

TITLE: Satellite Precipitation and Cloud Experiment (SPACE)

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SIGNIFICANT ACCOMPLISHMENTS FY84:

An experiment plan has been formulated to support an investigation of the precipitation processes associated with mesoscale systems and the interaction of rain producing cloud complexes with the meso and macro-scale environment. The focal areas for this investigation are: 1) the structure and dynamics of precipitation systems, including the electrification and their relation to the multi-scale thermodynamic, and dynamic processes influencing the precipitation event, 2) the structure and dynamics of the moisture field about developing cloud and precipitation systems, 3) the scale interaction between the synoptic scale background and the meso/micro scale features leading to the production of significant precipitation events.

The field program necessary to accomplish the scientific goals is planned to take place in 1986. It is designed to incorporate satellite information (VIS and IR as well as VAS data), special radiosonde and surface observing capabilities, radar observations of storm development, special observations from aircraft and ground based lightning measurements. Both an increased understanding of the precipitation process and the use of meteorological satellite data in the analysis of precipitation events will result from this program. A significant contribution to the storm data base will also result from the special observation program.

The observing network required to accomplish the desired study of precipitation and related processes will consist of a special network of rawinsonde stations located in northern Alabama and eastern Tennessee. This network will have eight (8) RAWINSONDE stations at a spacing of approximately 100 km. The RAWINSONDE network is located over the western half of the Tennessee Valley Authority's special raingauge network. This network is supplemented by the climatological raingauge stations. In addition to the high density raingauge network, the network area is covered by the MSFC lightning location network. The inner core of rawinsonde stations will provide the "high resolution" observations necessary to investigate the finer details of the moisture structure surrounding the precipitation systems, as well as the precipitation characteristics. The larger scale features as well as the scale interaction problems will be investigated using the regular National Weather Service Network Rawinsonde stations in the southeastern portion of the United States. These observing stations will be supplemented by three (3) special stations in order to obtain a more nearly uniform grid over the area. Observations will be made at 3 hour intervals.

The rawinsonde network covering the southeastern US will provide the information to examine scale interaction as well as the broader aspects of

large precipitation regions such as are found in the spring of the year. The higher resolution network in northern Alabama/Tennessee will be operated for special portions of the larger scale studies but will be primarily used in a June-July study of the smaller scale precipitation events. It is anticipated that each network will have approximately 15 operational days, with the larger network operating primarily in the spring of the year and the high resolution network in the summer of the year.

CURRENT FOCUS OF WORK:

Current efforts are directed toward the development of the field program and the coordination of the observation requirements in order to accomplish the scientific goals of the experiment. The integration of the upper level observation program with capabilities of the surface research and operational radar observation is underway. The NASA U2 and ER2 aircraft programs will be coordinated with the observation program where mutual observational benefits are possible. Coordination with the operational requirements of the Microburst Severe Thunderstorm (MIST) program are being made to assure the most efficient utilization of the observing resources.

PLANS FOR FY85:

The development of the field program and the scientific goals will continue through the coming year. Although the observational phase of the program is planned to be in 1986, a significant portion of the procurement and experiment planning will be required to be carried out within the next year.