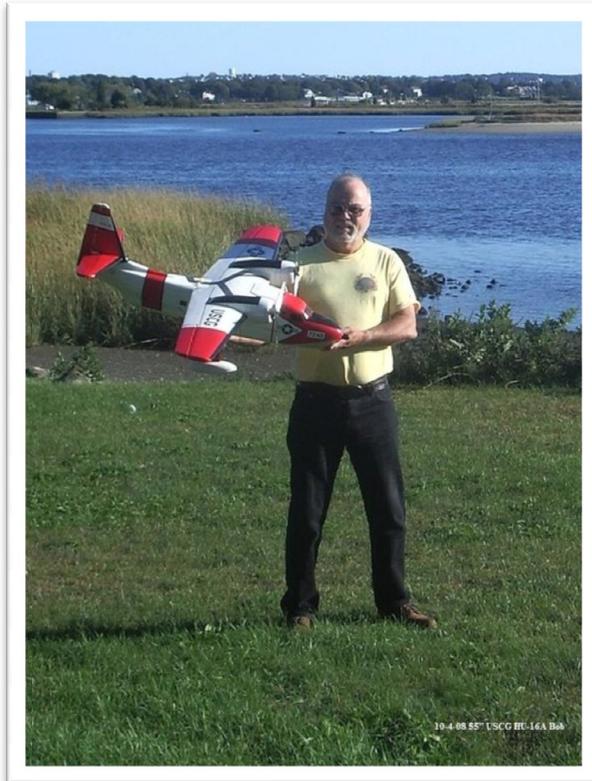


## **Grumman Hu-16A Albatross R/C Model - USCG Group Quonset Point, RI**



### **A Brief Introduction**

**Booklet Written and Produced by**

**Robert Pacheco – Swansea, MA USA**

The Albatross, the fifth amphibian built by Grumman Aircraft for the military, was designed in the late 1940's for Air/Sea search and rescue, air ambulance, antisubmarine patrol, cargo, and transport. The first of about 450 aircraft built entered service in 1949. The Albatross served with the U.S. Navy, Coast Guard, and the military services of 17 foreign countries. The last aircraft left Navy service in 1976, and some Albatrosses are still in service abroad.

The Albatross usually carried a crew of seven, including pilot, co-pilot, radio operator, radar operator, navigator and two crewmen. The search radar was said to be sensitive enough to spot a life raft on the open ocean. During the Korean war 900 airmen were rescued by Albatross crews. It has a wingspan of 85 feet, a length of 62 feet and weighs 22,000 pounds empty. It can carry 1700 gallons of fuel in its main, float and drop tanks and has a range of over 3,000 miles. It has two nine cylinder supercharged Wright 1820-76 radial engines that produce 1450 horsepower each and give it a cruise speed of close to 200 mph and a service ceiling of over 25,000 feet. N3HU is an 'A' model Albatross. The 'B' model was designed later, has a longer wingspan that gives it a greater range and service ceiling, but slightly slower speed. A 'tri'-phibian version with skis was designed to operate off the ice and snow in the Polar Regions. The original medical stretchers are used as bunks. A marine lavatory replaced the spartan Navy head and a small galley was added.

# My Thoughts for Selection of this Aircraft

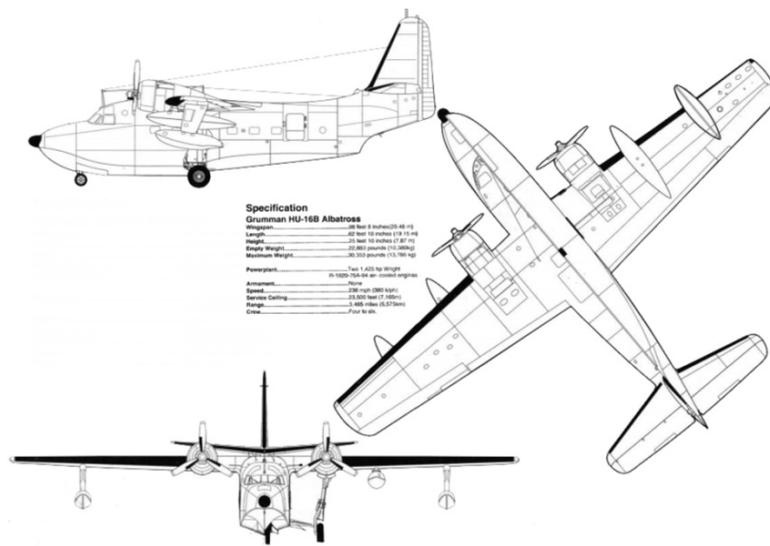
I started to think where I live there is plenty of water around this area plus fortunately living alongside the large bay attached to my home. I wanted a plane dedicated to some RC flights on the waterside. I also wanted an amphibious plane with less ability to be blown over by the wind that a float plane has. I searched the web and reviewed many videos.

