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SOLAR THERMAL ENERGY
RESEARCH GROUP

An accurate altitude estimator for an Unmanned Aerial Vehicle (UAV)

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- Background
- Methodology
  - Problem Formulation
  - Simulation
  - Experimentation
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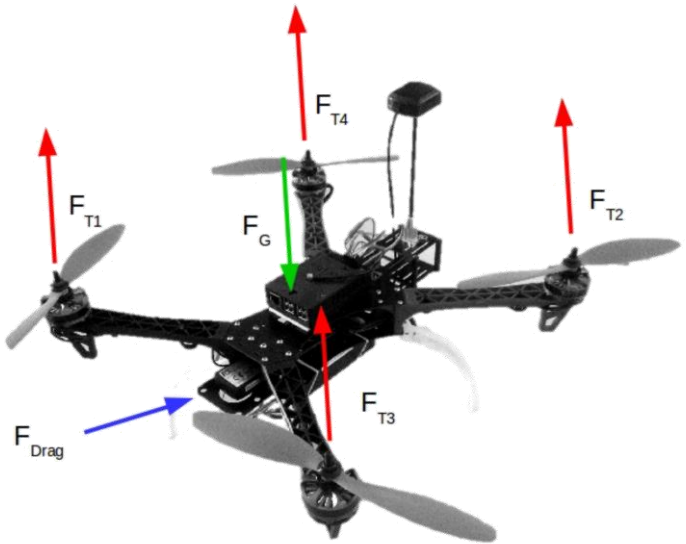
Background

Unmanned Aerial Vehicles

- What are UAVs?
- How may UAVs serve a CSP plant?



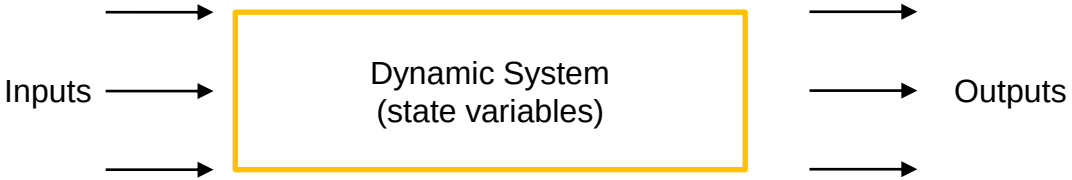
Background

Challenges

- Obstacle Avoidance
- Accurate Navigation
  - Control System
  - State Estimation

