F.E.T.C.H.

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Problem Statement

The College of Natural Resources is required to collect sun foliage in order to conduct their experiments. Current methods, such as cranes, climbers, and shotgun slugs are expensive and inefficient. A more practical, portable solution is needed for the future.

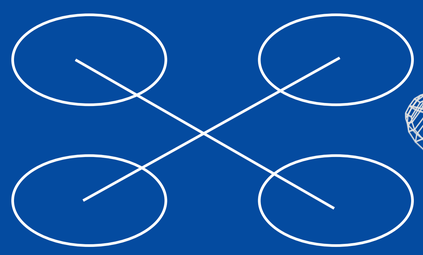
Quad-copter

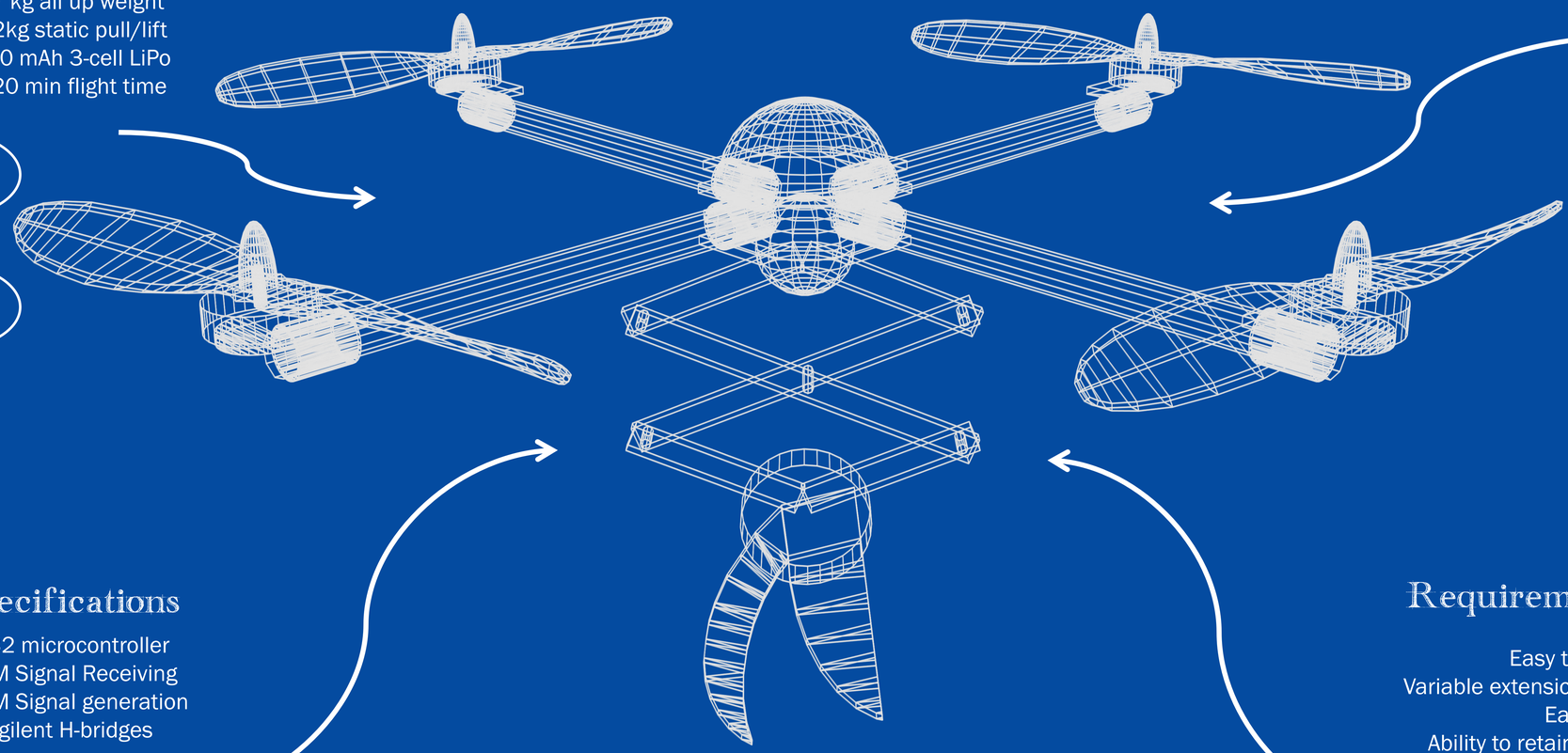
Requirements

Portable
Agile/Maneuverable
Stable
Heavy weight capable
Easy repair/off-the-shelf parts

Specifications

Ardupilpot Mega 2.5 flight controller
620 kV Brushless motors
12” x 4.7° APC Propellers
1.27 kg all up weight
3.32kg static pull/lift
2200 mAh 3-cell LiPo
11-20 min flight time





Ground Station

Requirements

Portable
Function in low light
One operator
Long range

Specifications

2.4 GHz 8 Channel Radio with additional toggles
900MHz video feed for on-board cameras
Laptop for receiving/viewing video
DC Battery charger and reserve batteries
Laptop
LEDs

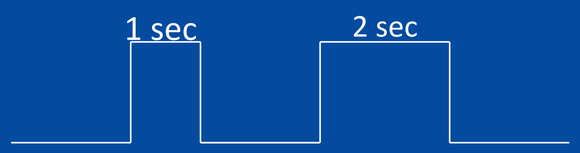
Software

Requirements

Interpret signals from RC Controller
Control LEDs
Control arm Extension
Control arm speed
Control cutting
Prevent motor damage

Specifications

Pic32 microcontroller
PWM Signal Receiving
PWM Signal generation
2 Digilent H-bridges



Solution

Our solution is a remote controlled quad-copter equipped with an extendable arm. This arm will include an attachment capable of clipping and holding a sun foliage sample.

Arm

Requirements

Strong
Easy to extend
Variable extension length
Easy to cut
Ability to retain clipped sample

Specifications

DC Motors
Worm Gears and racks
Nut and bolts
C-Shape plastic tubing
Cut-and-hold sheers