I looked through aircraft books and finally this caught my eye. Next I surfed many forums and could not find any plans that could be worked into this model. I did find a couple books about the aircraft with 3 view drawings. Next I converted the 3 view drawing to a jpg picture file. I found a picture enlarger online from a fellow in Italy and still available. It takes a photo and as you enlarge the picture it will add letter size pages that are glued together to make a jumbo photo. It has a scale that measures in inches and millimeters also.

Stefano Duranti <http://www.profilo2.com> There are also other software available that do posters.

## Some Finished Model Specifications

- Wingspan.....55.0 inches
- Length.....36.0 inches
- Weight.....2 lbs. 8oz. less battery
- Power Plants .....Hextronic DT-750 rewind 17turns Delta 22AWG wire
- Power.....48oz Thrust each motor
- Propellers.....2 - GWS 10X6 DD with opposite rotation
- Receiver.....Corona 4 Channels RS 4011- 72Mhz
- Range..... 3,500feet
- Battery.....Zippy 2,500 Mah 20C 11.1 v Series Lipoly



In the 3 view drawing, I was able to blow the plan up to the desired span I wanted. The original aircraft HU-16A had a 16 foot shorter wing than the HU-16B and later versions. So it was a choice to make the A or B version. I wanted a plane in the 55 inch wing so if I built the B version that size it would translate to a smaller fuselage. The A version gave me a bigger fuselage. Looking at the finished plane I guess I could have built maybe a 70 inch wingspan with plug in wings. I mainly wanted the larger fuselage for many reasons.



### Now the “Down and Dirty build”



Now what I have here sitting on my router table is a 2 inch thick piece from a 2 X 8 foot sheet of builders pink foam. I bought 2 sheets of foam at my local Home Depot. 1 sheet is 2 inches thick and 1 sheet of 1 inch thickness. You may also find it in other colors. What I did was make a slightly larger traced copy of the 3 view plan of only of the side view of the fuselage. It was then traced on the foam sides of 3 pieces of foam. It will make a 5 inch wide fuselage with two 2 inch and one 1 inch piece. The 1 inch piece is the middle lamination used in the fuselage hull. I have an old Sears coping saw and I cut them all almost on the traced lines.

The taper for the wood is just a rough angle taken off of the 3 view drawing. It is about from the wing trailing edge back to the tail. Next as you see on the table is 2 pine scrap pieces of tapered wood. I just smoothed the band saw cut angle a little

with my sander. I also use about a 12 X 2 Inch home made scrap wood block sander in most of my build.. I use 2 pieces of wood with a ¼" stovebolt sunk in the bottom and a wing nut on top. I use #50 grit as it tears through the foam quickly when I need some serious shaping. In taping the wood taper parts to the table with my foam fuselage part in between, I now have a taper guide for a home made wire cutter sitting on top of the table also in the picture. I then hot wire cut the angle on both 2 inch sides. Be careful. They are opposite.

The Hot Wire cutter is very simple to make. You can make all sizes easily. I used PVC tubing and elbows. I used 2 small eyebolts on the top for ceiling suspension through 2 small pulleys to take the weight off when cutting wings. I use fishing sinkers to suspend it. The wire is deep sea Monel fishing wire attached to eyebolts also. You can also use stainless or galvanized wire. To tighten it bend the spring action of the PVC together and wrap the wire around the eyebolts. I know the die hard do righters are cringing. It does what I need. Sand paper does the rest. I have a roll switch on the bow also. 1 wire goes to each eyebolt at the ends of the bows. Tape it outside or run it through. Ordinary appliance wire. You can use a battery if you wish. I use a train transformer from e-Bay.



In These pictures you will see the angle cut piece and the stack of the 3 sections. The middle 1 inch section is sawed on my old coping saw or whatever you use. (Utility knife, Sabre saw, Band saw, etc.). I left 1 ½ inches in vital areas and a bit less in the nose, wing, and where the rudder and elevator goes. I'll bet your thinking this is weird way to build a plane.



