

ASTRA SCALE MODELS LTD.
Box 1541, St. Catharines, Ontario, Canada L2R 7J9

Kit No 72002

AVRO CF-100 Mk.4/5 "CANUCK"

1/72 Scale

Designed to meet RCAF requirements for an all-weather, day or night fighter, capable of operating effectively in Arctic regions, the CF-100 was intended to counter the growing Soviet bomber threat of the late forties. The prototype first flew in January 1950 and the aircraft was taken on strength with the RCAF in 1953. Officially dubbed "Canuck", the aircraft's sturdy construction soon earned it the nick-name "Clunk".

Developed through Marks 1,2 and 3, the Mark 4B Canuck entered operational RCAF service in 1954. In 1956, four CF-100 squadrons were assigned to NATO service in France and West Germany in order to provide much needed all-weather capability. It was in this role that the Clunk demonstrated its superiority over the CL13 Sabres, which were frequently grounded due to foul weather. The CF-100 served with NATO in Europe until it was replaced by the CF-104 Starfighter in 1963.

Although it was essentially the same as the Mark 4B, the CF-100 Mark 5 had an up-rated Orenda engine, a three-foot extension on each wing-tip and an enlarged tailplane. The ventral gun pack was removed and the capacity of the rocket pods was increased. In 1957, Belgium acquired 53 Mark 5's and thus became the only other country to fly the aircraft. On the domestic scene, the Mark 5 continued in service with NORAD until 1963, when it was replaced by the CF101B Voodoo.

The Clunk continued to serve, in the Electronic Warfare role, with 414 Squadron, Canadian Armed Forces, until it was retired, after 31 years service, in December 1981.

Preamble

Before construction begins, decide whether to build the Mark 4 or 5; whether to install rocket pods or tip-tanks and whether to present the model in flying or standing configuration. For the CF-100 Mk4, install the shorter tailplane; remove the wing-tip extensions and use the fuselage underside with the ventral gun-pack. These are the three major differences between the Mk4 and 5; otherwise the aircraft are virtually identical. Note that in Canadian service, only the Mk.4 Clunks stationed in Europe were camouflaged; all others were natural metal.

General Instructions

- **READ** all instructions and **STUDY** all drawings and sketches thoroughly before cutting any plastic.
- Check the Reference List and assemble as much information and as many photos of the aircraft as possible.
- Wash all parts well (with dishwashing detergent) and rinse thoroughly before separating parts from carrier sheet.
- To separate components from backing sheet, carefully score around the edges with a sharp knife, leaving about 1/8" margin, and break them from the carrier sheet along the scored line.
- Prepare parts for assembly by rubbing down the mating edges on a sheet of Wet and Dry Paper (240 Grade) mounted on a flat surface. Use plenty of water and rub in a circular motion. Check constantly to avoid removing too much material.
- An ideal "rubbing surface" can be made by fastening a sheet of Wet and Dry Paper to a sheet of glass. Contact cement or "UHU Glu-Stick" are suitable adhesives - they are both water-proof. Avoid clogging the grit by rinsing frequently under water and scrubbing with an old tooth brush.
- "Dry-fit" all parts before cementing into place. Some components are deliberately oversize to allow for "draught" and should be "dressed" before assembly.
- Major construction should be completed with Liquid Styrene Cement, applied sparingly with a fine pointed brush. Also useful are the "cyano" glues - Cyanoacrylate Adhesives - eg: "Hot Stuff", "Super T", "Zap", etc. They are fast-drying, add considerable strength to a joint and will not "attack" styrene.
- Some parts, due to their shape, may be stretched very thin or "over-attenuated", (eg. intake spinners). Given the limitations of the vacu-form process, not much can be done to avoid this situation. However, such parts can be strengthened by filling them with "Five Minute Epoxy" or Epoxy Putty (eg. "Milliputt" or "A plus B").
- When preparing flying surfaces (eg. wings, tailplanes, rudder) a firm, straight length of balsa (applicator stick, stir-stick or popsicle stick) taped to the trailing edge, will evenly distribute pressure applied during the rubbing down process. Aim for a clean sharp edge.
- A well-stocked "Spares Box" may yield suitable replacements for some of the smaller items (eg. wheels, ejector seats). White metal accessories such as those produced by AeroClub Models may also be used, notably the AeroClub Martin Baker Mk2 Ejection Seat (Part No. EJ001).

