NASA TECH BRIEF

Ames Research Center

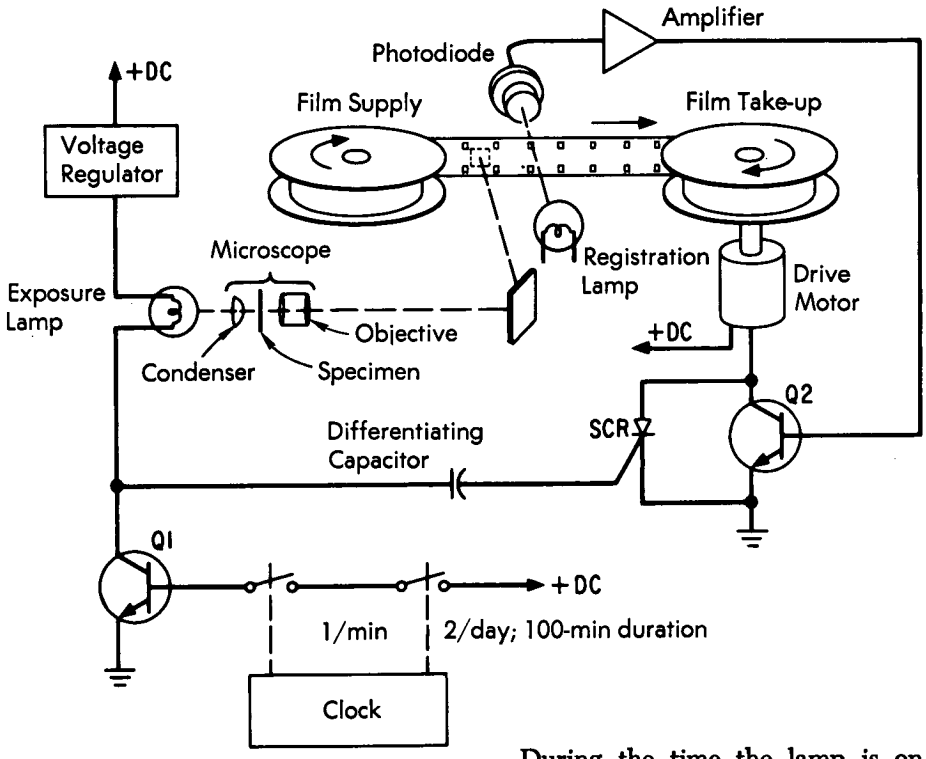
Time-Lapse Camera for Microscopy

The problem:

To obtain time-lapse photomicrographs of human cell growth in a zero-G environment over a period of about one month and in an earth satellite where weight and space limitations are severe and the reliability of performance is mandatory.

How it's done:

Twice each day, the exposure lamp assembly is switched on once every minute for 100 consecutive exposures. When the lamp is on, an enlarged image of the specimen is produced by the microscope and projected onto the film.



The solution:

A compact, lightweight camera which advances film frames without use of conventional sprockets and slip clutches.

During the time the lamp is on (approximately 1½ sec), the film is stationary in the film gate. As the lamp is switched off, a positive pulse produced by a differentiating circuit triggers a silicon-controlled rectifier (SCR) into conduction. The SCR completes

(continued overleaf)

the film-drive motor circuit, allowing film to be advanced.

The film gate supports a photocell and lamp on opposite sides of the film. The film blocks light to the photocell until a sprocket hole in the film reaches the light path. When light strikes the photocell, a current is produced, amplified, and used to turn on a transistor connected across the SCR. The SCR current drops below minimum holding level, causing it to cease conduction. However, the transistor maintains the motor current path until the edge of the sprocket hole again blocks the light path, turning off the transistor and hence, the motor. The motor remains off until the cycle is repeated.

Notes:

1. The living specimens are fed twice each day by a media exchange system and kept at body temperature by a thermostatically controlled heater.
2. Requests for additional information may be directed to:

   Technology Utilization Officer
   Ames Research Center
   Moffett Field, California 94035
   Reference: TSP72-10125

Patent status:

No patent action is contemplated by NASA.

Source: James E. Cook of
University of Texas Southwestern Medical School
under contract to
Ames Research Center
(ARC-10423)