to disruptive global force. Time and again, efforts to beat back the Houthis' military capabilities by killing their leadership and intercepting supplies from their Iranian patrons seem to produce only temporary dips in their ability to inflict harm on neighboring states, the global economy, and their fellow Yemenis.

How can this stateless armed group, dug into the hinterlands of one of the poorest countries in the world, be so resilient?[1] From their perch above the Red Sea, the Houthis were able to menace neighboring Gulf States with missile and drone strikes even before they started a two-year campaign against shipping at one of the world's most important trade chokepoints, at great expense to the world economy. In 2024 and 2025, Israel and the United States struck devastating blows against Iran and its so-called Axis of Resistance (a coalition of Iranian-backed nonstate armed groups), and launched military campaigns against the Houthis, while the United States designated the group a "foreign terrorist organization" (FTO). But the Houthis bounced back and show no serious signs of slowing down. Instead, they are redoubling their efforts to build stocks of long-range precision weapons.

A major part of the secret to the Houthis' resilience is the fact that the group increasingly assembles and manufactures arms in Yemen, utilizing a diffuse supply network that stretches across the Indian Ocean and beyond. Plans conceived in Tehran and northern Yemen are farmed out to operatives, contractors, and subcontractors to implement. Weapons, components, and raw materials are shipped to the Houthis from multiple sources, taking looping routes on sea and land, sometimes overshooting Yemen and doubling back. When parts finally arrive in Houthi territory on the boats of smugglers or regular tradespeople—some of whom may have no idea they are carrying anything illicit—the Houthis are able to assemble them into a formidable arsenal.

This network, which is as complex as the local and global trade routes that crisscross the Red Sea and Indian Ocean, has been nearly impossible to describe in any specific way—until now. This report's research team has pioneered novel techniques to create a picture of Houthi smuggling that is unprecedented in its clarity and granularity. Their findings imply that the Houthi threat is alive and well; and that American and international policies to stop it have, so far, been well off the mark.

The report is based on around 150 in-depth interviews with experts and confidential sources including senior military, security, and intelligence officials; reviews of open-source and private documents, and public and private land and sea interdiction data; port statistics; analysis of alleged smuggling sites using satellite imagery and nighttime light emission; and a systematic, rigorous analysis of remotely sensed data, including satellite imagery and ship automatic identification systems (AIS). Its analysis builds on a database, created by the research team from public and private sources, of more than 370 items captured during almost 140 land and sea interdictions of shipments bound for the Houthis.

The research reveals the ongoing evolution and scale of the Houthi weapons program. It lays out the challenge of any unilateral or multistate effort to rein the group in, and describes the channels and human networks that have enabled the Houthis' transformation into a disruptive global force. The report describes four key channels that form the Houthi supply chain, though it notes that many supply routes remain unknown. It goes on to assess ongoing efforts to disrupt those channels, before proposing policies that would be more effective—if higher risk.

1 "Yemen Poverty and Equity Assessment 2024: Living in Dire Conditions," World Bank, February 2024.

The Houthis' highly networked and decentralized supply chains are a warning for many other parts of the world about how advanced weapons can proliferate to state and nonstate actors alike. The Houthis represent not just a regional threat—and most importantly, a growing threat to their fellow Yemenis—but also a template for how other peripheral nonstate actors can exploit global supply chains and knowledge networks to achieve capabilities once reserved for powerful countries.

Current U.S. and international policies, predicated on the assumption that kinetic strikes and sanctions can contain the threat, fundamentally misunderstand the nature of the problem. Preventing the Houthis from further expanding their arsenal—or at least slowing the pace and increasing the costs—will require a concerted multinational effort that focuses on critical choke points, recalibrates monitoring approaches, and provides sustained support to local security services. Such efforts will also need to be sensitive to local context, and should do the minimum harm possible to one of the most impoverished populations in the world.

1. The Houthis' Resilience

When the Houthis seized the Yemeni capital, Sana'a, in 2014, they were a highly motivated and well-organized but technologically unremarkable militia. The most advanced weapons they possessed were rocket-propelled grenades and anti-tank missiles.[2] In the decade since, during which they sparked a civil war, the Houthis have cemented their control over northwestern Yemen with brutal force and used increasingly advanced, long-range weapons to pressure regional powers and even the United States into a series of formal and informal truces. Between October 2023 and October 2025 alone, the group launched more than 115 complex attacks on commercial and naval shipping in the Red Sea and Indian Ocean; launched missiles and drones at targets in Israel up to 2,600 kilometers from Yemen's borders; and engaged in a two-month military confrontation with the United States in the Red Sea. Before this, the Houthis had fired, conservatively, more than 1,000 rockets and missiles and launched more than 350 drone attacks on local and regional rivals, including Saudi Arabia and the United Arab Emirates.[3] Today, the Houthis arguably exert unprecedented control over Red Sea shipping lanes and global trade and exert state-like power in their relations with Yemen's neighbors.[4]

> "In response to the Houthis' growing capabilities, outside powers have doubled down on long-standing but ineffective policies."

In response to the Houthis' growing capabilities, outside powers have doubled down on long-standing but ineffective policies: targeting the group with air strikes, imposing sanctions on the Houthis and their confederates, and launching maritime interdictions of ships suspected of smuggling arms from the Houthis' main sponsor, Iran. Most recently, in January 2025, the Trump administration designated the group an FTO, the most onerous tool in the United States' sanctions arsenal. Then, between February and May 2025, the United States waged a sustained military campaign, targeting Houthi military sites before announcing a truce with the Houthis. Israel launched its own strikes on infrastructure and what it says are Houthi weapons and military facilities. Yemeni security services have intermittently ramped up their interdiction efforts, making a series of seizures despite infighting and a significant lack of resources.

So far, the Houthis have proven highly resistant to such measures. Material transfers to Yemen have continued at an industrial scale for most of the past decade despite Saudi, Emirati, Israeli, and U.S. bombing raids; UN Security Council arms embargoes on the Houthis and Iran; a UN-run monitoring and verification process for large ships entering Houthi ports; regional and international land and sea interdiction efforts; and a raft of Western sanctions targeting Houthi officials and procurement networks. Recent seizures in the Red Sea and at the Yemeni port of Aden show that the group is importing massive quantities of arms, material, and manufacturing equipment—that they are scaling up, not scaling back.

2 For comprehensive accounts of the Houthis' history, see: Daniel Egel et al., "Building an Enduring Peace in Yemen: Lessons from Five Years of RAND Research," RAND Corporation, February 2021; International Crisis Group, "How Huthi-Saudi Negotiations Will Make or Break Yemen," December 29, 2022; Sana'a Center for Strategic Studies, "The Yemen Annual Review 2023," February 15, 2024.

3 In 2020, the Center for Strategic and International Studies (CSIS) wrote that "the war in Yemen has seen the most extensive use of ballistic missiles and other asymmetric aerial weapons of any conflict in recent history." "The Missile War in Yemen," June 2020, CSIS; "Red Sea Attacks Dashboard," ACLED (Armed Conflict Location & Event Data).

4 "Lethal Attacks Show Strengthened Houthi Control over Red Sea Transit," Washington Institute for Near East Policy, July 16, 2025.

Several factors explain the Houthis' persistence. First and most important is the fact that "arms smuggling" no longer adequately describes the process by which the Houthis obtain advanced weapons systems. With assistance from the Quds Force (the external arm of Iran's Islamic Revolutionary Guards Corps, or IRGC), and other actors from the Axis of Resistance, the Houthis oversee a growing domestic military-industrial complex inside Yemen. The group is able to build and deploy weapons systems, including long-range drones, using imported parts and raw materials. While the Iranian supply of some key systems and components is critical to the Houthis' capabilities, the group's arms program is increasingly backstopped by a hybrid, global supply chain serviced by a web of participants—including tribally connected smugglers across Yemen and businessmen working from export hubs in eastern China.

Arms, parts, and raw materials are transported to the Houthis via a bewildering array of smuggling routes and legitimate commercial channels. When local or international authorities successfully target one channel, Houthi and IRGC managers quickly redirect flows through others, adjusting specific details like ship-to-ship transfer locations or inland routes while sustaining the flow of materials. When the opportunity presents itself—for example, when Saudi Arabia eased restrictions on shipping entering Houthi-controlled Red Sea ports in 2023 as part of its informal truce with the group—the Houthis and their backers quickly exploit it by sending even more materiel through an open route. Because the Houthis increasingly manufacture weapons from dual-use items and raw materials, they are also able to intermingle supplies for their arms program with legitimate cargo being transported via general cargo and container shipping networks.

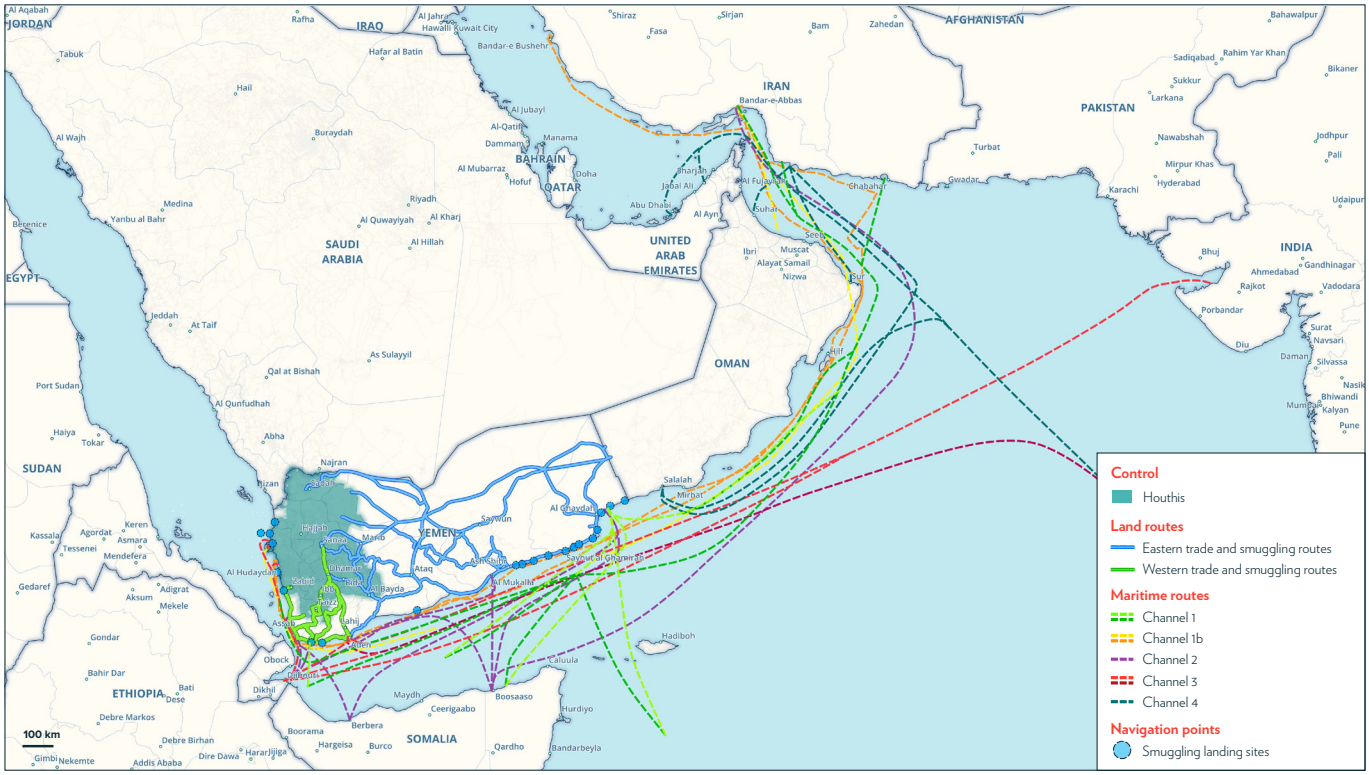

Figure 1. The Houthi Supply Chain: Maritime and Land Smuggling Routes

Data: This map shows a composite of known land and sea transportation routes used to provision the Houthi war effort. Created by the authors, using QGIS and Natural Earth data. Based on team mapping of overland and sea routes, including AIS data drawn from Global Fishing Watch.

Even well-resourced intelligence agencies suffer from knowledge gaps when it comes to the Houthi supply chain. Since 2015, international maritime forces have seized large amounts of small arms, light weapons, and drone parts en route to the Houthis.[5] But relatively few components for advanced, longer-

5 For this report, the authors built an interdictions tracker for Yemen, a database of all known land and sea interdictions based on CENTCOM, UN Panel of Experts, and local media reporting, along with documents and details shared privately by Western and Yemeni government officials. This tracker is described as the "project interdiction database" throughout the report.

range missile systems that the group uses have been interdicted.[6] In fact, although the Houthis have fired hundreds of ballistic missiles, as noted above, only five motors for these weapons have been captured over the course of the Yemen war, part of a single shipment seized in January 2024.[7]

The Houthis are also increasingly active participants in a knowledge ecosystem that defies the logic of traditional counter-proliferation policy. Moving in and out of Yemen, Houthi operatives collaborate with other Axis of Resistance groups, participating in training and knowledge-sharing in Iran and Lebanon, and—before the fall of the regime of Bashar al-Assad in December 2024—in Syria. IRGC and Hezbollah advisers make the reverse journey, traveling to Yemen to build Houthi capabilities and oversee attacks. Coupled with the global nature of their supply chains, the diffusion of knowledge and expertise within the Houthi movement and across the broader Axis means that eliminating a few key leaders or manufacturing sites is unlikely to degrade the group's capabilities in the long term.

Efforts to disrupt the Houthi arms program face three self-imposed limitations: fragmented, contested lines of authority; mismatched and often discordant local, regional, and international priorities; and widespread resource limitations. These problems manifest themselves at every level: International maritime operations are narrowly focused on direct transfers from Iran. Regional powers Saudi Arabia and the Emirates are increasingly at loggerheads over Yemen. Yemen's security forces, which rely on Riyadh and Abu Dhabi for support, often struggle with unpaid salaries, along with limited and often disputed authority. These problems have led to infighting among their ranks and deep capacity constraints.

Another issue is the United States' decision to essentially stop making Yemen policy. Following a brief military confrontation with the Houthis and a subsequent truce (the terms of which were never made public), some U.S. officials say that the Trump administration believes that the Houthis capitulated under pressure and no longer represent a threat. This assessment rests on the optimistic assumption that the U.S.–Houthi truce, the FTO designation, and the threat of Israeli airstrikes will keep the Houthis in check without sustained American engagement. But U.S. disinterest has had a chilling effect on international policy at a time when deep multilateral thinking is required. European and regional powers harbor deep concerns about the Houthis' trajectory but feel unable to act independently of U.S. support. Meanwhile, as this report documents, the supply chains enabling Houthi capabilities continue operating at an unprecedented scale and are growing in sophistication, while the Houthis' regional ambitions in the Middle East and Africa also expand.

The Houthis' rapid evolution over the past decade should be worrying for those invested in international peace and security because of the capabilities they have accrued (and their willingness to use them, including against their fellow Yemenis); and because of the blueprint they have created for peer groups. The Houthis have demonstrated that nonstate armed actors can now leverage external support and global connectivity to access capabilities once reserved for powerful states.

6 The longest-range Houthi missiles can travel around 2,000 kilometers, and are classified as "medium-range ballistic missiles," which have a range of 1,000–3,000 kilometers. Short-range ballistic missiles, which the Houthis also possess, can travel up to 1,000 kilometers. Other missile types, which the Houthis do not currently have in their arsenal, have a range of up to 5,500 kilometers.

7 Project interdiction database; U.S., UK, Yemeni, and regional officials, interviews with the authors, April–November 2024.

2. The Houthis, and Their Arsenal, in Context

Ansar Allah, or Partisans of God, are a religious, political, and military movement. They are colloquially known as the Houthis, for their founding family, whose current leader, Abdul-Malik al-Houthi, took control of the group after his brother, Hussein al-Houthi, was killed during fighting with government forces in 2004.[8] In 2014, the Houthis seized control of Sana'a, Yemen's capital, after a decade of warfare with the government in the country's remote north. Their efforts to consolidate their coup in late 2014 and early 2015 sparked a civil war, with Saudi Arabia and the Emirates intervening militarily on behalf of Yemen's internationally recognized government. Over the course of a decade of conflict, the Houthis cemented their control over Yemen's northwest and built an increasingly repressive, religiously ideological quasi-state.

Efforts to beat the Houthis back struggled from the start. The anti-Houthi front was divided in 2015 and fragmented over the course of the war, including during pitched battles between the Emirates and Saudi-backed forces over control of Aden in 2019. In 2022, the conflict reached a mutually hurting stalemate and the Houthis agreed to a nationwide truce after direct negotiations with Saudi Arabia. Shortly after, Riyadh engineered the ouster of President Abdu Rabbu Mansour Hadi and replaced him with a presidential council led by a former Yemeni interior minister, Rashad al-Alimi, who, like his predecessor, struggled to unite the anti-Houthi front. In December 2025 and January 2026, a territorial dispute between Saudi- and Emirati-backed factions ended with Saudi Arabia launching airstrikes to push back forces aligned with Abu Dhabi.[9]

With the internal war on hold since 2022, the Houthis have set their sights on regional conflict. The war sparked by Hamas's October 2023 attack on Israel and the devastating retaliatory Israeli offensive on Gaza that followed soon drew Lebanon, Syria, Iraq, Iran—and Yemen—into a region-wide war.[10] The Houthis began targeting commercial shipping in the Red Sea and military and civilian sites in Israel.[11] Israeli and U.S. military counterstrikes culminated in a U.S. military campaign against the group between March and May 2025 that, in turn, morphed into a military confrontation in the Red Sea.[12] The Houthis and the United States agreed on a truce, but Israel and the Houthis continued to exchange tit-for-tat strikes, including an Israeli air raid that killed most of the Houthi civilian government in October 2025.[13] The Houthi–Israeli conflict had been put on hold at the time of writing, with the Houthis announcing an end to their campaign in early November 2025—in response, the group said, to the ceasefire agreement

8 For deeper background, see "Truce Test: The Huthis and Yemen's War of Narratives," International Crisis Group, Middle East Report no. 233, April 29, 2022.

9 Abbas al-Lawati, "Saudi Arabia's Dispute with the UAE Exposes a Deeper Regional Power Struggle," CNN, January 4, 2026.

10 Veena Ali-Khan and Thanassis Cambanis, "Down but Not Out: Reassessing the Axis of Resistance," The Century Foundation, March 19, 2025.

11 "Calming the Red Sea's Turbulent Waters," International Crisis Group, March 21, 2025.

12 Christopher Blanchard, "Yemen: Conflict, Red Sea Attacks, and U.S. Policy," Congressional Research Service, July 22, 2025.

13 "Yemen's Houthis Say Military Chief Killed as Israel Claims Responsibility," Al Jazeera, October 16, 2025.

in Gaza announced a month earlier.[14] The war and the Red Sea campaign, along with discord within the Yemeni government, have cemented the Houthis' control over northwestern Yemen and placed them in a significant position of power over the global shipping lanes that pass through the Red Sea.[15]

At the heart of the Houthis' rise to power has been an astonishingly large arsenal of weapons. The Houthis' early domestic power was built on a steady supply of small arms and light weapons that would meet the needs of some European armies. Today, the group claims that it has more than 1.1 million men at arms, although Western military observers believe they can only mobilize a third to a half of this number, at best.[16] Since 2015, international maritime forces have seized around 40,000–50,000 assault rifles, rocket launchers, and other weapons bound for the Houthis, along with more than 2 million rounds of ammunition.[17] These figures tally with the requirements for a force of several hundred thousand men.[18] In fact, guns and ammunition are now so readily available inside Houthi-controlled areas that the group and its affiliates reportedly traffic weapons to Somalia and Yemeni-government-controlled areas to sell for a profit.[19]

Advanced weapons are critical to the Houthis' cross-border power projection. Long before they started attacking Red Sea shipping and Israel in late 2023, Houthi cross-border attacks into Saudi Arabia and the Emirates helped the group compel the two Gulf states to seek an exit from the Yemen war.[20] Then, in 2025, the group clashed with the United States in the Red Sea—arguably, fighting the superpower to a standstill—launching missiles and attacks from aerial and waterborne drones on American warships. Evasive U.S. naval maneuvers under Houthi attack caused the loss of two F-18 fighter jets. These losses compounded the material and financial costs of the U.S. campaign, spurring on the May 2025 truce.[21] Since 2015, the Houthis have used multiple types of ballistic missiles, cruise missiles, surface-to-air missiles, rockets, drones (unmanned aerial vehicles, or UAVs), and seaborne drones (unmanned boats, also known as unmanned surface vehicles, or USVs) to attack targets between 2,000 kilometers (for missiles) and 2,600 kilometers (for aerial drones) from launch sites in Houthi areas of control.[22] Conservatively, the group has launched more than 1,800 missile and drone strikes in total over the course of the war.[23]

14 "Houthis Announce End of Red Sea Shipping Attacks," Maritime Executive, November 11, 2025.

15 Noam Raydan and Farzin Nadimi, "Lethal Attacks Show Strengthened Houthi Control over Red Sea Transit," Washington Institute for Near East Policy, July 16, 2025.

16 "Text of the Speech by the Leader of the Revolution at the Arab National Conference in Beirut" (in Arabic), November 7, 2025, Saba News.

17 Author assessment based on project interdiction database. For an earlier assessment, see also "Assessment of the Response to Illicit Weapons Trafficking in the Gulf of Aden and the Red Sea," United Nations Office on Drugs and Crime, March 2024. The report estimated that 29,253 small arms and light weapons—a category that ranges from small pistols to shoulder-mounted rocket launchers, and henceforth is referred to as small arms—were interdicted at land and sea between 2015 and 2024, along with 2.4 million rounds of ammunition.

18 In other contexts, an interdiction rate of 20 percent for drugs and firearms is relatively high. U.S. and Mexican authorities, for example, intercept an estimated 16.7 percent of firearms passing between the two countries' borders, while estimates of the proportion of Captagon pills intercepted in the Middle East and North Africa ranges between 10 and 20 percent. See Topher McDougal, et al., "The Way of the Gun: Estimating Firearms Traffic Across the U.S.-Mexico Border," Igarape Institute, March 2013; Henry Thompson and Jack Watling, "Assessing Dynamics of Control Through Iranian Technology Transfer to Yemen's Houthis," *RUSI Journal* 167, iss. 4/5 (November 2022): 64–77. Extrapolations based on visible evidence—for example, seizures of aerial drone engines compared to known drone deployments—suggest that a 10–20 percent interdiction rate is reasonable for arms entering Yemen.

19 Yemeni arms dealer, interview with the authors via messaging app, July, August 2024.

20 Western, Yemeni, regional officials, interviews with the author, April–November 2024; "Beyond Riyadh: Houthi Cross-Border Aerial Warfare 2015-2022," ACLED (Armed Conflict Location & Event Data), January 17, 2023.

