



**Dedicated to  
the Sport  
Balloon  
Home-Builder**

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# THE BALLOON BUILDERS' JOURNAL

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While few find the paperwork trail for the FAA Airworthiness Certificate an enjoyable task, it is a requirement for legal flying. This article takes the reader step-by-step through the process.

### Page 8: Letters and Other Information

Read Phil MacNutt's response to the Bassett Burner article from our last issue. Bob Willbanks talks about his early balloon experiences. Brian Boland provides more information about the take-down propane tank discussed in the last issue. We discuss some thoughts about trademarks. Read about Ken Kennedy's latest balloon.

### Page 11: A Wet Weekend at Tillamook

Pilots traveled as far as 500 miles to inflate their balloons in the blimp hanger at Tillamook OR. We have pictures and a description of a little AX-2 hang balloon built by Bill Arras.

### Up and Coming

Part 103 (ultralight) balloons are more practical than many pilots realize. We'll discuss the regulations, the benefits and limitations to this approach. We will also layout a practical Part 103 balloon system.

## Notices To Readers

### The Second Annual Amateur Built Balloon Meet to be Held in Vermont

Brian Boland reports the second annual Balloon event is scheduled for May 26, 27, 28 and 29, 1995 in Post Mills, Vermont. This event should be even bigger than last year with new balloons and new attendees. If you are interested in more information contact Brian at P.O. Box 51, Post Mills, VT 05058 or call him or Fax him at 802-333-9254.

### Subscription Renewals Are Coming Due for Many Readers

The majority of our readers have memberships which renew each summer. If your subscription will come due with issue number 12, you will find a renewal form in this newsletter. Consider renewing today and beating the rush.

### Current Readership

Currently, we have 162 subscribers to *The Balloon Builders Journal*

**A Warning to Readers:** This newsletter is dedicated to an open and free exchange of ideas. Neither editor nor contributors make any claims or warranties as to the appropriate application of these ideas to actual balloon construction. Some ideas contained here may be unproven and highly experimental. The reader must assume all responsibility and liability for the use of ideas contained in this newsletter. Any individual contemplating the construction of a human carrying balloon or other aircraft is strongly encouraged to seek expert assistance. As with all aircraft the operations of balloons involve risk. This risk may be significant involving the potential for serious injury or even death. In the United States balloons are aircraft, subject to the rules and regulations of the Federal Aviation Administration. Readers are reminded that the building and operation of aircraft generally require specific registrations and certifications. Federal rules prohibit the commercial use of amateur-built aircraft.

## Completing the FAA Paperwork

By Bob LeDoux, Editor,

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*The paperwork necessary to obtain an airworthiness certificate is neither difficult nor particularly cumbersome. Here is a proven track in detail.*

### Introduction

Most articles are enjoyable to write, but this isn't one of them. While paperwork is no fun it remains a fact of life. Obtaining an airworthiness certificate is essential to legally flying in the United States. The procedures for obtaining an airworthiness certificate, presented below, do work. In fact, by following them you will be better prepared than the typical builder. You can take some comfort that your inspection for the certificate will go smoothly, and will reflect well on balloon builders in general.

As editor of *The Balloon Builders Journal*, I have the opportunity to discuss certification with builders from other countries. Its clear the U.S. Federal Aviation Administration is one of the most reasonable bureaucracies in the world when it comes to granting airworthiness certificates. Read for example, Steve Griffin's letter in the March-April 1994 issue of *BBJ*, page 10. Steve is an Australian builder faced with the prospect of performing a full engineering stress analysis for his balloon project. Steve is not alone. Many countries issue their certificates based on arbitrary and capricious standards. Other countries, like Australia, discourage construction by requiring extremely complex strength calculations more appropriate for an aircraft manufacturer than an amateur builder. From that perspective we are lucky our bureaucrats have established clear, and reasonable procedures by which to get a certification. (Enough of the soapbox.)

### Eligibility For Experimental Amateur Built Certification

Current regulations 'allow issuance of a Special Airworthiness Certificate under the Experimental Category for the purpose of Operating an Amateur-Built Aircraft'. That's the official mumbo-jumbo. In simple terms there are two basic requirements the builder must meet to be eligible for the certificate. First, the aircraft must be built solely for the builder's education and recreation. Second, the builder must construct a majority, (interpreted to mean

51%) of the aircraft. Typically, building only a balloon envelope is considered to be at least 51% of the total aircraft. It appears that all FAA offices will allow a factory built basket and burner system to be combined with an amateur built envelope.

