

Prediction of Aerodynamic Performance by Aerodynamic Interaction Between a Rotor and a Wing on Compound Helicopter

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URL: <https://www.jss.jaxa.jp/en/ar/e2018/9115/>

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● Abstract

The influence on the aerodynamic performance by aerodynamic interaction between a rotor and a wing on a compound helicopter have been investigated through a numerical simulation and an experiment.

Ref. URL: <http://www.aero.jaxa.jp/eng/research/frontier/rotary/>

● Reasons for using JSS2

There is a large number of computational case, and a computational resource is required to obtain the simulation results promptly.

● Achievements of the Year

As a pre-test prediction of the aerodynamic performance for a wind-tunnel test on the rotor-wing interaction, numerical simulations are performed based on the configuration of the test models. The numerical simulations of the rotorcraft are based the moving overlapped grid as shown in Fig. 1. The prediction results assisted the determination of the test condition and good correlation with the test data are observed.

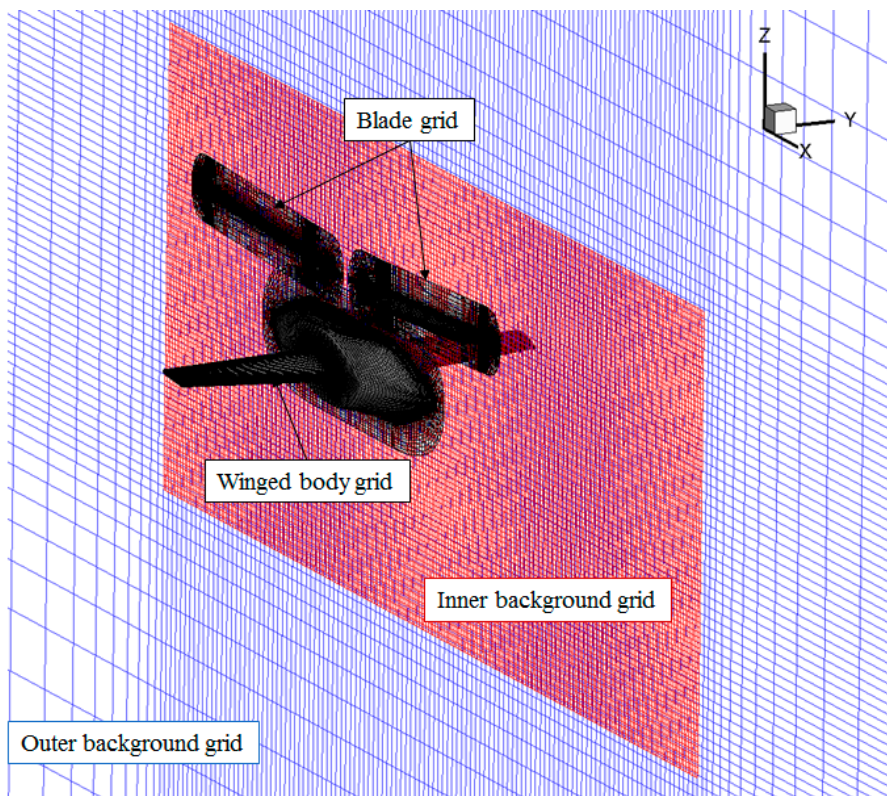


Fig. 1: Moving overlapped grid system in the numerical simulations.

● **Publications**

- Non peer-reviewed papers

- 1) Tanabe, Y., Kobiki, N., Sugawara, H., Kobayashi, W., Hayashi, H., Sato, R., “Pre-test CFD Simulation of a Wind Tunnel Test on Rotor/Wing Interaction”, 56th aircraft symposium, 2018. (in Japanese)

● **Usage of JSS2**

● **Computational Information**

Process Parallelization Methods	N/A
Thread Parallelization Methods	OpenMP
Number of Processes	1
Elapsed Time per Case	200 Hour (s)

● **Resources Used**

Fraction of Usage in Total Resources*1 (%): 0.40

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	1,108,304.46	0.14
SORA-PP	446,465.70	3.57
SORA-LM	0.00	0.00
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2 (%)
/home	5,049.27	5.22
/data	17,163.83	0.30
/tmp	2,890.23	0.25

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	7.94	0.28

*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.