PERCIVAL MEW-GULL

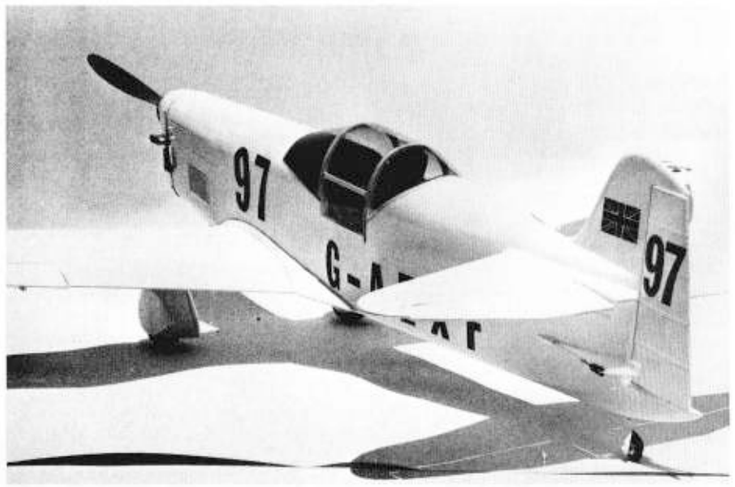
Don Srull's .19 Powered Sport-Scaler Is A Must For The Sunday Flier With An Interest In Vintage Aircraft. For Lightweight Digital Proportional Or Galloping Ghost Systems.

The "Golden Age" of R-C sport flying is here! Especially what can be labeled as "sport-scale" flying. Radio technology and material advances have made it so. Even the pure novice can buy into this great sport for a minimum investment and fly magnetic actuator, proportional rudder airplanes. With this light weight, simple equipment having fantastic reliability by standards of only 5 years ago, he can learn the principles of guided flight and have a ball. For just a few dollars more, he can go with a GG set-up which will give fairly good proportional rudder, elevator, and motor control. Again, simplicity and reliabliity are now outstanding due to people like Herb Abrams and the folks at Min-X, Controlaire, and Ace. Very recently available, and I think the biggest boon to the younger sport flyer who has limited funds and time, is the two actuator pulse system. The renaissance of the old "Kicking Duck" system as it used to be referred to, has to be credited to the beautifully engineered Rand Dual Pack. This package of twin actuators and built-in decoder electronics, used with any of several transmitter-receiver combinations, gives fully proportional rudder and elevator plus trimmable throttle control. Again simple, lightweight, and relatively low in cost. Finally, for those who don't want to be limited in any way by their radio gear and have the additional money, the new minaturized digital systems are the ultimate, providing fantastic performance in extremely small, lightweight packages. Until very recently I had stuck pretty much with pulse rudder and GG systems, not for economic reasons but principally due to the fact that I personally prefer compact models. Big airplanes with .45 and .60's up front, a gallon fuel tank, and a station wagon full of support equipment just turned me off. The new mini-digitals compete pretty well weight and space-wise with any of the single channel stuff giving three controls.

What this all means to sport flying of course is that you can fly what used to be considered small (or even Mickey Mouse) sized airplanes with the precision and reliability of the big, heavy gas eaters. "Small" fields are big enough now! And best of all, from my view-point at least, is that there is no longer any excuse to avoid scale models, even for sport flying. They don't have to be large, expensive, year-long projects to handle full-house gear. Nor are you restricted to the use of stable, high wing-type airplanes because of equipment limitations. So, whatever new gear you may have or are planning to buy, let yourself go and try a sport-scale airplane. They can fly just as well as the balsa boxes and will give you a lot more kicks.

The Mew-Gull presented here was selected as an outstanding sport-scaler which covers the GG thru small digital equipment range. Using a .15 and rudder plus elevator control it's a spry performer with GG or dual actuator systems. With power up to a .19 and one of the small digital sets, all the maneuverability and speed you want is available. In this case, coupled ailerons and rudder (C.A.R.) can be used if desired to give smoother, more precise rolling maneuvers.

