



ATOMIC AIRPLANE, XAB-1 BETA I

Incorporated in the design of Beta I are the engineering criteria established for an atomic airplane. The design, although hypothetical, is completely within the realm of possibility. In no way does Hawk Model Company intend to imply that such an airplane exists or is on the drawing boards. However, what is presented here has been checked by one of the United States' leading aircraft companies and has been declared entirely sound and possible. Therefore, this airplane **could** exist.

The success of an atomic powered aircraft lies with the use of a well designed nuclear engine. Several types are under consideration, however the **direct air cycle** type is considered the most promising for the first nuclear aircraft.

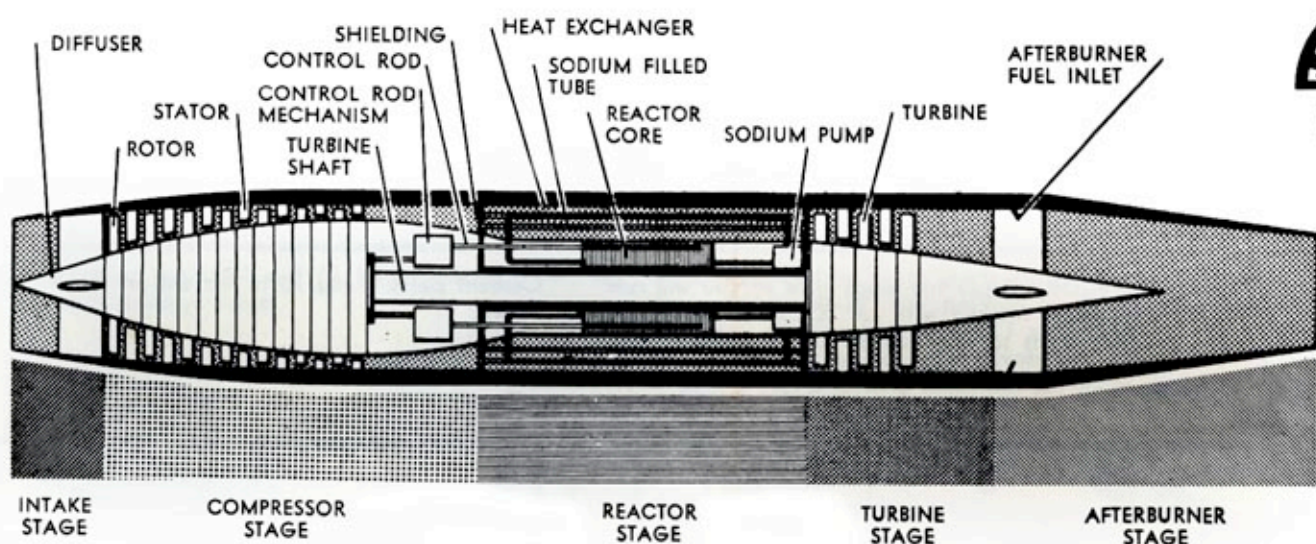
The primary purpose of atomic power is to provide a heat source. Internal functions of the nuclear jet engine are identical to a conventional jet engine, the only exception being that we burn fissionable fuel instead of jet fuel for heat.

A simplified drawing of the engine in Beta I is shown below. Note how very similar it is to a conventional axial flow turbojet. At the front of the engine is the inlet diffuser. This is specially designed for high speed flight. The **compressor section** is next. Air is forced into the engine by the rotation of the compressor fans. The heart of the engine is the **heat exchanger and reactor section**. It is here that heat is produced and passed to the air flowing through the engine. The reactor contains Uranium 235 fuel. To start the engine the compressors are first turned over electrically so that

air is forced through the engine. Within the reactor are **control rods** of cadmium. As these are withdrawn from the reactor the process of fission reaches the "critical" or power level. Tremendous heat is produced. This heat is conducted away from the reactor core by sodium which is forced by pumps through tubes in the reactor core. The hot sodium is then pumped to the heat exchanger, very similar to an automobile radiator only much more complicated, which transfers the heat to the air flowing through the engine.

The air expands and kicks back against the **turbine blades** causing them to spin. The turbine is connected to the compressor by a shaft and now the engine becomes self-sustaining. The air is now ducted out the rear to give jet thrust.

Note how the heat exchanger and reactor are built in quarter sections around the interconnecting shaft. This allows easy maintenance and fuel replenishment.



