



WB Hexa grids - DPW6

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WB grids

We have provided 13 full structured grids for the following WB configurations:

- 1) 2.75 deg, Tiny – 19,996,936 volume cells
- 2) 2.75 deg, Coarse – 30,194,662 volume cells
- 3) 2.75 deg, Medium – 44,930,430 volume cells
- 4) 2.75 deg, Fine – 69,627,572 volume cells
- 5) 2.75 deg, Extra Fine – 100,431,432 volume cells
- 6) 2.75 deg, Ultra Fine – 150,163,366 volume cells
- 7) 0.00 deg, Medium – 44,930,430 volume cells
- 8) 2.50 deg, Medium – 44,930,430 volume cells
- 9) 3.00 deg, Medium – 44,930,430 volume cells
- 10) 3.25 deg, Medium – 44,930,430 volume cells
- 11) 3.50 deg, Medium – 44,930,430 volume cells
- 12) 3.75 deg, Medium – 44,930,430 volume cells
- 13) 4.00 deg, Medium – 44,930,430 volume cells

The GMA – Automatic Mesh Generator

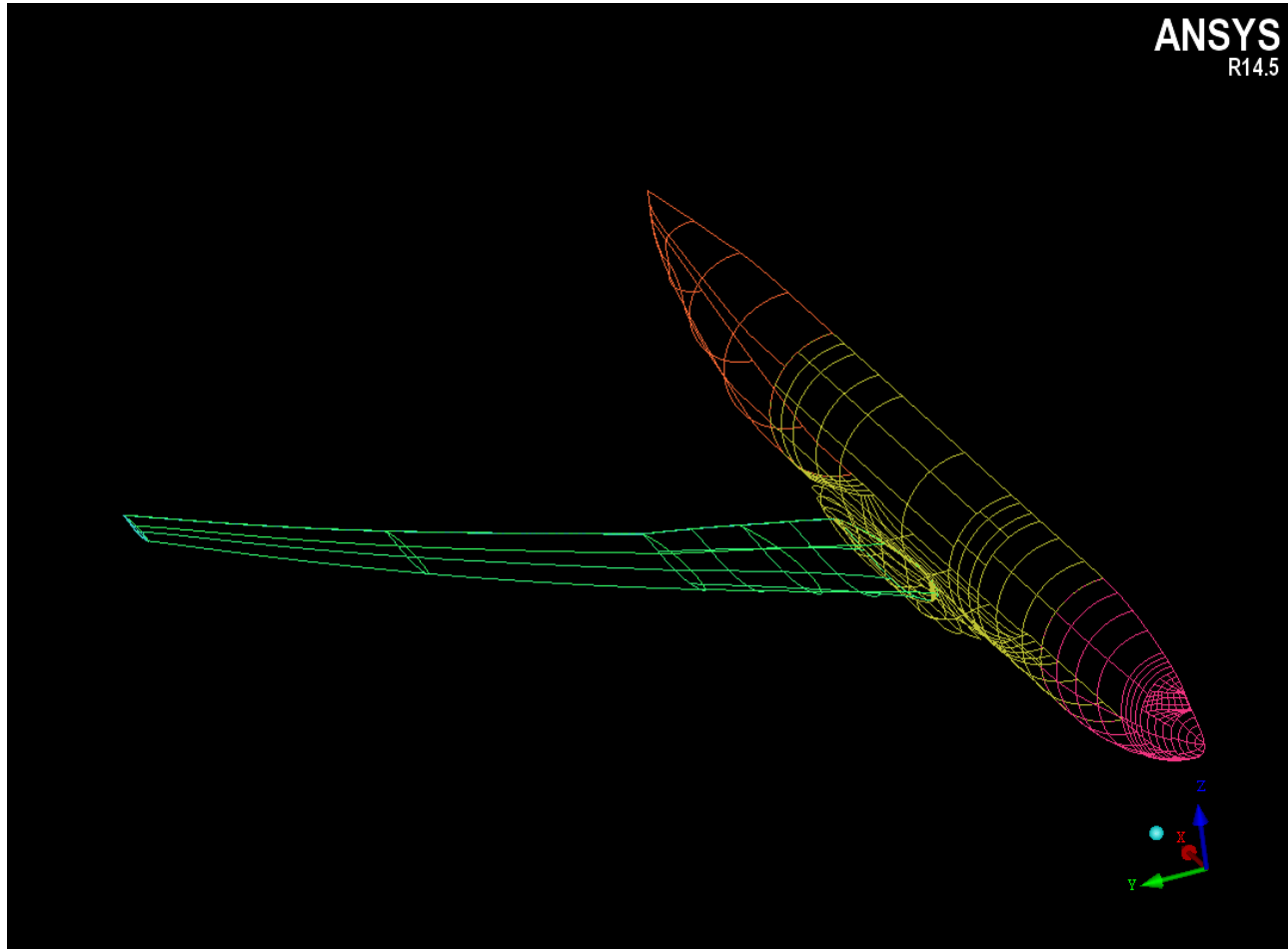
The grids are all generated by a program (GMA) that reads the geometry, reads the input grid parameters, and outputs the grids.

This yields fast mesh generation, high quality elements, and consistency when comparing runs with different grids and/or geometries.

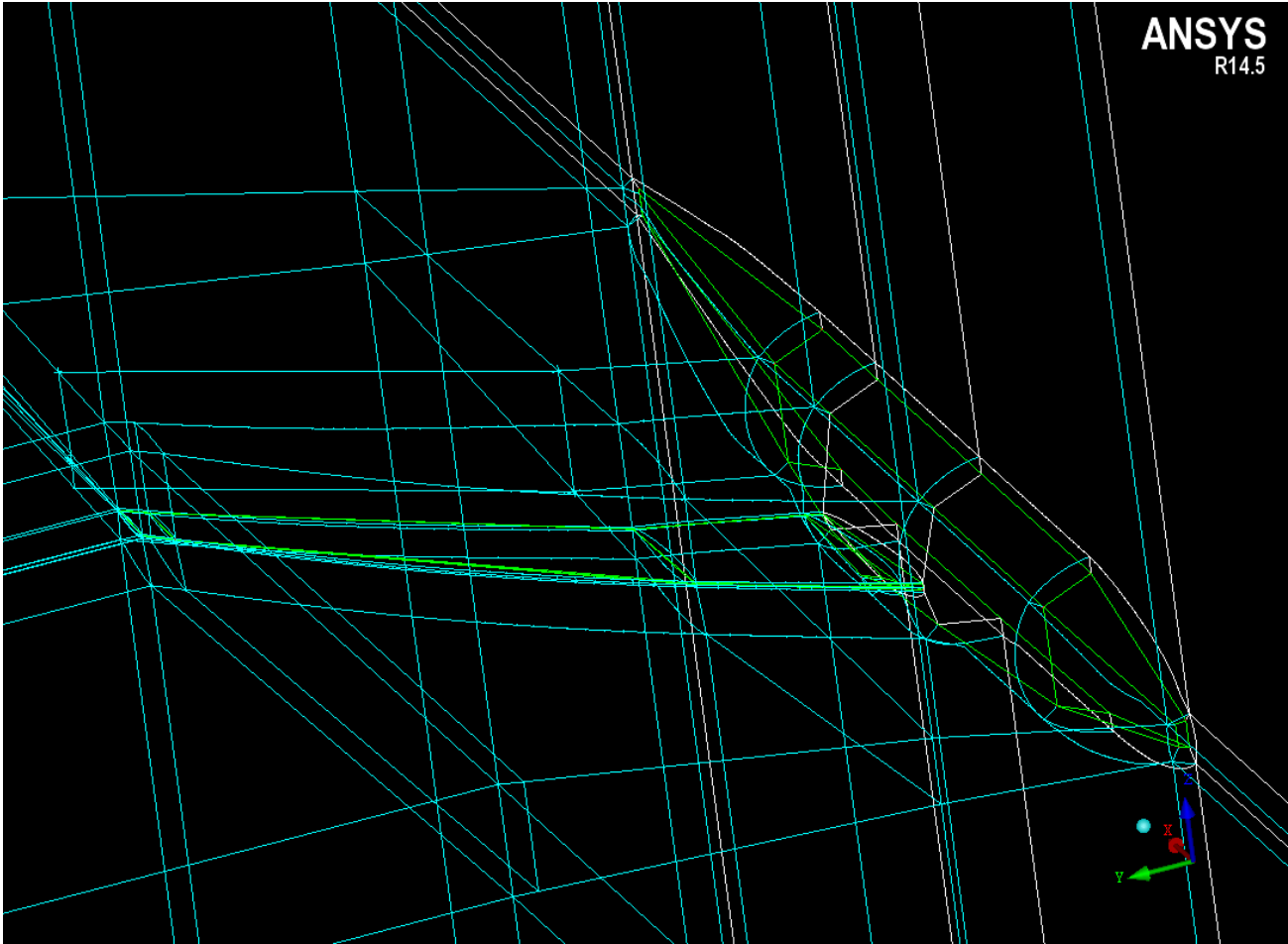
The Grids

The following set of slides help understanding how the grids look like and their main features

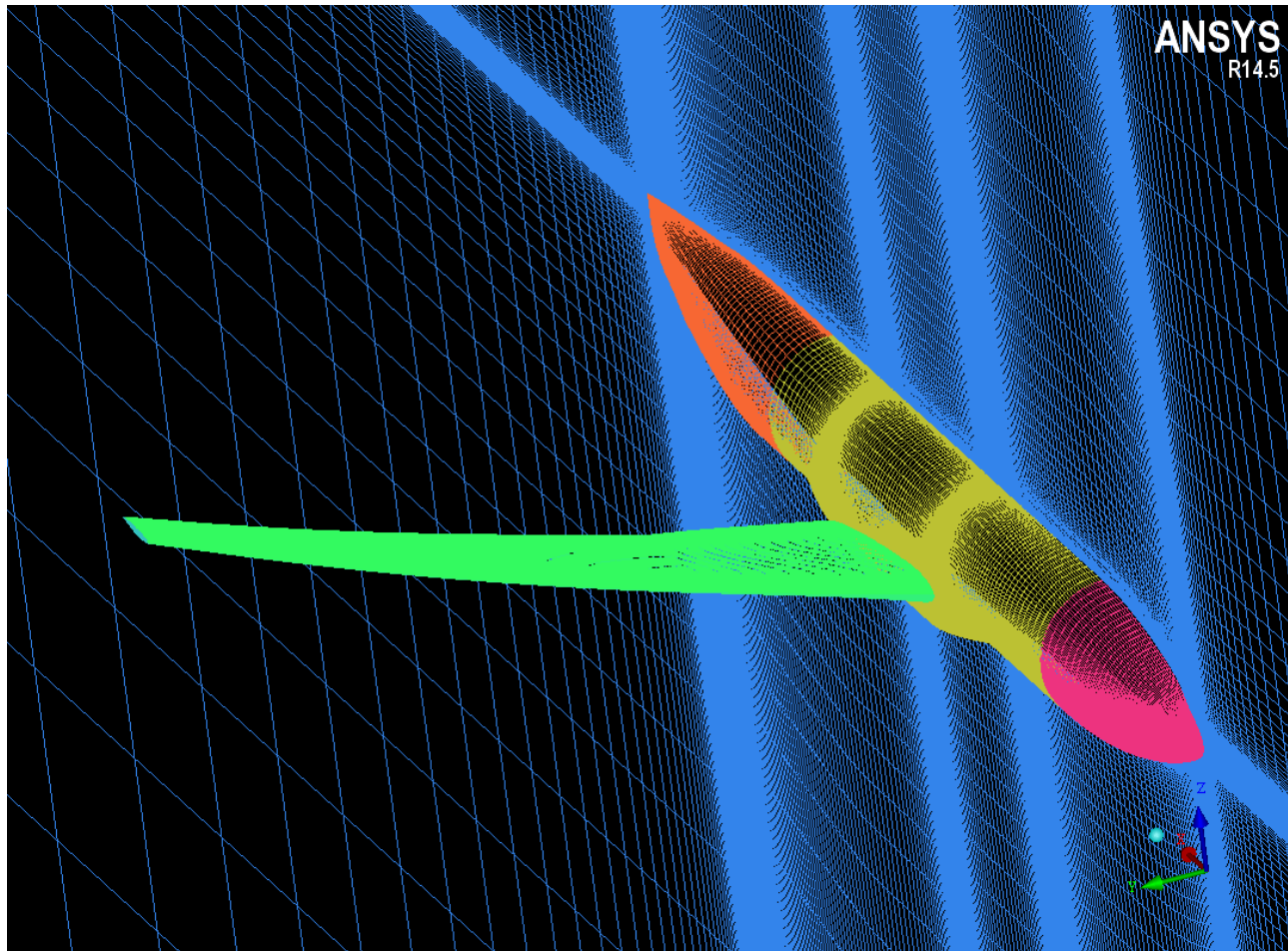
Input Geometry



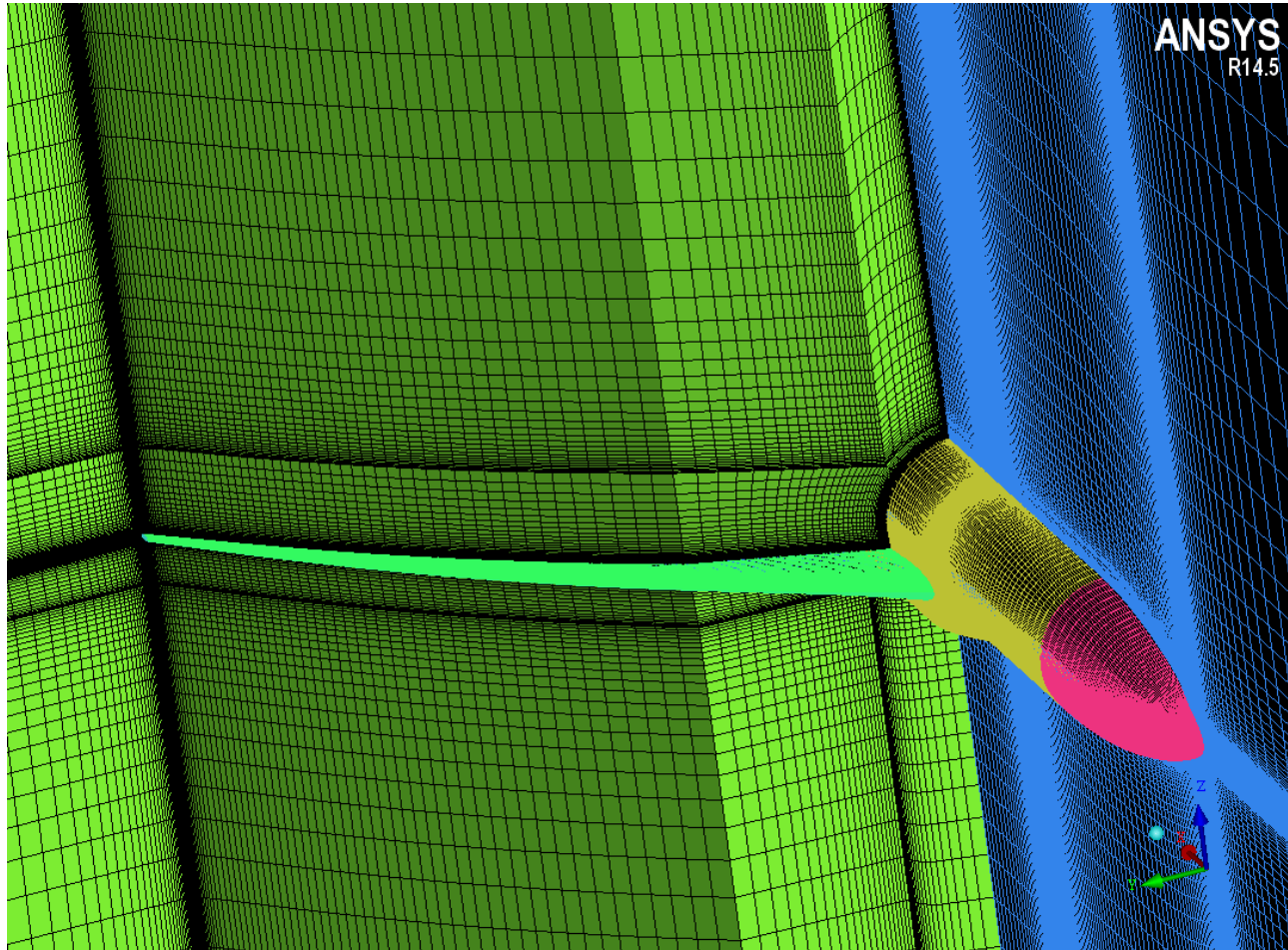
Spatial Block Cutting



Grid Generation



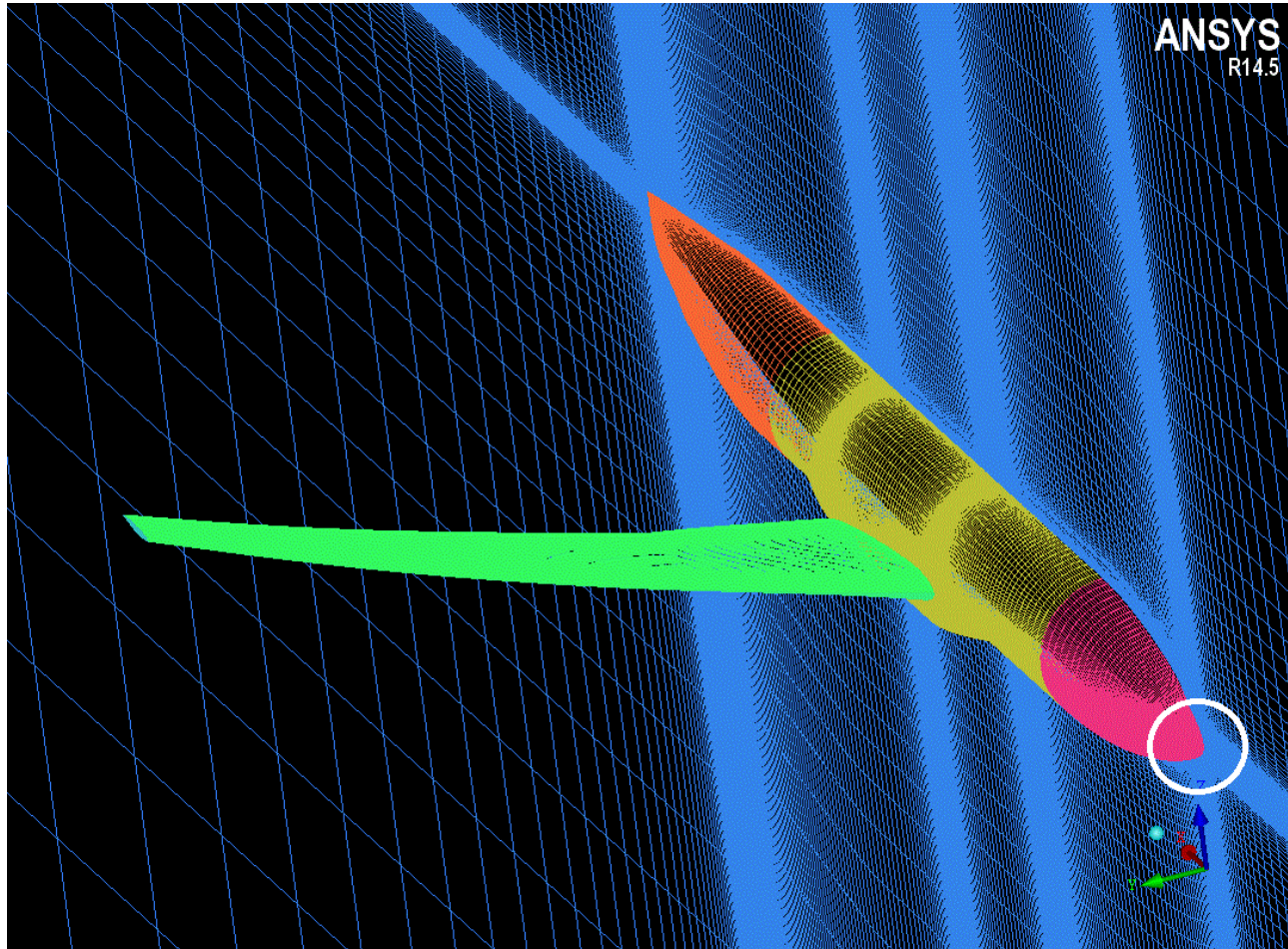
Scan Plane View



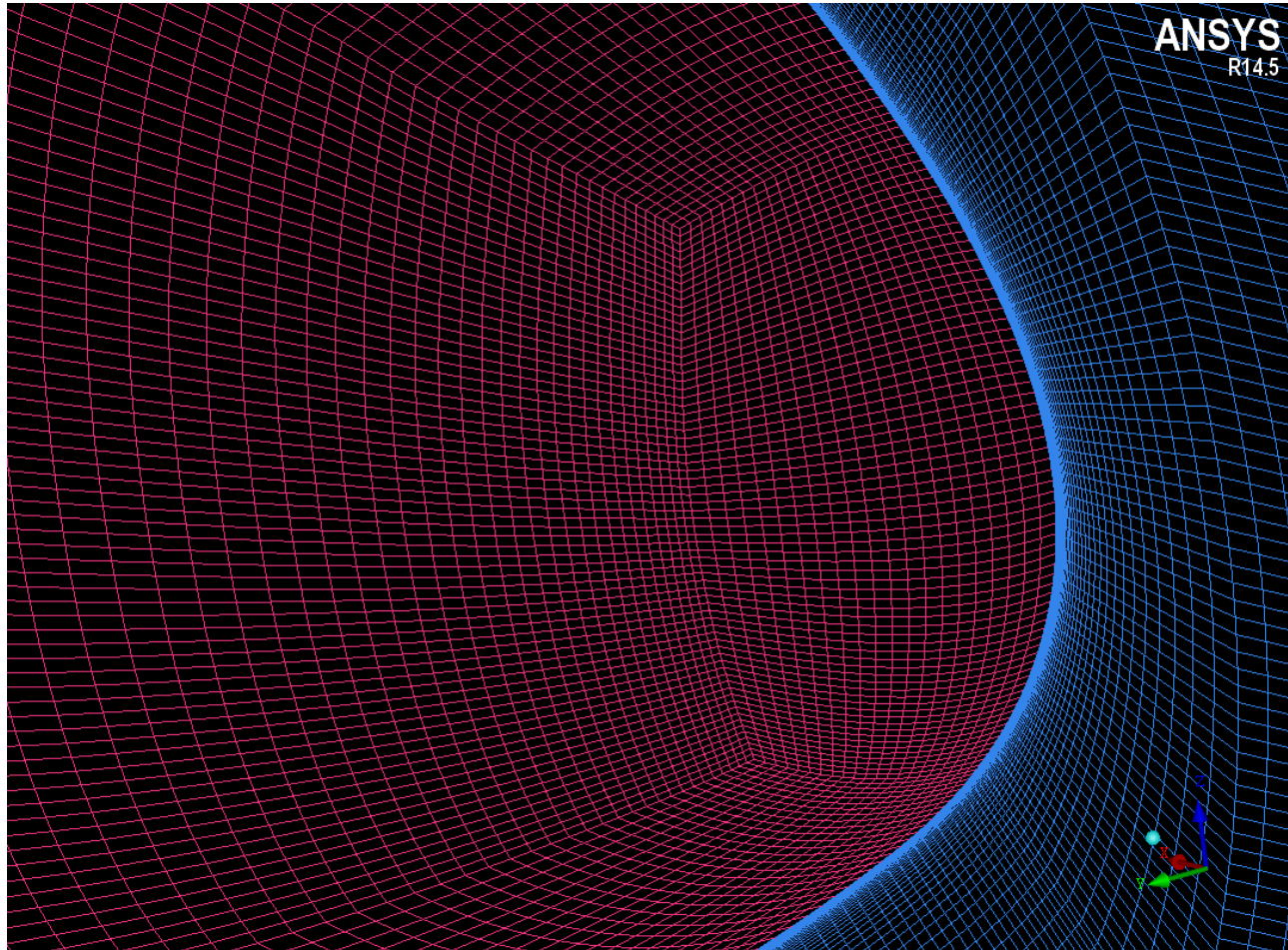
Details of the Grids

The following set of slides show details in relevant regions of the grid.

