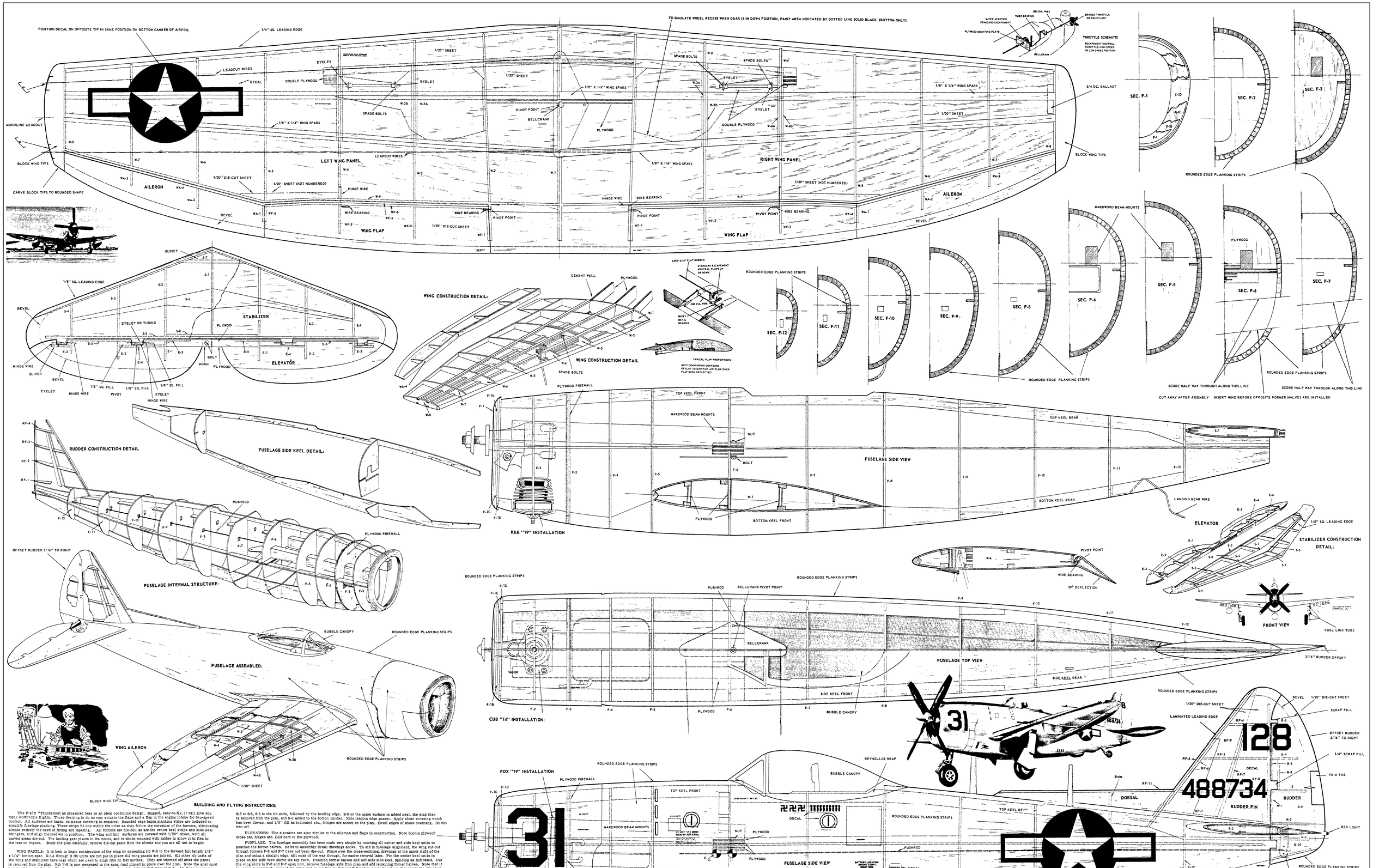

BUILDING AND FLYING INSTRUCTIONS:

