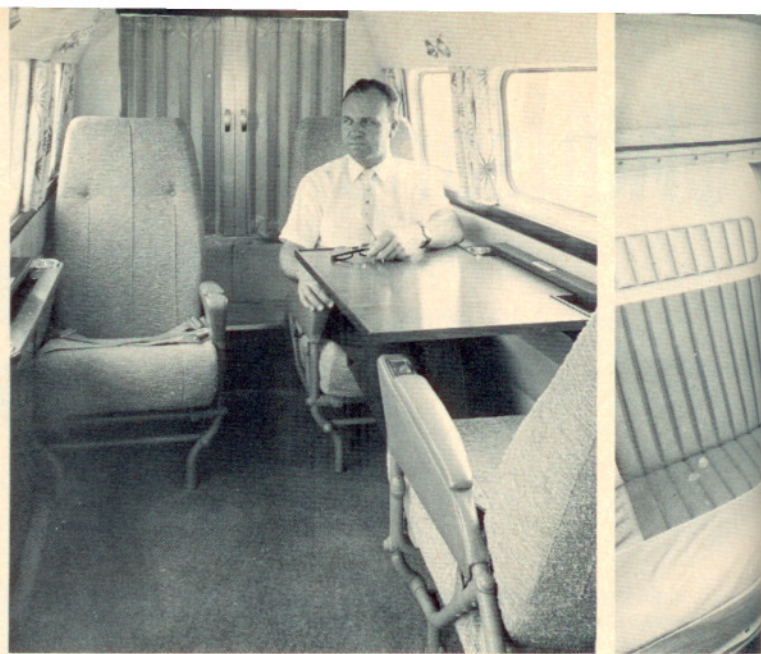




Harry Cooper, president of Cooper Industries, Elk Grove Village, Ill., assists this couple in color coordinating the new interior of their aircraft. Hundreds of fabric samples are available for prospective clients to inspect



Owners of the larger general aviation planes are the best customers for luxurious interiors. Here is a customized interior installed in a Beechcraft Model 18 by PacAero at Burbank, Calif.

by DON DOWNIE • AOPA 188441

Interiors For Lightplanes

Practically all pilots keep their planes in good mechanical condition, but many let the upholstery go in order to cut expenses. As a result, there aren't too many shops specializing in handling 'the inside job'

Few housewives would go 10 years without modernizing the inside of a house.

Few automobiles pass the 10-year mark without a reupholstery job or, if there's a teenager in the family, a "tuck-and-roll" custom interior.

Thus, it's natural that many of the estimated 42,000 aircraft flying today that are over 10 years old come up for modernization of the interior. There's a great deal more to bringing an aircraft interior up-to-date than snapping on a set of prefab seat covers, recovering the side panels and replacing the headliner with like-original material.

Yet there are surprisingly few shops specializing in this type of work, particularly for four- and five-place aircraft. Large executive transports and new aircraft, sold without completed interiors, have many well-known custom-interior designers to draw from.

"Most companies are known for large plane interiors, primarily because they are not requested to do smaller airplanes," said Joseph L. Rhodes, manager of the service division for Atlantic

Aviation Corporation, New Castle, Del. "However, they do design and install small plane interiors if requested to do so. Most single-engine and light-twin owners just don't want to go to the expense of utilizing professional design talent."

On the West Coast, A. R. Mueller, vice president, customer relations of PacAero Engineering Corporation, Burbank, Calif., said, "We have commenced on a program of completely modifying and equipping *Twin-Beech* aircraft with tricycle landing gear, avionics installations and custom interiors. These interior installations range from four to nine place, austere to plush, and are priced from \$5,500 to \$12,500."

Don Newmeier, sales manager of AiResearch, Inc., of Los Angeles, said, "We would be very happy to get into the lightplane interior business because it would give us a place to use the expensive remnants from our larger custom interiors. However, we sent letters to 300 light-twin operators and heard from about four of them. We did the interior of a *Bonanza* about 10 years

ago, but it was more of a courtesy to the customer than anything else."

