

Study of the Effect of Boundary Layer Ingestion (BLI) on Aircraft Propulsion / Distributed Propulsion Technology with Superconducting Motors

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● **Abstract**

This study focuses on the performance evaluation of an aircraft with boundary layer ingestion (BLI) which is expected to improve the fuel efficiency. The benefit of BLI was calculated by analyzing the flow under BLI conditions.

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

The full scale aircraft analysis increases the computational scale.

● **Achievements of the Year**

This study evaluates the power saving of the BLI aircraft. As a result, as shown in fig.1, approximately 20% of the required power can be reduced.

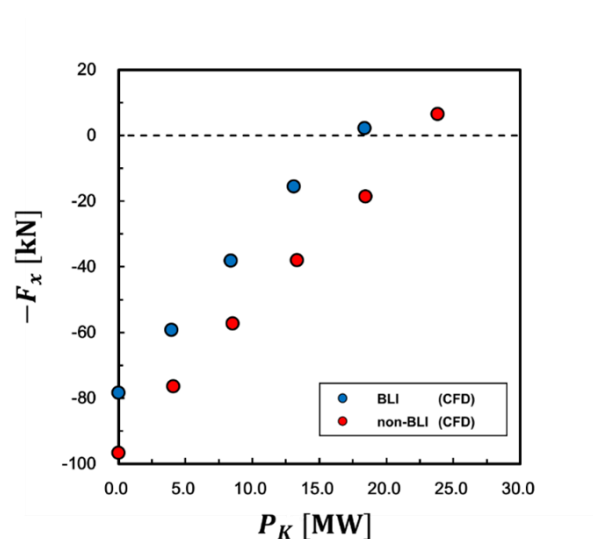


Fig. 1: Relationship between Power (P_K) and net force exerted on the aircraft on the condition of cruise (speed and altitude) for a reference BWB aircraft model.

● Publications

N/A

● Usage of JSS

● Computational Information

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	960
Elapsed Time per Case	13.8 Hour(s)

● JSS3 Resources Used

Fraction of Usage in Total Resources*1(%): 0.60

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage*2(%)
TOKI-SORA	12,411,215.10	0.57
TOKI-ST	58,730.74	0.06
TOKI-GP	0.00	0.00
TOKI-XM	0.00	0.00
TOKI-LM	214,712.78	15.49
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	1,607.33	1.08
/data and /data2	193,954.07	0.93
/ssd	185.93	0.01

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)	9,615.02	6.57

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