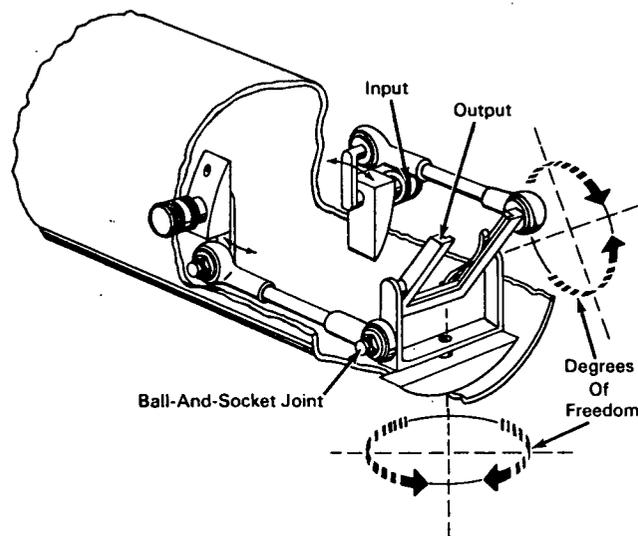


# NASA TECH BRIEF



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## Ball-and-Socket Joints Provide Accurate Biaxial Gimbal



**The problem:** To provide an accurate two-axis mechanism that will accurately position system elements such as mirrors, sensors, lenses, energy beams, etc. The mechanism must be capable of continuous motion without backlash so that exact repeatability is possible.

**The solution:** A mechanism that uses two rotating inputs coupled through a ball-and-socket linkage to an orthogonally pivoted output.

**How it's done:** The rotary inputs are connected to their respective output axes by adjustable links fitted with ball-and-socket joints at the ends. Members of the output are mounted to rotate in orthogonal planes, thus providing two degrees of freedom. As each input is rotated, the ball-and-socket linkage moves to rotate the output about that particular axis. The ball-and-socket joints prevent backlash, thus providing accurate positioning of the output.

### Notes:

1. Inputs may be by closed loop servomechanisms, synchomotors, stepper motors, or any other programmed rotary mechanical device.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
 Jet Propulsion Laboratory  
 4800 Oak Grove Drive  
 Pasadena, California, 91103  
 Reference: B65-10205

**Patent status:** NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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 (JPL-658)

Category No. 05