21 Claire Moses, "Second U.S. Navy Jet in 2 Weeks Is Lost off the U.S.S. Truman," *New York Times*, May 7, 2025.

22 John Gambrell, "US Military Acknowledges Yemen's Houthi Rebels Shot Down 2 MQ-9 Reaper Drones," September 4, 2024

23 Western, Yemeni, and regional officials, interviews with the author, April–November 2024.

The Houthis have also built a huge stock of landmines, which allow them to defend large swaths of territory with relatively small numbers of men. They assemble, manufacture, and deploy landmines and improvised explosive devices (IEDs) in vast quantities.[24] Since 2015, a single demining organization has removed about 460,000 landmines, IEDs, and unexploded ordnance from sites across Yemen.[25] This number far exceeds the prewar stockpile of the Yemeni government's armed forces, and is likely only a fraction of the number of such explosives that the Houthis have laid.[26] In 2022, Yemen had the world's third-largest casualty rate from landmines, after Syria and Ukraine.[27]

Most of the arms platforms the Houthis use were not present in Yemen before the war. Figure 2, based on author research, outlines when new weapon types have been seen in Yemen since 2015.

Figure 2. New Weapons Systems Identified in Yemen Since 2015

Source: Authors, UN Panel of Experts, Conflict Armament Research.

The group's stockpile of landmines, small arms and advanced weapons has allowed them to seize territory at home and project power abroad. Understanding how the Houthis obtained their arms, and the ability to use them, also helps explain the challenge of reining them in.

24 "Landmine Monitor 2023," International Campaign to Ban Landmines, November 2023. The Houthis' use of landmines and IEDs proliferated in their campaigns in central Yemen between Beyhan, Marib, and al-Jawf in 2015–18 and during major battles for control of Yemen's Red Sea coast in 2018.

25 "Statistics," Project Masam.

26 One of the authors of this report worked for a number of years on demining projects in Yemen and Africa. This assertion is based on his experience and knowledge of Yemeni army landmine types and stockpile.

27 International Campaign to Ban Landmines, "Landmine Monitor 2023."

3. From Smugglers to Supply Chains

In an October 22, 2025 speech, the Houthi leader Abdul-Malik al-Houthi pronounced that Yemen had reached "an unprecedented level in military capability." Yemen was "first among Arab states in war production and military industry, from pistols to Kalashnikovs, to artillery, to snipers, to unmanned aircraft, to missiles of various types," he claimed.[28] While Abdul-Malik al-Houthi overstated the group's abilities—and neglected to mention its continued reliance on Iran—his claim was not as far-fetched as it might seem. Between March 2024 and November 2025, the authors of this report compiled a database of more than 140 seizures by Western and regional naval forces, customs agents, border patrols, and local Yemeni security forces.[29] Coupled with fieldwork in Yemen and interviews with Yemeni, regional, and international officials, this database helps tell the story of how the group evolved from passive recipient of arms to overseeing its own military-industrial complex: from smugglers to supply chains.

Throughout the war, the Houthis' opponents have characterized their military capabilities as the product of smuggled Iranian arms. This claim, while somewhat accurate, misunderstands the evolving relationship between the Houthis, Iran's Quds Force, and the broader Axis of Resistance—and misunderstands the Houthis' own transformation. A growing body of evidence demonstrates Iran's essential role in providing the Houthis with the technology, materiel, and knowledge needed not just to operate different weapons systems, but also to assemble and even build them from scratch. Although Houthi weapons are based on Iranian designs and technology, they are no longer simply shipped intact to Yemen from Tehran. The Houthis assemble and manufacture weapons locally using raw materials, components, and manufacturing equipment sourced from both Iran and the group's own regional and global procurement networks.

2006–15: Smugglers

Advisers from the Lebanese militant group Hezbollah began coordinating with the Houthis around 2006.[30] Arms transfers between the groups were initially limited, however, in part because small arms were so readily available inside Yemen at the time.[31] But in 2009, the Yemeni government claimed to have intercepted two ships traveling from Eritrea to Midi Port in northwestern Yemen carrying rifles and anti-tank missiles, along with what local and international media described as "Iranian" military advisers, who were more likely Lebanese nationals.[32] A power and security vacuum during Yemen's 2011 Arab Spring uprising and a subsequent political transition process allowed for greater coordination between

28 "Text of the Speech by the Leader of the Revolution on the Martyrdom of the Jihadist Leader, Lieutenant General Muhammad Al-Ghamari" (in Arabic), Saba Net, October 22, 2025.

29 The database comprises almost 400 individual items, ranging from AK-47 bullets to fertilizers and precision machine tools.

30 Erika Solomon, "Lebanon's Hizbollah and Yemen's Houthis Open Up on Links," *Financial Times*, May 8, 2015; Peter Salisbury, "Yemen and the Saudi–Iranian 'Cold War'," Chatham House Middle East and North Africa Programme, February 2015.

31 Erika Solomon, "Lebanon's Hizbollah and Yemen's Houthis Open Up on Links," *Financial Times*, May 8, 2015; Peter Salisbury, "Yemen and the Saudi–Iranian 'Cold War'," Chatham House Middle East and North Africa Programme, February 2015; Yemeni officials and Houthi officials, interviews with the authors, Sana'a, Yemen, 2012–14; former Yemeni smuggler, interviews with the authors, Cairo, January 2018 and June 2024.

32 "Yemenis Intercept 'Iranian Ship'," BBC, October 27, 2009.

Hezbollah, the IRGC, and the Houthis.[33] Houthi commanders and rank-and-file members allegedly traveled from Yemen to Lebanon and Iran with growing frequency.[34] Efforts to smuggle arms to the group also intensified. In January 2013, U.S. and Yemeni naval forces intercepted a stateless dhow, the *Jihan 1*, off the coast of Yemen. The vessel was carrying small arms, Katyusha rockets, Iranian portable air defense systems, explosive materials, and landmine components. The Yemeni crew of *Jihan 1* told a UN panel of experts that they had piloted the vessel from Bandar Legeh in Iran to the Yemeni coast.[35]

A former Houthi smuggling coordinator claims that the Jihan 1 interdiction represented a fraction of the total volume of arms transported to the Houthis during this period.[36] Large volumes of small arms and other materiel were being shipped to Yemen in 2012–15 and warehoused at safehouses in major cities across the country, according to multiple sources.[37] After the Houthi takeover of Sana'a in September 2014, the relationship became more overt. Iranian cargo planes and vessels allegedly transferred large volumes of materiel to Sana'a International Airport and Houthi-controlled Red Sea ports before a Saudi-led intervention in 2015 briefly blockaded Houthi-controlled seaports.[38] Even after the blockade eased, the Saudi-led military coalition tightly controlled Yemeni waters and airspace, halting all international flights to Sana'a from 2016 on, and preventing further direct transfers from Iran.

Nevertheless, Iranian arms soon became an essential part of the Houthi war effort. When they entered Sana'a, the most advanced weapons the Houthis possessed were a limited stock of anti-tank missiles. As the war expanded from 2015 onward, however, the Houthis and their allies began to use a wider range of locally sourced weapons, the prewar Yemeni military stockpile—which they had seized control of along with the capital—and smuggled Iranian arms. Stocks of longer-range weapons that the group captured from the army—primarily Soviet-era and North Korean Scud missiles—were probably exhausted by mid-2017, and from around 2018 on, the Houthis transitioned to using Iranian-supplied and -designed weapons systems, including medium-range missiles and increasingly long-range armed aerial drones.

Of the forty items interdicted between 2015 and 2018, 37.5 percent were identified as being of Iranian origin, a far greater proportion than the next two biggest sources, Russia (15 percent) and China (5 percent).[39] Some non-Iranian weapons were likely sold to Iran first before being transshipped to Yemen.[40] For example, a large batch of Chinese-made AK-47 variant Type 56-1 rifles have been traced to Iran and appear to be among Houthi fighters' most commonly used weapons.[41]

33 Yemeni, U.S. officials, interviews with the author, Sana'a, Yemen, 2013 and 2014; two former U.S. officials, one former Yemeni official, interviews with the author, June, July 2024.

34 Yemeni, U.S. officials, interviews with the author, Sana'a, Yemen, 2013 and 2014; two former U.S. officials, one former Yemeni official, interviews with the author, June, July 2024.

35 "Final Report of the Panel of Experts Established Pursuant to Resolution 1929 (2010)," UN, June 2013.

36 Author interviews, Cairo, January 2018; by telephone, June 2024. This former smuggling coordinator claims to have coordinated arms transfers from coastal Taiz governorate to the city of Taiz and beyond, with shipments arriving almost weekly. The person defected from Ansar Allah around 2017.

37 Multiple confidential sources, interviews with authors, April 2024–November 2024.

38 Former UN Panel of Experts investigators, U.S. officials, interviews with the authors, June, July 2024. See also "Iranian Flight Lands In Yemen After Aviation Deal," Radio Free Europe, March 1, 2015.

39 Project interdiction database. Around 30 percent of all items interdicted during this period were of unknown origin.

40 Based on a review of UN Panel of Experts reports 2017–24.

41 Jay Bahadur, "An Iranian Fingerprint? Tracing Type 56-1 Assault Rifles in Somalia," Global Initiative Against Transnational Organized Crime, November 2021.

2018–25: Supply Chains

The Houthis' metamorphosis from passive recipients of complete arms systems to domestic manufacturers began, or at least became visible, around 2018. That year, Houthi-affiliated news outlets broadcast video of the group's de facto president touring military production sites; the videos showed Yemeni workers making fiberglass molds for aerial drones and assembling mortar shells, landmines, and other weapons systems. The same year, large amounts of components for aerial drones and other weapons systems began to be seized by Yemeni security forces.[42] By 2020, some 35 percent of recorded interdictions were of components and raw materials, mainly for use in manufacturing landmines. Around this time, UN investigators and other arms experts also began to notice that a number of recovered Houthi missiles, drones, and landmines were being assembled in Yemen. They noticed this because of the low quality of the construction compared to earlier, Iranian-made systems.[43]

> "By 2020, some 35 percent of recorded interdictions were of components and raw materials, mainly for use in manufacturing landmines."

Since 2020, the shift has been even more dramatic: in 2024 and 2025, more than 80 percent of items seized en route to the Houthis were materials for use in arms manufacturing, rather than complete systems. These seizures also show how the Houthis have diversified their supply chains. In total, 35 percent of all items documented between 2021 and 2025 originated in China—primarily components and raw materials—compared to 21 percent for Iran, the next largest source of arms and materials. Analysis of the inner workings of missiles and other weapons either recovered after attacks or during interdictions shows that other components and raw materials were sourced globally, from India, Germany, the Netherlands, South Korea, Switzerland, the United States, Thailand, Vietnam, and a number of other countries.[44] American and other Western and regional officials, including members of the Yemeni government, believe that these shipments are being used to manufacture a growing number of weapons systems, including many of the drones and missiles the Houthis used in their Red Sea attacks during the Gaza war and against the United States during their 2025 Red Sea confrontation.[45]

Patterns of activity around six sites in northern Yemen that are likely used for weapons production or storage lend some weight to these claims.[46] Light emission patterns at relatively isolated sites, measured using satellite imagery and used to gauge the level of human activity, closely track with the documented surge in component shipments and interviewees' claims of Houthi on-site manufacturing. Emissions decreased in the early years of the war as the electricity infrastructure deteriorated, stabilized at low levels by 2018, and then began climbing in 2020. The sharpest increases came between 2023 and 2025, coinciding precisely with the intensification of Houthi Red Sea operations and the documented spike in advanced component interdictions. Figure 3 charts nighttime light activity at one of these sites and shows how it correlates to the timeline of evolving Houthi capabilities laid out above.

42 "Watch the Video That Surprised the UAE and Saudi Arabia: President al-Samad Visits a Drone and Heavy Weapons Factory" (in Arabic), *Yemen Press*, April 22, 2018; "Watch the Video: Houthi Militias Unveil a New Drone and Heavy Weapons Factory, and Al-Samad Visits It Accompanied by Disguised Figures" (in Arabic), *Al-Mashhad,* April 23, 2018.

43 Arms experts, interviews with the author, 2025.

44 Based on analysis of interdiction tracker, expert arms assessment on file with authors.

45 Arms experts, Western, regional officials, interviews with the author, 2025.

46 The sites were identified by open-source intelligence researchers and a consultant researcher for this project before Operation Rough Rider, and were targeted by U.S. air strikes during the campaign.

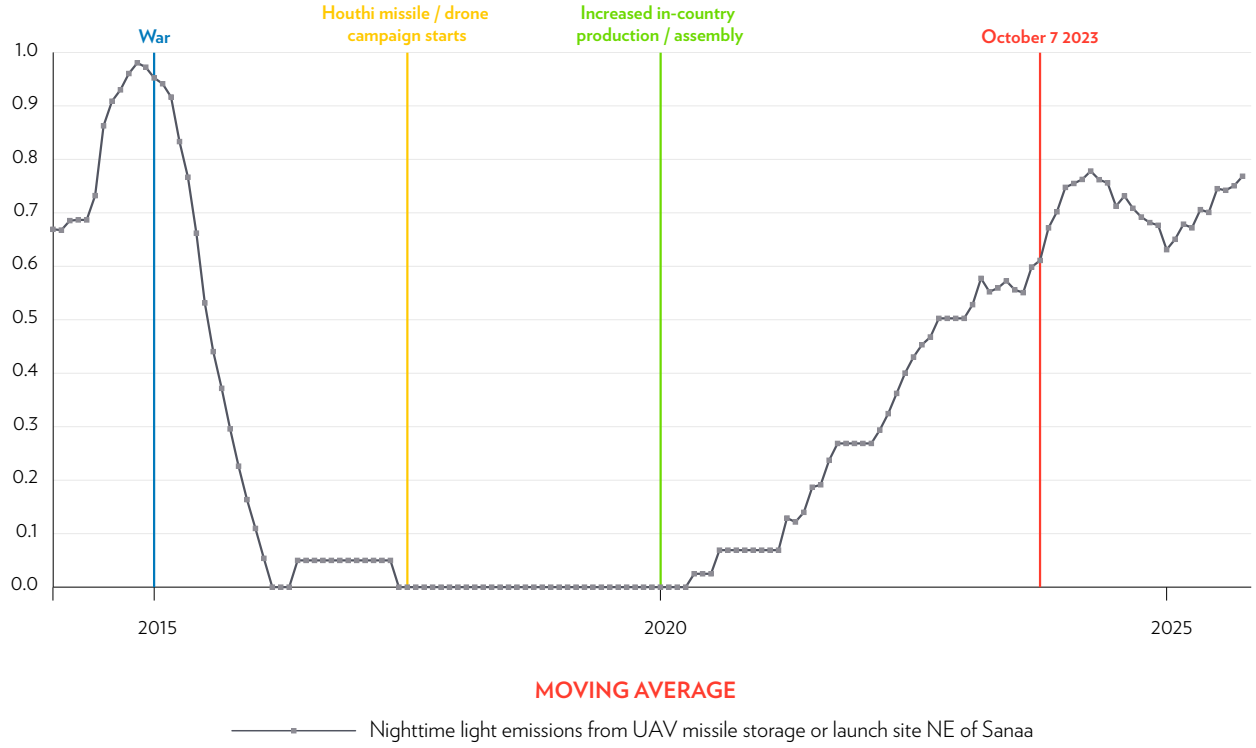

Figure 3: Nighttime Light Activity Patterns at a Likely Manufacturing or Storage Site Northeast of Sana'a

Source: NASA Black Marble nighttime light data; author timeline.

The Current State of Play: Two Charts, Two Figures

Two additional charts and analysis of two seizures help tell the story of the Houthi transition from smuggling to supply chains, and the current state of play for Houthi capabilities. The first chart, Figure 4, is based on the project interdiction database described above. It shows an annual count of seizures by type, divided between complete systems and components or raw materials. The second chart, Figure 5, shows a breakdown of the country of origin of items between 2015 and 2020, and 2021 and 2025. Chinese-origin raw materials and dual-use items represent the biggest share of all seizures. Together, Figures 4 and 5 show the shift from a dependency on Iranian arms to an international manufacturing supply chain most reliant on individual parts imported from China and other major global trade hubs.

Two major interdictions in 2025 illustrate both the growing sophistication of Houthi manufacturing and the technological barriers that constrain them. Between July and October 2025, security services in Aden intercepted dozens of shipments entering Yemen via Aden Container Port containing prohibited dual-use items, including a single shipment of forty-four containers in August. These shipments were originally destined for Houthi-controlled Hodeidah but were rerouted after the FTO designation and the Israeli strikes earlier in 2025.[47] The containers transported hundreds of items, including a bewildering array of aerial drones, drone components, and high-end manufacturing equipment, including precision CNC (computer numerical control) lathes, robotic welding systems, laser engravers, equipment for manufacturing circuit boards, and engraving equipment. Arms experts believe that the contents of these shipments could be used in the semi-industrial production of aerial drones, missiles, and small arms.

47 Mohammed al-Basha, "From China to Yemen: Seized Shipment Reveals Houthi Drone Factory in a Box," Basha Report, August 7, 2025. Complete inventory of items from the shipment on file with the authors.

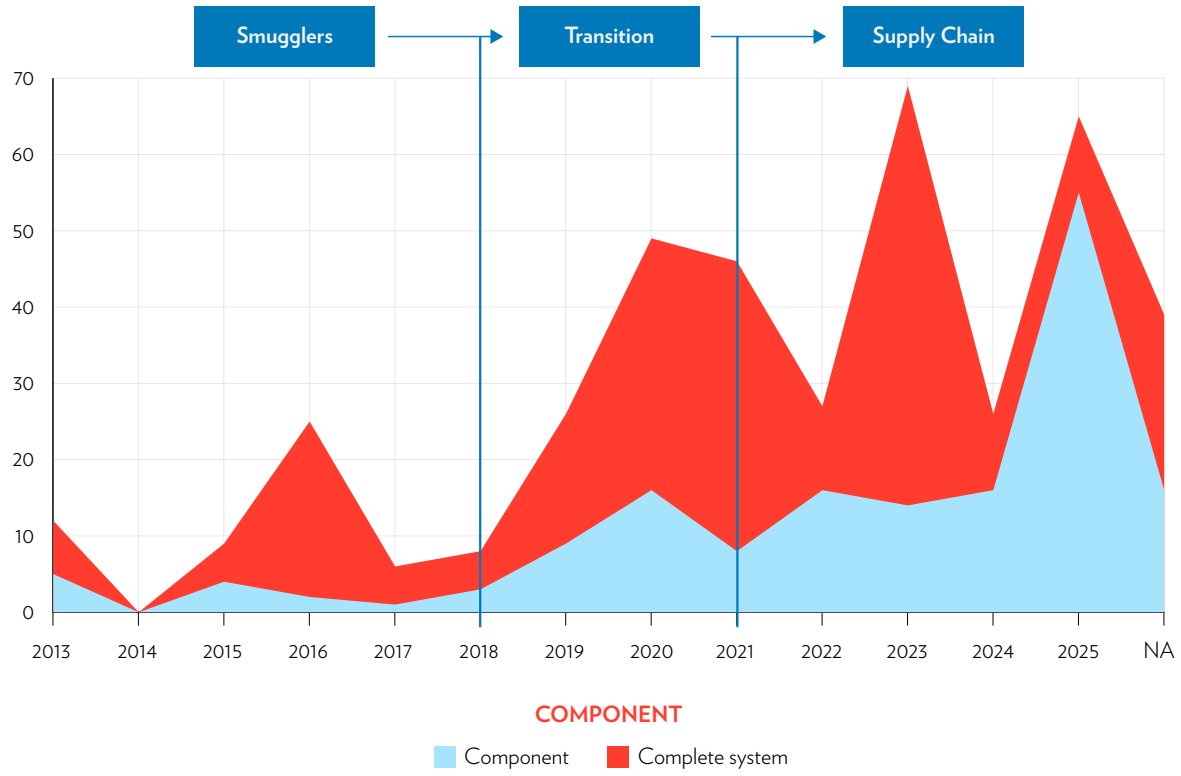

Figure 4: Annual Count of Seizures by Type, 2013–25

Source: Project interdiction database.

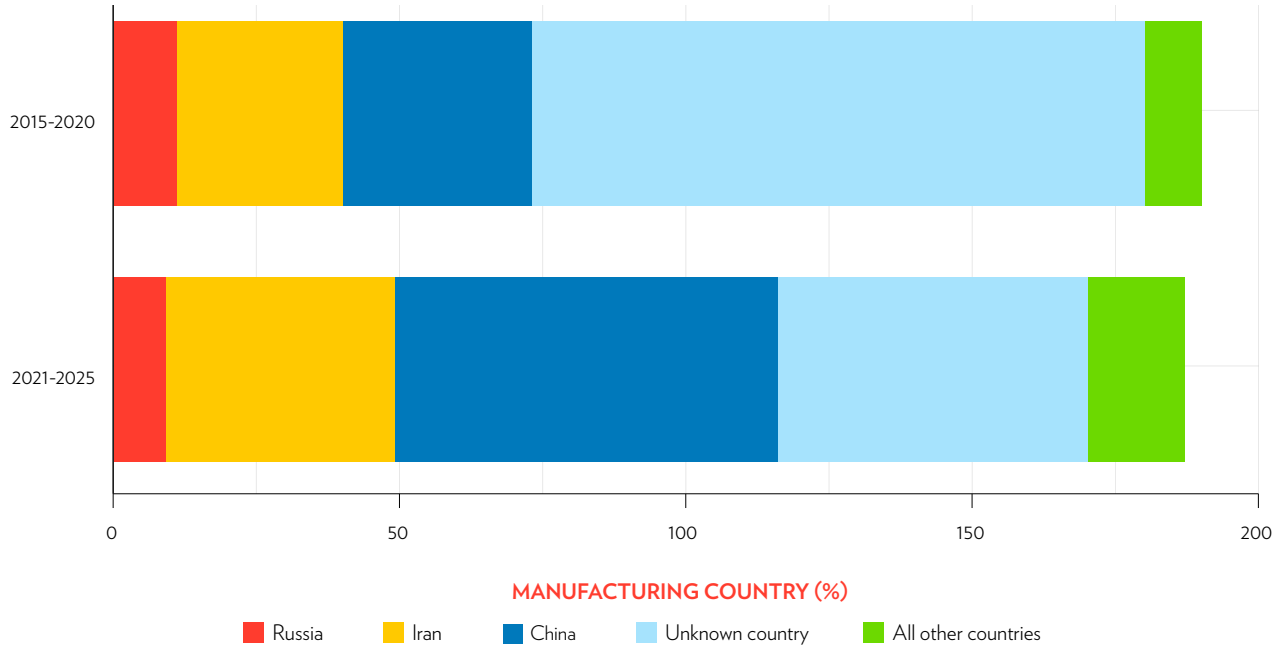

Figure 5: Country of Origin for Interdicted Items (%) 2015–20 and 2020–25

Source: Project interdiction database.

