

CFD Analysis of Wind Fields Around Regional Airports

Report Number: R23EEA10100

Subject Category: Aeronautical Technology

URL: <https://www.jss.jaxa.jp/en/ar/e2023/23718/>

● Responsible Representative

Atsushi Kanda, Hub Manager, Aviation Safety Innovation Hub

● Contact Information

Midori Maki(maki.midori@jaxa.jp)

● Members

Midori Maki, Hiroki Tadakawa

● Abstract

Database construction for wind forecasting system around airports

● Reasons and benefits of using JAXA Supercomputer System

CFD analysis of several hundred million points is necessary to resolve turbulence generated over complex terrain and to understand aircraft dynamics. Therefore, it is essential to use JSS3, which boasts a large memory capacity and high computational processing power.

● Achievements of the Year

Terrain-induced turbulence at several regional airports was analyzed using a solver with a track record in wind engineering. As a result, the location and mechanisms of turbulence were identified.

● Publications

- Oral Presentations

1) Hiroki Tadakawa, Yuka Fujita, Midori Maki, Takanori Uchida: A Study of Turbulence Visualization System for Landing Safety at Regional Airports: A Case Study of Okierabu Airport, 61st Aircraft Symposium, 2023

2) Hiroki Tadakawa, Yuka Fujita, Midori Maki, Takanori Uchida, Masaharu Imaki, Nobuyuki Kotake: A Study of Turbulence Visualization System for Landing Safety at Regional Airport: A Case Study of Iwakuni Aerodrome, 51st JSASS Annual Meeting, 2024

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	Automatic Parallelization
Number of Processes	1 - 36
Elapsed Time per Case	24 Hour(s)

● **JSS3 Resources Used**

Fraction of Usage in Total Resources*1(%): 0.04

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage *2(%)
TOKI-SORA	0.00	0.00
TOKI-ST	336,601.59	0.36
TOKI-GP	118.45	0.00
TOKI-XM	0.00	0.00
TOKI-LM	761.58	0.06
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	98.00	0.08
/data and /data2	36,124.00	0.22
/ssd	1,004.00	0.09

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.