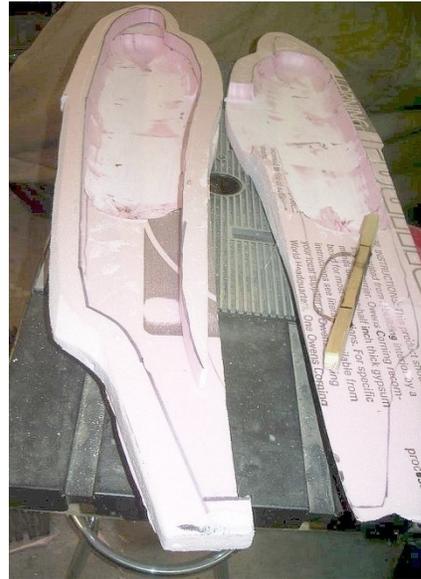
After all the sections were cut, I glued them all together in maybe 8 little spots with hot melt glue not too far in. You have to cut them after to get it apart. You also can use some package tape to help if you like. Just enough to hold all 3 parts in line together. The plywood curved parts on the table are rough guides from the 3 view to hotwire the nose round with a smaller hot wire handle that I use also. Go slightly oversize.



I needed to cut the "V" to the chines on the outer hull. I used some old housing copper wire stripped of the plastic housing. Straighten the wire as best you can. This is for roughing the shape in. Next I soldered some "T" pins to the wire along its length every few inches. The wire is push pinned to the hull along the drawn lines. After it is satisfactorily in place it is hot wired shaving it with my sling shot shaped hot wire cutter. It is in an above picture. Remove the copper wire.



Using a small block sander about 6 inches long, I rough sand it with #50 paper outside in the breeze so you do not get it all over yourself. Wear a mask otherwise. This dust is electrified and magnetizes to your body. Use common sense here. The fuselage hull is starting to look like something now. It is time to split apart the spot glue sections. Use a box utility knife blade to cut the glue spots apart.



Now we are going to hollow it out like a pumpkin. Trace a line around the inside perimeter of the middle section to the inside of the outside sections. See that piece of wood on top of the right section. It has a copper wire drilled through it about 3 inches with a large radius on the wire about 3/4 to 1 inch deep. Make the stick long so it rides the flat surface of the foam. There should be no spot glue traces left from taking the sections apart. Peel, sand, or scrape them off.



Here is where it gets hot. Use a torch to warm the copper wire on the stick to a high temp. Plunge the wire inside the traced lines and drag it along a couple inches and lift it out. If it gets stuck you will have to break that part of the foam to extract it. Keep heating and removing foam until it is cored all around. You do not have to go too far to the rear of the plane. You need some strength and you have the clearance of 1 inch in the thickness of the middle section. It will be rough inside. You can sand some of it out with some effort.



Now after you cored the pumpkin out sort of speak, you glue all the sections back together and sand some more. You can white glue the seams as I did or whatever you use such as Gorilla or epoxy. Remember that epoxy may be strong but the stuff is heavy. You want to be able to get the parts lined up to sit overnight to bond. I used pins and tape all around to hold it together. Elastics cut into the foam. Try some weight like books on a paper for weight. After it dries you would like to sand with #120 grit paper and spackle the hull all around with SpackleLite and let it dry and sand smooth again with the help of a medium paper block. Make sure you use the "LITE" spackle. Next in the right picture the fuselage is ready for the glass cloth and water base Polycrylic as I prepare to lay the 0.73 oz cloth.

