MATERIAL LIST

NO. REQ.	NAME	SIZE
2	Sheet #1 Die Cut Balsa	3/32"x3"x22"
2	" #2 " " "	3/32"x3"x22"
2	" #3 " " "	3/32"x3"x22"
2	" #4 " " "	1/8"x3"x13-1/2"
1	" #5 " " "	1/8"x3"x22"
1	" #6 " " "	3/16"x3"x15"
1	" #7 " " "	3/16"x3"x13-1/2"
1	" #8 " " "	3/16"x3"x18"
2	" #9 " " "	3/16"x3"x22"
2	" #10 " " "	3/16"x3"x22"
2	" #11 " " "	3/16"x3"x22"
2	" #12 " " "	1/4"x3"x22"
2	" #13 " " "	1/4"x3"x22"
2	" #14 Die Cut Mahogany	1/8"x4-1/2"x17"
1	" #15 " " Plywood	1/8"x6-1/4"x10"
1	" #16 " " "	1/8"x8-1/2"x14-3/4"
1	" #17 " " "	1/4"x6-1/2"x8-1/2"
2	" #18 Die Cut Balsa	3/16"x3"x18"
8	Hard Balsa Strip	1/4"sq.x 36"
5	" " "	1/8"x3/8"x36"
4	" " "	5/16"x5/8"x33"
18	Medium Balsa Strip	1/16"x5/16"x18"
4	" " "	1/16"x1-1/2"x33"
4	" " "	1/16"x1-1/2"x14"
8	Medium Balsa Sheet	1/16"x3"x36"
7	" " "	3/32"x3"x36"
1	" " "	3/16"x3"x18"
2	Mahogany Strip	1/2"x3/4"x2-5/8"
1	" "	1/2"x3/4"x4-3/8"
1	" "	3/8"x2-1/4"x5"
1	" "	3/8"x5/8"x18-3/4"
1	Birch Dowel	1/4"dia.x28"
1	Wing Leading Edge, L.H.	9/16"x as req. x 33"
1	" " " R.H.	8/16"x as req. x 33"
2	Stabilizer Leading Edge	1/2" x as req. x 13-5/8"
1	Fin Leading Edge	1/2" x as req. x 8-7/8"
2	Wing Tips Soft Balsa	7/8"x1-7/16"x7-7/8"
2	Stabilizer Tips Soft Balsa	3/4"x3/4"x5-7/8"
1	Fin Tip Soft Balsa	9/16"x15/16"x5-1/16"
4	"S" Hooks	1/2" dia.Hook x.070Wire(Apr.)
14	Spade Bolts	6-32 Thread
14	Hex Nuts	6-32
5	Eyelets	.089 O.D. x .335 Lngth.
2	Wood Screws	#6 x 1"lngth. Rnd. Hd.
6	" "	#4 x 3/8"lngth.Rnd.Hd.
2	Screw Hooks	7/16"dia.Hook x.078Wire(Apr.)
1	Length Hard Wire	.050 dia. x 12"
1	Length Copper Tube	1/8"O.D. x 3/4" Lngth.
2	Fork Landing Gear	1/8"O.D. x 9-3/4"Piano Wir
1	Main Strut L.H.	1/8"dia. x 8-1/2" " "
1	Main Strut R.H.	1/8"dia. x 8-1/2" " "
1	Sheets Silkspan	24" sq. approx. SGM
1	Cowl	.060 Polystyrene
1	Canopy	.050 Acetate
1	Kit Plan Sheet #1	33" x 44"
1	" " " #2	33" x 44"
1	Wing Fillet, L.H.)	2 x 3 x 10 Soft Balsa
1	" " R.H.)	
1	Pinked Edge Tape	3/4" wide x 22" Lngth.

BUILDING AND FLYING INSTRUCTIONS:

Originally designed and built by North American Aviation along the lines of the famed P-51 Mustang fighter of World War II, the design and manufacturing rights to the Navion were eventually sold to the Ryan Aeronautical Company, builders of this latest version the Super 260. Combining excellent stability and a 170 m.p.h. cruising speed the Navion is one of the most popular four place executive aircraft flying today. This replica of the Navion is also a high performance ship, designed with particular emphasis on ruggedness to withstand the high air loads and hot landings a ship of this size must survive.

