Engineering Specification Calculations

**Speed**

Rover must be able to move a minimum average speed of 1.25 ft/s since it needs to drive 30 ft. in 30 seconds while the RF transmitter may take up to 5 seconds to receive the code.

Vave= 30ft./25s = 1.2 ft/s

**Power**

Drive system needs to deliver approximately 6.8 Watts of power to move the minimum average speed of 1.25 ft/s at a total weight of 4 lbs.​

$$P=(f\*d)/t$$

*f =* force

*d =* displacement

*t* = time

1 Watt = 23.73 lb⋅ft2/s3

Power = (4lbs \* 32.2ft/s2 \* 1.25 ft.)/ s

Power = 161 lb⋅ft2/s3 / 23.73 lb⋅ft2/s3

Power = 6.8 Watts

**Drift**

Forward movement drift must be no greater than 0.5 ft. (left or right) for every 10 ft since it must drive forward 15-30 ft. and be in an area of ±10% of specified drive distance.

1.5 ft. (left or right) / 15 ft. (forward) = 1ft./10ft.

\*Allotted 0.5ft./10ft. to allow for over/under drive distance

**Turn Accuracy**

Turning mechanism on the tires must turn within +/- 5°

 Accuracy =$ \frac{actual value-(actual value-measurement)}{Actual value}$ \* 100%

**GPS Navigation**

GPS module must point due north no greater than 20° left or right in 120 seconds.

If heading, *x,* is less than 180°:

Turn left (*x)*°

If heading, *x*, is greater than 180°:

Turn right (360 – *x)*°