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FINAL REPORT ON AFOSR-87-0124

"ANALYTICAL, NUMERICAL AND EXPERIMENTAL
INVESTIGATIONS OF OBLIQUE-SHOCK-WAVE
REFLECTIONS IN PURE AND DUSTY GASES"

1 February, 1987 - 30 September, 1988

by

Dr. I. I. Glass, Principal Investigator

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Problem 3 - An Interferometric Investigation of the Diffraction of Planar Shock Waves Over a Half-Diamond Cylinder in Air. This problem has been completed and resulted in the presentation of the paper with the same title by D. L. Zhang and I. I. Glass, which was presented at the 8th International Mach Reflection Symposium, held at UTIAS, during July 12-15, 1988.

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Problem 5 Normal Shock-Wave Structure in a Dusty-Air Shock-Tube. Mr. G. D. Lock is completing a Ph.D. thesis. His data appear very good indeed. He is expected to complete his research program in 1989, under the direction of Dr. J. J. Gottlieb.

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Problem 7 Laminar Sidewall Boundary Layer Induced by a Moving Shock Wave in a Dusty-Air Shock-Tube. This research was completed and appeared as UTIAS Report No. 312 by B. Y. Wang and I. I. Glass under the same title, approximately.

Problem 8 Flat Plate Boundary Layer Induced by a Moving Shock Wave in a Dusty-Air Shock-Tube. This work was completed and appeared as UTIAS Report Nos. 310 and 311 by B. Y. Wang and I. I. Glass under Asymptotic Solutions and Finite-Difference Solutions, respectively.

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Additional List of Publications

The following publications are in addition to those reported in detail in AFOSR Final Report on Grant AFOSR-82-0096 for the five-year period 1 February, 1982 - 31 January, 1987.

1. B. Y. Wang and I. I. Glass, "Compressible Laminar Boundary-Layer Flows of a Dusty Gas Over a Semi-Infinite Flat Plate", J. Fluid Mech., Vol. 186, pp. 223-241, 1988.
2. I. I. Glass, "The Shock Tube and Its Applications", Experiments in Fluid Mechanics, Sec. 16, Supersonic Flow, pp. 380-386, Robert A. Granger, Ed.

4. I. I. Glass and J. Kleiman, "Some PCH Aspects of Shock-Wave Research", PCH PhysicoChemical Hydrodynamics, Vol. 9, No. 1/2, pp. 93-99, 1987.
5. D. L. Zhang and I. I. Glass, "An Interferometric Investigation of the Diffraction of Planar Shock Waves over a Half-Diamond Cylinder in Air", UTIAS Report No. 322, March 1988.
6. J. T. Urbanowicz, "Pseudo-Stationary Oblique-Shock-Wave Reflections in Low Gamma Gases - Isobutane and Sulphur Hexafluoride", UTIAS Tech. Note No. 267, Feb. 1988.
7. J. Kaca, "An Interferometric Investigation of the Diffraction of a Planar Shock Wave Over a Semicircular Cylinder", UTIAS Tech. Note No. 269, to be published.
8. H. Honma and I. I. Glass, "Nonlinear Effects on Weak Spherical N-Waves in Air with Vibrational Excitation", Proc. R. Soc. Lond. (to be published).

Our contributions to shock-wave phenomena over the past 40 years have been numerous in the open literature and in UTIAS Reports, Technical Notes and Reviews. This has been recognized in many countries especially the USA, when I was the AIAA Dryden Lecturer for 1986, and more recently in Canada, when I was presented with a testimonial by the 8th International Mach Reflection Symposium held at UTIAS, 12-15 July, 1988, which reads as follows, "A tribute to Professor I. I. Glass for his seminal contributions to theory and experiments revealing the complex nature of Oblique Shock Wave Reflection Phenomena". Brief assessments of his contributions were given by Dr. George Ullrich, DNA, Washington, and by Dr. H. Reichenbach, Ernst Mach Institute, Freiburg, West Germany. Prof. Glass told the audience that for health reasons he will now retire at 70 (Feb. 1988) and he and his wife Freda will spend 6 months (Nov.-May) in Florida and

6 months (May-Nov.) at UTIAS. Consequently, he will still be available for consultation and advice in the future.

Finally, I wish to thank DNA for their generous financial support over the few years in our research and development work. It was crucial and consequently, enabled us to be productive and inventive. Due credit was always given to DNA for this support in our publications.

I. I. Glass
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