SCALE MATTERS
with John Armarego

Lysander landing lights

LYSANDER LANDING LIGHTS

When assembling the Black Horse Lysander I decided to add some additional detail to the wing tip lights. I hope to use the same techniques later to form the wheel pant lights. The LYSANDER ran covert operations into Europe during WW11 navigating by moon light. I found night shots of the LYSANDER that seem to indicate that the wing tips also accommodated a form of landing light. Black horse had provided some nice vacuum formed parts but I wanted to make them functional.

Step 1:

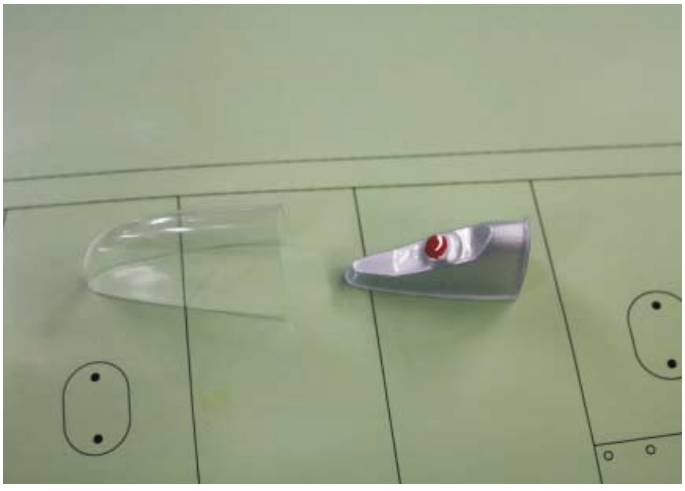
I started by drilling a 5mm hole in the wing tip that would be hidden by the vacuum formed light housing. This hole was drilled at an angle because I consciously wanted to drill through an open section of the wing rib. This hole was required so that I could run a draw string through to the aileron servo that could be used to pull the power leads for the wing tip lights. I used a file to enlarge this hole and to clear sufficient balsa material for the draw string.

Step 2:

I tied a 3mm nut to a piece of string and inserted it into the wingtip hole. I then dropped the nut down the hole and bounced the nut around inside the wing until it popped out of the aileron servo area.

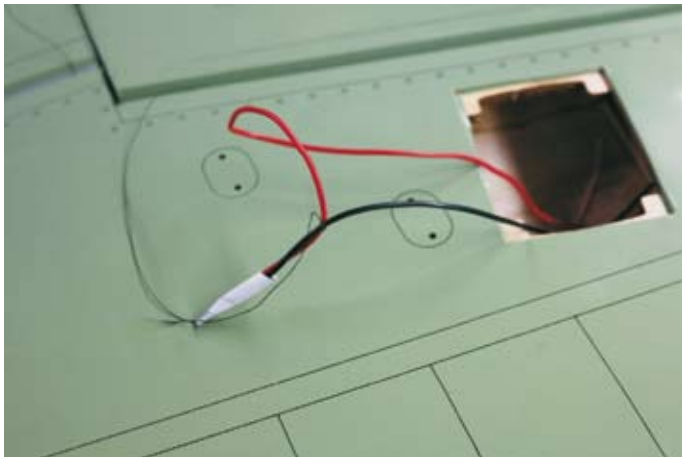
Step 3

You can obtain LED's (Light Emitting Diodes) from electronic stores like Jaycar or online through the internet. Search on super bright Light Emitting Diodes with or without the bezel depending on your application. They usually come in 3mm or 5 mm sizes and the higher the mcd value the brighter they will be (milli candela, a candela is a measurement of luminosity and is related to the brightness of a candle). Light Emitting Diodes are



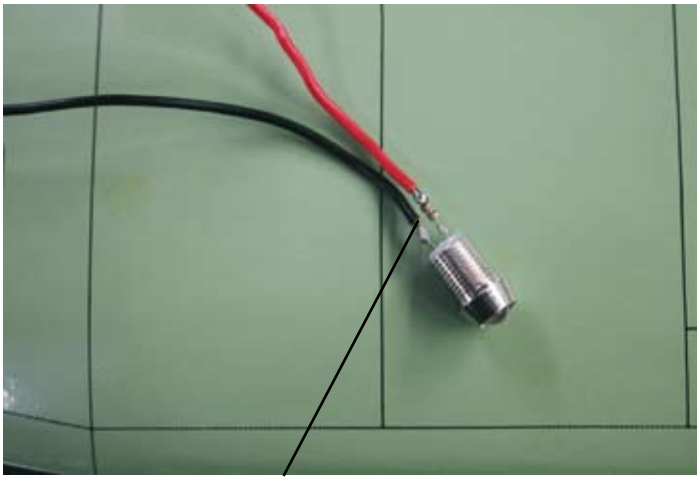
Nice vacuum formed parts provided with the kit

