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Today

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Unmanned Flight Plan

Lockheed Martin approaches UAV market from many directions

Michael Nysse, multifunctional analyst at Tactical Systems in Eagan, Minn., demonstrates the hand-launched Desert Hawk.

The late Clarence "Kelly" Johnson, legendary founder of the Skunk Works,® predicted decades ago that fighter jets eventually would "become drones with the ability to do everything a man-operated plane can do."

While Kelly was right that the industry would advance the state of the art in unmanned aerial vehicles (UAVs), a balance of manned and unmanned systems must be maintained and the Corporation realizes that the challenge is much bigger than the platform itself.

Defining the role of unmanned aircraft (whether for combat operations or intelligence gathering), building a trusted communications architecture, managing an integrated airspace with manned and unmanned systems, and making UAV control and ground support less labor intensive are proving to be every bit as important as designing the aircraft.

That's why Lockheed Martin has spent as much energy developing UAV command-and-control and related technology systems as it has designing UAV platforms. The strategy has resulted in the Corporation building a broad portfolio of unmanned aerial system (UAS) capabilities that will keep it embedded in the UAS business for decades.

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Birds Of A Feather

LM Aero dramatically improves handling of C-130 wing-part when all disciplines work together

If you had visited the material handling area of the C-130 production facility in Marietta, Ga., earlier this year, you would have seen stacks of long wooden crates covering thousands of square feet of floor space.

Workers would have been maneuvering fork lifts and cranes to lift the heavy wooden crates, prying open the lids, and carrying off piles of nail-studded wood and packing material.

Today, it's gone. All of it.

A cross-functional team at the site devised a novel solution in which the wing stingers and panels now arrive on reusable wheeled containers that roll directly onto the production floor. In addition to removing tons of waste from the facility and eliminating safety hazards, the solution improves production efficiency at a critical time for the Lockheed Martin Aeronautics facility.

If it sounds simple, it is — now that it's in operation. But getting to the point where the new system was ready for implementation in August took a determined effort by a tenacious team that overcame many challenges.

"The old process was very inefficient, and it was something that the material operations people wanted to change for years," says Dave Yenowine, supply chain management director at the site and project sponsor. "This time, everything came together. We had F-35 work coming on and we needed the floor space. We had new C-130 programs starting that were tripling the amount of work. And we have a strong focus on safety."

The project started in 2007 with a process mapping event that included representatives from material operations, production and procurement. The group looked at everything from how the parts were received from the supplier, processed through the warehouse, issued to production and handled by the mechanics on the production floor.

Members of Aero's wing-part efficiency team include, from left, Marsha Childs, project co-lead, Mike Beauchamp, ESH engineering manager, Mike Fulp, technical lead, and Kristin Bell, project co-lead, shown here in the C-130 production facility in Marietta, Ga.

In the course of the exercise, Kristin Bell, a Supply Chain Management operations engineer and

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Wing

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co-lead on the project, realized there was an aspect of the process that hadn't been given much thought — the huge volume of waste it generated.

Much of the wood from the crates was recycled, but sometimes the recycling yard would reach capacity, and nearly 100 tons a year had to be taken to a landfill. Plus, the volume of waste would be growing with the production rate increase of the C-130 program.

"We had never even thought about getting rid of the wood containers until we mapped out the process," Bell says. "But when we started asking questions about how we receive the parts and dispose of the waste, that's when we brought ESH (Environment, Safety and Health) into the project."

Bell took Mike Beauchamp, the site's ESH engineering manager, down to the floor to see the existing process, and he quickly saw an opportunity.

"The wood had nails sticking out all over and had to be moved off the floor," he says. "And then you had the crane moving these large crates overhead where people are working and all the dangers associated with that. The new solution eliminates all of that."

ESH quickly became one of the project's biggest supporters and helped move it ahead. Also contributing to the business case was the money that would be saved by avoiding the purchase of a replacement stacker crane, foregoing the cost of activating a new warehouse, and reducing the number of employee hours spent stacking, uncrating and moving parts. The total overhead cost savings (not including the capital cost avoidance) is about $250,000 a year.

> *"This process change was a really big deal. We needed everyone involved and we had to test it on the floor to prove that it was going to make production more efficient, not disrupt it."*
>
> ***— Kristin Bell, Supply Chain Management operations engineer and co-lead on Aero's wing-part efficiency team***

Once the project got the go-ahead, Bell and her co-lead, Marsha Childs, and the technical lead, Mike Fulp, set to the task of identifying the optimal solution and bringing it to fruition.

Here's how their solution works:

The parts are shipped from suppliers to a third party logistics company, Boneal, located in Kentucky within a one-day drive of the Marietta plant. The company, which is a small business located in a federal HUBZone, uncrates the parts, sorts them and loads them into a wheeled transportation container.

Boneal is provided a production schedule and ships the needed kit configurations to support the schedule. The company ships two containers at a time to reduce truckloads.

When they arrive, the containers roll off the truck onto a loading dock and then onto the production floor just in time to support the wing shop's manufacturing schedule. Once the parts have been loaded into assembly jigs, the containers are then returned to the logistics company for reloading.

The transportation containers, which are approximately 50 feet long, were custom designed and supplied by a local veteran-owned small business selected through competitive bidding. They feature hinged arms that swing out of the way as each stacked part is lifted vertically from the container, making the next part readily accessible.

The process eliminates the need for employees to handle the parts from the time they arrive at the loading dock until they're placed on the assembly jig.

"This process change was a really big deal," Bell says. "We needed everyone involved and we had to test it on the floor to prove that it was going to make production more efficient, not disrupt it."

Since the process has been implemented, the plant has been able to reclaim 60,000 square feet of "beachfront real estate" needed to rearrange the production floor to support F-35 production.

Another huge benefit of the project extends far beyond the C-130 program, says ESH engineer Beauchamp.

"We're going to be able to take the lessons learned from this project and use them over and over again on similar initiatives," he says. "It demonstrated that ESH objectives and production efficiency really do go hand in hand when everybody works together toward a common goal." ■

INFO For more information about the new wing-part handling process at Lockheed Martin Aeronautics, contact Kristin Bell at 770-494-2736, **kristin.bell@lmco.com**.

Chief Of Naval Operations Conducts F-35 Integration Summit At Center For Innovation

U.S. Navy Admiral Gary Roughead, Chief of Naval Operations, participated in a special demonstration event at the Center for Innovation in Suffolk, Va., in September. Roughead and 15 additional flag officers and service officials were part of an F-35 Lightning II fighter integration summit hosted by the Lockheed Martin Aeronautics business area in a combined effort with Information Systems & Global Services (IS&GS) and Electronic Systems business areas and the Corporate Engineering & Technology organization. The event featured information on the capabilities of the Center for Innovation with a demonstration of F-35 aircraft battlespace integration. "This was one of the best examples of Lockheed Martin horizontal integration we've achieved," said Aeronautics Executive Vice President Ralph Heath. Shown in the photo at right, from left, are John O'Neill, vice president, MS2 in Electronic Systems; Ralph Heath, executive vice president, Aeronautics; Ray O. Johnson, the Corporation's senior vice president and chief technology officer; and U.S. Navy Admiral Gary Roughead. At left, Admiral Roughead observes as Randy Peterson, director, IS&GS-Defense, explains the end-to-end Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) experimentation framework using a combination of live, virtual and constructive simulation as well as real hardware- and software-in-the-loop at the Center for Innovation.