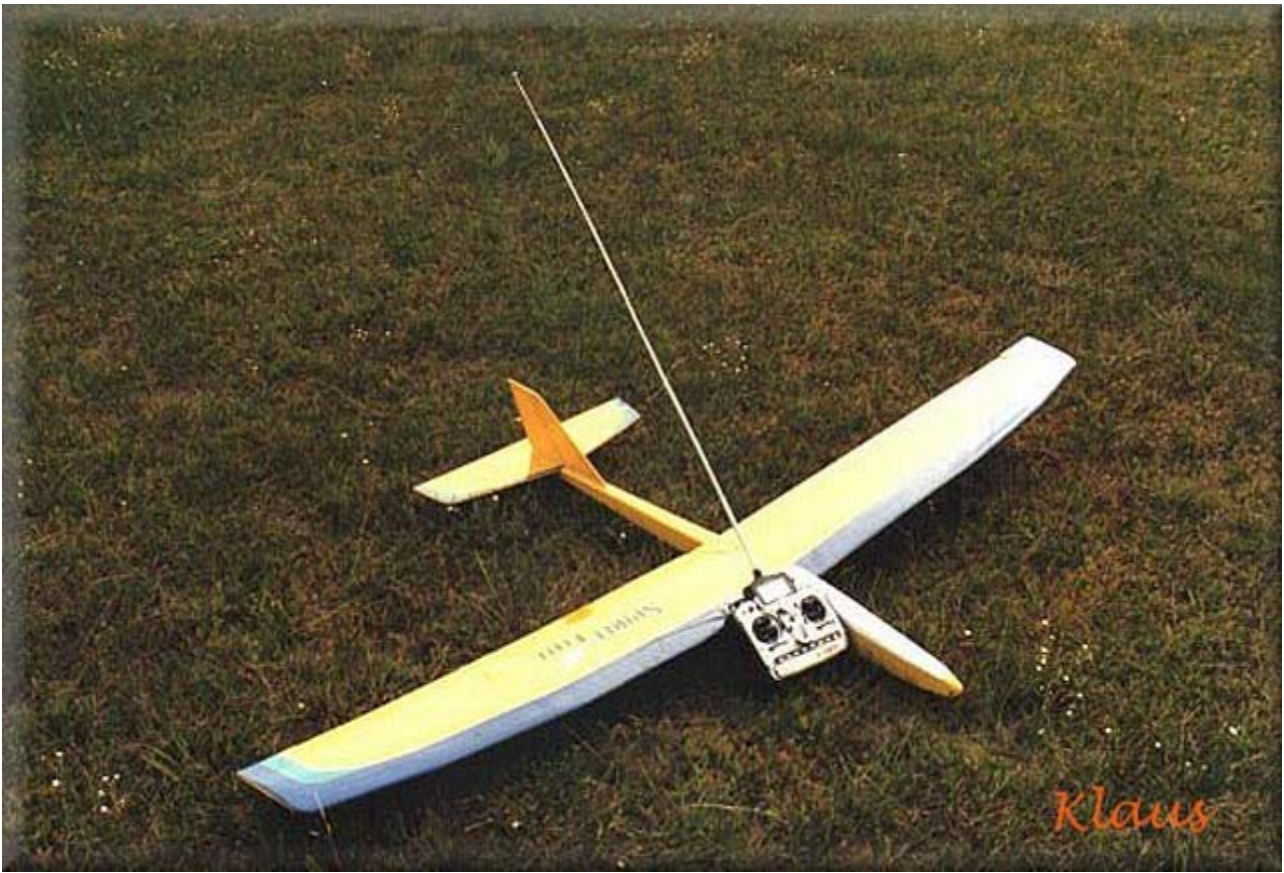


## Great Planes Spirit Elite.

By Klaus Weiss.



In this age of Almost Ready to Fly and Ready To Fly models, Great Planes still offer a variety of 'builders' kits. One of their latest designs is the two metre Spirit Elite sailplane, based on the popular and contest winning Spirit. This model displays a departure from convention by Great Planes, in that it offers a new, blended airfoil section as well as flaps, ailerons and a sleeker fuselage. This design should give the Spirit Elite the potential of flight characteristics and the performance optimisation, generally only found in the larger wingspan, high tech, high priced counterparts.

With an increasing interest in the 2 metre sailplane class in Australia and a resurgence in the number of radio control Glider pilots here, this should prove to be a winning combination for Great Planes.