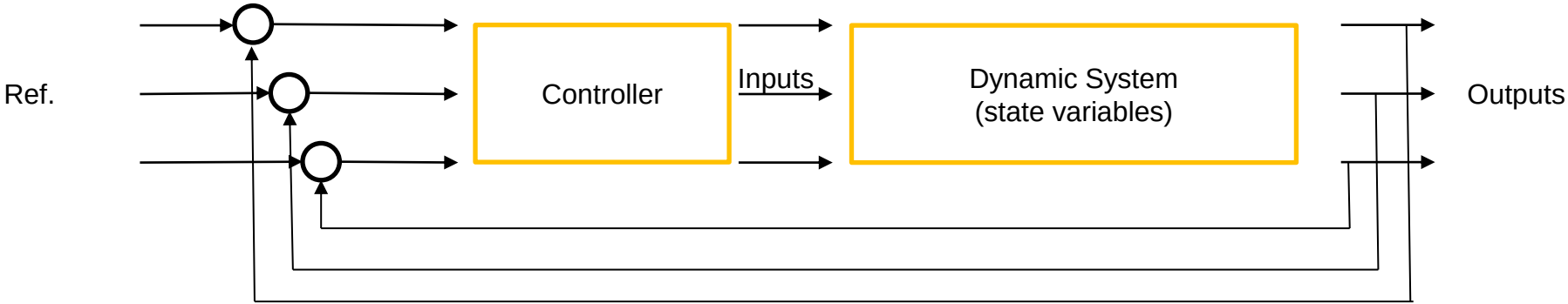
Background

System Modelling



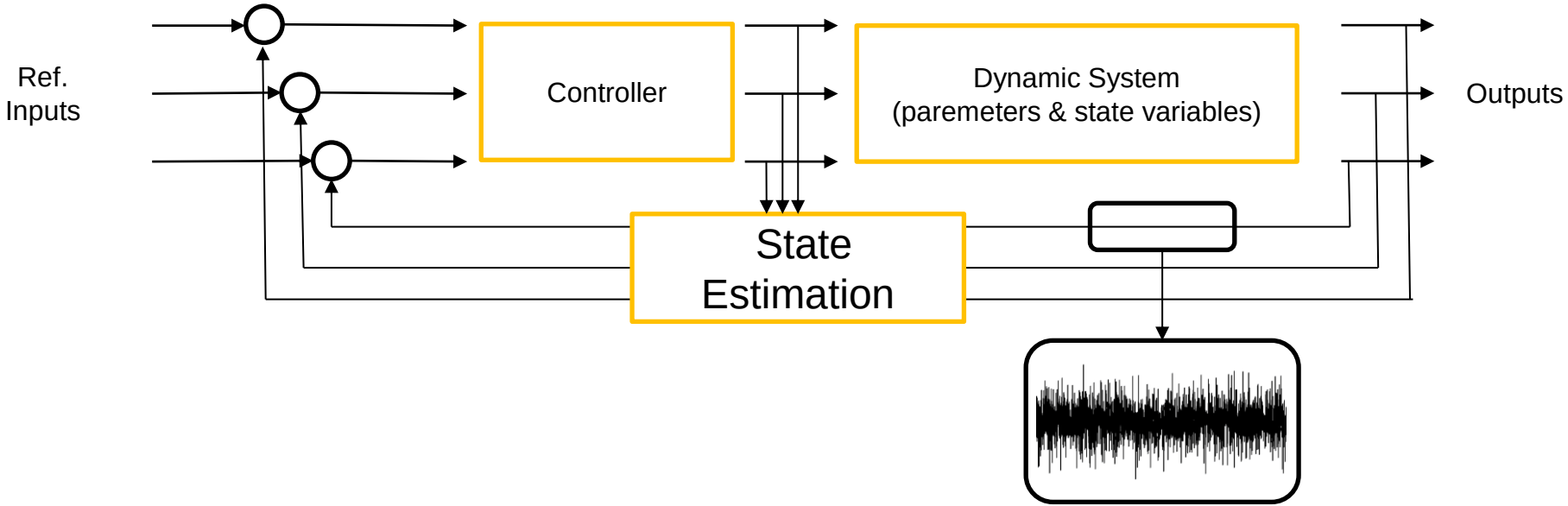
Background

Feedback Control



Background

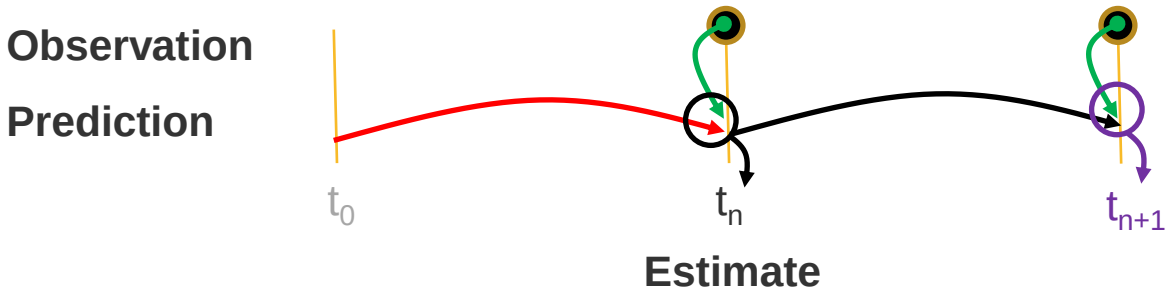
State Estimation



Background

The Kalman Filter

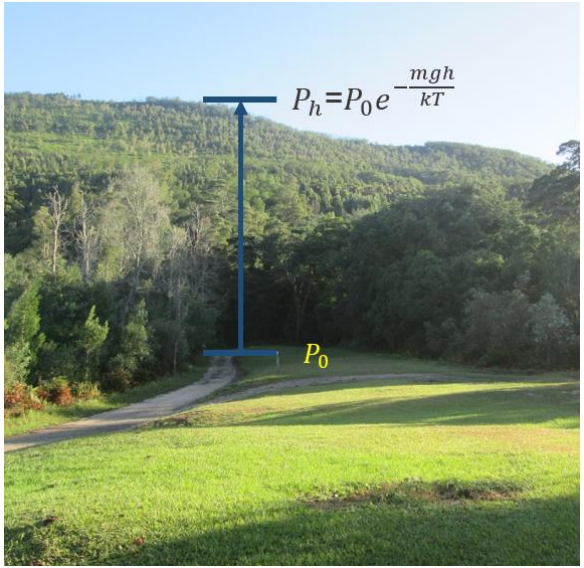
- Sensor fusion
- Iterative (Real time)



