VICTUS

ON-WATER RESULTS
BAYVEIW, IDAHO
AUGUST 2026

PhantomNAV™

Maritime Performance

What PhantomNAV™ Is

A Machine Learning State Estimator (MLSE): a software-based navigation system that turns a platform's existing inertial sensors into a synthetic, GPS-equivalent position, correcting drift by feeding position corrections into a Kalman filter.

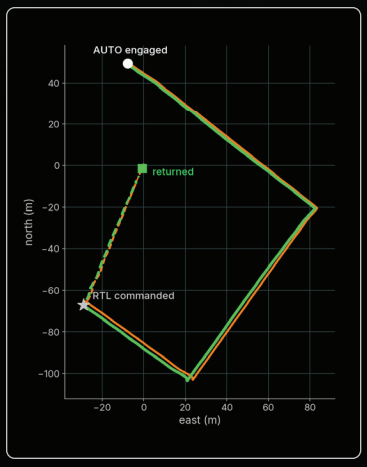
The Test

On-the-water testing put an uncrewed surface vessel (USV) through a five-waypoint autonomous leg, then commanded it home mid-sequence — returning to stop 1.8 m from its launch point. Throughout, the synthetic solution was injected into the autopilot in place of GPS: it is what the autopilot actually navigated on, with the vessel's physical receiver logged alongside only as an independent truth reference.

PhantomNAV™ POSITION ACCURACY

0.9%	**Drift, Autonomous Leg** Five-waypoint mission, 281m travelled, 2.44m off truth over the leg.
24,770 /24,770	PhantomNAV™ position updates **all passed** the autopilot's built-in validity checks, the same checks that catch a corrupted or spoofed signal. A physical receiver can fail those checks under multipath or a weak signal; this stream never did.

GPS1 (TRUTH) VS. GPS2 (PhantomNAV™ SYNTHETIC)



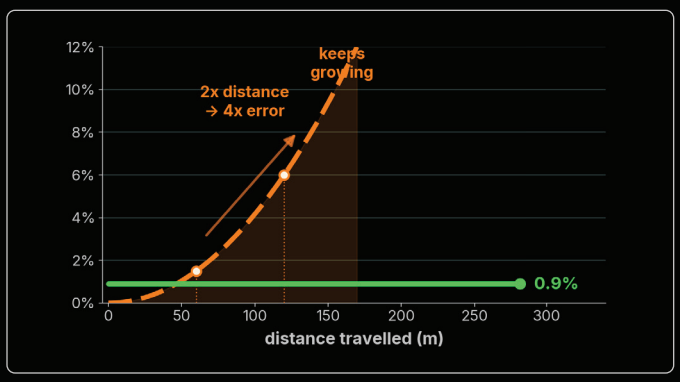
GPS1, the vessel's physical receiver: truth.

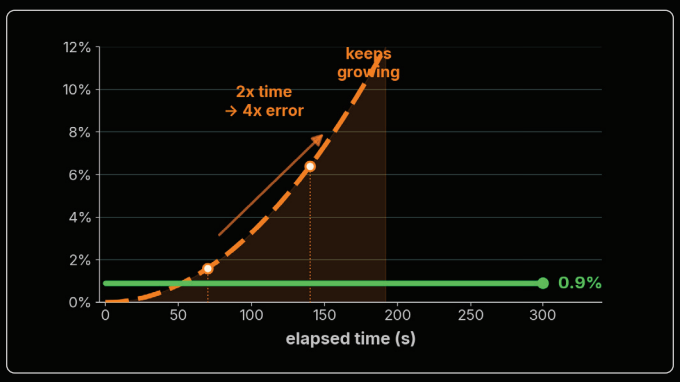
GPS2, PhantomNAV™'s synthetic solution: a separate, machine-learning-derived position channel.

Autonomous waypoint leg.

Commanded return. Recorded by the autopilot itself, one timebase, 9,554 and 53,129 position fixes.

DRIFT OVER DISTANCE AND TIME





PhantomNAV™, Autonomous leg (measured)

Unaided intertial dead reconking: error compounds with the square of time (illustrative shape)

PhantomNAV™ holds its accuracy over a mission instead of compounding, and improves as more sensor data trains the model. Drift here is measured against the known route. Unaided inertial dead reckoning, a platform's IMU integrating its own output with no velocity correction, compounds instead: doubling the distance or time roughly quadruples the error, growing with nothing to bound it. The dashed curve shows that well-established shape and is illustrative, not a measured comparison.

© VICTUS Technologies, Inc. (CAGE: 9UH37)

VICTUS

ON-WATER RESULTS
BAYVEIW, IDAHO
AUGUST 2026

HOW PhantomNAV™ IS BUILT

STEP 01	STEP 02	STEP 03
Measure	**Calibrate**	**Simulate**
Allan-deviation decomposition of the vehicle's own inertial logs into noise, bias instability, and random walk.	Imprint that measured error onto the simulator's clean inertial stream, then re-profile to confirm it landed.	Bespoke physics per domain, vessel hydrodynamics or multirotor rigid body, generating motion and ground truth.

STEP 04	STEP 05	STEP 06
Train	**Filter**	**Navigate**
A temporal convolutional network learns velocity over ground from a five-second window of inertial data.	Integrate velocity into a bounded position, learning the model's own bias while satellite navigation is healthy.	Present the result to the autopilot as a second receiver, and hand over cleanly on loss.

SCALES BEYOND THIS RUN

Falls Within The Predicted Range

The trial protocol predicts roughly sevenfold variation between runs of an unchanged system. Five runs that same day spanned position accuracy from about 3 m to 21 m, a spread that matches the prediction almost exactly, and this run sits inside it.

A Fraction Of The Cost

Quantum-grade inertial sensors require cleanroom fabrication, capping production at small volumes. PhantomNAV™ is software, running on sensors already aboard.

Built For Integration

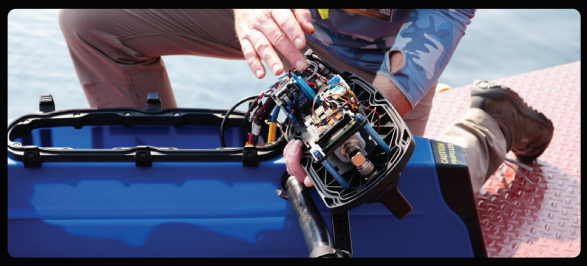
PhantomNAV™ fuses with whatever reference is on the platform, from a paddle-wheel to next-generation Alternative Positioning, Navigation, and Timing (ALT PNT) sensors, strengthening existing investments across any hull.

NEXT STEP: SCHEDULE A CAPABILITY BRIEF
info@getvictus.ai

TEST PLATFORM







Blue Boat uncrewed surface vessel (USV) on the water at Bayview, Idaho, August 2026: low-cost inertial measurement units (IMUs) and a commercial-off-the-shelf (COTS) guidance, navigation, and control (GNC) system, no augmentation. This performance is a floor; better-instrumented platforms should only improve on it.

© VICTUS Technologies, Inc. (CAGE: 9UH37)