In another incident in June 2025, Yemen's National Resistance Forces—an armed faction loyal to the government—had intercepted a dhow sailing from Djibouti to Houthi-controlled Salif port.[48] On board was the largest Iranian arms shipment to the Houthis documented to date. The shipment included at least six Ghadir anti-ship cruise missiles of the kind used to attack Red Sea shipping from October 2023 onward; more than fifty seeker heads used to help cruise and ballistic missiles find their targets; dozens of parts for the Iranian Type 358 surface-to-air missile the Houthis have used to down as many as twenty-five U.S. MQ-9 Reaper drones worth more than $750 million combined; and the Ghaem-118 interceptor, an Iranian anti-drone missile unveiled only months earlier.[49] The dhow was also carrying more than a hundred drone engines, AK-103 rifle parts that the Houthis claim to manufacture domestically, and eight hundred twenty-kilogram bags of nitrogen fertilizer for propellant production.[50]

Together, the two seizures tell a story. On one hand, the dhow shipment shows that the Houthis cannot yet manufacture highly complex weapons systems, and that they still rely heavily on Iran for technology and many critical items. In fact, all advanced Houthi weapons systems are still of Iranian design.[51] For this report, the authors commissioned an analysis, from an international arms expert, of the most commonly used Houthi advanced conventional weapons—ballistic missiles, cruise missiles, and aerial and seaborne drones.[52] Based on visual analysis of the design and engineering of Houthi missiles and drones, and a review of interdicted items, the expert found that each major Houthi missile and aerial drone system has an analogue in the Iranian arsenal. Analysis from the U.S. Defense Intelligence Agency, the Center for Strategic and International Studies, and Conflict Armament Research corroborates this finding.[53] In some cases, the Houthis test Iranian-designed systems before they transfer them to other groups. For example, the Houthis build and operate the long-range Sammad-1 and Sammad-2 drones used to target Red Sea shipping and Israel. These drones had not previously been identified in the Iranian arsenal, but were later seen at Iraqi militia military parades; arms experts believe they are of Iranian design.[54]

On the other hand, the Aden container seizure is a reminder of the growing capabilities of an armed group that wields the power of a state but acts with little regard for international or domestic law. The Houthis now operate at least four lines of arms manufacturing or assembly: for landmines and IEDs, including homemade explosives; for cruise and ballistic missiles; for aerial and seaborne drones; and for some small arms.[55] Houthi manufacturing capabilities vary depending on the complexity of the weapons systems in question. For missile systems, for example, the group locally maintains only partial production capacity, manufacturing fuselages, rocket fuel, and explosives, while still depending on Iran for designs,

48 "Seizure of a Floating Iranian Arsenal Bound for the Houthis," Basha Report, July 16, 2025.

49 "Seizure of a Floating Iranian Arsenal Bound for the Houthis," Basha Report, July 16, 2025; "New Seizure Evidences Iran-Linked Resupplies to the Houthis," Conflict Armament Research, September 2025. Archive of images of seized items on file with the authors.

50 "Seizure of a Floating Iranian Arsenal Bound for the Houthis," Basha Report, July 16, 2025; "New Seizure Evidences Iran-Linked Resupplies to the Houthis," Conflict Armament Research, September 2025. Archive of images of seized items on file with the authors.

51 Joshua Koontz, "Iranian Arms Dashboard," public data visualization posted to Tableau Public. See also "Mines and IEDs Employed by Houthi Forces on Yemen's West Coast," Conflict Armament Research, September 2018. The report states that the "design and construction [of land mines and IEDs] are consistently identical to materiel that CAR has previously documented, and which it has determined originated from Iran."

52 This analysis is corroborated by reports from the U.S. Defense Intelligence Agency, the International Institute for Security Studies, and the Center for Strategic International and Security Studies.

53 "The Evolution of the Houthi Arsenal Between 2015 and 2024," private research note produced as background to this report and on file with the authors, author name withheld, July 2024.

54 Arms experts, interviews with the authors, 2024, 2025.

55 The group manufactured their own landmines and IEDs before the war. See Barak Salmoni, Bryce Loidolt, and Madeleine Wells, "Regime and Periphery in Northern Yemen: The Huthi Phenomenon," RAND Corporation, April 2010. But anti-vehicle landmine and explosives production began at scale from around 2015–16, authors' previous research has found. Reporting from the UN Panel of Experts on Yemen shows that, at least until about 2020, short-range ballistic missiles deployed by the group were transported to Yemen in sections and then welded together, and locally fueled prior to launching.

guidance systems, and critical parts like fins and motors.[56] But in a number of other cases, the group has reached a capability tipping point and can build a significant proportion of some weapons systems using imported components.[57] The sophistication of the machinery the group is importing, and interviews with weapons experts and U.S. officials, suggest that Houthi arms production is improving—and that a significant number of Yemenis have acquired a high level of manufacturing knowledge, which is a major leap forward from the war's early years.

The Houthis' emerging military-industrial complex also operates at a vast and growing scale. In 2021, a single shipment of 1.5 million simple landmine detonators was seized by local forces in southwestern Yemen.[58] An engineer at a landmine disposal organization estimates that manufacturing the corresponding 1.5 million landmines would mean importing around 4,000 tons of precursor chemicals needed for the devices' explosive charges.[59] This would equate to 150 forty-foot shipping containers. While this may seem like an unlikely amount, trade records show that between 2023 and 2025 two alleged Djibouti-based Houthi front companies, implicated in multiple shipments to the Houthis documented by the authors, imported an estimated 7,500–8,500 tons of ammonium nitrate and other chemicals to the Horn of Africa before transporting them to Houthi-controlled areas in dhows and other small ships. That is three times the volume of the same chemical that caused the 2020 Beirut blast, described as the "largest non-nuclear blast in modern history."[60] The dhow intercepted by the National Resistance Forces in June 2025 was transporting an estimated 750 tons of weapons, components and chemicals from Djibouti. Citing crew testimony, National Resistance Forces officials claim that it had made the same journey twelve times over the previous eighteen months.[61] The Houthis' military-industrial program, in other words, is on a worrying trajectory toward increasingly autonomous manufacturing at a growing scale.

56 The basic Badr 17-inch (432-millimeter) diameter rocket and Qasim missile fuselages are almost certainly made from steel tubing in Yemen, for example. See Fabian Hinz, "Missile Multinational: Iran's New Approach to Missile Proliferation," International Institute for Strategic Studies, April 26, 2021.

57 "Letter Dated 11 October 2024 from the Panel of Experts on Yemen Addressed to the President of the Security Council," United Nations, October 11, 2024; "Evolution of UAVs Employed by Houthi Forces in Yemen: Investigating the Supply and Development of Unmanned Aerial Vehicles (UAVs) in the Yemen Conflict," Conflict Armament Research, February 2020; "Iran: Enabling Houthi Attacks Across the Middle East," Defense Intelligence Agency, February 2024.

58 Note on file with the authors from Project Masam, which reviewed the contents of the seizure; local security official based in Western Yemen, interview with the authors, June 2024.

59 Project Masam staff, interview and correspondence with the authors, June, July 2024.

60 Mazen J. El Sayed, "Beirut Ammonium Nitrate Explosion: A Man-Made Disaster in Times of the COVID-19 Pandemic," National Institute of Health, June 16, 2022.

61 National Resistance Forces official, interview with the author, July 2025.

4. The Houthi Supply Chain: Four Critical Channels

Locally manufacturing and assembling arms has changed the way that Houthis source their arms, making it harder, in turn, to stop the group from expanding its arsenal. The supply model from the war's early years—smuggling complete weapons through a few covert routes—has given way to a hybrid procurement network that blends globalized supply chains with local knowledge. Components and raw materials now flow from Europe, Asia, and the Middle East through both commercial and illicit channels, with each shipment passing through multiple hands before reaching Yemen. Training and knowledge sharing take place in Yemen and abroad, with Houthi, IRGC, Hezbollah, and other officials slipping in and out of the country with apparent ease.

"Components and raw materials now flow from Europe, Asia, and the Middle East through both commercial and illicit channels, with each shipment passing through multiple hands before reaching Yemen."

Understanding the Houthi supply chain helps illustrate the challenges inherent in trying to disrupt it. Despite its almost overwhelming complexity, the supply chain can be distilled into distinct channels. Drawing on a synthesis of multiple data sources, this section outlines four core supply channels. The analysis integrates mapping of smuggling and transportation routes and is based on dozens of interviews with local sources in Yemen; corroboration of overland routes through anonymized mobile phone location data; systematic identification of maritime smuggling sites using automatic identification system (AIS) tracking and satellite imagery; and analysis of nighttime light emissions to identify activity patterns at key nodes in the supply chain.

It is important to note that these are only verified channels. Yemeni and other sources claim that a number of other routes play an important role in sustaining the Houthi arms program; for example, smuggling routes connecting Yemen with Eritrea and Sudan across the Red Sea, which are discussed in more detail later in the report.

Direct Transfers from Iran

The direct Iran–Yemen supply channel is the busiest and still most important in the supply chain. It is used to deliver the widest, and most critical, range of items: small arms, ammunition, drones, missiles, and drone and missile components.[62] Goods are usually transported from Iran by dhow to offshore locations near Yemen, where they are collected and moved into Yemen by smaller dhows or skiffs.[63] After arrival, cargo is redistributed onto trucks and smuggled overland to Houthi-controlled areas via the eastern smuggling routes.[64]

62 Project interdiction database.

63 Project interdiction database.

64 Yemeni businessmen, smugglers, and other knowledgeable individuals, interviews with consultants, April–September 2024.

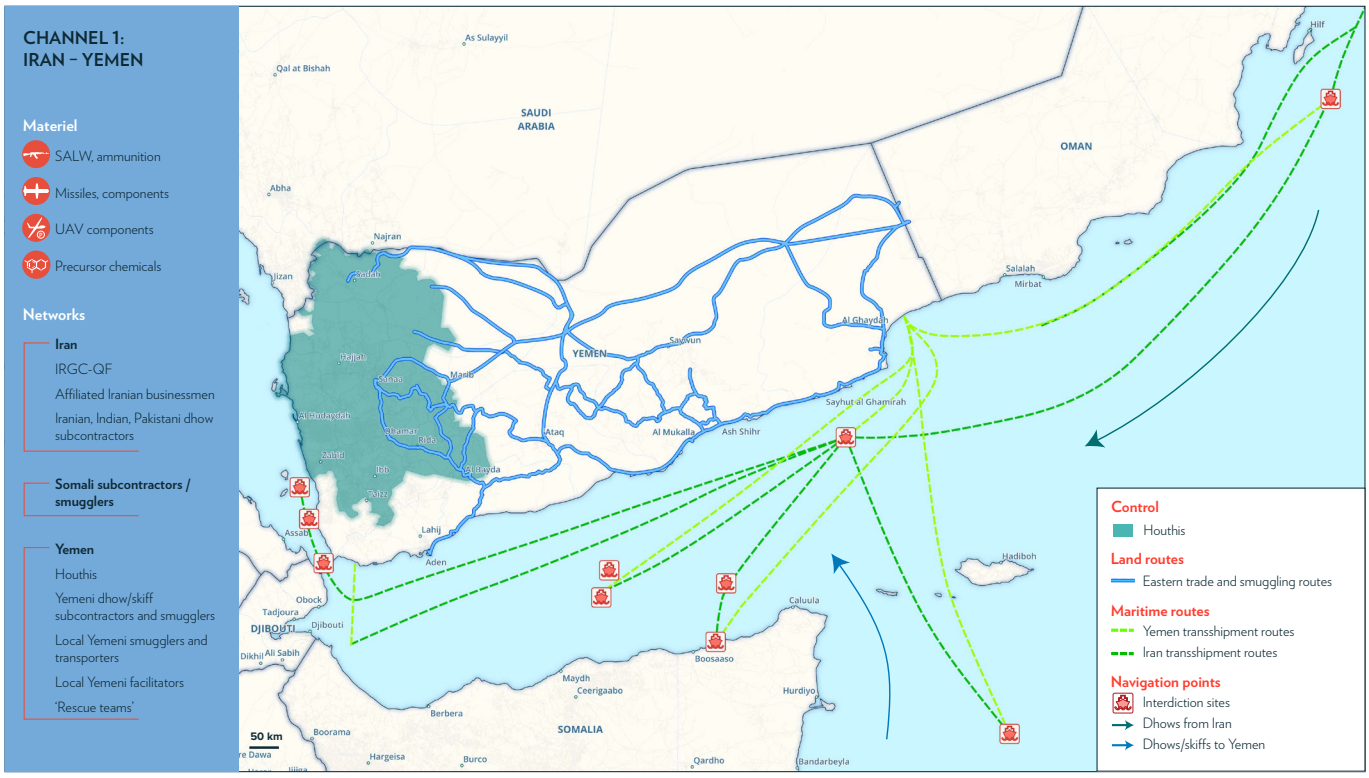

Figure 6. Supply Chain Channel 1: Direct Transfers from Iran

Data: This map shows a composite of land and sea transportation routes linking Iran with Yemen. Map created by the authors, using QGIS and Natural Maps data. Based on team mapping of overland and sea routes, including AIS data drawn from Global Fishing Watch.

Routes and methods have changed over time. In the war's early years, Iranian-led crews handed cargoes off to Somali smugglers. More recently, South Asian subcontractors have increasingly crewed vessels leaving Iran, while Yemeni sailors—often fishermen recruited from poor coastal areas in Houthi areas and trained in Iran—either transport entire shipments from Iran or transfer them to the Yemeni shoreline.[65] Transfer points have also changed over time, as the smugglers seek to evade interdiction. A January 2024 shipment that included ballistic missile motors, for example, was seized off the east coast of Somalia in an area that had not previously been identified as a transshipment site.[66]

When the opportunity presents itself, Iran and the Houthis have supplemented this channel by transferring materiel directly between Iranian and Houthi-controlled ports using larger cargo ships. Figure 7 shows the route taken by two of these ships, the *Kasra 2* and the *Almas*, in 2023. This channel may also include a second kind of ship-to-ship transfer, between larger cargo vessels, fishing skiffs, and potentially other large commercial vessels in the Red Sea and Gulf of Aden, again discussed in more detail below.

65 Based on a synthesis of smuggler video testimony and documentation provided to the authors by Yemeni security forces, an unpublished UN Office on Drugs and Crime report, and U.S. government documentation related to a seized arms shipment. See also "Superseding Indictment August 2024 Term—at Richmond, Virginia," U.S. Department of Justice, August 7, 2024.

66 Two U.S. officials, interviews with the authors, September, October 2024.

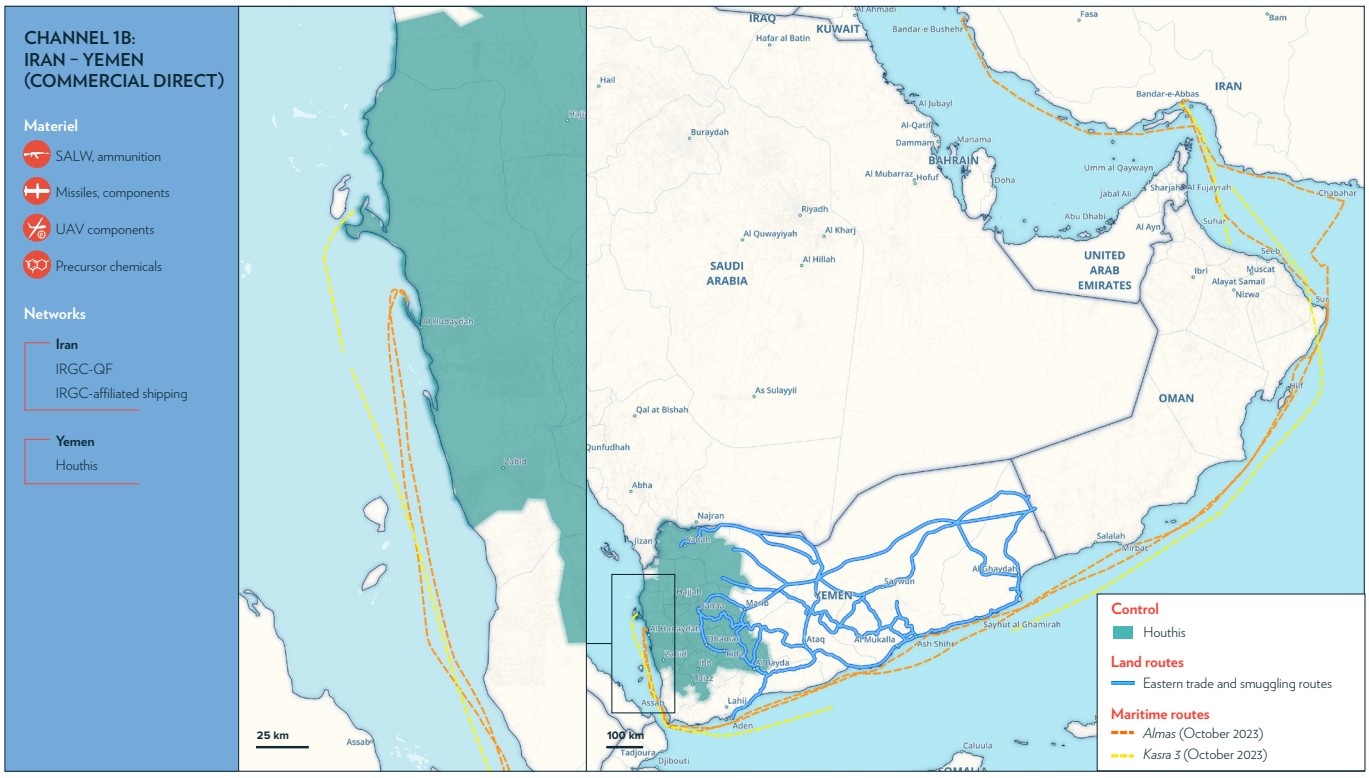

Figure 7. Supply Chain Channel 1b: Iran–Yemen Commercial Shipping

Data: This map shows the routes taken by two Iranian cargo vessels in 2023, part of an apparent effort to provision the Houthis before and after the events of October 7. Created by the authors, using QGIS and Natural Maps data. Based on team mapping of and AIS data drawn from Global Fishing Watch.

Horn of Africa Transshipment

A second supply channel leverages maritime networks connecting Yemen and the Horn of Africa, particularly Djibouti and Somalia. Items trafficked through this channel include missiles, aerial drone and missile components and other equipment from Iran, internationally procured light weapons and precursor chemicals for explosives and missile propellant, and specialized items like landmine detonators.[67] Local and Yemeni businessmen based in the Horn of Africa purchase many of these items from other African countries, China, India, and perhaps Russia. Other items are shipped to the Horn from Iran, intermingled with licit goods transported directly to Yemeni ports, or brought ashore at multiple points along Yemen's shoreline and transported overland to Houthi territory (see "Land Routes" in Section 5 for more detail).

Yemeni officials believe that Djibouti has become a key node in the supply chain in recent years, with advanced arms, dual-use components, and raw materials transported to the container port from Iran and other countries, and then transferred to dhows to be trafficked to Houthi-controlled areas, as appears to have happened in the case of the June 2025 Red Sea seizure described above and other earlier shipments.

Well-informed Yemeni and regional security sources and researchers believe that the Houthis also use this channel to sell surplus small arms to Horn of Africa countries, principally Somalia.[68] Arms dealers in Somalia consistently identify Yemen as the source of AK-47 variant Type 56-1 rifles found in their possession, according to researchers at the Global Initiative for Transnational Organized Crime

67 Based on the project interdiction database and a synthesis of smuggler video testimony and documentation described above.

68 Yemeni security and military officials, interviews with the authors and consultants, April–November 2024. Expert researcher focused on Somalia, interview with the author. Unpublished UN Office on Drugs and Crime report on file with authors.

(GITOC). In June 2021, following a series of weapons shipments from Yemen to Puntland, a Somali semiautonomous region, GITOC researchers documented two Type 56-1 rifles sold in Somalia that had a serial number close to a batch seized by U.S. naval forces in May of the same year.

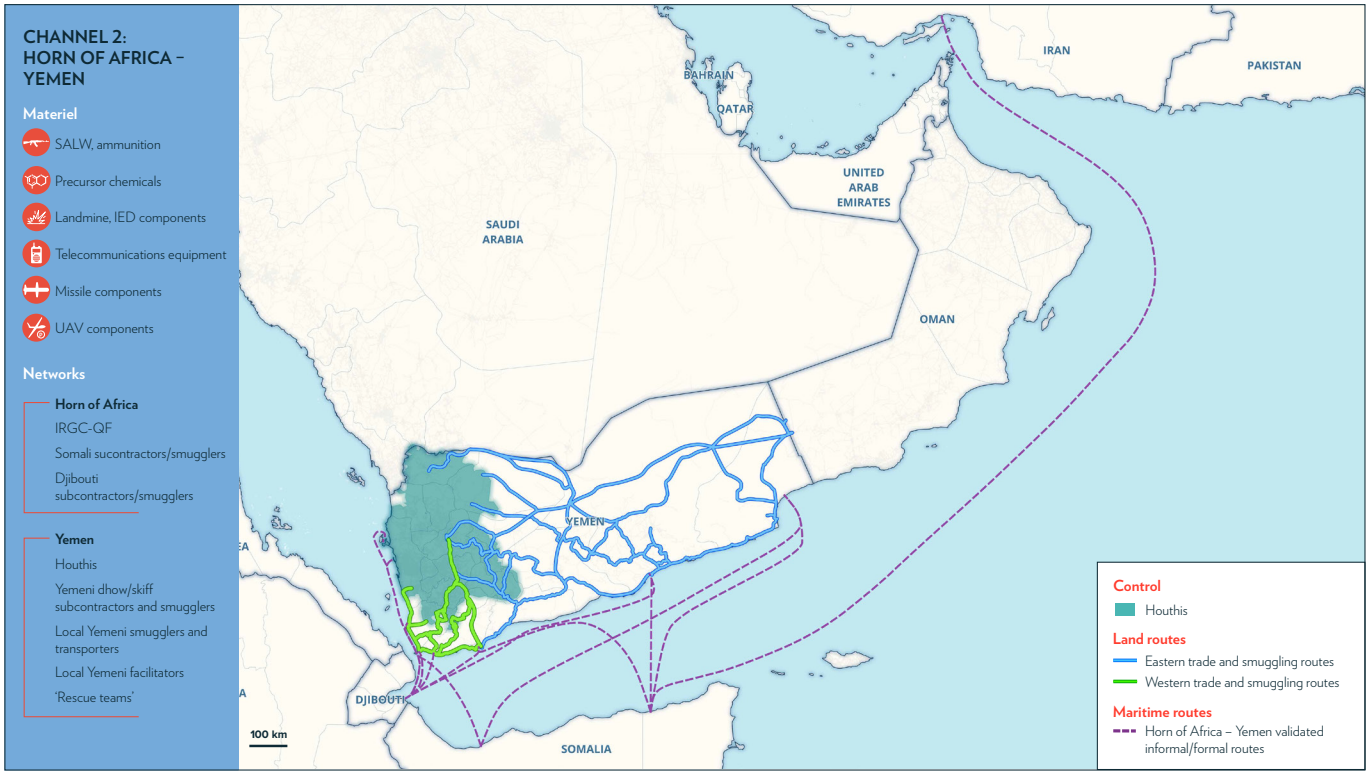

Figure 8. Supply Chain Channel 2: Shipments from the Horn of Africa to Yemen

This map shows a simplified outline of land and sea transportation routes linking Horn of Africa with Yemen. Map created by authors, using QGIS and Natural Maps data. Based on team mapping of overland and sea routes, including AIS data drawn from Global Fishing Watch.