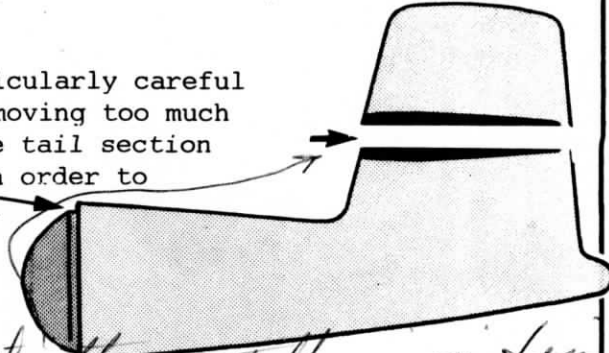
Construction

Study instructions before cutting any plastic!

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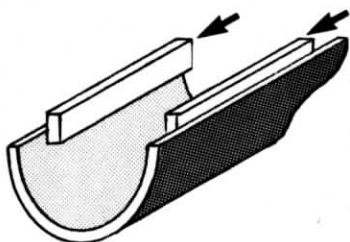
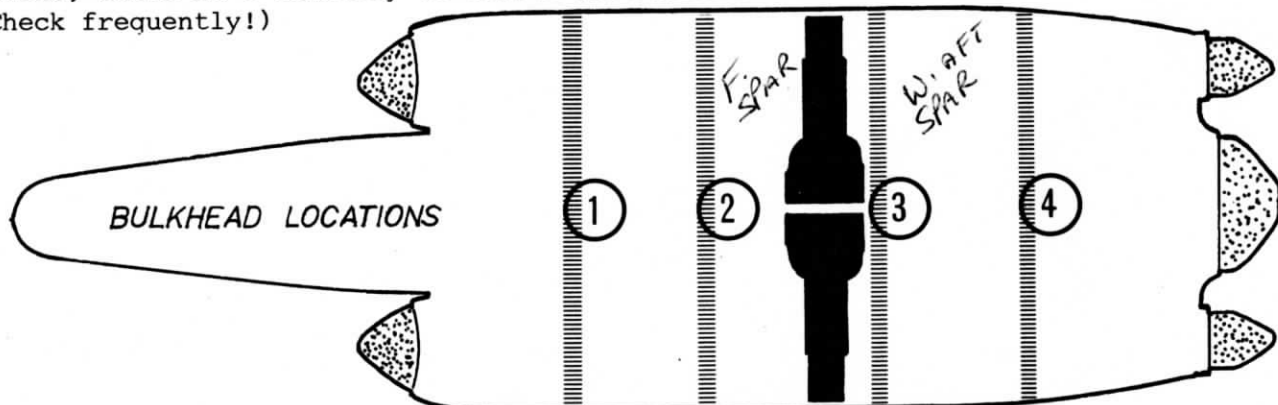
Commence "Clunking" with the stabilizer. Select and rub down the appropriate halves, paying close attention to the trailing edge, and cement together. Set the completed stabilizer aside for future reference.

Rub down the fuselage tail section. Be particularly careful with the trailing edge of the rudder and avoid removing too much material from other areas. The forward end of the tail section is critical and will later need to be "dressed" in order to achieve a clean fit with the rest of the fuselage. Cement the halves together, then carefully remove the top of the fin. This is to facilitate later installation of the stabilizer, but do not install it at this point.



