Registering an Amateur-Built Light Sport Kit Aircraft

A Senior Project
presented to
the Faculty of the Aerospace Department
California Polytechnic State University, San Luis Obispo

In Partial Fulfillment
of the Requirements for the Degree
of Bachelor of Science in Aerospace Engineering

by
Kevin Condron
June, 2012

© 2012 Condron
Registering an Amateur-Built Light Sport Kit Aircraft

Kevin Condron
California Polytechnic State University, San Luis Obispo, CA  93407

The focus of this paper is to cover the process of registering the amateur-built light sport aircraft, Zenith CH-701 with the Federal Aviation Administration, FAA. Registering an amateur-built aircraft with the FAA requires specific steps to be followed in order to successful register the aircraft and ensure it is legal to fly. The FAA requires a set of forms to filled out, the aircraft must pass an inspection by an FAA Inspector or a Designated Inspector before an Airworthiness Certificate can be issued, and the builder must provide logs of when, where and how construction took place, along with supporting documents and photographs.

I. Introduction

Amateur-built aircraft are defined by the FAA in Title 14, Code of Federal Regulations, part 21, section 21.191(g), as an aircraft in which “the major portion of which has been fabricated and assembled by person(s) who undertook the construction project solely for their own education or recreation.” Amateur-built aircraft, also known as homebuilt aircraft, have been growing in popularity and are being designed and built using many different materials and manufacturing techniques. As a result of the freedom builders have there is no set standard in the quality of work and flight restrictions are placed upon operating the aircraft.

The total number of registered homebuilt aircraft in the U.S. in 2011 was almost 33,000. The growth of amateur-built aircraft has been rising over the past 20 years and represents more than 15 percent of all U.S. single-engine, piston-powered aircraft. Amateur-built aircraft have been a concern of the FAA as the number of registered aircraft has doubled in the last 15 years. Flight hours of homebuilt aircraft have increased by 31 percent over the last 15 years; however, the actual number of fatal accidents annually has remained relatively constant, averaging fewer than 60 per year.\(^1\) Registering, inspecting and flight testing are an important part of the process to prevent more accidents.

Amateur-built aircraft are built by individuals and licensed by the FAA as “Experimental.” The experimental category was created more than five decades ago. Under FAA regulations, if an individual builds at least 51 percent of an aircraft, it can be registered as amateur-built. The Zenith CH-701 being registered for this project is a kit aircraft, which means some of the airplane is already fabricated. While the kit is being built the registration paper work process is started with the FAA. This paper work continues until after the aircraft is inspected and is deemed airworthy.

II. Registration Process

1. Obtain a US Identification Number

While the aircraft was still under construction, an US identification number was obtained from the FAA Aircraft Registry. The US identification number, also known as a tail number or “N-number”, is the registration number starting with an N. Regulations about N-numbers can be found in Title 14, Code of Federal Regulations, part 45. The FAA states that an N-number may have between one to five characters, must start with a digit other than zero, and cannot end in a run of more than two letters. In addition, N-numbers may not contain the letters I or O, due to their similarities with the numerals 1 and 0.\(^2\) This identification number is displayed on the airplane and is obtained from the FAA Aircraft Registry by requesting it either online or in writing. The N-number for the Zenith was obtained online by searching through the available choices until one was selected. It is important to note that the
N-number is only be reserved at this point and has not been applied to an aircraft. Once the FAA verifies that the N-number selected it is reserved for one year. The identification number selected for the Zenith CH-701 was N838CP. There is a $10 processing fee when reserving an identification number. It is only once the registration papers, described in the next process, are processed is the N-number applied to an aircraft.

