# Introduction

AFI research center has introduced "Integrated Supercomputation System" with scalar and vector parallel supercomputers, an SGI Altix and an NEC SX-8 in November 2005. In order to lead the way for fluid science technologies to be the basis of sustainable development in human society and in harmony with the global environment, we carry out research on "Fluid Information" not only for fluid flow but also for heat, energy, electromagnetic and information flow, from macro and micro points of view. We aim to develop control and design methods for flows on target for sustainable development in human society through clarifying unknown complex fluid phenomena by constructing "Integrated Supercomputing Method" that unifies the experiments and computations, by creating a database of massive fluid information obtained with large-scale numerical computations and by analyzing through advanced visualization using a three-dimensional visualization server.



Institute of Fluid Science, Tohoku University Director Toshiyuki Hayase

This center, as the international hub for the fluid information research, has organized an international symposium on advanced fluid information every year since 2001, and actively promotes collaborative research projects with domestic and overseas universities and enterprises.

## Advanced Fluid Information Research Center

The Advanced Fluid Information Research Center is managed under the leadership of the Director, with the Research and Development Division to operate the integrated supercomputing system for supercomputating, interface with experiments and advanced visualization, the Selection and Review Committee for project research, and the Planning and Public Relations Committee to manage the international symposia and the fluid science database who cooperate with each other. The Steering Committee continuously promotes the activity of the center and the External Evaluation Committee evaluates it in order to strongly support research on the cutting edge of fluid sciences.

## Information Dispatch

#### **OFluid Science Database**

We disburse research results on fluid science such as massive numerical computation data using supercomputers at the http://afidb.ifs.tohoku.ac.jp website as the "Fluid Science Database", with the aim of sharing and using the product of research on "flow" in the form of "fluid information".

### ○International Symposium on Advanced Fluid Information : AFI

Every year we organize the international symposium on advanced fluid information and

dispatch the research results on "flow" to the world. While sharing, linking, and using fluid information with domestic" and overseas researchers, we aim to further develop "advanced fluid information research".

- Symposia held so far • October 2001 in Zao
- December 2002 in TokyoDecember 2005 in Sendai
- November 2003 in New York
- October 2006 in Tokyo

- November 2004 in SendaiDecember 2007 in Sendai
  - 2007 in Sendai

Furthermore, we are sending out the research results by publishing the Result Report and actively making presentations at the open events in Tohoku University and related international conferences.



Flow with the boundary-layer transition and leadingedge separation around a delta wing



Nanoscale liquid water film between platinum solid walls and a close-up to the solid-liquid interface



Prediction of  $SiO_2$  etch rate by a coupled analysis of  $CF_4$  plasma and radicals flow.

