```
# y[m],x[m] , colour (r,g,b in 0-255)
-20.0,0.0,0,255,0
-20.0,3500.0,255,0,0
-16.25,0.0,0,255,0
-16.25,3500.0,255,0,0
-12.5,0.0,0,255,0
-12.5,3500.0,255,0,0
-8.75,0.0,0,255,0
-8.75,3500.0,255,0,0
-5.0,0.0,0,255,0
-5.0,3500.0,255,0,0
-1.25,0.0,0,255,0
```

Rotation matrix

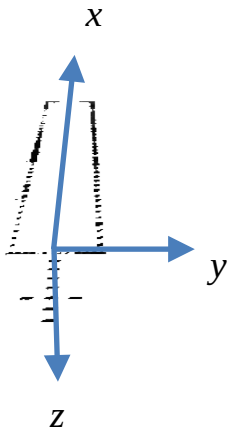
$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix} \times \begin{pmatrix} x\,9 \\ y\,6 \\ z\,3 \end{pmatrix} = \begin{pmatrix} 30 \\ 84 \\ 138 \end{pmatrix}$$

Rotation matrix pos of all lights

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix} \times \begin{pmatrix} 9 & 7 & 7 & 8 \\ 6 & 5 & 5 & 4 \\ 3 & 2 & 2 & 1 \end{pmatrix} = \begin{pmatrix} 30 & 24 & 24 & 18 \\ 84 & 69 & 69 & 54 \\ 138 & 114 & 114 & 90 \end{pmatrix}$$

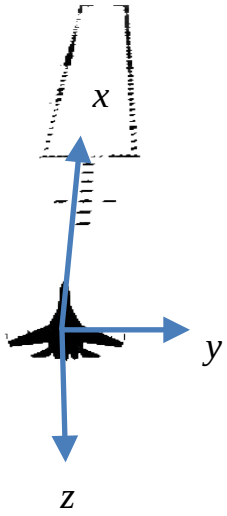
```
>>> lightcol
array([[  0, 255,   0],
       [255,   0,   0],
       [  0, 255,   0],
       ...,
       [255,   0,   0],
       [255,   0,   0],
       [255, 255, 255]])
```

```
>>> lightpos
array([[ 0.000e+00,  3.500e+03,  0.000e+00, ..., -1.950e+02, -1.950e+02,
        -1.950e+02],
       [-2.000e+01, -2.000e+01, -1.625e+01, ...,  1.300e+01, -1.300e+01,
         1.500e+00],
       [ 0.000e+00,  0.000e+00,  0.000e+00, ...,  0.000e+00,  0.000e+00,
         0.000e+00]])
```



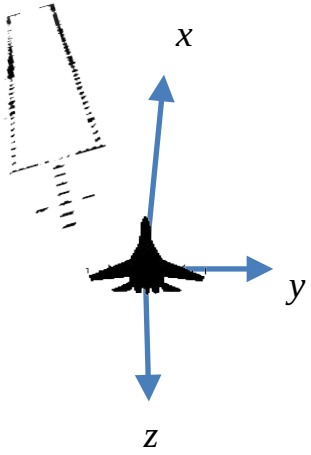
lightpos

From datafile:
Second column in datafile is x
first column is y
Z is set to zero
Create a transposed array with
n columns of three coordinates
Coordinates of lights
in world/runway axes
Origin at threshold
X-axis points in runway direction



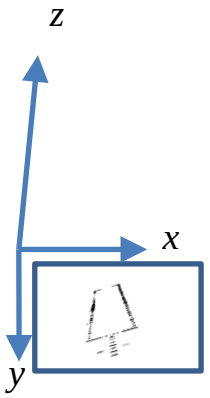

```
relpos =
  lightpos - ownpos
```

Subtract our own position:
Coordinates of lights
in relative axes
Origin at our position
X-axis points in runway direction




```
bodypos =
  Rtot.dot(relpos)
```

Multiply relpos with
rotation matrix:
Coordinates of lights
in body axes
Origin at our position
X-axis points in viewing direction




```
xscreen = y
yscreen = z
zscreen = x

xs = x*pz/z + xmax/2
ys = y*pz/z + ymax/2
```

Change axes
Add perspective
Move origin
Origin at top legft of screen
X-axis points left to right
Used for drawing