Putting the E in EAA
The history of homebuilding

Are You Hypoxic?
What happens when you fly too high

Lindy Lancair
Oshkosh 2014 Grand Champion

From Farm to Fighter
Giving back to veterans through the gift of flight
WHAT DO THE INITIALS “EAA” stand for? To someone not very familiar with general aviation, it would be a valid question on his or her first visit to AirVenture Oshkosh. From an initial impression, EAA might stand for “Enormous Air Show Association.” AirVenture is indeed an enormous air show, but as we know, it is much more. There is something aviation for everyone. The revelation that EAA stands for Experimental Aircraft Association may seem out of context with the overall theme of the event. EAA had its origin long before the word AirVenture had been coined, even before Oshkosh became synonymous with EAA, and before EAA became a dominant force in aviation.

THE FIRST EXPERIMENTALS
In the beginning with the Wright brothers all airplanes were homebuilt.

The amateur-built aircraft industry of today had its genesis in the distant past, long before the founding of EAA. Amateur building of aircraft, built solely for personal use rather than as pre-production prototypes, began in the late 1920s, when there was widespread fascination with flight. Few production lightplanes were available, and those that were in limited production were too expensive for most wannabe pilots. Ed Heath, Bernard Pietenpol, and others designed airplanes and offered plans and rudimentary kits for them. They were very basic airplanes that could be built with common materials and powered with inexpensive converted auto and motorcycle engines.

The early 1930s saw widespread activity, but only marginal practical success in terms of aircraft performance and safety, and unfortunately, in terms of regulatory freedoms. The Civil Aeronautics Administration (CAA) had not made provisions for amateur-built aircraft in the licensing requirements for civil aircraft, which it established in 1926. Many of the homebuilt of that period either flew illegally or under some form of exemption. Throughout the 1930s, a number of people became involved in the advocacy for licensing of amateur-built aircraft, particularly Leslie Long of Cornelius, Oregon. Les was a homespun genius who designed and built several single-seat designs, and even designed, built, and marketed his own aircraft engine, propellers, and radios (non-aircraft). But, more significantly, he wrote many articles for national aviation magazines. He advocated that the government adopt liberal licensing for amateur-built aircraft, like that enjoyed in his home state, Oregon. A few states established their own aircraft licensing rules a number of years before the CAA rules were enacted in 1926, and adhered to them even after the feds attempted to enforce theirs.
Unfortunately, none of Les’ efforts came to fruition in his lifetime, which ended from ill health in 1945. By this time even Oregon’s liberal homebuilt aircraft licensing rules had been overridden by the federal rules. However, Les’ ideals were kept alive by some of his friends and followers throughout the country, including George Bogardus, who took the lead in what became the American Airmen’s Association.

In 1946 George drove his 1937 Chevy from Oregon to Washington, D.C., and met with CAA officials, the outcome of which was the creation of the experimental amateur-built licensing category. On a trial basis, the CAA issued the airworthiness certificates for periods of only 12 months. In 1947, George flew from Oregon to Washington, D.C., in his homebuilt Little Gee Bee, a single-seat variant of Les Long’s last design. The flight helped convince the CAA that homebuilt planes were safe and practical, and the E-AB category was expanded, making its licensing more official and permanent. Because homebuilds were exempted from compliance with stringent certification criteria required for production aircraft, they were restricted from commercial flight operation, and they needed to have been constructed by the certificate applicant strictly for educational and recreational purposes.

In the years immediately following the creation of the E-AB category, homebuilding was the domain of a small number of enthusiasts, primarily those left over from the 1930s. The postwar lightplane production boom had burst, and there were abundant, cheap, used lightplanes everywhere. Those who pursued building E-ABs at this time were doing so either because of a love of creating or a desire to build something different, hopefully better than the new or used factory airplanes available. Economics was not a primary driving force.

There was not enough homebuilding activity to attract much attention. There were no kits available, so builders either worked from blueprints or designed their own one-of-a-kind airplanes. The aircraft they built were of necessity: small, simple, and usually single-seat open-cockpit designs offering only modest performance. Most relied on engines, instruments,
Amateur building of aircraft, built solely for personal use rather than as pre-production prototypes, began in the late 1920s, when there was widespread fascination with flight.

cowlings, landing gears, etc. cannibalized from aircraft salvage yards. Some of the resulting designs were so appealing that their hobbyist-designers prepared plans sets and marketed them, which began the kit plane industry.

The postwar homebuilt movement was energized in the mid-1950s through the efforts of EAA Founder Paul Poberezny. Most are familiar with the story of how the young pilot rallied a small group to form a flying club around an experimental modified Taylorcraft. The small group soon evolved into EAA. Though the E-AB category already existed, it was more of an organizational shell than a well-defined licensing category. In addition to growing its membership and forming chapters, EAA's primary task in its early years was working with the CAA (which became the FAA in 1956) to add structure and policy to the experimental category, a major part of EAA's early legacy that continues evolving to this day.

The story of Paul's charisma, of how he attracted members to the association, drew international recognition, and added a number of his own designs to the scores of other early designs, is well-known. What's important to recognize is that he oversaw and encouraged the evolution of a small movement that has been
transformed into a respected industry. Without Paul, you wouldn’t be reading this.

