



NASA PHOTOGRAPH

# THE CLEAN SLATE APPROACH

August Bellanca's Skyrocket is fast, spacious and beautifully crafted. So why isn't it being manufactured?

text and photography by Berl Brechner

ITS FINISH IS smooth, its lines gentle and gracefully tapered. The fiberglass airframe's looks hint strongly of power and perfection, of attention to detail, of fine-tuning for speed.

Its swift look is matched by the string of speed records the airplane holds: five official speed records in two weight classes—the fastest, 284 knots over a 500-kilometer run.

The airplane is the Skyrocket, the creation of August Bellanca. More than anything else in recent years, Bellanca has wanted to get this airplane, and a couple of other follow-on designs, into production.

The airplane has plenty of cabin room, and with its 435-hp Continental engine it is capable of nonstop cross-country flights of 1,500 nm at speeds that top those of any civil piston single ever—then or now—produced in this country. And according to Bellanca, an aeronautical engineer who has spent his life either working in or close to aircraft and component production facilities, the airplane is as simple to build as any now coming off the lines—maybe simpler.

Its creator is eager to build and sell the

airplane, and the Skyrocket seems to have the élan that would make it attractive to pilots looking for good transportation with a bit of flair.

So why can't you buy this airplane?

Well, it's a long story, one that is not uncommon in the annals of new airplane design. In fact, the obstacles in the path of an airplane moving from the drawing board to the showroom floor are so prevalent that they stop most projects in their tracks. Particularly hard hit are the creative individual airplane designers who are not backed by major manufacturing concerns.

Look at what's offered today. There are no newly designed and certificated piston airplanes available for purchase other than those developed or offered under the auspices of the big three manufacturers: Beech, Cessna and Piper. The one new offering from a smaller manufacturer that isn't a derivative of an older model is George Wing's Derringer, which took close to two decades to get into production and still faces a challenging future.

What it all seems to boil down to is the dichotomy between the hopes and aspirations

of creative airplane designers and the realities of the certification and marketing processes each new airplane must traverse. Putting it more bluntly, the problem, more often than not, is a failure to anticipate the cost, in hard dollars, of taking a promising new airplane project from beginning to end and feeding it all the money it needs along the way.

Bellanca's measurable costs for the Skyrocket have been moderate by current standards: perhaps in the realm of \$3 million, a large portion coming personally from Bellanca and his wife, Elettra. But much of that money was spent in the 1960s and early 1970s, when the worth of a dollar was much higher. In addition, Bellanca himself worked without a salary, and some of his key people worked in exchange for ownership interests in the project.

Raising money is, in itself, a difficult enough prospect. But when serious investors are confronted with the opportunity to funnel funds into something as speculative as an airplane that's never been flown, you can imagine how slowly their hands go for their wallets.



# CLEAN SLATE

*The prototype Skyrocket resolved initial skepticism about the project.*

There was a time when Bellanca and his crew worked late into the night in the Bellanca Aircraft Engineering shop, then in Lindenhurst, Long Island, on the airplane project. That was before the airplane had even been assembled, when it was represented by hundreds of pages of drawings and computations, wind-tunnel test data, and various pieces of molded and bonded honeycomb aluminum and fiberglass. Bellanca says he made occasional forays into Manhattan, looking for money to fund the continuing development of his concept. At that time, around 1970, his bold airplane faced investor skepticism on two fronts: the unproven "plastic" construction,

and a general disbelief in the promised efficiency the Skyrocket was to deliver.

An aeronautical engineer, Bellanca originally worked for his father's company, which developed a number of airplanes, and learned composite construction techniques by working in California for Douglas and on Long Island with Grumman. Bellanca was convinced his promises for the Skyrocket were sound. But, compared to what the established manufacturers offered, the projected drag coefficient of .016 and the flat-plat drag area of the Skyrocket were so low that disbelieving potential investors felt only raw power could deliver the promised performance. As for the materials and the

construction methods, they were, a decade or two ago, too alien to be believed.