The FAA is currently very concerned about the use of 'hired guns'. These are people, who for profit, build aircraft for others. While some argue that this may result in a safer aircraft, the FAA position is that the project is no longer for 'education and recreation'. Field inspectors are required to verify that aircraft are not being built for profit. If the inspectors believe fraudulent statements have been made on application forms, they are required to inform the FAA Security Field Office for possible criminal action.

### First Steps

When you first contemplate building a balloon, call your local FAA office. For most readers this will be the local Flight Standards District Office (FSDO). Ask to talk with one of the maintenance inspectors about building an aircraft. Ask whether they have a 'builder's packet', which contains advisory information and all the necessary forms to complete an airworthiness certificate application. If they do not, request copies of all the forms listed in this article. Also ask to receive copies of the following AC's: Two Advisory Circulars (AC's) are important. AC 20-27D *Certification and Operation of Amateur-Built Aircraft* provides detail information about the airworthiness certificate process and displays samples of the completed application forms. AC 65-23 *Certification of Repairmen (Experimental Aircraft Builders)* provides the information for obtaining the certificate that allows a builder to inspect his/her homebuilt balloon.

When the packet arrives, one is faced with about a pound of paperwork. AC 90-89 on flight testing of airplanes may be included. It is of limited use to the balloon builder. Set it aside and the paper weight becomes of manageable size.

### Apply for the Registration Number-NOW!

As soon as you have decided to build a balloon, apply for an aircraft registration number. This is the 'N' number that uniquely identifies each aircraft. The workload in the FAA Registry in Oklahoma City is heavy, and it is not uncommon to wait three months to receive a certificate. AC 20-27D describes the application process. Their process requires two mailings to and from the FAA Registry. The following process speeds this up:

1. Prepare a letter of request for the registration number. A sample of this letter is contained as Appendix 2 in AC 20-27D. If you are requesting a special registration number read the special instructions under section 8 of the Advisory Circular and expect a longer time frame to receive the registration certificate.

2. Complete and notarize the *Affidavit of Ownership* which is shown in the AC as Appendix 3. When completing the form, fill out the following items with these responses: Under 'Class' enter 'LTA-Free Balloon'. Enter 'N/A' for 'Does Not Apply' for the following items: 'Type of Engine Installed', 'Number of Engines Installed', 'Manufacturer...of Each Engine Installed', 'Built for Land or Water Operation', 'Number of Seats'.

3. Complete a form 8050-1 *Aircraft Registration Application*. A sample is shown as Appendix 5 in the AC. Make certain this form is signed. Because the 'N' number has not yet been assigned you will leave that portion of the form blank.

4. Make out a check for \$5, (unless you order a 'special registration number, then the check must be for \$10), to the 'FAA' and mail all four items to the Aircraft Registry in Oklahoma City.

### Beginning Construction

As you begin construction of the balloon remain cognizant of the FAA requirement for documentation showing you have performed the building. We recommend the following process.

Maintain a written log of daily activity. This can be kept on a computer word processor or hand written in a three ring or spiral binder. Entries can be simple like, "02-01-94, I spent 2 hours cutting out 16 red fabric panels for the bottom of the envelope". Don't be afraid to comment on

the problems you face and how you go about correcting them. Some FAA inspectors will view this problem solving as a clearly demonstrating the 'educational' aspects of the building project.

Make certain you keep all receipts for materials purchased. They are further documentation that you built and did not buy the balloon. Maintain a ledger sheet or computer spreadsheet of these expenses both for your own information and to show the FAA inspector.

If you purchase the balloon as a kit, make certain you receive an 8050-2, *Aircraft Bill of Sale* for the kit. See Appendix 4 in the AC for an example of this form.

Occasionally, take a photograph of your project. Don't be afraid to show yourself actually involved in some aspect of construction. This provides additional documentation that you performed the work.

A note about photography: AC 27-20D discusses the use of photography. Most *airplane* builders must take photographs to show hidden details. For example, after the fabric is put over an airplane wing, the spars and ribs which make up the wing construction are no longer visible. The photographs provide details that show the quality of construction. Balloon projects rarely have enclosed structures. Thus, these kinds of technical photos are rarely needed. But if, for example, you are building a composite fiberglass construction basket that includes enclosed structures, you might have a need for this type of technical photos

Purchase an aircraft logbook at your local airport. Set aside at least one page in the beginning of the logbook to document completion of different stages in your project. Each completion should show a date and the number of hours spent in that stage of construction.