DIRECT CYCLE NUCLEAR ENGINE

The Beta I airplane employs two conventional jet powerplants within the fuselage and two nuclear engines slung on pods at the wing tips.

A canard, or tail first, layout was selected because of advantages this layout offers for an atomic airplane and in particular for the Beta I flight criteria. The long nose enables the crew to be far removed from the reactors so that crew radiation dosage is reduced. Secondly, the horizontal stabilizer provides a small amount of lifting force which is not the case in conventional aircraft. A third important advantage is the increased stability of the canard at supersonic speeds.

Each reactor pod houses its own landing gear for towing from the airplane. The pod mounting of the reactor also allows simplified maintenance of the engine by remote controlled equipment.

Fuel for the conventional turbojets is housed in wing and fuselage tanks. Special mission equipment and armament is housed in the fuselage.

Takeoff is accomplished with the conventional turbojets. The nuclear engines are placed in operation when the aircraft is airborne. This decreases the radiation hazard to areas surrounding the airport.

Primary advantage of the atomic aircraft is its ability to cruise for great lengths of time and distance. A 100 hour mission is very conceivable. A

typical mission might consist of cruising at altitude for the purpose of early warning of enemy aircraft and missiles. The atomic aircraft may also be used to rendezvous with other aircraft and refuel them.

One of the most outstanding abilities of a nuclear aircraft is its potential to cruise for a great length of time, armed, and at a moment's notice come into an enemy land at low altitude below his radar warning system and attack. The chances of a successful attack are higher with such a system than they are when using an ICBM.

In the United States the General Electric Company is at work on the engine and Convair is doing technical studies of the airplane for a real nuclear aircraft.

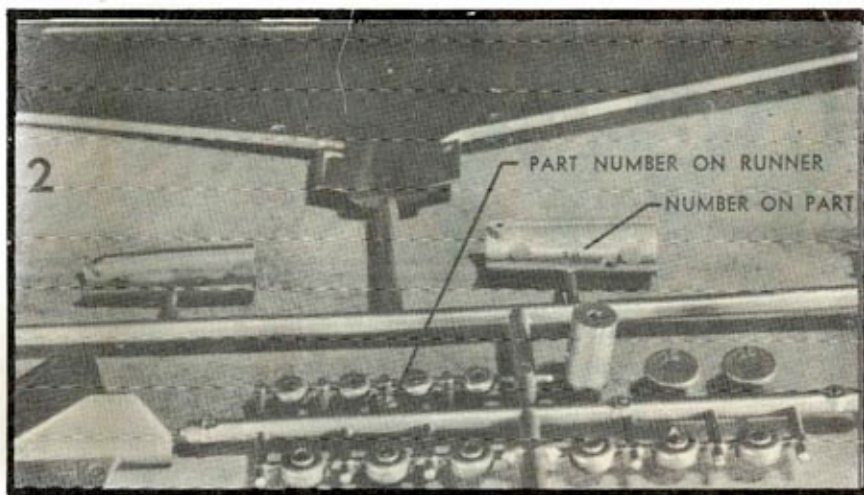
The Beta I has a span of 137 feet and length of 192. Beta I is designed for a maximum speed of 1300 m.p.h. In case of emergency the nuclear engines can be dropped from the aircraft and the plane flown home on its turbojets. Dropping of the engines would be a last resort measure. Every effort, both design and operational, would be made to insure "fail-safe" engine operation in case of malfunction.

Beta I is hypothetical but in no way is the design unrealistic. **Such a plane could exist!**

