

**AMATEUR-BUILT AIRCRAFT
AVIATION RULEMAKING COMMITTEE**

FINAL REPORT

Date: February 14, 2008

I - EXECUTIVE SUMMARY

The Federal Aviation Administration (FAA) Aircraft Certification Service established the Amateur-Built Aviation Rulemaking Committee (Committee) on July 26, 2006.¹ The Committee was made up of representatives from the FAA, aircraft kit manufacturers, commercial assistance center owners, and associations. The purpose of the Committee was to make recommendations regarding the use of builder or commercial assistance when fabricating and assembling amateur-built aircraft under Title 14 Code of Federal Regulations (14 CFR), part 21, § 21.191(g), Operating Amateur-Built Aircraft. This regulation permits someone to build an aircraft that, "...the major portion of which has been fabricated and assembled by persons who undertook the construction project solely for their own education or recreation."²

The Committee agreed that many amateur-builders use too much commercially provided assistance when fabricating and assembling an aircraft from a kit. In the most extreme cases, other persons fabricate and assemble the major portion of an amateur-built aircraft for the applicant. This can result in a falsification of the eligibility statement by the applicant.³

The Committee also agreed that FAA policy does not adequately define the limits of commercial assistance. At this time, amateur-built aircraft applicants (applicants) are not required to document the amount of assistance provided to them by commercial entities.

The Committee agreed:

- FAA directive and advisory language for the airworthiness certification of amateur-built aircraft does not adequately address the issue of commercial assistance in excess of that allowed under the regulations.
- The forms used in determining the amateur-built status of the aircraft need to be updated to more accurately reflect who actually performed the fabrication and assembly of the aircraft.
- The aircraft kit evaluation process is not standardized. The public, industry, the FAA, and individuals within those groups, have different opinions about what level of fabrication and assembly constitutes 'major portion.' In other words, it is

¹ FAA Order 1110.143, dated July 26, 2006, established the Amateur-Built Aviation Rulemaking Committee¹ (Committee). The Committee provided a forum for the FAA and the aviation community to discuss the use of builder and commercial assistance when fabricating and assembling an amateur-built aircraft. Although chartered through July 26, 2008, the Committee had its final meeting on November 15, 2007.

² The generally accepted definition of "major portion" in this instance is that the majority, or 51%, of the fabrication and assembly of the aircraft was performed by the amateur builder for his/her own education or recreation.

³ Affidavit Of Ownership For Experimental Aircraft Including Amateur-Built Aircraft And Other Non-Type Certificated Aircraft, Form 8000-38.

not clear how to determine if the amateur-builder fabricates and assembles the major portion of aircraft solely for their own education or recreation.

- Aviation Safety Inspectors and Designated Airworthiness Representatives may need additional training to fully understand the FAA's expectations when determining an aircraft's eligibility for an amateur-built certificate.

The Committee disagreed

- The Committee could not come to an agreement on how to define 'major portion' when evaluating aircraft kits, either in kit form at the manufacturers or when an aircraft is fully assembled.

FAA Enforcement

The Committee agreed that FAA enforcement action on aircraft construction projects that are egregious violations of the major portion provision of the regulations would provide a significant deterrent to those who promote violating the regulations.

Rulemaking Options

The FAA discouraged rulemaking unless a clear safety case can be made and a cost benefit analysis is provided. However, some Committee members believe there are opportunities to address the desires of a segment of the public for aircraft that does not meet the major portion rule with an alternative to the current amateur-built regulations for 'custom aircraft.'

Industry Committee Member Final Meeting Briefing

Industry Committee members addressed the above issues and briefed their proposals to Aircraft Certification Service management on November 15, 2007. The briefing proposed changes to FAA policy, forms, the kit-evaluation process, training and possible rulemaking. The policy changes are being drafted and will be made available for public notice and comment via the Federal Register. The final policy is targeted for issuance by October 2008. The industry rulemaking proposal is not finalized.

