

Advanced simulation of internal flow in rotating machinery

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● Abstract

In order to improve the accuracy of predicting the aerodynamic performance of the rotating machine by numerical simulation, comparison with known data will be performed.

● Reasons and benefits of using JAXA Supercomputer System

Since a large-scale analysis is performed as a verification of the LES analysis, it cannot be performed without JSS.

● Achievements of the Year

Verifications of numerical analyses by LES were performed for NACA0012 and T106A low-pressure turbine cascades.

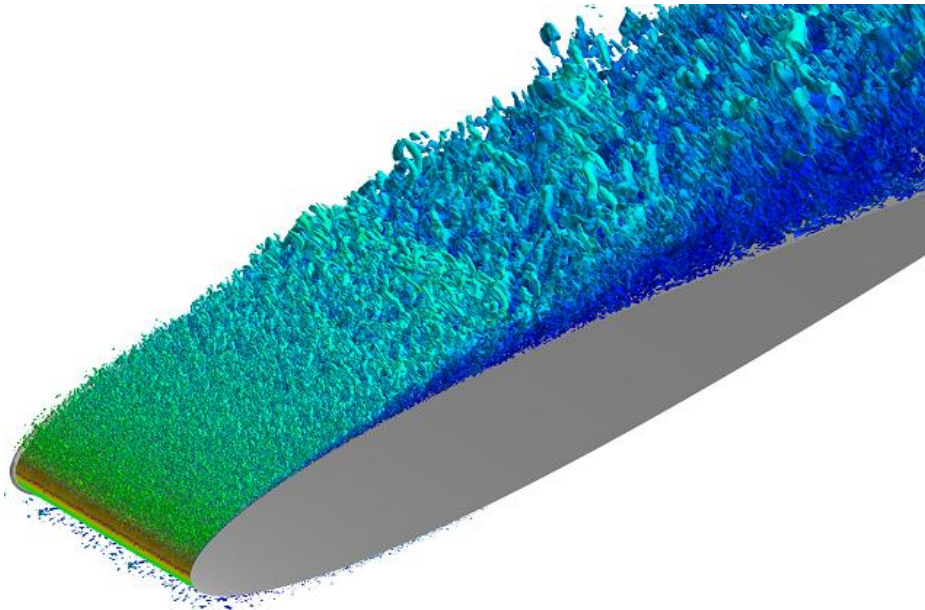


Fig. 1: Iso Surface of Q value (NACA0012)

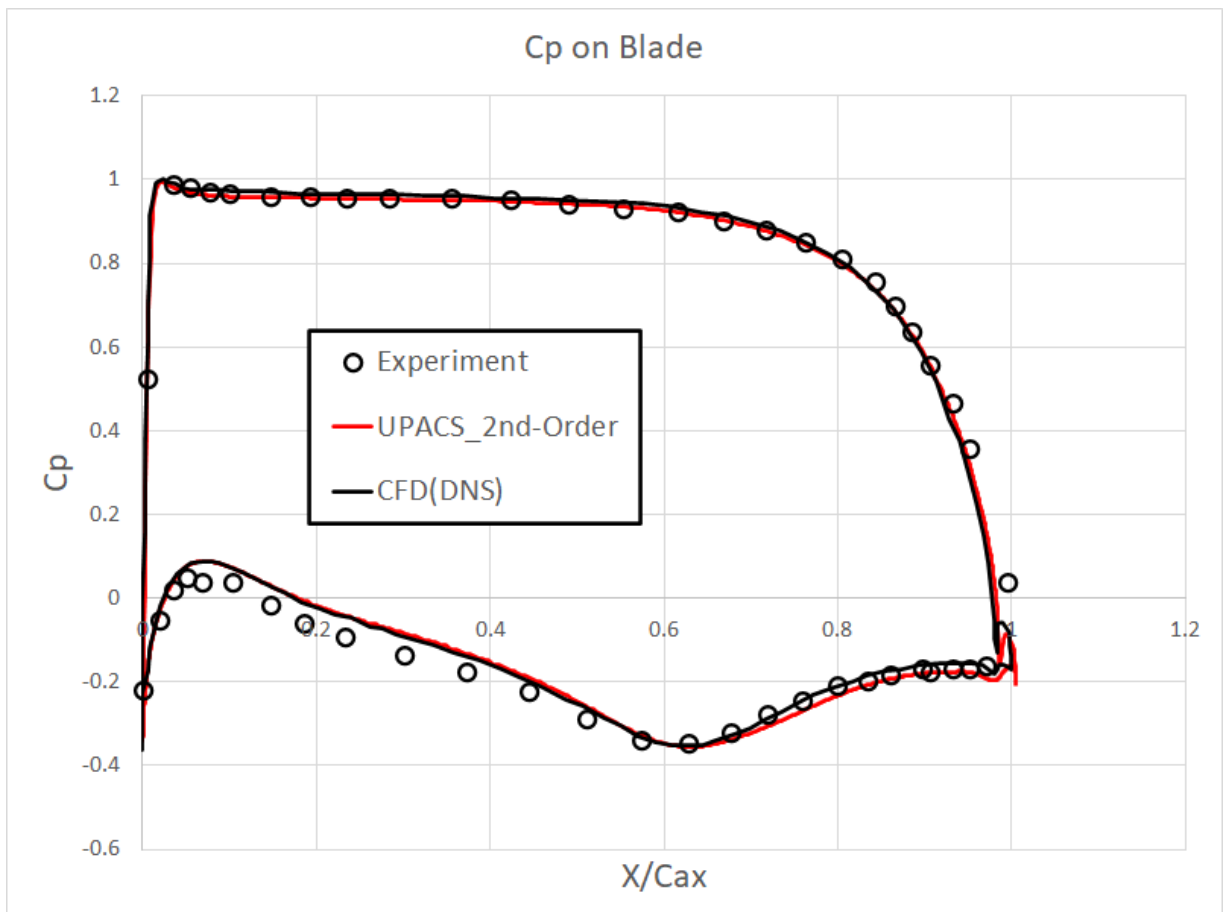


Fig. 2: Cp distribution on the blade surface (T106A)

- **Publications**

N/A

- **Usage of JSS**

- **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	OpenMP
Number of Processes	152 - 544
Elapsed Time per Case	1440 Hour(s)

- **JSS3 Resources Used**

Fraction of Usage in Total Resources*1(%): 0.45

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage *2(%)
TOKI-SORA	11,995,668.57	0.52
TOKI-ST	72,660.57	0.07
TOKI-GP	0.00	0.00
TOKI-XM	0.00	0.00
TOKI-LM	0.00	0.00
TOKI-TST	0.00	0.00
TOKI-TGP	0.00	0.00
TOKI-TLM	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage* ² (%)
/home	31.40	0.03
/data and /data2	9,644.86	0.07
/ssd	603.48	0.08

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage* ² (%)
J-SPACE	20.99	0.09

*1: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

*2: Fraction of Usage : Percentage of usage relative to each resource used in one year.

● **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage* ² (%)
ISV Software Licenses (Total)	0.07	0.00

*2: Fraction of Usage : Percentage of usage relative to each resource used in one year.