

## ***“Lower End” Missile Threats: The Case of Yemen***

By Ron Christman

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The role of missile warfare in the ongoing fighting in Yemen is easy to overlook in the context of the ISIL threat to peace, the presence of al-Qaeda and ISIL militants in Yemen, and the humanitarian crisis in this Arabian Peninsula conflict. Missile and rocket attacks by Yemen’s armed Houthi movement and its Army’s missile brigade receive less attention compared to “high end” missile threat scenarios posed by modernization of Russia or China’s strategic nuclear and conventional missile capabilities as well as nuclear and missile programs in North Korea and Iran.<sup>i</sup> Nonetheless, detailed analysis of the role of missiles in the conflict over Yemen yields insights regarding “lower end” conflict scenarios involving long-range rocket, and conventional ballistic or anti-ship cruise missile use by irregular, hybrid, or state adversaries.

### **Key Points**

- **Missile and rocket attacks by Houthi rebels and Saleh loyalists are a credible threat to coalition interests and an effective political and military tool.**
- **Coalition counterforce operations have failed to defeat this missile threat.**
- **Coalition ballistic missile defense operations are currently unable to deny missile operations or limit their damage.**
- **U.S. sea-based cruise missile defense operations have effectively countered the anti-ship missile threat.**
- **Yemen’s missile target system has considerable depth to cushion the impact of attacks against it, due to probable Iranian supplies and improvised domestic missile production.**

The first finding one can make in assessing this conflict is missile and rocket attacks by northern Shiite rebels known as Houthis and their allies among loyalists of former President Ali Abdullah Saleh have been and remain a credible military threat to the Saudi-led Gulf Cooperation Council (GCC) coalition seeking to restore Yemen’s exiled government in power led by President Abd Rabbuh Mansur Hadi. The coalition clearly understood the nature of this threat when it launched OPERATION DECISIVE STORM on 26 March 2015.<sup>ii</sup> Yemen’s long-range surface-to-surface missile (SSM) systems and their bases or known launch sites were high on the initial list of targets for strikes by the air forces of Saudi Arabia, the United Arab Emirates (UAE), Jordan, Kuwait, Bahrain, and Qatar.<sup>iii</sup> When first-phase operations ended a month later, the coalition announced it “had completed its objectives in Yemen by destroying the ballistic missile capabilities of the Houthi movement and Houthi-allied military units.”<sup>iv</sup>

Despite this pronouncement, Houthi rebels and Saleh loyalists have sustained limited-scale ballistic and cruise missile attacks against political and military targets since early June 2015. The coalition’s inability to deny these attacks has enabled Houthi and Saleh forces to demonstrate their ability to retaliate against Saudi air strikes in Yemen. A wide range of military targets have been attacked within Yemen and in Saudi Arabia; on a few occasions, they have also fired missiles against offshore naval targets.<sup>v</sup> To a lesser extent, the Houthis and their allies have also attacked civilian power<sup>vi</sup> and desalination plants,<sup>vii</sup> Saudi oil company assets,<sup>viii</sup> a UAE military leased ship carrying humanitarian aid,<sup>ix</sup> and international airports<sup>x</sup> used by Saudi military forces. Most missile or rocket attacks have occurred in response to coalition air strikes within Yemen.

Houthi rebels and Saleh loyalists have launched C-801<sup>xi</sup> or C-802<sup>xii</sup> anti-ship cruise missiles (ASCMs) and six different types of ballistic missile or long-range rocket systems (legacy SCUD<sup>xiii</sup> and SS-21/Tochkas SRBMs,<sup>xivxxv</sup> converted SA-2 SAM Qaher 1s,<sup>xvi</sup> Iranian-origin unguided Zel-Zal 2 and Zel-Zal 3 rockets,<sup>xvii</sup> and home-made Borkan 1 SRBMs<sup>xviii</sup>). A range of firing strategies have been employed—to include attacks using a single system type, a combination of two different systems in the same attack,<sup>xix</sup> and coordinated ballistic missile attacks with rocket or artillery forces.<sup>xx</sup> The ASCM fired on 1 October 2016 at an unarmed American HSV-2 Swift aluminum high-speed transport vessel leased to the UAE was armed with an explosively armed penetrator warhead—a very damaging warhead which launches additional pieces of shrapnel once the missile has penetrated the outer skin of a target.<sup>xxi</sup>

