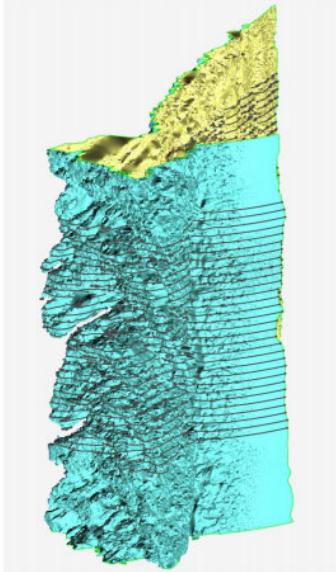


MCCS extraction workflow proposal

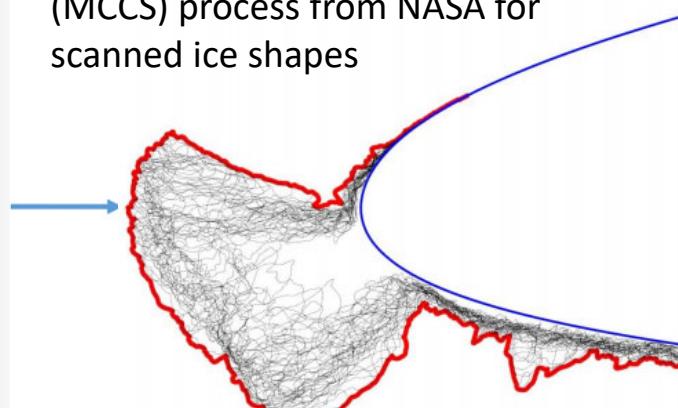
Isik Ozcer



MCCS extraction from 3D ice shapes



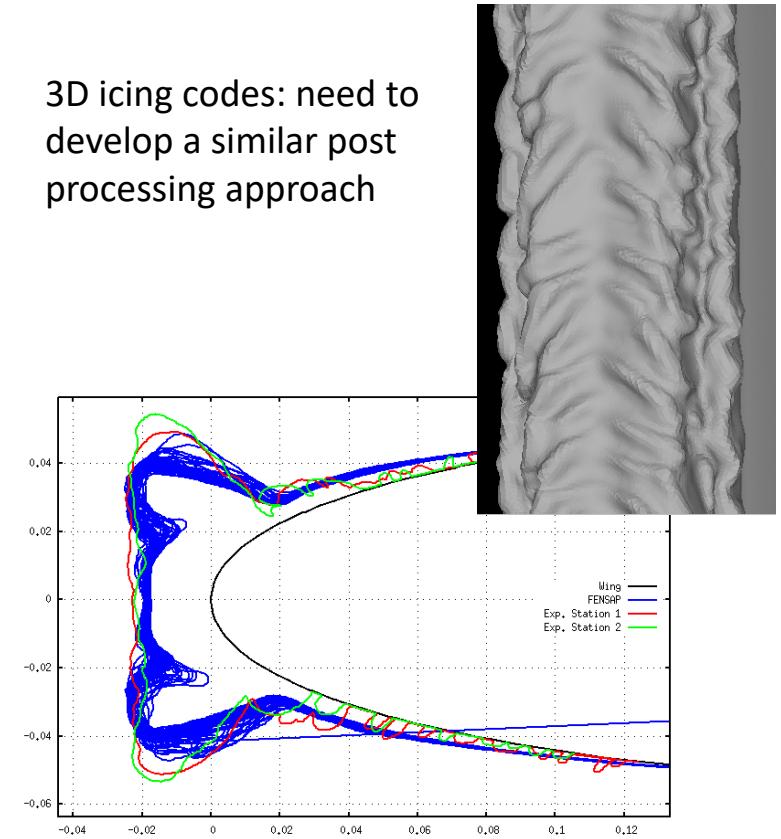
Maximum combined cross section (MCCS) process from NASA for scanned ice shapes



