



Applied Aerodynamics
Technical Committee

7th CFD Drag Prediction Workshop

Chicago, IL USA – June 2022



Side-of-Body Separation

(Wing-Body Trailing-Edge Juncture Separation)

Side-of-Body Separation

- **10 Submitted (partial) Data Sets (as of June 21)**

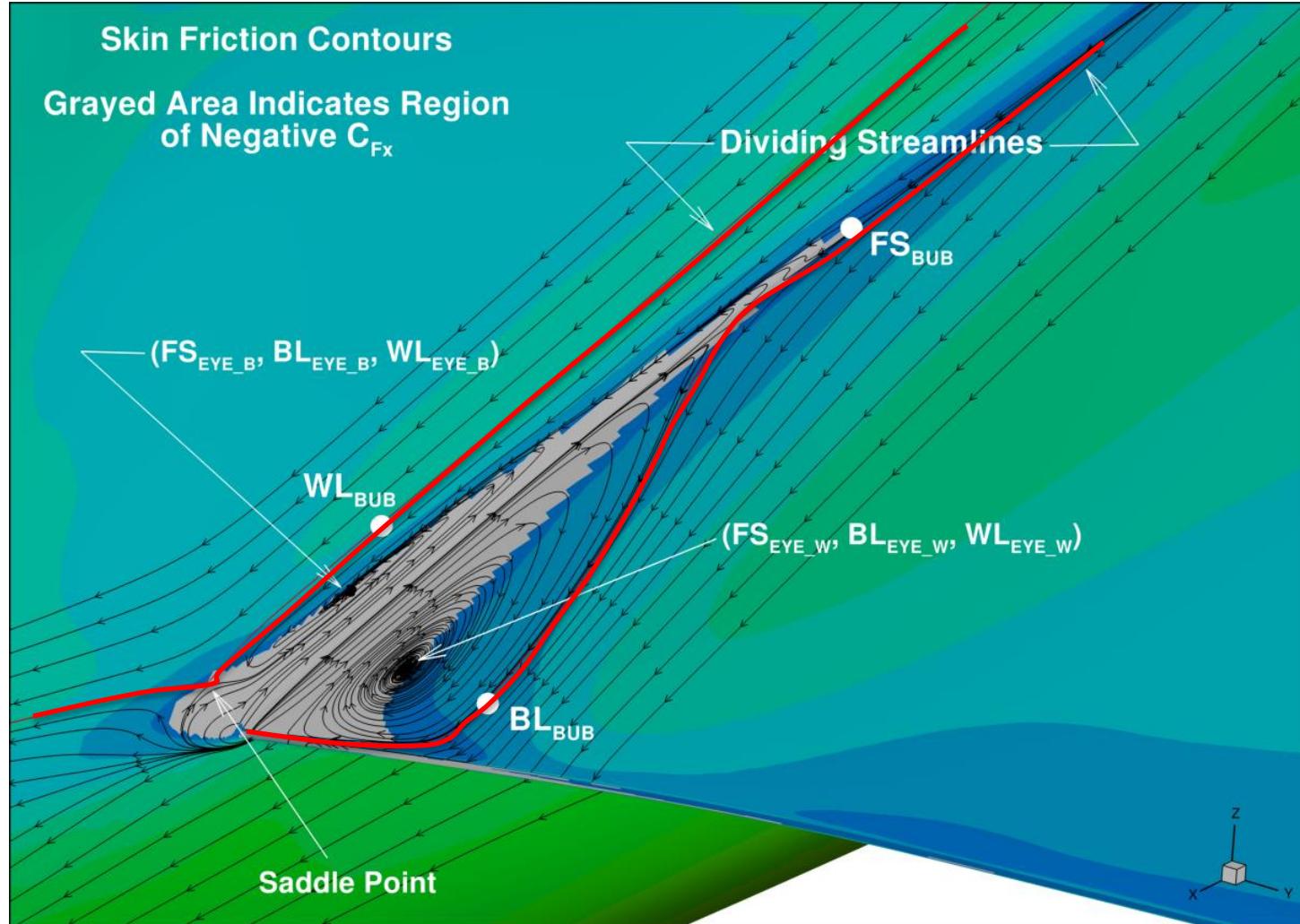
Grids

7 Unstructured
1 Overset
1 Multi-block
1 Custom Cartesian

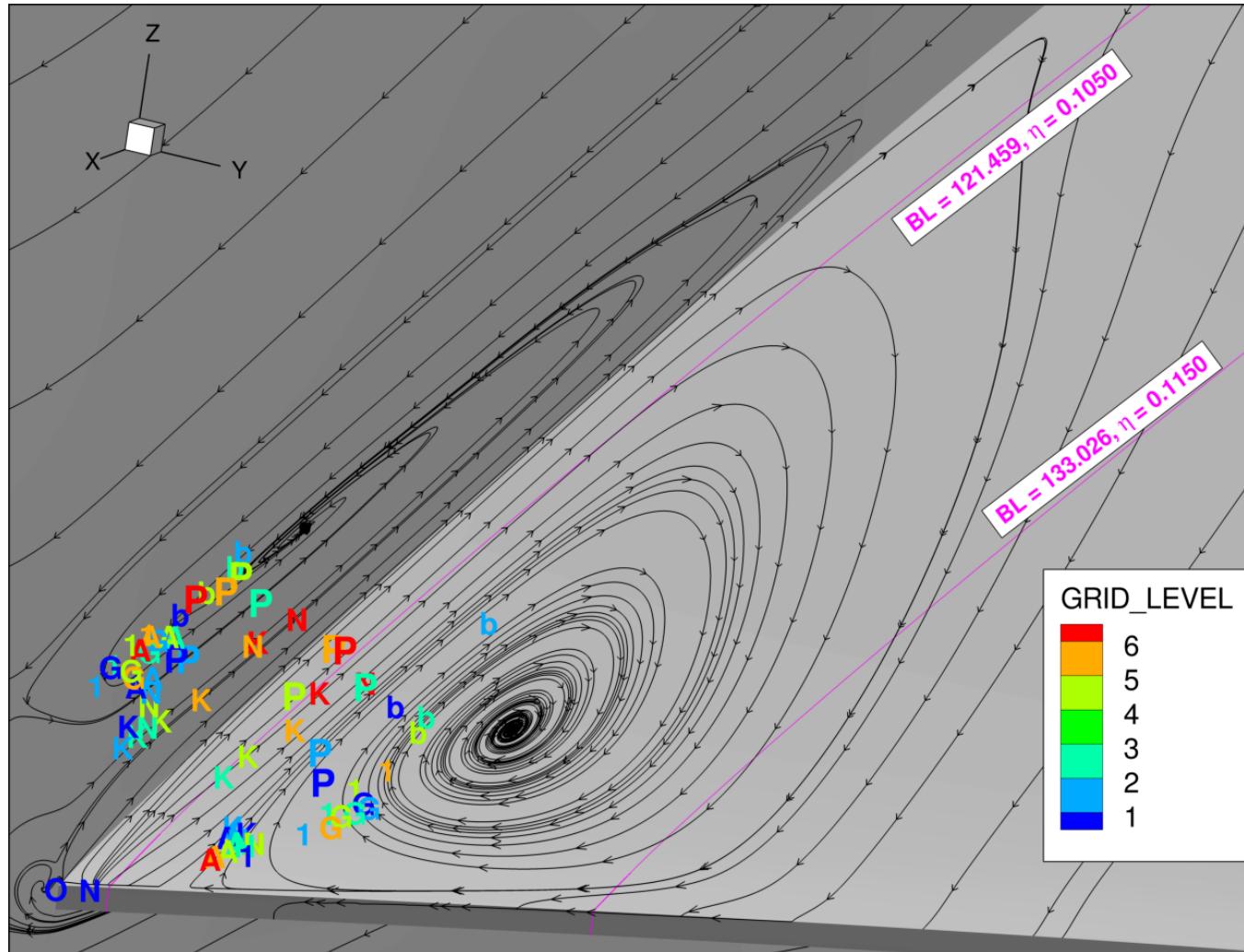
Turbulence Models

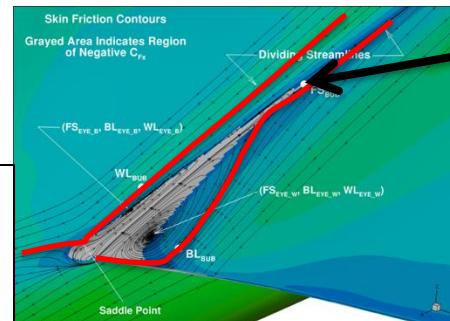
2 SA
6 SA QCR
1 SST
1 k- ϵ

Separation Bubble



CASE 1A: Grid Refinement – Eye Locations



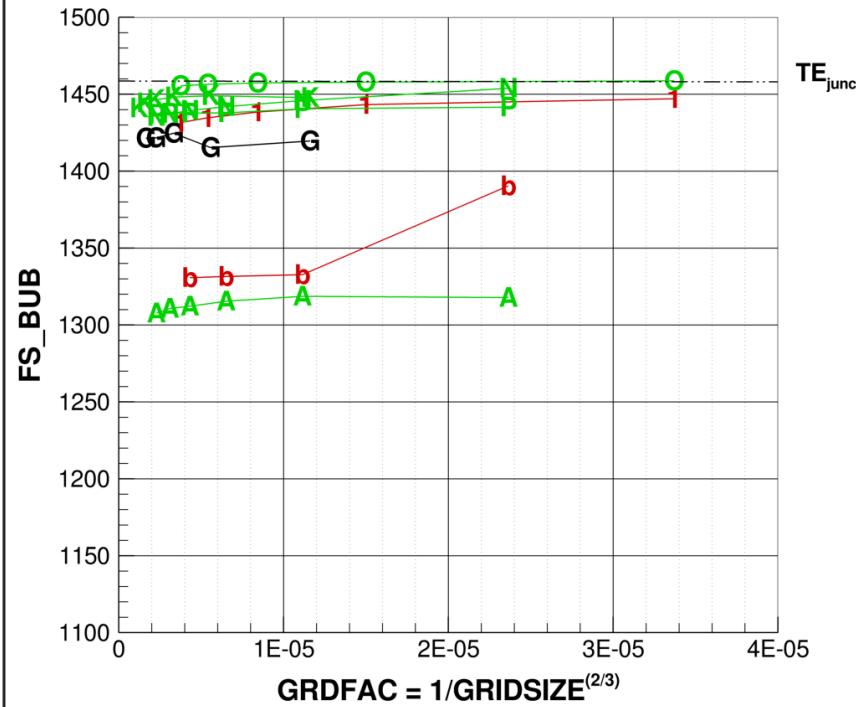
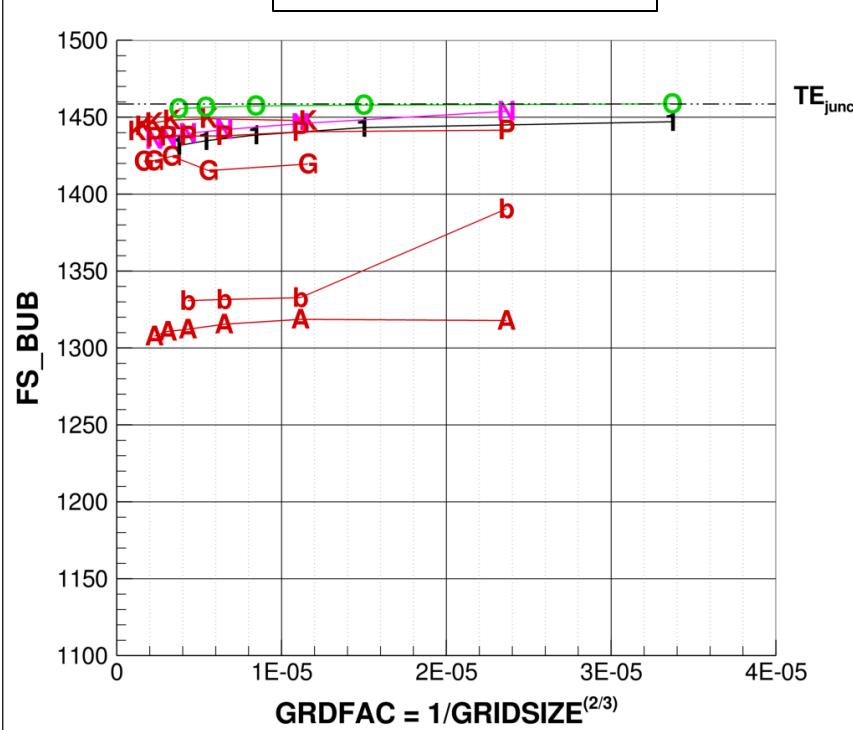
CASE 1A: Grid Refinement

