SAILPLANE A.V. 36 - CH. & J. FAUVEL

SUPPLEMANTARY INFORMATION SHEET NO.1 TO AMATEUR BUILDER'S FILE.

In order to remain in contact with the owners of construction files and to help everybody obtain the best possible performance and satisfaction out of their sailplanes, this information sheet will give you details of the latest improvements to the machine and some clarification to help you in your work. You will therefore find in this paper, corrections, additions and a few comments.

As of this date (Feb. 1954) more than 60 files have been sold nearly all over the world. The first glider built out of these files is No. 12 by the shop of the National Center of "La Montagne Noire". This machine made its first flight early in December and has already more than 20 hours flown by about 10 different pilots.

The rudders as shown on all files had been drawn larger than those on the prototype. On glider No. 12 they have proved their worth by a considerable increase of efficiency, improving the manoeuvreability, and the ease to spiral; also, the rapidity of reversing the direction of spiral has been increased as well as the possibility to come out faster of slide-slipping or crabing . All this adds up to very enjoyable handling characteristics.

The prototype No. 01 (F-CAAD) has now 300 hours of flight and more than 300 landings in the most varied conditions. It has been flown by 93 different pilots, among whom were 19 foreign pilots and several women. No mishap has ever arisen, either in tests, soaring, air shows and aerobatics. During trips about 10 hours were logged in double tow (two gliders behind one aircraft). Recently the 2 A.V.36 (No. 01 and No. 12) have been twice towed together by a single airplane. Thus the A.V.36 is the first tailless glider to be able to use double tow.

MODIFICATIONS

A. Cockpit

The canopy shown on the drawings has been largely widened (both shape A and shape B) with respect to the prototype which had been found too narrow.

The flights of No. 12 have shown that the canopy rear fairing drawn for this enlarged type does not give a correct airflow and reduces slightly the gliding ratio; some eddies can be felt on the elevator at low speed. However, this is in no way dangerous but a little less enjoyable.

We will therefore ask the builders not to follow the drawing No. 4 of the file which is replaced by a new drawing (complements). This new drawing corresponds to canopy "B" which is simpler and more economical to build. We favour this canopy because of better visibility and lighter weight in spite of a very slight drag increase.

B. Prefabricated Parts and Hardware

1. Several builders have asked where the following parts can be purchased. Pulleys ADR, PN-50 & PN-80; Flanged Bearing ADR S-6; Control Rod End ADR-CN-6; Metafram Bearings. They are made by: "Les Applications du Roulement" (ADR), 2 rue Breguet, Paris 11, France.

2. A few builders have asked where prefabricated parts could be found, especially mechanical and formed parts. The Establishment WASSMER, 13 rue Etienne Dolet, Paris 20, France, have the official license to build parts and prefab elements for the A.V.36. They are currently building a series of 42 gliders ordered by the "Service de l'Aviation Legere et Sportive". This company are able to furnish any parts or prefab elements as well as prefab kits for the A.V.36 ready to fly. They can also supply the following parts made of fiberglass:

Cockpit cover and canopy; Nose; Wing Tips and various other small parts. It is advisable to buy these at the beginning of the construction in order to ensure smooth adjustment of the fiberglass parts to the wooden structure.

Source of Supplies:

Canada

Falconar Aircraft
Municipal Airport
Edmonton, Alberta

U.S.A.

Check with your local aircraft supplier for standard hardware and materials. Falconar Aircraft can supply special parts, kits, etc.

C. ADVICE Concerning the Amateur Construction File

1. This emphasizes again the fact that the amateur construction file is, as its name implies, for the amateurs. Therefore, it could not be made up of a large number of drawings like an industrial file. This also gives us the advantage of sending it airmail at reasonable cost. It must be used in conjunction with the notice describing the construction which completes the drawings.

2. Please note that all secondary dimensions not given on the drawings have to be scaled from them. For example this applies in the case of the position of the air brake control lever on sheet 4 and of the secondary dimensions not marked on sheet 7.

