Spyker V.2 HA Models resin master and prototype

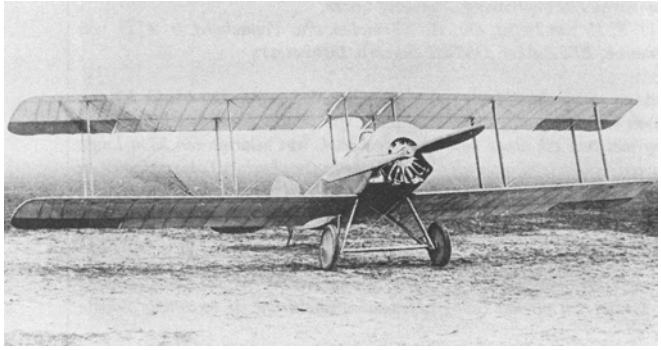
Trainer

Scale 1:72

This building report addresses primarily the development of a master for a resin kit and the building of the first resin prototype.

Spyker (Trompenburg) V.2

In 1917 the Dutch Ministry of War decided to finance the development of a training aircraft for the Dutch army Air Department (LVA). The decision to expand the Air Department considerably and the fact that insufficient aircraft were available to train the required number of pilots were pushing this initiative. The Trompenburg factory in Amsterdam was approached for the design and development of the airplane, and when the first design was presented the Navy Air Service (Marine Luchtvaart Dienst, MLD) and also the Ministry of Colonies joined the project. Between November 1917 and January 1918 58 V.2's, as the aircraft was designated, were ordered for the LVA, 8 copies plus 10 repeat orders in August 1918 for the MLD and two aircraft for the Colonies. The last two went later on also to the MLD.

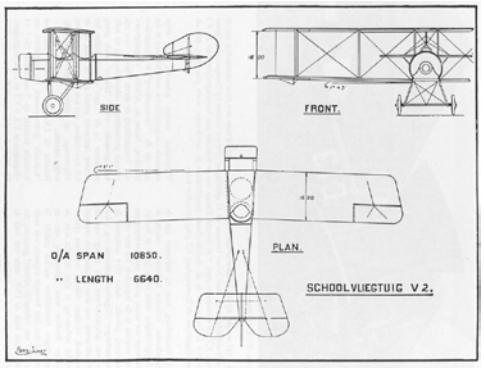


Trompenburg had acquired experience in building Farman biplanes and a small series of Nieuport IX fighters under licence, but the production of the latter suffered seriously from lack of materials and parts, that were not available. Also the repair of interned allied and German airplanes, under which the Sopwith 1 1/2 Strutter, had provided valuable experience to the firm. A first product of their own design was the Trompenburg V.1, a biplane fighter with a Thulin rotary engine of 80 hp that was completed in February 1917. It was quite some work to get it in a flight worthy condition, but in April 1917 it made its first flight. The performance was disappointing, quite a bit worse than that of the comparable Sopwith Pup. No production series followed.

The design of the two seat biplane trainer, now baptised Spyker V.2 (Trompenburg was also the producer of the famous Spyker motor cars), borrowed much of the construction methods of the Sopwith aircraft, especially the 1 1/2 Strutter. The prototype of the V.2 made its first flight on April 9th, 1918 and the performance was satisfactory; only small adaptations were required. Production went on until March 1919. The aircraft was reasonably well appreciated at the LVA, but quite the contrary by the MLD. Pictures show many crashes of aircraft of both services, relatively few, however, with fatalities. The trainer has been used until the end of 1925when it was replaced by the Fokker S.II and the S.IV at the LVA and the Fokker S.III at the MLD.

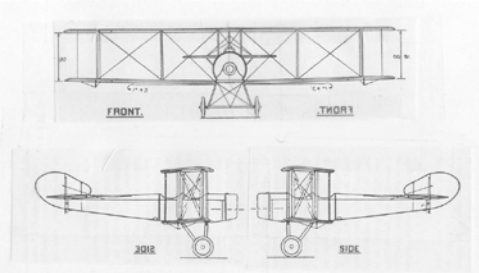
The Spyker V.2 main characteristics are:

	Ref.	*1:72*
Span	10.96 m	152.2 mm
Length	6.77 m	94.0 mm
Height	3.15 m	43.8 mm
Engine	Thulin A, 80 hp	
Crew	2	



Drawings

This piece of history gave me the idea to attempt to build a model based on an existing kit of a Sopwith 1 1/2 Strutter, and eventually to produce a resin for the V.2.

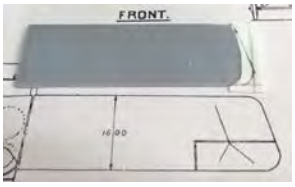


The book of Harm Hazewinkel (ref. 1) on the subject of Trompenburg and Spyker contained a good drawing and useful photographs. The drawing I have scaled to 1/72 and processed until I had a complete front view. I have also received useful photographs and information from Hans Berfelo (ref. 3), Frits Gerdessen (ref. 4) and the Aviodrome Museum (ref. 6).

Consequences for the resin kit

I have bought a cheap Sopwith 1 1/2 Strutter kit of Eastern Express. As I find realistic scratch building of cloth covered wings still very difficult, the first thing I have done is to fit the wings of the kit on the scaled drawing, as I prefer to “borrow”. Both span and chord agreed very well, only the wing tips, the ailerons and the location of the wing struts had to be adapted. The fuselage and tail planes, however, would need quite some modification.

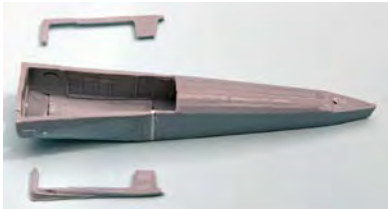
Wings



I have made new wing tips from 0.5 mm thick styrene sheet, have “removed” the contour of the old ailerons by filling it with cyanoacrylate glue and have engraved the new contour according to the drawing with a scriber. Also some engravings at the root of the lower wing had to be removed. I have restored the cloth surface lost in sanding by making small random scratches with a sharp pin. To be sure that the thin wing tips could be well reproduced, I have let cast the wings, which was also a good check whether the other repairs were successful. The wings have passed the test.

Fuselage

Having used the wing of the 1 1/2 Strutter as basis for the V.2, it became attractive to investigate, whether the fuselage could be used too. Fitting the parts on the drawing showed that the length was too great, but that width and height were quite the right dimensions. In the middle of the fuselage 18 mm had to be removed and the width of the aft fuselage had to be increased by 1 mm, decreasing to zero at the tail end. I had also to remove the upper edge of the side walls. To get everything fitting well I used a bit of styrene on some places.



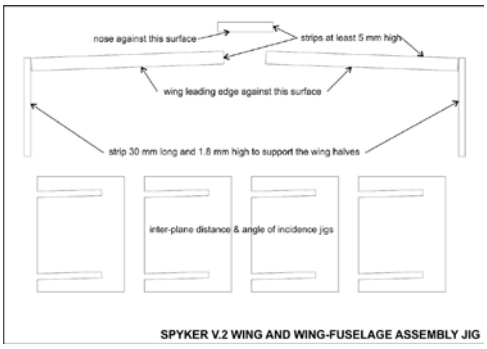
A new upper deck has been made by gluing a copy of the top view on a construction of layers of pieces of sheet of several thicknesses. I have first removed the cockpit openings and have sanded the styrene piece first to the correct width and shape to fit the fuselage. Next I have sanded the part in the same shape as the engine cowling, which gave the piece a good fit to the fuselage.

I have glued some extra material on the middle part of the front of the fuselage to get a better fit with the cowling. Comparing the new top panel with the original part gives a good impression of the length reduction.

Wing assembly jig

Another difference between the wings of the V.2 and the 1 1/2 Strutter are the dihedral and the slight arrow shape, which angles are both zero for the latter. After collecting the necessary dimensions and angles I have drawn a special wing and wing-fuselage assembly jig in CorelDraw.