The Spirit Elite differs in several areas, from previous Spirit designs. The fuselage is a lot slimmer and longer in the nose and tail moments. Radio equipment requires the use of micro and mini servos. The wing in particular is a much thinner section, utilising the Selig/Ashok Gopalarathnam 7035 airfoil at the root, blending into the S.A. 7036 section at the tip. This combination should give the Elite a very good Lift/ Drag ratio and excellent performance in windy conditions. Like the Spirit 100, the Elite lets you chose the type of wing you are going to build. There is the option of a dihedral wing with flaps and ailerons, or the polyhedral version. The polyhedral wing offers more stability and is generally easier to fly, so this alternative should suit novice pilots better. With the straight

dihedral, full house option, there is a wide range of advanced mixing and programming opportunities available, for those who have computer radios. It will take a while to test and optimise the full potential of this sailplane, but at first glance, it sure looks a winner.

## THE KIT

The balsa selection and die cutting is of the usual Great Planes high standard, with no die crushing of balsa parts evident. The plywood pieces pop out cleanly, as do the balsa parts. This is the first time I have seen jig tabs on the ribs of a Great Planes glider, and they will ensure the correct building alignment is maintained during the wing construction.

As with all Great Planes kit boxes, the artwork will catch the eye of any prospective buyer. The contents are well packed, with separate bundles and a comprehensive hardware package. Interlocking parts make for a straight assembly as well as providing strength. There is a rolled plan and a 32 page instruction booklet; with step by step drawings to aid in the construction sequence. At the end of the booklet, there are several pages dedicated to trimming and flying advice, slope soaring information, ballasting and an overview of how thermals work.

Having built several Spirit 2m sailplanes and a couple of Spirit 100 versions, I was interested in comparing how the Elite would build, in contrast. It seems to be just as accurate and easy to build as previous versions, borrowing a few aspects from the Spirit 100 assembly, in my opinion.

I can't stress strongly enough, the importance of reading through the booklet and referencing it to the plans, before you begin. Next, go through the parts list and identify the various balsa and timber pieces required for wings, fuselage and empennage. If needs be, mark them for identification, as the only way to do so otherwise, is to keep checking back on the bundle contents in the parts list.

## CONSTRUCTION.

A brief overview is all that is required here, as the booklet covers assembly quite well. A bit more text in the explanation of various sequences would assist, but you can't really go wrong, so long as you plan ahead and reference the steps in the book, in association with the plan. The plan also has a lot of parts information written on it, which is not shown in the instruction booklet. When assembling the wings, the die-cut balsa shearweb strip, doesn't start until rib W3. Don't ask how I figured this out. Look at the plans - I cut a new strip. It is a good idea to assemble all parts prior to gluing, and the interlocking tabs on this kit allow you to do just that. When satisfied with the fit, then you can safely glue it together.

When assembling the fuselage, begin by holding both sides together and, if necessary, sand them so that you get identical pieces. Ensure you assemble a left and right side, when you glue on the balsa doublers. I suggest paying attention to the wing seat area, and sand it so that it is the same on both sides. Again after you glue on the ply wing saddles. You don't want the wing tilting because of a bad fit in the saddle. Continue with the assembly of the fuselage. Prior to gluing on the top, insert the clear nylon antenna tube in

the holes through the formers. Makes it easier to slide the antenna through when installing the radio gear towards the end. I also found after assembly, that the rudder and elevator tubes flex unacceptably as they are employed, particularly at the servo end. I would suggest that you make up a couple of braces, similar to the part F17, and run the outer tubes through them, where there is a evidence of flexing of the unsupported tube. Solid pushrods are another option.



As for the supplied 10-24 wing bolts, I couldn't find a tap with that thread in any of the hobby shops I tried, nor could I locate additional nylon Great Planes bolts with that thread. I had to use 10-32 tap and bolts, which are readily available. I also found, retrospectively, that the plywood wing bolt plates were a little 'soft' for my liking and didn't take to thread cutting as well as I would have hoped. It may pay to replace it with a spruce or maple block or similar. It is probably o.k. if 10-24 tap is used, but for the fine thread of the nylon wing bolts I had to use, they may pull through. Maybe not, but I would be happier with a more solid block.

On the wings, take some time and care with lining up the TE stock and tip block, to the rib contour. You need to sand the leading edge of the stock to achieve this, and then also the flap and ailerons to match. If you are constructing the polyhedral version, it should be easier. When slotting the W1A ribs for the wing dowels, try and ensure they line up with the locating holes for fuselage former, F13. As mentioned previously, we are looking for a snug fit in the wing saddle. Trial fit the servo covers so that you can have a near perfect fit. Gaps look unsightly and are not very aerodynamically efficient.



## RADIO INSTALLATION

Mini servos fit o.k. in the fuselage, so fasten them to the basswood servo rails and work out the correct lengths for the nylon pushrods. Make sure nothing is binding during operation.