3. To answer a question which has been asked several times: The stressing of the wing spar and nose skin has been made on the basis of 3 ply plywood which is, therefore, always satisfactory. As stated in the construction notice , the use of the 5 ply is only in view of improving the form of the airfoil, increase its resistance to weather, this at the cost of a more expensive plywood and a slight increase in weight.

D. Stressing of the Glider

Up to file No. 56 and not incorporating the changes introduced on the complement sheet, the load factor of 12 is obtained for a take-off weight of 440 lbs. with a placard speed in calm air of 137 M.P.H. max.

At file No. 57 and up or file 0 to 56, incorporating the mods. of the complement sheet, the load factor of 12 is obtained at a take-off weight of 506 lbs., placard speed remaining at 137 M.P.H. max. This allows a pilot weighing 210 lbs. with parachute and an additional 17.5 lbs. of miscellaneous equipment. The mods from the complement sheet increase the empty weight by just over 2 lbs. They are:

1. Small increase of the spar boom thickness at the center section part which has no leading edge.
2. Center hinge of elevator now 240 m/m instead of 200 m/m.
3. Strip of skin plywood 20 m/m wide on to aft portion of oblique ribs on each side of elevator.
4. Small reinforcing of the fin spar booms.

Please note that without these reinforcing mods the A.V.36 still has a factor of 10 at 510 lb. AUW, thus remaining in the performance category (cloud flying permitted) where the max. load factor is 9. The small modifications bring the sailplane into the aerobatic category with the max. load factor of 12. These reinforcing mods. are not imposed by necessity but only to be largely covered because the A.V.36 is primarily a soaring glider, not aerobatic.

E. Botanical Names of Various Woods Suitable for A/C Construction

In order to avoid confusion it appears necessary to give the latin botanical names of various woods so as to enable the builders outside of France to identify them.

Epicea	- Picea excelsa	Bouleau	- Betula S.P.P.
Spruce	- Picea sitchensis	Hetre	- Fagus sylvatica
Pin d'Oregon	- Pseudotsuga taxifolia	Frene	- Fraxinus excelsior
Peuplier	- Populus S.P.P.	Okoume	- Aucoumea Kiaineama
Grisard	- Populus conescens		

F. Skid Fairing

To answer one question, the skid should be faired on its entire length. Failure to do this would reduce the performances and affect the glider's appearance.

G. Air Brakes

1. The flaps as per files No. 0 to 56 still give a pitching moment, in spite of being further aft than on the prototype. A new position is given on the complement sheet after successful tests. This new position does not give any noticeable pitching moment with the wooden flaps in spite of an increase in span and their braking effect is better.

2. Metallic Flaps - Tests have been carried on A.V.36 No. 12 with metallic flaps with holes and a little larger chord. They have proved to be even better than the wooden type with no reaction and a better braking effect. It will be possible to have them interchangeable with the wooden flaps as shown on the drawing. The WASSMER Company will supply them prefab.

H. Elevator Tab.

The type shown on files up to 56 has not given all the effect expected; a new tab, slightly larger, is shown on the complement sheet. For tab control, it will be noticed that the use of a stiffened type bowden casing will be necessary in order to obtain good control either way. The tube guiding the piano wire is indicated as fiber or hard plastic on the dwg. for light weight as it is always advantageous to have the lightest possible control surface without sacrifice of strength or rigidity.

To answer one question: It is possible to pass the bowden casing through the false spar boom and elevator spar boom just below the skin (instead of passing over it) provided a suitable reinforcing piece is glued on the booms locally. The casing should be forced in the hole and the reinforcing should be of a thickness at least equal to the hole dia. and about 15 cm. long.

I. Elevator and Ailerons

1. Oblique Ribs - The dimensions given on complement sheet No. 10 replace those given previously.

2. Plugging of Control Flaps Hinge Slot.- All hinge slots (ailerons, elevator, tab, rudder) must be with tape bonded on top of the wing with flap fully down or inside the hinge slot for the rudders.