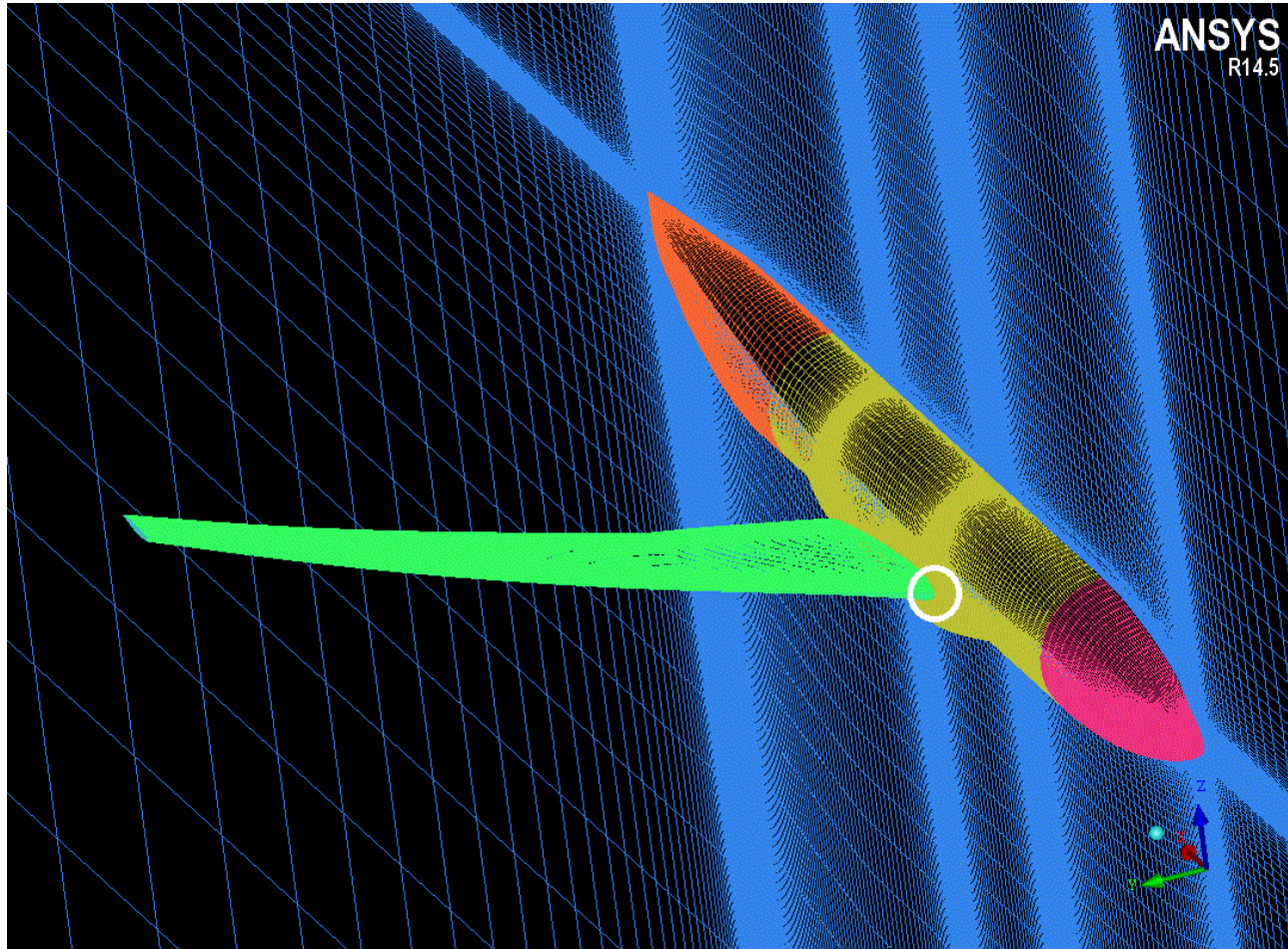
Nose Detail



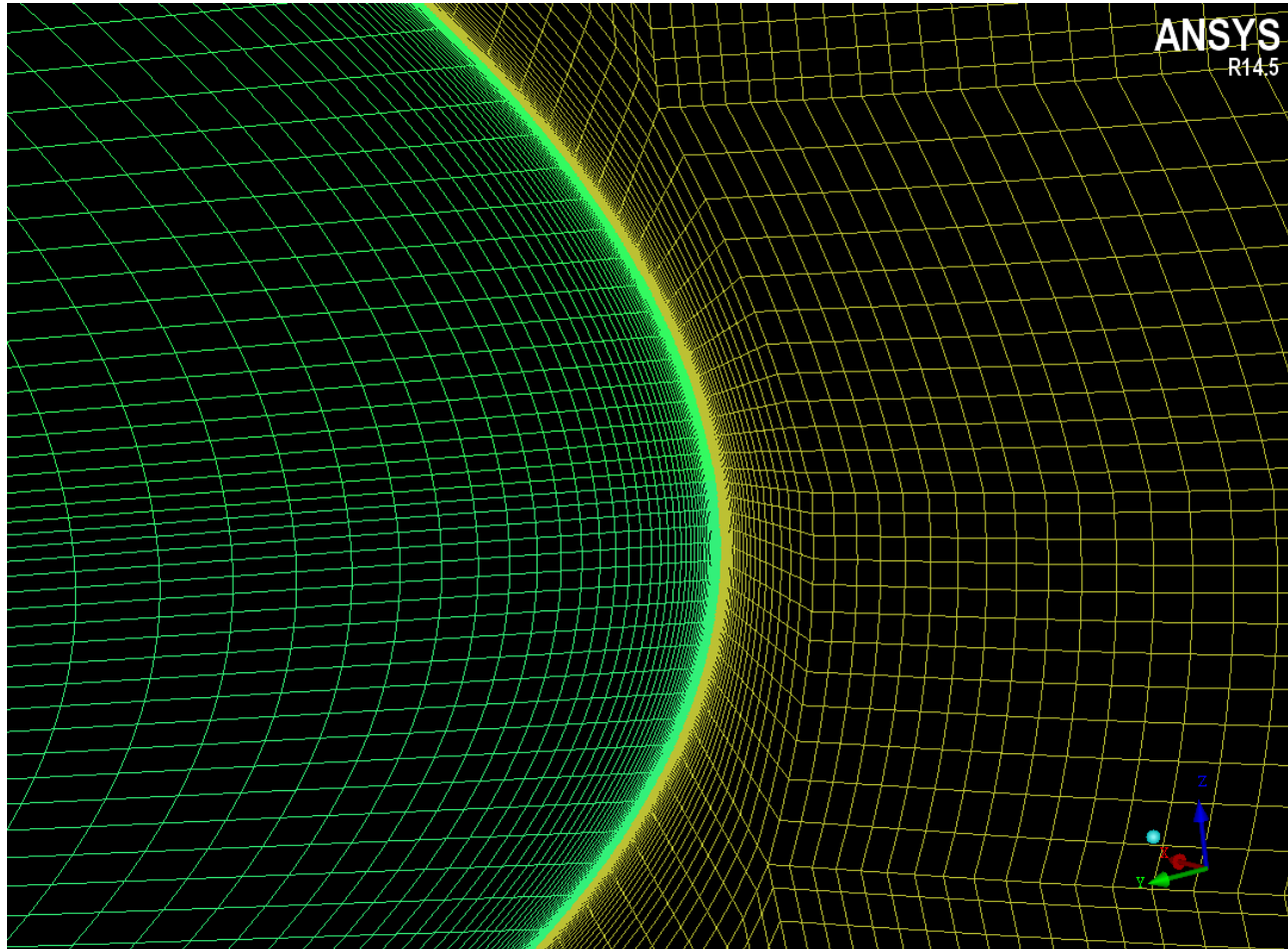
Nose Detail



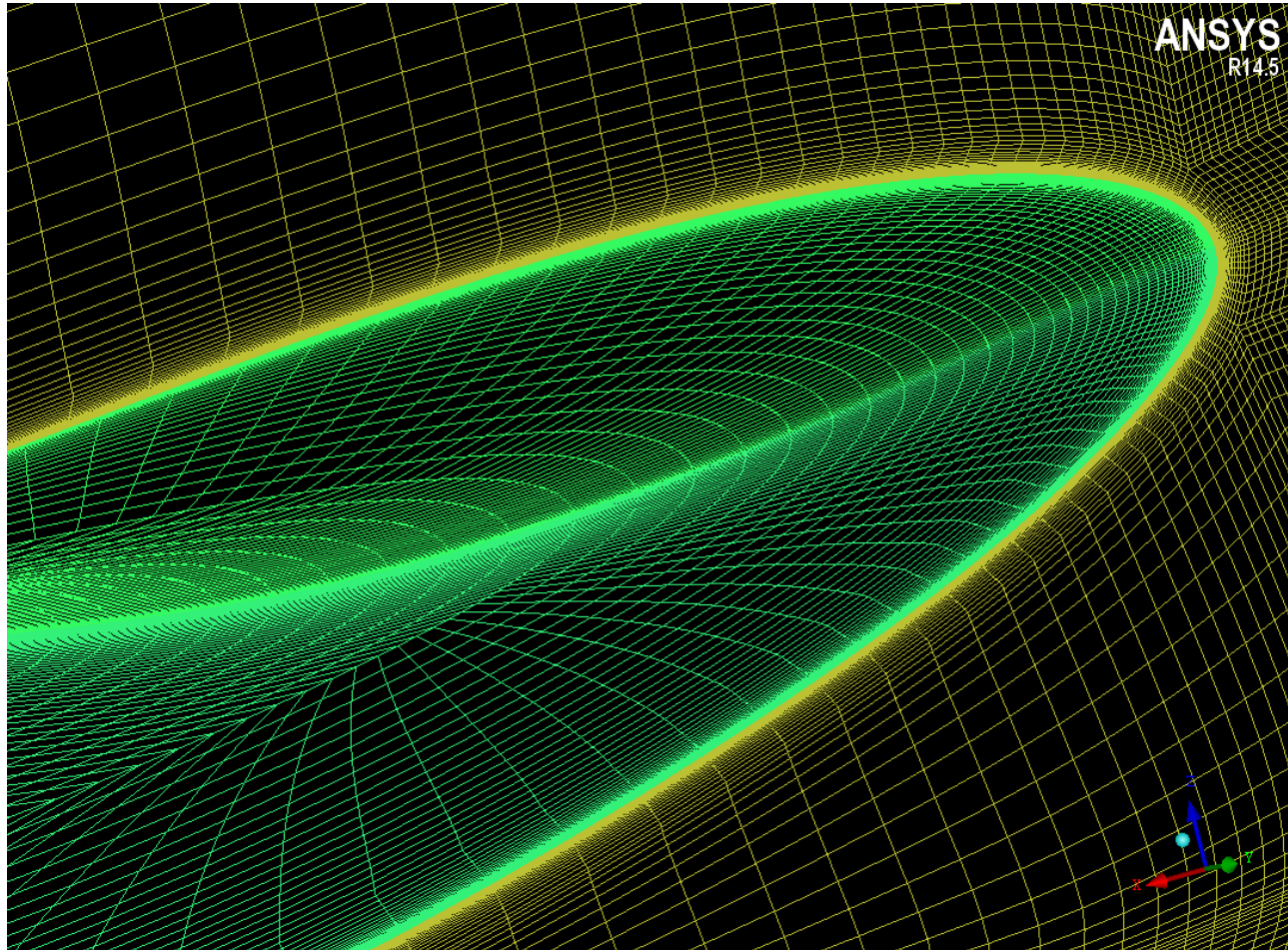
Wing Fairing Intersection (LE)



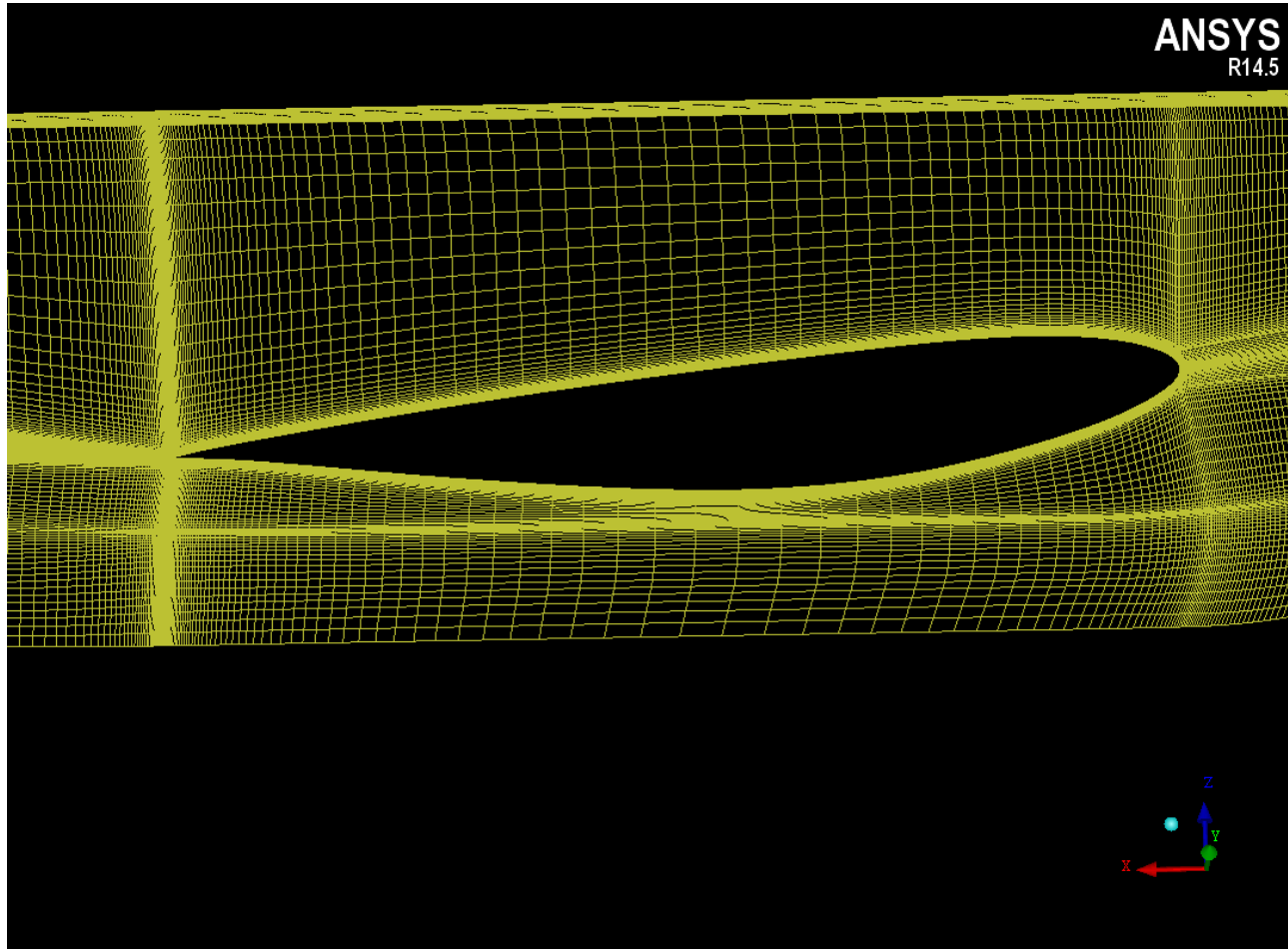
Wing Fairing Intersection (LE)



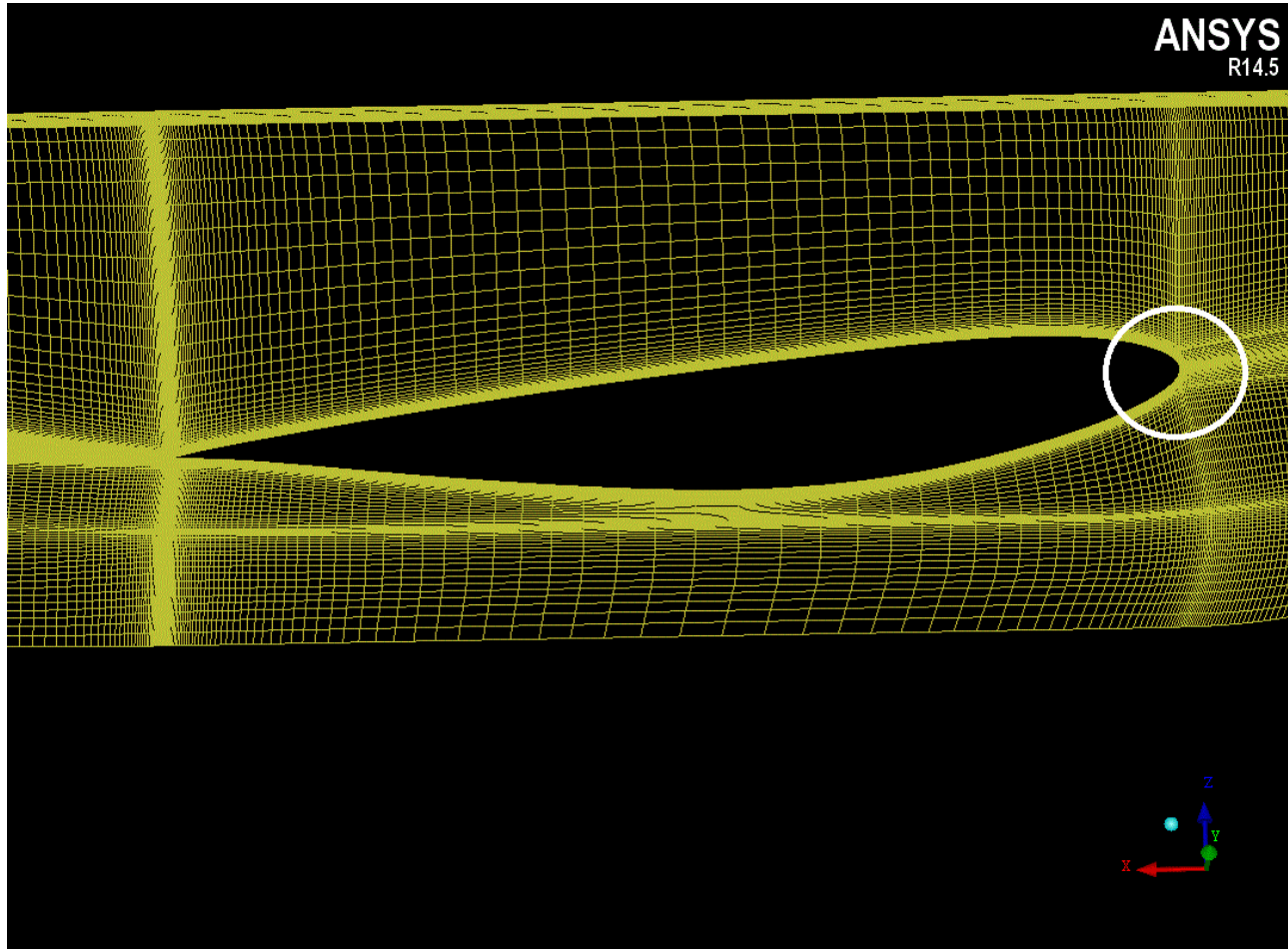
Wing LE Detail



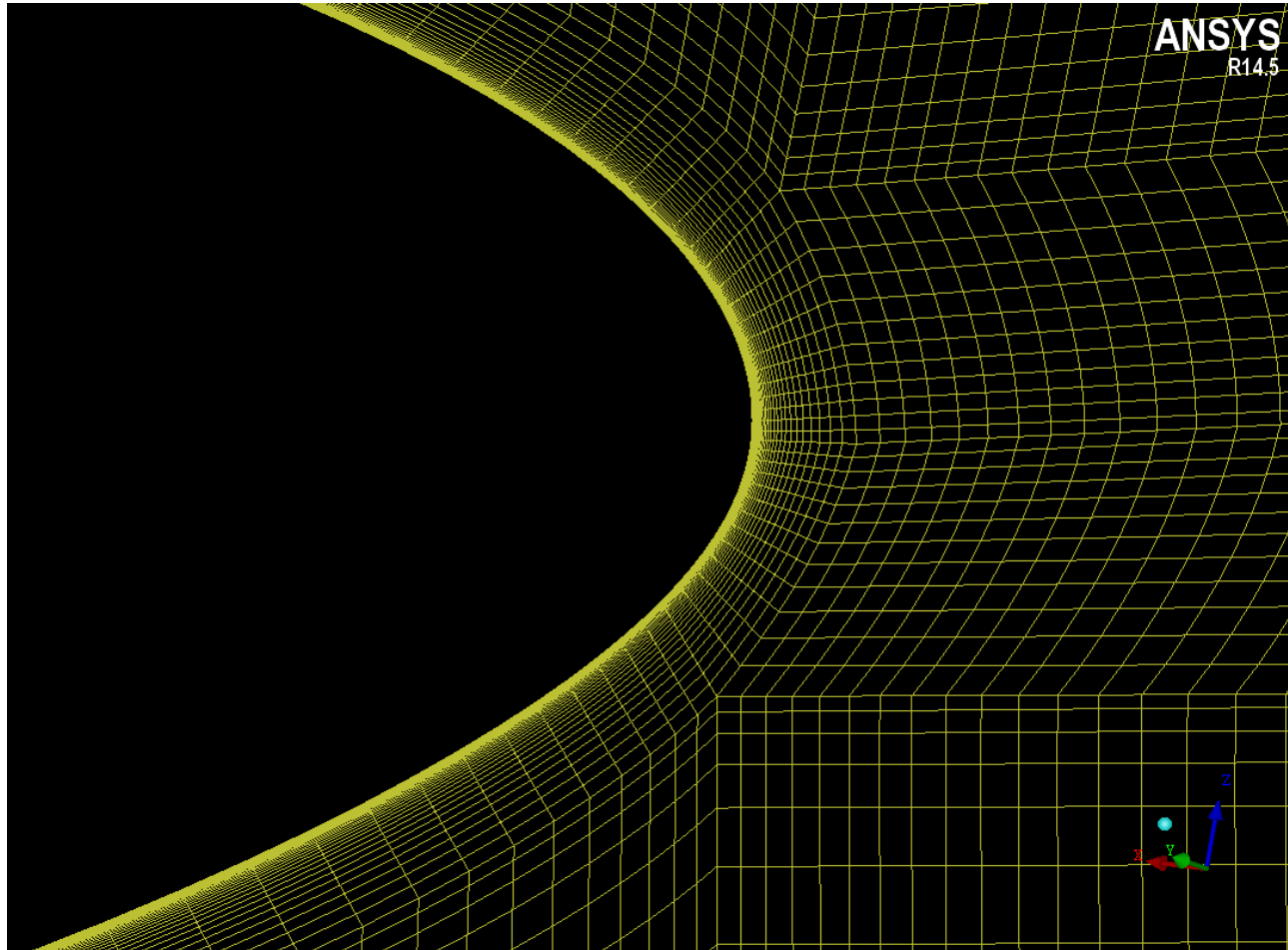
WB Faring



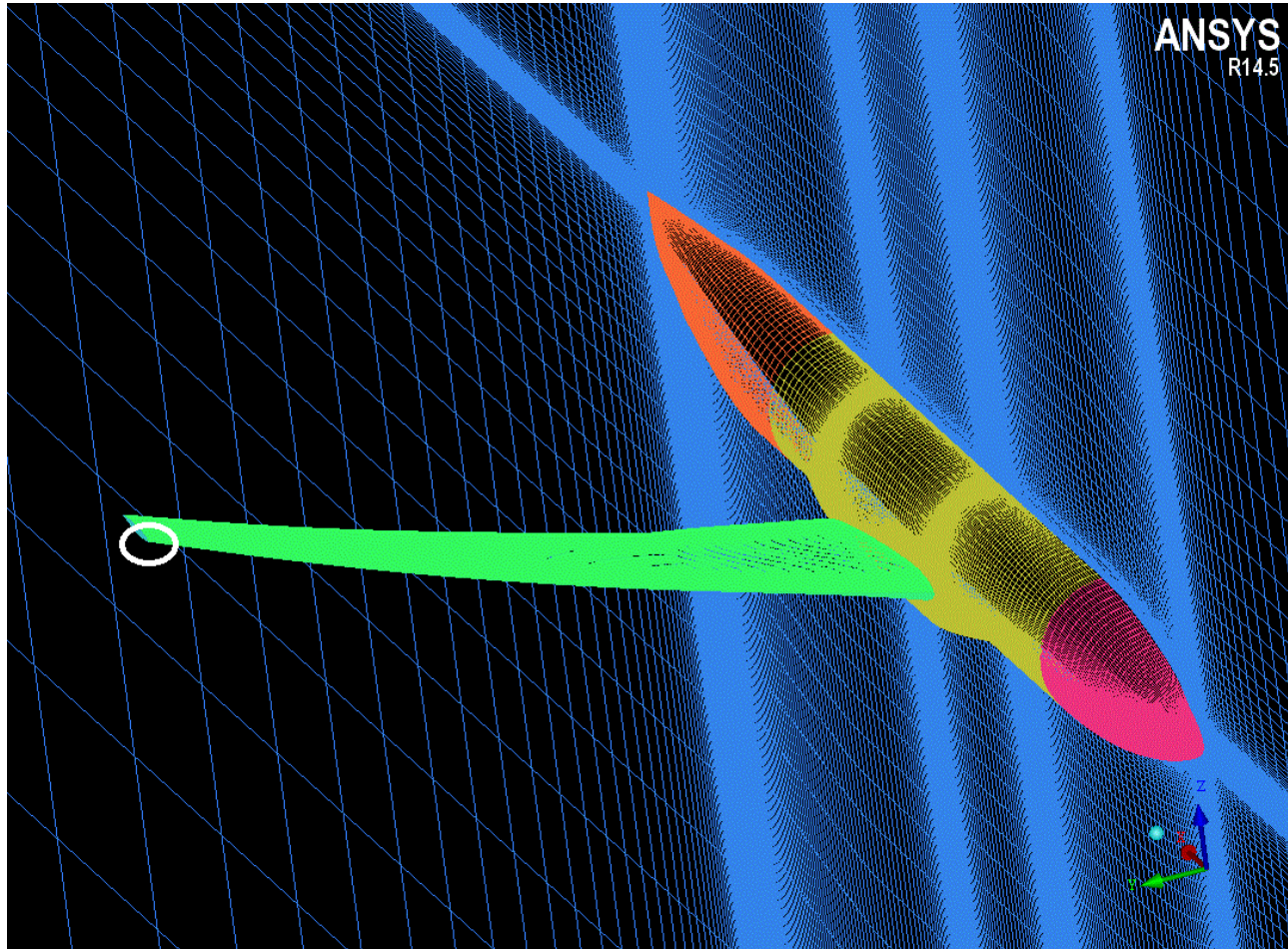
WB Faring



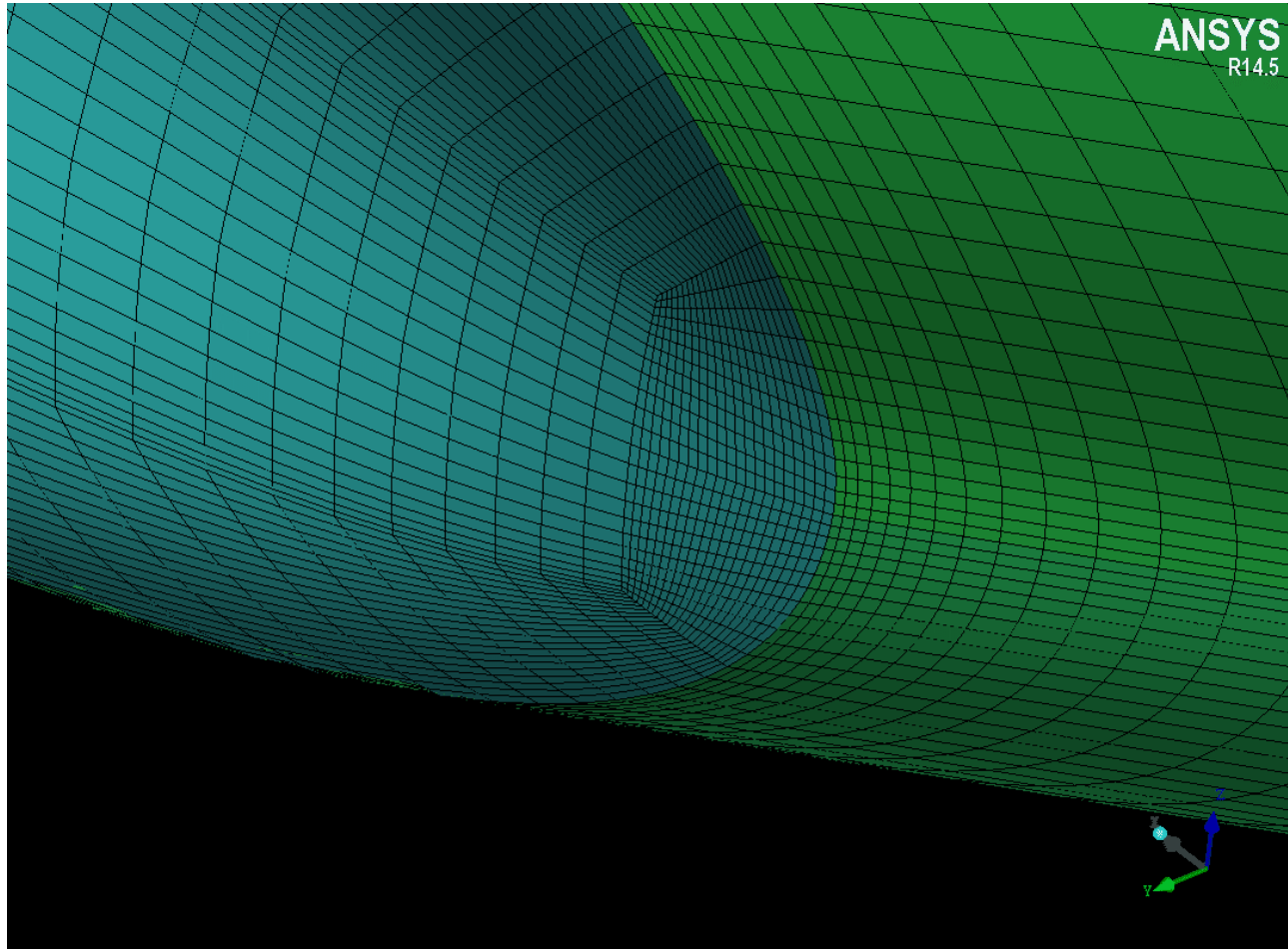
WB Faring



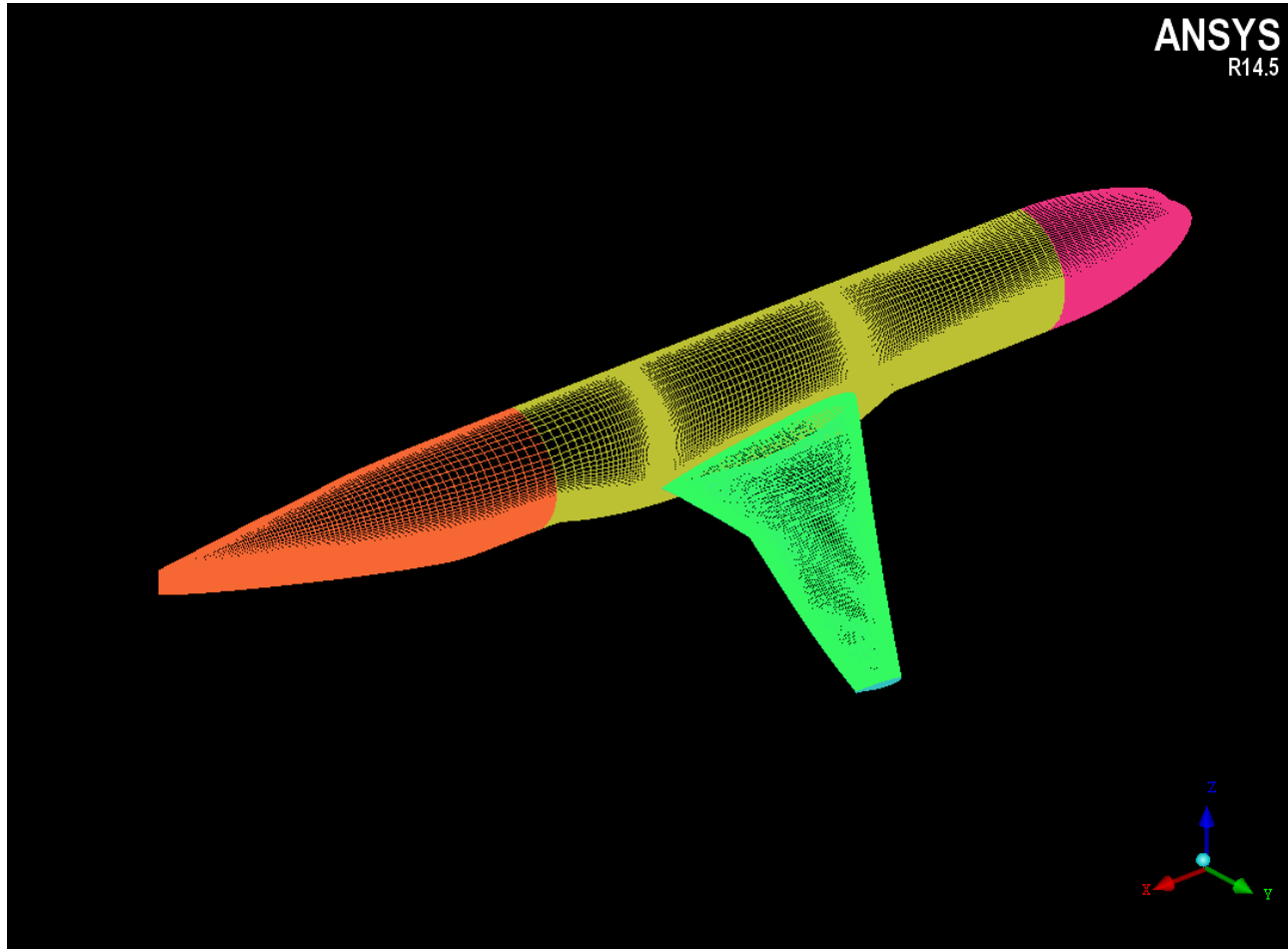
Wing Tip (LE)



