

Assessing the Houthi War Effort Since October 2023

By Michael Knights

The Houthis have used the Gaza crisis to vault into the front ranks of the Iran-led “Axis of Resistance,” arguably as the only axis partner to truly globalize the conflict through their anti-shipping attacks on the approaches to the Suez Canal. The movement has demonstrated boldness—as the first axis member to fire ballistic missiles at Israel—and resilience in the face of U.S.-U.K. airstrikes. The Houthis are likely to emerge from the war as a more confident, ambitious, and aggressive terrorist army, with a taste for provocative and eye-catching acts of defiance against Israel and the United States.

The military development of the Houthi movement^{1a} has been examined in detail by the author in two previous *CTC Sentinel* pieces that this article will build upon. The first, in September 2018, was an analysis² of the military evolution of the movement, noting the group’s very rapid five-year development from an insurgent group fielding roadside bombs to a state-level actor using Medium-Range Ballistic Missiles.³ In a second analysis⁴ published in October 2022, the author (along with Adnan al-Gabarni and Casey Coombs) provided an in-depth profile of “the Houthi political-military leadership, its core motivations, and the nature and extent of Iranian and Lebanese Hezbollah influence within the movement.”⁵ Taken together, the two studies painted a picture of a rapidly evolving military force, growing more centralized and cohesive, in part due to close mentoring from Lebanese Hezbollah and the Islamic Revolutionary Guard Corps (IRGC).

This study will take forward (data cut-off April 24, 2024) the analysis of the military development of the Houthi movement, formally known as Ansar Allah (Partisans of God), who are (since February 17, 2024) once again sanctioned by the United States

a Barak Salmoni, Bryce Loidolt, and Madeleine Wells noted that the Houthis are known by a variety of names: “the ‘Houthis’ (al-Houthiyyin), the ‘Houthi movement’ (al-Haraka al-Houthiyya), ‘Houthist elements’ (al-‘anasir al-Houthiyya), ‘Houthi supporters’ (Ansar al-Houthi), or ‘Believing Youth Elements’ (‘Anasir al-Shabab al-Mu’min).” Barak Salmoni, Bryce Loidolt, and Madeleine Wells, *Regime and Periphery in Northern Yemen: The Houthi Phenomenon* (Santa Monica: RAND, 2010).

Dr. Michael Knights is the Jill and Jay Bernstein Fellow with the Military and Security Program at The Washington Institute for Near East Policy. He has traveled extensively in Yemen since 2006. X: @mikeknightsiraq

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for terrorism.^b The analysis will draw on open-source reporting of Houthi military activities, which includes vast amounts of social media and broadcast media imagery from Yemen, both from before the current Gaza conflict and since the war began. Supplementing this, the analysis will also draw on historical data regarding the Houthi war machine in the post-2015 Yemeni civil war and the assistance it has drawn from Iran and Hezbollah. Official statements, global media, and Yemeni reporting of the Anglo-American military strikes on the Houthis since January 12, 2024, add another piece of the puzzle. Some data has been drawn from contacts in Yemen with extensive on-the-ground access in Houthi-held areas.

The paper starts by examining the strategic and operational environment facing the Houthi movement on October 6, 2023, the day before the current Gaza crisis began. This includes a review of the territory held by the movement, the military balance vis-à-vis the anti-Houthi factions, internal security and economic challenges, and the evolving Houthi role in the Saudi-mediated peace process to end the civil war. The section thereafter will review the Houthi military mobilization during the post-October 2023 Gaza crisis, including strikes on Israel and the opening months of the Houthi campaign against Israel-linked shipping in the Red Sea. The analysis will then turn to the impact that U.S. strikes from January 12, 2024, have had on the Houthi war effort and the military balance inside Yemen. This section will review the wartime evolution of Houthi anti-shipping operations and force preservation efforts. The analysis closes with a review of what observers can learn about the Houthi war machine from the events since October 2023: the movement’s strengths and weaknesses, and the opportunities

b On January 19, 2021, the outgoing Trump administration designated the Houthi organizational institution Ansar Allah as a foreign terrorist organization (FTO), a step that the Biden administration almost immediately revoked on February 16, 2021. Since then, some Houthi leaders remained covered by older sanctions (and additional Houthi military leaders continue to be added to U.S. sanctions lists) for posing a “threat to the peace, security, or stability of Yemen.” Then on January 17, 2024, the Biden administration re-designated the Houthis as a Specially Designated Global Terrorist (SDGT) entity but not as an FTO, a difference that enables easier access for humanitarian organizations and peace negotiators when the designation went into effect on February 17, 2024. For the newest SDGT designation, see “Terrorist Designation of the Houthis: Press Statement by Antony J. Blinken, Secretary of State,” U.S. Department of State, January 17, 2024. For the prior sanctions, see “Revocation of the Terrorist Designations of Ansarallah,” U.S. Department of State, February 12, 2021. The U.S. government noted: “Ansarallah leaders Abdul Malik al-Houthi, Abd al-Khaliq Badr al-Din al-Houthi, and Abdullah Yahya al-Hakim remain sanctioned under E.O. 13611 related to acts that threaten the peace, security, or stability of Yemen.” See also “Treasury Sanctions Key Military Leaders of the Ansarallah Militia in Yemen,” U.S. Department of the Treasury, March 2, 2021; “Treasury Sanctions Senior Houthi Military Official Overseeing Group’s Offensive Operations,” U.S. Department of the Treasury, May 20, 2021; “Treasury Targets Key Houthi Finance Network in Coordination with Regional Gulf Partners,” U.S. Department of the Treasury, February 23, 2022.

and threats that face the Houthis in the coming months and years. The October 2022 *CTC Sentinel* piece posited that Houthis had achieved their aim of becoming a “southern Hezbollah,” and this analysis aims to paint a well-evidenced picture of how this new southern Hezbollah has fought in the Gaza conflict since October 2023.⁶

The Houthi’s Strategic and Operational Environment on October 6, 2023

As noted in the October 2022 *CTC Sentinel* article, the territories and the populations controlled by the Houthis increased exponentially during their 2014–2015 military expansion at the start of the current civil war.⁷ By the author’s rough calculation using online mapping tools, the Houthi frontline expanded from about 700 kilometers in early 2014 to over 1,500 kilometers by the summer of 2015 and 1,700 kilometers by October 2023.⁸ The area occupied by Houthi forces increased from around 30,000 square kilometers in 2014 to 120,000 square kilometers in 2015, stabilizing at 110,000 square kilometers when the frontlines froze from 2018–2023.⁹ The population controlled by the Houthis rose by an order of magnitude, from little more than two to three million at the start of 2014 to 20–24 million (by U.S. government calculations) by 2023.^c Regime security—balancing internal control against manning the largely inactive frontlines—has been the overriding concern of the Houthi movement since the U.N.-brokered Stockholm Agreement froze major fighting in December 2018.¹⁰

Heavily populated, poor, mountainous, and fiercely tribal, northern Yemen is difficult for anyone to rule, including the Houthis.¹¹ Controlling 60–70 percent of Yemen’s population¹² but with only a small fraction of pre-war national income,^d the Houthi-run Sanaa government has been unable to pay more than a sixth of owed salaries to important classes of civil servants (such as teachers) for the last seven years.^e This has resulted in escalating pickets and public sector strikes in urban areas.^{13f} The war economy in Houthi areas has driven a brutal cannibalization of remaining assets, often not for the benefit of the broader population but for

the powerful Houthi “supervisors”^g embedded in each government department and district administration.^h Property seizures, enforced *zakat* (religious taxes), and the channeling of trucking and fuel allocation contracts to Houthi-aligned businesses have increased dissatisfaction across society in the Houthi-held areas.¹⁴

As a counter to growing opposition, Houthi leader Abdalmalik Badr al-Din al-Huthi is part-way through a kind of cultural revolution that is now gathering pace, nine years into Houthi control of the capital.¹⁵ One tool has been repression against professionals¹⁶ⁱ and businessmen,^j and efforts to replace Yemeni republican and secular symbols (such as Revolution Day on September 26).^k Tribal violence toward Houthi authorities^l—and to a lesser extent between rival Houthi powerbases^m—has surged at the ragged edges of the Houthi enclave, such as Hajjah, Bayda, and

c The State Department’s 2022 Report on International Religious Freedom stated that in 2022, “the Houthis continued to control approximately one-third of the country’s territory, including 70 to 80 percent of the population.” With the U.S. CIA World Fact Book putting Yemen’s population at 33.7 million, this results in 20–24 million persons under Houthi control. See “2022 Report on International Religious Freedom: Yemen Office of International Religious Freedom,” U.S. Department of State, 2023.

d The Houthis are likely to control under \$2 billion in annual income. See Michael Knights, “An Heir and a Spare? How Yemen’s ‘Southern Hezbollah’ Could Change Iran’s Deterrent Calculus,” Washington Institute for Near East Policy, December 2023.

e It was reported: “The last stable payments to teachers came in 2016. Since then, only partial payments have been made.” In 2022, the Houthis made payments to teachers once every six months, each equivalent to one month’s pre-war pay. Author’s subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons.

f Public servants in Houthi-controlled regions are now owed over five years of back pay. Details gathered from interviews with Yemen-watchers from the humanitarian, government and U.S. and U.K. think-tank communities for this study. Names of interviewees, and dates and places of interviews withheld at interviewees’ request.

g The Houthi set up local supervisors (*mushrifeen*) across all districts in Yemen and within all ministries and major military units, akin to a political commissar system of surveillance and parallel authority. See Adnan Al-Jabrani, “Who are the Houthis? The hidden structures and key leaders who actually run the organization,” Almasdar Online, 2022.

h Houthi supervisors have responded to growing austerity by redistributing wealth through mass confiscation of properties owned by factional rivals or associates of the internationally recognized government; by imposing taxes, including mandatory religious taxes (*zakat*); and by centralizing contract awards and humanitarian access in ways that channel remaining contracts and paid work toward Houthi supporters. Details gathered from interviews with Yemen-watchers from the humanitarian, government and U.S. and U.K. think-tank communities for this study. Names of interviewees, and dates and places of interviews withheld at interviewees’ request.

i In particular, the most targeted sectors of the professional community are professors, judges, teachers, civil society activists, humanitarian workers, and retired generals. Details gathered from interviews with Yemen-watchers from the humanitarian, government, and U.S. and U.K. think-tank communities for this study. Names of interviewees, and dates and places of interviews withheld at interviewees’ request.

j The Judicial Guard was set up by the Houthis to confiscate properties and businesses, and this organization has been used to target businesses who are not protected by some connection to the Houthi movement. This is headed by Major General Saleh Mesfer Farhan Alshaer, “a close ally of Houthi leader Abdul Malik al-Houthi [who also] serves as both the commander of the Houthi-controlled military logistics support organization, where he assisted the Houthis in acquiring smuggled weapons, as well as the officer responsible for managing all assets and funds confiscated by the Houthis.” “Treasury Sanctions Senior Houthi Military Officer Overseeing Group’s Seizure of Opposition Property,” U.S. Department of the Treasury, November 18, 2021.

k Significant arrests were made in the run-up to the Revolution Day on September 26, 2023, the annual commemoration of the republican forces’ victory over Yemen’s last religious imamate in 1962. Flag selling and flag waving was punished with beatings and arrests, and the Houthis also closed down popular social media services like Zoom and Google Meet on the anniversary. Instead, the Houthis had sought to make Prophet Mohammad’s birthday (celebrated in September) more extravagant as a means to overshadow September 26. Author’s subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons.

l A close review of reporting over an extended period (August to March 2024) shows the Houthi supervisors and local forces clashing violently with tribes in all of the Houthi-held provinces outside of their home districts of Saada and Amran. The most intense and sustained clashes have occurred in Al-Jawf, Al-Bayda, Hajjar, Ibb, and Sanaa. Author’s subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons.

m A review of open source reporting from August to March 2024 showed intra-Houthi killings of mid-level commanders in Sanaa, Saada, Ibb, Al-Bayda, Hajjar, Al-Jawf, and Taizz.