Most unusual about Bellanca's Skyrocket is the way the airplane was, and will be, assembled. Its fuselage is built in two molded, lengthwise halves. With the left half completed and sitting in a frame, all the interior fittings are inserted—wiring, floor and seats, instrument panel, motors and actuators, hydraulic lines. When that's done, the right half of the shell is glued in place. The method, Bellanca points out, eliminates the time-consuming interior work that goes in the nooks and crannies inside the finished airplane hulls in today's airplane factories.

Bellanca's airplane concepts were novel





all right, but not proven. Large money commitments were not forthcoming. In 1971, a group of West Virginians got behind the Skyrocket, and the whole project was moved—finished components, patterns, molds and material—to Scott Depot, West Virginia. At that point, 80 percent of the engineering work had been completed. The West Virginians' commitment was not large, as these things go, less than half a million dollars. But it would keep the project alive. At Scott Depot the airplane was finished, and its parts were assembled in a hangar at Huntington. In 1975, 12 years after Bellanca Aircraft Engineering began to build the airplane in earnest, the Skyrocket

flew. Bellanca credits John Harris, who helped assemble the airplane and did the flying, as a key to completion of the project. Harris had been an Air Force pilot and was a West Virginia steel company executive as well as one of the investors.

The following year, the Skyrocket was seen publicly at the Reading Air Show. By that time, the airplane had begun garnering speed records. Its composite frame had held together quite handily, and the investors had gathered roughly 70 names of people interested in purchasing a Skyrocket. No money was collected from them. Bellanca and crew were avoiding the money collecting and publicity pushing that accom-





# CLEAN SLATE

*A few hurdles, like certification of the Skyrocket, remain to be crossed before Bellanca can fulfill his dream.*

pany many airplane projects that later fail. There was, at that time, hope and promise.

What there wasn't much more of, however, was money. There also arose philosophical differences between Bellanca and the West Virginia group over the building of the airplane and the positions and roles of those in the management group. Before certification flight testing ever really got under way, the project ground to a halt. The airplane went unflown, tied down for several years outdoors at Charleston, West Virginia.

Bellanca, his wife and their three children moved back to their family home on the Maryland Eastern Shore. In 1980, he and Elettra bought out the stock of all but two of the West Virginians, and kept as stockholders two aeronautical engineers who had been involved with the Skyrocket from its

Long Island beginnings. The airplane was moved to a hangar at Summit Airport, nearby in Delaware. It last flew regularly this past summer, as part of a flight test of airfoil laminar flow being conducted by Ohio State University and NASA. NASA's evaluation of the flying showed the Skyrocket to have an exceptionally smooth wing and very good laminar flow characteristics. NASA pilots flew it roughly 30 hours. The airplane has accumulated about 120 hours' total.

