THE UNIVERSITY OF MICHIGAN

COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

Radiation Laboratory

STUDY OF PLASMA SHEATH ASSOCIATED WITH COMMUNICATIONS BLACKOUT: FINAL REPORT

By
Andrejs Olte

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This is the final report on Grant NsG-472. It summarizes the work performed during the period 1 January through 31 December 1966. Earlier work on this grant which started in 1963 is covered in previous reports and papers listed in the Bibliography.

In this grant we have been concerned with some of the problems encountered on re-entry because of the plasma sheath blackout of communications.

The studies undertaken have been written up either as Technical Reports or as journal articles. Here we outline those of the present report period.

In one of the studies we have been considering the radiation of a unit electric line source through a concentric axially slotted plasma sheath. An approach to the radiation problem that treats the plasma slot as a waveguide is presented in Technical Report 5825-6-T.

The second problem considers the radiation of a magnetic line source excited cylinder through a slotted plasma sheath. Both the integral equation approach and the waveguide approach is summarized in Technical Report 5825-8-T.

In the third problem we were concerned with the terminal admittance of a wedge guide that excites a perfectly conducting cylinder which is enclosed by a slotted shell and a plasma sheath. The results of a study on this problem are presented in Technical Report 5825-9-T.

The importance of electrokinetic waves (plasma waves) on the antenna surface current distribution was studied and key results summarized in two papers (Miller, E. K. and A. Olte, 1966).

These current papers and technical reports are included in the following Bibliography which covers all reports, and papers written under Grant NsG-472.

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Technical Reports

5825-1-T "First Semi-annual Report on Grant NsG-472: 1 June 1963 to 1 December 1963", A. Olte and Y. Hayashi (December 1963).

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5825-4-T "The Radiation Pattern of an Electric Line Current Enclosed by an Axially Slotted Plasma Sheath-I" A. Olte (November 1965).

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