Bubble Leading Edge

Grid Type

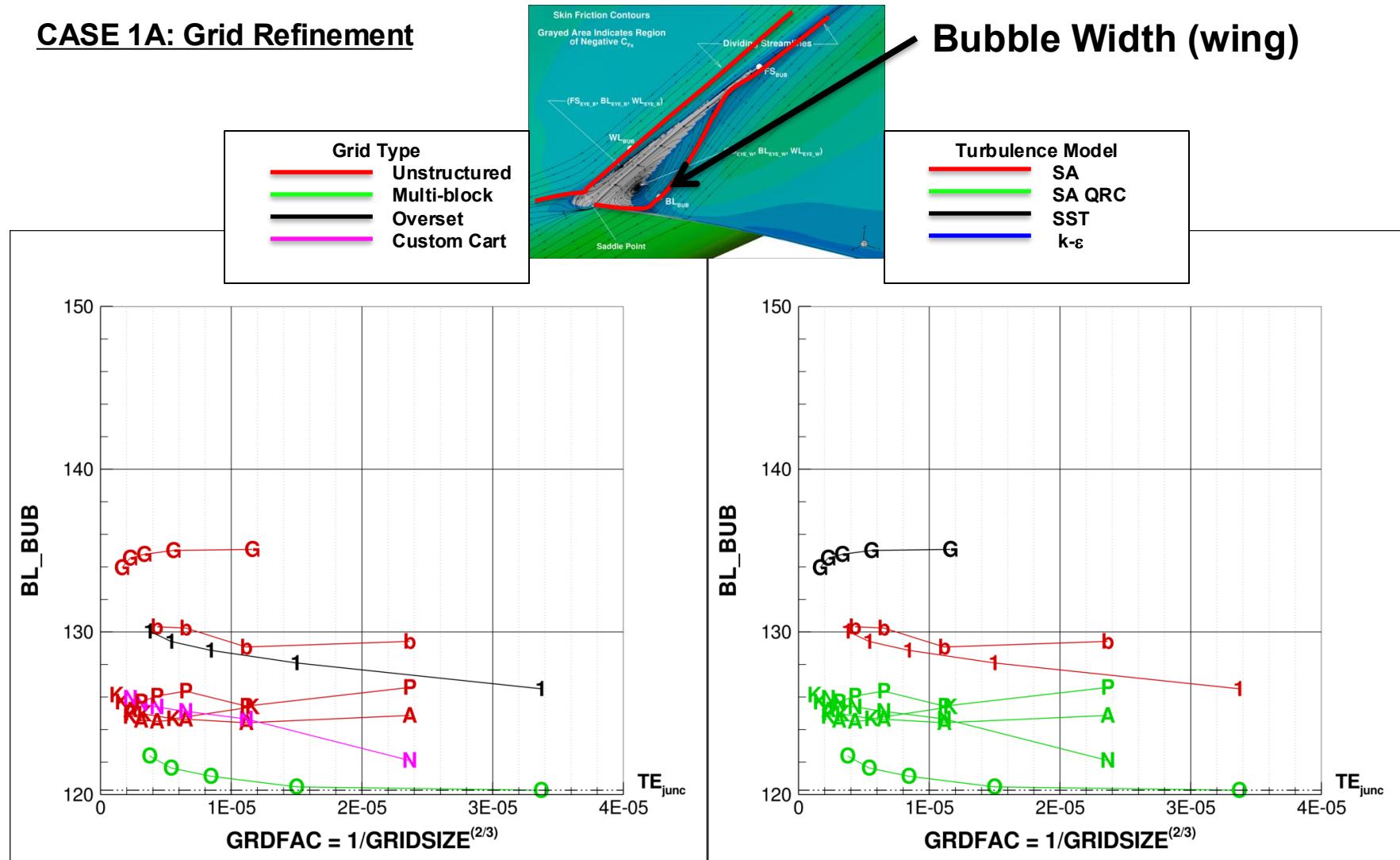
- Unstructured
- Multi-block
- Overset
- Custom Cart

Turbulence Model

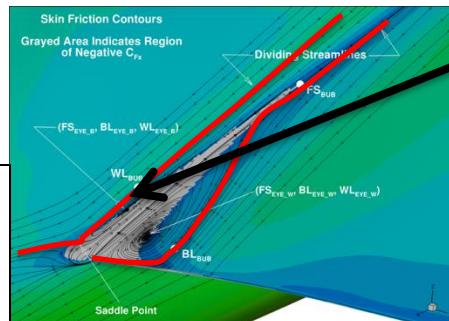
- SA
- SA QRC
- SST
- k- ϵ



CASE 1A: Grid Refinement



CASE 1A: Grid Refinement



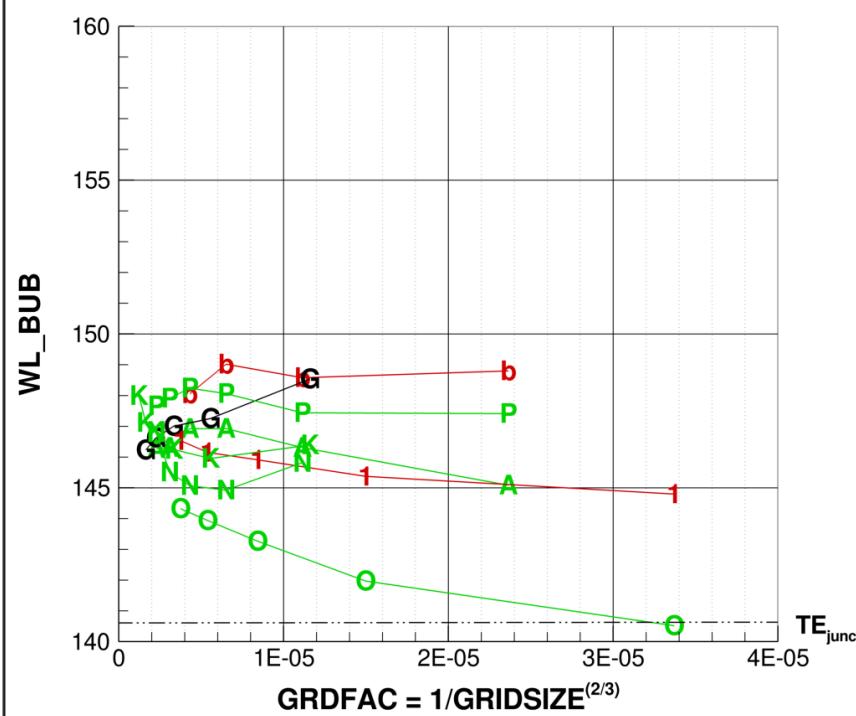
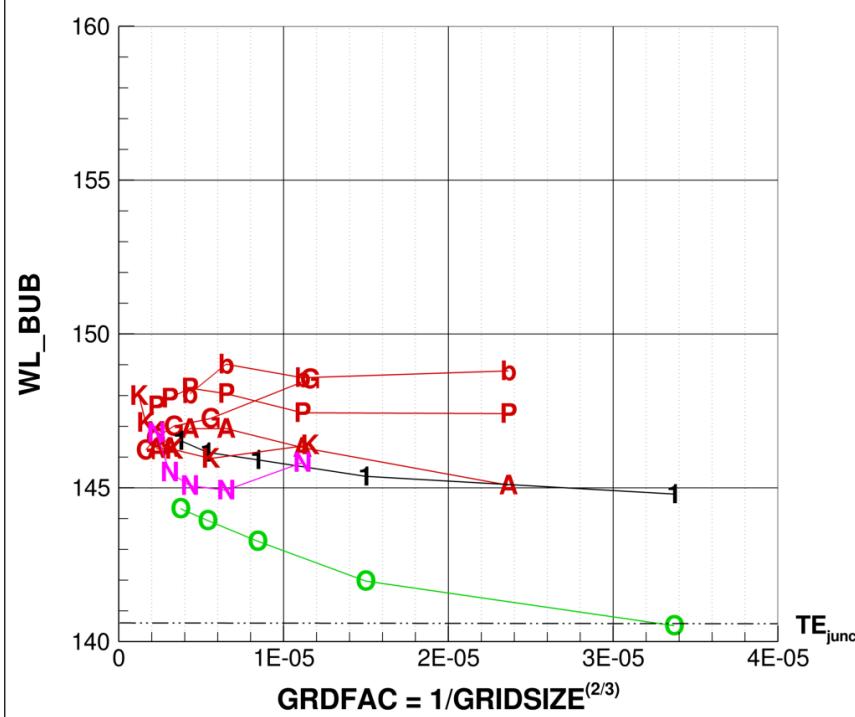
Bubble Height (fuselage)

Grid Type

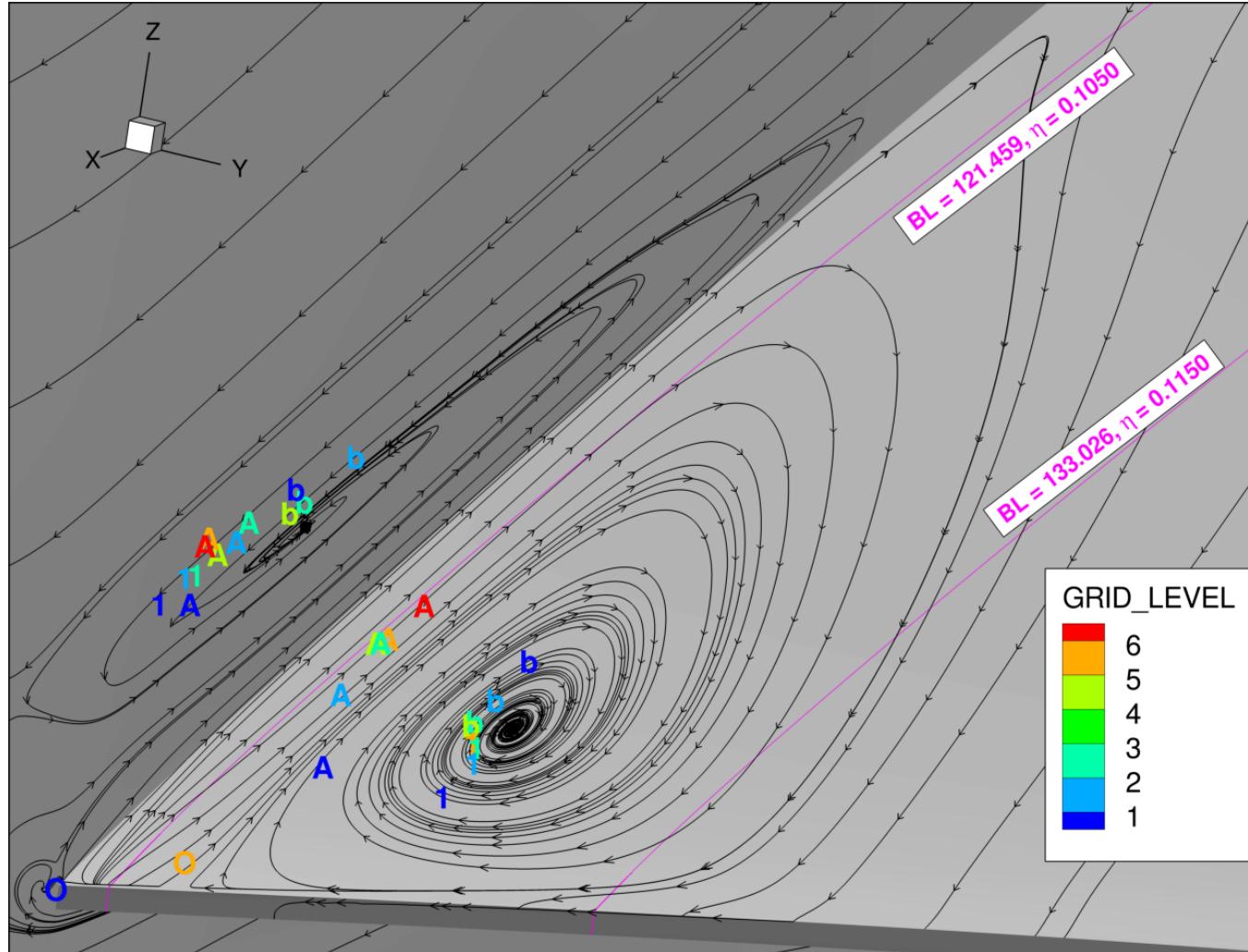
- Unstructured
- Multi-block
- Overset
- Custom Cart