International Commercial Shipments

International commercial shipping, most importantly containerized cargo from China, is also used to deliver critical items to the Houthis via a third channel directly linking Yemeni ports with international markets. Materials and components transported this way include precursor chemicals, aerial drone parts, and telecommunications equipment.[69] In June 2024, for example, the U.S. Treasury's Office of Foreign Assets Control sanctioned Ali Abd-al-Wahhab Muhammad al-Wazir and his China-based businesses for their role in "procuring materials that enable Houthi forces to manufacture advanced conventional weapons inside Yemen." The sanctions followed the 2023 seizure of drone parts at the Port of Aden, according to Yemeni businessmen and government officials.[70] According to businessmen whose goods were seized as part of the raid, a front company had ordered the parts from multiple Chinese manufacturers, disguised them as commercial electronics, and shipped them in containers alongside legitimate goods. The container's bill of lading listed the cargo as "industrial equipment."[71]

More recently, international container traffic has also been able to enter Houthi-controlled ports. In 2023, as part of a broader effort to negotiate Riyadh's exit from the war, Saudi Arabia paused a ban on

69 Project interdiction database.

70 "Treasury Targets Houthi Weapons Procurement and Funding Networks," U.S. Department of the Treasury, June 17, 2024.

71 Two Yemeni businessmen, one Aden-based government official, one former government official, interviews with the author, September 2024, January 2025.

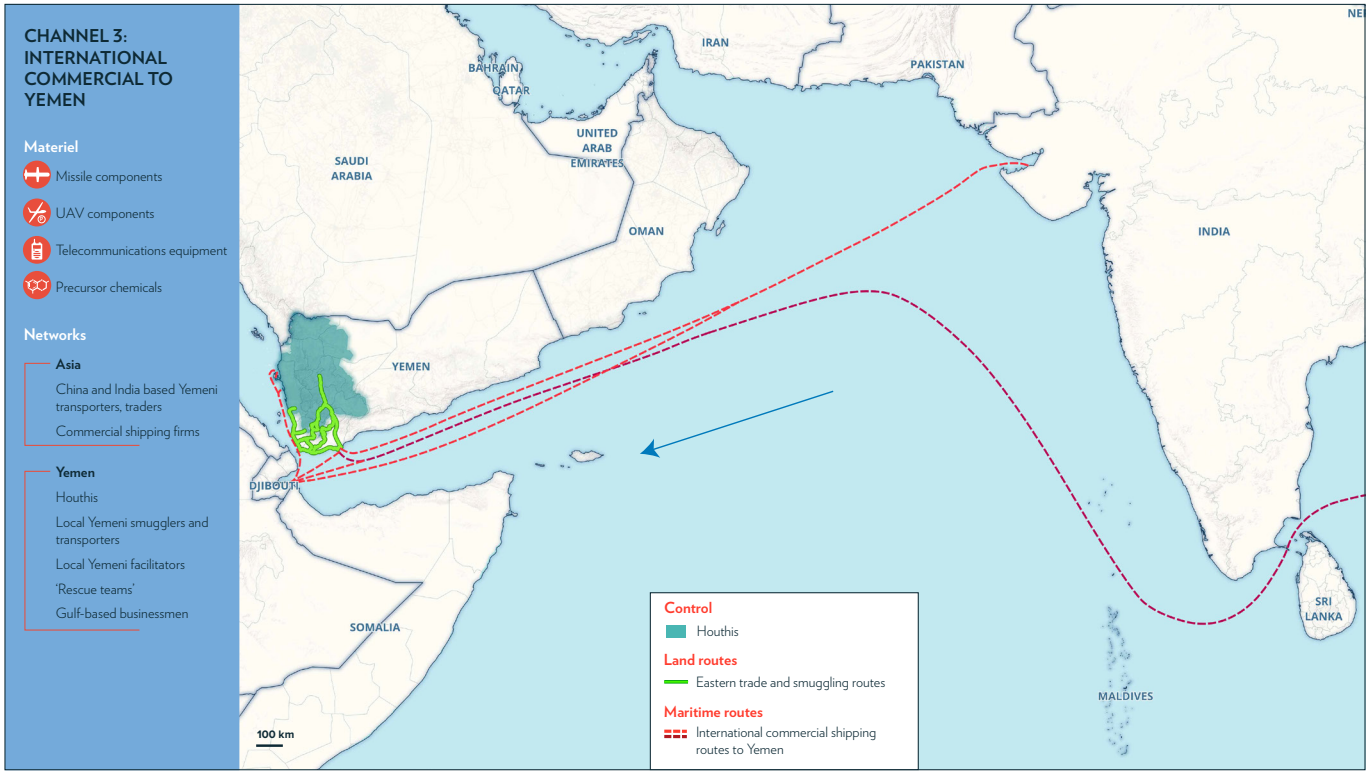

Figure 9. Supply Chain Channel 3: International Commercial Shipments to Yemen

Data: This map shows commercial sea routes used to provision the Houthi war effort. Map created by the authors, using QGIS and Natural Maps data. Based on team mapping of overland and sea routes, including AIS data drawn from Global Fishing Watch.

container ships entering Red Sea ports. Since then, a growing number of container ships have been offloaded at the Houthi-controlled Red Sea ports of Hodeidah and Salif after UN inspection in Djibouti. Yemeni businessmen and intelligence sources claimed these shipments include cameras and guidance systems for Houthi weapons systems, concealed in shipments of licit items or marked as generic "industrial equipment."[72] However, a combination of the American FTO designation and U.S. and Israeli attacks on Red Sea ports infrastructure has led many international shippers to redirect container cargo to government-controlled Aden, leading to a series of seizures of the kind described above. Analysis of maritime traffic around Yemen (described in more detail below) also strongly indicates ship-to-ship transfers of people and materiel from large cargo vessels to smaller ones around major shipping lanes. However, this cannot be definitively proved.

Overland through the Region

A significant volume of goods trafficked to the Houthis are first imported to the Emirates and Oman (from various points of origin) before being transported overland to Yemen.[73] The exact amount of materiel moving along this channel is difficult to gauge, as interdictions are infrequent and, Yemeni

72 Three Yemeni businessmen, interviews with the author, August, October 2024.

73 Project interdiction database; Yemeni businessmen, smugglers, and other knowledgeable individuals, interviews with consultants, April–September 2024. Public information about goods passing through the Emirates is less common. But in January 2024 Omani customs publicized the seizure of forty consumer drones destined for Yemen in a lorry on the Hafeet land border with UAE. See Oman Customs (@omancustoms), "#Seizures_in_Video || The General Directorate of Customs managed to seize a truck at the (Hafit) border crossing loaded with wireless aircraft (drones) arriving via the transit system from the United Arab Emirates heading to the Republic of Yemen. #Oman_Customs #Sultanate_of_Oman_Police," X, January 9, 2024.

authorities say, the Emirates and Oman do not respond to requests for cooperation in investigations.[74] A number of Yemeni, regional, and international military and intelligence officials believe that this channel is used to transport smaller items like guidance systems to the Houthis and, since at least 2021, the route has also been used to deliver specialized kits to jam drone signals.[75]

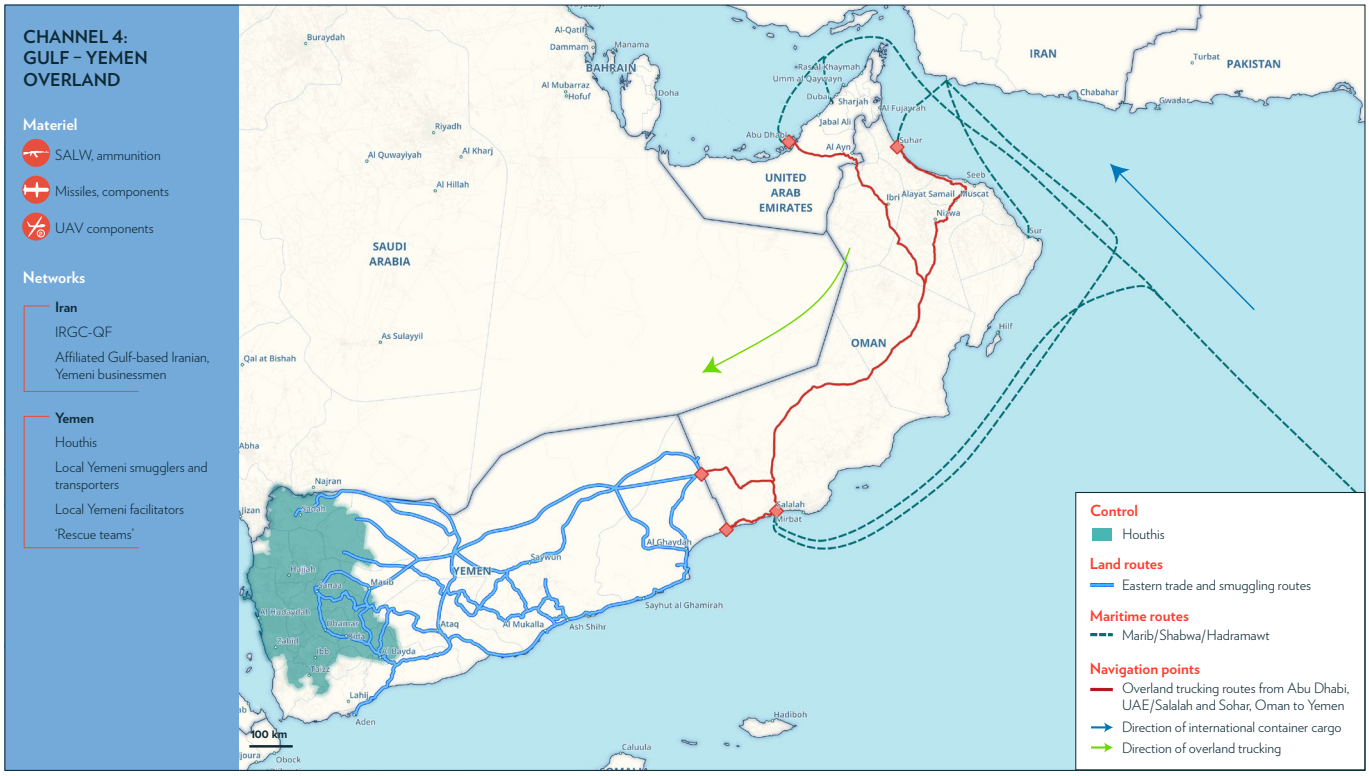

Figure 10. Supply Chain Channel 4—Regional Overland Routes from Gulf Ports to Yemen

Data: This map shows commercial sea routes used to provision the Houthi war effort. Map created by the authors, using QGIS and Natural Maps data. Based on team mapping of overland and sea routes, including AIS data drawn from Global Fishing Watch.

Interdiction data show that the channel is also used to transport a mix of Chinese, Russian, and Iranian small arms and some missile and drone components, likely in small boats from Iran to Oman before they are moved overland to Yemen.[76] Yemeni government officials allege that missile parts are also transported via this route—a claim for which there is some evidence. In 2018, local media reports claimed that an Iranian-flagged container ship was being used to ship ballistic missile parts to Oman for transport to Yemen.[77] The ship, its owner, and parent company were later sanctioned by the U.S. Department of the Treasury for "the transport of IRGC-QF [IRGC-Quds Force] cargo from Iran, ultimately destined to Yemen."[78] Shipping manifests and automatic identification system (AIS) tracking data confirm the vessel traveled between Iranian and Omani ports multiple times before it was sanctioned.[79]

74 Two Yemeni security officials; consultant interviews, Yemeni businessmen, smugglers and other knowledgeable individuals, interviews with the authors, April–September 2024.

75 Project interdiction database. See also, for example, "Nine Drone Jamming Devices Seized in Mahra," South 24, February 1, 2024.

76 Project interdiction database.

77 The report, documents, and files associated with it, have since been removed from the Internet, but remain on file with the authors.

78 "Treasury Designates IRGC-QF Weapon Smuggling Network and Mahan Air General Sales Agents," U.S. Department of the Treasury, press release, December 11, 2019.

79 Author analysis of AIS data, shipping manifests for Genaveh 12 (IMO: 9776523).

5. Routes, Recruits, and Supply Chain Management

While the four channels described above provide a structured framework for understanding the Houthi supply chain, they should not distract from its underlying complexity and adaptability. Each channel encompasses multiple land and sea routes, relies on diverse transportation methods, and involves hundreds of participants—some knowingly complicit, others unwitting accomplices. A small core of Houthi and IRGC-Quds Force operatives orchestrates the entire enterprise. This section examines these physical routes, human networks, and management structures in detail, revealing how seemingly distinct channels function as components of an integrated, adaptive system.

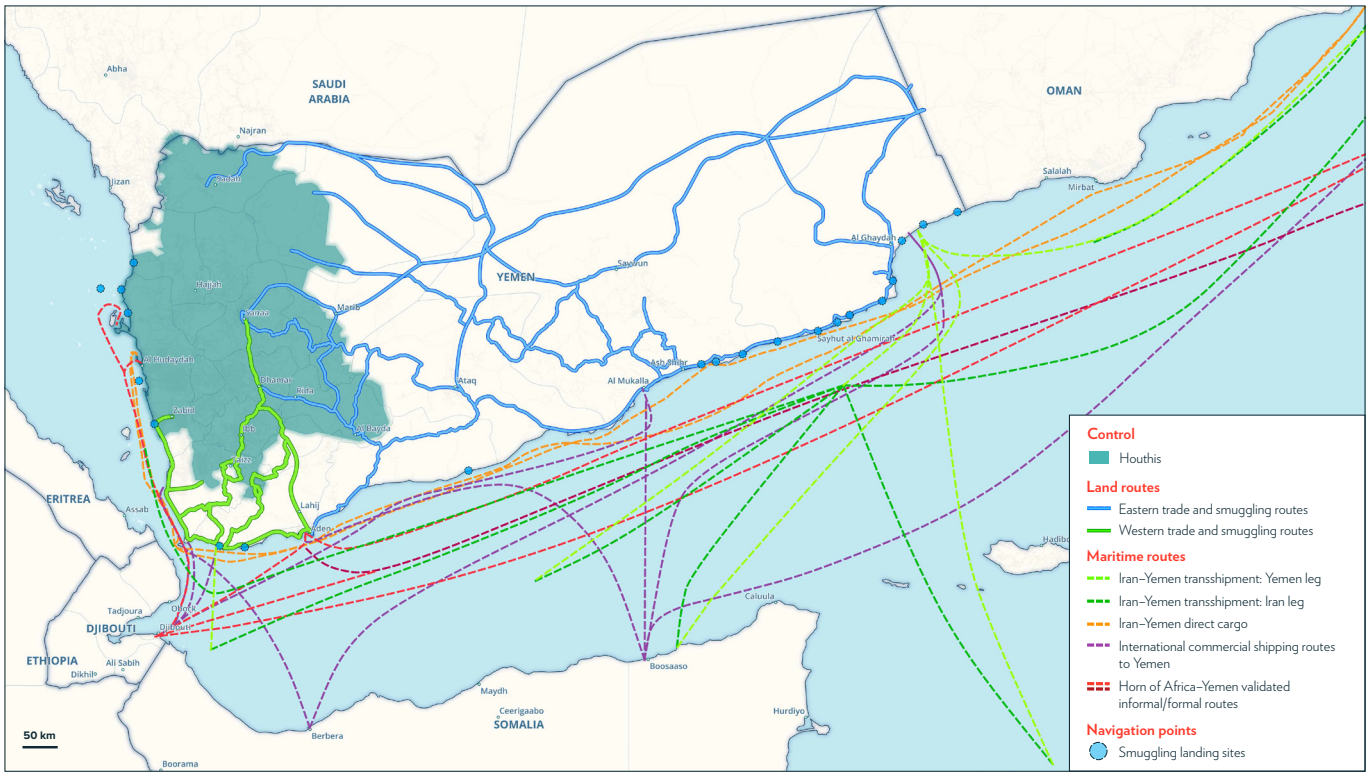

Figure 11. Yemen Land and Sea Smuggling Routes

Data: This map shows a composite of land and sea transportation routes linking used to provision the Houthi war effort. Map created by the authors, using QGIS and Natural Maps data. Based on team mapping of overland and sea routes, including AIS data drawn from Global Fishing Watch.

Maritime Routes

The maritime component of the Houthi supply chain operates through a sophisticated network of routes and vessels connecting global suppliers to ports and informal landing spots along Yemen's 1,200-mile coastline. Oceangoing cargo ships move materiel from distant sources like China and Iran; medium-sized

dhows transport goods across the Red Sea and Gulf of Aden; while small dhows and fishing skiffs transfer goods from other ships to Yemen's poorly policed shoreline.[80]

The most visible aspect of smuggling along maritime routes is ship-to-ship transfers originating in Iran. Such transfers account for the majority of maritime interdictions recorded by international, regional, and Yemeni forces since 2015.[81] The apparent destination for many of these shipments is al-Mahra, Yemen's thinly populated easternmost governorate. From here, the cargo is transported overland to Houthi areas. However, as noted above, a growing number of these shipments also travel directly to the Houthi-controlled Red Sea coast.

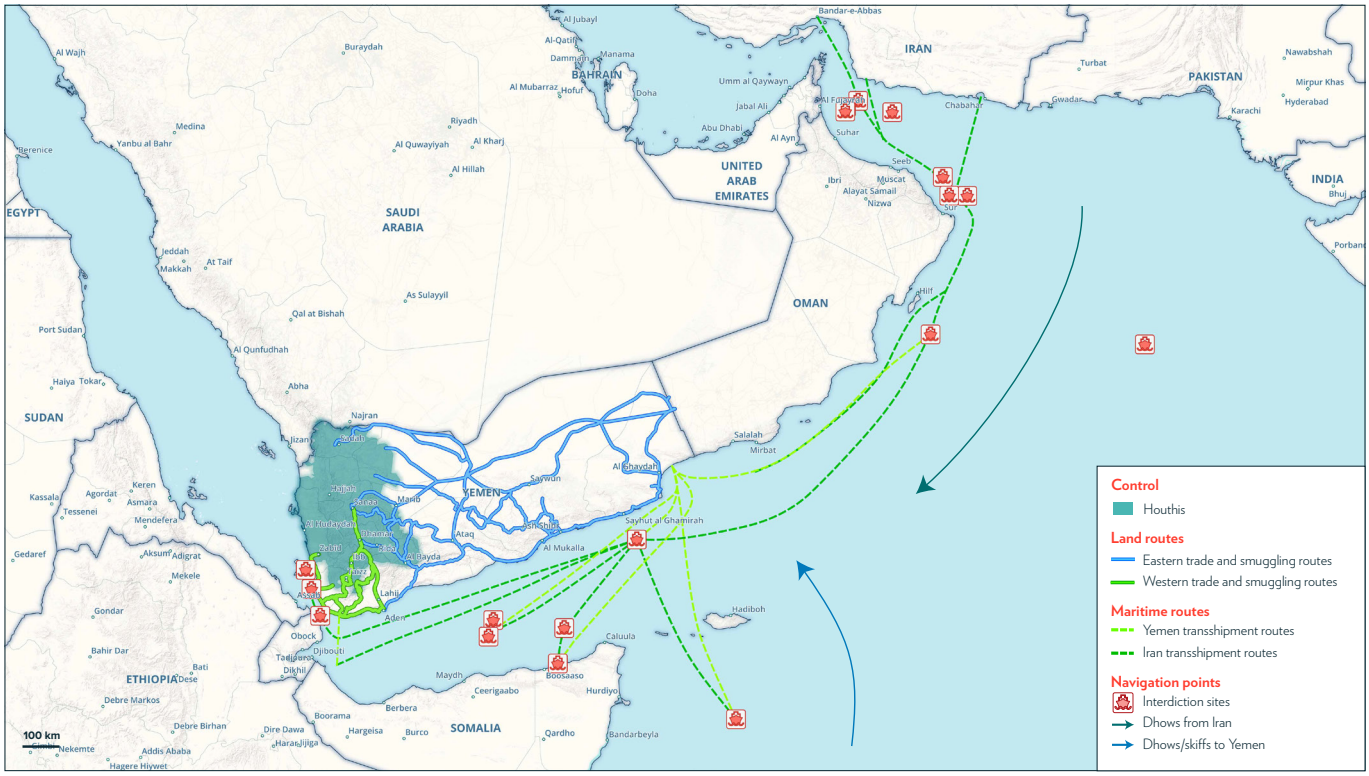

Figure 12. Iran–Yemen Transshipment Routes and Interdiction Sites

Data: This map shows a composite of land and sea transportation routes linking Iran with Yemen, including recorded areas where ship-to-ship transfers have been interdicted. Created using QGIS and Natural Maps data by the authors. Based on team mapping, including AIS data drawn from Global Fishing Watch.

Ship-to-ship transfers originating in Iran are by no means the only source of smuggled goods—or maybe even the most prevalent. Analysis conducted for this report shows a large number of medium-sized cargo and even container ships, some in excess of 200 meters in length, engaging in ship-to-ship transfers in or near Yemeni waters. Figure 13 shows a heatmap of potentially illicit transfers between 2018 and 2024, based on a database of more than 160 events compiled by researchers using ships' AIS software and satellite imagery. The map indicates clusters of potentially illicit activity along the coast of government-controlled Hadramawt and Shabwa governorates in Yemen's south, southwestern Lahij, and the Houthi-held Red Sea coast.

