

# NASA TECH BRIEF

## Goddard Space Flight Center



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### A Rapid, Precise, Reciprocating-Movement Color Filter System

#### The problem:

To generate pictures, color film is placed in the film plane and each line of the picture is exposed through red, green, and blue Kodak Wratten gelatin filters. These color filters must be moved into and out of position three times for each line. Thus, for a 4096 line picture, over twelve thousand filter changes must be made. If one second were required to move each filter, the time spent on just the motion would take over 3 hours for each picture.

#### The solution:

A unit was designed that changes filters in less than 46 ms.

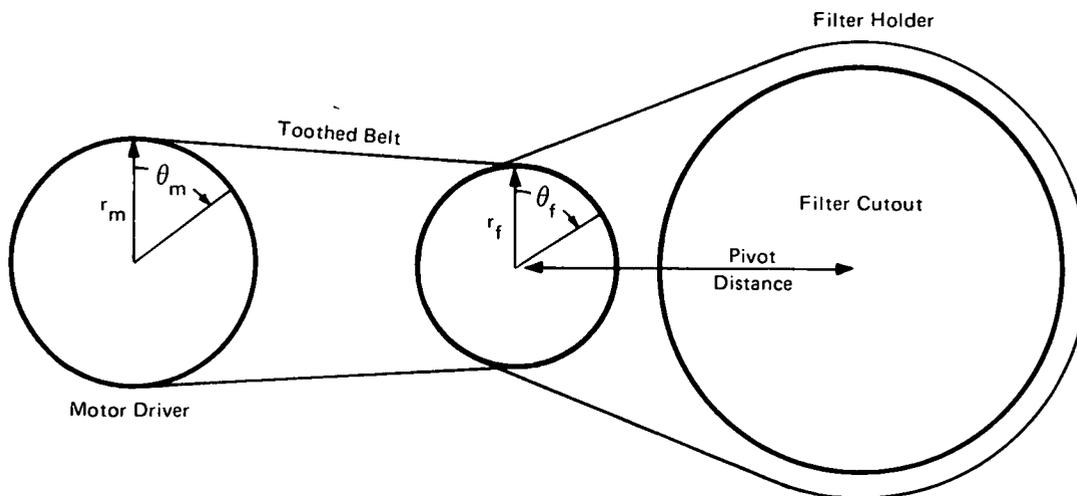
#### How it's done:

The filters are mounted on separate holders which are rotated into and out of position like semaphore flags. The figure shows the filter and driver relationship.

Only two filters are moved for a filter change, which requires less energy application than that of any existing system. The drive is distributed to the three drivers moving the filters from one fixed stop position to another through a displacement of less than  $120^\circ$ . Because of the short displacement, brushless permanent magnet torque motors are used, which are inherently more reliable than the brush type motors employed in a continuously rotating system.

A dual foldback current limited supply powers the unit; the drivers supply the proper currents to the torque motors. The timers and logic produce the proper waveforms to control the drivers.

This system may be used to record the previously derived colors on a photorecorder or to scan different color or wavelength components of a rapidly passing scene, as in aerial reconnaissance. The rapid, precise reciprocating movement provided by this system may be useful in purely mechanical and chemical applications.



(continuous overleaf)

**Note:**

Requests for further information may be directed to:  
Technology Utilization Officer  
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Greenbelt, Maryland 20771  
Reference: TSP72-10497

**Patent status:**

No patent action is contemplated by NASA.

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