

## Small in Size, Big on Precision

Tuebingen Scientific Medical GmbH is a medical device company specializing in instrumentation for minimally invasive surgery. The surgical systems fill in the gap between conventional surgical instruments and surgical robotics. Tuebingen's manual manipulator system, called Radius Surgical System, represents a new class of surgical devices entirely focussed on providing full freedom to operate and optimal ergonomics without the complexity of electromechanical robotic devices.

The surgical system consists of two hand-guided surgical manipulators. Depending on the surgical task, graspers, scissors, needle holders, and other devices can be attached to the tip and changeover only takes a few seconds. The system required a universal joint to transmit the power from the handle, which acts as a natural extension that emulates the movement of the hand, to the connecting shaft. The joint itself has an outside diameter of 8 mm to accommodate the space limitations of the surgical tool. A deflectable and rotatable tip provides all degrees of handling freedom.

During design development, the customer requested a specialized hub configuration to ensure a secure connection and precise operation. By means of innovative manufacturing processes, Belden Inc.®; a manufacturer of universal joints®; made modifications to the standard universal joint concept and delivered prototypes for testing. The final design now incorporates the universal joint and a component of the internal extension as a single piece, which was originally done as two separate pieces. To adhere to the sterilization regulations required by the medical industry, the universal joint was manufactured in stainless steel. *Information:* [www.beldenuniversal.com](http://www.beldenuniversal.com) [1].

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[1] <http://www.beldenuniversal.com>