The P-47N "Thunderbolt" as presented here is an ideal controline design. Rugged, easy-to-fly, it will give you many worthwhile flights. Those desiring to do so may actuate the flaps and a flap in the engine intake for two-speed control. All surfaces are balsa, no tissue covering is required. Rounded edge balsa planking strips are included to simplify fuselage planking. These strips fit one within the other as they follow the curvature of the formers, eliminating almost entirely the need of fitting and tapering. All formers are die-cut, as are the center keel strips and side keel stringers, and align themselves in position. The wing and tail surfaces are covered with 1/20" sheet, with all curved areas die-cut. The landing gear pivots in its mount, and is shock mounted with rubber to allow it to flex to the rear on impact. Study the plan carefully, remove die-cut parts from the sheets and you are all set to begin:

WING PANELS: It is best to begin construction of the wing by cementing rib W-2 to the forward fall length 1/8" x 1/4" bottom spar. W-1A through D rib units are not put in place till wing panels are joined. All other rib units of the wing and stabilizer have legs which are used to align ribs on flat surface. They are trimmed off after the panel is removed from the plan. Rib W-8 is now cemented to the spar, (and pinned in place over the plan. Note the spar must be raised to meet the rib. Block up accordingly along its length and install rib W-3 through W-7. All three top spars are and the 1/4" sq. leading edge may now be added. The die-cut trailing edge-spar W-9 is now installed. Crack and bend at points necessary, coating crack area with cement skin. A 1/20" sheet reinforcement in die-cut (not printed) is used to strengthen this area. Slot rib W-5 to receive it. Remove panel from plan and construct other panel in like manner.

JOINING WING PANELS: Three die-cut plywood gussets are used to strengthen the center break. These will give the correct dihedral angle (1-1/4" at bottom of W-8 rib.) Coat all end grain with a prime coat of cement to seal the pores. W-1A through W-1D units are next positioned. Remaining bottom spars are added at this time.

GEAR INSTALLATION: The gear is shock mounted. Laminate double layers of plywood (four rectangular pieces with protrusions on each end) and cement between ribs W-3 and W-4. Skin tight between spars. Drill at punch marks for spade bolts required. to hold the gear wire. Pass gear wire through ribs W-4 as indicated at W-4 rib detail at center right of plan. Slip eyelets provided over gear wire, and also the spade bolts. The eyelets allow the gear to pivot freely when the spade bolts are drawn tight against the plywood with nuts provided. Four small ply rectangles are also laminated and cemented in position as shown to form a forward angle stop for the gear. Carve slightly to allow gear to come forward to proper angle. Refer to section W-4 for hook and rubber shock absorber. Do not allow gear to travel too far rearward or it might fracture bottom center-spar.

SHEETING SURFACES: Material is provided for sheeting the wing forward of the 1/8" x 1/4" spars. Strip as needed from the 1/20" sheet, using a straight edge. Note sheet joins at center of spar to strengthen the joint. The material for the aft portion of the wing is die-cut. Remember that if flaps are to be actuated, hinges must be installed before sheeting. Also, to facilitate installation of controline leadouts, the top surface of the wing must be sheeted first. Leadout wires enter wing sheeting at approximately the points indicated and exit at the extreme tip. Note that the bellcrank is mounted in the fuselage. It is suggested that you proceed with fuselage construction to the point where the bellcrank is mounted. With the wing temporarily installed, you can better locate the leadout wires and their passage through the ribs. The leadout wires must parallel the ground line as seen from the front view. As seen from above, leadouts sweep rearward 1-1/2 degrees toward the tip. If you wish to install "Monoline", mount the unit at the same point as you would install a bellcrank, and sweep leadout rearward to position marked by the phantom line at the center of the winglip. Reinforce sheeting underneath with scrap celluloid at point where leadout penetrates sheeting. Wire bearings are embedded in the winglip at leadout exit points. Sand upper surface of wing around leadout area, pass leadout wire through, then plank lower surface of wing in like manner. Trim and sand entire structure.