2. Register the Aircraft
Once the US identification number was reserved, the registration paper work was started. It is important to note that reserving an N-number is only required if one wishes to select a specific tail number. If one is not reserved the FAA will assign one to the aircraft being registered. The first registration form that must be filled out is the FAA Form 8050-1, seen in Appendix A. This form is the application for registration and can be obtained from a local FAA Flight Standards District Office (FSDO) or by purchasing a registration kit from the Experimental Aircraft Association (EAA). All of the registration forms for the Zenith were obtained through a registration kit from the EAA but many of them can be downloaded for free from the FAA’s website. The second form to be filled out is the Affidavit of Ownership, AC Form 8050-88A seen in Appendix B. This form is specific to light sport aircraft and can be seen in Appendix B. Once the form was completed it was notarized. It is also important to note that for amateur-built aircraft, the aircraft make is the name of the builder. These two forms were mailed to the FAA Registry in Oklahoma City along with the fee of $5.00 after being completed. Once the paperwork was processed, the FAA mailed the aircraft owner AC Form 8050-3, Certificate of Aircraft Registry. This form must be kept in the aircraft at all times. A photo of the Zenith’s aircraft’s registration form can be seen in Fig. 1.

3. Apply for the Airworthiness Certificate
Some paperwork needs to be completed after the aircraft is completed and before the airworthiness inspection. Although at the publication of this report, the completion of the aircraft is a few weeks away the paperwork that will need to be completed will also be discussed. The two forms still needing completion are, FAA Form 8130-6, Application for Airworthiness Certificate, and FAA Form 8130-12, Eligibility Statement-Amateur-Built Aircraft. Form 8130-6 can be difficult to fill out and instructions for fill out the form can be found in FAA Advisory Circular AC 21-12B and FAA Order 8130.2F Chapter 8, Paragraph 267. FAA Form 8130-12 requires notarization. These two forms can be seen in Appendix C.
4. Request an Airworthiness Inspection
Two different resources can be used for an airworthiness inspection. The first option to request an inspection is through an FAA inspector. When trying to schedule an inspection with the FAA for the Zenith, dozens of phone calls were never returned and an inspection was never successfully scheduled. Part of the reason it is so difficult to schedule an inspection with the FAA is the lack of funding and resources the FAA currently has. If an FAA inspector is contacted and an inspection is scheduled, the inspection is free of charge. It is recommended to give at least 90 days notice if trying to schedule an inspection with the FAA. The second resource that can be used for scheduling an airworthiness inspection is an FAA Designated Airworthiness Representative, or DAR. DAR’s are independent contractors who do the inspection on behalf of the FAA. The average fee for using a DAR is about $500 but scheduling is much easier and they are generally more helpful in trying to schedule the inspection. The Zenith’s inspection will be conducted by a DAR.

5. Preparing for the Inspection
Once the aircraft is built and the inspection date has been set there are important steps to take to ensure a successful inspection. Part of registering and certifying the Zenith includes displaying the proper placards. There are many different placard that are required in the aircraft. These must be located properly and display the correct information. The N-number must be placed in two diametrically opposite positions on any fuselage structural member and must be at least 3 inches high and be in Roman letters. FAR 45.23, 45.25, 45.27, and 45.29 can be referenced for more instructions in placing the numbers. The word “EXPERIMENTAL” must be placed in the cockpit, and must be at least 2 inches high and no more than 6 inches. A passenger warning must also be installed in full view for passengers and must state: “PASSENGER WARNING – THIS IS AN AMATEUR-BUILT AND DOES NOT COMPLY WITH FEDERAL SAFETY REGULATIONS FOR STANDARD AIRCRAFT.” A fireproof plate with Builder, Model, and Serial Number marked on it by etching and be secured to the aircraft exterior so that someone on the ground can read it. FAR 45.11 and 45.13 can provide more information regarding the data plate. Form 8050-3 must also be displayed in the cockpit. Pictures of these items can be seen in Fig. 2.

6. Operating Limitations for Experimental Aircraft
Once the Zenith passes inspection, the aircraft will be considered airworthy. The inspector will issue FAA Form 8130-7, Special Airworthiness Certificate. This form must be displayed in view in the aircraft at all time. A blank 8130-7 can be seen in Fig. 3.
Along with the Special Airworthiness Certificate, the operating limitations must be kept on board the aircraft, seen in Appendix D. Once inspection is passed, the Zenith will enter into flight test. The aircraft will initially be flown in Phase I of the flight test program. This is done for typically 25 to 40 hours in an assigned area to prove the aircraft performs as expected. After phase one is completed, the aircraft moves into phase II of test flight, in which the aircraft may be flown within the operating limitations. The aircraft will stay in phase II for the rest of its life.

