

16.30/31, Fall 2010 — Lab #2 Competition

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December 1, 2010

Overview

This year's competition will be a mission during which your Quanser must navigate over buildings, through a "tunnel," and carry a payload back to the starting point. Penalties will be assessed for hitting the obstacles, which are virtual, and for the integral of the absolute error in both the pitch and travel axes. There will also be a penalty for not completing the "payload pickup" task properly (see below). The team to perform the mission with the **lowest** score will win.

Mission

Figure 1 shows a map of the mission. The x -axis corresponds to the travel angle (ψ), while the y -axis corresponds to the pitch angle (θ). The buildings and tunnel will be physical obstacles that will fit within the constraints on the map (no tolerance information is given, however).

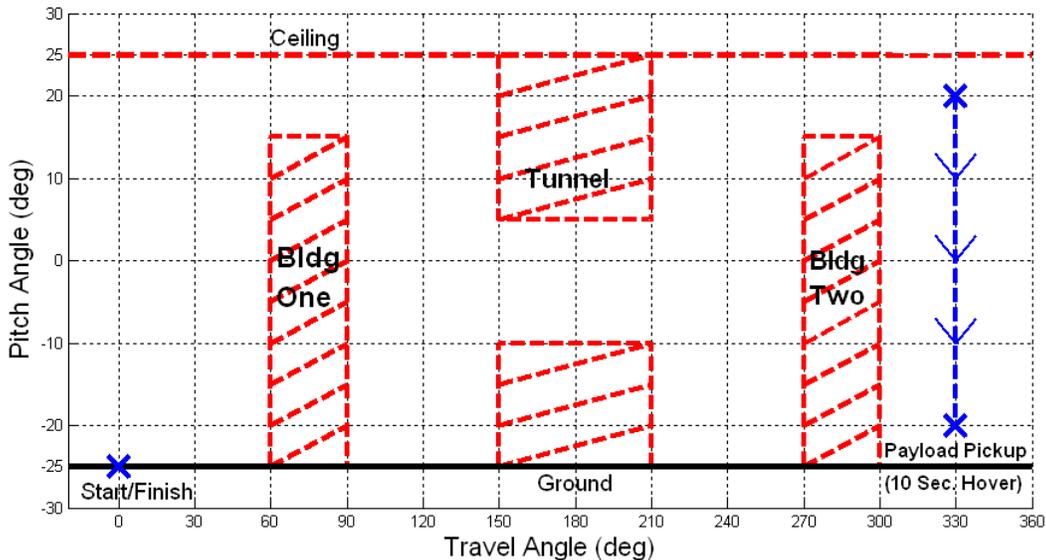


Figure 1: Mission map.

The mission has 3 stages:

1. Navigate from the starting point ($\psi = 0^\circ$, $\theta = -25^\circ$) to the surveillance waypoint ($\psi = 330^\circ$, $\theta = 20^\circ$), avoiding obstacles and staying below the ceiling ($\theta = 25^\circ$).
2. Descend to the payload pickup waypoint ($\psi = 330^\circ$, $\theta = -20^\circ$), and hover there for 10 seconds. During this hover, a small payload will be attached to your Quanser.
3. Navigate back to the starting point ($\psi = 0^\circ$, $\theta = -25^\circ$), again avoiding obstacles and staying below the ceiling ($\theta = 25^\circ$).

If you do not hover for a full 10 seconds at the payload pickup waypoint, 10 seconds will be added to your time for every second of hover missed.

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Fall 2010

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