File being used to increase the size of the wingtip hole

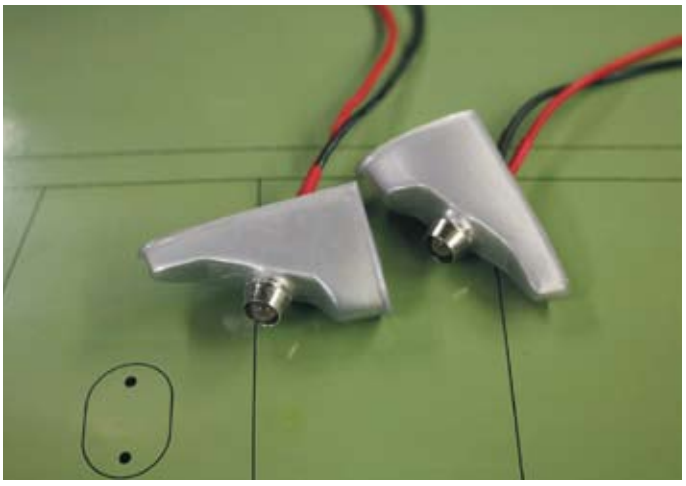


3mm nut with draw string attached

Specification for a powerful white 5mm Light Emitting Diode from Jaycar



Notice the resistor soldered to the LED lead



Inserted in the wing tip vacuum formed housing

LEDs with heat tube applied

current devices, so you have to control the current you supply to them, not the voltage. This is why the LED's require a series resistor, the resistor value is selected depending on the voltage that is being used and the current the LED requires to operate correctly.

This may look complicated but it is basic electronics: In the specification for the LED you will find an IF current figure, this is usually around 20mA depending on the brightness that the LED can operate at. IF stands for the forwarded operating current which in this case is 20mA (20 x 10 to the power -3 Amps which is equal to 0.020 Amps), IF= 0.020 amps.

Again from the specification you will see a VF voltage figure and this usually depends on the LED colour.
VF stands for the forward voltage drop;
VF = 3.3 v. for this white LED.
Basic Ohms Law is that Voltage (V) = Current (I) x Resistance (R)
Voltage is in volts, Current is in amps and Resistance is in Ohms. Equation for the LED is as follows:

V(supply) – V(forward voltage drop across the LED) = I (LED forwarded operating current) x R (resistor in ohms)

Therefore"
R (resistor in ohms) = V(supply) – VF(forward voltage drop across the LED)
IF (LED forwarded operating current)

In the case of the Lysander wing tip lights the receiver battery pack that is going to power the LEDs is a 5 cell pack which is typically 6v.

R (resistor in ohms) = 6v - 3.3v
0.02
= 135 ohms

So any preferred value resistor of around 135 ohms and with a wattage rating of around ¼ watts will be fine. (Suitable values would be: 120ohms, 150ohms, 180ohms).

If you purchase an LED that is designed to operate for a specific voltage it will have been supplied with a series resistors already included in the package. I hope this has provided sufficient information for you to start playing around with LEDs, they can be a lot of fun.

Once you have calculated the correct resistance value you then you need to obtain the resistor and solder it to one of the legs of the LED. It does not matter which leg of the LED the resistor is soldered to, but it does matter which leg of the LED is connected to the positive terminal of the battery supply. If you look carefully at a LED it will have one leg longer than the other. The longer leg of the LED is the anode and must be connected to the positive supply from the power source. You can cut the legs shorter on the LED to whatever length you like, but always remember which was the longer leg.

If you connect the LED the wrong way around it will not damage the LED, it will just not illuminate. Solder the leads to the LED and the resistor and then cover the joint with heat shrink tubing, The leads can now be connected to the draw string (I use masking tape) and pulled through the hole in the wing tip down to the servo tray opening.

Strip of thin aluminium bent with flat long nose pliers

Aluminium strip being pressed around the wings tip clear cover using the wing tip clear cover as the template

More aluminium strips being formed around the wing tips clear plastic cover

Aluminium strips are glued in place to the wing tips clear plastic cover using canopy glue

LED and wing tip vacuum formed housing being glued down with canopy glue.

