

Project Title: Low Cost Fundus Camera

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The fundus of the eye is a critical area in the human body as it is one of the few locations where direct visualization of capillary beds can occur. Blood vessel state is consistent throughout the body, so visualizing the state of capillaries in the eye can give vital insight to medical professionals about the rest of the patient's body. This is of particular importance for people with diabetes as uncontrolled blood sugar levels are an irritant to blood vessels, scarring them and causing damage throughout the body, including the eye. When this damage occurs to blood vessels in the eye it can have detrimental effects on a patient's vision.

Fundus photography can be used to directly photograph the retina and provide valuable information to clinicians about the state of a patient's retina, particularly in patients with diabetic retinopathy. A fundus camera fundamentally consists of a low power microscope with an attached camera. The basics of fundus photography are well-described at <http://www.opsweb.org/?page=fundusphotography>.

The customer has asked that a low-cost Fundus camera be created that will not require pupil dilation. This is important so that patients at risk for Diabetic Retinopathy can be monitored by their general practitioner, and only required to visit a specialist if there are signs of disease in the fundus.

Specific goals for this team are (in decreasing priority):

- Getting the optics array setup that gets a focused image with adequate field of view.
- Thorough documentation of the product design and interfaces.
- Researching and meeting any industry/FDA standards for this type of device.
- Getting a completely working prototype camera, this includes mechanical structures and housing.
- Establishing a user experience through product testing.
- Consider mass-manufacturing/production in the design and develop a possible plan for production.

The intended environment is general practitioner offices, assisted living spaces, and basic clinics.