SAFETY UP, SALES DOWN

Despite the sensationalism and the nay sayers, self-regulation proves it can work.

BY THOMAS A. HORNE

When *AOPA Pilot* last reported on the ultralight scene (see "Ultralight Update: Ending the Beginning," March 1983 *Pilot*, p. 98), we noted that ultralight flying had passed into a new era—an era characterized by regulation, politics and a sales slowdown. The events of the past year confirmed the continuation of this trend. It was a year marked by further formalization of the sport. There were more federal rules and self-regulatory initiatives, and concern about ultralight safety increased. The sales slowdown continued, with several manufacturers going bankrupt. For the most part, those that stayed in business geared up to sell faster, heavier, more controllable, three-axis designs.

The most important regulatory event of the past year was the issuance of Advisory Circular 103-7. This AC defined the FAA-approved methods of determining compliance with FAR Part 103, the Federal Aviation Regulations for ultralights that were published in September 1982. Part 103 established the speed limits for ultralights (maximum stall speed of 23 knots/27 mph, maximum cruise speed of 55 knots/63 mph) but said nothing about how these limits should be determined.

That all began to change in September 1983, when the draft version of AC 103-7 was made public. The AC contained two charts. One plotted engine horsepower against a complicated list of drag factors to determine the ultralight's maximum cruise airspeed; the other plotted wing loading against lift factors (based upon several wing profile types) to come up with an ultralight's computed stall speed.

Some manufacturers were surprised when the final version of AC 103-7 was published in January 1984. The FAA had changed some of the charts' variables. The net result is that the final AC is more conservative than the draft. The rules had been tightened, and the manufacturers of faster ultralights suddenly found themselves with aircraft that either stalled or cruised (or both) faster than the new AC allowed. Now, as they ponder their marketing dilemma, they are paying the price. Potential victims include the CGS Hawk, Ultralight Flight's Phantom, the Mitchell A-10, the Sadler Vampire and the Sorrell Hyperlite.

But AC 103-7's charts alone are not

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gospel. There is a provision for timed runs along a 1,000-foot-long course, and for tests using calibrated radar guns. If a timed test or a radar gun proves that the charts were in error, then the pilots of faster ultralights may have a way out of their troubles. Ultralight pilots—*not* the manufacturers—are responsible for proving that their machines comply with Part 103.

For AOPA's Ultralight Division, 1983 was a year of growth. Membership rose to the 8,900 mark. AOPA's Government and Public Affairs Division assigned several of its specialists to ultralight affairs, and AOPA continued its strong representation in user-group committees debating a proposed new category of lightplane—the Primary Aircraft. AOPA proposed less restrictive certification standards and procedures for aircraft in this category—aircraft with a single engine of less than 200 hp, a fixed-pitch propeller and a maximum four-place seating capacity. The FAA is behind this concept, thanks largely to AOPA's input.

The official magazine of AOPA's Ultralight Division—*Ultralight Pilot*—reviewed 17 ultralight aircraft in its six bi-monthly issues published in 1983. In several cases design deficiencies were noted, and manufacturers took steps to implement the design changes that *Ultralight Pilot* indicated were necessary. The magazine was recognized for its journalistic contributions by *Glider Rider*, another magazine that covers the ultralight scene.

The AOPA Air Safety Foundation continued at the forefront of the effort to self-regulate ultralights. In June 1983, the FAA granted the Air Safety Foundation a waiver to Part 103. This waiver permits the use of two-place "ultralight-type vehicles" for training purposes only. Under the terms of this waiver, those wanting to use two-seat ultralights legally for dual instruction must be ASF-registered examiners but need not be FAA-certificated pilots or flight instructors.

ASF's registration programs built momentum and prestige through 1983. The foundation's examiner-, pilot- and vehicle-registration programs received their FAA approvals on March 10, 1983. These programs are designed to promote ultralight-pilot safety and accountability. Examiners are empowered to administer written, oral and flight tests to ultralight pilots, and to recommend that ASF accept the reg-

NEW WINGS: PHANTOM

Ultralight Flight's Phantom is an ultralight that pushes the Federal Aviation Administration's weight and speed limits. The Phantom that *Ultralight Pilot* built weighed in at 252.75 pounds. Radar-gun tests, conducted by the local police, showed that the Phantom could fly right at the 63-mph limit; on two test runs, the police clocked it at 65 mph.