80 The terms "dhow" and "skiff" cover a wide range of vessels that vary significantly in range and capability. A fiberglass houri skiff is around 9 meters long and, powered by two 40-horsepower motors, can travel several hundred kilometers if it carries a load of plastic jerrycans of fuel. Shua'i dhows are between 5 and 15 meters long and are used for fishing and coastal trade, while ebri and jelbut dhows are between 15 and 32 meters long and have a capacity of up to 100 dry weight tons. They have inboard diesel engines of 80–450 horsepower, and work as both fishing and trading vessels—often both at the same time. Sambuk dhows are oceangoing vessels about 38 meters in length and can carry more than 500 tons of cargo.

81 Project interdiction database. All of these seizures have involved transshipment from larger dhows to smaller ones or fishing vessels at locations off the coast of Sawdah Island, Oman and, in the Gulf of Aden, approximately 110 kilometers off the Somali and Djibouti coasts.

Interviews with Yemeni security and military officials and other local observers, and a review of data on land-based interdictions gathered for this report, corroborate the claim that these areas are being used for arms and other forms of smuggling. Suspected ship-to-ship transfers also take place in international waters to Yemen's south and west. Dhows and cargo also travel directly from India, the Emirates, Oman, and the Horn of Africa to major Yemeni ports, where they transfer goods to fishing boats and skiffs while at anchor.[82] However, a great deal of this activity is illicit but not related to Houthi arms transfers. During the research process for this project, for example, researchers spent a significant amount of time analyzing ship-to-ship transfers off the coast of al-Mahra in eastern Yemen before concluding that they were related to a fuel smuggling operation run by a businessman based in government-controlled Aden.

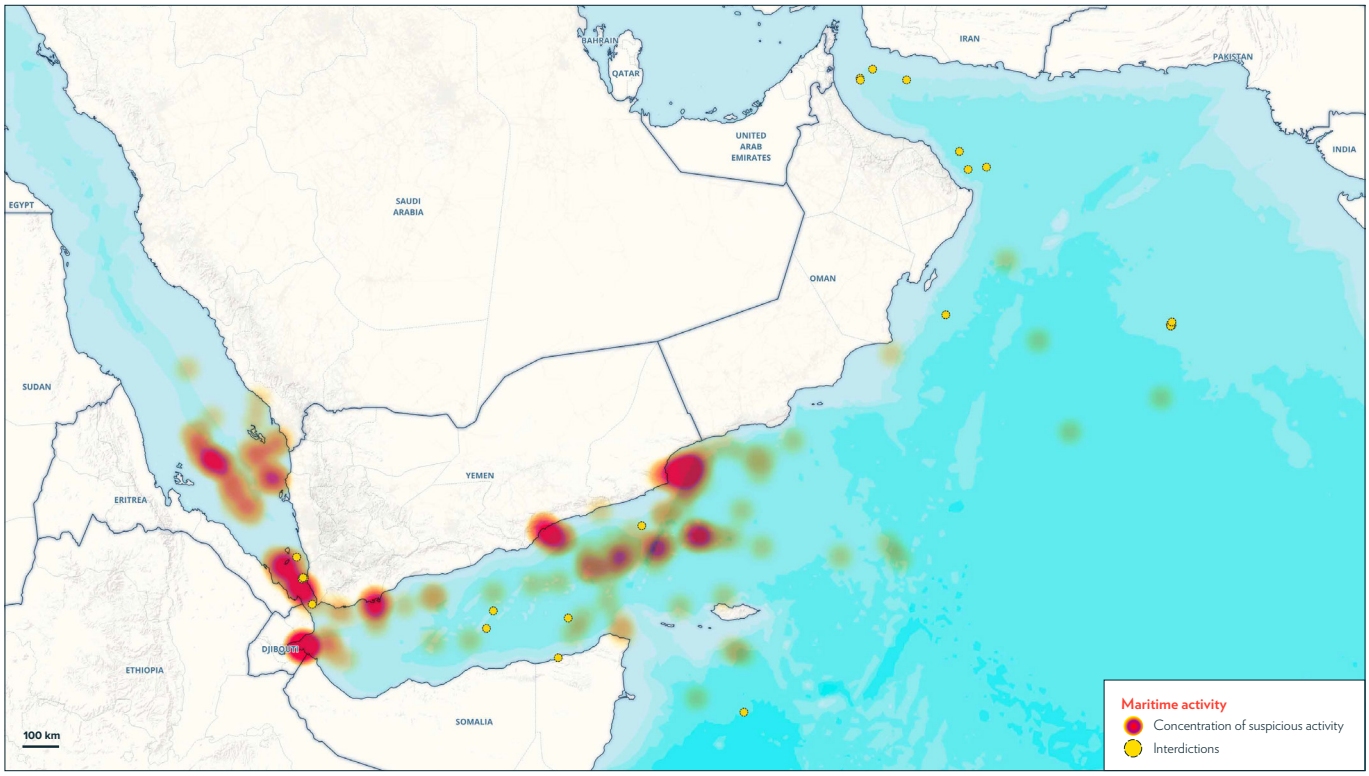

Figure 13. Suspicious Maritime and Interdiction Patterns

Data: This map shows areas of suspicious activities identified by the team using AIS tracking software and satellite imagery; and known interdiction locations collated by the authors from open and private sources. Created by the authors, using QGIS and Natural Maps data. Based on team mapping, including AIS data drawn from Global Fishing Watch.

Commercial Shipping

Goods are also smuggled to the Houthis in shipping containers via the Port of Aden and, since containerized traffic was allowed to return to Houthi areas in 2023, via Houthi-controlled Red Sea ports.[83] The al-Wazir case (described above) is part of a broader pattern. At least forty container shipments containing smaller aerial drone systems, telecommunications equipment, arms-related components, and raw materials have been seized at the Port of Aden over the course of the conflict, as well as manufacturing equipment for

82 Yemeni military and security officials, interviews with the authors, June–September 2024; project interdiction database.

83 Yemeni military leader, local security officials, Western intelligence official, interviews with the author, May, July 2024. From 2017 onward, commercial traffic other than food and fuel supplies was largely prohibited from entering the Houthi-controlled Red Sea ports. The UN Monitoring and Verification Mechanism, which inspects cargo ships bound for Hodeidah, has found no weapons systems on board any ship it has examined since its inception in 2016.

the Houthis' growing military-industrial complex.[84] The majority of the containers originated in China, Djibouti, and India.[85]

Smuggled goods from the Horn of Africa are also offloaded at quasi-formal ports in southern Yemen, or in the waters around major ports.[86] When the Houthi-controlled Red Sea coast is not being actively policed by outside powers, arms and materiel are also transferred directly to Houthi ports by cargo ships, dhows, and skiffs. As noted above, between October 2023 and May 2024, at least five large cargo ships traveled directly between Iran and the Houthi-controlled Red Sea ports of Hodeidah and Salif, circumventing UN, Yemeni government, and Saudi verification processes. Western officials believe these shipments transferred large quantities of arms to the Houthis, potentially including anti-ship missiles.[87] During the same period, a large number of dhows and cargo ships began to dock near a small fishing port to the north of Houthi-controlled Salif Port. Yemeni military and intelligence officials claim that these smaller vessels were carrying arms from Iran and the Horn of Africa.[88] Again, these vessels did not submit to clearance procedures or register with port officials.

Land Routes

Land-based smuggling routes connect Yemen's coasts and land borders with Houthi territory. These routes can be divided into two broad systems, one in the east of the country and the other in the west.[89]

- An **eastern** system connects land and sea entry points in al-Mahra, Hadramawt, and Shabwa governorates with road routes into Houthi-controlled areas in the central and northern al-Bayda, Marib, and al-Jawf governorates. The eastern route subdivides into a desert route that crosses northern al-Mahra, Hadramawt, and al-Jawf; and a coastal one that moves west along the three governorates' coasts before moving north, either in Hadramawt or Shabwa.

- A **western** system connects the Port of Aden and coastal smuggling sites in neighboring Lahij and Taiz governorates with Houthi-controlled areas in Taiz, Lahij, and neighboring al-Dhale (all three governorates are contested and territorially divided between Houthi and government-aligned forces). This route also subdivides into a direct route between Aden and Houthi-controlled Dhammar; and a series of smaller roads connecting coastal Lahij and Taiz with the Houthi-controlled north of Taiz governorate.

Vehicles traveling along both routes encounter multiple checkpoints and security outposts. Local security in government areas is often lax, and soldiers at checkpoints—many of whom have gone unpaid for

84 Documents on file and Yemeni official, interviews with the author, June, July 2024.

85 Project interdiction database.

86 Government and security officials in Aden report that a small fishing jetty to the west of the city, al-Imran, is being used by traders from Yemen and the Horn of Africa as an alternative to the main ports. When goods are offloaded at the port, local security forces, who occupy a coast guard base at the jetty, charge a lower tax and customs rate than the government. These funds are not transferred to the Customs Authority or any other central state body. Local security and government officials, interviews with the authors and researchers, Yemen, June, July 2024.

87 Vessels identified by the authors using AIS tracking software and satellite imagery include the *Almas* (MMSI: 312973000), *Alshahab* 1301107 (MMSI: 620963000), *Kasra 2* (IMO: 9124158), *Kasra 3* (IMO: 9109184), and the *Shahin* (IMO: 9104378).

88 Yemeni military official, interview with the authors and researchers, June 2024. A visual count of small dhows and cargo ships arriving in this area between January 2021 and August 2024 shows a significant increase in activity, while satellite imagery validates claims that smaller ships were used to offload goods from these vessels and transport them to shore, where they were loaded onto waiting trucks. Several of these vessels carried AIS trackers and had been previously identified by researchers and intelligence officials as likely being involved in smuggling. One AIS-tracked vessel made at least one trip to an Iranian port before traveling to Salif via the Emirates.

89 Four Yemeni security officials in Marib, Hadramawt, and Shabwa, interviews with the author, June–September 2024; mobility data tracking analysis of vehicle movements along key smuggling corridors, April–August 2024; "Assessment of the Response to Illicit Weapons Trafficking In the Gulf of Aden and the Red Sea," UN Office on Drugs and Crime, March 2024.

months—are increasingly willing to accept bribes. Security and customs posts in Houthi-controlled areas are reportedly used as collection points for shipments entering the northwest commingled with licit items. Elsewhere, Al-Mazyunah Free Zone in western Oman allegedly serves as a gateway for Houthi supplies entering Yemen from the Gulf. A number of Yemeni security sources claim that cargo bound for the Houthis is transported to warehouses in al-Mazyunah before being hidden in containers and other shipments of legitimate goods and transported across the eastern road route. Several truck drivers caught at the Oman–Yemen border transporting arms, components, and other illicit items, including drone jammers, have said they received these items in al-Mazyunah.[90]

Figure 14. Yemen Land Transport and Smuggling Routes

Data: This map shows a composite of land transportation routes used to provision the Houthis, based on a series of author and consultant interviews and inland interdiction data. Map created by the authors, using QGIS and Natural Maps data.

Overland smugglers use a variety of vehicles and techniques to transport illicit goods across Yemen. Arms and other materiel are often commingled with trucked goods, including vegetables, fish, and qat, and alongside electronics and machinery in shipping containers.[91] In some instances, high-value items are hidden inside machine tools, generators, and other heavy goods. Specialized smugglers using smaller vehicles like pickups, which can move along both highways and paved and unpaved desert and road routes, often transport high-value materiel.[92] Figure 15 illustrates some of these methods with images gathered from open source and private materials.

90 Project interdiction database; Yemeni military official, interviews with the author, June 2024; interdicted truck drivers' testimonies provided by Yemeni security forces, April–September 2024; "Nine Drone Jamming Devices Seized in Mahra," South 24, February 1, 2024. See also "Customs Seizes Drone Jamming Devices" (in Arabic), Yemen Ministry of Interior, January 2024.

91 Project interdiction database, open-source intelligence, and private images of intercepted goods in situ.

92 Three Yemeni security officials, interviews with researchers, June, July 2024.

Figure 15. Land Smuggling Methods

Clockwise from top left: (1) Toyota Land Cruisers prepared to carry illicit materiel across challenging terrain (source: Security Belt Forces social media via South24). (2) Artillery shells stored in a shipping container (source: Shabwa Defense Forces social media via cratar.net). (3) A truck driver hides chemicals in the back of a shipping container (source: Project Masam, on file with authors). Large-caliber ammunition hidden among fruit and vegetables (source: tihama24.net). Electronic equipment in the back of a truck (source: Security Belt Forces social media via southonline.net). And chemicals hidden among bags of cement (source: Project Masam).

Networks and Management

Behind these smuggling and transportation routes are networks of human beings. The Houthis increasingly outsource the procurement of critical items, and the actual handling of goods, to a range of subcontractors whose motivations for being involved in smuggling vary widely. Outside of Yemen, procurement and logistics for some items are outsourced to Iranian, Yemeni, and other regional businessmen based in the Middle East, Africa, Asia, Europe, and elsewhere. Drone parts and components, for example, are purchased by Yemeni businessmen based in China, and transported to Yemen by China-based, Yemeni-run logistics companies.[93] These logistics firms allegedly commingle and hide sensitive items among legitimate imports in shipping containers bound for Yemen.[94] Iranian- and Yemeni-run businesses in Djibouti, Oman, and the Emirates allegedly play a similar "cutout" role: they import goods to Oman from Iran, China, and other countries using apparently legitimate businesses, and then ship goods—including drone and missile components—overland to Yemen, for a fixed fee.[95]

93 In 2024, the U.S. Department of the Treasury's Office of Foreign Assets Control sanctioned a number of Yemeni nationals for their part in facilitating drone part shipments to Yemen via the Port of Aden. In June 2024, OFAC sanctioned Ali Abd-al-Wahhab Muhammad al-Wazir.

94 Project Masam, private correspondence from 24 January 2024 relating to the seizure in November 2022 of precursor chemicals from two containers in the Port of Aden.

95 "Treasury Targets Houthi Weapons Procurement and Funding Networks," U.S. Department of the Treasury Office of Foreign Assets Control press release, June 17, 2024; Three Yemeni businessmen with knowledge of procurement networks, interviews with the author, August–October 2024; Project Masam, private correspondence relating to the seizure of precursor chemicals from containers at the Port of Aden, January 2024.

The maritime component of the Houthi supply chain relies on overlapping networks of operators: Pakistani and Iranian sailors recruited by IRGC-affiliated businessmen to crew dhows from Iranian ports; Somali and Djiboutian smugglers who facilitate transshipment through Horn of Africa waters; Yemeni fishermen who navigate coastal waters from Iran and to complete final deliveries; Yemen-born sailors trained in Iran who pilot specialized transport vessels; and Djibouti-, Emirates-, Oman-, and Iran-based shipping companies that provide commercial cover for sensitive cargo.[96]

A similarly diverse range of local networks operate road routes. Some are professional smugglers, while others are unwitting or willfully ignorant participants.[97] Goods arriving on the coast of al-Mahra, Hadramawt, and Shabwa, for example, are generally transported inland by professional smugglers to warehouses run by Houthi-affiliated middlemen at key political-geographical intersections. Goods are transferred between socially connected trust networks as they cross Yemen. Items that can be easily hidden among other goods are often transported by established trucking firms and sole traders, who ask for documentation proving that cargoes are "legitimate" but do not inspect or question the origin of the items they are carrying.[98]

"The Houthis have built their own logistics and legal infrastructure in government-held areas, systematically exploiting gaps in local authority to support smuggling operations."

The diversity of actors and routes involved in the land and road routes creates built-in redundancies that are increasingly supplemented by Houthi penetration of government-controlled areas. Working with local affiliates, the Houthis have built their own logistics and legal infrastructure in government-held areas, systematically exploiting gaps in local authority to support smuggling operations. Houthi affiliates increasingly operate warehouses at major ports and in locations where different smuggling areas intersect.[99] At these warehouses, cargoes are separated by item type and prepared for transport to Houthi areas via commercial trucks and professional smugglers. The Houthis also oversee a web of "rescue teams." Houthi-aligned groups operate in coordination with well-connected tribesmen whose cooperation local security forces need on other issues—for example, in countering al-Qaeda in the Arabian Peninsula (AQAP).[100] These groups are often able to negotiate the release of smugglers and their cargo.[101] Local lawyers are increasingly part of so-called rescue teams and have sued the Yemeni government to compel Aden customs authorities to release seized containers containing rocket fuel precursors and drone parts.[102] As a senior Yemeni military officer based in the al-Abr district of Hadramawt said in August 2024:

96 "Superseding Indictment August 2024 Term—at Richmond, Virginia," U.S. Department of Justice, August 7, 2024; project interdiction database analysis of crew nationalities from maritime seizures, 2018–24; National Resistance Forces official, interviews with the author, June 2024; transcript of smuggler interviews by Emirates-supported forces, 2020, on file with authors; two Western naval intelligence officials, interviews with the authors, July–August 2024.

97 Yemeni military, security, and intelligence officials, businessmen, smugglers, interviews with researchers, al-Mahra, Marib, Cairo, and Istanbul, June–September 2024. One Yemeni businessman only learned that goods were being smuggled in a shipment he had chartered when it was held in Houthi-controlled territory due to a dispute between rival arms dealers over smuggled goods intermingled with his cargo.

98 Yemeni military, security and intelligence officials, businessmen, smugglers, interviews with researchers, al-Mahra, Marib, Cairo, and Istanbul, June–September 2024.

99 Senior security official based in Hadramawt, June 2024, Yemeni military officer, interviews with authors, al-Abr district, August 2024; nighttime light emissions analysis of suspected Houthi-affiliated warehouses in government-controlled areas showing increased activity, 2019–24; satellite imagery analysis of warehouse construction and activity patterns at key logistical nodes, 2018–24.

100 As demand for services has risen, smugglers have hired individual tribesmen to assist them in scoping out the best routes to Sana'a or Saada via Marib. The media official in the Ministry of Defense, a driver who frequently encounters smugglers, and an official from Marib local authority, interviews with the author, June 2024.

101 Senior security official based in Hadramawt, interview with a consultant, June 2024.

102 After a seizure of rocket fuel precursor chemicals in a container at the Port of Aden in mid-2024, the Houthis sent a legal team to Aden to pressure local authorities to release the entire shipment. Lawyers working on behalf of a Houthi-affiliated merchant have also sought to secure the release of a container containing drone parts seized in 2022.

Whenever we come across a shipment, we get lots of calls and pressure from certain influential people. This is mainly from tribal leaders or individuals we coordinated with for the fight against AQAP and the Houthis, so they are very valuable to us, to the point that we have to listen to them. . . . We don't arrest anyone for most shipments because of the rescue network. The Houthis use smugglers that are well connected and integrated, and have been chosen from big families, such as sons of sheikhs, and we live under their mercy. We are not a large army—we have limited resources and must maintain relationships with tribes.[103]

Supply Chain Management

While the supply chain is built around diverse operational networks, it is managed via a hybrid system that balances centralized strategic control with decentralized implementation. Well-informed local, regional, and Western officials describe a supply chain management system built around a small group of senior Houthi officials; and a similarly small group of Quds Force and Hezbollah operatives, based in both Yemen and Iran. In Yemen, the Quds Force and Hezbollah operatives work closely with their Houthi counterparts to plan domestic, regional, and international military-industrial strategies.[104] This group of operatives coordinates with a specialized Quds Force unit in Iran to develop a multiyear strategy across three broad pillars: domestic manufacturing and assembly needs; procurement and transport; and training for Yemenis on how to smuggle, build, assemble, and use new weapons systems.[105] Senior Houthi leaders then pass instructions to lower-ranking Houthi officials, who recruit and oversee their own procurement and smuggling networks.[106]

These senior Houthi officials subcontract the component procurement and other purchases to networks of local, regional, and international businessmen. Smuggler recruitment is run by Houthi subordinates, who generally hire sailors from their own coastal communities.[107] Houthi and Quds Force leaders in Yemen and Tehran, respectively, directly coordinate Iran–Yemen transshipments. Iranian overseers also subcontract the physical handling of goods to locally recruited smugglers, often via local businessmen.

A number of Houthi operatives now reportedly manage the supply chain from outside Yemen in direct coordination with Iranian and Axis of Resistance counterparts, working, in particular, from Iraq and Iran.[108] The Houthis are also, allegedly, deepening their connections with business, organized crime, and militant networks in the Horn of Africa and Red Sea by stationing operatives in Somalia, Djibouti, Sudan, and elsewhere.

103 Yemeni military officer, interview with a consultant, August 2024.

104 Two Yemeni military officials, three Western military and intelligence officials, one regional official, interviews with the author, May– August 2024. As part of this process, the Iran-based cell allegedly identifies which components, raw materials, and other materiel can be purchased in third countries, and which will need to be transferred from Iran. Lower-ranking Houthi officials work with this group to purchase and transport parts via local, regional, and international businessmen, and to recruit smuggling operatives.

105 West coast military official, security, military officials, interviews with the authors and researchers, Marib, al-Mahra, May–August 2024.

106 Yemeni military and intelligence and local media identify a group of Houthi leaders as "purchasing managers" who oversee procurement. These include Lieutenant General Abdalkarim al-Ghammari, a senior defense ministry procurement official, and his deputy, Major General Saleh "Abu Yaser" Mesfer Farhan al-Shaer. Lower-ranking officials include "Abu Idris" al-Sharafi and Mohammed Ahmed "Abu Jafaar" al-Talibi, who in recent years have been posted, respectively, to Iraq and Iran.

107 For example, Ahmed Mohamed Halas Bisharah, the main smuggling recruiter on the Red Sea coast, primarily employs sailors from his home village, Abu Zahr. Abdulaziz "Abu Muhammad" Mahrous, who was born on the island of Socotra, recruits sailors from the Gulf of Aden.

108 Yemeni military official, Western military official, security, military officials, interviews with the authors and researchers, Marib and al-Mahra, May–August 2024. "Smuggling Weapons and Fighters: External Expansion Path and the Horn of Africa of Houthi Terrorism," PTOC Yemen, August 2024, report on file.

6. Missing Links and Suspicious Patterns

This report describes the "known knowns" of the Houthi supply chain. But much remains unknown about how the group obtains a number of critical items, such as large and heavy missile components, including missile motors. Much also remains unknown about the people that Houthi networks comprise. The Houthis may be developing new supply routes, particularly in the Red Sea.

Missile Components

To date, international and local forces have interdicted just seven vessels transporting ballistic missile components. Of these vessels, only one, captured by the U.S. military in January 2024, contained liquid ballistic missile motors.[109] No motors for longer-range solid-fuel missiles, which the Houthis also use in large numbers, have ever been interdicted, despite their large size and weight, and the technical challenges of making them in Yemen.[110] Weapons experts believe, but cannot prove, that at least some missile parts, including motors, were or are delivered via container shipping.[111] If this is correct, Aden would have been the most likely port of entry for missile parts before 2023. Since 2023, Western and regional intelligence officials believe that missile components have been shipped directly to Houthi-controlled ports by Iranian cargo vessels. Some ballistic missile component shipments may also have been delivered via the Gulf supply channel, after being shipped commercially to Oman and transported overland to Yemen, as described above.