## The Wing

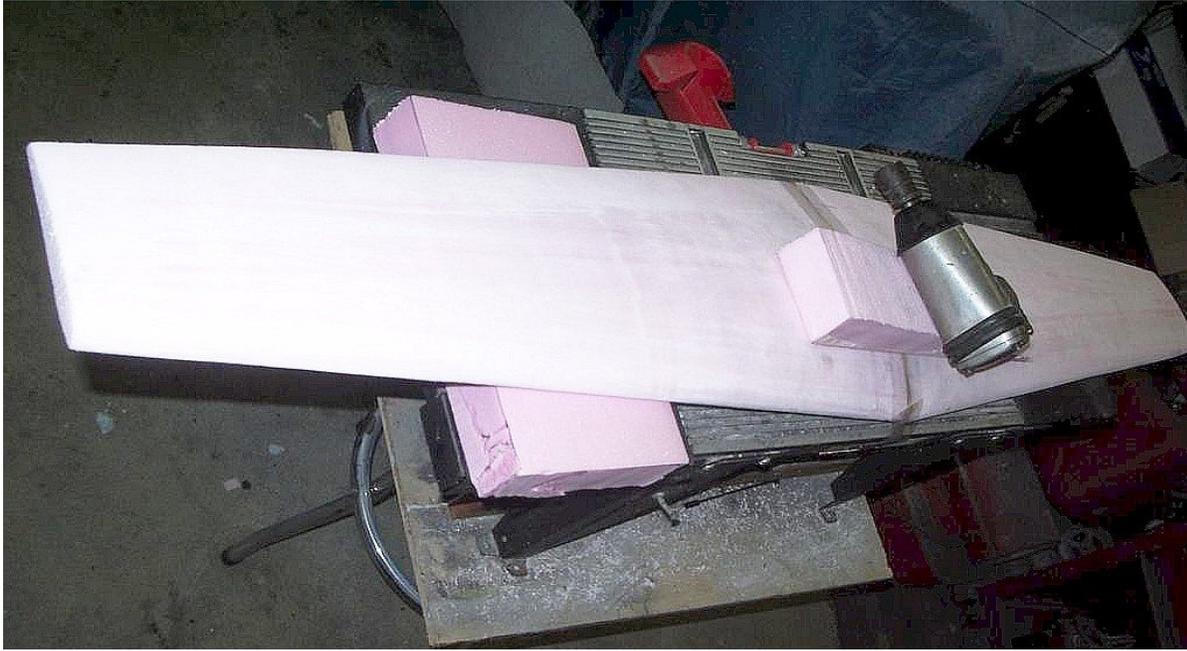


If you look at the left picture you will see the hot wire cutter hanging on 2 lines. The end of the wings has the aluminum airfoil patterns. These patterns are made from house shingle flashing that is thin enough to be cut with scissors. It is fastened to a piece of wood and taped down to the table. The end has holes in it to allow me to push toothpicks into the foam to prevent movement. I have relative numbers 1 to 10 on each end of the foam. When cutting I have to be at the same number on each end. This relates to moving the left side of the wire slower than the right side. You will get a workable wing but not as good as a machine will do. My long block sander will make short work of it. When sanding I left the tips and trailing edges a little thicker. Notice my roll on/off switch on the right side. The train transformer is below. I have opposite patterns for the other wing.



After the wings are cut and sanded I used Carbon Arrows for spars. I used a straight edge and a square to get them aligned so they can be straight across the full length. The straight edge is held in place with one hand and the other I use to run a hot soldering gun tip down the length. I test the CF arrow for a snug fit. I set it into the wing root at about 1/2 inch deep. Af-

ter doing the both wings, I sanded the wax shine off the arrows and hot glued them in place on a flat surface while they cool with the hot glue. This checks any cutting warps that are on the outer ends of the wing halves. I trimmed the CF ends to fit the wings together and sand for a few degrees dihedral. The joint used a 3 inch long 1/8<sup>th</sup> inch piece of piano wire with a few degrees bent in it. I used some brass sleeves for the outside of the arrows to help prevent splintering.



This is where I use epoxy in 1 of 2 places on the plane. I set the dihedral I needed and set it on a block. I use weight and package tape to hold it overnight.

### **Now the Engine Nacelles**



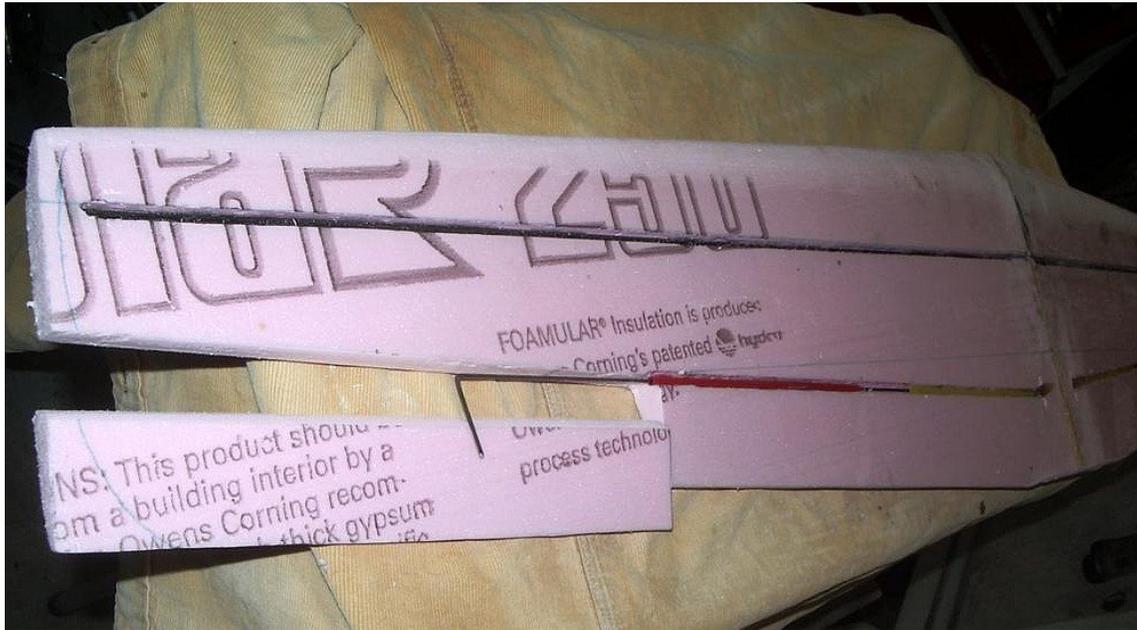
Next I am fitting some nacelle blocks to the airfoil for a snug fit. The blocks are band sawed rough. There is outboard thrust angle and upward thrust angle to be fit in the glue line. When fit is right I slip it in place and it sits nicely with the correct angles. I do not have them as close to the fuselage as the plans show. This is so I can use a larger propeller.



