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Tenth Quarterly Report

to

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Applications of HCMM Satellite Data  
to the Study of Urban Heating Patterns

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## Introduction

An additional case study of St. Louis, MO using HCMM infrared measurements in conjunction with our boundary layer model has been completed. As of June 1, the interactive data processing facility, referred to in previous reports, has become operational. An analysis of the region near Clarksville, TN has also been partially completed as part of our work with the EPA-sponsored STATE project.

## Analyses

The St. Louis case (for August 23, 1978) represents the first such set of analyses we have performed for an urban area using a 12-hr HCMM image pair. These analyses also incorporated a 5°C zero offset correction for an error which appears to be, at least after the early part of the summer of 1978, present in the calibration furnished by NASA. A variable water vapor correction based on surface temperature was also employed for the first time. The results, however, differ little from those cited for the June case.

An analysis has been partially completed for the Clarksville, TN area, August 22, 1978. This case represents the first one that we have initiated in which the analyses were carried out using the new interactive system on the department's PDP 11/10 computer and Grinnell image processor. This system has now been made operational for our purposes. Further work remains in developing graphics display on the department's flatbed plotter, removing the present necessity for use of the cumbersome calcomp system, currently employed for producing analyses from the satellite data.

Further surface temperature analyses are planned for at least one Washington, D. C. image pair. Surface temperature patterns will be compared with detailed air temperature measurements obtained from the National

Weather Association's observer network which extends throughout the Washington, DC and suburban Maryland areas.

Other Activities

The principal investigator (PI) attended a joint European-U.S. meeting of the HCMM experiment team (HET) held in Ispra, Italy, March 26-28. Sponsored by NASA, this meeting proved to be most fruitful for the PI in the continuation of his HCMM research.

A paper was submitted by the PI to the Journal of Applied Meteorology based on the work done in the St. Louis and Los Angeles cases. The title of the paper is "Remote Estimation of the Surface Energy Balance, Moisture Availability and Conductivity Over Urban and Rural Areas", co-authored by the PI, Joseph K. Dodd, Stanley A. Benjamin and James N. Cooper.

The HCMM satellite was the focus of an exhibit set up by the PI as part of the Earth and Mineral Sciences Exposition (EMEX), an open house for outside visitors, which was held on April 12 and 13. The interactive system was used to obtain an enlargement of a HCMM image for October 28, 1978, showing the State College area. The image was transmitted from the Grinnell to a large Sony TV monitor and visitors passing by were invited to pick out various significant features in the area, notably Mt. Nittany (which was warm) and the Barrens, a local cold spot. The exhibit received much attention.