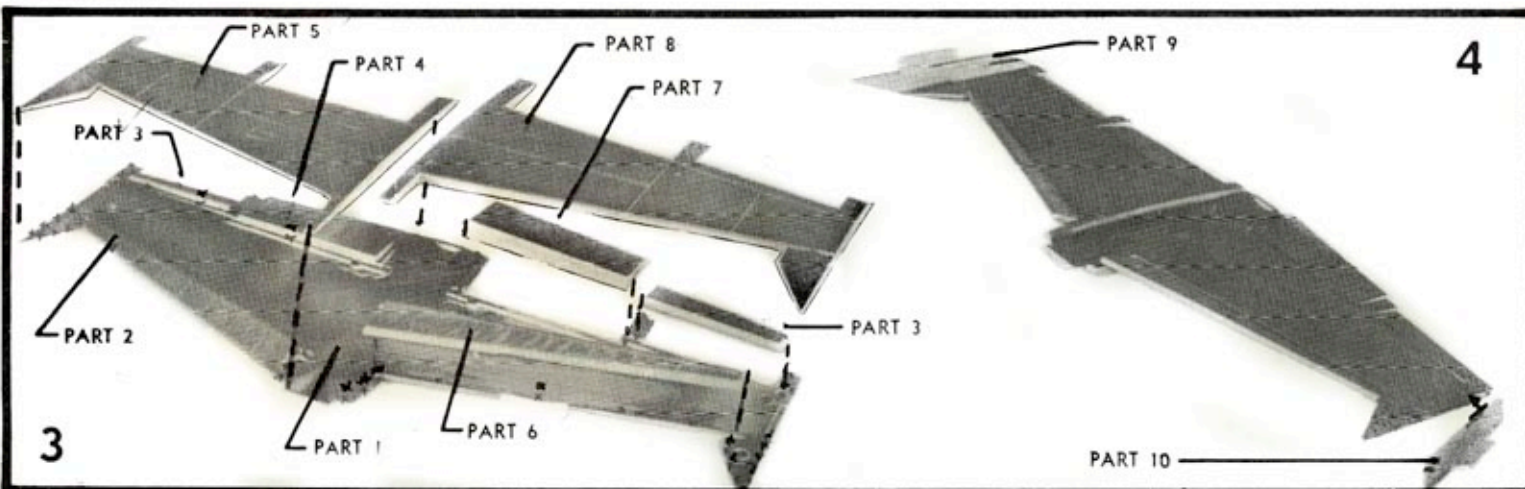
READ THESE INSTRUCTIONS CAREFULLY BEFORE BEGINNING CONSTRUCTION.



Shown above are materials useful in finishing your atomic airplane. Sandpaper, knife, and file are useful in removing excess plastic from parts. Use tube or liquid cement. Use enamel for painting your model. Flat black, red, and white are the colors needed to do a complete job.

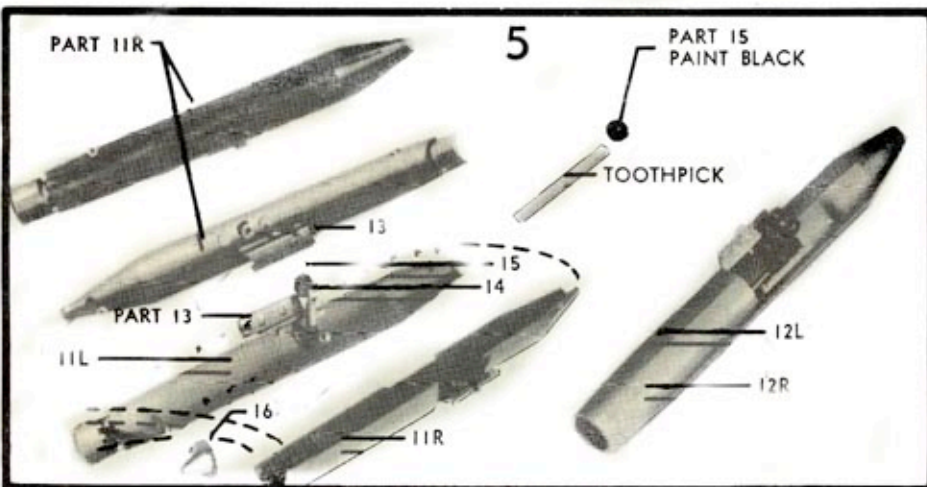


Note how the parts are numbered. Carefully study the parts in the box before removing from the "trees". It is best to remove the parts as you assemble them to the model.

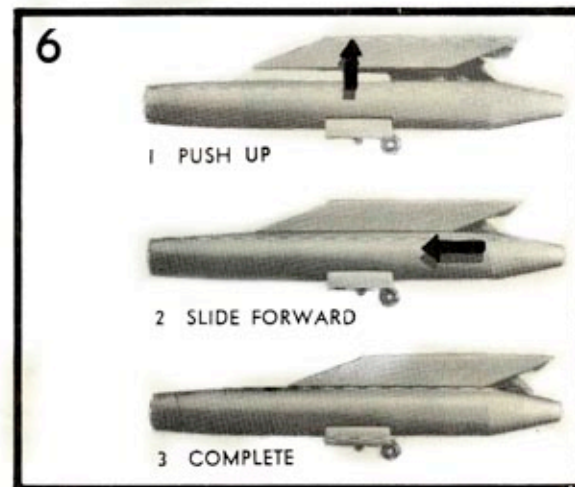


Assemble the parts as shown above. Do not use too much glue or you will ruin the smooth plastic finish. Put glue where marked with an "X". Keep glue away from the hinge pins on the movable parts so that you do not glue them tight.