At this point I need to fit the wing to the fuselage. I made 2 carefully measured straight cuts into the fuselage and squared the wing seat. Then I used filler blocks tapered in and over the wing. The leading edge blocks are faired in and covered with  $\frac{3}{4}$  oz fiberglass cloth and water base polyurethane. The engine nacelles are cut to shape and sanded. The cowls are from GWS Mitsubishi Zero with the guns at the underside. Notice upward and outside angles of thrust. Time for a water plane cradle.

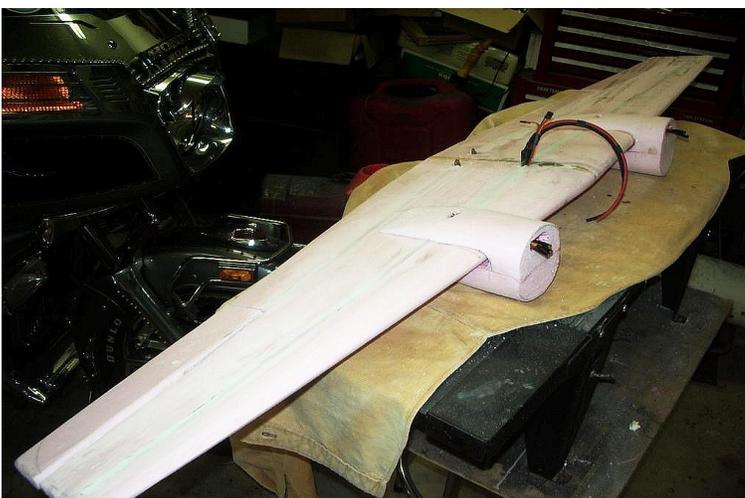


It is time to build the rudder and elevator. These are only  $\frac{5}{8}$  inches thick and are block sanded to shape. The slot is cut for the elevator and lined up. Not pictured is the nylon hinging of these control surfaces. I also put in the fuselage rear CF pushrods for the rudder and elevator. I used plastic outer sleeves also that are glued in place. It is only pinned in place for now in the picture.



Here the ailerons are cut out. I made the control linkages with plastic sleeve and piano wire. The bellcrank end is soldered flat copper drilled for the servo. The sleeve is buried in the wing root.

### Wiring and Components



In this photo there are a few things done. The wing spar and the aileron control rods have been filled with scrap foam in the cuts. They have been sanded and filled with Spacklelite. The wires for the motor power and the ESC motor controllers are set in place. They are filled also. Notice the small slot under the cowling and nacelle. This is an air inlet and exhaust for the controller. The nacelles were pushed over the controller and glued in with the halves split open. Notice the bellcrank ends sticking out for the servo.

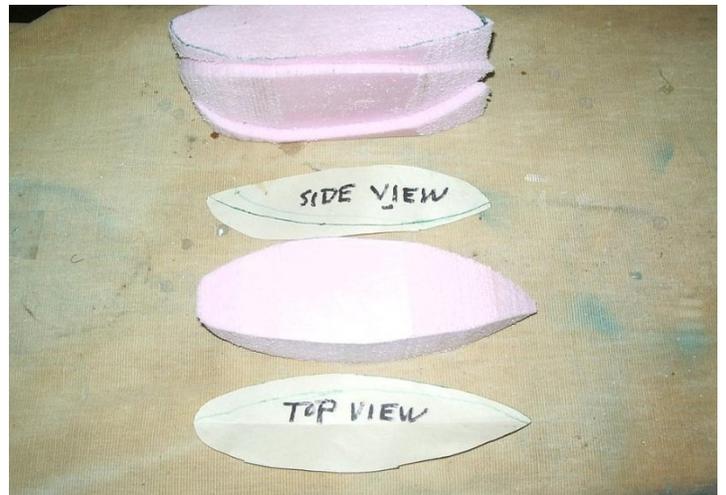
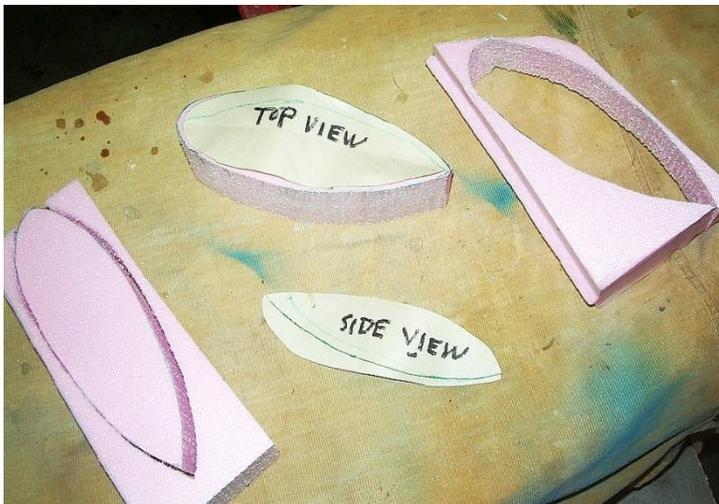


