Study on dynamic instability of a reentry capsule at transonic speed

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● **Abstract**

Atmospheric entry capsules are known to be prone to dynamic instabilities during subsonic to transonic speed flight. To investigate the phenomena, numerical fluid simulations of flows around a NACA0012 airfoil were performed to reproduce the self-excited oscillation, as an initial study of simulations.

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

Large computation cost to simulate unsteady flow fields.

● **Achievements of the Year**

Flow fields around a NACA0012 airfoil were numerically simulated. Changes in the flow field were investigated with varing the flow parameters.

● **Publications**

N/A

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	128
Elapsed Time per Case	12 Hour(s)

- **JSS3 Resources Used**

Fraction of Usage in Total Resources[*1](%): 0.00

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage[*2](%)
TOKI-SORA	8,632.43	0.00
TOKI-ST	6,639.73	0.01
TOKI-GP	0.00	0.00
TOKI-XM	0.00	0.00
TOKI-LM	216.02	0.01
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	260.00	0.24
/data and /data2	116,544.00	0.90
/ssd	150.00	0.02

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[*2] (%)
J-SPACE	28.77	0.13

[*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)	57.02	0.04

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

● **ISV Software Licenses Used**