II - ARC REPORT

Introduction:

There is concern by the Federal Aviation Administration (FAA) and other interested parties that a significant number of amateur-built aircraft are not being fabricated and assembled by persons for their own education or recreation, but are being built in large part by commercial assistance companies that specialize in kit aircraft construction. Although some assistance is allowed when fabricating and assembling an amateur-built aircraft, the major portion (at least 51%) must be completed by the amateur-builder to be in compliance with existing regulations.

14 Code of Federal Regulations, Part 21, *Certification Procedures for Products and Parts*, Section 21.191, Experimental Certificates, details the purposes for which experimental airworthiness certificates are issued.⁴ Section 21.191(g) regards constructing amateur-built aircraft and states in pertinent part, "...the major portion of which has been fabricated and assembled by persons who undertook the construction project solely for their own education or recreation."

Current technologies that allow for the fabrication and assembly of sophisticated amateur-built aircraft were not envisioned at the time section 21.191(g) was promulgated in 1964.⁵ Most amateur-built aircraft kits were generally simple to fabricate and assemble and did not require commercial builder assistance.

Over the last 30 years, the introduction of lightweight materials and high performance capabilities has optimized the construction of amateur-built aircraft. Many kit manufacturers have incorporated the latest advances in production methods and technology for both metal and composite aircraft into their designs. This has resulted in improved aircraft operational performance, making these aircraft an attractive alternative to purchasing a commercially built, type-certificated aircraft.⁶

Some of the kits use complex materials or require techniques beyond the ability of most amateur-builders. To assist amateur-builders with these projects, many manufacturers offer programs that include "builder assistance" and/or "educational assistance." Builder and/or educational assistance programs are not in and of themselves a violation of the regulations, however, FAA has no mandate for oversight for these types of programs. This means that FAA must rely heavily on the integrity of both the kit manufacturer and the amateur-builders' certifying statement to ensure the major portion of the aircraft has been fabricated and assembled by the amateur-builder, not the commercial builders.

⁴ Any registered owner of a U.S. registered aircraft (or the agent of the owner) may apply for an airworthiness certificate for that aircraft. An application for an airworthiness certificate is made in a form and manner acceptable to the Administrator, and may be submitted to any FAA office.

⁵ 14 CFR Part 21 was re-codified in 1964.

⁶ An aircraft that is type-certificated in the normal, utility, acrobatic, commuter, or transport category. These aircraft are built and produced by manufacturers that hold certain production approvals issued by the Federal Aviation Administration.

The Problems and Recommendations Identified By the Committee

FAA Advisory Circulars and FAA Orders/Directives

It was agreed by the Committee that existing Advisory Circulars (ACs), and internal instructions to FAA staff (Orders/Directives) for the airworthiness certification of amateur-built aircraft do not fully address use of commercial assistance.

The Committee recommended that advisory circulars, AC 20-27, *Certification and Operation of Amateur-Built Aircraft* and AC 20-139, *Commercial Assistance During Construction of Amateur-Built Aircraft*⁷ be rewritten to include:

- Instructions on how to get an aircraft evaluated by the FAA when using commercial assistance.
- Instructions on how to quantify and document commercial assistance.
- Clarification of the definitions regarding commercial assistance terms.
- Examples of fabrication and assembly values in table format.
- Revised FAA Forms 8130-12 and 8000-38⁸.

The Committee also recommended that FAA Directive 8130.2, *Airworthiness Certification of Aircraft and Related Products, section 9, Experimental Amateur-Built Airworthiness Certifications*, be revised to provide:

- Add more detailed information on determining major portion to include a structured process and procedure to evaluate amateur-built aircraft fabrication and assembly.
- Change discretionary language that directs Aviation Safety Inspectors (ASIs) and Designated Airworthiness Representatives (DARs) how to perform amateur-built airworthiness certification from “may” to “must” in certain instances.
- Add a more in-depth interview process at the time of aircraft certification to assist the FAA in determining if the applicant is familiar with all the fabrication and assembly tasks that are documented in the individual’s builders log and Form 8000-38.
- Provide a completed copy of Form 8000-38 for each amateur-built kit evaluated with each kit produced so their customers so they know exactly how much fabrication and assembly they must complete and how much they may contract out.
- Post on the internet a completed copy of Form 8000-38 for each amateur-built kit evaluated so FAA inspectors will know exactly how much fabrication and assembly the amateur-builder must complete and how much they may contract out.