Methodology

Problem Formulation & Proposed Solution

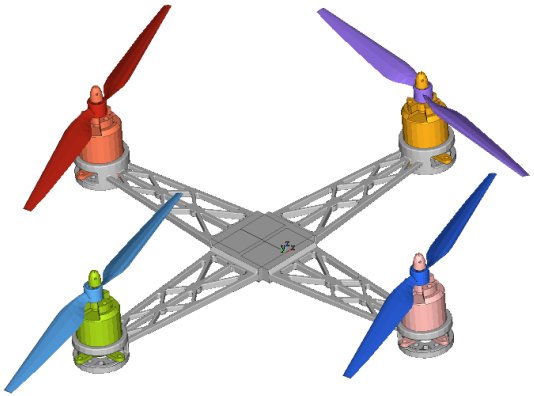
- Bad altitude estimates
- Fuse accelerometer/ GPS

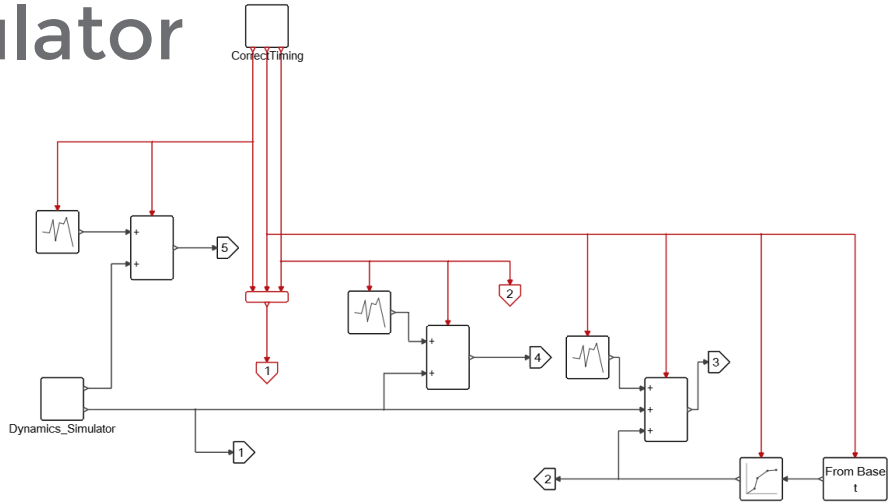


Methodology

Simulation

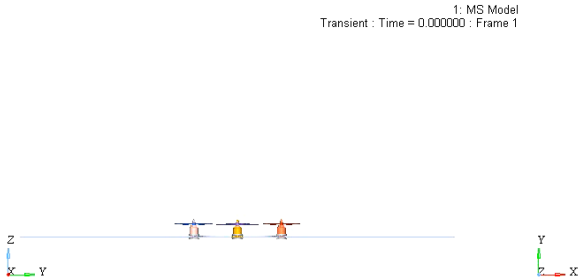
- System Identification
- Measurement Simulator