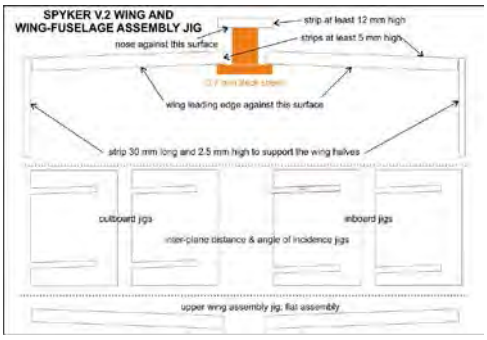
I have also drawn four jigs to align the lower and upper wing relatively to each other and to make the assembly easier. These are only preliminary, as they can only be checked on accuracy during assembly of the prototype model. I might add these jigs to the kit if production by laser cutting is not too expensive. Also the exact position of all adjustment surfaces still had to be checked.



Further examination of drawings and data revealed that the V-shape of both wings was identical, but the dihedral was not: zero for the upper wing, almost two degrees for the lower wing. So the upper wing can be assembled on a flat surface, but not the lower wing. Also drawing and pictures showed that the trailing edge of the lower wing was hanging under the lower surface of the fuselage. This means the fuselage must be lifted from the bottom plate of the jig.

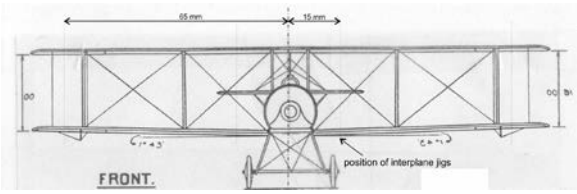
Between the upper wing halves and the centre section some space is left, as can be clearly seen on the picture of the prototype. Apparently first the canopy was first mounted on the fuselage, next the upper and lower half of the wings were assembled and finally attached to the canopy. This is nicely illustrated by one of the pictures I received from Frits Gerdessen.

This led to a new set up for the assembly jig and assembly method. A separate assembly jig is required for the upper wing, shown at the bottom of the drawing. The orange part lifts the fuselage by 0.7 mm and also the wing supports have to be made higher by the same amount.



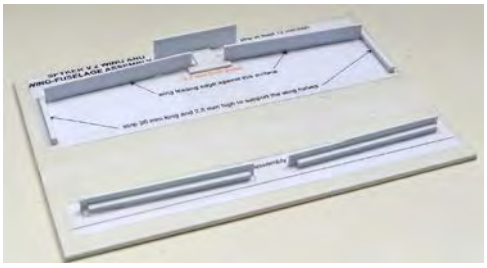
To ease assembly I have drilled 0.75 mm holes in all wings at the place of the forward wing spar, 3 mm from the leading edge, in which brass pins can be mounted. Corresponding holes have been drilled in the wing centre section and in the lower edge of the fuselage side walls. The exact location of which have been determined from the position of wing and fuselage in the jig. The upper wing is assembled flat and the wing halves are kept separated from the centre section by pieces of 0.5 mm thick strip. The lower wing forward edge is lifted by the fuselage lying on the orange part; the trailing edge is resting on the flat rig surface, attached to it with a piece of tape.

The rigs for relative alignment of upper and lower wings have been adjusted for the different dihedral; they must be cut from 1 mm styrene sheet and placed at 15 and 65 mm from the fuselage centreline.



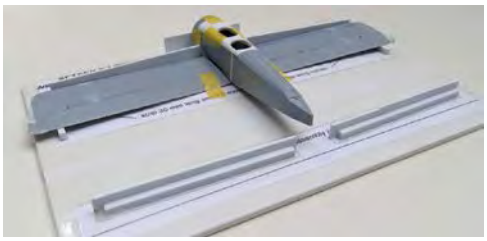
In that position the leave room to mount the inter wing struts. This is the theory; the assembly of the prototype model must verify that.

I have glued the new template with Sellotape on a piece of 2 mm thick styrene sheet and have also covered all areas with it, where glue had to be applied later. I have made the parts for the assembly jigs from styrene sheet of 0.25, 0.5 and 1.0 mm thick and from 2 x 2.5 mm profiles.

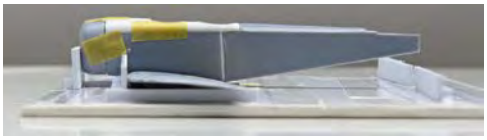


The parts have been temporarily glued on the jig base with Kristal Klear, so they could be removed easily without damage, if the jig design does not work as intended.

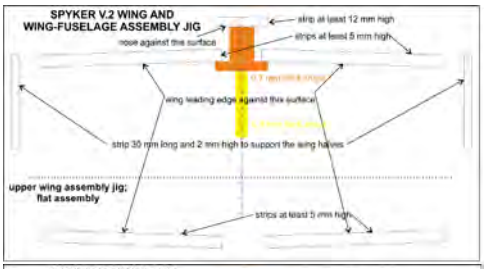
I have dry fitted the upper wing on the jig, which showed that the slope of the wing centre section edges had to be increased, a matter of some tenth of a millimetre.



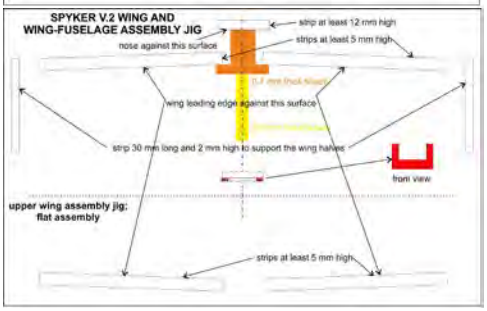
Next I have dry fitted the lower wing on the jig. This gave some problems. The fuselage had to be supported by a piece of 0.7 mm thick plastic up to the wing trailing edge to bring it down under the fuselage lower surface. And, seen from the side, it was not looking good.

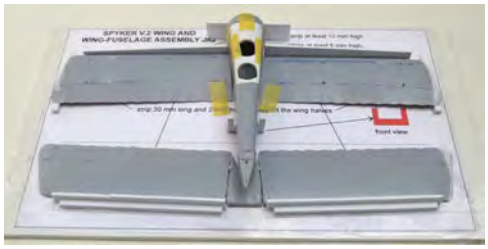


This was caused by a typical reasoning error. If the wing trailing edge is on the template surface at the wing root, the trailing edge at the tip must be 1.8 mm higher and not 1.8 plus 0.7 mm. I have implemented that by turning the support strips 90 degrees along its axis (it is then 2 mm thick) and placing them 6 mm further outward in span direction. At the same time I have also corrected the location of one of the pins in the fuselage.

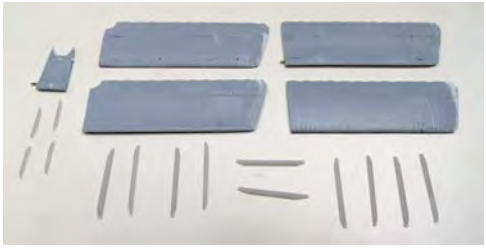


A third dry fit of lower wing and fuselage showed that the position of the fuselage was not well defined, both in the horizontal plane and in height. I have fixed that by producing a small support, placed on the fuselage centreline. Also, the layout has been adapted to allow parallel assembly of upper and lower wing. After a last dry fit the assembly jig has been stored awaiting the arrival of the prototype resin kit.





I have produced the masters for the wing struts from 1.8 mm chord Aeroclub styrene streamline profile. I have made the struts slightly oversized, so the modeller can make them the correct size to fit when building the model. I have drilled superficial 0.3 mm holes in the wings at the places where rigging lines have to be attached. Modellers can choose to use these, or select the more tedious job of drilling holes in the struts. A total number of 92 holes have been drilled plus another 8 for the control cables between the ailerons and 4 slanted holes to lead them into the wing structure. These numbers divided by two are then the total quantity of rigging lines and control cables to be made for the wings alone.



