

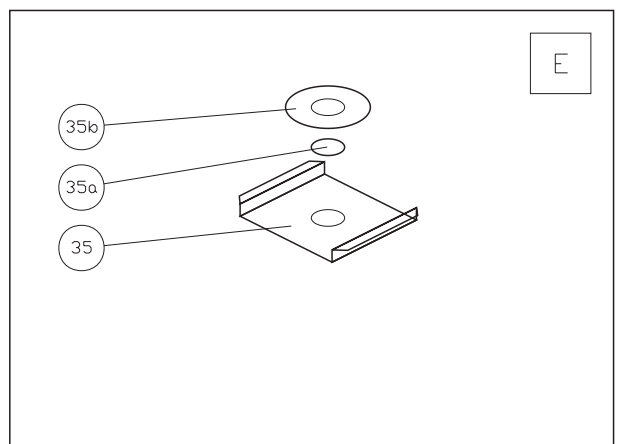
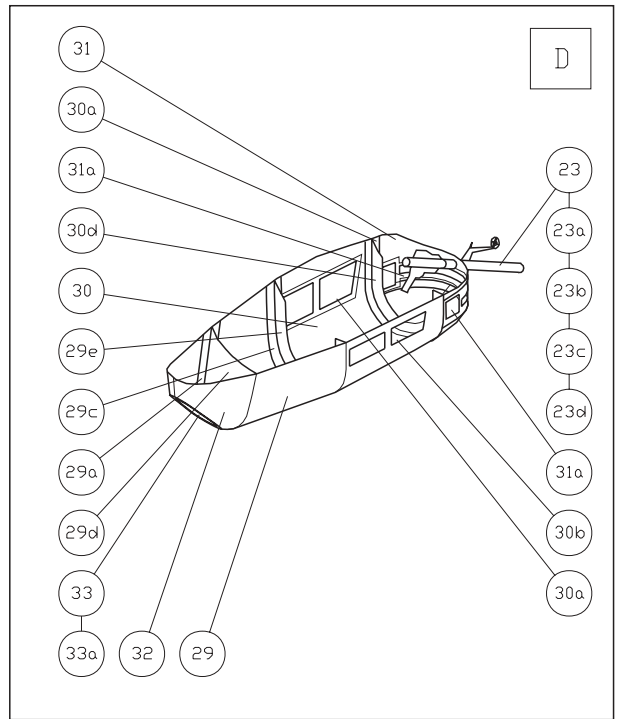
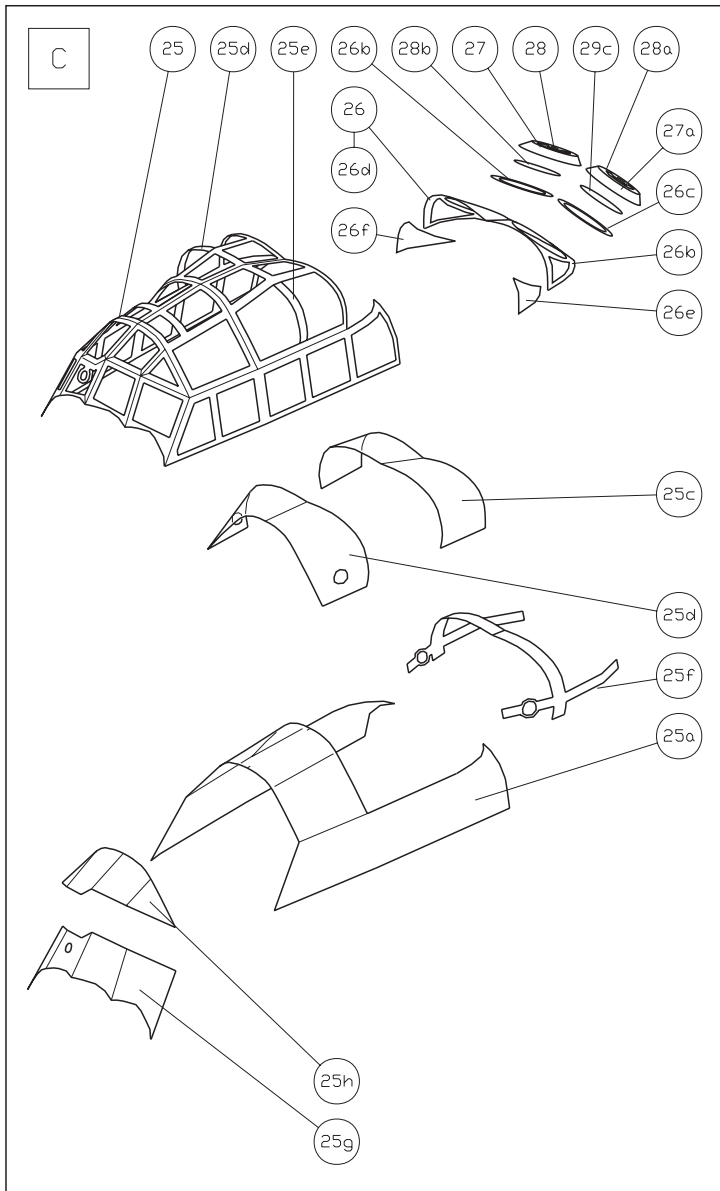
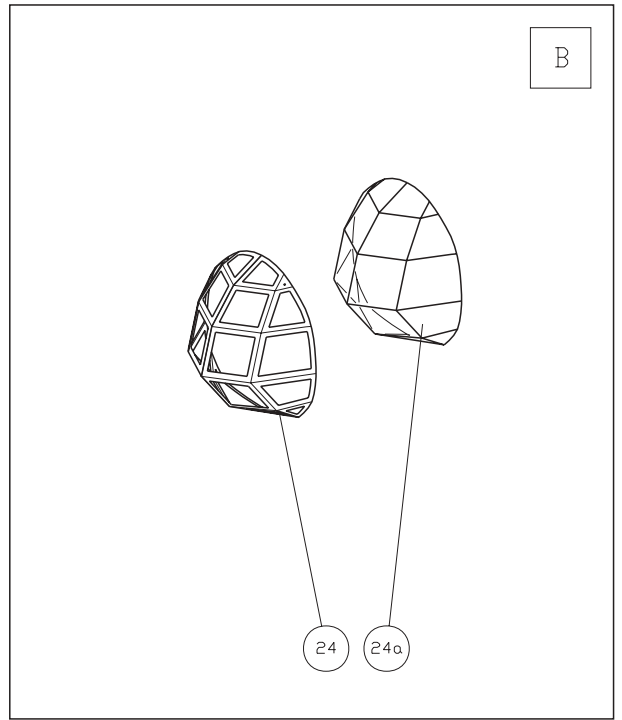
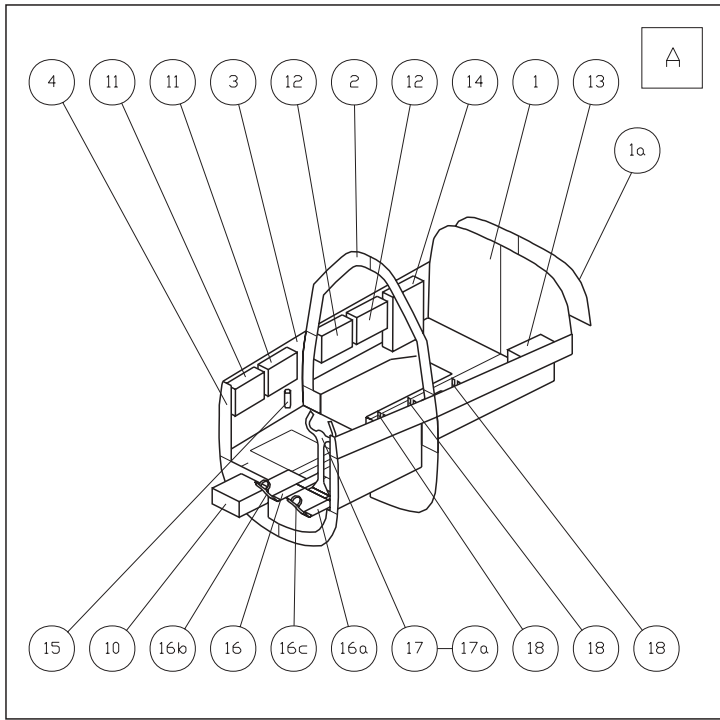
JUNKERS

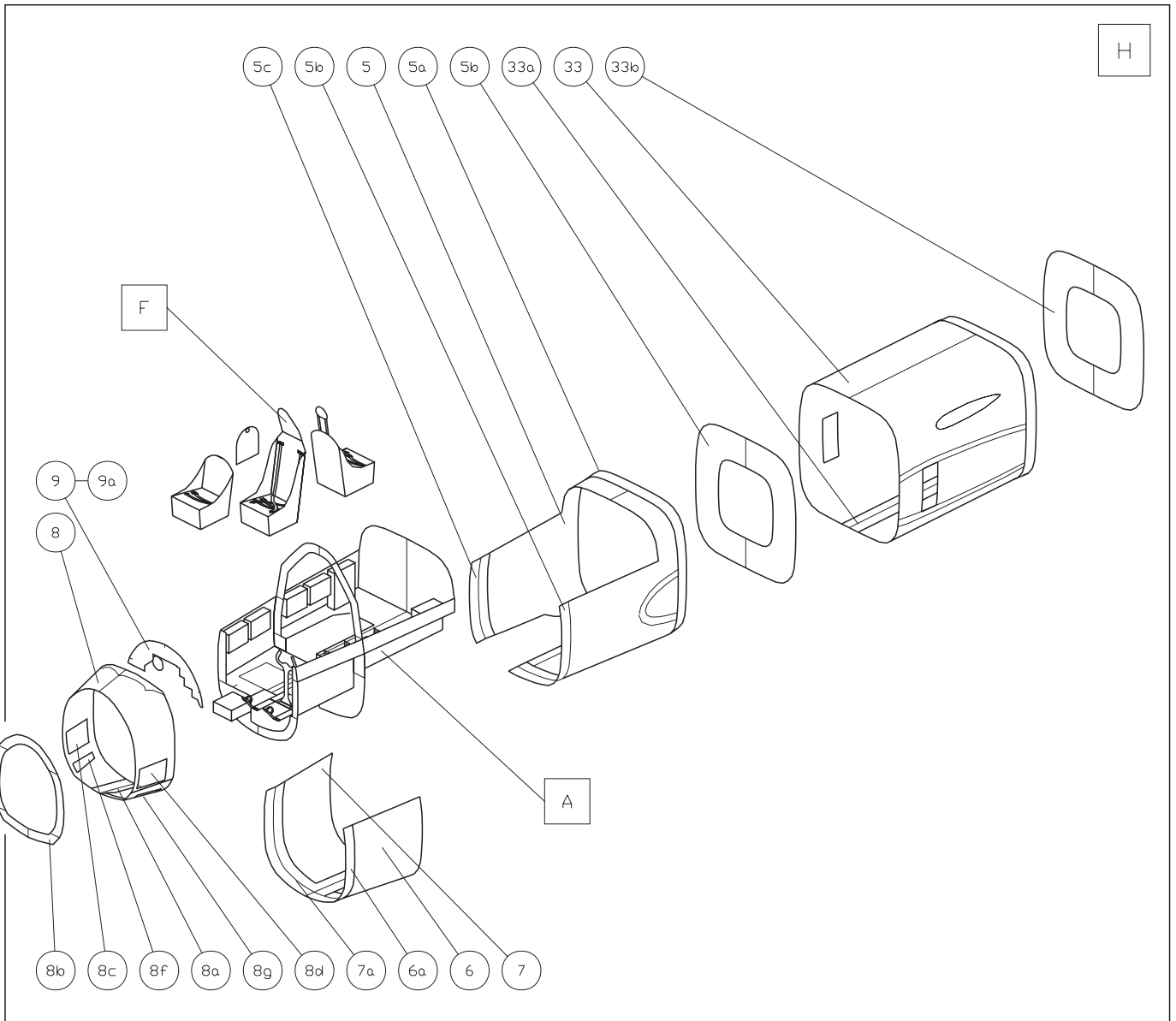
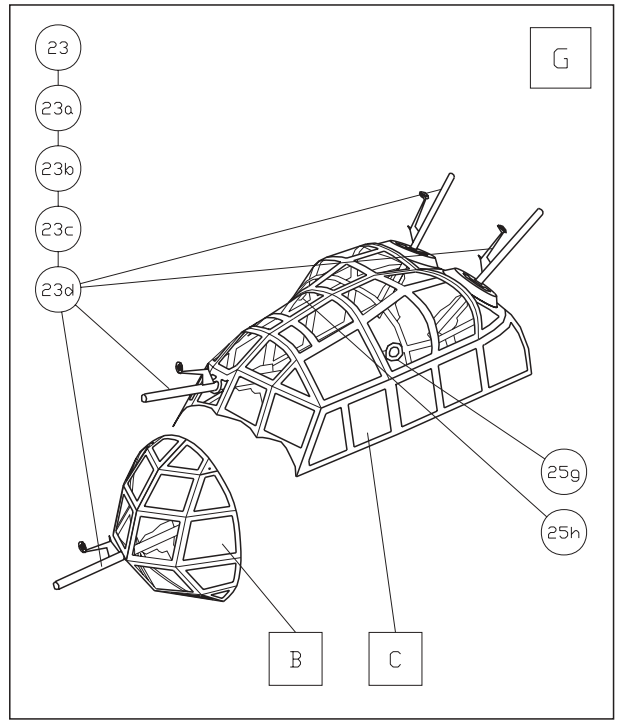
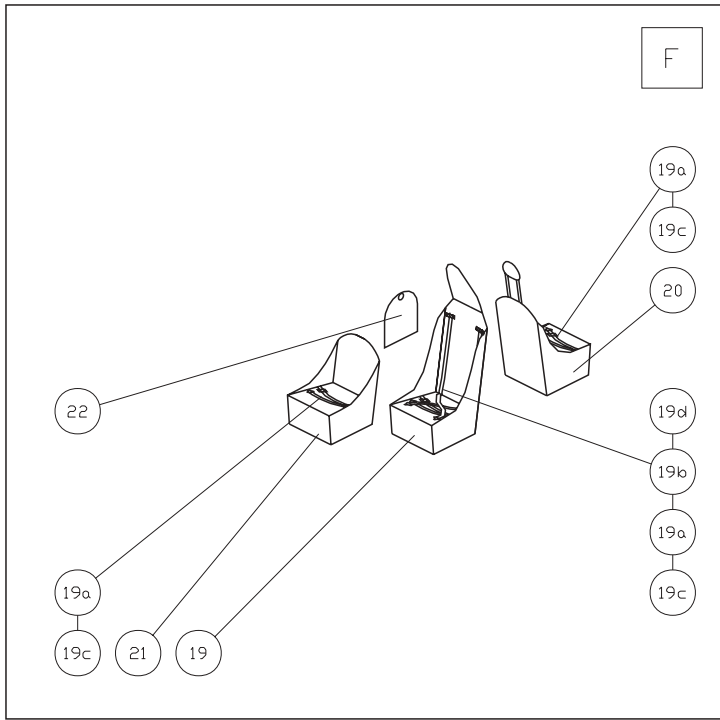
Ju-88 A4

