

Lockheed

NF-104A **Aerospace Trainer**



Original model design by Kancho
Modified and repainted by Ashrunner
With assistance from NOBI

Release through the kind permission of Kancho

October 2006

The NF-104A

The NF-104A was a modified F-104A used by the USAF Test Pilot School for high altitude work. It was fitted with a 6,000 lb thrust, LR-121/AR-2 rocket motor which give the NF-104 the ability to zoom climb to 1200,000 ft - literally to the edge of space. Three F-104As (56-756, 56-760 and 56-762) were converted to the NF version.

The differences between the standard F-104A and the NF-104A were the tail mounted rocket engine, the increased chord fin and rudder assembly (same as the one on the F-104B and the later G), increased wing span, revised intake shock cones for higher mach numbers, and small reactive rockets around the nose and on the wings.

A typical flight had the aircraft climbing to 35,000 ft where the rocket engine was ignited. The jet engine was shut down at 80,000 feet and restarted on the way down below 60,000 ft. Control in pitch and yaw at these altitudes was accomplished with hydrogen peroxide reaction control jets. This system was also used to maneuver the X-15 and manned space capsules orbiting the earth. On November 1963, Major R.W. Smith set an altitude record of 118,600 feet. Smith also took the NF-104 to 120,800 feet the following month but Guinness did not accept it because the flight did not exceed the previous record by 3 percent as required by FAI for world records.

On December 10, 1963, the second NF-104A (56-762), with Chuck Yeager at the controls, went out of control at an altitude of 104,000 feet and fell in a flat spin to 11,000 feet. Yeager managed to eject successfully at 8,000 ft., but was badly burned on his face by the rocket motor of his ejector seat. The aircraft was destroyed in the ensuing crash. An investigation later showed that the cause of the crash was the aircraft going into a spin because of excessive angle of attack and lack of aircraft response. The excessive angle of attack was not caused by pilot input but by a gyroscopic condition set up by the J79 engine spooling after shut down for the rocket-powered zoom climb phase.

More information on the crash can be found at <http://www.batnet.com/mfwright/nf104.html>