⁷ These Advisory Circulars (ACs) are not mandatory and do not constitute a regulation. These ACs describe an acceptable means, but not the only means, to comply with the certification requirements for amateur-built aircraft.

⁸ Form 8130-12 is used by the amateur-builder to certify that the major portion (51%) of the aircraft was fabricated and assembled for educational or recreational purposes. Form 8000-38 is used by the FAA to determine that an aircraft, when fabricated and assembled from a kit, will meet the major portion determination.

- Inform applicants of the proposed requirement to identify the individuals or companies that participated in the construction of the aircraft on the 8130-12 Eligibility Statement. This will enable the applicant to better anticipate the effect of hiring helpers and will become part of the official records of the aircraft's certification.

Forms

The Committee agreed that Form 8000-38, *Fabrication/Assembly Operation Checklist*, should be updated to more accurately reflect the actual fabrication and assembly of amateur-built aircraft. It is important to capture who did the actual work; the amateur-builder, the kit manufacturer in terms of what was provided in the kit and if used, assistance from a commercial builder or other source.

The Committee also recognized that the current Form 8130-12, *Eligibility Statement, Amateur-Built Aircraft*, does not require the applicant to certify that he/she fabricated and assembled the major portion of the aircraft; nor does it require the amateur builder identify any additional sources of fabrication and assembly that was used. A revision to the form would include this certifying statement.

Both of these forms are currently included in the above noted Advisory Circulars and will be updated as soon as possible.

Aircraft Kit Evaluation

The Committee also examined the process that FAA uses when evaluating aircraft kits. When requested, the FAA evaluates amateur-built kits at the manufacturer's facilities prior to marketing and sale. The purpose of this evaluation is to determine if the fabrication and assembly of the kit would allow the amateur-builder to complete the major portion of the aircraft. When a kit has been found to be eligible, it is added to the FAA's kit listing which is available via the internet to prospective buyers.⁹ These kit evaluations advise prospective applicants that they would be *eligible* for an experimental amateur-built airworthiness certificate if they fabricated and assembled their aircraft in accordance with the assembly and instruction documents evaluated by the FAA.¹⁰

The Committee members were in agreement that the process used for this evaluation is not standardized. Committee members did random reviews on previously evaluated amateur-built aircraft and found various methodologies had been used to determine if a kit or an assembled aircraft met the major portion requirement.

⁹ http://www.faa.gov/aircraft/gen_av/ultralights/amateur_built/kits/ This listing identifies previously evaluated kit aircraft that, at the time of the evaluation, met the requirement that the major portion of the kit could be fabricated and assembled by the amateur-builder.

¹⁰ There is no guarantee that an assembled kit would receive an experimental airworthiness certificate.

The Committee recommended that FAA form a group of Aviation Safety Inspectors to establish a standardized evaluation process. These inspectors would respond to requests from kit manufacturers to evaluate a kit to determine if an amateur-builder could fabricate and assemble the major portion of the aircraft.

Commercial Builder Services

As stated above, FAA is concerned that amateur-builders are using more commercial assistance than is allowed by the major portion requirement of 21.191(g). Some complex kits include advanced composites structures, state of the art avionics systems, special tools and gauges, and close tolerance fixtures. These builders must use commercial assistance because the aircraft cannot be fabricated and assembled outside the factory environment or by the average amateur-builder.

The Committee also noted that many aircraft are marketed as having the maximum amount of fabrication and assembly allowed already completed by the kit manufacturer (49%). In theory, the remaining 51% would then be completed by the amateur-builder(s). If additional commercial assistance were used, the aircraft would not be eligible for an amateur-built airworthiness certificate.