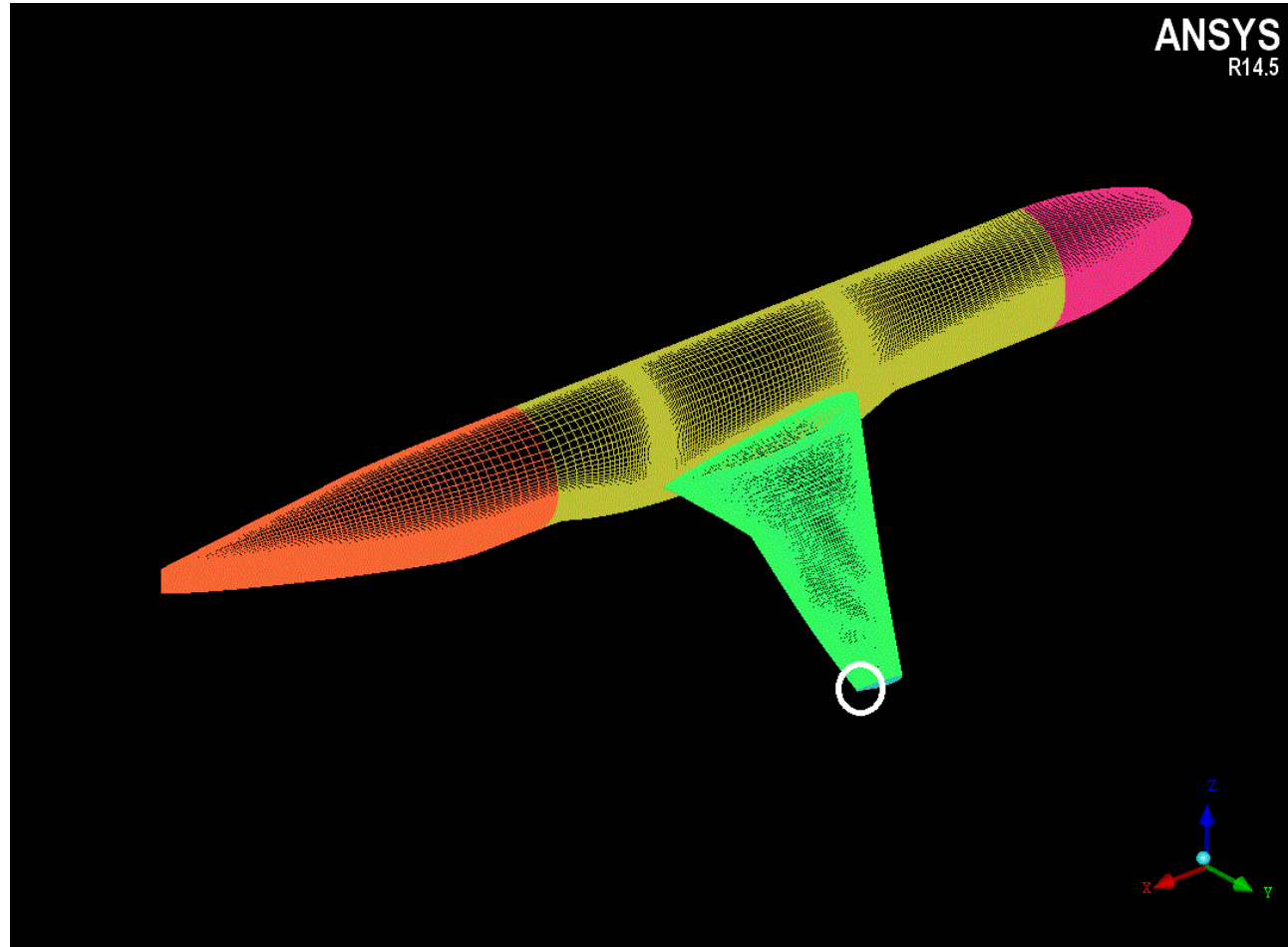
Wing Tip (LE)



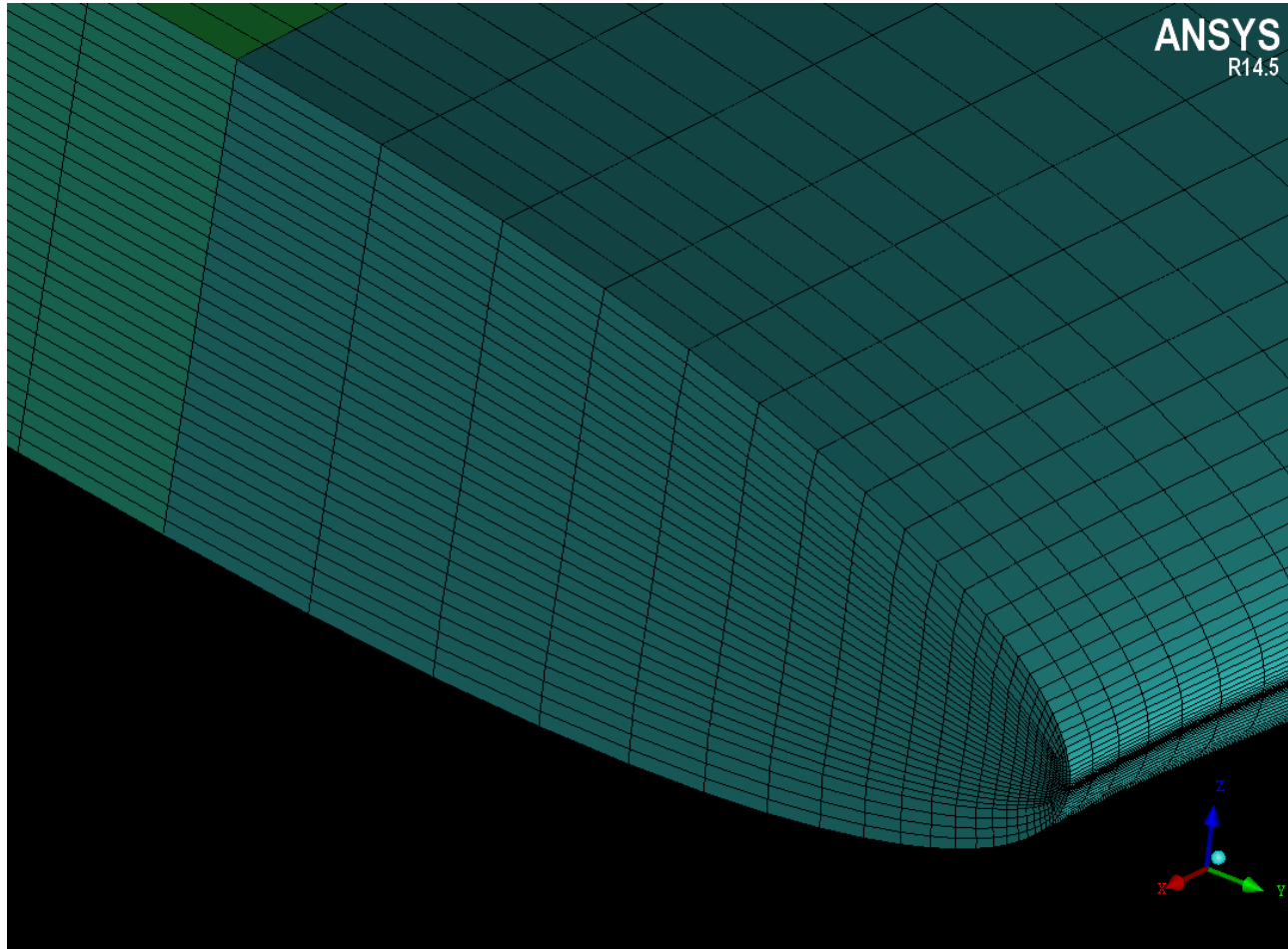
Wing Tip (TE)



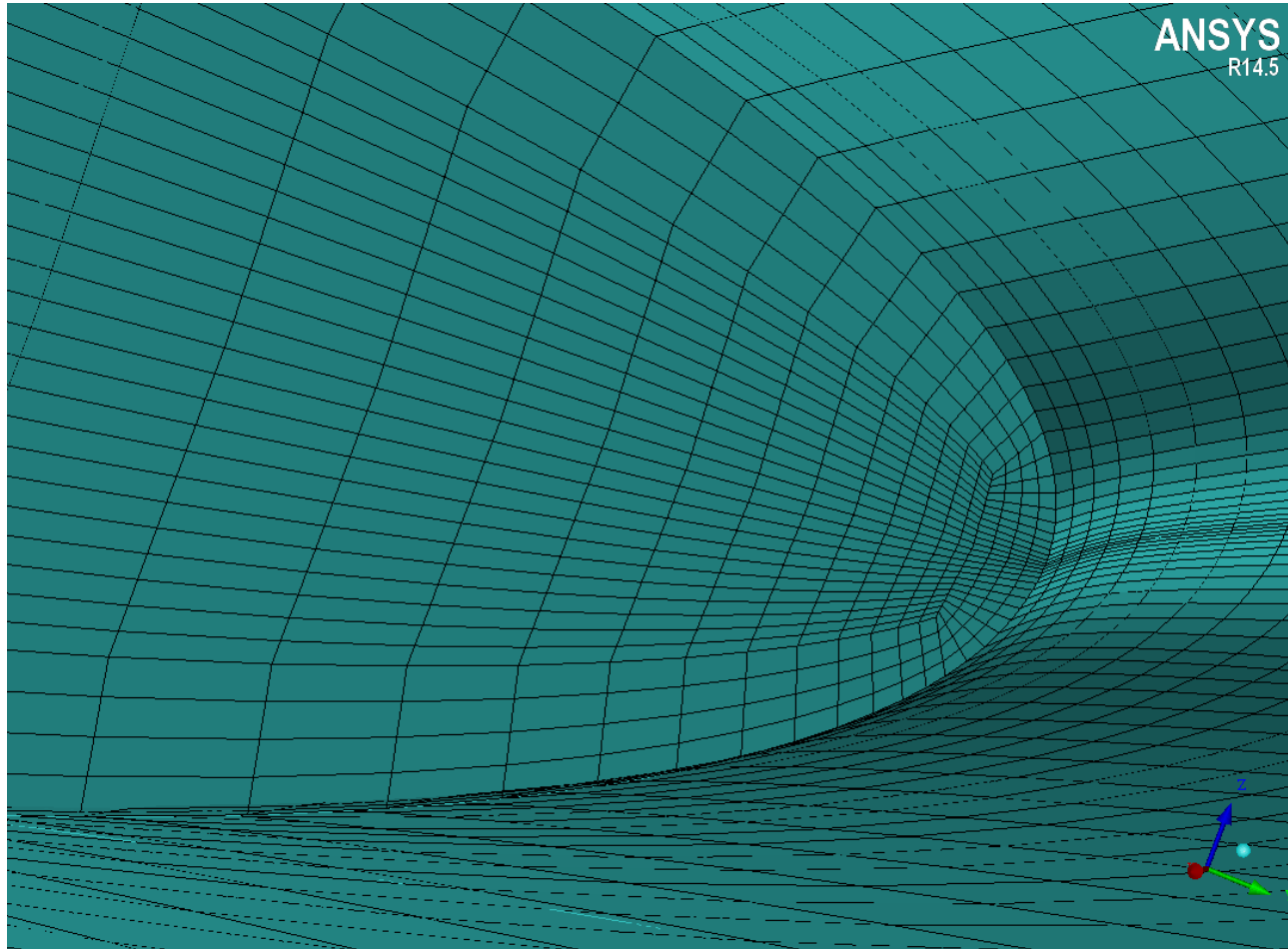
Wing Tip (TE)



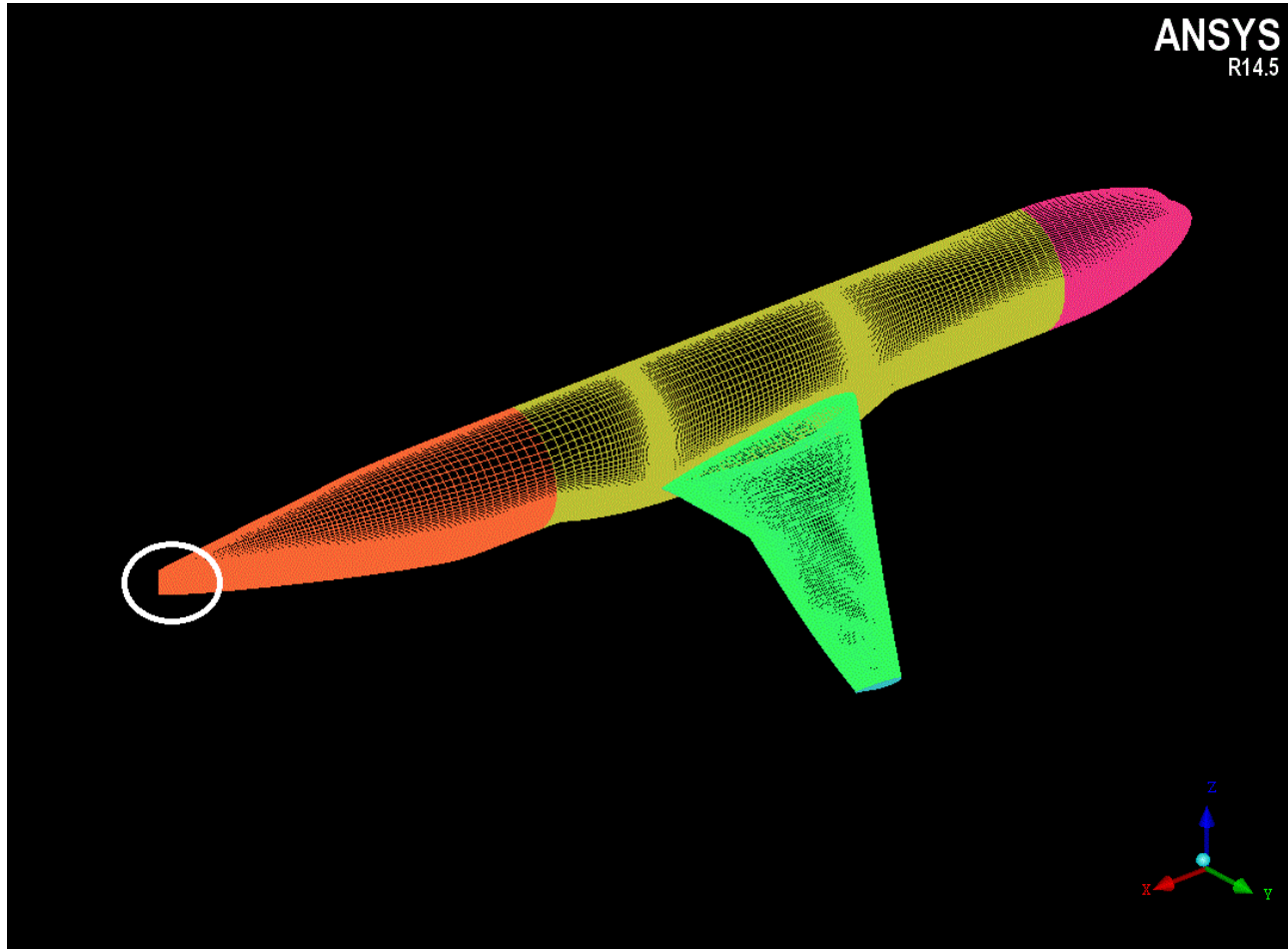
Wing Tip (TE) zoom in 1



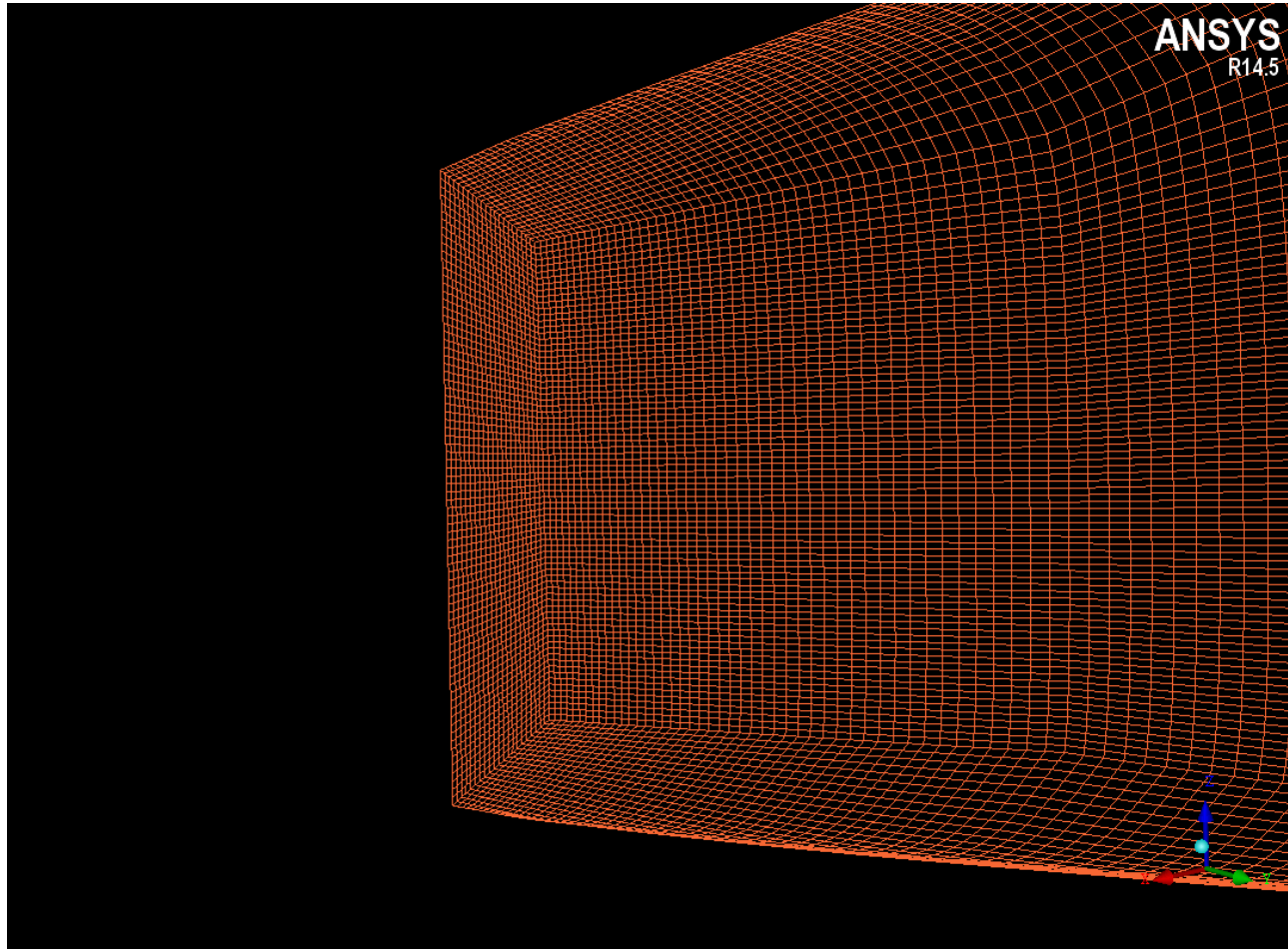
Wing Tip (TE) zoom in 2



Tail Cone



Tail Cone

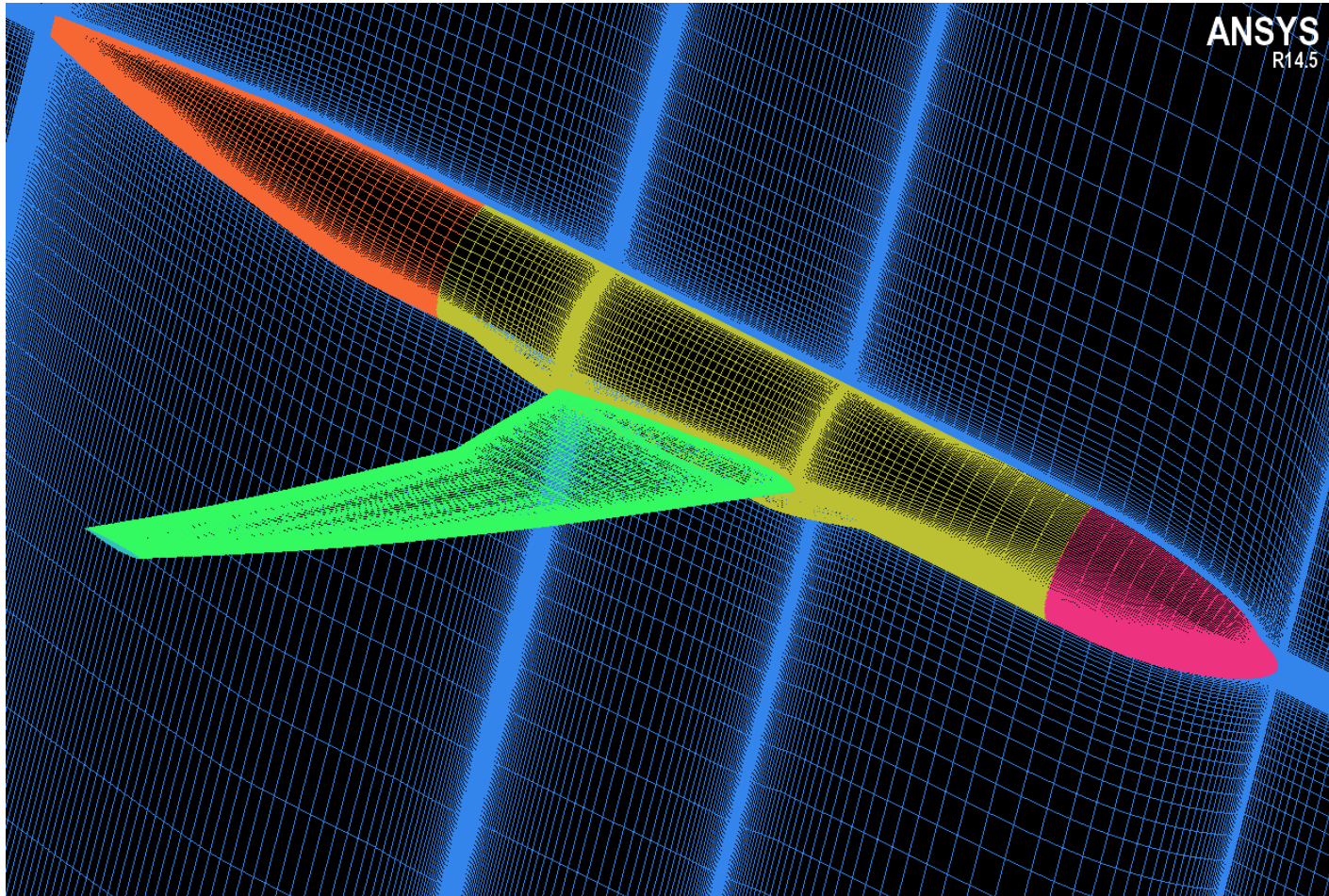


Refinement Study

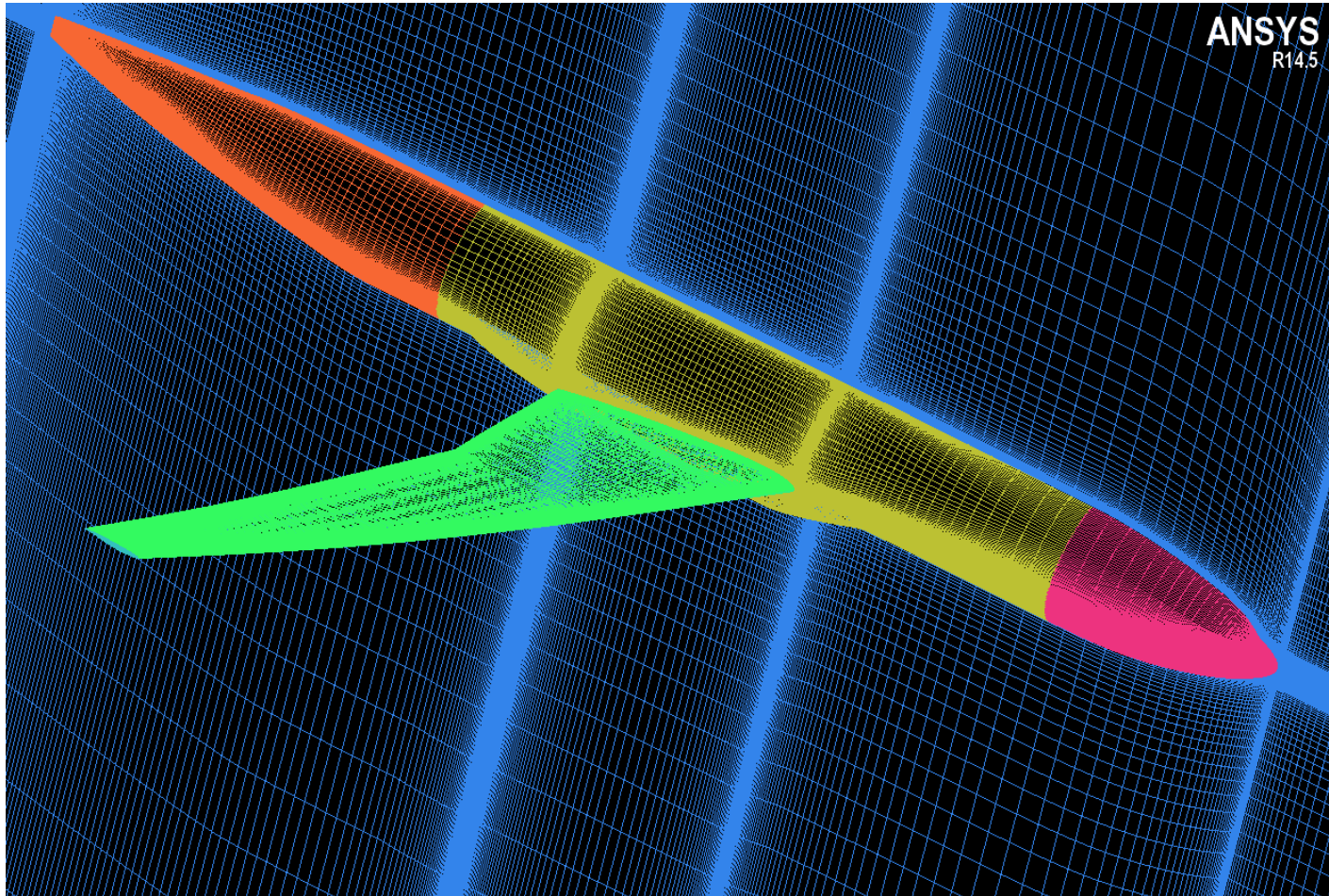
The next slides show the grids for the cases:

- **Tiny** (~20 M)
 - **Coarse** (~30 M)
 - **Medium** (~45 M)
 - **Fine** (~70 M)
 - **Extra Fine** (~100 M)
 - **Ultra Fine** (~150 M)
- **Wing Deflection = 2.75 deg**

