

# Navigating Troubled Waters: The Houthis' Campaign in the Red Sea and the Gulf of Aden

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# Contents

<b>Executive Summary</b>	<b>2</b>
<b>Introduction</b>	<b>4</b>
Section 1: <b>The War at Sea</b>	<b>6</b>
Houthi Attacks on Ships	8
International Responses	12
Section 2: <b>The Houthis' Arsenal</b>	<b>15</b>
Anti-Ship Ballistic Missiles	15
Anti-Ship Cruise Missiles	16
Uninhabited Aerial Vehicles	18
Uninhabited Surface Vessels	19
Uninhabited Underwater Vehicles	20
Section 3: <b>Economic Impact</b>	<b>21</b>
Impact on Shipping	21
Impact on Ports	23
Mild Effects Globally, Heavily Felt Locally	27
Section 4: <b>Arms Smuggling to the Houthis</b>	<b>28</b>
The Early Years (2009–15)	28
Arms Smuggling During the 'Restoring Hope' Period (2015–22)	30
Throwing the Gates Wide Open (2022–24)	32
<b>Conclusion</b>	<b>33</b>
<b>Notes</b>	<b>35</b>

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## Cover

*The MV Rubyymar (IMO: 9138898) partially submerged in the Red Sea, 2 March 2024. The ship was struck by two Houthi ballistic missiles in the Bab el-Mandeb Strait on 18 February 2024. (Photo by Khaled Ziad via Getty Images)*

# Executive Summary

Prior to the Hamas-led 7 October 2023 attacks against Israel, Ansarullah ('Partisans of God', known best as the Houthis), a predominantly Zaydi Shia armed group with roots in northern Yemen, had been viewed by most international observers as primarily a local threat, despite belonging to Iran's 'Axis of Resistance'. This changed in October 2023, when the Houthis launched a first wave of missiles and uninhabited aerial vehicles (UAVs) against targets in Israel, ostensibly in solidarity with the Palestinians in Gaza. Seeing that most of the attacks failed to cause significant damage, the Houthis in November 2023 moved to attack merchant ships affiliated with Israel and its Western allies in the Red Sea and the Indian Ocean, delivering a propaganda victory for the group and sending shock waves through the shipping industry. Subsequent attacks have targeted more than 300 ships, using a wide range of weapons systems. Though most attacks missed or did little damage, the Houthis have sunk two ships and four sailors have lost their lives.

This report analyses the evolution of Houthi strategy at sea over the twelve months since the start of the campaign, particularly with regard to targeting criteria, geographic scope and weapons systems used. It also considers the international military response, which includes several multinational naval missions, as well as the actions by Israel, the United Kingdom and the United States against ground targets in Yemen. It demonstrates that these strikes, while temporarily degrading the capabilities of the Houthis, have not succeeded in significantly reducing the overall number of attacks on ships. Meanwhile, the Houthi arsenal continues to develop and expand. Consisting primarily of Iranian-designed ballistic and cruise missiles, as well as UAVs and uninhabited surface vessels, the group continues to improve the range of its weapons systems and the accuracy of its targeting. Analysing how the Houthis, who have been subject to a United Nations Security Council arms embargo since 2015, manage to smuggle weapons and their components to Yemen, the

report illustrates the crucial role played by maritime smuggling using traditional dhows, and in particular the importance of the Red Sea ports of Hudaydah and Salif, which have remained under the control of the Houthis. It also discusses gaps in the enforcement of the sanctions regime and the important role of Yemen's neighbours in this regard.

In terms of the economic impact of the crisis, the impact on global supply lines has been more limited than was first anticipated. The number of transits per week of merchant ships through the Red Sea as of early November 2024 has decreased by roughly half since November 2023. Many of the larger Western shipping lines have decided to divert their vessels around the Cape of Good Hope, thus increasing the duration and cost of journeys from the Far East to Europe, but saving on insurance premiums and avoiding Suez Canal transit fees. Overall, this has had only a marginal impact on global supply lines and inflationary pressure. The impact on the littoral countries of the Red Sea, however, has been more significant. Egypt, which relies heavily on the revenue from Suez transits, has felt the effects of the crisis particularly acutely, while ports in Israel, Jordan, Saudi Arabia and Sudan have also been affected. Nevertheless, most of the littoral states have remained passive with regard to the crisis, a reflection of the fact that their own ships have not been attacked and that the Houthis' solidarity with the Palestinians is popular with the populations of many states in the region.

After twelve months of sustained attacks on Western shipping, it seems obvious that the current response by the international community has failed to reach its stated goals. Despite their military superiority, the US and its allies have not seriously degraded the capability of the Houthis to launch attacks, nor their ability to resupply their arsenals. Meanwhile, the presence of the international naval missions has not reassured most major Western shipping lines sufficiently for them to return to the Red Sea. Within Yemen and the region, the 'success' of the attacks has significantly

raised the profile of the Houthis. Interestingly, while Western governments are engaged in limited military actions against them, there appears to be no complementary political strategy. Rather than trying to contain their military ambitions, the international

community remains focused on the humanitarian situation in Yemen and on normalising their relationships with the group. In light of the mounting costs of the military deployments, Western capitals therefore need to reassess their strategy vis-à-vis the Houthis.

# Introduction

Prior to the Hamas-led 7 October 2023 attacks against Israel, Ansarullah (the Houthis), a predominantly Zaydi Shia group with roots in northern Yemen, had been viewed by most international observers as primarily a local threat, despite belonging to Iran's 'Axis of Resistance'. The Houthis took control of large parts of Yemen, including the capital, Sanaa, in the aftermath of the Arab Spring and since March 2015 have been engaged in a bloody civil war against the country's internationally recognised government and its allies in Saudi Arabia and the United Arab Emirates (UAE). While the Houthis suffered some military setbacks during the first phase of the war, the front lines have remained relatively static since the United Nations-brokered Stockholm Agreement was agreed in December 2018, and consequently they continue to control most major population centres, as well as three strategically important ports on the Red Sea. In 2016, the Houthis began to show their ability to project force beyond the immediate battlefield through attacks on civilian targets, such as oil installations, ports and airports in Saudi Arabia and the UAE, as well as against warships and commercial ships affiliated with both countries in the Red Sea and the Gulf of Aden.<sup>1</sup>

These attacks were carried out using a combination of ballistic and cruise missiles, as well as uninhabited aerial vehicles (UAVs) and uninhabited surface vessels (USVs), many of which included design features indicating technology transfers from Iran.<sup>2</sup> While most of these attacks did little military or economic damage, they allowed the Houthis to score important propaganda points on the 'Arab street' and, together with the military stalemate and the mounting cost of the war, contributed to Abu Dhabi's and Riyadh's decision to reduce their military footprint in Yemen. Meanwhile, Iran's provision of military, economic and political support to the Houthis has been a relatively low-cost way to put pressure on Saudi Arabia, a traditional rival for regional dominance. While the Houthis have often been characterised as proxies of Iran by their enemies,

this term does not adequately describe the relationship. Despite the presence of Iranian political and military advisers in Sanaa, the Houthis do not merely execute orders, but rather pursue their own goals and would likely continue to do so even without Iranian support. However, the convergence of their agenda with Iran's, as well as their reliance on Iranian support, has made them strategic allies.<sup>3</sup> Within the Axis of Resistance, the Houthis have also forged deep links to Hizbullah in Lebanon – which has provided military advisers, while Beirut also hosts the Houthi propaganda satellite television channel Al-Masirah – and with Shia resistance groups in Iraq, who claim to have coordinated attacks with them in the past.<sup>4</sup>

Motivated primarily by concerns about humanitarian access to the millions of Yemeni citizens living in Houthi-controlled areas, the international community has backed efforts by the UN and other regional states to find a solution to the conflict. During the initial phase of *Operation Restoring Hope*, the Saudi-led military campaign against the Houthis that began in early 2015, there was considerable tension between Western governments and Riyadh and Abu Dhabi, with the former opposing stronger measures to contain the Houthis, such as comprehensive financial sanctions. This was driven by the dual premise that the Houthis would continue to play an important role in any post-conflict Yemeni government and that their ambitions would not be a threat to Western interests in the region. The truce agreement signed in April 2022 between the Houthis and their opponents, as well as the rapprochement between Iran and Saudi Arabia that was signalled by their meeting in Beijing in March 2023, seemed to support this hypothesis. The 18 months between the start of the truce and October 2023 saw a pause of Houthi attacks on neighbouring states, a significant reduction of violence within Yemen and an improvement in the humanitarian situation.

This period of de-escalation ended on 19 October 2023 when the Houthis launched a first wave of missiles

and UAVs against targets in Israel, ostensibly in solidarity with the Palestinians in Gaza. These attacks exposed the strong anti-Israel and anti-United States elements in the Houthi ideology which had previously been overlooked.<sup>5</sup> Acting in coordination with other Axis of Resistance groups, the Houthis launched more than 220 aerial attacks on Israel during the course of the campaign, most of which the latter's air defences intercepted.<sup>6</sup> With the same agility and showmanship that had been evidenced in their campaign against Saudi Arabia and the UAE, the Houthis pivoted their attention to maritime targets linked to Israel and its Western allies. On 19 November 2023, a Houthi commando detachment fast-roped from an ageing Russian helicopter onto the deck of the Bahamas-flagged vehicle carrier *MV Galaxy Leader* (IMO: 9237307) and diverted it to anchor off the port of Hudaydah, where it remains.<sup>7</sup> With the action expertly captured on camera and then exploited by Houthi media, the hijacking of the vessel delivered a propaganda victory for the group and sent shock waves through the global shipping community.<sup>8</sup> Subsequent attacks are estimated to have targeted more than 300 ships in the Red Sea and the Arabian Sea, using a wide range of weapons systems. While most of them missed

or did little damage, two ships have been sunk and four sailors have lost their lives.

The response to these attacks has been led by Western nations, while in an unusual about-face, Saudi Arabia and most of the rest of the Arab world have remained neutral and the truce within Yemen has continued to hold. The US and the United Kingdom have established coalition naval missions to protect freedom of navigation in the waters around Yemen, using a combination of warships providing area protection to merchant ships, and aerial attacks aimed at degrading Houthi capabilities. The navies of European Union member states and various other countries have adopted a more defensive posture, providing protection to convoys of merchant ships and coming to the aid of targeted vessels. Despite these measures, most major shipping lines have rerouted their vessels around the Cape of Good Hope. The economic impact of the crisis has been felt most acutely in Egypt – where revenue from Suez Canal transits has decreased by roughly half – and by other ports on the Red Sea. This report, which has been published close to the first anniversary of the start of the Houthi maritime campaign, provides an overview of the situation in the waters around Yemen.

# 1. The War at Sea

The Houthi campaign against ships in response to the Gaza crisis began on 15 November 2023, when a suspected Houthi UAV was intercepted by the USS *Thomas Hudner* (DDG-116) in the Red Sea.<sup>9</sup> Houthi attacks in the region had begun one month earlier with the launching of missiles towards Israel starting on 19 October, following the onset of Israel's campaign in Gaza. For the Houthis, the attacks also served as a way to divert attention from a domestic crisis in Yemen over their failure to deliver public services, to encourage recruitment, to demonstrate their military power on the international stage and to present the group as a daring and effective member of the Axis of Resistance.<sup>10</sup> The attempts to strike Israel were ineffective, with most attacks being intercepted, which led the Houthis to turn their attention primarily towards ships.<sup>11</sup>

The international community has responded with three multinational military missions – *Operation Prosperity Guardian*, EUNAVFOR *Aspides* and *Operation Poseidon Archer* – to protect shipping in the waters around Yemen, while a number of countries, including China, India and Japan, have also increased their naval presence in the region. Defensive interceptions of attacks have been core elements of both *Operation Prosperity Guardian* and EUNAVFOR *Aspides*, which

were established on 18 December 2023 and 19 February 2024 respectively. The former mission is composed of several countries including the US and the UK, and its aims include 'ensuring freedom of navigation' and 'bolstering regional security and prosperity'.<sup>12</sup> The latter is an EU operation that seeks to 'restore and safeguard freedom of navigation'.<sup>13</sup> *Operation Poseidon Archer*, which was established on 12 January 2024, has taken a more offensive approach. The mission has involved US and UK strikes on Houthi targets in Yemen, aiming to 'disrupt and degrade the capabilities' of the Houthis to attack ships.<sup>14</sup> More specifically, it has involved the two countries operating jointly, as well as the US acting unilaterally. Australia, Bahrain, Canada, Denmark, the Netherlands and New Zealand have lent non-operational support to the mission.<sup>15</sup>

This section first unpacks the various phases of the Houthi campaign against ships, including the corresponding Houthi key statements, targeting criteria and motivations. It then analyses the attacks, with a focus on their quantity across time, geographical scope, commercial targets and the weapons-system types employed. Finally, it examines the international responses, consisting of the three multilateral naval missions and Israel's airstrikes on Houthi-controlled areas in July and September 2024.

## Phases of the Houthi campaign against ships

The Houthi attacks on ships have evolved over several phases. The onset of each phase has been either directly announced or alluded to by the Houthis. From these statements, one can discern the expanded targeting criteria, including the new types of ships to be targeted and, at times, the widened geographical scope within which the attacks are to take place. The immediate trigger behind each phase is also sometimes discernible. Among analysts, the Houthis' obscure language choices and lack of clarity regarding the starting point of some phases have led to varying interpretations of the parameters of each phase.

### First phase (14 November 2023–8 December 2023)

- **Key statement:** 'In the Red Sea, specifically at the Bab el-Mandeb and adjacent to Yemeni territorial waters, our eyes are open for constant monitoring and searching for any Israeli ship ... we will not hesitate to target them' (Houthi leader Abdul-Malik al-Houthi, 14 November 2023).<sup>16</sup>
- **Expanded targeting criteria:** All Israeli-owned ships passing through the Red Sea and Bab el-Mandeb Strait.
- **Immediate trigger:** The war in Gaza.

## Second phase (9 December 2023–17 January 2024)

### ■ Key statements:

■ 'The Yemeni Armed Forces announce that they will prevent navigating [sic] all the ships heading to the Zionist entity from any nationality, if the food and medicine keep not accessing the Gaza Strip, and they will become a legitimate target for our armed forces ... we warn all ships and companies to avoid dealing with Israeli ports' (Yemeni Armed Forces spokesperson Yahya Sare'e, 9 December 2023).<sup>17</sup>

■ 'The armed forces will consider any military escort of Israeli ships as a threat to the security of the Republic of Yemen, and based on this principle, it will be the right of the armed forces to confront this threat' (Supreme Political Council member Mohammed al-Houthi, 9 December 2023).<sup>18</sup>

■ **Expanded targeting criteria:** All ships traveling to Israel; all ships providing protection to Israeli ships.

■ **Immediate trigger:** The interception of Houthi attacks on ships by US warships, which would soon be formalised as part of *Operation Prosperity Guardian*.<sup>19</sup>

## Third phase (18 January 2024–2 May 2024)<sup>20</sup>

■ **Key statement:** 'The war that the American and British forces have become involved in is a war against our dear people ... The ongoing targeting of ships linked to Israel ... and this will also include American and British ships' (Abdul-Malik al-Houthi, 18 January 2024).<sup>21</sup>

■ **Expanded targeting criteria:** All US- and UK-owned ships. In practice, further expansion of attacks to the Gulf of Aden.<sup>22</sup>

■ **Immediate trigger:** *Operation Poseidon Archer*.

## Fourth phase (3 May 2024–18 July 2024)

■ **Key statement:** 'The Yemeni Armed Forces ... announce the beginning of the implementation of the fourth stage of escalation, as follows:

First, the targeting of all ships that violate the ban on Israeli shipping and those that are heading to the ports of occupied Palestine from the Mediterranean Sea ... Second, implementation of this comes into effect from the moment the statement is announced ... Third, if the Israeli enemy intends to launch an aggressive military operation against Rafah, the Yemeni armed forces will impose comprehensive sanctions on all ships of companies that are related to supplying and entering the occupied Palestinian ports whatever nationality they may have and will prevent all ships of these companies from passing through the armed forces' zone of operations, regardless of their destination' (Yahya Sare'e, 3 May 2024).<sup>23</sup>

■ **Expanded targeting criteria:** All ships fitting the above criteria specifically passing through the Mediterranean Sea (immediate effect); all ships belonging to companies with other ships calling at Israeli ports (from 6 May 2024).<sup>24</sup>

■ **Immediate trigger:** Israel's offensive in Rafah.

## Fifth phase (from 19 July 2024)

■ **Key statement:** 'We have entered the fifth stage through the blessed operation [Operation Jaffa], in which a new weapon has been used: an advanced drone ... The results will be: Increased escalation and targeting of the Israeli enemy; as well as the development of resources and capabilities, adapting to the level of challenge'.<sup>25</sup>

■ **Expanded targeting criteria:** Unclear, besides 'more' targeting of Israel.

■ **Immediate trigger:** The Houthi UAV attack in Tel Aviv on 19 July 2024.

Future phases might yet be on the horizon. On 3 May 2024, Yahya Sare'e warned that 'the Yemeni Armed Forces ... will not hesitate to prepare for broader and stronger stages of escalation until the aggression is stopped and the siege on the Palestinian people in the Gaza Strip is lifted'.<sup>26</sup> Two weeks later, Abdul-Malik al-Houthi had specifically referred to a 'fifth stage and beyond'.<sup>27</sup>



# Houthi Attacks on Ships

## A. Number of Attacks per Month

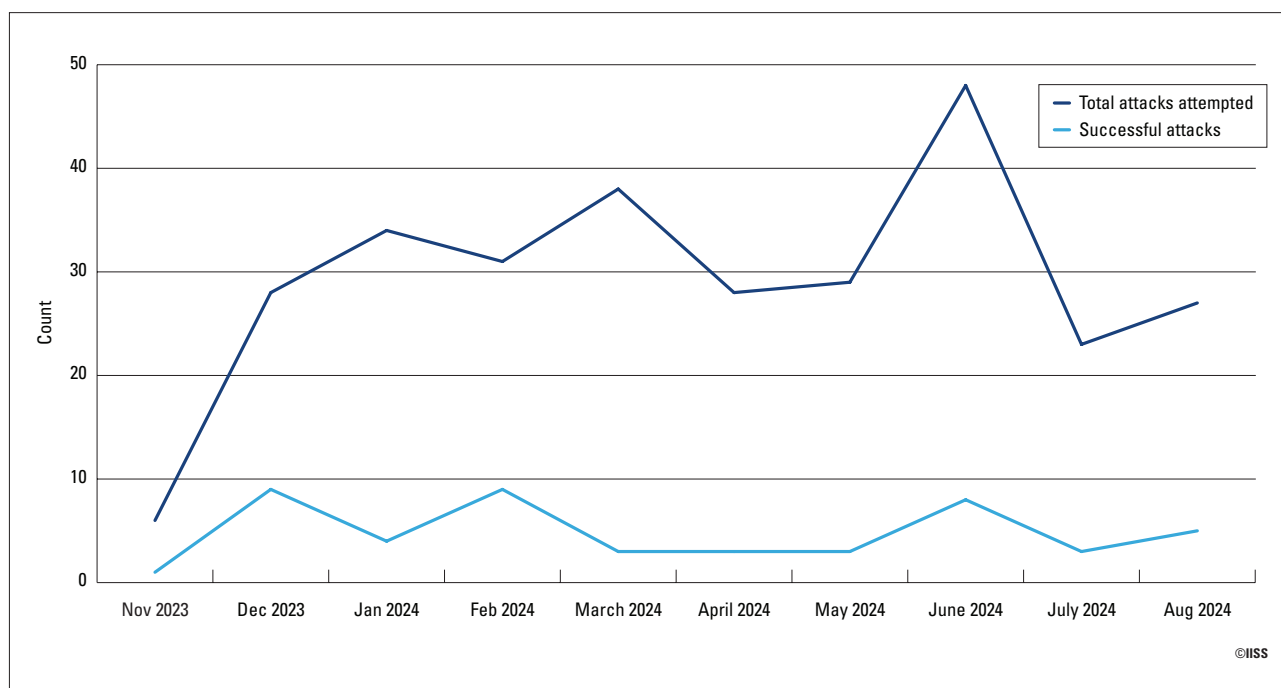
Figure 1.1 illustrates the number of Houthi attacks on ships between November 2023 and August 2024. There were 292 total attempted attacks (including successful, intercepted, and missed or failed attacks) – represented by the dark-blue line – in this period. The count initially stood at six in November 2023, rising to 34 in January 2024. Between February and May 2024, it remained largely consistent, with between 28 and 38 attempted attacks per month. However, the count surged to 48 in June, which represented the peak. This coincided with the start of Israel’s offensive in Rafah and, in turn, the Houthis’ fourth phase, as outlined above. Some analysts have also explained the high count in June as driven by an intent to exploit the scheduled departure of the Eisenhower Carrier Strike Group from the region.<sup>28</sup> After June, the count sharply declined to 23 in July. This was followed by a slight uptick to 27 in August.

In contrast, there were just 48 successful attacks – signified by the light-blue line – over this period. The count

per month fluctuated between one and nine, with peaks of nine successful attacks in December 2023 and February 2024. There was also a marginally smaller peak of eight successful attacks in June 2024, which coincided with the highest peak in the total number of attempted attacks.

Therefore, the number of successful attacks remained consistently low compared to the total number of attempted attacks. The Houthis’ most successful month was February 2024, during which nine out of 31 attempted attacks (29%) were successful. This was followed by their least successful month: in March 2024, a mere three out of 28 attempted attacks (7.9%) were successful. These numbers might simply lead to the conclusion that the Houthis have been unsuccessful in their attacks on ships. However, some analysts assess that some attempted attacks, such as those without a clear target, might have been intended only as displays of force.<sup>29</sup> Regardless of the success rate, the attacks have had huge global ramifications, for example on shipping (as discussed in Section Three).

