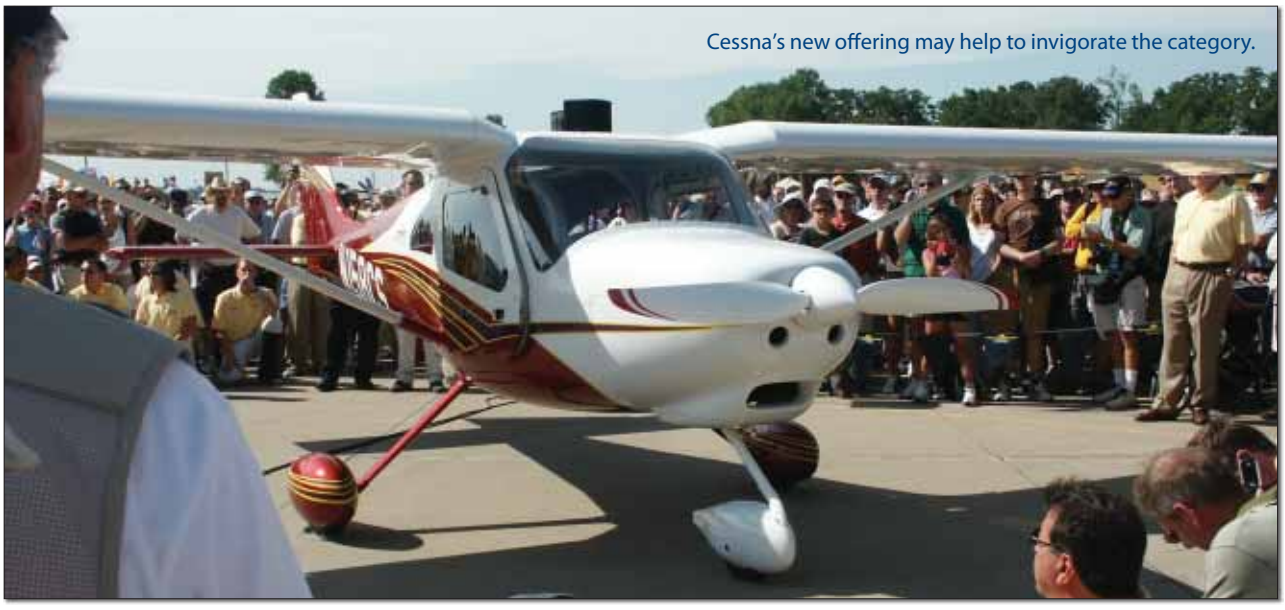


Cessna's new offering may help to invigorate the category.

Today's Light Sport *Looking Forward, Looking Back*

With the category more than heating up, let's have a look at how we got here.

BY DAVE MARTIN

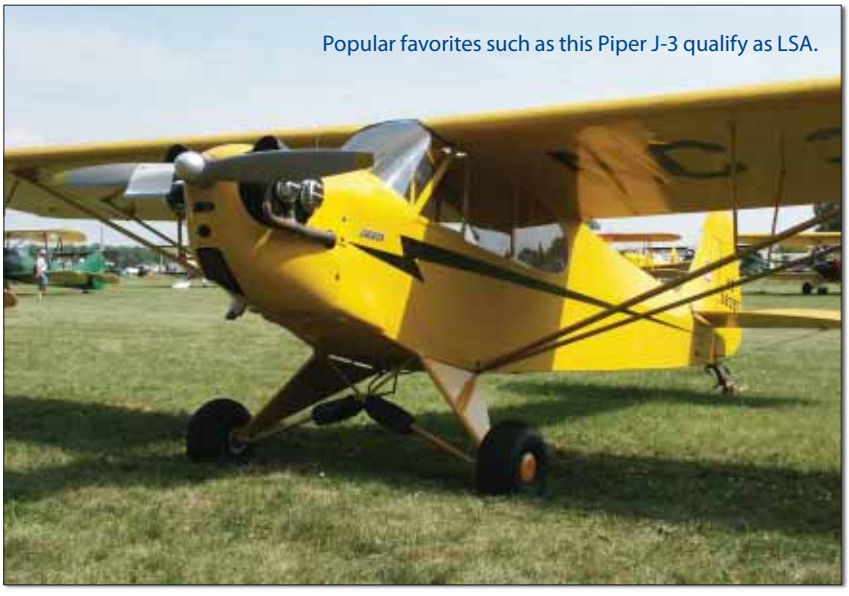
The Light Sport Aircraft directory featured in this issue reveals a snapshot of a dynamic new category of recreational aircraft. In just two and a half years since LSA and the accompanying Sport Pilot license became effective, nearly 40 factory-built aircraft have been approved by the FAA. Additionally, scores of Experimental/Amateur-Built category homebuilts qualify as LSAs, and many of their builders and pilots are already benefiting from Sport Pilot/LSA. More on this later.