The wing servos need to be micros, or purpose designed wing servos, to fit inside the wings. The mounting blocks are required to be glued to the servo cover plates. An easy job. I used button head screws to attach the covers, as they look neater. Use the same servo brands and models for the wings, as you don't want any great variance in throws or speed.

I will not go into the setups for computer radios, but the control surface throws listed in the instruction booklet, are always a good starting point.

## FLYING



This is always the most important part of a review, and for some reason, always the shortest. I used the throws suggested in the booklet for ailerons, elevator and rudder, as well as programming a couple of functions to aid in flight optimisation. I coupled the rudder with ailerons, to a value of 50% and 25% down elevator at full flap deflection in the

butterfly/crow mode. The starting points for launch camber, elevator/camber coupling and trailing edge camber are all good for initial flights. Fine tuning is a task undertaken over many launches, so don't be afraid to experiment.

For the initial launch, I left everything at neutral and gave the Elite a gentle toss on the high start. It climbed rock steady, needing only rudder control to keep it heading straight. A little dive at the apogee of the launch and a pull of up elevator, saw the model zoom upwards for a respectable height gain, before levelling out. A click of aileron trim and some down elevator trim was all that was required to get it flying straight and level. A couple of figure eight turns and some thermal turns, showed that it benefited from rudder/aileron coupling, which was enabled with the flick of a switch. Loops were easy, and inverted flight required only a little down trim on the elevator. This model is not designed for aerobatics, but should be able to do most of the simple ones which sailplanes can do, with ease. Coming in for a landing, I utilised flaps only, and the Spirit ballooned up, requiring a healthy bit of down elevator. This function can be programmed in for a progressive amount of down elevator, corresponding to the amount of down flap used. Further testing will get a smooth transition for landing, when using flap only. Next launch was carried out with the use of the launch camber switch. The model went up slower, but a lot steeper. Rudder control was positive all the way up. A flick of the switch just prior to zoom, gets the surfaces back to neutral and an impressive height gain was again achieved. Hey this is fun!!

More flying around, and some exploring of bubbles of lift, had the Elite way up high. A slight dive to gain airspeed, and a barrel roll was performed. No problems. Back to level flight and flick the switch for speed in the trailing edge camber mode. The airspeed picks up noticeably without much detectable loss in height. At slow speed, the turns tighten up with each circle, so pay attention that you don't stall and snap into a spin. Further trimming will help. Landing approach coming up, so on finals, a flick of the switch enables crow mode. With flaps down and ailerons up, the Spirit Elite slows down to walking pace, yet control is still there, albeit a lot slower. Wonderful things, these computer radios. When landing in the crow mode, be aware that several things happen to the model's behaviour. This combination creates a lot of washout in the wings and makes tip stalling almost an impossibility. Sixty degrees of down flap creates a large increase in lift, thus pitching the nose down. The up ailerons, (or reflexed) decrease the pitching moment and adds loads of drag, but it is best to also program in some down elevator correction, to aid in setting the model up in a shallow dive. I set crow braking up on the throttle stick, so that I can control the amount of deflection. If brought in automatically by the use of a switch only, it will cause the model to pitch up dramatically and lose airspeed. Elevator control prior to switching will alleviate this, but it takes practice. It is good practice to cancel crow braking, or down flap, immediately before touchdown. This saves servo gears from becoming stripped, due to the flaps dragging in long grass or hitting some object on the ground. The scope for experimentation with settings is a long process. Doing so, will ensure that you get the best possible performance from this sailplane.

The Spirit Elite enables the buyer to gain an introduction into the high performance capabilities of modern gliders, without having to go to the enormous expense of buying a fibreglass/carbon/kevlar moulded model, to do so. It is only new on the market, so I can't

comment on its contest winning potential, but from indications it appears that it will give an excellent account in its class. I will be trialling it in open class competition, as well as 2 metre competition and look forward to some good times with it.

The Great Planes Spirit Elite is distributed by Dawn Trading and available from a hobby shop near you. Enjoy. Quality at an affordable price.

#### LIST OF PHOTOGRAPHS.

1. Build the Spirit Elite over the well designed plan, using plastic or wax paper to protect it from glue.
2. Spirit Elite in 'bare bones' prior to covering
3. Same as above
4. Spirit Elite prior to launch
5. Elite at rest
6. Launching the Spirit Elite on a heavy duty high start
7. Up, up and away.
8. Colour scheme is easy to see against cloud cover
9. Crow configuration, with flaps down and ailerons up, slow the Spirit Elite to a walking pace, and make spot landings a lot easier.