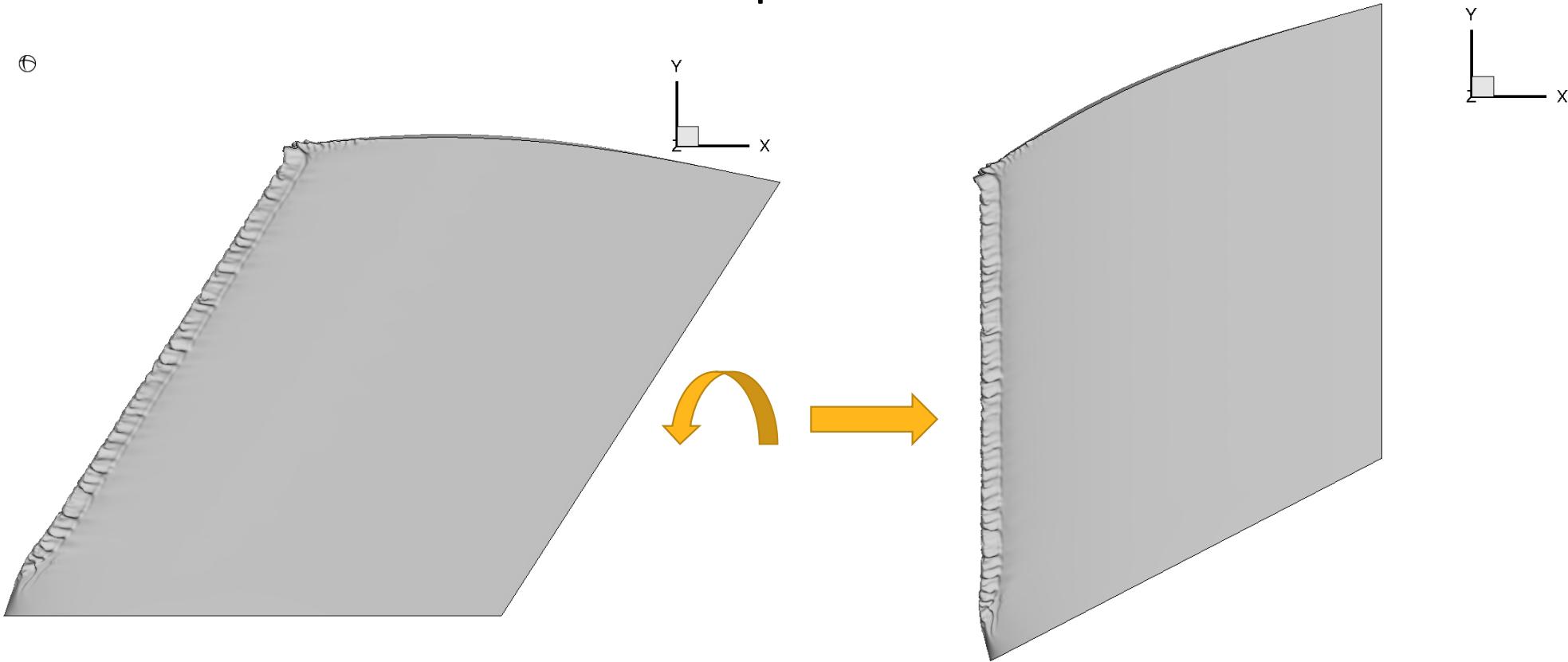
MCCS is an ice shape documentation technique for scallop ice shapes that form on swept wings