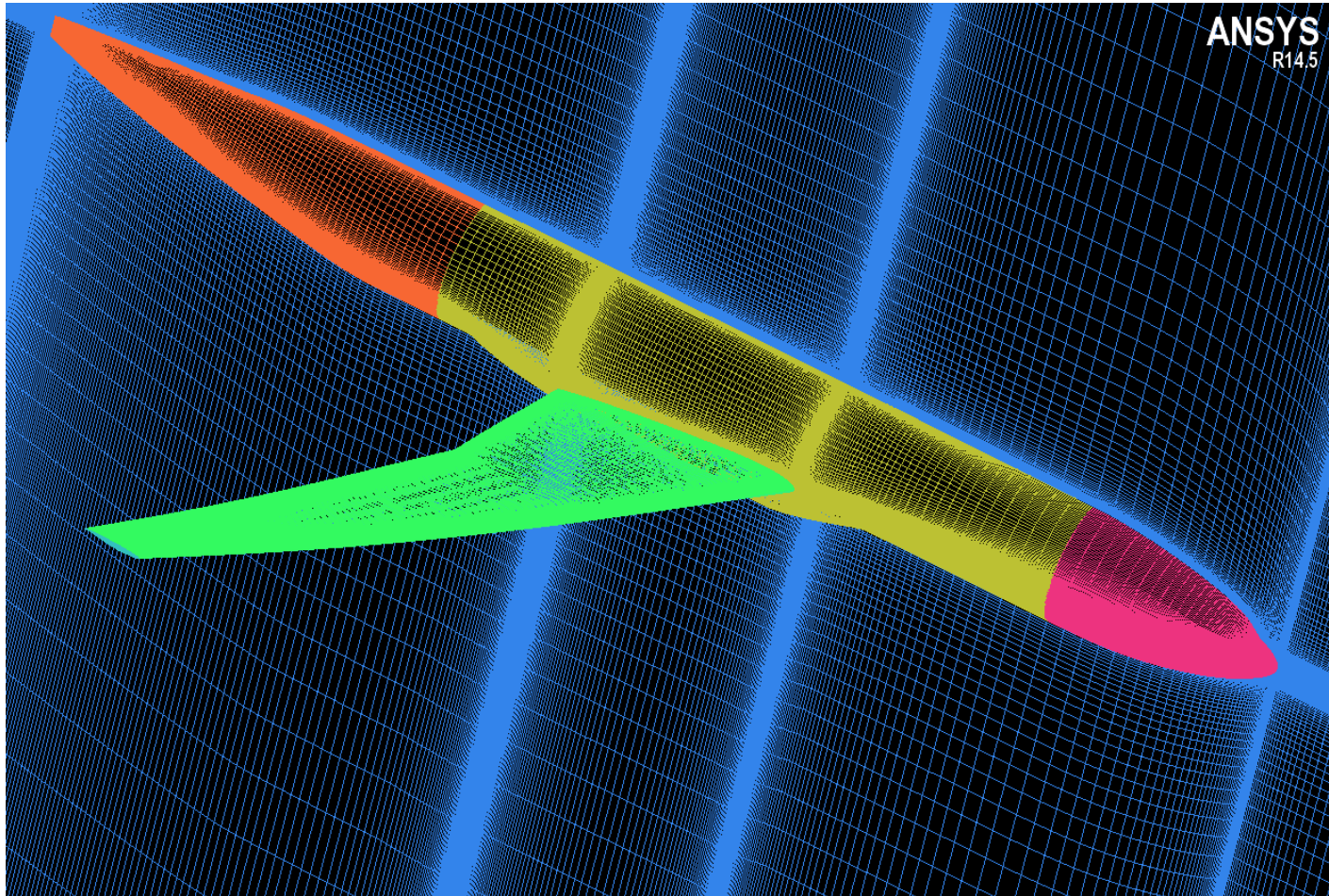
Tiny



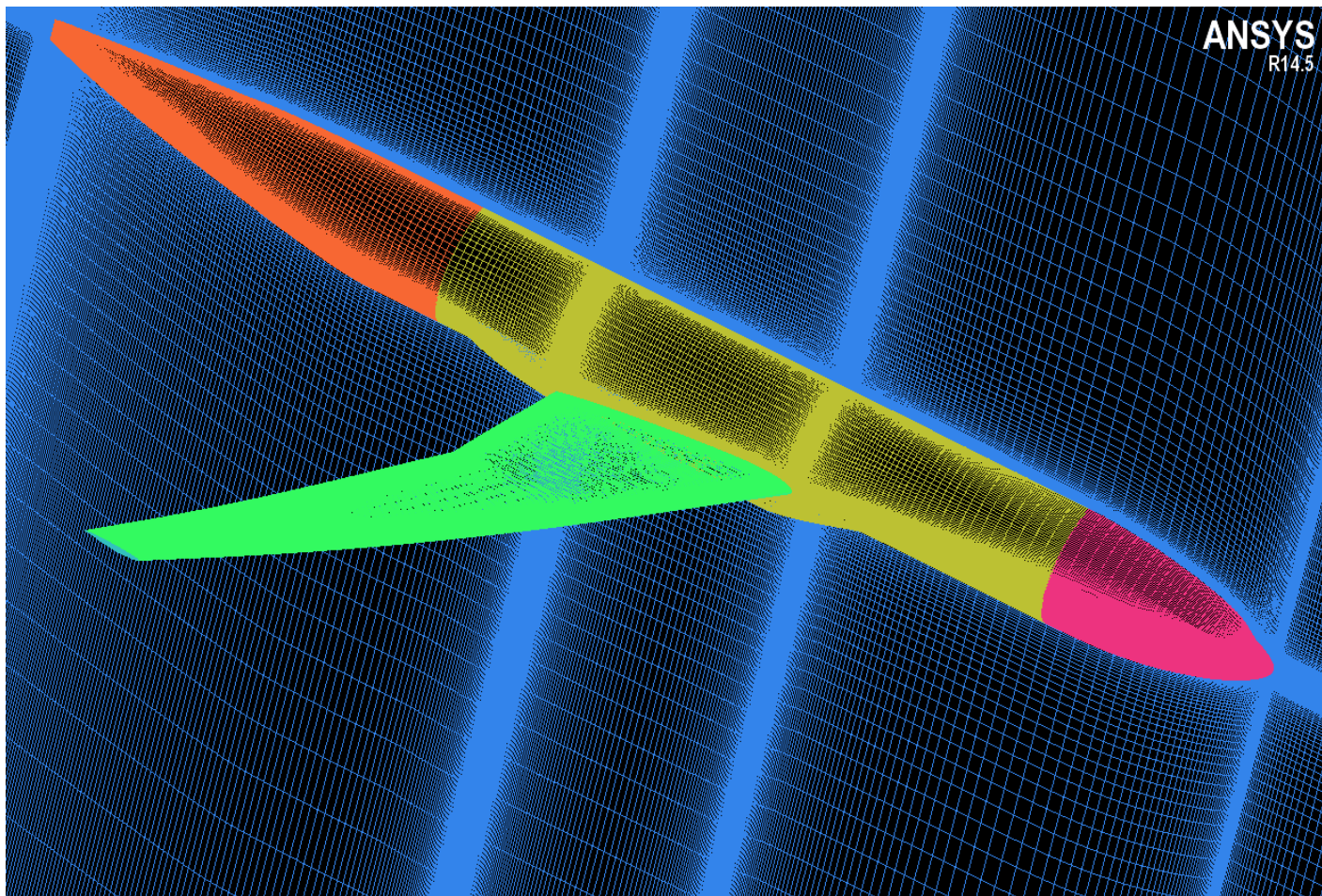
Coarse



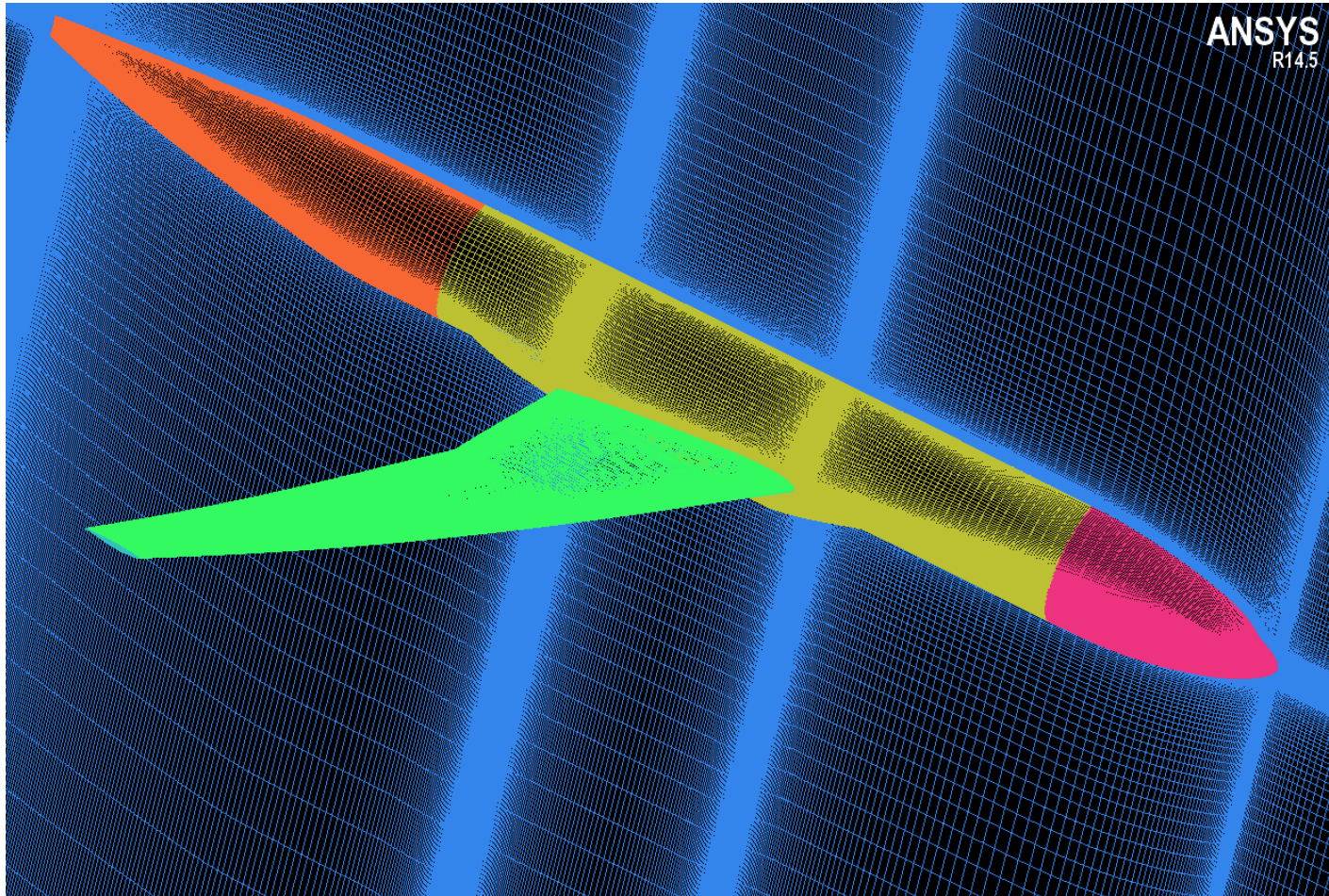
Medium



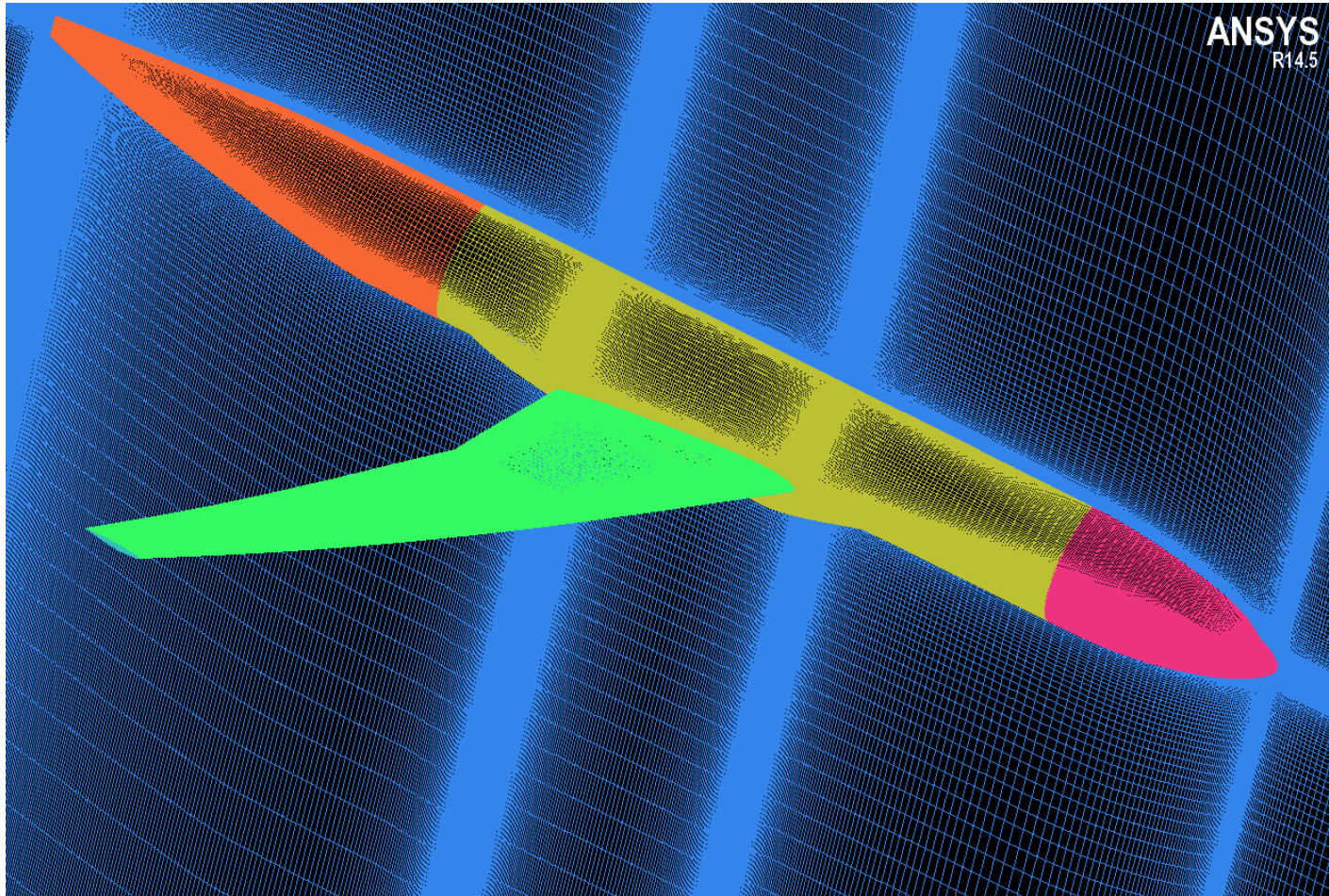
Fine



Extra Fine



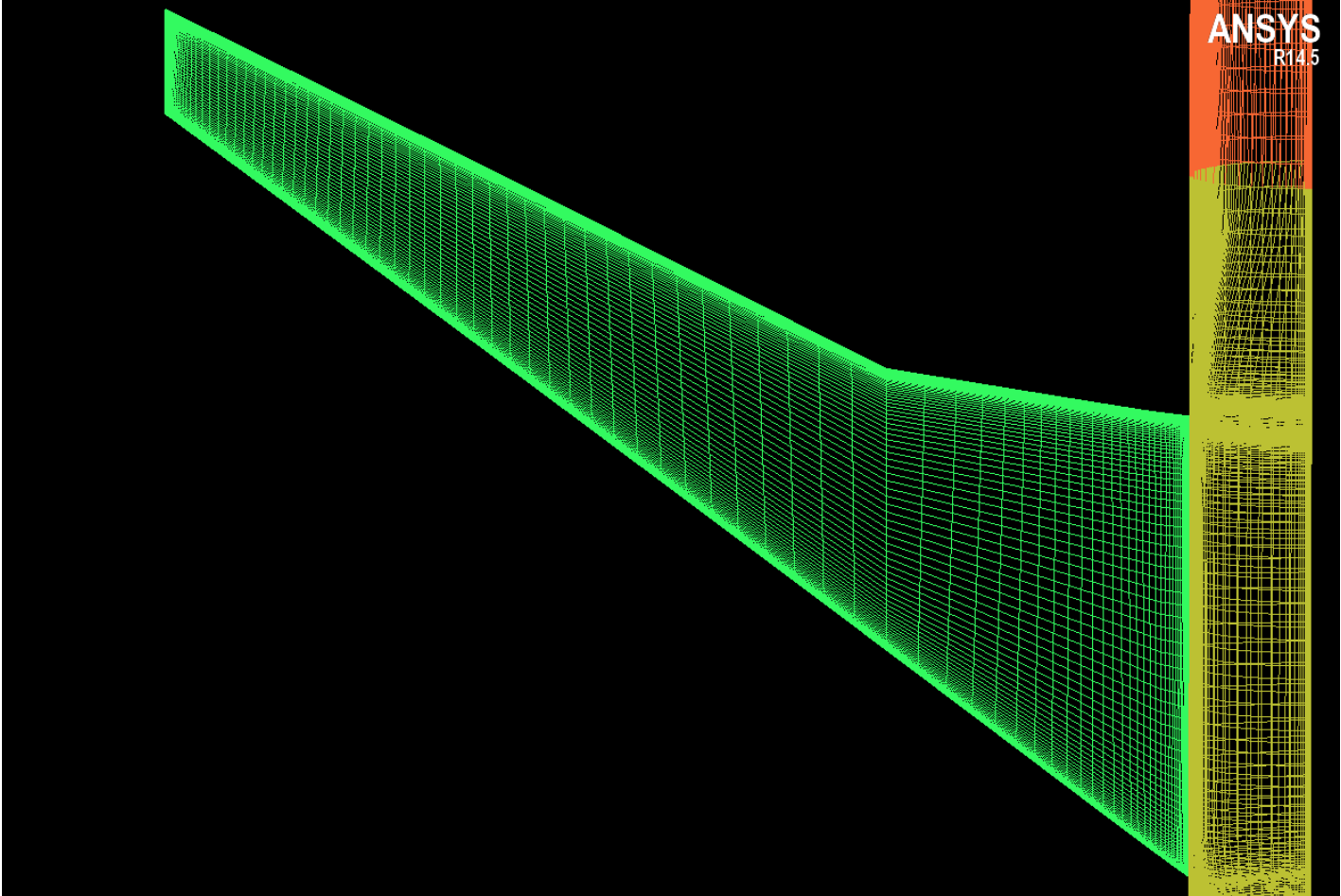
Ultra Fine



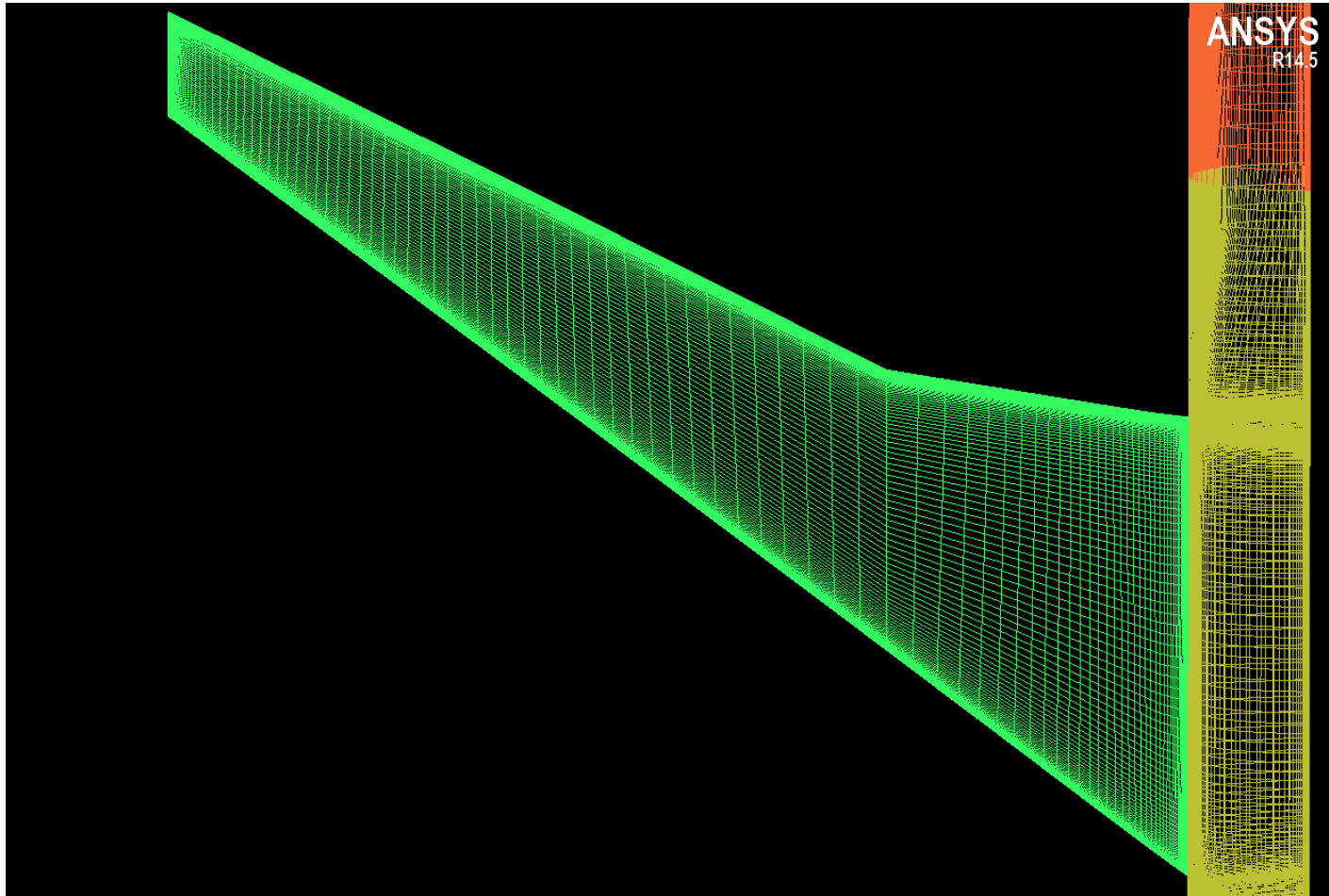
Refinement Study

=> detail on the wing upper surface

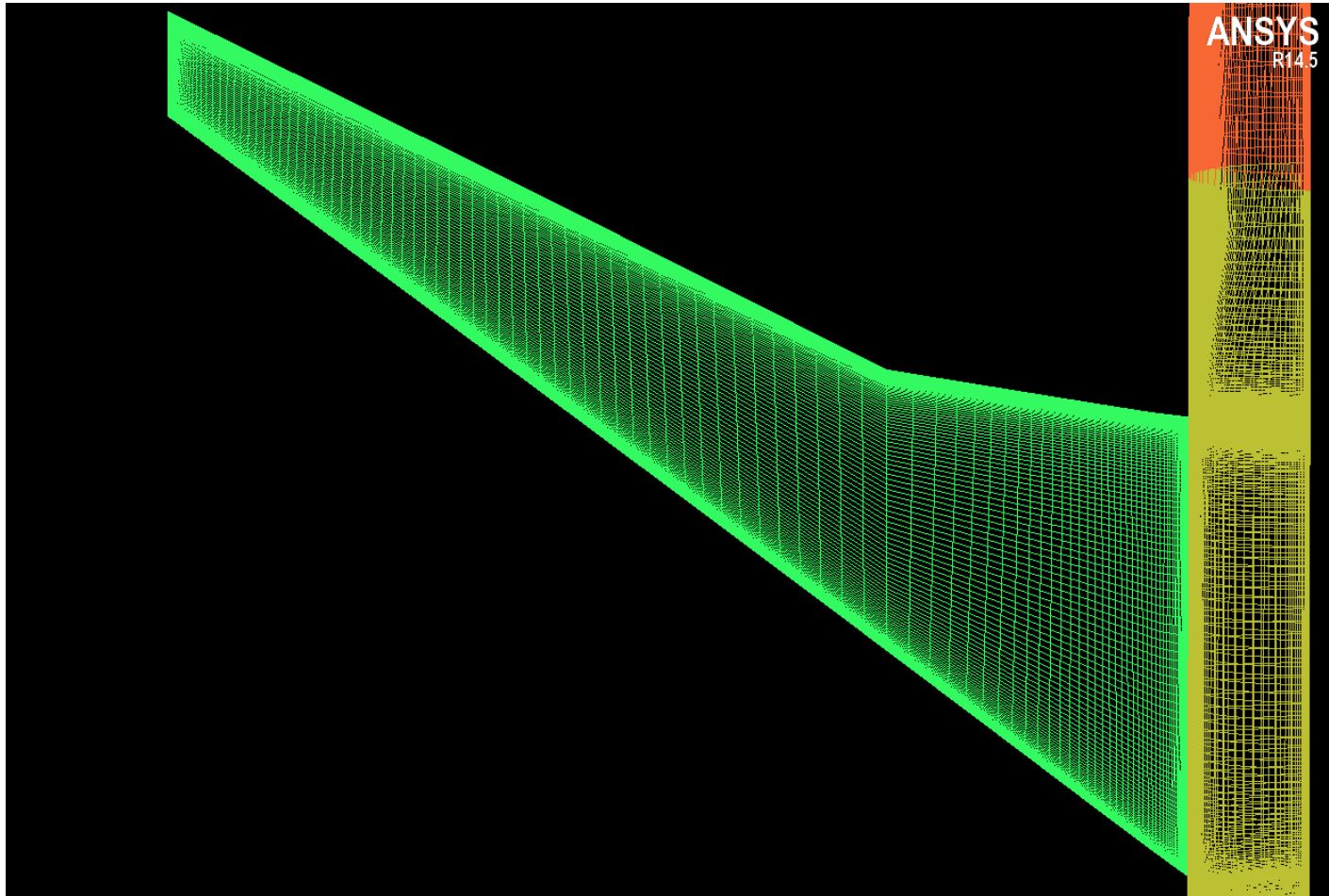
Tiny



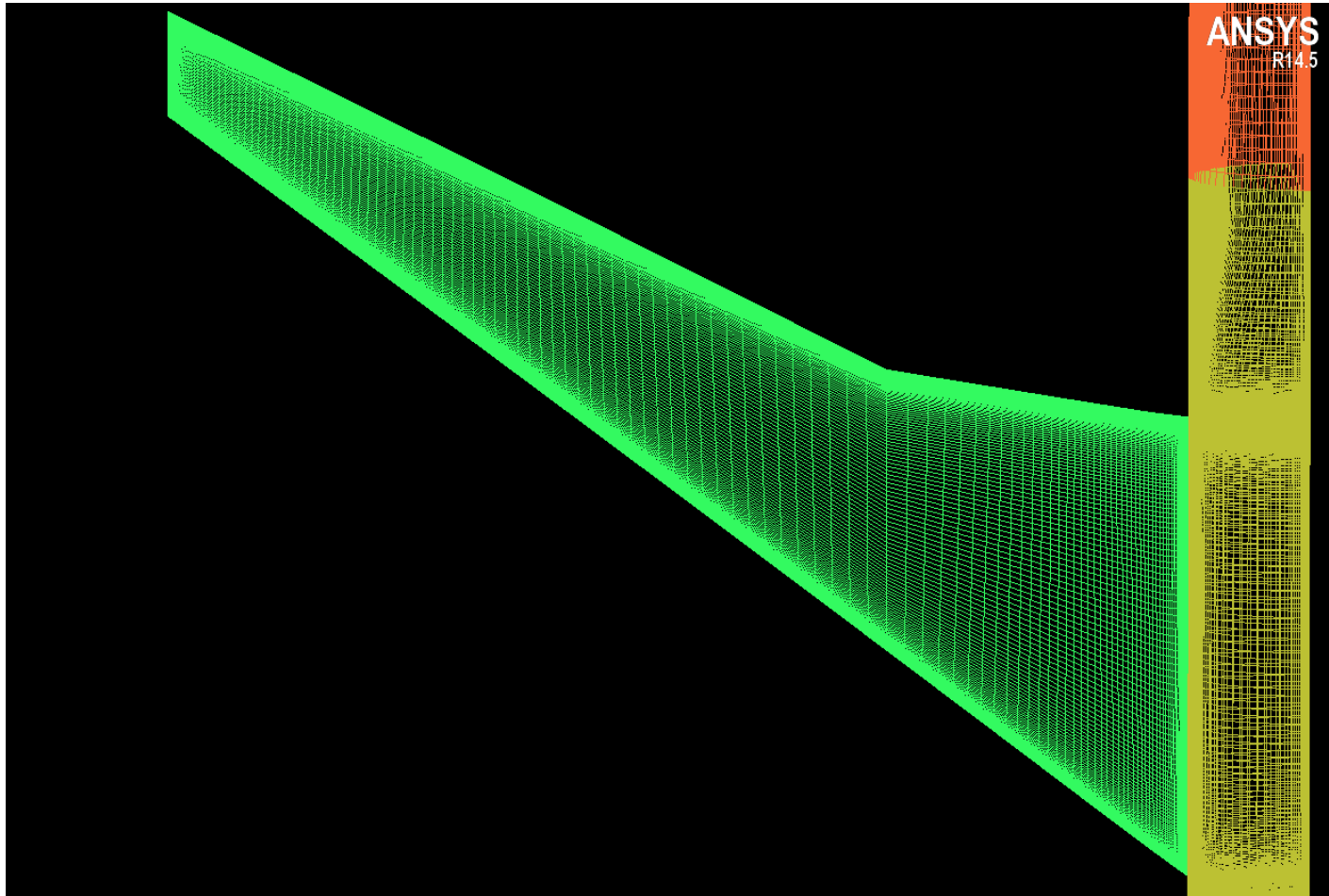
Coarse



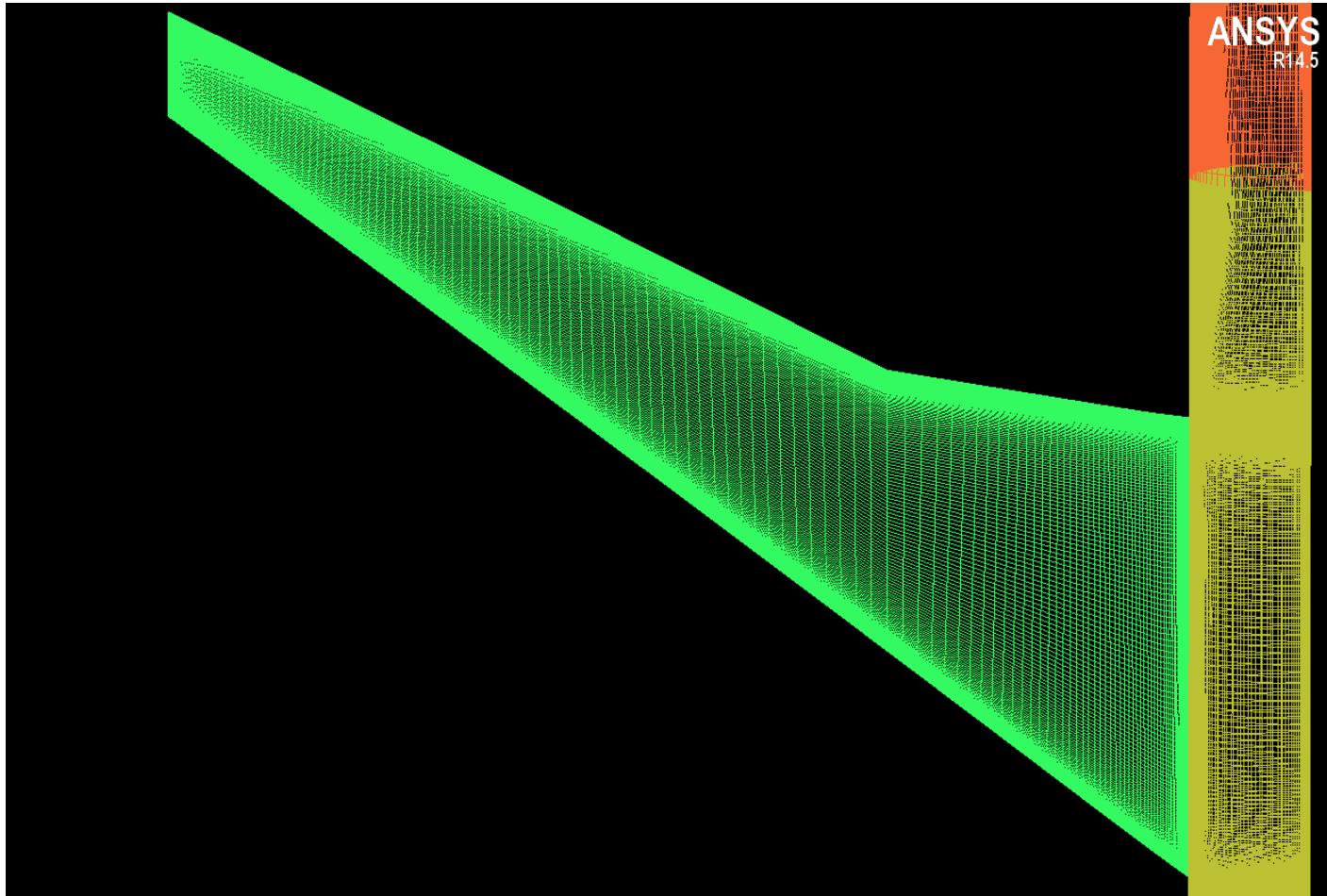
Medium



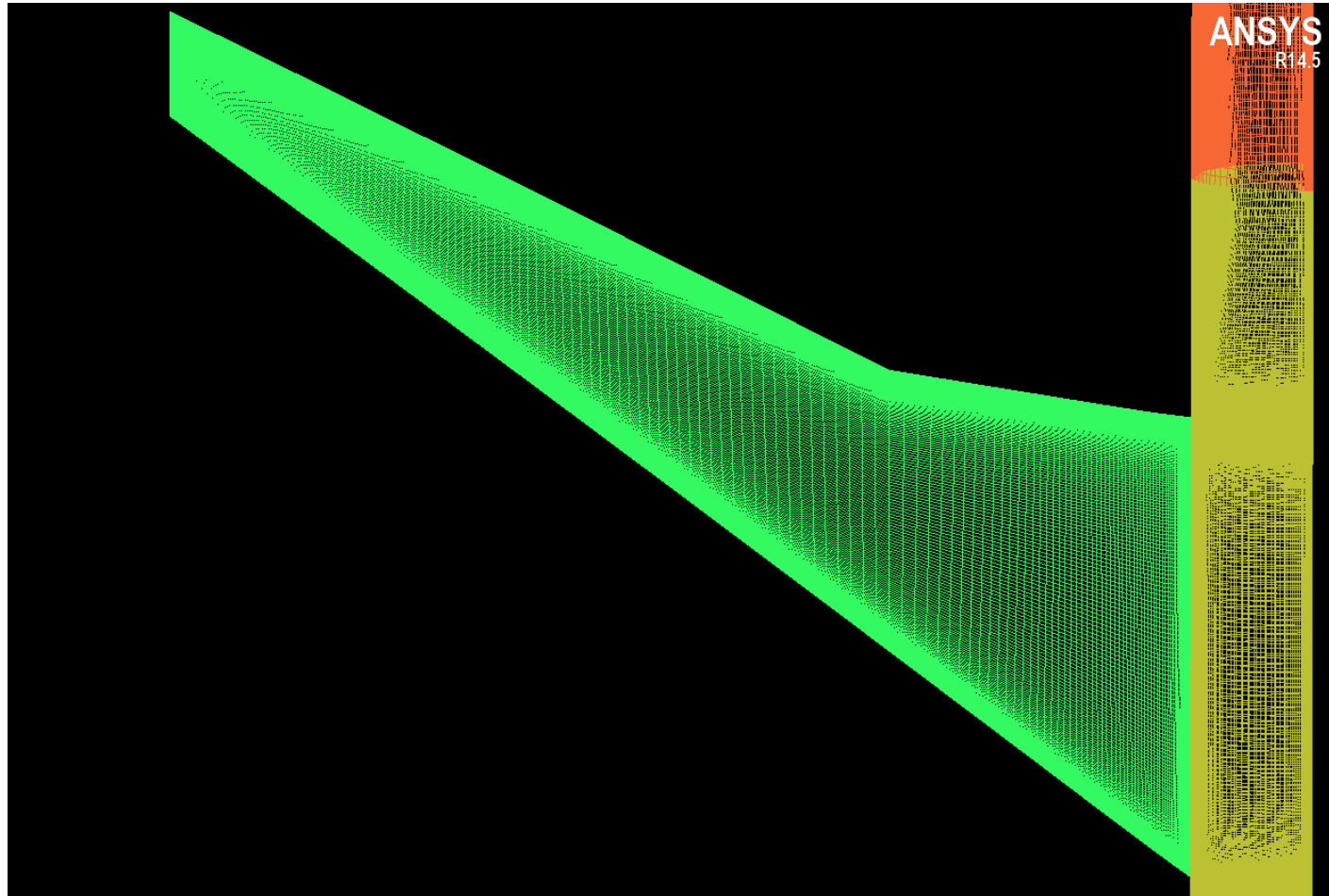
Fine



Extra Fine



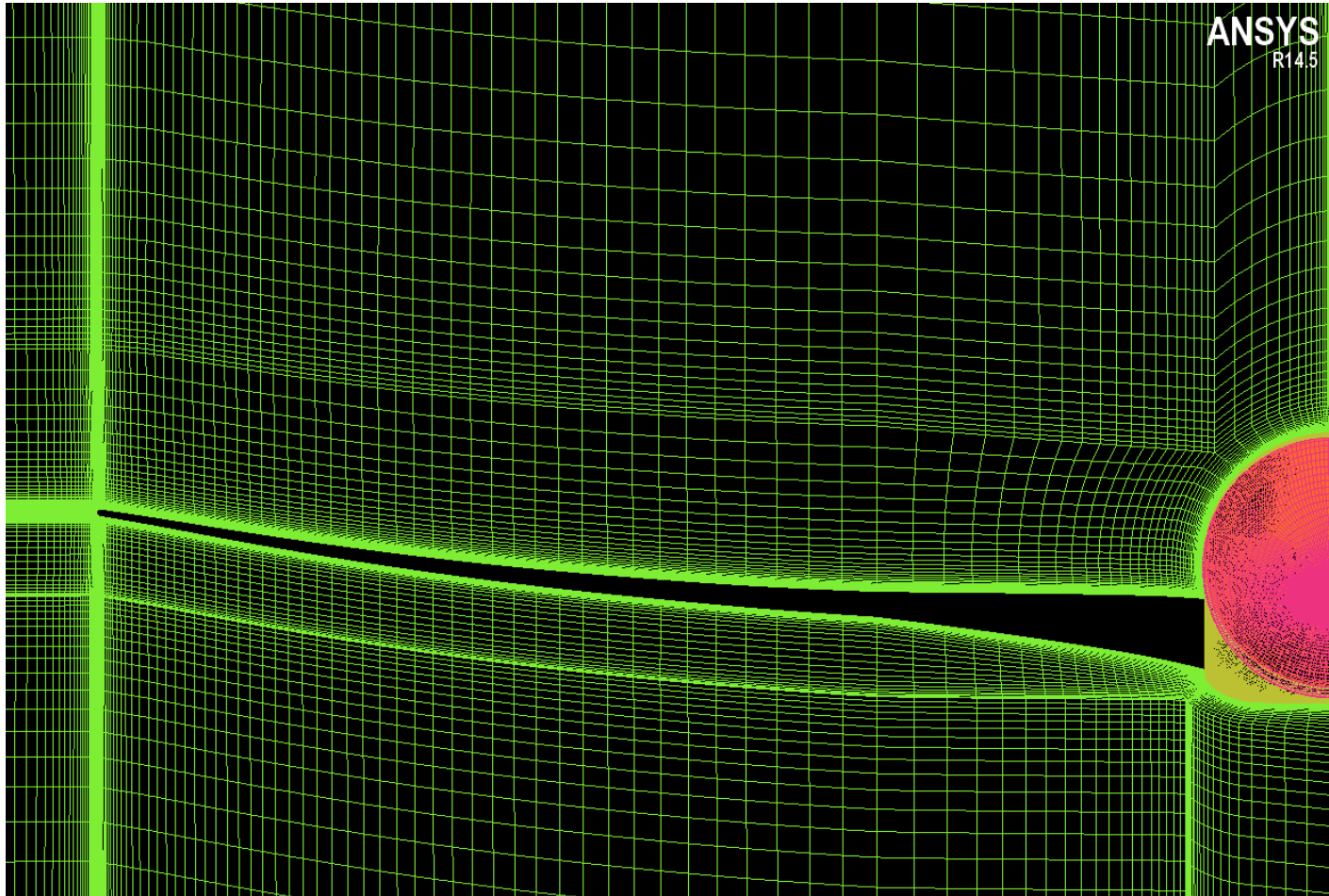
Ultra Fine



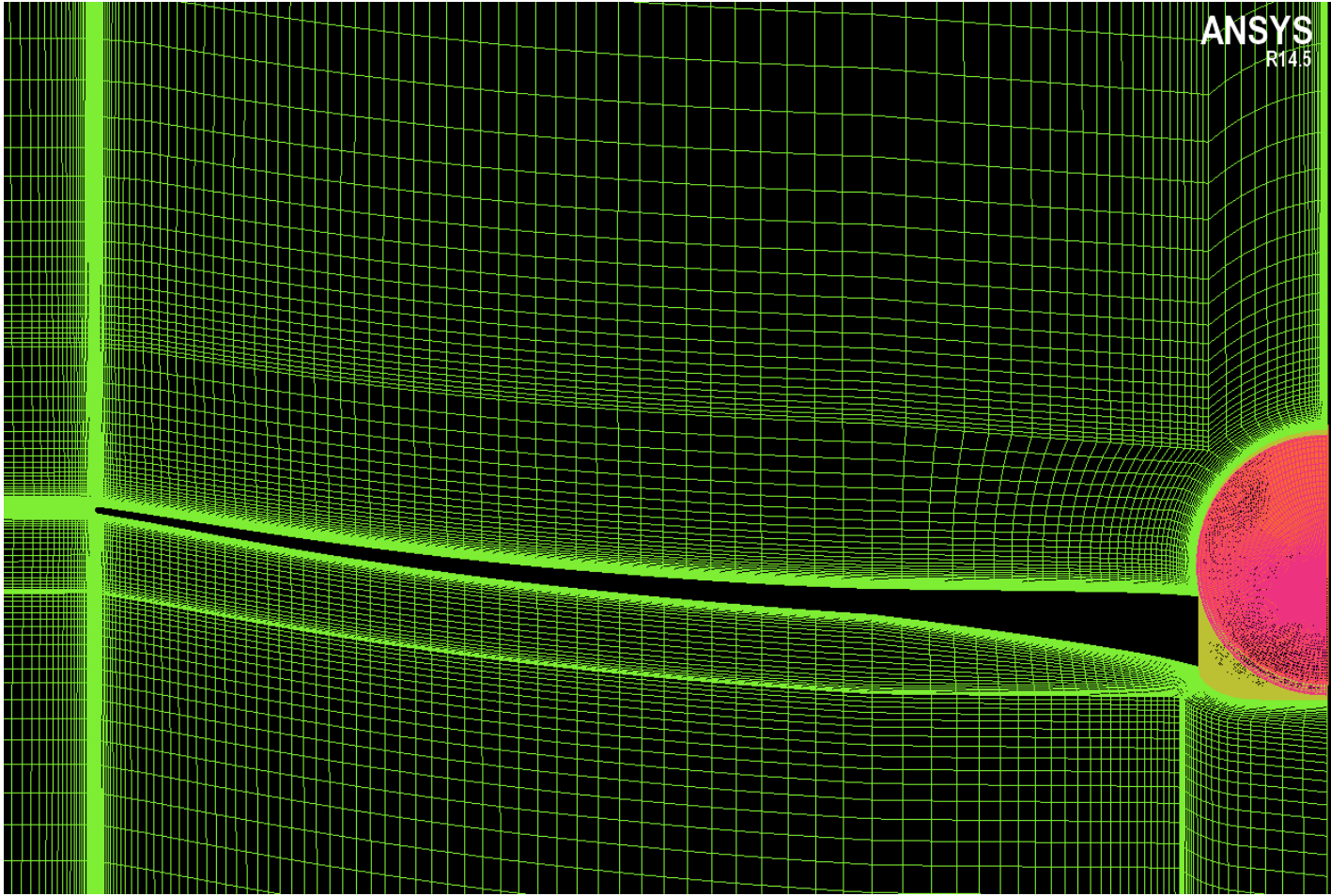
Refinement Study

=> Detail of the spatial grid on a vertical scane plane, cutting the wing and perpendicular to the fuselage axis