On closer examination I found the struts too wide, so I have produced new ones from Contrail Wing Struts, which have a chord of 1.5 mm and are 0.7 mm thick.

Cockpit

There is little or no information on the cockpit arrangement of the Spyker V.2; for the time being I have assumed that also here Trompenburg has borrowed much from the Sopwith planes. The kit of the 1 1/2 Strutter contains the framework to be mounted on the fuselage bottom and two sets for the rudder bar, seats and control stick. I have shortened the framework to fit in the shortened fuselage and have made the seat mounting positions corresponding to the cockpit openings. The markings on the fuselage top indicate the location of the canopy struts. I have removed the triggers that were casted with the control sticks.

As masters for the seats I will use copies of a white metal Aeroclub Models seat; they have less minute dimensions and are more detailed. I have widened two pieces of styrene tube to 1.4 mm, fitting the stubs on the cockpit floor framework, and

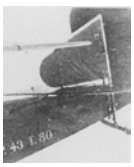
glued them under the seats.

I have received very useful information about the instrumentation from the archive of the Aviodrome Museum. I have drawn the instrument panel as a circle segment. The dials have been taken from photographs, treated with CorelDraw to extract only the part I wanted to use. The switches have been draw, as well as the oil level indicator for the front cockpit. I have printed one copy of 8 mm wide and one of 7 mm, have glued these with diluted Micro Kristal Klear on 0.75 mm thick styrene sheet, and cut them out. The 8 mm wide copy did not pass between the fuselage walls at the second cockpit; hence the 7 mm wide versions will be used. To check the correct fitting I have glued the temporarily under the fuselage top and it passed the fitting test on the forward fuselage.

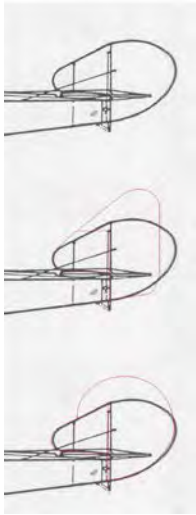
The last item to go in the cockpit is the compass. I have built it from two pieces of rod of different diameter glued on top of each other, mounted on a small square plate. The exact place in the cockpits is unknown; I will determine the most suitable place when building the prototype.

Tail surfaces






I have identified three different configurations of the rudder and fin: shown here as examples at the left the original (small) fin (the C13), next to it two pictures of the enlarged fin (the 56) and the large fin with straight trailing edge of the 43. I have sketched the fins on a copy of the fin in the drawing, scanned the drawing and copied the outline in CorelDraw.

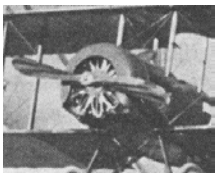


I have glued the drawings on 0.5 mm styrene sheet and cut them out. However, they were very flimsy, so I have repeated the exercise on 0.75 mm sheet. I have drilled the holes for rigging lines and control cables in the parts and have engraved the separation between rudder and fin and elevator and stabilizer. I have also lightly engraved the hard parts, where control horns and cables and rigging lines are attached.

To each fin I have glued two pieces of 0.6 mm styrene rod. Both rods pass through the stabiliser and the forward one fits in a hole in the top of the aft fuselage. The aft rod rests on top of the fuselage and its length is such that there is room left between stabiliser and fin, as can be seen on the pictures of the original (this served to adjust the angle of incidence of the horizontal tail plane). The picture shows the dry fit of the small rudder configuration.


Cowling, engine and propeller

On pictures of the V.2 two different shape of cowling can be seen, one fully closed with open slots on the front surface, which according to Hazewinkel has been rarely used, and one in the typical rotary engine style with an open lower side. Sometimes the central opening was smaller. I have opted for the regular one, shown in the middle.


The cowling in the kit of the 1 1/2 Strutter exposes more of the engine surface. I have glued a ring of 0.5 mm thick styrene in the cowling with the greatest length and have closed the lower side with the part provided in the Eastern Express kit. After finishing the part with sanding and applying putty, I have cut the lower side in the required shape.

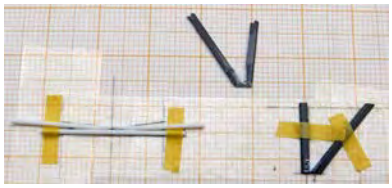
The engine in the kit is a Clerget, which is clearly different from the Tulin A engine of the V.2, which strongly resembles the Le Rhone 9C. Only Small Stuff carries such a model, which is very detailed, so I don't know whether it can be casted well. I have bought a copy to test that, but have also changed the Clerget engine in a "Le Rhone-look-alike" by removing one of the valve rods from the front and making the exhaust ducts from 0.3 mm copper wire. I have deleted the spark plugs and the valve rods (shown at the right in the picture) from the Small Stuff engine; these details are too small to be reproduced, when mounted on the engine. If modellers want such detail, they will have to purchase a Small Stuff engine themselves or to scratch build the detailing.

In my scrap box I have found a resin propeller resembling the propeller of the replica in the Aviodrome Museum quite well. As it is equipped with an original engine and propeller, this will do quite well.

Undercarriage

The diameter of the wheels in the 1 1/2 Strutter in the kit fitted exactly the diameter on the drawing, so they can be used as masters. The tail skid I have adapted somewhat to fit the model.

I have measured the dimensions of the V-struts and the axle from the three-view drawing, have calculated their length and have drawn them on graph paper. The V-struts have been built up from the same 1.5 mm chard streamline profile as the wing struts, reinforced at the bottom with a piece of 0.75 mm sheet material. I have made the axle from pieces of 0.8 mm plastic rod. I have covered the drawing with glossy Sellotape and built the parts up over it. At the bottom of the V-struts a hole of 0.9 mm has been drilled to accommodate the axle. The tail skid is a shortened version of the part originally contained in the 1 1/2 Strutter kit.

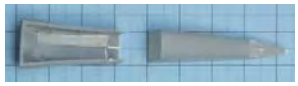


Other parts

The last parts to be made were the different instruments located on the canopy and wing struts, again based on information from the Aviodrome. One of them is an anemometer to measure the air speed, mounted on the inboard starboard forward wing strut. The other ones are clock like instruments mounted on the forward canopy struts, of which the function is not clear.

These last ones I have simply modelled by circular punched discs of 1 mm thick. The anemometer I have split in two parts. The rotor has been made from pieces of strip and slices of tube, the body from pieces of tube, a piece of strip and the dial again from a circular punched disc of 1 mm thick. The anemometer is rather a bit too large to be on the correct scale; smaller is difficult to model and probably even impossible to cast. I will decide later whether it will be included in the kit or not.

