

Acoustic Liner Program for future High-bypass-ratio Aircraft engines(Development of combustor)

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● Abstract

In this project, we will apply next-generation acoustic liner to combustor. To perform the numerical analysis of combustor with the acoustic liner by using HINOCA-AE which is CFD solver for aircraft engine combustors.

● Reasons and benefits of using JAXA Supercomputer System

We have designed the combustor by using hydrogen fuel. To differ from the flow field of jet fuel, we need to investigate the flow field of hydrogen fuel on the design phase.

● Achievements of the Year

Our numerical analysis is focused on the flow field of the inner combustion chamber by using hydrogen fuel. Large Eddy Simulation (LES) was performed with the inner combustion chamber as shown in Fig.1 The time-averaged temperature field are shown in Fig.2. We confirmed the numerical analysis of exit gas temperature are consistent with the experimental results.

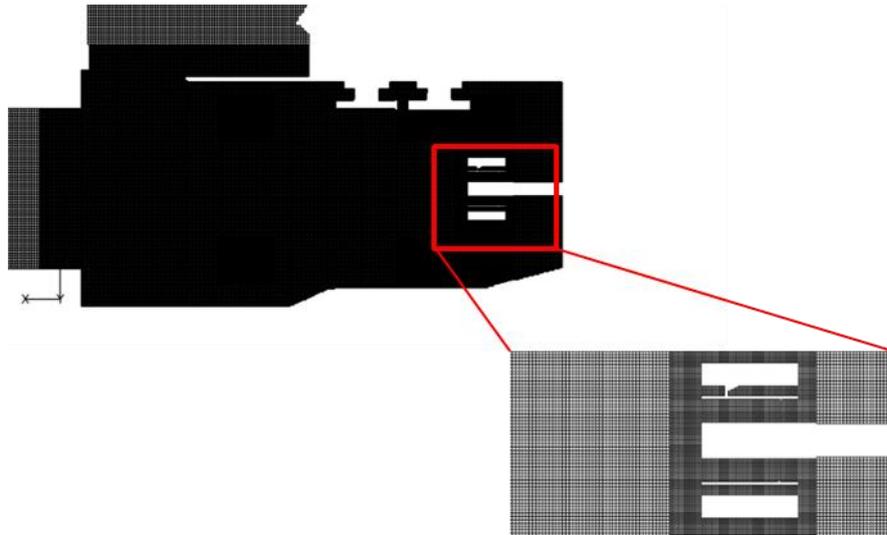


Fig. 1: Computational grid around injectors

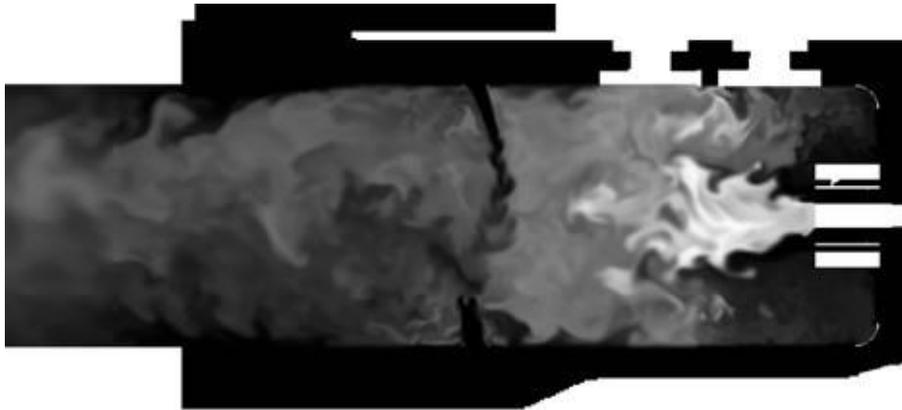


Fig. 2: Time-averaged temperature field of inner combustion chamber

- **Publications**

N/A

- **Usage of JSS**

- **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	OpenMP
Number of Processes	1 - 1534
Elapsed Time per Case	240 Hour(s)

● **JSS3 Resources Used**

Fraction of Usage in Total Resources*1(%): 0.34

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage*2(%)
TOKI-SORA	9,019,793.23	0.41
TOKI-ST	1,582.17	0.00
TOKI-GP	0.00	0.00
TOKI-XM	0.00	0.00
TOKI-LM	0.00	0.00
TOKI-TST	0.00	0.00
TOKI-TGP	0.00	0.00
TOKI-TLM	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage*2 (%)
/home	31.22	0.02
/data and /data2	112,715.11	0.54
/ssd	278.89	0.01

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2 (%)
J-SPACE	1.80	0.01

*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.

- **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage ^{*2} (%)
ISV Software Licenses (Total)	16.29	0.01

*2: Fraction of Usage : Percentage of usage relative to each resource used in one year.