aFJR light weight sound absorption liner technology development

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Abstract

The purpose of aFJR project is to advance research on jet engine component technologies so that Japanese manufacturers can join more effectively in international joint-development projects on next-generation jet engines. To compensate for increasing fan diameter, we are developing lightweight fan blades that have higher aerodynamic efficiency by applying advanced simulation technology and composite materials evaluation technology.

For the development of lightweight sound absorbing liner technology, we developed a technology to simulate sound waves absorbed by sound absorbing liners and devise a shape with higher absorption rate.

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

Reasons for using of JSS2

The calculation is LES with a large amount of computation and storage usage. It was necessary to use SORA-PP, TPP,　and SORA-FS.

Achievements of the Year

Numerical simulation method of sound absorbing liner with glazing flow was studied by using UPACS-LES which is an analytical code with less attenuation of sound waves using a 6th order compact scheme. Two-dimensional laminar flow was assumed for calculation. Fig. 1 shows the sound pressure. Sound waves propagating from the left to the right in the figure are absorbed by sound absorbing cells installed at the lower center of the figure.

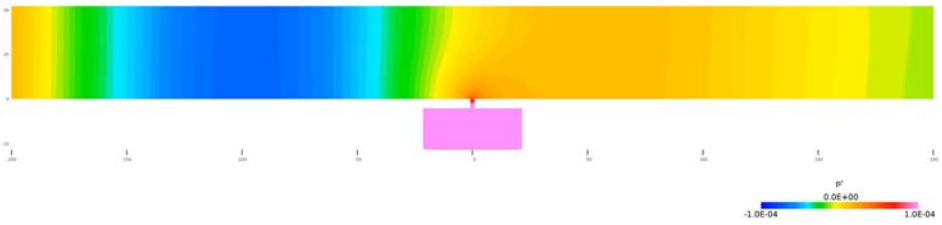

Fig.1 Sound pressure

Publications

- Presentations

1) Shunji ENOMOTO, Tatsuya Ishii, Yusuke Akamisaka, Hidemi Toh, "Numerical analysis of sound absorbing liner with glazing flow", 50th Fluid Dynamics Conference / 35th Aerospace Numerical Simulation Symposium, 2018

Usage of JSS2

Computational Information

Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	12 - 24
Elapsed Time per Case	40.00 hours

Resources Used

Fraction of Usage in Total Resources*1 (%): 0.24

Details

Computing Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	0.00	0.00
SORA-PP	172,878.44	2.16
SORA-LM	0.00	0.00
SORA-TPP	100,091.06	11.17

File System Resources		
File System Name	Storage assigned(GiB)	Fraction of Usage*2 (%)
/home	486.37	0.34
/data	21,003.73	0.39
/ltmp	11,914.07	0.90

Archiver Resources		
Archiver System Name	Storage used(TiB)	Fraction of Usage*2 (%)
J-SPACE	9.39	0.40

*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