



Dynamic Electrothermal Model of a Sputtered Thermopile Thermal Radiation Detector for Earth Radiation Budget Applications

By National Aeronautics and Space Administration (NASA)

Biblioscholar Mrz 2013, 2013. Taschenbuch. Book Condition: Neu. 246x189x7 mm. This item is printed on demand - Print on Demand Neuware - The Clouds and the Earth's Radiant Energy System (CERES) is a program sponsored by the National Aeronautics and Space Administration (NASA) aimed at evaluating the global energy balance. Current scanning radiometers used for CERES consist of thin-film thermistor bolometers viewing the Earth through a Cassegrain telescope. The Thermal Radiation Group, a laboratory in the Department of Mechanical Engineering at Virginia Polytechnic Institute and State University, is currently studying a new sensor concept to replace the current bolometer: a thermopile thermal radiation detector. This next-generation detector would consist of a thermal sensor array made of thermocouple junction pairs, or thermopiles. The objective of the current research is to perform a thermal analysis of the thermopile. Numerical thermal models are particularly suited to solve problems for which temperature is the dominant mechanism of the operation of the device (through the thermoelectric effect), as well as for complex geometries composed of numerous different materials. Feasibility and design specifications are studied by developing a dynamic electrothermal model of the thermopile using the finite element method. A commercial finite element-modeling package, ALGOR, is...

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