

## Thermal analysis of satellites

Report Number: R23EDG20108

Subject Category: Research and Development

URL: <https://www.jss.jaxa.jp/en/ar/e2023/23725/>

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### ● Abstract

A high-precision, non-equilibrium thermal analysis model is developed for heat accumulators using PCM (Phase Change Material). And, the coupled analysis technology and real-time analysis technology of the thermal fluid region connected to the space vehicle digital twin are acquired.

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

In this study, the Enthalpy-Porosity method was employed with ANSYS Fluent whose licenses JSS3 had. In addition, parallel supercomputers of JSS3 was used to obtain the result.

### ● Achievements of the Year

In comparison with the obtained test results, good agreement was obtained with the maximum error of 3.1K (Fig.1)

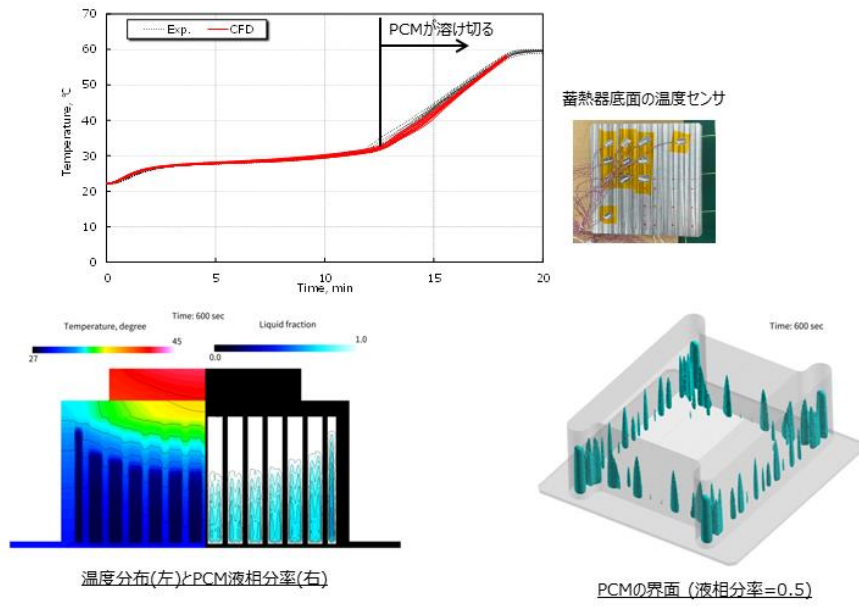


Fig. 1: Comparison of temperature distribution on the bottom surface of the heat storage device.

● **Publications**

N/A

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	8 - 12
Elapsed Time per Case	72 Hour(s)

● **JSS3 Resources Used**

Fraction of Usage in Total Resources\*1(%): 0.03

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage*2(%)
TOKI-SORA	0.00	0.00
TOKI-ST	31,696.91	0.03
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	45.91	0.04
/data and /data2	4,000.78	0.02
/ssd	0.00	0.00

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	92.66	0.33

\*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 <sup>*2</sup> (%)
ISV Software Licenses (Total)	4,485.96	2.02

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