Here you see dowels being pushed into melted holes with epoxy. This is the other place I will only use the epoxy. After the dowels are in place I epoxy the firewall in place. 2 screws are also added to the dowels for mount strength. The motor mount is also blind screwed in place. The motors have 2 set screws holding them in place. This is a rewind Hextronic DT-750, the cowling is from the GWS Zero.

## The Floats



The floats are being set up removable in case of damage. The plywood seats are 3/16 thick and it is set into the wing flat all the way down to the CF spar. The piece of tin can is used to melt the foam down to the correct depth. Glue the wood in place. I like to heavily score the surface so it grabs the glue easily.



Cut the floats to the template view .



The floats and plywood are made with bamboo dowels pre-drilled. They are angled into the floats and glued. The floats are sanded and glassed with WB polyurethane. 2 small screws hold it in place. The ailerons servo is also in place.



The box will be added water protection. The forward tray with Velcro strap will hold the batteries in the nose. All are test fitted before gluing.

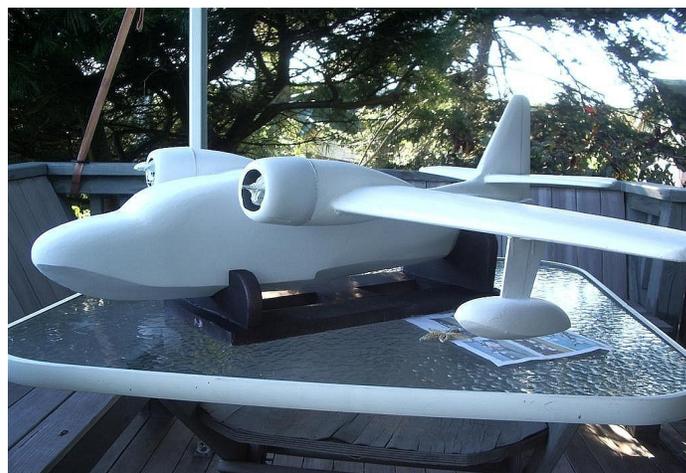
## Water Tight Seal and Components



The left picture shows the battery tray in place and the component box glued in place. I did not want it to reach across so water could find its way in the box. The box is not heavily glued in place either so I can remove it should I need too. Plastic sleeves are glued in to guide the CF pushrods. A slot is cut for the wiring exit.

The right photo shows the components in place and the wires exiting. They are sealed in the exit with some hot glue. The antenna can be lead out the box between the cover and the seal. You would not want glue on this. To make the cover seal you need some Lexan or clear plastic no less than 1/16 inch. Run a bead of silicone sealant along the box edge. Cut the plastic to size and smear Vaseline on the contact edge. Push it down on the sealant to squeeze some out. You need a minimum of 1/8 inch of sealant under the plastic. Let it cure overnight. Next day, trim the cured excess off of the edge of the plastic. Remove the cover next and you have a nice water seal. I put 4 dowels into the corners of the box. You place elastics over it to hold a seal and get easy access. The plywood sides are support for the wing bolts with blind nuts.

## The Finishing Stages



At this point there are 2 coats of Wal-Mart Craft pants sprayed on the plane with SpackleLite fill and light sanding between coats. No need to worry about using semi or gloss craft paints in the finish. When the final coat of Miniwax Polyurethane gloss oil base paint is sprayed on it will shine very bright. Using the aircraft in water with inkjet decals makes this a preferred selection to use the oil base as opposed to the water base clear paint. At this point the whole aircraft is disassembled and the 3 view drawing panel lines are drawn with a straight edge and a ruler to measure where the lines go. This is only by preference. You may not want to spend the time to do this. I recommend it use a pencil and a soft eraser if needed. Use very light pressure as you could scribe in a line you may not want. Then I use a permanent fine tip marker. I gave it another coat of white after this was done to tone it down. One last sanding and it is time to mask off all the white with the lines from the pictures needed to spray the flat red on all the parts that have that color scheme.