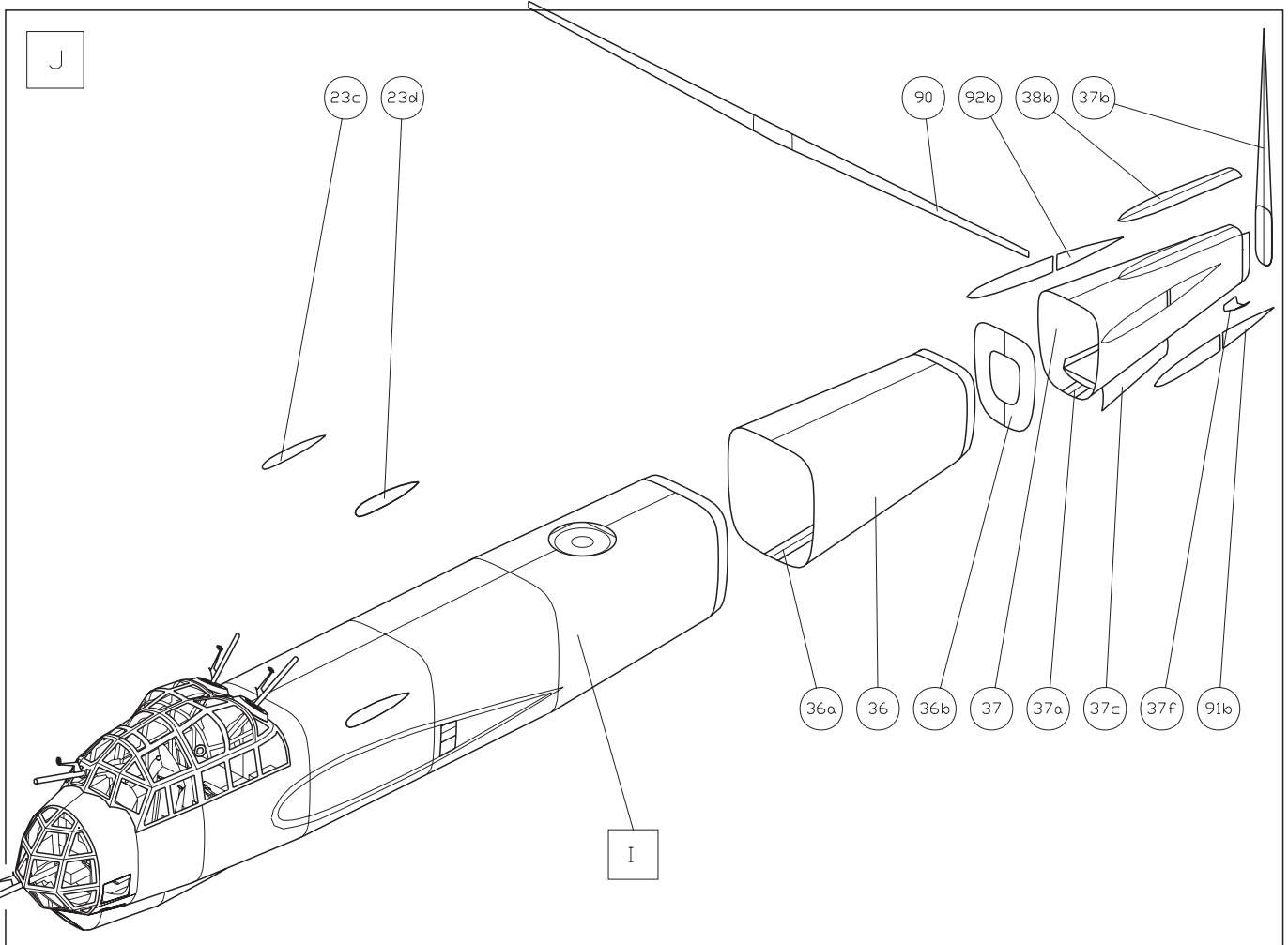
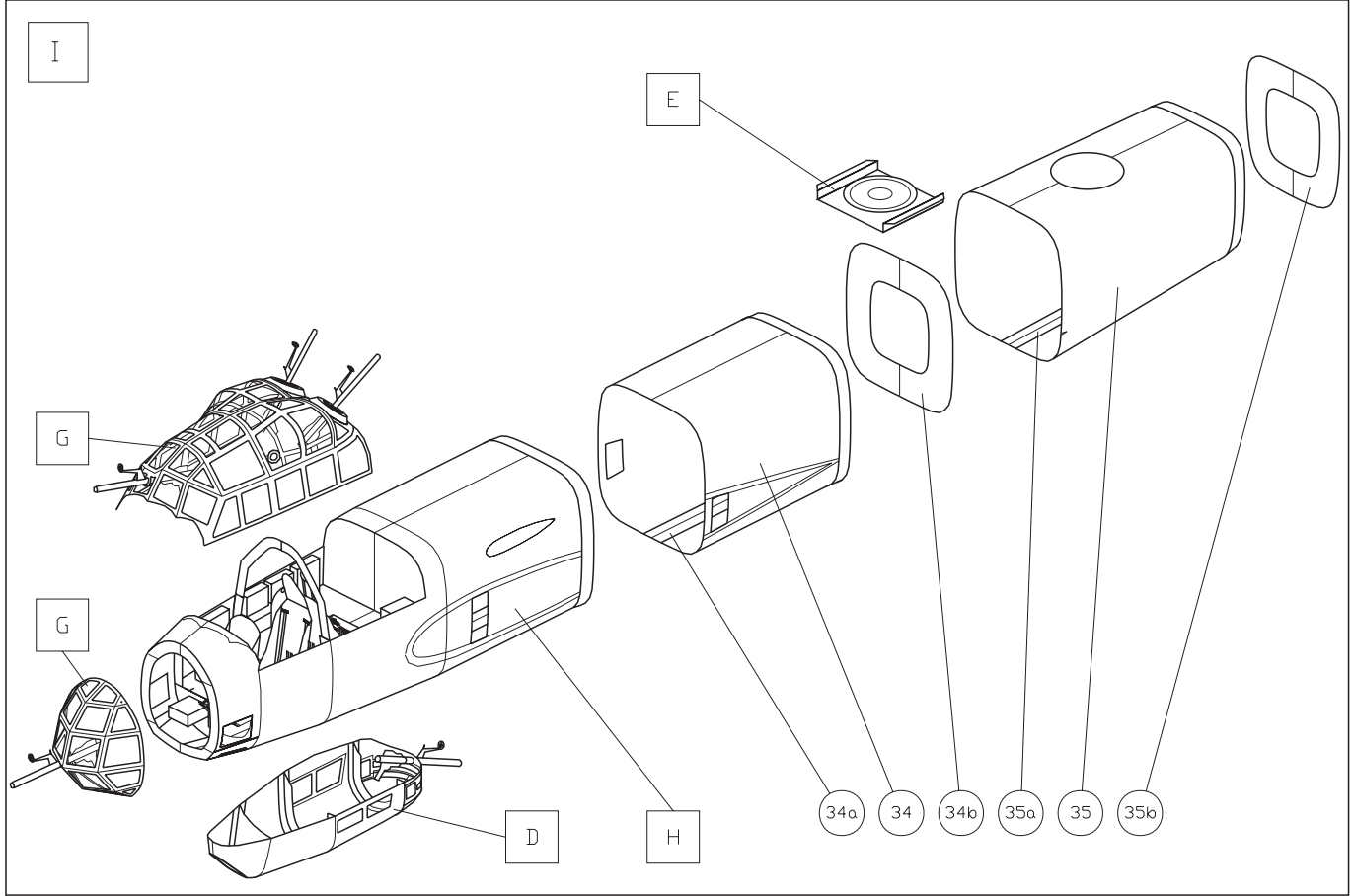
The most successful Luftwaffe bomber in the WW II. Eastern front, 1943

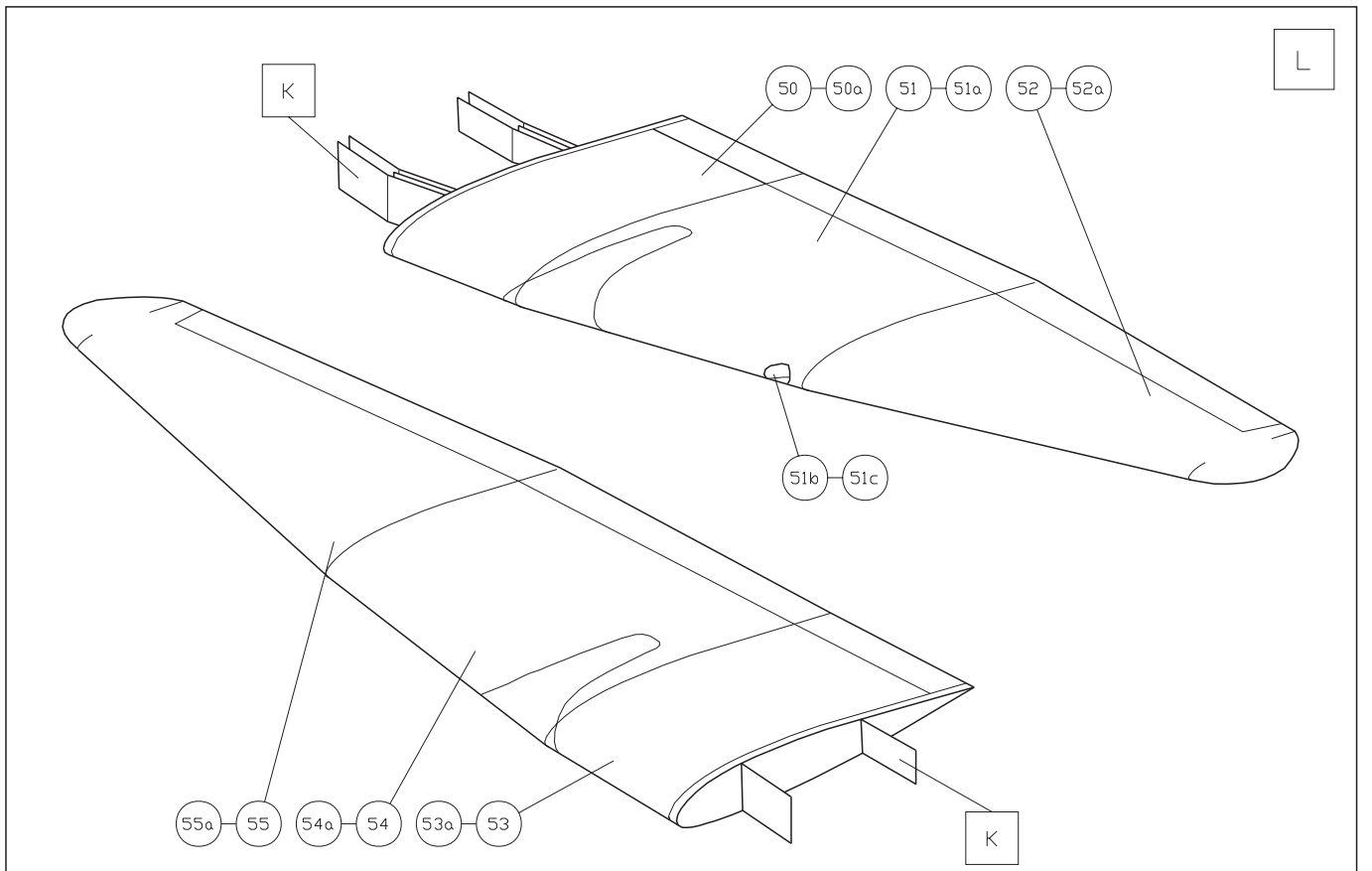
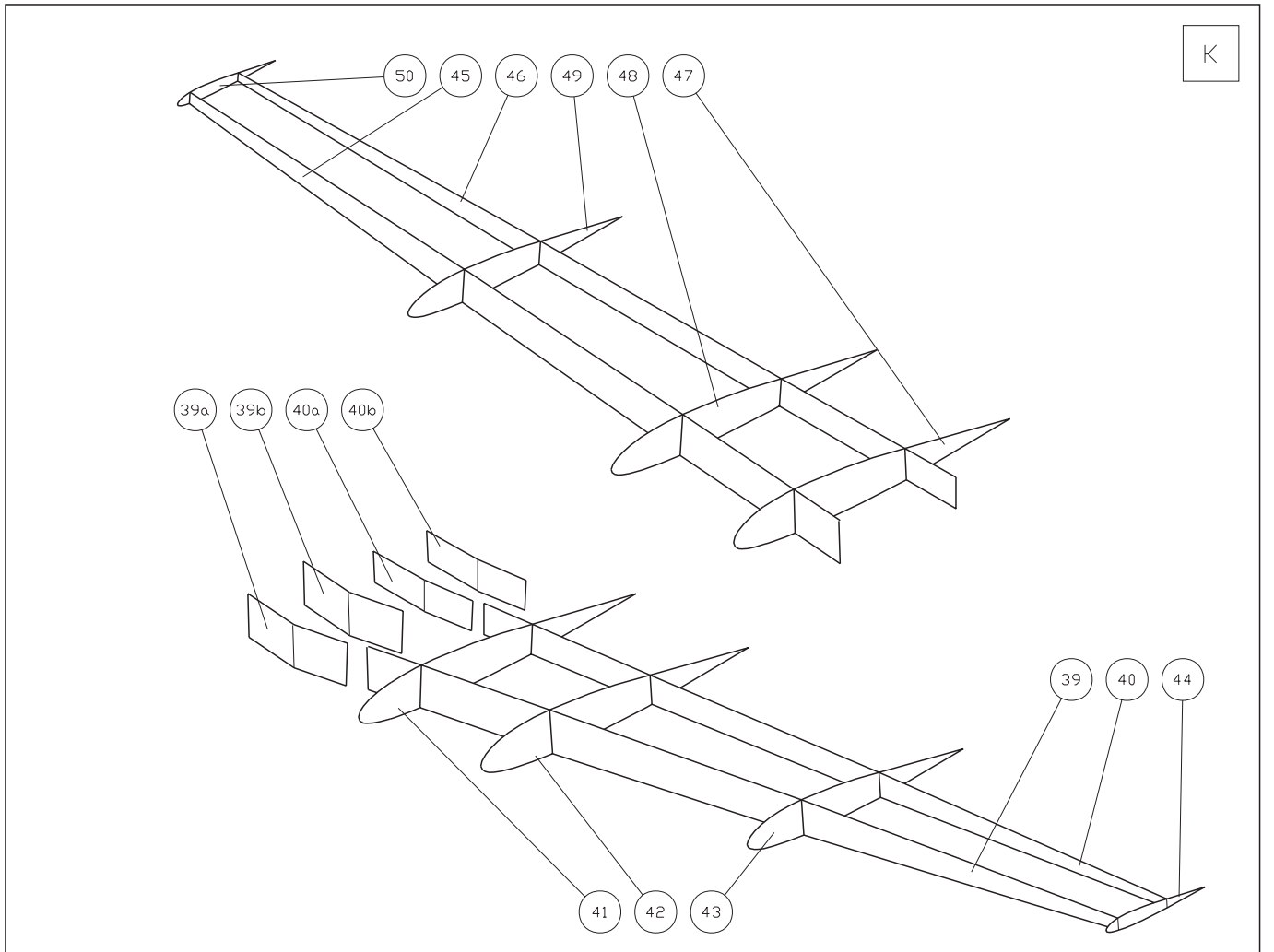
1/32 SCALE PRECISE CARD MODEL



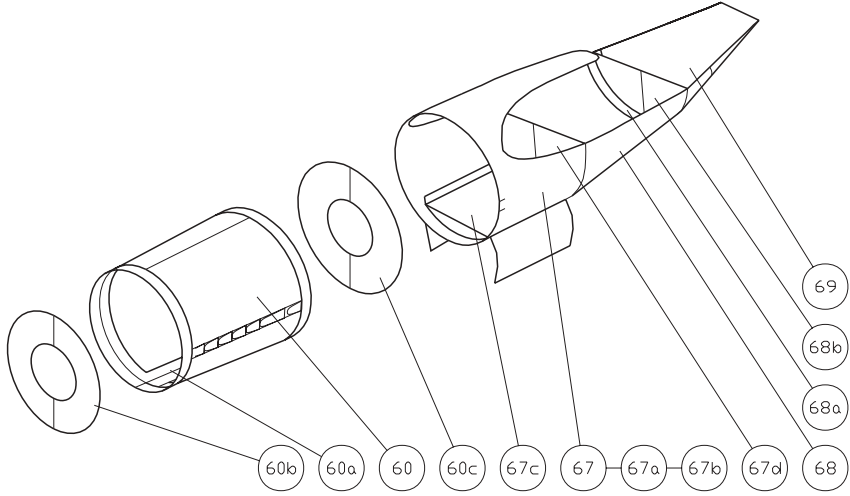
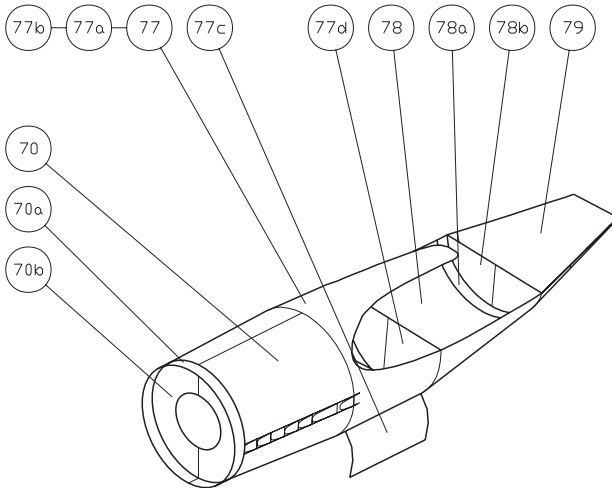