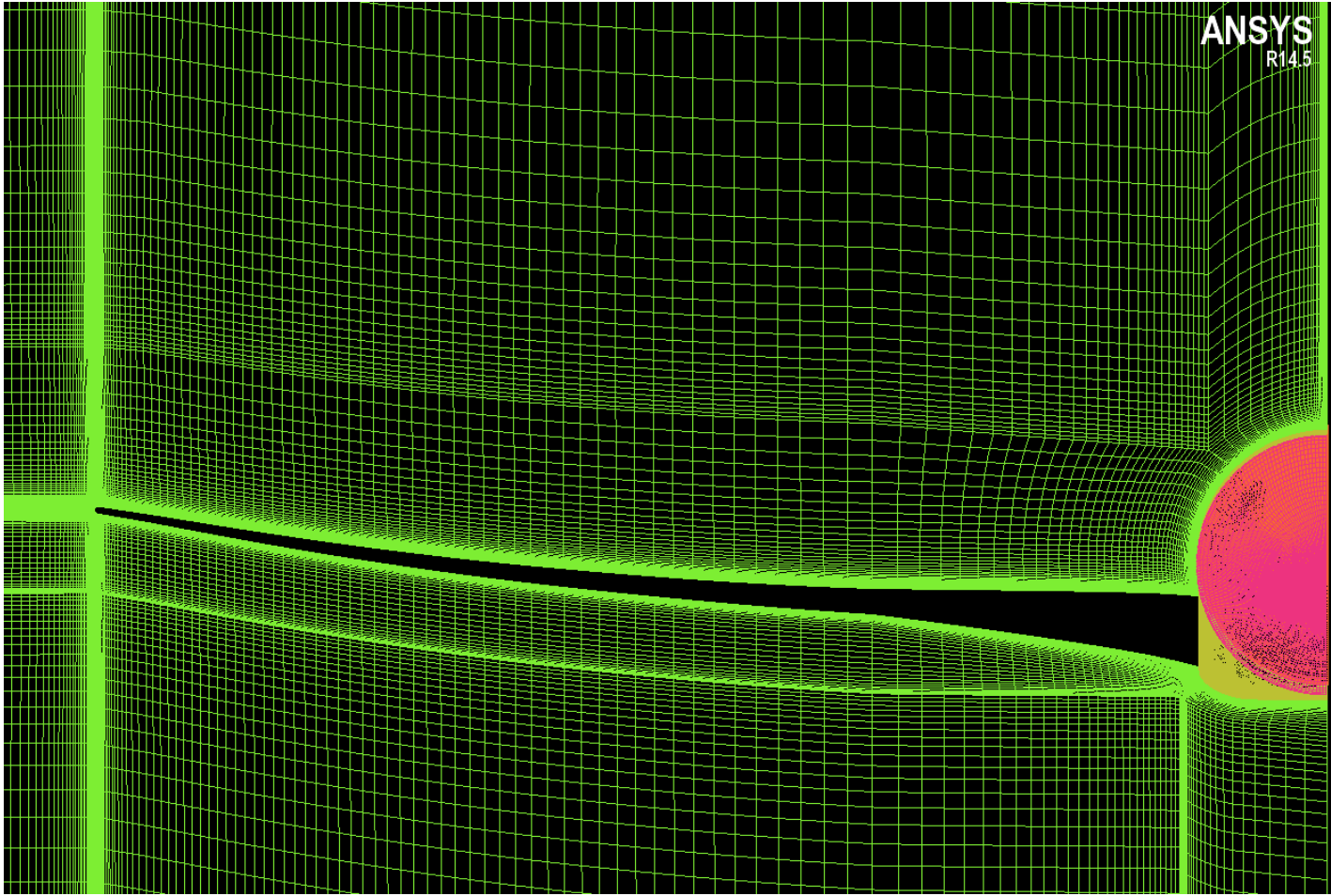
Tiny



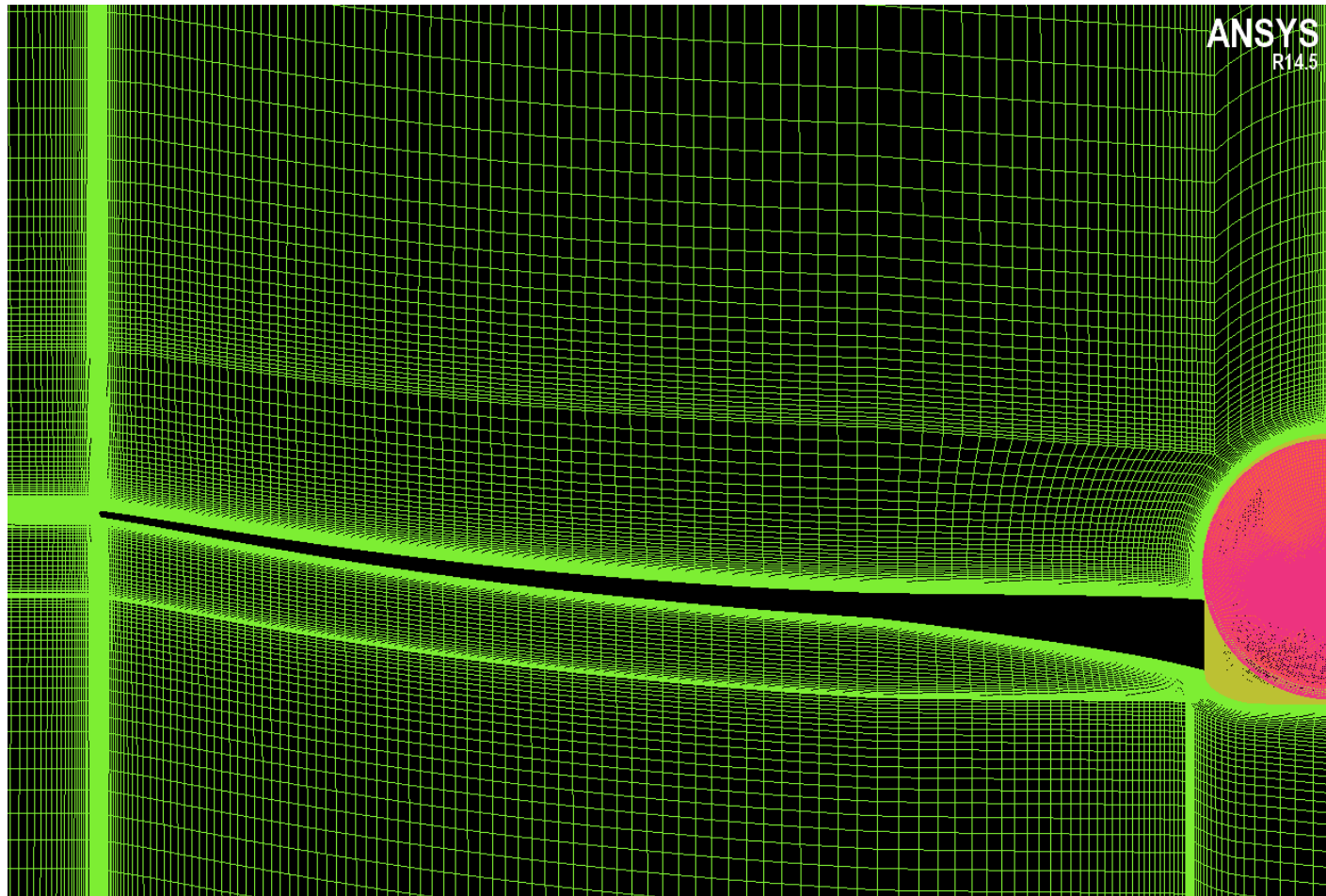
Coarse



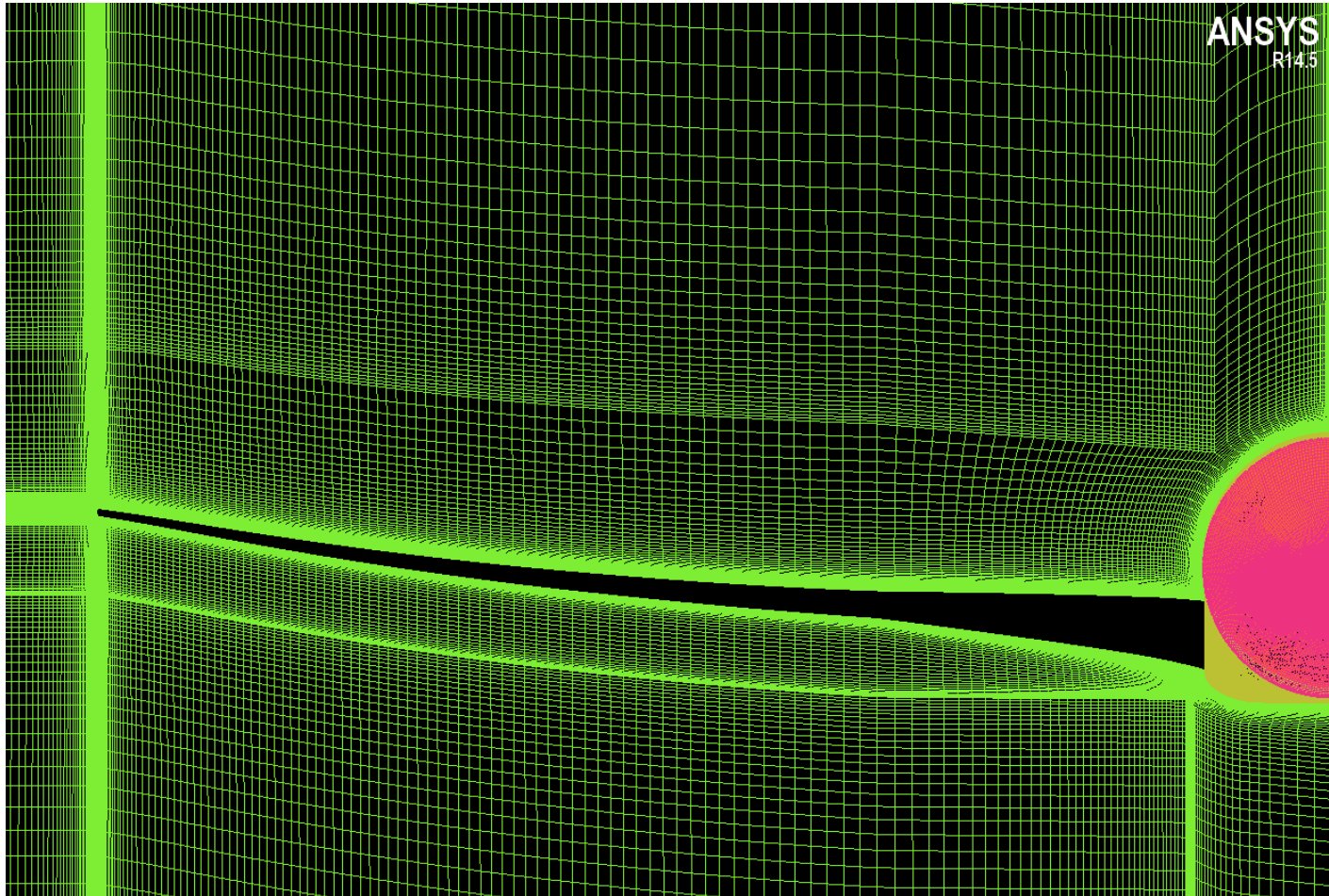
Medium



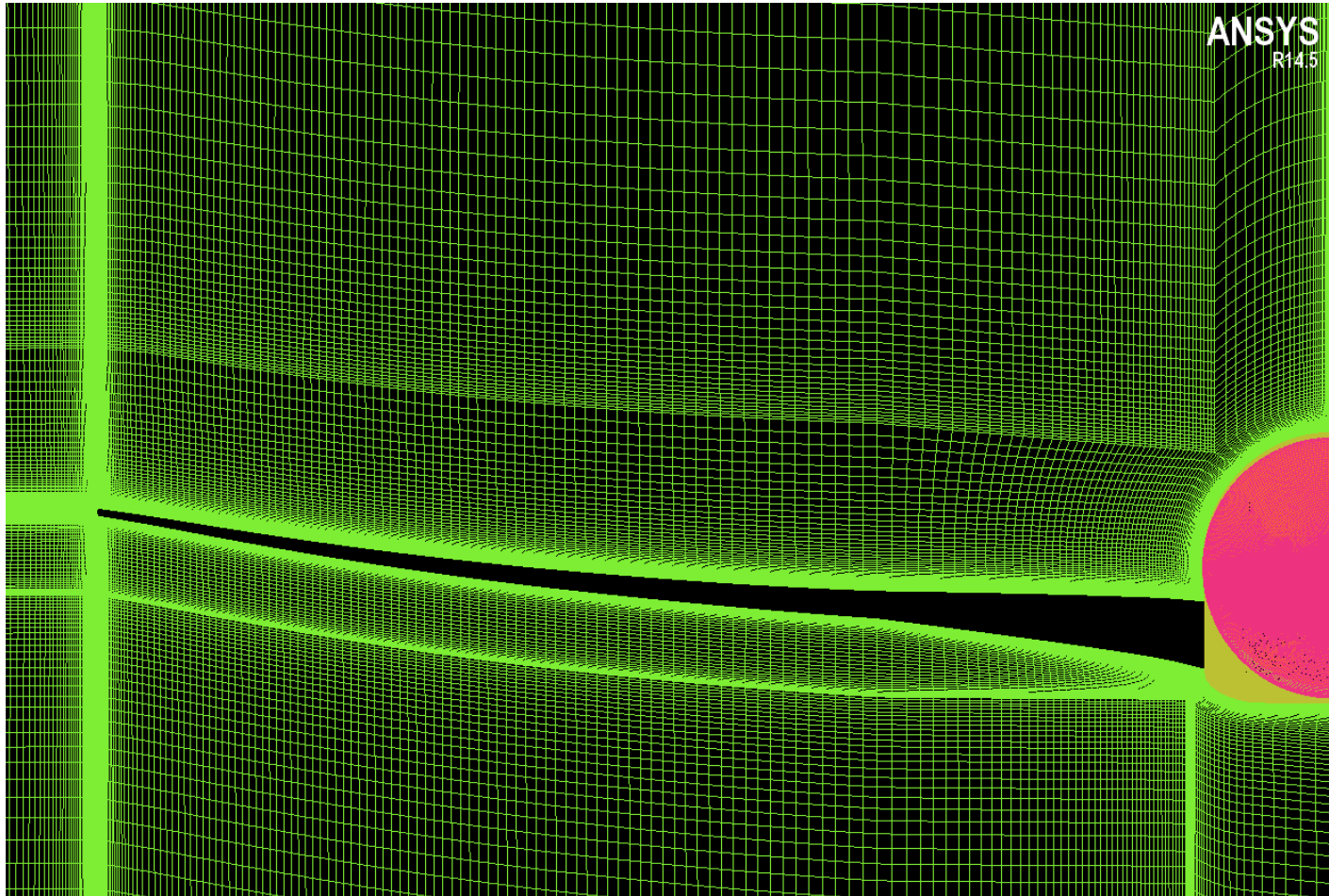
Fine



Extra Fine



Ultra Fine

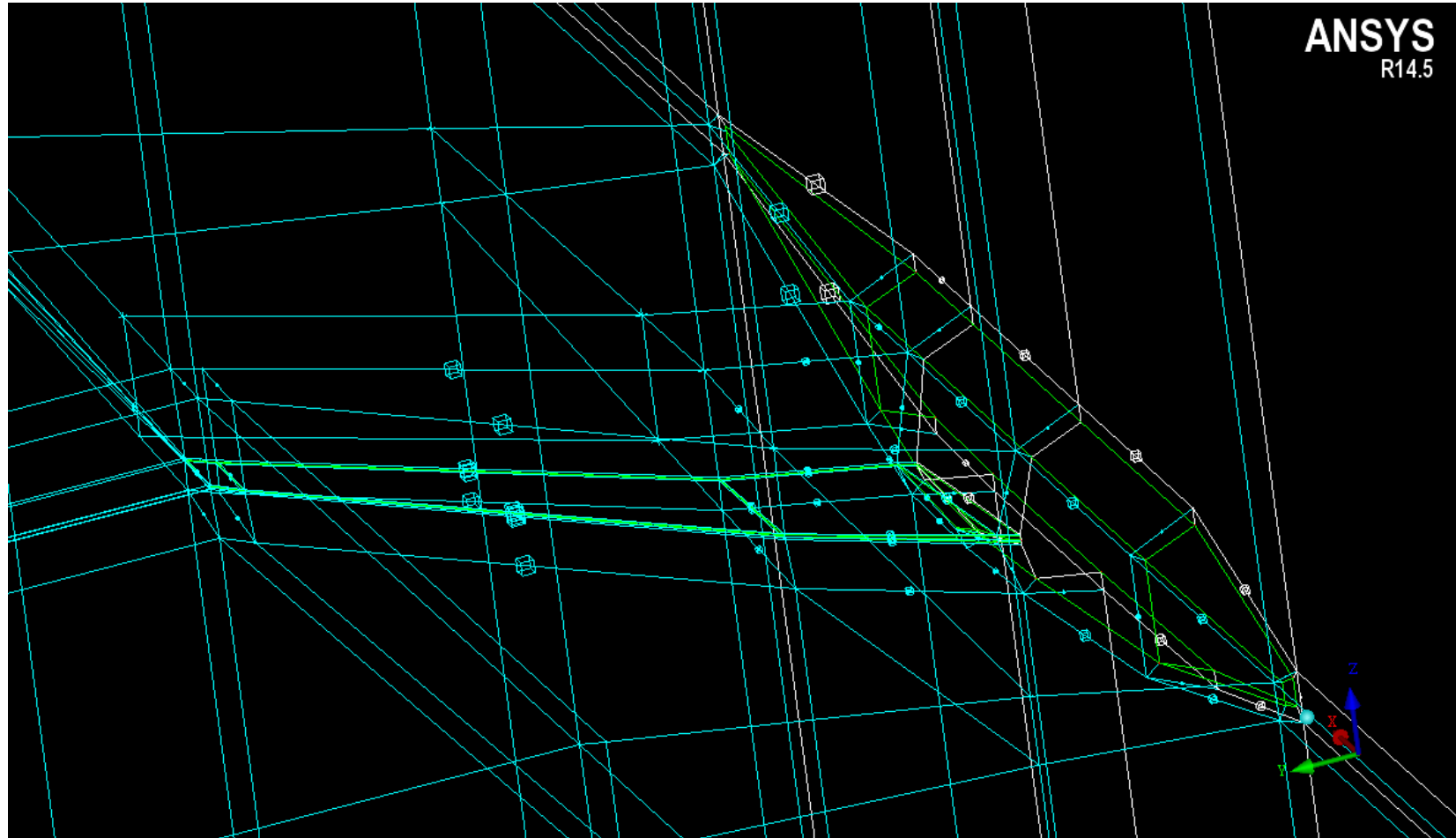


Wing Deflection Study

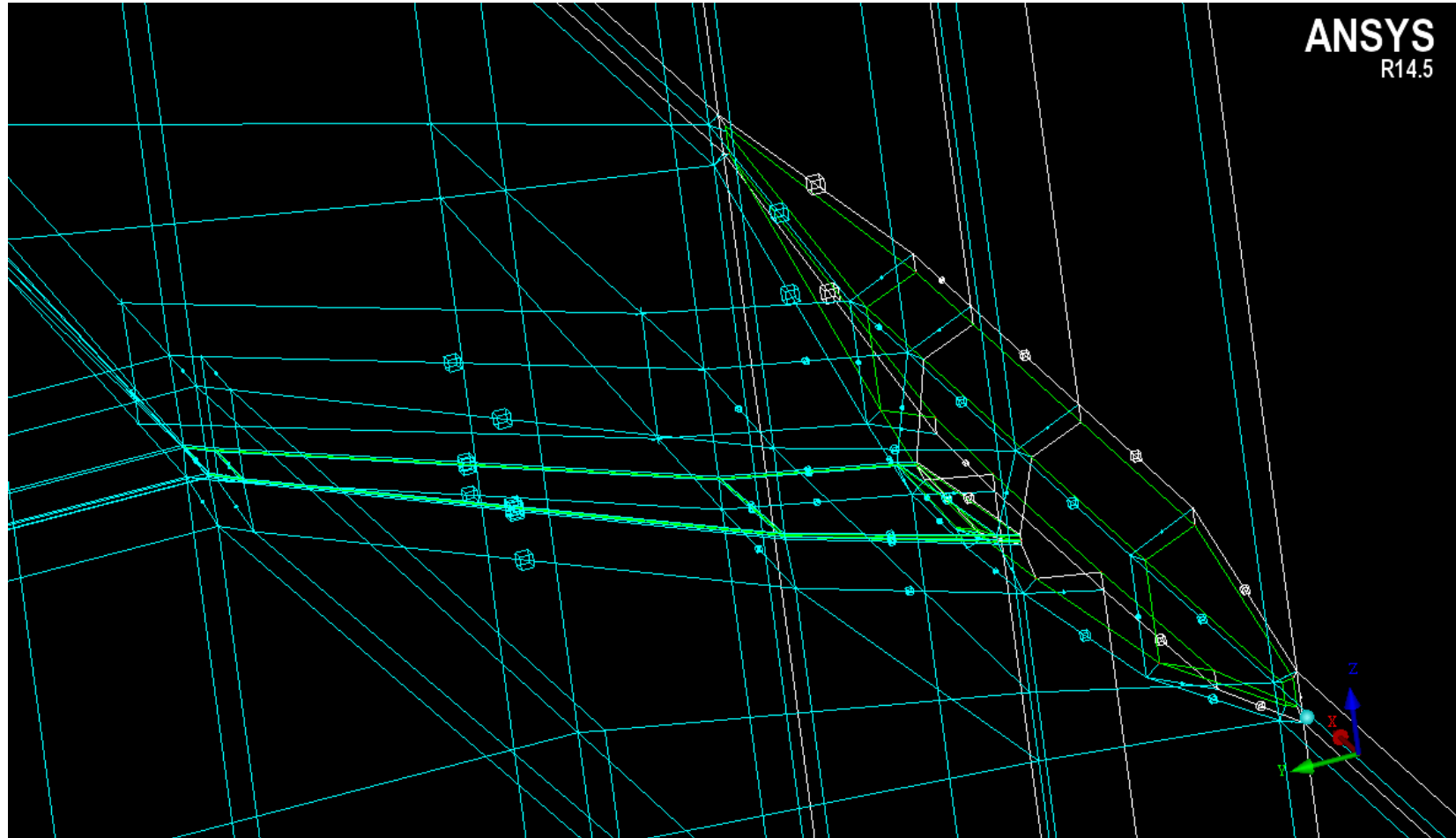
The next slides show M size grids for the deflections:

- **0.00 deg**
- **2.50 deg**
- **2.75 deg**
- **3.00 deg**
- **3.25 deg**
- **3.50 deg**
- **3.75 deg**
- **4.00 deg**

