Environment Conscious Aircraft Systems Research in Eco-wing Technology: Contract Work on CFD Code Modifications

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● Abstract

In a research of environment-conscious aircraft systems resarch for environmental conscious aircraft technology named "Research for Eco-Wing technology", innovative drag reduction technologies are investigated to reduce the fuel consumption for a conventional aircraft configuration. Aircraft noise prediction technologies and the conceptual design technologies are also developed for future aircraft which achieve low noise and high efficiency.

As part of research, an overset grid method with higher order interpolation is introduced into a CFD code to reduce time-consuming work for grid generation around complicated aircraft configurations, while achieving high resolution of noise sources with higher-oder numerical scheme. In this contract work, operation check and debug of the modified CFD code on JSS2 is conducted.

http://www.aero.jaxa.jp/eng/research/ecat/ecowing/

● Reasons for using of JSS2

The JSS2 is used to develop the airframe, engine, and interference noise prediction tools that have high or middle fidelities for applicable to MDO design with high fidelity CFD and FEM analysis. The airframe-engine installation and/or shielding effects are one of important key issues for the future aircraft. The accuracy of current low fidelity analysis for the airframe, engine, and interference noise prediction is not good enough for application to MDO design with high fidelity CFD and FEM analysis toward the future low-noise aircrafts. The JSS2 is required for development of high or middle fidelity noise prediction tools for competitiveness in technology.

● Achievements of the Year

The pre-processing in the modified code was developed with debuggin through application to a large scale practical problem on JSS2 SORA-PP system.

● Publications

N/A

● Usage of JSS2

● Computational Information

Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	300
Elapsed Time per Case	12.00 hours

● Resources Used

Fraction of Usage in Total Resources*1 (%): 0.09

Details

Computing Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	551.90	0.00
SORA-PP	84,869.11	1.06
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	024.38	0.02
/data	50,579.73	0.94
/ltmp	1,429.07	0.11

Archiver Resources		
Archiver System Name	Storage used(TiB)	Fraction of Usage*2 (%)
J-SPACE	0.01	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