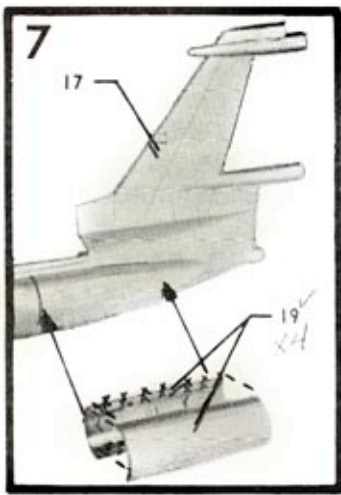
Cement parts 9 and 10 to the end of the wings as shown.



Snap the doors into place as shown. Mount the wheels on toothpicks and paint black. When dry, glue them to the axles on parts 14. Mount part 14 in the ring in 11L as shown — DO NOT GLUE. Place cement as shown by the "X" marks and glue 11R in place. Now glue part 16 into the front of the engine. Assemble the other reactor in the same way.

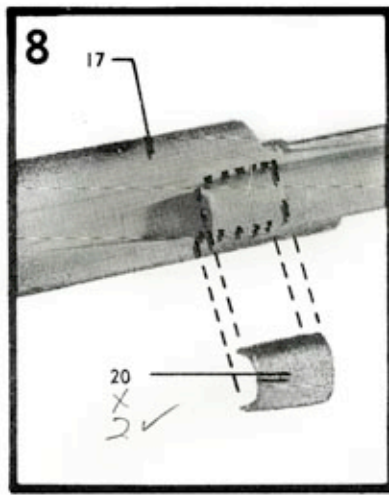


Follow the above steps to mount your reactors to the wing pylons. Do not glue. This allows you to remove the reactors for maintenance demonstrations.



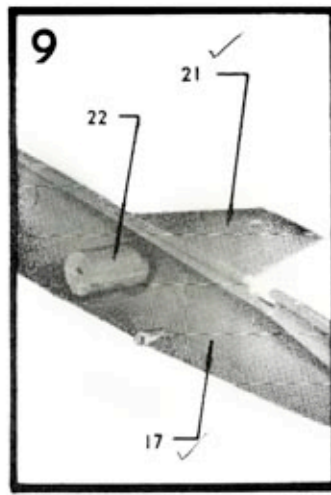
7
17
19
x4

Glue parts 19 together. Glue the completed units to the fuselage halves as shown.



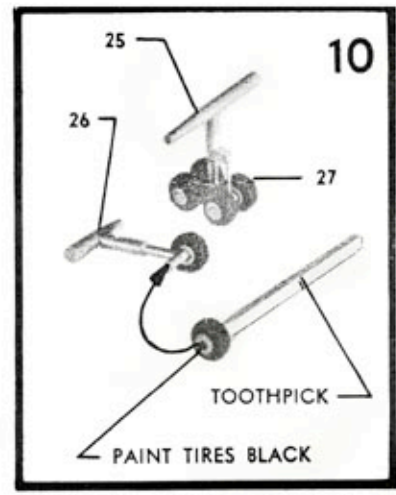
8
17
20
x2

Cement the scoops, parts 20, in place as shown.



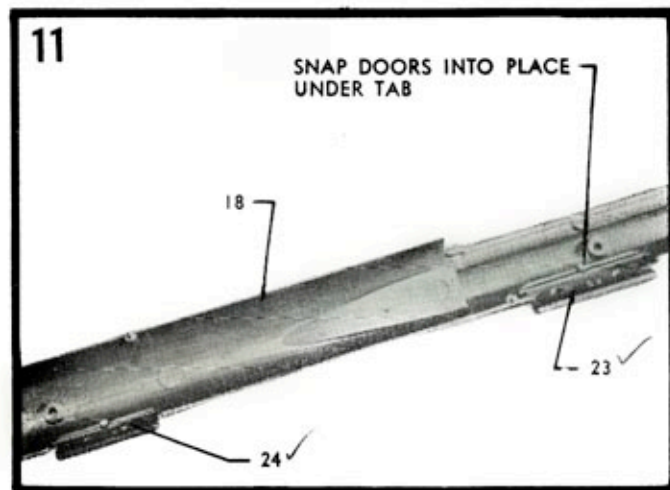
9
21
22
17

Slide the pin on part 21 through the hole in the fuselage side. Put a SMALL drop of cement in one hole of part 22 and place it on the pin of part 21.



