St. Jude Medical Catheter Redesign

Sponsor: St. Jude Medical
Mission: St. Jude Medical is dedicated to making life better for cardiac, neurological, and chronic pain patients worldwide through excellence in medical device technology and services.
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Project Mission: The St. Thomas Senior Design Team strives to create through St. Jude Medical, a new Bideflectable Luminary Catheter that maintains performance while reducing costs by fostering effective communication, creative solutions, and quality products.

Major Design Requirements:
1. Actuation Torque must be less than 6.0 in-lb
2. Smooth and continuous movement of actuator
3. Actuator must auto-lock
4. Device performance must be maintained
5. New design must operate within existing framework
6. Reduce manufacturing by 20%
7. Create an isolated electrical circuit from distal to proximal end
8. Reliability through 50 full deflection cycles
9. Reduce and simplify assembly process

The St. Jude Medical Senior Design Team worked on a product redesign for the CPS Luminary™ Bideflectable Catheter with Lumen. The bideflectable catheter has two deflectable curves: a large deflection to facilitate coronary sinus cannulation and a small deflection for target vein sub-selection. The catheter also has two bi-polar electrodes located at the distal end of the catheter that are used for electro-medical imaging during product use. The goal of the project was to reduce overall costs of the handle assembly by simplifying and reducing the number of components, increase ease of manufacturing and assembly, and reducing scrap during production. During the fall semester, the team worked with the customer, St. Jude Medical, in order to create a detailed list of product requirements, which then led them to develop several design concepts. The single lever concept design was chosen as the final design after undergoing testing and several design iterations. The single lever design consists of a lever, a lever base, two control arms, and two metal screws. The catheter pull wires connect to the lever and are fastened down by the metal screws. The control arms connect the lever with the actuator and are the driving force for the catheter deflection curves. The final lever design not only reduced the number of parts for the handle from 19 to 8, but also drastically simplified the assembly process from that of the current design.