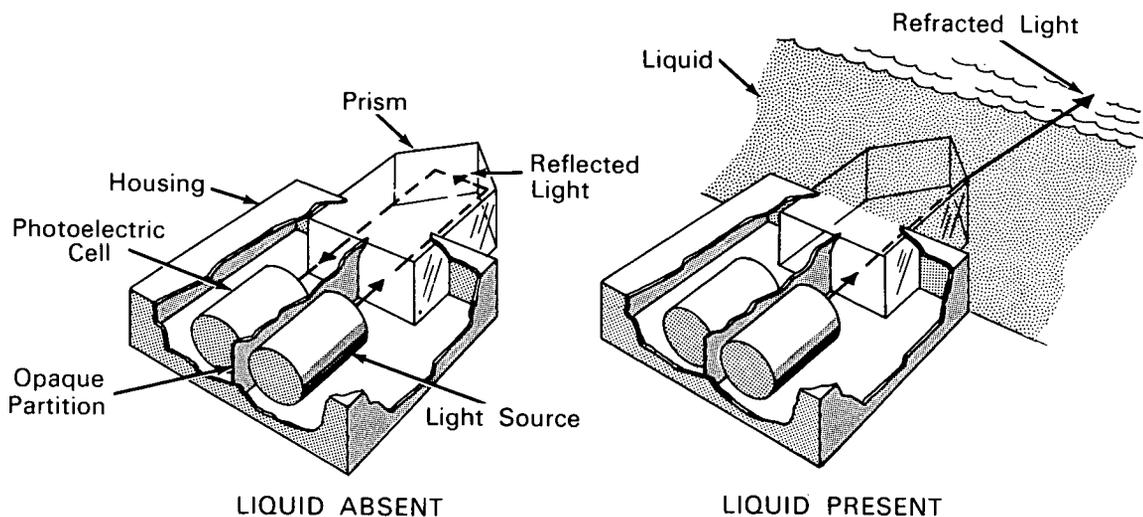


# NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

## Liquid-Level Meter Has No Moving Parts



**The problem:** To design an instrument without moving parts that will reliably indicate the level of liquid at temperatures extending through the cryogenic range up to 200°F.

**The solution:** An electro-optical system employing a number of glass prisms, which serve as liquid-level probes inside the tank, and optically aligned photoelectric assemblies, which are mounted on the outside of the tank. Each of the external assemblies contains a light source and a photoelectric cell. Heating elements are also incorporated within the external assemblies to insure operation of the photo-

electric cells when the system is used to monitor liquids at cryogenic temperatures.

**How it's done:** The dihedral ends of the glass prisms extending from the housings which contain the photoelectric assemblies are sealed into the tank at discrete levels. When no liquid is present at the level of one of the prisms, the light beam will be internally reflected in the prism to the photoelectric cell. An electrical signal from the cell will indicate the absence of liquid at this level. If liquid is present at this level, the beam of light will be refracted at the incident face of the prism and pass into the liquid, instead of being internally reflected to the photoelectric cell. As a result, no signal will be put out by the cell.

(continued overleaf)

**Notes:**

1. When the instrument is used with liquids at cryogenic temperatures, the heating elements must maintain the temperature of the photoelectric cells above their lower operating limit of  $-180^{\circ}\text{F}$ .
2. For further information about this innovation inquiries may be directed to:  
Technology Utilization Officer  
Marshall Space Flight Center  
Huntsville, Alabama 35812  
Reference: B63-10378

**Patent status:** NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: The Bendix Corporation under contract to Marshall Space Flight Center (M-FS-3)