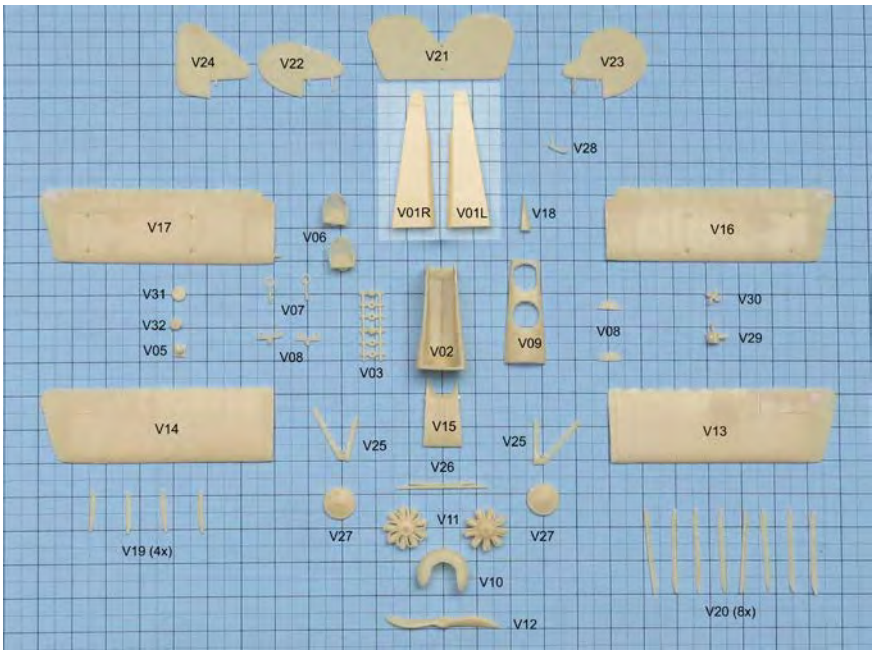
The last preparation of the parts was to separate forward and aft fuselage and to fill the cavity of the aft fuselage. This has been done to facilitate the casting process. The separation plane of the aft fuselage has been covered by pieces of 0.25 mm styrene strip to compensate for the material lost in cutting.



Overview of parts of the kits

ID	part	number
V01L	aft fuselage, left	1
V01R	aft fuselage, right	1
V02	forward fuselage	1
V03	cockpit bottom frame	1
V04	rudder bar	2
V05	compas	1
V06	seat	2
V07	control column	2
V08	instrument panel	2
V09	fuselage top	1
V10	cowling	1
V11	engine	2
V12	propeller	1
V13	port upper wing	1
V14	starboard upper wing	1
V15	upper wing centre section	1
V16	port lower wing	1
V17	starboard lower wing	1
V18	streamline headrest	1
V19	cabane struts	4
V20	wing struts	8
V21	horizontal tail plane	1
V22	vertical tail plane, small	1
V23	vertical tail plane, large	1
V24	vertical tail plane, straight	1
V25	landing gear V-struts	2
V26	landing gear axle	1
V27	landing gear wheels	2
V28	tail skid	1
V29	anemometer body	1
V30	anemometer rotor	1
V31	instrument on right cabane strut	1
V32	instrument on left cabane strut	1
V33	inboard wing alignment jig	2
V34	outboard wing alignment jig	2

The figure at the left shows the inventory of all parts[1] which are included in the kit except the two windscreens, which the modeller will have to cut from a piece of transparent plastic and the wing alignment jigs for which a piece of 1 mm thick styrene sheet will be provided in the kit. Also a piece of 0.75 mm diameter brass rod will be included to produce the pins to attach the wing halves to the fuselage and the wing centre section. And a piece of .5 mm brass rod to replace the resin pins of the fin, if required. In total the kit will include 48 resin parts. A picture of all parts is shown below.



Decals and painting scheme

I have made an overview of the configurations, registrations, paint scheme and other characteristics visible on the photographs and in my reference books. I have also found some examples of the curly LVA registration numbers and the more “disciplined” MLD registrations. I have scanned them and imported them in CorelDraw and have processed them until usable characters and numbers resulted. Also the Spyker logo has been treated that way, although I think that the inner circle as reproduced on the aircraft was empty.

The number of different configurations is limited. At the LVA three different rudders have been used, a small and a large “Sopwith” rudder and one with a more rectangular form. Consequences for the kit go no further than producing two or three vertical tail planes.

LVA aircraft have orange or red-white-blue-orange roundels on the wings, an orange, red-white-blue-orange roundel or no roundel on the fuselage side, a small registration with registration number, aircraft, and engine type behind the lower wing trailing edge, a large registration on the fuselage side combined with the small registration under the tail plane, an orange or a red-white-blue rudder. This is quite confusing, caused by a triple change of rules in some five years. Some aircraft had hard point indications on the aft fuselage.

Again, the MLD was more disciplined: A large registration of a C followed by a dash and two numbers, a red-white-blue-orange roundels or no roundel on the fuselage, no small registrations, orange or red-white-blue-orange roundels on the wings and an orange or a red-white-blue rudder. All had hard point indications on the aft fuselage for lifting the plane and a small rudder.

The Spyker logo was present on the orange rudder of all aircraft of LVA and MLD. It was deleted in the aircraft with a red-white-blue rudder.

The painting scheme was simpler. The prototype was finishes in clear dope, except for the forward fuselage, which was probably painted khaki, and carried no markings and registrations at all.

The LVA aircraft had a khaki fuselage, upper side of wing and tail surfaces khaki, lower surface of wing and tail planes clear dope, except the wing centre section, which was khaki. The MLD aircraft also had a khaki fuselage, but wing and tail planes were clear doped.

Based on the pictures, shown in the appendix, I have made, in addition to the prototype, the following selection for the versions to be included in the kit:

LVA 33 Red-white-blue-orange roundel on the fuselage after the large white registration, small white registration under the tail, red-white-blue large or small rudder, red-white-blue-orange roundels on top of the upper wing and under the lower wing.

LVA 43 Large white registration on the fuselage, small white registration under the tail, orange large or small rudder with white Spyker logo, orange roundels on top of the upper wing and under the lower wing.

LVA 56 Large white registration on the fuselage, small white registration under the tail, orange large rudder without Spyker logo, orange roundels on top of the upper wing and under the lower wing.

LVA 68 Small white registration behind the trailing edge of the lower wing, orange roundel on the fuselage, small orange rudder with white Spyker logo, white indications for lifting points, orange roundels on top of the upper wing and under the lower wing.

LVA 72 Small white registration behind the trailing edge of the lower wing, small orange rudder with white Spyker logo, white indications for lifting points, orange roundels on top of the upper wing and under the lower wing.

MLD C13 Large white registration on the fuselage, small orange rudder with white Spyker logo, white indications for lifting points, orange roundels on top of the upper wing and under the lower wing.

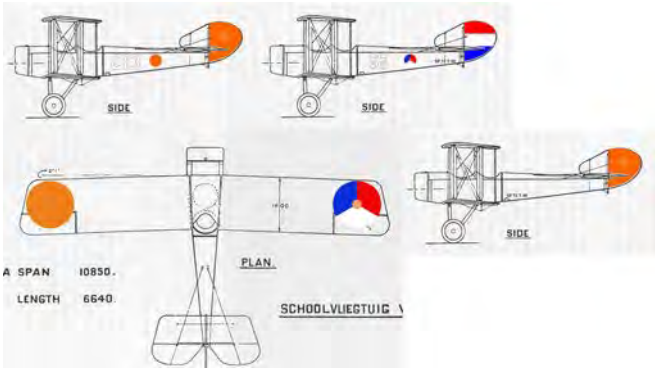
MLD C13 Large white registration before red-white-blue-orange roundel on the fuselage, red-white-blue small rudder, red-white-blue-orange roundels on top of the upper wing and under the lower wing.

MLD C21 Large white registration on the fuselage, small orange rudder with white Spyker logo, orange roundels on top of the upper wing and under the lower wing.

The MLD aircraft also had the registration marked in white on the wheel hubs.

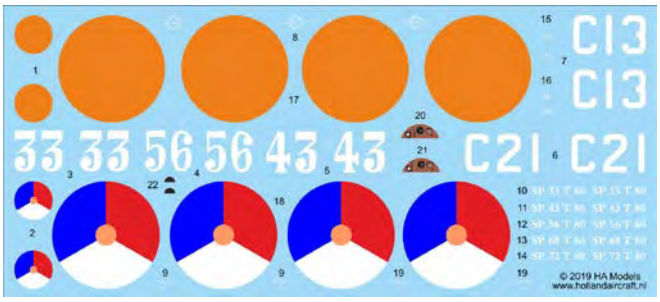
The minimum set of decals should contain:

- Four large and two small orange roundels,
- Four large and two small red-white-blue-orange roundels,
- Two times two hard point markings,
- Two white Spyker logos,
- Two large white LVA registrations,
- Two small white LVA registrations,
- Two large MLD registrations,
- Two small MLD registrations.