Score before assembly then drill out after - stiffener in fin

Select the appropriate main fuselage halves (Mk. 4 or 5) and BEFORE removing them from the carrier sheet, install bulkheads as required. Some adjustments will be required in order to achieve a good fit, but their precise location is not critical; their purpose is structural, not cosmetic. The "Cyano" glues are recommended for this step. Be careful to keep the undercarriage bay area clear. When the bulkheads are secure, rub down the fuselage halves, paying particular attention to the edges along the engine nacelles - (because the part is wider at this point, there is a tendency to remove more material from here than from the nose. Check frequently!)



SET UP WING SPAR

When satisfied that the mating edges are correct, cement short lengths of scrap plastic inside each edge of the lower half to help locate the upper section. This will also help to strengthen the joint when the halves are joined, but DO NOT glue the halves together yet!

Trial fit the upper and lower halves and tape them securely together using masking tape. DO NOT GLUE! Remove the "cones" from the intakes and using the engraved lines as a guide, adjust the leading edge of the intakes with a sharp knife and wet and dry paper wrapped around a tapered rod (eg. paint-brush handle). Aim for a perfectly circular opening. This "hole" will appear to be oversize - it is deliberately so, in order to accommodate the intake liner which will be installed later in the proceedings. While the fuselage halves are still taped together, remove the exhaust 'extensions' and clean up the area.

Also, remove the large cone-shaped appendage at the aft end of the fuselage proper. A razor-saw is best used here - strive for a clean, straight edge. At this point, trial fit the tail section to the main fuselage assembly. It will be necessary to adjust the "shoulder" on the forward end of the tail section in order to achieve a stress-free joint. Do not force the pieces together, as this will only "spring" the upper and

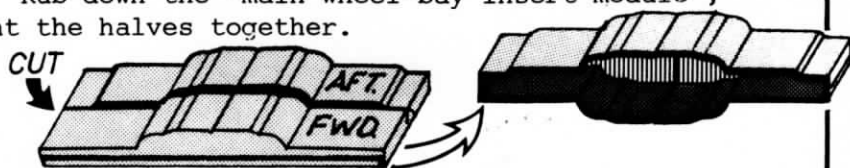


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lower main fuselage halves apart. Check carefully for lateral and longitudinal alignment. The engraved panel lines will assist in correctly locating the tail section in relation to the main fuselage. DO NOT CEMENT together yet! When satisfied with the fit of parts, set aside the tail section and remove the tape from the main fuselage halves.

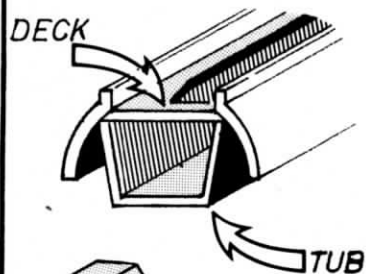
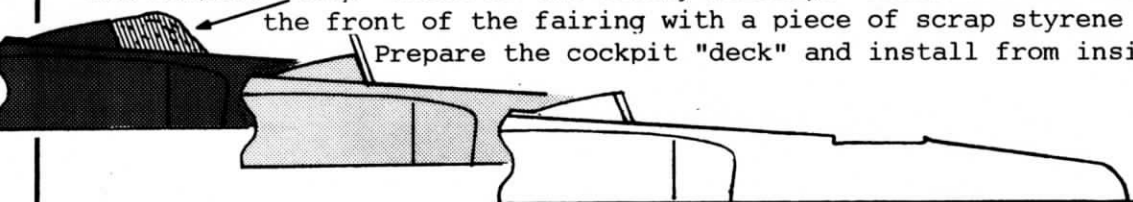
UNDERCARRIAGE BAY INSERTS: Remove the nose undercarriage bay insert from the sheet and set aside for future reference. Rub down the "main-wheel-bay insert module", saw in half along the step and cement the halves together.

Using the engraved lines and the inserts as guides, prepare the openings for the undercarriage bays. Aim for a snug, but stress-free fit. Do not cement these parts into place until after the top and bottom fuselage halves have been permanently joined.

