

# Application Handbook

## Special Machines

### Harmonic Drive LLC Camera Head Pan and Tilt Axes

- Sub-assembly
- Hollow-shaft actuator

The smooth running characteristics and compact design make FHA hollow-shaft actuators ideal for the pan and tilt axes of camera heads. This design example shows a camera head used in the security field for border observation. Similar designs are also attached to remote camera booms for sports coverage. The cables from the camera pass through the hollow-shaft of the tilt-axis actuator (axis 2). The hollow-shaft of the pan-axis actuator (axis 1) is used for the camera cables and the tilt-axis actuator, cables.

The small envelope and lightweight design of the FHA actuator means that this arrangement can also be used for airborne camera platforms mounted on moving vehicles. This basic design is also used for satellite tracking, where the extremely smooth, low speed output of the actuator is another advantage.