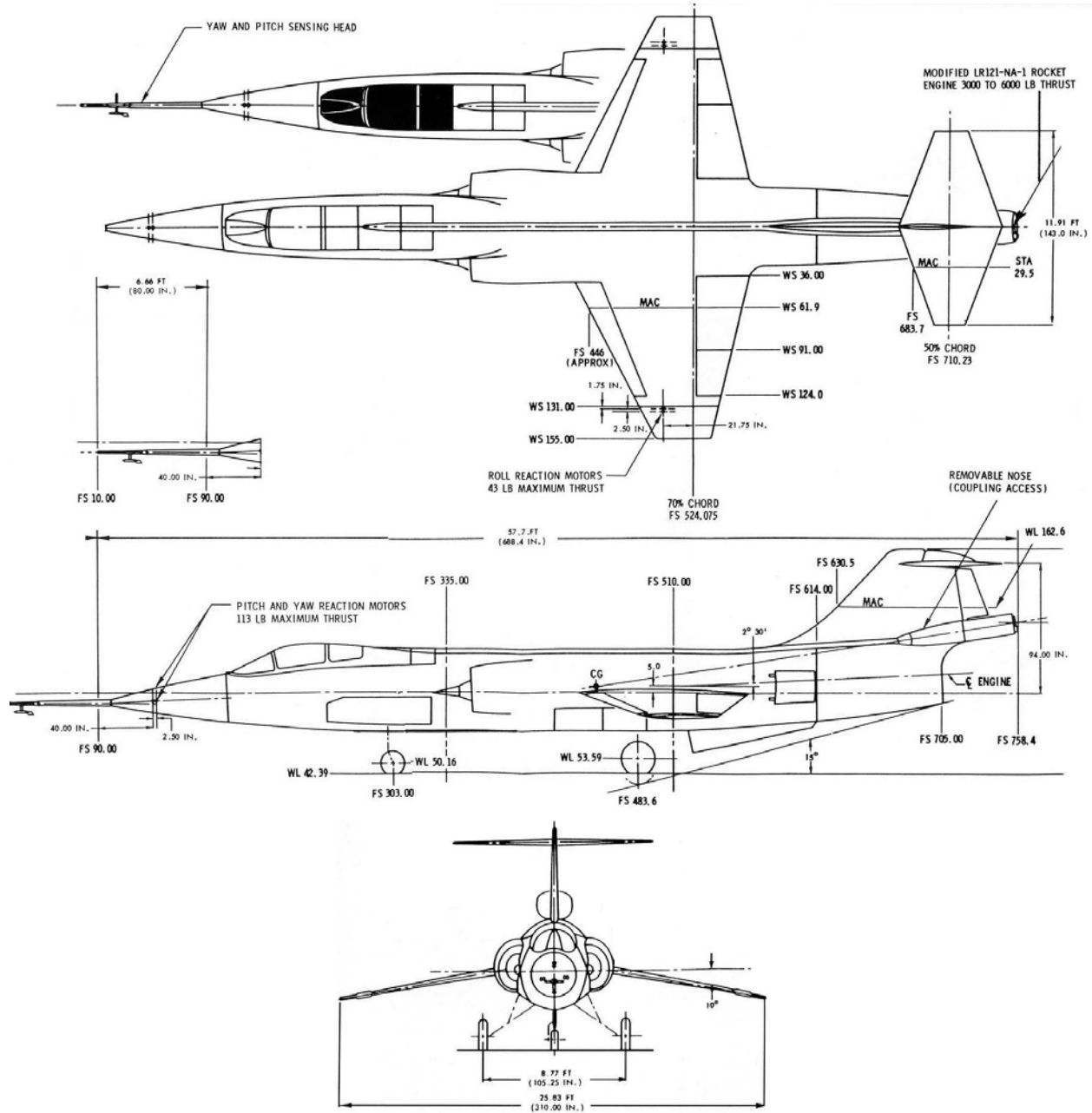
I want to thank Kancho for allowing me the opportunity of releasing this model kit publicly. You can see Kancho's models at <http://kancho.muncho.org/>

I also want to thank NOBI for his assistance and suggestions for the model. NOBI's models are available at <http://thaipaperwork.com/>

And a big thanks goes out to the beta builders of this model.

Lauren Sobkoviak
Redmond, Oregon
November 2006

NF-104A Drawings



Build notes

When building the NF-104, make sure the strip along the upper part of the spine is folded over and glued so it shows on both sides of the fuselage former. After both halves of the fuselage former are glued together, glue and fold Part X over the small, unpainted forward section of the fuel lines so it covers both fuel lines.

Parts 11R-a and 11L-a (smaller strips to be used on the vertical stabilizer) will be attached at the end of the build. Also parts 3L-a and 3R-a (the inlet cone extension) will be added at the end of the build. The rocket pack (parts R-1, R-2 and R-3) will be added at the finish of the main build.

To begin, after folding over the fuel line strips (remember the fold goes over to the back side, or unprinted side of the part), follow Kancho's original instructions for building the F-104.

I have included textured landing gear doors. They can be substituted for the doors after they have been cut out if the version you plan to build is with gear down. Also, the tires are a set of disks which should be glued together to form the wheels after the central hub is glued to the tire.

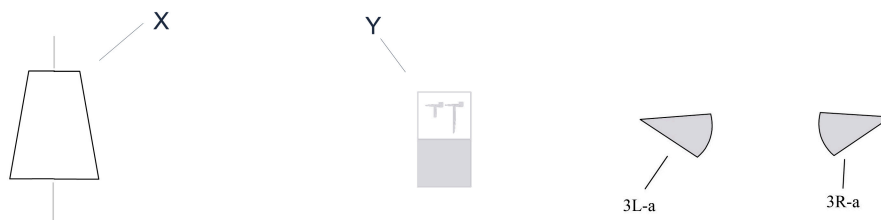
Assembly parts R-1, R-2 and R-3 is shown on the parts sheet. Remove the white X area of part R-2. Shape part R-3 into a small cone shape and glue to the inside of part R-2 aligned with the hole.

