

The EXPEDITE-RCS model is provided in two file formats compatible with many CAD software. Additionally, 7 triangular surface meshes are provided in two file formats. Each model and mesh file is that of the full-scale ($L \approx 49.4$ ft, the largest size in the problem set).

Model Files: IGES and STL Formats

IGES or IGS file is a standard text-based graphics file based on the Initial Graphics Exchange Specification (IGES). The EXPEDITE-RCS model in IGS format is contained in the file “EXPEDITE-RCS_model_s7.igs”.

STL is a commonly used file format for additive manufacturing. The EXPEDITE-RCS model in STL format is contained in the file “EXPEDITE-RCS_model_s7.STL”. This file was used to additively manufacture the scale models measured in [1].

Mesh Files: Nomenclature and Some Properties

The 7 surface meshes are organized from the coarsest to finest mesh according to the below table. The coarsest mesh has $\sim 2 \times 10^3$ and the finest mesh has $\sim 5 \times 10^7$ triangular elements. The ratio of the maximum to minimum edge length degrades for coarser meshes (from ~ 5 for the finest to ~ 25 for the coarsest mesh); this is because the coarsest meshes were also required to capture the various geometrical features of the aircraft model, leading to highly non-uniform meshes.

Edge Length	Mesh A	Mesh B	Mesh C	Mesh D	Mesh E	Mesh F	Mesh G
Average (m)	1.55×10^{-1}	8.55×10^{-2}	5.26×10^{-2}	2.4×10^{-2}	1.2×10^{-2}	6.0×10^{-3}	3.4×10^{-3}
Average (in)	6.4	3.6	1.8	0.96	0.46	0.24	0.12
Maximum (m)	3.02×10^{-1}	1.45×10^{-1}	8.6×10^{-2}	3.4×10^{-2}	1.7×10^{-2}	9.2×10^{-3}	5.6×10^{-3}
Maximum (in)	11.8	5.6	2.6	1.4	0.66	0.36	0.20
Minimum (m)	1.68×10^{-2}	4.85×10^{-3}	2.4×10^{-3}	6.5×10^{-3}	3.1×10^{-3}	1.8×10^{-3}	9.0×10^{-4}
Minimum (in)	0.46	0.45	0.39	0.27	0.12	0.07	0.04

* While two different units are used at this table, all the data in the model and mesh files are in SI units.

Mesh Files: INP and UNV Formats

The triangular surface meshes are provided in Universal File (UNV) and INP file formats.

The INP first line contains the number of nodes, $Nnodes$, and triangles, $Ntris$, in the mesh. The next $Nnodes$ lines contain the x,y,z coordinates for each line. The final $Ntris$ lines of the file contain the connectivity information for each triangular element.

Uncompressing Files

Due to Github’s intrinsic file size limit, all model and mesh files are zipped. They can be uncompressed using standard zip programs.

The finest mesh files “EXPEDITE-RCS_model_meshF” and “EXPEDITE-RCS_model_meshG” were split into several files and separately zipped. After uncompressing, the files should be concatenated into a single file; e.g., the following linux command will concatenate the files:

```
cat EXPEDITE-RCS_model_meshF.inp0* > EXPEDITE-RCS_model_meshF.inp
cat EXPEDITE-RCS_model_meshF.unv0* > EXPEDITE-RCS_model_meshF.unv
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References

- [1] J. T. Kelley, A. Maicke, D. A. Chamulak, C. C. Courtney, and A. E. Yilmaz, “Adding a reproducible airplane model to the Austin RCS Benchmark Suite,” in *Proc. Applied Comp. Electromagnetics Society (ACES) Symp.*, July 2020.