At this point, public and industry interest in LSAs and Sport Pilot has exceeded expectations. (The new license has limitations but should cost about half as much as a Private license and obviates the need for an FAA medical certificate.)

We're at a crossroads with LSA, no doubt; it is showing promise of growing rapidly and filling a big hole in the ranks of pilots and aircraft owners. But how did all of this activity and excitement come about? And, have we been down this path before?

Blame It on Francis and Gertrude

In the late 1940s, Francis Rogallo was an engineer working for NACA (NASA's predecessor), and he designed a folding-fabric-wing, kite-like device that he thought might work as an inexpensive sport aircraft...and possibly as a way for space vehicles to glide to a landing. The



Popular favorites such as this Piper J-3 qualify as LSA.

Rogallo wing featured a keel tube, two steeply swept leading-edge tubes, and a flexible material between the tubes. Francis's wife, Gertrude, sewed the sail for the first Rogallo wing using window curtain material, and their names appear on the 1948 patent.

NASA tested the Rogallo wing and discarded it for spaceship landings, but in the early '70s, a few young Californians tried the concept on some truly cheap gliders. Some were made of bamboo, plastic sheeting and duct tape, leading to the experimenters' well-advised mantra: "Don't fly higher than you're willing to fall."

The Rogallo wing's main drawback was its low glide ratio, typically about 3:1. Yet it inspired others to look for better performance in rigid-wing hang gliders. While still a high school student in San Diego, Taras Kiceniuk Jr. designed, built and flew a swept-wing biplane hang glider that he named Icarus. His next design, the Icarus II, swept the wings more and flew better. Of course, some potential hang glider pilots—especially those without a convenient hill or ridge nearby—hankered for power.

At the 1976 Oshkosh convention, John Moody offered the first public demonstrations of his Icarus II fitted with a tiny engine and prop. One day during a demo he survived an unintentional loop in front of the crowd. That got him grounded and resulted in his apology for scaring everyone (including himself) in a subsequent edition of EAA's magazine.

What's the FAA to Do?

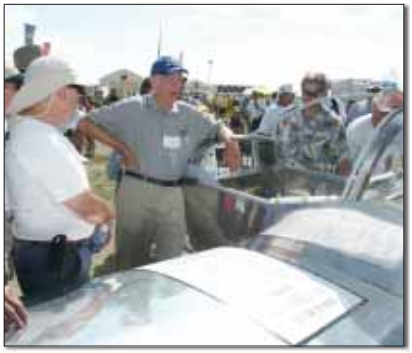
The genie was out of the bottle. Soon dozens of experimenters were building powered hang gliders of one sort or another, and companies offered ready-to-fly hang gliders and kits for powered ultralights. Accidents occurred. People died, and flying sites were lost.

The FAA took a novel approach to this totally unlicensed activity. Flying machines—whether they were powered or not—that could be foot-launched at least once by somebody were decreed to be air vehicles, not aircraft. That avoided the immediate need to clear the skies of hang gliders and powered ultralights while drafting new regulations, but it resulted in strange configurations such as trap doors below the pilot seat. It also taxed the supply of demo pilots who were light, skillful and very strong.

Sonex is capitalizing on Sport Pilot/LSA growth.

By early 1982, 106 companies in the U.S. and Canada were producing ultralights. The Big Three (Eipper Aircraft [originally Eipper Formance], American Aerolites and Rotec Engineering) were selling thousands of machines. Design and construction ranged from primitive yet crude to elegant and effective. In the latter category was the twin-engine Canadian Lazair. With its original pair of 5.5-hp Pioneer chainsaw engines, it weighed less than 200 pounds and could do consecutive low-altitude loops. (Designer Dale Kramer got wiser and stopped demonstrating loops.)

FAA staffer Mike Sacrey was assigned to write the proposed ultralight regulation; he visited flying sites and consulted with industry leaders. The proposed FAR, which became known as Part 103, gathered 40,000 comments and became effective in September 1982. Major requirements were (and still are) single seat, maximum empty weight of 254 pounds for a powered ultralight (155 pounds for unpowered), 63 mph maximum speed in level full-power flight, 27 mph maximum power-off stall speed, and a 5-gallon maximum fuel capacity.


Dick VanGrunsven of Van's Aircraft may offer an ELSA version of the RV-12.