Assemble the main rocket pod (part R-1). Use the unprinted area of the vertical stabilizer as a guide to glue down part R-1 (the rocket pod). When the main housing of the pod is in place, place the assembled rear portion (parts R-2 and R-3) on the pod.

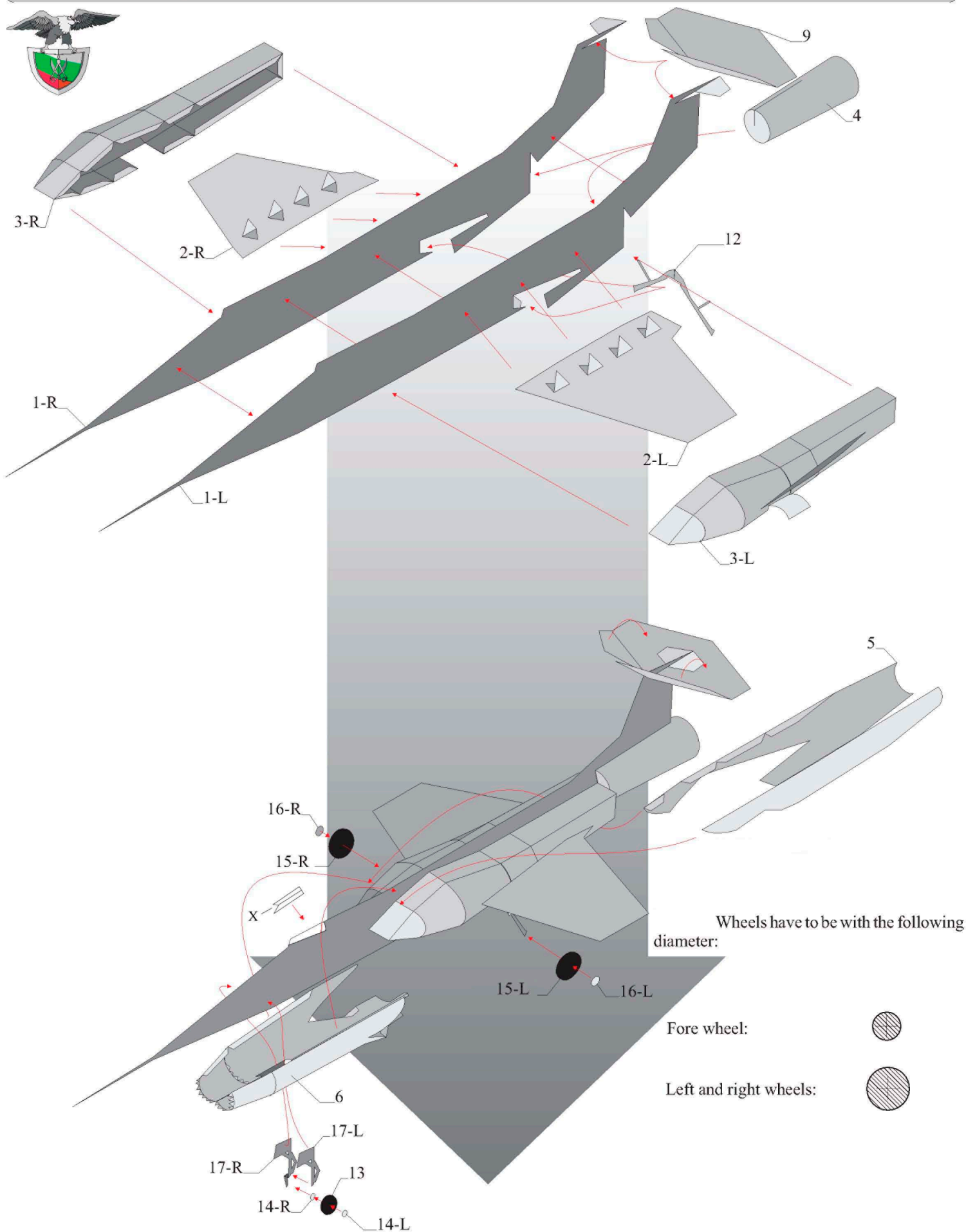
Take parts 11R-a and 11L-a and fold each one in half along the long center line. Once the two parts have been folded and glued, align one of the strips with the red line on the side of the vertical stabilizer, while making sure the shorter silver end lines up with the fuel line along the spine. At this point, trim the the short fuel line to fit flush along side of the spine's fuel line. On the other end of the vertical stabilizer's fuel line, trim it flush with the forward end (the small, rounded end) of the rocket pod. Glue in place. Do the same for the other side of the vertical stabilizer.

