Research of coupled analysis of motion and aerodynamics

● Responsible Representative

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● Abstract

In this research, we have extended FaSTAR-code to be able to handle coupled analysis of motion and aerodynamics and conducted a store-separation analysis for the validation.

● Reasons for using of JSS2

Computer for large-scale unsteady flow simulation

● Achievements of the Year

In this year, we have reduced the memory cost and accelerated the computational speed of FaSTAR-Move to enhance the user's convenience. As a result, the unsteady flow simulation of store-separation analysis with 10M grid points was finished within one-day.
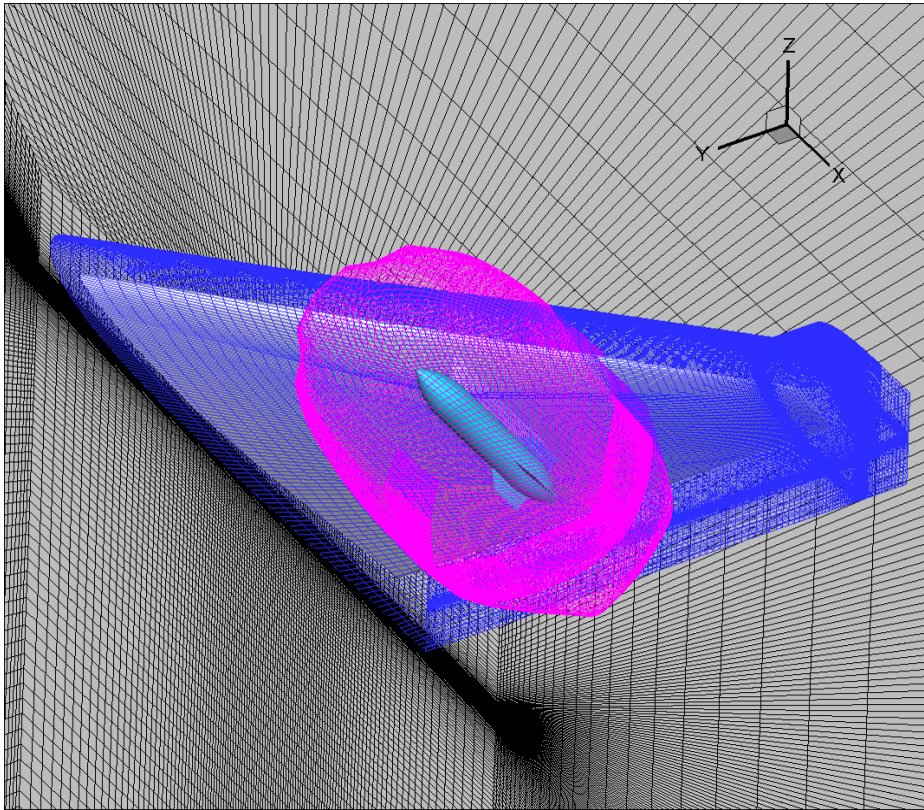
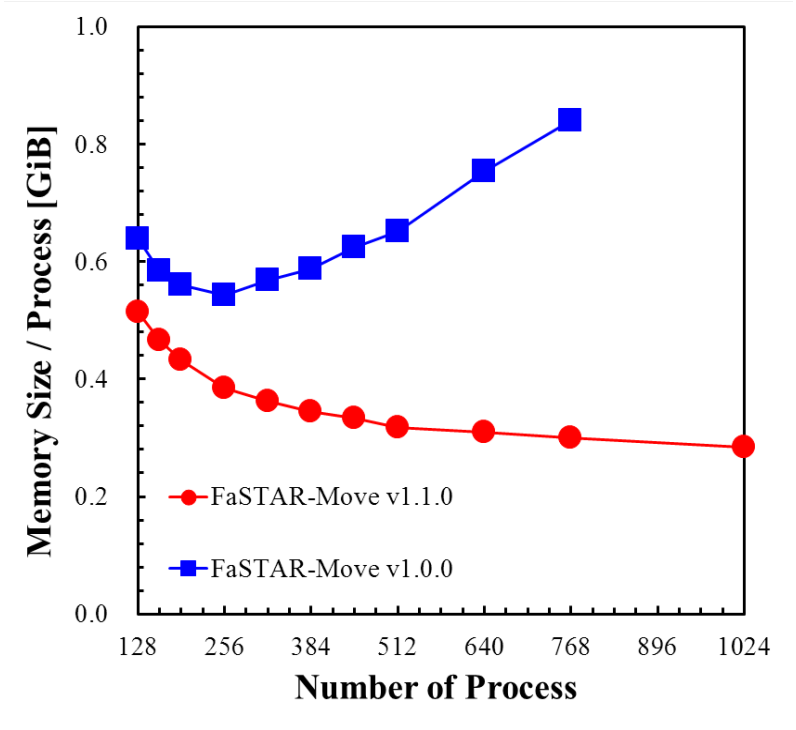Fig.1 Computational grid of store-separation analysis

Fig.2 Comparison of the memory performance

🌐 Publications

- ● Presentations

1) Keiji Ueshima, et al., "Development of FaSTAR-Move for flow analysis around moving/deforming bodies", 49th Fluid Dynamics Conference/35nd Aerospace Numerical Simulation Symposium, Tokyo, 2017

2) Keiji Ueshima, et al., "Improvement of FaSTAR-Move capability towards practical use", 55th Aircraft Symposium, Shimane, 2017

🌐 Usage of JSS2

- ● Computational Information

Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	64 - 2048
Elapsed Time per Case	20.00 hours

- ● Resources Used

Fraction of Usage in Total Resources*1 (%): 1.45

Details

Computing Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	11,678,000.75	1.54
SORA-PP	61,313.68	0.77
SORA-LM	12,511.32	6.44
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage assigned(GiB)	Fraction of Usage*2 (%)
/home	121.34	0.08
/data	23,151.11	0.43
/ltmp	4,072.77	0.31

Archiver Resources		
Archiver System Name	Storage used(TiB)	Fraction of Usage*2 (%)
J-SPACE	0.52	0.02

*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