New machine dedicated to composites

By Jay Levine
X-Press Editor

Increasingly complex composite components and parts require the latest industry-standard equipment. Recently, the Dryden Experimental Fabrication Facility began operation of such a machine.

The five-axis router enables easier fabrication of composite parts, frees up other machinery, and allows the fabrication facility to handle the creation of the latest composite parts and components, explained Ed Swan, Experimental Fabrication branch chief.

Increasing numbers of aircraft are made of, or are using, composite materials like lightweight and stronger carbon-carbon fibers. That includes several Dryden planes, such as the Global Hawks and Ikhana aircraft.

Though other fabrication facility tools are capable, the five-axis router is dedicated to making composite parts and does not require the delays caused by waiting for the other machines to be freed up to make the part, he added. The parts are also more easily and efficiently made on the router, without the

See Router, page 4

Phantom Eye arrives

By Gray Creech
Dryden Public Affairs

The Boeing Co.'s unmanned hydrogen-powered Phantom Eye high-altitude, long-endurance demonstrator aircraft has arrived at Dryden for assembly and flight-test preparations.

Dryden is hosting the Boeing flight-test operation, providing hangar facilities, engineering, ground test and test range support. The aircraft is expected to fly sometime this year.

Flight tests of the Phantom Eye, like those of Boeing's smaller Phantom Ray unmanned air vehicle that arrived at Dryden last year, will be conducted under a Boeing-funded commercial Space Act agreement with NASA. The aircraft, in several crates, arrived at Dryden March 25 after being trucked from the company's Phantom Works facilities in St. Louis.

Developed by Boeing, the Phantom Eye is a propeller-driven lightweight aircraft with a high-aspect-ratio, 150-foot-long wing. The fuel efficiency of the hydrogen-fueled propulsion system, coupled with use of winds to stay on station, is expected to enable the aircraft to stay aloft for up to four days while carrying a 450-pound payload.

Two modified Ford automotive engines provide power.

The Phantom Eye technology demonstrator is the forerunner of a planned larger version of the craft that is being designed to remain aloft for up to 10 days. The larger version could carry payloads weighing more than 2,000 pounds for persistent intelligence, surveillance, reconnaissance and communications missions.

Phantom Eye is an updated version of Boeing's Condor aircraft, which set several records for altitude and endurance in the late 1980s.

The Phantom Eye high-altitude, long-endurance aircraft arrived in crates at Dryden March 25. Plans call for it to fly later this year.
Three high school robotics teams sponsored or supported in part by the Dryden Office of Education participated in the FIRST organization’s regional robotics games in San Diego during the second weekend of March. Two of the teams learned that initial designs don’t always achieve the desired performance, when their robots were tested—and occasionally failed—in the crucible of competition.

The three teams - Lancaster High School’s Eagle Robotics, Antelope Valley High School’s Antelopes and Tehachapi High School’s Cyber Penguins—will try again in a second round of regional contests. Antelope Valley and Lancaster teams competed in the Los Angeles regional games in Long Beach March 25-26, while Tehachapi High’s team is entered in the Las Vegas regional April 1-2.

According to Lancaster High School Eagle Robotics team members Jeremy Germita and Lauren Parke, their team won 11 of its 15 matches, resulting in the team being named regional finalists and part of the seventh-seeded three-team alliance. However, in their last match of the competition, their robot, nicknamed “James Bot,” sustained several mechanical failures, one after another.

“The loss in the final match was caused by several subsystems failing—the left side drive wheels’ tread broke off, the mini-bot did not deploy, and, most spectacularly, the arm broke off. Smoke poured from James Bot as he limped across the field,” the pair wrote in an email. “In the end, we learned about our errors and plan to be back stronger than ever, at the Los Angeles Regional in Long Beach.”

Tehachapi High’s Cyber Penguins had a similar learning experience, according to the team’s advisor, Danielle Evansic.

“Our innovative round design was complemented by the light fiberglass frame the students designed and fabricated during the build season,” Evansic wrote.

“Unfortunately, programming and electrical issues kept the robot from performing up to snuff, and once those were addressed, we...”

See Robotics, page 3
NSSC celebrates five years

March 1 was the fifth anniversary of the NASA Shared Services Center. A ceremony marking the occasion was held March 17 at the NSSC facility at the Stennis Space Center in Mississippi.

More than 500 current and former employees and guests attended. Outgoing executive director Richard Arbuthnot was master of ceremonies, with David White, former program manager with contractor Computer Sciences Corp., appearing via video. Both have been with the NSSC since it was established.

Special guests in attendance included Woodrow Whitlow Jr., associate administrator of NASA’s Mission Support Directorate; James L. Jennings, former NASA associate administrator of Institutions and Management; and Mina Sami, vice president and general manager of the CSC Business Services Division of Science, Engineering and Technology Solutions.

During the ceremony, Arbuthnot expressed pride and gratitude to those in attendance. “As you already know, my last day at the NSSC is [March 18],” he said. “It really means a great deal to me to be able to be with you at this event. We have set a high bar at the NSSC, but with the caliber of employees we have here, I am confident the NSSC will continue to be a success story.”

Since opening, the NSSC has established itself as a leader in the shared services industry. In 2007, the Shared Services and Outsourcing Network named the NSSC as runner-up in the Best New Captive Services Organization Excellence Award in 2009. More recently, the SSON Corporate Executive Board announced the NSSC as the 2010 Force of Ideas Award winner for Shared Services Performance Measurement in the Advanced Shared Services category.

The NSSC is a public/private partnership between NASA, CSC and the states of Mississippi and Louisiana. The NSSC conducts selected business activities in financial management, human resources, information technology and procurement for all ten NASA field centers.

Robotics...from page 2

discovered that the gearing was under-designed. The robot did not meet expectations at the San Diego regional, but students learned a valuable lesson about build quality and the need to be able to rapidly diagnose and adapt to problems in the field. We’ve ordered replacement gears, the students have the robot ready to receive those gears, and we will hit the ground running as soon as we get to our next competition.”

FIRST – For Inspiration and Recognition of Science and Technology – is a nonprofit organization founded in 1989 to stimulate appreciation of science and technology in young people, their schools and their communities. The robotics program was developed to inspire curiosity and create interest in science, technology, engineering and mathematics among high school students. Through the NASA Robotics Alliance Project, NASA provides grants for 297 teams and sponsors four regional student competitions to encourage young people to investigate careers in the sciences and engineering.
The router, which is dedicated to composite work, can be programmed to cut a mold. Simultaneously, the technician prepares the composite set-up so everything is ready to make the part without delays or holding up work on other projects. It takes half the time to fabricate a mold for a part or component using the router.

The new machine also specializes in making molds out of a number of materials and can fabricate parts as a single piece. Once the mold is made, the composite material can be applied to it and then pulled off.

The equipment was an essential addition to the fabrication facility’s capabilities in order to keep pace with industry standards for making composite parts. The addition of the machine allows Dryden the capability of making parts here, rather than contracting out for the work, Swan said.

Besides providing more control of schedule and costs, Swan said it also allows more flexibility in meeting the needs of the researcher or technician that needs a special one-of-a-kind component or part.

For example, he said the part design might be the first of its kind and the engineer might not have the exact specifications and notice changes are needed as his or her research continues. Because the part is made at Dryden, the center doesn’t have to pay for changes that are required along the way and the needs of the researchers and technicians can be met without losing more time, he said.

Already fabricated by the new router are parts for the G-III, the ER-2 and the Global Hawk. Whatever the composite part or component fabrication job, the fabrication facility is now better prepared to handle it.