WHAT'S A GENIE? (Sept. 5,'09)

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There are three different bagged wings involved in the 3-piece wing, Genie line. See the file named AIRFOILS, PANEL SECTIONS AND WING PLANFORMS for core information on the 12' Big Genie, 11' Genie Pro and the 10' Genie LT/S wings.

The Aug. '09 plans show new slab side patterns. The favored combinations are:

(1) The SGP fuse with the Big Genie wing to make the 12' "BIG SMOOTHIE"

(2) The SGP fuse with the Genie Pro wing to make the 11' "SMOOTH GENIE PRO".

(3) A smaller fuselage with 2-piece slab sides to make the 10' span LT/S bagged wing.

(4) A 48" 1-piece slab side fuselage to make the non-bagged wing Easy LT/S.

See the Supplemental files about the Big Smoothie, the Smooth Genie Pro, the LT/S & the Easy LT/S for more information.

These are likely the best documented, best supported, best built, most extensively tested, continually refined, least costly state-of-the-art sailplanes on the planet, specifically designed for scratch building.

They're do-it-yourself projects, but see the document "WHAT'S AVAILABLE?" about plans, cores, composite fuselages, construction CD & hardware packs. Modelers who've never even assembled a simple kit have successfully built & flown these airframes. See pictures & stories in the GALLERY file.

DOCUMENTATION: Universal plans are viewable on-line in PDF format. From the website you can view any area at any scale you like. From the opening page you can copy plan data to a CD & have Kinko's etc., print a full sized copy for about $8. Plans fit on a 2"' x 6' paper. The CD files take you step-by-step with extensive text, drawings & pictures.

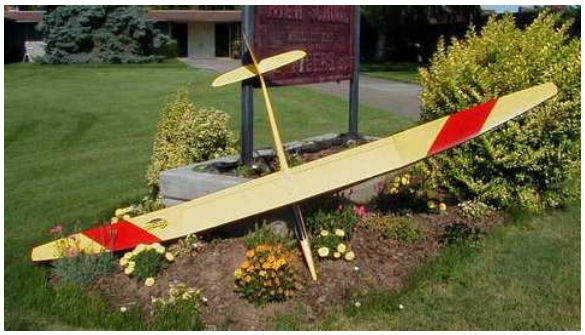
SUPPORT: Experienced Genie builder/enthusiasts are available for e-mail support. See page 1 of the opening page or of the GALLERY file. A Yahoo Genie Builder's Group where you can ask questions or contribute is up & running. From the website opening page, click on Related Links.

BEST BUILT: With their many unique features & innovations, nothing is built like these ships. There's no skimping to cut costs. There are no commercially motivated short cuts to rush the work.

Techniques used help minimize time needed to get superbly built, fine-performing, easy-handling, eye-catching and rugged airframes. Think of them as elegant "airborne juggernauts" compared to the rash of contemporary super light pod n' boomers, etc.

EXTENSIVELY TESTED, CONTINUALLY REFINED: the larger GENIE, of which I've built 29 for personal use, has been continuously refined since 1992. The 20 or so built of the other Genie versions employ the same, well-proven construction techniques & features. All have been extensively flown and held their own in competition in the NWSS.

Starting with the ATRIX design (Dec. '86 MA) I've built some 75 personal airframes of this type with 3-piece, saddle-mounted wings. They've been progressively refined to be simpler, stronger, better performing, more sophisticated, more durable, more practical & more eye-pleasing.



This is the 130” Genie Pro with the Pacific Sailplanes composite fuselage. (File 8)

This same wing is used on the Smooth Genie Pro with its longer, glassed-over fuselage.

All slim, curvy fuses/fin may be inexpensively scratch-built with glass cloth, birch ply, balsa, a little CF laminate & adhesives. They are known for their beauty, durability & finish. The lower right pic has perspective distortion, but displays the prominent droop snoot-bowed boom configuration. Modelers are startled to learn they are not expensive molded creations.

All feature well-secured one-piece nose blocks to drill out for a lead shot/resin mix. Molded glass canopies come with the parts packages. All have removable, single tooth nose skids made of 1/8” aluminum. Fuse cross sections by the fin are small, but strongly reinforced with CF laminate under ply doublers.

Fins are 5/16” light balsa with internal bell crank. Light spackle fillets at the tail make the fuse, fin & skid look one-piece.

Builders have total freedom in designing paint trim schemes.



<u>LEAST COSTLY</u>: You'd be hard pressed to get $350-$400 into even the full carbon-skinned ones, using commercially available CNC pre-cut cores. Yet, when nicely built, they compare favorably in all-around performance to ARF's costing $1,500 or more. Composite fuses add about $100 to costs. They may save time, but lack the durability & reparability of the glassed-over fuses.

<u>UNIQUE FEATURES & INNOVATIONS</u>: These are dozens including the following;

Location & amount of CF in any of the fuses keeps them "2.4 GHz friendly". The glassed-over ones are light, & anything but flimsy or delicate. All take a "gorilla" grip behind or under the wing for high-tension launches & take a pounding on landing. They are resilient & with the light tail, the dorsal, low stab & CF laminate between doublers by the fin are not prone to breaking by the fin in hard landings. If they break in an extreme situation, it's possible to restore them to original appearance. See the file "Anatomy of a Fuselage Repair".

The droop snoot puts the nose down first without spearing, helps avoid damage to flaps & servos & contributes to smooth overall airflow. Mike Selig, Ph D., well known for his development of model airfoils, determined the fuse configuration, as also used in his OPUS design & now the Pike Perfect & Icon 2, results in a 30% reduction in overall airframe drag. The extraordinary quietness of the Genie line airframes is testimony to their overall cleanliness.

