**Purpose:**

Our goal is to create a powered, programmable elbow orthosis which will 1) provide structural support for the elbow, 2) resist and restrict harmful ranges of motion, and 3) assist with intended elbow movements.

**Scope:**

Work includes the design and creation of a powered and programmable elbow orthosis. The design will leverage existing orthosis mechanical designs with various electrical and mechanical enhancements. Specifically, these enhancements will incorporate TI’s C28027 microcontroller, TI’s DRV8305 automotive gate driver, a compact motor, and an array of EMG, accelerometer, and positional sensors. While these components may be added to a preexisting orthosis, a custom base structure will likewise be explored. For prototyping and potentially for the final design, a hinged elbow brace may be 3D printed such that each component may be easily and reliably mounted. Work will result in a TI Design, and each unit will cost less than $499.99.

In general, the orthosis will stabilize, limit, and augment the elbow movement of most generic users. The overall structure (custom or not) will serve as a brace for the affected joint. Electromechanical limiters will resist and restrict the elbow from entering harmful ranges of motion. Electromechanical augmenters will assist the elbow into a position that is mentally intended but physically inhibited by a medical disorder.

**Personnel:**

The following are the primary contacts involved in this project:

* David Cuevas (Team Member, Motor-Body Interface)
* Nathan Glaser (Team Member, Body-Sensor Interface)
* Joe Loredo (Team Member, Power)
* Rafael Salas (Team Member, Data Processing)
* Leonardo Estevez (Team Mentor, TI Contact)

**Period:**

Total contract duration is 2 semesters spanning from September 2015 to April 2016. The following serves as a rough project timeline:

1. Research (1 month)
   * Medical condition and preexisting solutions
   * Adaptable hardware and software
2. Subcomponent Prototyping (2 months)
   * Body-Sensor Interface
   * Data Processing
   * Body-Sensor Interface
   * Power
3. Integration (2 months)
   * Optimize structure and mounts
   * Ensure communication between subsystems
4. Final Product Preparation