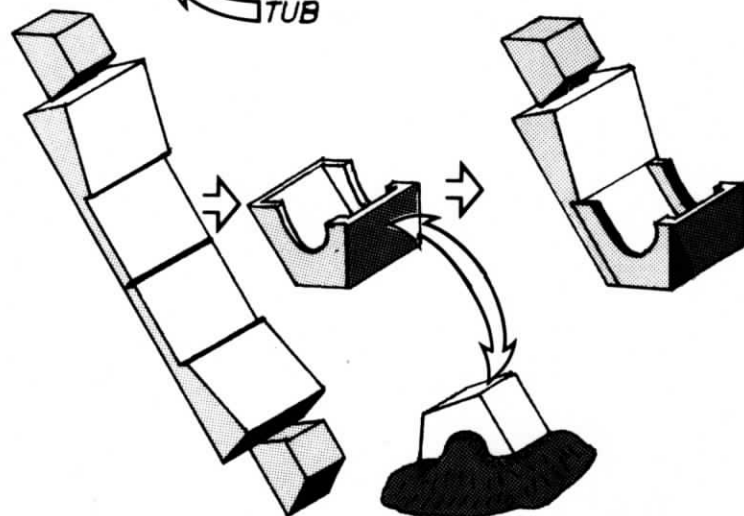


COCKPIT: Open up the cockpit area by cutting along the engraved lines and by removing the surplus "lump" ahead of the canopy fairing. Blank off the hole thus created at the front of the fairing with a piece of scrap styrene and trim to shape.

Prepare the cockpit "deck" and install from inside.

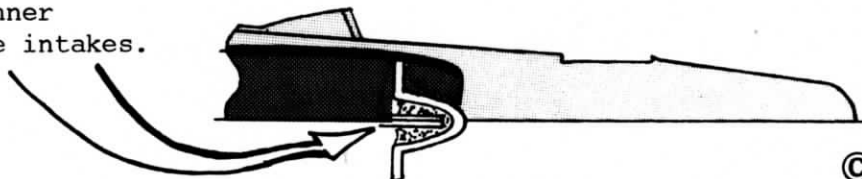


Prepare the cockpit "tub" and trim to fit from underneath (the back of the tub should be in line with the front of the fairing). Add the Navigator's and Pilot's instrument panels and detail as required.

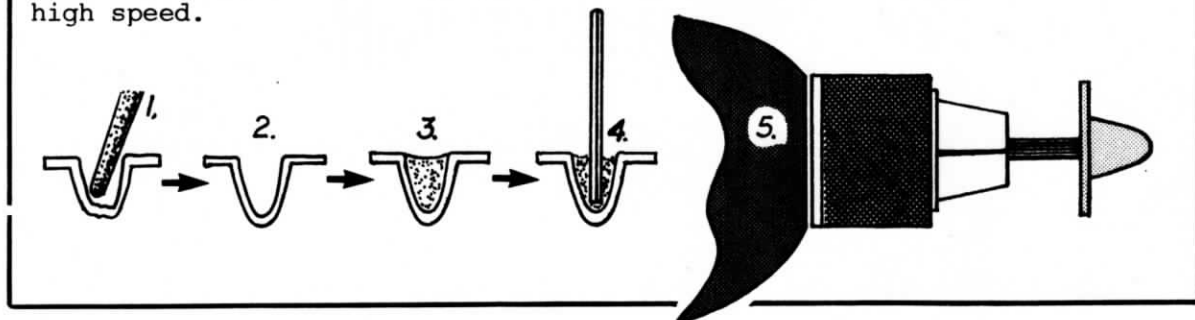


Complete the Ejector Seats by rubbing down the seat-back module and cutting in two along the engraved line. Cut out and trim the seat bottoms and cement to the seat backs. Add required detail from stretched sprue and fine wire. Set aside, for later installation.

Cut out and trim the intake spinner and fan assembly, (see note) and install these inside the fuselage top half, using drawings and panel lines on the kit parts for reference. The "fans" should be perpendicular to the kit join-line and the spinner should protrude slightly from the intakes. Check drawings.

