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Contract No. N00014-87-C-2354

(Competitive Award: \$1,093,508)

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APPLICATIONS RESEARCH STUDIES OF MICROTUBULES

Monthly Letter Progress Report #35

Period: 16 June 1990 to 13 July 1990

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1. General Objectives and Approach

This contract provides the Hughes Research Laboratories (HRL) funding for the first two years of a three year research program to investigate techniques basic to novel applications of lipid microtubules (μ Ts) for electro-optical, optical, and sensor devices, and to study the feasibility of such device applications. The overall program has two main areas: (1) The study of ordered microtubules in fluids and films, for applications such as variable transmission windows, IR polarizers, and microwave phase shifters; (2) The study of ordered attachment of microtubules to surfaces, for applications such as nonlinear optical devices and acoustic detectors. The emphasis in the second year is on the suspension, orientation and electro-optical properties of metallized microtubules in fluids and polymers, especially in regard to potential applications as radar shutters, lenses, and phase shifters. Techniques for controlling the orientation and attachment of microtubules to surfaces is also being studied in regard to acoustical detector applications.

2. Work In The Thirty-fifth Month

In this month we completed a revised patent application on "Liquid Crystal Based Composite Material Having Enhanced Microwave Birefringence", which will be filed when all of the inventors are available to sign the final version. We also drafted most of the sections of our final report on the first two years worth of funding on this contract.

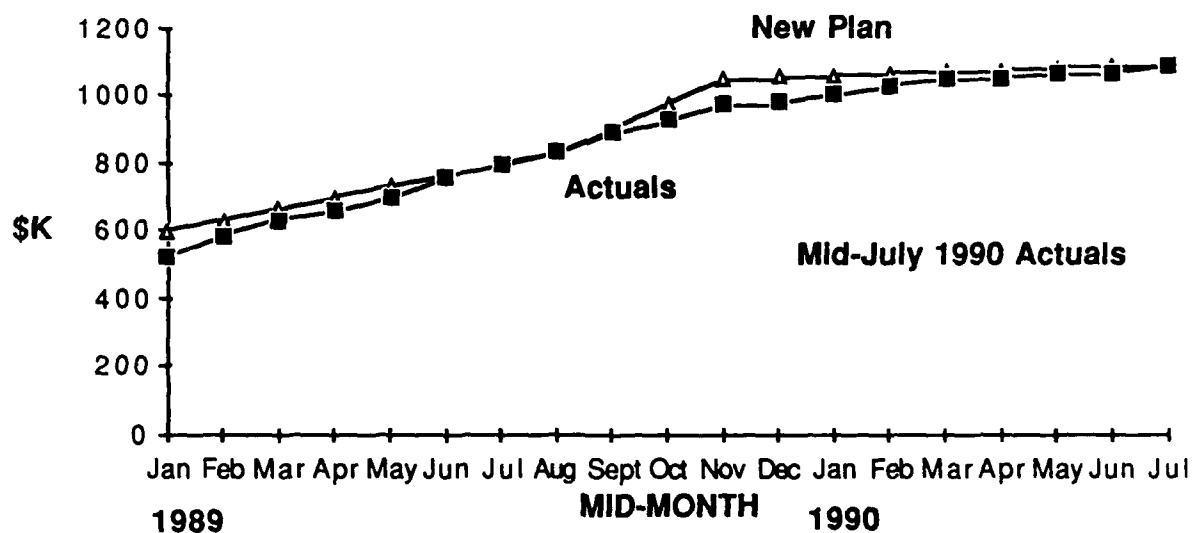
3. Plans For Next Month

Next month, or shortly thereafter, we plan to complete the art work and draft of our final report on the first two years worth of funding on this contract.

4. Project Status

Total funds expended through this period were about \$916.8K at the manufacturing level (corresponding to about \$1090.2K sales level). The attached graph shows our estimated sales-level expenditures (since January 1989) versus the proposed completion date of 11 July 1990 for the final report of the second year of the contract.

CONTRACT N00014-87-C-2354 SALES LEVEL EXPENDITURES



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