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NASA TECH BRIEF

Resonant Microwave Dichroic Surface

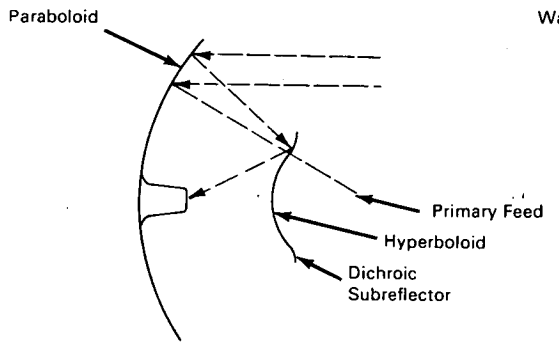

Figure 1. Application in a Cassegrain System

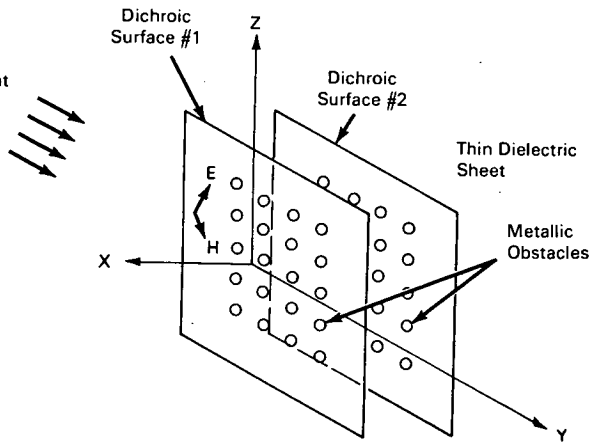

Figure 2. Resonant Two-Section Dichroic Surface

A resonant microwave dichroic surface has been developed which has high stopband filter characteristics with a low stopband-to-passband frequency ratio. It utilizes two stagger-tuned, resonant artificial dielectric surfaces and is virtually polarization insensitive. The dichroic surface was developed for use as a hyperboloidal subreflector in Cassegrainian Antenna Systems but can be used in unique systems which require selectivity in frequency, polarization, or angle of incidence; or it can be used to reduce the radar cross section of an object.

The artificial dielectric surface is constructed from selected metallic elements attached to a thin sheet of natural dielectric and arranged to form a planar array of conductive obstructions. This surface can be made to reflect any one frequency while passing all frequencies above and below the reflected one (provided that the proper choice of metallic element size, shape and spacing has been made). The reflected bandwidth may be increased by stagger-tuning the surface, and further increased by adding another surface in proximity to and parallel to the first.

The improvements and advantages over prior methods are:

1) steep transmit-reflect characteristic;

2) low transmission and reflection loss over more than 90% of the usable frequency band;

3) capability of being designed to have phase correction on the energy transmitted through it by the primary feed (higher illumination efficiency).

Note:

No further documentation is available. Inquiries may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: B69-10274

(continued overleaf)

Patent status:

No patent action is contemplated by NASA.

Source: E. G. Sakellaropoulos and H. Estep of
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under contract to
Goddard Space Flight Center
(GSC-10658)