Development of FaSTAR-Move

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● **Abstract**

FaSTAR-Move, an extended version of the fast unstructured-grid flow solver FaSTAR, is developed to analyse flow field around moving/deforming objects such as external store separation, flutter, rotor, and compressor/turbine of aero-engines.

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

JSS is necessary to complete numerical simulations of unsteady phenomena and to understand it in short time span.

● **Achievements of the Year**

FaSTAR-Move have been extended to enable rotor-stator steady analysis for rotating cascade and rotorcraft analysis with conplex geometry. It was comfirmed that FaSTAR-Move can reasonably simulate the flow field around them.
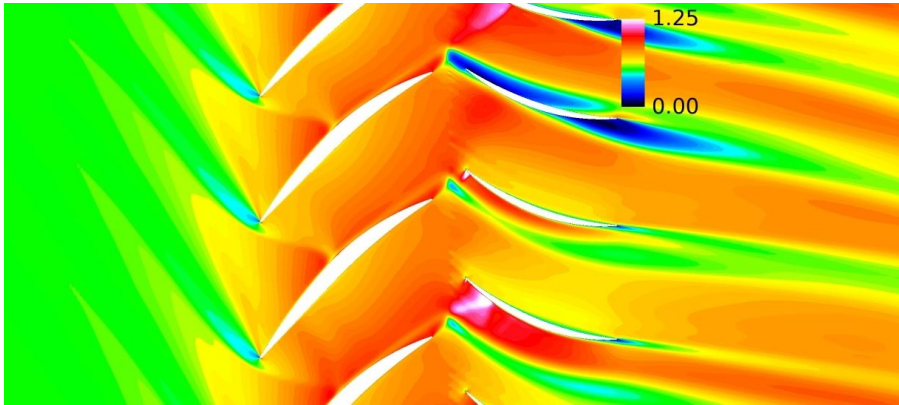
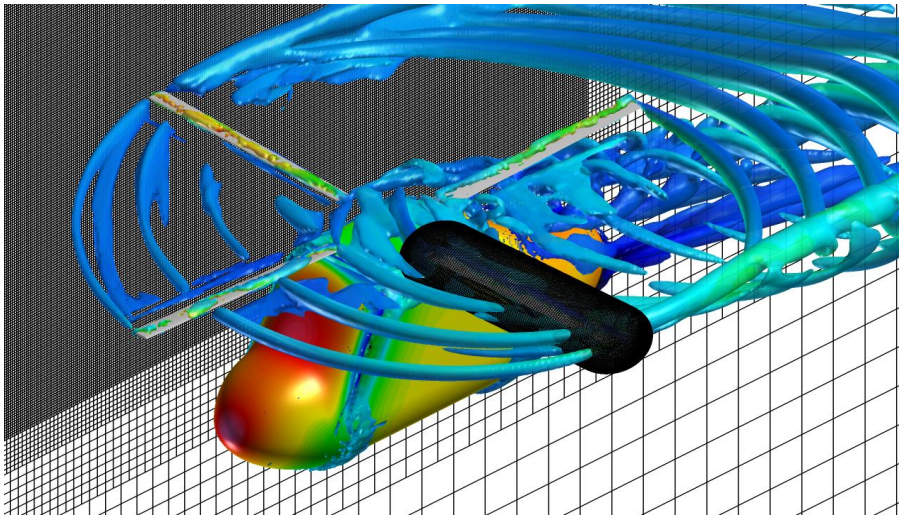Fig. 1: Steady state analysis result of axial compressor using frozen rotor method: Mach number distribution.

Fig. 2: Example of rotorcraft analysis.

- **Publications**

   N/A

- **Usage of JSS**

- **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	768 - 1024
Elapsed Time per Case	150 Hour(s)

● **JSS3 Resources Used**

Fraction of Usage in Total Resources[*1](%): 0.47

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage[*2](%)
TOKI-SORA	10,288,054.93	0.50
TOKI-ST	75,525.48	0.09
TOKI-GP	0.00	0.00
TOKI-XM	9,800.38	7.06
TOKI-LM	2,432.47	0.18
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	2,640.47	2.63
/data and /data2	90,572.14	0.97
/ssd	3,219.75	0.83

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[*2](%)
J-SPACE	7.47	0.05

[*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)	903.79	0.63

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

- **ISV Software Licenses Used**