

The 1987 HMNZS Southland USO Encounter

Kevin H. Knuth

Witness: Seaman David Barnett

Feb 1987, 175 mi NE off the tip of New Zealand's North Island



The *HMNZS Southland* was a (non-nuclear) Leander class Frigate. She was classified as an anti-submarine cruiser and operated both the G750 omni-directional sonar as well as the 177m attacker sonar.

In November of 1986, NZ DOD had the HMNZS Southland run exercises from Auckland about 20 km into the Hauraki Gulf and turn around and return with sonars in active mode to draw in and detect USOs. On multiple occasions the Southland was followed up to the harbor by a pair of unidentified underwater craft (USOs). These USOs did not present propellor noise and could not be identified. They would consistently break away before the Southland entered the harbor.

In February 1987, the Southland was located approximately 175 nautical miles North East off the tip of New Zealand's North Island. At one point the Southland's sonar detected a large underwater craft (USO) following directly astern that was estimated to be about 150 feet in width. Since the USO was directly astern, they could not determine the length of the object. Again, the USO could not be identified as no propellor sounds were detected. The USO moved silently.

The USO was directly astern at all times and it maintained a constant distance of 20 km and with a relative speed that was again constant to the ship. The ship's speed this was continuously changing from between 20 knots at its slowest to around 28 knots as the captain attempted to shake the object off. The ship also carried out during this time random course changes from port to starboard whilst also increasing and decreasing speeds.

During one sharp turn, the sonar operators were able to measure the length of the USO, which was approximately 800 feet. The largest submarines are the Typhoon class submarines with a length of about 575 feet. The USO was 30% longer than the largest known submarine.

After the turn, the USO began to accelerate closing the 20 km distance from the Southland. It took between 25 and 30 seconds for the USO to close the distance and pass beneath the Southland, which was when the ship lost all power and was left adrift leaving the crew on deck waiting for hours to be spotted and rescued.

Clearly the USO had to accelerate to close the 20 km distance that it had been maintaining. Here we perform two calculations to estimate the speed, and acceleration of the USO.

The first calculation involves estimating a minimum speed for the USO. We assume that the USO instantaneously accelerates from the original speed of about $v_o = 20 - 28 \text{ knots } (23 - 32 \text{ mph})$ to a higher speed, v , which it then maintains closing the distance. This will be a lower bound on the underwater speed of the USO as it closes the $x = 20 \text{ km}$ distance in $t = 30 \text{ s}$.

$$v = \frac{x}{t} = \frac{20 \text{ km}}{30 \text{ s}} = 0.667 \text{ kps} = 1492 \text{ mph}$$

So, at minimum, the USO was observed to be traveling at about 1500 mph underwater.

The second calculation is based on assuming a minimum acceleration. Here we assume that the USO accelerates at a constant rate during the maneuver.

$$x = \frac{1}{2} a t^2$$

$$a = \frac{2x}{t^2}$$

$$a = \frac{2 \cdot 20 \text{ km}}{(30 \text{ s})^2} = \frac{4 \text{ km}}{90 \text{ s}^2} \cdot \frac{1000 \text{ m}}{1 \text{ km}} = \frac{400 \text{ m}}{9 \text{ s}^2} = 44.4 \frac{\text{m}}{\text{s}^2} = 4.5 \text{ g}$$

with at top speed of

$$v = at = 44.4 \frac{\text{m}}{\text{s}^2} \cdot 30 \text{ s} = 1332 \frac{\text{m}}{\text{s}} = 2980 \text{ mph}$$

At minimum the acceleration was 4.5 g (4.5 times the acceleration of gravity at Earth's surface), with a maximum speed of almost 3000 mph underwater.

In summary, we can safely say that the 800 foot long USO performed a maneuver exhibiting an acceleration of at least 4.5 g, reaching a speed somewhere between 1500 and 3000 mph underwater.