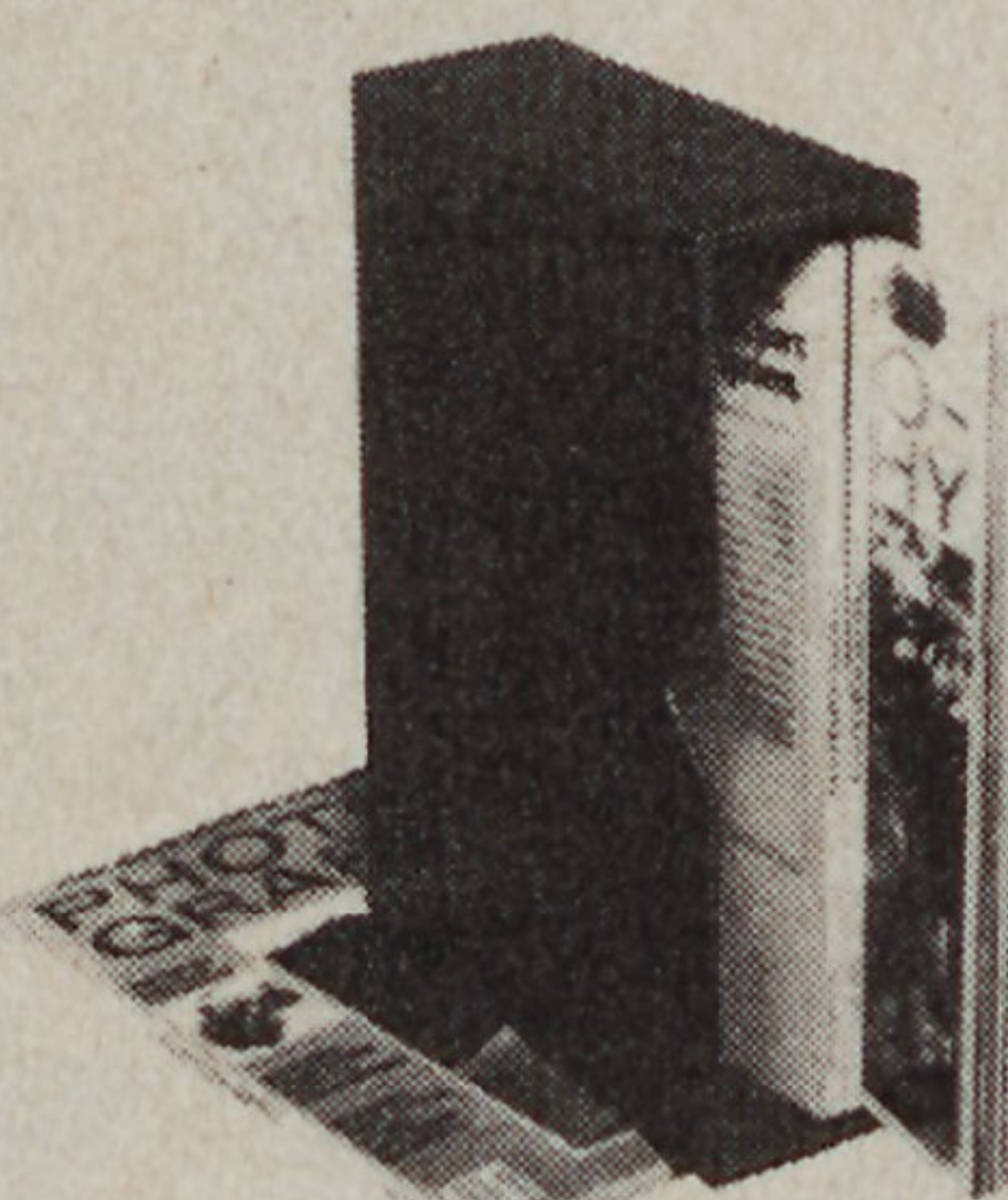
In the meantime, Bellanca, from his office and lab at his Galena, Maryland, home, continues working toward certification and production of the Skyrocket. His company also does aircraft component design work under contract to military and commercial concerns. In the long run, he envisions production of a twin-engine Skyrocket, which

would seat six, fly at 302 knots, and carry a basic price in the \$325,000 to \$350,000 range, and of a turboprop single Skyrocket that would fly at 315 knots and sell for about half a million 1982 dollars.

The record-setting flights of the airplane and the NASA work have proved his airplane, Bellanca believes. "In 1970 people needed to understand what this thing was about," Bellanca explains. "Was it just an airplane with a big engine or was it a real innovation in aerodynamic design?"

He says a Baltimore investment banking firm now has a strong interest in the Skyrocket, and that he is actively negotiating with the company to get the project restarted. He shirks off the state of the general aviation industry as a problem. "Money may be harder to get, but you need foresight.