While you can choose your own set of stages, the following reflects the sequence of events taken by many builders in construction of an envelope:

- Designing the size, pattern, and color scheme for the envelope.
- Preparing patterns for cutting fabric.
- Cutting out the envelope fabric panels.
- Sewing the panels into gores.
- Sewing gores into an envelope.

- Completing the top of envelope including deflation panel.
- Attaching cables to the bottom.
- Final detailing, like adding temperature line, and telltales, etc.

### Final Aircraft Completion Details

Make certain you have performed the following:

The word, 'EXPERIMENTAL' must be visible to persons as they enter the aircraft. The letters must be at least two inches tall. The builder has considerable leeway in this installation. On one of my balloons adhesive letters are applied to a piece of Plexiglas™ which is attached with leather thongs to the wicker between tanks. On another balloon, the word is spelled neatly out in letters sewn

to the inside of the envelope skirt.

A standard plate identifying the builder and the aircraft must be installed in the balloon. The plate must be heat resistant, capable of surviving a fire. Typically it is made of stainless steel. An aluminum plate is generally not acceptable. Many builders fill out the plate using a letter and number punch set. These punches look like chisels, but have letters/numbers on the end which can be hammered into the metal. Some builders have their plates engraved. Note that most engraving shops cannot engrave stainless steel. Some commercial shops can make you a very pretty stainless plate, but expect to pay \$15 to \$35.

The builder's plate can be mounted in a number of areas. It can be screwed to the basket floor in a protected area. One of my balloons has the builder's plate Nicopressed™ to the cable attachments in the envelope mouth.

If the balloon is designed to carry a passenger, then the standard Passenger Warning plate must be installed. This passenger warning statement is discussed in section 12 of AC 20-27D.

A standard builder's plate and passenger warning can be purchased as a set from many aircraft supply companies, at a reasonable cost.

Install the aircraft registration 'N' numbers to the envelope. These numbers must be of a permanent nature, at least 3 inches tall and mounted on opposite sides of the envelope near the maximum envelope diameter—near the equator. While some builders sew their registration number to the envelope, many builders prefer to use numbers cut from adhesive fabric. This fabric can be purchased from marine sail-maker shops.

### Aircraft paperwork.

Prepare your aircraft weight and balance report. Unlike an airplane which requires computation of moment arms and center of gravity, the balloon format is very simple. Create a computer spreadsheet or simple typed table which itemizes the components and their respective weight. *Table 1* displays one basic format. In this example, all the components have been weighed and those weights totaled. Then the weight of the fuel has also been computed and added to generate a 'fueled aircraft' weight. The payload represents this weight taken from the maximum gross weight for the balloon. The

Certified Aircraft Weight	
Make: LeDoux HAB-3	
Serial Number: 001	
Registraton: N4109R	
	Weight in Pounds
Basket	65
Burner with Hoses	15
Envelope	87
Instruments	2
Fire Extinguisher	3
Total Empty Weight	172
Weight of Fuel	129
Total Fueled Weight	301
Maximum Payload	299
Maximum Allowable Gross Weight	600
I certify that I have weighed this aircraft and that the data presented here is true.	
Signed: _____	
Dated: _____	
<b>Table 1:</b> The <i>Weight and Balance Report</i> for a balloon is much simpler than that of an airplane. He is an acceptable example.	

aircraft weight and balance report should be dated and signed by the builder.

Create a required equipment list. As a builder you have considerable leeway in creating this list. Typically such a list will include required instruments consisting of an altimeter, rate of climb indicator, envelope temperature gauge and fuel quantity gauges. Additionally, it would be wise to include ignitors or strikers for backup burner relight, and perhaps helmets, drop line and maybe a fire extinguisher. As a builder, use your own judgment. Recognize that you may someday have a 'ramp check' by an FAA inspector and could be required to demonstrate that all your required equipment is present.

Typically, a flight manual must be on board an aircraft which describes the limitations for the aircraft. Consider preparing placards to display the operating limitations of the balloon. This information can be used in lieu of a flight manual.