Figure 1.1: Number of Houthi attacks on ships per month, November 2023–August 2024

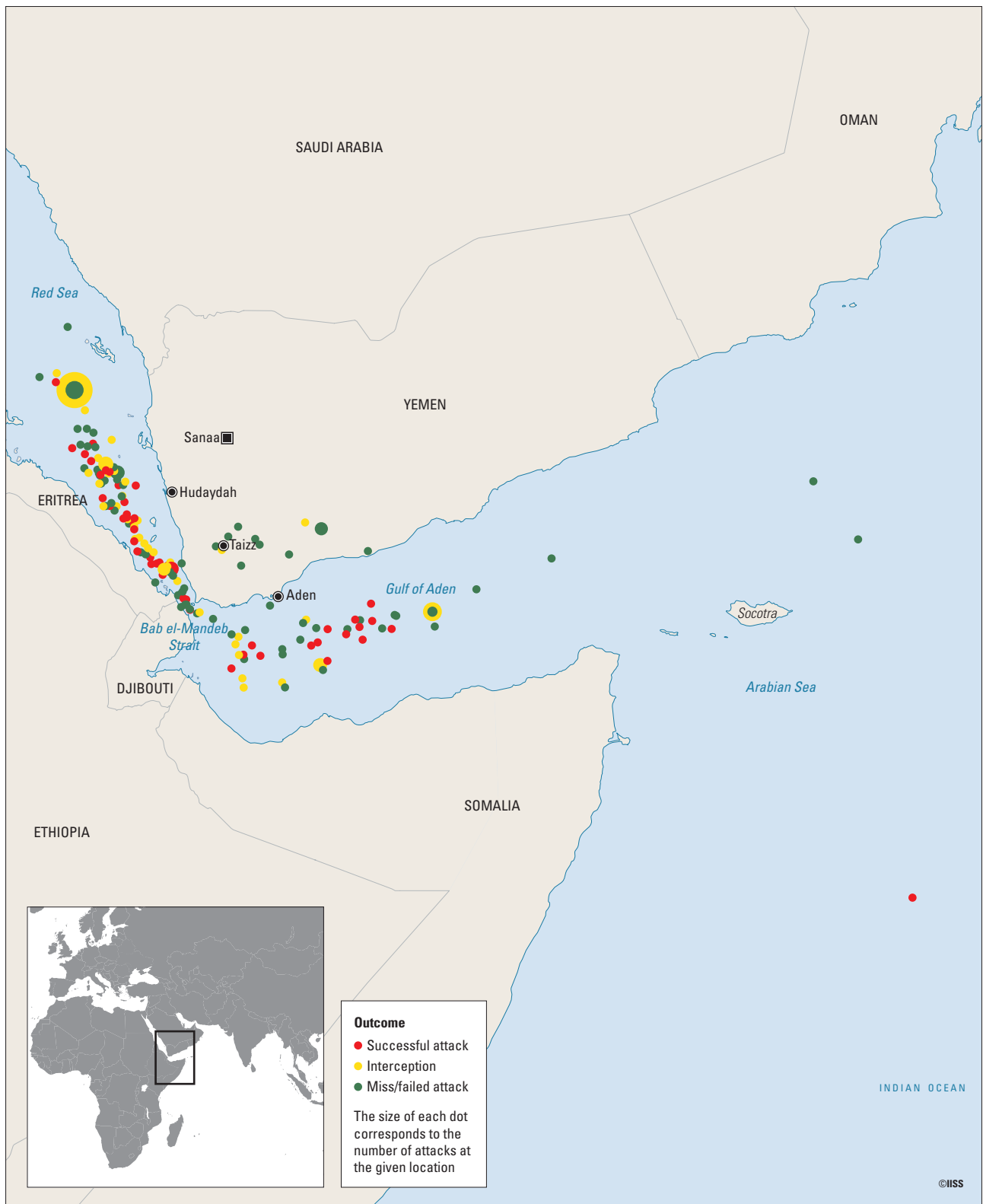


Note: ‘Attacks’ includes the use of missiles and uninhabited aerial vehicles, including those launched from inland, as well as uninhabited surface vehicles and/or ‘other’ weapons-system types (small arms, sea mines and explosive charges). Hijackings are also included. ‘Successful attacks’ includes all attacks resulting in kinetic damage to a ship and/or involving small-arms exchange. Attack count includes both confirmed and suspected Houthi attacks, if corroborated.

Methodology: Each attack is one that took place at a specific time, involved distinct types of violence and actors, and occurred in a particular location. This means that incidents that differ by time, location, agent or type of activity are counted as separate attacks. Two incidents that occur at the same time and in the same place, involving the same actors and type of activity, are aggregated into a single attack. The overall attack count may therefore differ from the actual number of incidents. This IISS definition is informed by, but distinct from, the methodology used by ACLED in compiling the data.

Source: IISS, based on ACLED-compiled data

Map 1.1: Houthi attacks on ships, November 2023–August 2024



Notes: 'Attacks' includes the use of missiles and uninhabited aerial vehicles, including those launched from inland, as well as uninhabited surface vehicles and/or 'other' weapons-system types (small arms, sea mines and explosive charges). Hijackings are also included. 'Successful attacks' includes all attacks resulting in kinetic damage to a ship and/or involving small-arms exchange. Both confirmed and suspected Houthi attacks, if corroborated, are included. Locations are based on the most precise geographical coordinates publicly available for each attack. In cases where precise information is unavailable, attacks are coded to generic Red Sea, Bab el-Mandeb Strait and Gulf of Aden areas. Consequently, some attacks may overlap.

Methodology: Each attack is one that took place at a specific time, involved distinct types of violence and actors, and occurred in a particular location. This means that incidents that differ by time, location, agent or type of activity are counted as separate attacks. Two incidents that occur at the same time and in the same place, involving the same actors and type of activity, are aggregated into a single attack. The overall attack count may therefore differ from the actual number of incidents. This IISS definition is informed by, but distinct from, the methodology used by ACLED in compiling the data.

Source: IISS, based on ACLED-compiled data

## B. Geographical Scope

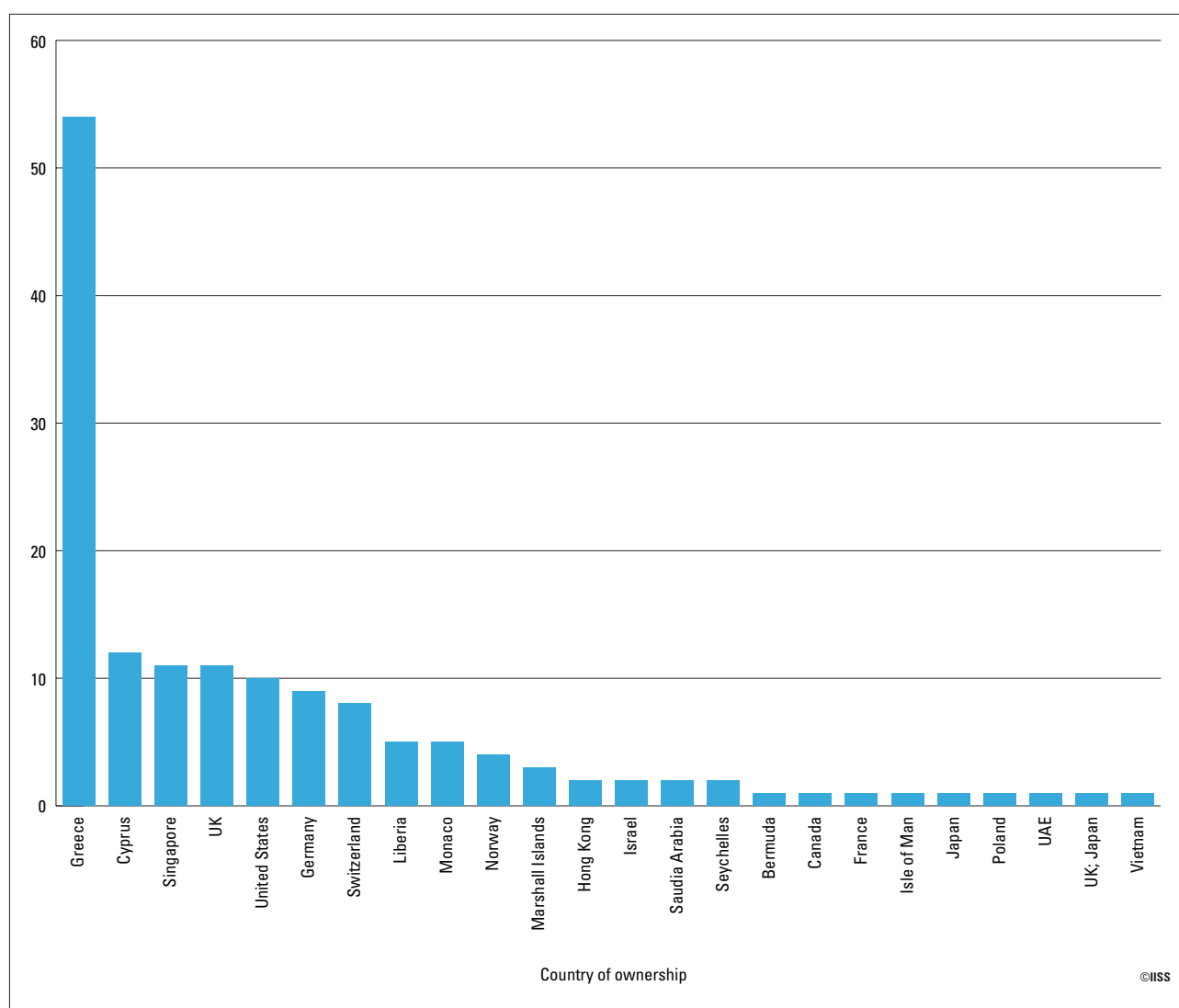
Map 1.1 displays the distribution of Houthi attacks on ships between November 2023 and August 2024. One-hundred and fifty-nine total attempted attacks took place in the southern Red Sea, 70 in the Gulf of Aden, 45 in the Bab el-Mandeb Strait and two in the western Arabian Sea. In addition, 15 attempted attacks ultimately occurred over land: 13 either fell short or were intercepted in Yemen's southern governorates, alongside an additional two that fell inland into Djibouti and Eritrea.

The map categorises the attacks into three types, based on their outcomes: 150 interceptions (in

yellow), 94 missed or failed attacks (in green) and 48 successful attacks (in red). Most of the attempted attacks took place in the southern Red Sea, which is also where the largest number of interceptions occurred. This points to the concentrated defence measures of *Operation Prosperity Guardian* and EUNAVFOR *Aspides* in this area.<sup>30</sup> Meanwhile, missed or failed attacks and successful attacks were more dispersed across the region.

One noteworthy case was the Houthis' UAV attack on the Portugal-flagged container ship *MSC Orion* (IMO: 9857157) on 27 April 2024, in which the ship

Figure 1.2: Number of Houthi attacks on commercial ships per country of ownership, November 2023–August 2024



Note: 'Attacks' includes the use of missiles and uninhabited aerial vehicles, including those launched from inland, as well as uninhabited surface vehicles and/or 'other' weapons-system types (small arms, sea mines and explosive charges). Hijackings are also included. Attack count includes both confirmed and suspected Houthi attacks, if corroborated. Methodology: Each attack is one that took place at a specific time, involved distinct types of violence and actors, and occurred in a particular location. This means that incidents that differ by time, location, agent or type of activity are counted as separate attacks. Two incidents that occur at the same time and in the same place, involving the same actors and type of activity, are aggregated into a single attack. The overall attack count may therefore differ from the actual number of incidents. This IISS definition is informed by, but distinct from, the methodology used by ACLED in compiling the data. Source: IISS, based on ACLED-compiled data

sustained minor damage. It took place approximately 300 nautical miles southeast of the Horn of Africa, marking the Houthis' first successful attack in the Indian Ocean.<sup>31</sup> Combined with the Houthis' declared intention to attack ships in the Indian Ocean and Mediterranean Sea, as well as the group's lethal UAV attack on central Tel Aviv on 19 July 2024, this suggests a high potential for future attacks in areas where international maritime forces are not present.<sup>32</sup>

### C. Commercial Targets

As outlined above, the Houthis have developed complex and changing targeting criteria, which is reflected in the data on which ships have been attacked. Figure 1.2 shows the total number of Houthi attacks on commercial ships by the country of ownership between November 2023 and August 2024. Greek-owned commercial ships were attacked significantly more than others, with 54 total attempted attacks. Cypriot-, Singaporean-, British- and US-owned commercial ships follow, each with a count in the range of 10–12 attempted attacks.

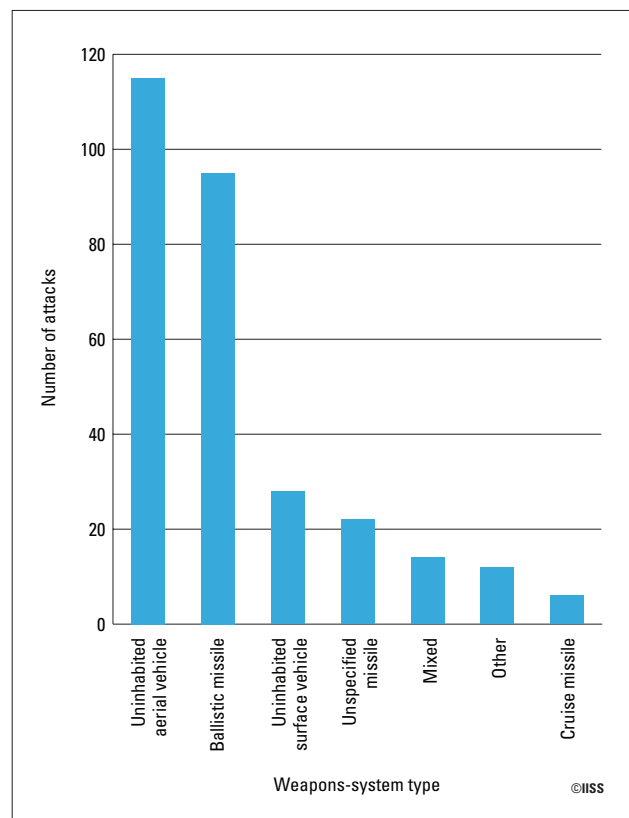
Likewise, there were also a greater number of successful attacks on Greek-owned commercial ships than on others, with 18 in total. British-, Singaporean-, Cypriot- and German-owned commercial ships follow, with counts of six, four, three and three successful attacks respectively.

Figure 1.2 demonstrates that Greek-owned commercial ships experienced attacks remarkably more than other commercial ships between November 2023 and August 2024. This should be expected, given that Greece is the largest ship-owning country, with Greek shipowners controlling over 20% of the global merchant fleet in terms of deadweight tonnes.<sup>33</sup> However, increased defence-industry cooperation between Greece and Israel in recent years might have also made Greek-owned ships a more attractive – besides simply accessible – target.<sup>34</sup> Ships with ownership ties to other countries, including Cyprus, Singapore and the UK, also faced a significant number of such attacks. Notably, most commercial ships subject to these attacks have ownership links to countries participating in one or more of the three international missions.

### D. Weapons-System Types Employed

Figure 1.3 displays the number of attacks per weapons-system type used in Houthi attacks on ships between November 2023 and August 2024. UAVs and ballistic missiles were the most employed weapons-system types, as used in 115 and 95 attacks respectively. USVs, as well as mixed weapons-system types and 'other' weapons-system types (specifically: small arms, sea mines and explosive charges) follow, each with counts in the range of 12–22 attacks. Cruise missiles were employed six times. However, 22 attacks involved the employment of unspecified missiles, meaning that the counts for ballistic missiles and cruise missiles should be treated as baselines. Counted together, ballistic,

Figure 1.3: Number of attacks per weapons-system type used in Houthi attacks on ships, November 2023–August 2024



Note: 'Attacks' includes the use of missiles and uninhabited aerial vehicles, including those launched from inland, as well as uninhabited surface vehicles and/or 'other' weapons-system types (small arms, sea mines and explosive charges). Hijackings are also included. Attack count includes both confirmed and suspected Houthi attacks, if corroborated. Methodology: Each attack is one that took place at a specific time, involved distinct types of violence and actors, and occurred in a particular location. This means that incidents that differ by time, location, agent or type of activity are counted as separate attacks. Two incidents that occur at the same time and in the same place, involving the same actors and type of activity, are aggregated into a single attack. The overall attack count may therefore differ from the actual number of incidents. This IISS definition is informed by, but distinct from, the methodology used by ACLED in compiling the data. Source: IISS, based on ACLED-compiled data

cruise and unspecified missiles were used in 123 attacks. Overall, the data highlights a strong reliance on UAVs and (mostly ballistic) missiles in the attacks that took place in this period.

Turning to the types of weapons system used in attacks each month, the numbers of attacks involving missiles and UAVs remained quite similar to one another between November 2023 and August 2024. However, there was a greater reliance on missiles at the start of 2024 and in the later summer months. Indeed, the number of attacks involving missiles was greater than the number involving UAVs by seven in January, by five in July and by seven in August. In contrast, there were four and five more attacks involving UAVs than missiles in March and May 2024 respectively.<sup>35</sup> The military capabilities of the Houthis are further discussed in Section Two.

## International Responses

### A. Operation Prosperity Guardian and EUNAVFOR Aspides

Several countries have intercepted Houthi attacks on ships as part of *Operation Prosperity Guardian* and EUNAVFOR *Aspides*. As discussed in relation to Map 1.1, 150 interceptions were carried out between November 2023 and August 2024, with most occurring in the southern Red Sea.<sup>36</sup>

One way to measure the success of the naval missions is to consider the number and types of weapons systems that were intercepted. Of the 309 weapons-system targets that were intercepted overall, UAVs were intercepted most often, with a count of 229, followed by 43 USVs and 30 ballistic missiles. Cruise missiles were intercepted least often, with a count of only seven.<sup>37</sup> This suggests an increased degree of difficulty in intercepting this low- and fast-moving weapons-system type. Overall, the data indicates that UAVs were regarded as the highest-priority threat or were the most numerous and accessible targets.

A number of attacks were thwarted, and the interceptions would have contributed to protecting freedom of navigation, as envisioned. However, the attacks have persisted at a consistent rate since interceptions began. As shown in Figure 1.1, the total number of attacks

per month barely declined, from 28 in December 2023 to 27 in August 2024, with higher counts in all other months within this period except July 2024.<sup>38</sup> Therefore, *Operation Prosperity Guardian* and EUNAVFOR *Aspides* should not be judged as successful in this respect.

### B. Operation Poseidon Archer

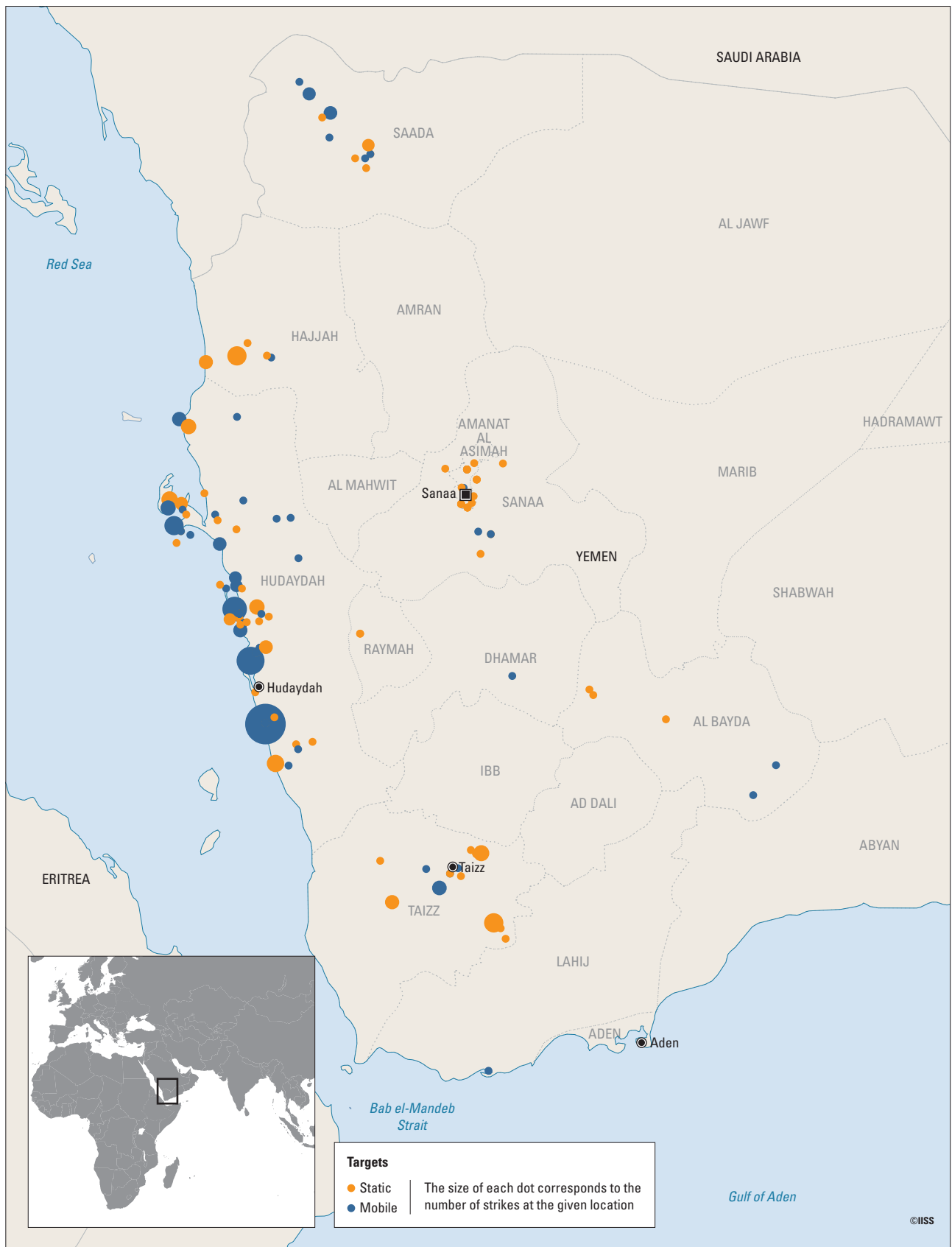
The US and UK began striking Houthi targets in Yemen under *Operation Poseidon Archer* on 12 January 2024. The strikes can be categorised into two types, against ‘static’ and ‘mobile’ targets. Strikes on static targets have been conducted by US and, to a lesser extent, UK forces. More specifically, these strikes have hit Houthi stationary military assets, which include – but have not been limited to – command-and-control centres, production facilities, weapons-storage facilities, air-defence systems and radars. In contrast, strikes on mobile targets, which have been carried out by US forces, have pre-emptively targeted Houthi pop-up mobile weapons systems that were ready to launch in the direction of the Red Sea or Gulf of Aden or were considered an imminent threat to shipping. These targets include ballistic and cruise missiles, as well as UAVs, USVs and uninhabited underwater vehicles (UUVs).<sup>39</sup>

Map 1.2 shows the distribution of US and UK strikes on Yemen between January and August 2024. A total of 226 strikes were launched over the western part of the country. The map categorises the strikes into the two types discussed above: 98 on static targets and 128 on mobile targets. Strikes on static targets were dispersed across the central and southern governorates of western Yemen. The highest concentration of such strikes – 46 – took place in Hudaydah, followed by 11–12 strikes in Amanat al Asimah (Sanaa City), Taizz and Sanaa. Strikes were also carried out on static targets in Hajjah, Saada, Al Bayda and Raymah.