Internal rubber grippers firmly secure stabs on the <u>non-rotating</u> main pivot wire. The stab's fixed tubes freely rotate on it. Rudder is knuckle-hinged & detachable. Stabs & rudder are inexpensive, simple, light, practical, built-up, repairable Monokoted structures that remain effective at low landing speeds.

A key to fine performance is an efficient & strong wing. The quad-taper planforms developed provide essentially elliptical lift distribution. A blend of Selig airfoils assures favorable characteristics in all ways important to thermal competition. Experimenters are free to use other airfoils by shaping the wing saddle accordingly.

Wing center sections have a rectangular, Kevlar thread wrapped, CF spar system which, along with the dense foam cores & the overall carbon skin, handles those high stress, pedal to the metal, dip & zoom launches with impunity. The lightweight LT/S will do especially spectacular launches on winches typically used for traditional thermal contests.

On the bagged wings, glass & CF cloth go directly over the cores. The Mylar carriers are pre-painted to yield beautiful, near finely-finished wing panels out of the bag. Fine-finishing the real

wood LE to a glass-smooth, pit-free, glossy painted finish, as detailed & shown in the Fine Finishing file, is unique to these scratch-built airframes. The overall appearance can rival that of molded wings, including with multi-toned LE's.

The Genie line of airframes is the only one that intentionally & conveniently accommodates the installation of the ultra slick, all-internal Rotary Driver System (RDS). Other high performance, contemporary airframes made with squared-up servo wells either hamper or totally defeat doing a proper RDS installation. Using the RDS makes it possible to have the cleanest wings in the business. There are no protruding horns, clevises, pushrods & bulgy covers. Nothing hangs out to create parasitic drag, cause noise or catch on things.

Aileron servos go in the center section. No holes, connectors or leads extend into the tips. Light, simple aileron-operating mechanics automatically link when tips are attached & slip apart when detached. These & the absence of outboard hardware help keep mass inboard for roll axis agility.

In the tip sections, the overall unidirectional CF cloth used in the layup over Dow High Load 60 or Spyder cores provides skin stressing strength to resist creating compression fractures. No tip spars are needed since, using the RDS, no structure weakening servo wells are present.

CNC cores, cut with the precision needed to get maximum performance out of the airfoils, are commercially available for all ships. See the "What's Available?" file. Modeler Anker Berg-Sonne's cores, cut from Dow High-Load 60 are beautiful, accurate & yet modestly priced. Making smooth, precisely cut, 8 piece sets with right & left sections that are mirror images in 3 dimensions, takes time, skill, specialized equipment & is no small task.

If you do your own, Easy LT/S cores (see supplemental file) are a simplified departure from the others, cut with constant chord centers, single taper tips and then modified into a triple taper planform with simple trimming and sanding. While performance and handling are better than expected, they don't compare with that of the bagged wing LT/S.

AERO-ELASTICITY: Flex is present in the wings of Burt Rutan's unique & efficient designs, in high aspect ratio, full-scale carbon sailplane wings & also in wings of soaring birds. Genie panels themselves are rigid, but use of lightweight, blue-tempered, clock spring steel blades for tip section attach & support provides an element of aero-elasticity with a 3-fold purpose.

(1) Something can give without breaking such as when a ship flops hard on one or both tips. (2) The spring helps absorb launch stresses that could contribute to compression fractures. (3) On abrupt release from a high tension launch, tips do a down stroke to provide an impetus into the zoom. This is observed in what appears as a leaping action in a well-timed release.

The compact boxes for these thin blades are simple, lightweight, sturdy & securely imbedded between Kevlar wrapped spars & other Kevlar & CF reinforcement.

In the glassed-over wood fuselages, a simple, inexpensive, laminated ply towhook block system is used. It has holes spaced on 1/4" centers, but another adjustment is in towhook shank exposed. Extending a towhook has a similar effect as moving it back. At negligible cost & no fuss, the combination makes very fine adjustment possible for optimum tow.

Common ½" thick servos such as the JR micros, Airtronics 94761Z & other quality servos those sizes, all work very well in the wings. The side mounting lugs on super thin "wing servos" are an obstacle to proper mounting of flap servos for the RDS. Harley's "Easy Mounting System" (HEMS), detailed in CONST. File #3, Part 2, is a simple, dedicated, inexpensive, easily-fabricated, tiltable mounting system for the RDS. No mounting lugs are used. Commercial servo mounts, made for use with traditional surface moving hardware, are not well-suited to the RDS.

Nose blocks have rugged, removable, single tooth skids of 1/8" aluminum & can be drilled out for a lead shot/resin mix for easy balancing out.

A simple, durable, unique & easily installed new hinging system, dubbed "Individual Kevlar Hinges" is introduced with these airframes. Details are in CONST. File #7.

Building just one with a glass/CF skinned wing, compared to buying a contemporary molded ARF, can save you $1,000 or more. With that you can get set up for life to make your own beautiful, high-performance airframes. You'll then have something to take real pride in & can work independently of others for repairs, replacements & cost.

Bare, well-built Genie airframes have sold for as much as $1,400. Build two, sell one & you'll have paid for yours, with hundreds left over for other things. Low cost scratch building has kept me in competitive new airframes for 40 years. Used ones in nice shape can be sold well above cost to build them.

Your retirement kitty will stay in a much healthier state than if you fritter your money away on manufactured airframes.

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