

History Takes Flight

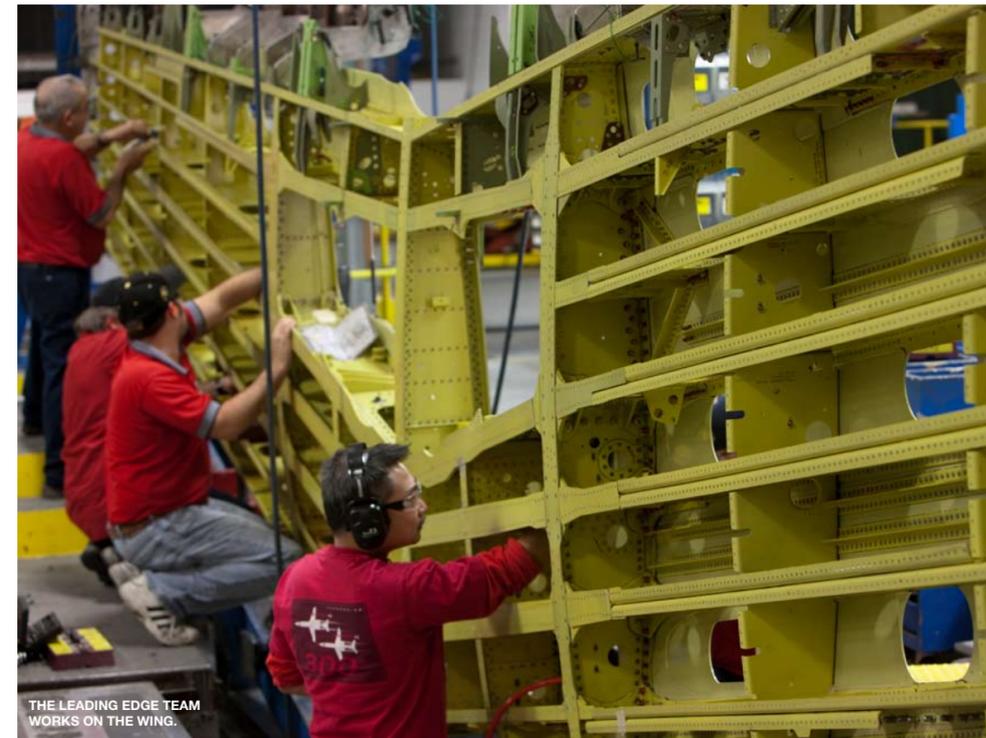
BY ADAM FISHER

FROM THE WICHITA HANGAR WHERE LEARJET BEGAN, TO EVERY RIVET ON EVERY WING, THE HISTORY OF THIS AIRCRAFT IS IN ITS TECHNOLOGY AND THE HUMAN SKILL THAT FINESSES IT INTO PLACE.

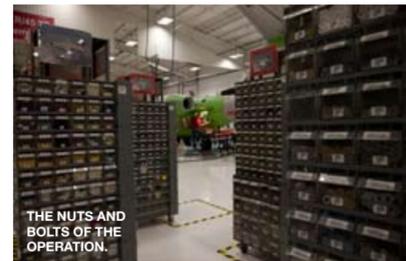
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THE SHOWROOM, READY FOR A PRESENTATION CEREMONY.



THE LEADING EDGE TEAM WORKS ON THE WING.



THE NUTS AND BOLTS OF THE OPERATION.



A 50-YEAR-OLD HYDRO-PRESS FORM.

At one corner of Wichita's airport complex is Learjet's historic Hangar One, though Bill Lear wouldn't recognize it today. The old cinder block walls are wrapped in gleaming aluminum and the entrance shaded by a giant silver wing – an architect's interpretation of the soaring feeling of flight. The hangar is now a study in modernist minimalism, an appropriate place for the spec room where future Learjet aircraft owners pick out the marble and leather and wood that define Learjet luxury. Back in the day, the likes of Bob Hope and Frank Sinatra would come out to Lear's patch of Wichita wheat field, and the aura of 1960s glamour still hangs in the air.

"Here's a Learjet 60 XR fresh off the assembly line: the Coke-bottle curves of its fuselage, the tilt of its nose cone, the fins" says my guide, Mike Grommesh, a 36-year factory veteran. All reflects in the showroom's shiny white lacquer-like floor. The bird practically levitates, just three patches of red carpet marking the spots where it touches earth. Nearby a bottle of Champagne chills, awaiting the ceremonial handing over of keys and the owners' maiden voyage.

There is a small, unmarked passage at the back of Hangar One. It leads to the production line. If you've ever wondered exactly how a Learjet aircraft is built, you want to be fortunate enough to pass through this door. The basic ingredients are simple: thousands of pounds of aluminum, 20,000 rivets, and about 100 days on an assembly line for the fuselage alone. The rest is secret sauce: a precise mix of knowledge and craftsmanship. Learjet is just about the last manufacturer that still builds a complete aircraft under one roof. Making sure that it all goes exactly according to plan are team leaders like Mike Grommesh, who has a piece of paper – signed, stamped, double-checked and dated – tracking every rivet, bend, and weld that goes into making each airplane that rolls off the line. When a proud new owner of a Learjet 60 XR takes the keys, Grommesh sends the collection of file boxes to permanent storage.

The hands-on work is done by about 500 people in an ultra-modern, spotless factory: flatscreen monitors on the wall detailing the day's work order, huge gantry cranes moving about sections of fuselage overhead, autoriveters and room-size computer-numerical-controlled

(CNC) routers and punches. Every now and then a bright orange stand-up cart silently whizzes by, usually piloted by a muscular employee sporting safety glasses and a pocket protector. State-of-the-art computerized equipment sits cheek by jowl with metalworking tools like breaks, rollers, welders, mills, lathes, die forms and hydro-presses. Much of the tooling is modern and some of it is so tried and true that, in Grommesh's words, it could have "come over on the Mayflower."

