

May Community Center Computer Class

Taking 3D-Printing to Sea



The U.S. Navy Is Taking a 3D-Printing Factory to Sea

A Portable Factory Aboard the USS Essex. (U.S. Navy amphibious assault ship that functions much like a small aircraft carrier and supports Marine forces.)

During a two-week voyage to the RIMPAC 2026 exercise in Hawaii, the **USS Essex tested a portable manufacturing system that can make parts—and even complete drones—while the ship is at sea.**

The Firestorm Labs **xCell expeditionary manufacturing system** produced more than **1,000 parts and 12 operational FPV drones** during the voyage.

Key Takeaways

1. More than 1,000 parts were manufactured at sea.

These included replacement parts, tools, brackets, covers, gauges, and other equipment requested by the crew.

2. **The ship manufactured 12 operational drones.**

The Squall FPV quadcopters were built during the voyage and later flown during RIMPAC exercises as simulated enemy aircraft.

3. **The drones can reach 80 mph.**

Squall drones have a reported range of up to **20 miles**, flight time of up to **42 minutes**, and payload capacity of about **5.5 pounds**.

4. **Some printed parts solved important maintenance problems.**

The system produced Apache helicopter rotor droop-stops designed to help prevent potentially **\$500,000 in rotor damage**, along with a custom coupling needed for life-preserver testing.

5. **The factory kept working in rough seas.**

Manufacturing reportedly continued despite waves reaching approximately **12 feet**.

6. **The biggest advantage may be faster repairs.**

Instead of waiting days or weeks for certain replacement parts to be shipped or flown to the vessel, crews could potentially manufacture them **aboard the ship within hours**.

What Does “Containerized” Mean Here?

The xCell factory is built into **two expandable standard 20-foot ISO shipping containers**—approximately the footprint of one 40-foot container.

Inside are industrial 3D printers, assembly equipment, and other manufacturing systems.

Because the factory is containerized, the entire manufacturing operation can potentially be transported by **truck, ship, or other military transportation** and deployed wherever it is needed.

Why This Matters

The important idea is manufacture instead of transport.

Traditional: Part breaks → Find replacement → Ship it → Deliver it → Repair

At-Sea Manufacturing: Part breaks → Make it aboard ship → Repair

Not every military part can be 3D printed. But for parts that can, a portable factory could reduce dependence on warehouses, aircraft, ships, fuel, and vulnerable supply routes.

The drones make the headline. The ability to manufacture ordinary replacement parts on demand may be the bigger story.