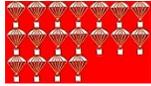


The left picture shows the red application to the fuselage with all the masking tape and paper removed. The black trim is package tape as you see below the fuselage. It goes over the tape marks for a clean sharp contrast as seen in the scheme. Take a piece of old window glass and clean it well. Lay a piece of tape with just a bit more length than is needed. With a metal ruler or one with a metal edge you lay it over the tape and get the right width and slice it down with a utility or Exacto knife into a strip. Peel it up and place it on the plane. Trim as needed with a fresh sharp blade.

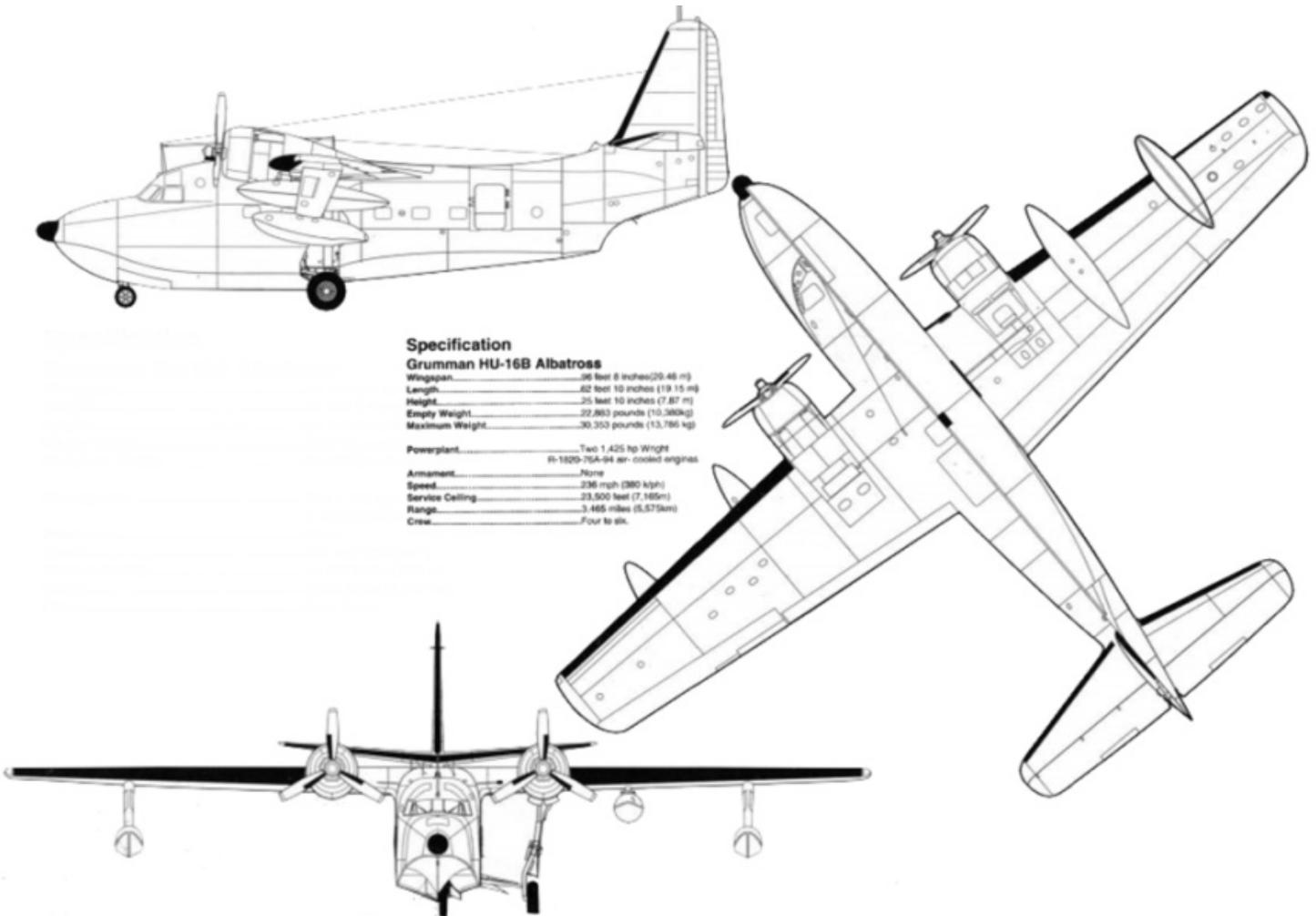
The photo on the right shows all the red as per scheme has been done. Now is the time to carefully place the inkjet decals and more thin stripes to the airplane. If you are doing the cockpit windows with tape, make them now. I painted the wheel on the side of the fuselage. I also painted the anti-glare and small row of fuselage windows. The walkway and engine nacelles were also painted black and dark gray. If there were some bad areas from lifting the tape they need a paint brush attention also. The anti-icing black on all the leading edges need to be done also. Now is the time to look for all the paint flaws and fix them. The propellers are red oxide primed and sprayed silver in light cotes. Check for balance also.