Ice prediction workshop data submission requirement

3D icing codes: need to develop a similar post processing approach

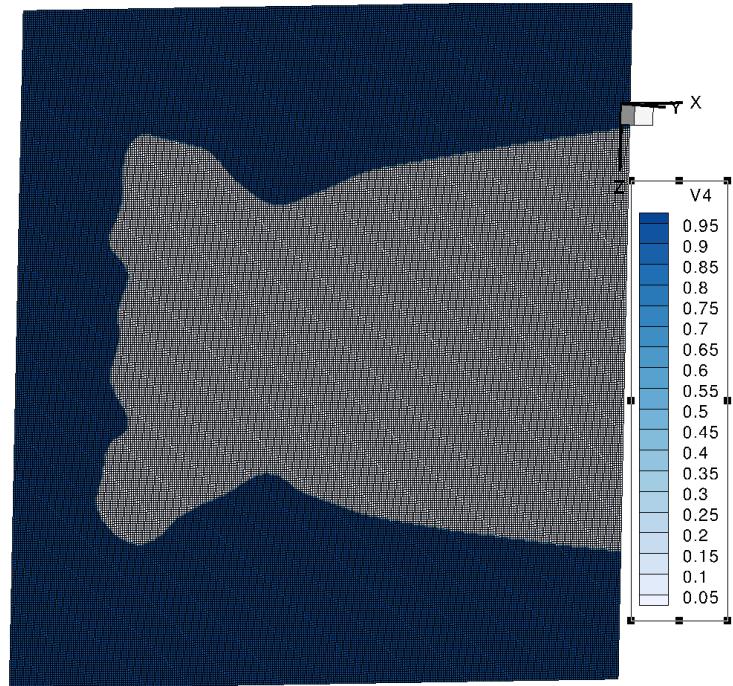
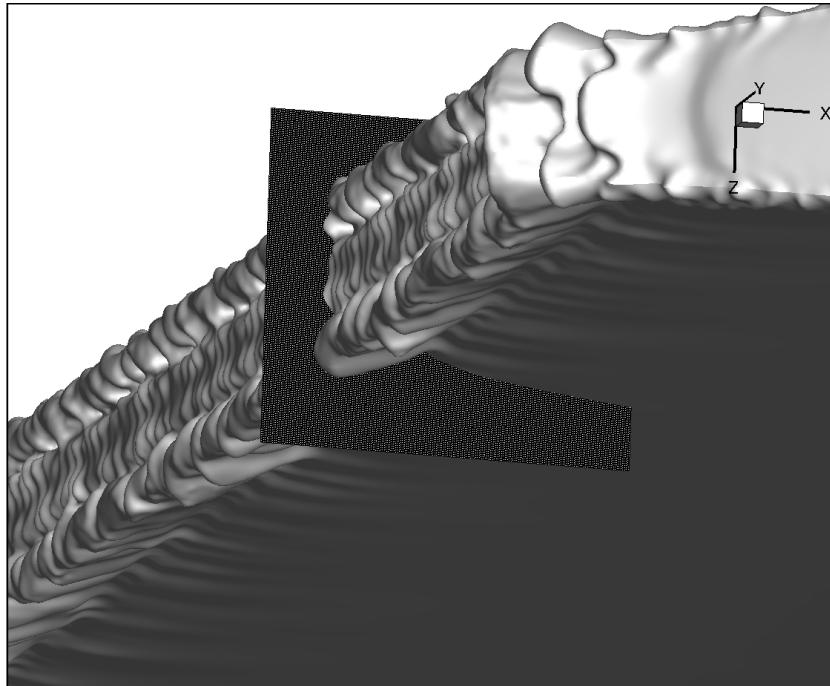


MCCS extraction from 3D ice shapes – tecplot workflow



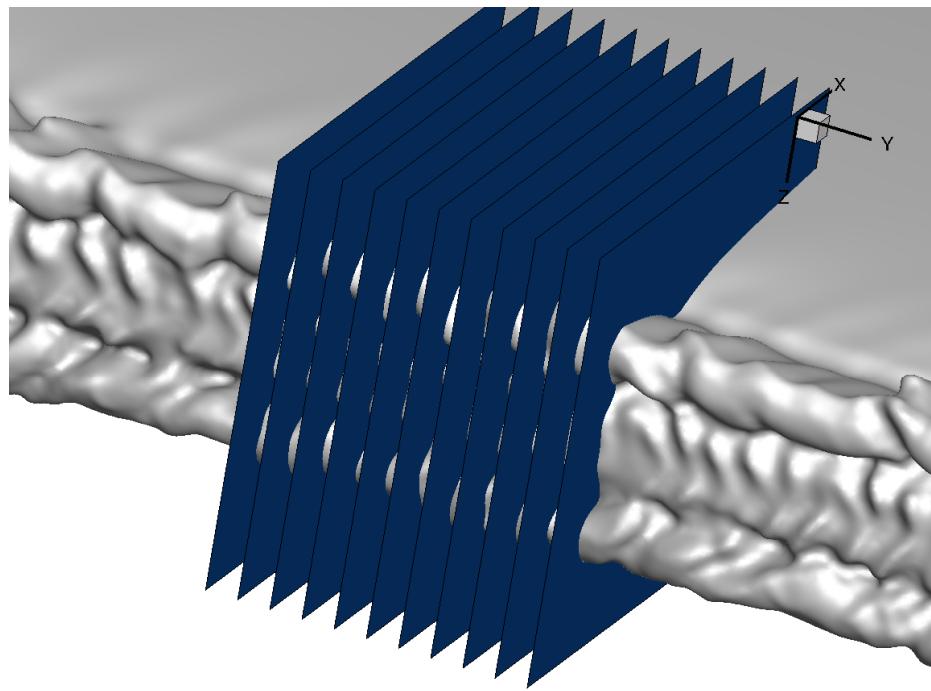
Need to have the final ice shape with a volume mesh around it
Start by loading that into tecplot and rotating the dataset to line up the LE with the Y coordinate