Coalition counterforce attack operations have failed to defeat periodic missile strikes by Houthi and Army missile crews. Since the coalition's initial attempt to destroy the Yemen Army brigade's missile capabilities, Saleh loyalists in this unit and Houthi rebels have sustained offensive missile fires against enemy targets. Estimating the number of missiles launched is difficult because it is hard to confidently confirm all news reports of missile launches or defensive interceptor operations by sources sympathetic to either side of the conflict. From a conservative rough order of magnitude (ROM) standpoint, Houthi rebels and Saleh loyalist forces have probably launched over 100 ballistic missiles or long-range rockets and a small number of ASCMs against targets since June 2015.<sup>xxii</sup> Coalition air forces continue to strike SSM forces in Yemen. However, most sorties occur in the aftermath of missile launches, and coalition attack operations target launch points of origin which have probably been vacated by missile crews and their equipment. Few reports indicate coalition success in destroying launchers or missile airframes. Coalition air forces do not appear to be locating and attacking out-of-garrison missile units before they launch missiles.

Coalition ballistic missile defense operations have also been ineffective in denying Houthi or Saleh loyalist missile attacks or limiting their damage. Using the same conservative ROM standard, Saudi and UAE missile defense units have intercepted, at most, 50 percent of the ballistic missiles reportedly fired at GCC targets. According to Brigadier General Ahmad Asiri, a military adviser to Deputy Crown Prince Mohammed bin Salman, Saudi Arabia has intercepted 36 ballistic missiles fired indiscriminately by the Houthis as of 24 January 2017.<sup>xxiii</sup> Almost two years into the conflict, indications of Houthi or Yemen Army ballistic missile attacks on coalition military positions in Yemen or military or civilian sites in Saudi Arabia continue to appear in international news media. The last reported Houthi missile fired into Saudi territory reportedly was intercepted by Saudi air defense forces on 27 January 2017.<sup>xxiv</sup> In the 1 October 2016 anti-ship attack, Saleh loyalists damaged a UAE leased transport vessel in the Bab al-Mandab Strait as it returned from a humanitarian mission to Aden in southern Yemen.<sup>xxv</sup>

In contrast, US sea-based cruise missile defense operations effectively countered the anti-ship missile threat it encountered in October 2016 while operating in the Gulf of Aden. On three and possibly four occasions, ASCMs were fired from territory controlled by Houthi rebels towards a US Navy (USN) Arleigh Burke class AEGIS destroyer, and two amphibious transport dock ships operating in international waters in the southern Red Sea.<sup>xxvi</sup> In the two occasions in which this US Strike Group detected a clear inbound missile threat, the USS Mason destroyed the inbound ASCM threat by firing two Standard Missile-2 defensive interceptors, one Evolved Sea Sparrow Missile, and a Nulka anti-ship missile decoy.<sup>xxvii</sup> A few days later, the USS Nitze, a USN destroyer, launched 3 Tomahawk land-attack cruise missiles which destroyed three Yemeni coastal defense radars used in the original attacks on these American ships.<sup>xxviii</sup> Whether Houthi rebel or Saleh loyalist leaders directed these anti-ship launches against USN forces is unclear, since neither group of leaders has claimed responsibility for these attacks.<sup>xxx</sup>

From a target system analysis perspective,<sup>xxxix</sup> the missile and rocket capabilities of the Houthi rebel and Saleh loyalists have demonstrated considerable depth. Over the first six months of missile warfare, this alliance employed SCUD and SS-21/Tochka SRBMs and ASCMs which were in the inventory of Yemen's armed forces prior to this conflict. Beginning in December 2015, it has used three or possibly four additional missile or rocket systems it did not possess prior to the Saudi-led GCC intervention.

- Two of these systems—liquid and solid fueled Qaher-1 ballistic missiles (a converted SA-2 surface to air missile) and solid-propelled, SCUD-like Borkan (Volcano)-1 SRBMs—were reportedly designed and manufactured by Yemeni industrial firms.
- The other two systems—unguided, long-range Zel-Zal 2 or Zel-Zal 3 rockets—were either made by Iran or are a Yemeni variant of these rockets made by indigenous sources.

