Dynamics analysis of JDS (Japan Docking System) soft capture system

● **Responsible Representative**

Maki Maeda, Project Manager, Human Spaceflight Technology Directorate

● **Contact Information**

Kenta Nagahama(nagahama.kenta@jaxa.jp)

● **Members**

Kaname Kawatsu, Hirofumi Kurata, Ryosuke Kajiwara, Maki Maeda, Yasuhiro Nagase, Kenta Nagahama, Kei Saito

● **Abstract**

On-orbit dynamics simulation of docking mechanism (JDS: Japan Docking Mechanism) for autonomous docking demonstration by HTV-X

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

All JAXA employee can use JSS quickly and easily without any complicated procedures.

The system can be connected within the JAXA intranet, so there is little risk of information leakage.

Quick access to extensive support on how to use the system.

Linux contaier technology can be applied.

● **Achievements of the Year**

For the on-orbit demonstration of automated docking with HTV-X JDS (Japan Docking System), it is necessary to ensure docking capability under various docking conditions (e.g., speed/attitude). In this study, NASA-Trick, a docking simulator provided by NASA, has been utilized to enable parameter studies of the automated docking system design.

JSS contributes to reduce calculation time significantly. JSS analysis environment enabled us to conduct more than 600,000 cases of monte-calro analysis which are required to verify docking dynamics performance.

● **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 Minute(s)

●   **JSS3 Resources Used**

Fraction of Usage in Total Resources[1](%): 0.02

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage[2](%)
TOKI-SORA	0.00	0.00
TOKI-ST	136,131.52	0.14
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	388.33	0.26
/data and /data2	148,270.00	0.71
/ssd	0.00	0.00

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[2] (%)
J-SPACE	0.00	0.00

[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)	0.00	0.00

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