Study the plans before beginning construction. Note that all die cut balsa parts are identified by a letter and two dash numbers. The letter indicates where the part is to be used, - F fuselage, W wing, R rudder, S stabilizer and E elevator. The first dash number is the part number and indicates the suggested order of installation. The second dash number indicates on which die cut sheet the part is to be found. For example F-10-7 is used in the fuselage, the tenth part to be installed, and is found in die cut sheet #7. While studying the drawings, remove parts from the die cut sheets and mark with proper numbers. This will greatly speed up construction.

Decide whether the model is to be radio controlled, controline, or free flight. Note the modifications of the structure required for the particular type chosen. If radio control is selected weight is not too critical, but equipment should not be heedlessly loaded aboard as lighter weight means better handling in the air and easier landings. For controline flying a finely finished and well detailed model can be constructed and powered by the larger engines. For free flight, weight should be kept to a minimum and motors of .19 to .23 cu. in. may be used.

FUSELAGE:
Assemble the fuselage as illustrated in the Assembly Detail sketches. The basic fuselage frame of 1/4 sq. balsa provides a light structure upon which the formers may be assembled to obtain the streamlined form of the original ship. Prime all joints with a coat of cement, allow to dry and apply a second coat when installing the part.

Before separating the sides as assembled in Step I, trim the outline flush to obtain identical sides. Then when the sides are drawn together at the rear as in Step II, the fuselage should be symmetrical when the ends are flush. Note that the heavy 1/4 corner planks are cemented in place first and then bevelled with a knife and sandpaper block, or a small model maker's plane to blend with the contours of the bulkheads as indicated in the cross sections. The 3/32 sheet skin laps over the corner planks providing a strong and quickly constructed semi-monocoque fuselage. Moisten the planks slightly on the outside if necessary and hold in place with pins and rubber strands while the cement is drying. When completely covered, shape the fuselage corners to blend with the contours of the formers. Sand carefully to avoid thin spots in the skin.

Glue the plywood firewall to the fuselage nose, preferably with Weldwood glue, using small nails and weights to hold the bulkheads in place while the glue is setting.

WING:
Assemble the wing as illustrated in the Assembly Detail sketches. Both left and right wing panels are assembled on the plan, with the right wing being constructed upside down. The unique "jig rib" system employed automatically aligns the leading and trailing edges and incorporates the correct washout in each wing panel. Block up the wings 5" at each tip and reinforce the center joint with with plywood and balsa gussets. Layout and drill the landing gear attachment bolt holes in the hardwood spar and slide the spar in place after the wing panels have been joined. After the leading edges and center section have been covered with 1/16 sheet balsa sand the leading edge to blend into the contours of the airfoil.

A small trim tab built into the trailing edge of the right wing will prove effective should the model persist in circling in one direction, as well as assisting in keeping the lines taut in controline flying.

Set the wing in place on the fuselage, fill in the gap at the leading edge with scrap balsa and fair in with the lines of the fuselage.

Fit the fillets between the wing and fuselage. Rubbing the surface to be fitted with blue carpenter's chalk will simplify this job by revealing the high spots and consequently where material must be removed. After the block has been fitted carve the fillet to shape and cement to the fuselage only.

STABILIZER:
Assemble the stabilizer directly on the plan, blocking up the leading and trailing edges of the ribs with scrap to keep them level. For free flight or radio control the movable elevators are not necessary. However, if desired, these may be installed to provide a means of trimming the model to correct stalling or diving. Cement a loop of soft iron or copper wire to the elevator and to the stabilizer tip. Bend the wire to set the elevator to the desired position.

Mount the elevator torque rod in metal washer bearings cemented to the sides of the center stabilizer ribs as shown in the Elevator Control Installation sketch. Insert the outboard eyelet bearings, drill a 5/16 diam. hole in inboard rib and slide the elevators onto the torque rod dowel and cement thoroughly.

MOTOR MOUNT:
Assemble the motor mount as illustrated in the Motor Mount Detail sketch. Use Weldwood or similiar resin glue and small nails to assemble parts. Best results are obtained with this type of glue at temperatures of at least 70 deg. F. With this type of motor unit the fuselage is completely sealed from fuel penetration and the unit will also pop out upon striking an obstruction.