Several features account for the Phantom's speed: The wings are double-surfaced; a pod shields most of the pilot's body from the relative wind; and the Phantom uses a 35-hp Kawasaki engine (the same one that powers the Kawasaki jet-ski), a 2.3:1 reduction drive and a 58-inch diameter propeller for its propulsion. It all adds up to more lift and thrust for less drag.

This is the most airplane-like ultralight we have flown to date. Control response is excellent, especially in roll. The Phantom, like many other newer ultralights, has full-span ailerons. The larger aileron area makes all the difference in the world to an ultralight. Full-span ailerons yield higher roll rates and vastly improved crosswind control compared to the crude spoilers that were in fashion back in 1980 and 1981. "It's incredible," one of our pilots pronounced after flying the Phantom. "It was the first time that I really felt in control of an ultralight."

The hardware is not bad, either. A huge Teleflex cable activates the elevator, and a pair of well-designed bellcranks transmit control inputs to the ailerons. Though the Phantom is rated at +6.6 and −4.4 Gs, the company says that destructive tests have shown that the airframe will go to +9.9 and −6.6 Gs before failing. This exceeds the airframe strength requirements for certificated airplanes. (FAR Part 23, the regulations that deal with airworthiness standards for general aviation airplanes, requires an airframe to withstand ultimate loads of +9 and −4.5 Gs to qualify for the Acrobatic category.)

Though it is a fairly sucessful airplane (about 300 Phantoms have been sold since its introduction in August 1982), there could be problems. The Phantom is one of those airplanes adversely affected by the final version of AC 103-7. New penalties assigned to double-surface airfoils mean that the Phantom, unless radar-gun tests or a series of timed runs prove otherwise, may exceed the permissible ultralight flight envelope. In the absence of an official determination, though, the Phantom remains an ultralight, and a fine one at that.

The Phantom sells for $5,995. The manufacturer claims a 35- to 65-hour construction time. It took us 42 hours, thanks to the help provided by a factory representative. —*TAH*

NEW WINGS: PARAPLANE

The prize for the most unusual new design of 1983 surely must go to the ParaPlane. Part parachute and part airplane, this ultralight flies at a fixed angle of attack and a constant, 26-mph airspeed. Instead of relying on stabilizers, washout and dihedral for stability, the ParaPlane oscillates to compensate for gusts and power changes. Its canopy is nearly identical to those used for steerable, high-performance sport parachutes. The ParaPlane is, in fact, an airfoil—designed by Peter Lissaman of the Gossamer Condor/Albatross design team. Standard canopy area is 375 square feet;

NEW WINGS: FALCON

With its composite construction, sleek lines, enclosed cockpit and retractable nosewheel, the American Aircraft Falcon is perhaps the most sophisticated ultralight ever to hit the market. Introduced in final form (there were nine prototypes) in September 1983, the Falcon is off to a promising start

The Falcon is the first ultralight to make wide use of composite materials. The fuselage is made of damage- and impact-resistant Kevlar. At the engine mounts and wing-attach points, the structure is reinforced with a carbon fiber/epoxy composite, a material known for its high-strength extreme stiffness. The wings have an aluminum leading-edge spar enclosed in a pre-built D-cell, styrofoam ribs capped with aluminum strips and a covering of Tedlar, a blend of Teflon and mylar.

Designed right at the limit of the guidelines set out by Advisory Circular 103-7, the Falcon reportedly weighs in at 250 pounds (254 pounds is the limit). Maximum cruise speed in level flight is right at the 63-mph (55-knot) limit. The airplane is powered by a 25-hp, single-cylinder Rotax engine. At cruise settings the engine burns 1.7 gph.