Various reports suggest a direct role for the Iranian regime in supporting the Zaydi Houthi rebels and allied Yemeni missile units with missile technology, rocket or missile transfers, training, and advice in order to compete with Saudi Arabia for influence in Yemen's internal affairs.<sup>xxxix</sup> Iran's Foreign Ministry denies this support;<sup>xxxix</sup> however, an agency belonging to its Revolutionary Guard has asserted the Houthis use Iranian-made missiles.<sup>xxxix</sup>

The depth provided Houthi and Saleh missile capabilities by wartime production improvisation and likely Iranian support directly reduces their vulnerability by cushioning the effect of potentially disruptive attacks.<sup>xxxix</sup> Almost two years after the coalition sought to destroy this capability, the Houthi-Saleh alliance retains the ability to employ ballistic missile or long-range rocket attacks against coalition targets in Yemen or other targets deep in Saudi territory. This alliance probably lacks the ability to mass missile or rocket salvos against the coalition in large-scale attacks; however, its missile capability has proven its resiliency in hostilities which show no sign of ceasing anytime soon.

### Implications

- Develop tailored strategies for countering lower end missile threats rather than considering them lesser included cases in planning and resourcing robust missile defense systems.
- These strategies should counter likely adversaries' efforts to protract war via limited missile or rocket attacks vice massed attacks and by maintaining target system depth.
- Counter strategies supplementing foundational missile defense force structure and new EW/IO capabilities should include:
  - Attacks on missile industrial infrastructure and support systems
  - Interdiction operations against foreign missile transshipments and assistance
  - Pre-launch operations to find, fix, track, and attack out of garrison missile units
  - Offense-defense weapons employment guidance for weapon systems capable of defensive interceptor and offensive strike operations.

The continued use of missiles in the fighting in Yemen underscores the need to develop tailored strategies for countering the limited use of rocket and ballistic or cruise missile attacks by irregular, hybrid, or state adversaries rather than viewing lower-spectrum missile threats as lesser included cases when resourcing and improving an effective, robust missile defense system. To be sure, defense planners need to prioritize efforts to develop "Raid Breaker" missile defense force structures and operations enabling them to compete and prevail in scenarios in which potential state adversaries—North Korea, Iran, Russia, or China—employ mass guided munitions salvos of 100 conventional missiles or more against our interests, forces, or bases.<sup>xxxix</sup>

For example, the possible transfer of 600 Patriot Advanced Capability-3 defensive interceptor missiles to Saudi Arabia<sup>xi</sup> would strengthen its ability to mount a missile defense against the missile threat from Yemen. Developing and deploying new electronic warfare (EW)<sup>xii</sup> or information operations (IO)<sup>xiii</sup> capabilities for regional purposes will also create opportunities for enhancing left- and right-of-launch defenses against lower end conventional missile threats in civil wars or local conflicts.

However, adversaries involved in lower-end missile wars may not always possess the intent or capability to overwhelm robust missile defenses via massed attacks.<sup>xiii</sup> Instead, they might prefer to emulate the Yemen model by raising the costs and risks of fighting them by protracting war over time via limited missile or rocket attacks and by maintaining target system depth. Missile defense plans for dealing with these adversaries should therefore supplement the foundational role of robust defensive force structures and newer “left of launch” EW and IO capabilities by designing strategies to defeat this approach by potential adversaries. Based on lessons from the Yemen conflict, counter strategies should consider the following measures:

- Attack operations targeting the industrial infrastructure producing missiles or rockets and support system engineering improvised variants of foreign missiles or rockets.
- Maritime, land, or air interdiction operations targeting the transshipment of foreign missile or rocket associated material, technology, or equipment to potential low-end adversaries.
- Find, fix, track, and attack operations to destroy enemy missile and rocket units and equipment, especially launchers, before they attack U.S. and Allied forces, bases, and interests.<sup>xiv</sup>
- Offense-defense weapons employment guidance for lower end, lower risk scenarios which would enable timely responses to ballistic or cruise missiles attacks by weapon systems capable of defensive interceptor and offensive strike operations, like the USN’s AEGIS SM-6 missiles.<sup>xv</sup>
- The importance of such guidance would increase in circumstances where the challenge of performing pre-launch attacks against out of garrison missile units remains as difficult as SCUD Hunting was in the first Persian Gulf War.<sup>xvi</sup>

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<sup>v</sup> Source: Author’s comprehensive master chronology and table of reports of ballistic and cruise missile attacks and defensive interceptor operations against this attacks; too many source to cite.

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<sup>xix</sup> Sam LaGrone, “USS Mason Fired 3 Missiles to Defend From Yemen Cruise Missiles Attacks,” US Naval Institute News, 11 October 2016.

<sup>xiii</sup> Ian Black, “Saudi Strike in Response to Houthi SCUD Attack as Forgotten War Rages On, The Guardian, 15 October 2015. Available at: <https://www.theguardian.com/world/2015/oct/15/saudi-arabia-strike-response-houthi-scud-attack-forgotten-war>.

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