SPACE
SCIENCE AND
ENGINEERING
CENTER

THE UNIVERSITY OF WISCONSIN

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1225 West Dayton Street
Madison, Wisconsin 53706

TO: Contracting Officer, Code 245, NASA/GSFC
        Technical Officer, Code 650, NASA/GSFC

FROM: Thomas O. Haig
        Executive Director

REFERENCE: Contract NAS5-21798

SUBJECT: Monthly Progress Report for "Studies of Soundings and Imaging
            Measurements from Geostationary Satellites"

Task A   Investigation of Meteorological Data Processing Techniques

        Several tapes of ATS-III data have been digitized and
        processed for quality assessment and noise reduction. They
        have been navigated on the McIDAS system and analysis work
        will start next week.

Task B   Sun Glitter

        Dr. Sromovsky and a graduate student in meteorology have
        developed a detailed plan for measurement of sun glitter from
        ATS-III images using McIDAS. Available data tapes have been
        reviewed for appropriate data content.

Task D   Cloud Growth Rate

        Considerable progress has been made in preparing data tapes
        for this study. Tapes for several mid-latitude severe storms
        have been processed and navigated and alternative methods of
        making growth rate measurements on the McIDAS equipment are
        being investigated.

Task E   Comparative Studies in Satellite Stability

        Routine computations were made last month. A detailed progress
        report will be prepared following completion of these computations.

Task G   Rainfall Measurements by RAKE Radar

The Collins report: "The Feasibility of the Application of
a Geostationary Satellite RAKE System to Measurements of
Rainfall" has been reviewed and discussed. Assumptions in
the report are realistic from known data and for favorable
detection probabilities. Predicted performance, however,
is marginal and a search for suitable satellites upon which
to base a test has not proved fruitful.

There appear to be several possible methods to improve
detection capabilities. The first is to use more elaborate
doppler processing techniques; however, the doppler spectral
width may not be defined closely enough to allow this. The
second is to use short coherent code words spaced to provide
optimum detection for a given altitude. How well these
short code words can be coherently processed depends heavily
on how well satellite motions can be estimated and corrected
for and control of the code to avoid spectral lines in the
doppler spectrum. A third possibility is to use frequency
agility on successive short code words. This tends to
decrease the doppler resolution. All methods increase the
complexity of the satellite RAKE system and should be studied
in depth before dependence on them is assumed.

In view of the marginal performance predicted and the lack of
suitable satellites, we have decided not to proceed with the
Collins subcontract in the next phase planned for this study.
The Collins report will be included in the Final Report for
NAS5-21650.