EAA held its first fly-in convention in 1953 at Curtiss-Wright Airport in Milwaukee, Wisconsin. A total of 29 aircraft attended, and only 15 were true homebuilts. Today, the homebuilt parking area at AirVenture is a patchwork quilt of a vastly different breed of airplanes than those that attended the early EAA fly-ins. Most of them now share durable aluminum and composite airframes, built from well-developed kits. These materials have generally proven better suited for kit production than the wood or steel tube and fabric structures of their earlier kin. The planes are products of the emergence of the kit aircraft industry, which evolved to meet the needs of builders wanting bigger and higher-performance homebuilt airplanes.

In the 1960s, the emergence of aluminum structured aircraft like the Thorp T-18 and Bushby Mustangs started a trend away from the more basic, usually open-cockpit, tube and fabric designs that were dominant in the 1950s. Rudimentary kits, usually consisting of raw materials and a few formed and molded parts, were the norm until the mid-1970s. It was an era that has come to be known as scratchbuilding period, when most homebuilders bought a set of plans and set out looking for the materials that would be needed to build that airplane. Some of the designers sold limited materials packages or specific difficult-to-fabricate parts, but most sent the plans with their blessings and good wishes for completion.

In 1977, Frank Christensen’s very complete and detailed kit for his
Christen Eagle biplane set a new standard and forever changed the course of homebuilding. It also raised the FAA’s eyebrows with concerns about it being too complete to qualify as amateur-built. The FAA created a checklist to evaluate kits for compliance with what became known as the 51 percent or major portion rule.

Perhaps the most influential singular homebuilt design ever to appear was Burt Rutan’s VariEze, making its entry in the 1970s. It was the first structural composite homebuilt design. In addition it offered the unorthodox canard wing/stabilizer configuration, along with mouthwatering performance and efficiency. It was followed in a few years by the Glasair, which offered not only a composite structure, but also pre-molded parts vaguely reminiscent of snap-together plastic model planes. Other composite designs soon followed, and the overwhelming appeal and promise of the designs seemed to sound a death knell to traditional aircraft structural materials.

Around the early 1990s another development made homebuilts even more appealing: the introduction of partially assembled kits rather than just the packages of loose parts and materials. Known as fast-build or quick-built kits, the new products bumped up against the interpretation of the major portion rule and required more fine-tuning of the FAA’s kit compliance checklist, as well as defining just how complete a quick-build kit could be. The result was that more homebuilts of refined design and higher performance became accessible to a broader range of potential builders.

CNC MANUFACTURING

During the 1990s, manufacturers of kits for aluminum airplanes began taking advantage of developments in computerized manufacturing machinery. Along with CAD (computer-aided design), extremely accurate and efficient mechanized manufacturing of primary airframe parts began to happen. Computer-aided manufacturing (CAM) machinery including laser cutting, punching, routing, plasma cutting, etc. were well-suited for producing parts for aluminum aircraft, but of limited benefit for composite aircraft. Ultimately, kits for some homebuilt designs evolved to the point that airframe parts included all rivet and bolt holes so accurately positioned that assembly could be done without the need for traditional jigs and holding fixtures.

Throughout the ’70s, ’80s, and ’90s, Oshkosh attracted ever-expanding crowds and a growing number of new designs in the homebuilt field. EAA members always showed up with a high level of anticipation for what was new. It wasn’t uncommon to see numerous new designs every summer. Some aircraft showed up for one Oshkosh and were never seen again. Others became popular, gained loyal followers, and spawned new kit manufacturing facilities.
HOMEBUILDING THROUGH THE YEARS

1973
Van's RV-3

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HOMEBUILTS OF POST-2000
Kits predominate in the new millennium, with an increasing percentage of quick-build kits. Most popular kits now available are mature designs that have survived the test of time and evolved over a period of about 20 years or more. Introduction of new models is a less common occurrence because of the time and expense necessary to develop aircraft and kits that meet present consumer demands and expectations. In this respect, the kit plane industry has mirrored the GA industry, where truly new designs are increasingly rare. Due to the incremental advances in design, there may not be the level of excitement and anticipation as that of the 1980s and ’90s, but kit planes are better than ever and offer a viable alternative to the increasingly unaffordable factory production aircraft.

In 2012 and 2013, sales of new piston-powered light aircraft were about the same in number as homebuilt aircraft completions. While neither is a particularly impressive figure, the proportions are telling. Experimental aircraft claim an ever-increasing percentage of the GA fleet; while that figure now stands at about 20 percent, it is on the increase with no end in sight.

E-AB aircraft, by default, have become one of the only affordable sources for new personal airplanes. In that EAA has grown and evolved from its roots in homebuilt airplanes to embrace all forms of aviation, it is interesting that E-AB airplanes offer the most growth potential. In a sense, we’ve come full circle.