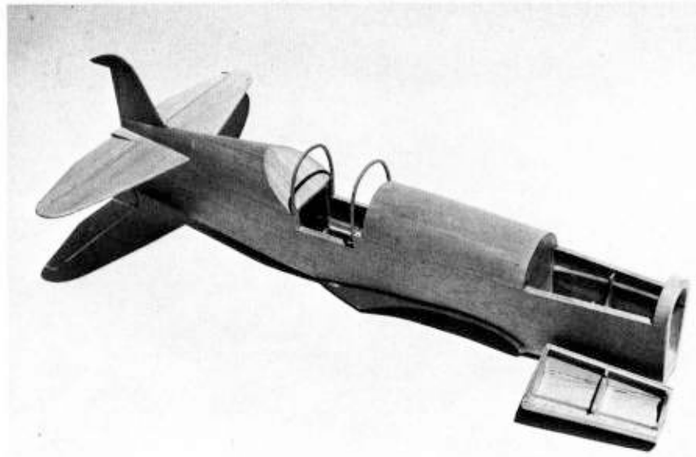
To be perfectly honest, I selected the Mew-Gull for my next sport-scale project strictly on the basis of looks. I saw a 3-view and some pictures one evening in Walt Mooney's garage (also known as the Southern California Aviation

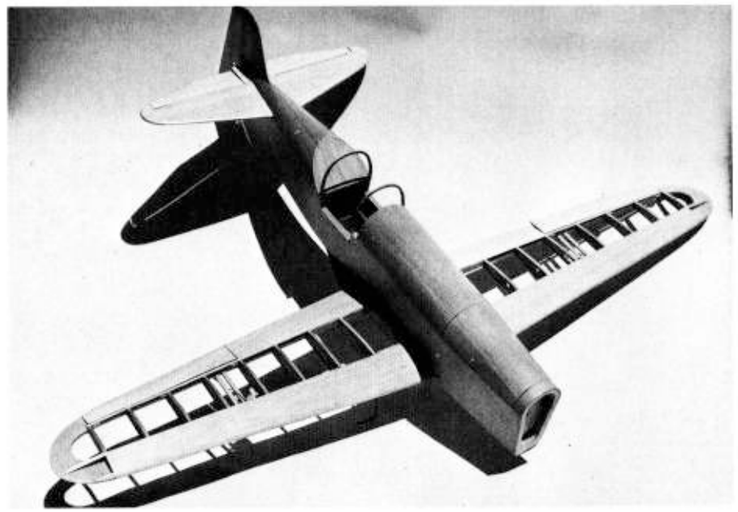


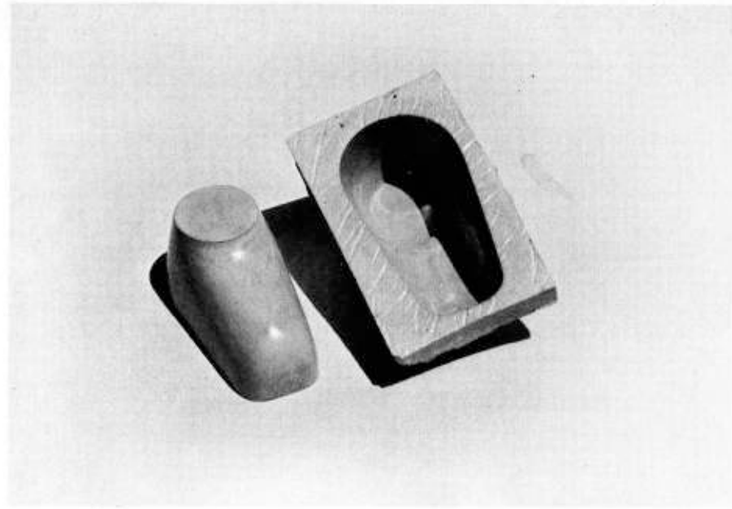
Archives) and decided I had to build one no matter how tough it would be. I only noticed its fine model characteristics while drawing up the initial plans. Some of these nice features are the long nose moment, avoiding the usual tail heavy problems of many scale aircraft. Another is the ample 5° scale dihedral. This is why the model can easily be flown with rudder and elevator only if desired. Finally, the fuselage has sufficient volume for any radio gear, plus two fists and an arm!