Step 4:

The LED and the wing tip vacuum formed housings are glued and held down with masking tape until dry. I again use the canopy glue, it is ideal for this application because it is still flexible once it has set and remains clear, so that it does not affect the appearance of the wing tip parts.

Step 5:

Thin aluminium flashing which is purchased by the role from Bunnings is guillotined to form long thin strips about 4mm wide. The strips are creased over in the middle using a pair of smooth long nose pliers. The strips are then bent over the wing tip clear covers using the cover as a template. Two separate strips are used to produce aluminium edging around the wing tip clear cover. The aluminium strips are then glued to the clear wing tip covers again using canopy glue.

Step 6:

The ends of the LED wiring at the servo tray end is soldered to one of the ends of a servo Y lead. The other end of the Y lead is connected to the ailerons servo. The aileron extension lead is then connected to this Y lead and continued as normal to the wing root. When the aircraft is assembled it is just a normal process of connecting the aileron extension lead to the receiver input.

Whenever the receivers are powered up the wing tip lights turn on as an indication that the receiver system is powered up. The two wing tip LEDs together draw a total of 40mA which less than a standard servo. On a 2000mA receiver battery they would last 50 hours of continual use, so the current drain is negligible.

LYSANDER PILOT

Having a nice pilot really helps to make a scale model complete. So I set out

LED power leads connect to aileron servo leads through a Y lead and power up when receiver is switched on

Mug shot of the WW11 British RAF pilot

to look for an appropriate subject. I needed a WW11 British RAF pilot 12" Tall which is around 1/6 ~ 1/5 scale. The Lysander has plenty of cockpit area, and enough room for a full pilot not just a Bust. I think it is worth purchasing nice pilots because you can use the same 'guy' for a range of aircraft, if they are of the same side (air force) and scale.

I found WARBIRD PILOTS www.warbirdpilots.com an excellent choice. These suppliers do fantastic pilots in all the required scales. The detail in the clothing is outstanding, do yourself a favour and look up their web site. The pilot that I purchased is the WW11 British RAF pilot 12" Tall 1/6 ~ 1/5 scale. The pilot was much lighter than I expected and is fantastic, he came with the following specifications:

Professionally Painted Head
Royal Blue Pants and Shirt
Black Boots
Mae West Life Vest
Parachute Harness
Helmet
Goggles
Oxygen Mask

All these features are very well made. This pilot is available with a servo operated moving head as an option — I just had to have this option and I am so glad I did. Connect the head servo lead to a Y lead connected to the rudder and this 'cool' pilot's head turns at will.

Lysander pilot

To mount the pilot I glued a balsa spar across the fuselage that the pilot could sit on. The pilot is held in position using a simple shoelace so that he can be easily removed. I removed the bottom piece of the seat that came with the Lysander. The cockpit and canopy just slide down over the pilot perfectly, just way to simple.

The pilot is cotton filled and he can be made into a Bust by cutting it with a pair of scissors at your desired location. The pilot has a wire frame for the arms and legs which enables the figure to be bent and positioned as required.

COCKPIT MODIFICATIONS

The Lysander came with the cockpit and canopy internal areas painted in a grey colour. The more correct colour is Cockpit green, Tamiya XF-71. I applied this cockpit green easily by just over painting the area with a brush. This helps to lighten up the appearance and highlight the cockpit area of this aircraft. I also used a sharp scalpel blade and opened around the seat of the supplied cockpit as well as around the back of the seat. In the Lysander this area of the aircraft around the wing supporting structure is very open and is another feature of the aircraft that I

Original cockpit area

A start on the modification on the cockpit area

Cockpit area painted up

wanted to highlight. These parts that come from Black Horse are excellent and are easily cut and modified to more closely reflect the real aircraft.

I hope you found this 'scale matters' article interesting. I may not have finished with the Lysander yet, I think it needs some more scale detail. We are having -6o C in Canberra over the next few days, so I may just stay in the shed. If you have specific questions about any of the 'Scale Matters' articles you can email me aeromodeller@outlook.com and I will do my best to answer any questions. You may also find some interesting 'build information' at www.nitrodude.forumer.com

The web site for the National Aeromodelling and Aviators' Society (NAAS) can be found at www.naas.org.au. or on facebook <www.facebook.com/naasact/>

Until then, happy building and plenty of flying. John.

Change of colour of the inside of the cockpit area and wing support frame from grey to cockpit green

This photo shows the pilot sitting a little high; this was on purpose to show the shoe lace that is was used to tie him down into the correct position. *(A shot of the finished job is in John's Lysander review article on page . Ed)*