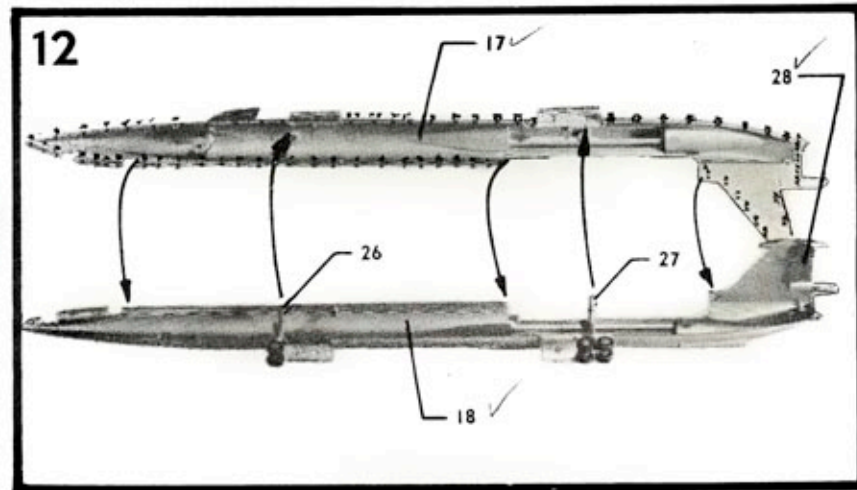
10
25
26
27
TOOTH PICK
PAINT TIRES BLACK

Mount the wheels, parts 27, on toothpicks and paint them. When dry, glue them to the axles of parts 26 and 27.



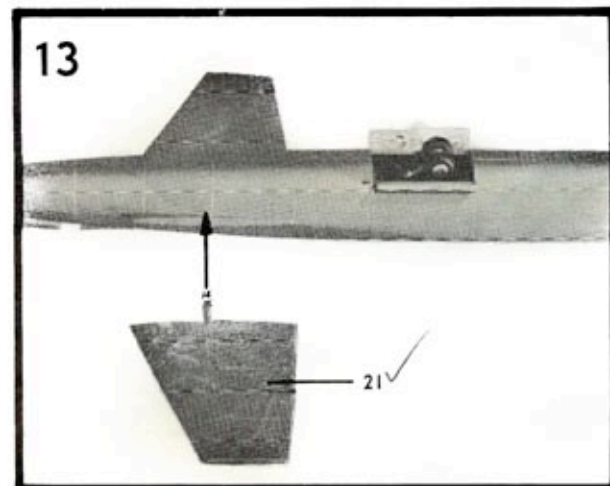
11
SNAP DOORS INTO PLACE UNDER TAB
18
23
24

Snap the doors, parts 24 and 23, into place as shown. Do this to both fuselage halves.