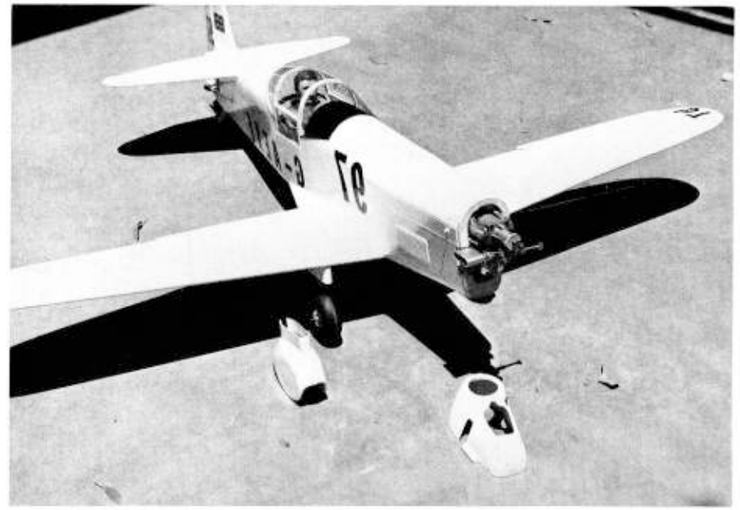
The prototype model shown in the pictures does have two slight deviations from scale at which scale purists might sneer. The horizontal tail surfaces were enlarged about 20% to give a stability margin for the GG systems. With Digital systems I think the scale surface area shown on the plans would be perfectly O.K. The other scale sin is the steerable tail wheel – the real ships had a skid. Since I usually fly off of hard surfaces, a tail wheel was necessary to have effective ground steering capability. Another less noticeable variation is that the wings are only partly sheeted and part fabric, while the actual aircraft were all plywood skinned except for control surfaces. If one wished, by correcting the above deviations and adding a few more authentic external and cockpit details, the airplane could be easily turned into a competition-type scale model. However, its original purpose was strictly for fun flying.

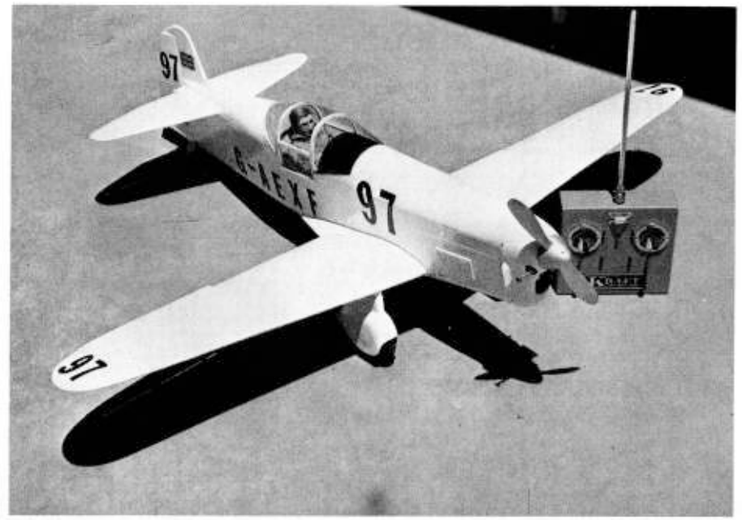
In addition to being one of the classiest looking racing airplanes ever built, the Percival Mew Gull has a rather illustrious and interesting history. In 1934, the racing Mew Gull was the first British civil aircraft to exceed 200 miles per hour, and was actually faster than contempory fighter aircraft. In addition to Capt. Percival, the plane's creator, making fastest time in every King's Cup race from 1934 to 1937, a Mew Gull flown by Alex Henshaw won the 1,012 mile race of 1938 and made fastest time, averaging 236 miles per hour. In 1939 Henshaw also broke the England – South Africa – England record by flying the 12,600 miles in 3 days, 6 hours and 58 minutes. The prototype Mew Gull was designated P.2 and first flew to test a wing section with a Napier Javelin engine. This aircraft was eventually completely rebuilt into the P.6 with a Regnier engine, later changed for a D.H. Gipsy Six I. Eventually three more P.6's were built and they all began competitive racing. The most famous of the aircraft, the Z S – A H M, first appeared in 1934 and was a consistent winner. In 1937 this aircraft became G – A E X F and raced until 1939 when it was dismantled and











stored in a stable in France during World War II. In 1951 she was racing again, being modified periodically to keep it one of the hottest racing machines of the 1950's. The configuration and markings of G – A E X F, circa May, 1953 were used as the basis for the model presented here. Several pretty good photos and a three view were found in "Aircraft Described No. 66" which appeared in an old Aeromodeller magazine, reprints of which are available from Model Aeronautical Press, Ltd. The specifications of the Mew Gull are as follows: 24 feet 9 inches span; 20 feet 9½ inches in length; 1,850 lbs. max. weight; 256 m.p.h. max. speed and 225 m.p.h. cruising speed. The machines were of conventional all wood construction and covered with plywood, except for control surfaces. The particular aircraft modeled was glossy white overall with black racing numbers and dark blue letters positioned as shown in the photographs. The spinner and prop had a natural dural finish. So, if a sport model of a beautiful, though relatively unknown, racing airplane that flies like a dream sounds tempting, the Mew Gull is for you.

