

# Optic Flow Sensor

**Objective:** Using optic flow sensors, detect and track the walls of a rural or urban terrain.

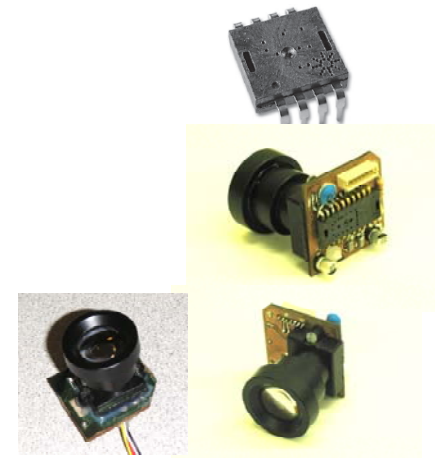
**Principle Investigators:** Tim McLain, Randy Beard

**Sample Publication:** Stephen Griffiths, Jeff Saunders, Andrew Curtis, D. Blake Barber, Timothy W. McLain, Randal W. Beard, "Maximizing miniature aerial vehicles," *IEEE Robotics and Automation Magazine*, vol. 13, no. 3, 2006 p. 34-43.

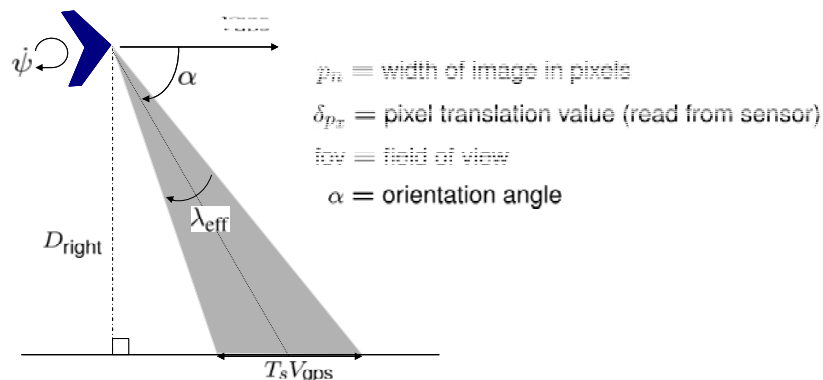
**Funding Source:** AFOSR.

## Optic Flow Sensor

- Computationally cheap
- Light weight – 0.8 oz (22 grams)
- Small form factor – 1" x 1" x 1.5"
- Inexpensive – \$80 including optics
- Fast – computes optic flow at 2300 fps
- Range: 80 m using 1.2 deg FOV lens.
- Custom design at BYU



## Approach



$$\lambda_{eff} = \frac{\delta p_x fov}{p_n} + \psi T_s \quad D_{right} = \frac{V_{gps} T_s}{2 \tan(\frac{\lambda_{eff}}{2})} \cos(\phi) \sin(\alpha)$$

## Results

First successful flight test in 2005.

Successful terrain following (height above ground) in 2005.

Flew through a rural canyon in 2005.