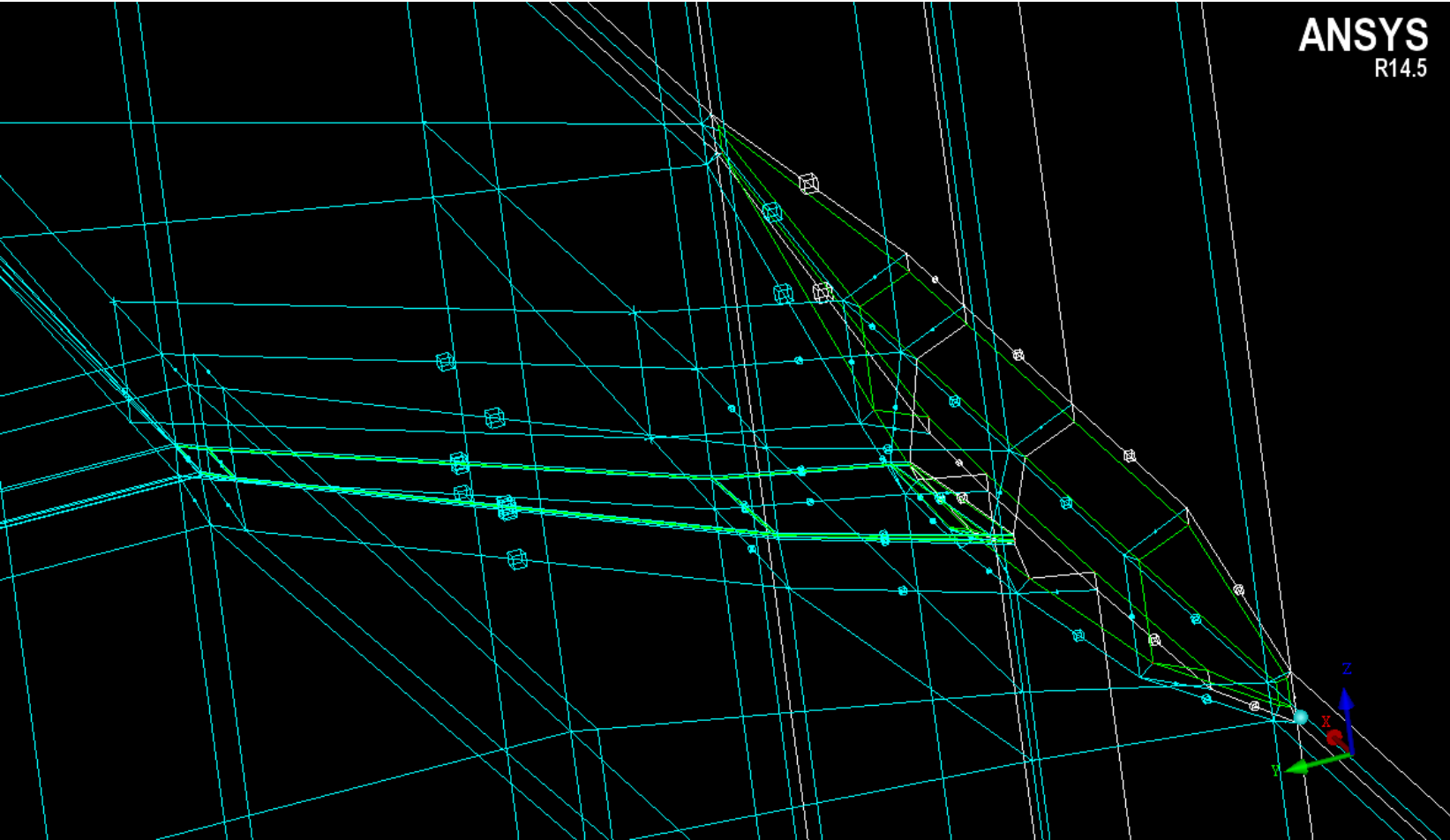
Space Blocking – 0.00 deg



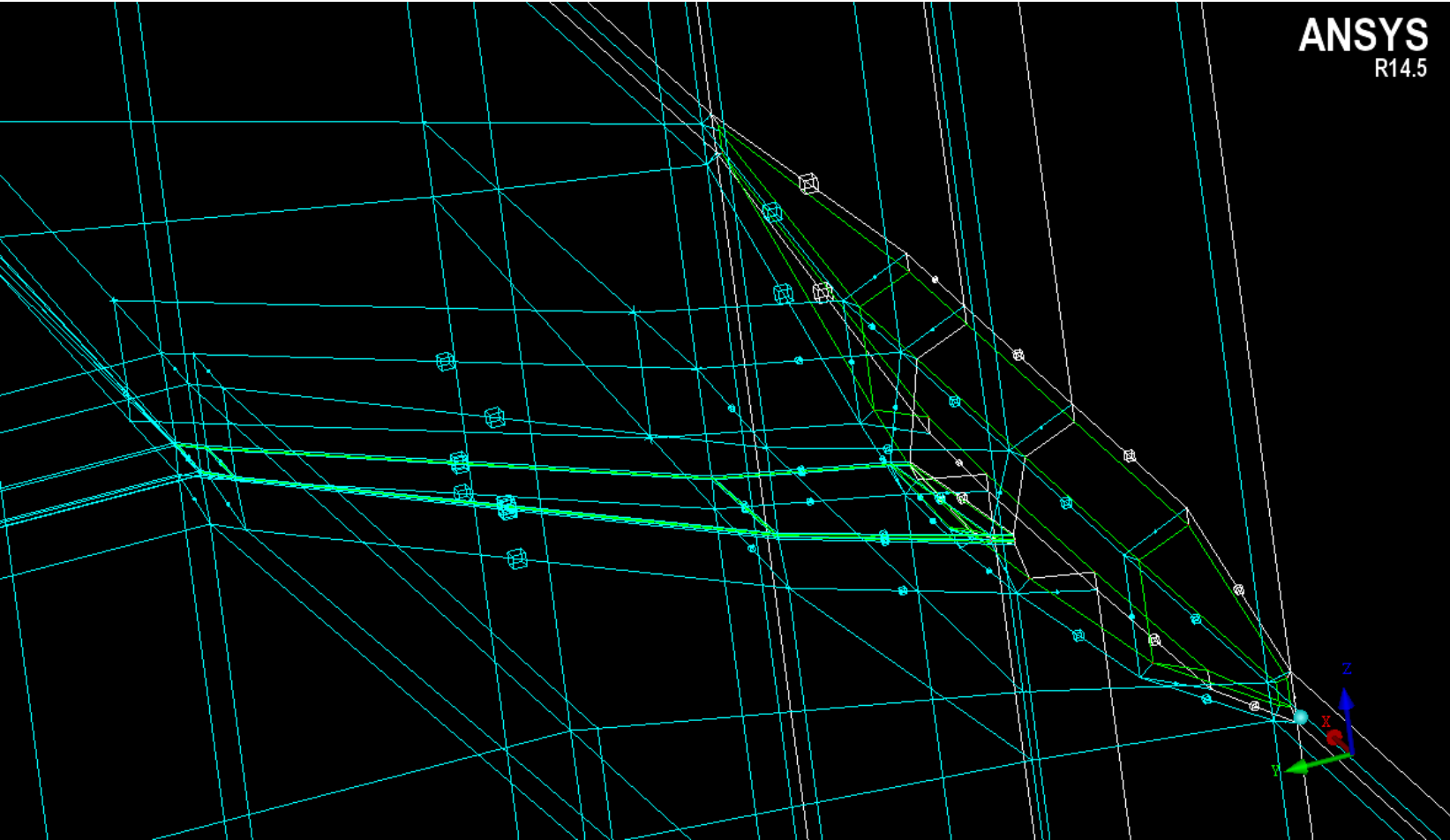
Space Blocking – 2.50 deg



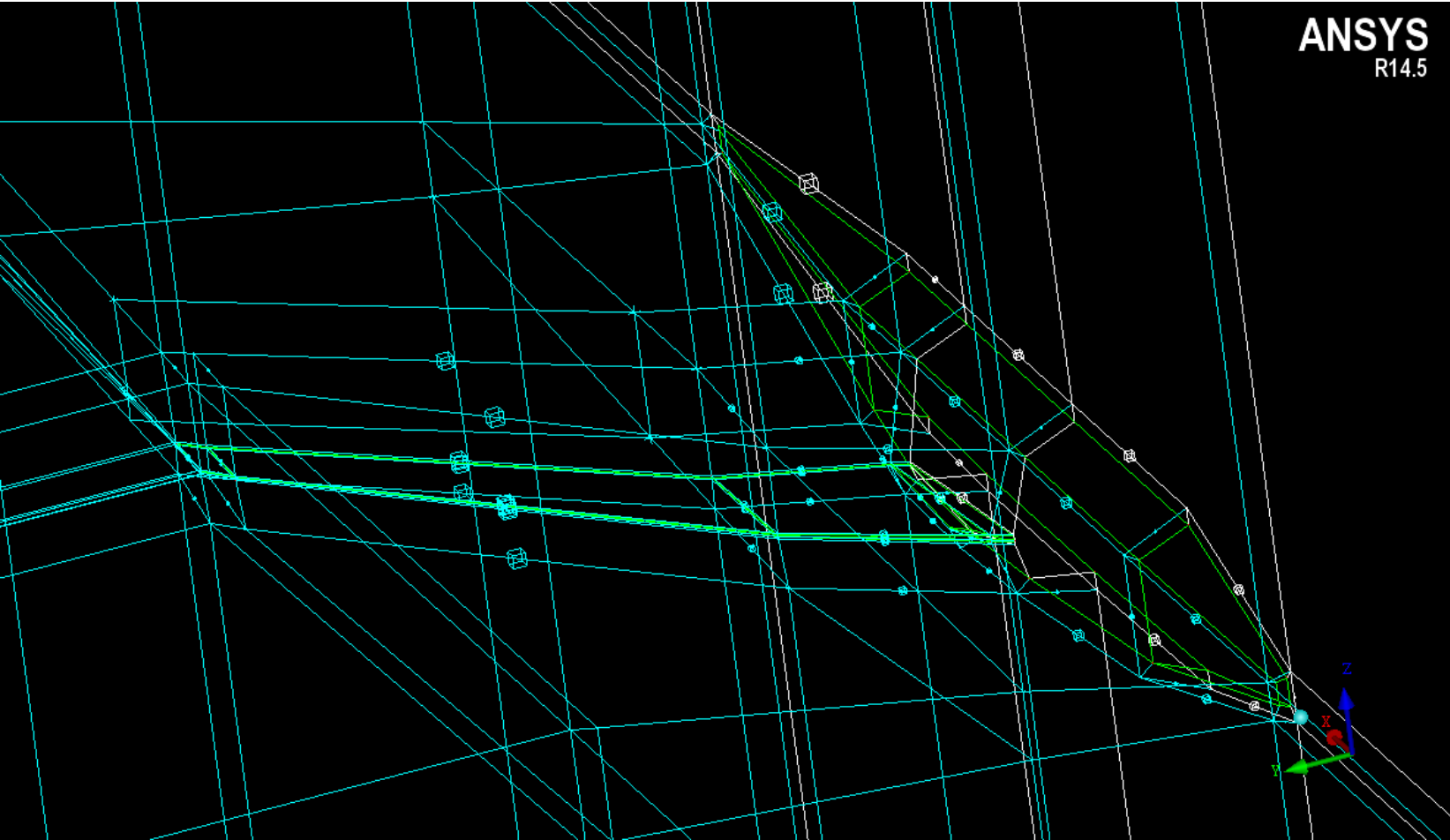
Space Blocking – 2.75 deg



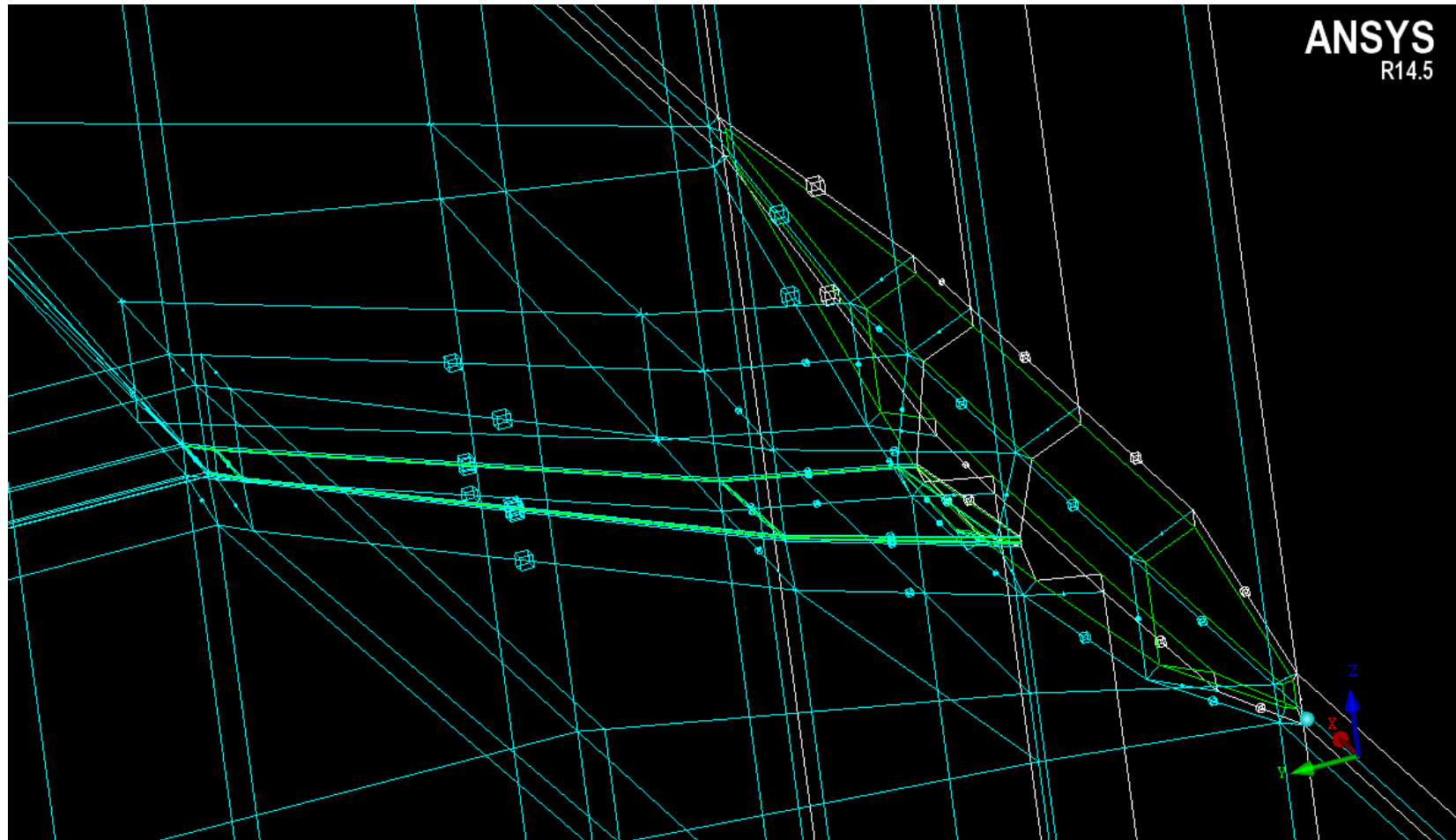
Space Blocking – 3.00 deg



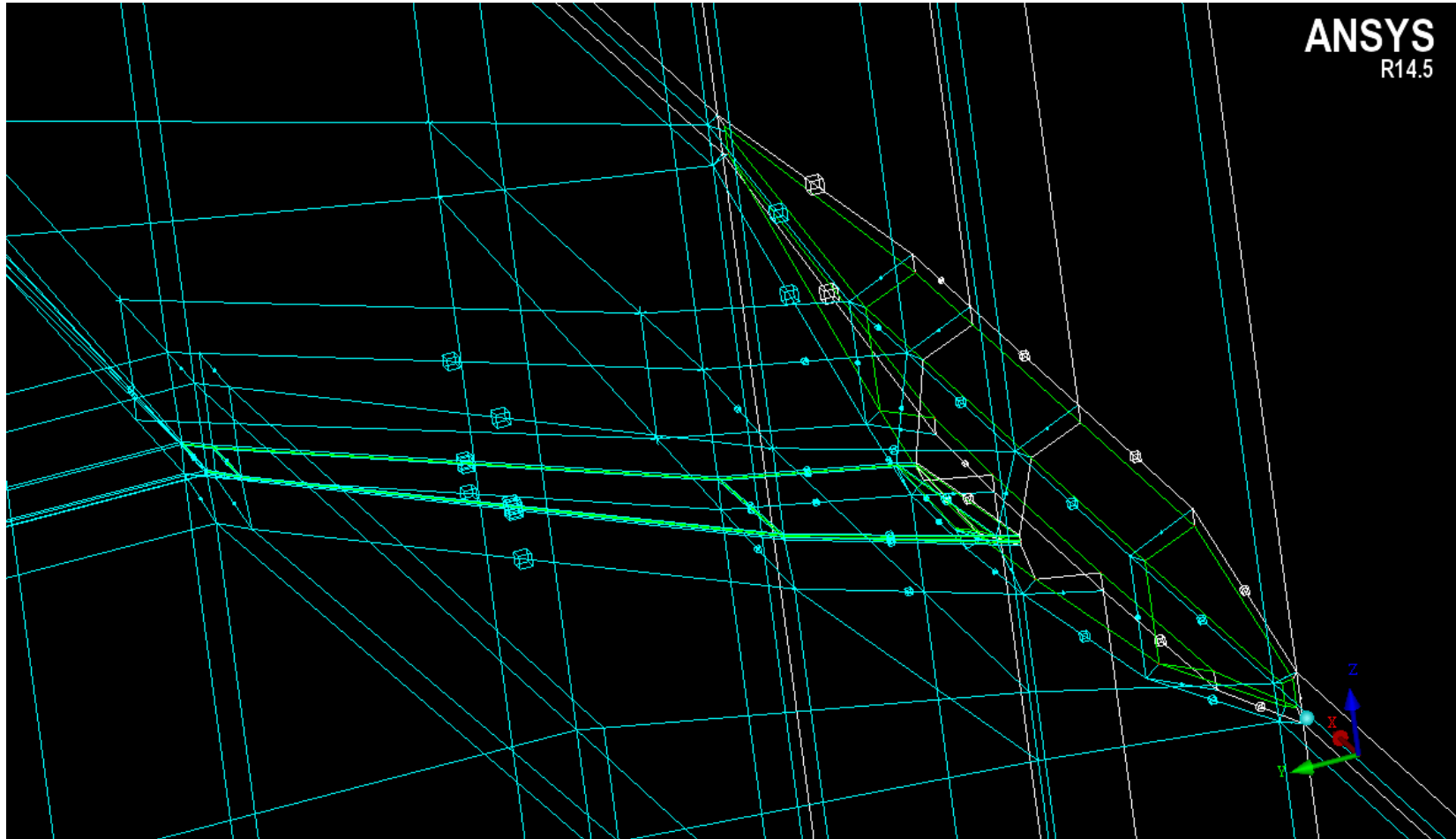
Space Blocking – 3.25 deg



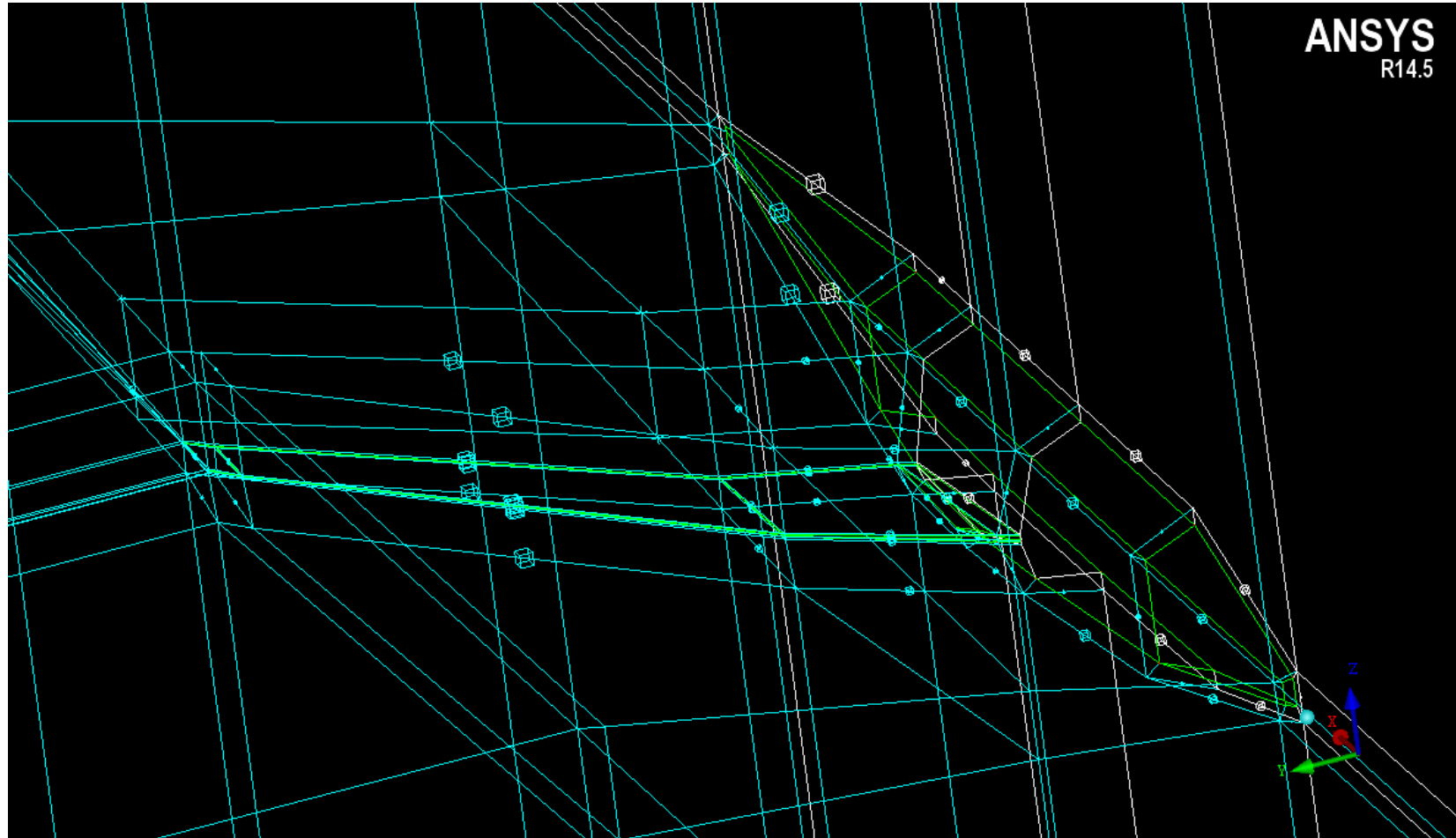
Space Blocking – 3.50 deg



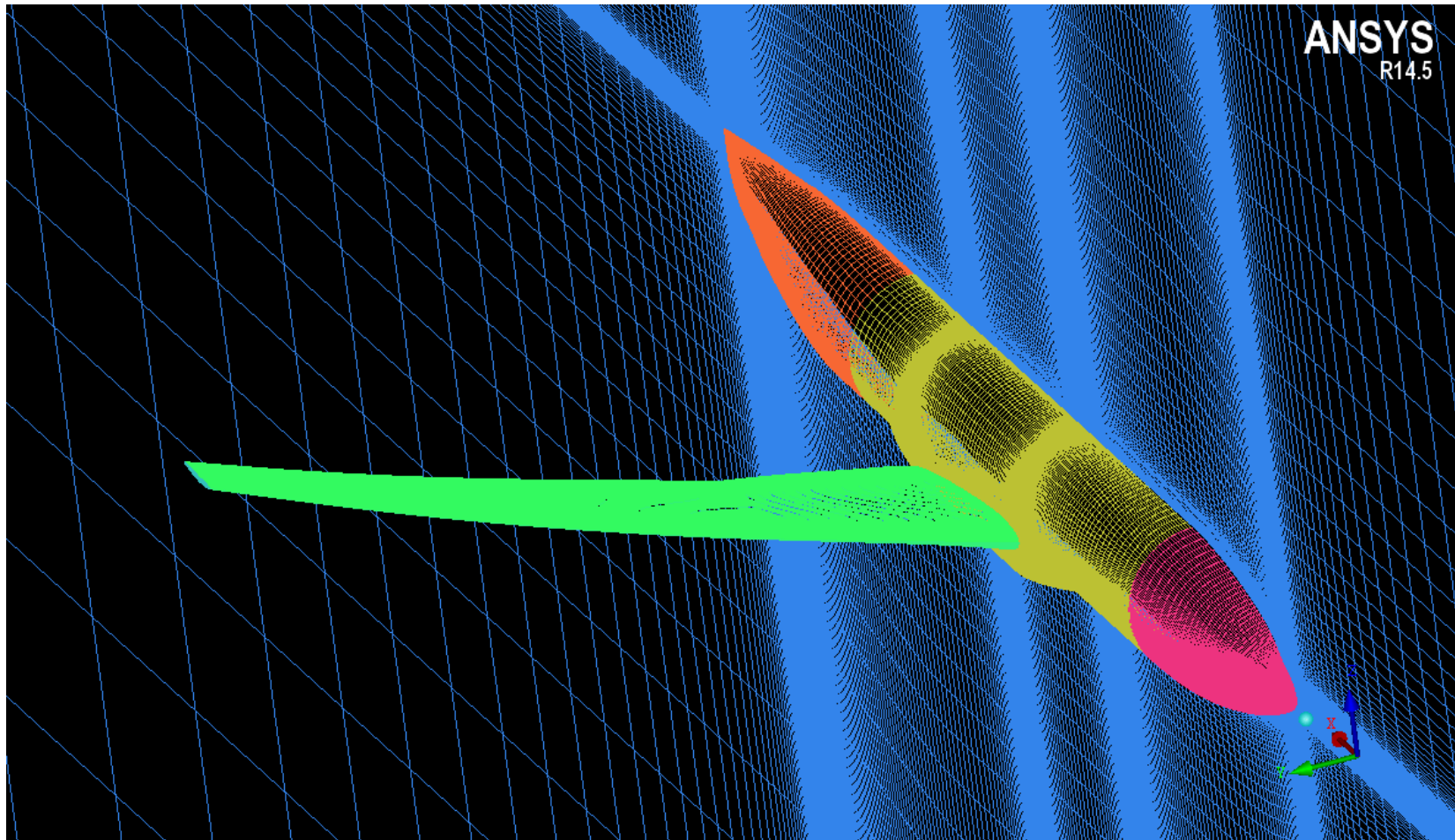
Space Blocking – 3.75 deg



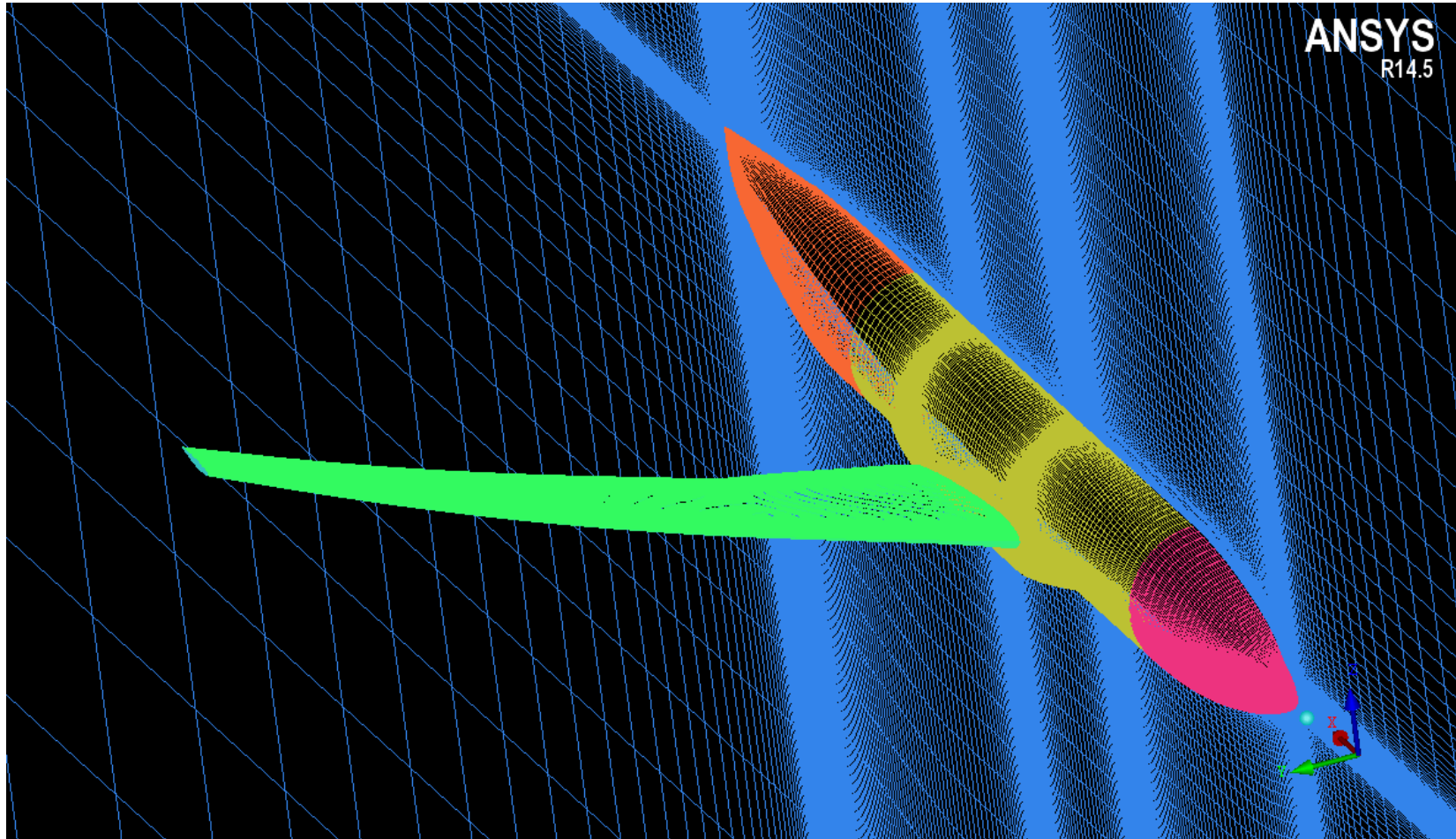
Space Blocking – 4.00 deg



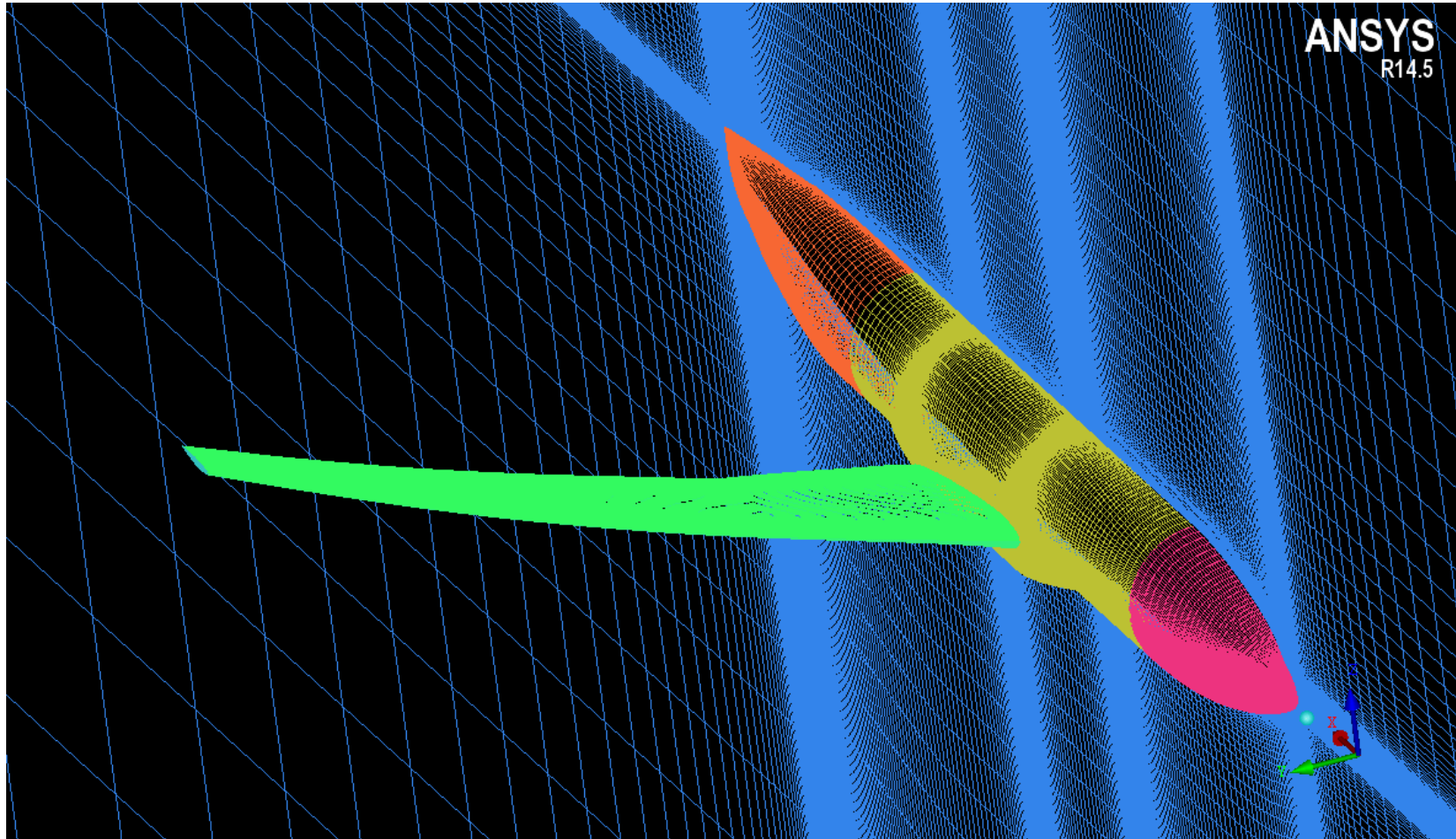
Grid – 0.00 deg