### **The First Inflation**

Now the fun times begin. Take a camera for your first inflation. Take pictures of the balloon. A dimensioned picture or drawing is required for your airworthiness certificate. I prefer to mount a photo on a heavy piece of paper or light cardboard. Below the photo identify the aircraft by builder, address and 'N' number. Display the dimensions including the aircraft height and width at the equator.

### **Preparing for the FAA Inspection**

Before the FAA inspector is called out for his friendly visit, the following materials must be completed. Examples of the forms and letters are contained as appendices in Advisory Circular 20-27D:

*Letter of Application:* This application is now treated as a form, a sample of which can be found in the AC 20-27D as Appendix 8. This form is a request to have an airworthiness certificate issued. The purpose of the issuance is 'for operation of an amateur-built aircraft'. You are asked to designate a flight test area. Request an area with a 50 mile radius around a local airport of your choice. Note that airplanes are typically given a test area of a 25 mile radius. Balloons are typically given 50 miles because of 'their reduced controllability'.

Form 8130-12 *Eligibility Statement for an Amateur-Built Aircraft*. This is a statement notarized by the builder. It lists aircraft

information including model and serial number. With the notarization the builder attests, under threat of criminal penalty, that he/she 'fabricated and assembled' the aircraft. This is the statement by which the FAA could take action if you employ a 'hired gun' builder. A sample of this form can be found in AC 20-27D as Appendix 7.

Form 8130-6 *Application For Airworthiness Certificate*. This is a standard form, the basic application for the certificate. A sample of this form, completed, can be found in AC 20-27D as Appendix 6.

*Aircraft Registration form.* AC 20-27D under paragraph 11.b states that either the pink copy of the form 8050-1 or the form 8050-3, as provided by the FAA registry are required to show compliance with registration requirements. In fact, many inspectors will not grant an airworthiness certificate unless the permanent form, 8050-3 has been received from Oklahoma City. If you haven't yet received that form, raise this issue with your inspector before the inspection.

Many FSDO's will request an application packet, including certain documents, be mailed to them before the inspection. This packet will typically include the *Letter of Application*, the forms 8130-6, the 8130-12 and the three view drawing or dimensioned photograph. I think it is a good idea to include copies of all other documents and forms in your package, so the inspector has a chance to review them and ensure they are in good order before the inspection.

### **The Repairman's Certificate**

A person who builds a balloon is eligible to receive a repairman's certificate which permits the builder to perform annual (condition) inspections to the aircraft. Information about the procedure for obtaining a certificate can be found in Advisory Circular 65-23. This circular, along with the application form for a repairman's certificate (8610-2) should be included in the builders packet.

This application should be completed at the same time as the application for airworthiness certification is made. A sample of the completed application form can be found in the AC 65-23.

### **The Inspection**

FAA staff are still performing inspections in many parts of the country. In some areas, their inspection responsibilities have been

assigned to Designated Airworthiness Representatives (DAR's). These individuals, unlike the FAA, are typically available on shorter notice but will charge for their services. From my FSDO, I can generally obtain an inspection on about two weeks notice. The local inspection staff actually look forward to getting out of the office and seeing what's going on in the builders world.

An appropriate display of paperwork will help make the inspection go quickly. Create a three ring binder which contains your materials. Place in the binder all your design work papers, like your gore pattern spreadsheets or copies of the gore pattern layout from a commercial balloon repair manual. Even sketch sheets and interim worksheets should be displayed as showing your efforts to resolve problems. Include any other items that demonstrate you created the design and performed the building. These items would include your log of daily activities and time spent in design and building.

Also include in this binder an envelope with all your receipts for materials used to construct the balloon. If you have taken pictures during construction, place some of these in your binder. Include in your binder copies of all forms which you have prepared for your airworthiness certificate application. At some future time you should be able to demonstrate a paper trail that shows you built the aircraft and completed the paperwork necessary to properly establish its airworthiness.

Make certain your logbook is up to date. As mentioned above, one page should itemize the various tasks and completion dates for those tasks.

If your FAA office has little experience with balloons, they may ask you to obtain a statement from a knowledgeable person as to quality of work and materials in your balloon. Your local balloon repair station should be willing to make this entry for a small charge. This is not an annual inspection, but rather a quick look at the aircraft. A statement like the following is needed, preferably entered in the aircraft logbook: "I have examined this aircraft and find that it has been constructed using materials and fabrication techniques which are generally accepted in the balloon industry'.