III. Conclusion

The FAA requires a trail of paperwork that must be completed prior to flying an amateur build aircraft in order to track and help ensure the safety of those who plan to fly in it. The FAA has made the process of registering and certifying a kit aircraft as streamlined and as efficient as possible. It is surprisingly simple to build and certify a kit aircraft. It takes some research, following instructions and attention to detail to make sure the process goes as smooth as possible. The experimental category was setup to allow aviation enthusiast the opportunity to build their own aircraft, such as the Zenith.
Appendix A
FAA Form 8050-1

CERT. ISSUE DATE

FOR FAA USE ONLY

UNIVERSITY OF THE AMERICAN DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION-NATIONAL SPACE POLICY AND REGULATORY CENTER

FAA FORM 8050-1

CERT. ISSUE DATE

FOR FAA USE ONLY

TYPE OF REGISTRATION (Check one box)


NAME OF APPLICANT (Persons shown on evidence of ownership. If individual, give last name, first name, and middle initial)

TELEPHONE NUMBER (_ _ _ _ _ _)

ADDRESS (Permanently mailing address for first applicant. If P.O. BOX is used, physical address must also be shown)

Number and street:

Rural Route: 

CITY 

STATE 

P.O. Box: 

ZIP CODE

☐ CHECK HERE IF YOU ARE ONLY REPORTING A CHANGE OF ADDRESS
ATTENTION! Read the following statement before signing this application.
This portion MUST be completed.
A false or dishonest answer to any question in this application may be grounds for punishment by fine and/or imprisonment (U.S. Code, Title 18, Sec. 1001).

CERTIFICATION

I WE CERTIFY

☐ 1. That the aircraft is owned by the undersigned applicant, who is a citizen (including corporations) of the United States.

☐ 2. That the aircraft is not registered under the laws of any foreign country, and

☐ 3. That legal evidence of ownership is attached or has been filed with the Federal Aviation Administration.

NOTE: If executed for co-ownership all applicants must sign. Use reverse side if necessary.

TYPE OR PRINT NAME BELOW SIGNATURE

SIGNATURE

TITLE

DATE

SIGNATURE

TITLE

DATE

SIGNATURE

TITLE

DATE

NOTE: Pending receipt of the Certificate of Aircraft Registration, this aircraft may be operated for a period not in excess of 90 days, during which time the PBNK copy of this application must be carried in the aircraft.
Appendix B
AC Form 8050-88

AFIDAVIT OF OWNERSHIP FOR AMATEUR BUILT AND OTHER
NON-TYPE CERTIFIED AIRCRAFT
(Does not include light-sport)

U. S. Identification ____________________________

Name of Amateur/Non TC’ed builder ____________________________

Model ____________________________ Serial Number ____________________________

Class (airplane, rotorcraft, glider, weight shift control, powered parachute, etc.) ____________________________

Type of Engine Installed (reciprocating, turboprop, 2 or 4 cycle, electric, etc.) ____________________________

Manufacturer, Model and Serial Number of each Engine Installed ____________________________

Number of Engines Installed ____________________________

Built for Land or Sea Operation ____________________________ Number of Seats ____________________________

MUST CHECK ONE

☐ More than 50% of the above-described aircraft was built from miscellaneous parts and I am the owner. (This option is for aircraft eligible for amateur-built certification.)

☐ More than 50% of the above-described aircraft was built from a kit (prefabricated parts) and I am the owner. The bill of sale from the kit manufacturer is attached. (This option is for aircraft eligible for amateur-built certification.)

☐ I certify that the above-described aircraft is a newly built non-type certified aircraft and is not currently registered in another country. (This option is for aircraft eligible for experimental certification other than amateur-built.)

☐ I certify that the above-described aircraft is a previously built (used) non-type certified aircraft and is not currently registered in another country. (This option is for aircraft eligible for experimental certification other than amateur-built certification.)

☐ Evidence of ownership from the aircraft builder through any intervening owners is attached (chain of ownership).

Unable to obtain complete chain of ownership. Statement as to ownership history and whereabouts of aircraft is attached.