Yemen (Rowan Technology)

al-Jawf. Alongside repression, the Houthi leadership is increasing popular mobilization and indoctrination as a means of reducing resistance to Houthi misrule. In the field of mobilization, as the October 2022 *CTC Sentinel* article explored in depth,¹⁷ the Houthis have invested significant effort in developing a comprehensive military human resources system¹⁸ with the Houthis claiming a mobilization capacity of 708,000 personnel before the Gaza conflict.^o This is run (as a formal government institution) by the Ministry of Defense General Mobilization Authority (GMA),^p which is itself led by the Houthi Jihad Preparation Official (aka the Official of the Central Committee for Recruitment and Mobilization), Abdul Rahim al-Humran.¹⁹ The Jihad Preparation Official also leads a parallel mobilization reserve, the Houthi Basij Logistics and

Support Brigades, akin to Iran's Basij forces.^q In a demonstration of the ability of mobilization potential, the September 21, 2023, coup anniversary saw what the Houthi-controlled SABA news agency claimed to be "around 35,000 from various military formations" participating in the military parade.²⁰

Alongside mobilization, the Houthis are also using mass indoctrination programs to replicate IRGC and Hezbollah methods of militarizing their society and creating the infrastructure for permanent mobilization. As the October 2022 *CTC Sentinel* article noted,²¹ the Houthi "Spiritual Guidance Department" has now been active for almost a decade, and its younger soldiers were just small children when the Houthis seized Sanaa in 2014.²² As a result, the *CTC Sentinel* piece calculated, most military-age Yemenis cannot remember a time before Houthi propaganda, which to this day is headlined by the slogan (or the scream (*al-shi'ar*): "Death to America, Death to Israel, Curse upon the Jews, Victory to Islam."²³ Numerous groups—tribal members, teachers and professors, students, and even captured al-Qa`ida fighters—have been cycled through an intensifying program of cultural reeducation courses run by Ansar Allah.^r

The final key aspect of the strategic environment of the Houthis

n The October 2022 *CTC Sentinel* study notes that the Houthi governorate supervisors, "neighborhood affairs managers," and "neighborhood sheikhs" comb households for military-age males and maintain an updated military human resources system. Knights, al-Gabarni, and Coombs, "The Houthi Jihad Council: Command and Control in 'the Other Hezbollah,'" *CTC Sentinel* 15:10 (2022).

o Navanti Group analyst Mohammed Al-Basha noted that in February 2024, the Houthis announced their trained reserve had reached 873,123 personnel and that this number had grown by 165,429 since October 7, 2023. This suggests their claimed number for the mobilization reserve was 707,694 in October 2023. See Mohammed Al-Basha, "#Yemen: In February 2024, Abdul Malik Al Houthi announced that the total number . . .," X, February 22, 2024.

p As the author (plus al-Gabarni and Coombs) noted in 2022, the General Mobilization Authority (GMA) is the arm of the Defense Ministry used to mobilize an estimated 130,000 recruits from the poorer segments of society, for whom even the minimal salary of around \$30 per month is preferable to complete poverty. Knights, al-Gabarni, and Coombs, "The Houthi Jihad Council: Command and Control in 'the Other Hezbollah,'" *CTC Sentinel* 15:10 (2022).

q This is a parallel mobilization reserve force run by the Jihad Preparation Official and akin to Iran's Basij forces. These brigades are being developed by Qasim al-Humran (aka Abu Kawthar), who previously oversaw the Ministry of Youth and Sports. See Knights, al-Gabarni, and Coombs.

r Author's subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons. The aforementioned eight-month review from August to March 2024 shows sheikhs, tribal fighters, students, professors, and even doctors being removed from their daily lives and duties to be enrolled in 45-day indoctrination courses. The same reporting describes al-Qa`ida fighters reeducated in indoctrination courses held by the Houthis prior to release.

on the eve of the Gaza war was the status of the U.N.-backed peace process that has ebbed and flowed since the 2018 Stockholm Agreement.²⁴ Within that process, the Houthis had decidedly gained the upper hand²⁵ over the internationally recognized government and its Presidential Leadership Council (PLC), in part due to very strong Saudi Arabian and U.S. keenness to end the Yemen war.⁵ Despite the ceasefire, the Houthis continued to make strenuous efforts to seize the country's main oil and gas hub at Marib until they were fought to an exhausted standstill in January 2022.²⁶

Thereafter, the Houthis moved into negotiating mode, using ongoing saber-rattling to threaten to derail the peace process.²⁷ In addition to mobilizing ever greater numbers of military reservists,²⁸ the Houthis also used their leverage (i.e., greater determination to continue the fight than the PLC's Gulf partners) to push their advantage in the peace negotiations.¹ Houthi drone attacks in October 2022 shut down the internationally recognized government's oil exports and much of their customs revenues.²⁹ Punitive Houthi taxation of inbound trucks at the internal border with the PLC areas further damaged the PLC-held ports.³⁰ The Houthis successfully leveraged the potential crisis of the deteriorating oil tanker, the FSO Safer, moored at the main Houthi port of Hodeida, as a bargaining chip in financial negotiations.^u

The Houthis also held their April 2022 cessation of missile and drone attacks on Saudi Arabia at risk.^v At the September 21, 2023, parades, the Houthis showed off their increasing military power, should hostilities recommence, including new classes of Iran-provided medium-range ballistic missiles capable of striking Israel (as well as all of the territories of the Gulf Cooperation Council states) and also new Iran-provided anti-ship ballistic missiles (ASBM), anti-ship cruise missiles (ASCM), and one-way attack drones.³¹

As the Hamas attack on Israel unfolded on October 7, 2023, the Houthis thus faced a dichotomous strategic environment: On the one hand, the movement faced no real prospect of military defeat in the civil war, with increasing evidence pointing to an advantageous and confident Houthi position in the peace process. Neither Saudi Arabia nor the UAE was prepared to restart its military support to the PLC,³² and the United States sought a rapid conclusion to the war in order to roll into a planned trilateral normalization deal

involving Israel, Saudi Arabia, and the United States.³³ At the same time, the Houthis sat atop a collapsed economy and were entirely reliant on a Saudi-funded economic bailout to reduce growing societal tension in the Houthi areas.³⁴ A new conflict, the preferred environment for the primarily military Houthi leadership,³⁵ could thus not have been better-timed or more convenient as a way to further militarize the society, demonstrate Houthi military strength at a key moment in the Saudi-backed peace negotiations, and distract Houthi citizenry from worsening economic and political conditions.^w

The Post October 7 Houthi Campaign

Houthi War Aims

Within the broader "axis of resistance"³⁶—comprising Iran, Lebanese Hezbollah, Iran-backed militias in Iraq,^x and Hamas and Palestinian Islamic Jihad, among others—the Houthis were still less-recognized newcomers to the top-table of Iranian partner forces. The author's October 2022 *CTC Sentinel* article (alongside al-Gabarni and Coombs) argued that this was largely an inaccurate view.³⁷ Instead, based on the authors' detailed review of Houthi relations with Iran and Lebanese Hezbollah since the 1980s, the Houthi relationship with these founding members of the axis of resistance was "arguably that of a strong, deep-rooted alliance that is underpinned by tight ideological affinity and geopolitical alignment.³⁸ As the Houthi slogan—"Death to America, Death to Israel, Curse upon the Jews, Victory to Islam"³⁹—suggests, the movement had been seeking to become an important player in the axis' wars against Israel since at least 2001, when the second intifada was gathering force in Palestinian areas.⁴⁰

It was thus not surprising that the Houthis would enthusiastically join other axis of resistance actors—including mentors like Iran and Hezbollah^y—in aiding Hamas after October 7. One Houthi war aim was arguably to screen not only Hamas but also Hezbollah from enemy action. Houthi leader Abdalmalik al-Huthi announced on October 10 that the Houthis would join the conflict if the United States did, part of the axis effort to shield Hezbollah and Iran from direct U.S. pressure.^z On October 31, as the Houthis launched

s There are many indicators of Riyadh's determination: Saudi Arabia first offered its own unilateral ceasefire with the Houthis, then unilateral prisoner releases of Houthi prisoners of war, then held direct peace talks with them, including in Riyadh. Mohammed Hatem and Sam Dagher, "Saudi Arabia Pushes for End to Yemen War After Iran Détente," Bloomberg, April 9, 2023.

t The Houthis regularly bring up the possibility of returning to general warfare, including with strikes into Saudi Arabia, using these threats to drive up their negotiating price: to be not one of many factions at the peace table but equivalent to the internationally recognized government; to have Houthi salaries paid by Saudi Arabia for six months; to gain concessions in the loosening of the naval blockade and the return of some flights to Sanaa airport; and so on.

u The Houthis adopted a maximalist position in which they would either receive the oil on the FSO Safer or equivalent financial recompense. See Frank Giustra, "There's a decrepit supertanker off the coast of Yemen — it's another Exxon Valdez disaster just waiting to happen," *Toronto Star*, February 7, 2023.

v As recently as March 25, 2024, deep into the Saudi-Houthi peace process, the president of the Houthi Supreme Political Council, Mohammed Ali al-Huthi, threatened to resume attacks on Saudi Arabia if the Kingdom continued hosting U.S. military aircraft. See "Houthis threaten Saudi Arabia's oil installations for 'supporting US aggression,'" S&P Global Commodity Insights, March 25, 2024.

w This point was well-made by Gregory Johnsen, who wrote "The Houthis view the war between Israel and Hamas as an opportunity to mute some of this domestic criticism. If they are attacking Israel, their local rivals will be less inclined to attack them." See Gregory D. Johnsen, "The Houthi War on Israel," Arab Gulf States Institute in Washington, November 8, 2023.

x On November 25, 2023, the U.S.-designated Kataib Hezbollah movement listed itself as belonging to the Islamic Resistance in Iraq and added "the Mujahedin brothers who participated in military jihad operations" since October 7 included Iraqi groups Ansar Allah al-Awfiya, Harakat Hezbollah al-Nujaba (HaN), Kataib Sayyid al-Shuhada (KSS), and KH. See Hamdi Malik and Michael Knights, "Militia Hair-Pulling Over Who Are 'The Truest Muqawama,'" *Militia Spotlight*, Washington Institute for Near East Policy, November 26, 2023.

y The October 2022 *CTC Sentinel* article paints a detailed picture of Houthi relations with Iran (almost that of a parent) and Lebanese Hezbollah (akin to an idolized older brother). Knights, al-Gabarni, and Coombs.

z Abdalmalik al-Huthi noted: "We will not hesitate to do everything we can and everything we have in our hands, and we are in complete coordination with the Axis of Resistance to do everything we can . . . If the US directly intervenes, we are ready to participate with missile strikes, drones, and other military options." Author's subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons.

their first ballistic missile strike on Israel,^{41 aa} the Houthi military spokesman, Yahya Sarea, confirmed that attacks on Israel would be sustained as long as Israeli operations in Gaza continued, again serving the aim of the axis to shorten Israel's window of action against Hamas.⁴² At a minimum, therefore, Houthi war aims included commitment to the mutual defense of other axis of resistance members.

More interesting in the author's view, the Houthis committed themselves to entering into open war with the Israelis to an extent that no other non-Palestinian member of the axis did, with little apparent fear of an Israeli response.⁴³ Thus, while Iran did not directly attack Israel until April 13, 2024 (i.e., for 189 days since October 7, 2023),⁴⁴ the Houthis (with direct Iranian support^{ab}) commenced direct cruise missile and drone on Israeli territory from October 19.⁴⁵ Iraqi militias commenced attacks from Iraq and Syria on U.S. bases from October 17 (following the Gaza Al-Ahli Hospital explosion^{46 ac} and the related furor sweeping the Arab world⁴⁷), but there is little indication (and no claims) that Iraqi members of the axis struck Israel itself until November 2, 2023.⁴⁸ While Lebanese Hezbollah shielded itself from powerful Israeli retaliation by sticking as close as possible to the "rules of the game" (i.e., shallow and small attacks within the border zone, and no deeper attacks on cities or strategic infrastructure),⁴⁹ the Houthis threw their best shots at Israel from the beginning, seemingly (to the author) accepting no rules at all.

Two decades of war against Yemeni and Gulf Arab armed forces partially explains Houthi risk-acceptance, as does Israel's relative lack of experience targeting Yemen and the distances involved (i.e., as opposed to Israeli familiarity with and closeness to Lebanon and western Syria). In addition, this author has argued,⁵⁰ an additional Houthi war aim was to become a widely recognized, *leading* player in the axis of resistance, which may help explain Houthi over-performance and above-average risk-taking (by the standards of non-Palestinian axis members) since October 2023.⁵¹

Command and Logistics in the Post-October War Effort

As the October 2022 *CTC Sentinel* article detailed,⁵² the Houthi command and control system is reasonably well-organized and generally led by experienced Houthi fighters who have received specialized training in Iran and/or Lebanon when their roles involve drone, missile, naval, logistics, preventative security, and

aa Israel intercepted the missile using an Arrow-2 interceptor system. Seth J. Frantzman, "In first, Israel's Arrow 2 air defense system intercepts ballistic missile near Red Sea: IDF," *Breaking Defense*, October 31, 2023.

ab Adm. Brad Cooper, deputy commander of U.S. Central Command, stated in mid-February: "The Iranian Revolutionary Guard Corps is inside Yemen, and they are serving side by side with the Houthis, advising them and providing target information . . . They're resupplying them as we sit here right now at sea. We know this is happening. They're advising them, and they're providing target information. This is crystal clear." Quoted from Norah O'Donnell, Aliza Chasan, Keith Sharman, and Roxanne Feitel, "Houthis get critical support from Iran for Red Sea attacks, U.S. Navy admiral says," *CBS, 60 Minutes*, February 15, 2024.

ac The Houthis, like the rest of the non-Palestinian axis of resistance, commenced their military attacks on Israel after the Al-Ahli Hospital explosion on October 17. Previously, axis members had said their military activities against Israel would be linked to commencement of Israeli ground operation in Gaza or the eventuality that the United States intervened—both events the axis sought to deter. In the author's view, Al-Ahli seemed to bring on the axis' military support in an unplanned manner.

