

## Reinforcing of RCS Control Ability by Utilizing Jet Interaction Force

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### ● Abstract

A capsule lacks its attitude control ability during a reentry flight. The purpose of this study is to utilize RCS interaction force for reinforcing the ability by changing the external shape locally.

### ● Reasons for using of JSS2

The use of JSS2 was nessesary for conducting CFD analysis to survey the validity of the capsule shape change in a short period before manufacturing a wind tunnel model.

### ● Achievements of the Year

HRV capsule was changed its external shape near the RCS, and CFD analyses using FaSTAR code were performed on that capsule to examine variations of the interaction force. Figure 1 shows pressure distributions on its after-body, and it seems the RCS interaction causes mainly on the shape changed part. As shown in Fig. 2, the interaction force increased in a direction of reinforcing the RCS control ability. The design and manufacuture of wind tunnel model was carried out based on this CFD result.

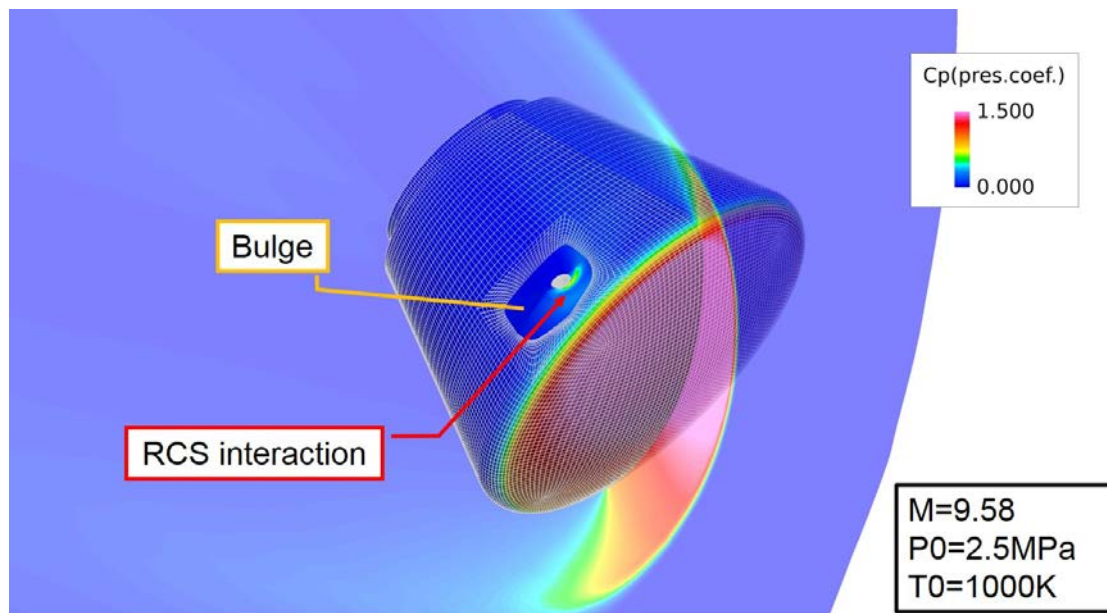


Fig.1 Pressure distribution around RCS

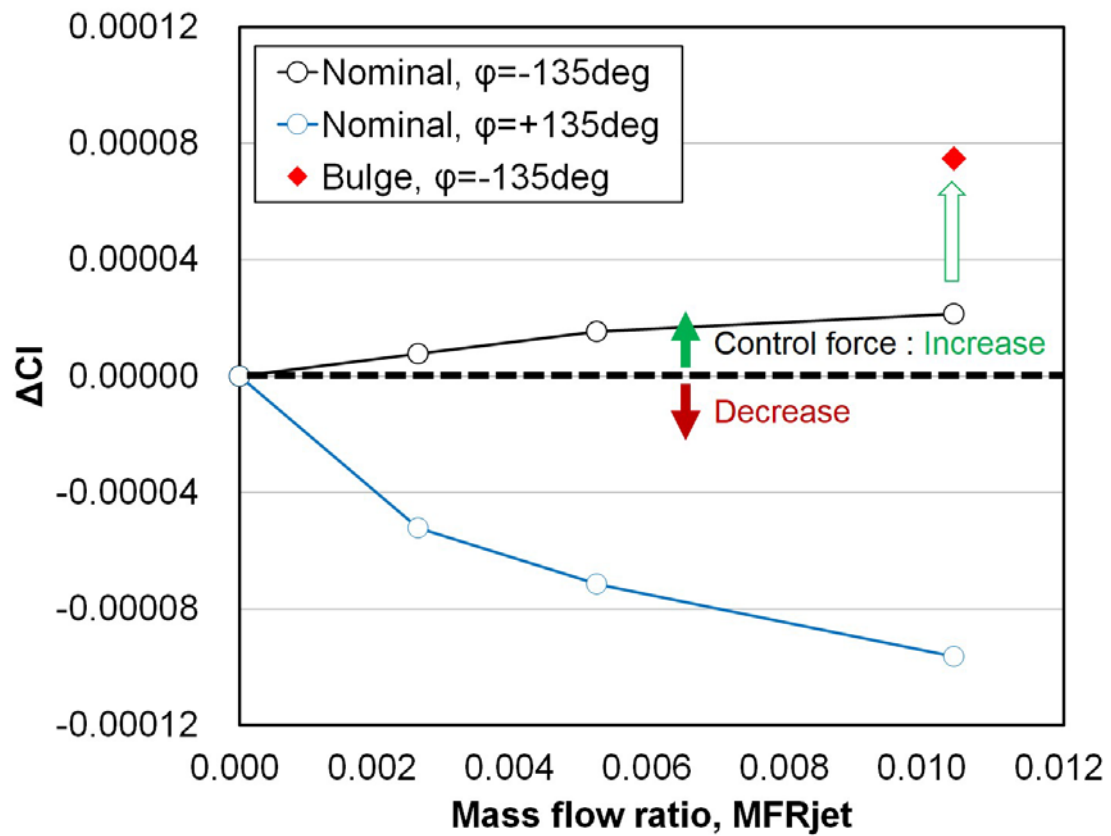


Fig.2 Variation of RCS interaction force

## Publications

### ● Presentations

- 1) Miki, H., Fujii, K. "Prediction of Jet Interaction Heating on a Reentry Capsule", SciTech2018, AIAA-2018-0382.

## ● Usage of JSS2

### ● Computational Information

Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	128
Elapsed Time per Case	20.00 hours

### ● Resources Used

Fraction of Usage in Total Resources\*1 (%): 0.05

Details

Computing Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	417,613.89	0.06
SORA-PP	139.20	0.00
SORA-LM	0.00	0.00
SORA-TPP	0.00	0.00

File System Resources		
File System Name	Storage assigned(GiB)	Fraction of Usage*2 (%)
/home	013.70	0.01
/data	1,229.21	0.02
/ltmp	2,669.27	0.20

Archiver Resources		
Archiver System Name	Storage used(TiB)	Fraction of Usage*2 (%)
J-SPACE	0.00	0.00

\*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