In contrast, strikes on mobile targets were heavily concentrated along Yemen’s western coastline. The greatest number of these strikes took place in Hudaydah, with 107 on mobile targets, followed by far lower counts, of eight and four, in Saada and Taizz respectively. A few strikes of this kind also took place in Al Bayda, Amanat al Asimah (Sanaa City), Sanaa, Dhamar, Hajjah and Lahij.

One way to gauge the success of *Operation Poseidon Archer* is to consider the number of mobile targets

Map 1.2: US and UK strikes on Houthi targets in Yemen, January–August 2024



Methodology: Each strike is one that took place at a specific time, involved distinct types of violence and actors, and occurred in a particular location. This means that incidents that differ by time, location, agent or type of activity are counted as separate strikes. Two incidents that occur at the same time and in the same place, involving the same actors and type of activity, are aggregated into a single strike. The overall strike count may therefore differ from the actual number of incidents. This ISS definition is informed by, but distinct from, the methodology used by ACLED in compiling the data.

Source: ISS, based on ACLED-compiled data

struck, as opposed to static targets (which are more difficult to quantify). In total, 326 mobile targets were struck. UAVs were struck most often, with a count of 123, followed by 84 cruise missiles, 32 USVs and nine ballistic missiles. UUVs were struck least often, with a count of only two. Notably, 71 unspecified missiles were also struck, meaning that the counts for ballistic missiles and cruise missiles should be treated as baselines.<sup>40</sup> Overall, among the mobile targets, the data suggests that UAVs and cruise missiles were treated as the highest-priority threat or were the most numerous and accessible targets.

Such numbers are significant, and the strikes would therefore have disrupted and degraded the capabilities of the Houthis to attack ships to some extent. However, the attacks have continued and their rate per month has fallen only marginally during the course of *Operation Poseidon Archer*. As illustrated in Figure 1.1, the total number of attempted attacks decreased only slightly from 34 in January 2024 to 27 in August, with peaks in March and June. The mission should therefore be judged as having had only limited success in this regard.

### C. Israeli Airstrikes in July and September 2024

In addition to the multinational military responses to the Houthi attacks, Israel's armed forces also carried out airstrikes against targets in Houthi-controlled areas of Yemen in July and September 2024. The first round of strikes (dubbed *Operation Outstretched Arm*) hit ten targets in the port of Hudaydah on 20 July 2024. This was in response to the Houthis' UAV attack in Tel Aviv the preceding day.<sup>41</sup> The Israeli attacks struck a fuel depot, a power station and container cranes in the harbour.<sup>42</sup> The second wave of strikes, on 29 September, hit targets in and near the ports of Hudaydah and Salif. This was in retaliation after two intercepted Houthi missiles targeted central Israel in the previous two days.<sup>43</sup> The Israeli strikes struck fuel depots, power stations and an oil terminal.<sup>44</sup> Ostensibly aimed at disrupting the smuggling of weapons and fuel from Iran to the Houthis (see Section Four), the strikes had little impact on the group's ability to launch attacks. In fact, in the period following *Operation Outstretched Arm*, the total number of attempted attacks on ships declined to 23 in July but rose again to 27 in August.

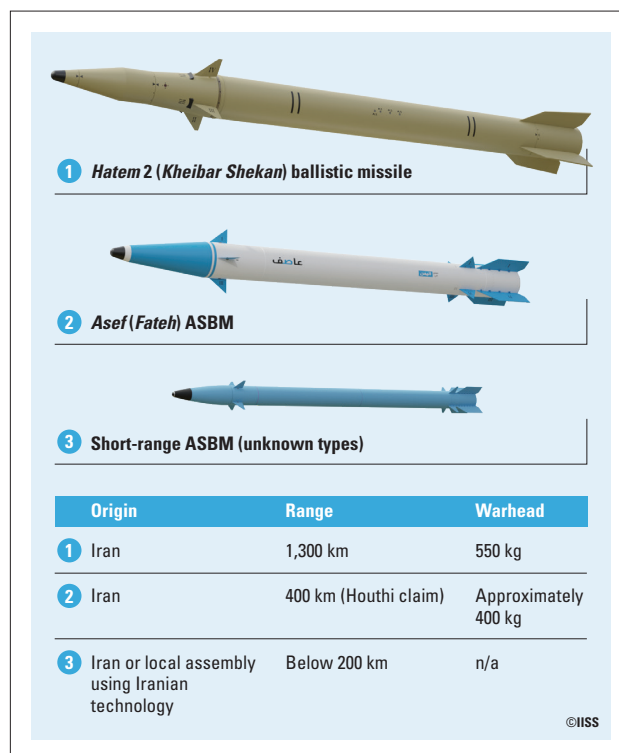
## 2. The Houthis' Arsenal

Despite the significant number of systems deployed in the Houthis' anti-shipping operations, detailed information on the specific types used remains limited. Operational security concerns drive the Houthis to reference only broad categories of systems in their public statements, and they have released minimal footage of the actual missions. Additionally, imagery of damaged commercial vessels and associated debris has been sparse, likely due both to commercial considerations by the shipping lines as well as efforts to avoid providing the Houthis with real-time battle-damage assessments during ongoing hostilities. The impact of Houthi systems or their interception over open waters frequently results in the destruction and loss of critical components, further complicating efforts to analyse the guidance and control technologies employed. Consequently, the findings presented here should be regarded as provisional.

### Anti-Ship Ballistic Missiles

The Houthis first unveiled dedicated anti-ship ballistic missiles (ASBMs) in their 2022 post-ceasefire parade. Since then, the group has displayed a total of six designs, all of which either originate from Iran or are based on Iranian technology.<sup>45</sup> Due to the high impact speed of ballistic missiles, which hinders both visual identification and the retrieval of debris, detailed information on the exact types of ballistic missiles employed remains particularly limited. One system confirmed to have been used by the Houthis is the anti-ship variant of Iran's *Fateh* class of solid-propellant short-range ballistic missiles.<sup>46</sup> Iran initially introduced an anti-ship version of the 300 kilometre-range *Fateh-110* in 2011, designated as *Khalij-e Fars*.<sup>47</sup> Since then, Iran has further adapted its anti-ship guidance technology for longer-range systems within the *Fateh* family.<sup>48</sup> In 2022, the Houthis unveiled the *Asef*, which is clearly an anti-ship variant of a *Fateh*-class missile.<sup>49</sup> The Houthis' claim that the *Asef* has a range of 400 km would, if accurate, suggest it is an anti-ship version of the *Fateh-313*.<sup>50</sup> However, it is also plausible

Figure 2.1: Ballistic missiles known to have been used in the Houthi anti-shipping campaign, November 2023–August 2024



Source: IISS research

that the Houthis have exaggerated the range of a more standard *Fateh-110* or that they may be employing both versions.

The substantial range and the ballistic trajectory of anti-ship variants of the *Fateh* missile provide the Houthis with significant operational flexibility. These missiles can be launched from deep within Yemen's interior, allowing the Houthis to exploit the country's mountainous terrain to obscure their operations from adversary surveillance. Recent construction activities, particularly at known ballistic-missile sites, strongly suggest that the Houthis are employing underground facilities to shelter their arsenal, following practices observed in Iranian and Hizbullah strategies.<sup>51</sup> The survivability of the Houthi missile force is further enhanced by the versatility of the *Fateh*'s launch modes. *Fateh*-class missiles can be deployed from mobile



launchers, which can be disguised as civilian trucks, as well as from concealed or buried static launchers. The presence of *Fateh*-class missiles in Yemen not only constitutes a threat to merchant and military vessels in the region but also raises questions regarding the provision of these systems to the Houthis. *Fateh* missiles use solid-propellant motors that cannot be disassembled for transport, with a weight of more than two tonnes and a length of over five metres. Given these logistical challenges, the provision of such missiles to Yemen would necessitate either highly sophisticated local-production capabilities or, more plausibly, the existence of secure and capable transport routes.

In addition to *Fateh*-class missiles, the Houthis have also employed shorter-range ballistic missiles in the anti-shipping role, with one Western official noting an increase in the use of such systems over the course of the campaign.<sup>52</sup> While the specific types of these systems remain unclear, the Houthis have showcased in their parades several shorter-range ASBMs that could be viable candidates. One notable example is the *Mohit*, a modified S-75 *Dvina* (SA-2 *Guideline*) surface-to-air missile from pre-war Yemeni military stock, repurposed for anti-shipping operations.<sup>53</sup> The conversion of existing missile stocks offers significant logistical advantages, and the Houthis have previously demonstrated the capability to adapt S-75s for surface-to-surface roles.<sup>54</sup> It is also noteworthy that Iran has developed an anti-ship version of the S-75, further suggesting potential external technical assistance in these adaptations.<sup>55</sup>

Other potential candidates include three short-range, solid-propellant anti-ship missile designs, the *Faleq*, *Mayun* and *Al-Bahr al-Ahmar*. While these systems strongly reflect Iranian design philosophy, none are identical to any publicly known Iranian missiles. They could represent either previously unknown Iranian missile types transferred to Yemen or Iranian designs tailored for local production in Yemen. Iran is well known for its strategy of enabling non-state-actor allies to produce their own, smaller-diameter missile and rocket motors and warheads, subsequently providing them with guidance systems to manufacture precision-guided missiles.<sup>56</sup> In the Yemeni context, both solid-propellant precursor chemicals and mixing equipment destined for the Houthis have been interdicted, and

shorter-range rockets deployed by the Houthis have exhibited features indicative of local production.<sup>57</sup> It is therefore plausible that some Houthi ASBMs could be of local manufacture, although conclusive evidence for this remains elusive.

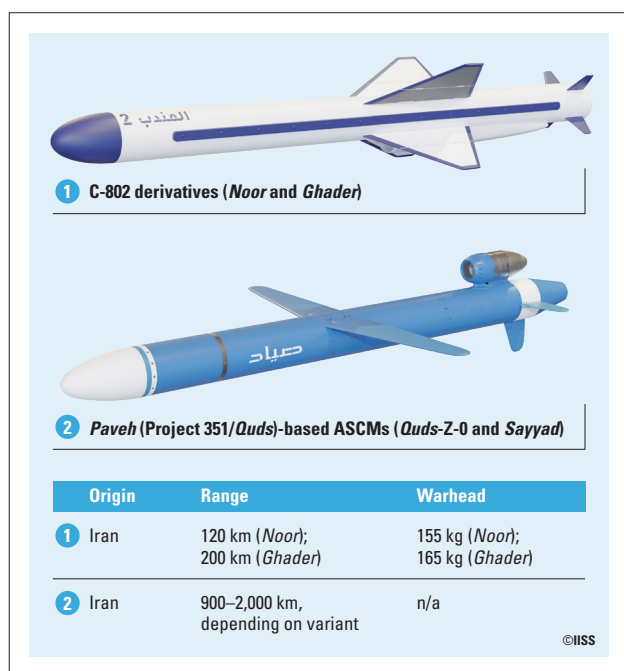
Most Iranian ASBMs are equipped with electro-optical and infrared (EO/IR) seekers for terminal guidance.<sup>58</sup> Following launch, these missiles are initially guided towards the general vicinity of the target using inertial navigation systems (INS) and, potentially, satellite navigation. When reaching the target area, the EO/IR seeker autonomously acquires and homes in on the target. Western officials have confirmed the use of homing seekers on Houthi ballistic missiles, and Houthi ASBMs displayed in parades and documentary footage appear to feature similar, if not identical, seekers to those employed on Iranian ASBMs.<sup>59</sup>

It is also possible, however, that alongside dedicated ASBMs, the Houthis may deploy precision-guided ballistic missiles originally designed for land attack, which utilise satellite-navigation systems. While these missiles lack the capability to home in on moving naval vessels, they could be aimed at a vessel's projected future position. Although this form of deflection shooting would inherently reduce accuracy compared to homing guidance, the Houthis may consider this trade-off acceptable, particularly when targeting large, slow-moving merchant vessels which tend to follow predictable courses. There is at least one instance suggesting the use of such a guidance method. In June 2024, the Houthis employed a 1,300 km-range Iranian-made *Hatem 2* (*Kheibar Shekan*) precision-guided land-attack ballistic missile in an attempt to strike the *MSC Sarah V* (IMO: 9181675) near the island of Socotra.<sup>60</sup> Although the attack ultimately failed, the missile reportedly missed the vessel by only 50 metres.<sup>61</sup> Despite the lack of a direct hit, the long-range nature of the attack allowed the Houthis to claim a propaganda victory, demonstrating their ability to project force over significant distances.

## Anti-Ship Cruise Missiles

When the Houthis took control of large parts of northern Yemen in 2014–15, they inherited a number of older Soviet and Chinese anti-ship cruise missiles (ASCMs) from Yemen's pre-war navy. Shortly afterwards, they

**Figure 2.2: Anti-ship cruise missiles known to have been used in the Houthi anti-shipping campaign, November 2023–August 2024**



Source: IISS research

began receiving Iranian ASCMs, which they deployed on a limited scale in the conflict against the Saudi-led coalition.<sup>62</sup> Although ASCMs have been used in far smaller numbers compared to ASBMs, they have nonetheless played a role in the ongoing Houthi campaign against merchant shipping and in attempted strikes on Western naval vessels.<sup>63</sup> The aforementioned Soviet and Chinese legacy systems continue to be paraded by the Houthis, but they are limited in both range and quantity, and their operational status remains uncertain. It is therefore reasonable to assume that the Houthis' primary ASCMs are now Iranian-made C-802 derivatives and that these have been used in their campaign against shipping in the Red Sea. Iran produces three variants derived from the radar-guided Chinese C-802 and appears to have supplied at least two of these to the Houthis. An interdicted missile, inspected by UN experts, was identified as corresponding to the original 120 km-range C-802 copy *Noor*, while a missile paraded by the Houthis under the designation *Al-Mandab 2* closely resembled the Iranian 200 km-range derivative *Ghader*.<sup>64</sup> It remains unclear whether the Houthis have also acquired Iran's longest-range C-802 variant, the 300 km-range *Ghadir*. Notably, Iran made at least one

known attempt to resupply the Houthis with a C-802 derivative, which was thwarted when US forces intercepted a smuggling dhow off the coast of Somalia in January 2024.<sup>65</sup>

In addition to C-802 derivatives, the Houthis have also showcased ASCMs based on the Iranian *Paveh*/Project 351 land-attack cruise missile (known in Yemen as *Quds*). During their 2023 parade, the Houthis unveiled two anti-ship versions of the *Paveh*: one equipped with an EO/IR seeker, designated as *Quds-Z-0*, and another with a radar seeker, named *Sayyad*.<sup>66</sup> *Paveh*-based ASCMs could offer significantly greater ranges than standard ASCMs, with ranges varying from about 900–2,000 km depending on the baseline variant used. There is evidence suggesting that such a missile was employed, albeit unsuccessfully, at least once. In late April 2024, the Houthis claimed to have targeted the *MSC Orion* in the Indian Ocean, and the vessel reported being struck by a UAV at a distance of approximately 1,400 km from Houthi-controlled territory.<sup>67</sup> Several days later, images of a *Paveh*-type missile that had crashed in northern Somalia surfaced on social media.<sup>68</sup> Given the timing and location of the missile wreckage, it is likely that the missile was launched in a failed attempt to strike the vessel.

It is noteworthy that ASCMs have played a significantly less prominent role in the Houthi anti-shipping campaign compared to ASBMs and UAVs. Several potential explanations have been proposed to account for this discrepancy. One reason for the relatively limited use of ASCMs could be logistical constraints. Houthi UAVs involve a combination of locally manufactured parts and the assembly of smaller components, and a similar process may apply to some of their ASBM systems. In contrast, only the final assembly of ASCMs takes place in Yemen, where larger pre-made sections are put together. This dynamic might contribute to the limited number of ASCMs observed, as smuggling the larger components necessary for their final assembly is more challenging than smuggling the smaller parts and raw materials required for UAVs. Another plausible explanation lies in the operational limitations of the older C-802 derivatives used by the Houthis. It may not be possible to launch these missiles from inland positions, confining their deployment to shore areas, which are under intense surveillance by Western intelligence, surveillance and

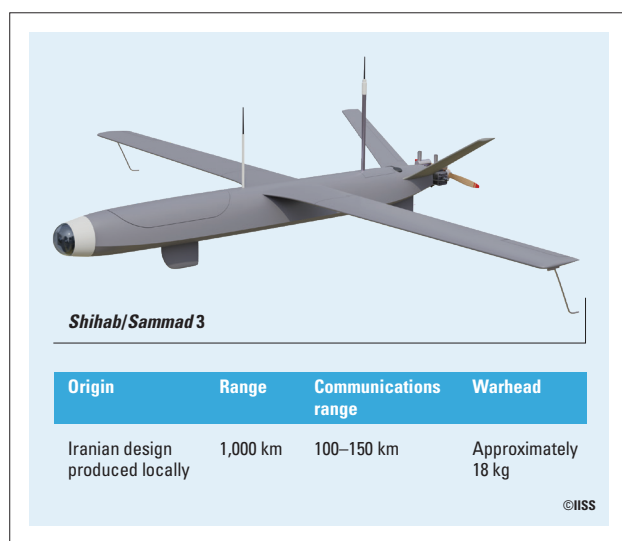
reconnaissance (ISR) assets. These limitations might increase the risk associated with ASCM use compared to ASBMs and UAVs. This theory is supported by the numerous US Central Command (CENTCOM) reports documenting the destruction of ASCM launchers on the ground, potentially indicating the challenges the Houthis face in deploying these systems.<sup>69</sup>

To date, the Houthi ASCM arsenal has predominantly relied on Iranian-supplied technology. However, recent reports suggest that Russia may be considering providing the Houthis with advanced ASCMs as a retaliatory measure against Western arms deliveries to Ukraine.<sup>70</sup> The potential introduction of Russian systems such as the long-range supersonic P-800 *Oniks* (SS-N-26 *Strobile*) would represent a significant escalation. These advanced missiles would offer capabilities far superior to the Iranian systems currently in Houthi service and could pose a substantial threat to both merchant shipping and Western naval vessels operating in the region.

## Uninhabited Aerial Vehicles

The Houthis first introduced UAVs into their arsenal in 2016 and swiftly integrated them as a central component of their asymmetric-warfare strategy against the Saudi-led coalition. Houthi UAVs were employed against anchored ships both during the war with the coalition

**Figure 2.3: Direct-attack uninhabited aerial vehicles known to have been used in the Houthi anti-shipping campaign, November 2023–August 2024**



Source: IISS research

and during the group’s campaign against oil exports by the internationally recognised Yemeni government.<sup>71</sup> Following the onset of the Houthis’ anti-shipping campaign, the group’s UAV capability unsurprisingly emerged as a critical asset in the operation.<sup>72</sup>

In their anti-shipping operations, the Houthis have utilised UAVs in multiple roles within their kill chain: first, as ISR assets for locating and identifying potential targets, and second, as effectors for conducting direct attacks. When deployed as ISR assets, Houthi UAVs are linked to a ground station via radio communication, transmitting data from their electro-optical sensors to an operator on the ground. While this set-up enables effective identification of naval targets, it also restricts the UAV’s operational range to the direct line of sight between it and the ground control station. For relatively low-flying Houthi ISR UAVs, this range may be limited to just 100–150 km.<sup>73</sup>

The Houthis have employed UAVs as direct-attack weapons in at least two distinct modes. The first mode functions similarly to a loitering munition, where Houthi UAVs maintain a radio link with a ground station, enabling an operator to steer the UAV towards its target using real-time electro-optical data.<sup>74</sup> An automated lock-on mechanism might be engaged during the final approach to ensure precision. In this mode, the UAV’s high level of accuracy poses a significant threat to crews, despite the relatively small explosive payload. This threat is particularly acute when operators target critical areas such as a vessel’s bridge, a tactic observed in both Houthi and Iranian anti-ship operations.<sup>75</sup>

The second mode observed in Houthi UAV attacks on civilian shipping has been termed the ‘flying mine-field’ approach. In this mode, UAVs navigate a predefined area by referencing waypoints through satellite navigation, crisscrossing the area at extremely low altitudes. Positioned within narrow shipping lanes, the UAVs follow this pattern until they either strike a passing vessel or crash due to operational limitations. While this method enables beyond-line-of-sight targeting, it is relatively indiscriminate and less effective than UAVs under direct operator control.<sup>76</sup>

The Houthis have showcased a diverse array of UAV types, but Western officials and interception footage released by Western militaries consistently identify the

*Sammad* series as the most frequently deployed in the Red Sea and Gulf of Aden.<sup>77</sup> Originating from Iran, the *Sammad* UAV family is notably versatile and has been extensively utilised by the Houthis not only in their naval operations but also in strikes against Israel, Saudi Arabia and the UAE. The development of the *Sammad* design follows a pattern seen in other Iranian UAVs, where the endurance and range of a successful base model is incrementally enhanced through upscaling and the addition of more powerful engines. This evolutionary process began with the *Sammad 1*, also known by its Iranian designation, *Sayyad*, which had an operational range of 500 km. This model was later developed into the *Sammad 3* (US designation KAS-04), with an extended range of more than 1,600 km, and eventually into the even longer-range *Yafa*.<sup>78</sup> The *Sammad* series encompasses various models tailored for specific roles, including global navigation satellite system (GNSS)-guided long-range one-way attack munitions, ISR variants, and loitering munitions. In their anti-shipping operations, the Houthis have employed a loitering, datalink-equipped version of the *Sammad 3*, referred to as the *Shihab*.<sup>79</sup>

Compared to other UAVs with similar endurance, the *Sammad* variants offer the Houthis distinct advantages due to their overall simplicity and cost-effectiveness. These UAVs feature simple and straightforward designs that mostly incorporate commercially available off-the-shelf engines. The combination of these factors makes local mass production of the UAVs within Yemen more feasible. This likely accounts for the extensive use of *Sammad* UAVs in anti-shipping missions and strikes against Israel, in contrast to the more sophisticated and expensive *Shahed 131* and *Shahed 136* models, which are also in the Houthi arsenal but have not been observed in the current conflict.

