

Preface

The Sixth Summer Program of the Center for Turbulence Research was held during the four-week period June 24 to July 19, 1996. There were thirty-seven participants from the U. S. and nine other countries and twenty-six local Stanford, NASA-Ames, and CTR staff who devoted virtually all of their time to the program. As in the previous summer programs, the participants used the archived direct numerical simulation databases to test turbulence models and study turbulence physics. In addition, several calculations of complex flows and new simulations were performed during the Program.

A hallmark of the 1996 Summer Program was a very large turbulence modeling and application group. The so-called Reynolds averaged modeling, RANS, is an important industrial tool for prediction of turbulent flows. New modeling ideas recently put forward at CTR and a special focus on a specific application were the catalysts that brought together this group of turbulence modelers and computational fluid dynamicists.

As in the past Summer Programs, the combustion community was well represented. Of particular interest were promising findings in the application of the large eddy simulation technique, LES, to turbulent reacting flows. The LES group contributed the largest number of papers to this volume. New subgrid scale models were tested and several important issues in application of LES were addressed. The LES group also included two representatives from aerospace and automobile industries which recently have shown interest in using this tool for simulation of complex flows encountered in power systems. The control, structures, and hydroacoustics group included such fundamental studies as control strategies for laminar/turbulent transition and detection of organized structures in separated flows. It also included a group from David Taylor Laboratory who evaluated models of space/time characteristics of wall pressure fluctuations in separated flows.

As part of the Summer Program three review tutorials were given on *Large eddy simulation* (Parviz Moin), *DNS of premixed combustion* (Thierry Poinsot and Denis Veynante), and *Turbulence/shock wave interaction* (Krishnan Mahesh); and one seminar entitled *Controlling complex systems with MEMS* was presented by James McMichael. A number of colleagues from universities, government agencies, and industry attended the final presentations of the participants on July 19. They provided valuable input on the work accomplished and participated in the discussions.

There are twenty-eight papers in this volume grouped in the above four areas. Each group is preceded with an overview by the CTR coordinator of the group. Early reporting of thirteen of the projects occurred at the Forty Ninth Meeting of the Division of Fluid Dynamics of the American Physical Society in Syracuse, New York, November 24-26, 1996.

The success of an intensive program such as this results from the efforts of many professionals. We are grateful to several administrative staff members of NASA Ames for going beyond the call of duty to facilitate this Summer Program. It is also

a pleasure to acknowledge the diligent efforts of Debra Spinks in the organization of the Program and compilation of this report. Her efforts in the planning and operation of this and other CTR Summer Programs have been invaluable.

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