

## Development of fluid analysis system for turbomachinery using CFD software named UPACS

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### ● Responsible Representative

Tatsuya Ishii, Aeronautical Technology Directorate, Propulsion Research Unit

### ● Contact Information

Mitsumasa Makida, Aeronautical Technology Directorate, Propulsion Research Unit(makida.mitsumasa@jaxa.jp)

### ● Members

Mitsumasa Makida, Shunji Enomoto, Ryoji Takaki, Junichi Kazawa, Kazuomi Yamamoto, Yosuke Matsumura, Yoshinobu Yamade, Hiroshi Koizumi, Masayuki Kakehi

### ● Abstract

For turbo machines including centrifugal compressors, a software package will be developed to analyze flow phenomena in more detail by utilizing JAXA's fluid analysis technologies.

### ● Reasons and benefits of using JAXA Supercomputer System

To analyze the detailed flow field around turbo machines, it is necessary to confirm the prediction accuracy of the analysis by DES. For this purpose, a large-scale analysis will be performed in various flow conditions, so it cannot be performed without JSS2.

### ● Achievements of the Year

We analyzed the flow field around the centrifugal compressor with DES and confirmed that there was no problem with parallelization performance of UPACS.

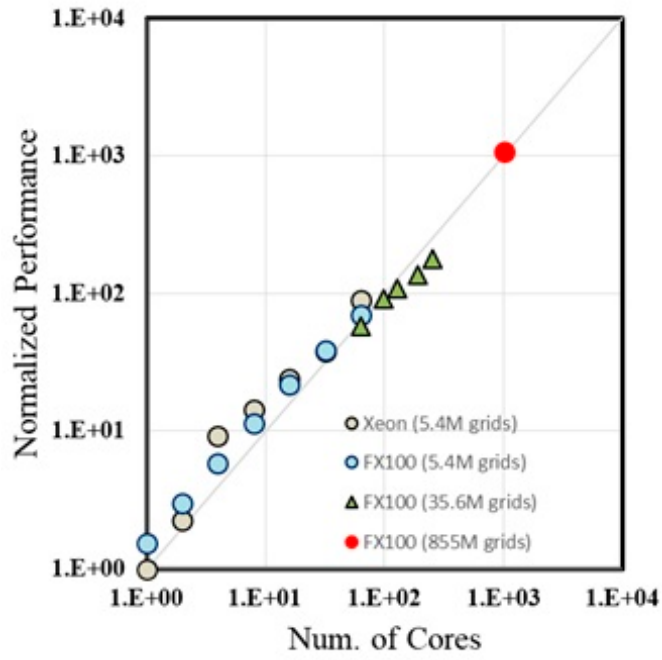


Fig. 1: parallelization performance of UPACS

● **Publications**

N/A

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	Automatic Parallelization
Number of Processes	64 - 1024
Elapsed Time per Case	12 Hour(s)

- **Resources Used(JSS2)**

Fraction of Usage in Total Resources<sup>\*1</sup>(%): 0.03

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage <sup>*2</sup> (%)
SORA-MA	93,355.78	0.02
SORA-PP	6,466.66	0.05
SORA-LM	0.00	0.00
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage <sup>*2</sup> (%)
/home	108.02	0.10
/data	14,032.42	0.27
/ltmp	2,686.93	0.23

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage <sup>*2</sup> (%)
J-SPACE	106.13	3.51

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

<sup>\*2</sup>: Fraction of Usage : Percentage of usage relative to each resource used in one year.

- **Resources Used(JSS3)**

Fraction of Usage in Total Resources\*1(%): 0.01

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2(%)
TOKI-SORA	0.00	0.00
TOKI-RURI	0.00	0.00
TOKI-TRURI	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2(%)
/home	129.79	0.09
/data	19,251.04	0.32
/ssd	678.41	0.35

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2(%)
J-SPACE	106.13	3.51

\*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.