

# Application Handbook

## Medical Equipment

### Harmonic Drive LLC Stereotactic Manipulator Rotary Axis

- Precision output bearing
- Hollow-shaft

There are many new and interesting applications in medical equipment for Harmonic Drive® precision strain wave gearing products. A particularly demanding application is in the rotary axes of a stereotactic manipulator, which is used for brain surgery. The manipulator is a 6-axis robotic arm that supports the operating microscope used by the surgeon. As the operation progresses, the microscope superimposes computer data on the actual viewpoint of the operating area, acting as a head-up display to guide the surgeon through the operation.

Each axis features a CSF component set within a special gearbox. This design example shows a special hollow shaft design. A shaft connected to the output flange passes back through the gearbox to a high-resolution encoder. This direct output measurement system is used for reasons of safety. The Wave Generator is driven via a toothed belt. The motor is mounted parallel to the gearbox. This basic design is also used in other applications on areas, such as precision machine tools or measuring machines, where exceptionally high positioning accuracy is required.