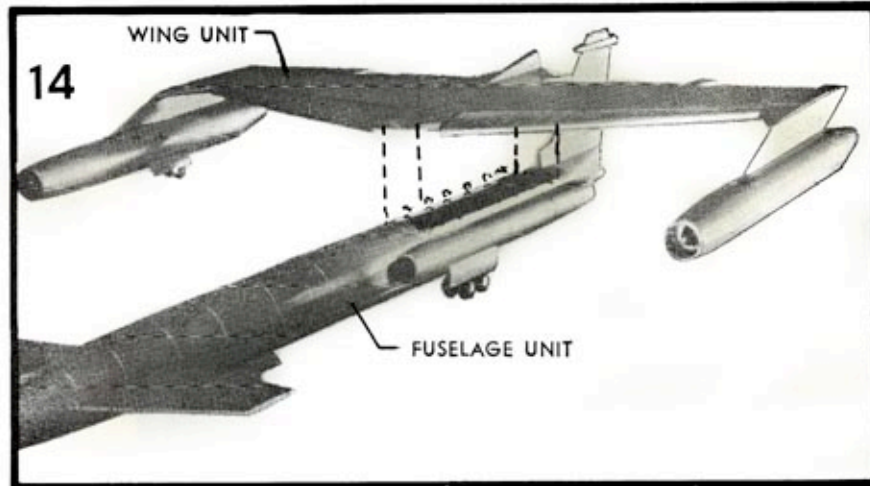
12
17
18
26
27
28

Mount the landing gears, parts 26 and 27, into the rings in part 18. Place the rudder, part 28, into position on the tail of part 18. Place glue where indicated on the edge of part 17 and glue the body halves together. Guide the ends of the landing gear pivots into the other rings with your finger or a pencil. This step may seem difficult — be patient and careful.



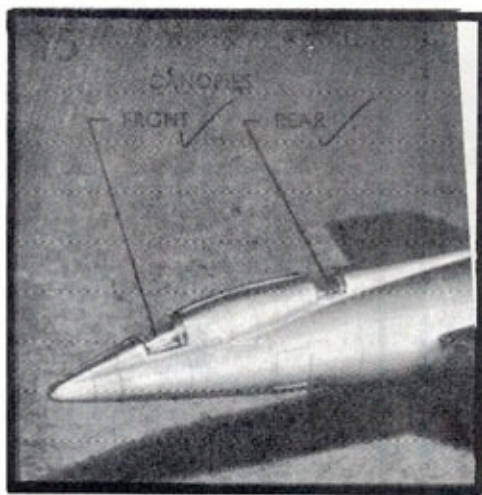
13
21

Place a SMALL drop of cement on the flat side of the pin on part 21. Insert into the fuselage and guide the pin into the hole in part 22 which is inside the airplane.

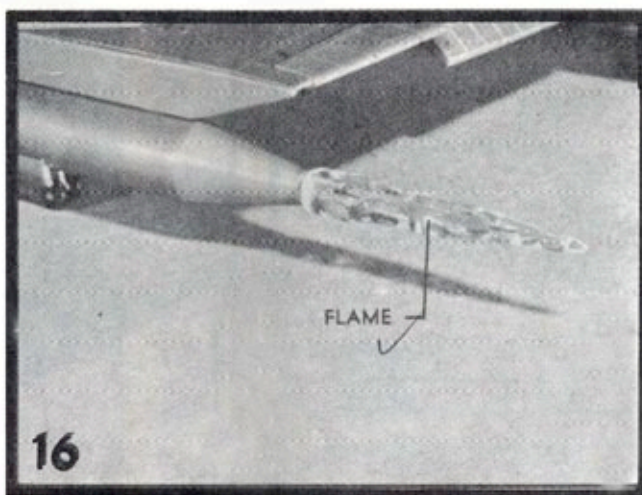


14
WING UNIT
FUSELAGE UNIT

Glue the wing unit to the fuselage as shown above. Try the wing in place first without glue to check for proper fit. Trim if necessary and glue into position.

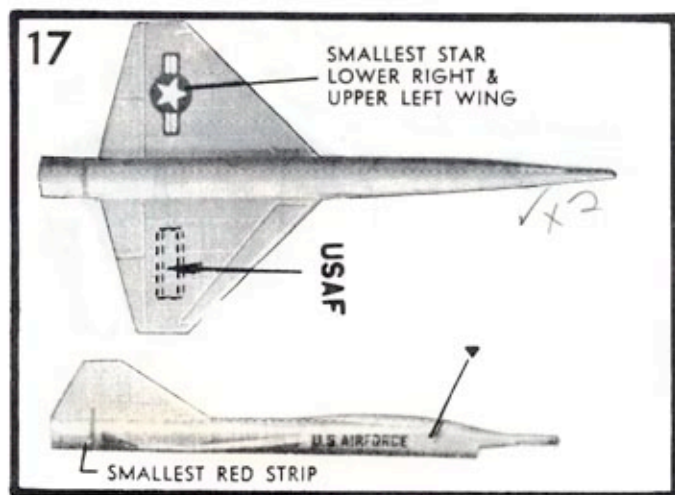


Glue the clear canopies into place. Use only a small amount of cement for a neat job.

