BY RUSS OLEXA, EDITOR-AT-LARGE

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To engrave the various control buttons and knobs on this Airbus A330's control panel, Gables Engineering uses a fiber laser.

Focused on MARKING

Fiber lasers speed up and simplify myriad applications

Product marking applications are often done using dated equipment, such as pantographs, acid etching or other mechanical methods, including a hammer and punches.

These methods are slow and laborious, however. Today, for high-volume marking, lasers have pretty much taken over because of their low cost, high efficiency and ability to do just about any type of marking or etching on many kinds of materials, including metal.

One company that has benefited from laser marking is Gables Engineering, Coral Gables, Fla. It produces aircraft control panels for communication, navigation and audio, along with many specialty items, including cabin smoke detectors and weather radar control panels.

These products require some type of marking, which can include numerals, letters or etched artwork on glass for LCD displays.

Craig Kirsch, manager of mechanical and manufacturing engineering, says that at one time, Gables Engineering used a Gorton pantograph machine, which was like a small milling machine, to put information on front panels. But this equipment had drawbacks, such as being slow and limited as to the types of work it could do.

Gables Engineering was started by Victor Clarke, who made control panels in a small storefront in Coral Gables, Fla., in 1946.

With his thorough knowledge of the aviation industry, the company established an international reputation as a source for reliable, custom-engineered control panels, audio systems and related products for aircraft.

Today, Gables Engineering believes in investing in the best technologies and equipment and has developed many proprietary processes.

Additionally, the company is vertically integrated, offering its customers a rapid design-to-production cycle with optimal control quality and delivery.

Sum of its parts

Gables Engineering uses a turret punch press to produce the various holes in sheet metal for equipment such as digital audio systems and radios in its control panels. For other machined areas, it uses milling and turning centers.

"We buy some electrical components, but we also make switches in house," says Kirsch. "When you're looking at an aircraft control panel's faceplate, there's anywhere from 4 to 8 in. of electronics behind it that are also part of the unit. We make the unit electronics behind it and the faceplate, [which] would generally be a clear piece of acrylic plastic that's painted white then painted again, either black or gray, over the white. We laser engrave the nomenclature or artwork through the colored paint to the white on the front panel."

A cockpit display's basic framework is 1/16-in.-thick coated aluminum (to prevent oxidation) for the front and a piece of painted clear plastic laminate for the faceplate with a 1/32-in.-thick aluminum cover wrapped around everything.

Kirsch says there might be four 1/4-in. square posts attached at the four corners

Photo: Airbus

for the framework of the unit. This gives the control panel a depth of anywhere from 2 in. to 8 in.

"You have a faceplate, a back plate and an aluminum cover that wraps around the sides and top to contain it all," he says. "We use a lot of aluminum in the basic structure, and then of course you have the electronics and PC boards inside, behind the control panel. But some of the newer front panels are cut out of aluminum plate. Control panels can be made either way."

Building a panel

Kirsch says that after a control panel has been approved for a particular design for an aircraft, it will have to go through a certification process to make sure it meets all Federal Aviation Administration requirements, along with those of the mainframe manufacturer, such as Boeing or Cessna.

This usually means the panel must meet everything from shock to vibration to flammability requirements, as well as be able to operate properly under all these conditions.

Once the design is approved, the production programs are sent to the various manufacturing areas to produce the parts and make the assemblies. Gables Engineering will build a one-off order or produce hundreds of panels.

Marking faster and easier

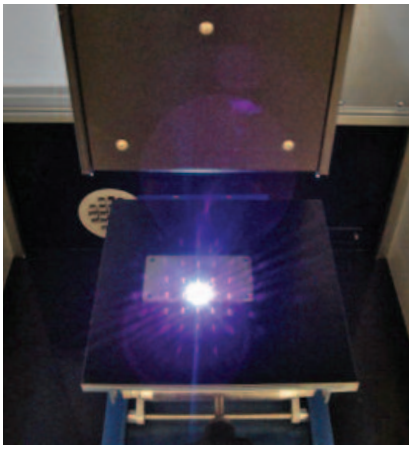
After it moved away from the Gorton pantograph, Gables Engineering bought YAG lasers for marking. But Kirsch says this equipment had a great deal of maintenance issues.

"About 15 years ago, we went to a YAG laser that was a lot quicker than the pantograph and did a better job," he says. "But later we found ourselves spending [thousands of dollars] per year to keep them running. The maintenance costs were getting a little out of hand."

Gables Engineering was also using a laser from Laser Photonics, Lake Mary, Fla., for its LCD control panel manufacturing.

"Using their laser, we were scribing lines on the glass where it would be snapped apart," says Kirsch. "Then when their fiber lasers came out, Laser Photonics offered us a unique solution to our marking problems."

> "[Laser Photonics'] equipment has worked out very well for us, and we have developed a valuable relationship with the company."
>
> **Craig Kirsch,** manager of mechanical and manufacturing engineering, Gables Engineering



Left: A Laser Photonics fiber laser is used for scribing work.
Right: An aircraft control panel shows the various types of information a pilot needs to know.

Over several years, Gables Engineering bought two Fibersource XPs from Laser Photonics to mark front panels and two Fibersource XP Pluses to do the artwork on coated glass used to make LCD panels.

"We bought one about four years ago, and then a year later, we were so happy with it that we purchased another one," says Kirsch. "Then, two years later, we bought two more. Not only are they meeting our expectations as far as no maintenance costs, but for the type of work we do, they are giving us a nicer surface when cutting into white paint. The fiber laser gives us a beautiful flat white surface without any etch marks. So we are actually happier with the outcome of the process that it produces."

Kirsch also says these systems are pretty compact—the base is about 3 ft. by 3 ft., and it stands about 5 ft. tall. In a room that had one YAG laser, Gables Engineering can now fit two fiber lasers.

"We don't have an X- and Y-axis on our table on our front panel marking lasers, so both the part and the lens are fixed in one area," he says. "If we had an X- and Y-axis, we would have a larger working area because we could move the part around underneath the lens. Or we could use a different-sized lens with the same laser to get a larger working area. This really works out for us because most of our control panels fall within the laser's 7-in.-by-7-in. working area."

Kirsch also says fiber lasers are noted for their tremendous uptime and require little maintenance to keep them running.

"[Laser Photonics'] equipment has worked out very well for us, and we have developed a valuable relationship with the company," says Kirsch. FFJ

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