

REPORT DOCUMENTATION PAGE

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1. AGENCY USE ONLY (Leave blank) | 2. REPORT DATE: 11/19/96 | 3. REPORT TYPE AND DATES COVERED: Progress 1/1/96 - 12/31/97

4. TITLE AND SUBTITLE: "High Performance Computer Models in Computational Acoustics" | 5. FUNDING NUMBERS: N00014-96-1-0442 PR # 96PRO3456-00-

6. AUTHOR(S): Diana C. Resasco, Martin Schultz, P.I.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES): Yale University, Suzanne K. Polmar, Ph.D. Director Grant and Contract Administration, 12 Prospect Place, New Haven, CT. 06511-3516 | 8. PERFORMING ORGANIZATION REPORT NUMBER: 622A-31-42284

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES): Administrative Grant Officer, Office of Naval Research Regional Office, 495 Summer Street Room 103, Boston, MA 02210-2109 | 10. SPONSORING/MONITORING AGENCY REPORT NUMBER: N00014-96-1-0442

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Approved for public release
Distribution Unlimited

13. ABSTRACT (Maximum 200 words):
The long term goals of this project is to develop accurate models and efficient algorithms for the numerical solution of wave propagation problems for Navy applications.

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14. SUBJECT TERMS: 3-dimensional coupled wave propagation, FOR3D code, parabolic elastic wave equations | 15. NUMBER OF PAGES: 3 | 16. PRICE CODE:

17. SECURITY CLASSIFICATION OF REPORT: Unclassified | 18. SECURITY CLASSIFICATION OF THIS PAGE: Unclassified | 19. SECURITY CLASSIFICATION OF ABSTRACT: Unclassified | 20. LIMITATION OF ABSTRACT: UL

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C - Contract	PR - Project
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PART A

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1. Principal Investigator: Diana C. Resasco, Martin H. Schultz
 2. Title: High Performance Computer Models In Computational Acoustics
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 6. Category of Research: Propagation (theory, modeling & computation)

PART B

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1. Long Term Goals
To develop accurate models and efficient algorithms for the numerical solution of wave propagation problems for Navy applications.
 2. Scientific and Technological Objectives
Through our continued collaboration with Dr. Ding Lee, our objective is the development of a 3-dimensional coupled wave propagation model in a fluid-elastic environment.
 3. Background
In previous years, the Computational Ocean Acoustics group at Yale has contributed through the design and analysis of new numerical schemes, the enhancement of the FOR3D code, and its implementation on parallel machines. The fluid-elastic model will be considered an important extension of the code.
 4. Approach
We continue to work with Dr. Lee in the development and analysis of the mathematical model. Issues that require special attention include the numerical implementation of the solution to a complex system of differential equations that results from a parabolic approximation of the problem, stability analysis and efficient implementation.

5. Accomplishments and Results

In recent fiscal years, the group at Yale contributed through the design and implementation of fast algorithms for PE approximations and the development of parallel algorithms and their implementation on parallel supercomputers.

This fiscal year, we collaborated with Dr. Lee in the development of a numerical solution to the parabolic elastic wave equations developed by Lee et.al. on the previous FY.

A set of fluid-elastic interface conditions has been formulated in ODE form which can be incorporated to the coupled 3D fluid-elastic interface model.

We continue to collaborate with Dr. Lee in the development and analysis of numerical techniques to solve the resulting coupled system. A paper reporting preliminary results on the elastic model is in preparation.

Yale continues to sponsor and contribute to the International Conference on Theoretical and Computational Acoustics, which provides a forum for the discussion of state-of-the-art development and results in the field of acoustics.

6. Impact on S & T

The FOR3D model and code has been a useful tool for research, application and reference for many users worldwide. We expect that the added capabilities of a fluid-elastic environment will make it even more useful to practicing acousticians.

7. Relationship to other Projects

This research project is related to Computational Shallow Water Acoustics.

FY96 STATISTICAL INFORMATION

1. Diana C. Resasco - Martin H. Schultz
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2. Book (authored): NUMERICAL ACOUSTIC PROPAGATION IN THREE DIMENSIONS
Ding Lee and M.H.Schultz
World Scientific Pub. Co., Singapore, 1995
Book (Edited): THEORETICAL AND COMPUTATIONAL ACOUSTICS '95
Ding Lee, Y-H.Pao, M.H.Schultz and Y-C. Teng
World Scientific Pub. Co., Singapore, 1996

Graduate students (state if female or minority)

None

PostDocs

None

Percentage of funds sent on to other performing organizations

None