

# Catheter Handle

## Executive Summary

St. Jude Medical sponsored a University of St. Thomas senior design team during the 2007-2008 academic year. The project was to design a handle for a catheter that allows for delivery of a lead to the heart. The team, which consisted of five mechanical engineers, began developing customer requirements in September 2007 through discussions with both corporate sponsors and a faculty advisor. From these requirements multiple initial concepts were created and evaluated by the corporate sponsors and faculty advisor. Through these evaluations, one basic design was chosen to be pursued. After discussions with the corporate sponsors, the decision was made to modify the scope to place more emphasis on background research and concept generation in order to increase the probability of success.

To this effect, the team met with different human factors experts and used previous consumer studies to better understand what requirements a physician would want in a catheter handle. Iterations were done on various proof-of-concept design aspects such as the handle shape and size before the team felt confident enough with the design to move forward to prototypes. These prototypes were initially manufactured using stereolithography (SLA) rapid prototyping methods. Eventually, the parts were machined in order to better replicate the final quality of those pieces which required tighter tolerances, a more rigid material and low static friction. At the same time various back-up designs – most of which were continuations of designs from earlier in the year – were created as an alternative solution should the main design fail to fulfill the requirements.

The end of the year was spent perfecting iterations and completing preliminary work on items such as the design's manufacturability and intellectual property documentation. The iterations were mainly focused on developing smooth and natural actuation. During this process different techniques were used to verify the progress of the concept, including testing by different St. Jude engineers with relevant experience and finite element analysis using ANSYS. The project concluded its work in May 2008 by delivering a final functional prototype comprised of both rapid prototyped and machined parts along with material and manufacturing recommendations.