The Falcon has perhaps the most comfortable cockpit of any of the ultralights that *Ultralight Pilot* has evaluated. Once you work your way into the seat, the ergonomics work well. The low-slung-and-stretched-out seating position closely resembles that of a high-performance sailplane. For winter flights, the pilot can order an optional canopy section that encloses the cockpit fully. There is also cabin heat, provided by heat from the cylinder head, and piped into the cockpit by a single duct.

Since the Falcon has such a low power-to-weight ratio and high-performance airfoils, takeoffs consume a lot of runway—for an ultralight. After 200 feet or so the airplane will lift off, and climb outs (assuming a 170-pound pilot) will average 650 fpm at the best-rate-of-climb speed of 50 mph (43 knots).

For an already-certificated pilot, transition to the Falcon should present no special problems. The canard's elevator is very sensitive, so one must be careful not to overcontrol. Turns are somewhat sluggish because the swept wing resists displacements about the yaw axis, and because the wing-tip rudders are not as effective as the tail-mounted rudders that most pilots are accustomed to. But these are minor matters that can be smoothed out with just a little practice.

Falcons can be ordered with an optional, ballistically-deployed parachute recovery system. In case of structural failure, the pilot activates the system, and the parachute, installed in the fuselage, is blown through a special panel and into the slipstream.

The Falcon sells for $7,995 and comes pre-built. —*TAH*

for heavier pilots and high-density altitude conditions, a larger, 450-square-foot canopy is available.

Power is provided by two 15-hp Solo engines, manufactured in West Germany. The propellers are counter-rotating. This cancels p-factor and torque effects, preventing the ParaPlane from making uncommanded left turns during high power operations. Should the engines fail, the ParaPlane settles into a 3:1 glide ratio.

Flying the ParaPlane is a lot like hovering over the landscape in a lawn chair. There are only two controls: the steering bars and the throttles. Push with your left foot, and the ship slowly will turn left. Want to climb? Just add power. The absence of pitch controls leaves the pilot with very little to do. You might as well fold your arms, or use the opportunity to take pictures.

While certainly not a cross-country machine, the ParaPlane can fulfill a very specific mission quite adequately: sightseeing in the local area. The apparatus is portable (it can fit in the trunk of a standard-size American car) and requires very little takeoff/landing distance. Once the propellers' blast fills the canopy and you begin moving, takeoff distance is a mere 75 feet. By virtue of its built-in recovery system, it appears to be the safest novelty machine yet produced by the ultralight phenomenon. Price—$3,750. —*TAH*

istration of ultralight pilots who have demonstrated their competence. The number of ASF examiners rose to 1,221 by May 1984. Total registrations of pilots and vehicles by May 1984 were 2,511 and 912, respectively.

The Powered Ultralight Manufacturers Association (PUMA) also had a rewarding year. For the first time, there was an agreement among PUMA members concerning the content of its proposed ultralight airworthiness standards. On April 10, 1984, the FAA approved the PUMA standards.

It took two years, but now the self-regulatory structure is in place, and the FAA is satisfied.

At the grass-roots level, there are still some pitched battles. Some public-use airports have been the scene of disagreements between ultralight pilots and local officials. In those cases where there has been no demonstrated conflict between ultralights and conventional aircraft, AOPA's Ultralight Division has been successful in representing the interests of ultralight pilots. In Manteo, North Carolina, and New Paltz, New York, local authorities were persuaded to allow ultralight operations to resume.

State governments were leery about FAR Part 103 when it first went into effect. Many state aviation commissions felt that Part 103 did not go far enough to restrict ultralight operations. Today, the situation has changed somewhat. States are not complaining as much, and an overwhelming majority believe that additional regulations are unnecessary. Those that do feel more rules are in order agree that ASF's registration programs are best suited to promote safety and public accountability.

In 1983, the National Transportation Safety Board (NTSB) first conducted a large number of ultralight accident investigations. A preliminary NTSB report showed that 98 accidents had been investigated, 53 of which involved fatal injuries. For the first time, we had an idea of fatal ultralight accident trends. According to NTSB reports, many fatal accidents occurred on the pilots' first solo flights.

In November 1983, NTSB hinted that recommendations concerning ultralight safety and operations would be sent to the FAA. But as of April 1984, no recommendations had surfaced.