Most of the manufacturers required customer flight training, which was initially done with one-way, instructor-to-student radios. However, the FAA soon bowed to common sense and approved a waiver to allow two-seat ultralight trainers (up to 496 pounds empty) and ultralight instructors credentialed and registered by several aviation organizations.

Ultralight Madness

Everyone, it seemed, wanted to fly ultralights. AOPA hired John Ballantyne, a well-known California ultralight instructor and dealer, to head its new ultralight division. EAA also set up an ultralight section and ran a sepa-

Photos: Dave Martin and Courtesy the Manufacturers

rate convention for ultralighters at Oshkosh. Every aviation magazine publisher including the originator of KITPLANES® considered starting an ultralight magazine, and by mid '84, there were seven of them. At EAA's 1984 Sun 'n Fun fly-in at Lakeland, Florida, the 450 ultralights present nearly blotted out what sunlight there was; it rained a lot that week. Huge indoor ultralight trade shows and outdoor fly-ins and contests vied for attention.

Unfortunately, it wasn't to last. ABC television's *20/20* news program did a hatchet-job story on ultralights in November 1983, and many blamed it for the virtual collapse of the manufacturing and sales industry in less than a year. While the ABC program certainly did not help, I contend that the demise came more from market saturation. By the end, nearly everyone who could afford an ultralight and whose spouse or girlfriend/boyfriend would permit it already had one. AOPA canceled its ultralight division and suggested that John Ballantyne establish a separate organization. He founded the U.S. Ultralight Association. Of the seven magazines, only one survives. Originally a Chattanooga hang glider club newsletter, *Glider Rider* is now named *Ultralight Flying*.

Weighty Matters

From the beginning, excessive airframe weight was an issue for the ultralight community. The 254-pound limit (with waivered credits for floats and attached parachute systems) was a severe structural hindrance for some designers. They argued that with "a few more pounds," they could add safety features such as a beefier structure and wheel brakes. Ballantyne of USUA petitioned the FAA to consider higher weight and speed limits, but the FAA did not budge.

Instead, the FAA encouraged establishing volunteer committees composed of industry and association reps plus a few FAA employees to look at alternatives. These committees (known as ARACs.) talked and wrote about their concerns throughout the 1990s. In the end, the decision was to retain Part 103, the ultralight regulation, but to establish a new category of aircraft and a new license. Eventually, these became the LSAs and the Sport Pilot license.

A program that sounds similar was tried in the early '90s. The FAA came up with a new Recreational Pilot license, and nine aircraft manufacturers signed up to produce new Primary Category aircraft under the program. Larry Burke, who co-founded the Light Aircraft Manufacturers Association (LAMA), helped write the specs for the new aircraft category. Two of the nine companies, Quicksilver Aircraft and a division of Zenith Aircraft, produced Primary Category aircraft models. But only a few hundred Rec Pilot licenses were

The Homebuilt Advantage

No question that ready-made LSAs are stealing all the headlines. After all, they are among the few new airplanes to come on the market in a decade or more, and, besides, they at least approach affordability.

This state of affairs has, perhaps, cast a long conceptual shadow on Experimental/Amateur-Built "51% rule" homebuilts that also qualify as LSA legal, meaning they can be flown by Sport Pilots as well as traditionally licensed sticks. Inside our two previous directory issues this year, for kits and plansbuilt fixed-wing aircraft, there are some 276 designs that are LSA legal. Seen as a whole, the homebuilt LSA designs easily outnumber those that are too large, fast or heavy to be included.

Experimental/Amateur-Built aircraft that qualify as LSA carry significant benefits. Chief among them is that you, the builder, have tremendous flexibility in the equipment to be installed, ranging from engine and prop choices to integrating the avionics package of your dreams. The way the SLSA rules are written, your engine/prop combination is precisely what the manufacturer has approved, nothing more and nothing less. Same for the avionics, though the manufacturer has some leeway in specifying which components can be installed; if you want to add a piece of equipment later, it has to be on the approved list. No approval, no installation. And that's because the category lacks a secondary-approval mechanism—no such thing as STCs or Form 337 modifications, as are common among production aircraft.

As for ongoing maintenance, SLSAs are covered under provisions that allow owners to receive specialized training to obtain a Repairman (Light-Sport Aircraft) Certificate. There are two "ratings" in this class: The Inspection rating applies only to ELSAs and gives the privilege only to aircraft owned by the certificate holder. The Maintenance rating allows individuals to perform maintenance and the annual condition inspection. (A traditionally trained A&P mechanic can as well. See table on page 27.)