As extras covering all identified variants:

- Two time two large white LVA registrations,
- Four times two small white LVA registrations.



As the difference in cost between the minimum and the maximum set is marginal, I have decided to go for the maximum set, the design of which is shown at the left. The size of the decals has been taken from the photographs and checked on the masters. An impres-

sion of the expected result for the different variants is shown in the picture above.

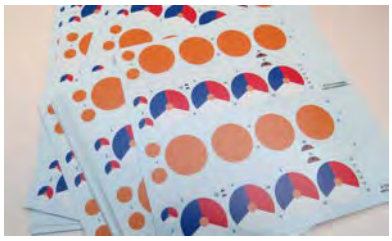
Later I discovered on the pictures of the MLD Spyker V.2 replica also registrations on the wheel hubs. Careful examination of the photographs of original V.2's revealed they were also present on the MLD aircraft, but not on the LVA aircraft. So I have added two tiny C13's and C21's to the sheet. I have numbered the decals for easy reference in the building instructions. I have also included the two instrument panels and the two step holes to climb on the wing and into the cockpits. The picture shows the decal sheet after optimization for printing by Arctic Decals.

Resin casting limitations

Only one casting limitation has been identified[2]. A bar had to be attached to the top of three cylinders of both versions of the engine to allow air bubble free casting, while maintaining the level of detail. This will not be a problem, as these cylinders can be covered by the cowling.

Printed decals and casted parts

Almost at the same time the first three set of casted parts and the full set of decal sheets arrived. As usual the decal set by Arctic Decals was of excellent quality. The casted parts showed more air bubbles than usual, mainly at the very thin wing tips and trailing edges. The engines, which were thought to be difficult to cast, were very well reproduced, and the damage after removal of the sprues was hardly visible, so it is not necessary to hide it in the cowling.



The propeller in one of the sets was missing a tip; next castings will be checked on this defect.

A major defect had occurred in casting the aft fuselage V01. I had filled the aft fuselage with plaster to make the casting easier, as making a mould and casts of a part with such a narrow, deep cavity with thin walls is generally causing trouble, as happened with masters and parts of the my Koolhoven F.K.49. Apparently not air had been driven out in filling the master. This caused the sides and top of the master to buckle when under vacuum and created also a magnificent air bubble in the tail point. For me it was clear that such a defect that would be perfectly reproduced in each kit was unacceptable.

So I purchased in a hurry a second Eastern Express kit of the Sopwith 1 1/2 Strutter, cut the fuselage halves to the required length for the aft part of the Spyker, adjusted the width to match the forward part and shipped these to the casting enterprise to make a new mould and new parts V01L and V01R.

The new castings arrived within two weeks and were as expected.

Building the pre-production kit

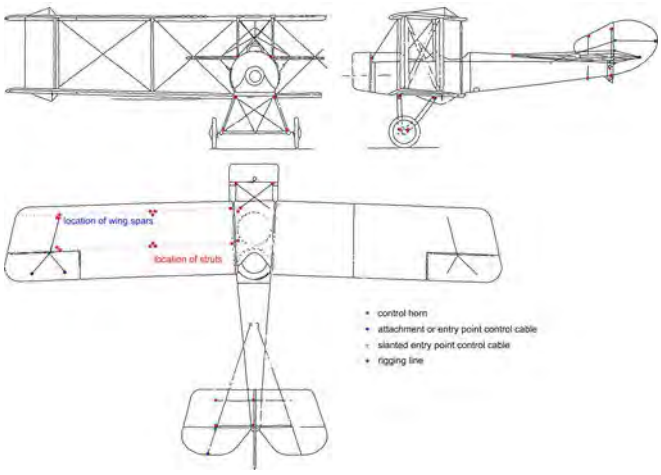
Preparation

I have first prepared the wings for assembly. The 0.75 mm holes in the centre section of the upper wing and in the lower part of the forward fuselage have been opened up. The resin stud, being too weak for a strong connection, has been removed from the each wing root, 0.75 mm holes have been drilled in their place and 4 mm long pieces of brass rod have been glued in them.

When cleaning the upper wing centre section I accidentally removed one of the casted studs, meant to ensure the gap between centre section and outer wings. I have repaired this by gluing a piece of 0.25 x 0.4 mm strip instead.

The superficial holes in the lower side of the centre section, where the canopy struts will be located, did not line up well with those in the forward fuselage top panel, so I have drilled new holes in front of the old forward ones.

I have "refreshed" the 0.3 mm holes for rigging lines and control cables in wings, tail planes and fuselage, but in doing so I noticed some were missing or not in the right place. In particular I could not reconstruct the routing of aileron and elevator control cables, as these had not been drawn in the drawing in ref. 1. So I have again examined drawing and pictures and have arrived at a best guess routing. When I asked Frits Gerdessen to confirm my guess, he sent me a scan of the original MLD drawing on which he has based the drawing in ref. 1. I have used that to finalized the routing and have drawn a new scheme, indication all attachment and entry points of the rigging lines and the control cables.



The MLD drawing (and on closer inspection also a number of photographs) showed also that there were crosswise rigging lines running from the top of the forward canopy struts to the top of the fuselage behind the engine. The complete scheme and the corrected scale drawing will be included in the kit.

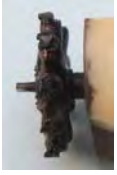
So now I could complete the full set of 0.3 mm holes in wings, tail planes and fuselage. When that was done, I have separated the control surfaces from wing and tail planes. Although I will build the LVA 43 version with the large rudder, I have separated all rudders from the fin to check whether that was possible without problems.

I have mounted the control horns, made from pieces of 0.5 mm styrene rod, to ailerons, elevator halves and the rudder and have made the last remove the last irregularities.

Engine

I have selected the casting of the Small Stuff Tulin A engine to be used on the model. This one is slightly more detailed than the casting of the modified Clerget engine, although that copy is also quite good. I have drilled a 0.7 mm hole in the back of the engine and have glued a piece of 0.7 mm styrene in it to serve as engine shaft. To mount the engine freely rotating I have glued a slice of 2.4 x 1.0 mm tube around the shaft, just thick enough to let the propeller rotate freely before the cowling. During the process I have checked this regularly.

I have painted the engine black and have dry brushed it with gun metal. The inlet ducts I have painted copper.



I have drilled a hole of 0.8 mm in a piece of 2 mm rod to retain the engine to the fuselage, but to leave it freely rotating. I have passed the engine shaft through the hole in the firewall and glued the ring to the shaft. As the inner surface of the fire wall was not flat and parallel to the outer surface, the construction is slightly wiggly.

Fuselage and cockpit

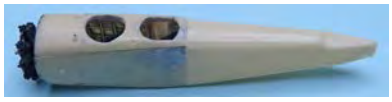
The two halves of the aft fuselage have been glued together and the assembly has been glued to the forward fuselage. I have taken care to align the side

walls well.

Next I have assembled the cockpit bottom frame and the control stick and rudder bars.

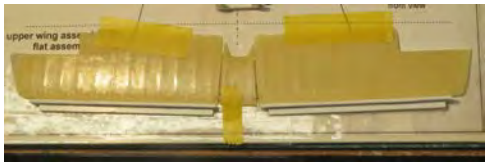
On the picture of the wrecked MLD V.2 C20 it showed that the sides of the seats were perforated, so I have glued a number of holes in them. After painting they have been glued to the cockpit bottom frame.

The top panel of the cockpit has been painted, and the instrument panel decals have been applied. I have completed the cockpit decoration with a pair of PE seat belts.



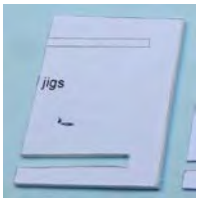
After installing the engine I have glued the cockpit top panel in place. Finally I have glued the cowling to the firewall. After finishing the joints the fuselage is ready for assembly with the wing.

