

## Computational analysis of compound helicopter

Report Number: R20ETET08

Subject Category: Skills Acquisition System

URL: <https://www.jss.jaxa.jp/en/ar/e2020/14401/>

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### ● Abstract

The purpose of this study is to investigate aerodynamic interaction between the rotor and the wing of a compound helicopter using CFD analysis.

Ref. URL: <https://kitnet.jp/laboratories/labo0022/index.html>

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

The analysis of the aerodynamic interaction between the rotor and the wing using the helicopter aerodynamic analysis code rFlow3D is computationally intensive.

### ● Achievements of the Year

The aerodynamic interaction between the rotor and the wing of a compound helicopter in hover is simulated (Fig.1) . The aerodynamic interaction between the rotor and the wing of a compound helicopter in high speed flight is simulated (Fig.2) .

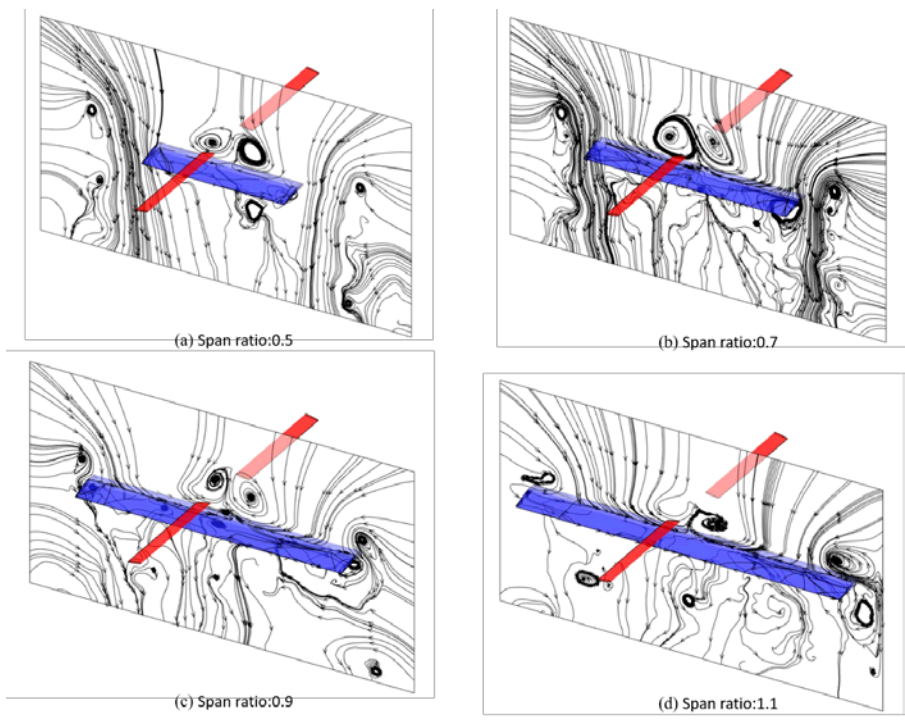


Fig. 1: Rotor and wing interaction in hovering flight

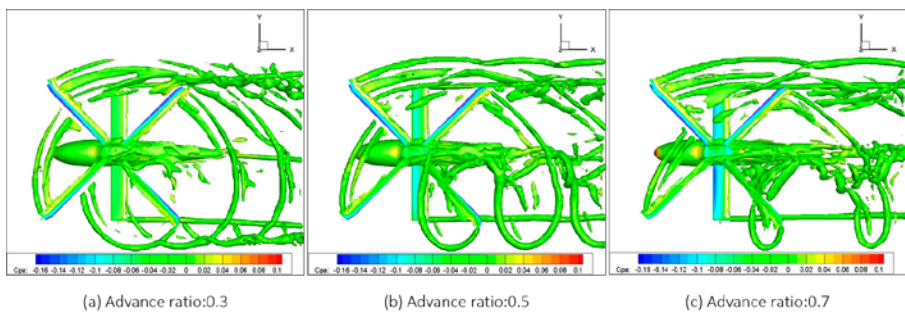


Fig. 2: Rotor and wing interaction at high-speed flight

● **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	140 Hour(s)

- **Resources Used(JSS2)**

Fraction of Usage in Total Resources\*1(%): 0.21

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2(%)
SORA-MA	96,924.78	0.02
SORA-PP	298,613.48	2.34
SORA-LM	0.00	0.00
SORA-TPP	10,490.02	0.99

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2(%)
/home	48.85	0.04
/data	7,409.59	0.14
/tmp	1,304.36	0.11

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.

- **Resources Used(JSS3)**

Fraction of Usage in Total Resources\*<sup>1</sup>(%): 0.75

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage* <sup>2</sup> (%)
TOKI-SORA	2,747.53	0.00
TOKI-RURI	1,177,170.03	6.74
TOKI-TRURI	13.12	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage* <sup>2</sup> (%)
/home	48.85	0.03
/data	8,297.37	0.14
/ssd	498.91	0.26

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