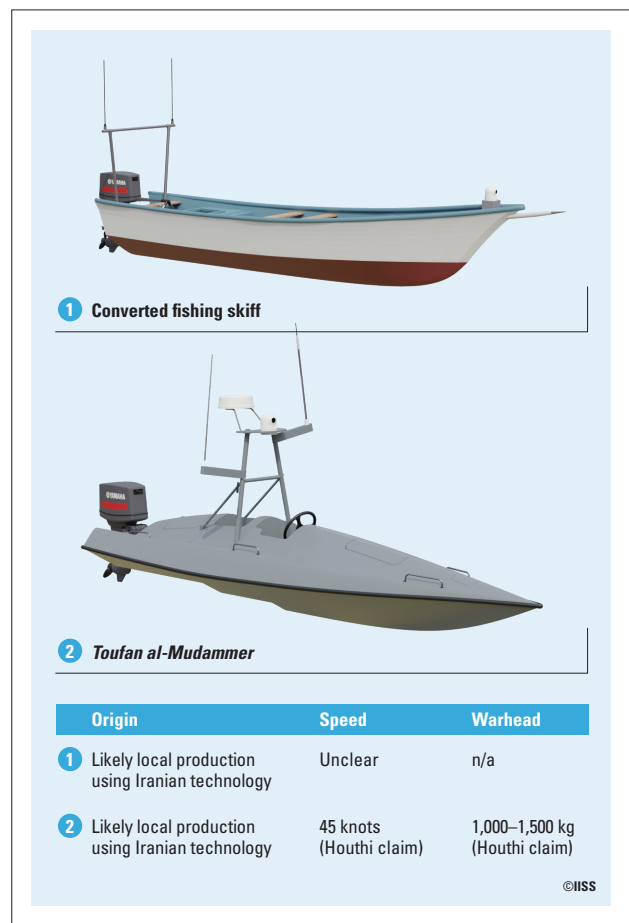
Despite the relative wealth of information on Houthi UAVs, significant uncertainties remain regarding their maritime use. These uncertainties apply particularly to the Houthis' ability to conduct beyond-line-of-sight ISR and strike missions, apart from their established use in flying-minefield operations. While there is evidence that the Houthis have extended their operational range by situating ground control stations on elevated terrain, this method has inherent limitations. Potential methods

to achieve a true beyond-line-of-sight capability might include the use of ground-based, sea-based or aerial relays, low-bandwidth satellite communications, or autonomous guidance using radar, radio frequency or electro-optical homing seekers. However, in the absence of publicly available data – such as imagery of debris – the full extent of Houthi UAV beyond-line-of-sight capabilities remains uncertain.

## Uninhabited Surface Vessels

The Houthis first deployed explosives-laden USVs in the Yemeni conflict in 2017, initiating their use with an attack on the Saudi frigate *Al Madinah*.<sup>80</sup> Over the following years, the Houthis sporadically employed USVs against a variety of targets, including Saudi-led-coalition warships, merchant vessels linked to coalition states, and Saudi ports on the Red Sea.<sup>81</sup> In 2024, they introduced USVs to their anti-shipping campaign in the Red Sea.<sup>82</sup>

Figure 2.4: Uninhabited surface vehicles known to have been used in the Houthi anti-shipping campaign, November 2023–August 2024



Source: IISS research

While USVs are generally easier to defend against than other Houthi anti-ship systems, such as ASBMs and ASCMs, their ability to carry significantly larger warheads and detonate near a vessel's waterline substantially increases the likelihood of sinking a vessel in a successful attack.

Several distinct types of USV have been employed by the Yemeni group. It appears that initially, most Houthi USVs were created by converting older patrol boats from pre-war Yemeni military stock through the addition of guidance systems, control mechanisms and warheads.<sup>83</sup> As the Houthis likely exhausted their limited stock of speedboats, the group introduced a series of purpose-built explosive USVs under the designation *Toufan*. Optimised for high speeds, the *Toufan* USVs – also referred to as *Blowfish* by Saudi Arabia and the UAE – come in various sizes, carrying warheads ranging from 150 to 1,000 kg.<sup>84</sup> The largest of these, the *Toufan al-Mudammer*, was used in a successful attack on the bulk carrier *Transworld Navigator* (IMO: 9469924) on 23 June 2024.<sup>85</sup>

The Houthis have also converted traditional wooden fishing skiffs into weaponised USVs. On 12 June 2024, the group employed one such USV, alongside an unspecified missile, in an attack on the MV *Tutor* (IMO: 9942627). The incident resulted in the sinking of the vessel and the death of one crew member.<sup>86</sup> The USV involved in the attack was equipped with two mannequins, which initially led the *Tutor's* crew to believe

they were encountering a crewed fishing vessel.<sup>87</sup> Most Houthi USVs are designed with the capability to be optionally crewed, allowing operators to guide the vehicle partway towards a target before disembarking. Afterwards, control can be maintained via a radio link, transmitting real-time video from an onboard electro-optical system to a mothership. Footage from the Houthi attack on the *Transworld Navigator* also suggests that an automated electro-optical tracking system may have been used during the final approach.<sup>88</sup> Although Houthi USVs pose a significant threat, they have not yet adopted the high-bandwidth, beyond-line-of-sight satellite communications that have been crucial to the success of Ukrainian USVs.<sup>89</sup>

## Uninhabited Underwater Vehicles

Among the most obscure anti-ship systems used by the Houthis are uninhabited underwater vehicles. In February 2024, CENTCOM announced the destruction of a Houthi UUV, marking the first observed deployment of such a system since the onset of the Houthi campaign. That same month, CENTCOM reported the seizure of UUV components in transit from Iran to Houthi-controlled Yemen in the Arabian Sea.<sup>90</sup> While Iran is known to produce and utilise UUVs, little is known about their specific designs, guidance systems or overall capabilities. The same uncertainty applies to Houthi-operated UUVs, which remain poorly understood in terms of their technical specifications and operational potential.<sup>91</sup>

# 3. Economic Impact

Since November 2023, Houthi attacks in the Red Sea have disrupted a key maritime route. Higher war risk insurance premiums have prompted thousands of vessels to divert around Africa. Globally, the impact has been milder than expected, with no significant rises in consumer costs and inflation as of early November 2024. These diversions have instead had a significant impact on Red Sea littoral countries, many of which were already economically fragile. The loss of vital Suez Canal revenues, higher freight rates and dramatic declines in port calls and cargo volumes signal a challenging time ahead for littoral countries if the crisis persists, particularly for those with less financial flexibility to weather the higher costs of importing goods.<sup>92</sup>

This section first examines how shipping has been affected, looking at the decline in shipping in the Suez Canal and Bab el-Mandeb Strait, as well as the impact of diversions around Africa in terms of time, distance and cost. It then turns towards the overall impact of the crisis on the global economy, and the increases in freight rates. The second half of the section takes a deeper dive into the impact of the crisis on Red Sea ports by examining changes in port calls, cargo volumes and a port connectivity index. The section finishes with an evaluation of the variable impact of the crisis on extra-regional ports.

## Impact on Shipping

### Straits, Routes and Revenues

Although the Houthi attacks on shipping began in late November 2023, traffic started declining significantly in the Suez Canal and the Bab el-Mandeb Strait about a month later, with the latter suffering a steeper decline. This time gap was due to the shipping industry needing time to replan routes, as well as a general hope that the Houthis might not be able to sustain the attacks over a longer period. Between February and October 2024, the number of transits through the Suez Canal and the Bab el-Mandeb Strait declined by around 60% from

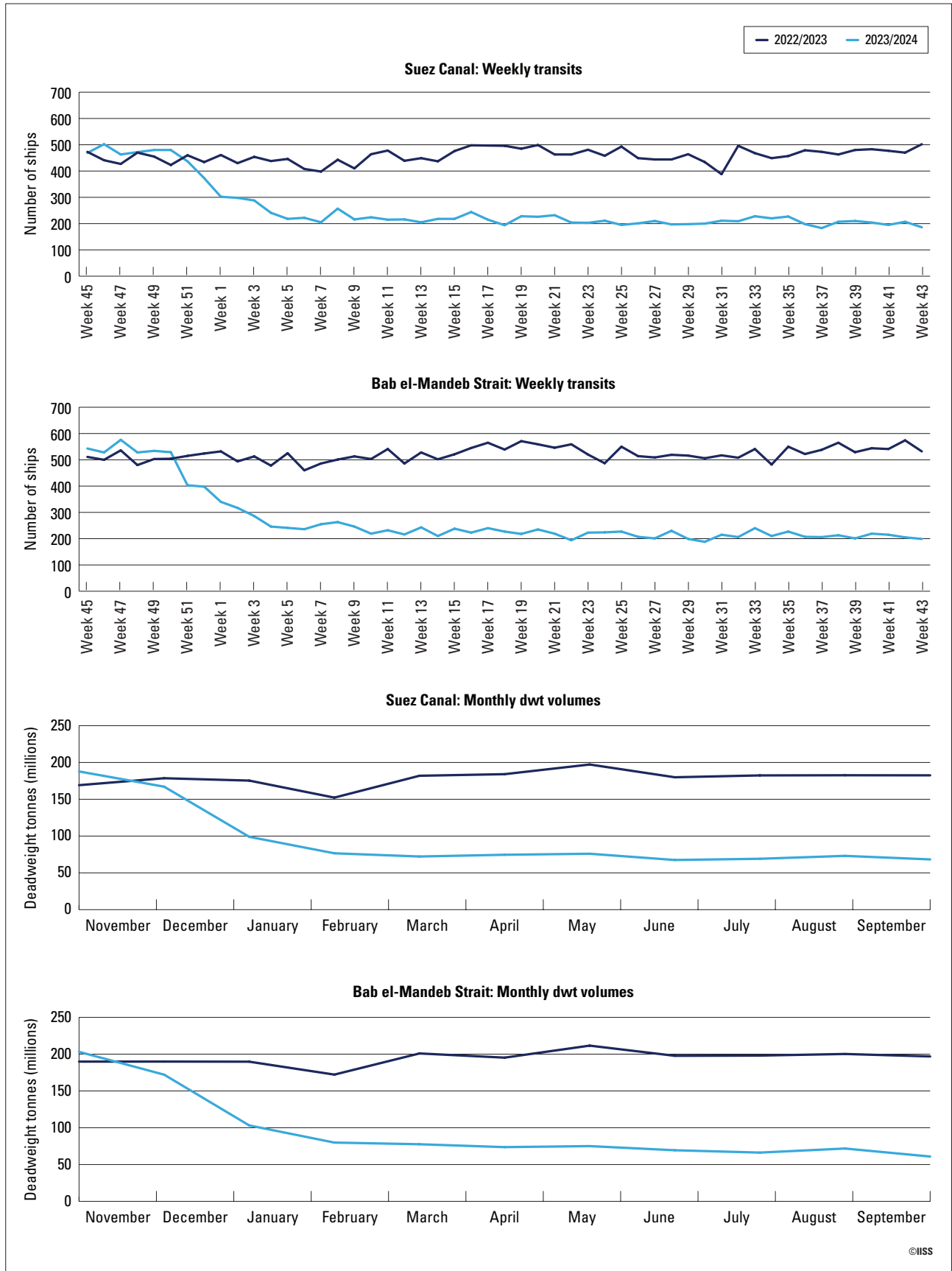
pre-crisis levels, while the deadweight tonnage sum decline was closer to 70%.<sup>93</sup> Transits via the Suez Canal, which hovered in the range of 400–500 ships per week in 2023, declined to around 200 per week in 2024. In the Bab el-Mandeb Strait, transits declined from about 500 ships per week to around 200 per week.<sup>94</sup> When measuring transits by sum of deadweight tonnes (dwt), the drop is even more significant (see Figure 3.1).<sup>95</sup>

Not all traffic has been equally affected.<sup>96</sup> Vehicle carriers, liquified-petroleum-gas carriers and liquefied-natural-gas carriers have almost entirely stopped transiting the Bab el-Mandeb Strait since February 2024. Container ships, dry-bulk carriers, product tankers and crude-oil tankers have also been significantly impacted, but to a lesser degree. Vessel rerouting through the Cape of Good Hope adds at least 30% more time (often much more) and around USD1 million in additional fuel costs per diversion (see Table 3.1).<sup>97</sup> As a result, most ships now transiting through the Red Sea are smaller, and thus less likely to be targeted. These are often feeder ships operating from ports like Djibouti.

As Table 3.1 demonstrates, the impact of diversions around Africa on Red Sea shipping is extremely dependent on the ports of origin and destination. The closer both ports are to the Red Sea (i.e., on either side), the more costly the diversion becomes (e.g., over 300% longer from Jebel Ali Port to Port Said). When both ports are located far away from the Red Sea, the diversion's impact declines significantly (e.g., only about 30% longer from Shanghai to Rotterdam).

In Egypt, Suez Canal revenue has declined by almost half compared to the first half of 2023, with losses of around USD3.5 billion by August 2024. Revenues, which are directly correlated with Suez Canal transits, started declining rapidly in December 2023. By February 2024, they stabilised at around USD400m per month. Assuming the current level of disruption continues until the end of the year, Egypt will lose at least half (USD5bn) of its Suez Canal expected annual revenues (about USD10bn), and possibly more, given that

Figure 3.1: Number of transits and deadweight tonnage (dwt) volumes passing through the Suez Canal and Bab el-Mandeb Strait, year-on-year comparison



Note: Number of transits reflects the total number of tanker ships and cargo ships carrying over 10,000 dwt. Deadweight tonnage describes a ship's overall carrying capacity in tonnes (metric). It includes the weight of cargo, crew, fuel, provisions and other materials on board. Source: Lloyd's List Intelligence, <https://www.lloydslistintelligence.com/>

**Table 3.1: Effects of diverting Red Sea shipping via the Cape of Good Hope on distance and transit times**

Trip	Red Sea route			Cape of Good Hope route		
	Distance*	Speed	Transit time <sup>†</sup>	Distance* (percentage increase)	Speed	Transit time <sup>†</sup>
Jebel Ali (United Arab Emirates) – Port Said (Egypt)	2,900 NM	12kt	10d	11,700 NM (+303%)	12kt	40d
		20kt	6d		20kt	24d
Jebel Ali (United Arab Emirates) – Rotterdam (Netherlands)	6,100 NM	12kt	21d	10,900 NM (+78%)	12kt	37d
		20kt	12d		20kt	22d
Shanghai (China) – Piraeus (Greece)	7,800 NM	12kt	27d	14,300 NM (+83%)	12kt	49d
		20kt	16d		20kt	29d
Shanghai (China) – Rotterdam (Netherlands)	10,500 NM	12kt	36d	13,800 NM (+31%)	12kt	48d
		20kt	22d		20kt	28d

\*Figures rounded to nearest hundred

<sup>†</sup>Figures rounded to nearest whole number

NM = nautical miles

kt = knots

d = days

Sources: sea-distances.org; IJSS analysis

revenues in May 2024 had fallen by almost two thirds.<sup>98</sup> The Suez Canal Authority attempted to redress this situation by offering discounts ranging from 10–75% on its pre-crisis fees – originally between USD400,000 and USD700,000, depending on the vessel – but it was unsuccessful.<sup>99</sup>

### Macroeconomic Impact and Freight Rates

The overall impact of the crisis on the global economy appears to have been limited. An Organisation for Economic Co-operation and Development (OECD) report stated in February 2024 that higher freight rates could add 0.4 percentage points to consumer-price inflation after about a year.<sup>100</sup> As of September 2024, however, oil prices had stayed below the pre-war level and inflation remained under control.<sup>101</sup>

Greater container-shiping capacity – thanks to newly built ships bought with the profits made during the coronavirus pandemic – as well as moderate consumer demand and sufficient inventories have made delays more manageable and could limit the impact of the current crisis.<sup>102</sup> Additionally, continued transits via the Red Sea (the route is not completely obstructed, as it was when the *Ever Given* ran aground in 2021) and the continued stability of energy markets throughout the crisis suggest that the impact might remain limited.<sup>103</sup>

On the other hand, the flexibility provided by overcapacity to container shipping does not necessarily extend to tankers, bulkers, vehicle carriers and other sectors.

More worrying is the increase in freight rates, with the price of affected routes – Asia to Europe – rising nearly fivefold as of August 2024.<sup>104</sup> A significant driver of such increases is the rise in war risk insurance premiums, which have surged from a pre-war rate of around 0.05–0.07% of the value of the ship to as much as 2%. Smaller insurers are thus starting to pause Red Sea war coverage.<sup>105</sup> Not all ships have been equally affected; ships with links to Israel, the UK and the US are reportedly paying 25–50% more in war risk premiums than the average.<sup>106</sup>

Meanwhile, Chinese ships going through the Red Sea are reportedly paying lower insurance premiums, as little as 0.35%.<sup>107</sup> This reflects their lower risk profile, but it could also be the result of Chinese government pressure on insurance companies to preserve lower rates.<sup>108</sup> Russian ships are also benefiting from lower premiums, which partly explains why two of the three countries whose vessels cross the Red Sea most frequently are China and Russia.<sup>109</sup>

### Impact on Ports

Most Red Sea ports have seen a decline in trade activity since the beginning of the crisis, particularly those in Egypt, Israel, Jordan and Saudi Arabia. Eritrean, Somali and Sudanese ports have also suffered from the crisis, but their already much smaller trade volumes limit the reverberations of such declines. The effects of the crisis on ports in Djibouti and Yemen have been mixed.



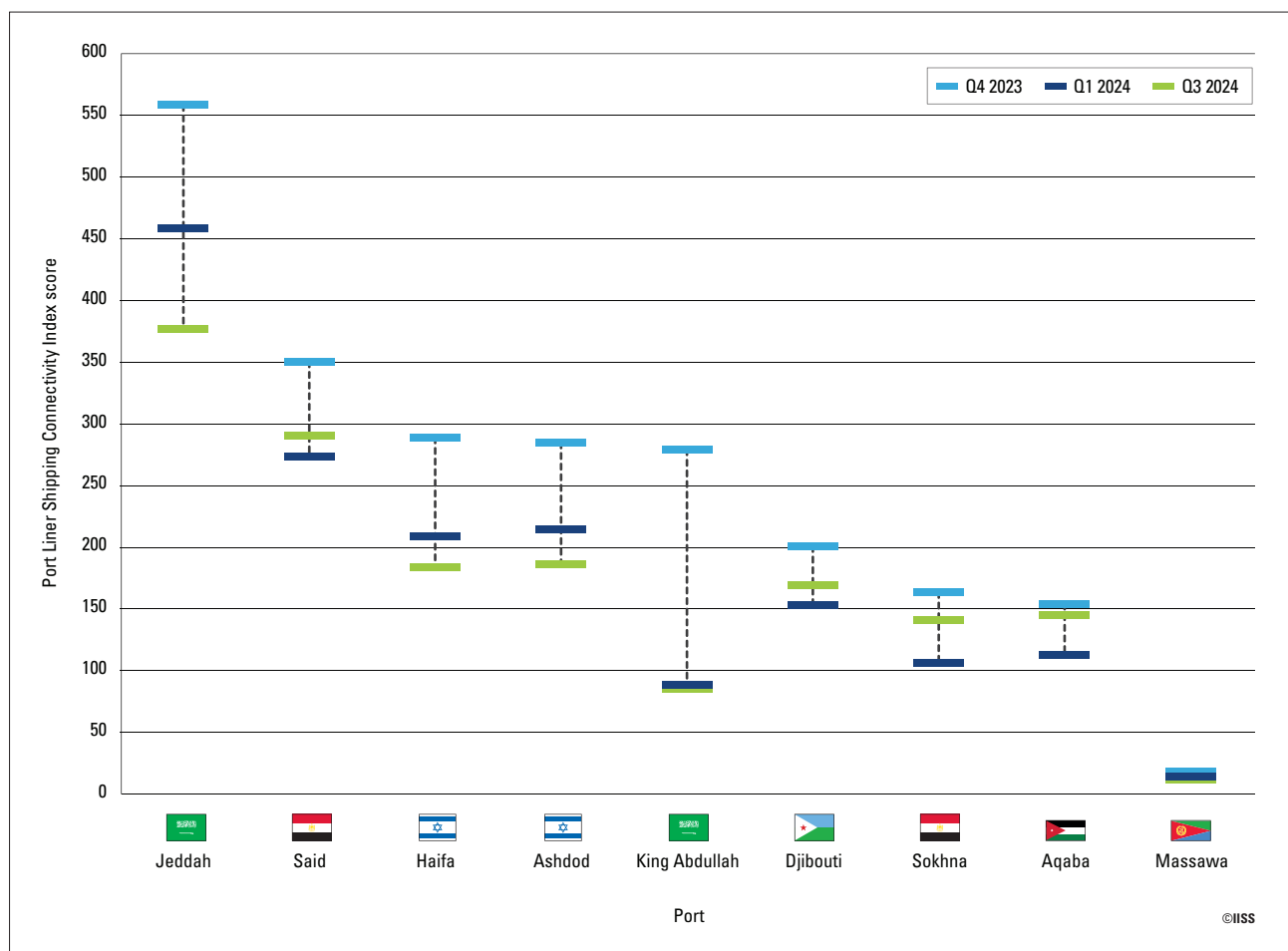
Acknowledging that there is not one single way to measure the impact on ports, this section looks not just at changes in port calls but also at a port connectivity index and cargo volumes, in order to offer several perspectives (see Figure 3.2 and Figure 3.3).