In the bottom drawer of a battleship of a desk in the tooling department (that's the unit that makes the tools that make the plane) is the facility's oldest artifact: a wooden block. It's a hydro-press form, and though worn and battered, its pieces still fit together like a three-dimensional jigsaw puzzle. There's engraving on the side, so worn it's no longer legible. It probably dates back to around 1962, when Bill Lear bought tooling from Switzerland and Germany and moved it all to Wichita to build the first business jet, the Model 23. Out in front of Hangar One, where only a dirt parking lot used to be, is one of those older jets. The first Learjet 35 aircraft sits on a stanchion at a radical angle, like a bird on a mount, forever frozen in upward flight: a symbol of the company's history and heritage.

Contrast the block with some of the new high-tech tools on the factory floor, like a piece of equipment on a five-foot cylindrical base topped with a glass eye in a turret marked with the elite Leica logo in curvy script. It's a laser tracker, a computerized measuring device that works by bouncing a laser beam off the item to be measured. With it, die can be calibrated within one one-thousandth of an inch (0.000254 millimeter).

I begin to understand exactly how old and new fit together at Learjet when I see the so-called Wingnuts. They're part of the Leading Edge team that puts together the wing, working below a banner that reads: "Without us it's just a bus!" The Wingnuts have the 44-foot wingspan of a Learjet 60 XR bolted inside what looks like a jungle gym for giants. Staircases run up and down to work platforms that jut out into space, giving the Wingnuts unfettered access to all parts of the wing. Much of the history of a Learjet aircraft is in the wing, a symbol for both its long legacy and modern innovation.



AN INSIDE LOOK AT THE WING.

“Fitting together the hand-built parts of the plane with the assembly-built components is really where art comes in.”

–Mike Grommesh



A RIVETING JOB: ATTACHING ALUMINUM SHEETS TO THE WING'S SKELETON.



WORKING ON A PRATT & WHITNEY ENGINE



POLISHING TO PERFECTION.



THE FINISHING TOUCHES: A PAINT JOB.



...AND A SERIES OF TEST FLIGHTS.

Today's job is to rivet preformed sheets of aluminum to the wing's skeleton. There are about 5,000 rivets holding it in place, and 75% of them are placed by hand. Drill, countersink, deburr, seal, and then rivet. It's a two-man process: One wields a pneumatic rivet gun, and another "bucks," or holds the metal block that deforms the rivet and creates the joint. Typically, the two can't see each other, so they communicate by knocking. Two knocks means "good, on to the next." The best riveters can rivet by feel alone, and have arms just the right length to get to the far corners and crannies and rivet inside the wing.

Fifteen feet out from the centerline is where the wingtip fuel tank of the Model 23 would have been. Two feet of wing was added in the 1970s with the creation of the Model 35. Then five years later, the tip-tanks were dropped for good. More wing length was added, and upturned "longhorn" winglets appeared on the Model 28.

The Learjet 60 XR flies on that same wing, which has evolved over time. "Right there, in the transition," says Grommesh pointing out the space between wing and winglet: "That used to be a dozen parts stamped out of plate and riveted together." Now it's all just one part, carved by a CNC milling machine from a solid block of aluminum. "Fitting together the hand-built parts of the plane with the assembly-built components is really where art comes in," says Grommesh, "because parts made by different processes invariably have different tolerances."

The next stop is at a workstation where I can see that art of fitting part to part. Fabricators check parts, which come out of hydro-presses and stamping machines, against a laser-calibrated form. There are more than 10,000 pieces in the Learjet 60 XR airframe and every one gets checked by hand. I watch a fabricator with a fresh bin of aluminum stringers (long strips of metal used to support and create the exterior shape of the plane), each with a compound curve. One by one he takes them from the bin and sets them into the reference form and,

with a few well-aimed taps, finesses them like no machine can. "He gets it right down to one ten-thousandths of an inch," says Grommesh, admiringly. It takes an army of craftsmen, each with the kind of skill that only decades of experience brings, to turn a set of engineering drawings into a flying machine. The same care and precision that goes into the wing pervades every inch of the airframe, and the luxurious but lightweight interior fittings created by a legion of expert cabinetmakers and upholsterers.

The final step is a series of test flights, when two expert pilots put the newborn plane through its paces. They literally tune the plane by making tiny adjustments to the leading edge of the airfoil, a process that owes as much to Stradivarius as to science. They test and adjust, repeating the process until the flying characteristics are perfectly balanced. I share one of these final flights on one aircraft, sitting on a long leather couch in a luxurious space more like an exclusive men's club than any airplane I've ever been in.

"If you don't like to fly the Learjet 60 XR, then you just don't like to fly," says our captain, Rod Hocter, as we start to accelerate down the Wichita tarmac. Copilot John Newberry, nods in agreement. Newberry winds up the twin Pratt & Whitney engines to near-maximum and pulls the stick way back, making the plane loft off the end of the runway and attack the sky at a hockey-stick angle. My stomach flutters under the G-force and my breathing momentarily stops when I realize that we're at the same flight angle that I first saw in front of the factory, that of the Model 35 on the stanchion. I'm frozen in flight, too.

After Hocter and Newberry level off they confide that they're not just showing off: it's important to have that kind of power in reserve to get through a demanding wind shear or other tricky situations in the air. Newberry sums up this aircraft with his own personal Learjet maxim: "There's a lot of thrust to trust." |||