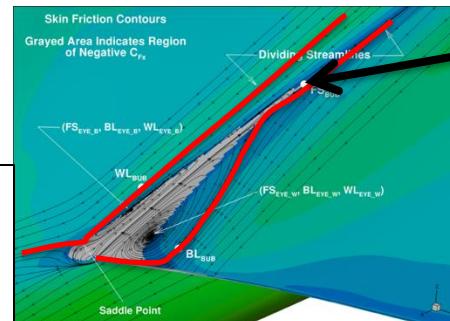
Turbulence Model

- SA
- SA QRC
- SST
- k- ϵ



CASE 1B: Grid Refinement – Eye Locations



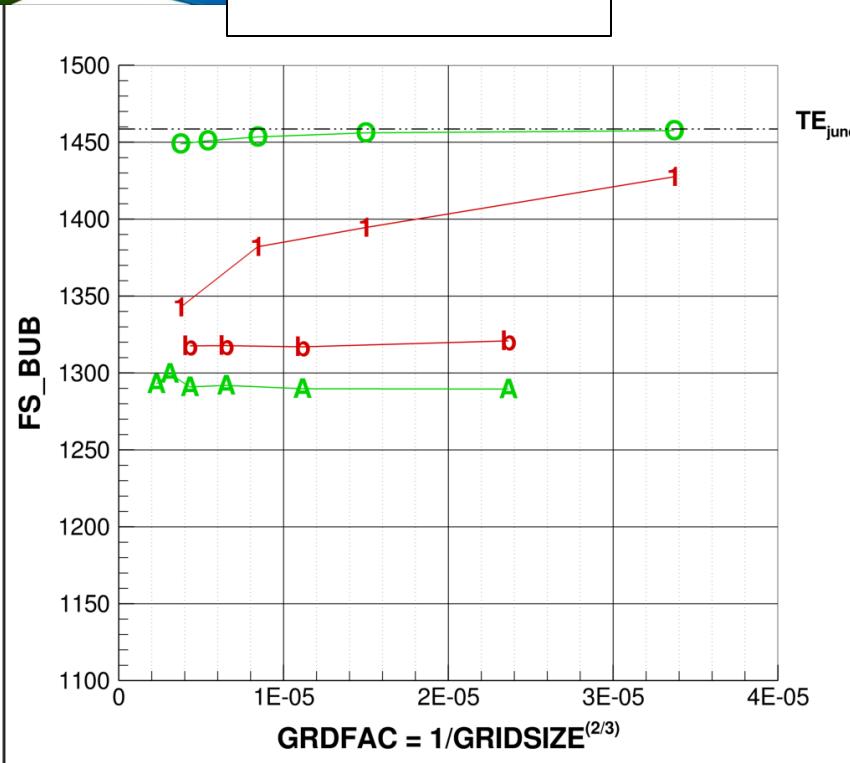
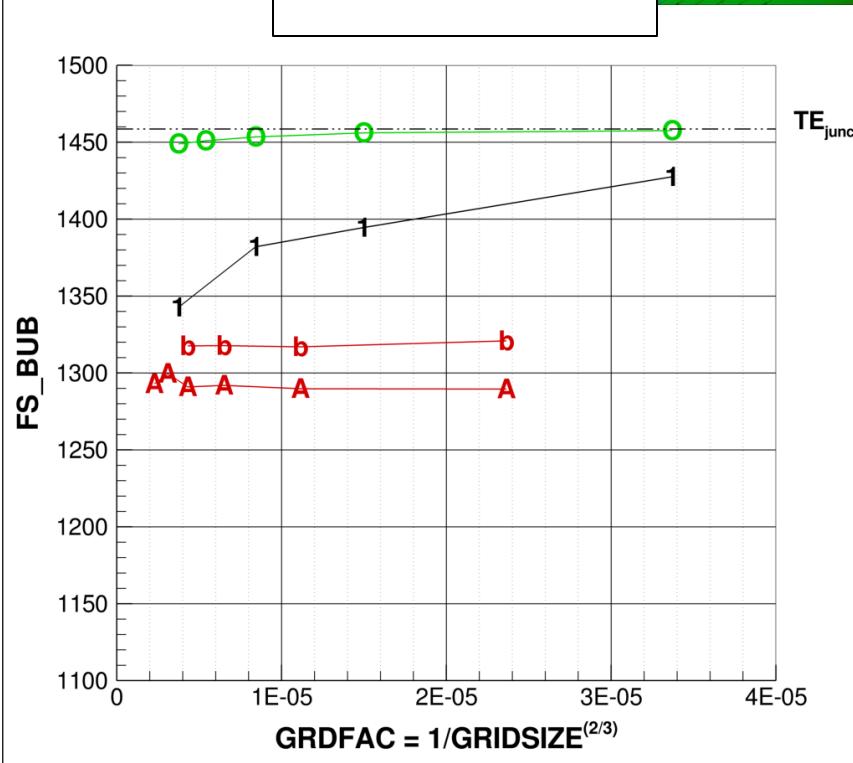
CASE 1B: Grid Refinement

Bubble Leading Edge

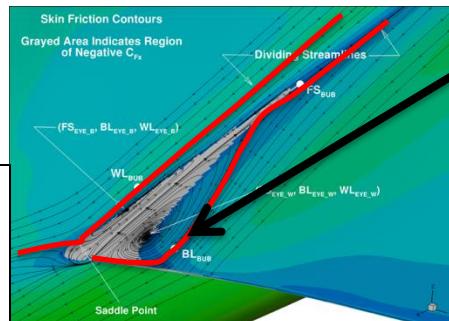
Grid Type

- Unstructured
- Multi-block
- Overset
- Custom Cart

Turbulence Model

- SA
- SA QRC
- SST
- k- ϵ



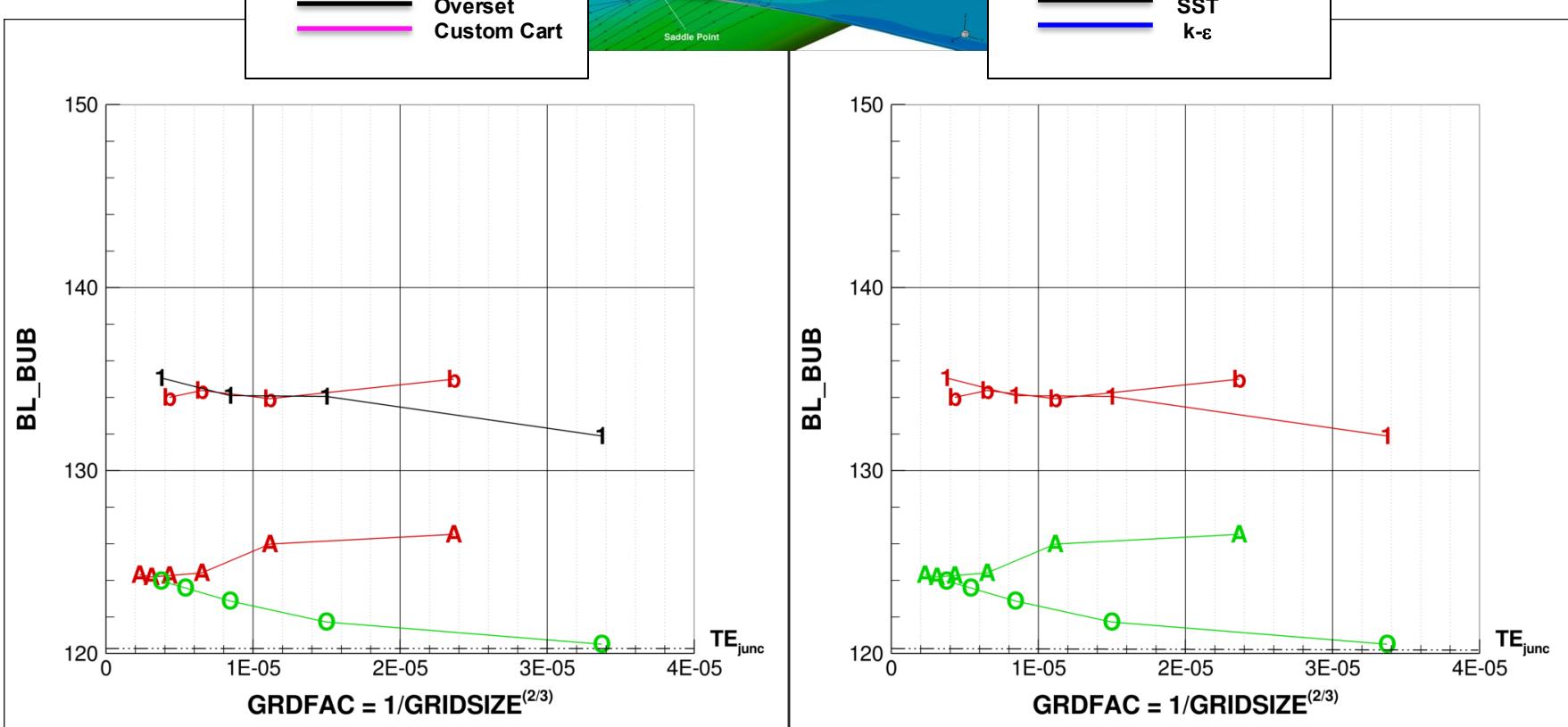
CASE 1B: Grid Refinement

Bubble Width (wing)

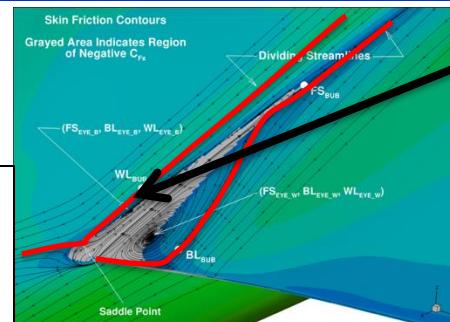
Grid Type

- Unstructured
- Multi-block
- Overset
- Custom Cart

Turbulence Model

- SA
- SA QRC
- SST
- k- ϵ



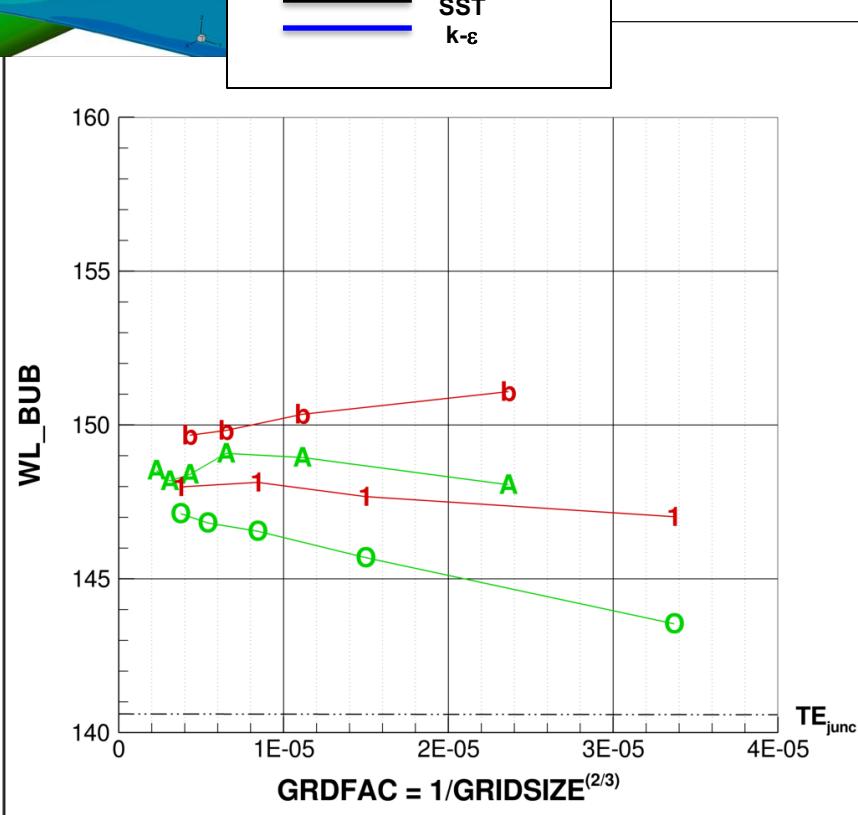
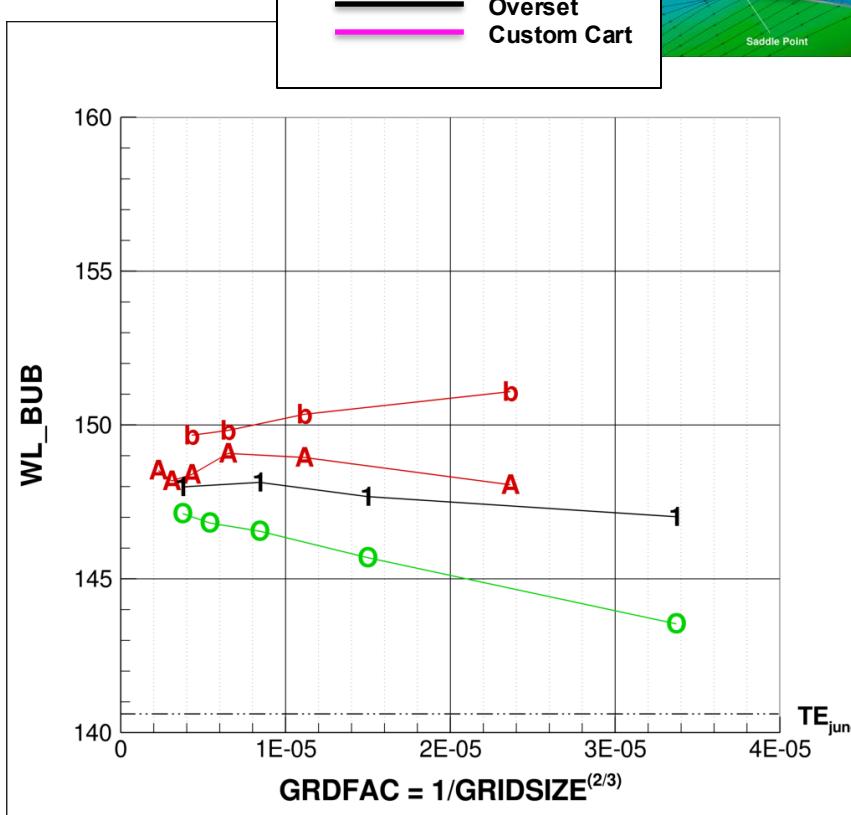
CASE 1B: Grid Refinement