Figure 3.2 illustrates the degree of integration of selected Red Sea ports into global liner-shipping networks, and how that has changed, quarter by quarter, since the beginning of the crisis. While all ports suffered steep declines from Q4 2023 to Q1 2024 – especially King Abdullah Port (KAP), with a 70% decrease – there was a divergence in this trend from Q1 to Q3 2024 (per latest data available as of September 2024). In that period, there were significant connectivity improvements in the ports of Aqaba and Sokhna, minor improvements in the Port of Djibouti and Port Said, and little to no change in

KAP and the Port of Massawa. Two Israeli ports, Haifa and Ashdod, saw their connectivity scores continue to decline from Q1 to Q3 2024, while Jeddah Islamic Port suffered another major blow after its initial drop from Q3 2024 to Q1 2024.<sup>110</sup>

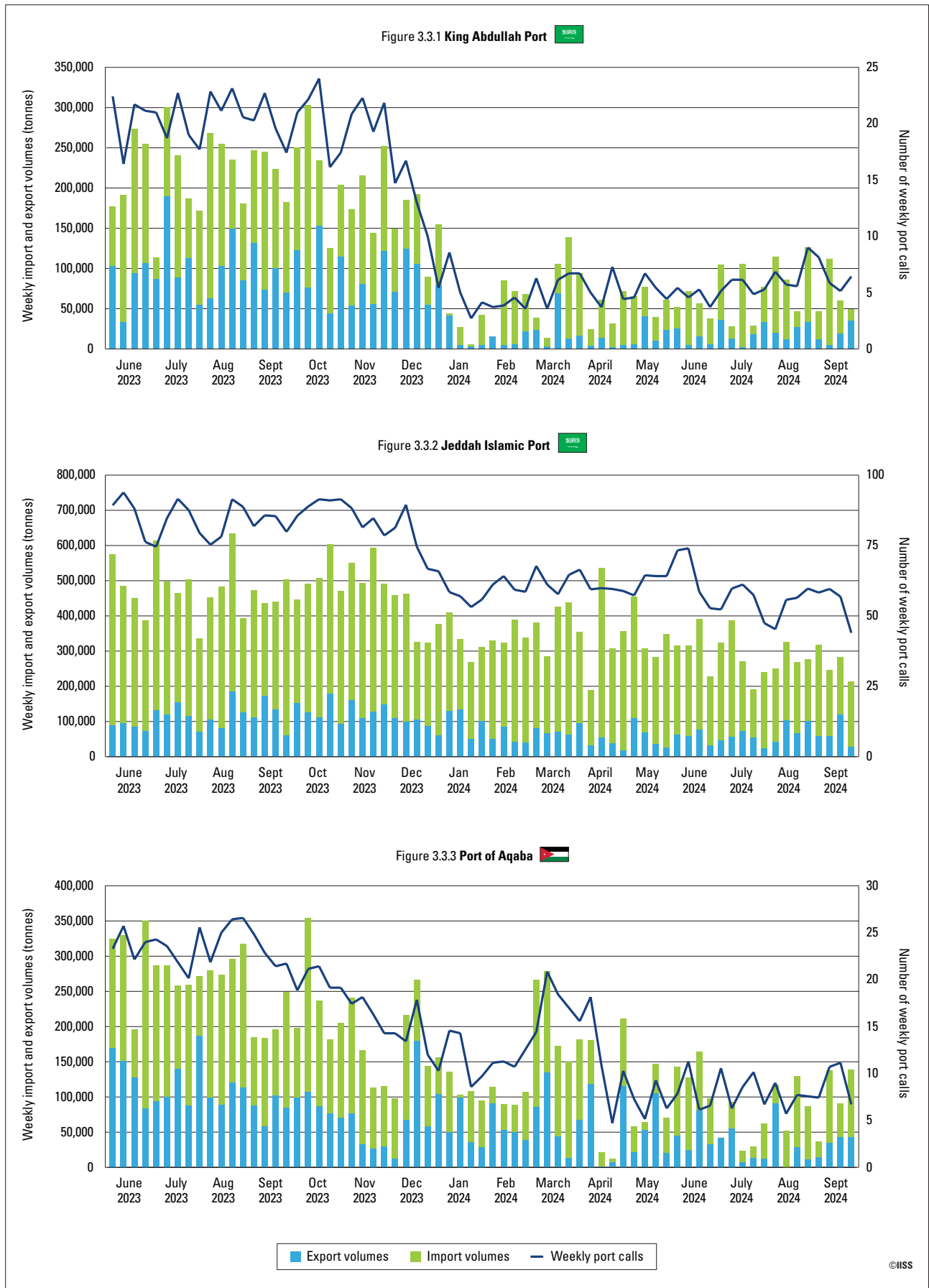
KAP, which was originally conceived as Saudi Arabia’s Red Sea port focusing on container-transshipment activities, has been one of the ports most heavily impacted by the diversions.<sup>111</sup> It suffered the steepest decline in the Port Liner Shipping Connectivity Index (PLSCI) of all the selected ports in proportional terms from Q4 2023 to Q3 2024, and Figure 3.3.1 illustrates that it has also seen a sharp fall in both export and import volumes, as well as port calls. Jeddah Islamic Port (Figure 3.3.2) has likewise experienced a steep decline in volumes and port calls, although comparatively less than KAP in proportional

Figure 3.2: Port Liner Shipping Connectivity Index: Changes in selected ports’ integration in global liner shipping networks, Q4 2023, Q1 2024 and Q3 2024



Note: Q4 2023 was the beginning of the crisis, Q1 2024 represents the aftershock, and Q3 2024 data is the most recent. Q2 2024 is omitted. The Port Liner Shipping Connectivity Index reflects a port’s integration into global liner shipping networks. A higher score denotes better connectivity. For more information about the methodology, see: <https://unctadstat.unctad.org/datacentre/reportInfo/US.PLSCI>. Source: UNCTADstat, <https://unctadstat.unctad.org>

Figure 3.3: Weekly export and import volumes and port calls in selected ports, June 2023–September 2024



Sources: IMF Port Watch, <https://portwatch.imf.org/>; United Nations Statistics Division, <https://unstats.un.org/bigdata/un-global-platform.cshhtml>

terms due to its much higher pre-existing levels of activity, and its lesser focus on transshipment. While port calls at Jeddah Islamic Port and KAP dropped 63% in Q1 2024 compared to 2023, Saudi authorities have been diverting trade flows to the King Abdulaziz Port of Dammam in the Gulf, which is handling record amounts of cargo.<sup>112</sup> Crude-oil exports from Saudi Arabia's northern Red Sea terminals have also increased since early 2024, reducing the need for its tankers to pick up oil in the Gulf to cross the Bab el-Mandeb.<sup>113</sup>

Aqaba, Jordan's only port, has also suffered from the crisis (Figure 3.3.3). Throughput fell by nearly half between November 2023 and February 2024, with potash exports – Jordan's main export, most of which is sent to Asia – being particularly affected.<sup>114</sup> This has forced Jordan to redirect some of its trade through land routes, and to exempt customs duties, among other measures, to reduce rising prices of imported goods.<sup>115</sup> Israel's war with Hamas and Hizbullah, and tensions in the West Bank, are adding even more pressure to Jordan's supply routes.

In Israel, traffic through the smaller Port of Eilat has completely stopped since January. It only accounts for 5% of Israeli trade, but due to the halt in activity, the port is reportedly laying off nearly half of its employees.<sup>116</sup> The ports of Haifa and Ashdod, though not in the Red Sea, have also been heavily impacted by the crisis, with Houthi attacks on Israel-bound ships likely being a key factor.<sup>117</sup> Israel's Mediterranean ports could potentially become an attractive target if Hizbullah decides to attack Israel's critical infrastructure.

Next door, several Egyptian ports – such as Port Said, Sokhna and Damietta – are seeing fewer containers transiting through their facilities; though Cairo's main concern is arguably the loss of Suez Canal revenues, a significant contributor to government revenues.<sup>118</sup> Short-term relief came in the form of combined pledges of over USD62bn from the EU, the IMF, the World Bank, Saudi Arabia, the UAE and the UK in 2024, giving Egypt some additional flexibility to deal with the crisis.

Traffic through Port Sudan, Sudan's main port, reportedly declined by up to 40% between the April 2023 outbreak of war in Sudan and January 2024, and has likely declined further since then.<sup>119</sup> The Red Sea crisis has forced humanitarian agencies to find

alternative routes to deliver critical aid to the country, resulting in freight costs increasing by more than 40% compared to pre-crisis levels.<sup>120</sup> In some cases, costs have reportedly increased eightfold for companies that switched from shipping aid by sea to air transport.<sup>121</sup> In addition to greater costs, this has resulted in major delays. Shipments that used to take one or two weeks now take months to reach Sudan. Alternative routes for aid shipments coming from Asia include flying them in from Kenya; circumnavigating Africa; or disembarking them at ports in the UAE, driving them across Saudi Arabia and then sending them to Sudan from Jeddah.<sup>122</sup>

Djiboutian ports appear to have benefited from the crisis in one respect, as many ships are dropping off cargo there. This cargo is then picked up by smaller feeder vessels, which are less likely to be targeted, and shipped into Red Sea ports.<sup>123</sup> This has led to significant increases in container handling at Doraleh, which could boost revenue by one-third to around USD600m in 2024.<sup>124</sup>

In Yemen, fuel and food imports via the Houthi-controlled ports of Hudaydah, Salif and Ras Issa between January and August 2024 increased by 11% and 16% respectively, compared to the same period in 2023.<sup>125</sup> This was likely a direct consequence of allowing Hudaydah to regain its business from Aden, as the former gradually reopened in late 2022 and early 2023.<sup>126</sup>

However, the World Food Programme (WFP) has said it is feeling the knock-on effects of the Red Sea crisis through increased shipping costs and delivery delays into Yemen.<sup>127</sup> Perhaps more concerning, Israel's July 2024 attack on the port of Hudaydah caused significant damage, leading to a subsequent decline in wheat imports and the redirection of most fuel ships to Ras Issa oil terminal. The WFP also stated that close to 800,000 litres of WFP-owned fuel stored for its on-demand services was destroyed in the airstrikes.<sup>128</sup> The subsequent attack on Ras Issa in September 2024, which destroyed four fuel tanks, could make it more difficult for the two Houthi-controlled ports to continue importing fuel.<sup>129</sup>

Beyond the Red Sea, the impact has been mixed. Port congestion has increased not just in the region but in ports across the world. Major container ships carrying

goods from Asia to northern European ports now stop to drop off and pick up cargo from container terminals in western Mediterranean ports, such as Tanger Med, Algeciras and Barcelona, from where the cargo is then redistributed to other Mediterranean ports via short-distance feeder services.<sup>130</sup> This increase in transshipment volumes, while positive, has also led to overflowing storage yards and longer waits for vessels in such ports. As most major container ships no longer venture into the Mediterranean, key transshipment hubs such as Piraeus, Gioia Tauro and Marsaxlokk have seen declines in vessel calls and container handling.<sup>131</sup>

Major ports in the Gulf, such as Hamad Port, Jebel Ali Port, King Abdulaziz Port in Dammam and Khalifa Port, have seen rising volumes on a year-on-year basis.<sup>132</sup> In Southern and East Africa, several ports have also picked up new business in bunkering and restocking services, benefiting from the increase in traffic of ships going around Africa. But they have also suffered from the disruption, as most East African countries rely on the Suez Canal as the key channel to European markets and suppliers.<sup>133</sup> For instance, an estimated 15% of Kenya's foreign trade by volume crosses the Suez Canal, while for Tanzania the figure is 10%.<sup>134</sup>

## **Mild Effects Globally, Heavily Felt Locally**

The impacts of the Red Sea crisis have been highly variable. Globally, its effects have not been as catastrophic as expected by some. Higher prices have not yet meaningfully affected inflation as of early November 2024. Increased port congestion and freight rates are unwelcome, but European and East Asian markets – affected by the diversions – are less vulnerable to slightly

higher prices than poorer regions. As carriers integrate diversions around Africa into their long-term planning, congestion should ease.<sup>135</sup> Record growth in the global container-ship fleet has limited the impact of diversions, which appear to be sustainable in the short term. However, a prolonged crisis in the Red Sea will likely magnify the impact of other potential disruptions around the world, such as in the Panama Canal, which reduced traffic due to a historic drought between mid-2023 and early 2024.

Regionally, however, the effects have been more notable. An IMF report estimates that prolonged Red Sea disruptions through to the end of 2024 could lead to an average 10% decline in exports and a 1% GDP loss for countries bordering the Red Sea.<sup>136</sup> Traffic has declined dramatically in several Red Sea ports, and higher import prices further threaten to destabilise already fragile countries like Egypt, Eritrea and Jordan, among others.

Within the Red Sea, some have weathered the crisis better than others. Surprisingly, Saudi Arabia has not experienced significant disruption. Most of its oil shipments go from the Gulf to Asia and do not take the Red Sea route, and the country has found alternative logistical arrangements to compensate for the declines in traffic through its Red Sea ports.<sup>137</sup> The viability of newly built ports and logistics parks springing up across the Red Sea – particularly in Saudi Arabia – could also be called into question, especially if the diversions around Africa because of the instability in the Bab el-Mandeb Strait become the new normal. Ultimately, the medium-to-longer-term impact will be determined by the duration of the attacks, the evolution of the conflict in Yemen and the decisions made by shipping companies.

## 4. Arms Smuggling to the Houthis

As discussed in the previous sections, the Houthis have significantly upgraded both the range and the precision of their weapons systems in their campaign against merchant ships in the Red Sea and the Gulf of Aden. While parts of their arsenal date back to pre-war stocks of the Yemeni Armed Forces – elements of which switched sides and joined the Houthis in 2014 – most of the group’s ageing Russian and Chinese weapons either have been used during the conflict with the Saudi-led military coalition or are by now no longer serviceable, even though they are still frequently displayed during Houthi military parades.<sup>138</sup> The Houthis have long maintained publicly that their newer weapons systems are local designs ‘made in Yemen’, rather than delivered from Iran or locally manufactured using Iranian technology. However, this claim was debunked in 2018 when UN sanctions experts found evidence of Iranian technology in ballistic missiles and UAVs used in attacks on Saudi Arabia.<sup>139</sup> This section provides an overview of known smuggling patterns employed by the Houthis and their allies for weapons, ammunition and components, as well as the measures taken by the international community to stop the proliferation of arms.

### The Early Years (2009–15)

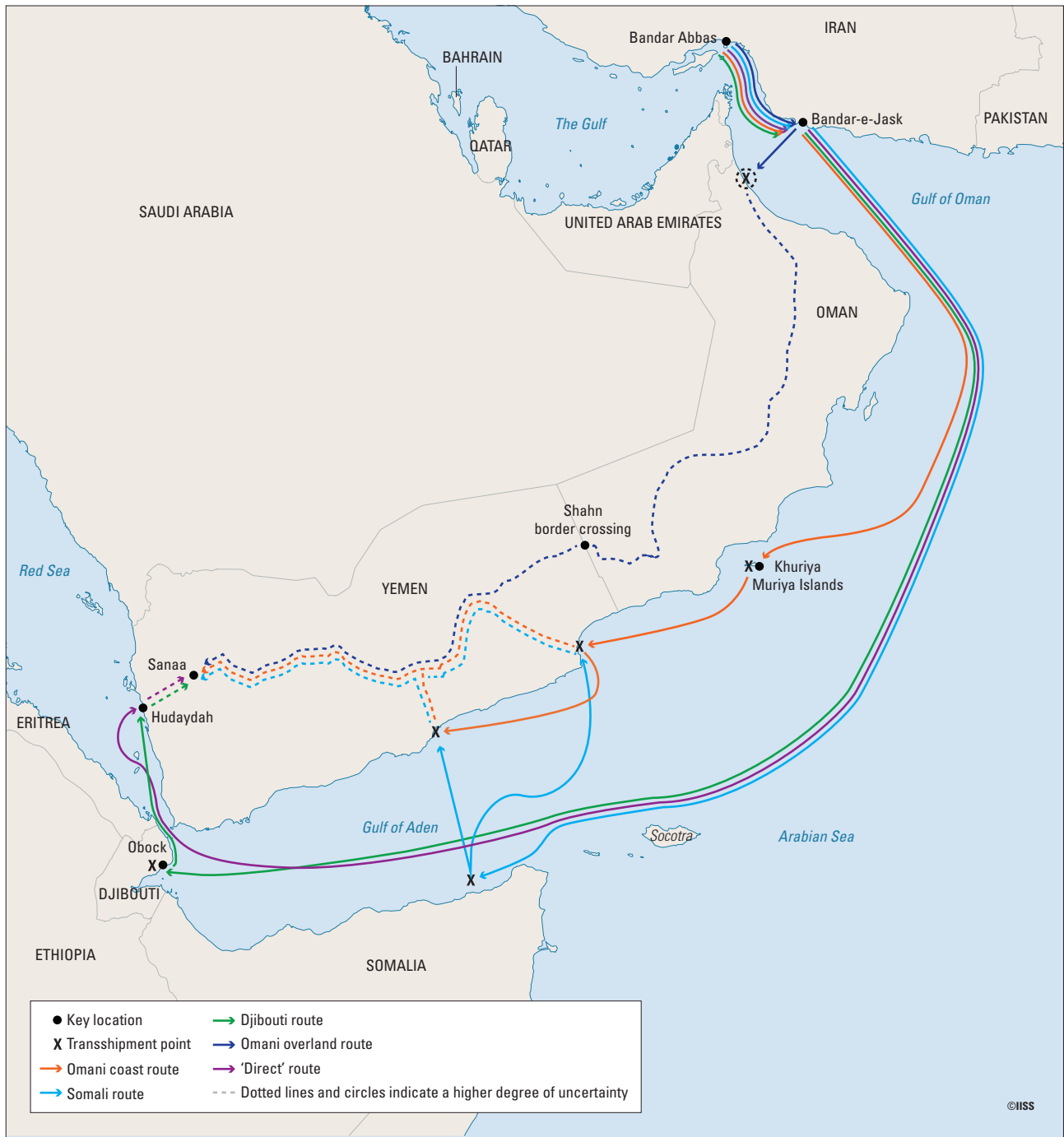
Evidence of Iran supplying weapons to the Houthis dates back to the period before the takeover of Sanaa when the group was engaged in the so-called ‘Saada Wars’, a series of military skirmishes with the government of president Ali Abdullah Saleh. There is some evidence that even during this early period, Lebanese instructors – likely from Hizbullah – were already present in Yemen, and limited numbers of weapons were being smuggled by small vessels from Iran to Yemen’s Red Sea coast.<sup>140</sup> Following the start of the Arab Spring, which saw the removal of president Saleh from office, contacts between the Houthis and other members of the Axis of Resistance intensified and more weapons were smuggled. The primary means of transportation were dhows: traditional wooden cargo ships which ply

their trade between the Indian subcontinent, the Gulf and the Horn of Africa, often operating from smaller ports and carrying a wide range of legal and illegal cargoes. Dhows are ideal for the smuggling of weapons in bulk as they usually operate without automatic identification system (AIS) transponders, can transship cargo in coastal waters to smaller boats, and can land on beaches. Ranging in size from small fishing boats to cargo vessels displacing several hundred tonnes, it has been estimated that there are more than 4,300 dhows sailing the Arabian Sea, operating in a largely unregulated environment.<sup>141</sup>

In January 2013, the US interdicted the dhow *Jihan-1*, which was carrying 40 tonnes of weapons, explosives and ammunition, partially concealed in cartons used for car spare parts, close to the Yemeni coast.<sup>142</sup> Interviews with the crew and the analysis of retrieved GPS data indicated that the crew first travelled from Yemen to Bandar Abbas in Iran, bypassing immigration procedures, and were subsequently transferred to another port, Bandar-Lengeh, where the dhow had already been loaded.<sup>143</sup> This pattern continued at least until 2022. There were partially destroyed labels on some of the seized ammunition boxes naming the ‘Ministry of Sepah’ as the origin.<sup>144</sup> Sepah is the Persian term for the Islamic Revolutionary Guards Corps (IRGC), which is the organisation understood to be in charge of supplying weapons, as well as training and technical advice, to non-state armed groups affiliated with the Axis of Resistance. However, the Ministry of Sepah was disbanded in the late 1980s when the IRGC was brought under joint command with Iran’s armed forces, indicating that some of the shipped material was quite old at the time of the smuggling.<sup>145</sup>

Following the Houthi takeover of Yemen’s capital Sanaa and the Red Sea coast in early 2015, the supply of arms temporarily became more overt, though details remain scarce. According to media reports, which have been confirmed by international experts, in early 2015 Iran sent at least one ship carrying 165–185 tonnes

Map 4.1: Key routes used for smuggling weapons into Yemen



Note: The depiction of each route is an approximation.  
 Source: IISS analysis

of weapons to the port of Salif.<sup>146</sup> This constituted a violation of UN Security Council Resolution 1747 (2007), which banned all Iranian transfers of weapons or related materials. It is possible that arms were also delivered to Yemen on flights that began operating between Tehran and Sanaa airport during this period. In March 2015, the first direct flight from Iran – operated by Mahan Air, an airline with links to

the IRGC – landed in Yemen.<sup>147</sup> While the Houthi-controlled aviation authorities agreed to 14 weekly flights on this route, it is not clear how many actually operated, nor what kind of cargo was transferred. On 26 March 2015, Saudi Arabia, leading a coalition of Arab nations, launched a military operation in support of the internationally recognised government of Yemen, which had been deposed by the Houthis.

This led to the closure of Yemeni airspace and a naval blockade of the Red Sea ports (both measures remained in force until early 2022). In April 2015, the UN Security Council imposed an arms embargo against the Houthis and their allies, which established a legal basis for member states to interdict shipments.<sup>148</sup> These measures forced the Houthis to return to the clandestine smuggling operations of previous years.