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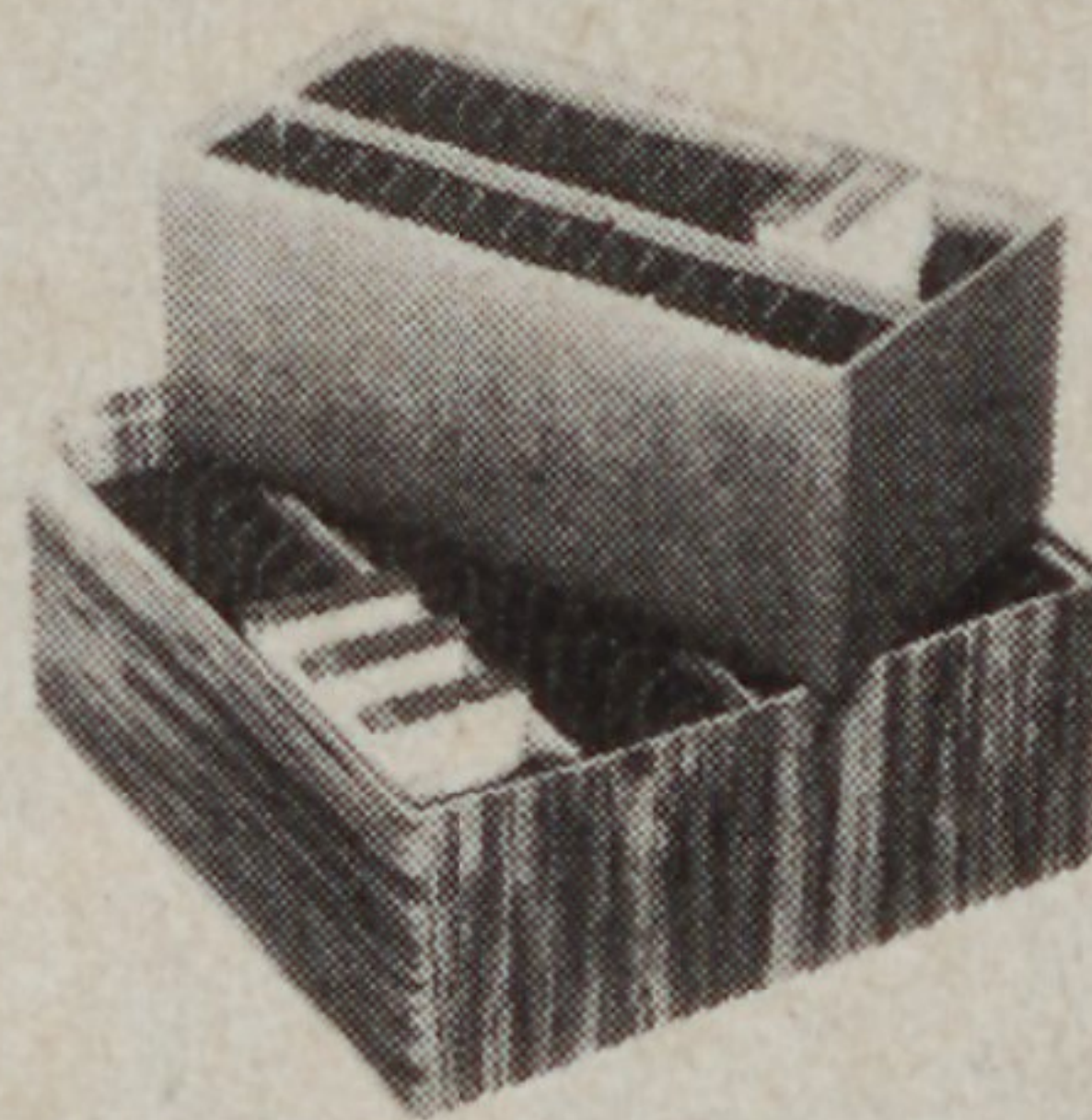
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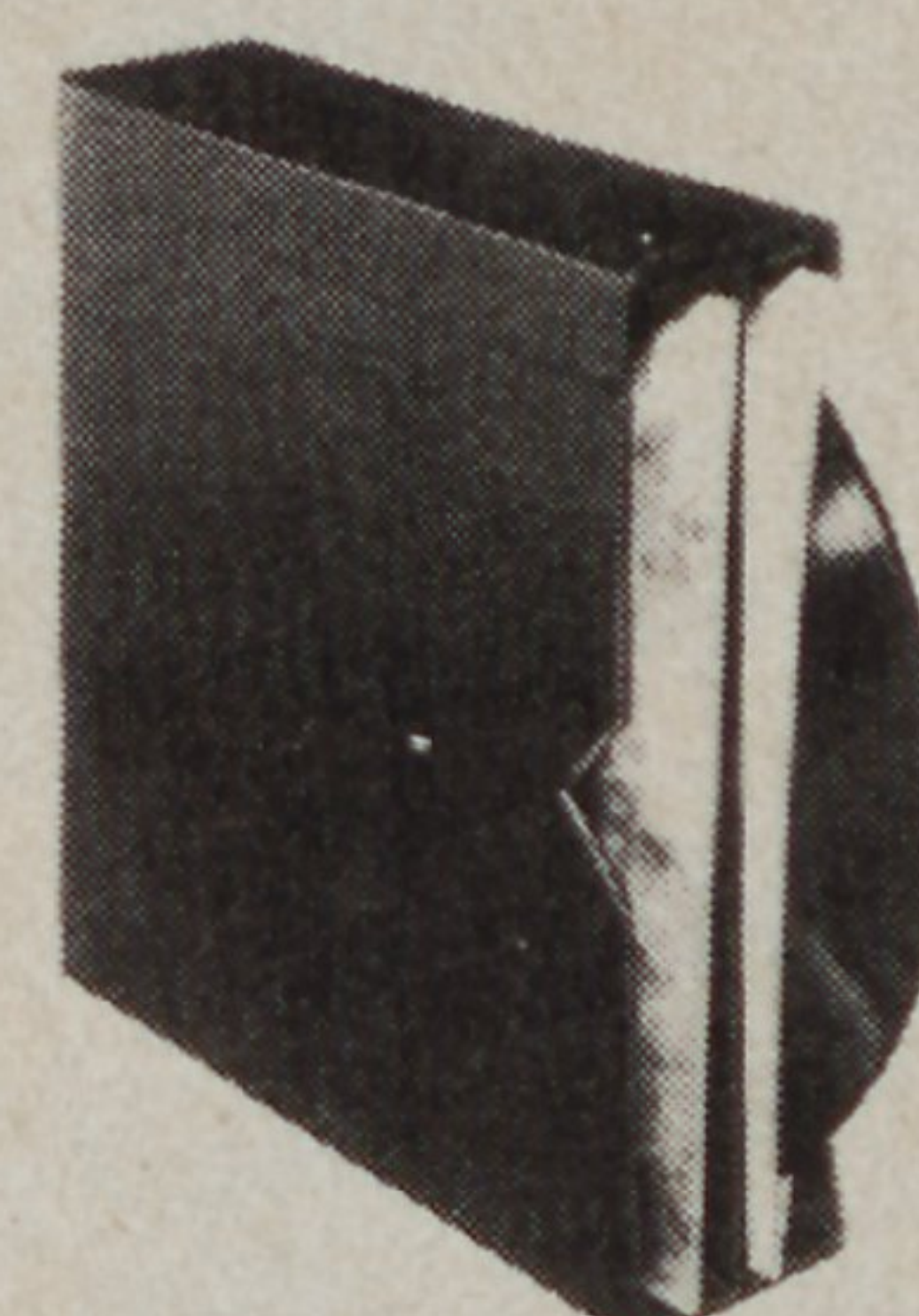