3. Covering of Control Flaps Lower Slots - The dimensions given on dwg. for plywood and rounded strip on the moving parts are minimum dimensions. The best gliding ratio will be achieved when this covering will give as smooth a surface as possible. It will be necessary to leave as much plywood and rounded strip as possible provided the following angles are respected:

Elevator:	14° down	26° up
Ailerons:	14° down	up angle automatically given.

(a) As far as the elevator is concerned, the down angle could be reduced to 12° in order to keep the slot covered for a larger up angle because in flight such a down angle is never used.

(b) Make very sure that the rounded strip does not risk catching the plywood lip thus blocking the control. It does not matter if they rub on each other slightly when a down angle of 10° is exceeded. This angle is rarely exceeded in flight by the ailerons and never by the elevator.

J. Skid Rubbing Strips

On strong ground or on heavy soil where the earth has a tendency to stick to the wood, it is advantageous to fit two 1.00" strips of .083 steel underneath the skid. On good grass, they are not necessary or can be reduced to ½" width. At any rate, it is best to have a skid made of 3 laminations of Hickory.

K. Floor

Its dimension had been forgotten on the first files. Forward of frame 2, it is made of 4 m/m gaboon or birch plywood, but 1/8 birch or 2-1/16 glued together can be used. The extension of the floor aft of frame 2 will be made of 1/16" birch or 1.5 m/m.

L. Access Doors

They are shown at a diameter of 90 m/m which is sufficient. They could be enlarged to 120 m/m, provided of course that a good reinforcing borders the hole. It should be noted however that large doors, while giving better access, weaken the panel in which they are cut, are more difficult to adjust in non-developable surfaces.

M. Control Surfaces End Clearance

The clearance at the end of the elevator and the large side of the ailerons will have to be as small as possible and not give any risk of rubbing or blocking the controls. This clearance will have to be about 2 to 3 m/m after covering and painting. For the elevator, this dimension will be measured near the hinge line and will taper to 4 m/m or 4.5 m/m at the trailing edge.

When finishing, it will be possible to use balsa strips to reduce a gap left too large as a precaution during the construction. The balsa will be fabric covered and painted.

On the right-hand side aileron, this clearance will be locally enlarged to install the blocking plate. Space should be provided for a No. 10 bolt. This will also prevent the blocking plate coming off while travelling on the trailer.

Between the two ½ ailerons, just at the horn, the skin plywood advantageously cut in one piece, is normally split in the horn axis by a 3 m/m slot, then covered with a piece of tape bonded to it. If this were not done there would be theoretically some control friction when using full ailerons. We say theoretically because in practice the stiffness of the A.V.36 is so good that this friction has not occurred in one specific case where the slot had been forgotten.

Please note that the rear portion of wing tip is attached to the aileron and moves with it. A small piece of al. alloy 1/32" thick, cut at the proper shape, fabric covered and painted will be used to cover the hinge slot.

ERRATA OF CONSTRUCTION FILE

Dimension Sheet

Wing Spar at rib N-16 rear face: read 392.4 instead of 292.4
Sheet No. 10 dimension N_1: read 75 m/m instead of 70 m/m on top boom.
: read 40 m/m instead of 35 m/m on bottom boom.

These two changes raise the ultimate load factor to 12 at 510 lb. AUW.

Airbrake flaps N-10 - dimension b3: read 102 instead of 162.

Sheet No. 1

When finishing, cover nose rib No. 2 with fabric to close the instrument and baggage compartment. The last aileron diagonal rib between ribs N28 and N30 can be eliminated provided the plywood borders are kept as shown. For dimensions of elevator and aileron diagonal ribs, see Sheet 10. At ribs N-10, 12 & 14, it is easier when bonding the fabric to the rib to use a few points of stitching in front of the false spar and also in the hollow on top of the wing. Please note again that NO HOLES must be drilled in the spar booms. There shall be no bolts or screws through them.

