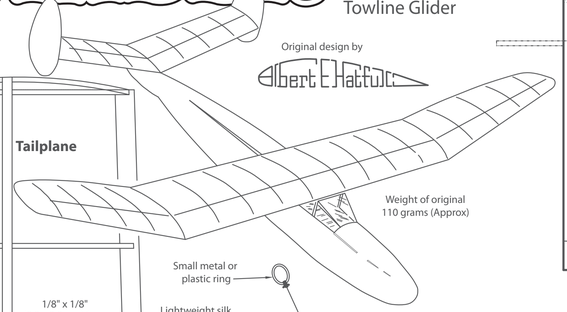
INVADER

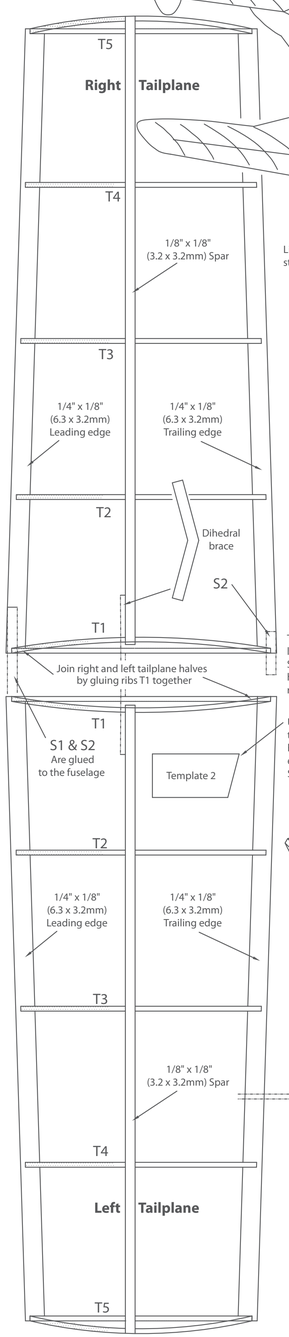
KEILKRAFT

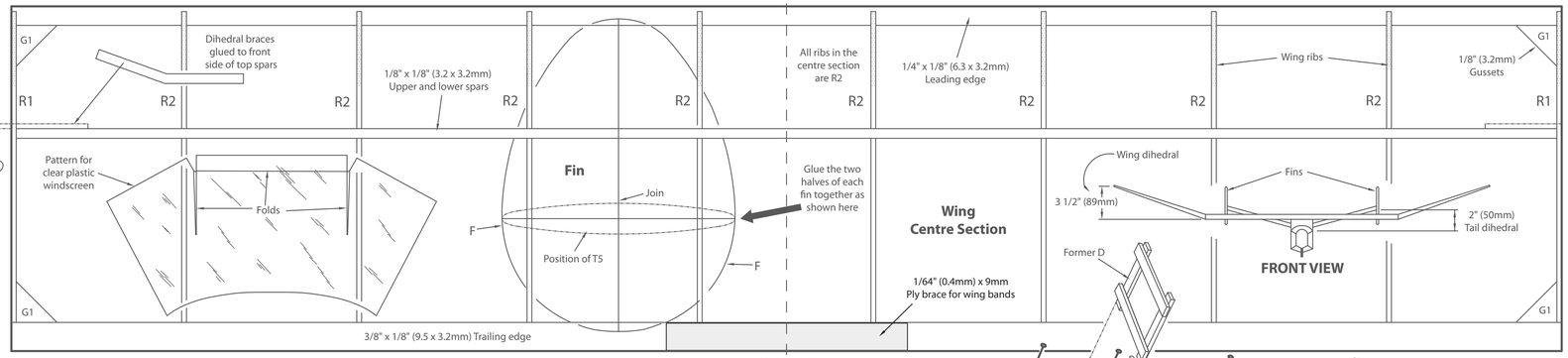
1,016mm (40") Wingspan
Towline Glider

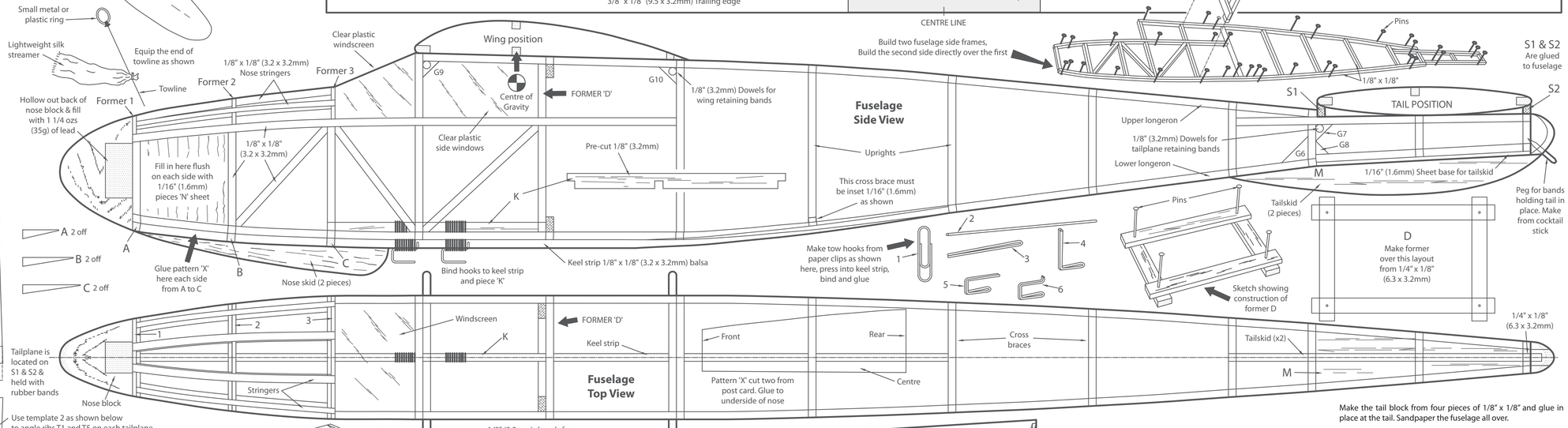
Part No: A-KK1020

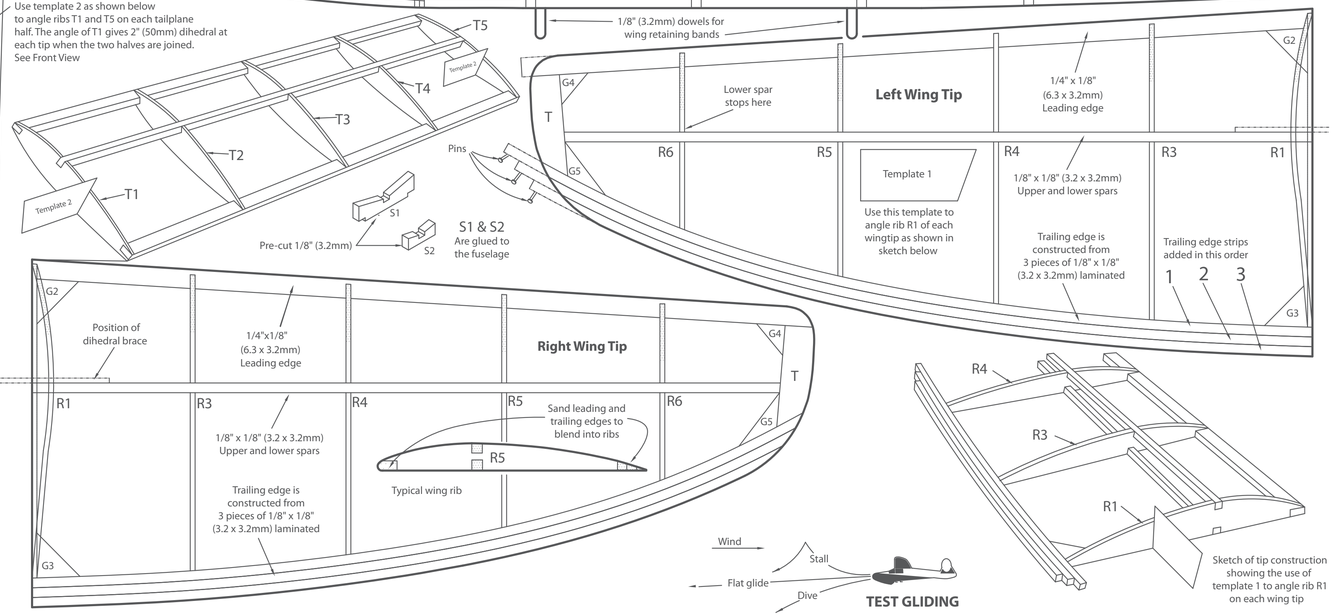
Original design by
Albert E Hattuck











GENERAL TIPS
During the build we suggest covering the plan in a clear plastic film to protect the plan as you build. You will need various hand tools, glues and other materials to complete this kit. These instructions are a brief overview of the major steps involved in building your Invader kit. Please read them through first and study the plan diagrams/notes to guide you through the build process in more detail.

FUSELAGE
Two side frames are required for the fuselage. Build these as shown in the sketch on plan, placing pins on either side of the wood, not through it. When the glue has dried on the first side, cover with cling film and build a second frame directly over it using the same retaining pins where possible. Next construct Former D as shown from 1/4" x 1/8".

Remove both side frames from the plan. Remove Former D from the plan and clear away any surplus glue from the corners. Glue Former D in the position shown between the two sides, apply glue inside the two rear ends and insert a piece of 1/4" x 1/8". Place an elastic band around the fuselage at Former D to hold the sides into the corner notches.

