aFJR high efficiency fan technology development

● Responsible Representative

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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 high efficiency laminar flow fan blade technology in aFJR project, it is necessary to investigate the possibility that laminar flow fan blade design adversely affects fan flutter.

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

● Reasons for using of JSS2

Flutter simulation is useful for increasing the certainty of aFJR project and super-computers are required for this type of transition simulation.

● Achievements of the Year

For the fan blades used in the demonstration test, the flutter occurece point in a wide range of operation area was predicted. This made it possible to avoid flutter in the demonstration test.
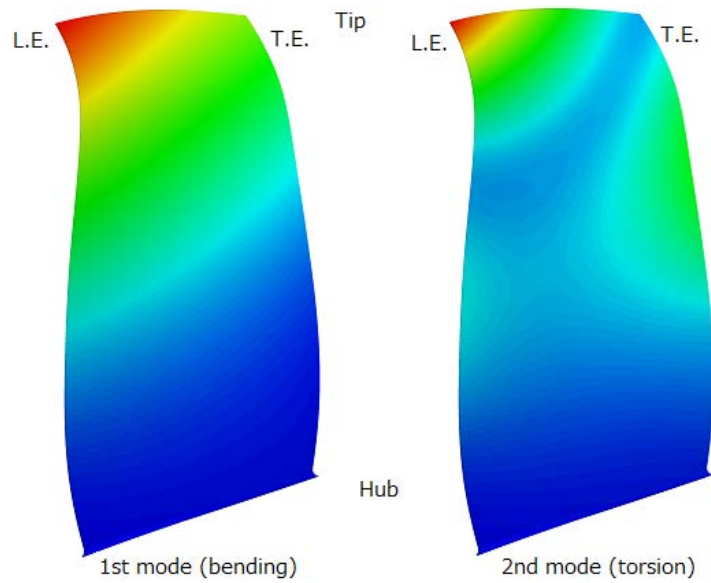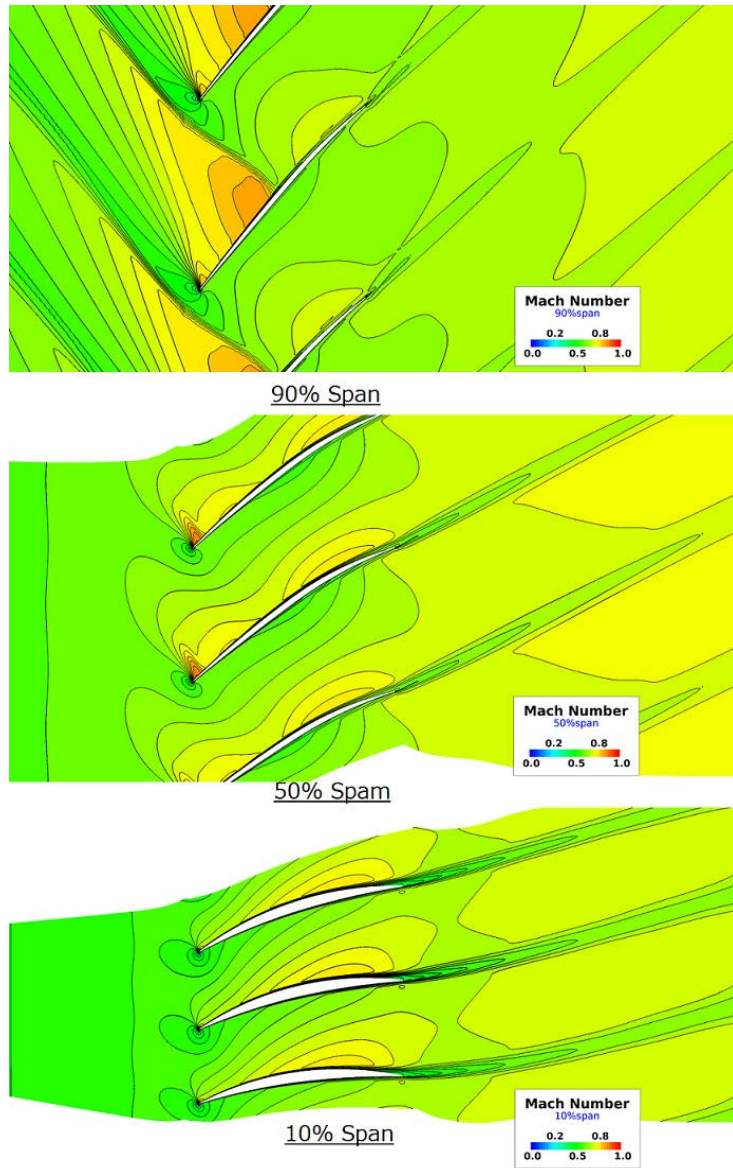
Fig.1 Natural vibration mode of fan blade
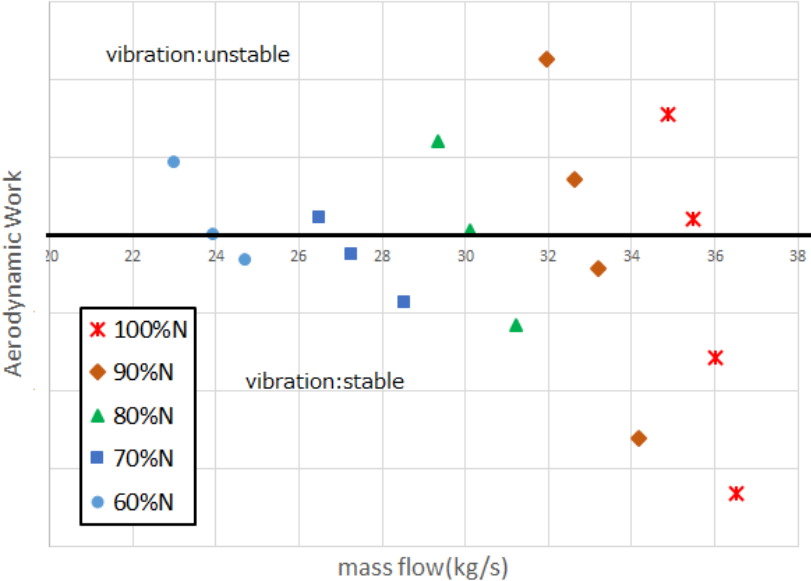

Fig.2 Mach number distribution

Fig.3 Flutter occurrence point prediction result

Publications

N/A

🔵 Usage of JSS2

● Computational Information

Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	96
Elapsed Time per Case	120.00 hours

● Resources Used

Fraction of Usage in Total Resources*1 (%): 1.58

Details

Computing Resources		
System Name	Amount of Core Time (core x hours)	Fraction of Usage*2 (%)
SORA-MA	6,831,961.84	0.91
SORA-PP	742,527.45	9.30
SORA-LM	0.00	0.00
SORA-TPP	267,950.51	29.90

File System Resources		
File System Name	Storage assigned(GiB)	Fraction of Usage*2 (%)
/home	027.70	0.02
/data	7,194.98	0.13
/ltmp	3,915.55	0.30

Archiver Resources		
Archiver System Name	Storage used(TiB)	Fraction of Usage*2 (%)
J-SPACE	9.63	0.41

*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