7 SEPTEMBER 2024

AIRFRAME CLUB PRESIDENT CHRIS STRACHAN
MODIFIED POWER SYSTEM PAUL BURLING

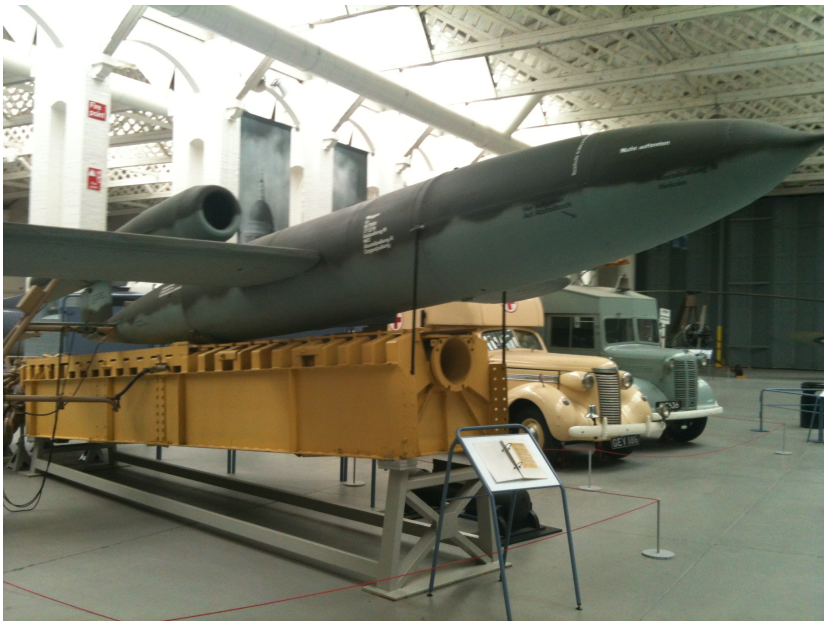
JB-2 (LOON)

Paul Burling

HISTORY AND DEVELOPMENT

The JB-2 was rushed into production in late 1944. Ford Motor Company made the engine, while Republic Aviation was to produce the airframe, but Republic Aviation just did not have the manufacturing capacity so it was subcontracted to Jeep maker Willys-Overland. Visually, it is not easy to distinguish the JB-2 from a V-1, some would say it is a direct copy. The wingspan is a little bigger, the pylon supporting the front of the engine is shaped a little differently, and the small range-counting propeller sticks out a little farther. (The number of revolutions roughly measured the distance flown; a magnetic compass provided the heading, a barometer regulated the altitude, and an autopilot kept the missile flying steadily.). The first flight of the JB-2 was June 1945. It was designed to carry a 2,200-pound high explosive warhead to a range of 150 miles and could be launched from the ground, ships, or aircraft.

The development of the JB-2 Loon came too late for use in World War II, and it was not used in combat. However, about 1000 JB-2s were built for the Army and Navy and production delivery began in January 1945 but was cancelled on VJ day. It provided invaluable experience to U.S. Navy and Army Air Force (and later, Air Force) personnel in the handling of missiles.



The model airframe

Constructed beautifully by Chris Strachan using traditional techniques Bulsa wood and Tissue bonded together using PVA adhesive the model was purchased from The vintage Model Co 12.5 inc Crossley V-1 Flying bomb Doodlebug and can still be purchased for £34.99.

The kit dimensions:

- Wingspan: 12.5" (31.8 cm)
- Power system: Jetex
- Manufacturer: Richard Crossley
- Difficulty: Intermediate

Originally designed for Jetex Power this kit features realistic appearance and excellent flying qualities together with simple construction. The Jetex engines were designed for model aircraft by Joseph Mansour and brothers John and Charles Wilmot.

KIT CONTENTS

- Plan
- Strip wood
- Laser Cut Parts
- Balsa block
- Tissue

The first doodlebug flying bomb to target London, crashed and exploded at Grove Road near Mile End Park in East London. These sinister weapons became known for their distinctive sound followed by 15 eerie, menacing silence before the detonation of typically 2000 lb of high explosives. I remember my mum telling me that she heard these doodlebugs as she called them over the Elephant and Castle area in London where she lived before being evacuated out to Gt Shelford near Cambridge.

The Power System

The free flight version of the JB-2 which was tested and flown by Chris Strachen using a Rapier rocket motor manufactured in the Czech republic. But unlike the Jetex or Jet-X motors, these are one-shot items consisting a cardboard tube filled with propellant plugged with a ceramic end cap with a hole. Currently, Rapiers are available in three power ratings: L-1, L-2 and L-2HP. The earlier L-3 series has now been phased out of production, having been superseded by the L-2HP which is identical in appearance to the standard L-2. Though motors tend to vary somewhat in power from batch to batch, the duration of the L-2 falls between 18 and 25 seconds. Fuses are included with each box of motors.