“While Lebanese Hezbollah shielded itself from powerful Israeli retaliation by sticking as close as possible to the ‘rules of the game’ (i.e., shallow and small attacks within the border zone, and no deeper attacks on cities or strategic infrastructure), the Houthis threw their best shots at Israel from the beginning, seemingly (to the author) accepting no rules at all.”

intelligence-gathering functions.⁵³ Within the Houthi hierarchy, the counter-Israel and counter-shipping operations are likely to have been commanded and coordinated by the so-called Special Forces Official,^{54 ad} known only as Abu Fatima,⁵⁵ and the Islamic Revolutionary Guard Corps – Quds Force (IRGC-QF) Jihad Assistant^{56 ac} and his Hezbollah deputy, all three of whom are on the Houthi Jihad Council.⁵⁷ Tactical control is likely to have been held by the deputy to the Special Forces Official, Naval Forces chief of staff Mansour al-Saadi, a long-standing Houthi commander on the Red Sea coast since 2015, sanctioned by the United States for “mastermind[ing] lethal attacks against international shipping in the Red Sea” after receiving specialized training in Iran.^{58 af} The “ground-holding” commander of the Houthi forces along the Red Sea coast—the cockpit for most of the operations since October 2023⁵⁹—is the U.S.-sanctioned^{ag} Major General Yusif al-Madani (Abu Husayn),^{ah} the head of the Hodeida-headquartered Fifth

ad The October 2022 *CTC Sentinel* study noted: “The Special Forces Official’s area of responsibility seems to be the Houthi units that directly draw upon Iranian and Lebanese Hezbollah support, and the SFO role is closely associated with the IRGC-QF Jihad Assistant and his Hezbollah deputy and seems to work directly to the Jihad Council.” Knights, al-Gabarni, and Coombs.

ae The October 2022 *CTC Sentinel* study noted that “though the exact identity of the current Jihad Assistant is not yet publicly known, a previous IRGC-QF official to play the role was IRGC-QF Brigadier General Abdalreza Shahla’i.” Knights, al-Gabarni, and Coombs. Investigative reporter Jay Solomon suggested this was the case as recently as January 2024. See Jay Solomon, “Iran’s Revolutionary Guard Deployed in Yemen,” *Semafor*, January 15, 2024.

af Al-Saadi was designated by the United States for threatening the peace and security of Yemen under Executive Order 13611 on March 2, 2021. See “Treasury Sanctions Key Military Leaders of the Ansarallah Militia in Yemen.”

ag On May 20, 2021, al-Madani was sanctioned by the United States for threatening the peace, security, and stability of Yemen, followed by the United Nations on November 9, 2021. See “Treasury Sanctions Senior Houthi Military Official Overseeing Group’s Offensive Operations” and “Yusuf al-Madani,” United Nations Security Council, November 9, 2021.

ah Al-Madani spent his youth as one of the most promising students of Abdalmalik al-Huthi’s predecessor as Houthi leader, Husayn Badr al-Din al-Huthi, in Sa`ada. He married one of Husayn’s daughters and gained a powerful reputation as a commander in every Houthi conflict since 2004. His brother Taha al-Madani, another very senior Houthi field commander, was killed in action in 2016. Knights, al-Gabarni, and Coombs.

Military Region Command.^{ai}

Arguably one of the reasons this team of commanders was quick to react to the October 7 crisis is that the Houthis appear to have been improving the readiness and infrastructure of the Red Sea forces since the summer of 2023, possibly related to rising U.S.-Iran naval tensions in the Arabian Gulf, where Iran had made six attacks on Israeli or U.S.-linked vessels between February and July 2023.^{aj} This activity accelerated as the tensions with Iran peaked in July and August 2023, with Abdalmalik al-Huthi's confidante Mahdi al-Mashat, president of the Houthi Supreme Political Council, announcing^{ak} naval drills in the island chain off the Hodeida coast^{al} and with on-the-ground observers noticing the activation of new missile battery locations in coastal sites such as Ras Issa, Ras al-Khatib, and Al-Arj (in between the two).⁶⁰ These fast attack boat and unmanned surface vehicle (USV, drone boat) drills commenced on August 5-7,⁶¹ with Houthi political official Husayn al-Ezzi warning U.S. naval ships to avoid Yemeni territorial waters or risk "the beginning of the longest and most costly battle in human history."⁶² The exercises were repeated again on September 11,⁶³ perhaps to reinforce the warning on the anniversary of terrorist attacks on the United States. As the Gaza war began on October 7, the Houthis had (on October 4-6) just closed off the Nakhila coast (an 80-kilometer stretch of coast studded with small harbors and artificial canals) to fisherman and coastal road traffic,⁶⁴ and also Kamaran Bay (the northern side of the Ras Issa peninsula),⁶⁵ activity that on-the-ground observers correlated with landings by dhows and fishing boats to unload military supplies, most likely from Iran.⁶⁶

Targeting Israel

While Iraqi groups began their retaliation against the United States in Iraq and Syria within hours of the October 17 Gaza Al-Ahli hospital explosion,⁶⁷ it was the Houthis that led the escalation against Israel itself after the Al-Ahli incident. Lebanese Hezbollah had been skirmishing with Israel on their shared border since October 7 but did not escalate to strike Israeli cities or infrastructure, or use weapons heavier than unguided Katyusha rockets.⁶⁸ On October 19, the Houthis commenced a harassing bombardment of Israel that (in the author's assessment⁶⁹) was quite limited in scale but also unprecedented in many regards.

Nine waves of Houthi strikes against Israel in October-December

2023 can be evidenced using open-source reporting,^{70 am} ranging from the first on October 19 to the last recorded strike in 2023 on December 26.⁷¹ These include three medium-range ballistic missile (MRBM) launches against Israel,^{72 an} the first-ever MRBMs to be targeted on Israel by a member of the axis of resistance, Iran included (at that point). The Houthis had only just hinted that they had the capability to reach Israel when they exposed fuselages and engines from extended-range MRBMs at the September 21, 2023, parades in Sanaa,⁷³ just a month before the war.^{ao}

The Houthis also used at least 12 Land Attack Cruise Missiles (LACM) in the October-December 2023 strikes, which the U.S. Defense Intelligence Agency (DIA) assessed to be Quds-type missiles (the Iranian 351/Paveh),^{ap} spread across five known salvos.^{aq} Finally, the Houthis threaded Sammad-2/3 one-way attack drones^{ar} into at least four of these salvos, including one attack stream with at least 15 drones and another with at least 13 drones.^{as} While *not a single one* of these 46 known⁷⁴ MRBMs, cruise missiles or drones launched by the Houthis in 2023 made it to Israel through the gauntlet of U.S., European, Arab, and Israeli air defenses,⁷⁵ it was nonetheless impressive that the Houthis could launch this many attacks at ranges of up to 1,900 kilometers at relatively short notice, imposing upon Western militaries the mass expenditure of more expensive interceptor systems by the United States, United Kingdom, and Israel.^{at} The above calculations may even be an underestimate of the number of munitions fired at Israel by the Houthis in the first months of the war because from around mid-November onward,⁷⁶ it became harder to differentiate whether all the cruise missiles and drones being fired northwards were aimed at Israel itself or against shipping in the Red Sea.

am These comprise attacks (all in 2023) on October 19, 27, and 31; November 9, 14, 22, and 25; plus December 6, 16, and 26.

an These comprised attacks (all in 2023) on October 31; and November 9 and 25.

ao The U.S. Defense Intelligence Agency (DIA) assessed at least one of the launched missiles to have been an extended-range variant of the Houthi Burkan-3/Zulfikar, known in Iran as Qiam/Rezvan. See the declassified dossier, "Iran Enabling Houthi Attacks Across the Middle East," Defense Intelligence Agency, February 2024.

ap DIA assessed at least one of the launched missiles to have been an extended-range variant of the Quds, known in Iran as Project 351/Paveh. See "Iran Enabling Houthi Attacks Across the Middle East."

aq These comprised attacks (all in 2023) on October 19 and 31; November 22 and 25; plus December 26.

ar The Houthis seem to be using a Sammad-2 or Sammad-3 variant, which DIA assesses to be a version of the Iranian Sayyad (KAS-04) drone. No wreckage seen thus far suggests the Houthis had yet used Waid-2 delta-wing drones, which DIA assesses to be a version of the Iranian Shahed-136 drone. See "Iran Enabling Houthi Attacks Across the Middle East."

as Known Houthi drone attacks on Israel in 2023 comprised attacks on October 19 and 27; November 25; plus December 26. The October 19 attack stream included at least 15 drones and four cruise missiles, and the December 26 salvo used at least 13 drones and five cruise missiles.

at Facing large salvos, U.S., British, and other nationalities expended multiple air defense vessels' full arsenals of interceptor missiles during the conflict (known as "going Winchester"), requiring vessels to be replenished, drawing down on valuable general war stocks and generally engaging with more valuable missiles than the systems being intercepted—a form of cost-imposition on anti-Houthi forces. See Sam LaGrone, "U.S. Destroyer Used SM-2s to Down 3 Land Attack Missiles Launched from Yemen, Says Pentagon," USNI News, October 19, 2023.

ai Fifth MRC covers Hodeida, Hajjar, Al Mahawit, and Raymah governorates. The deputy commander is Hamza Abu Talib, a low-profile fighter groomed by Madani. Knights, al-Gabarni, and Coombs.

aj This included three successful seizures of vessels by Islamic Revolutionary Guard Corps Navy (IRGC-N) forces and two failed efforts to undertake visit, board, search, and seizure (VBSS) operations against U.S.-linked ships. In this case, and all other maritime attack case studies in this article, the author uses the very useful Washington Institute online tracker by Noam Raydan and Farzin Nadimi. See Noam Raydan and Farzin Nadimi, "Tracking Maritime Attacks in the Middle East Since 2019," Washington Institute for Near East Policy.

ak This was on July 30, 2023. Author's subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons.

al The Houthi-held island chain includes (as their main bases) Taqfash, Jebel al-Tair, and possibly Zubayr. Details gathered from interviews with Yemen-watchers from the humanitarian, government and U.S. and U.K. think-tank communities for this study. Names of interviewees, and dates and places of interviews withheld at interviewees' request.

The Houthi Campaign Against Shipping

Houthi officials had threatened since October 22 to begin targeting Israeli-linked shipping,^{77 au} and this was confirmed for the first time by Abdalmalik al-Huthi in his November 14 speech,⁷⁸ in which he warned: “We will monitor and locate Israeli ships in the Red Sea and we will not hesitate to target them.”⁷⁹

In the author’s assessment,⁸⁰ this was a natural progression for the Houthi war effort for a number of reasons. On November 1, the leader of the axis of resistance, Iran’s Supreme Leader Ali Khamenei, called upon the axis to answer the sieging of Gaza by blocking Israel’s exports and trade.⁸¹ As Elana DeLozier presciently noted in 2019,⁸² the Houthis have a demonstrated penchant for “eye-for-an-eye” actions of this kind, especially in terms of counter-blockading the blockader.^{83 av} The Houthis also needed a new, more sustainable option, as the strikes on Israel—as well as all being intercepted—expended the highest-end, most exquisite systems available to the Houthis: extended range MRBMs and cruise missiles.^{84 aw}

An anti-shipping war was a war the Houthis had prepared for, both in terms of the armaments they held⁸⁵ and the Iranian operational and tactical models⁸⁶ they emulated.^{87 ax} The Houthis also had a preexisting track record of striking enemy shipping in the Red Sea, largely vessels from Saudi Arabia and the UAE when these were the main combatants fighting the Houthis in Yemen’s civil war.⁸⁸

As the author’s 2018 *CTC Sentinel* study of the Houthi war machine explored in detail,⁸⁹ in 2015 Ansar Allah took control of Yemen’s Red Sea coastal missile batteries and then integrated them into an Iranian-supported salvage and modernization program.^{90 ay} Houthi coastal defense and sea denial efforts were directly modelled on Iran’s own guerrilla coastal defense tactics,⁹¹ built around land-based anti-shipping missiles, one-way attack drones, rocket- and missile-armed fast attack craft, mines, unmanned surface vehicle (USV) explosive drone boats, helicopter-borne commando boarding

teams, and combat divers.^{92 az}

Interestingly, when the Houthis commenced their new anti-shipping campaign in November 2023, their first efforts closely mirrored the “board and seize” naval commando tactics that were employed by Iran itself in February–July 2023 as Tehran attempted to seize five commercial ships in the Gulf.^{ba} As is often the case, with hindsight, the Houthis laid a very clear trail of preparations before their November 19, 2023, seizure of the *Galaxy Leader*, an Israeli-owned car carrier.^{93 bb} From about November 12 onward, the Houthis began accelerated exercising of naval commando and helicopter VBSS (visit, board, search, and seizure) operations.⁹⁴ From November 13–18, the Houthi naval forces extended their patrols in a wide net from as far south as the Somali coast to the Farasan islands off Saudi Arabia.⁹⁵ After a number of failed speedboat chases of commercial vessels on November 17–18,⁹⁶ the Houthis succeeded with *Galaxy Leader* only by using a helicopter to land commandos, who then stopped the ship to allow a Houthi boat flotilla to catch up.⁹⁷

Though an enormous propaganda victory,^{bc} the Houthis found it hard (in this author’s assessment⁹⁸) to replicate the success of *Galaxy Leader*. When a seizure was attempted on November 26 against an Israel-owned tanker *Central Park* (just south of the Bab el-Mandeb), the effort was disrupted by a U.S. naval vessel, the *USS Mason*, which was subsequently unsuccessfully targeted in an apparent first use of anti-ship ballistic missiles (ASBMs) by the Houthis.⁹⁹ Five further efforts were made in December by the Houthis to seize a vessel in the Red Sea using refined detection^{bd}

au The then Houthi prime minister, Abdelaziz bin Habtour, warned in an October 22 television address that “Zionist ships” in the Red Sea would also be attacked if Israeli military action in Gaza continued. Quoted in author’s subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons.

