

## SUPPLEMENTAL BIG SMOOTHIE FILE (Sept. 5, '09)

By Harley Michaelis

The dark, flying picture is my Big Smoothie in a left bank on its maiden flight on March 28, '09. It was a cool, drizzly day with a light gray sky. Its sleek, graceful & stealthy lines are nicely presented without perspective distortion in this near silhouette view.

Witnesses were Nico Peursum, visiting from the Netherlands, friends Winston Okerlund of Walla Walla, WA & Kirby Parker of Richland, WA. Against that sky, we all lost sight of the ship as it was turned to head back toward us. In the ensuing unseen & rather steep, unscheduled nose first landing, the main aluminum wing bolt sheared & the wing jettisoned. That this metal bolt could shear without the wing holddown system breaking or tearing out was a welcome revelation.

3/30 I broke my neck, suspending flying until late June when I risked my neck doing brief flights off a short hi-start. Winston then took the pic on the right at the Walla Walla Community College.



July 5, less neck brace, but with lady friend Iris along for moral support, I rather gingerly drove 65 miles to a sod farm north of Pasco, WA to visit at an AMA sanctioned contest. I took the ship along for "show and tell". Two experienced flyer friends winched it up while I observed. It launched straight & true, easily did 4 second zooms, penetrated well, nicely thermaled & slowed well with the flaps for landing. It has an extremely low sink rate & like other Genie line ships, passes by barely making an audible whoosh, thanks to the low drag design & all-internal RDS.

Back home, Iris took this pic at the WWCC near time of the setting sun. 12' span is a lot of sailplane.

I'm looking forward to having a well-mended neck, so I can look up with ease, handle winching & really wring out this ship. It's interesting how the itch to fly can motivate one to keep active, while trying to avoid overdoing it.

Genie Builder Don Grisham of Winter Haven, Florida came up with the name “Big Smoothie”. This ship mates the Big Genie wing with the longer, lower profile, glassed-over Smooth Genie Pro fuselage. The all up weight is a half pound less than my 94-96 oz. typical with the older fuselage.

Guys have built big Genies at 104-105 oz. & swore they could stay up in light lift, so compared to those, 87.5 oz. is a pound in weight reduction. Do keep in mind that compared to the ubiquitous, contemporary, pod n’ boom ultra-lights, the Genie line ships are “airborne juggernauts” not dependent on light weight for fine performance.

The glassed-over SGP fuselages are far more rugged than a hollow shell composite. They’re also available in laser cut kit form at <http://www.vintagesailplaner.com/SmoothGeniePro.html>. A day’s work should have the fuse assembled, shaped & ready for glassing over.

The picture below nicely shows the “droop snoot, bowed boom profile. The picture doesn’t do justice to the smooth, subtle curves & the fine finish possible by “glassing-over”.



There are several differences between this ship & the regular Big Genie. For the wing spar I abandoned  $\frac{1}{2}$ " wide CF spars. Instead I went for  $\frac{3}{8}$ " using a double tapered one on the top only & .045" non-tapered on the bottom. That reduced weight & cost per wing although I had to buy pairs of each from ACP. The vertical tail is the full size one on the plans. The liberal “Vertical Tail Volume Coefficient” means even smoother, more solid tracking.

The nose block is a full 5" long. Drilled 2-1/2" deep with a  $\frac{7}{8}$ " wood bit, it takes up to 5 oz. of lead shot/resin mix well forward. The bow in the boom area is more pronounced. It looks good. The slab side patterns on the new plans have it. Combined with the “droop snoot”, the profile is distinctive & creates overall airframe low drag. The fuse remains 2.4GHz friendly.

The tail skid (sub-fin) is the prettier, lighter one detailed in Const. File 4. The towhook blocking is centered  $\frac{1}{4}$ " forward of the position originally shown on the SGP SS pattern, having learned the SGP was a bit squirrely with the towhook centered there.

My SGP’s (130" wing) were coming in with all up weights of 80 oz. I figured I could come within a few ounces of that with a BG wing. When it came time to put the lead shot/resin mix into the drilled out nose block, I arbitrarily went for 4-1/2 ounces which gave an all up weight of 87.5 oz. It seems just right.

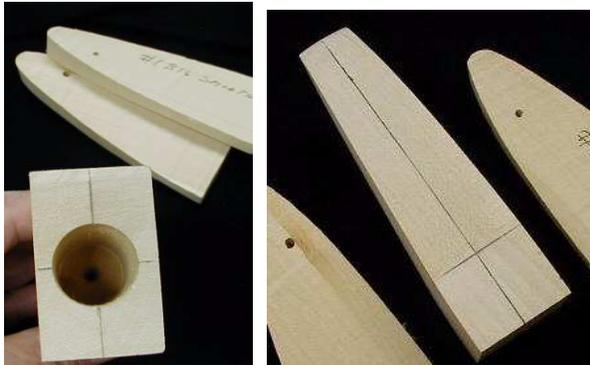
A major change is having Anker Berge-Sonne (<http://www.stealthplaneworks.com/>) fine cores cut



from Dow High Load 60. I've never had cores so beautiful or accurate to work with. The opposing panels are like mirror images in 3D. The uniform TE's are artwork. I'm expecting the best performance yet out of the wing.



