

TITLE: Rotating Torque Transducer
SPONSOR: PHD, Inc.

Proposal/Scope

Develop a rotating torque transducer to be used in the study of electromechanical robotic systems. The transducer will be placed between the output shaft of a servomotor and the input coupling of a gearbox or drive mechanics of a robotic actuator. A torque sensing portion of the transducer will rotate along with the rotating shaft of the motor and provide an electrical output proportional to the torque applied by the motor to the gearbox or drive mechanics.

A suitable slip-ring assembly will allow the electrical signals and electrical power connections to and from the rotating torque sensor to be transferred between the external stationary environment and the internal rotational environment of the motor shaft and torque sensor.

The torque sensor and slip-ring assembly will be obtained from commercial suppliers and will not be developed as part of the project.

The transducer will be modular in design, so that the input coupling between the motor and transducer and the output coupling between the transducer and gearbox / drive mechanics can be altered to fit a range of motor shaft diameters and lengths and gearbox / drive mechanics input coupling geometries. One arrangement might consist of separate, mechanically attached input adaptor section, measurement section (torque sensor and slip-ring assembly), and output adaptor section.

All rotating components of the transducer (in particular, the torque sensor and slip-ring assembly) will be selected to minimize the rotational inertia of the transducer so that insertion of the transducer into the instrumented system will not significantly affect the performance of the system.

All rotating components will be designed to “balance” the transducer by placing the center of mass of each component and subassembly as close as possible to the rotational axis of the motor and gearbox/ drive mechanics, to minimize vibration of the transducer during use.

Budget: \$1000