## The Actual Inspection

You should have the aircraft assembled and laid out as though you were going to begin an inflation. Do not expect an extensive examination. Do not expect to perform an inflation. The examiner will check to see you have completed your paperwork, you have the 'N' numbers installed, the word EXPERIMENTAL in place and the builder's plate and passenger warning, if appropriate, are installed.

He may then look for really stupid things like using lawn sprinkler or garden hose for propane fuel lines (It has been tried.) He is likely to ask you questions about the kinds of materials you used in construction and whether these are typically used in balloons. Because he is likely to have an airplane inspection background, he will be looking for use of 'hardware' store bolts and fittings instead of aircraft quality items. You may need to tactfully educate him on the types of hardware used in balloons.

When using factory components, such as a burner, some inspectors might ask whether that unit has any airworthiness directives (AD's). It is prudent to contact your local balloon repair station before your inspection. Advise them of the standard units you are using, especially basket, tanks, burner, hoses and instruments. Ask your repair station whether they are aware of any AD's from any manufacturer for these products. The answer is likely 'no'. Note the result of this 'AD check' in your aircraft logbook.

Under FAR 39.5 any product which has an AD must be operated in accordance with the provisions of that AD. This could create a problem during the inspection.

The diligent' inspector will require a factory built unit to be maintained in accordance with the latest AD notes. Some inspectors may allow the builder the option of modifying or removing the manufacturer's data plate from the item. For example, if the burner has a plate stating the manufacturer and serial number, an 'X' might be stamped after the serial number or the plate might be removed from the burner.

If these techniques are used to avoid the AD requirement, request a letter from the FSDO on this action. Fortunately, there are very few AD's on balloon components and this technicality generally occurs on airplane engines and not on balloon burners or baskets.

## The FAA Inspection Does Not Ensure The Aircraft is Safe to Fly!

The builder should understand a basic fact: The aircraft inspection is a bureaucratic procedure to ensure that paperwork and certification requirements are in order. The inspector does not ensure the balloon is safe. He does not address issues like flight performance or whether the balloon performs properly when inflated. His function is '...ensuring the use of acceptable workmanship, methods, techniques, and practices and issuing operating limitations necessary to protect persons and property not involved in this activity...'. The onus of determining that the balloon is safe to fly rests solely with the builder.

As an aside, the smart builder keeps the factory advised of his components. If, for example, your amateur-built balloon is using a *Rally* basket and burner, advise the factory, *Aerostar, Inc.*, as to your ownership, providing them with the serial numbers of your components. This will ensure you are informed of Service Bulletins and AD's which might occur. It is also be a good idea to have the factory maintenance manual for the balloon components you own.

## The Test Period

Under current procedures, most inspectors are issuing a permanent airworthiness certificate along with a set of operating limitations. These limitations are specified as having two phases, Phase I and Phase II.

Phase I is intended to be the aircraft test phase during which the 'bugs' are worked out and the aircraft is shown to operate in a consistent and safe manner. During this period the balloon is limited to operations within the specified test area, and passenger carrying is prohibited. Balloons are typically required to make 5 takeoffs and landings in the Phase I period. Some inspectors may also require a minimum test period of 10 hours.

During the Phase I period the operator will be required to maintain records or log book entries showing specific information on each flight. This information will typically include:

- The duration of each flight, and the number of landings made,
- A statement as to the purpose of each flight,

- For test flights, any changes required to correct the aircraft as a result of test flying are to be noted in the log book,

- Any unusual experience or mishap is to be recorded in detail. Any pilot who flies the aircraft is to sign the log entry.

Once the requirements of Phase I are completed, a logbook entry must be made to that effect. The aircraft may then be operated under the less stringent limitations of phase II. These limitations can vary across time and between FAA offices. One of my certificates was issued during the period when bungy jumping was controversial. That certificate prohibits bungy jumping from the balloon.

Typically, the Phase II Limits are the following:

- Except for takeoffs and landings, no person may operate an experimental aircraft over densely populated areas or in congested airways. (This limitation allows us to fly as part of a rally in an urban setting.)

- The FAA office must be notified when major changes are made to the aircraft.

- When passing into or out of airports with operating control towers, the tower is to be notified of the experimental nature of the aircraft.

- Special permission must be sought from the destination country to fly the aircraft in a foreign country.