For endcaps, a ply pattern was made where core Sections 1 & 2 butt. Four blanks were cut from 1/2" hard balsa & the top one marked for stack cutting with the bandsaw. 2" brads kept the pieces aligned. The stack was finished with a disk sander. After slotting for the blades & beveling to 3/8" & for dihedral, etc. they are glued on.



A 5" nose block was made from a 2" x 2" x 6" bass block from National Balsa. It needed to be over 2" high at its rear end, so hard balsa scrap was glued on top. While rectangular in cross section, the block was drilled for a lead shot & resin mix & the slot for the tooth made with a series of 1/8" holes. With the tooth in, the assembly was drilled for a dowel pin. The tooth was pulled to taper the block with a bandsaw. When later glued in, the block was shaped to final contour.



Drilling the hole in the tooth creates a burr. Clamp tooth in a vise. Tap on the block to remove it. File off the burr. If the slot is oversize, wax the tooth. Put reinforced epoxy in the slot. Insert the tooth to make a snug slot. Use 1/8" dowel as a pin.

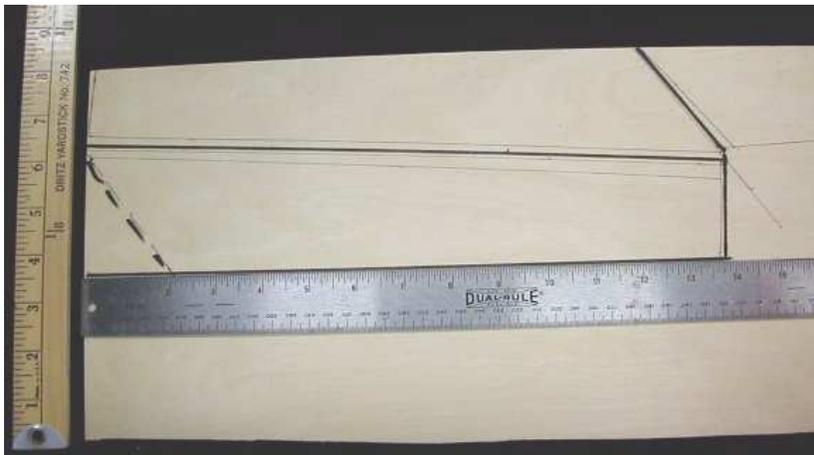
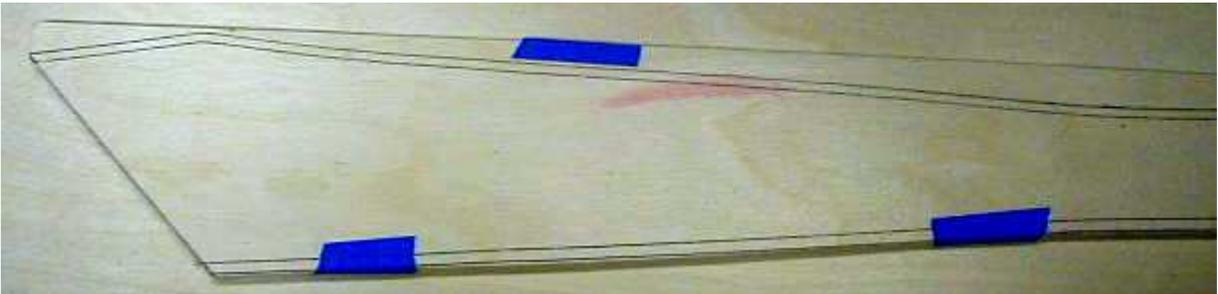


This shows the nose block laid on my reusable pattern. 3/8" bass behind the block handles landing impacts.

Going rearward, use progressively lighter balsa. In the glassing-over process epoxy penetrates it to create a hard skin. Dings are easily fixed with spackle or Icing Putty & paint.

**UTILIZING THE PLY SHEET:** If working with 48" sheet ply, follow the instructions in Construction File #1 to get any bows in the sheet opposing. See the pictures below. Working along the top edge of the full sheet, mark & cut a pair of blanks for the long rear SS sections. Tape these two blanks together as shown in the first picture below. Flip the sheet to put a factory edge at the top. To make blanks for the front sections, mark as shown in the second picture. Cut & tape the blanks

together or temporarily join them inside with double sticky tape for stack cutting into matched pairs.



Mark & cut the front section blanks as shown here. Tape together. While in blank state, trim all angled edges as shown below so continuous, long, straight lines will be formed between both SS sections.



With sections taped together, bear them on one sanding block & true up the splice lines with another block.

If available, put a fine-toothed blade in the bandsaw to cut close to the marked SS lines. Block sand along the edges to work down to the fine marked lines to finish matching front & rear pairs. Internal splicing with 1/32" ply as detailed in File 1 can then follow. After cutting one set of blanks near one factory edge, there's plenty of ply left for a 2<sup>nd</sup> set. Lay your cut pieces or master patterns on the remainder to see how to do it & have lots left for doublers, blade boxes & misc.

**WING BOLTS:** Due to wing mass, nylon bolts will shear with discouraging ease on landing. The 1-1/2" aluminum socket head 1/4 x 20 bolt from Micro-Fasteners will handle "gorilla" launch stresses, but still shear on a hard enough impact. The plate across the system should be 1/8" x 3/4 aluminum with a steel nut on its underside.

Return to Const. File # 1 for further steps.