

PhD Dissertation Defense Announcement
Mechanical and Aerospace Engineering Department
University of Texas at Arlington

**DESIGN AND DEMONSTRATION OF AN INERTIAL-STABILIZED
SINGLE-AXIS HEADLAMP FOR MOBILE SYSTEMS**

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ABSTRACT

The introduction of adaptive headlamps has added left and right movement of the headlamps to enhance the vision of the driver during a turn at night. Adaptive headlamps also allow up and down motion of headlamps in either two discrete positions with low and high beams based on vehicle speed and oncoming traffic lights or using the vehicle suspension measurement to adjust headlamp beam angles in any angle between low and high. Using the vehicle suspension ignores the roadway influence on where the headlamps should be positioned to illuminate the roadway for the driver. This dissertation develops governing equations and provides an electro-mechanical breadboard design for a single-axis servo system that provides inertial stabilization of headlamp angles such that the headlights are always pointing level with respect to inertial space. Not only does this keep the headlights level to optimally illuminate the road ahead for the driver, but it also prevents the headlights from shining in the eyes of the oncoming traffic. The breadboard design includes selection of the angular positioning sensor, mechanical embodiment, electrical circuitry and control program. Included simulation and demonstration of the breadboard design provides the foundation for future prototyping of vehicle systems.