Road Following

**Objective:** Use computer vision to autonomously track a perimeter on the ground.

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**Funding Source:** NASA.

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**Approach**

- Control a desired heading rate for a skid-to-turn platform equipped with a strapped-down camera:
  \[ \chi^d = N \left( \frac{c_y e_y - c_x e_x}{\sqrt{c_x^2 + c_y^2}} \right) \]

- Control a desired roll angle and a gimbal elevation angle for a bank-to-turn platform equipped with a gimbaled camera:
  \[ \phi^d = \frac{V}{g} \arctan (\chi^d) \]
  \[ \alpha^d = \phi \]

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**Results**

- Successful flight test in 2007.

- Used in conjunction with cooperative perimeter tracking and image mosaicing.

- Rural road successfully tracked for over two miles.

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**Computer Vision**

- Threshold in Hue-Saturation-Value (HSV) color space.

- Connect the classified pixels into components.

- Find the largest components and return the top center pixel.