Numerical Investigation of three-dimensional flow fields around a cavity

● **Responsible Representative**

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● **Abstract**

It is well known that a rectangular cavity, such as the one found in the landing gear compartment of   aircraft, causes self-excited vibration due to turbulent flow and aerodynamic noise. In this study, we investigated the phenomenon of self-excited vibration inside the cavity by using 3D numerical analysis.

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

Because it takes time to calculate the unsteady flow field

● **Achievements of the Year**

An analysis of fluid structure in cavity flow at supersonic speed was carried out. Steady-state and unsteady-state fluid simulations were carried out to reproduce the cavity tone phenomenon. The reproducibility of the flow field was investigated.

● **Publications**

N/A

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	256
Elapsed Time per Case	50 Hour(s)

● **Resources Used(JSS2)**

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](%)
SORA-MA	24,139.09	0.00
SORA-PP	2,349.44	0.02
SORA-LM	0.00	0.00
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage[*2](%)
/home	104.90	0.10
/data	11,718.76	0.23
/ltmp	2,343.75	0.20

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[*2](%)
J-SPACE	5.66	0.19

[*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](%): 0.06

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage[*2](%)
TOKI-SORA	146,912.05	0.03
TOKI-RURI	18,635.39	0.11
TOKI-TRURI	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage[*2](%)
/home	572.20	0.39
/data	31,250.01	0.52
/ssd	4,901.89	2.56

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[*2](%)
J-SPACE	5.66	0.19

[*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.