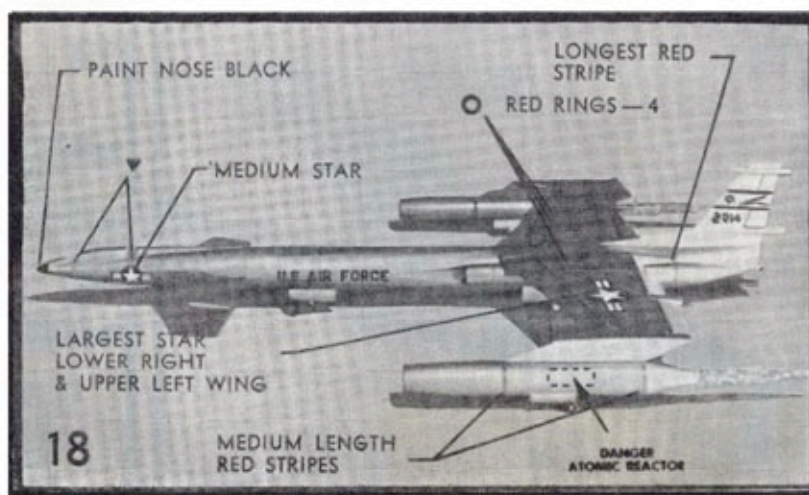


Glue the flames into the rear of the atomic reactors next.

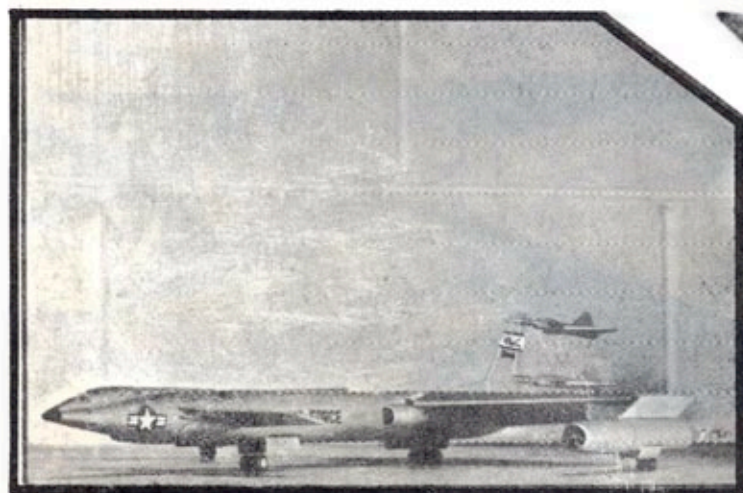
YOU ARE NOW READY TO APPLY THE DECALS. STUDY THE PHOTOGRAPHS BELOW AND THE BOX COVER BEFORE BEGINNING. SHOULD YOU DESIRE TO PAINT THE BOTTOM OF BETA I WHITE, AS SHOWN ON THE BOX, DO IT NOW BEFORE APPLYING THE DECALS.



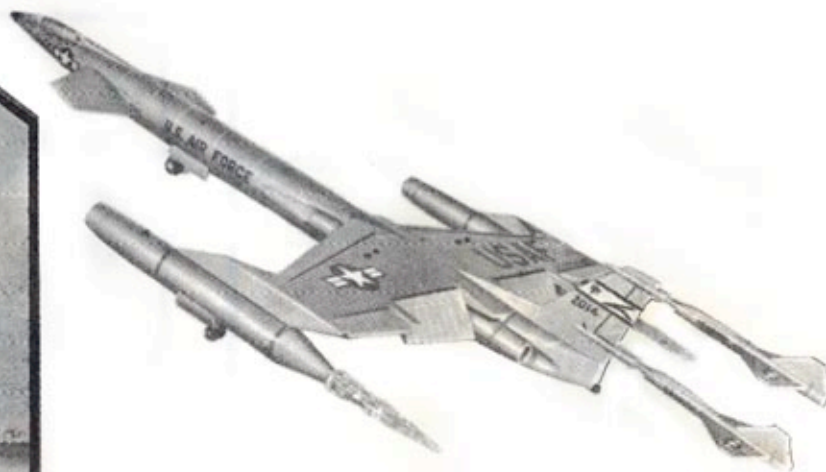
Apply the interceptor decals as shown. Both aircraft are identical.



This photograph shows the decal placement very well. Paint the nose and tail radomes black.



Glue the interceptors in place in the tail or leave them loose. This is how Beta I looks on takeoff.



Climbing for altitude and ready for action!