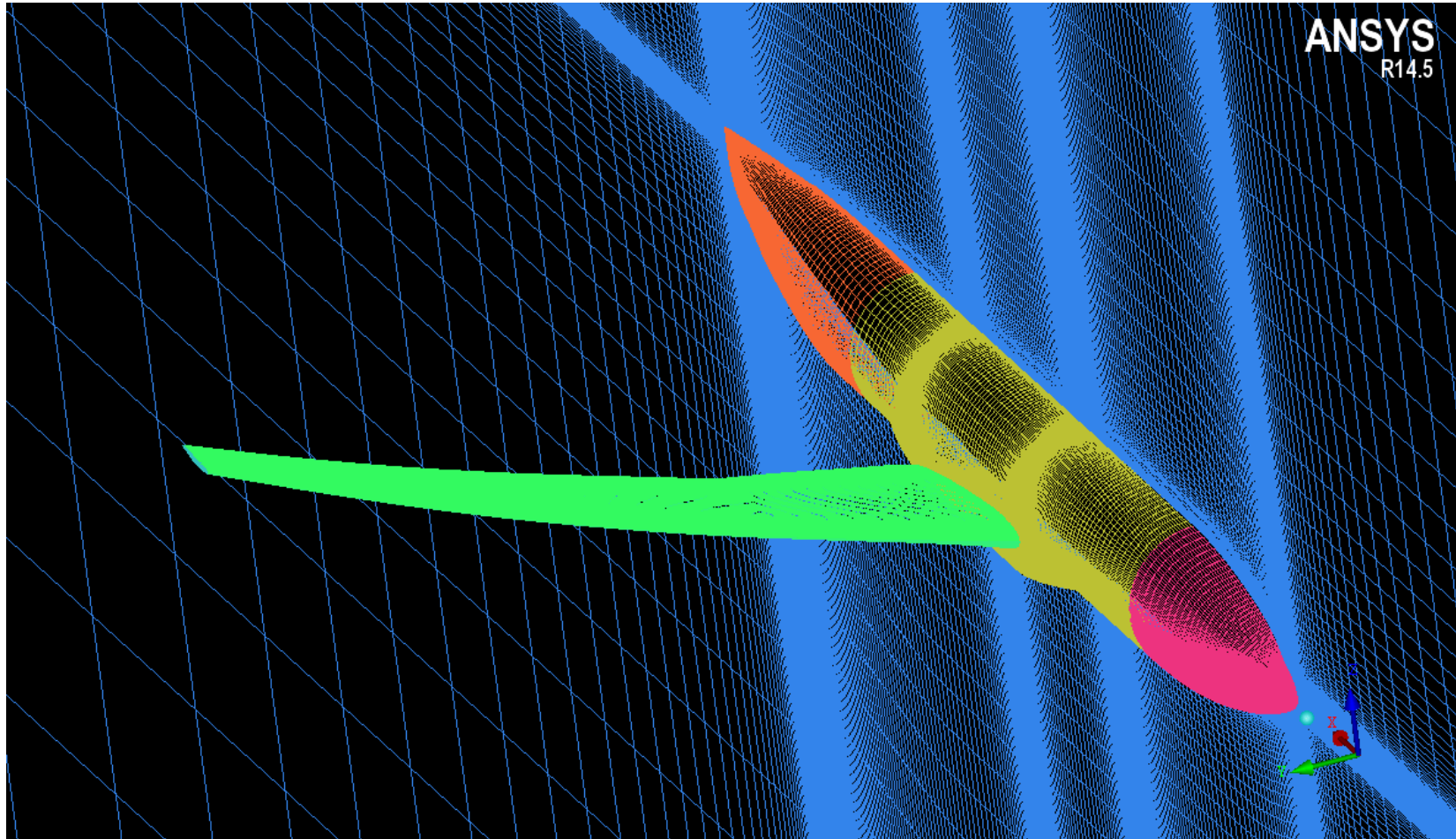
Grid – 2.50 deg



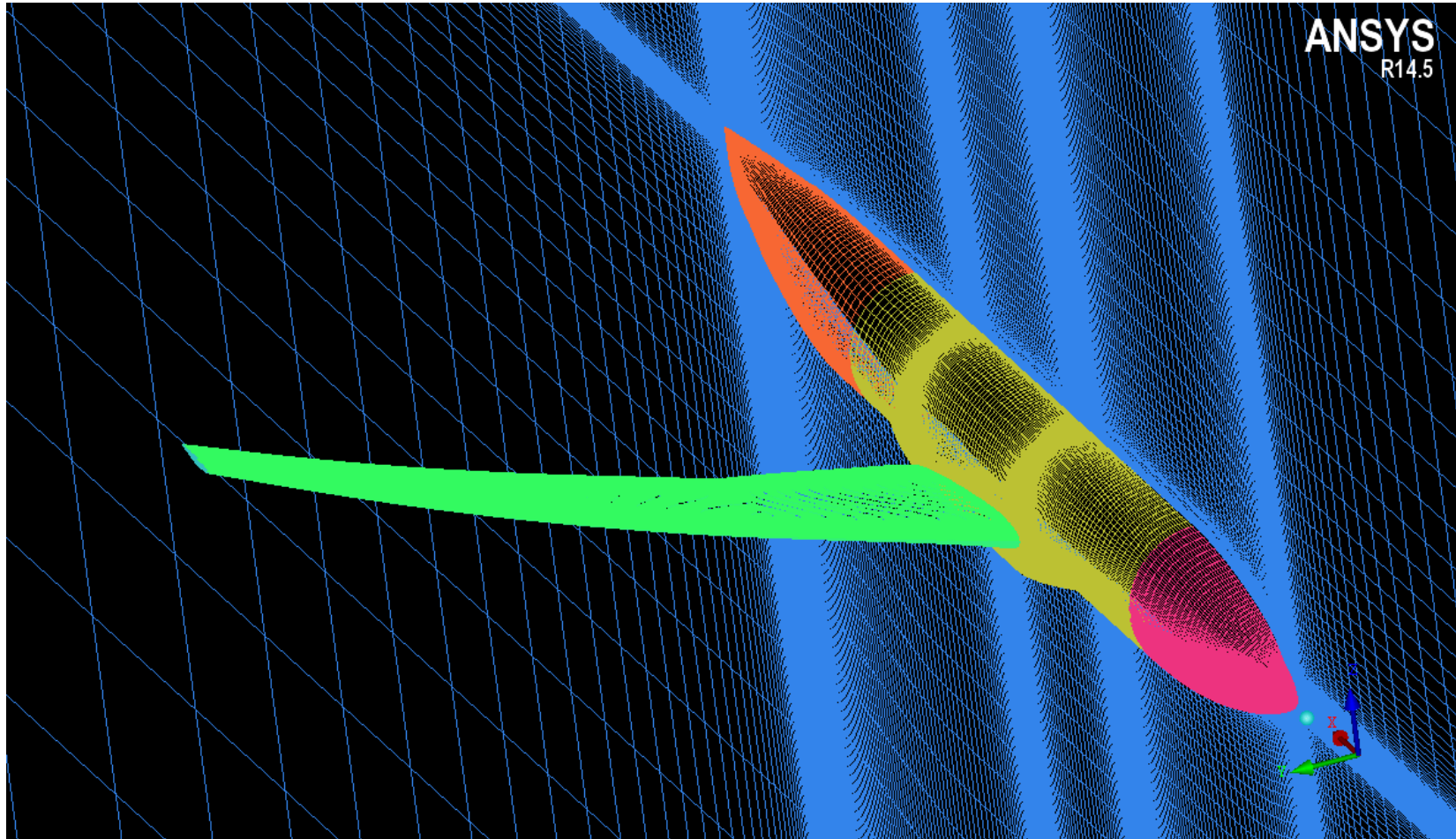
Grid – 2.75 deg



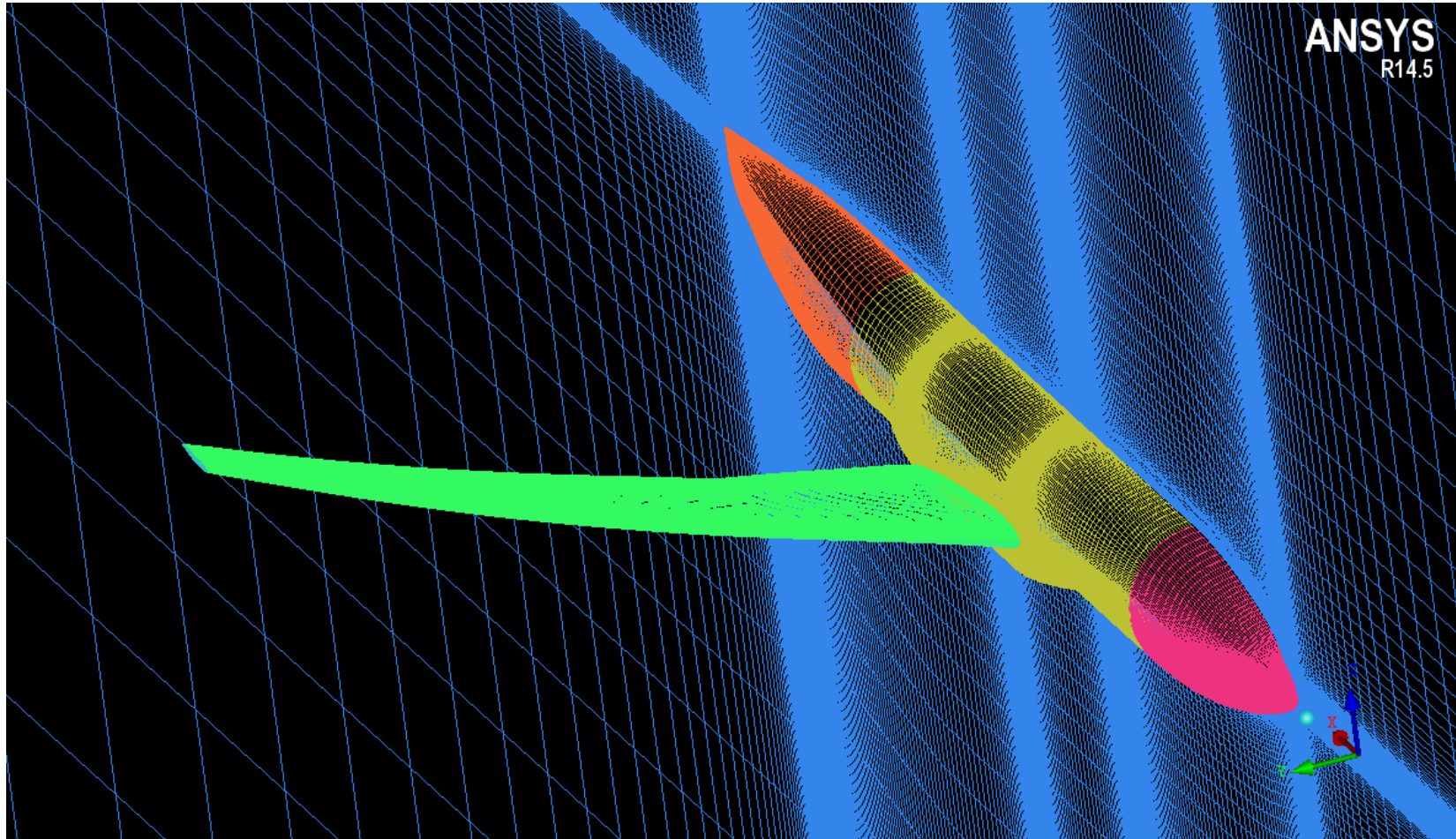
Grid – 3.00 deg



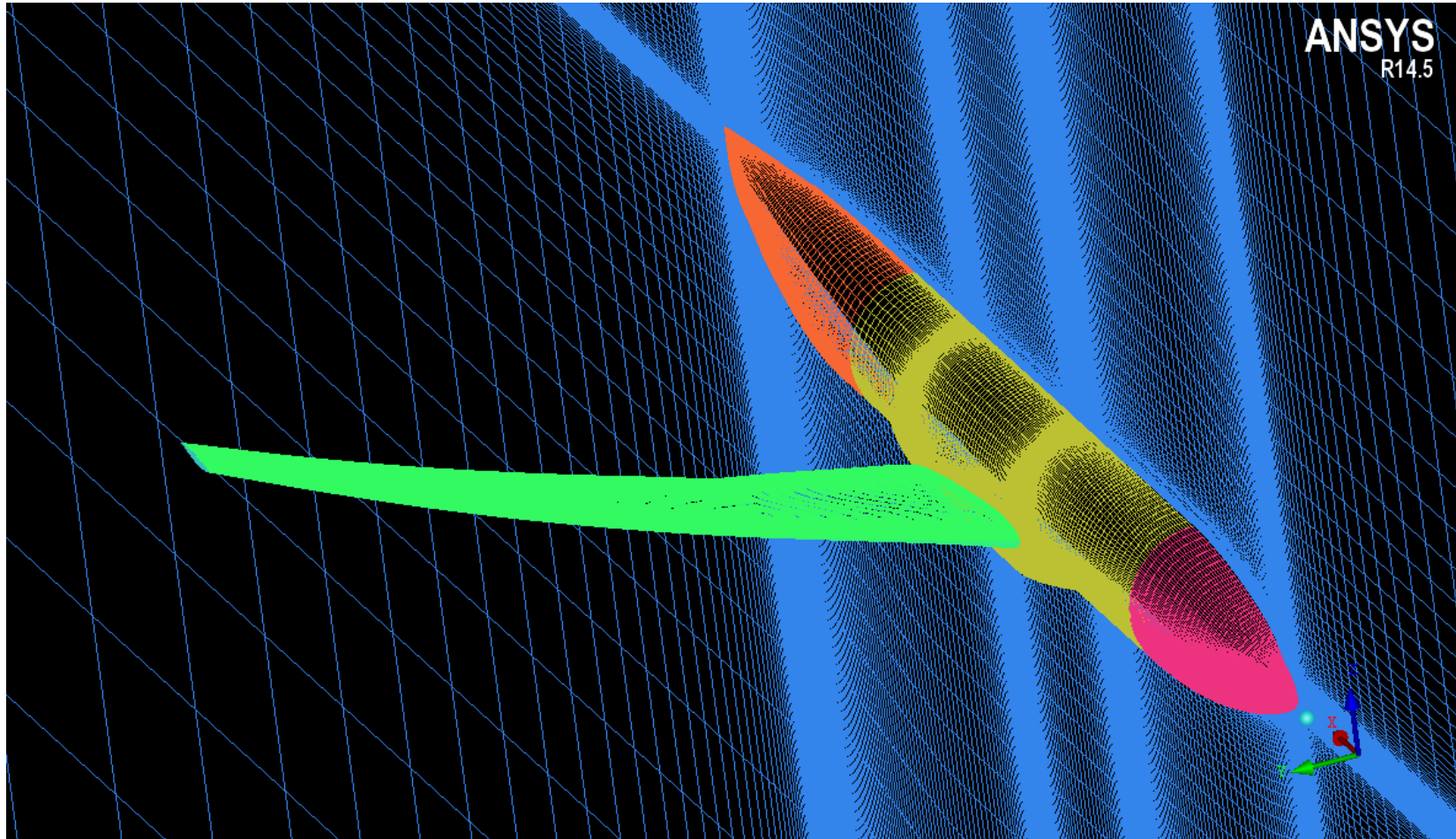
Grid – 3.25 deg



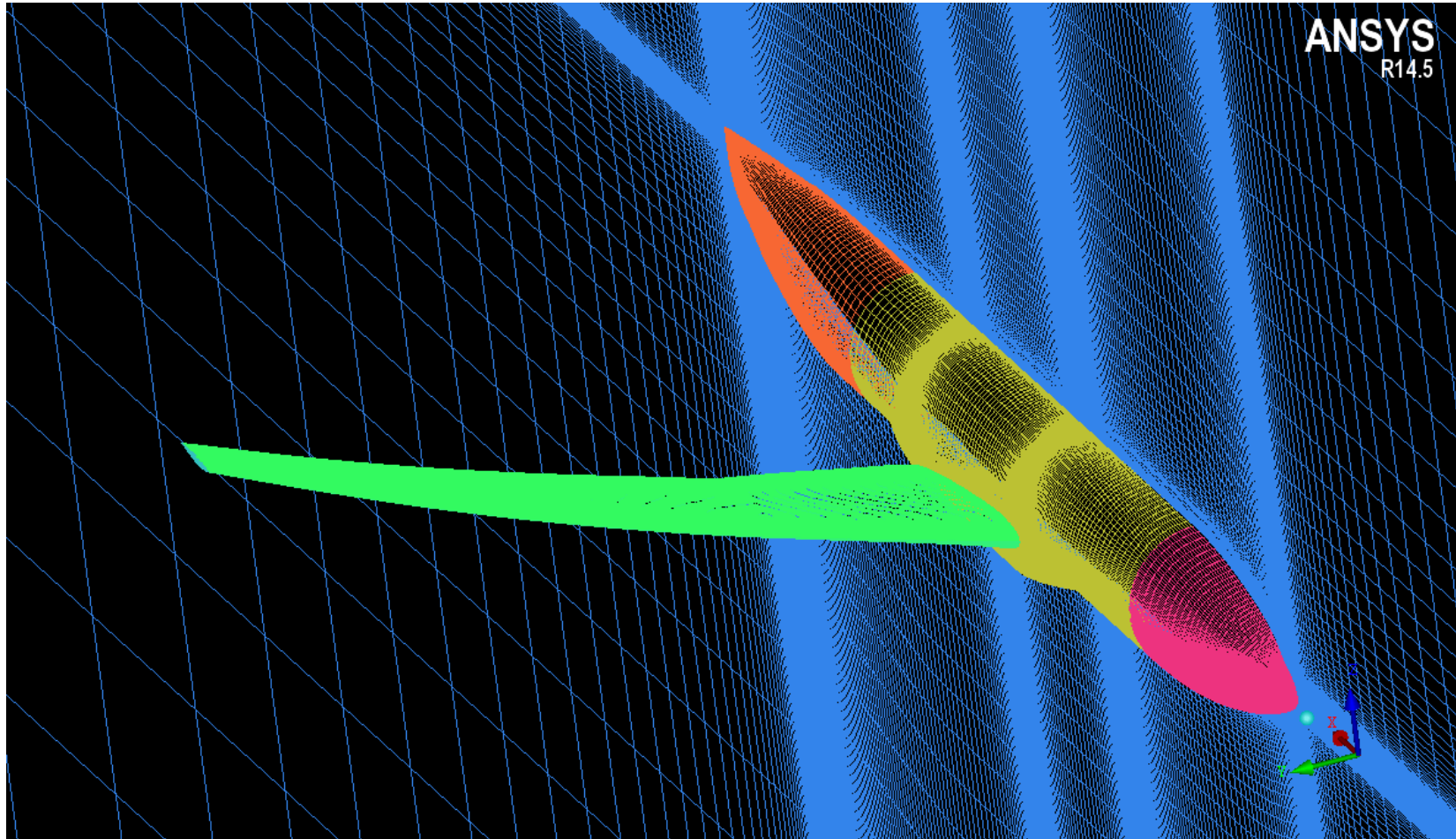
Grid – 3.50 deg



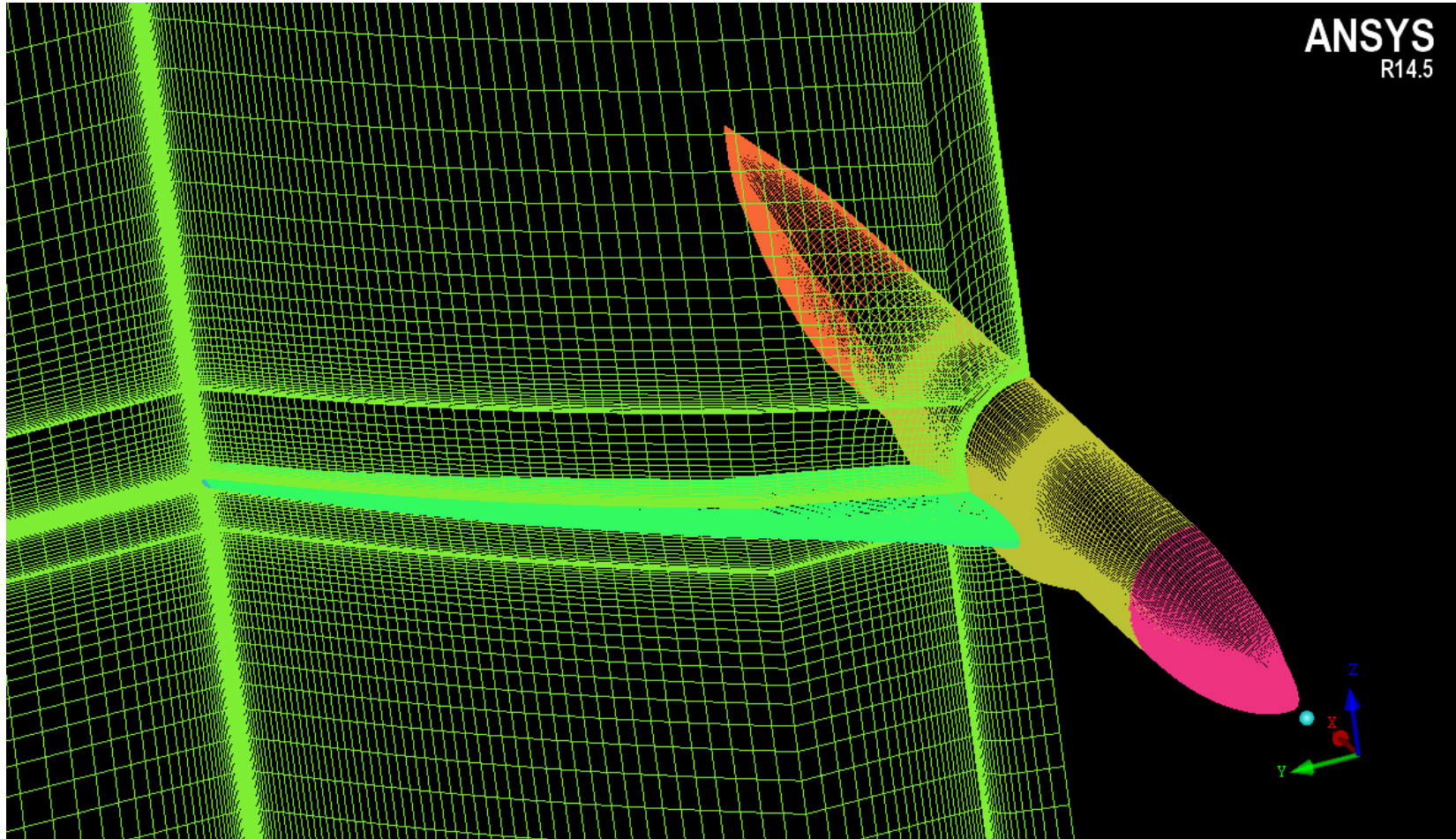
Grid – 3.75 deg



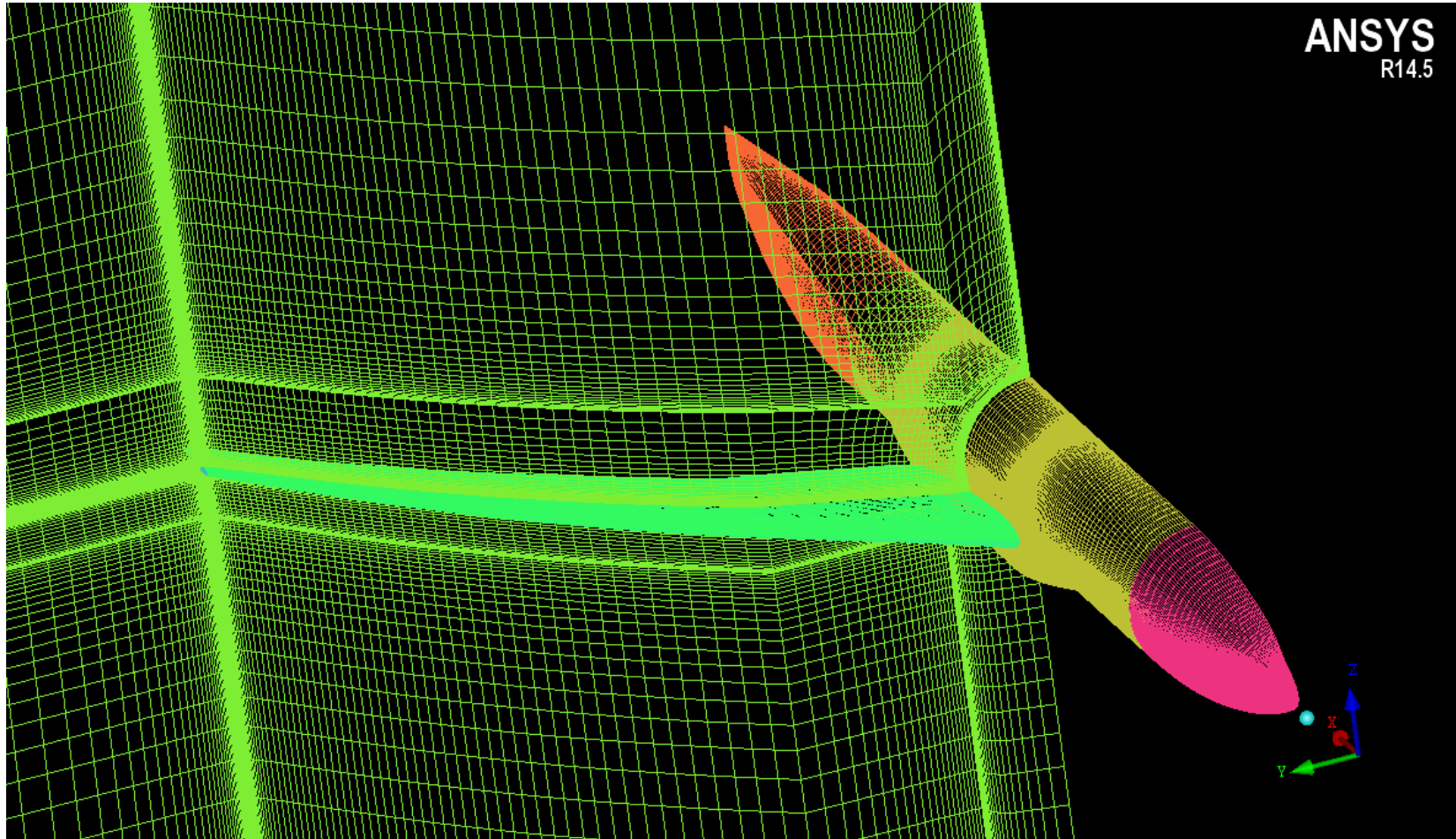
Grid – 4.00 deg



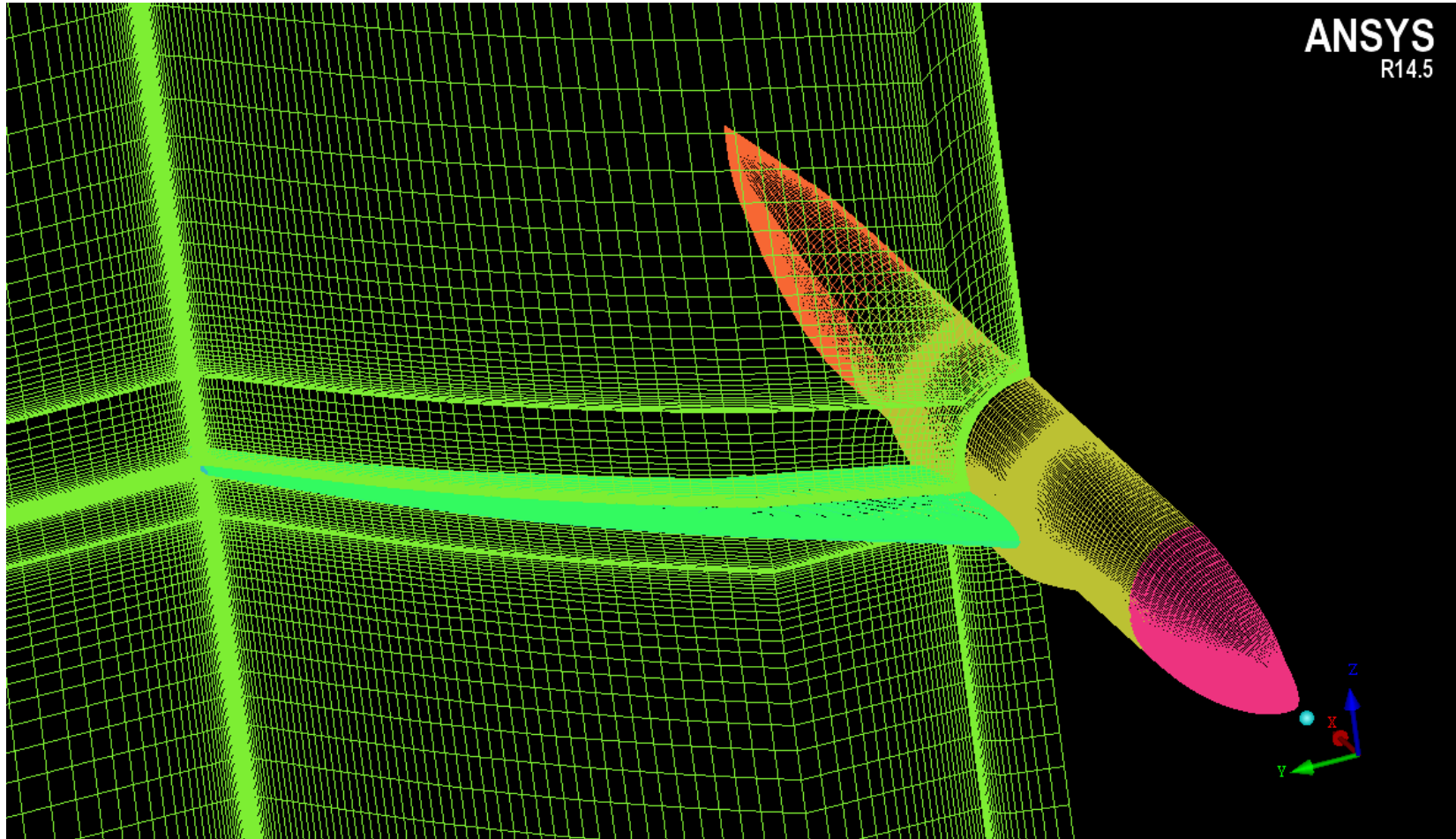
Wing Scan – 0.00 deg



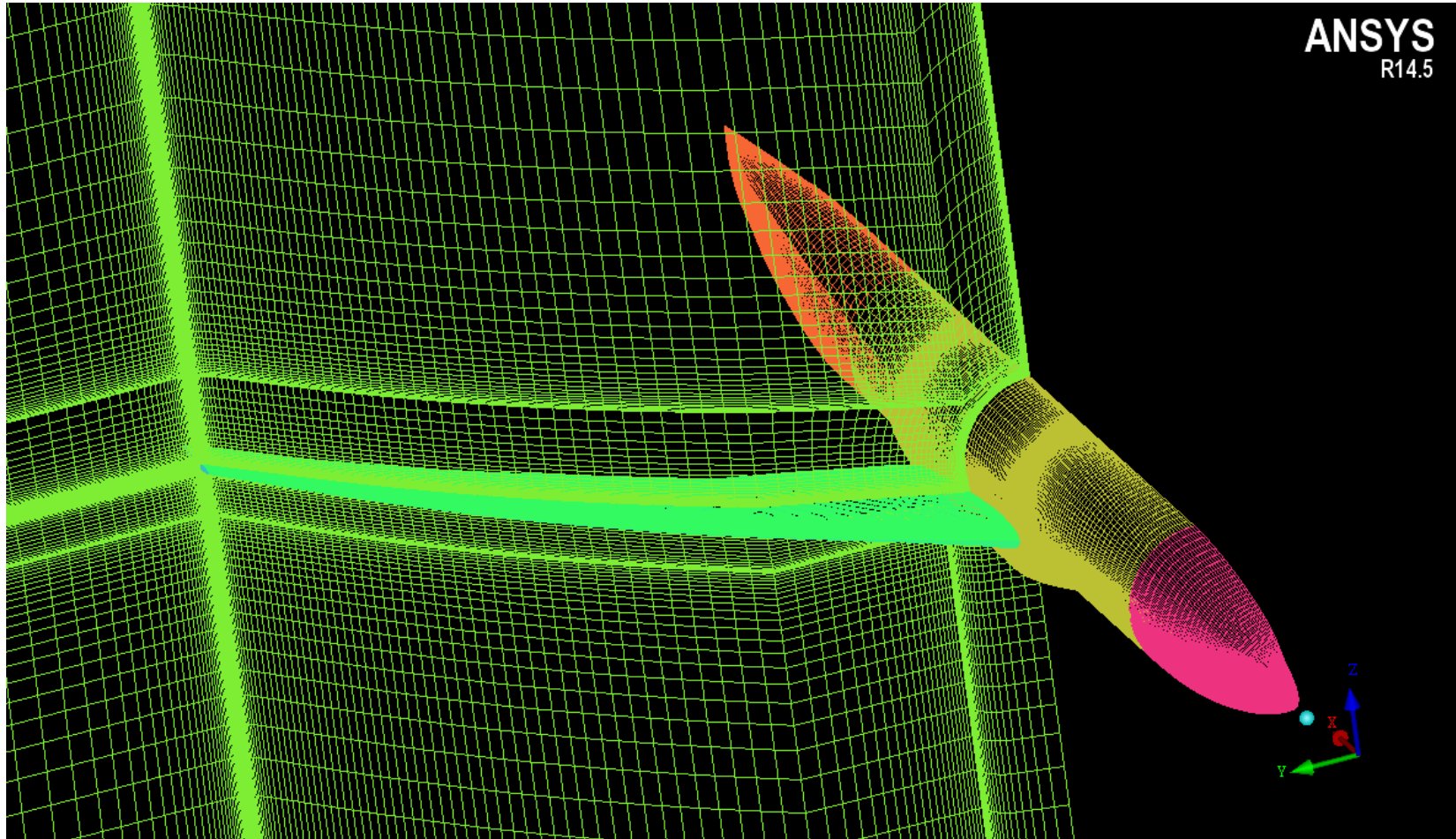
Wing Scan – 2.50 deg



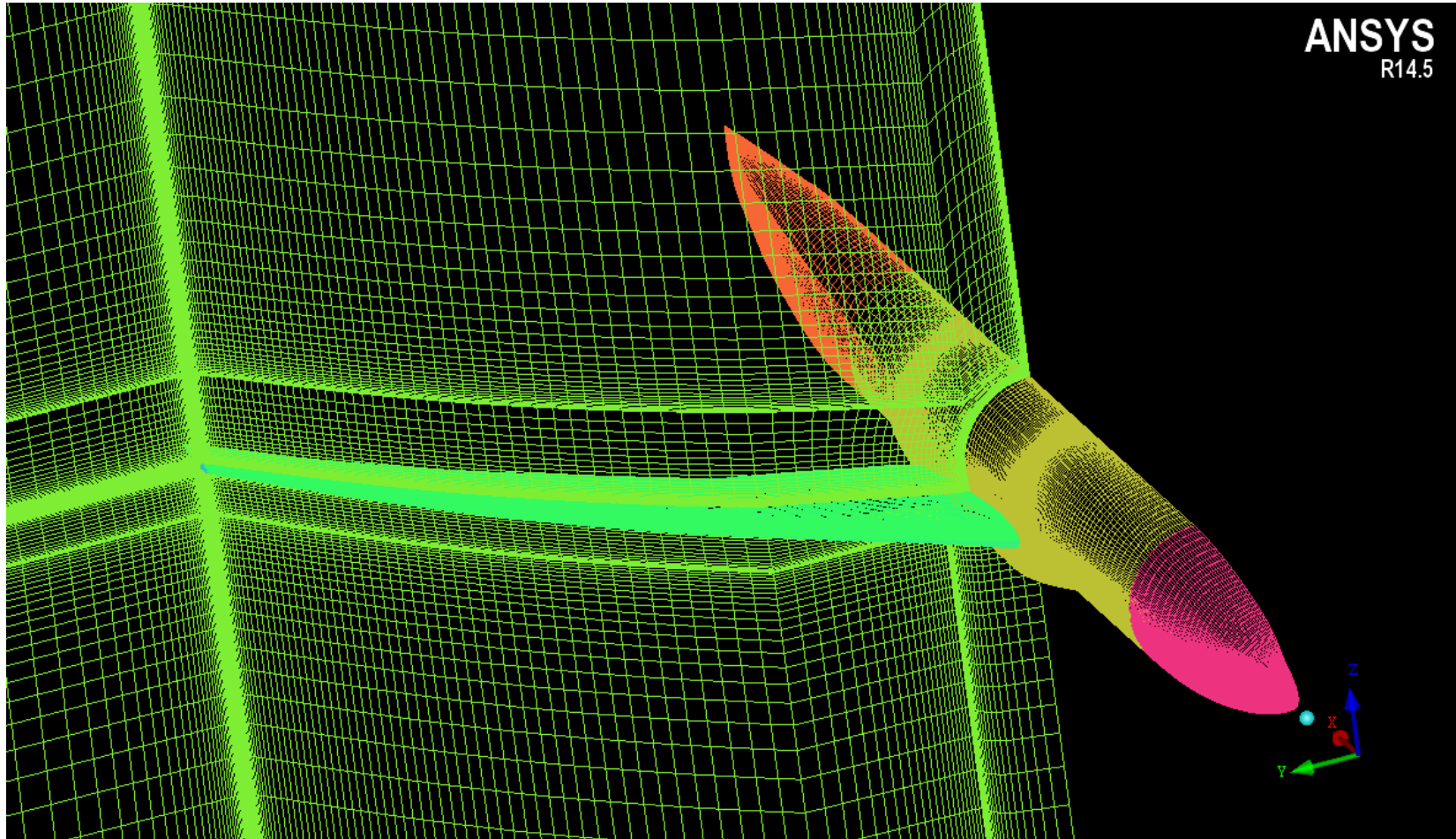
Wing Scan – 2.75 deg



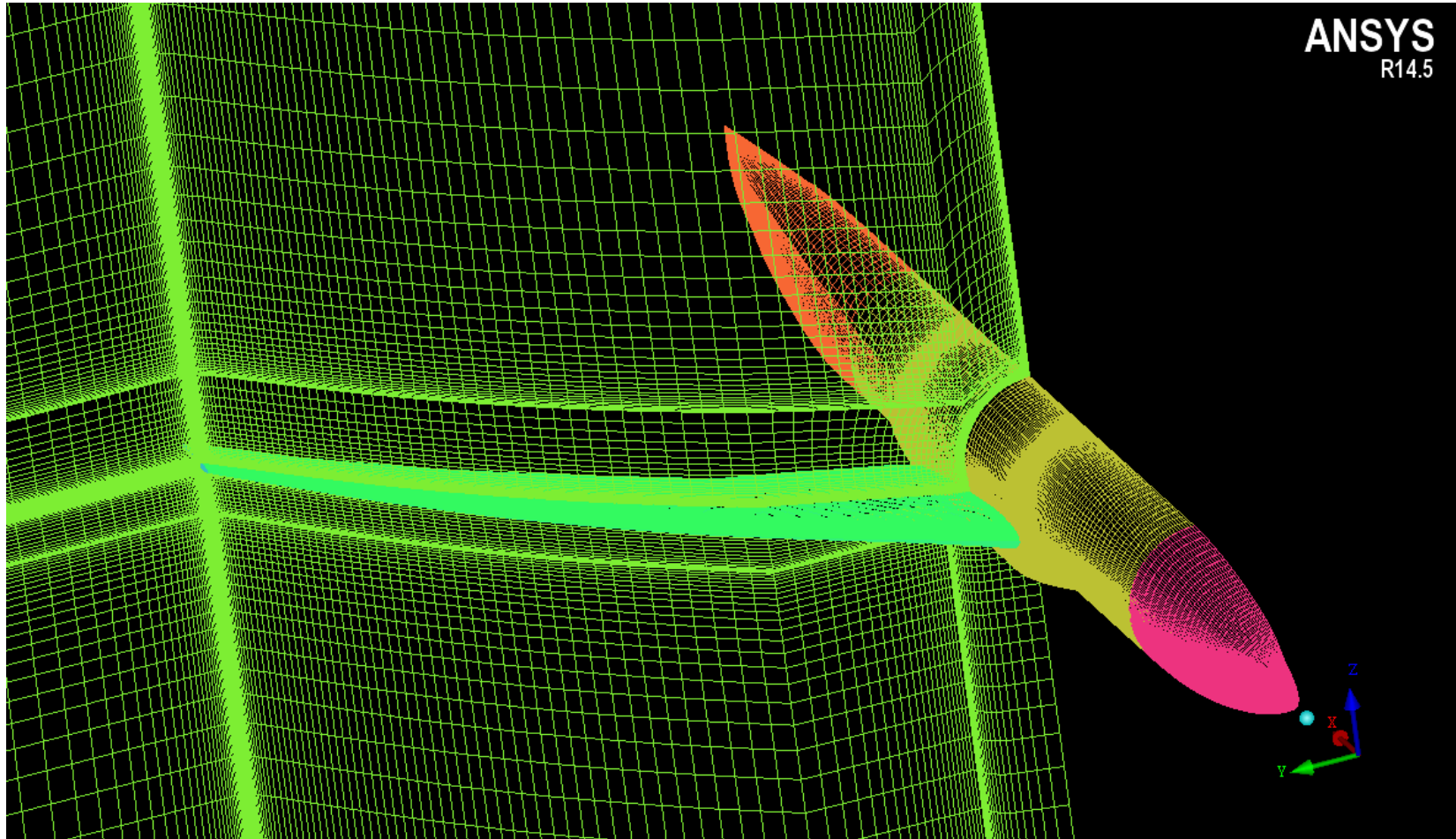