WING AILERONS: The ailerons are easily assembled. All parts are die-cut. Bevel sheeting edges to line indicated and cement WA-1, WA-2 and WA-3 ribs in place. Leading edge is formed from die-cut WA-4. Sheet upper surface and sand smooth, rounding leading edge as on the flap section. Tack cement in place for field adjustment if necessary. See the flying instructions for correct setting.

WING FLAPS: These are assembled in identical manner to the ailerons, differing only in that the leading edge is a double lamination, and cracked and bent slightly as indicated. Those desiring to actuate the flaps must hinge them as shown, cement wire stops to the wing to hold them in neutral, and add a wire horn for the servo or third line to contact. Refer to flying instructions for further information, and to plan details for suggested operational methods as used on R.C. designs, which face identical problems in flap operation.

STABILIZER: As on the wing ribs, the stabilizer ribs are equipped with alignment legs, later trimmed off. Cement S-8 to S-5, S-5 to the rib ends, followed by the leading edge. S-6 on the upper surface is added next, the slab then is removed from the plan, and S-6 added to the bottom camber. Note leading edge gusset. Apply sheet covering which has been die-cut, and 1/8" fill as indicated etc., Hinges are shown on the plan. Bevel edges of sheet overhang. Do not trim off.

ELEVATORS: The elevators are also similar to the ailerons and flaps in construction. Note double plywood cross-bar. Hinges etc. Bolt horn to the plywood.

FUSELAGE: The fuselage assembly has been made very simple by notching all center and side keel units to position the former halves. Refer to assembly detail drawings above. To aid in fuselage alignment, the wing cut-out through formers F-6 and F-7 have not been die-cut. Place over the cross-sectional drawings at the upper right of the plan and using a straight edge, slit most of the way through, for easier removal later. Pin the center keel units in place on the side view above the top view. Position former halves and left side side keel, splicing as indicated. Cut the wing slots in F-6 and F-7 open now, remove fuselage side from plan and add remaining former halves. Note that it is easier to install the wing if the wing slot is cut free in W-6 and W-7 before cementing these formers to the structure in this case, as the dihedral angle will interfere. Once the wing has been fully sanded etc., it may be permanently cemented in place. Align carefully, and add the bottom portions of F-6 and F-7 at this time. The keel will align the wing at the correct angle. The plywood firewall should also be slipped into position at this time.

Install motor mounts and bellcrank assembly at this time. Refer to cross-section F-6 for bellcrank assembly details. The stabilizer may also be installed at this time, with elevator and horn attached. Here again the keel will align the surfaces at the correct setting. Install pushrod and check for equal up and down elevator movement. This is important! Former F-2 has been partially cut-out for engine installation. After fuselage assembly it may be trimmed as necessary to clear engine used. The area below the mounts, and forward of the firewall is to be made removable for engine servicing. This is cut free bit by bit as the planking is all installed. In this way, the planking holds the correct fuselage curvature, and guarantees alignment. Score each part of the planking as it is put in place so that fully planked a clear cutting line is visible. Breathing holes for cooling the engine should be provided along the bottom, forward of the firewall. Cowl area may be tack-cemented in place, or keyed with wire or dowel and held in place with rubber tension.

The rounded edge planking strips should not be installed until all internal structure and batteries etc. if required are in position. Apply planking starting at the side keel strip, work up and down from there, until the strips meet in wedges at the centerline. Protruding edges will sand off easily, giving you a lightweight beautiful structure which will be stronger than a carved fuselage of similar thickness.

Note the planking is to be recessed along the scale keel line as detailed. Using a thin piece of flexible material for a straight edge, mark off this cowl line and slit 1/16" deep, and trim with model knife or razor.

RUDDER FIN: Cement RF-9 in place as the rudder post. Align carefully. Install RF-1 rib, cemented to fuselage. Laminate the leading edge cor of die-cut parts RF-3 and RF-6. RF-6 penetrates the planking and fits around the keel. Position remaining ribs carefully. Dorsal sheeting is die-cut. It will fit over leading edge RF-3 and butt against RF-6. Add skin indicated and cap top edge, with 1/20" sheet. Sheet the rudder as on the other surfaces.