- The pilot in command must have an appropriate rating for the aircraft.

- The aircraft cannot be operated for compensation or hire. (An FAA written opinion exists in which rally 'show up' money and balloon competition winnings are not considered compensation or hire.)

- Any person carried in the balloon must be advised of its experimental nature.

- Parachute jumping operations are prohibited unless otherwise authorized.

- The aircraft cannot be operated unless it has received a condition inspection within the preceding 12 calendar months. The instructions for the wording of the condition inspection can be found in the operating limitations.

*Special thanks to Dan Bachelder and Tom Weisgerber of the Portland, OR, FSDO for suggesting clarifications to this article.*

## Letters to the Editor and Other Bits of Information

### The Bassett Burner Article

Bob,

I sure enjoyed the article by Bill Basset on the 'homebuilt' burner. I recently did a complete overhaul on a 'Barnes T3' and thought that was big stuff. I realize now that it was child's play compared to Bill's efforts. The article did bring to mind a few things I learned during my work.

*'Melting Manifolds' and Silicone Rubber:* Bill refers to the main fuel manifold 'melting'. I suspect that what he is noticing is really the result of etching cause by condensation dripping down the manifold. I've seen some burners that had silicone rubber smeared all over the manifold to prevent this from occurring. The first burner I got was etched so bad that the manifold cracked. A bead of silicone is also run around the top of the Inconel-Swagelok nut connection at the manifold. This prevents condensation from running down the tube to the inside of the nut where it could freeze, expand and then shatter the nut. I wouldn't want to be around when that happened. Balloon Works uses a special GE silicone that is not available at local hardware shops. This decision was based on deterioration-over-time problems that occurred with normal GE stuff. An engineer at Balloon Works told me that I could use the across-the shelf stuff with no problem, but I have to re-caulk it every few years.

*Pilot Lights:* I tried to clean mine, and apparently screwed up the hole in the orifice, because I could not get a decent flame after I put it back together. The hole is so small (it makes a #80 drill look like the Lincoln tunnel) that even a slight burr could foul the performance. I called Balloon Works and they had new orifices in stock and were happy to charge me \$16 for three. After installing the new ones, the thing worked perfect. I performed the famous 'burner across the fan' test to check it out. I lit the pilot lights and then cracked my 24 inch inflator fan up wide open and positioned the burner perpendicular to the air flow, about 12 inches from the front of the cage. The pilots stayed lit. Sixteen bucks well spent.

*Main Orifice sizes:* Balloon Works started offering an orifice upgrade a few years back. For \$25 they would send you 3 new orifices, which were nothing more than new

Swagelok plugs with larger holes. If you price the plugs plus a new drill bit, 25 bucks may not be a bad deal. Using page pins to measure, it looked to me like the difference is 3 drill numbers (from a #26 to a #23).

Thanks again for a great article.

Philip MacNutt  
4909 Great Divide  
Austin TX 78736

*Editor's note: My Balloon Works Maintenance Manual (1983) states that some RTV sealers can cause corrosion of adjacent metal parts. The Balloon Works sells an approved sealer (part #4051) for about \$10.*

12/18/94

Bob:

It's a balmy sixty seven degrees here in Atlanta, and I just returned from one of those beautiful December flights where wind was only five miles per hour and visibility was seventy miles. What a great way to celebrate the Holiday Season. Now as I sit reading back issues of *B.B.J.*, my memory is piqued and I want to offer several observations and suggestions for building one's first balloon. A bit of history first.

Spring of '95 will mark twenty years in ballooning for me; it seems only yesterday that I was bitten by the ballooning bug after taking that first proverbial flight. Needless to say the seeds of a great aviation experiences were planted that year in 1975, when Ron Lively introduced me to ballooning in a Stokes SuperPressure Balloon. What a Rube Goldberg contraption. Non-ridged uprights, helmets were required safety gear not because of external dangers, but because of the 1/2 horsepower electric motor and 24 inch steel fan hanging above your head. We flew with toilet tissues in each pocket in case the Model T Ford spark coils failed to operate. Even though there were two coils to fire the sparkplugs in the stacks, you could not be sure that the points would not stick thus leaving you igniterless.