COWL:
Trim the excess material from the vacuum formed polystyrene shell by scoring the material as deeply as possible with a single cut. Flexing the plastic will then cause excess stock to break off cleanly. Slide the cowl on the nose and drill through into the cowl attachment blocks for #4 x 3/8 round head screws.

CANOPY:
Build up the canopy frame directly on the fuselage as illustrated in the Canopy Detail sketch.

Drill through the canopy frame and top of fuselage for the locating pins. Trim the excess stock from the formed canopy and fit to the frame. Prime the edges of the balsa outline with several coats of cement. Attach the canopy with model cement, or bond the cement priming and the canopy with acetone.

COVERING AND ASSEMBLY:
Smooth the entire framework to remove all bumps and apply several coats of clear dope. Cover the entire ship including all wood surfaces. Use silk or nylon for maximum durability. Use fuel proof dope throughout. As a finish apply three coats of colored dope, preferably by spraying. Typical Navion finishes are all red or blue with ivory fuselage top and leading edge of fin. Some earlier ships were finished all red, blue or green with tips of surfaces to match the license numbers.

ENGINE INSTALLATION:
For radio control flying any engine from .29 to .35 cu. in. will provide adequate power, with an 11" diam. x 6" pitch propeller. As a free flight model .19 to .23 cu. in. engines will give realistic performance with 10" diam. x 5" pitch propellers. For controline flying use the large engines around .6 cu. in. for best performance.

RADIO INSTALLATION:
The large cabin makes the installation of radio equipment quite simple. The Super Aerotrol equipment illustrated is light in weight and reliable. Check the operation of the control system carefully and eliminate any binding. Note that the neutral position of the rudder may be adjusted by changing the relationship of the arm engaged by the escapement and the arm on which the push rod is hung.

CONTROLINE INSTALLATION:
Mount the bell crank on the hardwood support between the plywood formers as illustrated in the Bellcrank Installation Detail Sketch. Form the ends of the lead in lines carefully and bind with wire, or wind around line itself and solder. If desired the wing and tail surfaces may be cemented solidly in place for controline flying, sacrificing of course the ease with which the ship can be transported.

FLYING:
Lash the wings in place using at least eight strands of 3/16 rubber to keep the wing from shifting. Pull the rubber through the fuselage with a wire hook as shown in Rubber Installation Detail, if internal rubber is used. Check the balance of the model with all equipment in place. If necessary mount heavy spinner on engine or bolt ballast to firewall beneath engine.

Hand gliding a ship of this size requires a bit of practice. Place one hand under the center of the wing, run and thrust forward with the other hand at the rear of the fuselage. Launch the ship level with as hard a push as possible, being careful not to hurl the ship upward into a stall. Adjust rudder to obtain a straight glide, and observe carefully to detect any consistent tendency to drop one wing. Should this occur the small wing tab may be bent up to raise the left wing, or down to raise the right wing. This proceedure is advisable when flying from grass fields where the model must be hand launched. Should a smooth area be available the ship may be allowed to take off from the ground eliminating the launching operation.

In making the first flights use full power and about one minute motor run. Correct any tendency to circle sharply, immediately, and do not hold any signal too long. Until well acquainted with the action of this ship keep all circles gentle, as the air speed will build up quickly due to the clean lines and high wing loading. Observe the response of the ship to left and right signals and adjust either the wing trim tab or the rudder to obtain equal action in both directions. With the installation of a two speed engine actuated through a compound escapement altitude can be controlled, as well as affording a means of cutting the engine should dangerous maneuvers develop. Affording perhaps the smoothest control, especially for a fast ship of this type, is a proportional system allowing the exact amount of control desired to be selected.

Contrary to the usual practice of testing in a dead calm, a little breeze will make hand launching easier, and the model will easily penetrate the wind.

In testing the model for free flight, follow the same general proceedure as outlined above for radio control except reducing the motor run to about 20 seconds and run the motor at somewhat less than full speed. Adjust the ship to fly in wide circles either to the left or right.

Good workmanship coupled with good maintenance of the equipment will assure many exciting flights of this advanced miniature aircraft.

NAVION "SUPER 260"

DESIGNED AND DRAWN BY: HENRY STRUCK
KIT ENGINEERED BY: BILL EFFINGER

SCALE: 1" = 6"
SHEET 2 OF 2
DRAWING NO. 3111

BERKELEY MODELS INC.,
WEST HEMPSTEAD, NEW YORK, U.S.A.