For your Experimental/Amateur-Built, LSA-qualifying airplane, you can apply for a Repairman Certificate that gives you tremendous power and leeway for modifications and maintenance. The benefits here, in terms of your ability to maintain the airplane and to make modifications (large or small), are massive when judged against the restrictions on SLSAs.

And there's one more thing: Typical builders work over time, buying components and supplies as they can afford them. This ability to self finance, if you will, also carries appeal to those who don't want to plunk down the high-five-figure cost of a new, ready-to-fly LSA. *—Marc Cook*

issued, and although the two Primary Category aircraft are still available, the program fizzled.

Starting Over

A funny thing happened on the way to forming a new license and a new category of aircraft. In 1995, Congress passed a law saying that henceforth, federal regulations that affect an industry must be written as a consensus standard. What's that?

It means that volunteers from the industry and from user groups are to draft the regulations in conjunction with people representing the federal agency responsible. In the case of Sport Pilot and LSAs, it meant that subcommittees would be formed to write every regulation, and the FAA could have only one voting member on each subcommittee. Each company and each organization would also have a single vote. This is a revolutionary concept, especially in a highly technical field such as aviation. The FAA helps guide the process but does not decide the outcome

	Experimental Category					SLSA		
	ELSA			Amateur-Built				
	Owner	LS-I	LS-M/ A&P	Owner	Repair-man/ A&P	Owner	LS-I	LS-M/ A&P
Modifications During Construction	N	N	N	Y	Y	N/A	N/A	N/A
Modifications After Construction	Y	Y	Y	Y	Y	N	N	(3)
Preventative Maintenance	Y	(1)	Y	Y	Y	Y	(1)	Y
Repair and Major Maintenance	Y	(1)	Y	Y	Y	N	N	N
100-hour Inspection	N	N	(2)	N/A	N/A	N	N	Y
Annual Inspection	N	(1)	Y	N	Y	N	N	Y

1. Can perform if owner of aircraft.
2. Former Part 103 two-seat exemption aircraft transferred to ELSA and used for training.
3. Only modifications specifically authorized by the aircraft manufacturer can be made.

of any issue.

The FAA staff, headed by Sport Pilot Manager Sue Gardner, worked on a proposal to incorporate many of the ARAC recommendations. In February 2002, the Sport Pilot/Light-Sport Aircraft notice of proposed rulemaking (NPRM) was released for public comment.

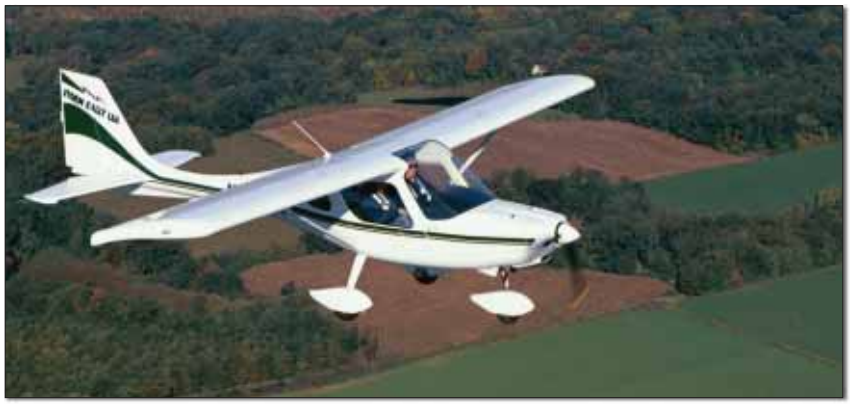
Finding a Consensus

From the outset, early in 2002, the administrative process for Sport Pilot and LSA was recognized as potentially overwhelming. More than 120 people attended the first organizing meeting hosted by the EAA at Oshkosh. Reps from the FAA, aircraft companies (many of them homebuilt aircraft kit manufacturers), a wide variety of aviation organizations, and a few "users" such as journalists attended that first big meeting.

EAA's governmental affairs manager, Earl Lawrence, proposed a solution to the administrative task ahead. As part of the EAA group testing auto gasoline in light airplanes, Lawrence was a member of the ASTM International committee on aviation fuel standards. ASTM is a nonprofit company founded late in the nineteenth century to coordinate testing and standards for the manufacture of materials and products. One of the first standards, introduced in 1898, was for the formulation and testing of structural steels. These standards assured civil engineers that their properly designed steel bridges would not collapse because of inferior materials.

Today ASTM's work can be found on everything from the installation of tile floors to the design and operation of amusement park rides. The company does not charge for administering the entire consensus standards process but makes money by selling the resulting documents.