MCCS extraction from 3D ice shapes – tecplot workflow

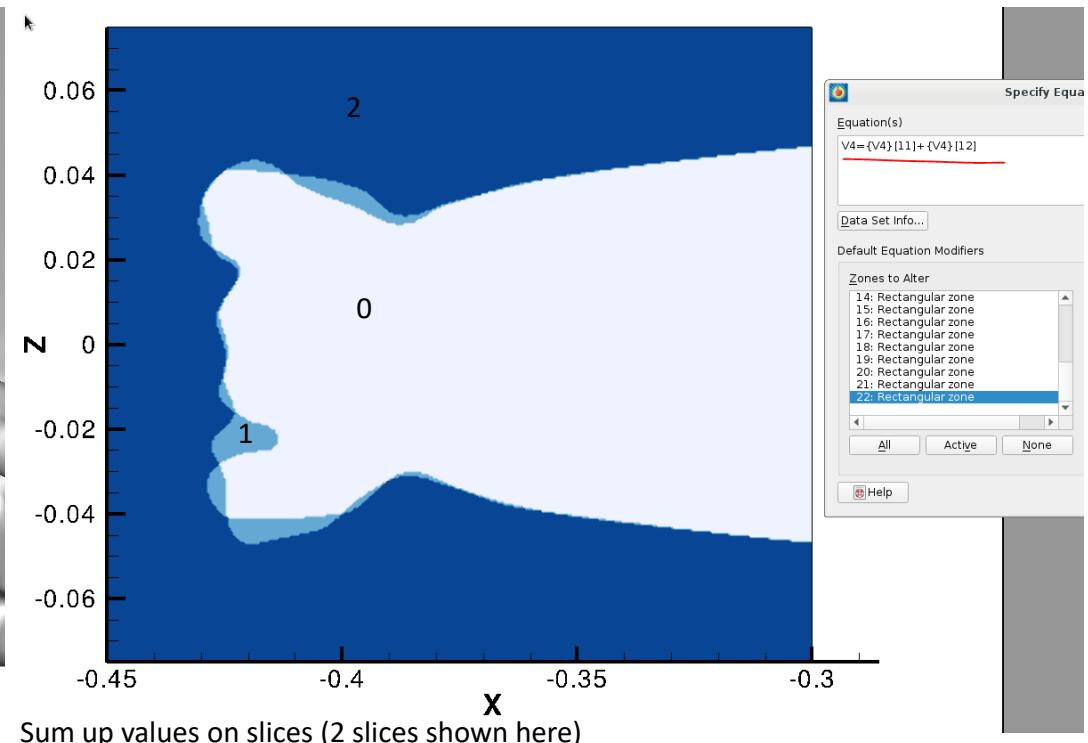


Create a bounded rectangular bounded slice (0.5mm resolution here),
Create a uniform scalar = 1 in the volume around the ice,
Interpolate to the slice to get 0/1 to identify the ice boundary at this slice station