Wing assembly

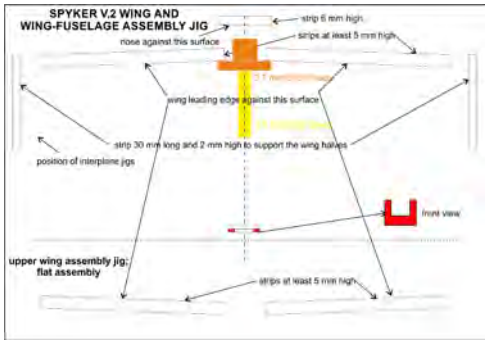


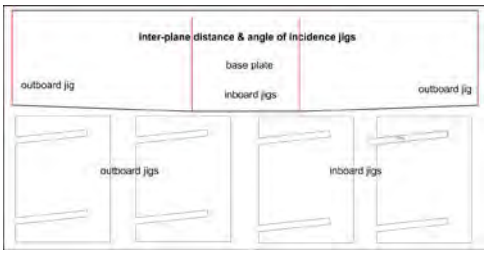
The upper wing has been assembled in the wing assembly jig, securing the joints between wing halves and wing centre section with an extra drop of glue. When the glue was dry, I have removed the wing from the jig. The wing still had to be handled with care. I have applied a layer of primer and have finished the lower surface with Humbrol 148. After the paint job all holes for the rigging lines have been opened up again.

The lower wing has been glued to the fuselage on the fuselage-wing assembly jig. While the glue was drying, I have cut one of the inter-wing jigs from 1 mm styrene sheet to check the alignment of wing and fuselage. When fitted to the wing the vertical edge of the jig should be parallel to the joint between cowling and fuselage. This was absolutely not the case; the angle of incidence of the wing was far too large. To measure this angle I have made a series of inter-wing jigs from carton, increasing the angle with steps of 2 degrees. The angle appeared to be ten degrees, far too large. The cause appeared to be that the lower cylinders of the engine were resting on the jig, forcing the forward part of the fuselage and the wing attachment points upwards, increasing the wing incidence angle.



I have modified the assembly jig by removing the forward part of the orange shape and have also moved the U shaped part, supporting the fuselage, further backwards. The wings have been removed from the fuselage, which thanks to the cyanoacrylate glue could be done without damage, and the wings have been assembled again on the modified jig. The resulting wing incidence angle was now six degrees, an acceptable compromise.

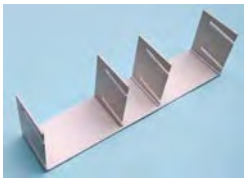




The drawing of interplane distance jigs has been modified accordingly and a base to align these relative to each other has also been drawn.

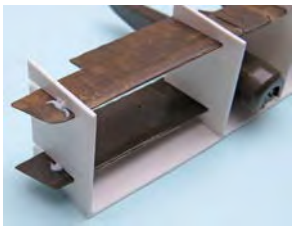
I have reassembled the lower wings using the modified wing-fuselage assembly jig and have also made the cockpit edge padding from 0.5 mm soldering wire, which is easy to form, first around the handle of a brush to the right diameter and bit by bit following the fuselage contour, fixing it with cyanoacrylate glue.

At this face I have also measured the place of the attachment points of the undercarriage legs. I have made superficial holes at those locations, where the lags must be attached.



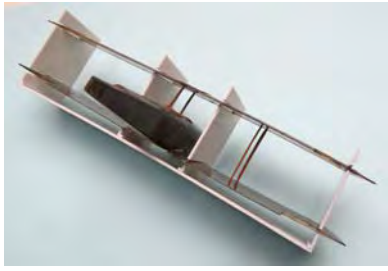
The inter-plane distance jig have been cut out and have been glued them to the baseplate, reinforcing the joints with bits of 1 x 1 mm styrene strip. I have dry fitted the upper wing and the lower wing-fuselage assembly, adjusting the width of the slits until they fitted smoothly, which is essential not to damage the paint of the wings later.

I have painted stabilizer, fin, rudder, elevator halves ailerons, top side of lower wing, under side of upper wing and fuselage and given them a coat of gloss varnish.

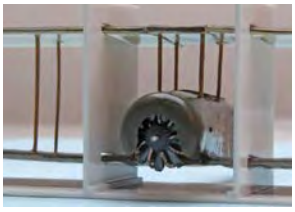


Next I have mounted the wing-fuselage assembly and the upper wing in the assembly jig, aligning them well. I have fixed the wings in the jig with a drop of Microscale Kristal Klear to prevent movement, when mounting the canopy and wing struts.

Strut mounting



I have first fitted a pair of canopy struts and a pair of inboard wing struts. One by one the struts have been made to fit by cutting off a piece of their length with steps of tenths of a millimetre, until they snapped just in the superficial holes without bending. The Kristal Klear allowed still moving the wing a bit, until the struts were well vertical. When this worked well, I have fitted the two remaining canopy struts and have glued all struts by applying a small drop of cyanoacrylate glue with a piece of thin metal wire, avoiding as much as possible the 0.3 mm hole for the rigging wires.



The inter-wing struts have been fitted the same way. I have very carefully adjusted the length, because even a small excess length made the struts buckle.

When all struts had been glued and the glue had set, I have removed the drops of Kristal Klear fixing the wings to the jig with a pair of tweezers and have removed the model from the jig, softly pushing it backwards, each wing a bit at the time.

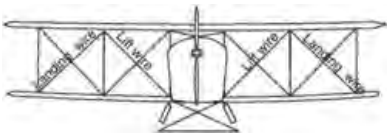
Rigging

After re-opening all 0.3 holes in the wings I have started the rigging with the eight rigging wires between fuselage and wing centre section. The ends of 0.06 mm black painted fishing line have been inserted from the top in the holes in the wing in the holes in the top of the fuselage, starting with the crossed wires between the starboard struts and the port struts and ending up with the wires between the forward struts and the two to the top of the cowling. I have fixed each wire in its hole in the fuselage by applying a drop of thin cyanoacrylate glue with a piece of metal wire.

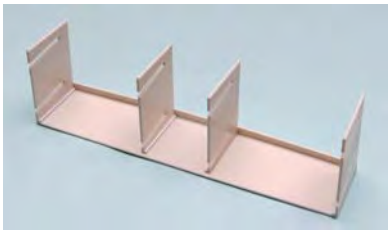
Next I have tensioned the wires with a piece of tape and applied a drop of glue on each of the holes in the top wing. When the glue had dried, I have removed the excess fishing line and glue from the wing top surface with a new, sharp scalpel. I have tensioned the two wires running to the cowling by heating them carefully.

The crossed wires between the wing struts have been mounted, working symmetrically from the inboard to the outboard struts. It became then very

clear that something was wrong with the wing dihedral; apparently the lower wing dihedral was too small and had forced the tips of the upper wing downwards. In hind view I could have noticed this already when fitting the lower wing-fuselage assembly in the jig, as I had to bend the lower wing tips upwards to make them pass in the jig. Also the jig bent slightly upwards due to the force exerted by the wing tips on the jig.



I have tried to correct this error by applying the landing wires in the inboard wing bay and heating them. This was a failure, the fishing line snapped before it could apply enough force to bend the lower wing upwards.



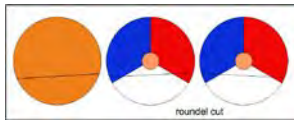
I have decided to leave this as is and have continued applying the remaining wires between the wing struts. In the instruction sheet a number of instructions have been added to ensure a timely and sufficient check on the lower wing dihedral. I have also modified the inter plane & angle of incidence jig to prevent baseplate bending by gluing a strip along the forward edge.