So how does the owner of a smaller aircraft modernize the inside of his plane?

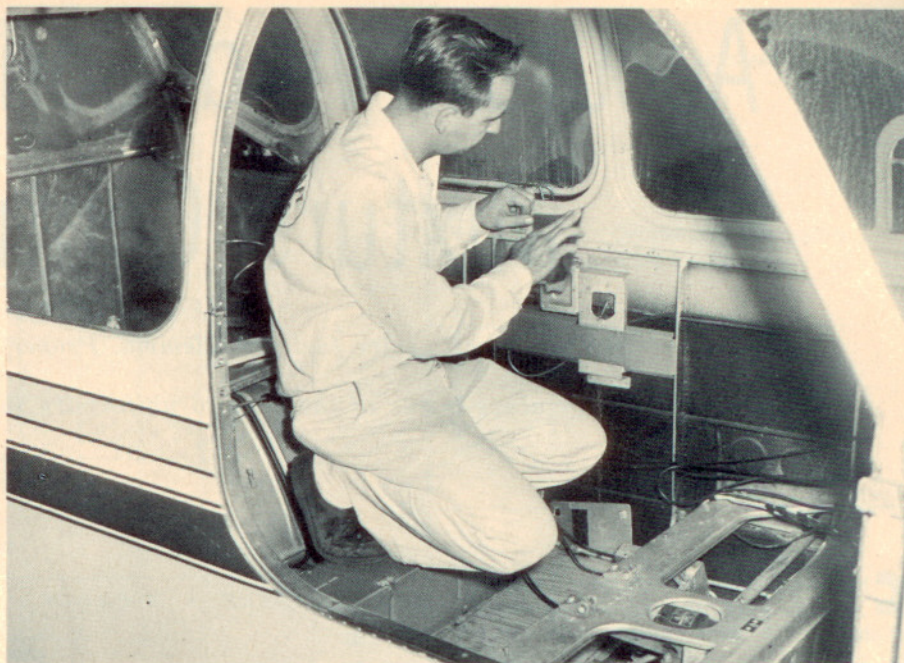
Walt Chandler, who runs a maintenance facility at the El Monte Airport near Los Angeles, says, "My 1948 model *Bonanza* still has the original headliner. The remainder was redone five years ago by a local automotive upholstery shop. We charge a flat \$100 to remove and re-install the interior panels and headliner on a *Bonanza*. Then, the automotive upholstery shop replaces the material in kind on the original forms for about \$375, depending on the cost of the material. Then we re-install the recovered panels."

Chandler cautioned, however, that all component removal and re-installation must be done under the supervision of a licensed mechanic.

The Beechcraft factory has come up with a modernization kit for all models of the *Bonanza* called the "El Dorado." This factory package consists of a complete interior of beige or blue, third



Beechcraft's El Dorado kit has simplified the installation of new interiors in Bonanzas. This is a refurbishing job that was done on an early model of the popular single-engine plane



Even the floor panels have to be removed in this Bonanza, which is being given a new interior at one of the few shops specializing in this type of work. This photo shows Albert Krueger of Al's Aircraft Interiors at Long Beach, Calif., inside the shell of the aircraft

cabin windows (except for the Model 35 and 35R), hand-contoured control wheel and a new exterior paint job. An optional overhead vent and light console is also available. The kit itself lists for \$834.50, plus installation charges, while the optional vent and light console costs an extra \$295.

The El Dorado kit was developed by Beechcraft because there are now more than 3,500 Bonanzas flying that are over eight years old.

"In response to a mailing early in September to all Bonanza owners, a record was set for a two week's return by the number of cards requesting more information about the various kits," said Frank Pedroja of the public relations department. The El Dorado program is made up of five basic kits that may be ordered individually if desired. To date, the interior kit has been the most popular item. It includes everything necessary to upholster the entire Bonanza cabin, with the exception of the window curtains. It provides side panels, headliner, carpeting, seating upholstery, arm rests and glare shield. Renovation of the baggage compartment is included. All the "wear points" are reinforced with high quality vinyl plastic. An extremely durable knit nylon is used on the seat and back cushions and the side panel inserts. The prefabricated El Dorado kits are stocked by Beechcraft distributors and can be installed in the field.