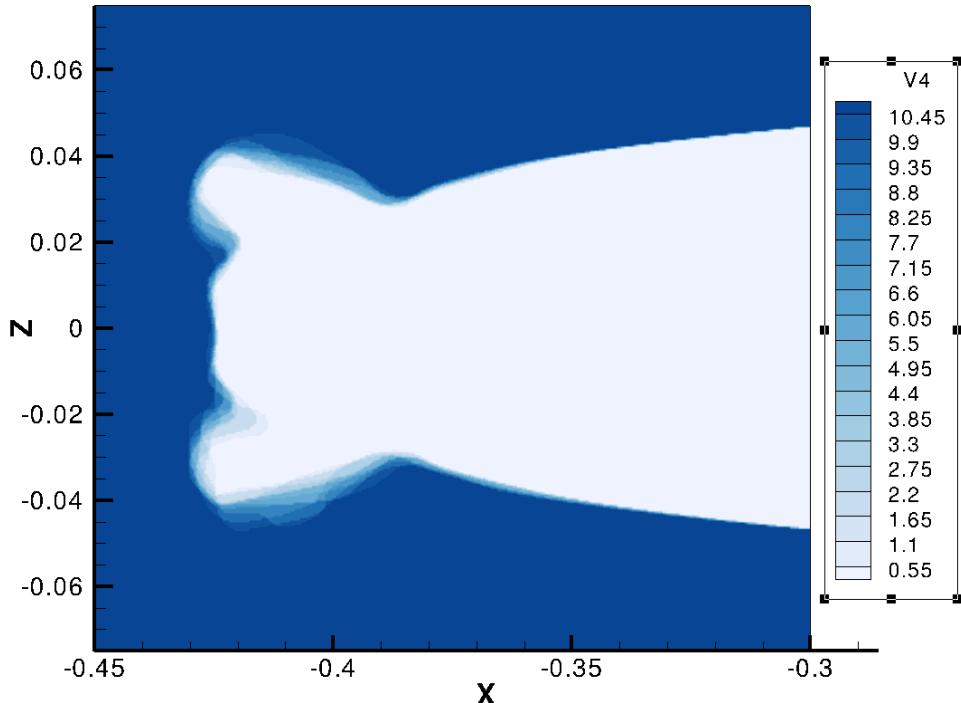
MCCS extraction from 3D ice shapes – tecplot workflow