I have applied the remaining rigging wires, again working symmetrically from inboard to outboard. When all wires had been applied and the glue had set, I have removed the excess glue with a sharp, new scalpel blade and have sanded the gluing spots with fine grade sandpaper. The top side of the upper wing and the underside of the lower wing were then ready for painting.

I still had to mount the windshields, made from transparent plastic of 3.5 x 3 mm and 3.5 x 2.5 mm respectively. It was not a good idea to do that in this phase; attempting to place those damages the two drag wires running from the canopy to the engine cowling and one of the cross wires between the inboard struts, which were hardly repairable. In fact, the mounting of the windshields should preferably be done before any rigging is present. I have glued the windshields with a bit of Kristal Klear in front of each of the cockpit openings, the largest at the front cockpit.

Decals

The roundels on the wing cover the almost complete separation line between wing and aileron. So for deflected ailerons the decals have to be cut before application. To make that easier I have drawn a template to do so. Due to the slight V-shape of the wings the cut in the red-white-blue-orange roundel is different for the port and the starboard wing. The template has been reproduced on transparent sheet to make the cutting process easier.



I have cut out the template for the orange roundels and have separated the wing and the aileron part. I have first tried to cut a roundel with a scalpel along the template, but that gave a rather ragged cutting edge. So for the next ones I have marked the cutting line on the decal paper next to the image and have made the cut with a pair of scissors. The other decals I have cut out as close to the printed image as possible.

I have applied the decals on the wings and the fuselage, using ample water and Microscale Set. When using too little fluid the decals set immediately and cannot be moved any more. When I wanted to mount the matching decals on the ailerons, they showed a mismatch with those on the wings. Apparently the cuts were not exactly on the same place, and a mismatch shows very much due to the slope of the roundel at the place of separation. With trial and error I found the matching pairs, but it would have been easier to mark each pair on

the back of the decals.

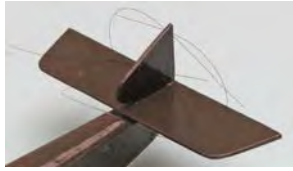
A second problem originated from the fact that I had mounted the aileron control horns before painting and decal application. Each decal had to be cut in at the place of the control horn, and again on different places due to building tolerances.

When all decals had been applied I have given the ones on wing and ailerons a good coat of Microscale Sol, hoping that then the place of the control cable attachment and routing points would show up. Finally I have sealed all decals with a coat of Microscale gloss varnish to protect them in handling and control cable application.

Tail surfaces

I have painted the tail surfaces and have assembled the horizontal and vertical tail plane, leaving a gap between the lower side of the fin and the stabilizer. This is the space needed for trimming the horizontal tail plane. Pictures show also a gap at the trailing edge. Initially I did not want to reproduce that, as I wanted to have a solid joint between the fin, stabilizer and top of the fuselage, but then the trailing edge of fin and fuselage would not be well aligned and the rudder would not fit well. So I have glued a sliver of styrene strip on the rear end of the fuselage and have mounted the tail surfaces on the aft fuselage, aligning it well relative to wings and fuselage. I have painted all control horns light grey.

I have applied the Spyker logo to the tail, checking through a magnifying glass whether the word “SPYKER” was at the top.



The rigging of the tail surfaces is quite straight forward. First I have glued the fishing line in the holes drilled at the lower side of the aft fuselage, and then I have fed them through the holes in the stabilizer and in the fin. I have tensioned them carefully, fixing them with small pieces of tape and not pulling too strongly to prevent deforming the stabilizer and fin. A drop of glue in the holes in the fin and cutting off the excess fishing line finished the job.

Undercarriage

I have drilled 0.3 mm holes in the top and bottom of the forward and aft legs of the V-struts for the rigging wires and also two holes in the fuselage underside next to the forward legs. I have also tried to drill a hole in the middle of the axle, but this did not work. The V-struts have been dry fitted to the fuselage underside and at the location of the aft leg I have drilled a superficial hole of 1.2 mm diameter.

Next I have dry-fitted V-struts and axle. I had to shew the holes for the axle in the V-struts to obtain a good fit. The struts and axle have been glued, aligning the axle well parallel to the fuselage-wing underside and taking care that the configuration is symmetrical. The height of the wing tips over a flat surface has been measured, while the model was resting on the undercarriage legs.

Prior to applying the rigging lines I have opened up all 0.3 mm holes again. I have fed the 0.05 mm fishing line through the holes in the V-struts and have glued the lines in the holes closest to the fuselage underside. This was not the best choice, as now it was impossible to tension them properly before gluing the other end of the lines to the V-struts. Next the last two rigging lines between fuselage underside and the middle of the axle have been applied.

When gluing the wheels to the axle it appeared that the wing tips were not on equal height. This was caused by the fact that the axle had moved in the hole in one of the V-struts before gluing and as a consequence was not completely horizontal. The difference was too much to compensate by taking some material of the tires, so I had to correct it by mounting one of the wheels eccentrically. I have mounted the tail skid after slightly enlarging the hole in the fuselage underside.

Control surfaces

I have glued the elevator halves and the rudder in deflected position. After preparing the fishing line for the control cables, this time silver lacquered to get more contrast with the khaki fuselage, I have glued six pieces of line in the two holes in the top of the aft fuselage (two lines in each hole) and in the two holes in the side of the aft fuselage. When the glue had set and after guiding the lines over the forward tail rigging lines, I have tensioned the bottom ones and glued them on the control horns of the elevator.

I have fed the lines from the upper control horn and the one from the lower control horn though the hole at the trailing edge of the elevator halves, glued them there and have cut off the excess fishing line. For the ridder I have used the same procedure.

Next the ailerons have been glued in their deflected position. The control cables for the ailerons are relatively complex, as they split in two on each control horn. I have started to carefully open up the holes in wing and ailerons, which pass though the decals. Next I have glued an end of fishing line in each of the four holes in the wing and have fed each line through a hole in the upper and in the lower aileron.

Then each of the lines had to be tensioned over the control horn with a piece of tape attached to the aileron itself. This was not easy due to the limited space available on the aileron and the required deflection angle. However, after much attempts I have achieved an acceptable result.

The aileron cable loops have been finished by gluing the loose ends of the fishing lines again on the top of the control horns and cutting off the excess line.

To complete the model I have attached the anemometer to the forward starboard inboard wing strut, such that the dial is pointing towards the cockpit openings. The two other instruments have been glued to the forward canopy struts. The dials appear to be rather large in proportion to the other parts of the model, so it would have been better to use slices of styrene rod instead.

The propeller has been painted natural wood and finished with burnt sienna oil paint. Mounting it gave no specific problems. The propeller can rotate, but due to the oversized hole in the fuselage front wall and the play between the fuselage front and the retaining roundel at the back of the fuselage front wall it tends to hang downwards. I hindsight it would have been better to glue the engine in a fixed position.

When the model was completed the box art could be finished, an excellent opportunity to make the last error. Instead of LVA 1918 and LVA 1919 I managed to put 2018 and 2019 with the pictures. Luckily a fellow modeller pointed this out to me, before most of the kits were distributed.

Below some pictures of the finished prototype.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SP.43 T.80


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SP.43/T.80


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Summary

Building the prototype has been very useful to finalize the assembly order. It has also resulted in adjusting some of the jig used in assembly. The model is not easy to build; in addition to the general fragility of biplane models comes the very flexible construction of the upper wing. This forces the builder to be very accurate in achieving the correct dihedral of the lower wing, as the dihedral of the upper wing just follows that of the lower wing, while it should show zero dihedral. The application of the aileron control cables is not easy, but by careful planning the correct result is achieved. The decals are of good quality and easy to apply.

The kit gives the opportunity to build a unique model in many different variants.