Bubble Height (fuselage)

Grid Type

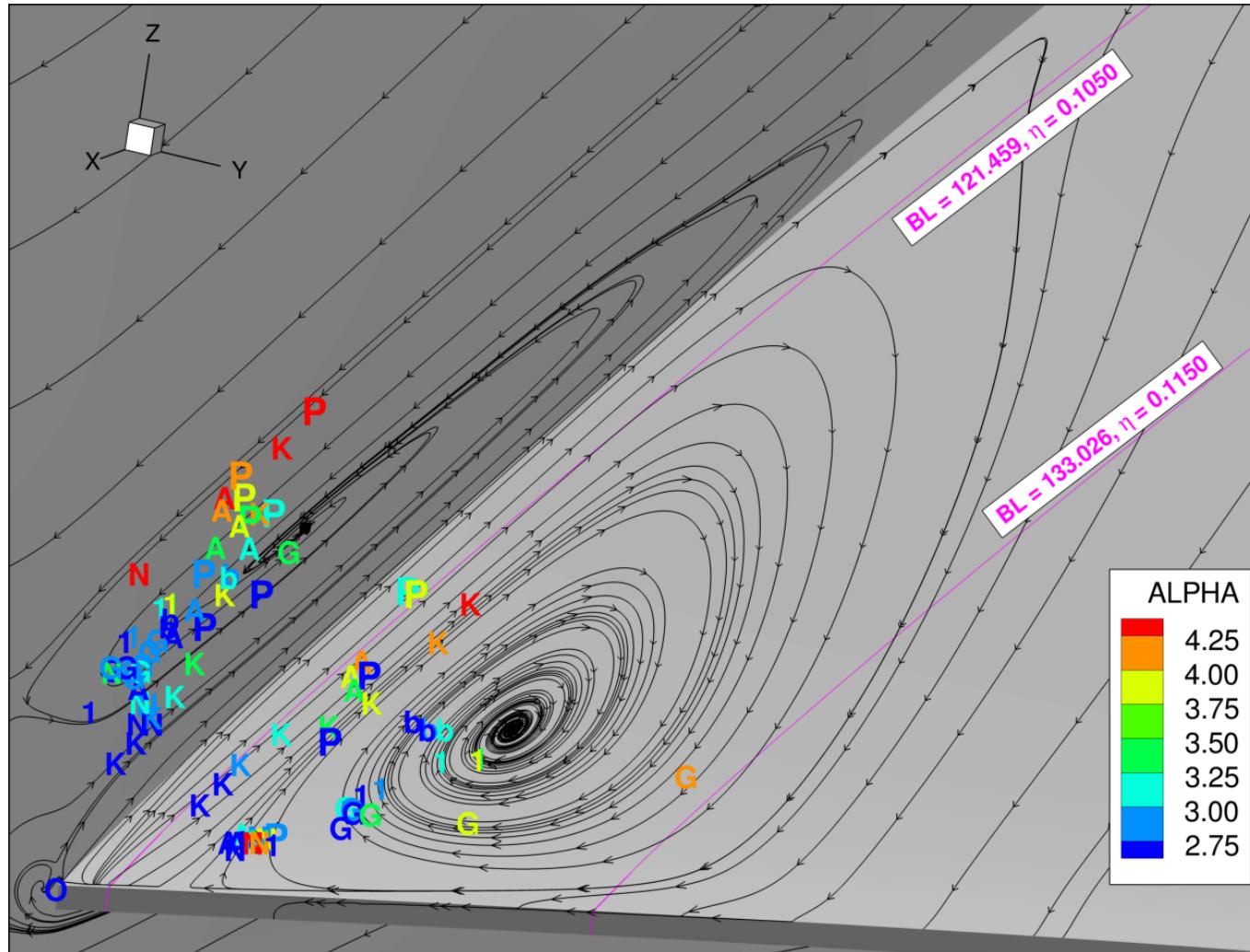
- Unstructured
- Multi-block
- Overset
- Custom Cart

Turbulence Model

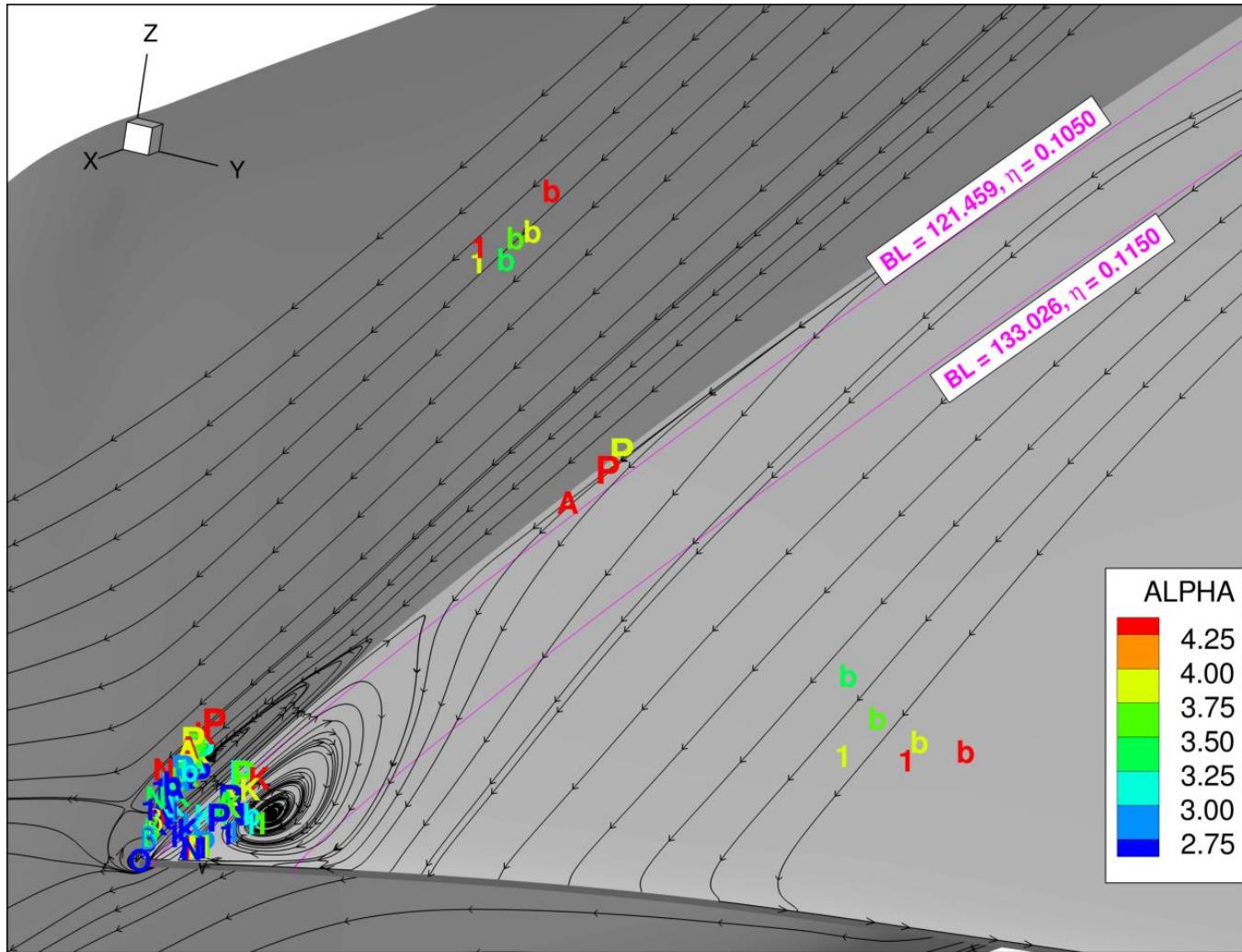
- SA
- SA QRC
- SST
- k- ϵ

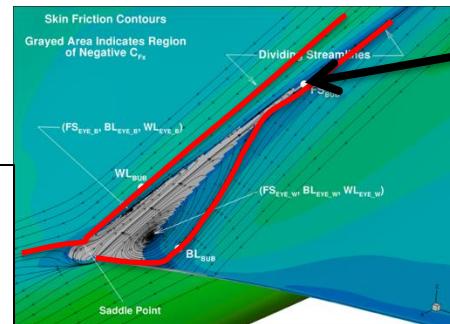


CASE 2A: Alpha Sweep – Eye Locations



CASE 2A: Alpha Sweep – Eye Locations



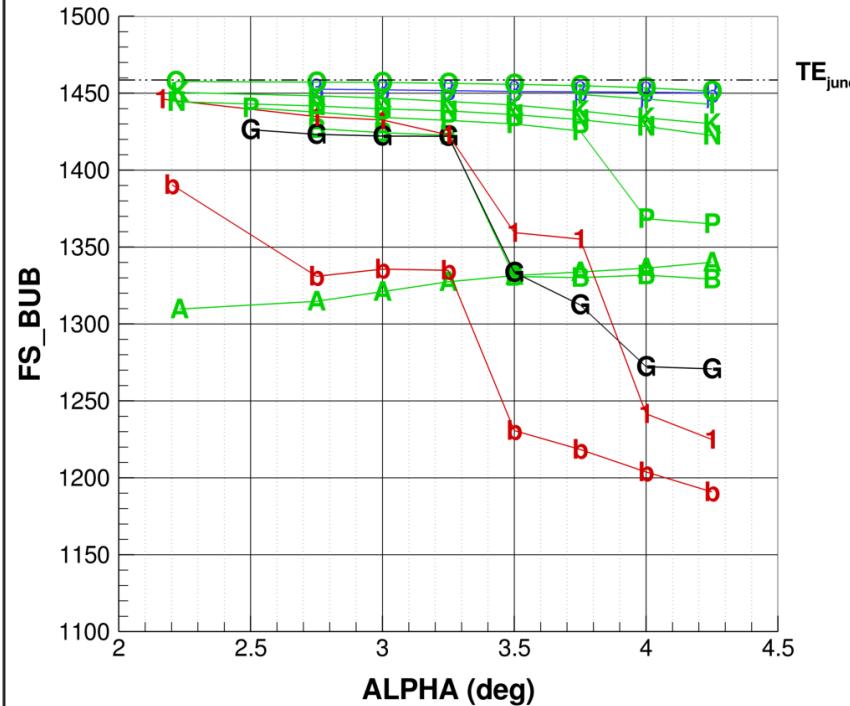
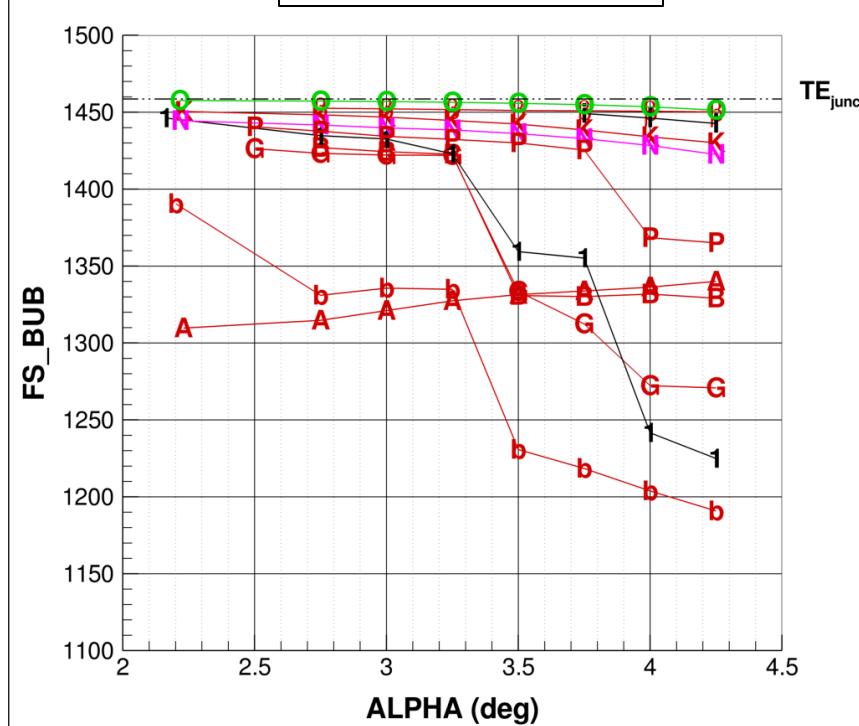
CASE 2A: Alpha Sweep

