

## PATENTS BRANCH INVENTION REPORT

"30 years too early!"

SECURITY GRADING OF THIS REPORT	<del>COMMERCIAL IN CONFIDENCE</del>		JOB NO.	13152 MdH
ANTICIPATED GRADING OF PATENT APPLN				
INVENTOR(S)	E. Abel; S. M. Third			
DESCRIPTIVE TITLE	Three Dimensional Trackball			
Please quote Job No. on all correspondence	Patent Appln. No.	Due Date (Completion, etc.)	Responsible Officers	
			M & S	Patents

Subject matter: 07.05

A trackball is a sphere mounted in a frame and free to turn about any axis through its centre. Rotation of the trackball about any one of three non-coplanar axes (which may be orthogonal) is detected by a respective detector, so that rotation about any axis is resolved into three component rotations. The trackball may have a hole in one side large enough to accommodate an operator's hand, and may be used at the master end of a master/slave manipulator to control the pitch, roll, and yaw motions of a slave arm, the link between the trackball and the slave arm preferably being electronic.

The detector of the rotation may be mechanical, optical, electromagnetic or magnetic. The mechanical detector might comprise a multiturn potentiometer turned by a wheel in frictional contact with the trackball, and such a wheel may comprise a circular sheet of neoprene sandwiched between rigid flanges. The optical detector might scan a pattern of dots or lines on the surface of the trackball. The electromagnetic detector might comprise a search coil surrounding the trackball, or a small ferrite-cored search coil, with a primary coil inside the trackball supplied with an a.c. signal, and the magnetic detector might comprise a reluctance detector scanning a dimpled ferromagnetic trackball.

Force feedback could also be provided by using a conducting material in the trackball, and three induction motors to create the feedback forces.

30 years too early  
 \* Patent application for this & other 3 degree of freedom (& by extension, multiple DOFs) input devices for haptic control of a remote item.... Rejected by Harwell Patents Board as being non-commercial & having no potential... big mistake!!  
 Multiple DOF contactless/remote input devices <sup>since</sup> used by air traffic control, military targeting, gamers, & (in 2000+) virtual reality etc gesture input devices. This had force/pressure feedback too!

DECISION To follow. To be considered at the Patents Advisory Committee cc. Mr. E. Abel (Mechanical) Meeting on Thursday 26th November, and Mr. S.M. Third observations to assist the Committee may be sent to Mr. G.W. Peagram\* the undersigned beforehand.  
 Mr. K.J. Hill\*  
 Mr. S.L. Naylor\* \*Please notify Patents Branch promptly if there are any queries over inventorship.