When set, refer to the Top View, cut the Cross Braces to the correct lengths and glue in place. Add sheet piece 'M' at the rear. Glue pieces 'N' in place at the nose, one side each. Cut piece 'K' from 1/4" x 1/8" and glue centrally in position at the bottom of the fuselage. Glue the lower "keel" strip directly over K, and the triangles "A", "B" and "C" on each side of the KEEL.

Add nose formers 1, 2 and 3, then glue the four nose stringers of 1/4" x 1/8" into their notches. Bend up the two hooks from paper clips as shown, then press the spike ends into the Keel strip at the positions indicated, glue and bind with thread. Cut two pieces "X" from postcard or 1/64" balsa to pattern shown, then glue one on each side at the nose over the triangles A-B-C.

Roughly carve the nose block to the shape shown on the plan, then lightly glue to the fuselage and finish with fine sandpaper. Remove the nose block and hollow out the back to receive the lead balance weight (1 1/4 oz / 35g). Form a glue skin over the lead when in place, then glue the nose block to the fuselage again.

Make the tail block from four pieces of 1/8" x 1/8" and glue in place at the tail. Sandpaper the fuselage all over.

Add the windscreen cut to the pattern and the side windows. Glue a match or cocktail stick into the tail block.

WINGS
Pin the Leading Edge, Lower Spar and Trailing Edge over the plan. Apply glue to the front, lower notch and rear end of the ribs R2, then press in place directly over positions shown. Hold upright by placing pins on each side of the ribs until set.

Build the Wing Tips in this order:- Pin down the Leading Edge. Pin down strip 1 (see left wing tip) of the Trailing Edge, placing pins around the inner edge only and at the extreme ends as shown. Apply glue and press strip 2 against the first strip pinning in place as you proceed. Do not add strip 3 yet.

Add the tip piece cut from 3/8" x 1/8". Glue rib 5 between Leading and Trailing Edges. Butt join the lower spar up to R5 then place pins along the lower spar to hold in position. Ribs R4, R3 and R2 may be added, glue rib R1 in place, tilting as shown to obtain dihedral. Next glue the top spar into the notches in the ribs, remove pins from the second trailing edge strip if set and add the third – gluing and pinning as before.

Remove the Centre Section and Tips from the plan, cut the tips to the curve shown and sand the trailing edges to a fine section. Sand smooth all over.