RUDDER: This is assembled in the same way as the ailerons etc., differing only in that it must be offset to the right 3/16" to hold the model right on the lines, and in that clearance must be cut as necessary for elevator horn motion. Allow no possibility of binding at this crucial control point!

CANOPY and TRIM: The bubble canopy should be carefully trimmed from the celluloid base, and test-fitted. Flair out on sides at the base. Apply cement fillet and reynolds wrap or similar aluminum foil trim. Gear cover doors, optional fuselage lighting trim etc. are now added to the gear. Gear doors are inserted into the wing, penetrating sheeting and cementing to rib W-2 as indicated. Probe for rib position with a pin. Tailwheel door covers, masts etc. are also added. Solder wheel retaining washers on etc. Rounded edge planking strips are used to form the wing fillet. Cement strips as necessary in place, and when dry, carve the fillet to shape. (Refer also to 3 view.) Final sand entire structure.

FINISHING: No tissue covering is required. If you wish to apply it anyway, it may be added, and will make a slightly more durable model. For preparation of wood surfaces, apply several coats of a good grade of fuel-proof sealer, to fill the pores. Sand between each coat until all grain etc. is hidden. Apply several coats of clear fuel-proof dope, paint all of airplane fuel-proof silver, with black anti-glare areas as indicated on the 3 view details. Apply decals as shown. Spray if possible a thin coat of fuel-proofer over them. Use care in brushing. Cut exhaust outlet, and pipe exhaust free of plane with tin can stock.

FLYING: The first flight is best made in calm air. Check your model over thoroughly, for correct center of gravity, free-working controls, tight line connections etc. 1/8" down left aileron, 1/8" up right (outboard) aileron, 3/16" rudder offset to the right is recommended for the first flight. Trim as necessary as tackling trim etc. indicates. Other suggested adjustments include 1 to 2 degrees right thrust, and 3/4 oz. ballast at right wing tip (outboard tip)

Use a prop of medium to medium high pitch. A four bladed prop may be fashioned by notching hubs of two conventional props half way through, and cementing together. We strongly advise however, that such props be used for appearance only, rather than flying, as it is possible to lose a blade.

Select a smooth take-off site, and face model downwind. Check wheel alignment, - model should roll straight and true. Check up and down elevator movement at handle. Run engine wide open at all times for take-off, allowing for leaning out in air by a slightly rich needle valve setting. To avoid over-control on first flight, keep your arm relatively stiff at elbow and wrist, controlling the model by raising and lowering your arm. This gives gentle elevator action. Once you have the feel of the model, wrist action may be employed. Keep model low and level as tanks end nears. Allow the model to glide in at its own angle, - do not try to stretch the glide. As it nears the ground, flair out with gentle up-elevator, increasing up elevator as much as possible without causing the model to balloon upward.

FLAPS and MOTOR CONTROL: Those desiring to actuate the flaps and a motor speed control devise may do so in several ways. A third line is the easiest, in which a tug on the line controls an engine speed control intake flap or other two-speed device. This line is also tied into the flaps, which are held in neutral by a stop. Rubber tension holds the flaps against the neutral stops. As the third line is pulled, the flaps also are lowered. Release of the third line, allows flaps and motor speed control device to return to neutral.

A better, tho more complex method is to run 45 volts (from a hearing aid type battery attached to the flyers waist) out the controlines to a relay. Controlines must be insulated, and if not available at your dealers, they may be made by applying a coat of cold water dope, tire lacquer or other lacquer to the controlines. Both terminals must be insulated. All the connections should be bridged with soft flexible wires. A button on the control handle, signals the relay, which in turn a servo motor in the plane, lowering the flaps, motor speed etc. Model should be test flown before flaps etc. are actuated.

REPUBLIC P-47N "THUNDERBOLT"

For .15 to .29 Engines - 32½" Wingspan

DESIGNED AND DRAWN BY: DON McGOVERN

KIT ENGINEERED BY: BILL EFFINGER

Controlimer

FOR "U-CONTROL" OR "MONOLINE" FLYING

SCALE: 3/4" = 1'

FULL SIZE PLANS

KIT NO: 5-6

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