Bubble Leading Edge

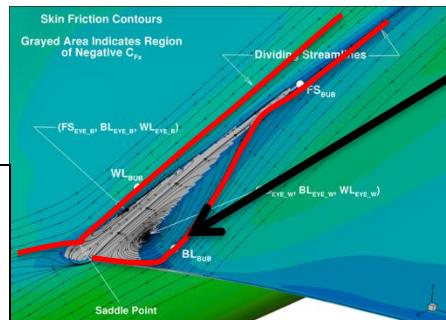
Grid Type

- Unstructured
- Multi-block
- Overset
- Custom Cart

Turbulence Model

- SA
- SA QRC
- SST
- k- ϵ



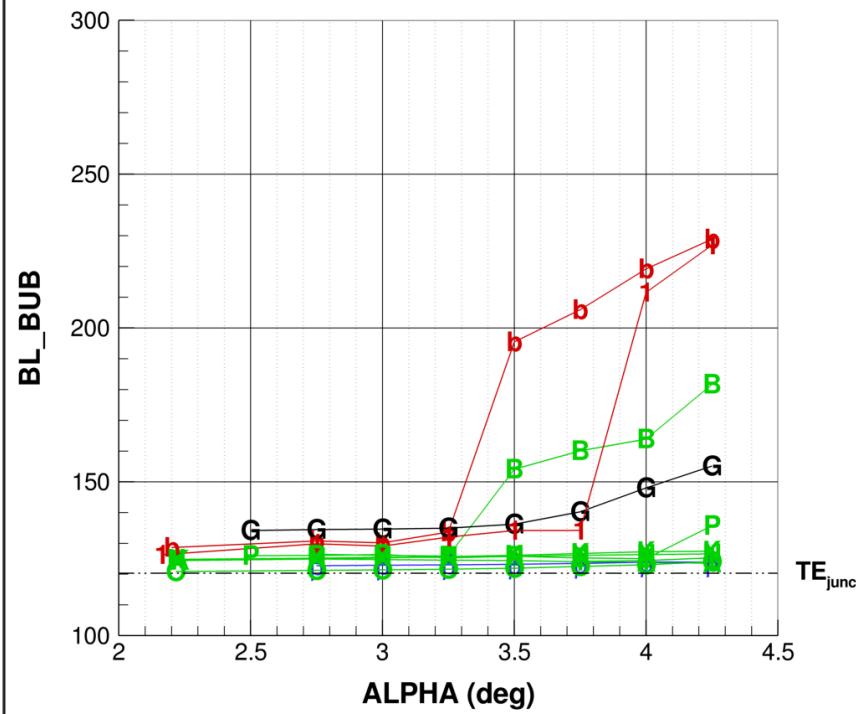
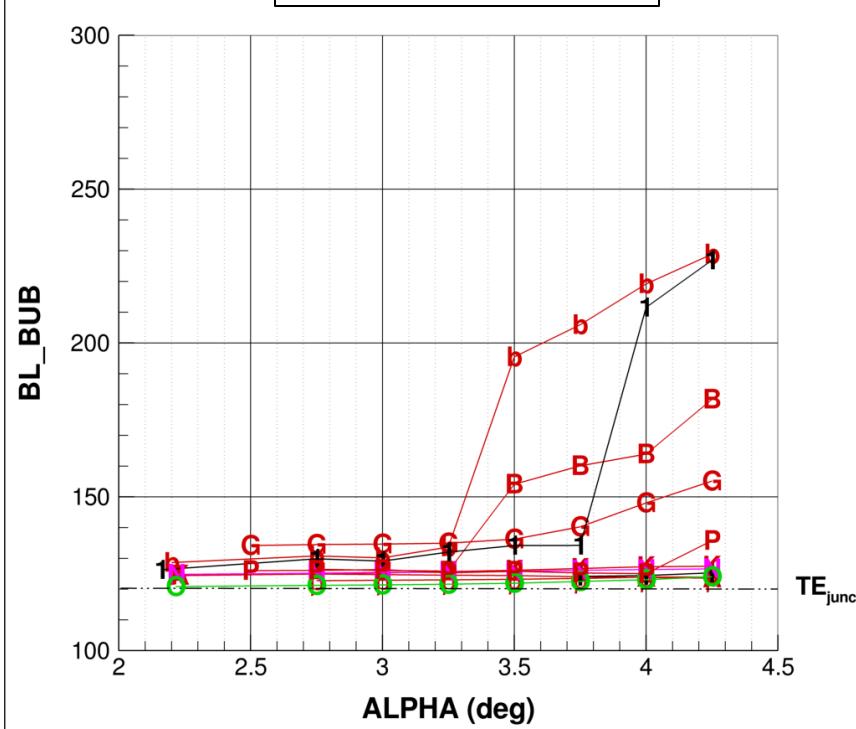
CASE 2A: Alpha Sweep

Bubble Width (wing)