Join the tips to the centre section by applying glue to ribs R1 of the tips then press on to the end with the tips propped up to 3 1/2" (89mm) dihedral as shown in the Front view.

When dry, enlarge the slots in the ribs directly in front of the top spar at the dihedral joint and glue the dihedral braces in position along the top spar. Be generous with glue here.

TAILPLANE
This is constructed in two halves. Pin all the ribs in position over the plan, placing two at the front and two at the rear on each side of each rib. Bend the pins holding ribs T1 and T2 until they are tilted over at an angle which must be checked as shown using the dihedral template 2.

Apply glue to the front and rear notches of the ribs and press the Leading and Trailing Edges into place. Add the top spar. Remove from plan when set and round off the Leading and Trailing Edges. Glue the two halves together at T1 and leave to set with one half resting flat and the opposite tip supported to 3 1/2" (89mm), measure this. When set, enlarge the slot in the ribs directly in front of the spar at the dihedral joint – Glue the Tail Brace into this slot and against the spar. Sand smooth all over.

Glue the parts of the two fins together as shown, sand both sides perfectly smooth and round off the edges.

TISSUE COVERING, DOPING AND ASSEMBLY

FUSELAGE
Cover the sides first. Cut a piece of tissue slightly larger than the actual area to be covered and make a cut out for the side windows. Apply paste around the "outline" of the fuselage then press the tissue in place stretching gently to eliminate wrinkles. Trim round the edge leaving a small margin to paste over the edges. Cover the bottom of the fuselage with one piece of tissue. The top surface will require two pieces (one from the windscreen running forward and one from the top of the windscreen running aft).

WING
Cover the bottom surface of the centre section first. Apply paste to the Leading and Trailing edges and the end ribs of the centre section. Lay the tissue in place on one end rib, stretch gently to the other end and then work down the Leading and Trailing edges removing any wrinkles and making sure that the tissue is evenly taut. Cover the under-surfaces of the tips in a similar way.

Always leave a small margin of tissue to paste over to the opposite surface. Covering the top surface is again very similar. Start with the Centre, using the same procedure as before.

TAILPLANE
Cover the tailplane using four pieces of tissue, start with the under-surface first and proceed as for the wings.

Spray all the tissue covering with water; as the water dries out the tissue will tighten and small wrinkles will disappear.

When the water has completely dried out, apply a coat of clear dope (thinned out with 40% cellulose thinners) over all the covering. While using dope, cover the Nose-skid and Tail-skid and Fins (both sides) by doping the structures then pressing the tissue into place.

With the Fins cover the second side directly after the first to avoid subsequent warping.

Glue S1 and S2 underneath the Tailplane where shown. The Nose-skid, Tail-skid and fins may be glueed in their respective positions when dry. Apply a second thin coat of dope all over.

FLYING
Assemble the model for flying and note how S1 and S2 on the tailplane fit the rear portion of the fuselage.

If the nose weight is correct, the model should balance at the lower spar position on the wing.

Launch the model from shoulder height on a slightly downward path into wind. If it stalls (see sketch on the plan) add small pieces of plasticine to the nose until cured. Cut the nose block off and install this weight inside when correct, re-glue the nose block in place. If the model dives, glue a strip of 1/32" balsa underneath the wing Leading edge where it sits on the fuselage.

When the model is gliding as flat as possible without stalling, towline flights may be attempted.

Starting with about 150 ft of towline equipped as shown on the plan, place the ring on one of the hooks under the fuselage (front hook for rough weather and testing, rear hook for calm days). Have an assistant hold the model with the nose well up ready for towing.

With a little practice it is possible to tow the model right up overhead. When releasing, do not jerk the line but rather allow the tow ring to slip off the tow-hook by slackening the line tension.

If the model veers excessively from left to right while towing examine the wing for warps. These may be removed by carefully twisting in the opposite direction while holding over steam.

Ripmax

Only Suitable for Ages 14+

To complete the model as illustrated you will need to purchase further items such as tools and materials. Skill & patience required.
Choking Hazard – Contains small, keep out of reach of children.