

How to Win the Maritime Resupply Logistics War

By CAPT Richard Brasel, USN (Ret.), Chief Revenue Officer, PteroDynamics Inc.

It is no secret to anyone who has had the privilege to serve with the Navy or Marine Corps that maritime logistics and resupply is a time-consuming, complex, and absolutely essential part of Naval operations. Logistics is the lifeblood that makes all operations possible.

The mission becomes much more complicated once a battle group is deployed at sea for any extended time. Maintenance requirements and ensuring critical parts and supplies get to the ships and crews where and when they are needed become a daily focus for many Naval Aviators. As a helicopter pilot, I lived this reality executing many vertical replenishment (VERTREP) missions.

The problem of supplying urgently needed repair cargo to vessels hundreds of miles out at sea – out of range of helicopters – gets more complex, time-intensive, and expensive. These missions require the significant expense of sending a CMV-22 VTOL aircraft or C-2A to a carrier where its cargo can then be transported via helicopter to another vessel.

In addition to operational costs and personnel hours required, these logistics missions reduce the operational lifespan of combat helicopters that are expensive to maintain and operate. That's a lot of money and energy to expend on delivering cargo that almost always weighs less than 50 lb. According to a recent U.S. Navy Sealift Command CASREP, out of nearly 3,500 deliveries, only 10% of the items weighed more than that. In fact, 48% of items delivered weighed less than 1 lb.

The UAS Solution to Maritime Resupply

Recent technological advancements hold the promise to make highly automated VTOL unmanned aerial systems (UAS) an ideal solution for shore-to-ship, ship-to-ship, and ship-to-shore logistics, and the U.S. Navy is working with industry partners to fast-track innovation.

The capability to fly a fleet of small, far less expensive automated VTOL UAS aircraft off carriers, supply ships, or from shore to deliver critical parts and cargo hundreds of miles away would undoubtedly improve readiness levels. Imagine autonomous VTOL UAS aircraft flying to vessels deployed 250-300 miles away to deliver a payload, recharging or refueling, taking off with new cargo, and flying back. What now might take a week to get a critical part could be accomplished in less than a day.



Transwing operating off the flight deck of USNS Burlington (T-EPF 10) during the Hybrid Fleet Campaign Event.

Making autonomous UAS maritime resupply missions like these a feasible reality requires a step up in baseline performance capabilities: superior VTOL performance, range and endurance that surpasses what's available in current designs, speed to reach remote locations, the ability to operate in austere and contested environments, and the technology for highly automated operations. In other words, a highly automated UAS platform that performs like a great fixed-wing aircraft with superb VTOL capabilities.

UAS Coming of Age at the Navy's Hybrid Fleet Campaign Event

We're beginning to see UAS platforms that meet many of these performance capabilities. PteroDynamics demonstrated the capabilities of its automated Transwing® VTOL UAS at the U.S. Naval Forces Southern Command/U.S. 4th Fleet Hybrid Fleet Campaign Event (HFCE) last October. The event was a proving ground for emerging unmanned systems and an opportunity for senior leaders to see the capabilities that could support the Fleet. In attendance were Navy leaders including Chief of Naval Operations, Admiral Lisa Franchetti, representatives from 10 foreign partner countries, and 18 industry partners.

Transwing aircraft flew nine autonomous launch and recovery flights from USNS Burlington (T-EPF-10) during the HFCE. The Transwing represents a very different approach to VTOL aircraft design. It overcomes inherent limitations in other VTOL designs by combining the speed, range, and endurance of fixed-wing aircraft with outstanding



CNO Admiral Franchetti and other representatives receive a briefing on the Transwing from Tim Whitehand, PteroDynamics' VP Engineering, onboard USNS Burlington (T-EPF 10) at the U.S. Naval Forces Southern Command/U.S. 4th Fleet Hybrid Fleet Campaign Event (HFCE) in October 2023.

VTOL performance. Its wings fold and unfold to transition quickly and smoothly between vertical and horizontal flight. With wings folded for VTOL operations, the Transwing has a high degree of controllability so it can take off, land, and maneuver in turbulent winds and in high sea states. When airborne, it then unfolds its wings to become a highly efficient fixed-winged aircraft.

Because the Transwing design eliminates the extra drag and weight of multiple additional propulsors, the aircraft has greater range and endurance and can fly at high speeds to reach remote locations without runways. The aircraft doesn't require additional infrastructure or crew training for launch and recovery, and its folding wings give it a small operational ground footprint for easy storage.

U.S. Navy as an Innovation Partner

The Navy is playing an important, active role in working with industry partners to advance and operationalize the latest technologies, systems, and procedures. October's Hybrid Fleet Campaign Event provided an invaluable experimentation venue for multiple developers of the latest technologies to embark with the operational force, evaluate the capabilities of new innovative systems in a real-world environment, and receive important operational performance data and feedback.

The Transwing's successful flight tests conducted from USNS Burlington provided critical data on the platform's key operational capabilities, including autonomous takeoff and landing from a flight deck with computer vision, integration of the UAS with ship operations, navigation to and from a moving ship at sea, and transition from VTOL to cruise flight performance.

There still is work to be done to advance the underpinning technologies that will lead to the widespread adoption of automated cargo delivery to all the ships in the Fleet. One example is the technology to eliminate the need for a ground control station (GCS) and ground crew on every ship to receive UAS-delivered cargo.

A very important part of this equation is the continued close collaboration between the Navy and industry innovators to define requirements and speed innovation. Programs like the HFCE play a critical role in accelerating the development of the latest unmanned technologies that will provide the Navy with next-generation automated cargo delivery capabilities.

About the Author

CAPT Rich Brasel, USN (Ret.) is Chief Revenue Officer at PteroDynamics, an innovation leader in autonomous VTOL aircraft systems. A former DoD Major Program Manager and Naval Aviator, Rich has over 20 years of experience developing, testing, and fielding unmanned aerial systems. He was a U.S. Navy test pilot and served as the Commanding Officer of the U.S. Naval Test Pilot School. PteroDynamics Inc. is an innovation leader in autonomous vertical takeoff and landing (VTOL) aircraft systems. PteroDynamics' Transwing® aircraft unique capabilities are ideal for automating time-sensitive delivery of critical high-value payloads to hard-to-reach locations with no runways and in austere conditions, including maritime logistics support, payload delivery to remote locations without airstrips, and reconnaissance and surveillance. For more information, please visit www.pterodynamics.com.