

# 1 Mission

Mapping a field of  $5000ha$  within a day

## 2 Design Requirements

### Constraints (C)

1. Camera Specifications (Canon Powershot ELPH 130 IS)
  - (a)  $16Mpix$
  - (b)  $1/2.3inch$  CCD (sensor size:  $l = 6.16mm$  and  $w = 4.62$ )
  - (c)  $5 - 40mm$  focal length
2. Minimum  $2pix$  to cover the space between seeds

### Assumptions (A)

1. operational focal length  $f = 5mm$
2. exposure time  $t_{exposure} = 3s$
3. endlap  $PE = 60\%$  and sidelap  $PS = 30\%$
4. seedband  $seed = 6cm$  (typical in canola crop)
5. window of time to operate  $t_{window} = 8h$
6. size of the field covered by each flight  $S_{field} = 250ha$  (square)
7. takeoff and landing angle  $45^\circ$

### Wanted Values

1. Altitude
2. Cruise Velocity
3. Flight Time