Name of Owner: ____________________________

Signature of Owner: ____________________________ Title of Signer: ____________________________ (If Appropriate)

Address: ____________________________

City: ____________________________ State: ____________________________ Zip: ____________________________

Telephone: ____________________________

Notary Public:

State of: ____________________________ County of: ____________________________

Subscribed and sworn to before me this ____________________________ day of ____________________________ , ____________________________

My Commission Expires: ____________________________

(Signature of Notary Public)

AC Form 8050-88 (09/10) Supersedes Previous Editions
### Appendix C
AC Form 8131-12 and AC Form 8130-6

#### ELIGIBILITY STATEMENT

**AMATEUR-builtin AIRCRAFT**

**I. REGISTERED OWNER INFORMATION**

<table>
<thead>
<tr>
<th>Name(s)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Address(es)</td>
<td></td>
</tr>
<tr>
<td>No. &amp; Street</td>
<td>City</td>
</tr>
<tr>
<td>Telephone No.(s)</td>
<td></td>
</tr>
</tbody>
</table>

**II. AIRCRAFT INFORMATION**

<table>
<thead>
<tr>
<th>Model</th>
<th>Engine(s) Make</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assigned Serial No.</td>
<td>Engine(s) Serial No.</td>
</tr>
<tr>
<td>Registration No.</td>
<td>Prop./Rdt(s) Make</td>
</tr>
<tr>
<td>Aircraft Fabricated</td>
<td>Plan</td>
</tr>
</tbody>
</table>

**III. MAJOR PARTS: ELIGIBILITY STATEMENT OF APPLICANT**

I certify that the major portion of the aircraft (as defined in Section II above) was fabricated and assembled by

Names of all builders (Please Print):

solely for my (our) education or recreation, in accordance with 14 CFR part 21, Certification Procedures for Products and Parts, § 21.919(g), Operating amateur-built aircraft. I have records to support this statement and will make them available to the FAA upon request.

During the fabrication and assembly of this project, if we used the following commercial assistance (mark N/A if no commercial assistance was used):

<table>
<thead>
<tr>
<th>Name of company or individual(s)</th>
<th>City &amp; State</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of company or individual(s)</td>
<td>City &amp; State</td>
<td>Phone</td>
</tr>
</tbody>
</table>

**NOTICE:**

Whoever in any matter within the jurisdiction of the executive, legislative, or judicial branch of the Government of the United States, knowingly and wilfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or who makes any materially false, fictitious or fraudulent statement or representation, or makes or uses any false writing or document knowing the same to contain any materially false, fictitious or fraudulent statement or entry, shall be fined under this title, imprisoned not more than 5 years or, if the offense involves international or domestic terrorism, imprisoned not more than 8 years, or both. (U.S. Code, Title 18, Sec. 1001)

**APPLICANT’S DECLARATION**

I hereby certify that all statements and answers provided by me in this statement form are complete and true to the best of my knowledge, and I agree that they are to be considered part of the basis for issuance of any FAA certificate to me. I have also read and understand the Privacy Act statement that accompanies this form.

Signature of Applicant: ______________________  Date: ________________

**IV. NOTARIZATION STATEMENT**
### A. MANUFACTURER

<table>
<thead>
<tr>
<th>NAME</th>
<th>ADDRESS</th>
</tr>
</thead>
</table>

### B. PRODUCTION BASIS (Check applicable box):

<table>
<thead>
<tr>
<th>PRODUCTION CERTIFICATE (Give production certificate number)</th>
<th>TYPE CERTIFICATE</th>
</tr>
</thead>
</table>

### C. GIVE QUANTITY OF CERTIFICATES REQUIRED FOR OPERATING NEEDS

<table>
<thead>
<tr>
<th>DATE OF APPLICATION</th>
<th>NAME AND TITLE (First or type)</th>
<th>SIGNATURE</th>
</tr>
</thead>
</table>

### A. DESCRIPTION OF AIRCRAFT

<table>
<thead>
<tr>
<th>REGISTERED OWNER</th>
<th>ADDRESS</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>BUILDER (If any)</th>
<th>MODEL</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>SERIAL NUMBER</th>
<th>REGISTRATION MARK</th>
</tr>
</thead>
</table>

### B. DESCRIPTION OF FLIGHT

<table>
<thead>
<tr>
<th>CUSTOMER DEMONSTRATION FLIGHTS</th>
<th>(Check if applicable)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>VIA</th>
<th>DURATION</th>
</tr>
</thead>
</table>