Wing Scan – 3.00 deg



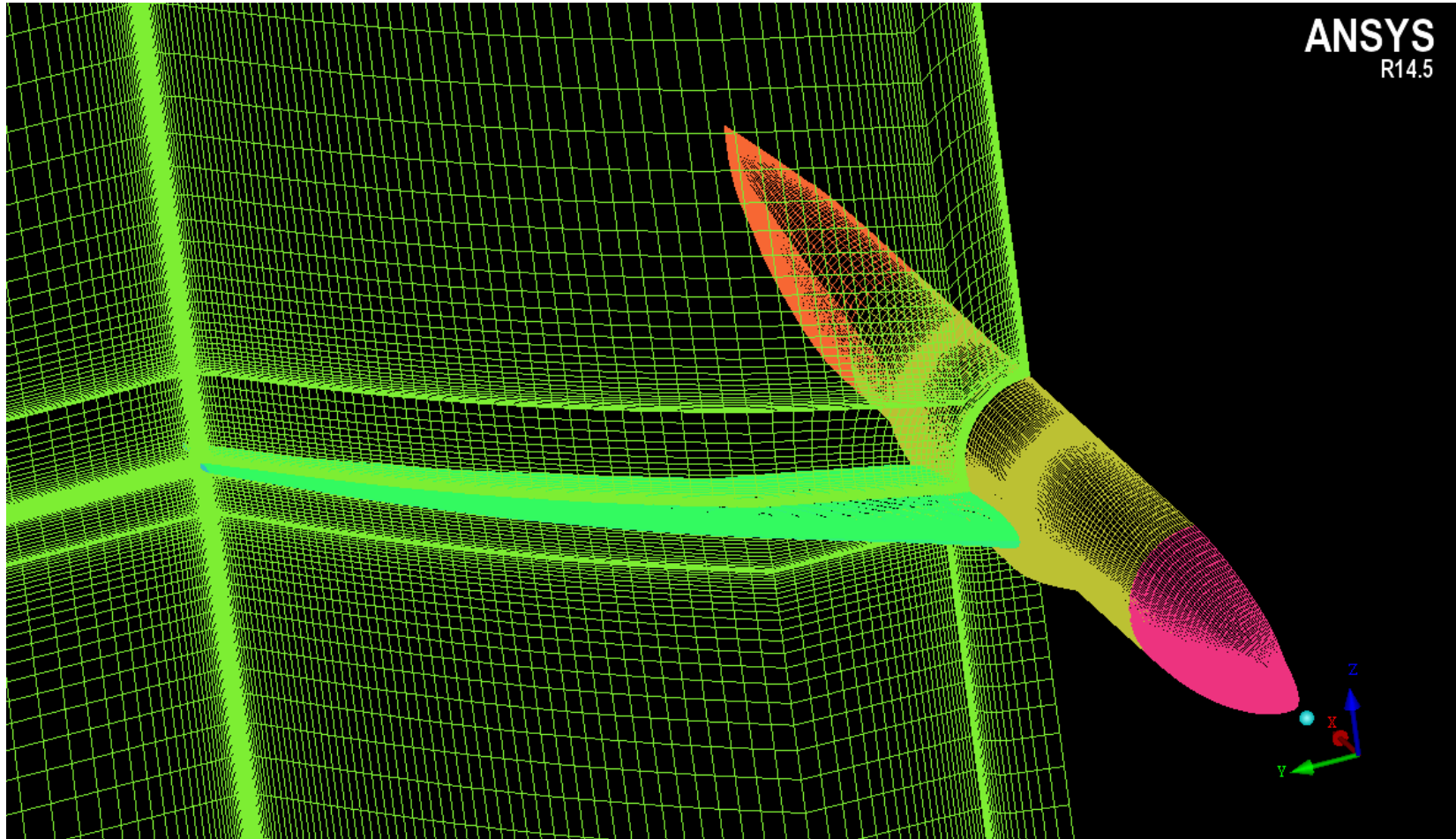
Wing Scan – 3.25 deg



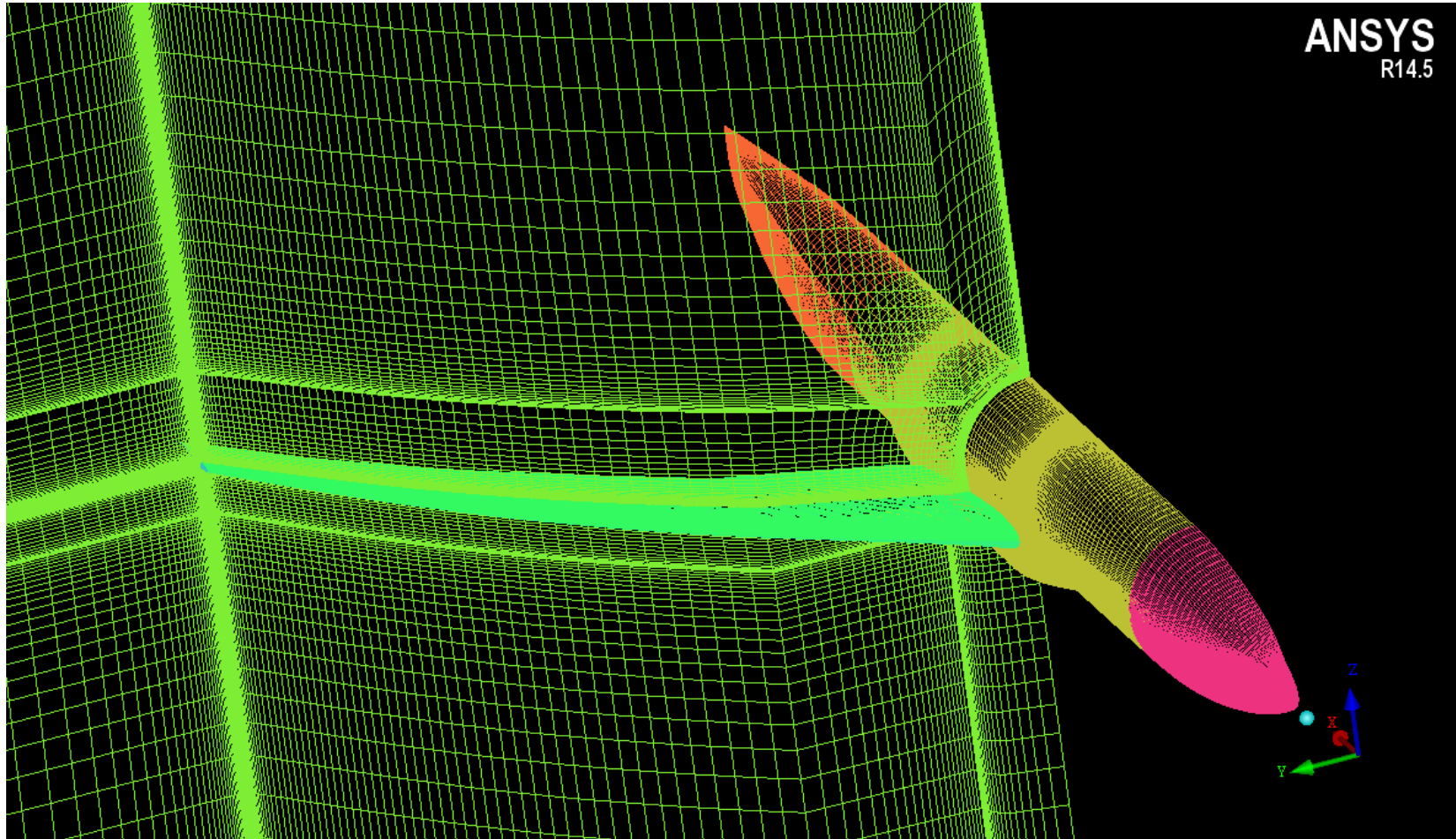
Wing Scan – 3.50 deg



Wing Scan – 3.75 deg



Wing Scan – 4.00 deg



General Comments

- 1) The grids are in CGNS format**
- 2) Observe that the number of vol cells (size M) for different deflections is exactly the same, i. e., the grids keep connectivity which yields good quality comparisons.**
- 3) The adding of # of cells is made uniformly all over the 3D space, in order not to privilege any particular region with more refined (or coarse) grid.**

The GMA – DPW6 (2016)

Thank You!



FOR THE JOURNEY