## Arms Smuggling During the 'Restoring Hope' Period (2015–22)

During the first years of *Operation Restoring Hope*, large parts of Yemen became battlegrounds. Yemeni militias supported by Saudi Arabia and the UAE fought against the Houthis in the north and the west of the country, and against al-Qaeda fighters who had used the security vacuum to carve out their own stronghold centred on the port city Mukalla in Hadramawt.<sup>149</sup> Little is known about arms-smuggling patterns during this period, despite the capture between September 2015 and March 2016 of four dhows carrying small arms and light weapons by international warships operating under the umbrella of the Combined Maritime Forces. Investigations by the UN determined that they were bound for the Somali coastline and that their cargo would then be transhipped to smaller dhows going to Yemen, likely in an attempt to obscure the route.<sup>150</sup> In Yemen, the dhows would offload their goods at different locations on the country's long Gulf of Aden coastline, primarily in Hadramawt and Mahra, areas which were at least nominally under the control of the internationally recognised government.<sup>151</sup> From there, they would be smuggled across the desert to Houthi-held territory.<sup>152</sup> Out of a total of 20 dhows that were intercepted by various nations between 2013 and 2024 carrying weapons, ammunition or related items, and whose cargo was likely at least in part bound for the Houthis, 14 were following this route.<sup>153</sup> However, with the exception of the last seizures (discussed below), their cargo was limited to small arms, light weapons and ammunition of Chinese, Russian and Iranian origin. More advanced weapons systems such as missiles or their components were not transported via this route.

Until late 2019, most of the information regarding the Houthi arsenal came from the exploitation of missiles

and UAVs which had been used in attacks on targets in Saudi Arabia. While there was strong evidence of the Iranian origin of some of the weapons systems and investigators were able to trace the chain of custody of some of the Western components, there was little information indicating how the arms were transferred to the Houthis.<sup>154</sup> UN and other international experts also had access to some of the arms seized by Saudi Arabia and its allies during military operations in Yemen, but in many cases the location and circumstances of the seizures remained unclear.<sup>155</sup> In some cases, the details of seizures were deliberately kept undisclosed, presumably to avoid damaging fragile political relations, such as when, in 2018, a container filled with ballistic-missile components was allegedly stopped in an Omani port after the intervention of a foreign security agency, then swiftly returned to Iran. The shipping company and the Iranian vessel carrying the container – the *Genaveh-12* (IMO: 9776523) – were later sanctioned by the US government, and people directly involved with the matter have confirmed the incident. The lack of publicly available information, however, makes it difficult to assess how active this route was and how the container was supposed to be moved onwards from Oman to Houthi-held territory.<sup>156</sup>

The existence of a second smuggling route involving transshipment in Omani territorial waters was confirmed by two further interdictions in the Gulf of Aden by the US Navy in November 2019 and February 2020. The seized cargo included parts for *Quds* (Project 351/*Paveh*)-type cruise missiles, the C802 anti-ship cruise missile and the *Saqr* (Project 358) surface-to-air missile. It also included various other components for UAVs and USVs, almost 14,000 non-electric detonators and 21 anti-tank guided missiles, which UN experts assessed to be the Iranian version of the 9M133 *Kornet*.<sup>157</sup> Interestingly, the cruise missiles found on the dhows were shipped in sections, rather than as complete systems, and so would require assembly at their destination. Evidence of a similar pattern had been observed in the debris of ballistic missiles used in attacks on Saudi Arabia. The missiles were composed of sections that had been crudely welded together, indicating that, at least at that time, ballistic missiles were smuggled to Yemen in parts rather than manufactured locally.<sup>158</sup>

While it remains unclear how those components were transferred to the Houthis, another puzzle concerns the production of the fuel for their missile programme. In 2017, Emirati forces seized industrial storage and mixing equipment on the main road to Marib, though the precise circumstances of the operation remain unclear. UN experts found traces of TM-185 – a kerosene mix used as a propellant – on the equipment, as well as the possible residue of inhibited red fuming nitric acid, which is used as an oxidiser in many liquid-fuel ballistic missiles.<sup>159</sup> Several of the components identified in the equipment were either manufactured in Iran or could be traced to exports to Iran.<sup>160</sup> This is further evidence that *Scud*-type ballistic missiles used by the Houthis during that period were assembled from parts and that the fuel was manufactured in Houthi-held territory. The Houthis also increased their use of solid-propellant ballistic missiles – starting with the *Badr-1P* – during that period, raising the question of how solid-propellant motors and propellants were being produced in Yemen. With regard to the latter, a series of seizures of dhows in the Arabian Sea in 2021 and 2022 provided an important clue. The dhows carried large quantities of chemicals labelled ‘urea fertiliser’, a commodity whose import to Houthi-held territory had been banned by the internationally recognised government, but which in practice had been tolerated due to its agricultural use. The same crews and dhows involved in smuggling weapons to the Houthis were also involved in the urea trade, and subsequent chemical analysis showed that some of the ‘fertiliser’ was ammonium perchlorate, the most common oxidizer for solid-propellant ballistic missiles. According to interviews conducted with the dhow crews following their arrests, they had picked up the cargo from a port in Iran and were bound for the port of Obock in Djibouti, from where the chemicals were to be transhipped to smaller vessels bound for Houthi ports on the Red Sea.<sup>161</sup>

Another smuggling route significant during that period was the land border with Oman. Unlike the border with Saudi Arabia, which became heavily militarised during *Operation Restoring Hope*, the border with Oman, whose government has remained neutral during the conflict, has stayed open for both people and goods. As a result, the country has become the main overland

transit hub for Yemen, including for weapons and related parts, as well as for the smugglers themselves, who usually travel by road to Oman and then take commercial planes to Iran.<sup>162</sup> Given its strategic location, it seems surprising that there weren’t many seizures on Omani soil, however, a number of shipments were intercepted either shortly before arriving in Oman or on the Yemeni side of the border, coming from Oman.<sup>163</sup> Examples of the former include the interception by the UK navy of three Iranian speedboats during a 13-month period between January 2022 and February 2023. The speedboats were smuggling ballistic- and cruise-missile components, as well as 9M133 anti-tank guided missiles and other equipment from Iran, towards the Omani coastline.<sup>164</sup> While it is unclear who in Oman was the intended recipient of the weapons or how the cargo would have been transported onwards to the Houthis, analysis of GPS coordinates retrieved from some of the seized equipment showed that they had been at an IRGC facility in Tehran prior to their transfer to the boat.<sup>165</sup>

While some sophisticated weapons have been seized on the Yemeni side of the border – including 52 9M133 anti-tank guided missiles concealed in electrical generators in March 2022 – most of the interdicted items travelling along that route have been dual-use goods, especially engines and servo actuators for Houthi UAVs and USVs, which usually originate from China and Japan.<sup>166</sup> Investigations by UN experts show that dual-use items are shipped – either directly from the manufacturing countries, or in some cases via intermediaries in China – to Omani companies, which then organise their onward transportation to Yemen, indicating the presence of a separate smuggling route which does not pass through Iranian territory.<sup>167</sup> The distance from the Omani border to Houthi-controlled territory in Yemen is more than 1,000 km. The area is under the control of the internationally recognised government and vehicles need to pass through a number of military checkpoints. The fact that illicit goods, including arms and dual-use items, continue to be transported on this route, concealed under commercial cargo, points towards problems with the capacity of the local security forces to detect and identify items, and also corruption, which stems in part from the chronically late payment of government salaries.<sup>168</sup> These issues could also explain why there



were several cases of attempted smuggling, mostly of detonators, precursor chemicals and other components, through the government-controlled Aden container port prior to 2022, when the Houthi-controlled ports on the Red Sea started to receive containers again.<sup>169</sup>

## Throwing the Gates Wide Open (2022–24)

The signing of the UN-mediated truce agreement between the Houthis and Saudi Arabia and its Yemeni allies in April 2022 significantly changed the dynamics in Yemen. As a military solution remained elusive and the financial and reputational costs began to mount, *Operation Restoring Hope* ran out of steam, which had seemed an increasingly likely outcome since the Stockholm Peace Agreement of December 2018. Riyadh and Abu Dhabi were increasingly looking for ways to disengage militarily from Yemen and pressured the internationally recognised government, which relies heavily on their assistance, to offer concessions to the Houthis.<sup>170</sup> These included opening the Houthi-controlled airport in Sanaa to limited commercial flights, and, crucially, removing restrictions on what kinds of goods could be transported to the Red Sea ports of Hudaydah and Salif. These developments, while undoubtedly a relief for the population living under Houthi rule, created new opportunities for smuggling and created serious challenges for sanctions enforcement.

While the international arms embargo remained in place and all commercial ships bound for Houthi-controlled ports were still obliged to undergo inspection by the UN Verification Mechanism (UNVIM) in Djibouti prior to proceeding to Yemen, it appears that Saudi Arabia removed its naval assets from the approaches to the ports at some point in 2022 without any public announcement.<sup>171</sup> With the risk of Saudi and Emirati airstrikes gone, the Houthis began to openly showcase their growing arsenal of sophisticated weapons in a number of large military parades in both Hudaydah and

Sanaa. There is a growing body of evidence – including analysis of AIS data, satellite images, media reports and expert interviews – suggesting that between October 2023 and May 2024, at least five large cargo vessels travelled directly from Iran to the Houthi ports without first receiving clearance.<sup>172</sup> While there is no verifiable information regarding the cargo carried by these ships, it seems very likely that they were carrying weapons and related items, which could explain the surprising number and quality of ballistic- and cruise-missile systems employed by the Houthis during their campaign against commercial ships in the Red Sea and the Gulf of Aden.

While the return of larger cargo ships potentially carrying arms to the Red Sea is a new development, this does not mean that the established pattern of smuggling by dhow from Iran to the Houthis via Somalia has stopped altogether. This was evidenced by the seizure of two dhows by the US military in January 2024, at least one of which was interdicted close to the Somali coastline.<sup>173</sup> Interestingly, unlike in previous dhow seizures, the cargo of one of the ships included ballistic-missile engines. This was only the second time that an interdiction involving a seizure of ballistic-missile components had been publicly announced.<sup>174</sup> No further seizures have been reported since January 2024, which is surprising given that the frequency of missile, UAV and USV attacks in the Red Sea and the Gulf of Aden would suggest that the Houthis need to replenish their stocks frequently. While the Israeli attacks on Hudaydah did significant damage to the fuel depot and a power station (see Section One), the port remains operational and both bulk carriers and container ships continue to arrive, indicating that they did little to deter the smuggling of weapons. As long as the approaches to the Houthi-controlled Red Sea ports are not effectively patrolled and ships can berth there without going through the UNVIM clearance procedure, the gates to Houthi-controlled Yemen remain wide open.

# Conclusion

After twelve months of attacks by the Houthi forces on merchant ships in the Red Sea and the Gulf of Aden, it is possible now to review their impact on the region, as well as whether the response by the international community has been adequate in containing and resolving the threat. In doing so, a number of strategic conundrums have become apparent:

- Despite the military superiority of the forces involved, neither the attacks carried out under *Operation Poseidon Archer* nor those by the Israeli Air Force have seriously degraded the capability of the Houthis to launch attacks, nor to smuggle weapons from Iran and other countries. In addition to showing the limitations of operating without ground forces, this is a result of Yemen's rugged geography; the Houthis' experience in concealing their positions; and concerns about the operations' humanitarian impact, which have so far prevented larger-scale attacks on port facilities in Houthi-controlled areas.
- The defensive actions of *Operation Prosperity Guardian* and EUNAVFOR *Aspides* – while undoubtedly having saved the lives of civilian sailors – have failed to reassure the international shipping industry sufficiently for traffic in the Red Sea to return to pre-November 2023 levels. Mandated with protecting the freedom of navigation, the participating nations' need to maintain significant naval assets in the region is a serious burden. This is particularly true for the EU and its member states, whose navies are already overstretched.<sup>175</sup> Adding to this, the cost of depleting expensive weapons systems to defend against the more cheaply manufactured Houthi missiles and UAVs raises the question of how long the current missions can be sustained.<sup>176</sup>
- In terms of economic impact, it is the littoral countries of the Red Sea, in particular Egypt, that are most affected by ship diversions. At the same time, with the exception of Israel, these countries have been largely passive during the current crisis. The fact that the Houthis claim to be acting in solidarity with the Palestinians in Gaza, a popular cause in the Arab world, puts their governments in a difficult position. Having already suffered the reputational damage and economic toll of leading a military coalition during *Operation Restoring Hope*, Riyadh in particular is keen to maintain the current truce with the Houthis and to protect its own territory and ships from further attacks.
- The international arms embargo that has been in place against the Houthis since 2015 has demonstrably failed to prevent them from obtaining increasingly advanced weapons from Iran and other sources. Although the embargo was reasonably successful in raising the transaction costs of arms supplies until the truce of April 2022, some of Yemen's neighbours made little effort to enforce it, and the removal of effective naval deterrence measures on smuggling to Houthi-controlled Red Sea ports opened the gates for direct supplies. Meanwhile, the paralysis of the UN Security Council with regard to Yemen means that more effective measures, such as secondary sanctions on the IRGC, are extremely unlikely.
- Within Yemen, the attacks against Israeli and Western shipping have significantly strengthened the political position of the Houthis, despite their limited effect in military terms. Perversely, the aerial attacks on targets in Yemen, which have claimed dozens of lives, have strengthened regime coherence in Houthi-controlled areas and strengthened the group's narrative as the champion of the Arab world in the struggle against the US, Israel and their allies. The attacks have allowed the Houthis to divert attention from their failure to provide public services in the areas under their control, a strategy they employed successfully during the war against Saudi Arabia and its allies.

- Meanwhile, the Houthis have also improved their reputation in the region and have positioned themselves as the de facto government of Yemen. Reflecting their desire for recognition, the Houthis have occasionally been willing to show restraint and to cooperate with the international community – for example, during the salvage operation for the oil-product carrier *MV Sounion* (IMO: 9312145), which had been hit by Houthi attacks in August 2024. The Houthis did not interfere with efforts to salvage the ship, which was at risk of breaking up and causing a large oil spill in the Red Sea, which would have affected the fishing and tourism industries across the region. Such instances have convinced many leaders of the Gulf states, as well as some policymakers in the West, that the Houthis are rational actors who they can engage with.
- While UN-supported talks between the parties drag on and the EU, UK and US are engaged in limited military operations against the Houthis, there appears to be no accompanying political or economic strategy. Attempts in mid-2024 to increase economic pressure on the Houthis (by using the Central Bank of Yemen in Aden to limit their access to the international banking system) were swiftly revoked over fears that this might rekindle the war inside Yemen. Western governments remain focused on improving the humanitarian situation in the country and normalising their relationships with the Houthis, ultimately paving the way to a (likely Houthi-led) government of national unity.
- Within the network of Iran’s allies, the position of the Houthis has strengthened over the last year as they outperformed expectations regarding both their political resolve and military prowess. It remains to be seen how this will change the

group’s position within the Axis of Resistance and whether Tehran will be able to maintain its significant degree of influence in Yemen. Much will depend on how the current round of the conflict between Israel and Iran and its allies in the Levant ends. The Houthis have demonstrated their ambition to conduct their own foreign policy beyond the region through diplomatic contacts with Russia and China, which hints at the possibility of a more independent – but certainly not more pro-Western – position in the future.

One year after the start of the Houthi attacks, it seems clear that the current approach taken by the international community in addressing the challenge has failed to achieve its goal. Limited military action alone is not enough to reassure shipping lines sufficiently for traffic to return to pre-crisis levels. Meanwhile, there is apparently still no political strategy in Western capitals for containing the ambitions of the Houthis both within Yemen and in the region. Regardless of whether the Houthis will indeed cease their attacks on Western ships once the fighting in Gaza ends, the developments of the last year have shown that they will continue to exploit their ability to threaten international sea lanes in order to extract concessions, much as they did between 2017 and 2022 with ships belonging to Saudi Arabia and the UAE.

In light of the mounting costs of the deployments and competing demands for military assets, as well as the passivity of regional powers, Western capitals need to urgently assess the level of priority they allocate to freedom of navigation in the waters around Yemen. Depending on the outcome of this assessment, there will be a need either to develop a coherent strategy to address the Houthi threat or to disengage from the theatre, rather than maintain the status quo.

## Notes

- 1 See Luca Nevola, 'Beyond Riyadh: Houthi Cross-border Aerial Warfare 2015–2022', *Armed Conflict Location and Event Data (ACLED)*, 17 January 2023, <https://acleddata.com/2023/01/17/beyond-riyadh-houthi-cross-border-aerial-warfare-2015-2022/>.
- 2 United Nations, 'Final Report of the Panel of Experts on Yemen', S/2018/594, 26 January 2018, <https://undocs.org/en/S/2018/594>.
- 3 See International Institute for Strategic Studies, *Iran's Network of Influence in the Middle East* (London: IISS, 2019), <https://www.iiss.org/publications/strategic-dossiers/iran-dossier/>.
- 4 'UAE Says It Blocked Drone Attack, Shadowy Group Claims Responsibility', *Reuters*, 3 February 2022, <https://www.reuters.com/world/middle-east/uae-says-it-destroyed-3-drones-that-penetrated-its-air-space-wednesday-2022-02-02/>.
- 5 Hannah Porter, 'Houthi Propaganda Finally Reaches Global Audiences', *Italian Institute for International Political Studies*, 15 February 2024, <https://www.ispionline.it/en/publication/houthi-propaganda-finally-reaches-global-audiences-163934>.
- 6 Emanuel Fabian, 'Israel Strikes Houthi-controlled Port in Yemen After Deadly Drone Attack on Tel Aviv', *Times of Israel*, 20 July 2024, <https://www.timesofisrael.com/israel-strikes-houthi-controlled-port-in-yemen-after-deadly-drone-attack-on-tel-aviv/>.
- 7 See Prevail Partners, 'Uncharted Waters: A Retrospective Look at The Hijack of The MV Galaxy Leader', 24 January 2024, <https://www.prevail-partners.com/uncharted-waters-a-retrospective-look-at-the-hijack-of-the-mv-galaxy-leader/>.
- 8 See See مالمعلا [Yemeni War Media] (@MMY1444), post to X, 25 July 2024, <https://x.com/MMY1444/status/1816546986440687892>.
- 9 Mallory Shelbourne, 'USS Thomas Hudner Repels Drone Launched from Yemen', *United States Naval Institute (USNI) News*, 15 November 2023, <https://news.usni.org/2023/11/15/uss-thomas-hudner-repels-drone-launched-from-yemen>.
- 10 'Houthi Strikes, Red Sea Shipping and Yemen's War', *Hold Your Fire!* podcast, 28 June 2024, <https://open.spotify.com/episode/7IRcReux9nZ5OlBezoVUIF>.
- 11 *Armed Conflict Location and Event Data (ACLED)*, <https://acleddata.com/>; and 'Houthi Strikes, Red Sea Shipping and Yemen's War', *Hold Your Fire!* podcast.
- 12 US Department of Defense, 'Statement from Secretary of Defense Lloyd J. Austin III on Ensuring Freedom of Navigation in the Red Sea', 18 December 2023, <https://www.defense.gov/News/Releases/Release/Article/3621110/statement-from-secretary-of-defense-lloyd-j-austin-iii-on-ensuring-freedom-of-n/>.
- 13 European External Action Service (EEAS), 'EUNAVFOR Operation ASPIDES', 19 February 2024, [https://www.eeas.europa.eu/eeas/eunavfor-operation-aspides\\_en?s=410381](https://www.eeas.europa.eu/eeas/eunavfor-operation-aspides_en?s=410381).
- 14 US Department of Defense, 'Statement by Secretary of Defense Lloyd J. Austin III on Coalition Strikes in Houthi-controlled Areas of Yemen', 3 February 2024, <https://www.defense.gov/News/Releases/Release/Article/3665867/>.
- 15 UK House of Commons Library, 'UK and International Response to Houthis in the Red Sea 2024', 30 July 2024, p. 6, <https://researchbriefings.files.parliament.uk/documents/CBP-9930/CBP-9930.pdf>.
- 16 'Kalimah as-sayid al-qa'id 'Abdulmalik Badr ad-Din al-Houthi fi tadshin al-zikra as-sanawiya lil-shahid' يف يشو حلا نيدل ارب لفل مالدب ع دئ اقل ديسلا تمك م 2023–1445 ديشلل فيونسل ايركذلا نيشدت [(Text + video) speech of Sayyid leader Abdul-Malik Badr al-Din al-Houthi at the inauguration of the annual anniversary of the martyr 1445 AH – 2023 AD], *Al-Masirah*, 14 November 2023, <https://www.masirahtv.net/post/243236/>.
- 17 Yahya Sare'e (@Yahya\_Saree), post to X, 9 December 2023, [https://x.com/Yahya\\_Saree/status/1733537821120487850](https://x.com/Yahya_Saree/status/1733537821120487850).
- 18 يشو حلا يل ع دمحم [Mohammed Ali Al-Houthi] (@Moh\_Alhouthi), post to X, 9 December 2023, [https://x.com/Moh\\_Alhouthi/status/1733537300024348703?s=20](https://x.com/Moh_Alhouthi/status/1733537300024348703?s=20).
- 19 'Houthi Strikes, Red Sea Shipping and Yemen's War', *Hold Your Fire!* podcast.
- 20 On 9 January 2024, the Houthis claimed their first attack on a US warship, which was 'providing support to the Zionist entity'. This was as a response to a previous US attack on Houthi forces. However, the third phase can be understood to have begun on 18 January, with Abdul-Malik al-Houthi's televised address and following the first US and UK strikes. عيسر يي ح ي ديمعلا [Yahya Sare'e] (@army21ye), post to X, 10 January 2024, <https://x.com/army21ye/status/1745053062161482147>.

