

Beyond the horizon: NSM missile homes in on Harpoon replacement market

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Success in the US Navy's Over-the-Horizon Weapon System competition is set to re-energise Kongsberg's efforts to grow sales of its Naval Strike Missile worldwide. *Richard Scott reports*

Foreign companies striving to break into the US defence market – and particularly the guided weapons sector - recognise that success is difficult to achieve given the lobbying power of US industry incumbents and the naturally protectionist instincts of Congress. Moreover, it is a market where there is no such thing as an overnight success: it typically takes many years, if not decades, to establish a presence, build partnerships, shape the market, and craft a strategy for business capture.

However, that is not to say that success is unattainable. In the 1980s, Norway's Kongsberg Våpenfabrikk sold its Mk 2 Mod 7 Penguin anti-ship missile to the US Navy (USN) to equip the service's SH-60B LAMPS III helicopter. While final missile offtake was smaller than expected, Penguin's sale to the USN, and integration with the SH-60B platform, provided a significant boost to the company's subsequent efforts to sell the helicopter-launched Mk 2 Mod 7 missile worldwide.



The design of the NSM emphasises the penetration of ship defences through a combination of low observability, onboard intelligence, and endgame kinematics. (Kongsberg)

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More recently, what is now Kongsberg Defence & Aerospace has achieved a second and potentially far bigger breakthrough. In May 2018 the company, in partnership with US prime Raytheon Missile

Systems, was selected to supply its Naval Strike Missile (NSM) to meet the USN's requirement for a new Over-The-Horizon Weapon System (OTH-WS). NSM will initially equip Freedom and Independence variants of the Littoral Combat Ship (LCS), and subsequently the next-generation guided missile frigate (FFG[X]); Raytheon and Kongsberg already have aspirations to equip other USN platforms, including units currently equipped with Harpoon.

Selection for the OTH-WS programme was the culmination of a protracted campaign, going back almost a decade, during which time Kongsberg had assiduously positioned itself in expectation of a requirement to 'up-arm' the LCS. Anticipating an opportunity sometime before a Program of Record was formalised, the company had worked to market NSM as a non-developmental, 'fifth-generation' precision-guided anti-ship weapon system that would meet nascent requirements for 'over-the-horizon' reach, survivability, target discrimination and lethality.

The fact that NSM was a new missile – and one for which the Norwegian government had already funded full development and qualification – was one of Kongsberg's trump cards. Another was the partnership with Raytheon, formalised in April 2015, which provided for the establishment of a US assembly line. And not to forget a successful live-fire demonstration from USS *Coronado* (LCS 4) in September 2014 under a foreign weapons evaluation.

While the OTH-WS competition has occupied much of Kongsberg's attention recently, it is by no means the only new opportunity for NSM. Having already secured sales in Malaysia, Poland, and Norway, the company was in June 2018 contracted for a year-long study which will see it establish requirements for the long-term evolution of the NSM weapon system to meet the needs of Norway and Germany. This follows the signature in early 2017 of a strategic co-operation agreement between the two governments.

Sovereign capability

Norway has, since the 1960s, nurtured and sustained a small but highly proficient sovereign guided-weapons sector. The origins of this indigenous scientific and industrial capability date back to the Cold War, and the development of the Penguin anti-ship missile. The Penguin was conceived to meet the Royal Norwegian Navy's (RNoN's) requirement for a highly discriminative anti-ship missile that could navigate through archipelagic waters and terrain, and then select and home in on its intended target.

The Penguin was originally developed by the Norwegian Defence Research Establishment [Forsvarets Forskningsinstitutt – FFI] in close co-operation with Kongsberg (as nominated manufacturer for series production) and the RNoN. Product responsibility was transferred to Kongsberg at the start of 1971.

The original Mk 1 ship-launched version of the Penguin entered service with the RNoN in 1972, with a first export contract signed by Turkey the same year. Subsequently, the Penguin evolved through several distinct design iterations, spawning the helicopter-launched Mk 2 Mod 7 variant (sold to Australia, Brazil, Greece, New Zealand, Spain, Turkey, and the United States) and the fast-jet Mk 3 version developed to equip Royal Norwegian Air Force (RNoAF) F-16s.

Towards the end of the 1980s the RNoN began to consider its requirement for a new ship-launched anti-ship missile to meet the needs of the 2010 to 2040 timeframe. Studies undertaken by the RNoN and FFI determined that none of the surface-to-surface guided weapons available on the market could suffice, not least because of the size constraints imposed by the RNoN's new fast patrol boats. Instead, the decision was made to start a new national development programme.

The staff requirement for what became the Nytt Sjømålsmissil – later re-branded and anglicised as the Naval Strike Missile – called for a high-performance, extended-range anti-ship missile with excellent target discrimination, a high probability of penetrating enemy defences, effective in open and confined waters, and easily adaptable to platforms of varying sizes from fast attack craft upwards.

"The operational analysis said that, if you are going to penetrate defences, you have two choices," said Hans Kongelf, Kongsberg's vice-president – missile systems. "You must either fly very fast at supersonic speed, or you fly [at] high subsonic [speed] but remain passive and stealthy.

"Our choice was the latter – a supersonic missile cannot operate effectively in enclosed waters like the Norwegian fjords, and the thermal build up in the nose does not allow for the infrared guidance required for precision targeting."

He continued, "Our conviction is that by staying passive you avoid detection until very late, enabling the missile to penetrate through the outer layers of defence. We understand that you will be detected late on in the terminal phase, so that demands very good agility in the endgame to evade close-in weapon systems."

In September 1991, Kongsberg was awarded a definition study contract that considered how best to engineer a guided-weapon solution to meet the RNoN's requirements. A full development contract followed in December 1996 and while design, engineering development, testing, and qualification of NSM proved to be more challenging than originally envisaged, the RNoN finally took the weapon into its inventory in 2012.

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