Resilient Networks of People

People are at the heart of the Houthis' evolution from smuggling to manufacturing. Regional researchers, intelligence sources, and media reports consistently describe the presence of Quds Force, Hezbollah, and other Axis of Resistance advisers in Yemen, while Houthi technicians regularly travel for training in Iraq, Iran, Lebanon, and (before the fall of Bashar al-Assad) Syria. In one instance in 2023 documented by the authors, approximately thirty to forty Houthi operatives received specialized drone and missile training in Syria. More than seventy Houthi technicians underwent similar instruction at a single training session in Iraq the following year.[112] The scale of the Iranian and wider Axis advisory presence inside Yemen is debated: Yemeni political leaders claim that more than 1,500 foreign military advisers operate alongside the Houthis in Yemen, while Western military and intelligence officials estimate the number is much lower, with one former senior U.S. military leader suggesting "dozens."[113]

109 Direct cargo ship transfers from Iran to Yemen in 2015, 2023, and 2024 may have contained advanced weapons systems, but this has not been definitively proven. The only other recorded incident was the purported attempt to transfer missile components from Iran to Oman on the *Genaveh 12* in 2018.

110 U.S. military, intelligence officials, interviews with the authors, Washington, D.C., July 2024; U.S. law-enforcement officials, interviews with the authors, New York, August 2024.

111 Two weapons experts, one former Western military official, interviews with the authors, May–August 2024.

112 Based on two Arabic-language intelligence briefings, source withheld, provided to the authors and corroborated with regional and Western sources.

113 Three Yemeni officials, one regional official, interviews with the authors, March 2024–March 2025; U.S. officials, interviews with the authors, Washington, D.C., September, December 2024; former senior U.S. military official, interviews with the author, September 2024.

Numbers aside, these direct relationships mean that, even when the Houthis' manufacturing sites are destroyed or technicians are killed by air strikes, the group has access to a pool of knowledge that allows it to quickly rebuild its manufacturing capabilities. It also means that disrupting the Houthi arms program is not just a question of stopping smuggling from Iran but also of understanding how Houthi, IRGC, and other Axis of Resistance operatives move in and out of Yemen. Yet no senior Houthi, Iranian, or Lebanese operatives have been captured entering or leaving Yemen since the beginning of Yemen's civil war.[114] In the view of Western, Yemeni, and regional observers, this suggests that the Houthis and their allies use an as-yet-unidentified transit system, or at least did so between 2015 and 2022, likely involving commercial shipping.[115]

Mobility analysis, which uses anonymized mobile phone data to track patterns of human activity, provides some support for these claims. A number of Iraqi and Iranian mobile devices—and their owners—traveled to Yemen in the twelve months before February 2025.[116] For example, in January 2025, a mobile device at a naval yard at Bandar Abbas, Iran, was moved to a small cargo ship whose movements it was possible to trace using the vessel's AIS tracker. The device and the vessel tracked the Omani coast before moving into Somali waters—where the device and the ship's identification system were both turned off (see Figure 16). The device subsequently appeared in Sana'a, before reappearing on a vessel off the coast of Mokha a month later.[117] In another instance, a mobile device traveled from Bandar Abbas to Djibouti, departing the vessel before a UN inspection at the port and returning for the onward journey to Houthi-controlled Yemen.[118]

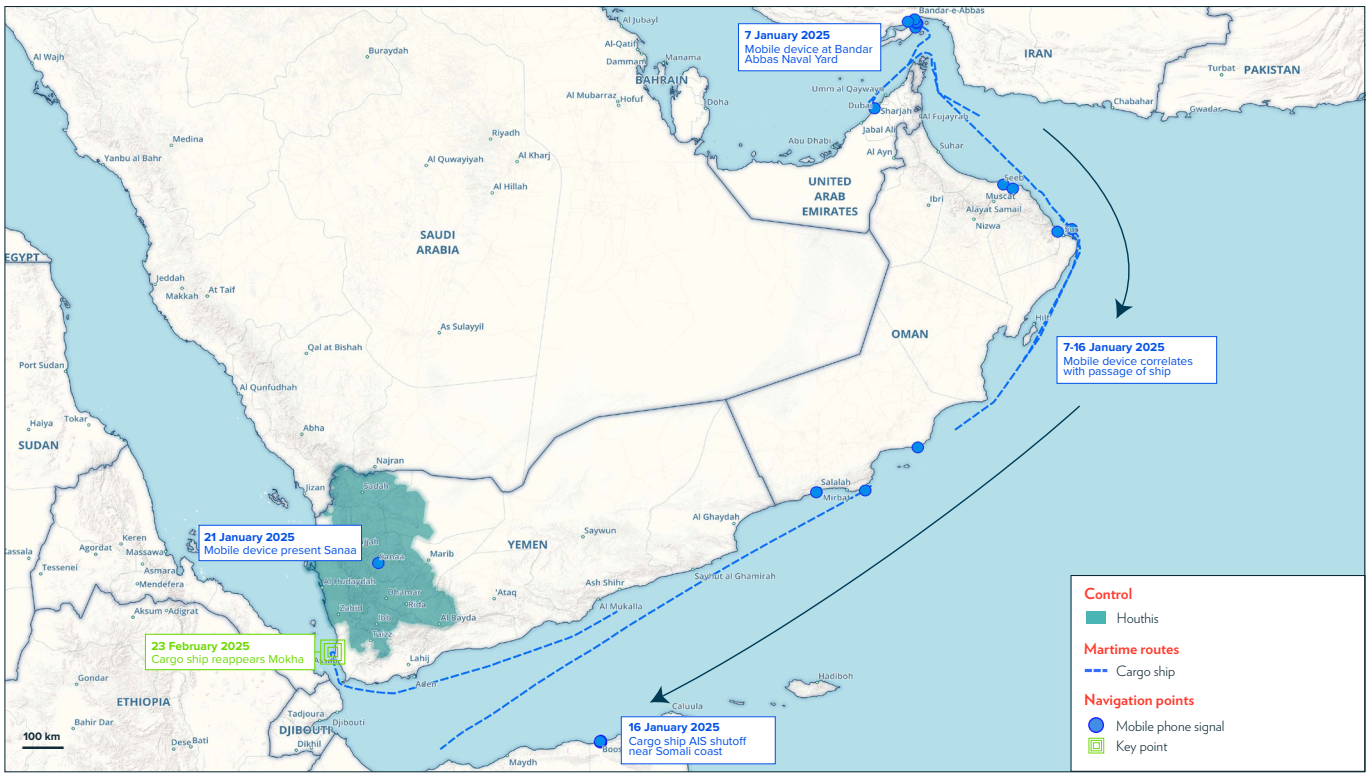

Figure 16. Mobile Device Route from Bandar Abbas to Yemen

Data: This map shows the pathway of a vessel correlated with the movements of a single mobile device moving from Bandar Abbas to Sana'a. Map created by authors, using QGIS and Natural Maps data. Based on team analysis of mobility data provided by Emdyn and AIS data drawn from Global Fishing Watch.

114 Yemeni military official, UN investigator, interviews with the authors; notes on file from regional intelligence agencies.

115 U.S., UK government officials, arms experts, interviews with the author, April–November 2024.

116 Report on file with authors.

117 Based on analysis conducted for this report by Emdyn, a British remote data analysis firm, and the authors.

118 Based on analysis conducted for this report by Emdyn, a British remote data analysis firm, and the authors.

Yemeni officials also believe that many foreign nationals flew into Yemen after the 2022 truce and before Israeli airstrikes halted flights to Sana'a International Airport in May 2025.[119] Coupled with the Houthis' ability to print their own passports, the reopening of the airport during that period allowed for both Yemenis and foreigners to enter and exit Houthi areas more freely.[120] With the airport shuttered, the Houthis, Hezbollah, and Iran now likely use commercial shipping to move in and out of the country.

The Islamic Republic of Iran Shipping Lines Network

Patterns of activity by IRGC-linked ships in the Red Sea may offer some clues as to how people and some weapons components entered Yemen in the past. Between 2018 and 2023, two IRGC-operated ships, the *Saviz* and later the *Behshad*, maintained fixed positions in the Red Sea to the west of major shipping lanes and Hodeidah.[121] Regional and Western intelligence believe that these were "spy ships" that functioned as command-and-control platforms for a sophisticated maritime network, and which later assisted Houthi targeting of Red Sea shipping.[122]

Also between 2018 and 2023, a number of mainly Iran-flagged commercial vessels regularly weighed anchor near the two spy ships. Of these, eleven of the most active in waters near the two spy ships were once registered as part of the Islamic Republic of Iran Shipping Lines (IRISL), an Iranian shipping firm that Western countries have repeatedly sanctioned for activities related to Iran's arms program.[123] The vessels followed a consistent pattern: departing Iran, loitering near the *Behshad* or *Saviz*, proceeding via the Suez Canal to Latakia, Syria, and then continuing to European ports (principally Valencia and Antwerp), before returning via the same route.[124] UK media reporting from March 2024, citing Israeli intelligence, claimed that some of the vessels involved were transporting arms bound for Hezbollah.[125]

Satellite imagery shows a number of instances of one of these ships, *Artin*, loitering near the *Saviz* or *Behshad* with a smaller ship alongside one of the two vessels (see Figure 17). In a number of instances, larger cargo vessels of up to 224 meters in length, with their identification systems turned off, can also be seen in the area at the same time.[126] Yemeni and regional intelligence officials believe that these larger

119 Yemeni officials, interviews with the author, 2024, 2025.

120 Yemeni military officials and former Yemeni government officials, interviews with the author, May and July 2024; mobility analysis of foreign nationals' movement patterns in Houthi-controlled areas, conducted by Emdyn, February 2025, report on file with authors.

121 The *MV Saviz* and *MV Behshad* were anchored in the Red Sea between 2018 and 2019, and 2019 and 2023, respectively. Figure 17 shows a probable ship-to-ship transfer between the *Artin*, an IRISL vessel, the *Behshad*, and a smaller, unidentified vessel.

122 These vessels include the *Parnia* (IMO: 9270684), *Kashan* (IMO: 9270672), Jairan (IMO: 9051636), *Elyana* (IMO: 9165815), *Delbin* (IMO: 9465849), *Daisy* (IMO: 9272955), *Behshad* (IMO: 9167289), *Artin* (IMO: 9737229), *Golsan* (IMO: 9247156), *Artenos* (IMO: 9228800), and *Arezoo* (IMO: 9165839), all previously registered with IRISL. Author analysis of AIS tracking data for these vessels, 2018–24.

123 "Treasury Designates Islamic Republic of Iran Shipping Lines (IRISL) and Affiliates," U.S. Department of the Treasury press release, September 10, 2008. The original 2008 designation identified IRISL for providing logistical services to Iran's Ministry of Defense and Armed Forces Logistics and falsifying shipping documents to conceal illicit shipments. Vessels were identified using the International Maritime Organization (IMO) number system, which assigns a permanent identification number to each vessel, which remains unchanged regardless of name or ownership changes. Analysis of these IMO numbers reveals that IRISL vessels systematically transferred formal ownership and management through shell companies like Hafiz Darya Shipping while maintaining operational control through complex management structures across multiple jurisdictions.

124 Analysis of AIS tracking data and satellite imagery compiled between 2021 and 2024 shows consistent movement patterns for former IRISL vessels, including the *Artabaz, Arezoo, Artenos*, *Artin*, and *Daisy*. These vessels regularly transited between Iranian ports, designated loitering areas in the Red Sea, Syrian ports, and European destinations following predictable routes and timelines. Some of these vessels later added Libyan and Romanian ports to their regular route.

125 Melanie Swan, "Iranian Bombs Dropped on Israel Are Transported on Ships Using European Ports," *Telegraph*, March 14, 2024.

126 Author analysis of satellite imagery from Planet Labs, showing ship-to-ship transfers near the *Behshad* and *Saviz*, and AIS presence via Spire, accessed through the Global Fishing Watch platform.

ships may have been anchored in the Coalition Holding Area, a maritime holding pen for vessels awaiting Saudi clearance to enter Yemen, before Riyadh eased restrictions on inbound traffic in 2022–23. While the claim cannot be definitively proved, the same officials believe that the IRISL-linked vessels transferred goods and materiel to both small boats and commercial vessels, for transport to Yemen and perhaps other Red Sea locations.[127]

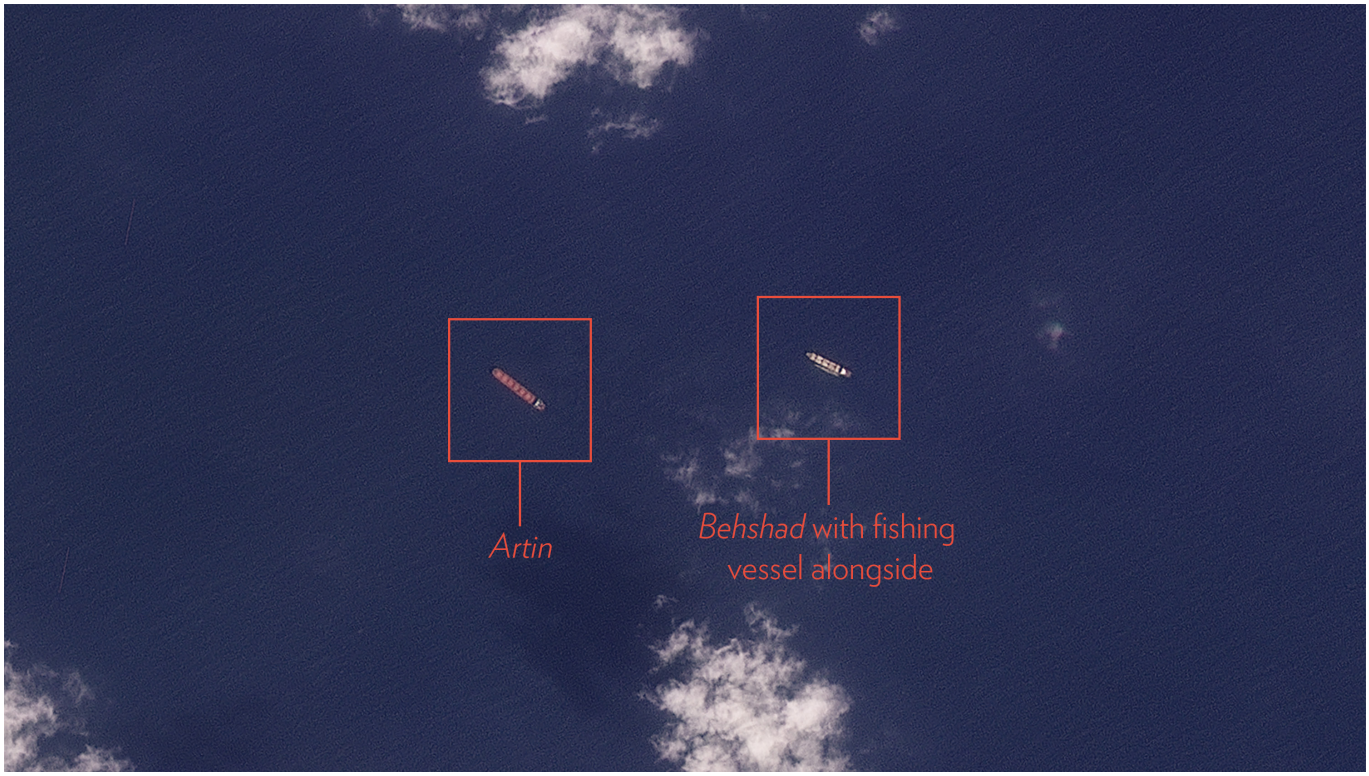

Figure 17. *Behshad* Ship-to-Ship Transfer with IRISL-Linked Vessel *Artin* Nearby, November 2023

Source: Planet Labs.

Continued monitoring of the IRISL network and patterns of activity in the Red Sea shows how IRGC-linked networks adapt to external pressure—and illustrates the challenge of tracking and disrupting them. In January 2024, as Western naval presence in the Red Sea grew in response to Houthi attacks, the *Behshad* was disabled by an alleged U.S. cyberattack. In response, the IRISL network shifted its loitering location from the Red Sea to northern Somali waters while maintaining the same overall patterns of movement. But in mid-2024, the IRISL-linked vessels suddenly halted their Red Sea and Mediterranean routes. By 2025, the network had shifted to a new route between Iran and East Asia, principally China. Around this time, a new group of vessels began to operate in the Red Sea, making regular trips to Houthi-controlled ports, and loitering off the coast of Yemen and Saudi Arabia. The movements of one of the vessels in the new network closely mirrored regional intelligence reporting on the movement of IRGC and Axis of Resistance operatives between Somalia, Yemen, and Sudan.[128]

127 Author interviews, two Yemeni intelligence officials and one regional security official with knowledge of maritime operations, August–October 2024.

128 Author analysis, using AIS software, of ship movements around Yemen, and comparison to intelligence report timelines provided by regional intelligence networks, on file with authors.

New Horizons: A Red Sea Channel?

Exploiting the chaos of the conflict in Sudan, Iran and the Houthis may be expanding their supply chains into the Red Sea. Numerous reports claim long-standing links between the Houthis and smuggling networks in Sudan and Eritrea, but until recently these appeared to be primarily related to trafficking small arms, African migrants seeking passage through Yemen to nearby Gulf Arab states, and illicit drugs.[129] But Yemeni and regional officials are insistent that advanced weapons components and other materiel are now being flown into Eritrea and Sudan before being smuggled to Yemen. [130]The IRGC has a limited but sustained presence in Port Sudan, and Iranian arms shipments are regularly flown into the area in support of the Sudanese Armed Forces. A growing body of evidence, including mobility data and AIS tracking, suggests that the Houthis, the IRGC, and Hezbollah operatives are also using Port Sudan as a transportation hub, traveling to and from Yemen via Port Sudan and nearby Suakin, another Sudanese port city, in small boats and commercial vessels.[131] While no firm evidence can be attached to these claims, a corridor linking Sudan, Eritrea, and Yemen would be logistically feasible and harder to disrupt than other supply chain channels, all of which currently pass through areas controlled by Houthi adversaries. (A Century International report forthcoming later this year will investigate these claims more thoroughly.)

129 "Houthi Weapons and Fighter Smuggling in Africa: Part Two," Platform for Tracking Organized Crime, 2024.

130 Yemeni and regional officials, interviews with the authors and consultants, September, October 2025.

131 Author analysis of mobility data and satellite imagery.

7. A Pattern of Counter-Smuggling Failure

Local, regional, and international efforts to disrupt the Houthi supply chain have consistently fallen short. Despite a series of international initiatives—including bombing raids, naval interdictions, sanctions, monitoring regimes, border controls, and direct military strikes—arms transfers have continued apace. Interviews, interdiction data, and analysis of remotely sensed data gathered for this report show that arms transfers to the Houthis remained at historically high levels after the group began targeting Red Sea shipping in 2023.

These failures stem from coordination problems, mismatched priorities, and resource constraints at multiple levels: between international naval forces, regional powers, and Yemeni authorities; among rival factions within Yemen's government; and between Western powers with competing strategic priorities. Over time, these structural weaknesses have created increasingly permissive conditions for smuggling—a vulnerability now being exploited by Iran and the Houthis.

Fragmented Authorities

Counter-smuggling activities in Yemen and the wider region are dispersed across multiple authorities that do not always coordinate closely with one another. For example, the Yemeni Coast Guard, the Saudi-led Coalition, and the U.S.-led Combined Maritime Forces each patrol different waters with limited direct coordination. On land, Yemeni border guards, customs authorities, and military and security services all seek to prevent overland smuggling through government-controlled areas—but often don't coordinate their efforts.

Even before the Houthis' attacks on commercial shipping, the Red Sea was heavily militarized. In 2002, the United States established the Combined Maritime Forces—today, a coalition of forty-seven states formed to combat terrorism and, later, piracy.[132] The international naval presence dramatically expanded during the 2008 surge in Somali piracy in the waters around the Horn of Africa, with NATO and the EU also deploying warships throughout the region.[133] Today, Djibouti alone hosts bases for the United States, France, China, Japan, and Italy. Saudi Arabia controls considerable swaths of the Red Sea's coastline, while Iran, Russia, and the Emirates have all sought to establish permanent positions in its waters.[134] In 2022, the United States formed a new multinational task force, Combined Task Force 153, with a specific focus on arms smuggling to the Houthis. Despite this concentration of naval power—the densest outside the South China Sea—arms and materiel continue to flow to the Houthis.

132 "Combined Maritime Forces," United States Naval Forces Central Command.

133 "Counter-Piracy Operations (2008–2016)," North Atlantic Treaty Organization, last updated 19 May 2022.

134 Kanako Masuda, "Competition of Foreign Military Bases and the Survival Strategies of Djibouti," JICA Ogata Sadako Research Institute for Peace and Development, Knowledge Report no. 8, July 2023.

The Houthis' Red Sea campaign led to an increased mobilization in the area. In late 2023, the United States organized a multinational naval task force with ships from ten countries to protect commercial vessels traveling through the Red Sea.[135] Then, in January 2024, American and British forces began air strikes against Houthi military launch sites, with the stated aim of deterring their Red Sea campaign.[136] The EU followed in February 2024 with its own maritime security mission, deploying naval vessels to protect shipping lanes.[137] Despite these combined efforts, which eventually involved warships from more than fifteen nations patrolling the Red Sea, the Houthis continued their campaign throughout 2024.[138]

The Houthis were able to do so, at least in part, because each of these naval forces and coalitions was focused on defensive action or preemptive strikes on Houthi launch sites. Despite the large naval presence in the Red Sea, a number of European and U.S. military officials said that their mandates did not cover smuggling.[139] This, in turn, informed what information different interested entities shared.

Conflicting Saudi and Emirati agendas and priorities further undermine efforts to prevent arms and materiel transfers to the Houthis. Both countries forcefully backed interdiction initiatives during the war's early years, but have since shifted focus. The Emirates, after withdrawing most forces in 2019, maintained selective enforcement focused on protecting its strategic interests rather than comprehensive counter-trafficking. And Saudi Arabia has eased restrictions on Houthi-controlled ports and borders as part of its effort to extricate itself from the Yemen conflict, starting in 2022.[140] Before this, Yemeni government officials accused the Emirates of backing the Southern Transitional Council's 2019 takeover of southern governorates, further diminishing the government's already limited authority.[141] Combined with a lack of international coordination, all of this meant that the National Resistance Forces, for example, formally coordinate with the Emirates and informally coordinate with other local forces, and that Abu Dhabi passes on information and materiel gathered and seized by these forces to American counterparts—but not to officials in Riyadh.[142]

Internal divisions within the Presidential Leadership Council (the executive body that has led Yemen since April 2022), and between the Emirates and Saudi Arabia, exploded into open view in December 2025, when Emirates-aligned southern secessionist forces seized much of Yemen's east before being pushed back by Saudi airstrikes and Saudi-backed government military units. These tensions were long-standing, and again prevented the formulation of a cohesive anti-smuggling agenda. The Presidential Leadership Council was formed to combine different anti-Houthi factions under the leadership of a new president, Rashad al-Alimi. But the Council was less a unified government than it was a loose coalition of political and military actors who pursued their own agendas on the ground.[143] The Presidential Leadership Council was supposed to integrate the different forces under a single chain of command via a new Joint Military and Security Committee, and to develop an anti-smuggling strategy, among other critical functions.[144] But the Council was hampered from the start by divisions among its members, excluded groups, and the rivalry between the Emirates and Saudi Arabia.