- 21 'Kalimah as-sayyid al-qa'id 'Abdulmalik Badr ad-Din al-Houthi houla akher at-tatawurat fi al-mantaqah' رځاً لوح يشو حلا نيدلا رذب لفلما ادب ع دئاقلا ديسلا قملك  
م 18-01-2024 - 1445 هـ جر 07 قطنملا يف تاروطنتلا  
[(Text + video) speech of Sayyid leader Abdul-Malik Badr al-Din al-Houthi on the latest developments in the region 7 Rajab 1445 AH 18 January 2024 AD], Al-Masirah, 18 January 2024, <https://www.masirahtv.net/post/246345/>.
- 22 Armed Conflict Location and Event Data (ACLED), <https://acleddata.com/>.
- 23 Ameen Hayyan (@ameenhayan), post to X, 3 May 2024, <https://x.com/ameenhayan/status/1786390416369021404>.
- 24 On 14 March 2024, Abdul-Malik al-Houthi threatened to ban ships passing through the Indian Ocean, warning that 'we also plan ... to prevent [the passage of ships fitting the declared targeting criteria] even through the Indian Ocean'. This is understood to have been implemented on 27 March 2024, with the Houthis' attack on the *MSC Orion* 300 nautical miles southeast of the Horn of Africa. See 'Kalimah as-sayyid al-qa'id houla akhir at-tatawurat wa al-mostajidat 'ala as-sa'id al-felastini wa ad-duali' دي عصللا ىل ع تادجستسمل او تاروطنتلا رځاً لوح دئاقلا ديسلا قملك  
م 2024 سرام 14 هـ 1445 ناضم 4 يلودلا وينيطسلفلا  
[(Text + video) speech by the leader on the latest developments and events in Palestine and internationally 4 Ramadan 1445 AH 14 March 2024 AD], Al-Masirah, 14 March 2024, <https://www.masirahtv.net/post/249462/>; and Robert Wright, 'Houthis Extend Attacks on Shipping to Wider Indian Ocean', *Financial Times*, 1 May 2024, <https://www.ft.com/content/778a80ao-1f55-4ffc-ade0-857bd5bd9b92>.
- 25 'Kalimah as-sayyid al-qa'id 'Abdulmalik Badr ad-Din al-Houthi bisha'n al-'adwan al-Isra'ili 'ala al-Yaman' يشو حلا نيدلا رذب لفلما ادب ع دئاقلا ديسلا قملك (ويديف+صن)  
م 21 هـ 1446 جر 15 نميلا ىل ع يلى يئارسالا ناودعلا نأشب  
م 2024 ويلوي  
[(Text + video) speech of Sayyid leader Abdul-Malik Badr al-Din al-Houthi regarding the Israeli aggression on Yemen 15 Muharram 1446 AH 21 July 2024 AD], Al-Masirah, 21 July 2024, <https://www.masirahtv.net/post/255626/>.
- 26 Ameen Hayyan, post to X, 3 May 2024.
- 27 'Kalimah as-sayyid al-qa'id 'Abdulmalik Badr ad-Din al-Houthi houla akher at-tatawurat wa al-mostajidat al-iqlimiyah' رځاً لوح يشو حلا نيدلا رذب لفلما ادب ع دئاقلا ديسلا قملك  
ةيميلقلا تادجستسمل او تاروطنتلا  
[(Text + video) speech of Sayyid leader Abdul-Malik Badr al-Din al-Houthi on the latest regional developments and events 8 Dhu al-Qi'dah 1445 AH 16 May 2024 AD], Al-Masirah, 16 May 2024, <https://www.masirahtv.net/post/252694/>.
- 28 MESARIC, 'Yemen: Ansar Allah Escalation', 3 July 2024.
- 29 RiskIntelligence, 'Security Threat Update: Red Sea/Gulf of Aden', 3 July 2024, p. 9.
- 30 Although the vast majority of interceptions were by warships as part of *Operation Prosperity Guardian* and EUNAVFOR *Aspides*, a few were carried out by armed security teams aboard ships.
- 31 Robert Wright, 'Houthis Extend Attacks on Shipping to Wider Indian Ocean'.
- 32 'Kalimah as-sayyid al-qa'id 'Abdulmalik Badr ad-Din al-Houthi houla akhir at-tatawurat wa al-mostajidat 'ala as-sa'id al-felastini wa ad-duali' ىل ع تادجستسمل او تاروطنتلا رځاً لوح دئاقلا ديسلا قملك (ويديف+صن)  
م 2024 سرام 14 هـ 1445 ناضم 4 يلودلا وينيطسلفلا دي عصللا  
[(Text + video) speech of the leader on the latest developments and events on the Palestinian and international levels 4 Ramadan 1445 AH 14 March 2024 AD], Al-Masirah; 'Kalimah as-sayyid al-qa'id 'Abdulmalik Badr ad-Din al-Houthi houla akher at-tatawurat fi al-mantaqah' رځاً لوح يشو حلا نيدلا رذب لفلما ادب ع دئاقلا ديسلا قملك  
م 18-01-2024 - 1445 هـ جر 07 قطنملا يف تاروطنتلا  
[(Text + video) speech of Sayyid leader Abdul-Malik Badr al-Din al-Houthi on the latest developments in the region 7 Rajab 1445 AH 18 January 2024 AD], Al-Masirah; Ameen Hayyan, post to X, 3 May 2024; and Raffi Berg, 'Israeli Man Killed in Drone Attack on Tel Aviv', *BBC News*, 19 July 2024, <https://www.bbc.com/news/articles/co6kdk6zo8lo>.
- 33 Union of Greek Shipowners, 'The International Perspective', <https://www.ugs.gr/en/greek-shipping-and-economy/greek-shipping-and-economy-2024/the-international-perspective/>.
- 34 Eugene Kogan, 'Israeli-Greek Naval, Air Force and Defence Industry Cooperation', *Austria Institut für Europa und Sicherheitspolitik (AIES)*, 7 June 2021, <https://www.aies.at/download/2021/AIES-Fokus-2021-10.pdf>.
- 35 IISS, based on data compiled by Armed Conflict Location and Event Data (ACLED), <https://acleddata.com/>.
- 36 All interceptions from this date are considered, even though the naval missions were formally established at later points.
- 37 IISS, based on data compiled by Armed Conflict Location and Event Data (ACLED), <https://acleddata.com/>.

- 38 December 2023 was the first month in which Houthi attacks on ships took place throughout the month.
- 39 'Yemen Situation Update: January 2024', Armed Conflict Location and Event Data (ACLED), 5 February 2024, <https://acleddata.com/2024/02/05/yemen-situation-update-january-2024/>; and Armed Conflict Location and Event Data (ACLED), <https://acleddata.com/>.
- 40 IISS, based on data compiled by Armed Conflict Location and Event Data (ACLED), <https://acleddata.com/>.
- 41 Armed Conflict Location and Event Data (ACLED), <https://acleddata.com/>.
- 42 Wolf-Christian Paes and Hasan Alhasan, 'Fireworks over Hudaydah: Assessing the Strategic Impact of Israel's Attack', IISS, 2 August 2024, <https://www.iiss.org/en/online-analysis/online-analysis/2024/08/fireworks-over-hudaydah-assessing-the-strategic-impact-of-israels-attack/>.
- 43 Armed Conflict Location and Event Data (ACLED), <https://acleddata.com/>.
- 44 Maziar Motamedi, 'Israel Hits Yemen's Infrastructure Again: What We Know and Why It Matters', Al-Jazeera, 30 September 2024, <https://www.aljazeera.com/news/2024/9/30/israel-hits-yemens-infrastructure-again-what-we-know-and-why-it-matters>; and 'Israel Strikes Houthi Targets in Yemen, Killing at Least Four People', Reuters, 29 September 2024, <https://www.reuters.com/world/middle-east/israel-launches-strikes-yemeni-houthi-targets-2024-09-29/>.
- 45 Fabian Hinz, 'Houthi Anti-ship Missile Systems: Getting Better All the Time', IISS, 8 January 2024, <https://www.iiss.org/en/online-analysis/military-balance/2024/01/houthi-anti-ship-missile-systems-getting-better-all-the-time/>.
- 46 Interviews with Western officials, 2024.
- 47 'Sepah az toulid-e mushak-e balistik baraye hamle be shenavarha khabar dad'  
داد ربخ اروانش هب لمح یارب یدیج کیستل لب کشوم دیلوت زا هاپس  
[The IRGC announced the production of a new ballistic missile to attack vessels], Radio Farda, 7 February 2011, [https://www.radiofarda.com/a/f11\\_iran\\_new\\_missile\\_persian\\_gulf/2300347.html](https://www.radiofarda.com/a/f11_iran_new_missile_persian_gulf/2300347.html).
- 48 'Sho'a'-e dayere-ye khatar baraye shenavarha-ye Amrikayi bishtar shod Zolfaghar-e Basir ra bishtar beshenasid'  
دش رتشیب یی اکیرم آ ی اروانش یارب رطخ هر یاد غاغش  
دیسانش ب رتشیب از "ریصب راقفل اوذ"  
[The radius of the danger circle for American vessels has increased/get to know 'Zolfaghar-e Basir' more], Tasnim News Agency, 28 September 2024, <https://www.tasnimnews.com/fa/news/1399/07/07/2357961/>.
- 49 Fabian Hinz, 'Little and Large Missile Surprises in Sanaa and Tehran', IISS, 17 October 2023, <https://www.iiss.org/en/online-analysis/military-balance/2023/10/little-and-large-missile-surprises-in-sanaa-and-tehran/>.
- 50 'Sarukh 'Asif'' فصاع خوراص [The Asif missile], Ansarollah, 24 September 2022, <https://www.ansarollah.com.ye/archives/550870>.
- 51 Fabian Hinz, 'Yemen's Houthis Are Going Underground', IISS, 29 April 2024, <https://www.iiss.org/en/online-analysis/military-balance/2024/04/yemens-houthis-are-going-underground/>.
- 52 Interview with Western official, 2024.
- 53 'Ta'araf 'ala aham as-sawarikh al-istratejiyah al-mukhasasha lil-ahdaf al-bahriyah 'tafasil''  
نصص حمل ائیجیت ارتسالا خیراوصل اماه ایل ع فرعت  
"لیصافت" یرحبل فاده الل  
[Learn about the most important strategic missiles designated for naval targets 'details'], *Yemeni Press*, 24 September 2022, <https://www.yemenipress.net/archives/275720>.
- 54 'Al-quwah as-sarukhiyah tustahdif bi-sawarikh Qahir 2M tahsinat Hadi fi Umm ar-Rish bi-Ma'rib' [The missile force targets Hadi's fortifications in Umm al-Rish in Marib with a Qahir 2m missile], Al Mayadeen, 25 February 2018, <https://www.almayadeen.net/news/politics/861511/>.
- 55 'Algubardari-ye razmandegan-e yamani az fanavari-ye mushaki-ye Iran'  
ناریا یکشوم یروانف زا ینمی ناگدنمزر یرادربوگلا  
[Modelling Yemeni fighters from Iran's missile technology], Tasnim News Agency, 29 May 2024, <https://www.tasnimnews.com/fa/news/1403/03/09/3094099/>.
- 56 Fabian Hinz, 'Missile Multinational: Iran's New Approach to Missile Proliferation', IISS, 26 April 2021, <https://www.iiss.org/en/research-paper/2021/04/iran-missile-proliferation-strategy/>.
- 57 US Defense Intelligence Agency, 'Seized at Sea: Iranian Weapons Smuggled to the Houthis', 30 April 2024, [https://www.dia.mil/Portals/110/Documents/News/Military\\_Power\\_Publications/Seized\\_at\\_Sea.pdf](https://www.dia.mil/Portals/110/Documents/News/Military_Power_Publications/Seized_at_Sea.pdf); and United Nations Security Council, 'Final Report of the Panel of Experts on Yemen', S/2019/83, 25 January 2019, [https://www.securitycouncilreport.org/atf/cf/%7B65BF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/s\\_2019\\_83.pdf](https://www.securitycouncilreport.org/atf/cf/%7B65BF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/s_2019_83.pdf).

- 58 'Gozaresh-e vizhe-ye Tasnim. Ma'muriyat-e jadid-e dariyayi baraye mushakha-ye 2000 kilometri-ye Sepah. Az Ghadir ta Khorramshahr mohaya-ye ma'muriyat-e jadid'  
 یامکشوم یارب ییایرد دیدج تیرومأم امینست فژیو شرازگ  
 دیدج تیرومأم یایم "رهشمرخ" ات "ریدغ" زا /اپس یرتتهولیک ۲۰۰۰  
 [Tasnim's special report new naval mission for IRGC's 2000 km missiles/from 'Ghadir' to 'Khorramshahr' preparing for a new mission], Tasnim News Agency, 26 September 2019, <https://www.tasnimnews.com/fa/news/1398/06/25/2097242/>.
- 59 Interview with Western official, 2024; and Fabian Hinz (@fab\_hinz), post to X, 25 July 2024, [https://x.com/fab\\_hinz/status/1816583530471711114](https://x.com/fab_hinz/status/1816583530471711114).
- 60 'Al-quwat al-musallahah al-yamaniyah tanshur mushahid li-sarukh Hatem-2 al-jadid alazi istahdaf bih safinah MSC Sarah V al-Isra'iliyah' [The Yemeni Armed Forces publish footage of the new Hatem 2 missile that targeted the Israeli vessel MSC Sarah V], Military Media, 27 June 2024, <https://web.archive.org/web/20240928223651/https://central-media.net/39668/599>.
- 61 Joint Maritime Information Center, 'JMIC Infonote 24JUN\_12 – Missile Attack Involving A Liberian-flagged Container Vessel, MSC Sarah V, 246NM Southeast of Nishtun, Yemen', 12 June 2024, [https://www.ukmto.org/-/media/ukmto/partner-products/indian-ocean/2024/jmic-infonote/jmic-infonote-24jun\\_12.pdf?rev=8aocod8470e44f92a926004e993b1e5c](https://www.ukmto.org/-/media/ukmto/partner-products/indian-ocean/2024/jmic-infonote/jmic-infonote-24jun_12.pdf?rev=8aocod8470e44f92a926004e993b1e5c).
- 62 Hinz, 'Houthi Anti-ship Missile Systems: Getting Better All the Time'.
- 63 Oren Liebermann and Natasha Bertrand, 'US Warship Had Close Call with Houthi Missile in Red Sea', CNN, 1 February 2024, <https://edition.cnn.com/2024/01/31/politics/us-warship-close-call-houthi-missile/index.html>.
- 64 Neil Gibson, 'UN Report Details Missiles Seized on Way to Yemen', Janes, 11 February 2020, <https://www.janes.com/osint-insights/defence-news/un-report-details-missiles-seized-on-way-to-yemen>; and 'Ta'araf 'ala as-sawarikh al-Yamaniyah al-mutatawirah alati ar'abat al-'alam wa al-qadirah 'ala tahwil al-Bahr al-Ahmar wa Bab al-Mandab ila jahanam'  
 ملالخال تبعرأ يتلا فروطتملا فينميلا خير اوصللا ىلع فرعت  
 منه ح ىلا بدنملا بابو رحألأ رحبلأ ليوحت ىلع فرءاقل او  
 [Learn about the advanced Yemeni missiles that terrified the world and are capable of turning the Red Sea and Bab al-Mandab into hell], Afak, 3 September 2022, <https://www.ofqnews.net/archives/228996>.
- 65 US Central Command, 'USCENTCOM Seizes Iranian Advanced Conventional Weapons Bound for Houthis', 16 January 2024, <https://www.centcom.mil/MEDIA/PRESS-RELEASES/Press-Release-View/Article/3645241/uscentcom-seizes-iranian-advanced-conventional-weapons-bound-for-houthis/#:~:text=U.S.%20Navy%20SEALs%20operating%20from,missile%20and%20cruise%20missiles%20components>.
- 66 Hinz, 'Houthi Anti-ship Missile Systems: Getting Better All the Time'.
- 67 United Kingdom Maritime Trade Operations (UKMTO), 'UKMTO Summary Report: 26 Apr–03 May 2024', [https://www.ukmto.org/-/media/ukmto/weekly-incident-report-pdf-files/indian-ocean/2024/may/20240503\\_ukmto\\_summary\\_report-03may24.pdf?rev=8962994a49a24abeb1f55fec2bc79ac6](https://www.ukmto.org/-/media/ukmto/weekly-incident-report-pdf-files/indian-ocean/2024/may/20240503_ukmto_summary_report-03may24.pdf?rev=8962994a49a24abeb1f55fec2bc79ac6); and Ameen Hayyan (@ameenhayan), post to X, 29 April 2024, <https://x.com/ameenhayan/status/1785056486965584045>.
- 68 AAGA\_CAWLLAN (@AAGA\_CAWLAN101), post to X, 3 May 2024, [https://x.com/AAGA\\_CAWLAN101/status/1786322884526285140](https://x.com/AAGA_CAWLAN101/status/1786322884526285140).
- 69 US Central Command, 'USCENTCOM Destroys Six Anti-Ship Cruise Missiles in Yemen', 3 February 2024, <https://www.centcom.mil/MEDIA/PRESS-RELEASES/Press-Release-View/Article/3665876/uscentcom-destroys-six-anti-ship-cruise-missiles-in-yemen/>.
- 70 Michael R. Gordon and Lara Seligman, 'U.S. Launches Effort to Stop Russia from Arming Houthis with Antiship Missiles', *Wall Street Journal*, 19 July 2024, [https://www.wsj.com/world/middle-east/u-s-launches-effort-to-stop-russia-from-arming-houthis-with-antiship-missiles-98131a8a?st=bsl75ybvbfaoa8&reflink=desktopwebshare\\_permalink](https://www.wsj.com/world/middle-east/u-s-launches-effort-to-stop-russia-from-arming-houthis-with-antiship-missiles-98131a8a?st=bsl75ybvbfaoa8&reflink=desktopwebshare_permalink).
- 71 United Nations Security Council, 'Letter Dated 21 February 2023 from the Panel of Experts on Yemen Addressed to the President of the Security Council', 21 February 2023, [https://www.securitycouncilreport.org/atf/cf/%7B65BFCF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/S\\_2023\\_130.pdf](https://www.securitycouncilreport.org/atf/cf/%7B65BFCF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/S_2023_130.pdf).
- 72 Luca Nevola, 'Six Houthi Drone Warfare Strategies: How Innovation Is Shifting the Regional Balance of Power', *Armed Conflict Location and Event Data (ACLED)*, 6 August 2024, <https://acleddata.com/2024/08/06/six-houthi-drone-warfare-strategies-how-innovation-is-shifting-the-regional-balance-of-power/>.
- 73 Interviews with Western officials, 2024.
- 74 *Ibid.*





- 91 H.I. Sutton, 'Notes on Emerging Iranian/Houthi Uncrewed Underwater Vehicle (UUV) Threat', *Covert Shores*, 18 February 2024, <http://www.hisutton.com/Iranian-Houthi-UUV-notes.html>.
- 92 Consumers in Red Sea littoral countries are the most exposed to the crisis, as a much greater percentage of imports travel along routes exposed to disruption. See Imogen Lillywhite, 'Middle East Consumers Most Exposed to Higher Import Prices from Red Sea Crisis', *Zawya*, 30 January 2024, <https://www.zawya.com/en/world/middle-east/middle-east-consumers-most-exposed-to-higher-import-prices-from-red-sea-crisis-j8lcq2gp>.
- 93 Lloyd's List Intelligence, <https://www.lloydslistintelligence.com/>.
- 94 *Ibid.*
- 95 Ziad Daoud (@ZiadMDaoud), post to X, 23 August 2024, <https://x.com/ZiadMDaoud/status/1826906383704273331>.
- 96 Joakim Hannisdahl (@JHannisdahl), post to X, 5 August 2024, <https://x.com/JHannisdahl/status/1820502195617591458>.
- 97 Akira Kitado, 'Red Sea Shipping Disruptions Ripple Through Asia-Europe Supply Chains', *Nikkei Asia*, 28 January 2024, <https://asia.nikkei.com/Business/Transportation/Red-Sea-shipping-disruptions-ripple-through-Asia-Europe-supply-chains>; Joe Antoshak, 'Red Sea Trouble Threatens US Freight Recovery', *FreightWaves*, 6 February 2024, <https://www.freightwaves.com/NEWS/RED-SEA-TROUBLE-THREATENS-US-FREIGHT-RECOVERY>; and 'The Impact of the Red Sea Crisis and Why Expansion to the North Could Be Catastrophic', *Fuel Oil News*, 22 March 2024, <https://fueloilnews.co.uk/2024/03/the-impact-of-the-red-sea-crisis-and-why-expansion-to-the-north-could-be-catastrophic/>.
- 98 Edmund Bower, 'Suez Canal Revenues and Traffic Fell in May', *Arabian Gulf Business Insight (AGBI)*, 10 June 2024, <https://www.agbi.com/trade/2024/06/suez-canal-revenues-traffic-fell-may/>. This is in line with cargo volumes crossing the Suez, which dropped by over 68% in May 2024, from 142.9–44.9 tonnes year on year. See also Ziad Daoud (@ZiadMDaoud), post to X, 23 August 2024, <https://x.com/ZiadMDaoud/status/1826906383704273331>.
- 99 HKTDC Research, 'Egypt: Suez Canal Temporarily Slashes Fees for Asia-bound Shipping', 8 May 2020, <https://research.hktdc.com/en/article/NDI2MDE2NTg2>; 'Suez Canal Tries to Gain Back Traffic by Giving Discounts', *Safety4Sea*, 18 June 2024, <https://safety4sea.com/suez-canal-tries-to-gain-back-traffic-by-giving-discounts/>; and Marcus Hand, 'Suez Canal Product Tanker Toll Rebates', *Seatrade Maritime News*, 11 July 2023, <https://www.seatrade-maritime.com/tankers/suez-canal-product-tanker-toll-rebates>.
- 100 OECD, 'OECD Economic Outlook, Interim Report February 2024: Strengthening the Foundations for Growth', February 2024, [https://www.oecd.org/en/publications/oecd-economic-outlook/volume-2023/issue-2\\_ofd73462-en.html](https://www.oecd.org/en/publications/oecd-economic-outlook/volume-2023/issue-2_ofd73462-en.html).
- 101 Peter Tirschwell, 'When It Comes to the Red Sea Diversions, the World Is Moving On', *S&P Global*, 13 August 2024, <https://www.spglobal.com/marketintelligence/en/mi-research-analysis/when-it-comes-to-the-red-sea-diversions-the-world-is-moving-on-.html>.
- 102 'According to BIMCO, an industry association, in 2023 the global fleet added capacity of around 2.3m 20-foot equivalent units (the standard measure of container size), surpassing the previous annual record by 37%. Another 1m arrived in the first four months of 2024.' See 'Boom Times Are Back for Container Shipping', *The Economist*, 27 June 2024, <https://www.economist.com/business/2024/06/27/boom-times-are-back-for-container-shipping>. See also 'Red Sea Disruptions Benefit Shipping Companies' Near-term Profitability', *Fitch Ratings*, 7 March 2024, <https://www.fitchratings.com/research/corporate-finance/red-sea-disruptions-benefit-shipping-companies-near-term-profitability-07-03-2024>.
- 103 World Trade Organization 'Global Trade Outlook and Statistics', April 2024, [https://www.wto.org/english/res\\_e/booksp\\_e/trade\\_outlook24\\_e.pdf](https://www.wto.org/english/res_e/booksp_e/trade_outlook24_e.pdf).
- 104 Compass Financial Technologies, 'Xeneta Shipping Index by Compass – Far East to North Europe', <https://www.compassft.com/indice/xsicfene/>.
- 105 Jonathan Saul and Carolyn Cohn, 'Red Sea Insurance Costs Soar as Houthi Shipping Threats Loom, Sources Say', *Reuters*, 19 September 2024, <https://www.reuters.com/world/middle-east/red-sea-insurance-costs-soar-houthi-shipment-threats-loom-sources-say-2024-09-19/>.
- 106 According to David Smith, head of hull and marine liabilities at insurance broker McGill and Partners. See Jonathan Saul and Carolyn Cohn, 'US, UK Ship Investors Hit by Soaring Red Sea Insurance – Sources', *Reuters*, 8 February 2024, <https://www.reuters.com/business/us-uk-ship-investors-hit-by-soaring-red-sea-insurance-sources-2024-02-07/>.

