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180098**FINAL REPORT**
NASA Grant NAG5-635

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TITLE:**Electrodynamics of the Middle Atmosphere:
Superpressure Balloon Program****PRINCIPAL INVESTIGATOR:**Robert H. Holzworth
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Robert H. Holzworth**ABSTRACT**

This project called Electrodynamics of the Middle Atmosphere (EMA): Superpressure Balloon Program was begun by the PI at the Aerospace Corporation in Los Angeles under joint NSF and NASA funding originally combined in one grant ATM80-17071 and has continued at the University of Washington under grants ATM82-12283, ATM84-11326 and ATM86-15628 and NASA grants NAGW-724 and NAG5-635. In the EMA experiment a comprehensive set of electrical parameters was measured during eight long-duration balloon flights in the southern hemisphere stratosphere. These flights resulted in the largest vector electric field data set ever collected from the stratosphere which has been a treasure-trove of new phenomena. Since the stratosphere has never been electro-dynamically sampled in this systematic manner before, it is perhaps not surprising that several new discoveries have been made and reported.

Another way to measure the success of this first EMA project is to note that all together the total data rate was about 1 bit/sec/payload amounting to 12 MBytes (1/3 of 1 standard 1600 BPI magnetic tape) which nevertheless has resulted in 14 papers and 2 masters theses (so far!). Ten of these papers and one masters thesis specifically acknowledge the support by NASA grant NAG5-635 are discussed herein.

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