In an increasing number of instances, kit purchaser also desire to pay for the construction of their aircraft with services provided by commercial builders.¹¹ During the airworthiness certification process, it is the amateur-builder, not the commercial builder, who must sign the form 8130-12, attesting that they have built the major portion of the aircraft.¹² Because the form does not require disclosure of the commercial builder's role in the construction of the aircraft, the FAA often cannot make a valid determination that the builder fabricated and assembled the major portion of the aircraft.

The Committee's recommendations to curb excessive commercial assistance are focused on improving the documentation that is required to be submitted by the applicant; strengthening the requirements for airworthiness certification of amateur-built aircraft, and standardizing the kit evaluation process. These actions will increase the ability of the FAA to enforce the major portion rule.

¹¹ These 'commercial builders' range in sophistication from other amateur-builders to de facto manufacturing facilities that exists solely for the purpose of fabricating and assembling aircraft kits for the purchaser.

¹² Form 8130-12 must be signed and notarized.

Calculating Major Portion

The Committee disagreed on how to calculate the work done by the amateur builder, the kit manufacturer, or the commercial builder to determine if the aircraft meets major portion the requirements of 21.191(g). Most industry ARC members continue to support the existing dual check system, primarily out of concern for potentially negative economic impacts. When using the dual check system, the both the kit manufacturer and amateur-builder take equal credit on the Form 8000-38 regardless of how much work either performs. An extreme example is the fabrication and assembly of an advanced composite fuselage structure. The amateur builder may only sand finish rough edges, yet the amateur-builder would take equal credit for the entire fabrication and assembly process.

The method of determining the major portion of construction has evolved since the rule was first codified in 1964. When FAA staff developed the form 8000-38 to calculate major portion, the intent was that a single check mark in a row or line item on the form would identify who did the task. It was not envisioned that credit for a task would be offered to an amateur-builder simply assisting in the fabrication and assembly. In the fuselage example above, the amateur builder would receive no credit for the insignificant fabrication or assembly work accomplished. FAA continues to support this methodology.

Currently, there are inconsistent evaluation criteria being applied by both applicants and FAA representatives. Some manufacturers and FAA representatives calculate major portion by using a “task-based” accounting mechanism that incorporates a “dual-check” system whereby an amateur-builder may be given shared credit even if that person does not complete the major portion of the task.¹³ Some Committee members advocated that the amateur-builder(s) continue to receive credit for completing the major portion of a task when they “perform the operation sufficiently to understand how to do it.” When this is used in practice, the kit manufacturer and amateur-builder share credit on the Form 8000-38.

Additionally, some industry representatives on the Committee recommended adding the term “Representative Number of Operations” or “RNO.” While the RNO name is new, industry’s position is that the concept uses counting methods similar to what is used today to result in a check for both the manufacturer and builder on Form 8000-38.

Because the Committee was unable to come to agreement in this area, FAA will develop the final method of calculating major portion with an opportunity for public comment.

¹³ FAA Form 8000-38 is essentially a checklist with tasks identified. A ‘check mark’ would be placed to indicate who did the work.

FAA Enforcement

The Committee agreed that the FAA should begin to take enforcement action and/or deny airworthiness certificates based on violations of the current rule. In egregious cases where there is a clear, deliberate falsification of the eligibility statement, the FAA should make referrals to the Department of Justice for prosecution.

Rulemaking

The FAA members on the Committee discouraged rulemaking unless a clear safety case can be made and a cost benefit analysis is provided. However, some Committee members believe there are opportunities to address the desires of a segment of the public for an aircraft that does not meet the major portion rule with an alternative to the current amateur-built regulations for ‘custom built aircraft,’ that:

- Eliminates any major portion requirements or determinations by FAA of experimental amateur-built aircraft.
- Provide industry standards similar to Experimental Light Sport Aircraft (ESLA) and Special Light Sport Aircraft (SLSA) to assure compliance with certain levels of safety
- Provide industry with a legitimate outlet for the skill/talent pool of the builder assistance sub-industry.
- Provide a legitimate source of personal use aircraft of class and type not economically viable under 14 CFR Part 23.
- Support the revision of the Experimental 21.191(h) “Primary Kit-Built” category to allow kits to be sold by declaring compliance with applicable ASTM International standards.¹⁴

Industry Committee members have proposed submitting a petition for rulemaking to the FAA to consider these ideas. FAA will evaluate any petition for rulemaking received.