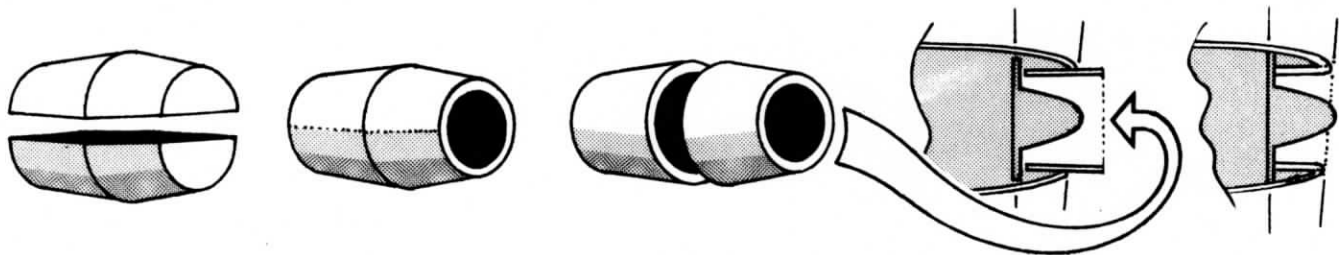


NOTE: If the spinners are over-attenuated and/or damaged, use a blunt instrument¹ to gently ease the part back into shape², then fill, from the back, with Five-Minute Epoxy or Epoxy Putty³. (Do not use lacquer-based body filler for this, since the lacquer will dissolve the styrene). Install a short piece of dowel or sprue in the epoxy before it "sets up" ensuring that it is perpendicular to the "fan"⁴. This will provide a convenient handle to use during the repair process; it could also be "chucked" in a variable-speed drill⁵ and turned, as in a lathe. Be careful, though, not to apply too much pressure and do not turn at high speed.



Add some weight to the nose in order to prevent "tail sitting". When satisfied with the cockpit area and with the undercarriage bay openings, cement the upper and lower fuselage halves together and set aside to dry thoroughly.

Meanwhile, rub down the intake liners and assemble the halves to produce a double-tapered tube. Strive for a perfectly circular cross-section. Remove the ends and saw in half around the centreline to yield two short, identical, open-ended slightly-tapered tubes. When the main fuselage assembly is thoroughly dry, insert an intake liner into each intake opening. Check carefully for head-on alignment and adjust if necessary. Cement the liners into place and, when dry, trim the leading edge of each intake. Use a sharp knife and wet and dry paper to achieve the correct profile. Check drawings.

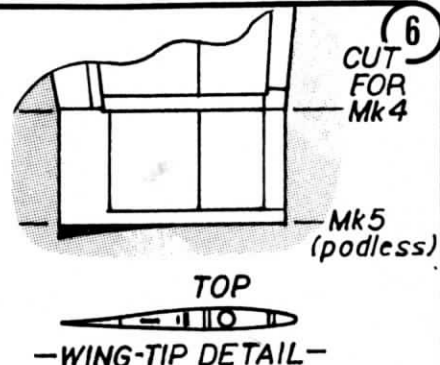


Cement the nosewheel and main undercarriage bay inserts into place and, when dry, trim to match the fuselage underside contours. When the assembly is dry, install a "wall" to separate left and right Main undercarriage bays. Add required detail from stretched sprue and fine wire.

When the main fuselage assembly is complete, cement the tail section into place. Check for proper alignment by constant reference to panel lines and to the drawings. Allow the assembly to dry thoroughly, then fill any gaps with light applications of body filler. Check for and repair any surface blemishes and restore any panel lines which have been obscured during assembly.

WINGS: Rub down the wing halves, paying attention to trailing edges. Since the top and bottom halves are quite similar, it is advisable to mark them in order to avoid confusion. Cement the appropriate halves together and when dry, clean up the wing roots in order to facilitate a good butt-joint with the fuselage. (Remove the wing tip extension if building a Mk.4)

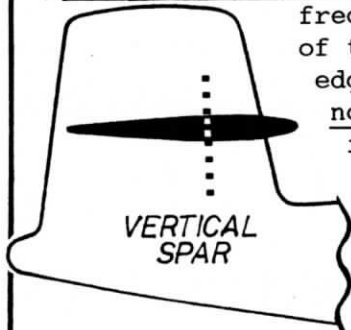
TIP TANKS AND ROCKET PODS: are optional. The aircraft can be accurately completed without them simply by "squaring off" the wing tips and adding appropriate details to the exposed tips (eg. access panels, fuel and electrical connections).