Sheet No. 3

The false fin spar on the first files has erroneous dimensions but was shown to the correct scale on the dwg. The corrected dimensions are given on Sheet No. 10. Fin Spar - A small boom reinforcing is shown on Sheet No. 10. It gives L.F.12 at 510 lbs. AUW. This reinforcing can be cut to allow for the rudder push rod; this does not affect its effectiveness. The block 80 x 80 m/m x 4 m/m thick behind the push rod axis (Sheet 10) is to be made of birch (no gaboon) two 2 m/m thicknesses could be used. Note that the max. chord of the rudder is 550 m/m. The dimension between the axis of the bell crank and the rudder hinge is 576.3 m/m The 2 axes are parallel.

Sheet No. 4

If the Anemometer "25-11 type Badin 101" is used, the pressure pick-up will be placed as follows:

(a) Badin head No. 20 (with heater) or No.200 (without heater): axis parallel to the local airstream, base fixed flat on the plywood of the nose fuselage, close to the nose top ridge.

(b) Static pick-up type Badin 100, on each side of the fuselage and 240 m/m aft of frame 0 and 225 m/m above the floor. The largest dimension of the base flange being horizontal. Tests have shown that this installation gives a deviation of 0 to 2 M.P.H. in the normal range. In addition the Badin head No.20 could be heated by a battery used for other electric instruments so as to prevent freezing but not defrost. To these static pick-ups, should be connected Altimeter and Variometer.

Seat Belt

Do not forget when making the wing spar to install the block on which the upper belt fitting is attached. This will be done at the same time as the small increase of the upper boom (82.5 m/m) below the upper side of the skin. Mean length for the various belts:

Shoulder straps: 675 m/m (26.6") adjustable ± 150 m/m (± 5.9")
Belt straps: 420 m/m (16.5") adjustable ± 120 m/m (± 4.75")
Leg straps: 250 m/m (10") adjustable ± 100 m/m (± 4.0")

Fuselage diagonals will be made of laminated wood 10 x 20 m/m.

The spar jig can be made in such a way that one element of the bottom be removable together with the sides so that it can be used later without modification when fitting the nose skin (because of the slope of the top of the wing).

Sheet No. 5

In order to ease installation and removal of the nose pylon from the pedal tube, it is preferable to use countersunk screws (AN-509) rather than ex bolts at the top of the fitting on Blkd. 0. If Ctsk. screws are not available, low head bolts could be used. Countersunk screws will be used also for the attachment of the skid front fitting on the skid.

Fabric Fairing of the Skid - Cut a piece of fabric the shape of the skid after lifting the glider to have no deflection of the rubber shocks. A ½" margin will have been left at the lower end of the fabric. This edge will be glued underneath a small wood strip on top of the skid at the edge, then the other edge will be glued on the fuselage side skin.
Note: The fabric could be replaced by pegamoid.

Please note that the dimension between the aft face of the ballast box of the pylon and the forward face of frame 0 is 238 m/m. This was forgotten on the first files.

The pulleys fitting blocks on frame 2 being a bit small are increased according to Dwg. #10. The dimension giving the lateral slope of the pedals (29 m/m) is reduced to 23 m/m in order to avoid rubbing of the turnbuckle against the bulkhead.

The airbrake control handle, which position is to be scaled from dwg. #4 rests on wood blocks glued inside the fuselage, flush with frame #1 and the fuselage diagonal. It is to be held against these by a 24 ST al. alloy strip .064 or .081" thick, held by two screws. The washer spacers will be made of hard rubber to act as buffers. The lower end of the handle will have to be made somewhat narrower than drawn on the first files to avoid hitting the mounting. The forward screw of this mounting will be replaced by a Ctsk. screw and nut.

