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Advisor: Dr. Gerald Cook
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Abstract:
The increasing use of Unmanned Aerial Vehicles has caused an expansion of technology and control techniques used in the aerial robotics field. Sensor arrays consisting of Global Positioning Systems, gyroscopes, accelerometers, magnetometers, Inertial Measurement Units and thermopiles have been developed into smaller inexpensive packages that can be installed on UAVs to measure the current positioning and attitude variables (roll, pitch, and yaw) of the aircraft. Matching this positioning data of the UAV to earth coordinate values allows for the use of navigation systems in autonomous missions. Using a ground station, an operator can program navigational waypoints and loiter parameters into the UAV flight computer, which then uses onboard lateral and longitudinal control systems to control the flight of the UAV. Even in GPS denied environments, control systems based on dead reckoning, radio frequency tracking, and vision based navigation allows for continual operation with minimal operator interaction.