

## Research on advanced rocket engines

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### ● Responsible Representative

Toshiya Kimura, Specially appointed advisor, Research and Development Directorate, Research Unit IV

### ● Contact Information

Toshiya Kimura, Research and Development Directorate, Research Unit IV(kimura.toshiya@jaxa.jp)

### ● Members

Kosei Goto, Taku Inoue, Toshiya Kimura, Shinichi Moriya, Mitsuru Shimagaki, Masaharu Takahashi

### ● Abstract

The objective of our work is to accelerate ongoing projects such as RV-X and CALLISTO, which are R&D of small reusable rockets, and future researches on reusable and advanced rocket engines through numerical simulations.

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

It is very useful for researchers who make R&D of advanced rocket engines that various softwares such as CFD and FEM are available.

### ● Achievements of the Year

Coupled thermal fluid simulations were made for radial gap motors and axial gap motors which will be used in electric pumps of a electric pump fed cycle rocket engines. The efficient cooling method of these motors were examined.

The pump and the motor were simulated as a single numerical model to examine thermal and fluid conditions in these systems.

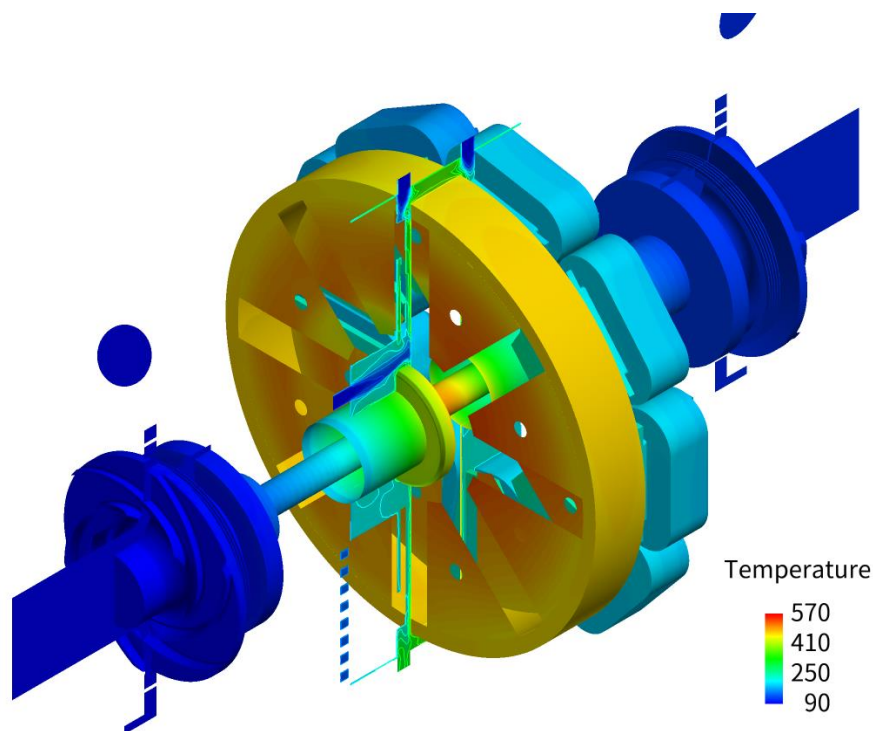


Fig. 1: One of examples of thermo-fluid dynamic simulations for an axial gap motor with two pumps

● **Publications**

N/A

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	N/A
Thread Parallelization Methods	N/A
Number of Processes	1
Elapsed Time per Case	1 Second(s)

- **JSS3 Resources Used**

Fraction of Usage in Total Resources\*1(%): 0.10

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage*2(%)
TOKI-SORA	0.00	0.00
TOKI-ST	0.00	0.00
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* <sup>2</sup> (%)
/home	132.04	0.09
/data and /data2	114.29	0.00
/ssd	0.00	0.00

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage* <sup>2</sup> (%)
J-SPACE	0.09	0.00

\*<sup>1</sup>: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

\*<sup>2</sup>: 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)	9,949.06	6.80

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