

Preface

This report contains the 1992 annual progress reports of the Research Fellows and students of the Center for Turbulence Research. It is intended primarily as a contractor report to the National Aeronautics and Space Administration, Ames Research Center. Another report covering the proceedings and research activities of the 1992 Summer Program was distributed earlier this year. In addition to this and the Summer Program reports, each year several CTR manuscript reports are published to expedite the dissemination of research findings by the CTR Fellows.

The Fellows of the Center for Turbulence Research are engaged in fundamental studies of turbulent flows with the objective of advancing the physical understanding of turbulence which will help to improve turbulence models for engineering analysis and develop techniques for turbulence control. The CTR Fellows have a broad range of interests and expertise; together with the NASA-Ames scientific staff and Stanford faculty members, they form a stimulating environment devoted to the study of turbulence.

In its sixth year of operation, CTR hosted twenty-one resident Postdoctoral Fellows, three Research Associates, and four Senior Research Fellows, and it supported four doctoral students and nine short term visitors. The major portion of Stanford's doctoral program in turbulence is sponsored by the United States Air Force Office of Scientific Research and the Office of Naval Research. Many students supported by these programs also conduct their research at the CTR.

Last year considerable effort was focused on the large eddy simulation technique for computing turbulent flows. This increased activity has been inspired by the recent predictive successes of the dynamic subgrid scale modeling procedure which was introduced during the 1990 Summer Program. Several Research Fellows and students are presently engaged in both the development of subgrid scale models and their applications to complex flows. The first group of papers in this report contain the findings of these studies. They are followed by reports grouped in the general areas of modeling, turbulence physics, and turbulent reacting flows. The last contribution in this report outlines the progress made on the development of the CTR post-processing facility. The objective of this effort is to develop advanced software for access and processing of direct numerical simulation databases. Our aim is to facilitate data transfer to the research community outside the physical boundaries of the CTR as well as to largely circumvent the tedious aspects of data management and computer programming for our visitors.

The CTR roster for 1992 is provided in the Appendix. Also listed are the members of the Advisory Committee which meets annually to review the Center's program and the Steering Committee which acts on Fellowship applications.

It is a pleasure to thank Debra Spinks, the Center's Administrative Assistant, for her skillful compilation of this report.

Parviz Moin
William C. Reynolds
John Kim