Ship killers: New anti-ship cruise missiles raise the stakes in Northeast Asia

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With the increasing number and quality of surface combatants being fielded in Northeast Asia, navies in the region are investing heavily in new anti-ship missiles as a means to deliver offensive or defensive punch. *Kelvin Wong* reports

The ambitions of Northeast Asia's naval powers to variously ensure sea control, or effect sea denial, have spurred the indigenous development of a multiplicity of new anti-ship cruise missiles (ASCMs) in the region. China, Japan, North Korea, South Korea, and Taiwan are all investing to meet national priorities. While work continues to evolve and hone a number of subsonic sea-skimming weapons, what is particularly notable is the development on a new breed of supersonic anti-ship guided weapons designed to penetrate shipborne air defences.

CASIC's YJ-9E anti-ship missile has been integrated to unmanned aerial vehicles such as the Wing Loong II, providing a maritime strike capability to these platforms. (IHS Markit/Kelvin Wong)

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China

The development of China's military scientific and industrial capability in the last 25 years has been remarkable. Having previously been limited to the production of clones of the Soviet-designed P-15 Termit (SS-N-2 'Styx') – technological progress being stymied by the Cultural Revolution – China produced the C-801 in the 1980s. This weapon, the first second-generation ASCM to be developed by the People's Republic, was followed up by the widely exported C-802 medium-range missile developed by the China Aerospace Science and Industry Corporation (CASIC).

Replacing the rocket propulsion of the C-801 with a turbojet engine, the C-802 anti-ship missile carries a 165 kg warhead and travels at speeds of up to Mach 0.9 with a maximum range of nearly 65 n miles (120 km).

China's mastery of ASM technology has particularly accelerated during the past decade. In terms of domestically produced missiles, the People's Liberation Army Navy (PLAN) has deployed the indigenous ship-launched Ying Ji (YJ)-62 ASM – with the export designation of C-602 – on the Type 052C destroyer. The subsonic missile is believed to have a range of up to 216 n miles and carries a 300 kg semi-armour piercing warhead, although CASIC states a range of 151 n miles for the export variant. The PLAN has also been upgrading its road-mobile coastal defence batteries with a new version called the YJ-62C.

The C-802 is also being offered in the submarine- and air-launched variants, known as YJ-82 and YJ-82K/C-802K respectively. The YJ-82 and YJ-83 are the most widely deployed ASMs in the PLAN, with the PLAN Air Force (PLANAF) employing the 135 n mile range YJ-83K (C-802AK) ASM on its Xian JH-7 fighter-bomber and H-6G bomber platforms. The YJ-82's successor is the supersonic YJ-63 (C-803) with a circa 160 n mile range and is deployed aboard the navy's Type 052C destroyer.

The latest and most capable missile, however, is the Yong Ji (YJ)-18 missile that equips the Type 052D destroyer. The vertically launched YJ-18 has a range of 290 n miles and a supersonic terminal phase. According to the US Department of Defense (DoD), the missile features a dual-speed propulsion system, with the flight profile initial subsonic at approximately Mach 0.8 for the cruise phase and – following the release of what the DoD describes as 'the sprint vehicle' – Mach 3 in the terminal phase, manoeuvring at up to 10 g to defeat the target vessel's close-in defences.

More recently, in November 2016 CAISC unveiled the export CM-302 ASM, which is claimed to maintain supersonic speeds throughout its mission profile. Based on the in-service YJ-12 supersonic ASCM, the new weapon is stated by the company to be a highly affordable but precise weapon capable of carrying a 250 kg warhead out to a maximum range of about 150 n miles with a high hit probability of 90%.

The CM-302 has a long-ogival nose and constant diameter cylindrical body, with four rectangular cross section fairings mounted at 90° intervals around the fuselage. An air intake closed by a jettisonable cover is located at the front end of each fairing, while one of the missile's cruciform-cropped delta wings and one of its cruciform tailfins are mounted further down the length of the fairing.

CASIC said the missile can be launched from air, land, and naval platforms, and modified for land attack missions. The company also states that it is specifically designed to engage naval vessels, such as aircraft carriers and destroyers, with a single missile having the potential to disable a 5,000-tonne warship.

Although official information on the CM-302 remains scant, it is believed that the baseline YJ-12 is powered by a liquid-fuelled ramjet engine and features a combination of an inertial navigation system (INS), radio frequency (RF) altimeter, and an active-radar seeker. The missile is believed to be guided by BeiDou satellite navigation to a target location, which can be constantly updated via datalink, before the radar seeker is activated during the terminal phase of the flight.

In January, CASIC was awarded a top prize in China's prestigious National Science and Technology Advancement Awards for the successful development of a new ASCM, according to a press release from the company's Third Academy – also known as China Hai Ying (Sea Eagle) Electro-Mechanical Technology Academy – which is responsible for missile development.

The company did not specify the new missile's designation in its release, although it did reveal that the new weapon, which can be launched from a surface combatant or a submarine, is the result of over 14 years of R&D and is "smaller in size but stronger in capability" than comparable missiles of the same size and weight class. According to CASIC, the unnamed ASCM stands out in the annals of the China's missile development history as "70% of the technology" applied to the missile is 'new' as opposed to the industry standard of 30% to manage technical risk.

Meanwhile, China's interest in fielding unmanned aerial vehicles (UAVs) has also resulted in a range of new or existing air-launched weapons being developed or adapted for UAV carriage. For example, the Aviation Industry Corporation of China (AVIC) is offering the new YJ-9E ASM, an export variant of its Tian Long 10 (Sky Dragon, or TL-10) missile developed by its Hongdu Aviation Industry Group subsidiary.

There are three known YJ-9E models: the YJ-9E with radar seeker, YJ-9EA with TV seeker, and YJ-9EB with a semi-active laser (SAL) seeker. AVIC indicated that the missile is capable of engaging not just ships, but also lightly protected structures and vehicles.

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