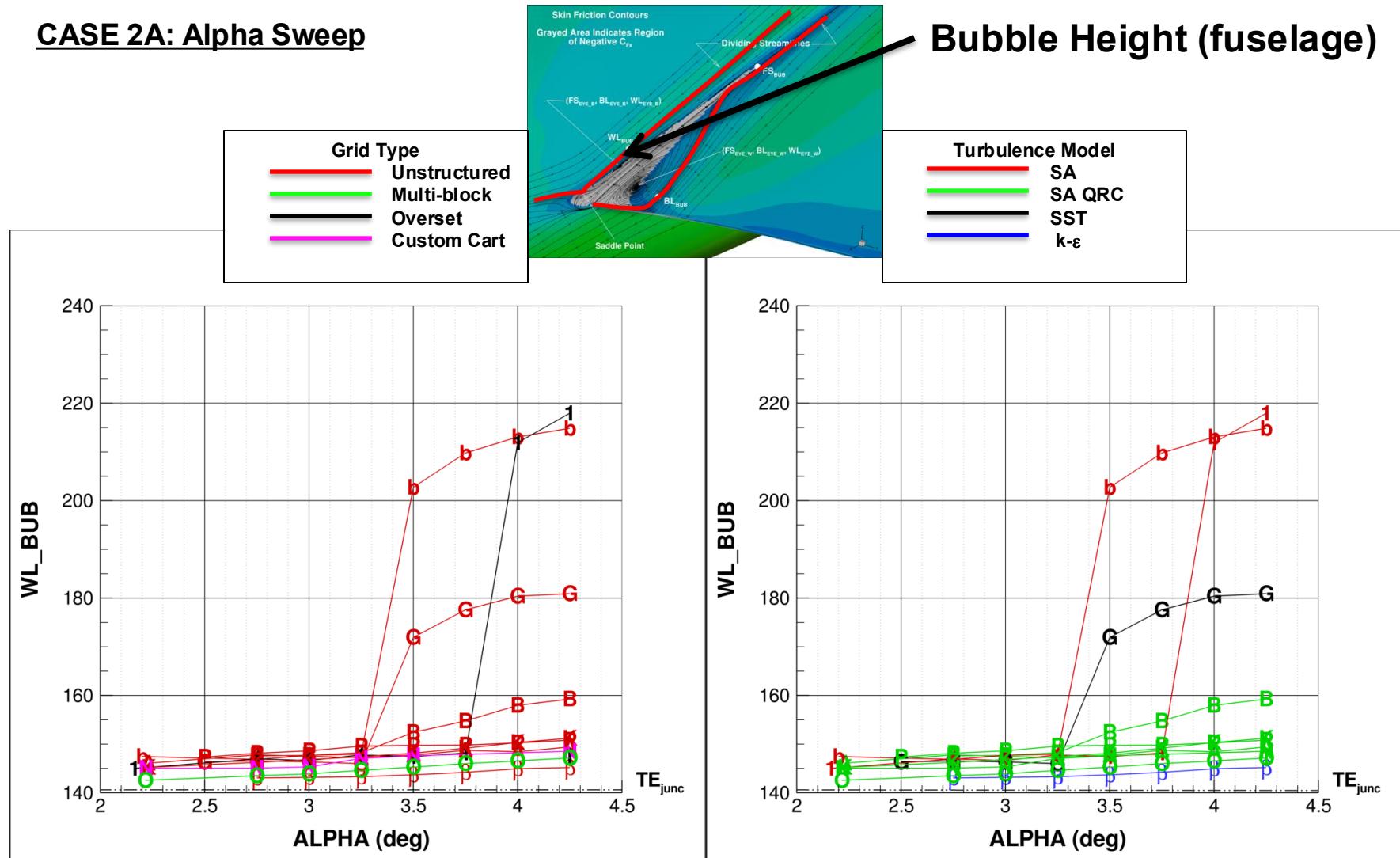
Grid Type

- Unstructured
- Multi-block
- Overset
- Custom Cart

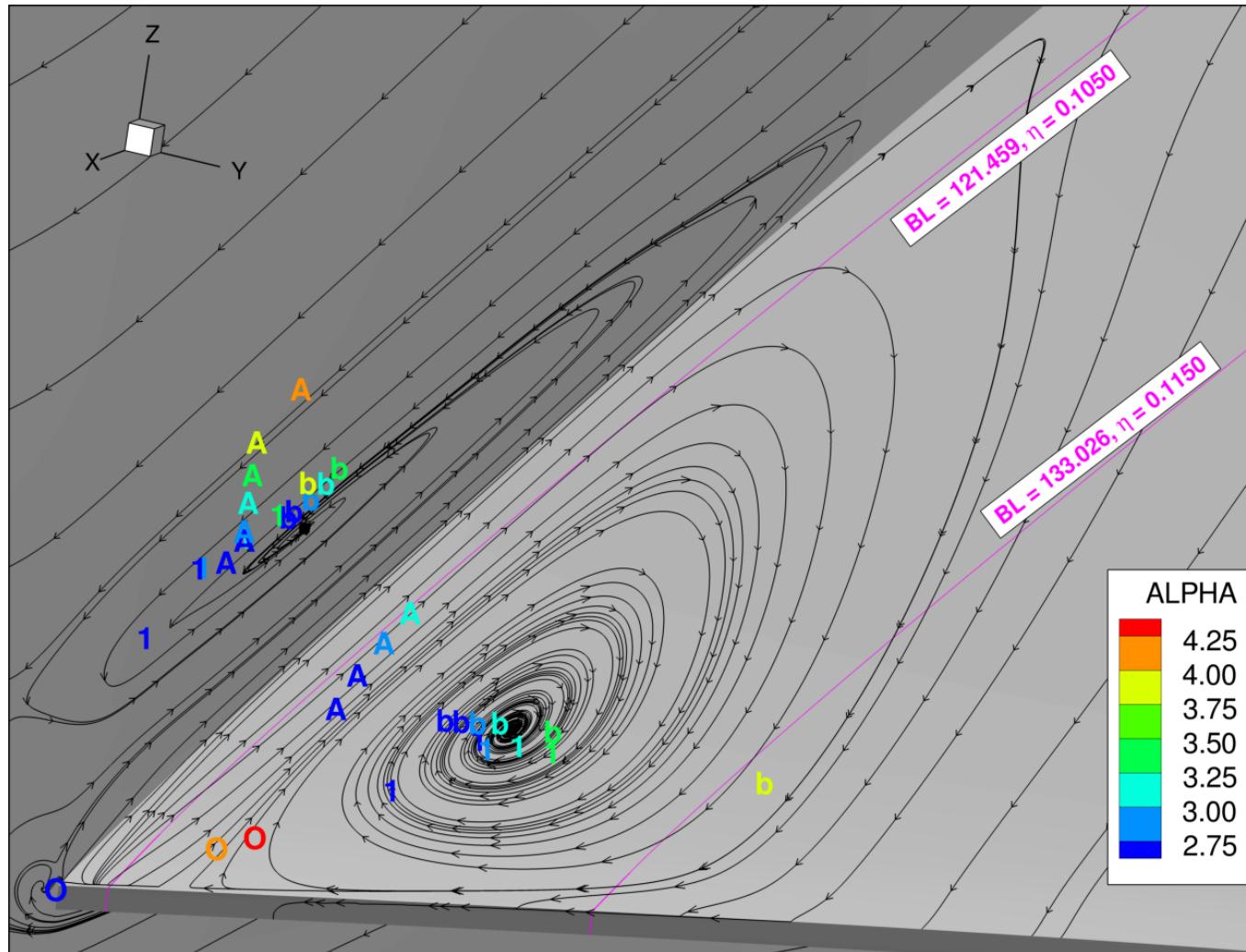
Turbulence Model

- SA
- SA QRC
- SST
- k- ϵ

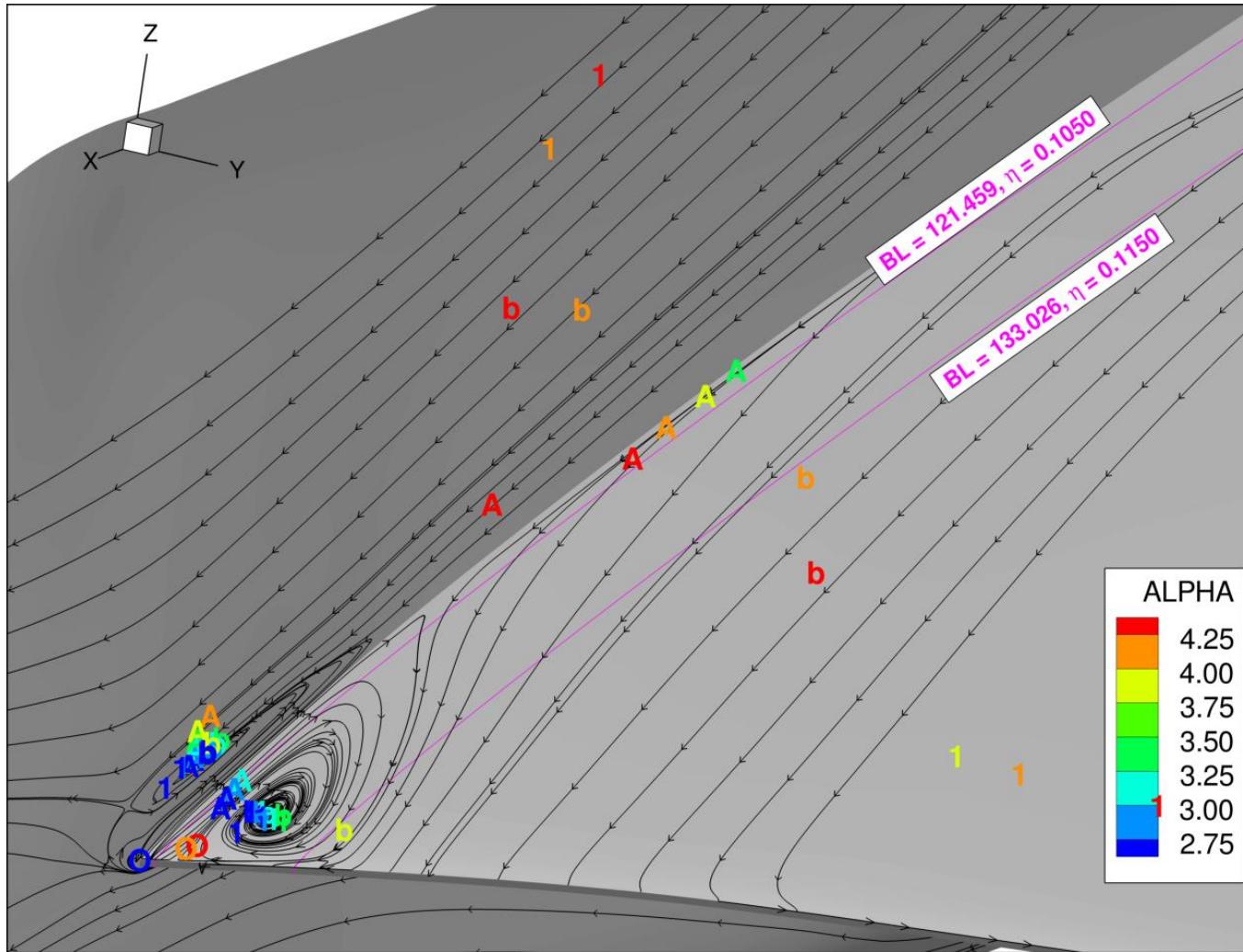


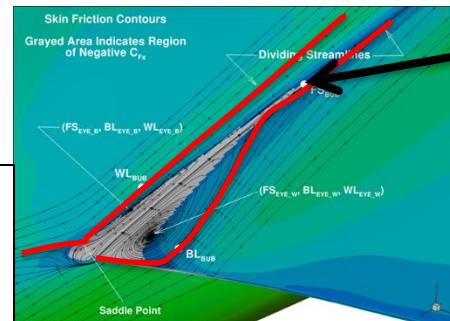
CASE 2A: Alpha Sweep


CASE 2B: Alpha Sweep – Eye Locations



CASE 2B: Alpha Sweep – Eye Locations



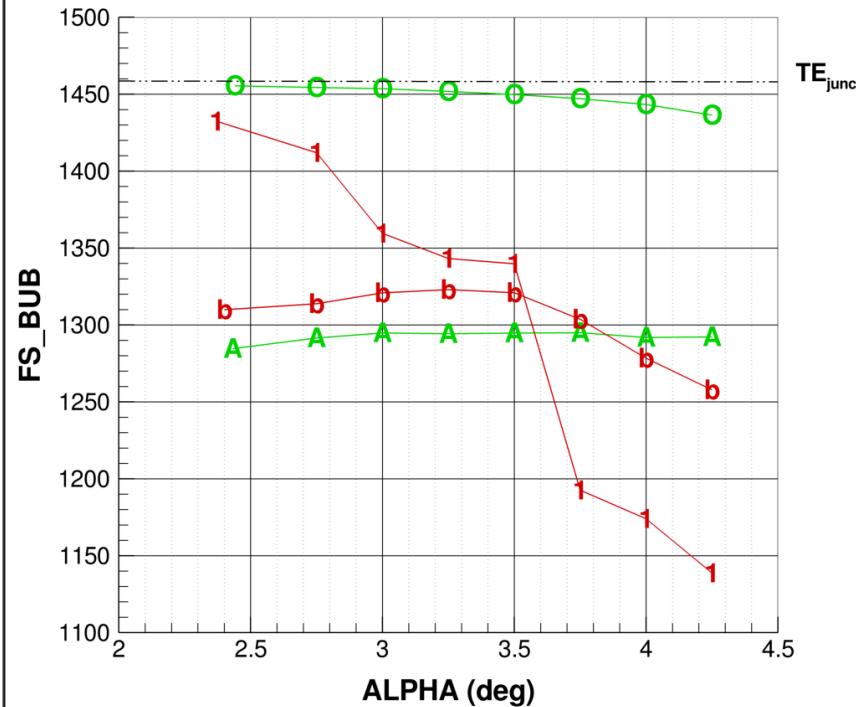
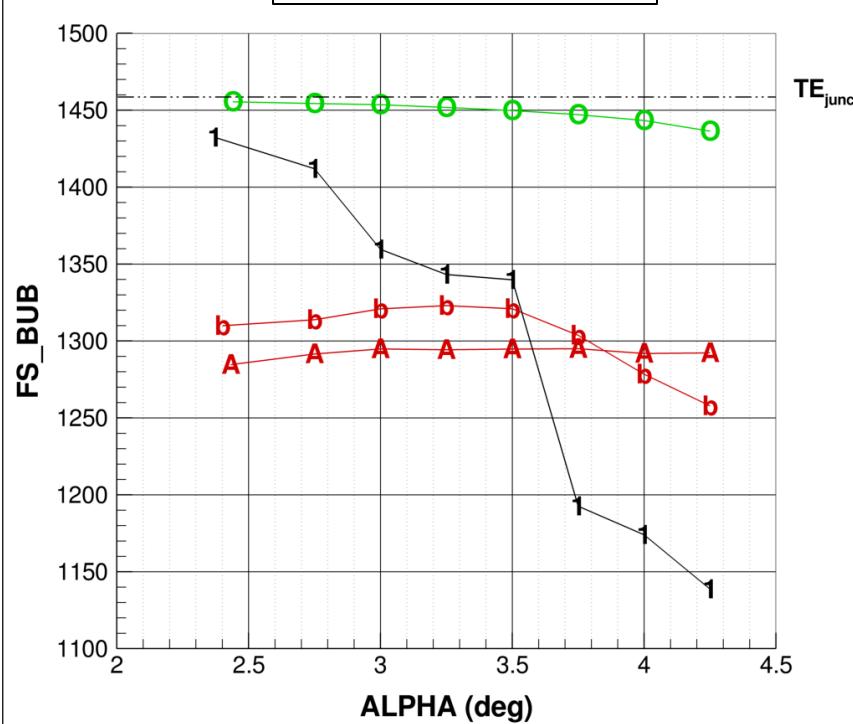
CASE 2B: Alpha Sweep

Bubble Leading Edge

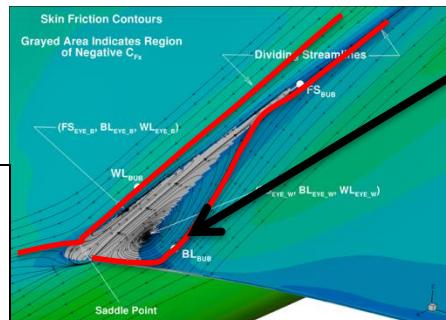
Grid Type

- Unstructured
- Multi-block
- Overset
- Custom Cart

Turbulence Model

- SA
- SA QRC
- SST
- k- ϵ



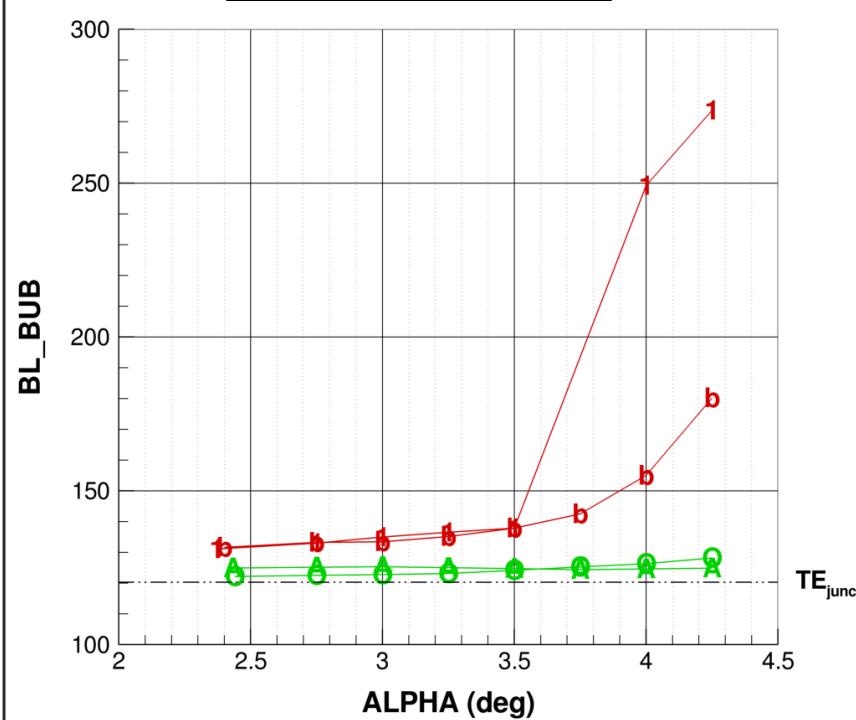
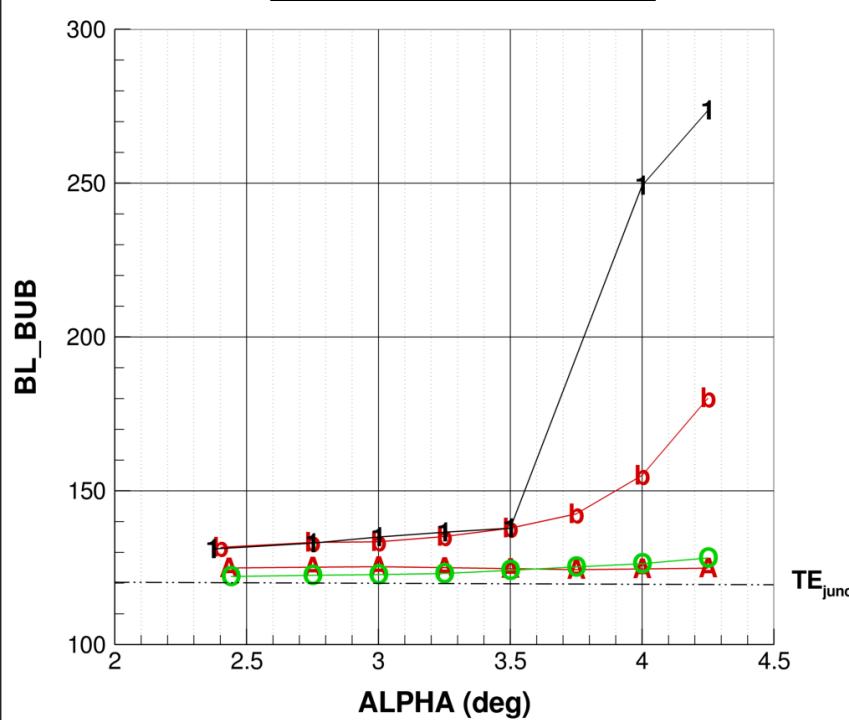
CASE 2B: Alpha Sweep