The 30° stop notch (Sheet 9) is made of 5/32 24ST held by screws on the wood block. To by-pass this notch, it will be necessary to pull the lever toward the centerline of the glider. This notch which was useful with the position of the flaps given on the early drawing is not absolutely necessary with the new position of the flaps (except for some particular manoeuvres). If perforated metallic flaps are used, this notch is practically unnecessary.

The perforated metallic flaps give some drag when closed unless a careful fairing of the hole is made. This can be achieved by gluing small pieces of balsa wood inside the flap box, thus restoring a smooth contour. The fuselage diagonals will be made out of 10 x 20 m/m laminated wood, adjusted to the proper shape and correct thickness on the fuselage side skin. The nose can be made either of aluminum sheet .040" or .048" in two half shells welded together or of fiberglass or can be bought prefab from Wassmer Co.

Sheet No. 6 & 7

See Sheet #10 for correction of an erroneous dimension of the cable release assembly. The radius of the aileron horn from 76 m/m becomes 79 m/m in order to avoid the cable from rubbing on the wing top. On the first files, the mounting of the stick main bearing was shown as being made out of 4 m/m 24ST while it should be made of 6 m/m ($\frac{1}{4}$") 24ST as shown on Sheet 10. This will bring the dimension between aft face of false lower frame and rear mounting to 760 m/m instead of 758 (Sheet 4).

On the first drawings, the blocking screw of the transversal axis of the stick was at the forward end. It is now at the back and it is necessary to weld a thick washer on the stick base to have enough metal for tapping (see Sheet 10).

Sheet No. 10 shows also the block limiting the stick movement. This block will have to be adjusted to allow a movement of the flaps if it is desired to increase the covering of the flap gap as explained earlier in this

Sheet No. 10

Also shows the block limiting the stick movement. This block will have to be adjusted to allow a movement of the flaps of 26° upward and 15° downward (could be reduced to 12° downward if it is desired to increase the covering of the flap gap as explained earlier in this paper). This block also locks the axis blocking screw.

Sheet No. 10 shows also that the bolt attaching the control at the forward end on the flanged ball bearing must have a castel nut, a shaped washer and a split pin. A good bearing surface inside the ring must be ensured.

Sheet 10 gives a correction of the aileron bell crank at the end of stick horizontal tube. This dimension is 99 m/m. It is the dimension of the axis of oscillation to the arm axis, on the arm drawing which is correctly drawn.

The gussets of the elevator horn must be adjusted so that they do not touch the false spar booms for the elevator angles of 26° down and 15° up.

The oscillating pulleys of the flap control have 3 guides of the same type. A clearance of .4 to .7 m/m (.016" to .028") must be left between the edges of the pulleys and the spacers. On Sheet 10 dimensions have been given for the drilling of the oscillating pulley plates. Also for the flap horn drilling. These dimensions were to be scaled from drawing on the previous issue.

On the intermediate elevator bell crank, behind the principal fuselage frame (triangular bell crank), it is advisable to weld a small piece of thin sheet steel with an hexagonal hole to hold the head of the bolt passing through the Oilite bushing. This will avoid tightening too much on the castel nut which must be locked by a split pin. (Too much tightening would bend the fitting and cause friction on the sides of the bushing).

Sheet 10 shows also an element of rib that can be used if it is desired to reduce the free span of the center plywood and facilitate its installation. This is not a requisite.

Sheet No. 8

When installed on its trailer and set at its no lift incidence, as shown in the file, the A.V.36, without nose and nose pylon and rudder folded, measures exactly 93.8" road width. Proper distribution of the load is obtained when the brooch passing through the principal frame shock absorber is on the vertical passing by the trailer wheel axis. Make sure that the wing clamp on rib #20 is set in such a way that the wing spar is on the vertical passing by the axis of the trailer.

A new trailer allowing the carrying of the glider nose down for countries where the permitted max. road width is less than 93.8" is being designed.

Cannes, France,
Feb. 17, 1954.