Beech has actually come up with a choice of two rear-window kits for the Bonanza. The standard El Dorado modification adds a small aft cabin window at a parts cost of \$132. More recently,

they have come out with a "Scanoramic" third window modification for all Bonanzas 35 through 35M at a parts cost of \$195. The "Scanoramic" window kit also increases the cabin length by 19 inches with added hat rack space.

Fabrics used for aircraft interiors can run all the way from cotton at \$1 per yard to nylon at \$18 when purchased in small lots. Glass-back fabrics for headliners will cost from \$9 to \$15, for lightweight, durable material, according to Marty Stelson, in charge of the interior division of PacAero.

A number of pilots report excellent seat reupholstery in leather done at

most reasonable prices at Mexican airports where labor costs are appreciably lower than those north of the border. However, the bargain hunter should be sure that any fabrics used are flame-proof and that any panels that are removed go back into the same fasteners. Absolutely no holes should be drilled in the aircraft structure.

How long will an aircraft interior last? Jack Whitney, upholstery specialist for the Air-Oasis Company in Long Beach, Calif., says that it all depends upon how much use the aircraft has and whether or not it has been han-

(Continued on page 60)

Jack Whitney, interior specialist of Air-Oasis at Long Beach, Calif., checks the job being done on a Cessna 170B



Interiors For Lightplanes

(Continued from page 35)

gared at night. "Outside tiedown cuts materially into the life of the interior because of the bleaching action of the sun during the day and the rotting caused by dampness at night.

"The latest thing in aircraft interiors are bucket seats, just like the automobiles," continued Whitney. "Many owners are requesting individual back seats or at least a split rear seat in older model aircraft, making it an easier project to reach the baggage compartment in flight."

Do-it-yourself fans are cautioned against attempting to redo an aircraft interior themselves by Mr. Whitney. He explained that a domestic sewing machine will not handle thread any larger than No. 20 size while he uses No. 16 or No. 12-size dacron thread that costs twice as much as cotton but is many times stronger.

"The popular 'tuck and roll' designs on interiors will add at least 1/3 to both the labor and material bill," explained Whitney.

Very few organizations specialize in aircraft interior work. One such company is Al's Aircraft Interiors, owned and operated by Albert and Alvin Krueger, at the Long Beach, Calif., Municipal Airport.

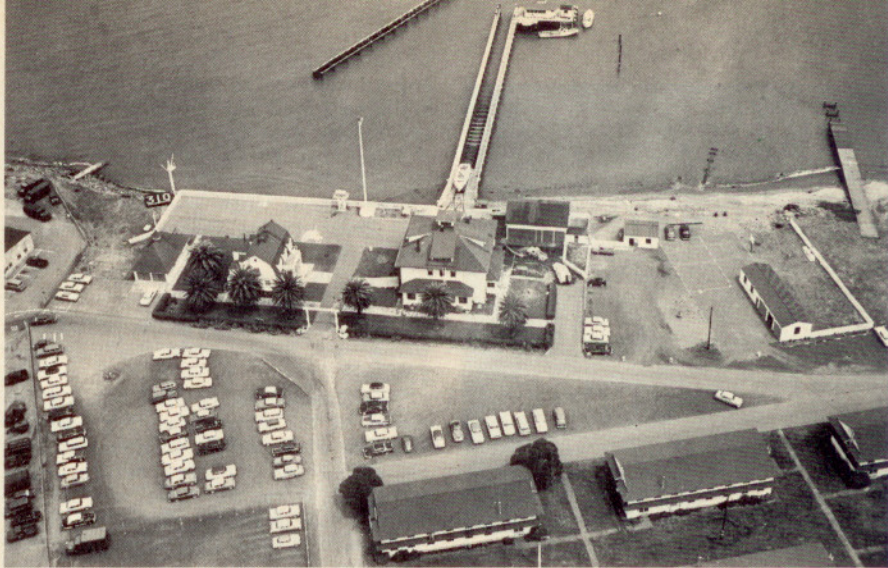
Albert Krueger began his flying career in a J-3 *Cub* in Denver, Colo., in 1944 and finally purchased an *Ercoupe* that needed a new interior. His job at that time was in restoring classic automotive interiors, so he rejuvenated his *Ercoupe* and has been exclusively in the aircraft interior business since 1955. While Al's Aircraft Interiors has handled everything from a Mooney *Mite* to a *Convair*, the majority of their work has been with single and twin-engine Beechcrafts.