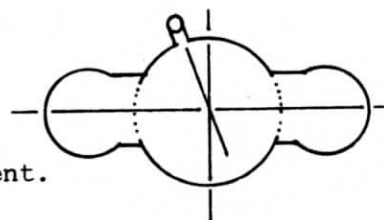
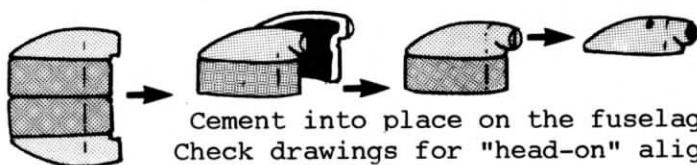
The CF-100 Mk.4 carried either tip tanks or rocket pods; the Mk.5 was more commonly seen with rocket pods. Prepare the required parts and cement top and bottom halves together. Refer to drawings for correct location and cement tanks (or pods) to wings. Sections of steel or brass pins could be used to strengthen the assembly.

WING/FUSELAGE ASSEMBLY: Make a spar from scrap material and slip it through the fuselage. Allow for 3° Dihedral. Assemble wings to fuselage - check drawings for correct location and check alignment of fuselage/wing panel lines. Note that the underside of the wing and the fuselage underside are generally a common surface. When the wings are secure, clean up the joint and fill any gaps with body filler. Use scrap styrene and filler to improve the trailing edge fillet.

STABILIZER INSTALLATION: Cement the stabilizer to the "sawn-off" rudder, checking frequently with drawings for proper location. Note that the centre of the leading edge of the stabilizer extends forward of the leading edge of the fin, and that the Trailing Edge of the stabilizer does not align with the Trailing Edge of the rudder. When the stabilizer is thoroughly dry, cement the top of the fin/rudder into place. check carefully for vertical and lateral alignment, using the Trailing Edge of the rudder as a DATUM LINE. A short piece of wire may be used as a vertical spar.



FUSELAGE AIR INTAKE: Rub down the fuselage air intake module, saw in half and cement the halves together. Open up the intake with a small drill bit and needle files. Trim the base of the intake using the engraved lines and the drawings as a guide.



UNDERCARRIAGE: Rub down and assemble the u/c legs. Add any required detail (eg. hydraulic lines, torque links). Rub down and assemble wheel halves. Assemble wheels to legs with short sections of steel pin and Cyano glue. Check drawings. The u/c legs are all extra long to facilitate installation. Drill an appropriate size hole in each u/c bay and insert the leg. Adjust the length according to drawings and glue into place with Cyano. The u/c doors can be cut from the unused fuselage underside.

Install Ejector Seats, using shims of scrap plastic to adjust height and angle. Complete cockpit detailing as required.

CANOPY: Two canopies are provided in the kit - just in case...Separate the canopy unit from the sheet and trim. Install with white glue.

The smaller item on the canopy sheet is the navigator's windscreen. Trim carefully to shape using the engraved lines as a guide and install on the cockpit deck behind the pilot's ejector seat and over the navigator's instrument panel.

