ECGR 4101/5101 10/2/13

Midterm Exam

MC questions
Short questions

FP ADC
Write code

Long question

* Book - Chapter 1-6
* Quizzes 1 through 9
* Homework 1-6
* Labs 1 through 3

* All lectures given in this class

* Allowed: PC/tablet PDF viewer only & calculator
(No wireless, no mobile phones)
Open book, open notes
* Bubble sheet → bring a pencil
Name only (UNCC last name first)
68% - 80%

AI: solutions q, H

Embedded Systems

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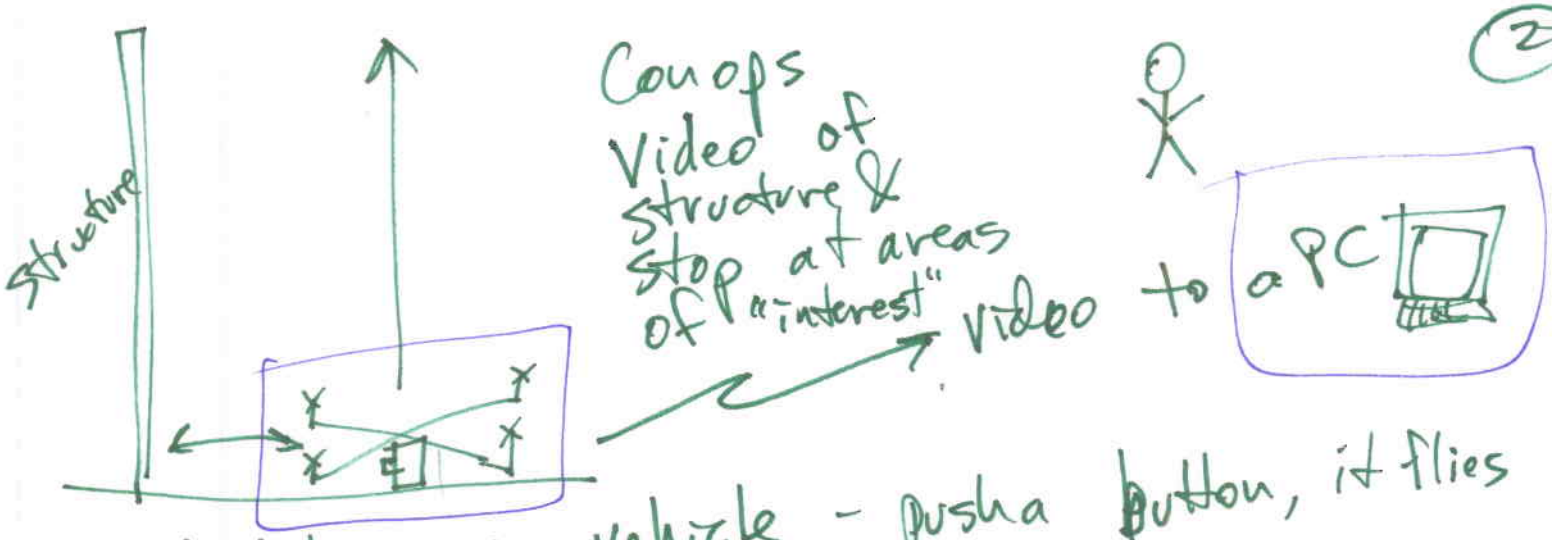

1) Autonomous vehicle - push a button, it flies & sends video
2) Human pilot → flight
3) Hybrid Autonous hover/safety system, pilot directing generally direction

Engineer

Computer - coding; flight / motor control
Video transfer; safety in flight

EE - Power, control, hardware / electronics, sensors

Mechanical → design of vehicle, aero-aspects

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(3)

Systems

Top-down decomposition

- System
  - Vehicle
    - PowerSystem
    - motors & control
    - Sensors
    - Video Capture & transmission
      - Camera
      - Camera electronics
      - antenna
      - software
    - Mechanical
      - X bar construction
      - motors & attachment
      - landing gear
      - blade safety device
  - PC Inspection
    - base Hardware
    - Video capture Hdwr
    - Video capture Sfwr
  - Pilot/Maintenance
    - Training Pilot
    - Train maint.

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(4)

Motion Control

- IMU sensor
- Electronic speed control
- motor
- Processor / μcontroller
- μsonic (sonar) sensor (20 feet) ± 0.05m
- GPS (location/height) ± 3m
- Altimiter (height) ± 0.1m – 3m

Requirements will, must, should, must not.

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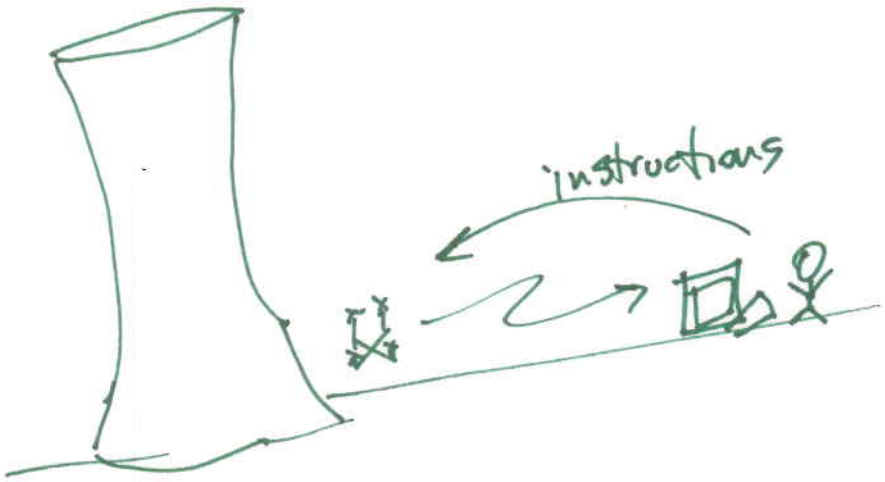
(5)



Requirements

1.0 The vehicle will fly from ground level to upto 400 meters high.

1.1 The vehicle will be deployable by one person.

1.2 The vehicle shall be of a quadrotor design

1.3 The vehicle shall carry one 12V LiIon battery

1.4 The vehicle, when instructed, will be able to autoland to its position on the ground without damage.

3 more requirements