"There's one whale of a lot of difference between a good automotive interior and a good aircraft interior," explained Krueger. "Many good auto-shop men can do a fair job with aircraft interiors but, because of the precise hole pattern of an aircraft interior, frequently the finished product just won't quite fit.

"An auto shop, for instance, will normally use only one type of cement. We use any one of five types of adhesive depending upon the type and color of the material. Some cements will 'bleed' through vinyl. It takes a special cement to attach nylon to aluminum, another for wool or cotton and a third to attach fabric to polyurethane (a new plastic replacement for foam rubber). There are fast and slow drying versions of these various cements.

"Aircraft interior work is a business that you can't very well advertise," said Al Krueger. "100% of our business has been done by referral. One customer has another owner see his interior and like it. Then he'll contact us to do something similar.

"Some customers want original design themes, some want to duplicate the



Typical of U.S. Coast Guard aerial identification markers is the "310" marking (left background) at Fort Point Lifeboat Station, San Francisco, Calif. The Coast Guard is considering doing away with these identification numbers unless pilots indicate a need still exists

(U.S. Coast Guard Official Photo)

Are Coast Guard Markings Used?

Pilots may lose one means of maintaining visual bearings unless they make known their feelings concerning Coast Guard aerial identification numbers.

In a letter to AOPA, Commander W. C. Gray, chief of the Coast Guard's Search and Rescue Branch, indicated that code numbers at lifeboat stations may soon be done away with.

"For a great number of years the Coast Guard has maintained aerial identification numbers . . . on the Great Lakes and along our coasts," Commander Gray wrote. "These numbers are presently found only on local area and sectional aeronautical charts.

"These markers were established when rivers, cities and railroad tracks

were the primary navigation aids. With the present electronic navigation aids, it is felt that even private planes are so equipped that aerial identification numbers are so little used that the expense of maintaining them cannot be justified."

The commander asked that comments be made, especially by pilots in the Great Lakes area, to help in determining how much the air identification aids are used. Pilot opinion will weigh heavily in deciding whether the markings will be continued, he said.

Comments may be submitted to Commander Gray at the 9th Coast Guard District, Main Post Office Building, Cleveland 13, O.

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latest production model, others bring in their new-model automobile and want the interior of their aircraft to match it."

The Kruegers work in conjunction with Belmont Aviation, local Beechcraft dealer, and offer a "package deal" for owners who want their aircraft updated with new radios, autopilots, engine change, exterior paint or oxygen installation. While the aircraft is "down" for any of this other work, the Kruegers will do a complete interior at the same time. Each installation is a custom job, designed to the customer's specific requirements. A complete plush package for a *Bonanza* can cost up to \$1,500 and would include a completely new Lucite instrument panel, special webbing and seat-belt buckles, backs of the front seats tapered to conform with more modern design, addition of soundproofing to bring the noise level at least as low as that in the latest models and complete new fabrics inside the aircraft.

The Kruegers use a sound meter inside the cockpit both before and after

the new installation to prove to the customer the extent of silencing involved. This can run anywhere between 5% and 25% improvement, according to Al Krueger, who uses 2½-inch-thick spun Fiberglas blankets (at \$5.83 per square foot) as soundproofing.