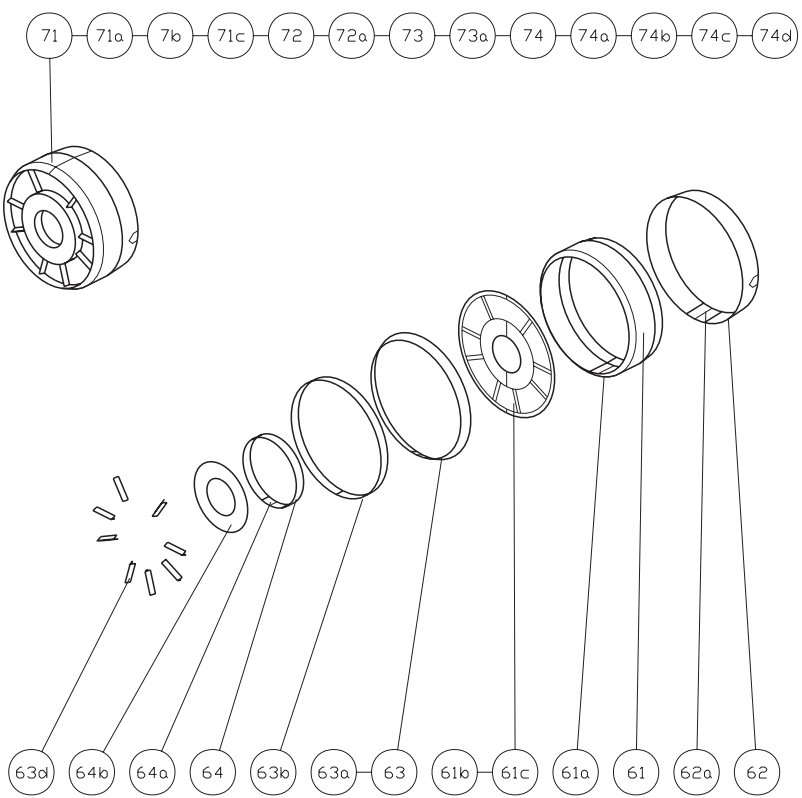


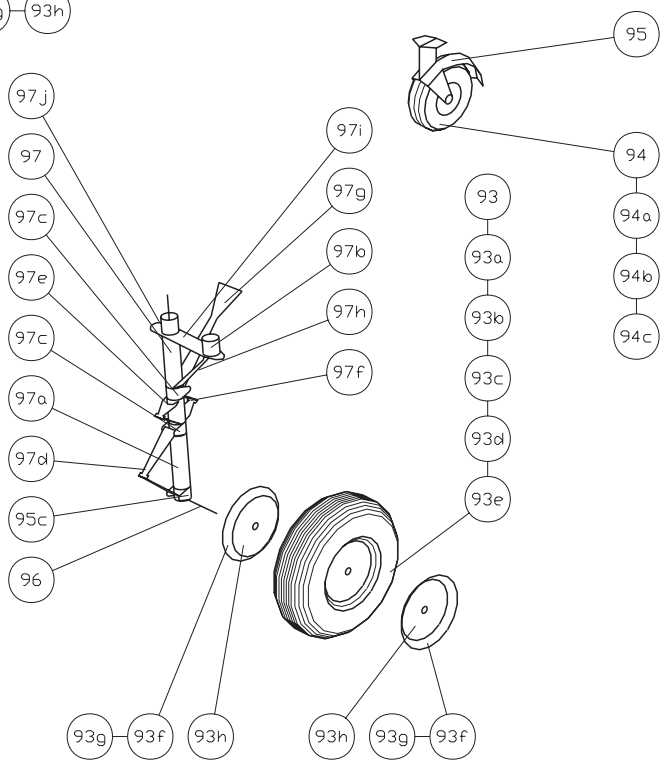
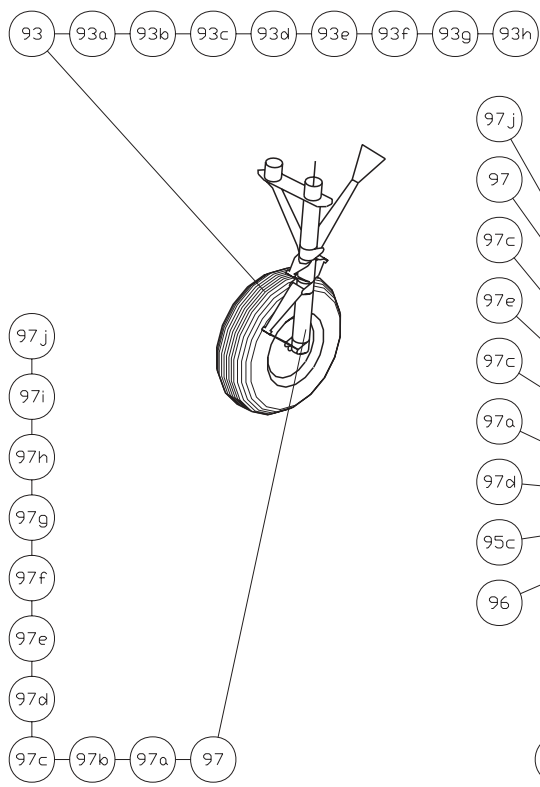
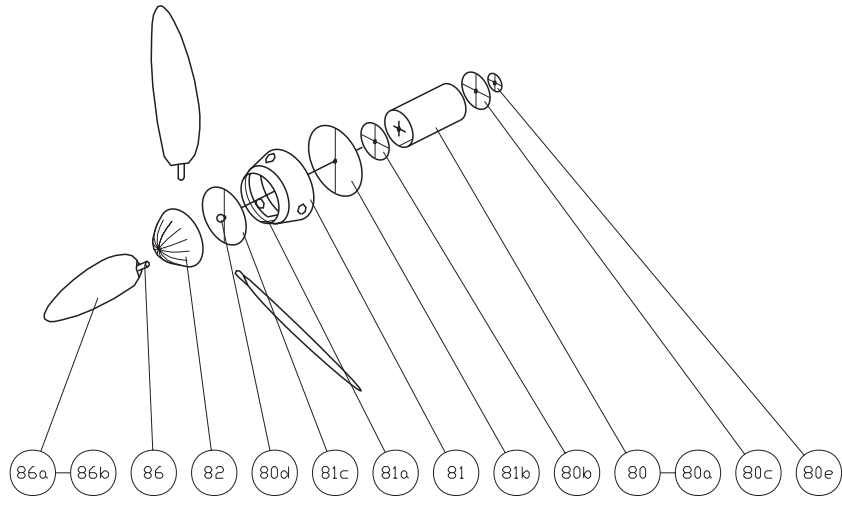
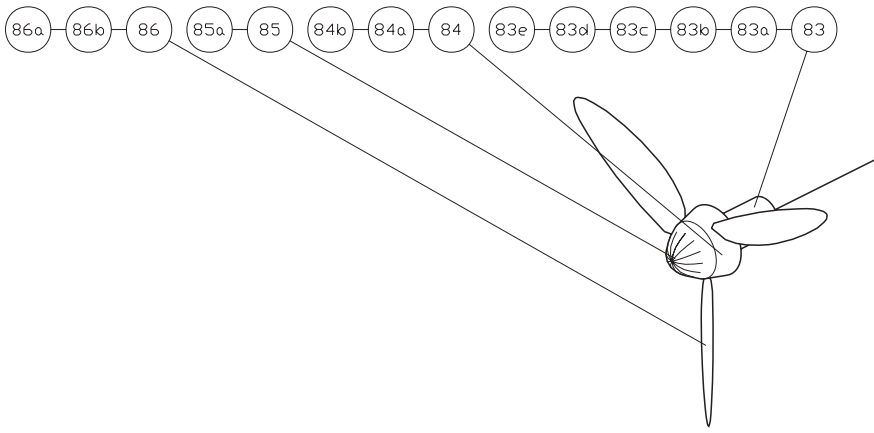


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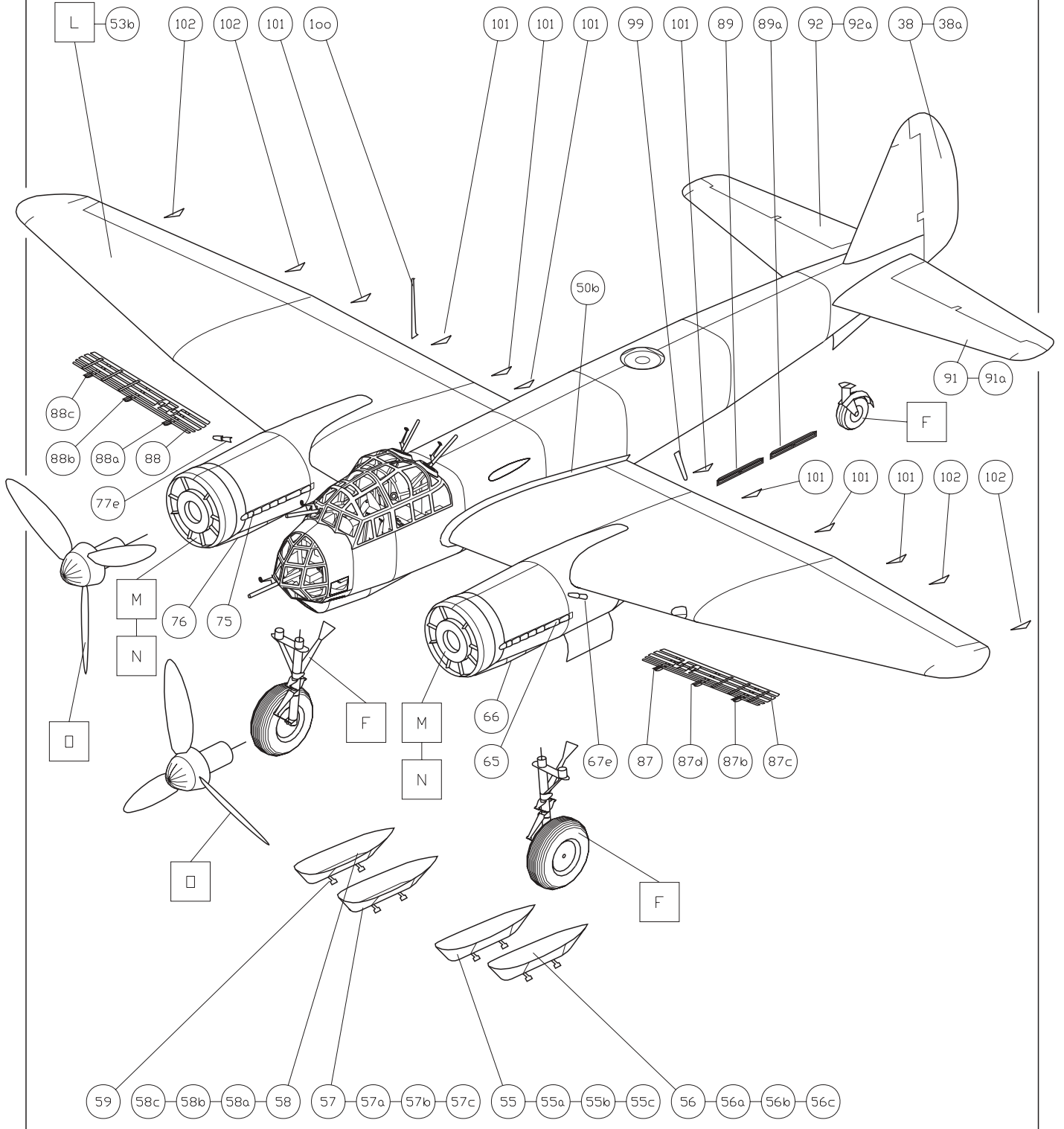


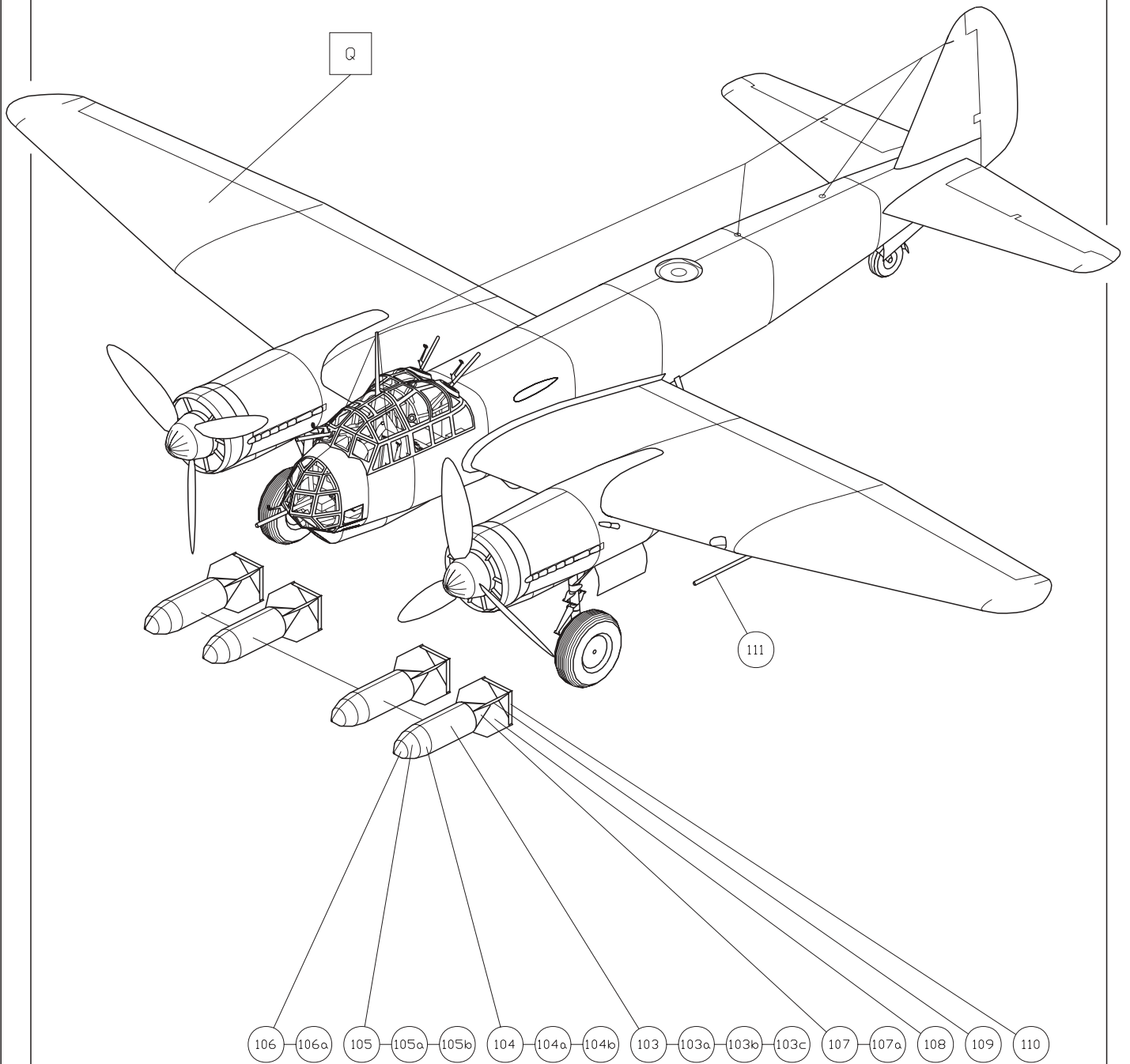
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1/32 SCALE Junkers Ju-88

ASSEMBLY INSTRUCTION

The proposed Ju-88 model is comparatively complicated and with high level of similarity to the prototype. Thus, a special attention and precision in the assembly procedure is required. Study carefully the illustrative drawings, cutouts and present instruction before starting the work on the model. Try to imagine the separate assembly phases and the purpose of each detail.

After the acquaintance with the model, you may start the assemblage. Follow the sequence given in the instruction. Cut the necessary details shortly before using them in order to avoid possible mistakes. Score all fold lines before cutting the details. The places of scoring are marked with small thin lines on the continuation of fold lines outside the parts. The scissors markings show where to make cuts on some details.

Do not be in a hurry with gluing - carefully check and shape the details until obtain the exact and correct fit. Before starting the work get hold of the necessary tools: scissors, sharp modeling knife, blunt knife for scoring the fold lines, prickler, ruler, nippers and grinding paper. Additional materials necessary for the assemblage are: sheet of cardboard with thickness approximately 0.5 mm, a piece of wire with diameter 0.5 - 0.8 mm, transparent foil for the canopy. Supply with proper glue. BISON Clear Adhesive, UHU or similar are recommended as the most appropriate ones. Waterbased glue is not recommended. The model can be built in two variants – with detailed interior and transparent canopy or with paper canopy. You must choose the variant before starting the work on the model. The details that are needed for paper nontransparent canopy are marked with shaded numbers.

Preparation for assembling includes gluing the pages that contain the formers and strengthening elements on 0.5 mm cardboard.

Start with the interior of the nose section. Carefully cut and form part 1. It represents the floor and the internal right and back side of the cockpit. After gluing the tabs of the part 1, insert it in the hole of the former 2. After several dry tests glue 1 to 2 and then add the right internal cockpit side 3 and the former 4 as it is shown on view A of the instruction drawings. You must be very precise in these operations. Keep the centerline straight and pay attention to all the lines of symmetry.

After gluing the interior details shown, leave apart the interior assembly and continue with the cockpit glazing. Score all the fold lines first and then carefully cut the canopy parts 24-28. Form and glue the canopy parts as shown on the view B and C. Score, cut and form all the transparent parts and then carefully glue them to the canopy frame. Use minimal amounts of glue and do not allow messing of the glazing.

Now assembly the ventral gondola /parts 29-33 as it is shown on view C. Note, that if your kit comes without preliminary toned back side of the visible interior parts, you must tone it manually before their cutting, with the interior color. It holds true for parts 2, 5, 7, 8, 24-33.

A bit later when you'll assembly the fuselage, you'll need the radio pathfinder antenna. Its assembling is shown on view E. Glue the part 35e on thick card before cutting it. Note that on the real aircraft the pathfinder antenna is glued on to the inner surface of the plexiglas window. If you prefer you can also glue 35f to the inner side of transparent part 35c. But it is not recommended because of the visibility of the glued areas .A better solution is just to glue the antenna subassembly to the fuselage part 35d so that the distance between the antenna and the glassing will be minimal.

Assembly also the equipage seats 19-22, and their belts 19a-19c /view F/.

Install the defensive armament – machine guns MG 81 in the gondola and front and rear canopies as it is shown on view G. Note that you must glue the gun sights 23c after inserting the guns in their places.

Now everything is ready for fuselage assembling.

The most critical for the entire model's assembly are the operations of gluing the interior A to segment 5 and then 5 to segment 33 of the fuselage. Carefully form the segments before gluing them. You'll see that it is a tricky job because these segments have almost rectangular shape. You must position their formers 5d and 33b strictly keeping the coincidence of their central lines of symmetry with those of the segments 5 and 33. Keep also the vertical direction of segments.

Few words for those of you who preferred nontransparent canopy – the assembling process of the front part of the fuselage is classical – assembly the segments of the fuselage and canopy marked with blue circles glue the canopy the ventral gondola, applying only the external part of the machine guns.

Now, when the most difficult part of the assemblage is done, you can continue with the building of the model. Complete the fuselage, adding the segments 34-37 and the vertical stabilizer 38, as it is shown on the view I and J. Before gluing the segment 37 you must add the tail wheel housing 37c if you prefer your model to be with undercarriage in open position.