av Thus, DeLozier noted, Saudi closure of Houthi airports would be answered with strikes on southern Saudi airports, and Saudi blockading of Houthi ports would be countered with attacks on Saudi ports and vessels. Elana DeLozier, “Houthi Messaging May Hint at a Targeting Pattern,” *Washington Institute for Near East Policy*, June 13, 2019.

aw Though impressive among axis of resistance members, the Houthi strikes on Israel were all intercepted and had no effect on Israel’s decision to mount a ground operation in Gaza from October 27, 2023, onward. Moreover, they expended the highest-end, most exquisite systems available to the Houthis: extended range MRBMs and cruise missiles.

ax The Iranian formula of guerrilla naval tactics is mirrored quite precisely: fast attack craft dispersed across inlets; use of spy dhows and surveillance ships and coast-watchers; extensive reliance on drones and anti-ship cruise missiles; and the option of mines, if needed.

ay Older ASCMs such as Rubezh B-21/B-22 (the Houthi name for Soviet P-21 and P-22/RS-SSC-3 *Styx*) and the *Al Mandab-1* (Houthi name for Chinese C-801) were gradually phased out and turned into parade floats, emergency stores, spare parts, or even decoys. In 2018, the author saw a number of Rubezh ASCMs abandoned on the Red Sea coast front in Hodeida that the Houthis had de-prioritized when they evacuated. Author’s personal recollection from period of embedded reporting with Gulf coalition forces in Yemen in 2018.

az In particular, the report notes that Ansar Allah undertook combat diver training on Zuqur islands in the Red Sea as early as 2017. Michael Knights, “The Houthi War Machine: From Guerrilla War to State Capture,” *CTC Sentinel* 11:8 (2018).

ba These included successful seizures by Iranian helicopter- and boat-borne commandos, for instance *Advantage Sweet* (April 27, 2023) and earlier the *Stena Impero* (July 19, 2019). Other seizure operations failed due to U.S. intervention, such as *TRF Moss* (July 5, 2023) and *Richmond Voyager* (July 5, 2023). The list also included at-sea seizures by Iranian naval forces unrelated to Iranian foreign policy, such as *Niovi* (May 3, 2023) and *Purity* (May 12, 2023). See Raydan and Nadimi.

bb Raydan and Nadimi note: At the time of the attack, the ship was owned by Israel-based Ray Shipping Ltd. (though it was chartered and operated by a Japanese company). See Raydan and Nadimi.

bc The Houthis turned the *Galaxy Leader* into a global media sensation, with slick video of the helicopter assault placed online. Within Yemen, the Houthis made the *Galaxy Leader* a kind of tourist attraction. See “Piracy Park: Yemen’s Houthis convert hijacked *Galaxy Leader* into tourist attraction at \$1 per visit,” *First Post*, January 29, 2024.

bd Houthi efforts to detect and track vessels took a number of forms, from increasing the density of patrol vessels and “spy dhows” (surveillance ships) in the Red Sea; use of long-range optics at elevated sites; making more rapid use of electronic intelligence provided by Iranian surveillance vessels and Houthi drones; using open-source vessel-tracking services; using the marine radar of commercial ships in Houthi ports; and boosting the power supply of GSM towers to allow them to interact with cellphones active on commercial vessels. These details are gathered from U.S. military interviewees for this study. Names of interviewees, and dates and places of interviews withheld at interviewees’ request. See also prior work on these themes in Knights, “The Houthi War Machine.”



Screen capture from footage published on a Houthi Telegram channel on November 1, 2023, purporting to show a UAS launch by the group. The image shows a V-wing Sammad-2 or Sammad-3 drone, which DIA assesses to be a version of the Iranian Sayyad (KAS-04) drone. See the declassified dossier, “Iran Enabling Houthi Attacks Across the Middle East,” Defense Intelligence Agency, February 2024.

and hunting tactics^{be} but no other ship was successfully boarded or seized. At least two of these cases saw very determined pursuits of vessels that spanned more than a day of complex maneuvering and integrated drone, speedboat, and shored-based activities.^{bf} In the last example of the Houthis trying to board a ship, U.S. helicopter sank three Houthi vessels on November 26, killing 10 Houthi operators after they machine-gunned the bridge deck of the Maersk Hangzhou.¹⁰⁰

From December 2023 onward, the Houthis shifted their focus to deliberate efforts to sink vessels. In December, there were five Houthi efforts to board ships but 15 efforts to cause damage with long-range strikes.¹⁰¹ Houthi anti-shipping tactics were not gradually ratcheted up, say from small one-way attack drones to heavier munitions: Instead, all three of the attacks on December 3

be The Houthis appear to have gone through a number of quick-fire evolutions in November and December 2023 regarding how they organized their fast attack craft flotillas, with various mixtures of mother ships (fishing boats) to undertake electronic intelligence-gathering and communications with land headquarters, ship-launched drones, fast pursuit boats, and boarding parties. These details are gathered from U.S. military interviewees for this study. Names of interviewees, and dates and places of interviews withheld at interviewees’ request.

bf One example of this is the effort to seize the Ardmore Encounter, a Marshall Islands-flagged ship carrying jet fuel on December 13, 2023, which was chased by multiple boat groups and subjected to missile and drone attacks, possibly in an effort to slow the vessel down. These details are gathered from U.S. military interviewees for this study. Names of interviewees, and dates and places of interviews withheld at interviewees’ request.

appear to have involved ASBMs.^{bg} Of the 15 Houthi anti-shipping strikes carried out in December and early January,¹⁰² before the United States directly intervened with strikes on Yemeni soil on January 12, 2024, seven are reported to have used heavier missiles (six ASBMs and one ASCM) and eight employed one-way attack drones with small warheads.¹⁰³ Though expanding the scope of targeting—to include Israeli-owned vessels and all ships visiting Israeli ports from December 9, 2023^{bh}—the Houthi leadership remained somewhat committed to discriminate targeting, at no point using naval mines, for instance.^{bi}

A number of factors reduced the overall technical effectiveness of Houthi anti-shipping warfare (i.e., damaging and sinking ships) and prevented the Houthis from being as discriminating as they probably wished to be in terms of verifying the nationality of target ships. For instance, they have struck the ships or cargoes of putative allies such as Iran^{bj} or powerful non-aligned parties^{bk} such as China^{bl} and Russia^{bm}—who abstained in the U.N. resolution that came imminently before the U.S.-U.K. strikes began.¹⁰⁴ The Houthis have even struck food deliveries bound for their own ports—in essence blockading themselves.^{bn} In the author’s assessment,¹⁰⁵ the Houthis appear to have made many basic research errors^{bo} about the current ownership (at the time of attacks) of vessels, suggesting quite rudimentary and negligent intelligence-gathering on potential targets.¹⁰⁶

In many cases, though, the pure range mechanics of anti-shipping warfare, *not* target research, may have worsened the difficulty of hitting the *right* moving targets at long-range in a fairly

bg The three attempted ASBM strikes were on the bulk carrier Unity Explorer, the container ship Number 9, and the bulk carrier AOM Sophie II. See Raydan and Nadimi.

bh On December 9, Houthi military spokesperson Yahya Sarea stated that the movement would now target all ships sailing to Israel, regardless of ownership. Author’s subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons.

bi No naval mines or Houthi mine-laying activities have been encountered until the time of writing. Author’s geolocated incident dataset of the post-October 7 war.

bj It was noted: “On February 12, two Houthi missiles targeted the Star Iris cargo ship, which was transporting corn from Brazil to Iran.” Author’s subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons.

bk In the framework of great power competition, the axis of resistance clearly leans toward the non-U.S. bloc, led by China and Russia. On March 23, it was reported, Chinese and Russian diplomats sought Houthi guarantees that their shipping would not be hit in return for ongoing support to the Houthis in the United Nations Security Council. Author’s subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons.

bl Just days after the aforementioned effort to negotiate free passage for Chinese and Russian shipping, the Chinese-owned Huang Pu was targeted with five Houthi ASBMs on March 23, 2024. Raydan and Nadimi.

bm Likewise, on January 12, 2024, the Russian vessel Khalissa was struck by a Houthi anti-shipping attack. Raydan and Nadimi.

bn In one case, the Sea Champion, carrying grain from Argentina to the Houthi-held port of Hodeida, was attacked by Houthi missiles. Raydan and Nadimi.

bo The incident-by-incident tracker produced by Noam Raydan and Farzin Nadimi is exceptionally useful for many reasons, not least its use of ship ownership data to note recent changes in ship ownership that the Houthis appear to have missed—with Israeli-, U.S.,- and U.K.-linked ships that may have been brought by Chinese owners, for instance. Raydan and Nadimi.

crowded body of water.^{bp} In the case of drones, used in about half of Houthi anti-shipping attacks, the key drawback (aside from their small warhead sizes^{bq}) is their slowness.^{br} For instance, a Sammad-type one-way attack drone traveling from the Red Sea coast of Yemen to the middle of the shipping lanes will fly for at least 30 minutes before reaching its destination, by which time a tanker moving at 20 knots will have moved around 20 kilometers.¹⁰⁷ By the time a drone arrives at engages with its terminal electro-optical infrared seeker, the original target may be far away from the original reported location.^{bs}

The same issue pertains to drone boats, which move more slowly than even a fixed-wing drone, meaning their quarry might have moved as far as 70 kilometers by the time the drone boat approaches its calculated location and switches on its terminal electro-optical infrared seeker.¹⁰⁸ Aerial and naval drone systems are quite vulnerable to detection and interception, especially if they need to send and receive updated navigation or targeting information while approaching a target.¹⁰⁹ The particular difficulty in guiding a USV onto a specific target at long range may account for the very small number of explosive drone boats (just two by April 24, 2024¹¹⁰) used by the Houthis in the conflict,¹¹¹ despite Houthi naval commander Brigadier General Mansour al-Saadi claiming in mid-December that around 80 such USVs have been stockpiled.¹¹²

Anti-ship cruise missiles are more capable systems, and the Houthis have been building up their ASCM arsenal since 2015, at first through receipt of the Iranian Nour and Ghadar missiles, two variants of the Chinese C-802, which the Houthis call Al-Mandab-2.¹¹³ This kind of weapon was used with great success in October 2016 to permanently cripple a UAE high-speed transport vessel¹¹⁴ and may have been used previously to sink an Israeli gunboat in 2006.¹¹⁵ Due to the narrowness of the lower Red Sea, even if the Houthis are operating unimproved 120-kilometer Mandab-1 versions, this system can cover the shipping lanes opposite Ras Issa and Hodeida, reaching down as far as the Zuqur islands.¹¹⁶

bp The pre-crisis totals were around 50-60 strait transits by large vessels per day. Lori Ann LaRocco, "Viewpoint: What Red Sea attacks mean for shipping Weekend assault on commercial vessels could have impact on global trade," *Freight Waves*, December 4, 2023.

bq Iran-provided drones such as the Sammad and Shahed series carry small warheads with under 40 kilograms of high explosive, which can kill exposed personnel on deck or within bridge housing, and which might have the ability to penetrate even double-hulled tankers due to their explosive-formed penetrator configurations, but they will almost never do critical damage or immobilize or sink a ship. This is the author's assessment based on all the available evidence and the authors' analytic processes.

br Iran-provided drones such as the Sammad and Shahed series cruise at about 185 kilometers per hour. This is slow enough that helicopters can overtake them, as was shown when a French helicopter crew shot down one Houthi drone with its door-gunner's defensive pintle-mounted machine-gun. "French Navy Helicopter shoots down Houthi drone in Red Sea," *Telegraph*, March 20, 2024.

bs If the correct heading is known, an approximate new location can be predicted and programed into an inertial navigation flight planner, creating a closed system that does not rely on a constant command link or GPS signal and which is therefore hard to jam with electronic countermeasures. Once the drone arrives and switches on its terminal guidance system—an electro-optical seeker looking for a ship silhouette or a signal receiver looking for ship transponders—the system is essentially self-guiding. All details gathered from interviews with U.S. and U.K. military personnel for this study. Names of interviewees, and dates and places of interviews withheld at interviewees' request.