Because there was no pilot system on this balloon you had to ignite the fuel by pressing a button on the burner control panel after opening the fuel supply. Since there was about 10 feet of fuel hose between the valve and burner, an after-burn of several seconds



followed each blast. It would be an understatement to say I was behind the balloon for the first several flights. A first hand knowledge of treetop forestry was learned during that time however. Undaunted, I soloed and Ron expressed an interest in building a balloon in the experimental category.

Since my salary as a high school band director did not allow for purchase of a balloon, I saw this as an opportunity to satisfy my taste for aviation while embarking on a construction project of interesting proportions. Ron provided the financing and I provided the 'Sweat Equity'; previous experience in an upholstery shop during high school and college paid off. We purchased a vintage 112W-140 Singer with puller, and a French felling folder. Sourcing of fabric terminated at a nearby sewing plant when we located 650 yards of coated '0' porosity nylon taffeta which had been rejected because of color. It seems the plant manager decided that windbreaks made from this material would not sell because the color looked pretty bad. The light pea green was not beautiful, but it was fifty seven cents per yard so it became our fabric. Owing to the fact that we were short of green fabric to complete the balloon, yellow was added for visual interest. I even added Smiley faces later.

Our pattern was gleaned from a computer curve supplied by George Stokes. He said it came from the US Weather Service, but we had no confirmation of that fact. (I still have the computer run as well as that original 1975 cardboard pattern). However we did the basic math and worked from the equator so the forty eight panels would use the maximum width of the 41 inch fabric. We did not do any volume calculations as we knew the balloon would be large enough to carry at least three persons based on the equator diameter.

In one evening, we transferred the math to a cardboard pattern on Ron's living room floor and cut it out. Our next decision was to decide where we were going to do the fabric cuts, as we needed an area about 90 feet long. Back to our local plant manager.

What A Guy! He allowed access to the sewing/cutting room on a Saturday. We stopped by and picked up his main cutter provided him with two six packs of beer and within two hours had the balloon completely cut out. There is no accounting for what one

can do on a cutting table where the fabric can be stacked. We positioned the pattern on top of our alternating stack of fabric and in one long cut, and 12 beers, we were ready to begin sewing the envelope together.

During the following two months, there in Ron's double car garage, I sewed on the balloon after school rehearsal sometimes until one and two AM. Eventually that last vertical seam became history. Oddly enough, as in some of the articles I have read, it was ever-present in my mind during the initial construction of the other 47 seams. Needless to say it came together OK.

I will not continue with the other details now, but will be sending suggestions along on a regular basis. *The Journal* is very interesting reading and I enjoy participating in the experimental life of ballooning. I have plans to build an ultralite hang balloon soon.

*Construction Tip:* I learned many years ago from Mike Adams that artwork or repair panels can be held in place by 3M ATG tape. The tape come on rolls of 1/2" and 3/4" and works great for positioning artwork or for general repair prior to sewing. I do not know how I was able to get along without it for years. Since it has no substrate, only adhesive applied to a paper transfer tape, there is no shrinkage. Also, since it's original intent is for use in mounting matting to museum artwork it is inactive to the material. The BIG PLUS is that it never gets brittle even in the presence of heat or cold. My source is United Manufacturers Supply (516) 433-8982; they also have an applicator gun which works well. Accept no substitutes 3M ATG is what you want.

Bob, thanks for keeping the experimental dreams alive.

Bob Willbanks  
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Snellville, GA 30278-5415  
CompuServe 75542,3025

### Regarding Trademarks.

Brian Boland shared the following tidbit with us:

As you may know, he is producing hot air balloon kits. Among the materials he provides in his kits is light weight silicone coated nylon fabric. Many of our readers will know of this material as Soar Coat™.

Herein lies the rub. Soar Coat™, produced by the Performance Textiles Company, is a

brand name for a specific, proprietary product intended primarily or use in parachutes. Brian's fabric does not meet the Performance Textiles criteria, and they sent him a polite letter telling him to quit using their trademark in his literature. Brian sent them a Fax in response and received a pleasant phone call on the matter.

As Brian puts it: "He [Bill Berrow, President, Performance Textiles] called to basically say there was no hard feelings. He reads my stuff and thinks what we are doing is great. I can see his point. They've spent lots of time and money developing [this product]. Some folks may think seconds or a lesser product is the same thing. Balloonists have been calling him and his company pestering them for seconds and 'cheap Soar Coat™'. According to Performance Textiles, its not Soar Coat™ until they put their first quality approval on it and its purchased from them."