### D. CREW REQUIRED TO OPERATE THE AIRCRAFT AND ITS EQUIPMENT

<table>
<thead>
<tr>
<th>PILOT</th>
<th>CO-PILOT</th>
<th>FLIGHT ENGINEER</th>
<th>OTHER (Specify)</th>
</tr>
</thead>
</table>

### E. THE AIRCRAFT DOES NOT MEET THE APPLICABLE AIRWORTHINESS REQUIREMENTS AS FOLLOWS:

<table>
<thead>
<tr>
<th>E. THE FOLLOWING RESTRICTIONS ARE CONSIDERED NECESSARY FOR SAFE OPERATION; (Use attachment if necessary)</th>
</tr>
</thead>
</table>

### F. CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 et seq. and applicable Federal Aviation Regulations and that the aircraft has been inspected and is safe for the flight described.

<table>
<thead>
<tr>
<th>DATE</th>
<th>NAME AND TITLE (First or type)</th>
<th>SIGNATURE</th>
</tr>
</thead>
</table>

### VIA AIRWORTHINESS DOCUMENTATION (Use only)

<table>
<thead>
<tr>
<th>A. Operating Limitations and Markings in Compliance With 14 CFR Section 91.9, As Applicable</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>B. Current Operating Limitations Attached</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>C. Data, Drawings, Photographs, etc. (Attach where required)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>D. Current Weight and Balance Information Available in Aircraft</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>E. Major Repair and Alteration, FAA Form 337 (Attach where required)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>F. This Inspection Recorded in Aircraft Records</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>G. Statement of Conformity, FAA Form 8130-6 (Attach when required)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>H. Foreign Airworthiness Certification for Import Aircraft</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>I. Previous Airworthiness Certificate Issued in Accordance With 14 CFR Section ___, CAR ___ (Original attached)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>J. Current Airworthiness Certificate Issued in Accordance With 14 CFR Section ___ (Copy attached)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>K. Light-Sport Aircraft Statement of Compliance, FAA Form 8120-18 (Attach when required)</th>
</tr>
</thead>
</table>
Appendix D
Copy of an example experimental aircraft operating limitations document.  

Small Airplane Directorate
Manufacturing Inspection District Office
6020 28th Avenue South, Room 103
Minneapolis, MN 55450-2700

EXPERIMENTAL – AMATEUR-BUILT AIRCRAFT
OPERATING LIMITATIONS

MADE:
MODEL:
S/N:
REGISTRATION NUMBER:

PHASE I-INITIAL FLIGHT TEST PERIOD IN RESTRICTED AREA:

1. No person may operate this aircraft for other than the purpose of meeting the requirements of § 91.319(b) during phase I flight testing, and for recreation and education after meeting these requirements as stated in the program letter (required by § 21.193) for the aircraft. In addition, this aircraft must be operated in accordance with applicable air traffic and general operating rules of Part 91, or any additional limitations herein prescribed under the provisions of § 91.319(e). These operation limitations are a part of the form 8130-7, and are to be carried in the aircraft at all times and accessible to the pilot in command of the aircraft.

2. During Phase I Flight Testing to meet the requirements of § 91.319(b) all flights shall be conducted within the geographical area described as follows:

[Describe Flight-Test Area]

3. This aircraft shall be operated for at least ( ) hours in the assigned geographic area.

4. All test flights, at a minimum, must be conducted under Visual Flight Rules (VFR), day only. Guidance concerning the scope and detail of test flights can be found in Advisory Circular 90-89, Amateur-built Aircraft and Ultralight Flight Testing Handbook. Following satisfactory completion of the required number of flight hours in the flight test area, the pilot must certify in the records that the aircraft has been shown to comply with § 91.319(b). Compliance with § 91.319(b) shall be recorded in the aircraft records with the following or a similarly worded statement: "I certify that the prescribed flight test hours have been completed and the aircraft is controllable throughout its normal range of speeds and throughout all maneuvers to be executed, has no hazardous operating characteristics or design features, and is safe for operation. The following aircraft operating data has been demonstrated during the flight testing: speeds Vso, Vx, and Vy, and the weight _______ and CG location _______ at which they were obtained."
References