135 "Statement from Secretary of Defense Lloyd J. Austin III on Ensuring Freedom of Navigation in the Red Sea," U.S. Department of Defense, December 18, 2023.

136 "U.S. Central Command Update on Self-Defense Strikes," U.S. Central Command, January 12, 2024.

137 "EU Military Operation in the Red Sea Launched," European Union External Action Service, February 22, 2024.

138 "Calming the Red Sea's Turbulent Waters," International Crisis Group, Middle East Report no. 248, March 21, 2025.

139 U.S., European military officials, interviews with the authors, October, November 2024.

140 "How Huthi-Saudi Negotiations Will Make or Break Yemen," International Crisis Group, December 29, 2022.

141 Three Yemeni government officials, interviews with the authors, June–August 2024.

142 Two Western diplomatic officials with knowledge of regional security coordination, interviews with the authors, August 2024.

143 Abdulghani Al-Iryani, "Reforming the Presidential Council," *Yemen Review*, Sana'a Center for Strategic Studies, October 16, 2024. Western officials and arms experts believe that the January 2024 interdiction was an emergency shipment to replenish depleted Houthi missile stocks amid escalating confrontations along Red Sea shipping routes. U.S., European military officials, interviews with the authors and researchers, October, November 2024

144 U.S., European military officials, interviews with the authors, October, November 2024.

Mismatched priorities in Abu Dhabi and Riyadh have undermined military and security reforms and coordination among forces aligned with the Presidential Leadership Council since the body's formation. Yemeni government and military officials claim that both the Emirates and Saudi Arabia halted payments to the Yemeni army and some armed factions after the UN brokered a truce and the Presidential Leadership Council was formed in 2022. They allege that the Gulf states stopped these payments in part to pressure the government into sustaining the pause in hostilities and to engage in a peace process with the Houthis.[145] Combined with a Houthi oil export embargo, which the group enforces by firing ballistic missiles at Yemeni government-controlled export terminals, the alleged nonpayment by Saudi Arabia and the Emirates meant that military and security salaries went unpaid for months at a time. There is no joint intelligence or analysis entity that coordinates across Presidential Leadership Council members and is capable of analyzing interdiction and other data.[146] This state of affairs may change after the infighting of December 2025 and January 2026, if Saudi Arabia takes full control of managing anti-Houthi forces, as appeared to be the case at the time of writing.

Case Study: Al-Abr in the Crosshairs

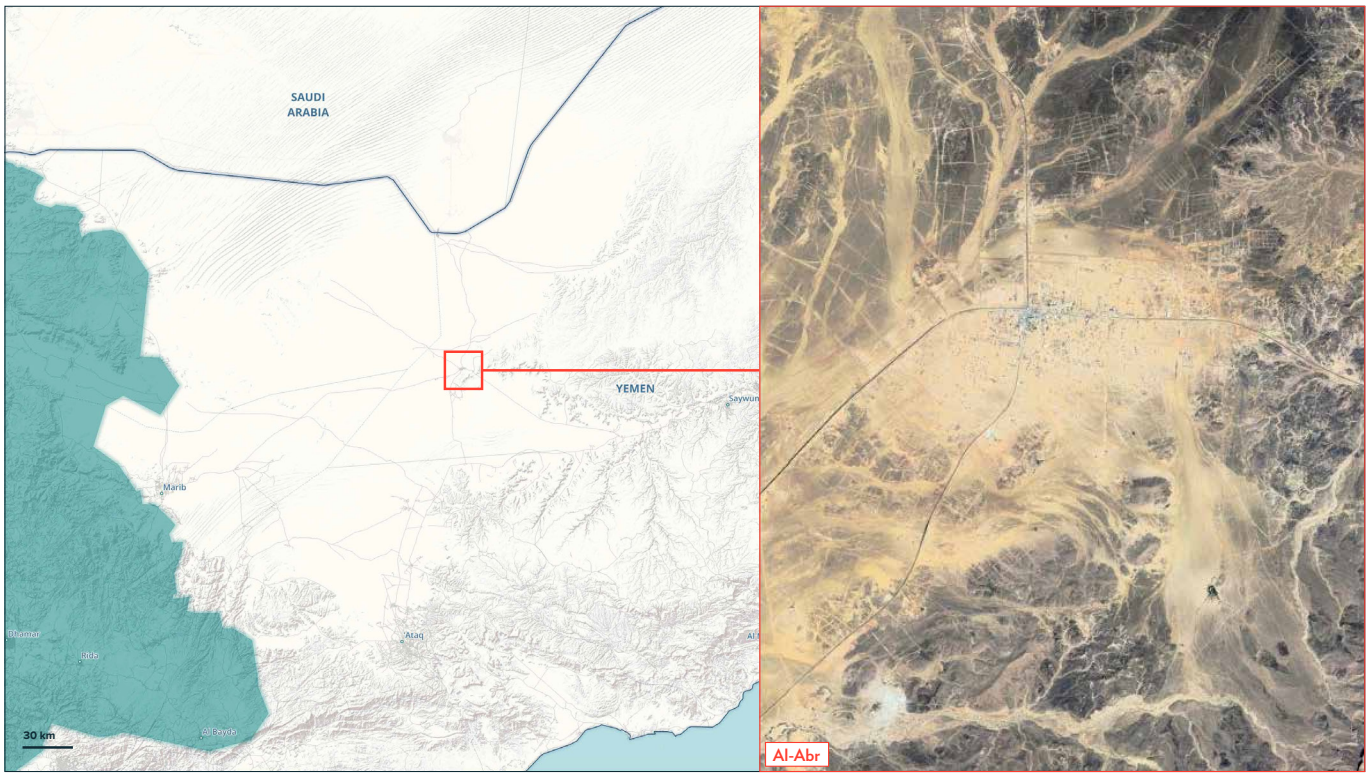

Figure 18. Al-Abr, Yemen

Source: QGIS / Natural Maps, Google Earth Pro

The district of al-Abr in northwestern Hadramawt governorate epitomizes the political challenges undermining efforts to police trade routes. The district's principal town, Hisn al-Abr, sits at a critical junction where roads from Oman to al-Jawf governorate intersect with routes running north–south from Shabwa governorate to the Saudi border. This strategic location makes al-Abr an unavoidable choke point for smugglers moving arms and materiel from Yemen's eastern borders to Houthi-controlled territories.[147]

145 Abdulghani Al-Iryani, "Reforming the Presidential Council," *Yemen Review*, Sana'a Center for Strategic Studies, October 16, 2024; two military commanders, interviews with the authors, September–October 2024.

146 Yemeni security, military, intelligence, and government officials, interviews with the authors, March–November 2024.

147 Two Yemeni military officials with experience in al-Abr, interviews with the authors, July–August 2024; satellite imagery and topographical analysis of al-Abr district, 2023–24.

The surrounding terrain provides smugglers with natural advantages. To the east lie the wadis leading into the Jol Plateau, a limestone cap covering much of central Hadramawt. To the west spread the gravel plains and sand dunes of Shabwa and Marib governorates. Skilled drivers can easily circumvent checkpoints by driving off-road through these varied landscapes, making comprehensive surveillance—with limited resources—nearly impossible.[148]

From 2015, forces of the First Military Region in al-Abr, overseen by the Ministry of Defense, coordinated with military and intelligence officials stationed in neighboring Marib. Lacking the resources needed to independently intercept smugglers, officials in al-Abr monitored suspicious vehicles and alerted Marib authorities about incoming traffic via both main roads and desert routes. Marib authorities reciprocated by sharing intelligence about suspicious vehicles headed toward al-Abr. According to security and military leaders in Marib, this collaborative system led to several major interdictions, including shipments containing drone components and missile parts.[149]

Military leaders restructured the First Military Region between 2020 and 2022, which dramatically degraded this effective coordination mechanism. The Saudi-led coalition and Yemeni government reshuffled military leadership primarily to ease tensions between the Emirates-backed Southern Transitional Council, Hadrami forces, and Saudi-backed government troops. They removed experienced northern officers with deep local knowledge and established relationships with Marib counterparts, replacing them with southern officials who lacked these connections.[150]

These personnel changes severed the long-established intelligence-sharing networks between al-Abr and Marib, which had taken years to build. Simultaneously, the suspension of military salaries—sometimes for up to six months at a time—severely undermined morale among remaining troops, making soldiers increasingly susceptible to smuggler bribes and threats. Local security officials report that they are now frequently pressured by tribal leaders when they attempt to interdict shipments, and have become powerless to resist Houthi "rescue teams," described above, that negotiate the release of captured smugglers.[151] Then, in December 2025, First Military Region forces were pushed out of northern Hadramawt by those of the rival Southern Transitional Council, as discussed above. A month later, this secessionist group was itself forced out by Saudi airstrikes and an offensive led by a different government military faction.

Similar breakdowns can be seen at multiple critical points in central Yemen, creating a permissive environment for Houthi supply chains to operate with minimal disruption.[152]

148 Analysis of Google Earth imagery of al-Abr district terrain, 2024; local drivers familiar with smuggling routes, interviews with researchers, June 2024; author knowledge of the area.

149 Three security and military leaders in Marib governorate, interviews with the authors, August 2024; analysis of interdiction reports from Marib and Hadramawt, 2018–23.

150 For example, in December 2022, the government announced the transfer of Brigadier General Yahya Abu Awja, a northerner who had served as chief of staff of the region and cultivated extensive intelligence networks, and appointed Brigadier General Amer Abdullah bin Hatyan, a southerner with limited experience in northern Hadramawt, to take his place. This was part of a broader leadership change that was completed in March 2025. See "The Handover Ceremony Between the Outgoing and Incoming Leadership of the First Military Region Has Been Successfully Conducted," YemenTV, March 1, 2025.

151 Yemeni military officer in al-Abr district, interviews with the authors, August 2024; senior security official based in Hadramawt, interviews with the authors, June 2024.

152 Four Yemeni security officials across central Yemen governorates, interviews with the author, July–October 2024; analysis of nighttime light emissions at key checkpoints showing reduced activity, 2020–24.

Misdirected International Efforts

International counter-smuggling efforts also suffer from other limitations. First, they are limited in focus. U.S.-led interdiction efforts, for example, focus on vessels sailing from Iranian ports rather than tackling the full range of smuggling activities in and around Yemen.[153] This narrow focus is, in turn, the product of resource limitations. Western officials lack the intelligence, surveillance, and reconnaissance (ISR) resources to monitor and disrupt other supply channels. Such resources are generally diverted to higher-level policy priorities like Taiwan and the Ukraine war. After October 2023, the U.S. government authorized an increased naval presence in the Red Sea, and a bigger ISR spend, but concentrated its efforts on mitigating the threat of Houthi attacks, rather than preventing arms transfers.[154]

U.S. military officials are wary of Yemeni government requests for financial, logistical, and capacity-building assistance to improve Yemeni security services' capabilities. For support to Yemeni forces to work, a U.S. military official said in July 2024, "you need U.S. personnel in the field, and the moment someone gets hurt, or is forced to engage in [military] action, you are being drawn in."[155] U.S. officials also worry that local Yemeni forces would sell U.S.-supplied arms to the Houthis or local al-Qaeda militants, as has allegedly happened in the past. This fear is amplified by Emirati-aligned media outlets that claim that government forces are often aligned with al-Qaeda or the Muslim Brotherhood (Abu Dhabi sees the groups as two sides of one coin).[156]

U.S policy, which often sets the agenda for other states, is also extremely changeable. When the new Trump administration came into office in January 2025, it initially adopted a more aggressive posture toward the Houthis, designating them an FTO and launching an intensive military campaign against them, called Operation Rough Rider.[157] However, after two months of conflict during which the United States lost two F-18 fighter jets and intelligence officials concluded that the Houthis had sustained only limited damage, Omani diplomats brokered a truce between the United States and the Houthis. The details of the agreement have never been made public, but reportedly centered around a Houthi commitment not to attack U.S. commercial vessels.[158] The Houthis continued to attack other vessels they said were linked to Israel, however, until a ceasefire was announced in Gaza in October 2025. After the truce, Trump administration officials treated Yemen as a "settled matter" and refused to discuss the Houthis' continued threat, several former U.S. officials say, all repeating the phrase "we did it" in explaining the administration's attitude.[159] "Until the Houthis do something so egregious that they [the Trump administration] can't ignore it, they are going to treat the Houthis as a nonentity for Israel or Saudi Arabia to deal with, not a matter of urgent U.S. policy," a former American official said.[160]

153 Multiple Western naval, intelligence, and other officials, interviews with the authors, April–November 2024; analysis of maritime interdiction patterns, 2018–24, showing focus on Iran-origin vessels. These interviews and an analysis of interdiction patterns indicate that almost all international interdictions are of direct transfer from Iran. Signals intelligence and pattern-of-behavior analysis are used to identify dhows departing Iranian ports and traveling toward known transshipment points. When these vessels either demonstrate specific "checklist" behaviors, or are observed in contact with other vessels, U.S. and Combined Maritime Forces forces are given authorization to interdict these vessels. The exception is several UK naval interdictions of speedboats traveling between Iran and Oman, for land shipment on to Yemen.

154 Three U.S. defense officials, interviews with the authors, July–September 2024; "CENTCOM Self-Defense Strike Against Houthi UAVs and Ground Control Station," U.S. Central Command, January 13, 2024.

155 Senior U.S. policymaker, interview with the authors, July 2024; "Assessment of the Response to Illicit Weapons Trafficking in the Gulf of Aden and the Red Sea," UN Office on Drugs and Crime, March 2024.

156 "A fundamental question we have is, if local forces we train pay for or capture arms, where do the arms go?," a senior U.S. policymaker said in a July 2024 interview with the authors. "We have seen too many reports of arms given to the Yemenis falling into the hands of al-Qaeda and the Houthis. From a political perspective, that's just a nonstarter for us."

157 "Renewed US Bombing and Houthi FTO Designation Signal Shift in Yemen Conflict" Sana'a Center for Strategic Studies, March 18, 2025.

158 Steve Holland et al., "Trump Announces Deal to Stop Bombing Houthis, End Shipping Attacks," Reuters, May 6, 2025.

159 Author interviews, Washington D.C., July 2025, September 2025.

160 Author interview, location and time left undisclosed.

Diplomatic efforts to constrain smuggling are further limited by competing political priorities. Overland smuggling from the Gulf to Yemen is an issue of considerable political sensitivity. Western diplomats, military, intelligence, and law enforcement agents reported that Emirati police, border, and intelligence officials work closely with their Western counterparts, sharing information and regularly interdicting materiel entering Emirati ports bound for Yemen.[161] Western officials also say that their Omani counterparts are often defensive when confronted about alleged smuggling through the country's territory. Western, regional, and Yemeni officials say that they often make significant requests of the Omanis, related to such matters as prisoner swaps and back-channel communications with the Houthis and other regional actors, including Iran.[162] Because of the importance and sensitivity of these negotiations, these officials are reluctant to upset relations with Oman by pressing the smuggling issue.[163]

Elsewhere, Western officials often look for low-cost, quick-fix solutions that outsource the risk of counterproliferation activities to multilateral bodies like the UN. The UN Verification and Inspection Mechanism for Yemen (UNVIM), for example, was established in 2016 to facilitate commercial shipping to Houthi-controlled ports.[164] At the time, the Saudi-led coalition was preventing commercial vessels from entering Houthi-controlled ports on Yemen's Red Sea coast, in order, the coalition said, to prevent arms transfers to the group. UNVIM requires vessels over one hundred metric tons that are bound for Houthi-controlled ports to submit clearance applications and undergo inspection in Djibouti. After UNVIM approves a vessel, the vessel must obtain clearance from the Saudi-led Coalition before entering a port, via the Saudi-run Evacuation and Humanitarian Operations Committee (EHOC).[165] The mechanism also monitors ship movements and inspects cargoes.

UNVIM, Western officials note, was designed to facilitate rather than prevent ships entering the Red Sea ports. It deters some smuggling because the UN searches vessels before they enter Yemen. Ship managers comply with the Djibouti inspection regime because of the threat of being stopped by the Saudi navy. But UNVIM has no enforcement power of its own—it can only report violations to the Coalition and the Yemeni government via EHOC.[166]

Already limited in its authority, UNVIM has faced a series of new challenges since 2022. That year, Riyadh eased restrictions on ships entering the Red Sea ports and EHOC began clearing any vessel that had been processed through the UNVIM process.[167] At the same time, Riyadh disbanded the Coalition Holding Area, a holding pen for vessels awaiting approval to enter Houthi-controlled ports, to the east of Eritrea. Then, in 2023, the Coalition and the Yemeni government allowed container vessels to enter Yemeni Red Sea ports for the first time since 2017, and asked that UNVIM inspect around 50 percent of vessels and containers.[168] But EHOC and the Yemeni government select vessels for inspection without disclosing criteria, leaving UNVIM unsure of how strongly its efforts are actually deterring smuggling.

161 U.S., UK officials, interviews with the authors, June, July, August 2024.

162 Three Western diplomats and two Yemeni officials, interviews with the authors, August–October 2024; "Calming the Red Sea's Turbulent Waters," International Crisis Group, Middle East Report no. 248, March 21, 2025.

163 "Calming the Red Sea's Turbulent Waters," International Crisis Group, Middle East Report no. 248, March 21, 2025.

164 "In Hindsight: The Story of the UN Verification and Inspection Mechanism in Yemen," Security Council Report, September 1, 2016.

165 "Information for Shipping Companies," United Nations Verification and Inspection Mechanism for Yemen (UNVIM); two UN officials involved with UNVIM operations, interviews with the authors, September 2024.

166 Two Western officials, interviews with the authors, September 2024; "Assessment of the Response to Illicit Weapons Trafficking in the Gulf of Aden and the Red Sea," UN Office on Drugs and Crime, March 2024.

167 Two Western officials, interviews with the authors, September 2024.

168 "Saudi Arabia Eases Import Restrictions at Yemeni Ports," Sana'a Center for Strategic Studies, April 2023; AIS analysis showing dissolution of Coalition Holding Area vessel patterns, 2022–23; two Western officials, interviews with the authors, September 2024.

Despite these limitations, some Western government officials have argued that UNVIM would deter smuggling to Houthi ports if it was expanded, oversaw a more aggressive inspection regime at Djibouti, and produced more wide-ranging analyzes of ship movements before and after they are processed through the UNVIM system. But UN officials are wary of such suggestions. UN officials worry that UNVIM is viewed by Western governments as a panacea to the smuggling problem, even as the mechanism continues to struggle from a lack of funding and equipment, and remains unable to enforce compliance.[169]

Evolution of Counter-Smuggling Efforts

These divisions and misdirected efforts have made it easier for Iran and the Houthis to adapt to counter-smuggling initiatives and move arms, materiel, and people into Yemen. Smuggling and supply chain patterns have continuously changed over the course of Yemen's civil war, in response to local, regional, and international factors. Using a mixture of interviews, analysis of interdictions and remotely sensed data, including nighttime lights and visual satellite imagery, the authors of this report have developed a method for tracking these patterns.

Analysis of activity patterns at four key sites—along with broader patterns of suspicious activities in and around Yemeni waters—provides a composite picture of how Iran, the Houthis, and their subcontractors have adapted, over time, to efforts to disrupt their supply chain. When one route is shut down or constrained, activity at another increases. These four key sites include a fishing port in northern Yemen, a smuggler's cove in the south, a smuggling and informal trade route linking Houthi and government areas, and a warehouse in eastern Yemen.

This analysis shows that the inflow of goods to Yemen shot up after the 2022 truce, peaked in 2023, and has since tapered off but remained at historically high levels. Taken individually, these data points cannot be said to definitively prove an increase in smuggling to the Houthis over the past several years. But seen collectively, they represent a strong indication that activity rose or held at high levels across most supply channels between April 2022 and early 2024.

2015–20: Increased Constraints

In the early years of the Yemen civil war, Saudi- and Emirati-backed forces established significant control over key smuggling corridors, creating substantial constraints for Houthi supply chains. Government forces recaptured strategic routes in al-Jawf, Marib, and Shabwa, while the Saudi-led Coalition severely restricted commercial access to Houthi-controlled ports and maintained aggressive maritime patrols. The Emirati-backed advance on the Red Sea coast and encirclement of Hodeidah in 2017–18 further constricted Houthi supply lines. During this period, suspicious ship-to-ship transfers and interdictions peaked, indicating both increased smuggling activity through alternative channels and heightened counter-smuggling effectiveness. Yemeni military officials believe that 2018–20 represented the high-water mark of local and regional efforts to stem the flow of arms to the Houthis.

2020–22: Declining Enforcement

From 2020 onward, this pressure began to ease as anti-Houthi forces fractured. The Southern Transitional Council took control of Aden and its ports in 2019, while Saudi Arabia initiated cross-border talks with the Houthis in early 2020. In early 2020, the Houthis seized territory in northern Sana'a, al-Jawf, and western Marib, reopening land supply routes. Land and sea interdictions by Yemeni forces in contested

169 Western official, interview with the authors, September 2024; three Western diplomats from countries supporting UNVIM operations, interviews with the authors, July–September 2024.

areas plummeted during this period, as they were wracked by internal disputes. By 2021, the Houthis had consolidated their hold over key governorates and smuggling routes in central and northern Yemen. Later that year, Emirates-aligned forces withdrew from their positions around Hodeidah and along the Red Sea coast. Exploiting the fragmented political environment, the Houthis began establishing their own logistical infrastructure in government areas, setting up warehouses and "rescue teams" across the country. Figure 19 tracks suspicious activity in waters around Yemen during this period, which declined as more direct routes became easier.