At *Balloon Builders Journal*, we recognize how important it is for a company to protect its trademarks. Recall that "nylon", "aspirin" and "zipper" were once trademarks which became generic because their developers didn't vigorously protect their band names.

We encourage readers to use generic terms, particularly in their letters to the editor. We will make a special effort to ensure that trademarks and brand names are properly noted in our articles and letters.

Bob LeDoux, Editor

### The Boland Take Down Basket

1/31/95

Bob

...Regarding the photo of the take down Boland fuel cylinders (*BBJ* Jan-Feb 1995, page 11). They're actually made from two 7.5 gallon Worthington tanks, not 10 gallon tanks. I'm taking two of these to New Zealand the end of March. The entire aircraft, even basket, fits inside the pair.

Brian Boland  
P.O. Box 51  
Post Mills VT 05058

January 30, 1995

Bob,

Enclosed is a picture of my latest, a 77,500 cubic foot, four color, 18 gore envelope.



Ken Kennedy's new envelope built using light weight parachute type silicone coated fabric. The size is AX-7. It required 301 hours to build

Total weight of the envelope and rigging is 140 pounds.

As I had written earlier, I tried to get a computer man to do something on his Auto-CAD™ on helping me achieve a semi-bulbous shape. However, he said that he didn't know enough about balloons to do me any good. If he had been a bit more willing and I had more time he might have given us something.

I ended up with some basic geometry along with some controlled seam puckering when sewing on the load tapes.

I will do a bit of tweaking on the panel geometry on the next balloon, which I started on today. This one will probably be an 80,000 cubic foot envelope.

The balloon in the picture is much like my last balloon. I did find that when using the light weight silicone coated fabric, one needs a bit more parachute overlap; perhaps on the order of 20%. That is what I put into this envelope and I am much happier with the fit. This balloon took 301 hours to build. I am getting faster. The last balloon took 355 hours.

Keep up the good work on the *BBJ*.

Ken Kennedy  
Rt. 2 Box 73  
Broken Bow, NE 68822



### A Wet Weekend at Tillamook

January 28, saw pilots from across the Pacific Northwest brave two inches of rain and wind gusts to 50 miles per hour to attend an inflation party in the Tillamook blimp hanger in Tillamook, Oregon. Pilots came from as far away as Boise, Idaho, a travel distance of about 500 miles.

Among the pilots attending were organizer, Rod Purdum from Portland and your editor. Both of us had brand new envelopes, which were being prepared for FAA airworthiness inspections. This event was a perfect opportunity during which to make our maiden inflations.

We'll have more on these balloon building projects in upcoming issues.

In the photos below is Bill Arras' little AX-2 hang balloon system. The envelope, of about 14,000 cubic feet, is carried in a zipper bag no larger, and no heavier, than a typical gym bag. The envelope attaches to a burner ring made from a bicycle rim to which, in turn, is attached the pilot riding in a parachute-type harness. Fuel is provided by an 8 gallon cylinder which rides just below the pilot.

The envelope has a truncated design. The mouth is quite large with the envelope cut off just below the equator. The suspension 'cables' are constructed from a flat braided line which is used for suspension lines on

some sport parachutes. Care is required to keep from burning these lines during inflation. The envelope is constructed from 1.1 ounce parachute cloth and uses sport parachute type tapes for reinforcement.

The picture sequence below shows Bill's 'dump' routine. The crown line ties off the envelope. The suspension lines are released and the envelope climbs into the air, inverts, dumps its air and plummets to the ground.

Bill was one of 28 pilots who participated in the indoor inflation in the all wood, World War II vintage blimp hanger. At 2 PM, 24 balloons ascended above the pavement on tether.

The hanger is one of three which was originally built on this site. The other two have since been demolished. The hanger is over 1000 feet long and 200 feet high, and was intended to hold the big airships of the 1930's. In reality, 'Goodyear size' blimps flew sentry duty over the coast line protecting marine shipping from submarine attack.

The remaining hanger is used as a museum, with many memorabilia from the airship era. The museum also houses many vintage aircraft, all in flying condition. These include World War II military aircraft, like a Corsair, P-51, ME-109 and PB.Y. The PB.Y can be seen in the background of the right hand photos.



Bill Arras flies his little AX-2 on tether inside the Tillamook, OR, blimp hanger. The two photos at the right show the dumping routine. See text for more details.