Following last month’s launch of the navy’s latest warship, the Ta Chiang, a heated debate has erupted in the media about whether the vessel can be classified as a “carrier killer,” with some claiming that it is a gross exaggeration of the ship’s capabilities.

So which side is right? Is the missile corvette a genuine “carrier killer” or not?

To find out, we must temporarily put aside the ship itself and instead focus on the missiles it is to carry: the Hsiung Feng III anti-ship missile.

The Hsiung Feng has a terminal velocity of Mach 3 and can skim less than 5m above the water’s surface. Supposing that the targeted aircraft carrier’s radar is positioned 50m above the water’s surface, its crew would, under optimum conditions, have about 40 seconds to initiate countermeasures.

In the real world, optimum conditions rarely occur. Complicating factors include weather and sea conditions, wave height, sea surface radiation, and the roll, pitch and yaw of the ship, as well as its gyroscopic alignment, radar performance, whether equipment in the ship’s operations room is on standby or fully activated, and the vigilance of the equipment’s operators.

If all of these factors are taken into account, an aircraft carrier would be lucky to have 20 seconds to react.

During this lethal time window, there is no room for a malfunction of equipment and systems, nor any form of human error.

The ship’s combat systems must accurately distinguish the target as an attacking missile, initiate tracking of the missile, lock on to the target, calculate the projectile’s trajectory, allocate the appropriate defensive weapon, ready the weapon for launch and fire it.

The ship’s defensive weapon must fire correctly, cleanly leave the ship’s vertical launch silo or weapons rack, climb to the correct height, gain speed to terminal guidance phase and hit the target.

While elements of the above sequence are automated, automation takes time.

Furthermore, if the defensive weapon is up against a hypersonic missile, and both operate at between Mach 3 and Mach 4, the difficulty of achieving a direct hit is akin to stopping a bullet with another bullet.

The key to a ballistic missile’s lethality is the speed at which shrapnel travels after impact and detonation, which can be calculated by adding the missile’s speed in flight at terminal velocity and its initial blast velocity.

If the initial blast velocity of the missile is Mach 3, the older version of the missile, the Hsiung Feng II, which is subsonic, would, on impact, discharge shrapnel at a velocity of just under Mach 4.

The Hsiung Feng III can reach Mach 3 during flight, so shrapnel would discharge at Mach 6 on impact. The increase from Mach 4 to Mach 6 might not sound particularly significant, but as a ballistic missile’s speed increases, its lethality rises in a geometric progression.

Therefore, if a warship is hit by a Hsiung Feng II, the warhead would penetrate between one and two bulkheads, and the exploding shrapnel would penetrate a further two or three.

A Hsiung Feng III warhead would penetrate three to four bulkheads and exploding shrapnel would penetrate a further three to four.

Such deep structural damage would be fatal to an aircraft carrier; it would only need to hit a fuel tank or one of the ship's magazines to trigger a chain reaction of explosions that, if it did not sink the vessel, would cause debilitating damage.

The Hsiung Feng III is clearly a "carrier killer" missile. The 700-tonne Ta Chiang is fitted with 16 anti-ship missile silos — twice the number of a 4,200-tonne Cheng Kung-class frigate. During conflict, the Ta Chiang would carry eight Hsiung Feng III and eight Hsiung Feng II. If it fired its entire missile payload at once toward an aircraft carrier, the damage would be incalculable.

The most effective way to defend against a saturation missile attack is to sink the platform carrying the missiles before they are fired. The Ta Chiang has a stealthy design and a shallow draft, which means that it can be hidden in one of Taiwan's many fishing ports.

Furthermore, the ship's data link is designed to enable it to fire missiles without emitting a electromagnetic signature, making it even more difficult for the enemy to detect.

Make no mistake, the Ta Chiang is a "carrier killer."

*Oliver Hwang is a retired navy captain.*

Translated by Edward Jones

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