Next generation jet engine technology - development of high efficiency compressor design tecnology and aerodynamic performance prediciton -

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Abstract

We will develop aerodynamic performance improvement technology and high precision aerodynamic performance prediction technology for multistage-compressor assuming an increase in relative tip clearance, corresponding to a small core engine applied to an ultra-high bypass ratio engine.

Reasons and benefits of using JAXA Supercomputer System

The number of cases of aerodynamic performance prediction of a multi-stage compressor will be very large for satisfactory results. So we can not be calculated in a realistic time using anything other than JSS.

Achievements of the Year

Verification analyses using rig test results were conducted with numerical techniques incorporatd into mixing plane to improve mass flow conservation in the computational domain. Numerical results with these techniques agreed with experimental data.

Publications

N/A

Usage of JSS

Computational Information

Process Parallelization Methods	MPI
Thread Parallelization Methods	Automatic Parallelization
Number of Processes	64 - 128
Elapsed Time per Case	100 Hour(s)

Resources Used(JSS2)

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

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage[*2](%)
SORA-MA	2,368,071.22	0.45
SORA-PP	284,164.21	2.23
SORA-LM	98.10	0.06
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage[*2](%)
/home	17.14	0.02
/data	11,248.37	0.22
/ltmp	3,510.98	0.30

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[*2](%)
J-SPACE	2.73	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.

- **Resources Used(JSS3)**

Fraction of Usage in Total Resources[*1](%): 1.07

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage[*2](%)
TOKI-SORA	0.00	0.00
TOKI-RURI	1,677,959.84	9.61
TOKI-TRURI	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage[*2](%)
/home	22.81	0.02
/data	11,773.96	0.20
/ssd	228.13	0.12

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[*2](%)
J-SPACE	2.73	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.