The Committee also agreed that a change to the existing amateur-built regulation is not the best way to address the desire for more commercial assistance in the construction of “custom” aircraft” for the following reasons:

- It was recognized that allowing builders to obtain more commercial assistance than is currently allowed by the regulation facilitates the construction of more complex aircraft. This would perpetuate the current situation and would encourage continued non-compliance with 21.191(g).

¹⁴ ASTM International Committee F37 has developed standards for aircraft design, manufacturing and continued airworthiness that has been accepted by the FAA for certification of Special Light Sport Aircraft and for a basis of obtaining a Primary Category Type Certificate.

III - CONCLUSION

Before concluding its meetings the committee drafted proposed changes to FAA Orders, Advisory Circulars, and Forms. The FAA is in general agreement with these proposed changes and will make all documents available for review and comment prior to publication.

The FAA will consider forming a group of Aviation Safety Inspectors to establish a standardized evaluation process and perform kit evaluations.

The FAA will develop the final method of calculating major portion. This method will be made available for review and comment prior to publication.

The FAA will consider petitions for rulemaking by ARC members or any other interested party or person.

IV - BACKGROUND

Committee Charter: FAA Order 1110.143, dated July 26, 2006, established the Amateur-Built Aviation Rulemaking Committee¹⁵ (Committee). The Committee provided a forum for the FAA and the aviation community to discuss the use of builder and commercial assistance when fabricating and assembling an amateur-built aircraft. Although chartered through July 26, 2008, the Committee had its final meeting on November 15, 2007.

Committee Membership: The Committee was comprised of three Co-Chairs that included one FAA senior manager, one association representative and one kit-plane manufacturer. In this way, all members of the Committee had a voice at the Co-Chair level.

Committee Co-Chairs:

Frank Paskiewicz, FAA Production and Airworthiness Division, AIR-200
Earl Lawrence, Experimental Aircraft Association
Dick VanGrunsven, CEO of Van's Aircraft

Committee members (in alphabetical order):

Jackie Black, FAA Flight Standards Service, AFS-300
Joe Bartels, CEO of Lancair
Stephen Buczynski, FAA Aircraft Certification, Van Nuys MIDO
Paul Fiduccia, President, Small Aircraft Manufacturers Association (SAMA)
Joe Gauthier, Manufacturing DAR
Paul Greer, Airworthiness Law Branch, AGC-210
Donald Lausman, FAA Airworthiness Certification Branch, AIR-230, (Team Lead)
Jeremy Monnett, Sonex Aircraft LLC
Dave Saylor, AirCrafters LLC
Rick Schramek, Epic Aircraft
Matt Tomscheck, FAA Aircraft Certification, Cleveland MIDO
Mikael Via, Glasair
Brian Whitehead, Transport Canada Civil Aviation.

¹⁵ The formation of this Committee is designated and established by the Administrator's authority under Title 49 of the United States Code (49 U.S.C.); section 106(p) (5).

APPENDIX

The following is a chronological history researched by members of the Committee on the evolution of the amateur-built aircraft category.