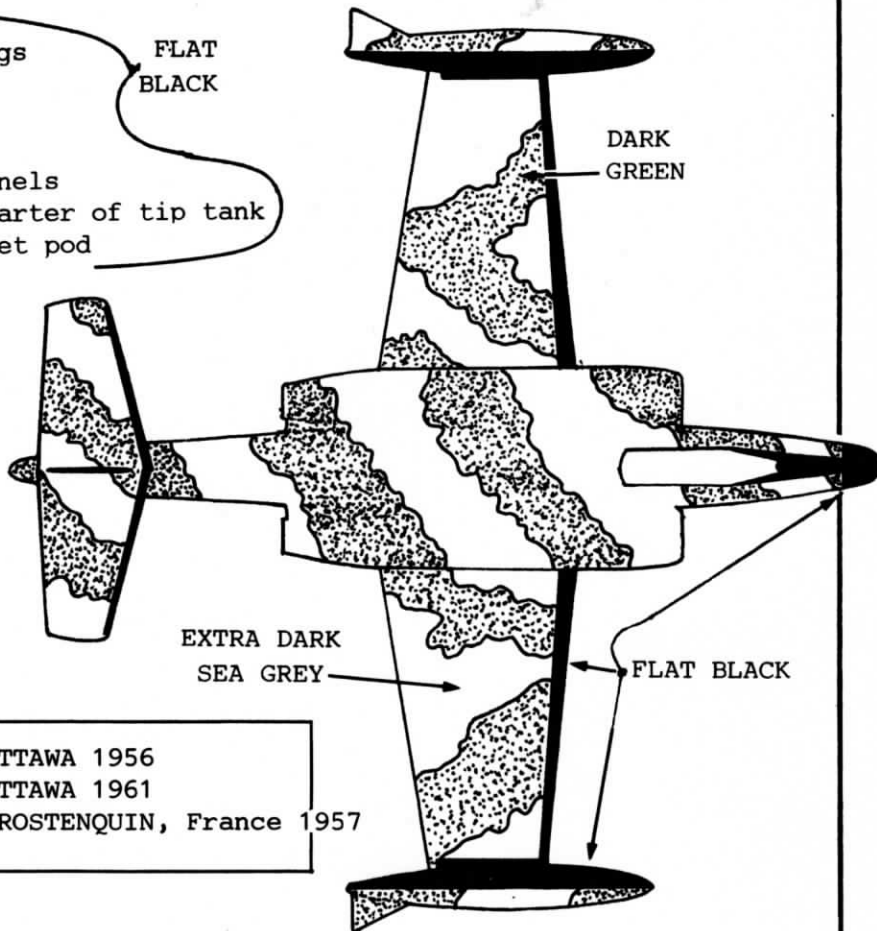


Colour & Markings

Most of the Clunks (eg. HG 356, HG 580) were natural metal overall, except for the following details:

- top and leading edge of fin
- leading edge of stabilizer and wings
- fuselage anti-glare panel
- nose cone
- windscreen frame
- cockpit consoles and instrument panels
- anti-glare panel on top inboard quarter of tip tank
- nose cone and tail section of rocket pod
- cockpit interior - LIGHT GREY
- undercarriage legs - LIGHT GREY
- wheel hubs - NATURAL METAL
- undercarriage bays - ZINC CHROMATE

Those aircraft assigned to NATO service in Europe (eg. NQ 389) were camouflaged in typical NATO colours: Extra Dark Sea Grey and Dark Green upper surfaces; Light Grey undersides.