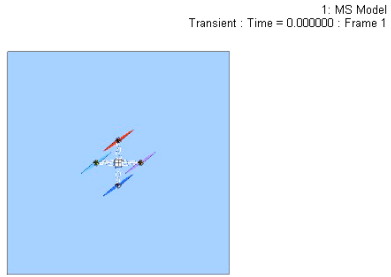


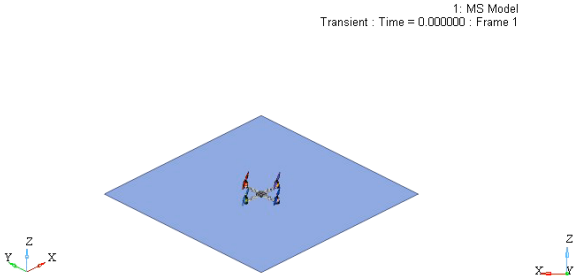


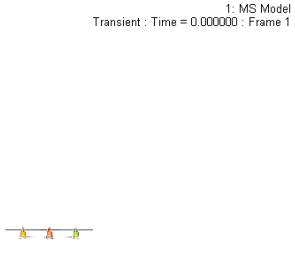
Methodology

Simulation Details



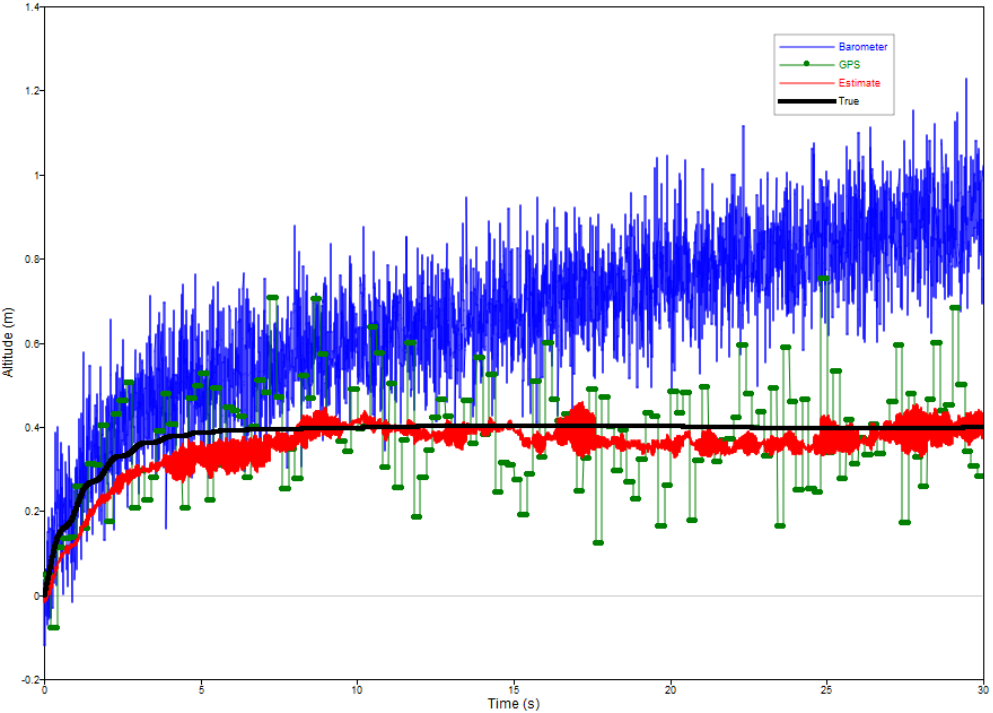


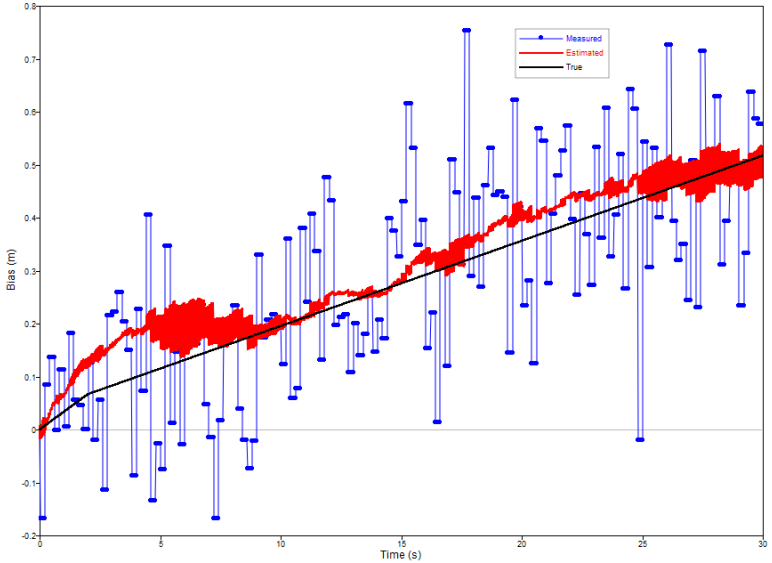




Methodology

Simulation Results





Methodology

Current/Future Work

- Implementation (Pixhawk Autopilot)
- Experimental validation of estimation performance

Conclusions

- Better Estimates than what any one sensor can provide alone
- Estimator does not suffer pitfalls of individual sensors
- Estimator is not sensitive to environmental changes

Thank You

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