References

1. F. Gerdessen, N. Geldhof & H. Hazewinkel, *Spyker, De eerste Nederlandse Vliegtuigfabriek*, KNVvL Afdeling Luchtvaartkennis, 2002
2. H. Hazewinkel, private communication
3. H. Berfelo, private communication
4. F. Gerdessen, private communication.
5. T. Wesselink & T. Postma, *De Nederlandse Vliegtuigen, Alle vliegtuigen ooit in Nederland ontworpen en gebouwd*, Unieboek B.V., Bussum, 1982
6. T. Wesselink, *Spyker Vliegtuigen, De geschiedenis van de NV Nederlandsche Automobiel- en Vliegtuigfabriek "Trompenburg" 1915-1921*, ISBN 978-90-818510-0-8, Dutch Aviation Publication/Theo Wesselink, 2012
7. Aviodrome, private communication.

Appendix Spyker V.2 documentation

Paint table

H = Humbrol, VMA = Valejo Model Air, WEM =White Ensign Models, RA = Revell Aqua

Code	*Colour*	*Where*
H18	Orange	Rudder
H33	Black	Engine, control stick handles, external instrument dials
H47	Sea blue	Top of compass
H62	Leather	Seat cushions, cockpit opening edges
H125	US dark grey	Fuselage inside framework, control stick, rudder bar, control panels
H129	US gull grey	Fuselage inside, control horns, external instrument housings
H148	Radome buff (Linen)	Underside top wing and underside lower wing outer panels, underside tail surfaces
RA 36178	Tank grey	Tires
VMA 71.064	Chrome	Cups of anemometer, propeller bolts
VMA 71.068	Copper	Engine inlet ducts
VMA 71.072	Gun metal	Engine (dry brushed)
VMA 70.077	Wood	Wing struts, propeller
WEM CC ACD 04	LVA khaki	Fuselage wing and tail surfaces upper side, fin

Photographs

If no reference is given, the pictures have been taken from the Internet/Wikipedia.

[Source: ref. 1, Hazewinkel]

[Source: ref. 5, Postma & Wesselink]

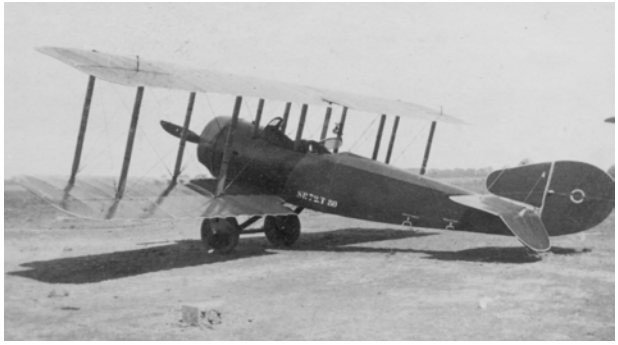
[Source: ref. 1, Hazewinkel]

[Source: ref. 1, Hazewinkel]

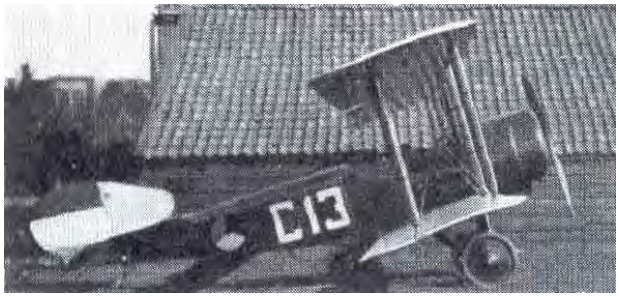
[Source: ref. 4, Gerdessen]

[Source: ref. 4, Gerdessen]

[Source: ref. 4, Gerdessen]

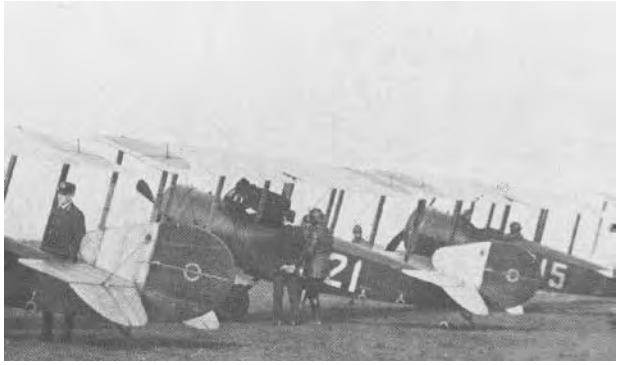


[Source: ref. 4, Gerdessen]



[Source: ref. 3, Berfelo]

[Source: ref. 1, Hazewinkel]



[Source: ref. 5, Postma & Wesselink]

[Source: ref. 6, Aviodrome]

[Source: ref. 6, Aviodrome]

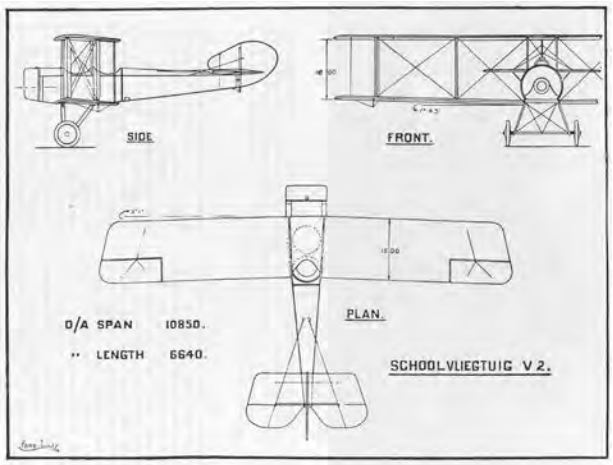
[Source: ref. 6, Aviodrome]

[Source: ref. 6, Aviodrome]

[Source: ref. 1, Hazewinkel]

[Source: ref. 6, Aviodrome]

Drawings



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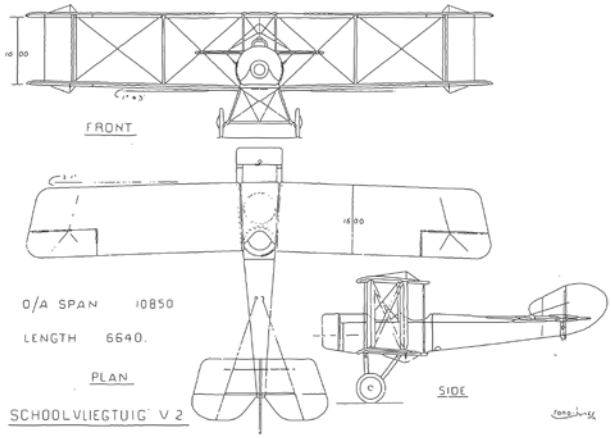
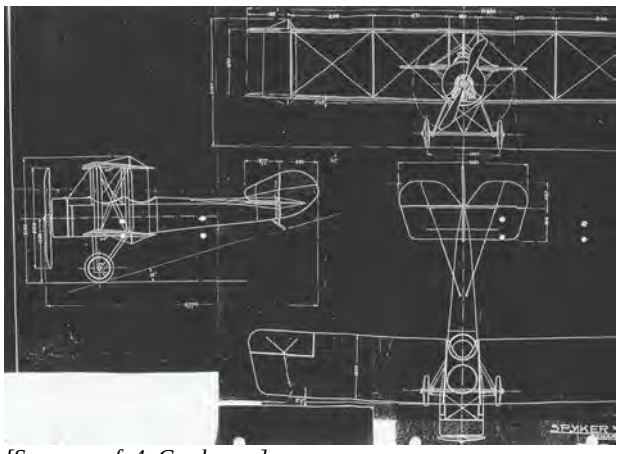


[Corrected version of drawing ref.1, Hazewinkel]



[Source: ref. 4, Gerdessen]

[1] The list and the figure have been updated due to the mishap in casting the aft fuselage, made from two parts.

[2] A second one (the aft fuselage) occurred during casting; remaining air in the master destroyed it.