Bubble Width (wing)

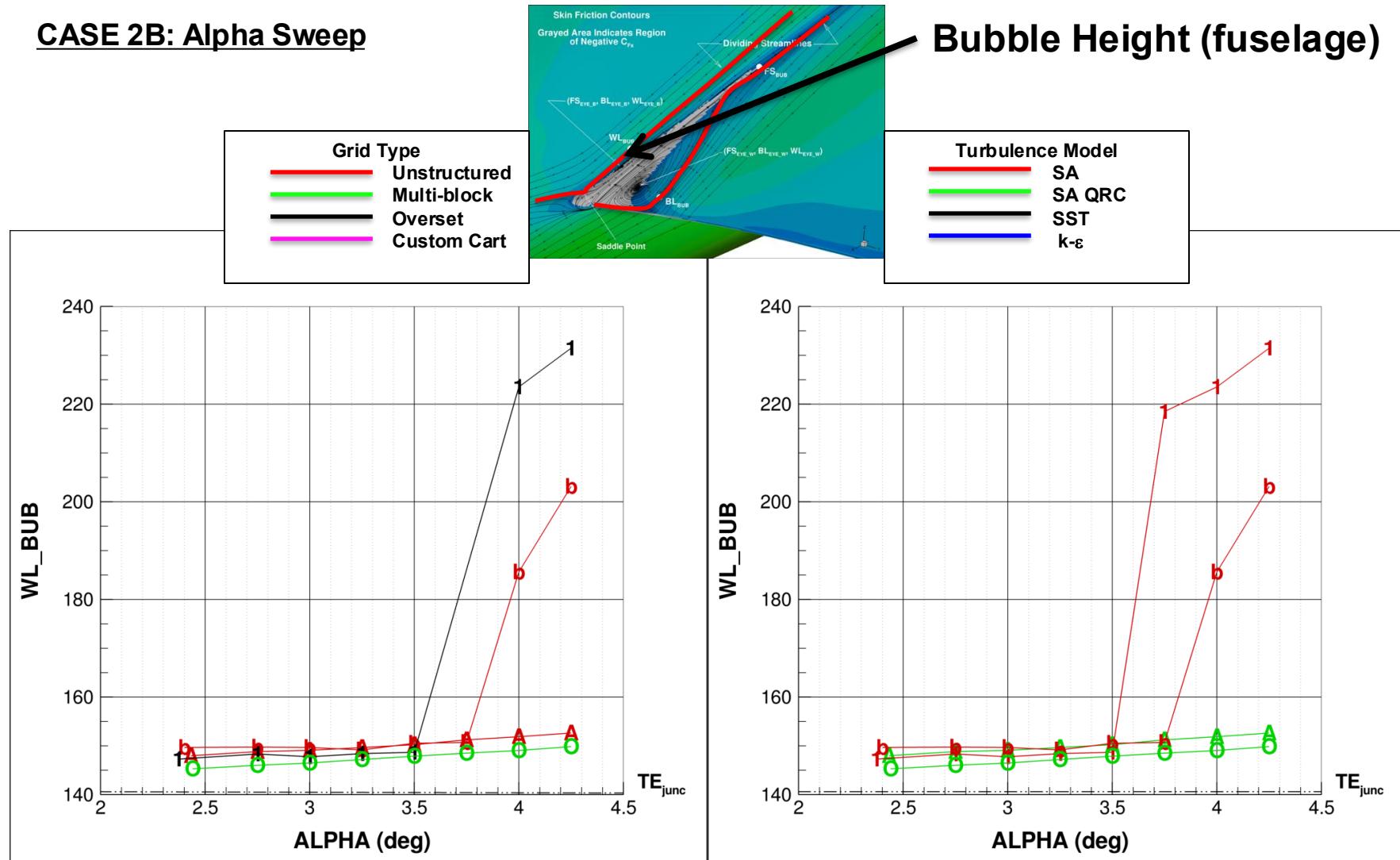
Grid Type

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- Multi-block
- Overset
- Custom Cart

