

Drone Delivery System: Using provided components, design and pre-build a system to drop a 'parcel' from a moving 'mother ship'



The 'mother ship' must slide or roll along an 18 gauge steel wire track stretched across the rotunda at KPU Richmond. The wire will be under 20lb of tension and inclined down at about  $12^\circ$  to provide locomotory force to the 'ship'. A target will be placed on the ground floor, approximately 12' under the wire, at the centre of the rotunda. The target will be directly under the wire, but will be shifted after each team trial so that every team will be aiming at a different location.

The parcel will be a small bean-bag, provided to you on the day of the event, with an attached small hook for connection to the 'mother ship'. The bean bag is approximately spherical with approximate mass and diameter of  $40 \pm 5$  grams and  $5.0 \pm 0.5$  cm respectively. The hook will have a diameter of:  $1.5 \pm 0.3$  cm and can not be modified in any way.



Teams will place their 'mother ship' onto the wire track at the high end, then attach the bean-bag via the hook, and then release the system. From then until the end of the trial, there is to be no direct physical contact with the 'ship'. However, teams will

use a TV remote control (provided at the event) to trigger the release of the bean-bag at the moment of their choosing.

To prepare the system in advance, teams will be provided with an infra-red receiver circuit (which contains an IR receiver, a power mosfet -think of this as a switch, turned on and off by the remote controller, that takes current to the electromagnet- , a small square of 'circuit board', and a small electromagnet). Just like for your TV at home, the range of infra-red signaling is about 15 feet when aimed directly at the receiver. Ensure your receiver is oriented properly in your final project!!

Teams can pick up these components from KPU Richmond, or they can be mailed to you. A deposit fee of \$10 will be collected and returned in exchange for the components.

Teams can choose to connect the components together (it is a very simple soldering task for those comfortable with that) or to have KPU volunteers connect them together. A video of the assembled system along with some suggestions can be found at:

[http://youtu.be/wL-\\_OuUrqOQ](http://youtu.be/wL-_OuUrqOQ)

Teams can make two attempts at hitting the target, with 3 minutes between attempts to make adjustments. The better score will count.