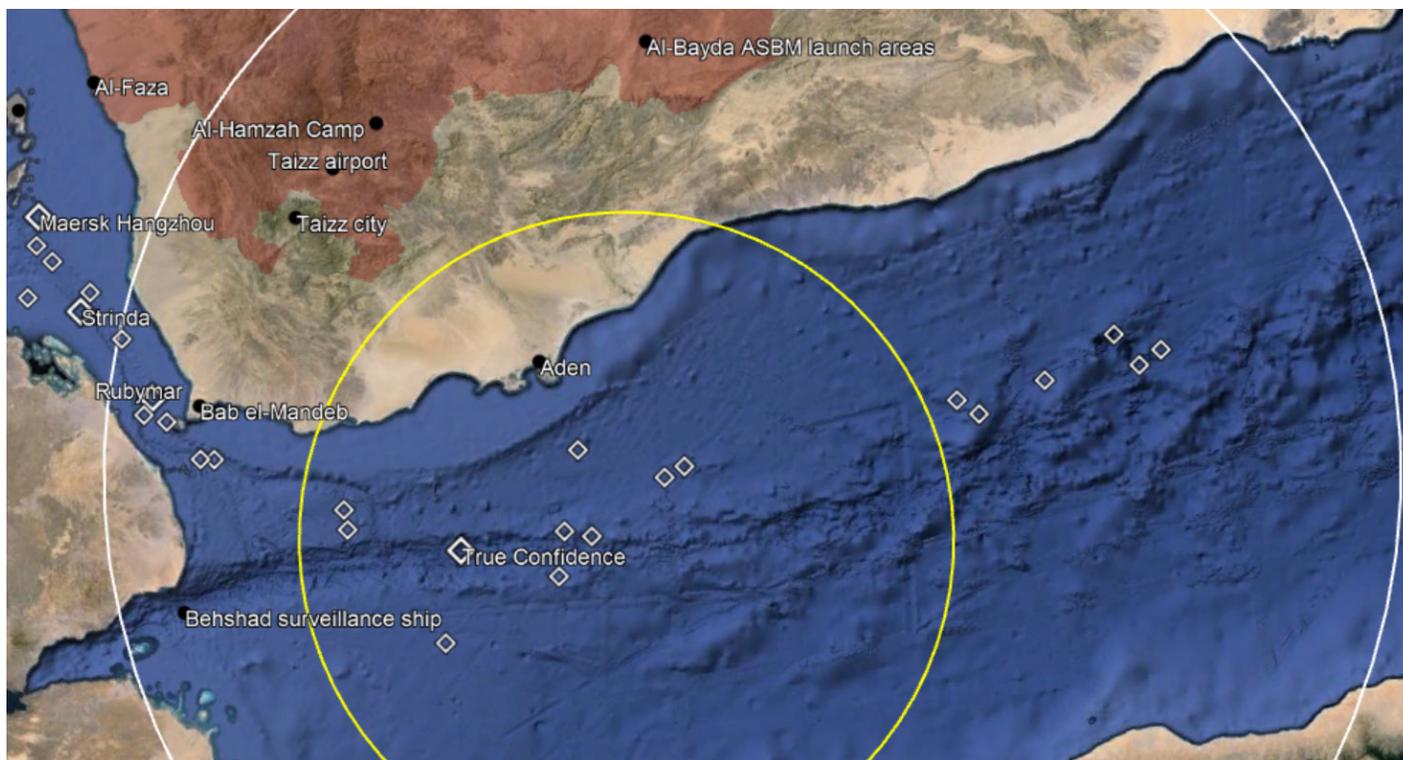
Only one anti-shipping attack has been strongly associated with an ASCM, however: the December 11, 2023, missile strike on the Norwegian-owned chemicals tanker *Strinda*, which was due to call on Israel's port of Ashdod in early January 2024.¹¹⁷ Closing head-on with the *Strinda* from a distance of 150 kilometers, the Houthi ASCM would only have needed to fly for around eight minutes,¹¹⁸ giving it a fairly small search area (of under 10 kilometers square)¹¹⁹ when its active radar seeker activated. Had an escort vessel been nearby, it probably could have jammed the terminal radar guidance,¹²⁰ but in this case the missile flew uninterrupted and struck the *Strinda*, passing through the ship and causing fires but no casualties.¹²¹ Given this result, it is perhaps surprising that more ASCMs have not been used, and might suggest (in the author's assessment¹²²) a Houthi withholding approach toward these valuable weapons.^{bt} Of note, while other ASCMs have been shown by the Houthis at parades,^{bu} the only ASCM known to have been used by the Houthis is the Al Mandab-2 (C-802).¹²³

The final type^{bv} of anti-shipping weapon used by the Houthis in the current war is the Anti-Ship Ballistic Missile. Though the

bt The Houthis have been very sparing in their use of ASCMs, both against the Saudi-led coalition and the United States and Israel. This could be to retain some secrecy around the performance of such systems, though they seem keen to display them at parades. Interceptions of Houthi arms-smuggling vessels have revealed no ASCM types other than the Mandab-2, with its distinctive fuselage, engine, and multi-directional shaped-charge warhead. The Houthis have received Quds-series land attack cruise missiles from Iran (in intercepted shipments from November 25, 2019, and February 9, 2020, and most recently in interceptions on January 11, 2024, and January 28, 2024. For the 2019 and 2020 intercepts (and others), see "The Iran Primer: Timeline: U.S. Seizures of Iranian Weapons at Sea," United States Institute for Peace, February 15, 2024. For the 2024 intercepts, see "USCENTCOM Seizes Iranian Advanced Conventional Weapons Bound for Houthis," U.S. Central Command, January 16, 2024, and "CENTCOM Intercepts Iranian Weapons Shipment Intended for Houthis," U.S. Central Command, February 15, 2024. Overall, the numbers of cruise missiles and ASCMs found in interceptions has been very small—single airframes usually, almost suggestive of sending prototypes intended to aid local production efforts of some components (such as airframes and control surfaces). The Houthis may not yet own a large ASCM arsenal and may be carefully husbanding what they have. For detailing on weapons used, the author used his geolocated incident dataset of the post-October 7 war, cross-checked against Raydan and Nadimi.

bu Newer systems shown at Houthi parades in 2022-2023 include two anti-shipping variants adapted from Quds-series (Iranian 351/Paveh) land attack cruise missiles, namely the Sayyad (radar-homing) and Quds-Z-0 (electro-optical seeker). See "The Iran Primer: Timeline: U.S. Seizures of Iranian Weapons at Sea," United States Institute for Peace, February 15, 2024. See also Fabian Hinz, "Houthi anti-ship missile systems: getting better all the time," *International Institute for Security Studies*, January 8, 2024, and Michael Knights and Farzin Nadimi, "Yemen's 'Southern Hezbollah' Celebrates Coup Anniversary in Deadly Fashion," *Washington Institute for Near East Policy*, September 28, 2023.

bv The Houthis are also reported by the United States to have employed an unmanned underwater vehicle (UUV) on one occasion when U.S. forces destroyed the system (February 17, 2024). The U.S. Central Command daily update noted: "This is the first observed Houthi employment of a UUV since attacks began in Oct. 23." "Feb. 17 Summary of Red Sea Activities," U.S. Central Command, February 18, 2024. Earlier, the United States captured parts of a UUV in the January 28, 2024, U.S. maritime intercept operation on a Houthi arms-smuggling ship. See "USCENTCOM Seizes Iranian Advanced Conventional Weapons Bound for Houthis."



Map 1: Houthi anti-shipping posture in the Gulf of Aden. The red-shaded areas are Houthi-occupied, and the white diamonds are known attacks on shipping (until map production on April 11, 2024). The yellow circle is a 150-kilometer radius drawn out from the area of the main shipping corridor in which most ships have been attacked, and the white circle is a 300-kilometer radius, the likely maximum range (in the author's view) of the Mohit and Asef ASBMs used by the Houthis. This map shows that it is difficult for the Houthis to use slower drone systems on the eastern side of the Gulf of Aden due to their lack of coastline launch sites, with ships likely to move long distances before such drones could close with the target. Updated course corrections to drones might be provided by the Iranian Behshad and other vessels in collaboration with retransmission towers in high places such as Taizz—where the United States undertook multiple rounds of strikes on GSM towers in November and December. ASBMs launched from inland areas such as Al-Bayda and Taizz have been a key weapon for rapidly reaching moving targets in the Gulf of Aden.

Houthis have teased their ownership of newer ASBMs at parades,^{bw} evidence only exists to suggest two types of ASBM are regularly used in Houthi service: The first, probably more numerous, is the liquid-fuel Mohit, which is a converted SA-2 surface-to-air missile with a range of about 275 kilometers and an electro-optical infrared seeker.¹²⁴ Use of this system is likely because the components—SA-2 SAMs—are still available in significant numbers and have been regularly employed by the Houthis in a surface-to-surface role (as the Houthi Qahir-1).^{bx} The other—which the DIA says has been

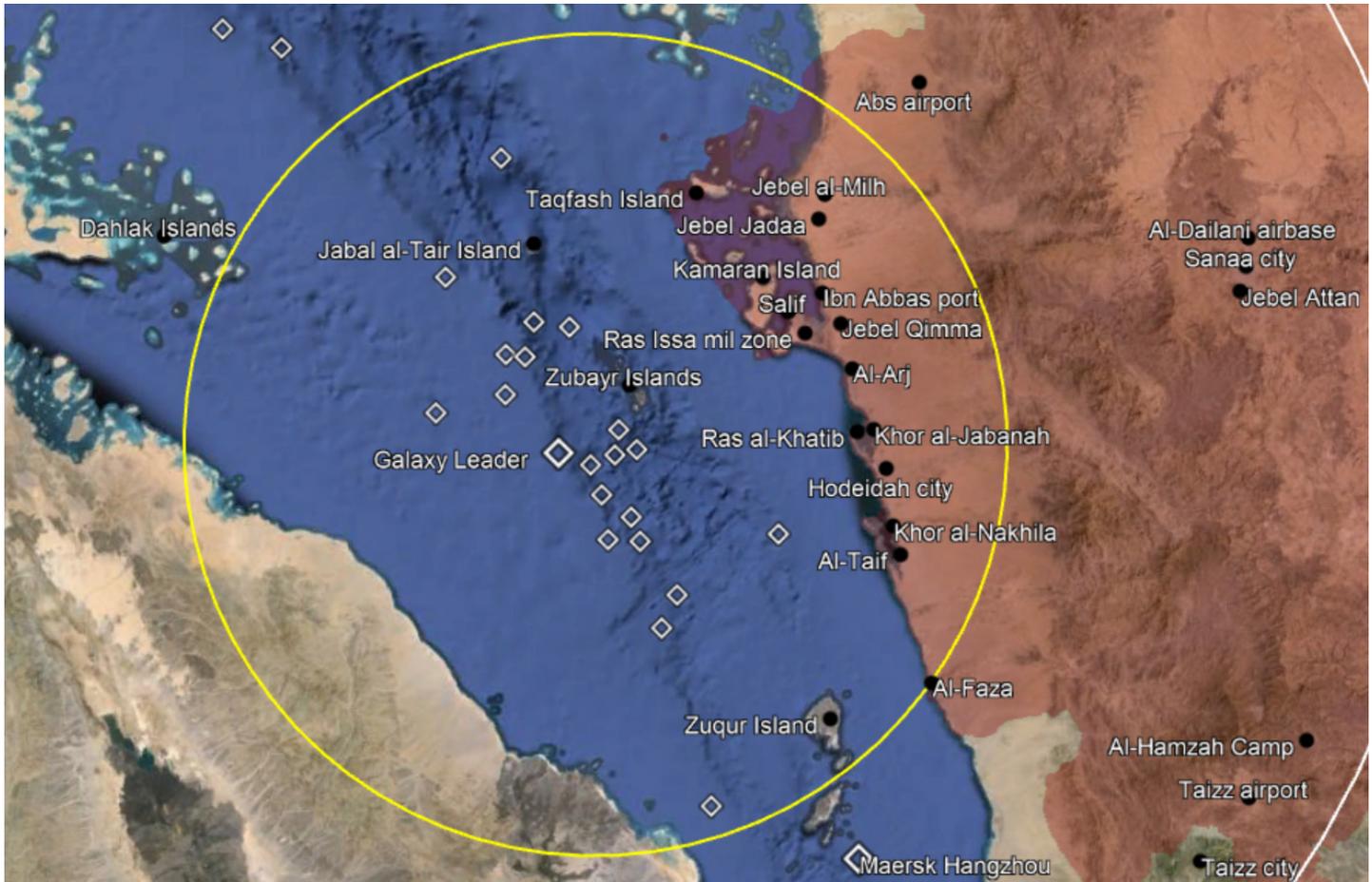
^{bw} Analysts of the September 21, 2024, parade noted the presence of smaller ASBMs at Houthi parades, such as the Tankil (450-km, likely only a mock-up for now, according to Farzin Nadimi), the Falaq (200-km), and the Al-Nahr al-Ahmar and Mayun variants of the Badr-P tactical rocket (140-km). Hinz, “Houthi anti-ship missile systems: getting better all the time;” Knights and Nadimi. See also Farzin Nadimi, “Under Fire in the Bab al-Mandab: Houthi Military Capabilities and U.S. Response Options,” Washington Institute for Near East Policy, December 8, 2023.

^{bx} The Qahir-1 is the name for converted Houthi SA-2s, a technique borrowed from the Iranian experience of converting SA-2s to turn them into surface-to-surface missiles (SSMs) of the Tondar type, which is itself an Iranian copy of the Chinese HQ-2 SAM-turned-SSM. See Michael Knights, “Countering Iran’s Missile Proliferation in Yemen,” Washington Institute for Near East Policy, November 8, 2017.

used in the current conflict^{by}—is the solid-fuel Asef, a copy of Iran’s Khaleej-e Fars (the navalized Fateh-110) missile with a range of at least 300 kilometers and also an electro-optical infrared seeker.¹²⁵

Both these missiles have the advantage of a much larger warhead (350 kilograms for the Mohit, 450 kilograms for the Asef) versus either Houthi drones (15–40 kilograms) or cruise missiles (165 kilograms with shaped-charge armor-piercing effects).¹²⁶ Another advantage of the ASBM is speed: In addition to potentially hitting the target with penetrating kinetic power as well as explosive force,¹²⁷ the ASBM closes the distance on a moving ship faster than any other system, meaning the ship moves the least distance from its last known location. Thus, a relatively slow improvised ASBM like the Mohit might reach its target within three to four minutes (at 150–250 kilograms), during which time a commercial vessel might only have moved three to five kilometers on a predictable course.¹²⁸ A faster ASBM or one operating at closer range might halve these numbers.¹²⁹ For this reason, ASBMs quickly became the single most-employed Houthi anti-shiping weapon after their

^{by} The DIA assessed at least one of the launched ASBMs used in the current Gaza war by the Houthis is the Asef missile. See “Iran Enabling Houthi Attacks Across the Middle East.”