Before the actual construction begins a few comments are in order. First off, even though the model, as presented, has no especially difficult building or flying quirks, it is definitely **not** a first model – either building or flying. The simple balsa boxes are the winners here for learningthe principles of model construction and R.C. flying. Secondly, no matter how many models you have built and flown, you can make this or any other airplane easier to build and much easier to fly if you **keep it light**. Unfortunately, many of the words written about the advantages of large models over small models concerning Reynolds Number effect, penetration, gust susceptibility etc., etc., are complete hogwash. For a given design type one of the most important (and controllable) variables is wing loading – the weight per lifting surface area. Whether 3 foot or 6 foot span, many good flying scale models at below 16 ounces per square foot would be treacherous beasts at 20 ounces per square foot. Free flight scale modelers have always been well aware of this effect, but the R.C. community, I think, has only recently fully appreciated its importance. The two most recent R.C. flight trainer airplane designs featured in RCM and another (unmentionable) magazine have one principal characteristic in common which will contribute much to their success: light wing loading. Add very much weight to these designs and

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you would have a good old fashioned (standard) R.C. airplane, tough to fly and tougher to land. Not only that, the top speed would be reduced and the stall speed would be increased. So take heed – build light. The use of contest grade balsa throughout, except for spars and fuselage bulkheads, will almost guarantee a light airplane. It's also much much easier to work with.

Before you start cutting balsa, decide on the engine and radio gear you will be using. If digital gear is used also decide whether you wish to use the C.A.R. control set-up or not. It is a little more trouble, but flying does improve. If you insist, you can add a little more weight and use four servos and have separate rudder and aileron control. Once these decisions are made you can plan the detailed internal arrangements of your Mew Gull. Start by carefully cutting out all of the balsa and plywood parts like a good pre-fab kit.

WING

It will be helpful to begin with the wing because it is used in building the fuselage. Lay out the 1/16" sheet leading and trailing edge lower sheets and the landing gear mounting strips. Glue on the lower spars, the tips, the bottom cap-strips and finally the ribs; leaving ribs R-1 unglued for the moment. Fit and glue the ¼" sheet leading edge. Next, complete the left wing panel by first tilting rib R-1 about 5° (the dihedral angle) before glueing and then add the top spars and the upper T.E. sheeting, leaving the L.E. uncovered for now. When completely dry, unpin the left panel from the building board and raise it so the tip is 4-½ inches above the board. Make sure the bottom of the wing ribs are exactly parallel to the board to prevent any wing twist from being built in. Complete the right panel exactly as you did the left. With your razor saw, cut out 3/32" slots in ribs R-1, R-2, and R-3 behind the front spars, and glue in the plywood dihedral brace. While the wing is drying, bend both landing gear legs from 1/8" piano wire. When the wing is dry, remove from the board and fit and line up the landing gear legs, using ¼" sheet metal screws to attach the metal clips. Sheet the L.E., add the top cap strips, and sheet the center section. Carve the L.E. to shape and sand the entire wing.

If you are not going to use ailerons, you are about finished with the wing. For aileron control, cut out the ailerons from the trailing edge using a razor saw and X-Acto knife. Add aileron end ribs, the plywood horn, and 1/16" sheeting to the aileron open face. Hinge with sheet nylon hinges and add the bellcranks and push rod motion. A Top Flite 2" nylon bellcrank is cut down as shown and mounted on a 1/16" ply insert. Shim up the bottom of the bellcrank bearing so that its axis is at right angles to the **bottom** of the wing airfoil. The C.A.R. configuration shown is designed for 3 abreast Kraft KPS-10 servos, with the center servo used for rudder/aileron control. If you are using other equipment, you may have to move things a bit.

To complete the wing for now, add the 1/32" ply scabs and drill the holes for the 8-32 nylon bolts. Build and attach the wheel spat pylons.

FUSELAGE – EMPENNAGE

The left half of the fuselage is built over the plans by first laying out the ¼" square keel pieces and the fin. Next, the half-bulkhead formers, the longerons and doublers are glued on, making sure they are square to the building board. The 1/8" sheet side is now glued in place. If the wood you used for the sides is a little -forward would be to build them up from balsa and cover with light weight fiberglass. The Hobby-Pody-Easy-Does-It method is a lot simpler and produces stronger, lighter units. On the prototype model shown in the pictures I used a female plaster mold to form the cowl and spats of reinforced epoxy. Exact replicas of the cowl and spats are built up and carved from balsa and finished to slick, smooth surface. The form for the spats is split down the center to form a right and left half. After heavily waxing the forms, casting plaster is poured over them to form the plaster female molds. The plaster molds are waxed and sprayed with a release agent (I used PARTALL FILM NO. 10, which works very well). Epoxy and cloth are then pressed into the mold. When set-up, they are removed, trimmed with a small tin-snips and the spat halves are epoxied togethr along the front seam. The advantage of this process is that when the unit is pulled from the plaster mold, it has a final surface finish and color – no scraping, sanding or painting the tough resin surface. The final shape and surface finish is put on the balsa form, and balsa is a lot easier to finish than resin. An added bonus is that only **one** form is required (and need be finished) for both identical spats. In any case, I recommend using the HobbyPoxy cloth and Formula II resin – two layers for the cowl and one layer for the spats – since it is extremely tough and flexible compared to the standard fiberglass cloth and resin. One last tip here; a little dab of white resin-tinting liquid in the epoxy used to mold the cowl and spats will result in sparkling white color all the way thru – no painting required. I also used a little of this whilte coloring in the epoxy glue used to join the spats together at the front seam.