- 1931
 - State legislatures adopt their own versions of the regulations governing aviation to compliment the requirements of the Federal Air Commerce Act of 1926.
 - The section defining the requirements for an airworthiness certificate, intended to apply only to those aircraft used in interstate commerce, was amended in many state laws to apply to all aircraft, effectively outlawing homebuilding.
- 1941
 - Oregon is the last state to outlaw homebuilt aircraft.
 - WWII puts an end to civil aircraft until after war.
- 1945
 - Efforts with the Civil Aeronautics Administration (the CAA was the predecessor to the FAA) to develop a homebuilt rule were begun.
- 1946
 - CAA agreed that starting in 1947 “X” certification for homebuilt planes, built before WWII, would be granted.
- 1947
 - CAA agrees to develop a permanent category for homebuilt aircraft.
 - A temporary “X” certification for homebuilts was granted which required renewal every six months.
 - Community Proposal to CAA for New Category
 - Homebuilt craft will be first flown under an ‘X’ certification for a proving period of 50 or 100 hours.
 - Such craft will be flown by the owner or associates who must have a private pilot’s certificate.
 - If after flying the proving period the plane seems to be satisfactory in regards to performance, structure, control and flight characteristics, the new category certificate will be issued.
 - Two place aircraft that have the category certificate will have the passenger cockpit placarded in such a way that the passenger he will be flying in an experimental aircraft.
 - If the plane is sold, the new owner must put the plane through for a category certificate as though he had built the plane.

- Flight restrictions would be similar as for the “X” certificate. The main one being the restriction from flying over densely populated areas.
- 1951
 - On November 17, 1951 an amendment to the Civil Air Regulations dealing with experimental certificates was published.
- 1952
 - On September 19, 1952, the amateur-built category was officially adopted.
- 1953
 - The Experimental Aircraft Association (EAA) was founded.
- 1960
 - Test areas were established and authorized for the testing of new amateur-built aircraft; first outside of Milwaukee and then the Dayton, OH area. Others followed and were coordinated by the EAA chapters in the area.
- 1964
 - Aerobatic maneuvers of experimental amateur-built aircraft were authorized.
- 1966
 - In September the FAA verified that IFR operations are authorized in experimental amateur-built aircraft.
 - However, it was also noted that experimental aircraft are not authorized to operate in congested airways or over densely populated areas and there was no way in actual IMC to guarantee that such operations would not take place - so IFR flight should not be accomplished as a practical matter.
- 1968 - Early 1970s
 - First kits started to appear. Their level of completion was such that FAA did not take any significant action to prevent them.
 - However, a kit for a Pitts biplane, which was previously built as an exhibition aircraft, was denied certification as an amateur-built aircraft because the pre-supplied components, e.g. wing ribs and welded fuselage, was considered to not meet the intention of the majority portion part of the amateur-built regulation.
- 1979
 - In September, for an unlimited duration, airworthiness certificates were allowed under revised FAR 21 regulations.

- Same regulatory change created Repairman Certificate for amateur-built aircraft builders.
- 1982
 - FAA 51% Kit evaluation list was initiated.
 - Close out inspection no longer required if builder participates in EAA Technical Counselor program.
- 1990
 - Requirement to show that closeout inspections were completed by the FAA or an EAA Technical Counselor was removed completely.
 - A FAA AC was issued advising builders to use EAA Technical Counselor and/or A&P to perform interim inspection during construction of aircraft.
- 1996
 - A Commercial Assistance AC was issued adding additional items that could be completed with the use of commercial assistance such as paint, avionics, and upholstery as they were defined as not part of the major portion.
- 1998
 - In May, flight over densely populated areas was authorized for takeoffs and landings or as directed by ATC.
 - FAA Flight Standards Handbook Bulletin, HBGA 99-13, clarifies experimental, amateur-built aircraft that received an airworthiness certificate before the issuance date of HBGA 98-05, (May 28, 1998) and that received an authorization in the form of operations limitations allowing operations over densely populated areas for the purpose of takeoffs and landings, are authorized for takeoffs and landings and en route operations over densely populated areas.
 - This change also allowed practical IFR operations.
- 1999
 - 8130.2D was issued allowing for major changes in the field without FAA “approval”.
 - Created Amateur-Built only section in Order 8130.2 for operational limitations.
 - Created requirement to record Vx, Vy and max gross weight of aircraft as flown during test period.
- 2006
 - Amateur-Built Aviation Rulemaking Committee chartered by the FAA Administrator, providing a forum for the discussion of current issues surrounding amateur-built aircraft.