FQUROH+: CFD Code Modifications

Report Number: R20EDA101R29
Subject Category: Aeronautical Technology
URL: https://www.jss.jaxa.jp/en/ar/e2020/14287/

Responsible Representative

Yoshikazu Makino, Unit Head, Aeronautical Technology Directorate, Aviation Systems Research Unit

Contact Information

Mitsuhiro Murayama(murayama.mitsuhiro@jaxa.jp)

Members

Mitsuhiro Murayama, Kentaro Tanaka, Tomoaki Ikeda, Yosuke Matsumura, Masayuki Kakehi

Abstract

JAXA FQUROH+ Research aims at raising the technical maturity level of the noise reduction technology for high-lift devices and landing gear, which draws international attention to reduce noise in areas around airports, to a level applicable to future development of aircraft and related equipment. One of the objectives of the research is to verify the feasibility of practical noise reduction concepts and design methods based on advanced computational simulations. In this work, operation check and debug of the modified CFD code on JSS is conducted.

Ref. URL: https://www.aero.jaxa.jp/eng/research/ecat/fquroh/

Reasons and benefits of using JAXA Supercomputer System

The JSS is used to understand detailed physics of noise generation, and to optimize noise reduction designs. The FQUROH+ Research aims to accelerate technology maturity of airframe noise reduction methods using advanced high-fidelity computational simulations on the JSS's high performance computing platform and to demonstrate the high-fidelity design technologies through flight tests. Computational simulations using the JSS make it possible to design low-noise devices by understanding detailed physical phenomena, which is difficult to obtain only with wind tunnel tests.

Achievements of the Year

The pre-processing in the CFD code was modified with debuging through application to a large scale practical problem on JSS.

Publications

N/A

Usage of JSS

Computational Information

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	1 - 300
Elapsed Time per Case	10 Hour(s)

Resources Used(JSS2)

Fraction of Usage in Total Resources[*1](%): 0.05

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage[*2](%)
SORA-MA	139,372.38	0.03
SORA-PP	11,406.41	0.09
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	35.11	0.03
/data	51,087.91	0.99
/ltmp	1,134.59	0.10

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[*2](%)
J-SPACE	1.88	0.06

[*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[*1](%): 0.03

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage[*2](%)
TOKI-SORA	0.00	0.00
TOKI-RURI	0.00	0.00
TOKI-TRURI	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage[*2](%)
/home	46.32	0.03
/data	51,486.32	0.86
/ssd	61.65	0.03

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage[*2](%)
J-SPACE	1.88	0.06

[*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.