The LSA volunteers voted for ASTM to guide the consensus standards process, and ASTM's board agreed to coordinate the LSA standards under a new committee designated F-37. Dan Schultz from ASTM was assigned to guide the committees through the years-long process. Earl Lawrence was elected F-37 executive committee chairman, and Larry Burke was chosen as secretary.



The Air Elite Storm Rally offers solid performance on a 912ULS engine.

The Kappa KP5 is a sporty addition to the category.

Now the real volunteer work began. Each of the LSA categories (airplane, glider, weight shift, powered parachute, gyroplane and lighter than air) was assigned to a subcommittee, and officers were elected in each subcommittee. Membership was (and still is) open in the subcommittees, but each company, organization and the FAA was given only one vote. Within each subcommittee, the task of writing technical standards was begun under ASTM rules.

Here's how it works: The proposed standards are shared and balloted by e-mail within each subcommittee. Every member is required to vote, and any negative vote (which requires written rationale) stops the process, either until a unanimous consensus is reached or, after a thorough discussion, the negative vote is considered non-persuasive. After subcommittee work, the entire F-37 committee votes on each part. Some standards have sailed through the process easily, but most take months to resolve all issues. Since starting, additional subcommittees have been formed that address "cross-cutting" issues such as the format of maintenance manuals and pilot handbooks plus the design, testing and certification of engines. There is even a subcommittee that looks at standards for airparks that will accommodate LSAs.

Some initial consensus standards work continues, but most LSA standards are complete and have been published. Committee F-37 will not disband, however, because periodic reviews and updates are part of the process.

LSA Becomes Real

Sport Pilot/LSA became effective on September 1, 2004. Nothing visible happened that day because structures were not quite ready to license new Sport Pilots or approve newly manufactured aircraft (SLSAs). However, some licensed pilots whose aircraft qualified under LSA definitions let their FAA medical certificates lapse and—with no paperwork required—became Sport Pilots.

A few months later, the FAA completed processing its first imported and domestic SLSA applications. Flight instructors declared their intention to teach Sport Pilot students, and pilot

examiners submitted the paperwork to participate.

EAA, which has been a prime mover in the LSA movement, reports that since the opening gun in 2004, more than 1300 people have passed the Sport Pilot written exam, more than 400 new Sport Pilot licenses have been issued, more than 100 Sport Pilot instructors are certified, and more than 500 LSAs have been registered.

The number of registered LSAs does not count the many standard category aircraft (certain models of Piper Cubs, Aeronca Champs, Ercoupes, Taylorcraft and others) and probably even more Experimental/Amateur-Built planes that meet the LSA definition. (Look at all the "LSA Legal" icons to be found in our annual kit and plansbuilt directories for proof of the numbers.)

What's an LSA?

To be flown by a Sport Pilot, the aircraft must qualify as an LSA. Briefly, an LSA is an aircraft not exceeding 1320 pounds gross weight (or 1430 for amphibians), flying not faster than 120 knots level under maximum continuous power, stalling not faster than 45 knots, carrying not more than a pilot and one passenger, and meeting other limits such as single engine and a fixed or ground-adjustable propeller.

We've touched on the SLSA (factory-built) category found in this month's directory. And I've noted that amateur-built aircraft meeting the LSA definition qualify to be flown by Sport Pilots, and there is no extra paperwork.

Other aircraft qualifying as LSAs are Experimental LSAs, known as ELSAs and are not to be confused with Experimental/Amateur-Built planes. Companies with qualified SLSAs may turn out nearly complete kits that are built precisely by amateur builders who license them as ELSAs. One advantage is that the owner may take an approved 16-hour course and qualify to do the annual condition inspection on his own aircraft. The other type of ELSA is a former two-seat or heavy (illegal) ultralight whose owner takes steps to convert it to an ELSA.

The disadvantage of the ELSA category is that unlike an SLSA, the aircraft cannot be rented or used for paid flight instruction (though an ELSA owner could pay for instruction in his or her own aircraft).

As we went to press, all the attention by pilots, potential owners and aircraft manufacturers, has been on the SLSA side of the fence; in time, ELSAs might begin to emerge, but it hasn't happened yet.

So, summing up, the Light Sport movement is undoubtedly gaining speed and credibility. The pioneer manufacturers, many of them small companies based overseas, will almost certainly be joined by larger entities, perhaps as large as Cessna itself. (While, at press time, Cessna had not announced it would actually build its SLSA, the proof-of-concept example had flown.) For Light Sport enthusiasts, these are exciting times. ✚