Continue with the wing frames 39-50, following view K. After drying the glue cover the wing frame halves with the skin parts 50-55. Start from the inner parts 50, 53. Carefully position the rest of the skin parts so that not to allow twisting of the wing and to ensure the straight rear wings' edges. You can make the landing light on the part 51 transparent by using parts 51b and 51c.

After few dry tests glue the wing halves to the fuselage, keeping their angle of attack and dihedral angle, referring view Q and the 3-d drawings of the real thing on page 9 of the instruction. In the same way prepare and glue the horizontal stabilizer 91 – 92 to the fuselage.

Assembly the engines gondolas. Note that the left parts 60, 67 – 69 and the right parts 70, 77 – 79 are not the same, so be careful not to mismatch them. You must keep the vertical direction and orientation of the formers as well. If you are building the model with undercarriage in open position,

use the wheel housings 67c and 77c. Glue the engine gondolas to the wing after few dry tests, strictly keeping their horizontal and vertical angles of positioning according to the view Q and page 9 of the instruction drawings. Complete the engines, building the engine glycol cooling radiators cowlings 61-64 for the left and 71-74 for the right engine end glue them to parts 60 and 70 of the gondolas. Glue also cowlings 66, 76, exhaust pipes 65, 75 to the engines.

Now assembly the propellers 80 – 86 so that their shafts to be capable to rotate freely in their bearings 80, 83. Insert the propeller bearings in their places in front of the engine radiators.

Continue wit the undercarriage – parts 93-95 as shown on the view P of the instruction. Cut the wheels parts 93 and 95 from the 0.5 mm card, make the thin holes in the center of each of them and glue them together. After drying the glue round the wheels with sandpaper and paint them black.

Position the undercarriage in the wheels housing, strictly keeping their angles of orientation, referring the drawings on page 9.

Add the details – bomb racks 56 – 59, airbrakes 87, 88, antenna masts 99, 100, flaps and elerons drivers cowlings 101 and Pitot tube 111.

Assembly the bombs 106 - 110 and attach them to the bomb racks.

Now your model is ready.

Enjoy.



Picture of the completed model

Junkers Ju 88 – Historical and Technical Description

When the Second World War began the Luftwaffe bomber units were equipped with three main bomber types, all of them medium bombers: Dornier Do 17, Heinkel He 111 and Junkers Ju 88.

The latter had proven itself to be an exceptional aircraft capable to fulfil a variety of roles. Due to its versatility Ju 88 was used not only as a bomber, but also as a day and night fighter, reconnaissance aircraft, torpedo bomber, ground attack aircraft and at the final stages of the war as a pilotless bomb in Mistel program.

Development of the type began in 1935 when the RLM (German Air Ministry) issued specifications to Junkers, Messerschmitt, Focke Wulf and Henschel for a fast bomber aircraft. Three of these companies submitted proposals and after consideration RLM rejected Messerschmitt and Henschel designs (Bf 162/163 and Hs 127 respectively). Junkers submitted two proposals - a twin-tail Ju 85 project and a conventional aircraft designated Ju 88. In the event Ju 88 was selected for full-scale development and RLM ordered three prototypes Ju 88V-1, V-2 and V-3 for further evaluation.

Design work on Ju 88V-1 began in January 1936 and construction of the prototype was started that spring. The first prototype began test runs and flight trials in late Autumn of the same year, carrying civil code D-AQEN. It was powered by two 1000 hp Daimler-Benz DB 600Aa 12-cylinder inline liquid-cooled engines. The Ju 88V-1 first flight took place on 24 December 1936 with Junkers' chief-pilot Kindermann at the controls. The aircraft displayed excellent flight characteristics and reached speed was about 450 km/h (280 mph). During later trials the V-1 was fully destroyed in an accident. The program was interrupted until the second prototype V-2 (D-AREN) made its first flight on 10 April 1937. The third prototype V-3 (D-ASAZ) made its maiden flight on 13 September 1937 and featured an improvements such as increased rudder area for better lateral stability, more comfortable canopy with better visibility, etc. The DB 600Aa engines were replaced with more powerful 1100 hp Junkers Jumo 211A engines. The V-3 was also evaluated in Service Test Center in Rechlin where the aircraft demonstrated a top speed of 323 mph.

The test results were all favorable and RLM ordered Junkers to start preparations for full-scale production. Some recommendations for changes were made by Rechlin test pilots and all these improvements were introduced in fourth prototype V-4. The most important changes were the movement of the canopy further forward; addition of another defensive machine gun and fourth crew member, and addition of ventral gondola (known as "bathtub") with another machine gun for defense of rear lower area. Another improvement was the attachment of the airbrakes under the wing to cover the RLM requirements for dive bombing capability of the aircraft, and the fully glazed nose known as *Vollsichtkanzel* (High visibility cockpit). The Ju 88V-4 made its first flight on 2 February 1938. It was followed by V-5 aircraft, which in July 1939 set a World record covering 2000 km (1243 miles) distance at an average speed of 498 km/h (311 mph) - an impressive speed for a bomber indeed, that can be compared with the speed of the contemporary British fighters (a fact immediately used by German Propaganda Ministry).

After total quantity of experimental aircraft reached 10, RLM ordered A-0 pre-series and A-1 series production in 1938. The order was for 28 A-0 and 50 A-1 bombers, two weeks later order for A-1 was increased with further 100 aircraft. First A-0 variants reached service units in March 1939. Later most of these were used for trials and designated "V" (experimental). The A-1 variant participated in German campaign in Poland in 1939 and later in 1940 was frequently seen in Western European skies too. A-3 unarmed variant with dual controls for training purposes was produced too.

In 1940 Luftwaffe already have battle experience with the new bomber. This result in the order for a new variant with improved capabilities, designated A-4. The most important changes were the introduction of new more powerful Jumo 211F or J engines (1400 hp) and the increased wingspan for better handling characteristics and maneuverability. The problems with production of Jumo 211F/J engines led to the introduction of an interim A-5 variant powered with older 1200 hp Jumo 211G/H engines. In A-5 most typical features of A-4 were introduced. Despite of its higher number designation A-5 is the predecessor of A-4 bomber.

The A-4 series prototype Ju 88V-21 (D-ACBO, later ND+BM) was first flown on 1 November 1940. In 1941 the problems with the new Jumo engine were solved and the full-scale production of A-4 was started. The first produced aircraft were equipped with F-series engines and metal VDM propellers. Soon Jumo 211F engine was replaced with J-modification and new wooden VS-11 propeller with broader chord was introduced. A typical feature of A-4 is the asymmetrical engine nacelle - the result of the additional air intake for F/J engine cooling.

Ju 88A-4 became the most produced variant of the bomber. It came just in time to participate in the invasion of Soviet Union on 22 June 1941. The first unit, which went into battle with A-4 variant, was KG 51, however until the end of 1942 most bomber units of Luftwaffe were re-equipped with the type. In 1942 the quantity of Ju 88A-4 in front-line service is about 520 aircraft - a nearly half of the total number of bombers used by Luftwaffe. A-4 variant was used until the end of war on all fronts, not only by Luftwaffe but also by Air forces of Germany satellites - Bulgaria, Croatia, Finland, Hungary, Italy and Romania. This versatile bomber can be seen at all fronts from 1941 until the end of World War 2.

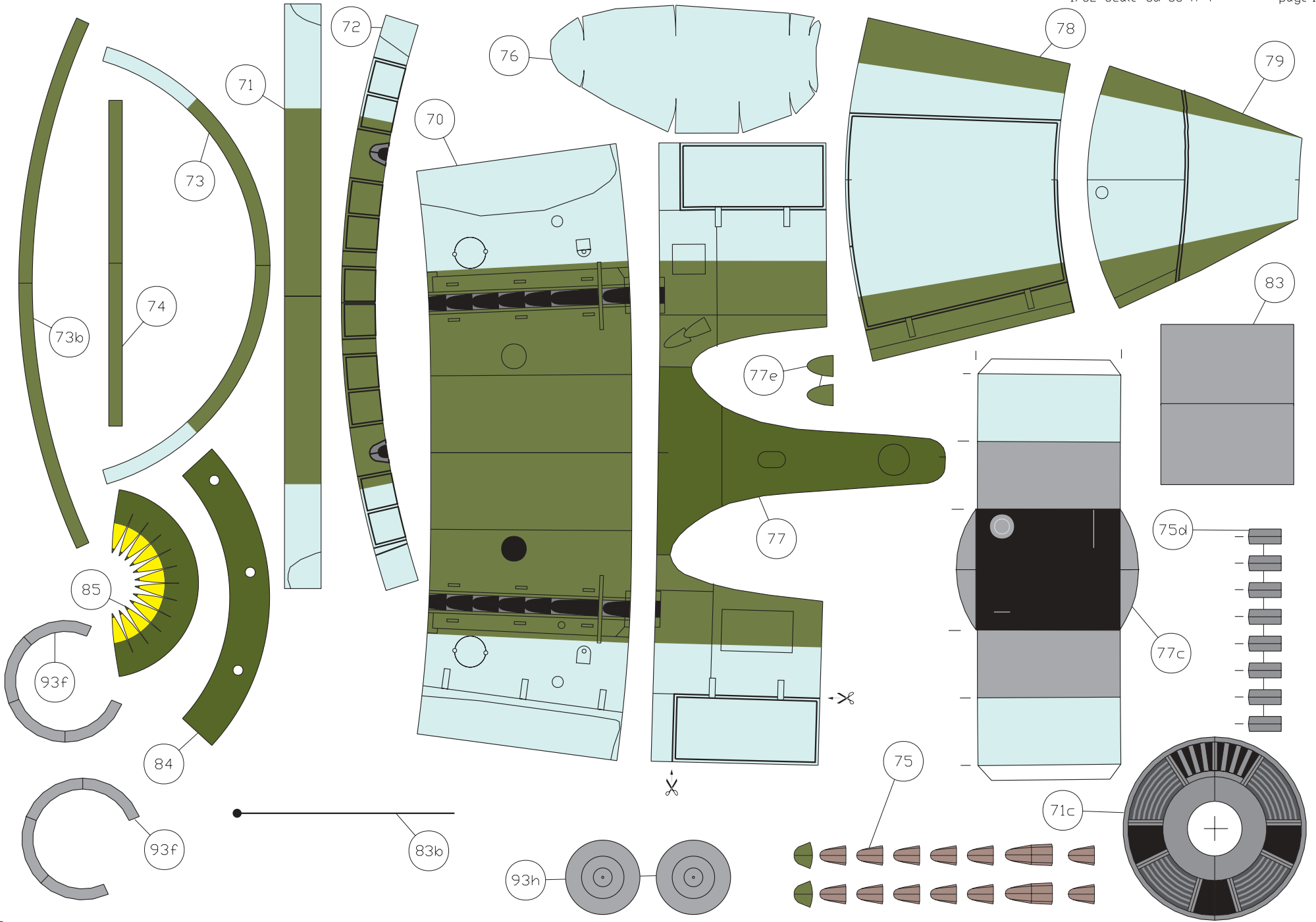


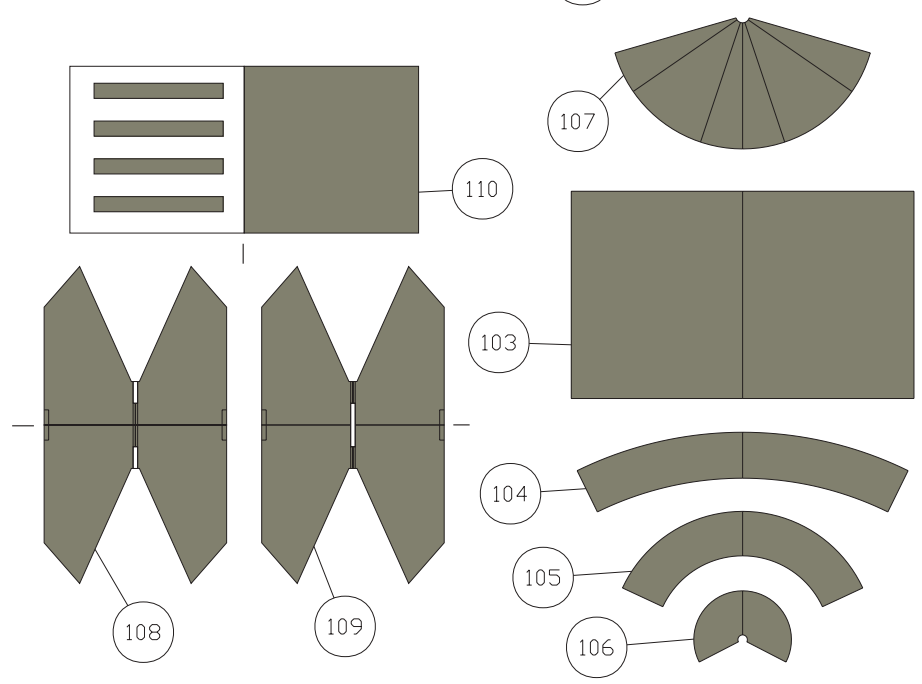
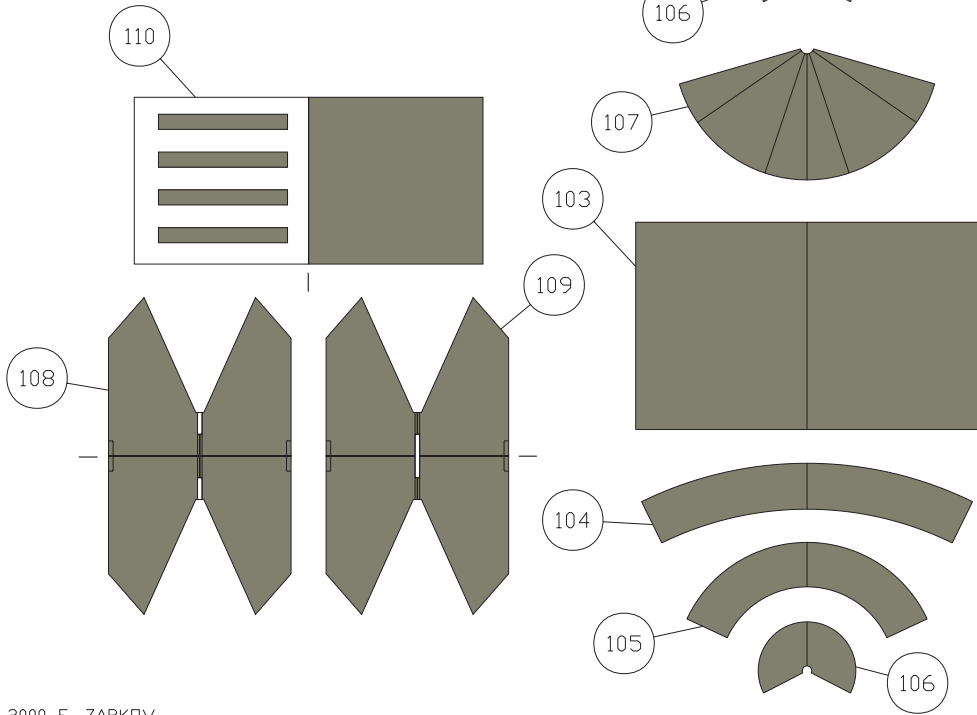
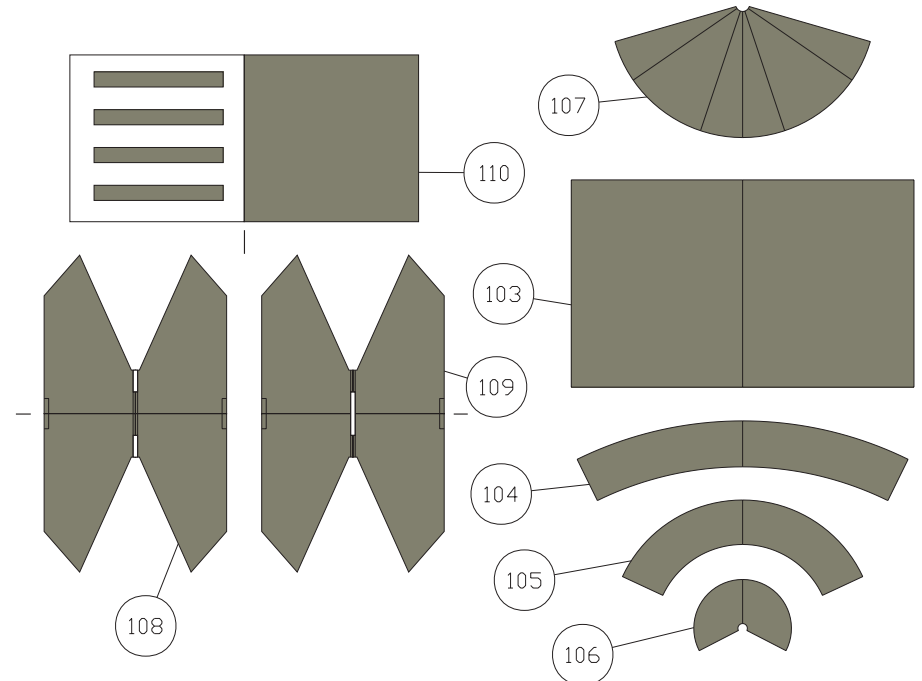
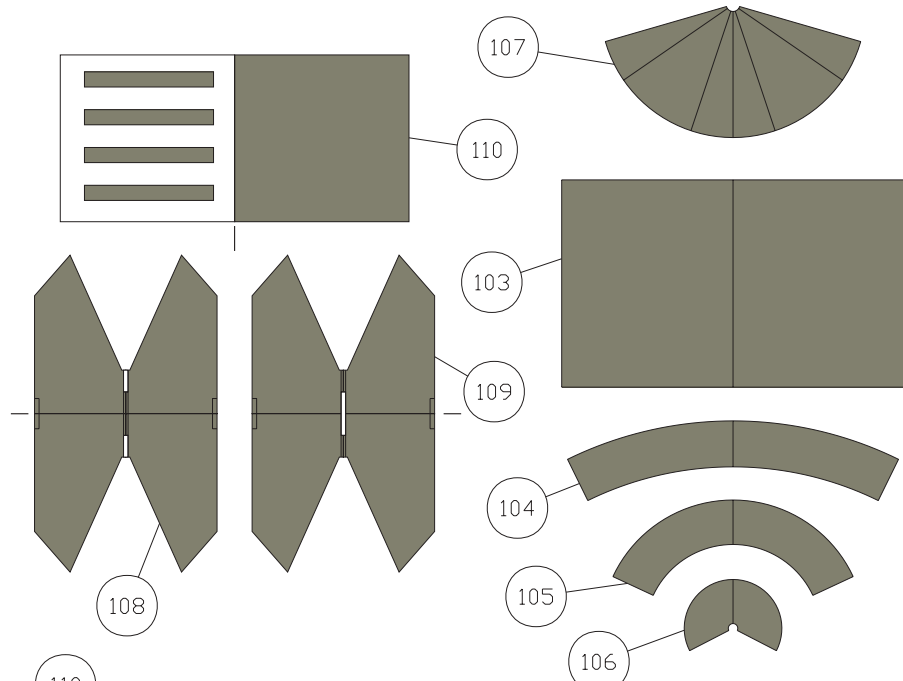
Close view of the model's canopy and interior