The final product is about done. The Miniwax Gloss Polyurethane oil base paint gives a good seal and great gloss. This should hold the packing tape in place also. I still have a few things like the aluminum rims on the wheels, running lights, and any flaws I find to finish. I have some wiring Anderson plugs to install. The wing bolts are nylon thumb screws to remove the wing and access the battery. I still have to do the foam wing saddles also. Next will be a taxi test before filming.



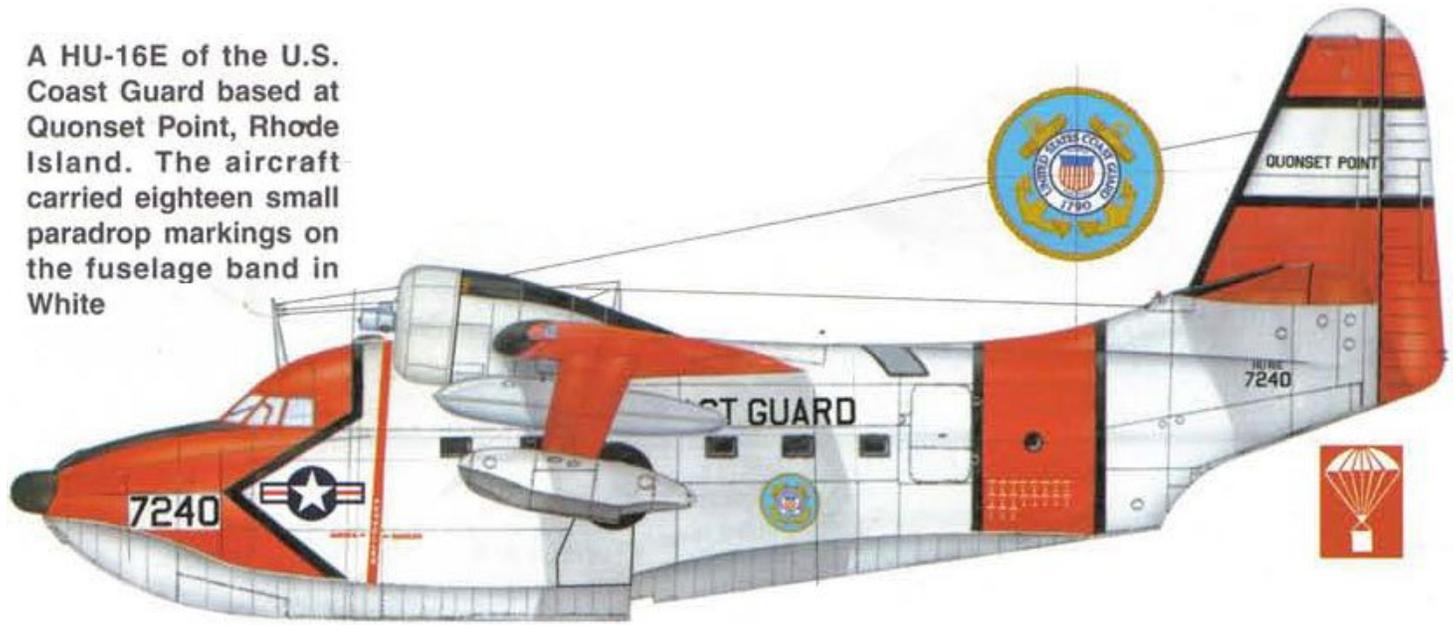
## Pictures and Subjects Related To Building





These decals would have to be resized in a photo program to fit properly. The Stars and USCG on the right were used. They are slightly larger size. The Quonset Point can be a little taller.

A HU-16E of the U.S. Coast Guard based at Quonset Point, Rhode Island. The aircraft carried eighteen small paradrop markings on the fuselage band in white



This is the earlier paint scheme. Take note.





~ The above row of Albatrosses have been sent to the Philippines. ~

Some of these aircraft have different options, color schemes sizes, and build versions. The B version upward had a 16 foot wing extension. You may be able to see it in the above picture if you compare the wings on the first 2 planes.



USCG 44' Motor Lifeboat