- 107 Alex Longley and Aine Quinn, 'Chinese Ships Get Cheaper Insurance to Navigate Red Sea', Bloomberg, 6 February 2024, <https://www.bloomberg.com/news/articles/2024-02-06/chinese-ships-get-cheaper-insurance-to-navigate-houthi-menaced-red-sea>.
- 108 Zoom interview with a maritime-security analyst, July 2024.
- 109 *Ibid.*
- 110 UNCTADstat, 'Port Liner Shipping Connectivity Index, Quarterly', <https://unctadstat.unctad.org/datacentre/dataviewer/US.PLSCI>; and UNCTADstat, 'Port Liner Shipping Connectivity Index, Quarterly', <https://unctadstat.unctad.org/datacentre/reportInfo/US.PLSCI>.
- 111 Mette Grube Condrup, 'Saudi Arabian Port Calls More than Halved', ShippingWatch, 24 April 2024, <https://shippingwatch.com/Ports/article17048226.ece>.
- 112 *Ibid.*; and 'King Abdulaziz Port in Dammam Sets New Container Throughput Record', Zawya, 8 August 2024, <https://www.zawya.com/en/business/transport-and-logistics/king-abdulaziz-port-in-dammam-sets-new-container-throughput-record-baqe3wx5>.
- 113 Jamie Ingram, 'Saudi Red Sea Crude Exports to Europe Soar', *Mees*, 22 March 2024, <https://www.mees.com/2024/3/22/opec/saudi-red-sea-crude-exports-to-europe-soar/a7e6cd50-e860-11ee-8ef9-1f9ceedbcbf>; Julian Lee and Alex Longley, 'Saudis Boost North Red Sea Oil Exports to Avoid Chaos in South', Bloomberg, 1 February 2024, <https://www.bloomberg.com/news/articles/2024-02-01/saudis-boost-north-red-sea-oil-exports-to-avoid-chaos-in-south>; and Noam Raydan and Farzin Nadimi, 'Amid Red Sea Crisis, Saudi Company Launches North Shipping Service', Washington Institute for Near East Policy, 2 April 2024, <https://www.washingtoninstitute.org/policy-analysis/amid-red-sea-crisis-saudi-company-launches-north-shipping-service>.
- 114 The Observatory of Economic Complexity (OEC World), 'Jordan', <https://oec.world/en/profile/country/jor?depthSelector1=HS2Depth>.
- 115 IMF, 'Regional Economic Outlook: The Middle East and Central Asia: An Uneven Recovery Amid High Uncertainty', April 2024, <https://www.imf.org/en/Publications/REO/MECA/Issues/2024/04/18/regional-economic-outlook-middle-east-central-asia-april-2024>; and 'Government Extends Relief Measures to Tackle Maritime Crisis, Price Hikes', *Jordan Times*, 8 May 2024, <https://jordantimes.com/news/local/government-extends-relief-measures-tackle-maritime-crisis-price-hikes>.
- 116 Nathan Klabin, 'Eilat Still Shipless, Houthi Strangle Port City', MediaLine, 30 May 2024, [https://www.reuters.com/world/middle-east/israels-eilat-port-faces-layoffs-amid-red-sea-shipment-crisis-union-says-2024-03-20/](https://themedialine.org/top-stories/eilat-still-shipless-houthi-strangle-port-city/#:~:text=%E2%80%9CThe%20port%20of%20Eilat%20is,would%20otherwise%20go%20to%20Eilat; 'Israel's Eilat Port Faces Layoffs Amid Red Sea Shipping Crisis', Reuters, 20 March 2024, <a href=); and 'Ba'ad 'iiflasih bisabab al-hisar al-yamanii.. mina' 'iilat yabda tasrih eadad kabir min al-muazafin' أدبي تالیا انیم ..ینمیلًا راصحلا ببسب مسالف! دعب نیفظوملا نم رییک ددع حیرست
- [After going bankrupt due to the Yemeni blockade, Eilat Port begins laying off a large number of employees], Yemen Eco, 22 July 2024, <https://yemeneco.org/archives/86027>.
- 117 IMF PortWatch, 'Haifa', <https://portwatch.imf.org/pages/1aacbcd641c4124b13902706784bac8>; and IMF PortWatch, 'Ashdod', <https://portwatch.imf.org/pages/b7325c4ca47c4e73b65caba632417bb5>.
- 118 Jérôme de Ricqlès, 'Container Shipping Overcapacity Temporarily Masked by Rerouting', Upply, 30 May 2024, <https://market-insights.upply.com/en/container-shipping-overcapacity-temporarily-masked-by-rerouting>; and Marwan El Sammak, 'Op-ed: Navigating the Red Sea Crisis – Impact and Implications', *Business Monthly*, 9 June 2024, <https://businessmonthlyeg.com/op-ed-navigating-the-red-sea-crisis-impact-and-implications/>.
- 119 'Red Sea Tensions Threaten Sudan Ports Activity', Radio Dabanga, 24 January 2024, <https://www.dabangasudan.org/en/all-news/article/red-sea-tensions-threaten-sudan-ports-activity>.
- 120 'Sudan: IRC Faces an over 40% Increase in Aid Shipping Costs amid Red Sea Disruption', ReliefWeb, 28 February 2024, <https://reliefweb.int/report/sudan/sudan-irc-faces-over-40-increase-aid-shipping-costs-amid-red-sea-disruption>.
- 121 Fred Harter, 'Houthi Attacks in Red Sea Having A "Catastrophic" Effect on Aid to Sudan', *Guardian*, 16 February 2024, <https://www.theguardian.com/global-development/2024/feb/16/houthi-attacks-in-red-sea-having-a-catastrophic-effect-on-aid-to-sudan>.
- 122 *Ibid.*
- 123 'Red Sea Closure a Mixed Bag for Africa', Kuehne+Nagel, 3 May 2024, <https://mykn.kuehne-nagel.com/news/article/red-sea-closure-a-mixed-bag-for-africa-03-May-2024>.

- 124 Doraleh Terminal registered a new record for total handling in March 2024. See 'Record 110.000 TEUs!', Société de Gestion du Terminal à Conteneurs de Doraleh (SGTD), 2 July 2024, <https://www.sgtd-terminal.com/2024/07/02/record-110-000-teus/>; and Simon Marks, 'How Tiny Djibouti Said "No" to the US Over Houthi Red Sea Attacks', Bloomberg, 16 May 2024, <https://www.bloomberg.com/news/features/2024-05-16/red-sea-crisis-over-gaza-leaves-djibouti-walking-a-diplomatic-tightrope>.
- 125 World Food Programme (WFP), 'Yemen Food Security Update: June 2024', June 2024, [https://reliefweb.int/attachments/6d3067ba-edde-4312-9e0b-998775567852/Monthly\\_Food\\_Security\\_Update\\_June\\_2024.pdf](https://reliefweb.int/attachments/6d3067ba-edde-4312-9e0b-998775567852/Monthly_Food_Security_Update_June_2024.pdf); and WFP, 'Yemen Food Security Update: September 2024', September 2024, <https://reliefweb.int/attachments/78dc18a5-061f-49bc-8961-8d57a9cc6f1c/Monthly%20Food%20Security%20Update%20Sep%202024.pdf>.
- 126 Phone interview with a Yemeni port official, August 2024.
- 127 Hashem Osseiran, 'Yemen Aid Groups Say Red Sea Crisis Driving Up Costs', *Al-Monitor*, 8 February 2024, <https://www.al-monitor.com/originals/2024/02/yemen-aid-groups-say-red-sea-crisis-driving-costs>.
- 128 Reliefweb, 'WFP Yemen Situation Report #7, July 2024', 25 August 2024, <https://reliefweb.int/report/yemen/wfp-yemen-situation-report-7-july-2024>.
- 129 Reliefweb, 'For the Second Time: Israel's War Machine Targets Yemen's Power Infrastructure', 2 October 2024, <https://reliefweb.int/report/yemen/second-time-israels-war-machine-targets-yemens-power-infrastructure-enar>.
- 130 'Mediterranean Ports Warn of Overflowing Storage Yards in Latest Threat to Supply Chain', *Financial Times*, 22 April 2024, <https://www.ft.com/content/1foa7add-1412-4b27-926f-cb99338fa520>.
- 131 Piraeus saw a 13% decline in container handling in the first half of 2024. David Glass, 'Red Sea Crisis Hits Volumes at Port of Piraeus', *Seatrade Maritime News*, 31 July 2024, <https://www.seatrade-maritime.com/ports/red-sea-crisis-hits-volumes-port-piraeus>; and James Baker, 'Red Sea Rerouting Hits East Mediterranean Transshipment Hubs', *Lloyd's List*, 20 March 2024, <https://www.lloydslist.com/LL1148603/Red-Sea-rerouting-hits-east-Mediterranean-transshipment-hubs>.
- 132 'Qatar Ports See 12% Jump in Container Volumes in H1', *Hellenic Shipping News*, 9 July 2024, <https://www.hellenicshippingnews.com/qatar-ports-see-12-jump-in-container-volumes-in-h1/>; Federico Maccioni, 'DP World's First-half Profit more than Halves amid Middle East Tensions', *Reuters*, 15 August 2024, <https://www.reuters.com/world/middle-east/dp-world-profit-more-than-halves-first-half-amid-middle-east-tensions-2024-08-15/>; and 'AD Ports Group Starts 2024 with Significant Financial and Operational Performance in Q1', *Hellenic Shipping News*, 14 May 2024, <https://www.hellenicshippingnews.com/ad-ports-group-starts-2024-with-significant-financial-and-operational-performance-in-q1/>.
- 133 Céline Bacrot and Marc-Antoine Faure, 'Red Sea Crisis and Implications for Trade Facilitation in Africa', *UN Trade & Development*, 17 April 2024, <https://unctad.org/news/red-sea-crisis-and-implications-trade-facilitation-africa>.
- 134 *Ibid.*
- 135 Mike Wackett, 'Weak Demand and Overcapacity Adding to Carrier Red Sea Stress', *Load Star*, 30 January 2024, <https://theloadstar.com/weak-demand-and-overcapacity-adding-to-carrier-red-sea-stress/>.
- 136 IMF, 'Regional Economic Outlook: Middle East and Central Asia: An Uneven Recovery Amid High Uncertainty', April 2024, <https://www.imf.org/en/Publications/REO/MECA/Issues/2024/04/18/regional-economic-outlook-middle-east-central-asia-april-2024>.
- 137 IMF, 'Saudi Arabia: 2024 Article IV Consultation—Press Release; and Staff Report', 4 September 2024, <https://www.imf.org/en/Publications/CR/Issues/2024/09/03/Saudi-Arabia-2024-Article-IV-Consultation-Press-Release-Staff-Report-and-Informational-Annex-554530>.
- 138 'Houthis Showcase Large Arsenal of Missiles, Drones at Sana'a Military Parade', *MEMRI TV*, 21 September 2023, <https://www.memri.org/tv/houthis-showcase-large-arsenal-missiles-drones-military-parade>.
- 139 United Nations, 'Final Report of the Panel of Experts on Yemen Mandated by Security Council Resolution 2342 (2017)', *S/2018/594*, 26 January 2018, <https://undocs.org/en/S/2018/594>.
- 140 'Yemenis Intercept "Iranian Ship"', *BBC News*, 27 October 2009, [http://news.bbc.co.uk/2/hi/middle\\_east/8327892.stm](http://news.bbc.co.uk/2/hi/middle_east/8327892.stm).
- 141 Emeric Lendjel and Nora Marei, 'The Complementarity Between Dhow Shipping Networks and Standard Shipping Lines in the Gulfs of Persia, Oman and Aden', *cybergeo*, 2021, <https://journals.openedition.org/cybergeo/37025>.
- 142 See Meir Amit Intelligence and Terrorism Information Center, 'Iranian Subversion in Yemen: A Ship with a Cargo of Arms

- Originating in Iran and en Route to the Shi'ite Houthis Rebels in North Yemen, Was Recently Intercepted', 11 February 2024, <https://www.terrorism-info.org.il/en/20475/>.
- 143 United Nations, 'Final Report of the Panel of Experts Established Pursuant to Resolution 1929 (2010)', S/2013/331, 5 June 2013, <https://undocs.org/en/S/2013/331>.
- 144 Tim Michetti, 'A Guide to Illicit Iranian Weapon Transfers – The Bahrain File', Atlantic Council, December 2020, <https://www.atlanticcouncil.org/wp-content/uploads/2020/12/A-Guide-to-Illicit-Iranian-Weapon-Transfers-in-the-Gulf.pdf>.
- 145 Wehrey et al., *The Rise of the Pasdaran: Assessing the Domestic Roles of Iran's Islamic Revolutionary Guards Corps* (Santa Monica, CA: Rand Corporation, 2009), [https://www.rand.org/content/dam/rand/pubs/monographs/2008/RAND\\_MG821.pdf](https://www.rand.org/content/dam/rand/pubs/monographs/2008/RAND_MG821.pdf).
- 146 'Iranian Ship Unloads 185 Tons of Weapons for Houthis at Saleef Port', Alarabiya News, 20 March 2015, <https://english.alarabiya.net/News/middle-east/2015/03/20/Iranian-ship-unloads-185-tons-of-weapons-for-Houthis-at-Saleef-port>; and interview with international military sources in 2023.
- 147 'Iranian Flight Lands in Yemen After Aviation Deal', Radio Free Europe/Radio Liberty, 1 March 2015, <https://www.rferl.org/a/iran-mahan-flight-lands-yemen/26875916.html>.
- 148 United Nations Security Council, 'Resolution 2216 (2015)', 14 April 2015, <https://documents.un.org/doc/undoc/gen/n15/103/72/pdf/n1510372.pdf>.
- 149 International Crisis Group, 'Yemen's al-Qaeda: Expanding the Base', 2 February 2017, <https://www.crisisgroup.org/middle-east-north-africa/gulf-and-arabian-peninsula/yemen/174-yemen-s-al-qaeda-expanding-base>.
- 150 United Nations, 'Final Report of the Panel of Experts on Yemen Established Pursuant to Security Council Resolution 2140 (2014)', S/2022/50, 26 January 2022, <https://undocs.org/en/S/2022/50>; and Conflict Armament Research, 'Maritime Interdictions of Weapon Supplies to Somalia and Yemen', November 2016, <https://www.conflictarm.com/dispatches/maritime-interdictions-of-weapon-supplies-to-somalia-and-yemen/>.
- 151 Interviews with international and Yemeni security sources between 2020 and 2024.
- 152 *Ibid.*
- 153 While most of the dhows transporting weapons to Yemen seem to be linked to the Houthis, there are also maritime transfers of arms from Yemen to the Horn of Africa countries. However, the composition of the cargo on those dhows is quite different to those coming from Iran to Yemen; IISS analysis based on published sources and expert interviews.
- 154 United Nations, 'Final Report of the Panel of Experts on Yemen Mandated by Security Council Resolution 2342 (2017)', S/2018/193, 31 January 2017, <https://undocs.org/en/S/2018/193>.
- 155 Interviews with international sanctions experts between 2018 and 2024.
- 156 United States Institute of Peace, 'U.S. Sanctions Iranian Shippers and Airline', Iran Primer, 11 December 2019, <https://iranprimer.usip.org/blog/2019/dec/11/us-sanctions-iranian-shippers-and-airline>; and interviews with international intelligence sources between 2018 and 2024.
- 157 United Nations, 'Final Report of the Panel of Experts on Yemen', S/2020/326, 28 April 2020, <https://undocs.org/en/S/2020/326>.
- 158 Interviews with international sanctions experts between 2018 and 2024.
- 159 United Nations, 'Final Report of the Panel of Experts on Yemen', S/2019/83, 25 January 2019, <https://undocs.org/en/S/2019/83>.
- 160 United Nations, 'Final Report of the Panel of Experts on Yemen Mandated by Security Council Resolution 2342 (2017)', S/2018/193.
- 161 United Nations, 'Final Report of the Panel of Experts on Yemen Established Pursuant to Security Council resolution 2140 (2014)', S/2023/130, 21 February 2023, <https://undocs.org/en/S/2023/130>.
- 162 *Ibid.*
- 163 One of the rare exceptions was the seizure of concealed UAVs by Omani customs at the border with the UAE in January 2024. See 'Oman Customs Seizes Truck Loaded with Drones', *Oman Observer*, 9 January 2024, <https://www.omanobserver.om/article/1147977/oman/rop/oman-customs-seizes-truck-loaded-with-drones>.
- 164 United Nations, 'Letter Dated 18 May 2023 from the Permanent Representative of the United Kingdom of Great Britain and Northern Ireland to the United Nations Addressed to the Secretary-General and the President of the Security Council', S/2023/362, 18 May 2023, <https://undocs.org/en/S/2023/362>.
- 165 United Nations, 'Final Report of the Panel of Experts on Yemen Established Pursuant to Security Council resolution 2140 (2014)', S/2023/130.

- 166 South24, 'South Yemen: Thermal Missiles Shipment Seized Coming from Oman', 12 March 2022, <https://south24.net/news/newse.php?nid=2539>; and United Nations, 'Final Report of the Panel of Experts on Yemen', S/2020/326, 27 January 2020, <https://undocs.org/en/S/2020/326>.
- 167 United Nations, 'Final Report of the Panel of Experts on Yemen Established Pursuant to Security Council Resolution 2140 (2014)', S/2022/50.
- 168 Wolf-Christian Paes, 'Assessment of the Response to Illicit Weapons Trafficking in the Gulf of Aden and the Red Sea', United Nations Office on Drugs and Crime (UNODC), 2024, [https://www.unodc.org/documents/CRIMJUST/Yemen\\_Booklet\\_Online.pdf](https://www.unodc.org/documents/CRIMJUST/Yemen_Booklet_Online.pdf).
- 169 Interviews with port officials and security sources in Aden in 2023.
- 170 Ahmed Nagi, 'Catching Up on the Back-channel Peace Talks in Yemen', International Crisis Group, 10 October 2023, <https://www.crisisgroup.org/middle-east-north-africa/gulf-and-arabian-peninsula/yemen/catching-back-channel-peace-talks-yemen>.
- 171 Interviews with international maritime and UN sources in 2023 and 2024.
- 172 IISS analysis of AIS data from commercial-tracking platforms; 'Masadir: al-Houthiyoun yudakhilun kamiyat kabirah minal-tayran al-musayir wa as-sawarikh al-balistiyah 'abra mina' al-Hudaydah'  
 نار يطل ا نم قري بكتا اي مك نول خدي نوي ثوحلا :رداصم  
 قدي دحل اءان يم ربع عيتسل لابل ا خيرا واصل او ريسملا  
 [Sources: Houthis bring in large quantities of drones and ballistic missiles through Hudaydah port], Livehod, 10 November 2023, <https://livehod.com/2023/11/10/رداصم-نار-يطل-ا-نم-قري-بكتا-اي-مك-نول-خدي-نوي-ثوحلا>; and interviews with international maritime and UN sources in 2023 and 2024.
- 173 US Defense Intelligence Agency, 'Seized at Sea: Iranian Weapons Smuggled to the Houthis', 30 April 2024, [https://www.dia.mil/Portals/110/Documents/News/Military\\_Power\\_Publications/Seized\\_at\\_Sea.pdf](https://www.dia.mil/Portals/110/Documents/News/Military_Power_Publications/Seized_at_Sea.pdf).
- 174 The first time was the seizure of jet vanes for ballistic missiles, which were part of the cargo of the speedboat intercepted by the UK navy between Iran and Oman in March 2023. See US Naval Forces Central Command, 'U.S. Forces Assist UK Seizure of Missiles Shipped from Iran', 2 March 2023, <https://www.cusnc.navy.mil/Media/News/Display/Article/3315919/us-forces-assist-uk-seizure-of-missiles-shipped-from-iran/>.
- 175 Matthias Gebauer and Marina Korbaki, 'Kommandeur der EU-Mission "Aspides" klagt über zu wenige Kriegsschiffe', *Der Spiegel*, 23 October 2024, <https://www.spiegel.de/politik/deutschland/rotes-meer-kommandeur-der-eu-mission-aspides-klagt-ueber-zu-wenige-kriegsschiffe-a-22d10b13-4aa1-408d-ac56-41031b3144ed>.
- 176 Reliable figures for the cost of the missions are hard to come by, but in October 2024 the Pentagon requested USD1.2bn to continue its mission in the Red Sea and to replenish the stocks of missiles used to defend against aerial attacks by Iran and its allies. 'The Pentagon Requests \$1.2bn to Continue Red Sea Mission', *Middle East Monitor*, 5 October 2024, <https://www.middleeastmonitor.com/20241005-the-pentagon-requests-1-2bn-to-continue-red-sea-mission/>.

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