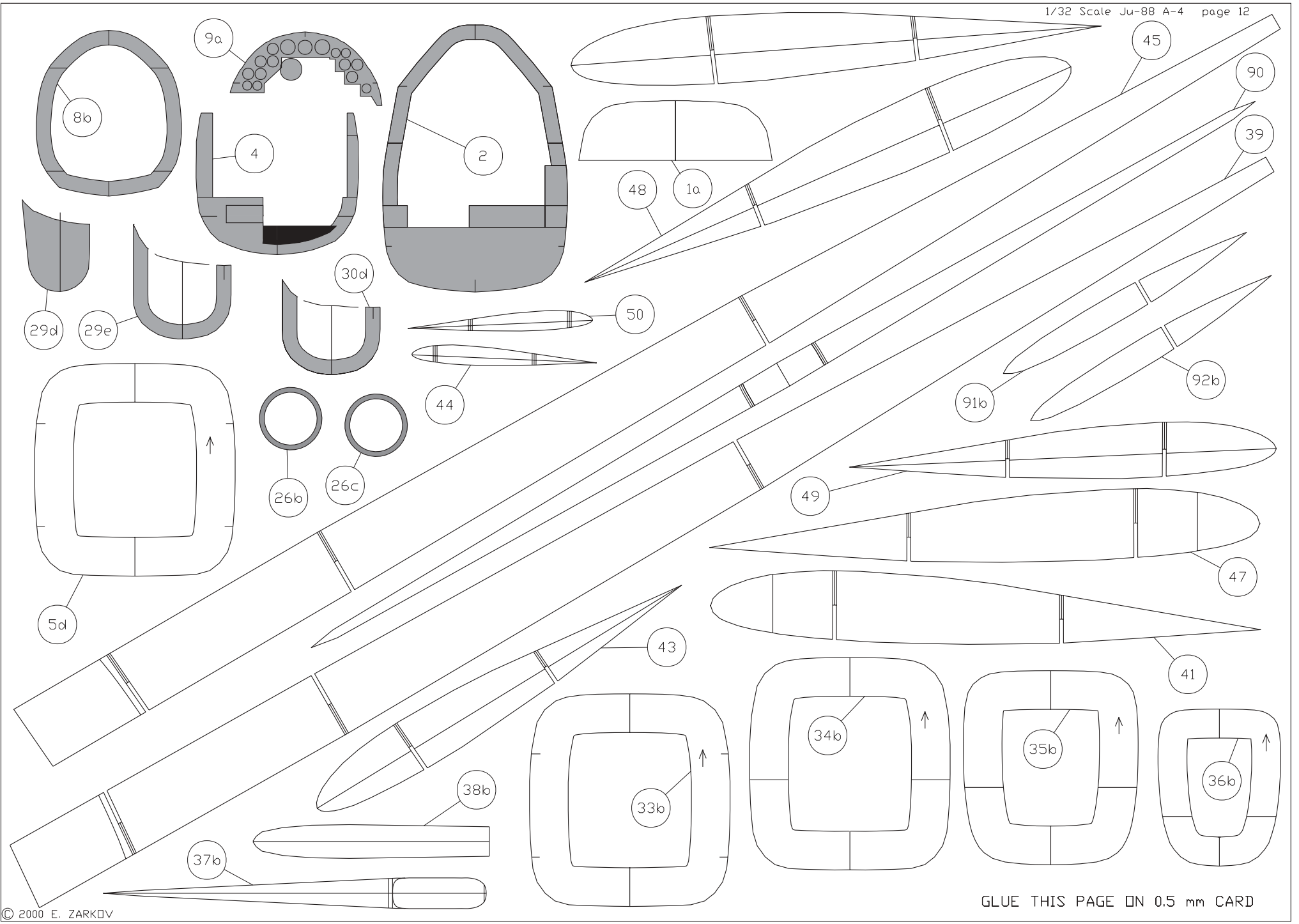
POWERPLANT	Two Junkers Jumo 211F (early production) or Jumo 211J 12-cylinder in-line inverted vee liquid cooled engines
Engine power rate	1040 - 1400 h.p. max (take-off and emergency) each 780 – 1060 h.p. normal (at 5200 m)
Airscrew	VDM metal narrow-chord blades (early production) VS-11 laminated wood broad-chord blades
Fuel capacity	internal - 1680 l (two fuselage tanks 415 l each and two wing tanks 425 l each) provisional – 1220 l additional fuel tank in front bomb bay (Rüstsatz B), or 1220 l in front bomb bay and 3680 l additional tank in rear bomb bay (Rüstsatz C)
ARMAMENT	4-5 Rheinmetal MG 15 drum feed 7,92mm machine guns or Mauser MG 81 belt feed 7,92mm machine guns, 1 Mauser MG 81Z twin 7,92mm machine gun and (optional) 1 MG 131 13mm heavy machine gun in some cases replaced by MG-FF 20mm cannon (field modification)
PERFORMANCE	
Speed	Max.speed 470 km/h at 5300 m with normal take-off weight Max. cruise speed 398 km/h at 5000 m Economical speed 370 km/h at 6000 m Landing speed 140 km/h
Climb time	23 min to 5400 m
Service ceiling	8200 m
Range	1790 km with total fuel capacity 3070 l at economical speed 2730 km with total fuel capacity 4030 l at economical speed
Take-off run	1800 m with normal take-off weight
Weights	9860 kg empty 12105 kg normal take-off 14000 kg max take-off
DIMENSIONS	
Wingspan	20,08 m
Length	14,36 m
Height	5,07 m

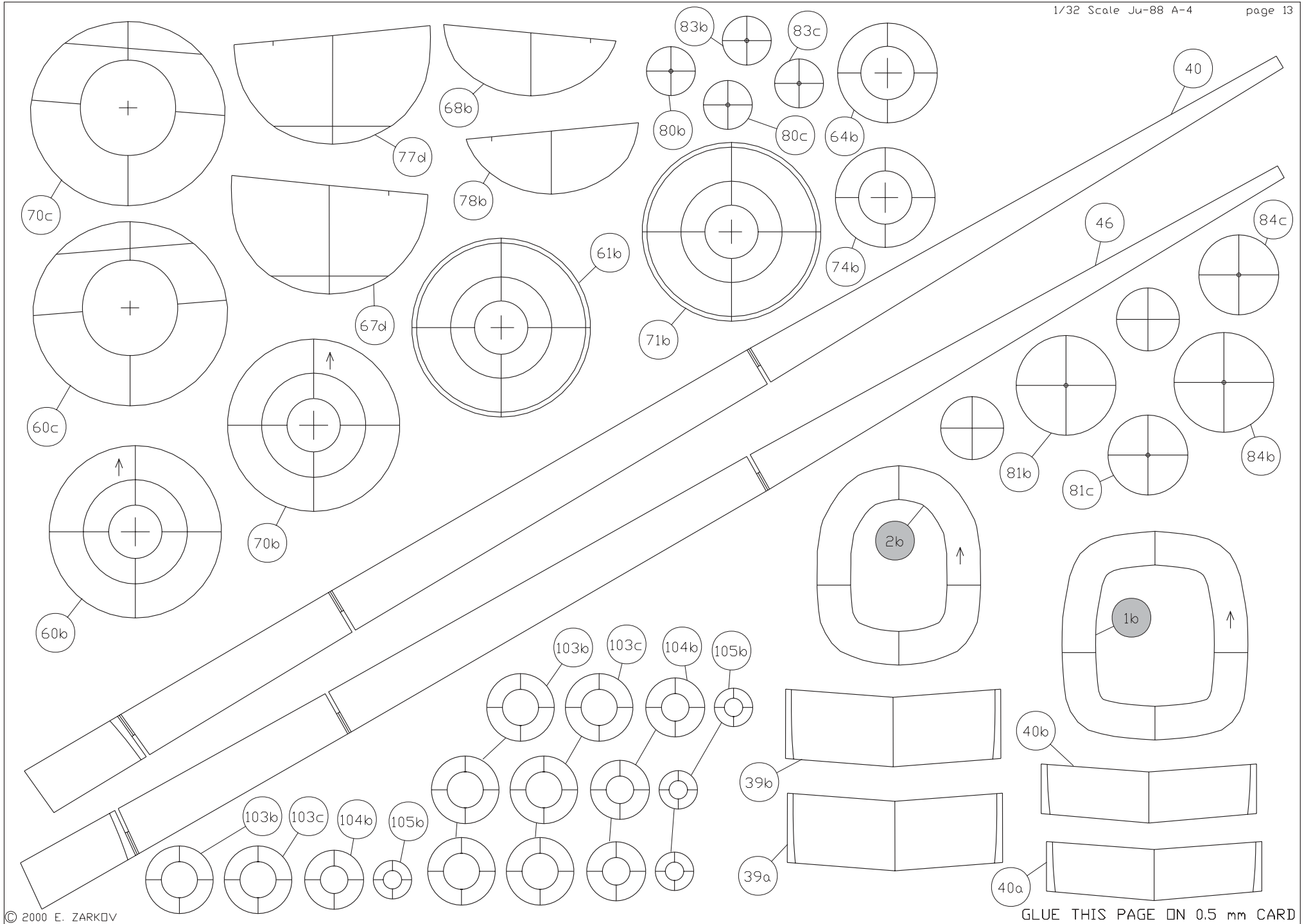
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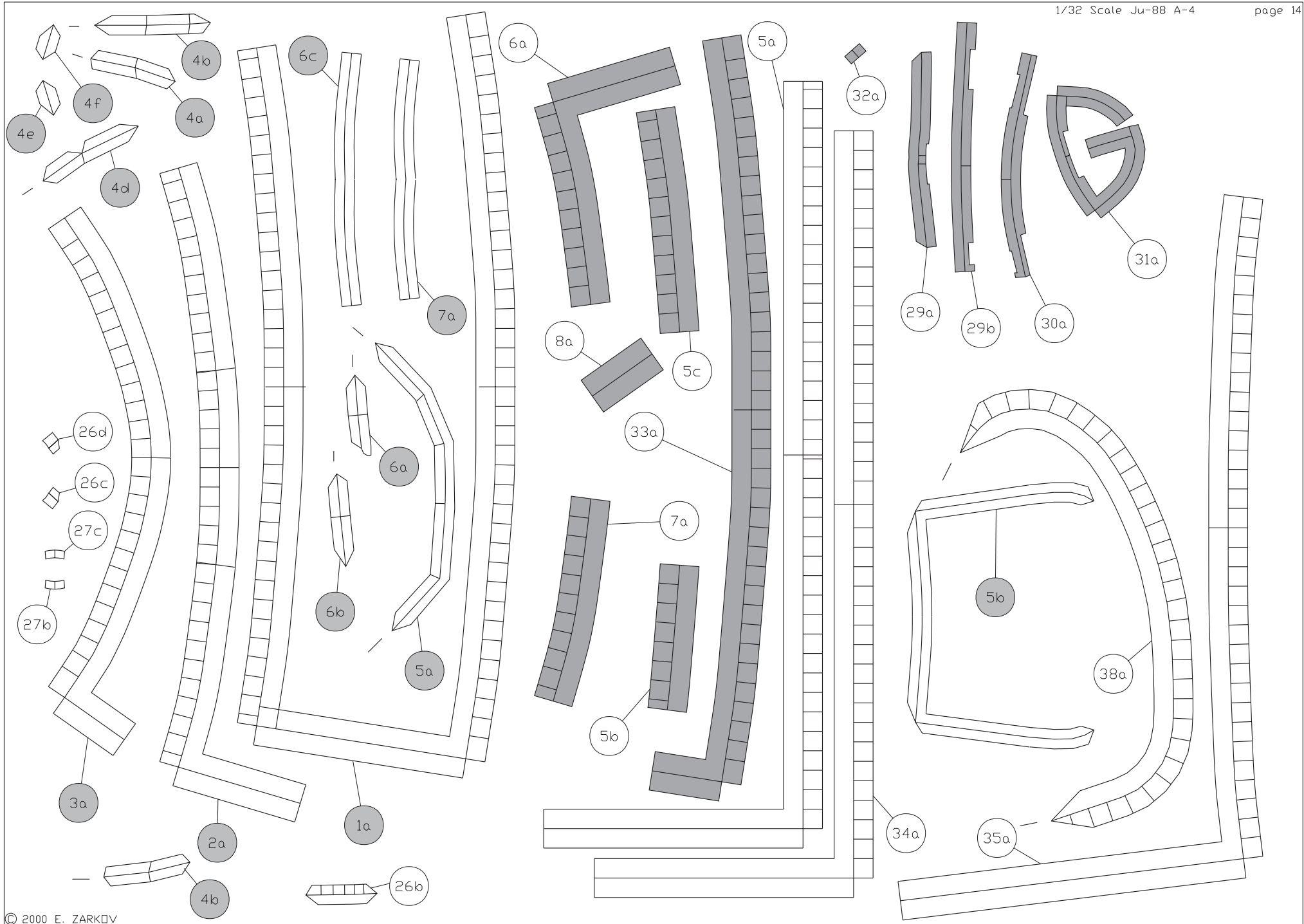
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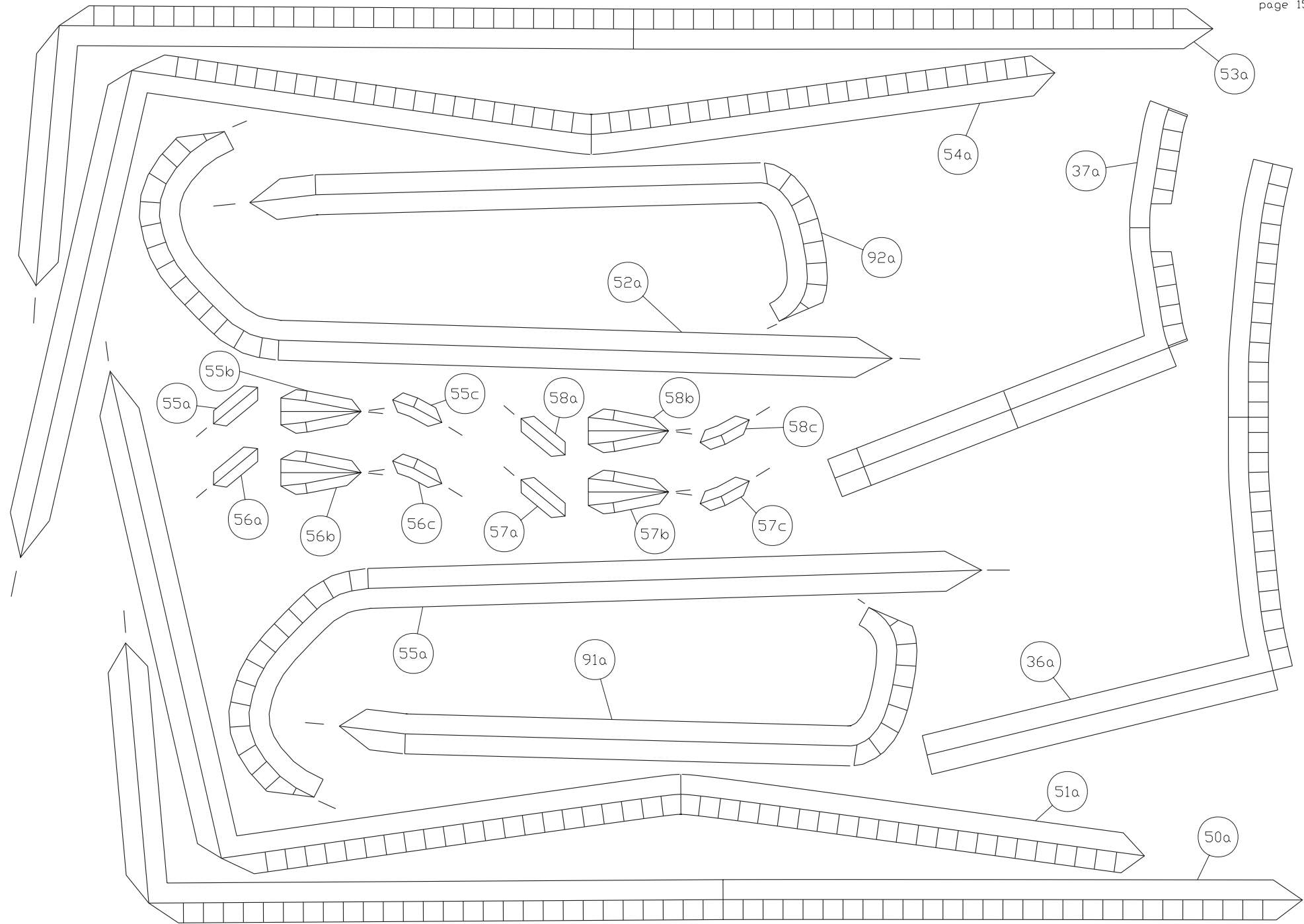