COVERING AND PAINTING

Super Monokote would be an ideal lightweight covering for the Mew Gull. Since I hadn't had any experience with this material at the time, I chickened-out and used the old-fashioned materials as follows: after final sanding the entire airplane, give it 3 coats of thin clear dope. Cover the wing with silk and the rest of

the airplane with medium weight silkspan. Apply two more coats of dope and three coats of filler, sanding between each coat, and it's ready for color. Three light spray coats of white will cover everything nicely. Mask off the area above and inside the windscreen and paint it dull black. Talcum powder added to plain black dope will yield a nice flat finish. Make accurate paper patterns for the front and rear canopy sections. Cut them from thin clear sheet plastic and glue on. Another tip here – I have found that the best glue for attaching canopies is the clear Testor's fast drying airplane glue. It sticks much better than even epoxy, is nearly invisible, and is much easier to use. The removable hatch section of the canopy actually should have a slight bulge in the top as shown on the plans. For real accuracy you could heat and stretch sheet plastic over a form – I cheated and used a straight flat section.

Plain black, 2 inch and 3 inch decals from SIG were used for the racing numbers and lettering as shown in the photographs. A small British flag painted on the fin completes the exterior trim. The whole ship was given a coat of Fullers' Plast – a clear, glossy synthetic varnish that is fuel proof. A coat of clear polyurethane varnish would be as good. Finish up by adding an instrument panel, a pilot, and any other interior details you may fancy. Install the engine and radio gear and you are ready to fly.

FLYING

Don't be nervous about that first flight – the worst that can happen is you will cream your beautiful new airplane and demolish your radio gear! I just want to emphasize that if you follow these check-out procedures religiously, the Mew Gull will fly O.K. the **first time.** If you don't, you're on your own.

First off – is the finished weight within limits? 2 to 2½ pounds for pulse and 2½ to 3 pounds for digital. If you are a little over this, allright. If you are way over, the plane will be much more difficult to trim out, and at the high speed it will have to fly and land – – – – – ! Next step – check the C.G. Move batteries or add ballast if necessary to get it as shown. Use a yardstick or piece of string to check the incidence of wing and tail, and the thrust line. Finally make sure your radio gear works to perfection, all linkages are free, and you have used the outside holes in the rudder and ailerons (if used) to minimize throw.

First taxiing and flight sessions should be made without the cowl and wheel pants. It will ruin the looks of the airplane but engine starting and adjusting will be much simpler, and less-than-perfect landings will be easier on the bottom of the wings.

Before flying, taxi around a bit to get the feel of the airplane. When you feel ready, give it full power and keep it tracking straight with the tail raised off. Don't let it break ground until a really good head of speed is built up. Then, **very gently** ease in a **little** up elevator until it breaks ground in a shallow fast climb. Remember, elevator response is pretty rapid. Don't try to turn until at least 50 to 100 feet of altitude have been gained, and then a **very gentle** right turn while still climbing is the ticket. Don't throw the stick around at all until plenty more altitude is gained and your goose bumps subside. Now, use rudder, elevator, rudder plus elevator; throttle back and feel out her medium speed capabilities. While still up high, throttle way back and get an idea of what the response during landing will be like. O.K., time to land. At medium low throttle descend and get into the landing pattern. Remember to approach at a reasonably good speed; don't try for a stalled 3-point touch down just yet. Fly it in and chop the throttle when 5 to 10 feet off of the ground. (For GG systems of course, its necessary to throttle full back at higher altitudes and land. Using the throttle at low altitudes is not recommended.)

Now that you're back on the ground in one piece, tweak any of the linkage to correct for trim problems. After a few more flights when you feel comfortable with the inverted engine, and the lands get smooth, put on the cowl and wheel spats. Now, wasn't it worth that little extra work to have the 'purtiest' airplane on the field? ●