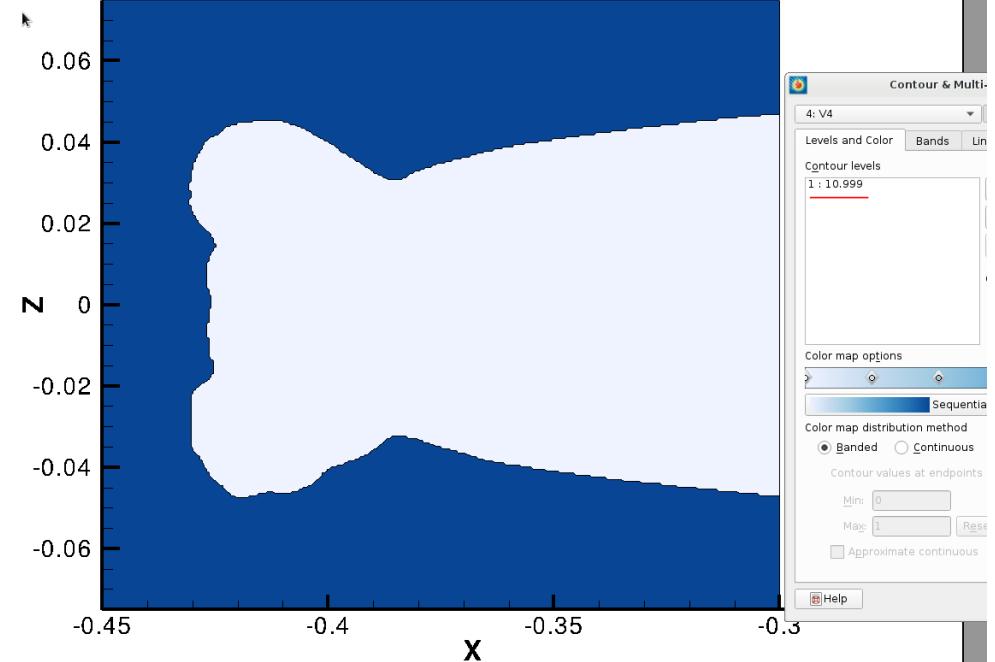
Repeat for more slices



MCCS extraction from 3D ice shapes – tecplot workflow

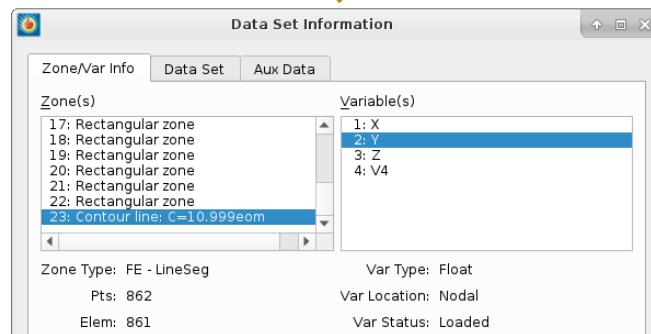
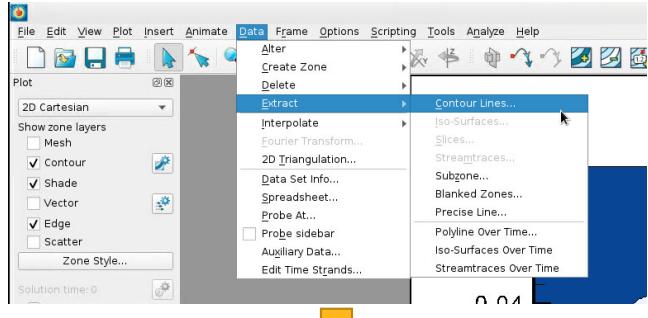


11 slices summed up, variable range 0 - 11

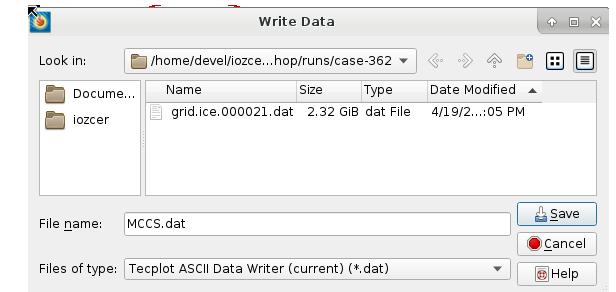
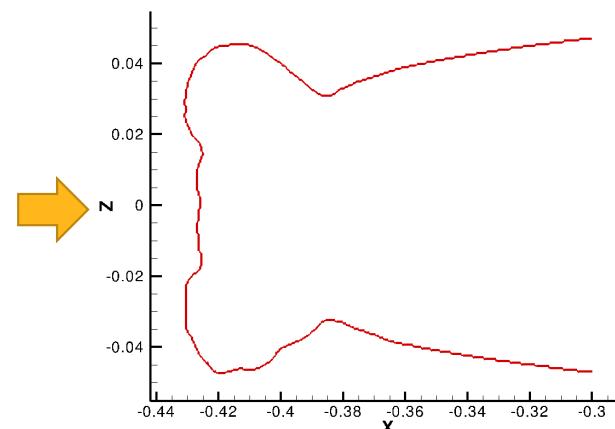


Reduce contour level to 1, set value $\sim \text{max}$ (11) \rightarrow MCCS!

MCCS extraction from 3D ice shapes – tecplot workflow



Contour lines can be extracted as data sets



```

TITLE      = "NTI converted file"
VARIABLES = "X"
"Z"
ZONE T="Contour line: C=10.999e0m"
STRANDID=0, SOLUTIONTIME=0
Nodes=862, Elements=861, ZONETYPE=FELineSeg
DATAPACKING=POINT
DT=(SINGLE SINGLE )
-4.204013348E-01 -4.740752652E-02
-4.198896723E-01 -4.740752652E-02
-4.193979800E-01 -4.740752652E-02
-4.188963175E-01 -4.740752652E-02
-4.183946550E-01 -4.740752652E-02
-4.178929827E-01 -4.740752652E-02
-4.214046896E-01 -4.690585285E-02
-4.209024906E-01 -4.690635577E-02
-4.209029973E-01 -4.690585285E-02
-4.173918068E-01 -4.690635577E-02
-4.173913002E-01 -4.690585285E-02
-4.168896377E-01 -4.690585285E-02
-4.163879454E-01 -4.690585285E-02
-4.158862829E-01 -4.690585285E-02
-3.045150638E-01 -4.690585285E-02
-3.040134013E-01 -4.690625519E-02
-3.035117090E-01 -4.690627381E-02
-3.030100465E-01 -4.690628499E-02
-3.025083840E-01 -4.690628499E-02
-3.020066917E-01 -4.690631106E-02
-3.015050292E-01 -4.690631106E-02
-3.010033667E-01 -4.690631106E-02
-3.005016744E-01 -4.690631106E-02
-3.000000119E-01 -4.690631106E-02
-4.219058454E-01 -4.640468583E-02
-4.219063520E-01 -4.640418291E-02

```

Ansys