Map 2: Houthi anti-shipping posture in the Red Sea. The red-shaded areas are Houthi-occupied, and the white diamonds are known attacks on shipping (until map production on April 11, 2024). The yellow circle is a 150-kilometer radius drawn out from the area of the main shipping corridor in which most ships have been attacked, and the white circle is a 300-kilometer radius, the likely maximum range (in the author's view) of the Mohit and Asef ASBMs used by the Houthis.

triple usage on December 3.^{bz} On February 18, 2024, the Houthis used ASBMs to strike the Rubymar chemical tanker, causing the first sinking of a ship in the conflict on March 2.¹³⁰ ASBMs also caused the first civilian casualties of the anti-shipping war, with three seafarers killed when the True Confidence was struck on March 6, 2024.¹³¹

The Impact of U.S. Airstrikes

On December 16, 2023, the United States and nine coalition partners^{ca} established a new Red Sea and Indian Ocean naval task force—Operation Prosperity Guardian¹³²—and began issuing ultimatums to the Houthis to cease their attacks on shipping.¹³³ At that stage, no ship had been sunk nor even had lost power, and

no seafarers had been killed,¹³⁴ but the Houthi naval harassment campaign nonetheless prompted all of the top-10 shipping and logistics firms to suspend use of the lower and central Red Sea, impacting Bab el-Mandab and Suez Canal traffic.¹³⁵ After a final three weeks of Houthi rhetorical defiance^{cb} and ongoing attacks,^{cc} and a January 10, 2024, U.N. resolution,^{cd} the United States and the United Kingdom commenced airstrikes on Houthi targets onshore in Yemen on January 12.¹³⁶

What did the Houthi naval and coastal defense target system

^{bz} In the central Red Sea, 11 of 21 (47 percent) anti-shipping attacks from October 19 to March 31 used ASBMs, with the remainder split between drones and seizure attempts. In the southern Red Sea, six of 14 were ASBMs (43 percent). In the Indian Ocean, 11 of 15 (73 percent) were ASBMs. Author's geolocated incident dataset of the post-October 7 war, cross-checked against Raydan and Nadimi.

^{ca} These being the United States, United Kingdom, Bahrain, Canada, France, Italy, Netherlands, Norway, Seychelles, and Spain. See "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.

^{cb} On December 20, 2023, for instance, the Houthi military spokesman Yahya Sarea said of the risk of a U.S. attack: "They've tried us for nine years; if they want to do it again, we are here and ready." Houthi leader Abdalmalik al-Huthi added on the same day, "the Americans shouldn't think they can make attacks here or there and then send intermediaries to calm the situation down." Sarea tweeted that Houthi retaliation would exceed what U.S. American forces "faced in Afghanistan and suffered in Vietnam." Author's subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons.

^{cc} There were six unsuccessful Houthi attacks on commercial ships in over the first nine days of January 2024. Raydan and Nadimi.

^{cd} Four members, including Russia and China, abstained during the vote. "Adopting Resolution 2722 (2024) by Recorded Vote, Security Council Demands Houthis Immediately Stop Attacks on Merchant, Commercial Vessels in Red Sea," United Nations, January 10, 2024.

comprise as the opening U.S. strikes were planned and undertaken? Fixed (or immobile) key target types included:

- Known Houthi missile and liquid fuel storage sites in Sanaa and elsewhere in the Houthi interior, usually in pre-civil war improved cave systems such as the Jebel Attan “presidential mountain” in Sanaa.^{ce}
- Post-2015 onshore missile and drone storage facilities such as Jebel Qimma, Jebel al-Milh, and Jebel Jadaa,¹³⁷ all small rocky hills that protrude 20–40 meters (70–140 feet) above the surrounding Hodeida governorate coastal plain and where quarrying has left enlarged caves that may have been further improved (on the Iranian and Hezbollah tunneling model)¹³⁸ since the Houthis began to utilize these sites in 2020–2021.^{cf}
- Training and depot locations for the Houthi naval and coastal defenses forces at locations such as Hodeida’s Ras al-Khatib naval base and the Khor al-Jabana naval and coastal defense complex across the inner anchorage, both relatively visible locations.^{cg} A second major headquarters area is the Ras Issa military zone and the adjacent Kamaran Island military zone, both large areas that are subject to closure to non-military personnel during security operations.¹³⁹ These sites have been prepared for precision attacks through the creation of hundreds of identical weapons storage “igloos” (buried shipping containers).¹⁴⁰
- Resupply points where Iranian advanced conventional munitions have historically made landfall, notably the inlets of Kamaran Island and the nearby Ibn Abbas; the Khor al-Nakhila area (a seven-kilometer area of sheltered coast encompassing Khor al-Nakhila, Khor al-Ghulayfiqah, and Al-Taif);^{141 ch} and finally the Al-Faza area, where a 15-kilometer stretch of coast can be closed to the public and fishermen when resupply ships enter the road-adjacent canals built there in the second half of 2022 to allow inshore

ce The mountain and surrounding camp have been associated with elite presidential forces since the late 1960s and with Yemeni missile forces since the Republic of Yemen gained its first surface-to-surface missiles in the 1980s. Jebel Attan is honeycombed with improved caves that were considered by Gulf and Western intelligence agencies to be a shelter for missile systems and liquid fuel storage. This is an almost uniform view gathered from interviews for this study (with Gulf, U.S., and U.K. intelligence officials) and fits with the author’s assessment. Names of interviewees, and dates and places of interviews withheld at interviewees’ request.

cf The author keeps a close watch on all the declared cargoes entering Hodeida port, the only Houthi container and general cargo port. One noticeable trend is the regularity with which shiploads of steel, timber, and concrete have arrived in the Houthi areas at a time of general economic depression. Even in the first five months of the current crisis (October 2023–March 2024), while food imports to Yemen dropped by 30 percent (by the author’s tallying of U.N.-announced cargoes), non-food and non-fuel cargoes (mainly steel and timber) dropped by only 18 percent. It may be worthwhile for intelligence community analysts to try to account for where these building materials are mainly being utilized, to differentiate reconstruction from military fortification and tunneling.

cg These are both largely above-ground complexes close to sea-level that are well-known as Houthi naval and coastal defense hubs. Details gathered from interviews with U.S. and U.K. military personnel for this study. Names of interviewees, and dates and places of interviews withheld at interviewees’ request.

ch These locations also have a tight lock with areas bombed by the United States and United Kingdom since January 2024. Author’s geolocated incident dataset of the post-October 7 war.

unloading at high tide.^{ci}

- Larger surveillance platforms, including communications towers and long-range optics (LOROPS) and naval and air defense radars. Of interest, LOROPS systems were discovered in the January 28, 2024, intercepted shipment of Iran-provided arms being sent to the Houthis.¹⁴²

Largely re-locatable and mobile target types included:

- Houthi “missile battalions” that employ drone, ASCM, and ASBM units, drawn from both the aerospace forces and the naval forces.^{cj}
- Houthi USVs, fast-attack boat units and their mother ships (fishing vessels), moving between various rocky inlets or stretches of coast vegetated by mangrove trees.^{ck}
- Houthi air defense units, which primarily pose a threat to multinational drones (shooting down two MQ-9 Reapers over Yemen on November 8, 2023, and February 19, 2024).^{143 cl} The two key systems observed in use are both Iran-provided: the Houthi Saqar-1 and -2 (Iran’s 358-series anti-air loitering munition)^{cm} and the Houthi Barq-2 (Iran’s Taer-2,¹⁴⁴ capable of trying to intercept coalition jets within a 40-kilometer radius, and thus able to cover large complexes such as Ras Issa/Kamaran).^{cn}
- Houthi helicopters and their minimal supporting infrastructure.^{co}
- Specialist headquarters personnel and foreign (i.e., Iranian and perhaps Lebanese Hezbollah) advisors, with an extensive preventative security infrastructure to conceal,

ci The new canal was not visible in Google Earth imagery from July 2022 but present in November 2022 imagery.

cj Very little is known about the “missile battalions,” which are more likely to be batteries operating in very small tactical echelons, possibly exposing only single disguised launch vehicles at a time. Details gathered from interviews with U.S. and U.K. military personnel for this study. Names of interviewees, and dates and places of interviews withheld at interviewees’ request.

ck The USVs have not clustered together since a series of Saudi strikes on Ras Kamaran in 2017–2018. They appear, based on U.S. strike reports, to have been dispersed to the inlets and canals south of Hodeida. Details gathered from interviews with U.S. and U.K. military personnel for this study. Names of interviewees, and dates and places of interviews withheld at interviewees’ request.

cl Iran-backed militias in Iraq brought down another MQ-9 in Iraq on January 18, 2024. See Michael Knights, Amir al-Kaabi, and Hamdi Malik, “Tracking Anti-U.S. Strikes in Iraq and Syria During the Gaza Crisis,” *Militia Spotlight*, Washington Institute for Near East Policy, which is updated on daily basis and publicly available online.

cm The DIA assesses that 358-series surface-to-air missiles have been used in multiple attacks on U.S. drones in Yemen. See “Iran Enabling Houthi Attacks Across the Middle East.”

cn A Barq-2, the Houthi designation for Taer-2, was found recently crashed in the desert in Marib, Yemen, on March 22, 2024. See Ali Al-Sakani and Fabian Hinz, “Note entirely certain, but it does look a lot like a Houthi Barq 2 surface-to-air missile . . .,” X, March 22, 2024 (with imagery).

co Three strikes on Houthi helicopters have been undertaken. Helicopters are vital to seizure operations such as the *Galaxy Leader*. The Houthis kept the helicopters dispersed and hidden, but some appear to have been reacquired by the United States. Details gathered from interviews with U.S. and U.K. military personnel for this study. Names of interviewees, and dates and places of interviews withheld at interviewees’ request.

disperse, and relocate them as needed.^{cp}

The U.S.-led strike operations starting on January 12 (Operation Poseidon Archer^{ca}) have (at the time of writing) now taken place on 40 separate days, with some days seeing multiple rounds of strikes on multiple target complexes.^{cr} A careful day-by-day accounting of the U.S.-led operations reveals (in the author's view) the phases of the campaign so far: initial broad strikes on known fixed targets related to missile and drone warfare, and the immediate benefit of seeing the Iranian surveillance and arsenal ship, Behshad, leave the Red Sea along with other Iranian naval vessels.^{cs} This shifted some of the action to the Gulf of Aden and the Bab el-Mandeb itself, and was followed by an apparently unsuccessful late-January 2024 U.S. effort to suppress Houthi ASBM launches on the Gulf of Aden from the inland mountains of Abyan and Taizz.^{ct}

Destruction of Houthi air defenses (eight to 12 strikes)^{cu} and the hunting down of helicopters (at least three strikes) were stretched-out processes that had mostly concluded (perhaps temporarily) by

the end of February 2024.¹⁴⁵ A focused effort was made in the first half of February to destroy the dispersed Houthi USV fleet, with an estimated destruction of 16 drone boats in their hide-sites (about a quarter of the claimed Houthi arsenal).^{cv} The "dynamic targeting" of Houthi missile forces, largely on the Red Sea coast, saw U.S. strikes occurring on average every two days from early February to early March.¹⁴⁶ From March 7-22, the United States seemed to accelerate preemptive targeting of suspected missile batteries,^{cw} with at least six major strikes characterized as destroying entire batteries (of four to six missiles or drones) or storage sites.¹⁴⁷ Although some of these targets might be decoys, it appears as likely that after months of observation, the United States successfully profiled the "pattern of life" of Houthi missile forces, allowing them (with more aggressive rules of engagement) to effectively strike them as they were drawn out of their hide-sites for use or to be shuffled into a new hide-site,^{cx} often a buried container.^{cx}

Effect of Strikes on Houthi Intentions and Capabilities

Tallying all strikes until the time of data cut-off (April 24, 2024), Sanaa experienced the most U.S.-U.K. strikes (around 33); the Al-Jabana missile, drone, and naval zone northeast of Hodeida's port was also heavily hit (26); and the remaining intensively struck areas were two locations used for resupply and boat dispersal (the Nakhila coast (19) and the Al-Faza canals (11)) plus the missile storage caves at Jebels al-Milh, Qimma, and Jadaa (13).¹⁴⁸ Much has no doubt been learned by the United States about the Houthi naval and coastal defense system and its offensive and defensive tactics, limitations, and vulnerabilities over the past half year.

