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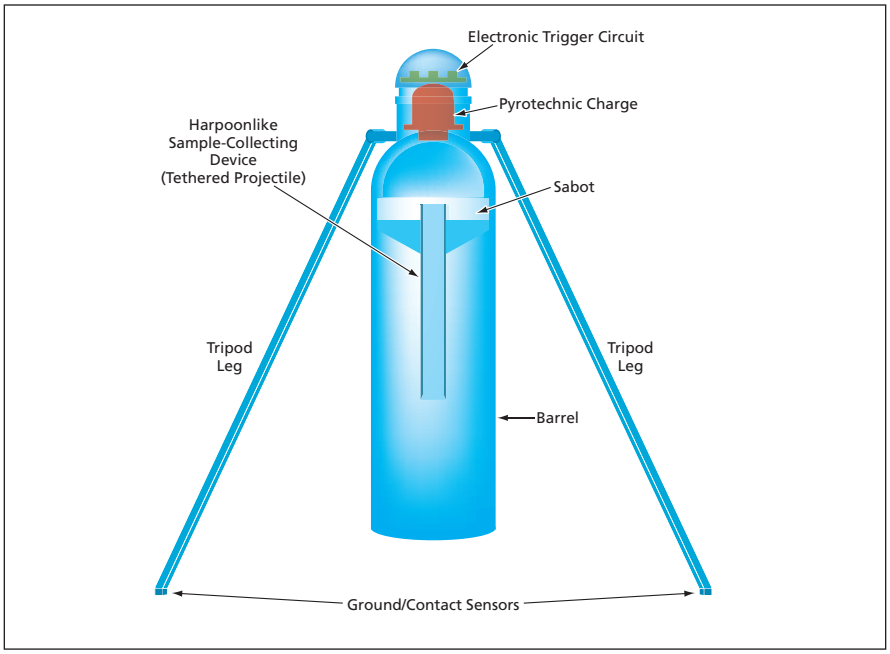


A **Gun Aimed Downward From the Top of a Tripod** would fire a tethered projectile into the ground to collect a sample when all three feet of the tripod simultaneously touch the ground.

barrel just below the pyrotechnic charge, and the tethered projectile would be placed in the barrel just below the sabot. The tripod feet would be equipped with contact sensors connected to the trigger circuit.

In operation, the tripod would be lowered to the ground on its tether. Once contact with the ground was detected by the sensors on all three tripod feet, the trigger circuit would fire the pyrotechnic charge to drive the projectile into the ground. (Requiring contact among all three tripod feet and the ground would ensure that the projectile would be fired into the ground, rather than up toward the gondola or the balloon.) The tethered projectile would then be reeled back up to the gondola for analysis of the sample.

*This work was done by Jack Jones, Wayne Zimmerman, Jiunn Jenq Wu, Mircea Badescu, and Stewart Sherrit of Caltech for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).* NPO-44445

# Enhanced Video-Oculography System

*Lyndon B. Johnson Space Center, Houston, Texas*

A previously developed video-oculography system has been enhanced for use in measuring vestibulo-ocular reflexes of a human subject in a centrifuge, motor vehicle, or other setting. The system as previously developed included a lightweight digital video camera mounted on goggles. The left eye was illuminated by an infrared light-emitting diode via a dichroic mirror, and the camera captured images of the left eye in infrared light. To extract eye-movement data, the digitized video images were processed by software running in a laptop computer. Eye movements were calibrated by having the subject view a target pattern, fixed with respect to the subject's head, generated by a goggle-mounted laser with a diffraction grating.

The system as enhanced includes a second camera for imaging the scene from the subject's perspective, and two inertial measurement units (IMUs) for measuring linear accelerations and rates of rotation for computing head movements. One IMU is mounted on the goggles, the other on the centrifuge or vehicle frame. All eye-movement and head-motion data are time-stamped. In addition, the subject's point of regard is superimposed on each scene image to enable analysis of patterns of gaze in real time.

*This work was done by Steven T. Moore and Hamish G. MacDougall of Mount Sinai School of Medicine for Johnson Space Center. For further information, contact the JSC Innovation Partnerships Office at (281) 483-3809.* MSC-23957-1