The Kruegers will take three full weeks to do a full custom interior on a *Bonanza*. This starts with the removal of the instrument panel and all instruments which are sent out for recalibration and overhaul if necessary. Then, out come all the seats, headliner, side panels, overhead ventilation and speaker console, floorboards and baggage compartment covers. Usually a third-window kit is installed at the same time.

The original .012 micarta headliner used on older model *Bonanzas* is replaced with .016 aluminum covered with Fiberglas. Much of the upholstery material comes from the Beech factory. Occasionally, some is standard non-flammable Cadillac cloth.

Al Krueger considers the *Bonanza*

to be the most difficult of the single-engine aircraft to refinish because everything inside the airplane must come out before removal of the side panels.

When the Kruegers complete a full custom interior, there's a small gold-plated plaque that goes on the map-case door, stating that this custom interior was created for the owner—listing his name—exclusively by Al's Aircraft Interiors.

"That little plaque is the best advertising we have," said the Krueger brothers.

One Massachusetts pilot left his *Bonanza* on the West Coast for painting while he continued on an overseas trip. He called the Krueger brothers and said, "Al, I want an interior just like the one you did for a friend of mine."

As part of their upholstery work, the Kruegers have developed and received STC (Supplemental Type Certificate) approval on an accordion door for the *Twin Beechcraft*, developed the first rotating beacon kit for the *Beech Baron*, put the first 11-pound double-seat in the back of the *Baron* and put a fifth seat in the *Piper Apache* even before the factory made one available. They also developed a Fiberglas overhead console for the *Bonanza* that has been certified on "field approval" on an FAA Form 337.

All interior modifications must: be made on a log-book entry by a qualified A & P Mechanic for minor items; given "field approval" by the FAA on a Form 337 for more detailed work; or have a full STC for major interior modifications effecting the primary structure of the airframe.

"Frequently we have planes in for a reupholstery job where previous misaligned screws are close to rupturing gas or hydraulic lines," Al Krueger said. "We had a Cessna 310 panel modification where a short circuit in an unfused cigarette lighter had burned out all the insulation. On a *Navion* recently, we found a hydraulic leak caused by improper installation where a line went under the instrument panel and through the firewall. On older models of the *Navion*, sound-proofing has been known to wrap around the trim-tab linkage under the side panel on the right side of the aircraft where a universal joint was installed at the right seat.

"The installation of 'blind' screws shows up frequently when we go into the upholstery of a used aircraft. We've found these holes drilled into the radius of a bulkhead ring in the primary structure, presenting a definite structural hazard.

"Upholstery should be replaced exactly as it came out, using the same Tinnerman, Nut-Plate or Rivnut. Beech, for instance, uses a friction clip in the holes of the structure to eliminate more complicated fasteners. At least two of the shops formerly in this area are out of business as the result of law suits for damage to the primary structure of the customer's airplane," said Al Krueger.

"There are a number of ways to 'plush-up' a small airplane," continued

Krueger. "Most customers want light-colored window curtains. We frequently add headrests, modern polyurthane padding, arm rests, and the highest quality fabrics and plastics, in addition to modern Lucite instrument panels. It's a long way from the 'slip-cover, hog-ring' operation of a mass-production automotive chain."

Krueger's advice to aircraft owners who do not have a specialty aircraft shop in their area is to take the upholstery job into a reputable automotive upholstery shop—particularly one that handles the restoring of antique cars—and have them duplicate what the factory originally installed. Then the reupholstered panels and headliner must be reinstalled by a licensed aircraft mechanic.

So when it comes time to redo the interior of your aircraft, you can have your own mechanic pull the hardware and have it recovered in kind by a good automotive shop; find one of the few local airport establishments specializing in aircraft interiors; or—if money is no particular object, check with Atlantic Aviation, AiResearch, PacAero, Horton & Horton, Remmert Warner, or one of a handful of others who specialize in performing complete interior work on larger, more expensive aircraft. Each of the firms mentioned have graduate design personnel on their staffs as well as the detail and drafting people necessary for original interior creation.

But this latter route isn't going to be inexpensive. END