

En-Core Project / Turbine internal cooling analysis

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Subject Category: Aeronautical Technology

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● Abstract

We will contribute to strengthening international competitiveness by demonstrating technologies for high-temperature, high-efficiency turbines and ultra-low NOx lean burn combustors that reduce nitrogen oxide (NOx) and CO2 emissions.

● Reasons and benefits of using JAXA Supercomputer System

There are many large-scale analyzes and case studies for turbine cooling in En-Core project. To avoid schedule delay of the project, JSS3 is necessary.

● Achievements of the Year

Flow analyses of the turbine internal cooling of the test rig were carried out.

● Publications

N/A

● Usage of JSS

● Computational Information

| | |
|---------------------------------|-------------|
| Process Parallelization Methods | MPI |
| Thread Parallelization Methods | OpenMP |
| Number of Processes | 384 |
| Elapsed Time per Case | 720 Hour(s) |

- **JSS3 Resources Used**

Fraction of Usage in Total Resources*1(%): 0.56

Details

| Computational Resources | | |
|-------------------------|--------------------------------------|------------------------|
| System Name | CPU Resources Used (core x hours) | Fraction of Usage*2(%) |
| TOKI-SORA | 8,889,745.73 | 0.39 |
| TOKI-ST | 1,888,743.10 | 1.89 |
| 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 | 38.70 | 0.04 |
| /data and /data2 | 8,917.78 | 0.07 |
| /ssd | 314.63 | 0.04 |

| Archiver Resources | | |
|--------------------|--------------------|-------------------------|
| Archiver Name | Storage Used (TiB) | Fraction of Usage*2 (%) |
| J-SPACE | 0.00 | 0.00 |

*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) | 416.56 | 0.29 |

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