To its credit, NTSB identified a structural design flaw in the Airmass Sunburst. The flaw—wing attach cables designed so that they could fray easily—had caused a pattern of similar fatal accidents, and NTSB warned the ultralight flying public through publications such as AOPA's *Ultralight Pilot*.

On December 8, 1983, the American Broadcasting Company, in its popular weekly broadcast *20/20*, seized on the Sunburst's problem and several other highly publicized accidents as evidence that ultralights were patently unsafe. The reporters argued that more federal regulations were in order but neglected to mention that ASF's pilot competency programs were already in place, and that they had FAA approval. There were several other significant omissions from the broadcast.

In one particularly graphic sequence, the pilot of a Pterodactyl is shown falling to his death after one of the airplane's wings failed. ABC bemoaned the pilot's fate but did not give viewers the full story. The pilot, himself a television personality, had misrepresented himself as an FAA-certificated pilot; his seat belt/shoulder harness was not fastened; and he disregarded his instructor's admonitions and took off after limited taxi and "crow-hop" practice. After climbing to altitude, he entered a pilot-induced oscillation and oversped the airplane. The resultant forces caused the wings to fail.

The fatal crash of a popular ultralight journalist, Glenn Brinks, focused attention on the Ultralight Engineering Astra (one of the many new designs to appear in 1983). Brinks, eager to write about it, flew the airplane for the first time at an air show in Bakersfield, California. After taking off and turning downwind, the Astra nosed over and dove into the ground. Brinks was killed on impact. There were allegations that the Astra Brinks flew had not been thoroughly flight tested. Shortly after the accident, Ultralight Engineering went out of business.

Brinks's accident cast a shadow on the mindless enthusiasm of some ultralight publications. Suddenly, safety became a major editorial concern. There were fewer "puff pieces" (articles often written by manufacturers' representatives extolling the virtues of a certain product without mentioning shortcomings) after the crash.

Despite new regulations and growing safety concerns, many new designs debuted in 1983. The most notable were American Aircraft's Falcon (a canard design with composite construction), Cloud Dancer's Jenny (an ultralight version of the Curtiss JN-2), Eipper Aircraft's GT (equipped with flaps and a pilot fairing) and MXL (double-surface wings with full-span ailerons), Birdman's Chinook (touted as a bushplane, it is a taildragger with an enclosed cockpit), the Sadler Vampire (aluminum wings and tail, fiberglass fuselage and twin-boom tail structure), the Hoverair Drifter (an ultralight hang balloon—a one-man hot-air balloon) and ParaPlane Corporation's ParaPlane (a motorized parachute). The Falcon and ParaPlane were featured in last year's issues of *Ultralight Pilot*. They are reviewed briefly in the articles accompanying this story.

As for powerplants, Bombardier Rotax of Gunskirchen, Austria, continued its rise in popularity. Many manufacturers opted for the Rotax 277, a 28-hp engine, for their single-seat models. For two-seat ultralight-type airplanes, the 50-hp Rotax 503 engine was popular. The pre-eminent American ultralight engine manufacturer, Cuyuna, developed a capacitance-discharge ignition system for its engines.

But if there were successes, there were also flops. Airmass (manufacturers of the Sunburst) declared bankruptcy, as did Ultralight Engineering (Astra), Aerodyne (née Vector), Waspair (Tomcat) and Mattison Aircraft (MAC). Several companies sold out (American Aerolights, Gemini International, Mitchell Wing and Pterodactyl), and others simply dropped from sight. Competitive forces continue to exert a Darwinian influence as they weed out the less marketable products.

Are there too many manufacturers chasing too little business? We think so. In the absence of any reliable sales figures, observers must rely on interpreting the mood of the industry to predict sales trends. The mood is not cheerful. It is clear that ultralight aviation is not the expanding universe that it was once thought to be. If 1983 proved anything, it was that manufacturers no longer exert a dominant influence. With the regulatory and self-regulatory developments, the initiative passed to the government and the self-regulatory bodies. Exuberance has been replaced by tinges of sobriety. But with this sobriety may come the maturity that the sport will need if it is to achieve a wider public acceptance. □