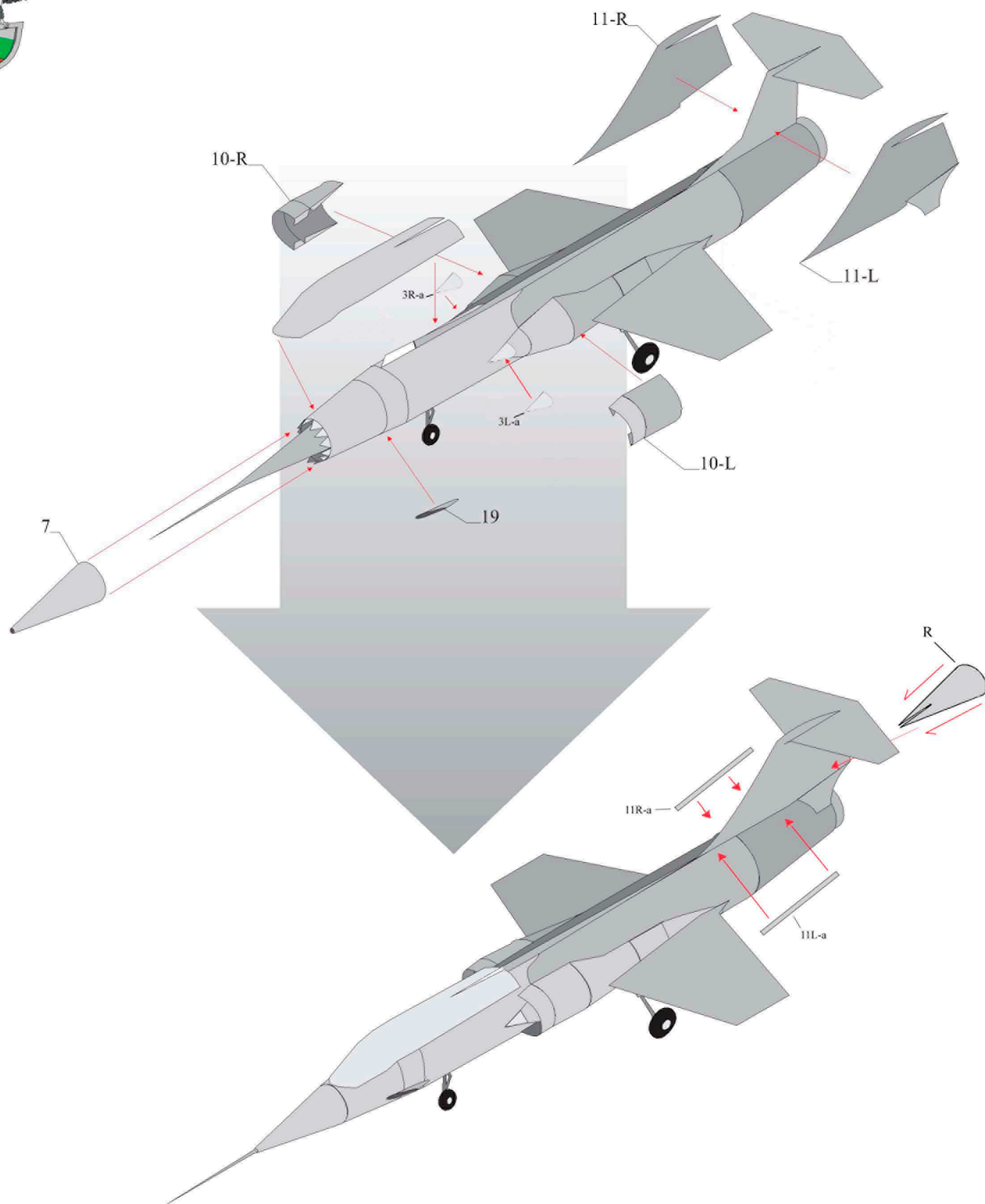
When the above are finished, parts 3L-a and 3R-a should be added. The new cone section should fit over the unpainted portion of the original cone. It can either be thinned on the wide end where it attaches to the old cone, or reprinted on normal bond paper before being glued in place.