If E-AB aircraft are fast becoming the new face of private aviation, why are they not more obvious at AirVenture? Actually, they are. If you take the time to venture into the vast homebuilt parking and display areas, you can discover a dynamic subculture of aviation. While owners and pilots of antique and classic airplanes are devoted advocates of their chosen airplanes, nothing equals the culture of the homebuilder. The building time and innovative effort expended to bring an E-AB to fruition creates a common bond between builders. Theirs is a world of quiet pride and satisfaction. But, should you approach and admire their homebuilt creations, you will be treated to an outpouring of their vast knowledge, pride, and enthusiasm. Most are nearly evangelical in their zeal, and it’s contagious.

Homebuilders have historically seen the need for and benefits of networking with other builders, sharing talents and tools needed to create high-quality airplanes. That’s where EAA and its many chapters come to the fore, offering a common ground for kindred spirits, rugged individualists though they might otherwise be.

About two years ago, leaders of a number of mature kit companies recognized the benefit of sharing talents and resources for the benefit of the industry. Thus, the Aircraft Kit Industry Association (AKIA) was formed with goals of striving for improved safety while improving and promoting the industry’s products. AKIA is working with EAA to achieve goals they hold in common like safety, education, transition training, and preserving the freedom we enjoy as builders and pilots.
The Christen Eagle II brochure featured portions of the 26 kits required to build the aerobatic two-place aircraft.
AKIA, the Aircraft Kit Industry Association, was founded in 2012 by 15 of the leading aircraft kit manufacturers and suppliers in the United States. Our purpose is to protect and promote our industry. AKIA has grown to include 26 companies, led by an executive committee that currently includes Dick VanGrunsven of Van’s Aircraft, John McBean of Kitfox, and me, and has an advisory committee of four individuals with vast experience and leadership in the aircraft industry. AKIA seeks to strengthen ties with all individuals and organizations who share our common interests.

The common goals of AKIA member organizations are simple and widely shared in aviation. They include increasing both the number of pilots and the number of aircraft builders in the world today, encouraging and supporting youth aviation education programs, providing opportunities to refine and improve skills, preserving the freedoms our forefathers worked so hard for, and most importantly sharing our passion and love for aviation by enjoying it with friends and family!

AKIA members have donated plans, kits, and engines to a number of youth build programs, provided significant discounts to many other builds in educational settings, and sponsored EAA’s One Week Wonder at AirVenture 2014 and EAA’s staff Zenith build. AKIA is also pursuing a number of initiatives to enhance safety including support of the FAA’s new Additional Pilot Program, angle of attack system testing, widespread use of the experimental training LODA, and other programs.

The experimental aircraft category has grown to include something for just about everyone and is used by most every aviation company on the planet. By definition, it is where all new product development has its origins. Experimental aircraft represent one of the few areas of continuous growth in aviation because of the diversity, excellent safety record, freedom to use the most current and cutting-edge technology, and significantly reduced costs to those who own and operate experimental aircraft.

The experimental aircraft rules allow one of the greatest freedoms known to man. We have the privilege to design, build, and fly just about anything we can dream up and create with our own hands, minds, and hearts. We are united in our passionate belief that these freedoms are worth preserving and fighting for. We further believe these freedoms are the gateway to many things that we aspire to and highly value individually and as a society: innovation, creativity, challenge, achievement, intellect, competition, economic growth, and a better understanding of our world.

For more information including an introduction to building your own airplane, visit www.AKIA.aero.

Jeremy Monnett, EAA Lifetime 590707 and CEO of Sonex Aircraft LLC, is a private pilot with glider, float, and jet sailplane ratings and a mechanical engineer. He was elected president of AKIA in 2014.

**WHY YOU SHOULD BUILD**

Kit-built aircraft are more affordable than new production aircraft. Many kit aircraft models offer performance and handling qualities not found in factory production aircraft at any price. For example, the most numerous class of homebuilts are mid-to high-performance two-seat models. Many homebuilts in that bracket offer performance and flying qualities that have never been available in factory-built aircraft. The most popular and enduring class of E-AB designs are those offering high, or higher still, performance.

You’ll meet very interesting people. Many builders have stated that even if they were not able to finish and fly their airplanes, the friends gained and experiences shared were more than worth the effort.

Many have not considered building a kit because of the perception that only a very small percentage of airplanes ever see completion. It may have been true in the past when airplanes were built from plans and raw materials. Today’s kits have been refined over decades, making them very accurate, complete, and easy to assemble. Builders have demonstrated a very high completion rate. The reasons for the survival of the long-standing kit companies include kit quality, service provided, and performance and utility of the finished aircraft.

So, the next time you attend AirVenture, look over some of the 1,000 or so homebuilts on display. You can return home with a new appreciation for the “E” in our organization’s name and the rich history behind it. Join an EAA chapter and support its outreach programs. Maybe you will even become inspired to join the ranks of those who roll their own. You’ll never regret it. EAA

Richard VanGrunsven, EAA 3204, is the founder of Van’s Aircraft and the designer of the RV series of kit planes. His EAA membership traces back to 1957 when he was 17 years old. He has been flying homebuilts since 1962 and his own designs since 1966.

**HOMEBUILDING THROUGH THE YEARS**

**1998**

Sonex

**2011**

SubSonex

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