Research on DX in Aircraft Certification

● **Responsible Representative**

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● **Abstract**

The objective of this research is to evaluate analysis accuracy and effect of a bundle of wires close to the target wire in element tests for indirect effect of lightning on aircraft.

● **Reasons and benefits of using JAXA Supercomputer System**

High-performance computing is necessary, because numerous electromagnetic field analyses need to perform to evaluate multiple parameters such as properties of adjacent wire bundle and target wire.

● **Achievements of the Year**

Electromagnetic field analysis of specimen model composed of a metal flat plate and one wire (Fig. 1) were conducted, and accuracy of the analysis was evaluated by comparing the test results. The main results from the analyzed induced current waveform (Fig. 3) with the specimen model in case of input lightning current waveform as shown in Fig. 2 are as follows.

(1) The specimen model (Fig. 1) can provide sufficient accuracy as a base model for evaluation of effects of the parameters.

(2) Though individual differences in contact resistance between the wire and an aluminum housing exist, the effect of variation of the contact resistance is small because there is small difference between induced current waveforms with average and individual contact resistances.

This results were obtained from a project, JPNP23012, commissioned by the New Energy and Industrial Technology Development Organization (NEDO).
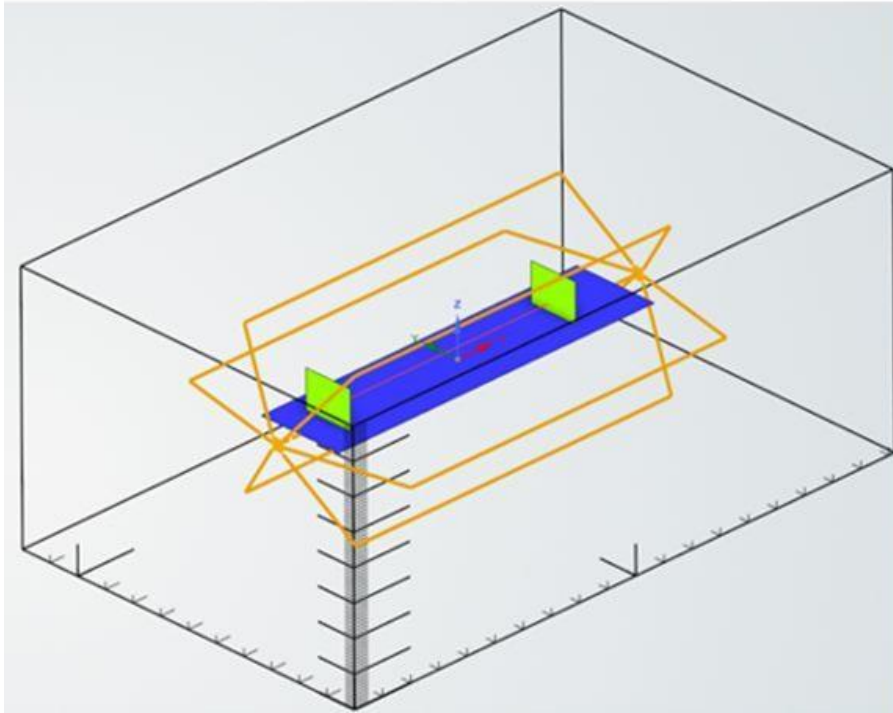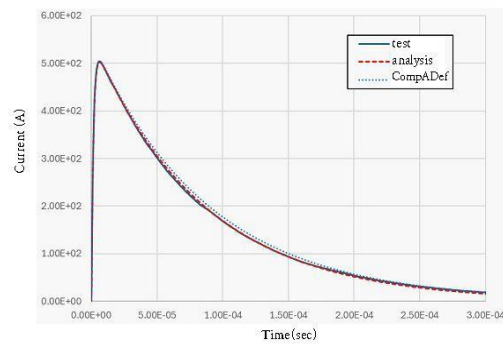
Fig. 1: Electromagnetic field analysis model
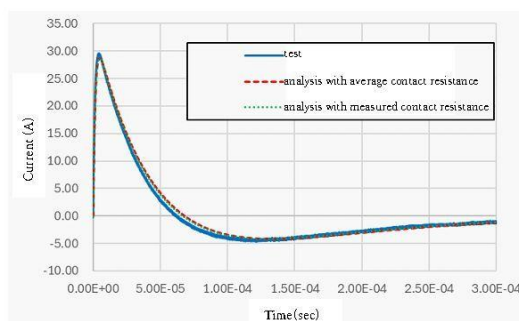

Fig. 2: Lightning current waveform

Fig. 3: Induced current in bundle wire

● **Publications**

N/A

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	N/A
Thread Parallelization Methods	N/A
Number of Processes	1
Elapsed Time per Case	10 Hour(s)

● **JSS3 Resources Used**

Fraction of Usage in Total Resources[*1](%): 0.02

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage[*2](%)
TOKI-SORA	0.00	0.00
TOKI-ST	77.12	0.00
TOKI-GP	0.00	0.00
TOKI-XM	29.75	0.01
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	1,269.00	0.86
/data and /data2	120,384.17	0.58
/ssd	0.00	0.00

Archiver Resources		
Archiver 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.

● **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage[2] (%)
ISV Software Licenses (Total)	0.00	0.00

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