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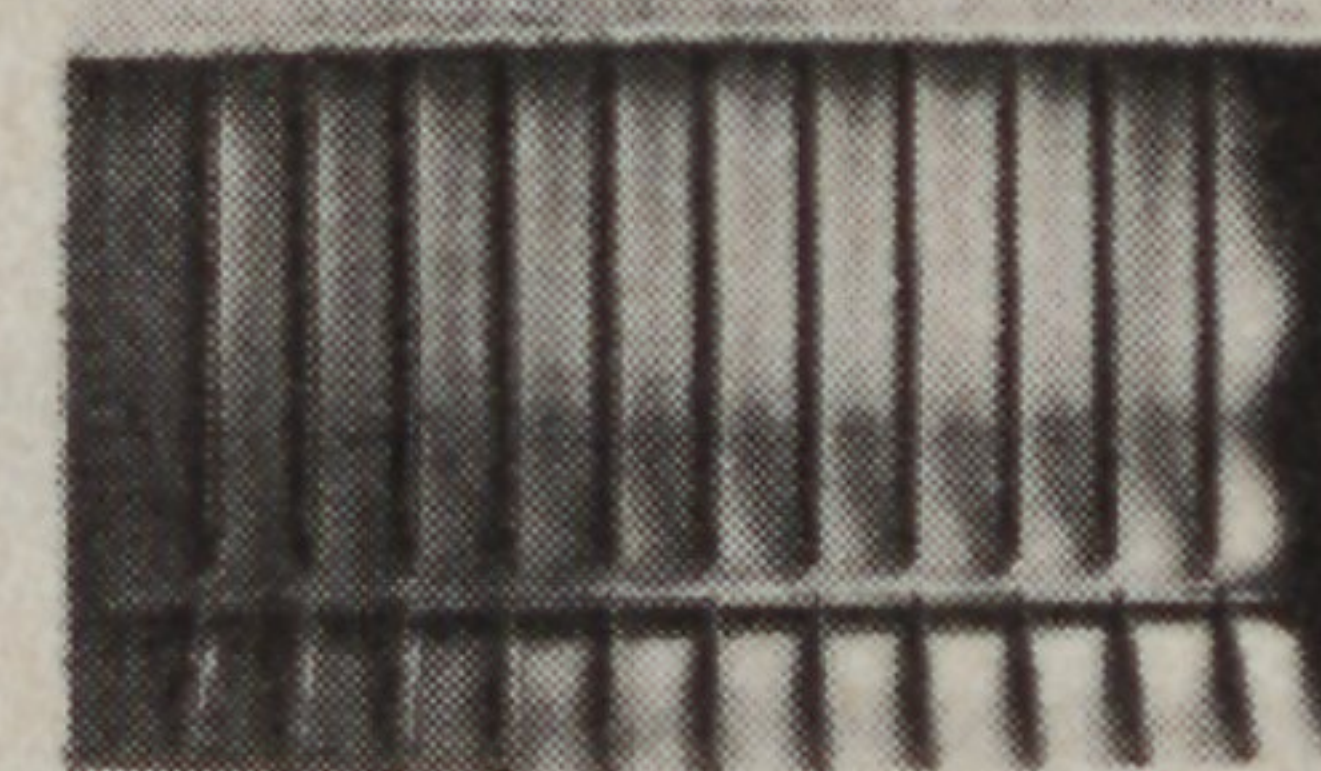
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We're talking about a business two years or so from now."