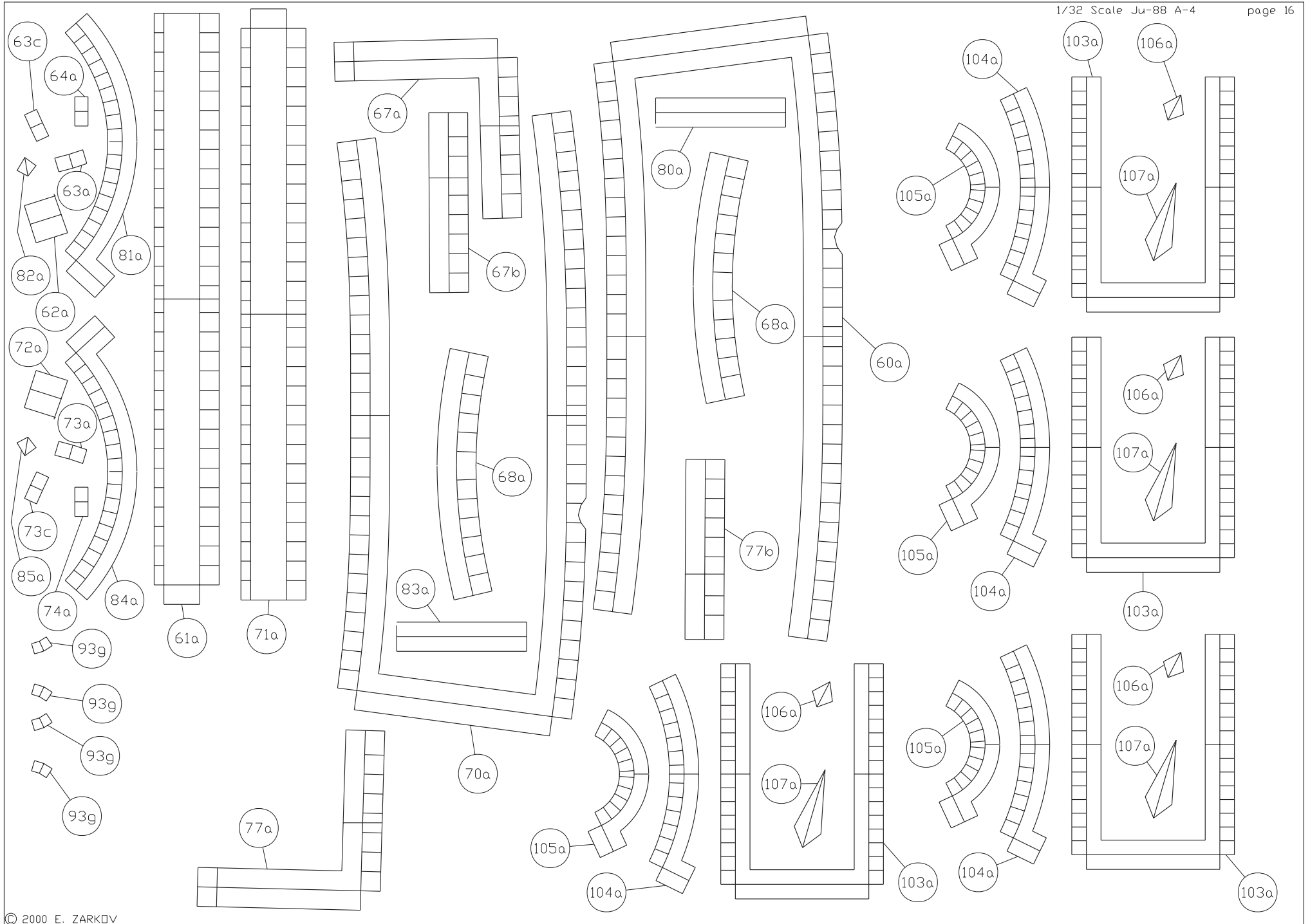


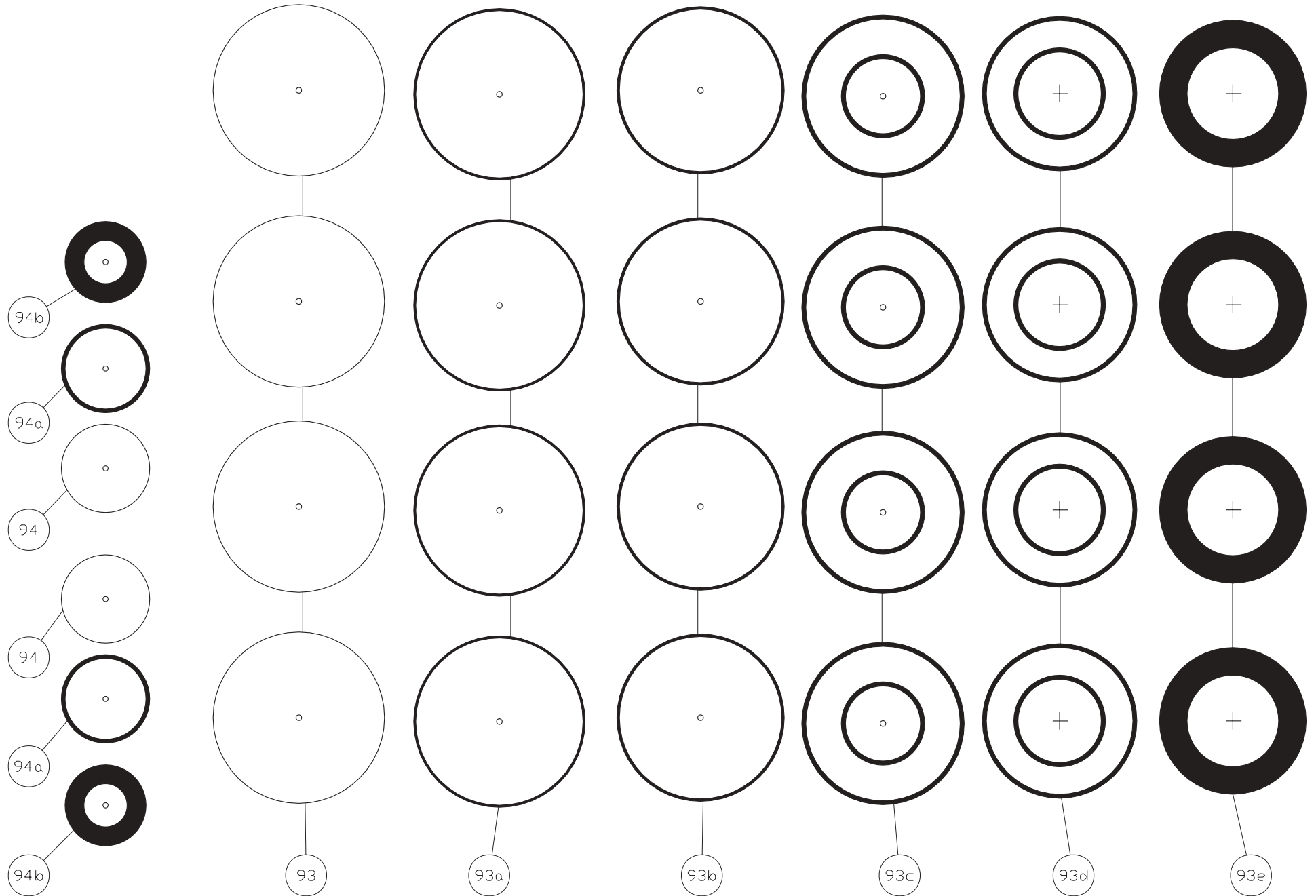


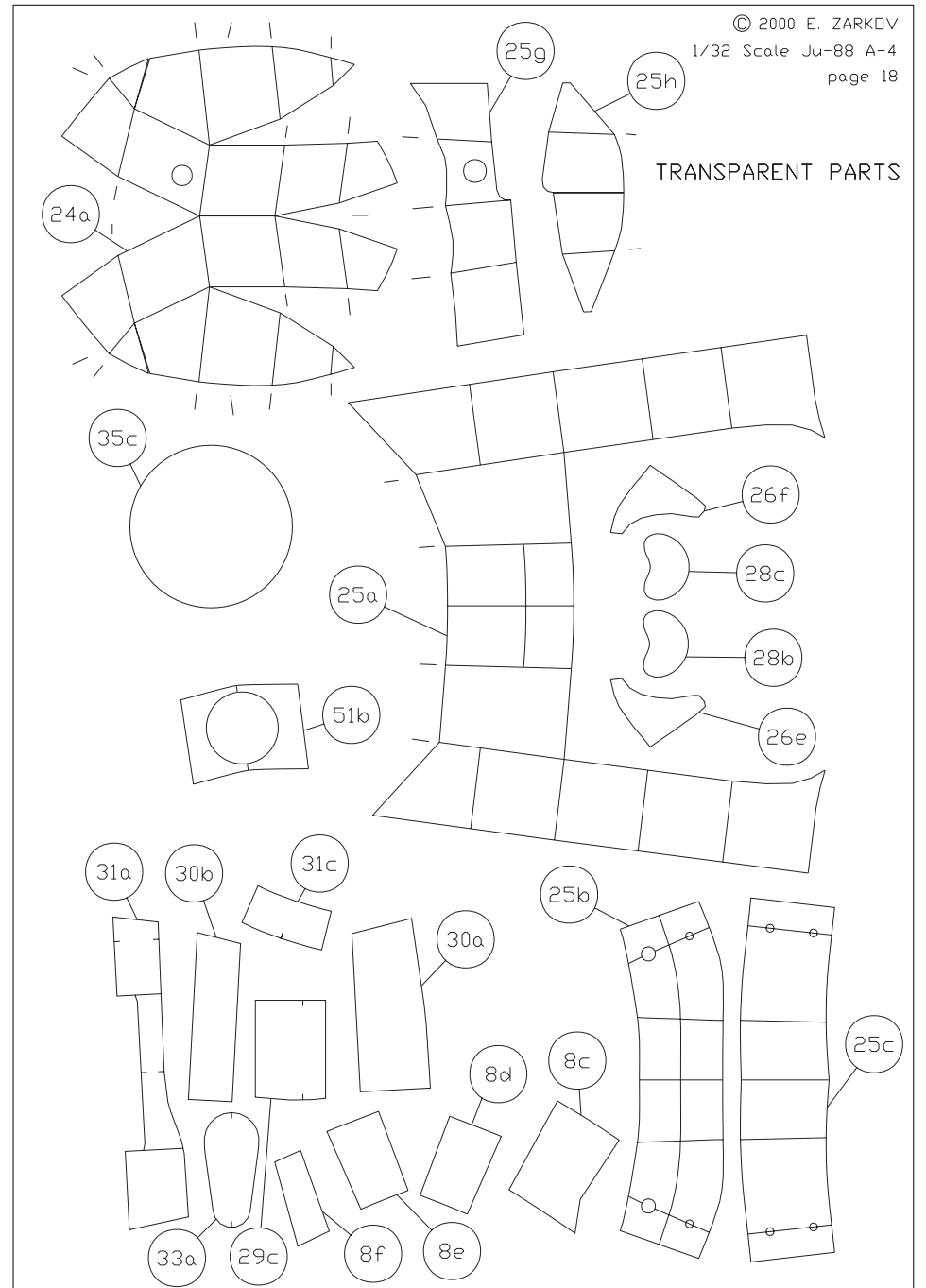
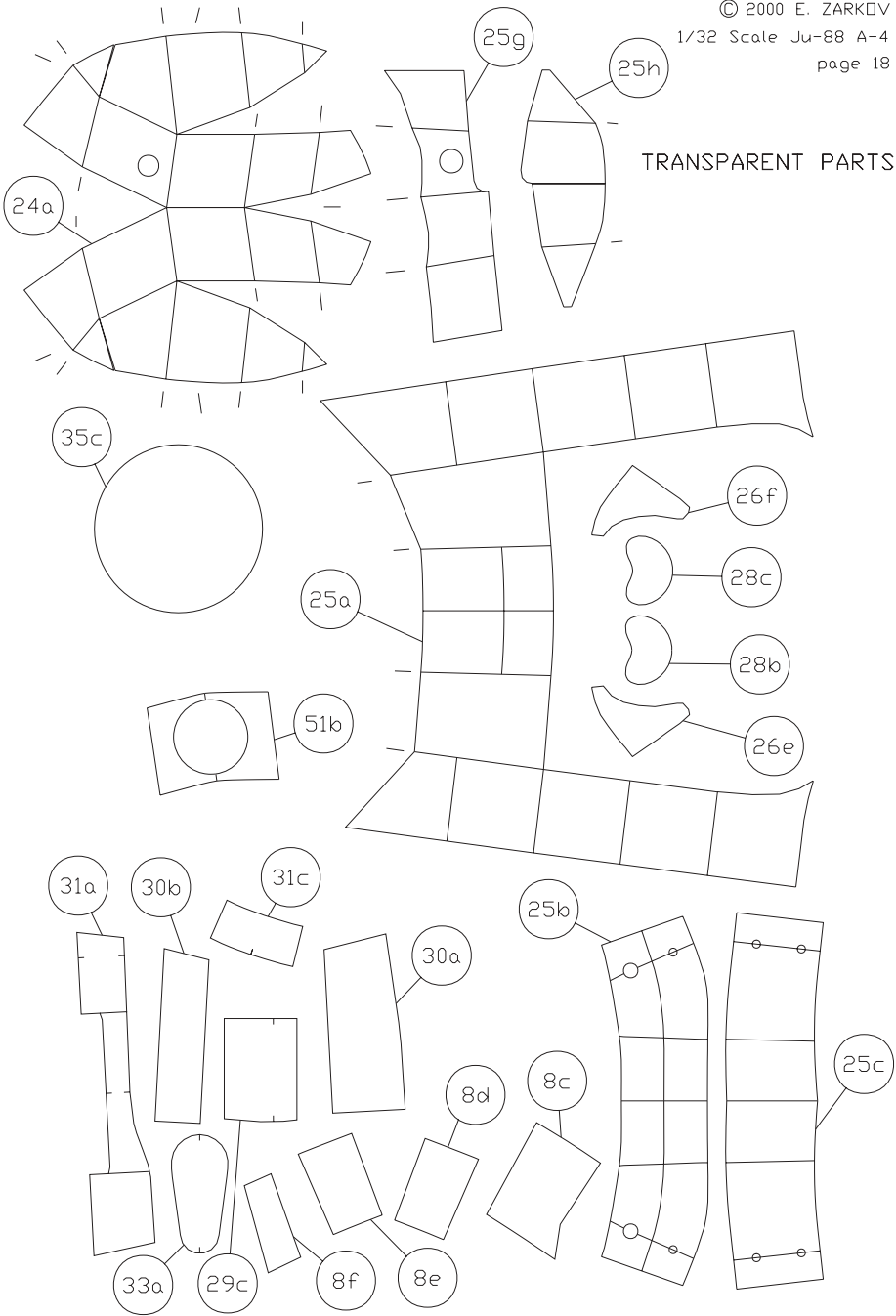


