

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

Report Number: R23EDA101C39

Subject Category: Aeronautical Technology

URL: <https://www.jss.jaxa.jp/en/ar/e2023/23671/>

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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 the carbon neutral fuel (ex. hydrogen). To differ from the flow field of jet fuel, we need to investigate the flow field of carbon neutral 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 carbon neutral 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. According to numerical analysis, we obtained results of the flow field around injector, the dilution holes and so on.

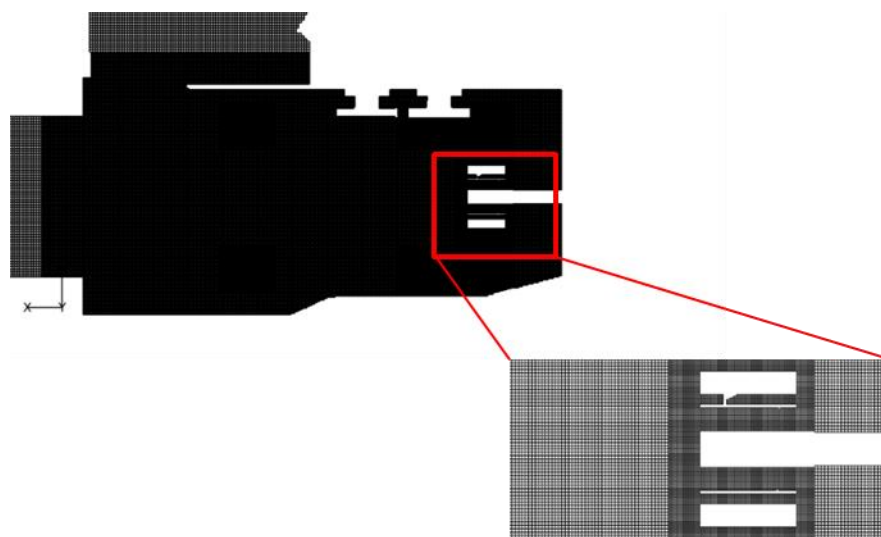


Fig. 1: Computational grid around injectors



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 - 926
Elapsed Time per Case	240 Hour(s)

- **JSS3 Resources Used**

Fraction of Usage in Total Resources*¹(%): 0.20

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage* ² (%)
TOKI-SORA	5,534,413.11	0.25
TOKI-ST	258.39	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	25.79	0.02
/data and /data2	110,135.58	0.68
/ssd	264.21	0.02

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage* ² (%)
J-SPACE	1.71	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)	11.75	0.01

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