

THE UNIVERSITY OF MICHIGAN RADIATION LABORATORY

2455 Hayward Street  
Ann Arbor, Michigan 48105  
(313) 764-0500

15 February 1974

011764-11-L

Air Force Avionics Laboratory  
Air Force Systems Command  
4950 Test Wing (Technical)  
ATTENTION: AFAL-WRP  
Wright-Patterson AFB, Ohio 45433

SUBJECT

Monthly Progress Letter No. 11

PERIOD COVERED

15 January - 15 February 1974

CONTRACT NO. PROJECT  
and TITLE

F33615-73-C-1174, 7633  
"Non-Specular Radar Cross  
Section Study"

CONTRACTING OFFICER

George E. Himes

REPORT SUBMITTED BY

Thomas B. A. Senior and Eugene F. Knott

11764-11-L = RL-2239

DISTRIBUTION

AFAL-WRP-2  
ONRRR-1  
Hiatt/Contract File  
Knott  
Senior

THE UNIVERSITY OF MICHIGAN RADIATION LABORATORY

011764-11-L

This is the eleventh monthly progress letter on Contract F33615-73-C-1174 and covers the period 15 January - 15 February 1974.

As reported in the previous progress letter, a copy of program RAMVS has been forwarded to AFAL and during the present reporting period the program has been debugged on the CDC 6600 system at WPAFB. RAMVS was written explicitly for E-polarization, but by reason of the duality of the integral equations it should also be capable of giving the results for H-polarization if the input data are suitably chosen. However, for reasons not yet known, the program failed to produce acceptable values when it was tested for a body having magnetic sheets. Fortunately a version of RAMVS was on hand that performs the polarization conversion internally and this version was pressed into service. At the time of this writing a sequence of computations had been performed at the WPAFB facility, but the output has not arrived at Michigan and we cannot yet judge the results.

The first of two interim reports due under the Contract has been submitted and approved by the Sponsor, and during this reporting period copies have been distributed according to the Distribution List. A draft of the second interim report is nearly complete and will be forwarded to AFAL for approval during the next reporting period. Both reports are unclassified. Although the final report is not due for several weeks, one chapter and an appendix have been completed. This is possible because the effort discussed — an investigation of the effects of electric resistive sheets for E-polarization — is virtually complete and our energies for the remainder of the Contract will focus on the use of magnetic resistive sheets and an impedance surface for H-polarization.

We plan to exploit the impedance boundary condition 'portions' of the generalized program to remove the traveling wave contribution to the backscattered field. A magnetic sheet will then be used to reduce the H-polarized scattering due to the leading edge of a body, and we feel that much of what has been learned for the E-polarized case can be applied because of duality. It is expected that due to the limited time remaining in the contract we must also rely on an impedance surface to reduce creeping waves on bodies like a cone-sphere. The translation of such surface impedances into realizable material properties must, of course, take into account the bulk properties of the material as well as the thickness of a layer of it.

THE UNIVERSITY OF MICHIGAN RADIATION LABORATORY

011764-11-L

One meeting was held during this reporting period to review technical progress (on January 16, 1974). The attendees were Dr. C. H. Kreuger of AFAL, and Prof. T.B.A. Senior, Dr. V.V. Liepa and Mr. Eugene F. Knott of The University of Michigan.