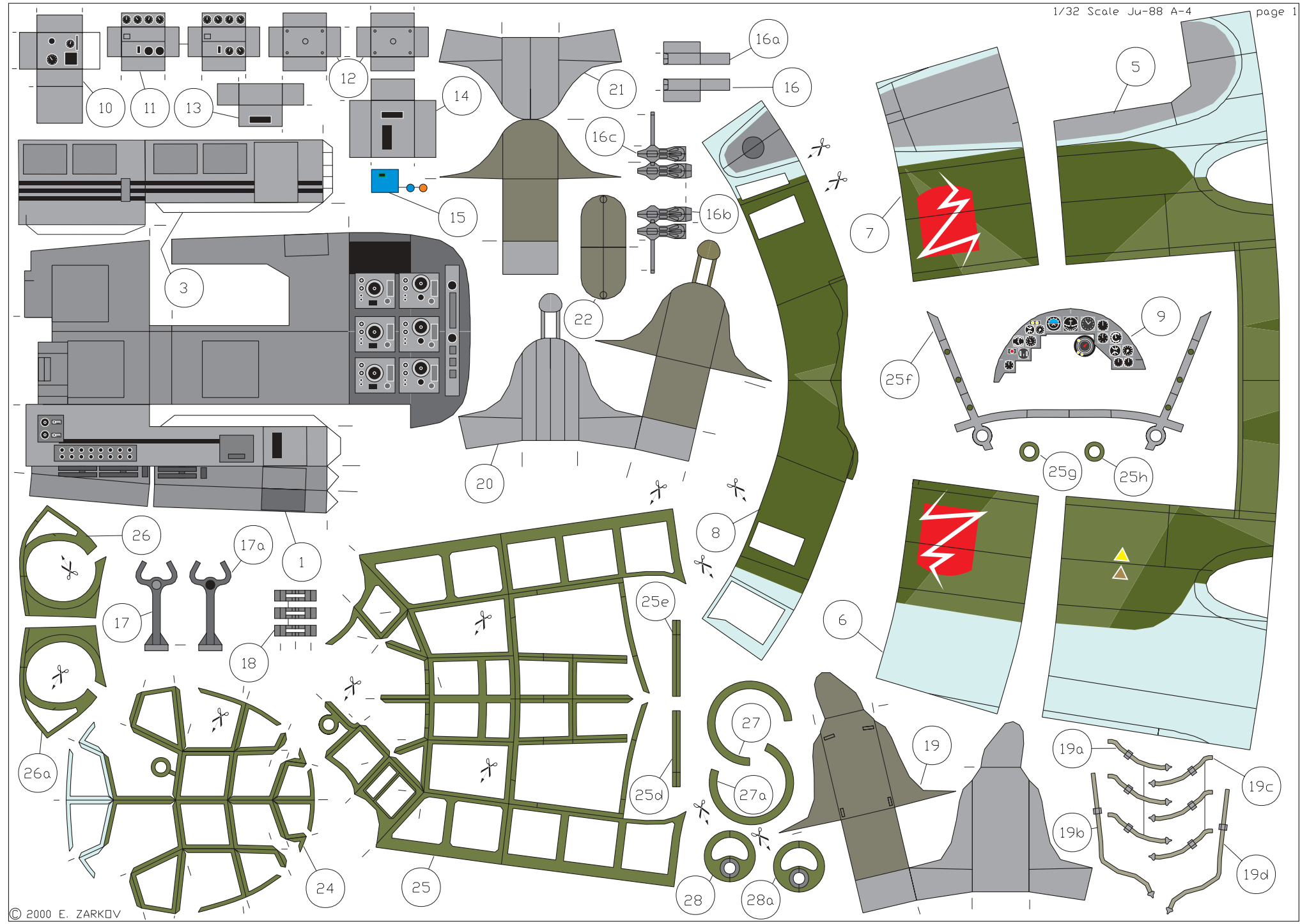




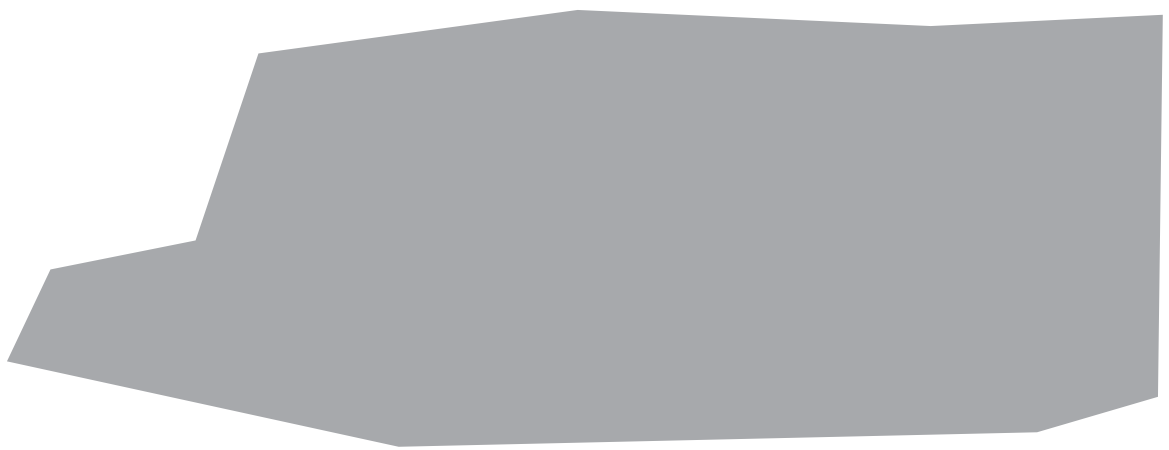


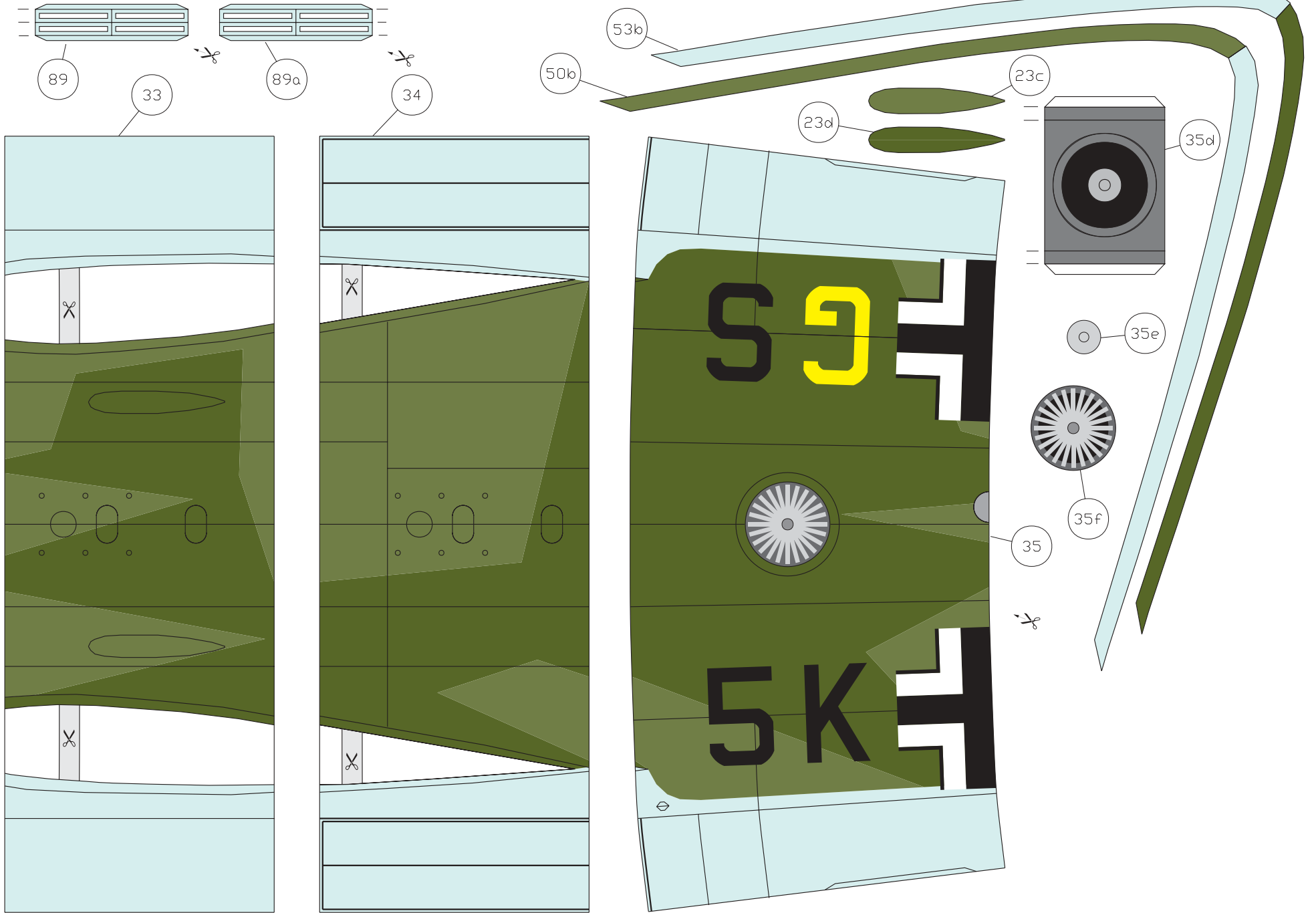


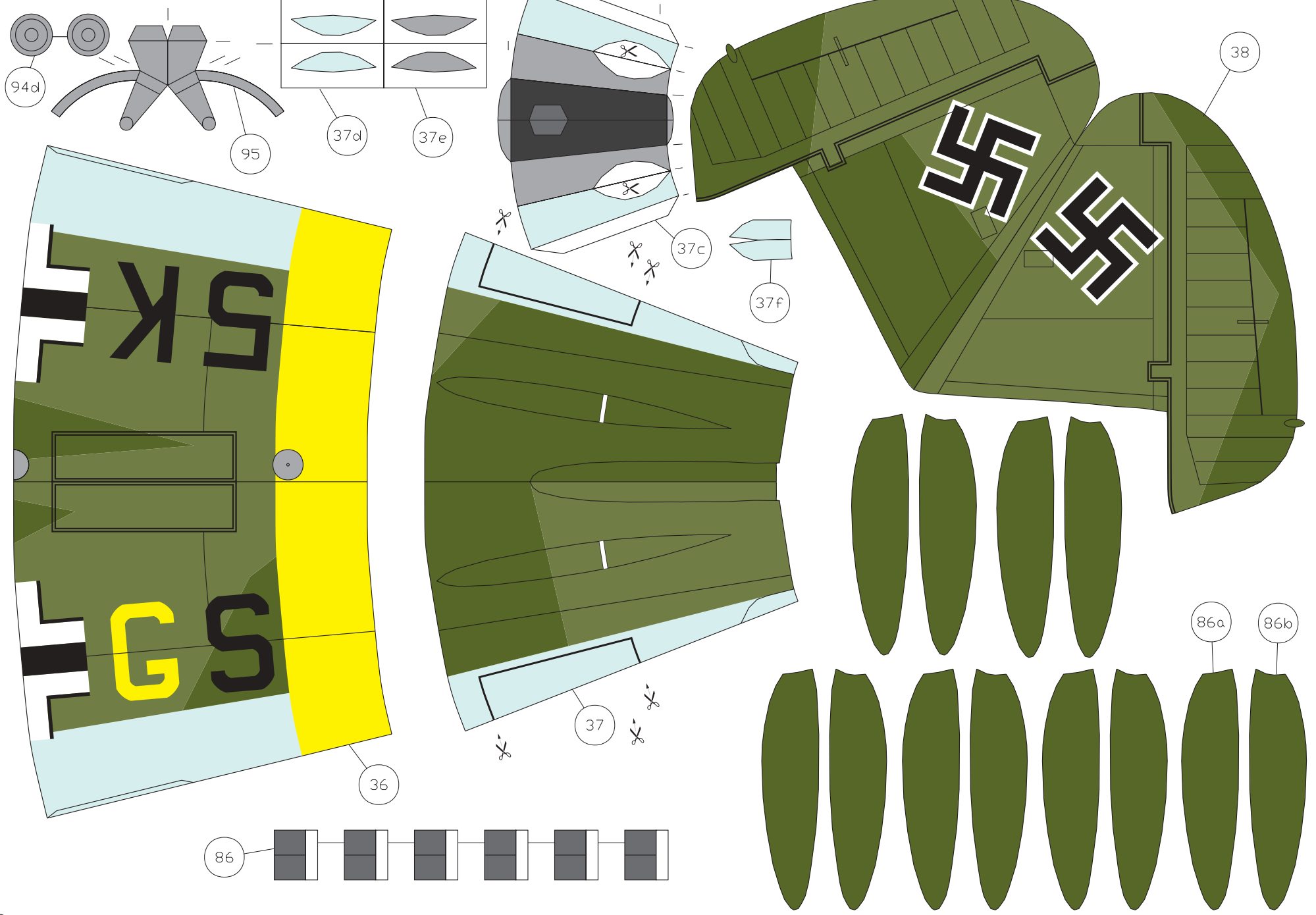


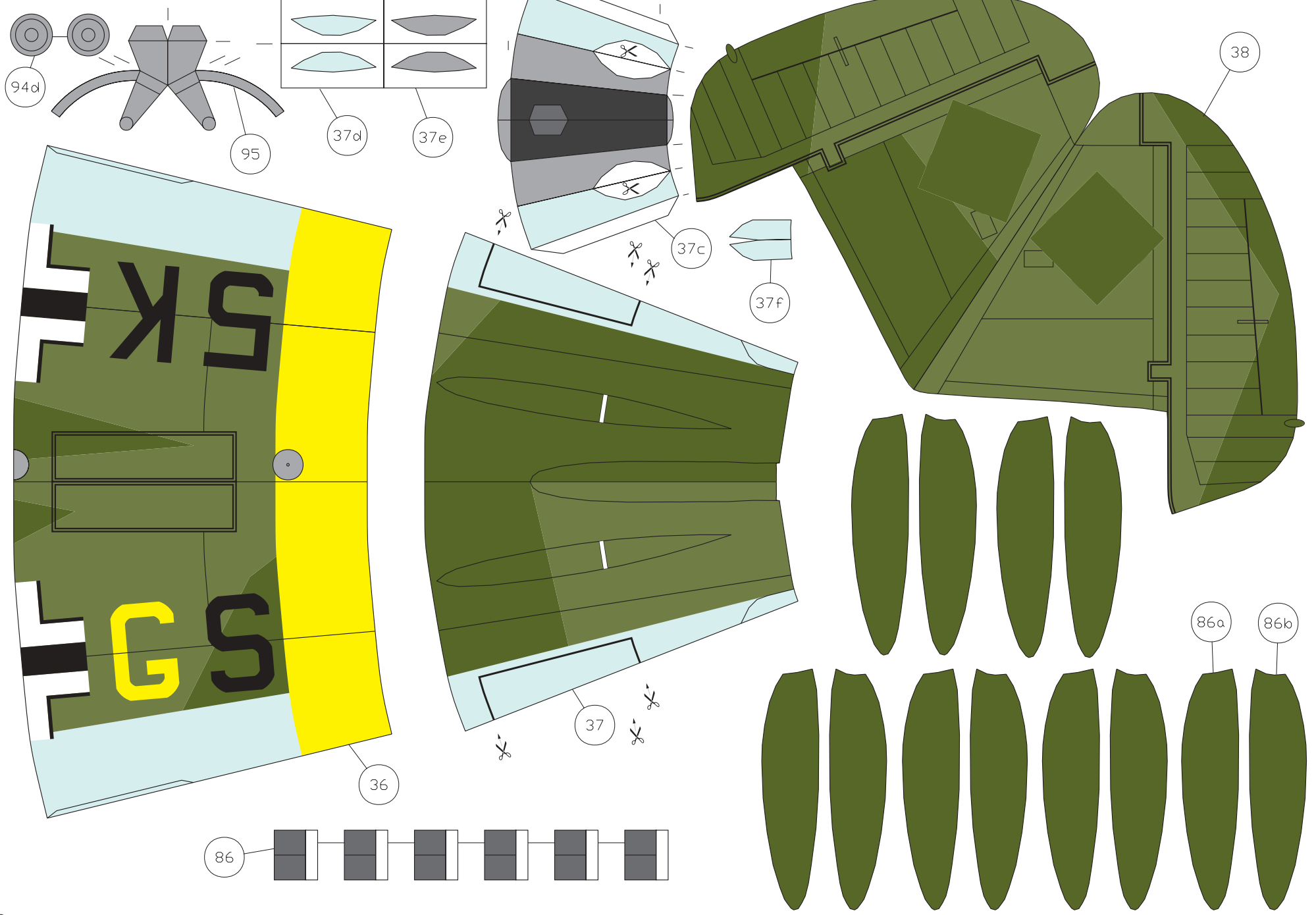


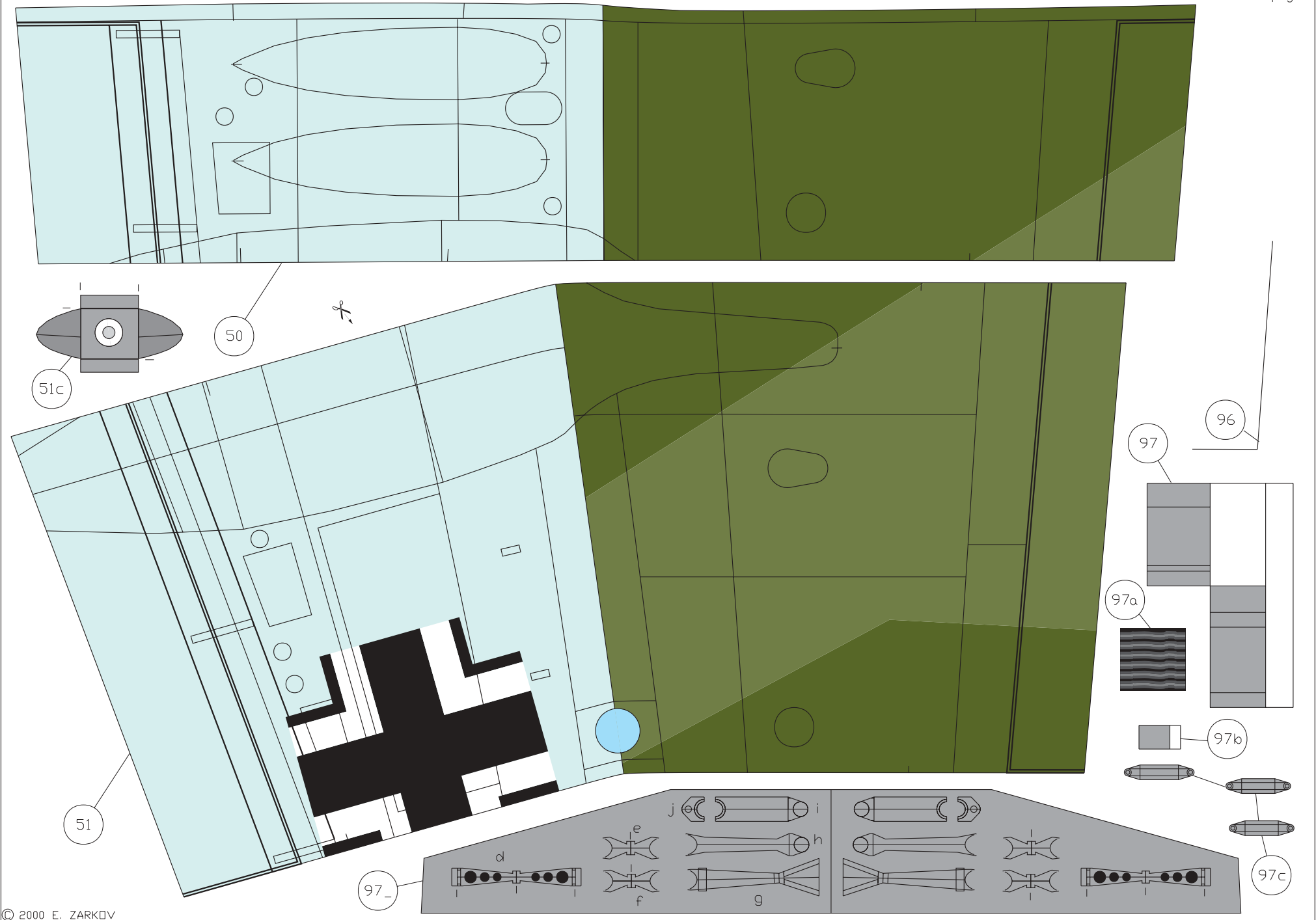


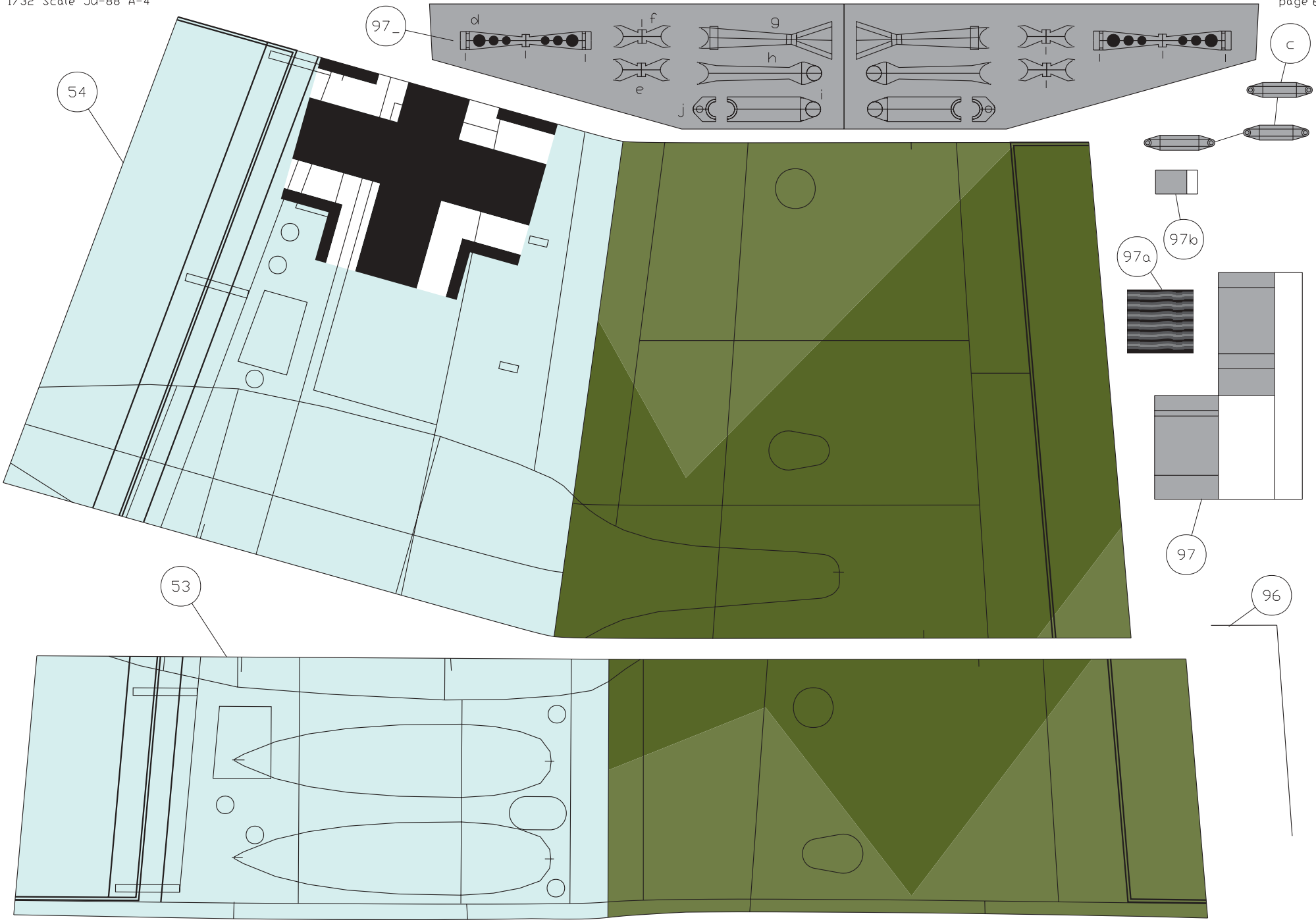


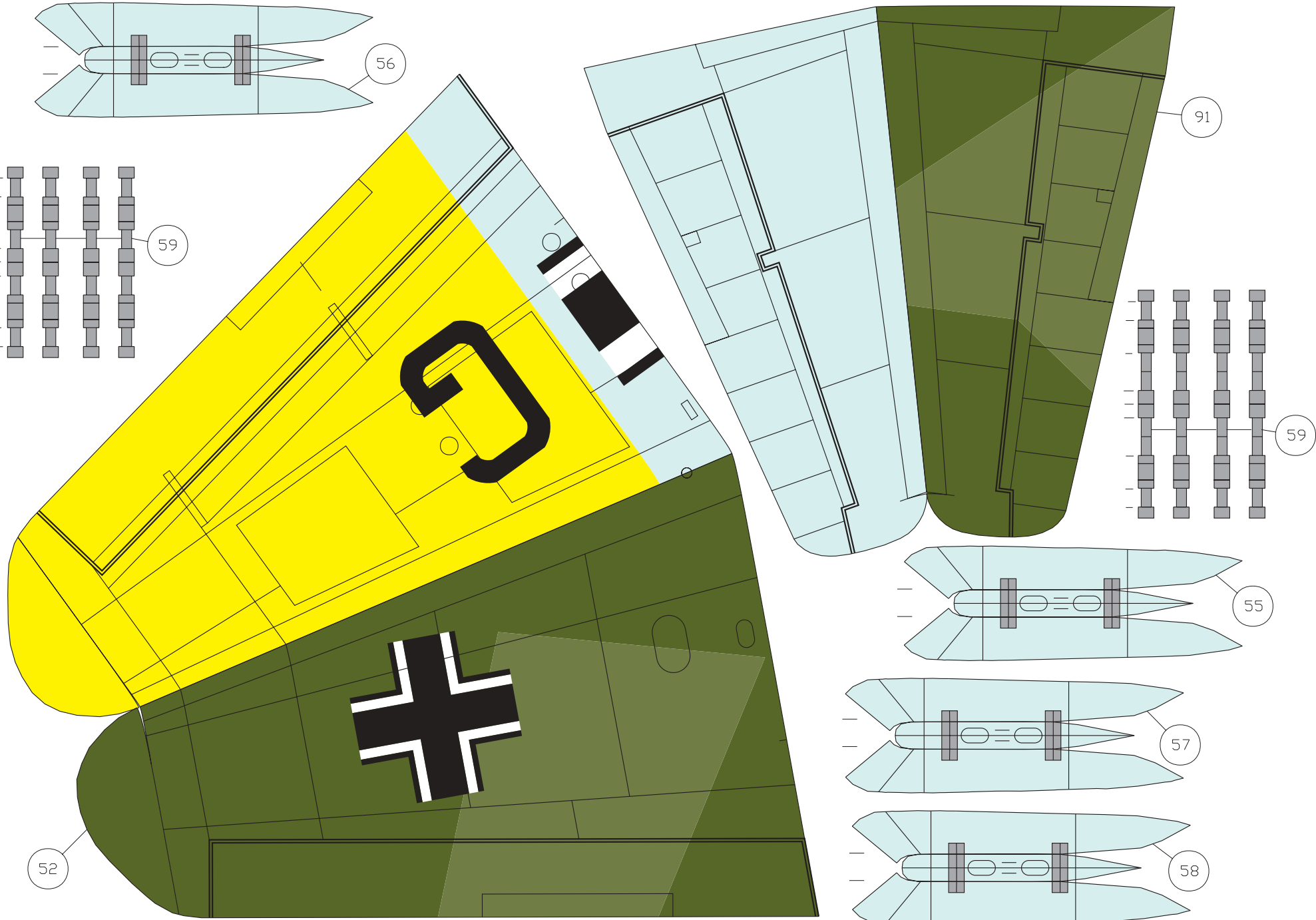


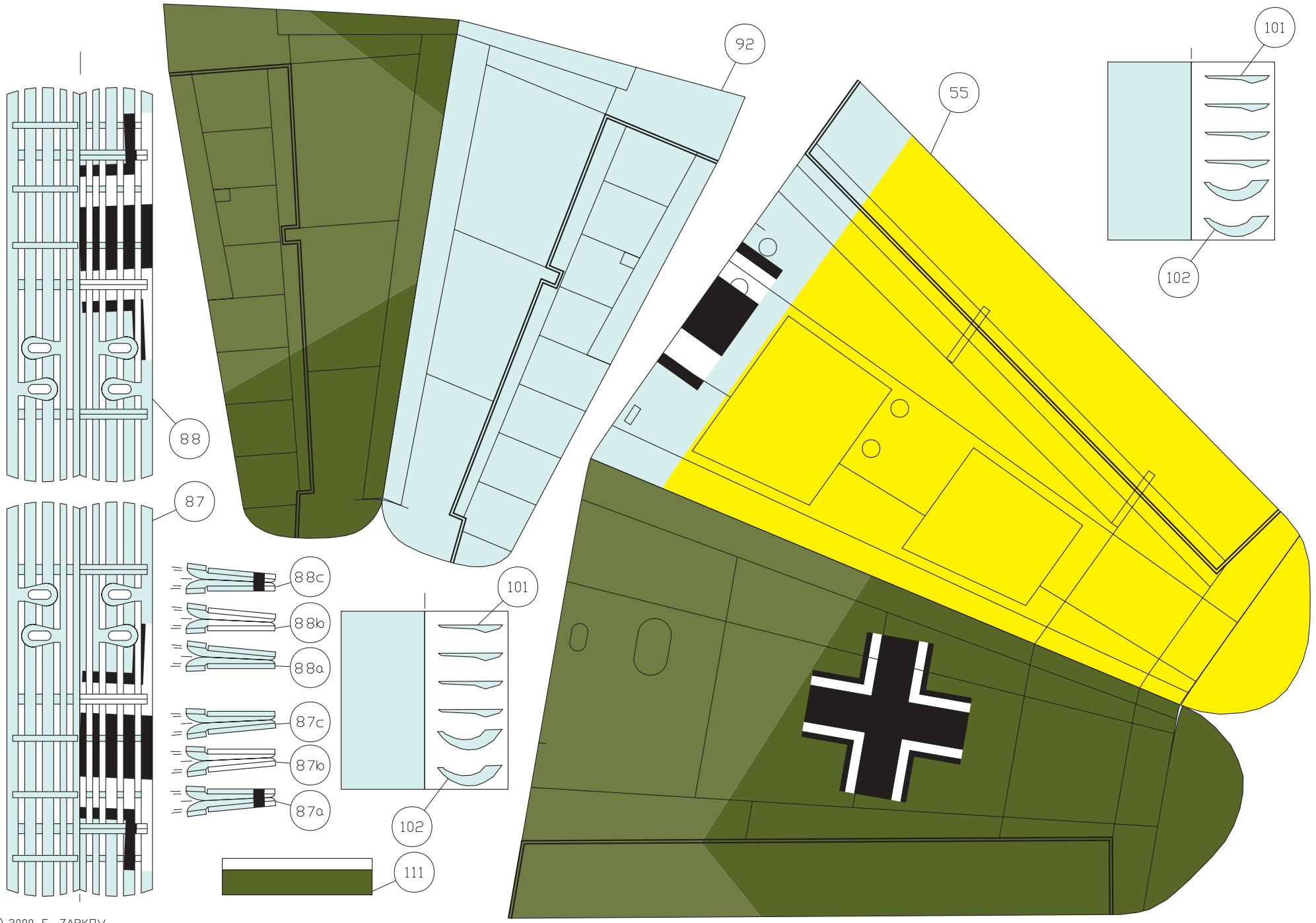


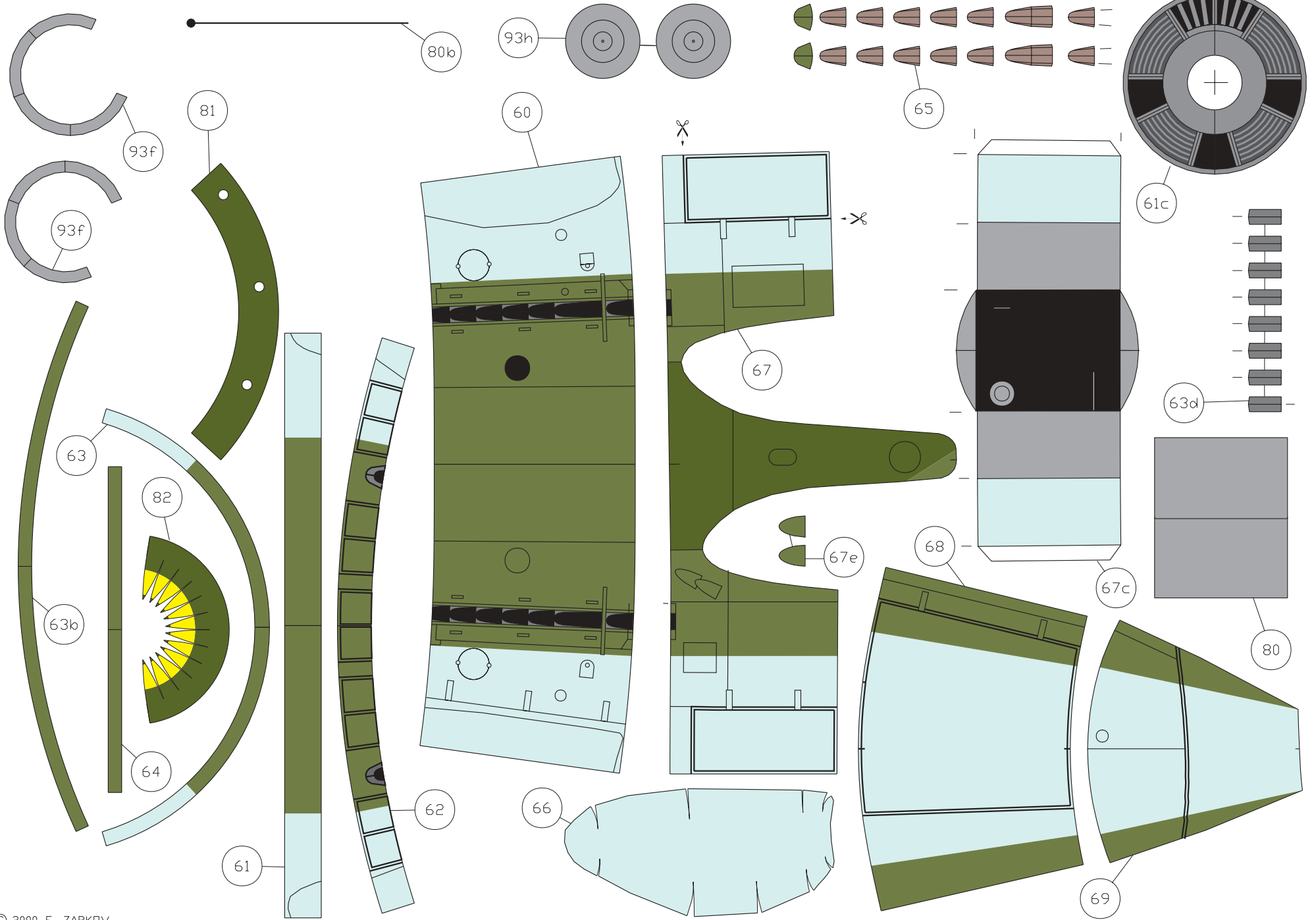












MASTERING *Junkers Ju-88 A-4*

Do not be in a hurry with gluing - carefully check and shape the details until obtain the exact and correct fit. Before starting the work get hold of the necessary tools:

**scissors, sharp modeling knife,
blunt knife for scoring the fold lines,
prickle, ruler, nippers**



The proposed Ju-88 A-4 model is designed as a classic paper kit and is relatively easy to be build. Despite its relative simplicity, a special attention and precision in the assembly procedure is required for achieving excellent results. Study carefully the illustrative drawings, cutouts and present instruction before starting the work on the model. Try to imagine the separate assembly phases and the purpose of each detail.



After the acquaintance with the model, you may start the assemblage. Follow the sequence given in the instruction.

Cut the necessary details shortly before using them in order to avoid possible mistakes. Score all fold lines before cutting the details. The places of scoring are marked with small thin lines on the continuation of fold lines outside the parts.



You can find detailed description of the model's building sequence in the assembly instruction supplied with this kit