

Numerical Wind Tunnel; Concept and Requirements

Yuichi Matsuo (matsuo@nal.go.jp)
National Aerospace Laboratory, JAPAN

National Aerospace Laboratory (NAL) has long led the aerospace research and development activities in Japan by introducing the most advanced computer system of the age. In 1993, NAL introduced a very high performance distributed parallel-vector supercomputer called Numerical Wind Tunnel (NWT-I) whose name comes from the wish that numerical simulations will be able to take the place of wind tunnel experiments in the near future. Seven years have already past since the NWT-I system was established and many achievements have been made particularly in the Computational Fluid Dynamics (CFD) applications in NAL. However, the capabilities that we originally expected to the NWT-I system e.g. high data-productivity comparable to wind tunnel test have not yet been satisfied. In the next generation NWT *i.e.* NWT-II, we are aiming at:

- realizing the NWT concept (high data-productivity and increased system-operability) both in name and reality,
- applying CFD techniques to design process through multidisciplinary analysis and design optimization;

and we focus on:

- 1) high computing performance for use in multidisciplinary analysis and optimization,
- 2) total system integration including data storage, visualization and storage-area-network,
- 3) seamless software developing environment which makes user-friendly usage possible.

Developing a CFD-based aerodynamic design method using an inverse technique is one of the major goals in the NAL SST project, and NWT-II is considered to play an important role as the computing infrastructure.