In addition to the disruption and losses caused by strikes, the

cp In the previous October 2022 *CTC Sentinel* article, the authors described the very professional (Iran- and Hezbollah-trained) Preventative Security organization and underlined which Houthi commanders were responsible for protection of Iranian advisors. Knights, al-Gabarni, and Coombs.

cq As the Deputy Pentagon Press Secretary Sabrina Singh noted on January 25, 2024: "Operation Poseidon Archer is not a named [U.S. Department of Defense] operation but it is something that [U.S. Central Command] has named in terms of multilateral strikes and dynamic strikes within Houthi-controlled areas in Yemen." See "Deputy Pentagon Press Secretary Sabrina Singh Holds a Press Briefing," U.S. Department of Defense, January 25, 2024. It is distinct from the maritime escort mission of Operation Prosperity Guardian, and Operation Poseidon Archer only includes the United States and United Kingdom.

cr At the time of writing, the strikes break down into four larger multinational (i.e., U.S.-U.K.) joint deliberate strikes (January 12 and 20, February 3 and 29) and 33 other days on which U.S. forces unilaterally engaged "pop-up" or dynamic targets that triggered U.S. rules of the engagement. Author's geolocated incident dataset of the post-October 7 war.

cs On January 10, 2024, ship-tracking services reported the Iranian Behshad arsenal and surveillance ship leaving the Red Sea, on its way to a safe (Chinese military) harbor in Djibouti. See Tanker Trackers, "Iranian 'spy ship' BEHSHAD (9167289) has departed the southern sector of the Red Sea . . .," X, January 10, 2024. The Behshad eventually left the Chinese anchorage but did not return to the Red Sea, instead providing a surveillance post covering the Gulf of Aden and a transshipment platform to break Iranian arms and personnel cargoes down into smaller loads for landing by fishing boats. See Alex Longley, "Iranian Ship Back in Gulf of Aden After Reported US Cyberattack," Bloomberg, February 22, 2024. See also Courtney Kube and Carol E. Lee, "U.S. conducted cyberattack on suspected Iranian spy ship," NBC News, February 15, 2024, and Robert Wright, "The mysterious Iranian ship accused of lining up the next Houthi targets," *Financial Times*, March 9, 2024. The Behshad subsequently, in mid-April 2024, returned all the way to Iran, though it is unclear if its functions were replaced by another ship or by different means. See Patrick Sykes, "Iran Ship Linked to Houthi Attacks Goes Home Amid Tensions," Bloomberg, April 18, 2024.

ct In February, the United States repeatedly struck ASBM launch sites in the inland mountains of Abyan and Taizz, and also communications towers there that may have been used as elevated masts for long-range optics and electronic intelligence-gathering. This did not seem to end ASBM attacks in March on Indian Ocean shipping, but U.S. strikes in the area ceased in March. Author's geolocated incident dataset of the post-October 7 war.

cu The key air defense threat encountered was 358-series Iran-made loitering anti-aircraft missiles over the Kamran Island and Ras Issa military zones. The predominance of E/A-18 aircraft (electronic warfare versions of the FA-18) coming off the U.S. carriers suggests a prudent suppression of enemy air defense effort to ensure no radar-guided SAMs were fired. The electro-optically guided 358-series loitering anti-aircraft missiles are mainly a threat to U.S. drones, and a number of these appear to have been engaged as "dynamic targets" when encountered. Author's geolocated incident dataset of the post-October 7 war.

cv In 2019-2020, the Saudis destroyed nine Houthi USVs at berth in Ras Issa (versus Houthi use of around 18 in attacks on Saudi ships and oil loading terminals). See Caleb Weiss, "Analysis: Houthi naval attacks in the Red Sea," FDD's Long War Journal, August 17, 2019. In the current war, the USVs appear to have been dispersed in inlets south of Hodeida mainly. Details gathered from interviews with U.S. and U.K. military personnel for this study. Names of interviewees, and dates and places of interviews withheld at interviewees' request.

cw This acceleration and slight loosening of the rules of engagement followed the sinking of Rubymar (on March 2) and the fatal attack on mariners on the True Confidence (March 6). Details gathered from interviews with U.S. and U.K. military personnel for this study. Names of interviewees, and dates and places of interviews withheld at interviewees' request.

cx The @VleekieHond X thread from March 25, 2024, (with commercial satellite imagery overlaying strike locations on apparent storage igloos) hints at the intensive strikes on suspected missile locations by late March. See VleekieHond, "I bought some more high resolution imagery (0.5 meter) of this area near . . .," X, March 18, 2024.

cy This is a recurring procedure seen in Iraq and Syria as well. Covering shipping containers in earth, except for their entrances, is an economical way to produce bermed ammunition storage igloos that can be used to complicate the targeting process and play a 'shell game' with dispersed and hidden munitions. Any empty igloo is essentially a decoy target that may sap surveillance and strike efforts. Details gathered from interviews with U.S. and U.K. military personnel for this study. Names of interviewees, and dates and places of interviews withheld at interviewees' request.

Houthi system has probably (in the view of the author)^{cz} drawn down its war reserves at a faster rate than any other time in the movement's history—especially in terms of modern Houthi anti-shipping missiles, which have probably never been used or destroyed in such large numbers before.^{da} If high-quality open-source collation efforts and the author's own efforts in this regard are even broadly accurate, by April 24, 2024 the Houthis (combining launches and pre-launch losses) may have depleted their reserves to the tune of around 135 ASBMs,^{db} 87 ASCMs or other cruise missiles,^{149 de} 263 one-way attack or larger surveillance drones,^{150 dd} and 38 USVs.^{151 de} While the Houthis had run a marathon in their 2015-2022 bombardment of Saudi Arabia—which involved over 851 drones alone¹⁵²—the Gaza conflict was more akin to running a very fast mile. Averaged across 2015-2022,¹⁵³ the Houthis launched 11 drones a month at Saudi Arabia, versus an average of 40 a month expended (including both anti-Israel and anti-shipping strikes) from October 19, 2023, to April 24, 2024.¹⁵⁴ If only MRBMs, cruise missiles, and SRBMs with ranges over 250 kilometers are tallied for the 2015-2022 period (198),¹⁵⁵ the average is two per month fired at Saudi Arabia in 2015-2022, versus 35.6 per month (including both anti-Israel and anti-shipping strikes) expended from October 19, 2023, to April 24, 2024.¹⁵⁶

Yet, knowing the rough rate of expenditure and losses is insufficient in gauging the impact on Houthi stockpiles because of the yawning intelligence gap regarding the size of pre-war Houthi missile and drone reserves and domestic drone production

cz The author has monitored Houthi strike operations since 2014, including all strikes on Saudi Arabia, the UAE, within Yemen, in the maritime environment, and now against Israel, the United States, and United Kingdom. The Houthis have operated quite consistent drone and short-range ballistic missile (SRBM) campaigns against Saudi Arabia. According to the Saudi government, between March 2015 and December 2021, the Houthis launched 851 drones and 430 other munitions (probably almost all tactical rockets but also cruise missiles, SRBMs and MRBMs against Saudi targets, according to data from the Saudi armed forces. Quoted in Robbie Gramer, "Inside the Houthis' Stockpile of Iranian Weapons. Airstrikes haven't hindered their Red Sea attacks—at least yet," *Foreign Policy*, February 8, 2024.

da The Houthis had never, before November 26, 2023, fired an ASBM at a maritime target, and they had only conducted one proven ASCM attack, on the UAE vessel Swift. Author's geolocated incident dataset of the post-October 7 war, plus Weiss.

db Of which 62 launched and 33 destroyed on the ground. See the excellent collation work done on X by Intelschizo, most recently on March 11, 2024: Intelschizo, "11MAR2024 Updated Infographic of Houthi Missiles, Drones, USV's . . .," X, March 11, 2024.

dc Of which 14 launched and 73 destroyed on the ground.

dd Of which 175 launched, and 26 were destroyed on the ground. In the author's view, at least another 33 ASBMs were claimed destroyed on the ground by the United States, in the latter half of March 2024 as the rules of engagement slightly loosened. Author's geolocated incident dataset of the post-October 7 war.

de Of which three launched, and 35 were destroyed in their hide-sites. Author's geolocated incident dataset of the post-October 7 war. Of interest, Abdalmalik al-Huthi gave some metrics of his own on March 7, 2024, claiming that the Houthis had undertaken 90 attacks on 61 vessels utilizing 403 weapons systems. This latter munitions total is not appreciably different from March 11, 2024, open-source tracking figures given earlier in this study (401, including 95 ASBMs, 87 ASCMs or other cruise missiles, 201 one-way attack or larger surveillance drones, and 18 USVs). Abdalmalik quoted in author's subscription to collection of open source collation reports from 2023 and 2024, name of service withheld at the request of the service for safety reasons. Attack statistics from Intelschizo, "11MAR2024 Updated Infographic of Houthi Missiles, Drones, USV's . . .," X, March 11, 2024.

capacity,¹⁵⁷ and because it is unclear how many resupply vessels visited the Houthi-held areas prior to January 11, 2014, or since.¹⁵⁸ In the 12 weeks between October 7 and January 11, on-the-ground reporting suggests the Houthis landed at least four resupply vessels (assessed to each be capable of landing 30 tons of supplies) on the Nakhila coast.¹⁵⁹ On December 13, the Houthi-held port of Hodeida was visited for five days by boats that originated near Iran's Behshad arsenal ship, with unknown quantities of materiel and personnel offloaded.¹⁶⁰

On the eve of the initiation of U.S. strikes, the U.S. Navy intercepted one dhow off Somalia that was carrying 14 electro-optical trackers for surface-to-air missile systems, at least three ballistic missile warheads, at least five liquid-fuel type MRBM missile engines, and a single C-802/Ghadar-class Iranian ASCM, called Mandab-2 by the Houthis.¹⁶¹ Based on counting components visible in the press photograph, another Iranian shipment intercepted on January 28, 2024, included at least three USV guidance systems, component parts of a small unmanned underwater vehicle, and also at least two cruise missile active radar homing systems for Mandab-series missiles.¹⁶² Since this event, on-the-ground reporting suggests the Houthis received as many as eight small boats immediately in the first half of February 2024, in each case only after closing off the Nakhila coast and Al-Faza coastlines to civilians.¹⁶³ (In one very significant case, the small boats appear to have first interacted with a sanctioned Iranian mother ship vessel and the Behshad arsenal/surveillance ship.^{164 df}) Based on a very rough calculation,¹⁶⁵ this kind of trickle of missile and drone or USV components (if confirmed) would somewhat slow but not stop the rate of depletion (the author's calculated rate¹⁶⁶ being 13.8 missiles and 31 drones per month based on the prior paragraph) and thus extend Houthi endurance, especially if (as seems likely) there are supply runs that have not been detected at all.¹⁶⁷ In March 2024 and thus far in April, there were no new interceptions but only one reported landing was publicized.¹⁶⁸

Looking at Houthi operational tempo as a potential measure of effectiveness for U.S.-U.K. strikes, there is a stark difference between ongoing Houthi bombast and an apparent steep decline in Houthi military actions.¹⁶⁹ Houthi statements have continued to threaten escalation: beginning from March 4, 2024, to negotiate permits¹⁷⁰ for certain nations to traverse the Bab el-Mandab while others (the United States, the United Kingdom, and Israel) would be excluded;¹⁷¹ and threatening on March 15 to strike ships in the Indian Ocean all the way down the east coast of Africa toward the

df These include three boats of Iranian personnel on February 1 who entered Yemen via the passing container vessel Kashan, which has been linked by investigative reporters to Iranian state smuggling operations in support of the Assad regime in Syria. Melanie Swan, "Iranian bombs dropped on Israel are transported on ships using European ports," *Telegraph*, March 14, 2024. Regarding the three boats, details gathered from interviews with Yemen-watchers from the humanitarian, government and U.S. and U.K. think-tank communities for this study. Names of interviewees, and dates and places of interviews withheld at interviewees' request. The Kashan was sanctioned by the United States in 2020. "U.S. Sanctions Iranian Shipping Companies," Iran Primer, United States Institute of Peace, June 8, 2020. Both the Kashan and the Behshad had their transponders off from January 28 to February 2, 2024, during which time satellite imagery shows them moored together in Djiboutian waters on February 1. Author's use of commercial satellite imagery from this date range showing a ship matching the length, type, and deck color of the Kashan.

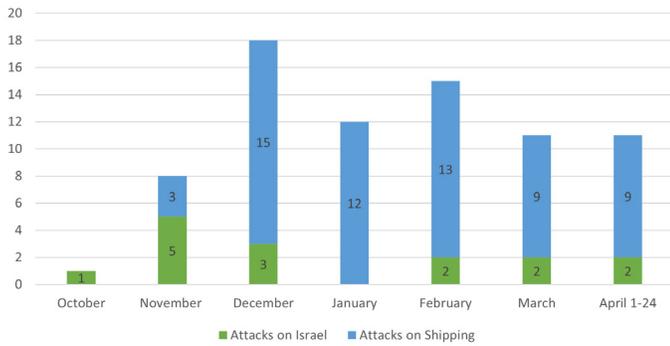


Figure 1: Houthi Operational Tempo, October 19, 2023, to April 24, 2024

Cape of Good Hope.^{172 dg} Houthi spokesmen also threatened the use of unmanned underwater vehicles and levied threats against submarine communications cables.^{173 dh}

Attack metrics seem to tell a different story: Houthi attacks against shipping and against Israel did not intensify in March or April 2024 (see Figure 1), instead holding at a slightly lower level than was evident in December, January, or February.¹⁷⁴ In the author's assessment,¹⁷⁵ the dramatic final sinking of the Rubymar (on March 2) and the fatal strike on the True Confidence (on March 6)¹⁷⁶ distracted from a gradual decline in Houthi anti-shipping actions and apparent attrition to Houthi missile units as March and April unfolded. In terms of munitions launched by the Houthis or destroyed as they were deployed for launch, April did bear witness to a dramatic month-on-month decline: the average number of attempted Houthi missiles and drones launchings in March was 3.8 versus 1.8 in the first 24 days of April 2024.¹⁷⁷ The raw number of larger Houthi munitions used in these attacks or attempted attacks also dropped sharply: from an average of 1.8 ASBMs per day in March to 0.3 per day in April (1-24). Drone attacks stayed the same: 1.9 per day in March and 1.8 per day in April 1-24. Whether the current Houthi downturn will persist—and whether it is voluntary or imposed by U.S. strikes and interdictions—is much less clear.¹⁷⁸

As important, since the U.S.-U.K. strikes that began on January

12, the Houthis have mostly^{di} handed off the task of directly striking Israel to the Iraqi militias in what may be a coordinated “offsetting” of the task to an axis of resistance member with more spare capacity.¹⁷⁹ In October–December 2023, the Houthis undertook more than twice the number of strikes (nine) that pro-Tehran Iraqi militia groups claimed against Israel (four), and were using much more advanced weapons including MRBMs (versus Iraqi militia-fired drones).¹⁸⁰ After U.S. strikes on the Houthis began on January 12 until the time of writing (April 24, 2024), Iraqi groups claim to have attacked Israel 47 times^{dj} versus only six Houthi strikes on Israel during the same period.¹⁸¹ (In a contrary trend, the Houthis tried to launch one MRBM and seven drones against Israel at the same time as Iran's April 13-14, 2024, direct attack on Israel, but all the Houthi launchers were struck on the ground by U.S. forces and the launches prevented.¹⁸²)

Lessons Learned, About and By the Houthis

Five months of conflict on the Red Sea and Gulf of Oman have provided important insights into the Houthi war machine, some of which are available in the unclassified realm and many more that will not be obvious to general observers but will be learned by the participants and their close security partners.^{dk} As has been the case in other wars involving minor powers, a category into which the Houthis arguably fit in the view of this author,¹⁸³ these conflicts offer a Spanish Civil War-type lens into how great powers or at least aspiring regional hegemon (such as Iran) might fight in the future. The conflict also gives a good view of the Houthi movement's strengths and weaknesses, and the opportunities and threats it will face in the coming years. The following section provides the author's assessment of these four categories, flowing out of the data and analysis above.

