

Systematic improvement of build and comparison of aerodynamic models of aircraft

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● Abstract

A research to realize efficient validation of numerical simulation using experimental data such as flight test and wind tunnel test data utilizing mathematical model.

● Reasons for using JSS2

To estimate viscosity and compressibility effects on airplane aerodynamics by numerical simulation to make comparisons with experimental data.

● Achievements of the Year

To compare flight test results with ground test, such as wind tunnel testing and computational fluid dynamics (CFD), CFD analysis was performed. It includes Reynolds number effect confirmation and support sting effect estimation for wind tunnel testing.

Although possibility of shock wave relocation due to Reynolds number variation was worried, it appeared only in a few cases at high transonic Mach number and high angle of attack. The amount of shock wave relocation is at most 10% of the chord length in most cases. (Figures are not presented because the results are not public at this moment.)

● Publications

N/A

- Usage of JSS2

- Computational Information

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	25
Elapsed Time per Case	12.5 Hour (s)

- Resources Used

Fraction of Usage in Total Resources*1 (%): 1.01

Details

Computational Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	9,044,164.87	1.11
SORA-PP	5,513.42	0.04
SORA-LM	135.01	0.06
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2 (%)
/home	530.91	0.55
/data	69,145.47	1.22
/ltmp	4,512.22	0.39

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	1.33	0.05

*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.