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The PI answered an long outstanding question regarding the generation of acoustic waves by electromagnetic pulses. A paper was written and submitted for publication together with it's being communicated to USAFSAM (to Dr. R. Albanese). Both Dr. Albanese and I regard this week to be extremely good and are going to continue funding this PI.						
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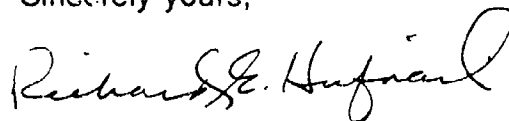
June 30, 1987

Dr. Arje Nachman, AFOSR/NM
Building 410
Bolling AFB, D.C. 20332-6448

Dear Dr. Nachman:

Enclosed is the final report for Grant #AFOSR 86-0261, as prepared
by the principal investigator Dr. Harry E. Moses.

Sincerely yours,



Richard E. Hufnail
Director of Grants and Contracts

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Enclosure

cc: Dr. H.E. Moses (w/encl)

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FINAL REPORT
AFOSR GRANT 86-0261
(UNIVERSITY OF LOWELL PROJECT NO. 03-4430)

Principal Investigator: H.E. Moses, Department of Electrical Engineering

The principal research accomplishment during the period of the grant was the study of generation of acoustic pulses from electromagnetic pulses. In particular, we considered an infinite medium, which we took to be a non-conducting liquid (ultimately we chose water for numerical examples) and assumed that a one-dimensional and electromagnetic pulse or train of pulses was created at time $t=0$ by the turning on and off of appropriate currents and found the acoustic pulses which were generated by the electromagnetic pulses. Indications are that if the electromagnetic pulse is sufficiently strong, the acoustic pulse which is generated can have significant physiological effects, if the liquid, say water, is assumed to model a tissue. The results of the research have been put into a paper, "The Generation of Acoustic Pulses by Electromagnetic Pulses in Tissues." Copies have been sent to the monitor, Dr. A. Nachman, and to our principal contact in the Air Force, Dr. R.A. Albanese of the School of Aerospace Medicine. Dr. Albanese has said that he believes that the research is significant and that he will suggest some changes, principally the inclusion of references which he will provide.

We have also investigated the mathematics of the Radon transform with the view to using it to obtain the exact time-dependent acoustic and electromagnetic fields from the fields in the wave zone. The applications are many, but the use in aerospace medicine includes the monitoring of acoustic and electromagnetic fields at a distance from the source and determining the fields near the source.

Papers have been and are being written on the subject in the successor grant.

This research is being done by the Principal Investigator with the aid of R.T. Prosser who is a consultant on the project.

Another area of research has been the time-dependent propagation of one dimensional electromagnetic pulses through slabs and media with continuously varying index of refraction, possibly with jumps. A paper has been written. Some revision will be done before publication.