The strengths shown by the Houthi military at the present time are significant. The movement has mobilized very large numbers of troops during the conflict, reportedly as many as 167,000 new troops, further offsetting its extensive garrisoning requirements.^{dl}

dg Earlier, on November 25, 2023, the Houthis claimed to strike an Israeli-linked container ship, CMA CGM Symi, in the Indian Ocean using a one-way attack drone, over 2,200 kilometers from the nearest Houthi-controlled area in Yemen. Considering the range, targeting support from Iran (in the form of the Safir surveillance ship off the coast of India) is considered likely in this case. Details gathered from interviews with U.S. and U.K. military personnel for this study. Names of interviewees, and dates and places of interviews withheld at interviewees' request.

dh On subsea internet cables, the Houthis threatened to attack these, but then subsequently denied doing so after the cables were indeed damaged. For the Houthi February 2024 threat to cables, see Patrick Wintour, “Houthis may sabotage western internet cables in Red Sea, Yemen telecoms firms warn,” *Guardian*, February 5, 2024. For the March 2024 damage to the cables, see John Gambrell, “3 Red Sea data cables cut as Houthis launch more attacks in the vital waterway,” *Associated Press*, March 4, 2024. For discussion of the potential role of the sinking of the Rubymar ship and its anchor in the cable damage, see Eleanor Watson, “Ship sunk by Houthis likely responsible for damaging 3 telecommunications cables under Red Sea,” *CBS News*, March 6, 2024.

di The Houthis did mount some more attacks on Israel, but in far fewer numbers: For instance, an intercepted ballistic missile strike in February 2024. See Emmanuel Fabian, “Israel's Arrow intercepts Houthi ballistic missile headed for Eilat,” *Times of Israel*, February 22, 2024. One Houthi cruise missile made it through Israeli defenses on March 19, 2024. See Robert Tollast, “Houthi cruise missile breaches Israeli air defenses for first time,” *National*, March 20, 2024.

dj Based on Militia Spotlight's close correlation of Islamic Resistance of Iraq claims versus observed attacks, the IRI claim channel is quite careful not to besmirch its credibility with false claims. In the case of Israel attacks, weapons impact (in Israel) may be harder to detect for a number of reasons: Such impacts may be more likely to be missed among the general war situation (versus the less chaotic Iraqi and Syria environments); Israel may downplay successful strikes; drones have far longer to travel, making crashes and interceptions likelier; and Israel's own air defense has likely destroyed large proportions of the inbound projectiles. In the author's assessment, most of the IRI's Israel launch claims are probably factual, though their success rate seems to be very low, similar to the Houthis' own low penetration rate versus Israel. See Knights, al-Kaabi, and Malik for metrics and attack detailing.

dk The United States and United Kingdom will be able to pass on these lessons to NATO, Gulf, and Asian partners: The Houthis will be able to share their experience with Axis of Resistance players; great powers such as China and Russia are likely to be watching closely.

dl As noted in Footnote O, Houthi figures suggest their trained reserve had reached 873,123 personnel and that this number had grown by 165,429 since October 7, 2023.

Exploitation of strong Yemeni sympathy for the Palestinians^{dm} has added to the recruiting potential of the Houthi movement, which already had a powerful military human resources system.¹⁸⁴ A second advantage is the divided and weak domestic opposition to Houthi rule, with the PLC factions lacking the freedom of action or the military force to exploit U.S. strikes. The Houthis continue to gain from Saudi Arabia's single-minded focus on ending the Yemen war and preventing any recurrence of Houthi missile and drone strikes on the kingdom.¹⁸⁵ In the author's assessment, a final strength shown by the Houthis has been resilience, pain tolerance, and strategic depth: The United States appears to have assumed from the outset that the Houthis could not be compelled to end their attacks, only partially disarmed (or "degraded") through direct strikes on their anti-shipping system.^{dn} ASBM attacks, which can be launched on shipping from practically any area in Houthi-held Yemen, underlined the value of Houthi strategic depth and concealment measures.

In the author's assessment, the Houthi military has also displayed some weaknesses in the conflict, although they hardly outweigh the strengths on show. The military capabilities of the Houthis, though boldly handled, have not been technically impressive.¹⁸⁶ Despite all their efforts, the movement (at the time of writing, April 24, 2024) failed to land a single effective blow on Israeli soil (with only one ballistic or cruise missile penetrating Israel's defenses¹⁸⁷) and only sank one ship. When facing the world's most advanced militaries, the capabilities built in Yemen by the axis of resistance were comprehensively (albeit expensively) countered. Houthi air defense took down two MQ-9 drones but otherwise proved ineffective against higher-flying manned aircraft—except perhaps to initially keep those aircraft at greater range and altitude.¹⁸⁸ Drone boats and helicopters lost most of the value they had attained in prior conflicts against less advanced opponents: Both had insufficient survivability to be of use once the United States and partner forces began to actively defend ships. Houthi reliance on a naval line of supply to Iran remains a key weakness that could be exploited in the future by a more effective U.S., Gulf, or European naval presence in the Red Sea. As with interceptions, however, this imposes a significant new cost on these defenders, which is a form of cost-imposing success for the Houthis, the Axis of Resistance, and for any great powers they ally with in the future.

The Houthis have significant opportunities that they might exploit in the near future. The Gaza conflict has shown them that their anti-shipping harassment tactics—guerrilla warfare at sea—do not need to be technically effective to nonetheless place a chokehold on Suez Canal transit and impose added costs on the global economic community. The world can do without the shortcut of the Suez—it is not the Strait of Hormuz, where free passage

“The world can do without the shortcut of the Suez—it is not the Strait of Hormuz, where free passage is essential—but the costly nature of the crisis will teach the Houthis the value of blockading the Bab al-Mandab Strait again in the future.”

is essential—but the costly nature^{do} of the crisis will teach the Houthis the value of blockading the Bab al-Mandab Strait again in the future and the need to employ more effective weapons and tactics (including hypersonic weapons) when that day comes.^{dp} The Houthis will also note the defensive stance taken by all the Arab states and particularly Saudi Arabia's focus on preserving the peace process, which may strengthen Houthi motivation to play hardball in peace negotiations and saber-rattle on Yemen's internal military fronts.¹⁸⁹ Though the war has shown Houthi capabilities to be quite inferior to U.S. and Israeli systems, if the precision weapons systems used by the Houthis in the Gaza war were turned on the much more vulnerable target set of PLC enemies, the results could be decisive in the author's assessment, a situation that could be partially rectified with international security assistance and training.^{190 dq} A final opportunity is stretching out the current war. The Houthis may recognize the value to their mobilization and indoctrination efforts of an ongoing anti-Israel and anti-Western struggle. They may not want to recede into global obscurity again.

At present, based on their words and deeds, the Houthis may feel that they do not face any credible military threats from enemies foreign or domestic, which is a recipe for overconfidence and risk-taking. In the current crisis, the domestic PLC adversaries made no aggressive moves to exploit U.S. strikes on the Houthis, restrained by a cautious Saudi Arabia that also avoided joining the U.S.-led coalition. Israel did not retaliate to any of the Houthis' attacks against it, on land or sea. Limited U.S. military strikes were painful but eminently survivable.

Yet, there are arguably emerging threats to the Houthi

dm The strength of pro-Palestinian feeling among Yemenis—in Houthi and non-Houthi areas—is an almost uniform observation gathered by the author himself on numerous visits to Yemen, in conversation with Yemenis over the years, and gathered from interviews for this study. For an open-source reference, see Stacey Philbrick Yadav, “The Houthis’ ‘Sovereign Solidarity’ with Palestine,” Middle East Research and Information Project, Issue 309, January 24, 2024.

dn From top to bottom, the U.S. government has been quite candid that deterring the Houthis was unlikely, but degrading their arsenal was still worthwhile. For the most senior enunciation of this position, see President Joe Biden's blunt admission here: Oren Liebermann and Nikki Carvajal, “Biden concedes Houthis haven't been deterred from carrying out attacks as US launches further strikes,” CNN, January 18, 2024.

do No one has yet ventured a comprehensive cost assessment of the Red Sea closure, but if one looks back to the closure of the Suez due to the Ever Given's 2021 blockage of the canal, that incident had a \$416 million per hour impact. Though workarounds have been found in the current crisis, the costs of the current crisis are likely to be in the tens of billions of dollars. See “Ever Given' ship stuck in the Suez Canal cost the economy \$400M an hour,” LMA Consulting Group, March 27, 2024. See also Mary-Ann Russon, “The cost of the Suez Canal blockage,” BBC, March 29, 2021, and Gregory Brew, “How—and Why—Yemen's Houthi Rebels Are Poised to Seriously Disrupt the Global Economy,” *Time*, December 19, 2023.

dp Houthi mention of hypersonic anti-shipping missiles is a recognition that this capability, which could be deployed in a test-bed environment in Yemen by the Iranians, is potentially a harbinger of things to come. “Houthis warn new ‘hypersonic missile’ will target Cape of Good Hope bound shipping,” Arab News, March 15, 2024.

dq If a similar-sized drone swarm as that fired on October 19, 2023, toward Israel were directed against every PLC command post on a certain frontline, a paralyzing blow might be struck that could enable Houthi land offensives to achieve heretofore unachievable breakthroughs.

movement that offer potential coercive mechanisms to the forces seeking to contain Ansar Allah. Isolation and splintering within the axis of resistance is one threat: Hamas, a contemporary of the Houthis, may be eviscerated by Israel without the axis having effectively prevented that outcome, which is a cautionary tale for the Houthis. Though Ansar Allah is undoubtedly more valuable to the Iranian and Lebanese core of the axis than it was before the war, it is nonetheless still peripheral to the main Iran-Iraq-Syria-Lebanon bloc and might be isolated by an energetic and patient maritime interception effort. The Houthis have also been revealed as aggressors to many international observers who previously viewed them as victims—the David to Saudi Arabia’s Goliath in the post-2015 conflict. The Houthis were redesignated as an SDGT by the United States and are now seen as endangering peace, stability, and the marine environment in the region, with a sharpened focus

on their ties to Iran and their egregious human rights record.¹⁹¹ This will make it harder¹⁹² for the Houthis—though not impossibly hard—to once again weaponize the fear of famine in Yemen, as they did in 2018-2020 to shut down the Saudi-led coalition’s promising Red Sea coast offensive.¹⁹³ As a result, the Houthis may emerge more vulnerable to information operations and to broad-based economic sanctions, which can add to their isolation and internal security challenges. In the author’s long view of watching the Houthi movement grow, the threat they fear most—and thus the ultimate form of exploitable leverage and deterrence—is the risk of the frontline military balance turning against Ansar Allah. If the Houthis continue to become more isolated, the PLC partners could, probably after a formal peace deal, find themselves better supported by the United States and other players as a proxy to contain and deter Houthi expansionism. **CTC**

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- 170 Adam Makary, "Ships entering Yemeni waters must obtain permit, Houthi minister says," Reuters, March 4, 2024.
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- 175 This is the author’s assessment based on all the available evidence and the authors’ analytic processes.
- 176 See the featured attacks section in Raydan and Nadimi.
- 177 Author’s geolocated incident dataset of the post-October 7 war.
- 178 Author’s geolocated incident dataset of the post-October 7 war.
- 179 This is quite clearly shown in the data series gathered via the author, both on the Yemen war and the Iraq/Syria theater. Author’s geolocated incident dataset of the post-October 7 war, cross-checked against Knights, al-Kaabi, and Malik.
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- 190 This is the author’s assessment based on all the available evidence and the authors’ analytic processes.
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