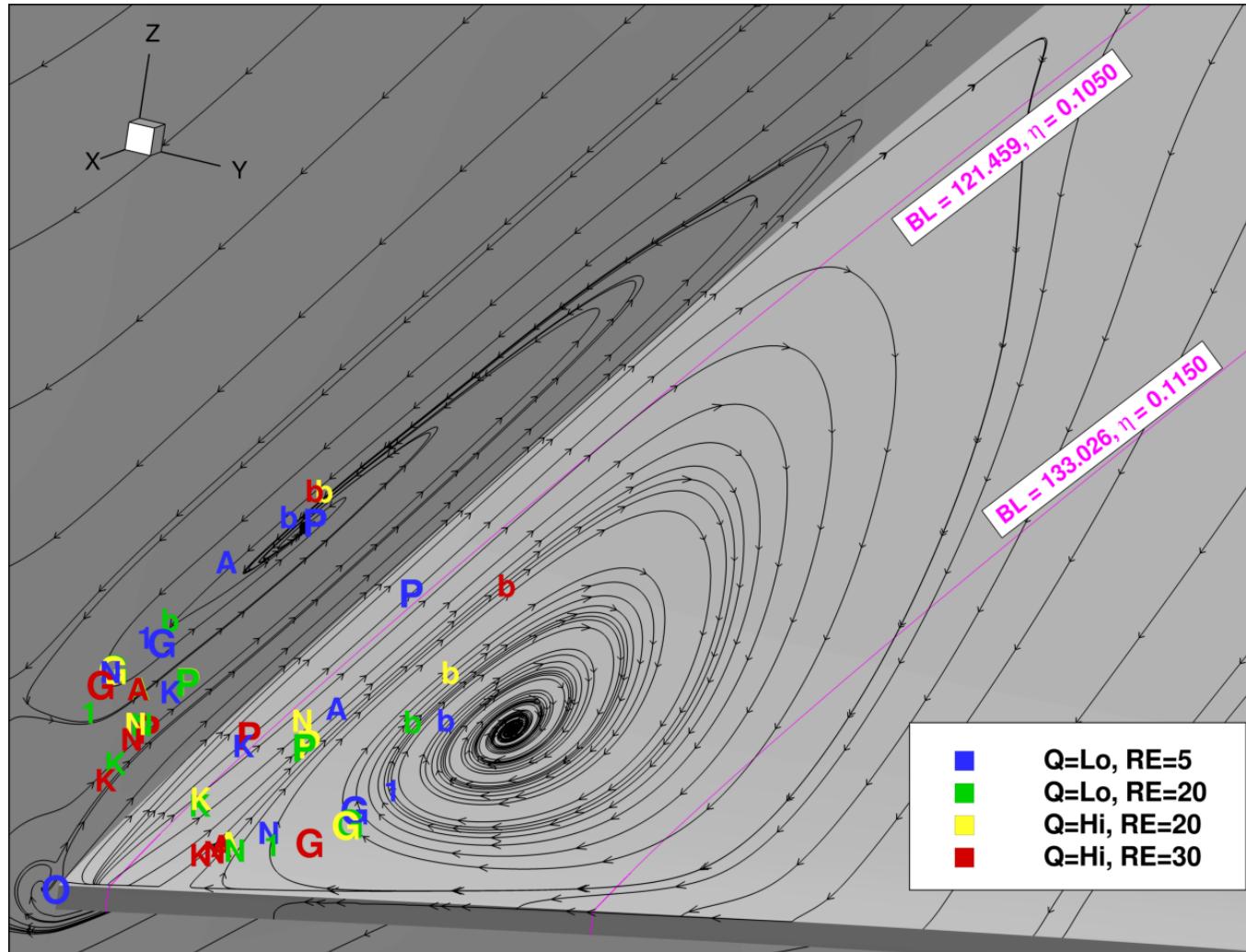
Turbulence Model

- SA
- SA QRC
- SST
- k- ϵ

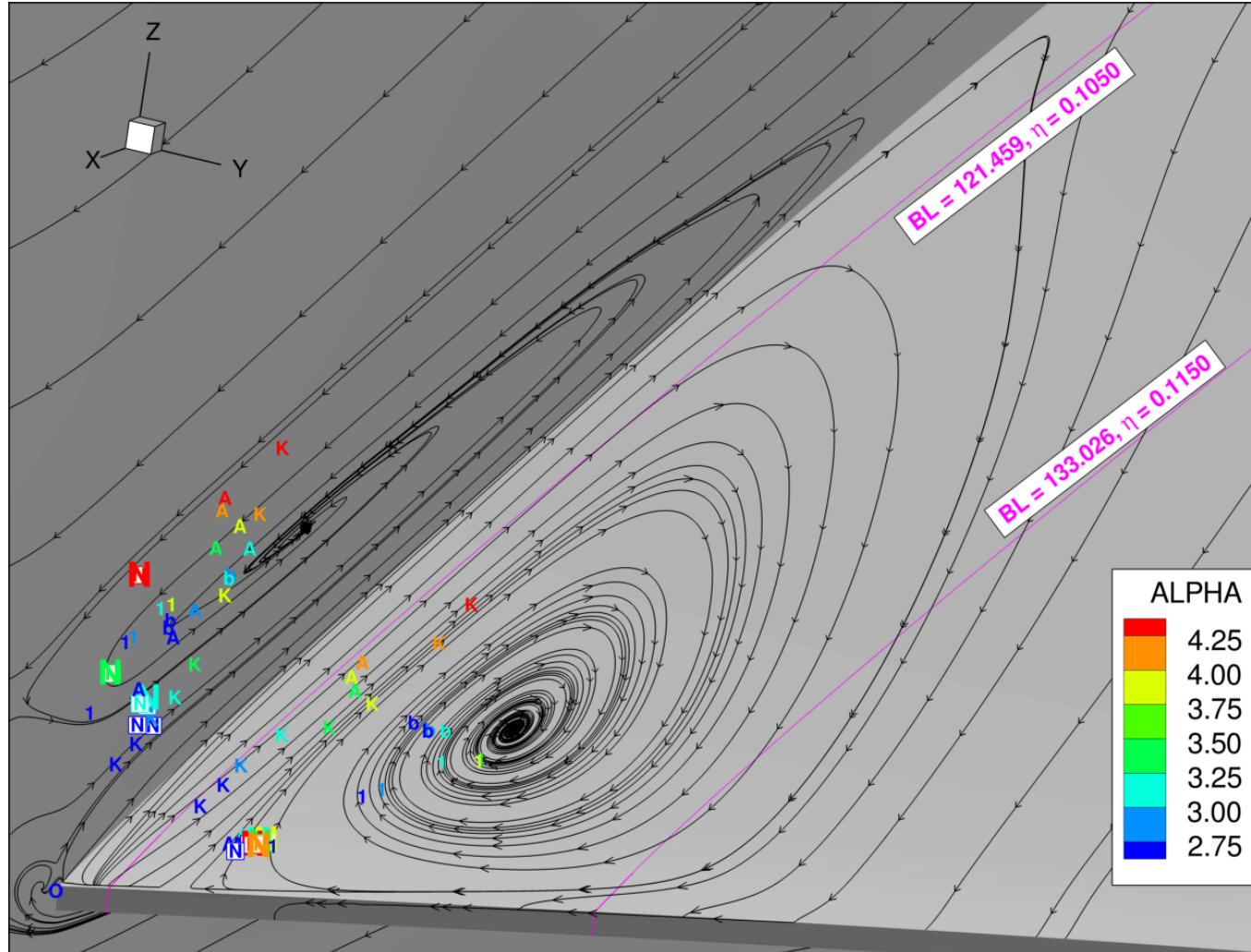


CASE 2B: Alpha Sweep


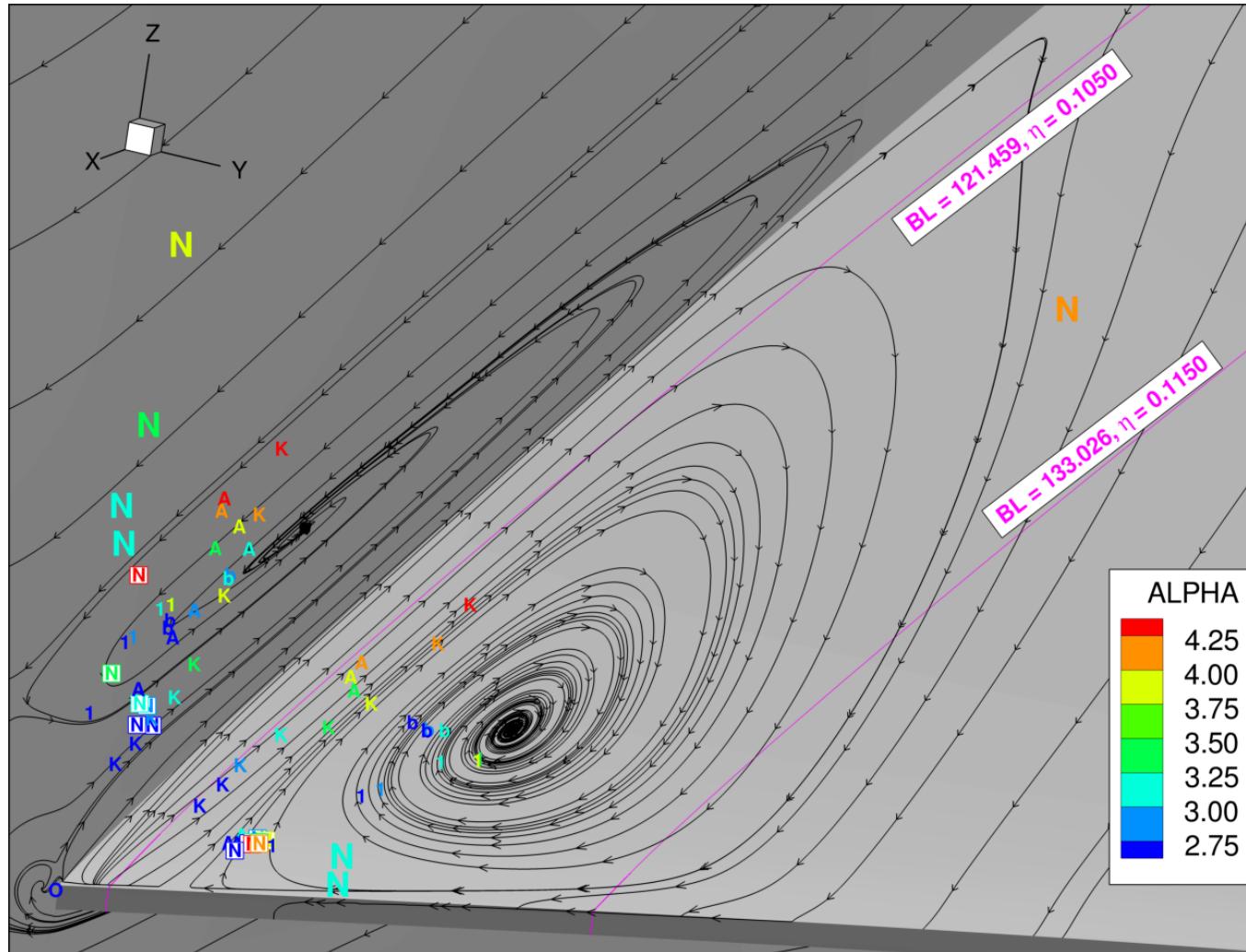
CASE 3: RN Sweep – Eye Locations



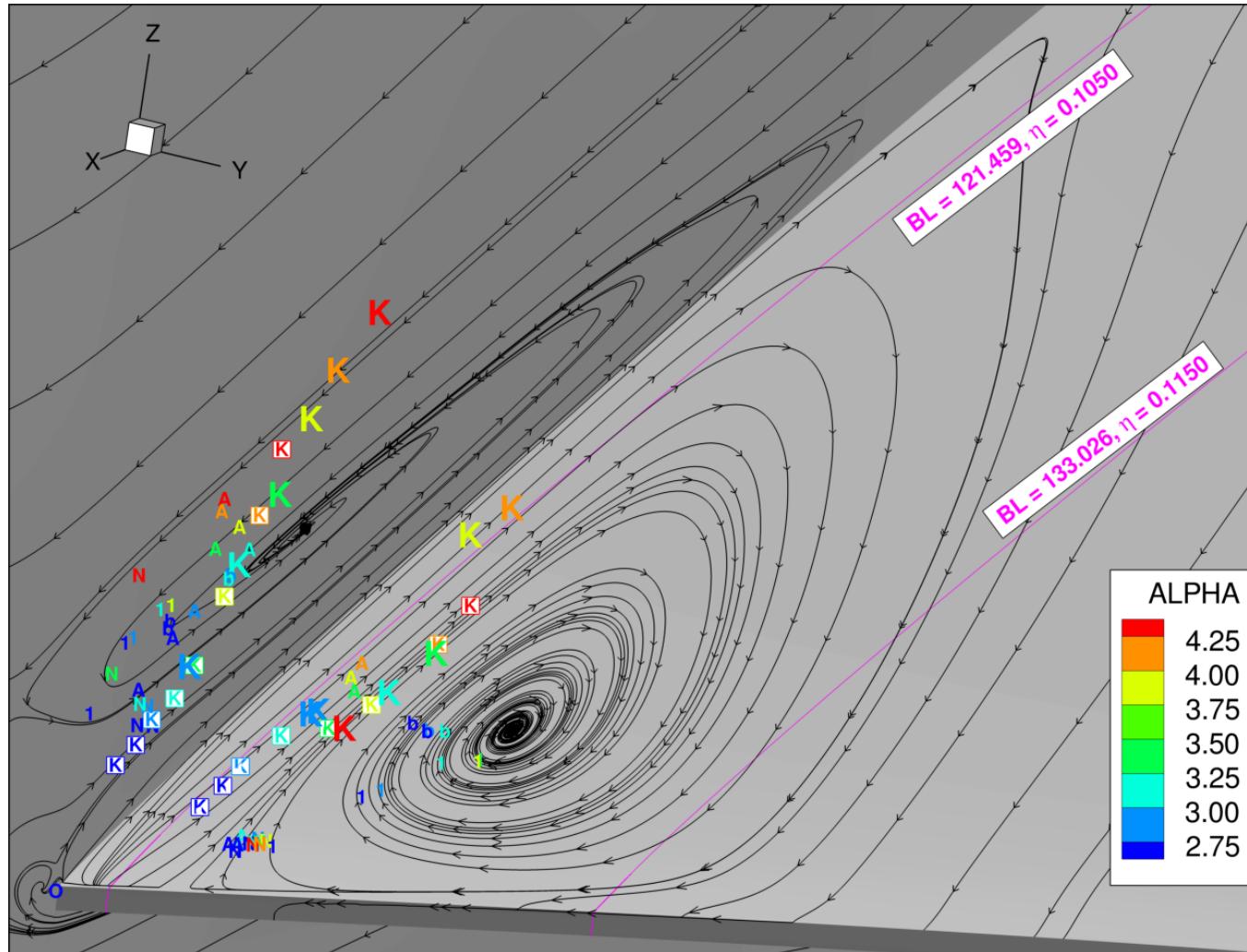
CASE 4: Alpha Sweep – Eye Locations: Adaptive Grid



CASE 5: Alpha Sweep – Eye Locations: DDES

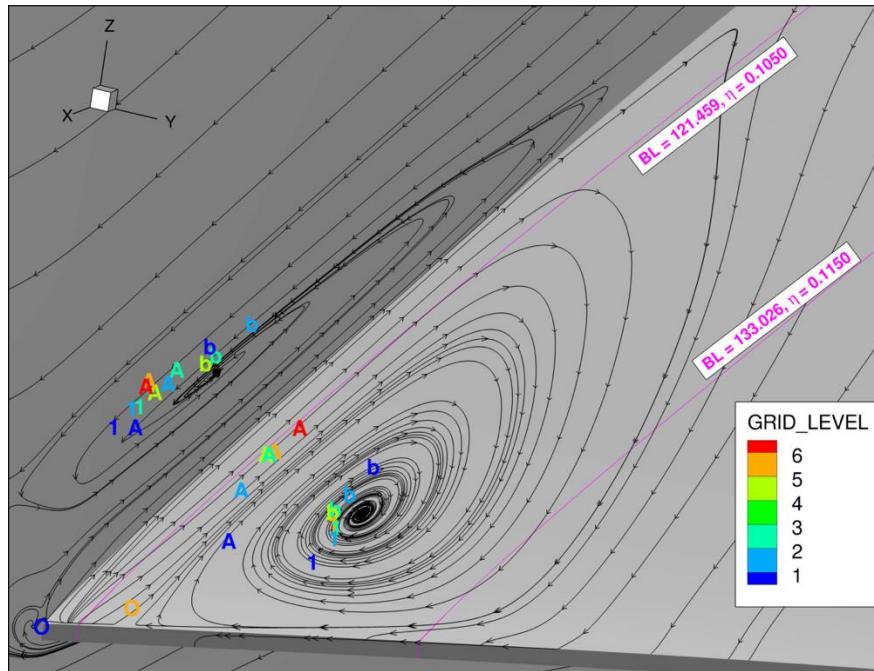


CASE 6: Alpha Sweep – Eye Locations: Aero-Structural

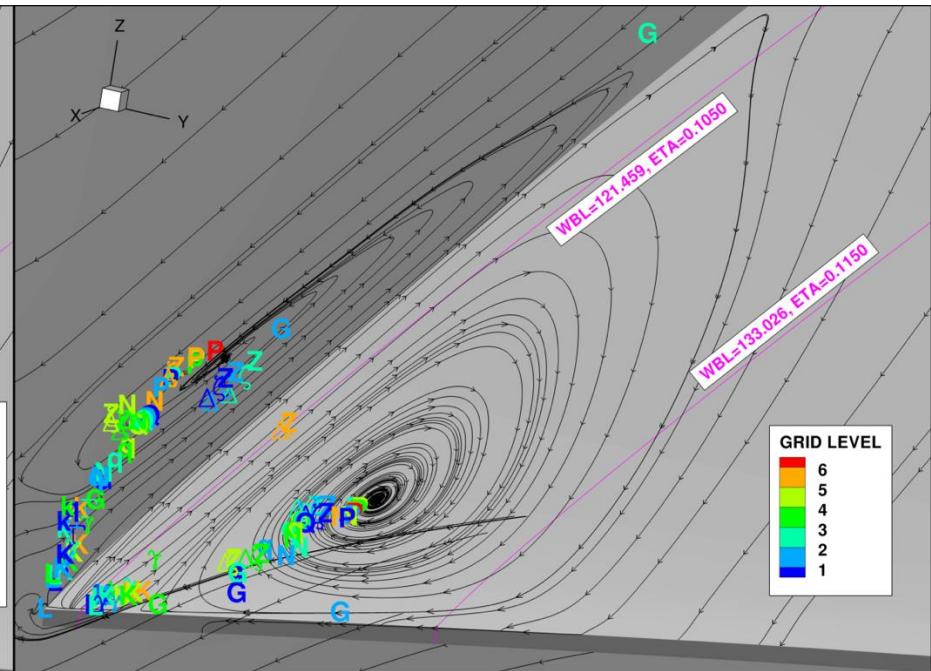


CASE 1B: Grid Refinement

DPW-7



DPW-6



CASE 2B: Alpha Sweep