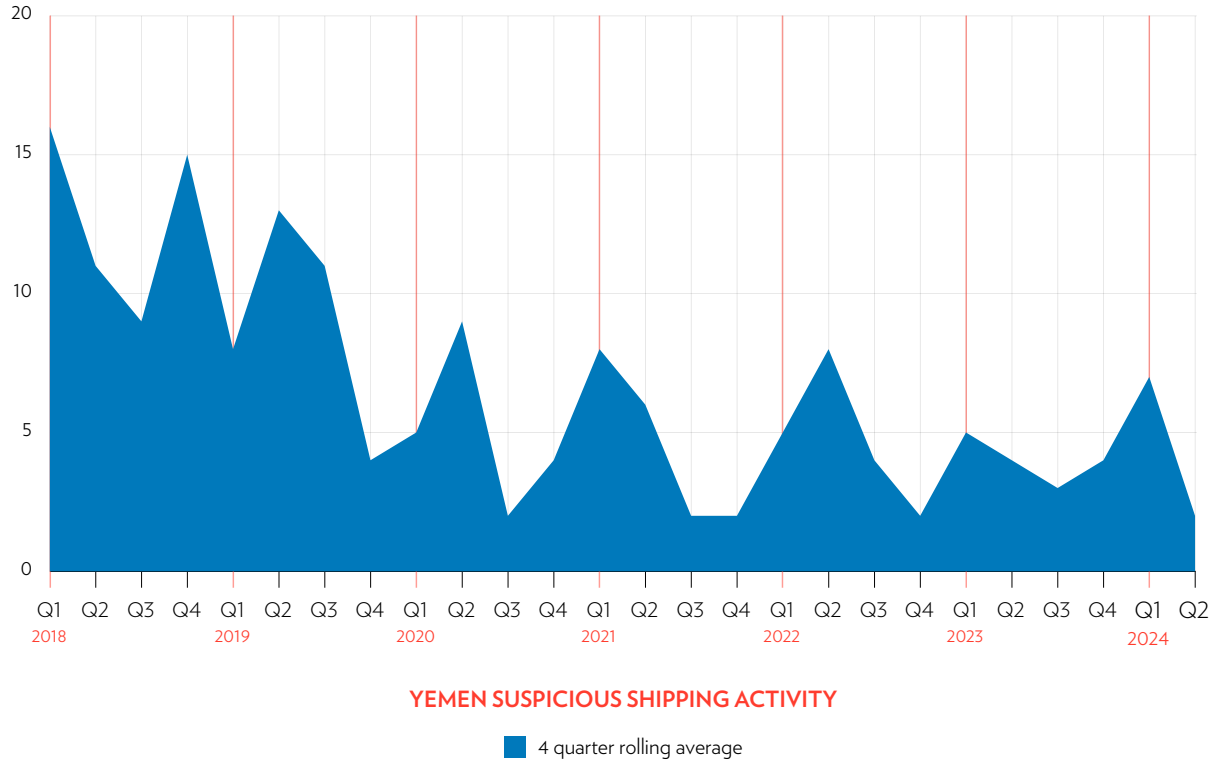

Figure 19. Patterns of Suspicious Activity (Potential Ship-to-Ship Transfers) in Yemeni Waters 2018–24

Data: These data, which are also shown in Figure 13, were compiled by the project team by analyzing AIS tracking software and satellite imagery and identifying suspicious movement and activities.

2022–24: "Yemen Is Open"

After the 2022 truce between Saudi Arabia and the Houthis, activity across the Houthi supply chain moved into high gear. The truce led to eased restrictions on Red Sea ports and the resumption of flights to Sana'a International Airport.[170] Nighttime light emissions analysis at known smuggling warehouses and transit sites shows activity peaking between 2022 and 2023 and then plateauing at historically high levels in eastern Yemen. Western routes, including direct transfers to Houthi-controlled ports, have also shown significant post-truce increases in activity. Figure 20 tracks the presence of large dhows and small cargo ships at a fishing port to the northeast of the Houthi-controlled port of Salif, which local intelligence sources believe is being used to offload arms and other supplies from Iran and the Horn of Africa. While these transfers dropped off in mid-2024, they have since returned to historically high levels.

170 Saeed al-Batati, "First Cargo Ship Docks at Yemen's Houthi-Controlled Hodeidah Port," Arab News, February 26, 2023; "Yemen's National Airline Resumes Flights from Sanaa Airport," Reuters, October 17, 2023.

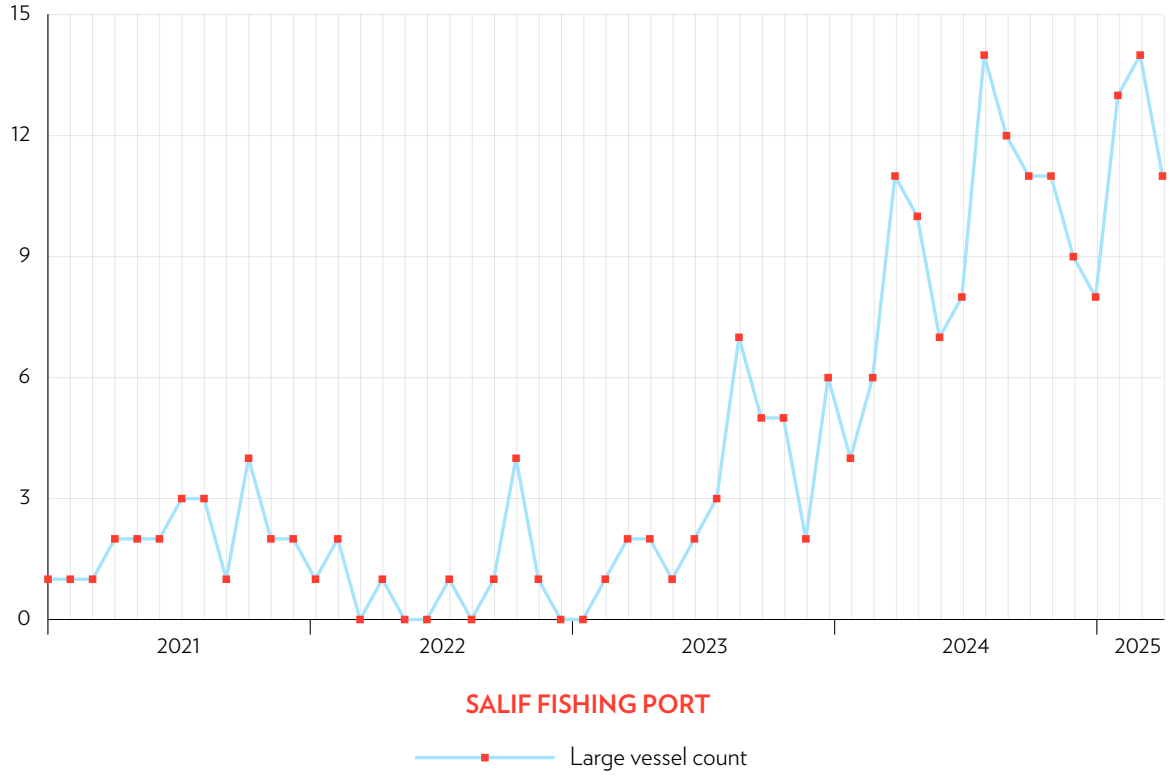

Figure 20. Large Vessels at Salif Fishing Port, 2021–present

Data: These data were compiled by a team member using Planet Labs imagery of activity offshore of a small fishing port north to the east of Salif cargo port. The researcher logged the presence of vessels above a certain threshold on a monthly basis between 2021 and 2025.

2025: More Interdiction Effort, Significant Headwinds

In 2025, against a backdrop of aerial campaigns and escalating sanctions, Yemeni security forces sought to demonstrate their value by dramatically escalating interdiction efforts. The United States' FTO designation and Israeli strikes indirectly aided these efforts by forcing container traffic from Houthi ports to government-controlled Aden.[171] From June 2025, security services in Aden seized unprecedented quantities of drone components, dual-use items, and manufacturing equipment—some of the war's most significant seizures.[172] Yet Yemeni officials acknowledge that they are hampered by a lack of resources and internal capacity. The Aden authorities, for example, struggle to document and assess seized materiel, often lacking the expertise needed to distinguish critical components from commercial goods.[173] The power struggle within the Presidential Leadership Council and between Saudi Arabia and the Emirates in late 2025 and early 2026 has left open the question of which forces will control the port in the future. More fundamentally, the Trump administration's belief that the FTO designation and strikes have "solved" the Houthi problem has led to American disengagement from Yemen. Rather than investing in training and intelligence sharing, U.S. policy delegates counter-smuggling to airstrikes and sanctions—addressing symptoms rather than the structural factors enabling the supply chain.

171 Private trade data on file with the authors.

172 Private note listing seizures on file with the authors.

173 Yemeni officials, interview with the authors, September 2025.

8. What Can Be Done?

The Houthis have set a worrying precedent. With support from Iran, they now exert significant control over global shipping routes and have the ability to project power far beyond Yemen's borders, not to mention wreak significant damage on rival groups and civilians inside Yemen. The group's Red Sea campaign was halted by the Gaza ceasefire. But its regional ambitions and ideological fervor will continue—along with its ability to strike targets thousands of kilometers away. It will be a matter of time before the Houthis find a new pretext to launch cross-border attacks. The Houthis' high profile has also allegedly attracted the interest of Moscow, and may have created entry points among militant groups in Somalia and other parts of East Africa (as a forthcoming Century International report will discuss in more detail).

Persistent failure to disrupt Houthi supply chains reveals a fundamental mismatch between conventional counter-smuggling tools and policy priorities, on the one hand, and the networked, adaptive threat the Houthis pose, on the other. The shift from smuggled arms to manufacturing supply chains, and deliberate integration with legitimate commercial activity, makes it harder to constrain the Houthis. Traditional approaches focus on interdicting individual shipments, sanctioning specific entities, or controlling particular routes. But the Houthi supply chain functions as a complex adaptive system that rapidly reconfigures in response to external pressure. This fact means that tactical successes—individual interdictions or sanctions designations—rarely translate into meaningful impact on Houthi capabilities. Disrupting this hybrid system will require a comprehensive approach that addresses structural vulnerabilities rather than focusing on individual routes or actors. Policymakers must learn from success stories, focus on choke points, rethink the UN monitoring role, and improve multilateral cooperation. Most importantly, they must demonstrate political will.

Learn from Success Stories

Success stories indicate that some tactical and operational policies could help stem the flow of arms, as part of a larger, coordinated effort. First, local, regional, and international maritime anti-smuggling operations have, to some extent, worked. The evidence for this is that a typical maritime seizure of small arms—anywhere from two to ten tons—costs Iran around $1 million, on average.[174] The contents of the seizures indicate that the smugglers are only shipping materials that are hard to send by simpler means. Finally, during the Houthis' recent campaign in the Red Sea and Gulf of Aden, there were short pauses in the attacks, which lasted from a week to eleven days, such as in early May, mid-July, and mid-September of 2024.[175] There are different plausible reasons for these pauses, but a very likely explanation is simply that the Houthis ran out of arms.

The evidence also suggests that tactical and operational policies could help tamp down overland smuggling. When local forces are motivated, coordinated, and provided with even a small amount of resources, successful policing operations are possible. Cooperation between military and security forces

174 "Record Seizures in 2021 after NAVCENT and CMF Increase Patrols," U.S. Central Command press release, January 18, 2022. The overall budget of the Quds Force is not known; however, there is some evidence it asked for a budget of €3 billion in 2023. See also Ghyam Sarnegouni (@ghyamsarnegoun), post to the messaging service Telegram, February 13, 2024.

175 "Red Sea Attacks Dashboard," ACLED (Armed Conflict Location & Event Data).

in Hadramawt and Marib, for example, led to a series of high-profile interdictions between 2015 and 2022, as described above. More recently, the Giants Brigades have disrupted smuggling operations in Lahij, in southern Yemen.[176] In Aden, customs and local security officials have interdicted a large amount of materiel since 2022.[177] Counter-smuggling campaigns by security forces in 2025 yielded significant results, including the seizures of a container and an Iranian shipment in June and August, respectively. However, the infighting of 2025–26 is likely to have significantly set back such efforts, underscoring the need for political and not just military or security cooperation in Yemen.

Focus on Choke Points

This report's analysis of the Houthi supply chain has identified several critical choke points. Figure 21 shows some of these areas, which include al-Abr; the Shihn and Sarfayt border crossings with Oman; Aden, Hodeidah, and Salif Ports; and with Djibouti. Individual initiatives to stem the flow of arms and goods through these areas are unlikely to disrupt supplies, as the Houthis and their allies will simply redirect them elsewhere. But a concerted effort across all of these choke points could introduce significant friction to the supply chain.

Combined intelligence gathering and analysis efforts would increase the effectiveness of such an initiative. If land and sea policing efforts were focused on these areas, coordinated across different lines of authority, and sufficient ISR assets made available, then international, regional, and local forces might be able to develop a detailed picture of supply pipelines and choke points.

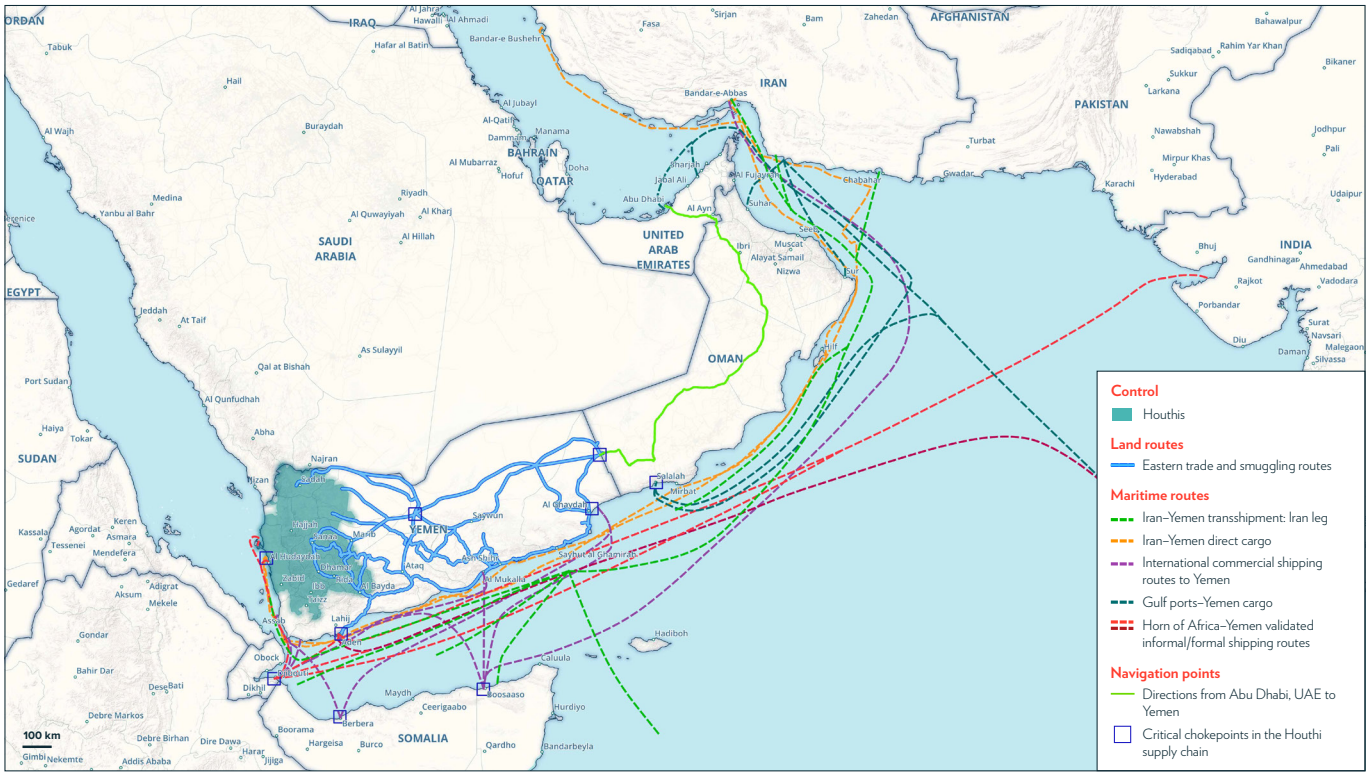

Figure 21: Critical Choke Points in the Houthi Supply Chain

This map shows a composite of known land and sea transportation routes used to provision the Houthi war effort. Created by the authors, using QGIS and Natural Maps data. Based on team mapping of overland and sea routes, including AIS data drawn from Global Fishing Watch.

176 Two Giants Brigade officials, interviews with researchers, August, September 2024.

177 Well-informed Aden native, interview with the authors, November 2024.

Recalibrate—and Rethink—Monitoring Efforts

A stepped-up monitoring and inspection regime may also help, albeit not a UN-led one. An expanded UNVIM could too easily become a panacea, and later a scapegoat, for a problem Western powers do not want to own. Simply asking the UN to do more while leaving current limitations in place is unlikely to work. As one Western official noted, the organization "does not have a navy and can't enforce what is a voluntary process."[178] Rather than seeking to enhance UNVIM's capabilities, a stepped-up verification and inspection regime for the Red Sea ports would be better housed under some form of multinational coalition, allowing for coordination with naval assets in the Red Sea.

Improve Multinational Cooperation

To build on existing successes, target choke points, and improve monitoring, outside powers will have to work together. Combined with funding, training and coordination for local security forces, and an international import-monitoring and inspection regime, consistent and frequent international interdictions could add significant friction to the Houthi supply chain. An inland monitoring regime could focus on known choke points at the intersection of some of the key pipelines described above, for instance al-Abr. International support for a high-tech, high-speed inspections regime at the Port of Aden and at the Oman border, and for the Yemen Coast Guard, could yield additional dividends, especially if outside powers provide not just training but also coordination support between Yemeni regions and regional security forces.

A sustained international maritime presence in the Red Sea and Gulf of Aden, combined with a stepped-up inspection regime for the Red Sea ports and funding for constant monitoring of known maritime smuggling routes—using remote sensing and other surveillance tools—would create additional deterrents. A coordinated, well-resourced surveillance effort would allow for an automated or partially automated "pattern of life" early-warning system leveraging AIS, satellite, drone, and other forms of aerial surveillance. Ships approaching Yemen would be assessed for past activity, and fixed-wing aerial surveillance deployed if previous or current activity patterns passed a set threshold.

Commonsense but Hard to Achieve

These recommendations appear commonsense, even if they are costly both financially and, potentially, politically. But they come with two important caveats. First, counter-smuggling initiatives will not be successful if they are applied piecemeal. Simply focusing on the Iran–Yemen pipeline and the Red Sea ports has done little to disrupt the supply chain. Secondly, and relatedly, they will work only if they are taken up at a senior political level by a number of countries that are willing to work collectively. Such high-level political uptake, in turn, requires prioritization and political will at the capital level. In comments echoed by other interviewees, a former senior U.S. military official, who held a senior leadership role in CENTCOM until relatively recently, summed up this point:

> *What you need is an explicit policy that comes from political leadership. Are you going to act against [smuggling]? To act against it, you have to put together the construct for that action. You need a political decision to act against it. First, you need more ISR gathering, and then you need ships—someone has to board vessels. That's doable. But ISR is scarce, and it's a political decision. People are hesitant about Yemen, and there are other priorities in the world today. You also need to do something multinational. That takes intense diplomatic engagement and then engagement [between militaries].*[179]

178 UN official, interview with the authors, September 2024.

179 Former U.S. military official, interview with the authors, July 2024.

The current U.S. posture on Yemen is unlikely to generate the kind of leadership described by the former U.S. official. Yet the more the Houthis are able to maintain their trajectory toward large-scale arms manufacturing, the more of a threat they will become to the region—and other Yemenis. There are also pragmatic, self-interested reasons for the United States and other states to think hard about the Houthis' growing capabilities. The costs the group has incurred on the global economy are staggering. Since October 2023, the group's Red Sea campaign has imposed billions in additional shipping costs on global trade, required over $1 billion in international naval operations—not counting the $1 billion that Operation Rough Rider is estimated to have cost—and consumed hundreds of millions in defensive munitions.[180] Conservative estimates place the total economic impact of the Houthi campaign at over $200 billion.[181] The environmental risks of Houthi attacks on chemical carriers and oil tankers threaten catastrophic damage to Red Sea ecosystems and coastal communities. And none of the above accounts for the damage the Red Sea campaign has done to Western credibility for protecting trade and deterring the proliferation and use of ballistic and other advanced weapons technology.

The Houthis' abilities reflect a mismatch in effort and strategic vision. While Iran has pursued a strategic, long-term approach to building Houthi capabilities, and the Houthis have proven apt pupils, counter-efforts have been tactical, inconsistent, and uncoordinated, hampered by competing priorities among local, regional, and international actors. Exploiting divisions in government areas, the Houthis even appear to be expanding their influence and logistical footprint across Yemen's front lines. The group's success suggests that traditional territorial containment strategies are increasingly ineffective. The Houthis have spent the three years since the 2022 truce building up not just their arsenal of advanced weapons but also that of conventional small arms weapons, tipping the balance of power on the ground further in their direction should large-scale ground warfare reignite inside Yemen.

Perhaps most importantly, the Houthi case demonstrates how modern conflicts are increasingly driven by cross-border and transnational networks that blur traditional boundaries between licit and illicit activity and operate at increasingly large scale and with relatively low levels of systemic friction. The Houthi supply chain leverages social networks that span licit and illicit trade and an emerging global economic system that integrates licit, illicit, and gray financial and trade flows, while remaining outside Western regulatory frameworks. This system has created space for groups like the Houthis and networks like the Axis of Resistance to access low-cost, high-tech components and transfer resources almost instantaneously with minimal oversight, fundamentally challenging current sanctions-heavy policy approaches. Arguably, one of the most important things Iran and its Axis of Resistance allies have done in Yemen is provide a blueprint for accessing this global system, and with a model of a strategic framework needed to exploit the system to its fullest.

The impact of this shift goes beyond its implications for the increasingly lopsided balance of power inside of Yemen. The Houthis' expanding capabilities also now risk drawing Yemen deeper into "Great Power" and regional competition beyond the main theaters of conflict that the group has thus far been associated with. Russia's increasing engagement with the Houthis since its invasion of Ukraine, including reported plans for direct arms transfers, suggests Moscow sees the group as a potential strategic ally in undermining Western interests and projecting power in the Red Sea corridor. This entanglement comes as the Houthis are expanding their own regional influence, particularly in the Horn of Africa. The Houthis' reportedly strengthening ties with actors in Somalia and Sudan suggest they could replicate Iran and Hezbollah's work in Yemen. This would provide groups like al-Shabaab with technical expertise, manufacturing knowledge, and crucially, access to the alternative economic networks that enabled the Houthis' own rapid military development.

180 Courtney Kube and Gordon Lubold, "Trump Operation Against Houthis Cost More than $1 Billion," NBC News, May 8, 2025.

181 "Inside the Houthi's Moneymaking Machine," *Economist*, January 16, 2024.

Building on the baseline established in this report, the next phase of this project will examine the Houthi supply chain within the broader Axis of Resistance ecosystem and the global shadow economy that enables it. Additional work will study the group's ongoing expansion into Africa, and the potential for the Houthis to build ties with other nonstate armed groups, and to build their capabilities.

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About XCEPT

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