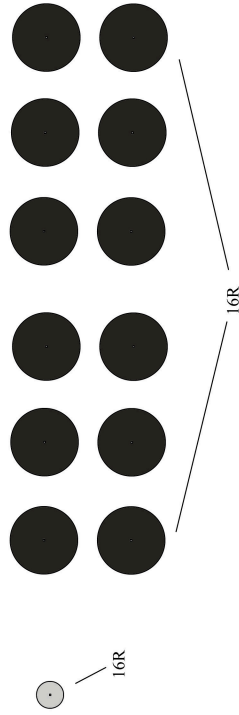
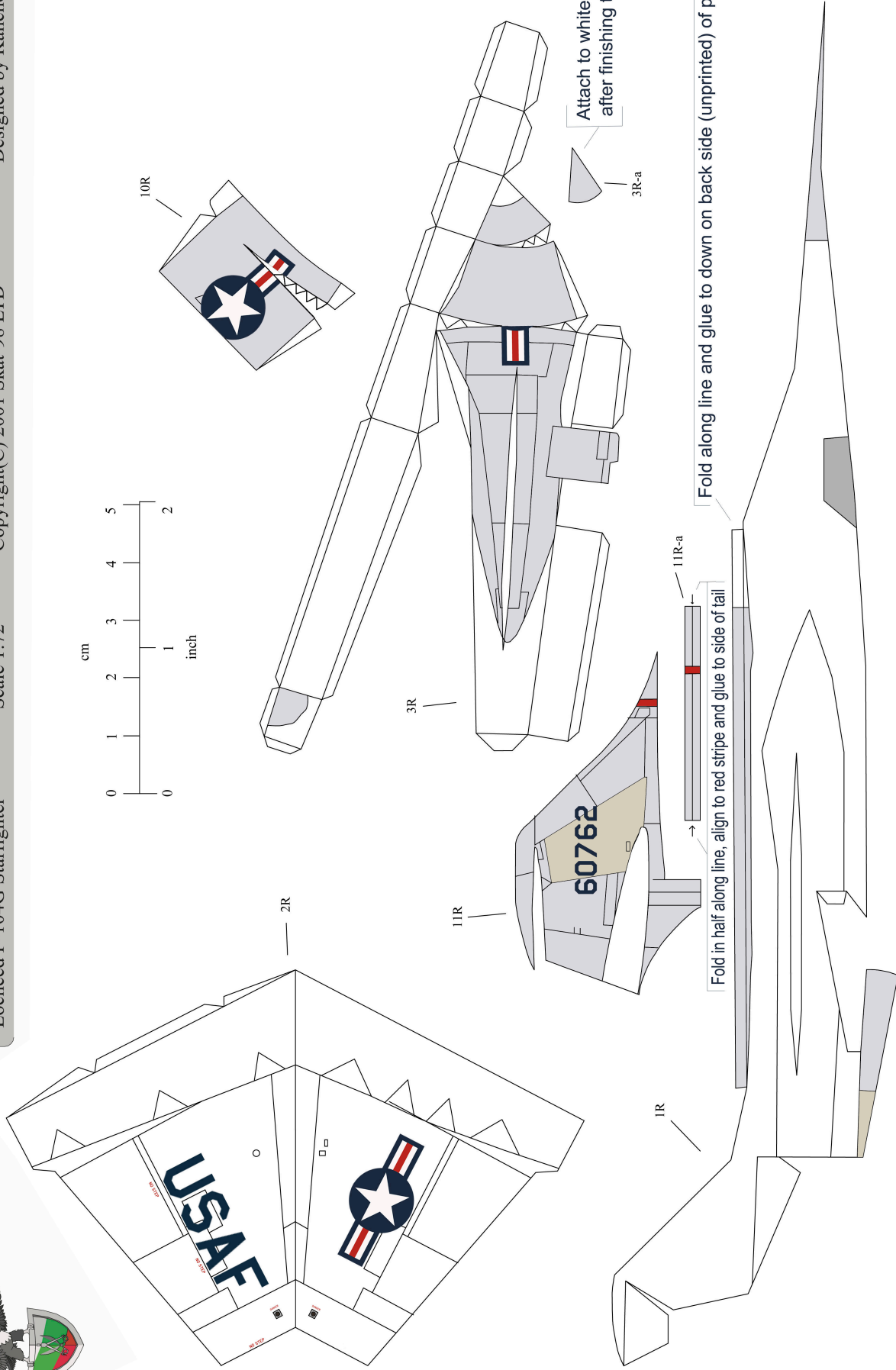
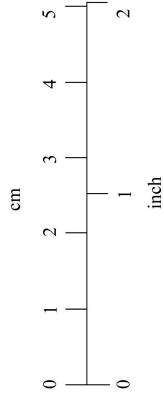
Parts X and Y below, along with with Parts 3L-a and 3R-a can be substituted for the parts on thicker card stock. Print this sheet on plain bond paper.

