



Kollmorgen and Stereotaxis Advance the Precision and Safety of Surgical Robots

Stereotaxis is changing the landscape of surgical robotics. As a pioneer in a field dominated by a few well-established players, Stereotaxis listens to what hospitals and surgeons say they're looking for and applies its unique vision, agility and collaborative spirit to develop unique robotic technologies used in complex, minimally invasive endovascular procedures. Its transformative new robot, Genesis, enhances the precision and safety of these surgeries to enable better, more predictable patient outcomes.

Challenge

Cardiac ablation to treat dangerous arrhythmias has traditionally been done using a manual pull-wire catheter positioned using X-ray visualization. These relatively rigid catheters, guided directly by the surgeon via a handle, don't allow for the most flexible navigation, accurate positioning or stable operation. Stereotaxis envisioned and engineered a new technique that would reverse the old push-into-place paradigm.

The company set out to create a system that could automatically guide a much more flexible catheter directly from the tip end using precise, robotically positioned magnets. With this technique, the surgeon would gain much greater control while working in the radiation-free environment of a separate control room. The new system would allow for a faster, more effective procedure with far less risk of adverse events. The flexible, tip-guided catheter could also easily navigate anatomy that would otherwise be unreachable, enabling care for patients who had no alternative options.

A major challenge in engineering this complex surgical robot was to precisely position the large magnets while avoiding potential interference from the magnetic field that could otherwise disrupt the electronic signals controlling the machine's motion.

“Kollmorgen has been a reliable, high-quality partner as we develop and manufacture innovative surgical robots used to treat thousands of patients in the most critical settings.”

—David Fischel,
Stereotaxis

Solution

Compact, torque-dense servo motors would be needed to position the heavy magnets smoothly and precisely. Feedback devices would need to operate reliably in the highly magnetic environment. And it would take a highly specialized manufacturing team and collaborative engineering expertise to help optimize this unique application. When a competing motion provider couldn't meet these demands, Stereotaxis turned to Guide Automation, a local Kollmorgen partner and distributor, to help define and fulfill specific application requirements.

With industry-leading torque density, Kollmorgen AKM servo motors deliver the performance to precisely control the application's large masses while fitting the constrained installation footprint. For this application, a specialized encoder that is compatible with highly magnetic environments is integrated into the AKM motors to provide interference-free positioning data.

Guide Automation worked closely with the Stereotaxis team through all phases of development, providing local commissioning and systems-testing support. Kollmorgen's collaborative engineering expertise, manufacturing quality and reliable distribution assured project success.



Genesis Robot

Results

With this solution, instead of manually manipulating the catheter, the surgeon visualizes and guides it from a computer cockpit in an adjacent control room. The catheter tip can be positioned with millimeter precision, navigating anatomy that would be unreachable with a manual catheter. The magnetic field holds the tip in position during the ablation process, unaffected by heartbeats that can push a manual catheter out of place.

For Stereotaxis and its customers, the new Genesis surgical robot represents a leap forward in robotic magnetic navigation technology and represents the future of endovascular robotics. It enables better control for more reliable results while reducing the need for radiation exposure by an average of 30% for the patient and eliminating exposure for care providers. Next-generation surgical robots, built with Kollmorgen motion technology, are now saving and improving thousands of lives.

30%

reduced radiation exposure.

About Kollmorgen

Kollmorgen, a Regal Rexnord Brand, has more than 100 years of motion experience, proven in the industry's highest-performing, most reliable motors, drives, linear actuators, AGV control solutions and automation platforms. We deliver breakthrough solutions that are unmatched in performance, reliability and ease of use, giving machine builders an irrefutable marketplace advantage.