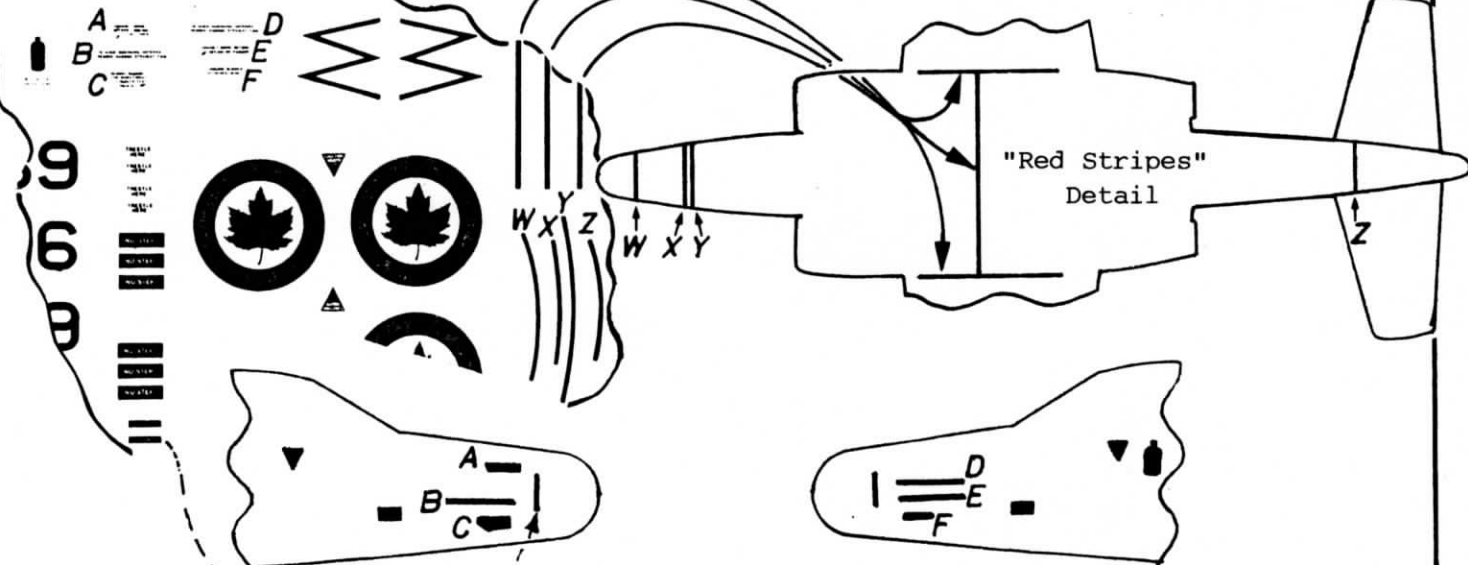


- HG 356 (Mk 4B)- 428 (Ghost) Sqdn. OTTAWA 1956
- HG 580 (Mk 5) - 428 (Ghost) Sqdn. OTTAWA 1961
- NQ 389 (Mk 4B)- 423 (Eagle) Sqdn. GROSTENQUIN, France 1957

DECALS: Check decal location by referring to the big drawing and the detail sketches below. Trim each decal as CLOSE to the outline as possible.

CF-100 CANUCK

- MARK 4 -
- MARK 5 -



Acknowledgements

ASTRA SCALE MODELS LTD. is grateful for the invaluable assistance provided by:

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Acknowledgement is also made to Howard McLean of Arrow Graphics, who provided, under contract, the excellent art-work for the decal sheet and for the scale drawings.

References

There are currently three excellent books about the CF-100:
"The Avro CF-100" by Larry Milberry - Canav Books 1981
"Canuck" by Ron Page - Boston Mills Press 1981
"Canucks Unlimited" by Bob Baqlow - Canuck Publications 1985

Each book contains a detailed history of the aircraft, dozens of black and white and colour photographs, technical drawings and colour profiles.

Available from: The Hangar Bookshelf, - or - Hobby House,
P.O.Box 1513, 89 Montreal Road, Vanier,
Belleville, Ontario Ottawa, Ontario
Canada. K8N 5J2 Canada. K1L 6E8

"Canucks Unlimited" may be purchased directly from the publisher:
Canuck Publications, 35 Glen Avenue, Ottawa, Ontario, Canada. K1S 2Z6
PRICE: \$19.95 Cdn. plus \$1.50 p.&p.

Other useful references include:

- Fighters of the Fifties - Gunston
- Air Fan # 20,21 - June, July 1980
- Aeroplane Sept. 1978
- Air Enthusiast Quarterly #4
- Flying Review Aug. 1960
- Flying Review Jan. 1957
- Flying Review Jan. 1956
- Flying Review Sept. 1955

Also highly recommended, as a general reference on vacuform modelling, is: "Building and Improving Vacuum-Formed Model Aircraft" by Richard Staszak: Published by Kalmach Books, 1027 North Seventh St. Milwaukee, WI 53233; Price \$6.95 (U.S.)