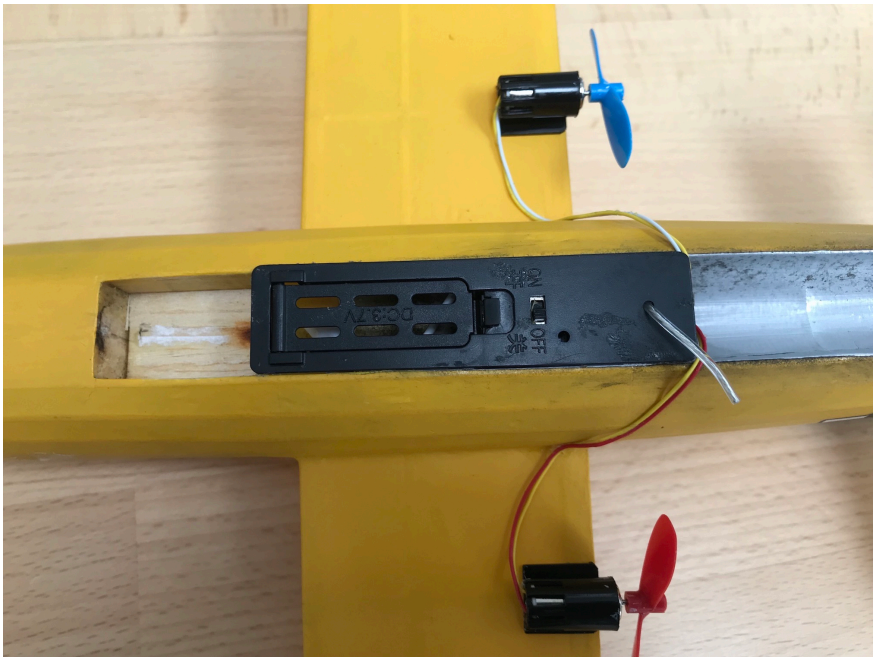
The propellant has a low burning rate, low flame temperature and is able to burn at low operational pressure in the cardboard combustion chamber. A long burning time and consequent long flight time are of special interest to modellers of jet models such as the JB-2. Looking at the burnt out cardboard tube a L1 was used when Chris test flew the JB-2.

These Rocket motors are good fun, I have used similar units and still have a Jet-X motor with pellets. However, they can be a little destructive to models that are not protected agains heat efflux of the rocket burn. The other issue is duration and direction as the burn can be variable and unpredictable.

Thinking out of the Box (my Box of RC gear)

Being fortunate to have purchased a number of models from Chris and appreciating his attention to detail on his models, I was determined to find an alternative power system but keeping the existing structure and if need be return it to rocket power!!
Thinking hard and scratching my head, I came up with an alternative which I think Chris would approve of! Maybe differential thrust???
Flying with just two motors that control both speed/climbing and yaw through differential thrust using a 1s Lipo. Keeping cost down, I explored the parts bin and found just what i needed, differential thrust, gyro stabilised electronics and using a 3.7v 150mAh Lipo. Cost of such technology £16.00 all in including battery and transmitter.

The circuit board was cut from a RC Foam Jet and was screwed to a lightweight plastic box that holds the battery. The printed circuit board can easily be removed by unscrewing two screws to save additional weight if needed. In the picture below you can see how this fits (without any modifications) to the airframe. Also, note the burn mark from the firing of the rocket motor.
The C of G is critical therefore the placement of the circuit board and battery must be placed accurately, this was trial and error to get the missile to fly correctly. The propellers can be changed easily, but i decided to keep these ones in uncle sam colour. God bless America ha ha.



Flying the JB-2 (Loon)

I have been experimenting with a number of my flying models that are typically lightweight below 50g and I have found that using this method of Radio control the easiest and cheapest way to control model aircraft. However there are some down sides.

The negatives

- C of G is critical for flight and control
- The placement of the motors and the distance between them will enhance or restrict the Yaw movement
- You must have an aerodynamic wing for lift otherwise the control of the assent and decent is impossible to control.
- Flying aircraft using this system requires smooth control from the pilot or there is a chance of stall, so no sharp turns
- Speed is proportional to the lift of the wing, so design aerodynamic efficient wings and keep your weight down
- Landing should be done under low power or the aircraft could nose in
- If you fly indoors make sure you have enough space including height
- If you can bind the electronics to a full size transmitter then do so
- Flying in low wind conditions

The positives

- Cost, must be the cheapest way of flying a Radio controlled plane
- Electronics very reliable and easily placed into many airframes (modular)
- No soldering or modifications to electronics (you can extend the wires to the motors
- You can adapt the motors as a pusher or a tractor appealing to old aircraft and new including your own airliner 737
- Can be flown as a free flight model cutting the throttle when you require, no timer needed

When you have mastered the system you should have many hours of fun and flight. Typically you can expect to fly on one charge for 10 minutes but I have seen longer times in still conditions. When taking off I use 75% of the throttle to get a good climb and then stooge around to 30% throttle. remember this system is not for aerobatics it lends itself to flying around a semi scaled speed in a clean and efficient way. I am sure many of you may be tempted at building your own planes. Go and buy some foam board B&Q 3mm and some UHU Por. Enjoy!

Props full chat

Incoming / Landing