

High-speed rotorcrafts technology training

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Subject Category: Skills Acquisition System

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- **Abstract**

Analysis of Aerodynamic Performance of a Coaxial Rotor in High-Speed Forward Flight

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

In order to perform a rotorcraft analysis tool.

- **Achievements of the Year**

Numerical analysis of a coaxial rotor for a next-generation rotorcraft was conducted. The numerical analysis was performed using rFlow3D developed at JAXA. Moving overlapped grids are utilized to simulate the motions of the main rotor blades. Figure 1 shows the computational grid in the present calculation.

In the present calculations, the vibration characteristics of an isolated coaxial rotor system under the advance ratio of 0.7 and 0.8 is investigated. Figure 2 shows an example of calculation result. The difference in the aerodynamic vibration mechanism depending on the number of blades per rotor is clarified through the numerical simulations. Further vibration reduction method are also investigated.

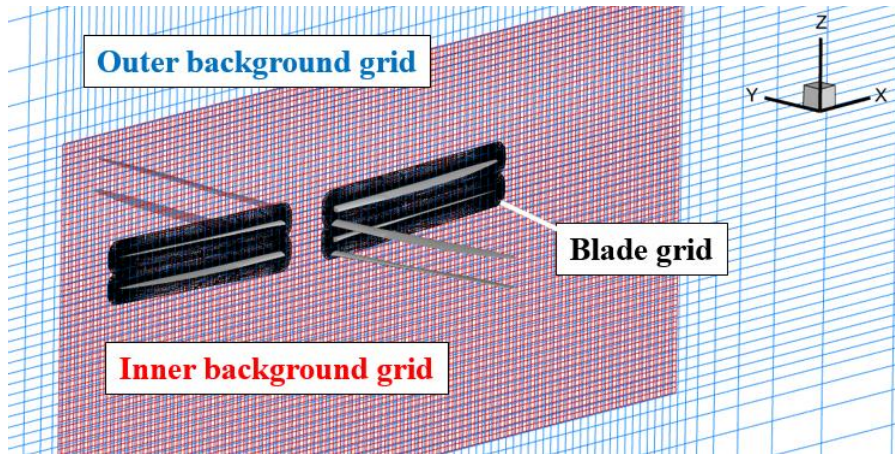


Fig. 1: Computational grid used in the simulations

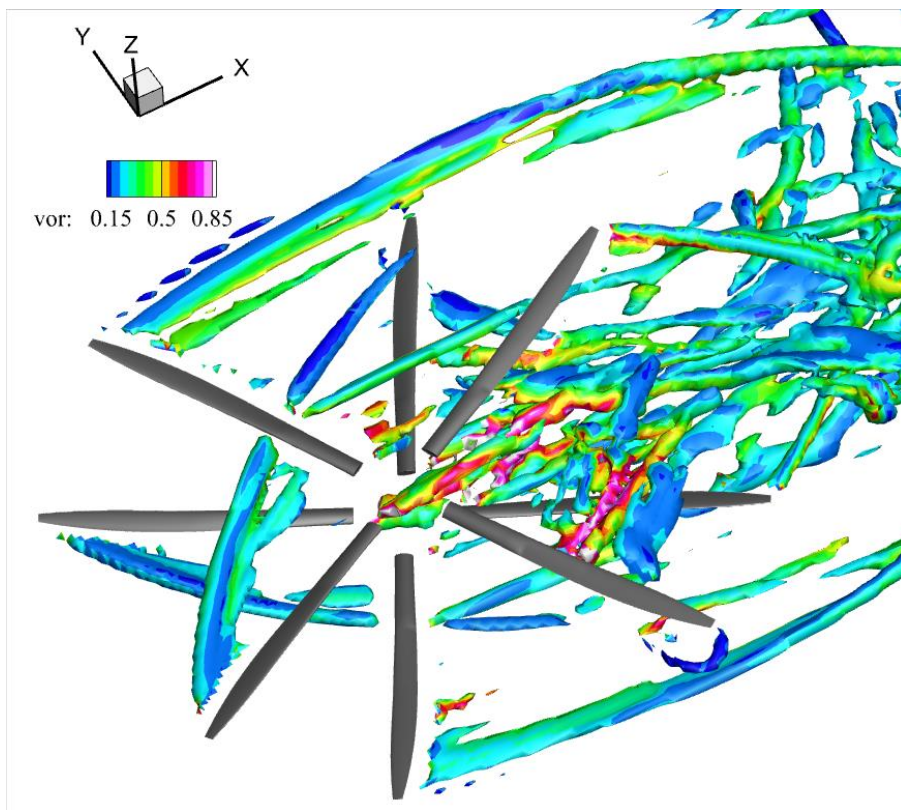


Fig. 2: Sample result for the coaxial rotor system

● **Publications**

N/A

● Usage of JSS

● Computational Information

Process Parallelization Methods	N/A
Thread Parallelization Methods	OpenMP
Number of Processes	1
Elapsed Time per Case	170 Hour(s)

● JSS3 Resources Used

Fraction of Usage in Total Resources*1(%): 0.16

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage*2(%)
TOKI-SORA	571.25	0.00
TOKI-ST	1,097,066.81	1.35
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	539.18	0.54
/data and /data2	33,814.51	0.36
/ssd	5,520.99	1.43

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)	487.70	0.34

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