There remain serious obstacles for Bellanca to face. For one, the airplane's empty weight is more than was intended. Bellanca says that some control surfaces and other fittings are constructed of heavier materials on the prototype than they would be on a production airplane. Another consideration is that the Skyrocket is yet to be pressurized, which entails added components and thus the potential for added weight. The toughest obstacle is the airplane's eventual certification. Two more airframes will have to be built for static and fatigue testing, and the present one has yet to be taken through the FAA's regime of test runs and paperwork exercises.

Given the patience he's had to exhibit so

far on his project, Bellanca has, if anything, become more realistic about building and marketing his airplane: "I feel at home on the technical side—the manufacturing technique and production aspects," Bellanca said as he drove away from Summit Airpark after visiting the Skyrocket. "I know that quite well. It's the financing area where I'm not going to pretend to know much, and I'm going to find someone who knows what they're doing." He says he is looking for people with aircraft manufacturing, financial and marketing expertise.

Bellanca has, based on some recent thorough analyses, assigned costs to completion of the project that are, perhaps, more realistic than those he might have set a decade earlier. His five-year business plan sets forth all the details—the development

of a 150,000-square-foot plant, the number and specialties of the employees, and the costs for getting the business rolling. Volumes of notebooks specify the details of all aspects of the future of the project. Bellanca anticipates it will cost between \$20 million and \$25 million to get the airplane certificated, into production and starting to turn a profit.

If all works, we should have quite a machine: a big pressurized single that can fly at 285 knots. The "ifs" of the project still loom large, but if dedication to a goal has any bearing on its success, production of the Skyrocket is not an impossible dream.

"What I want to do now," the designer says, "is what I wanted to do in the first place. Start an airplane factory and sell an airplane named Bellanca." □

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