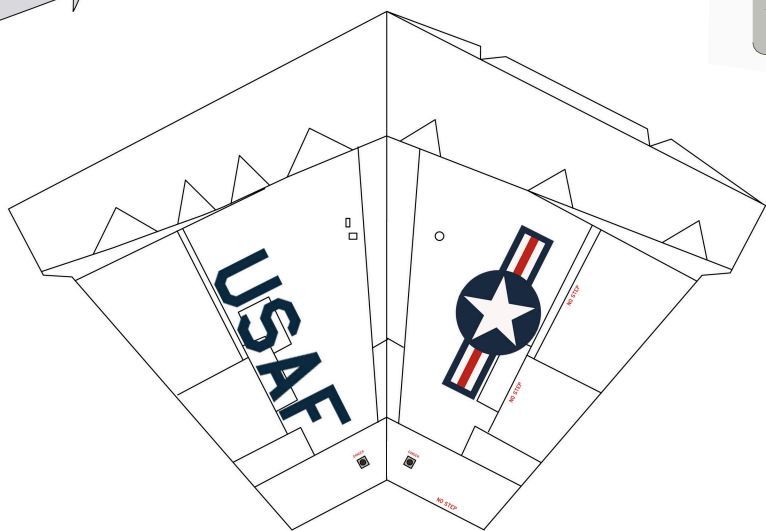
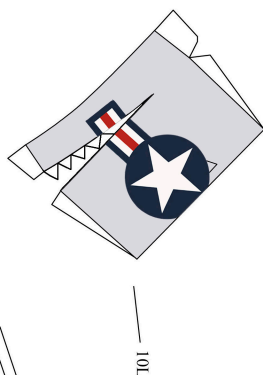
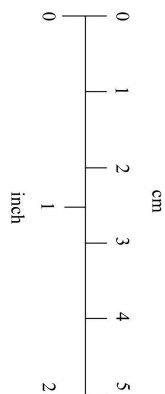


Part Y if you decide to use it, should be attached in the area marked by an arrow on the forward section of the pitot tube on page 2 of the parts. The longer vane should be placed horizontal on the bottom of the tube with the vane to the left and the wide portion to the rear. The smaller vane should be glued pointing down just forward of where the horizontal vane was glued with the wide part pointing rearward.









Attach to white cone area after finishing the build.



Fold along line and glue to down on back side (unprinted) of part

Fold in half along line, align to red stripe and glue to side of tail

