TITLE: Lightning Mapper Development - Status and Requirements

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SIGNIFICANT ACCOMPLISHMENTS:

The feasibility for the detection and location of lightning on a continuous basis using a sensor in geostationary orbit has been established. Based on extensive quantitative U-2 based measurements of the optical characteristics of lightning and the capabilities of modern solid state mosaic focal plane arrays, calculations indicate that the question is not whether it is possible to detect daytime lightning from geostationary orbit but rather how high a detection efficiency can be acheived.

FOCUS OF CURRENT RESEARCH ACTIVITIES:

The present focus of the lightning mapper development effort is toward strengthening the scientific justification for placing a lightning sensor in geostationary orbit. Those research areas that are expected to lead to a stronger in-depth understanding of the role of lightning activity in storm processes or address the interpretation and application of lightning mapper type data sets are being emphasized. This work includes U-2 and ground based lightning research as well as modeling and theoretical studies.

PLANS FOR FY-85:

(1) Continue scientific research focused on providing the quantitative, detail rationale necessary to provide for a lightning mapper new start.

(2) Perform mosiac array brass board tests and evaluations in order to determine the actual performance levels achievable with both analog and digital real time processors and to evaluate alternate background removal algorithims.

LIST OF PUBLICATIONS:

"Observations of Optical Lightning Emissions From Above Thunderstorms Using A-2 Aircraft", with R. L. Frost, P. H. Gillaspy, S. J. Goodman, O. H. Vaughan Jr., M. Brook, R. Orville and B. Vonnegut, Bulletin of American Meteorological Society, 64, (1983), 120-123.

"Some Scientific Objectives of a Satllite-Borne Lightning Mapper", with M. H. Davis, M. Brook, B. G. Heikes, R. Orville, C. G. Park, R. G. Roble, and B. Vonnegut, Bulletin of American Meteorological Society, 64, (1983), 114-119.

"Simultaneous Observations of Lightning Above and Below Thunderstorms", with S. J. Goodman, EOS, 64 (1983), 660.

"A Technique for the Detection of Lightning From Gostationary Orbit", with W. W. Vaughan and J. C. Dodge, EOS, 64 (1983), 660.

"Lightning and Related Phenomena in Thunderstorms and Squall Lines", with R. D. Rust, W. L. Taylor, D. R. MacGorman, E. Brandes, V. Magus, R. T. Arnold, T. Marshall and S. J. Goodman.

"Optical Characteristics of Lightning as Measured from above Cloud Tops", with R. L. Frost and S. J. Goodman, Preprints, VII International Conf. on Atmospheric Electricity, Am. Meteor. Soc., 4.

"The Detection and Location of Lightning from Space", with W. W. Vaughan, and J. C. Dodge, Preprints, VII International Conf. on Atmospheric Electricity, Am. Meteor. Soc., 4.

"Lightning Observations From Above Clouds", to be presented at the VII International Conf. on Atmospheric Electricity and submitted for Special Edition Vol. ofd the JGR.

"Techniques for the Detection and Location of Lightning From Geostationary Orbit", with W. W. Vaughan and J. C. Dodge, Preprints, Conf. on Satellite Meteorology/Remote Sensing Applications, Am. Meteor. Soc.