

CFD Software for Airflow Simulation in a Clean Room

by

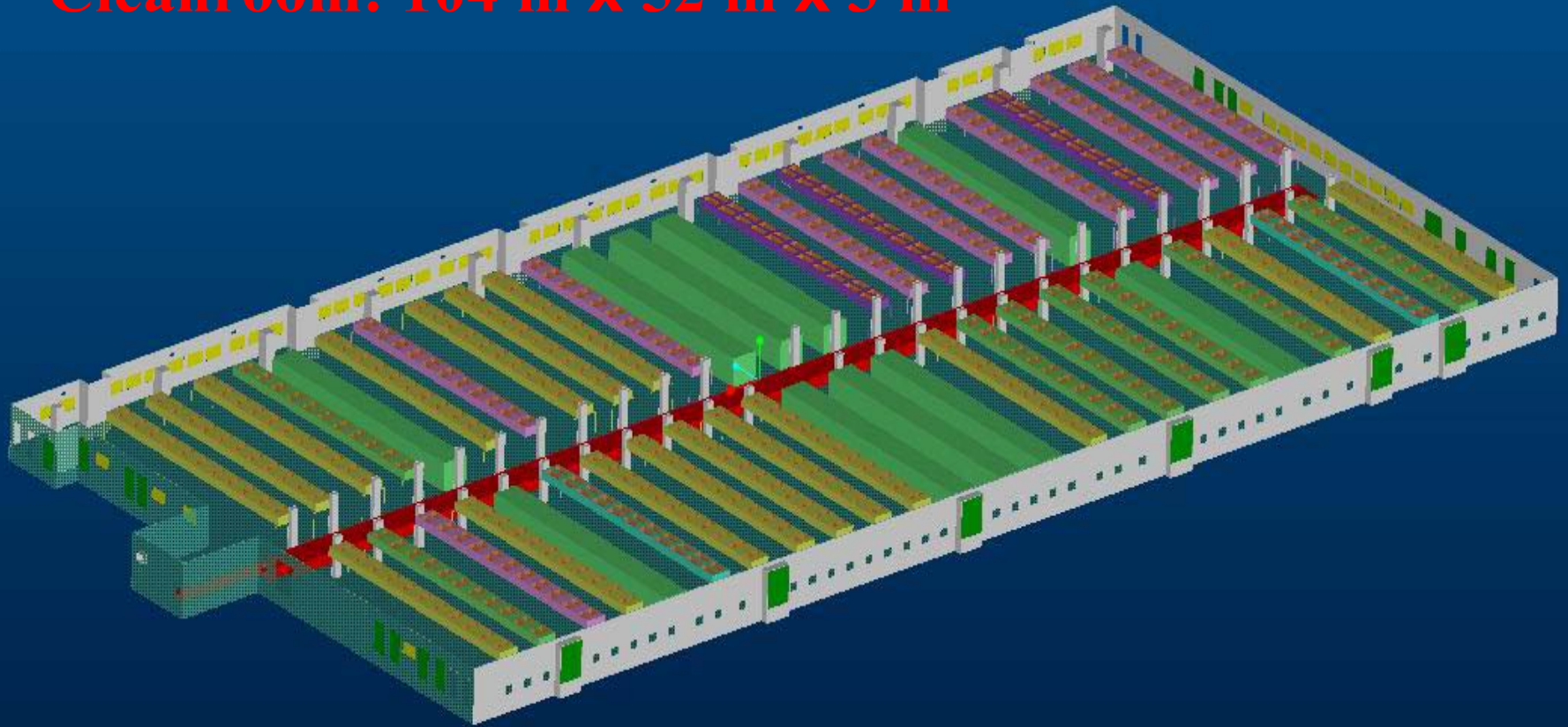
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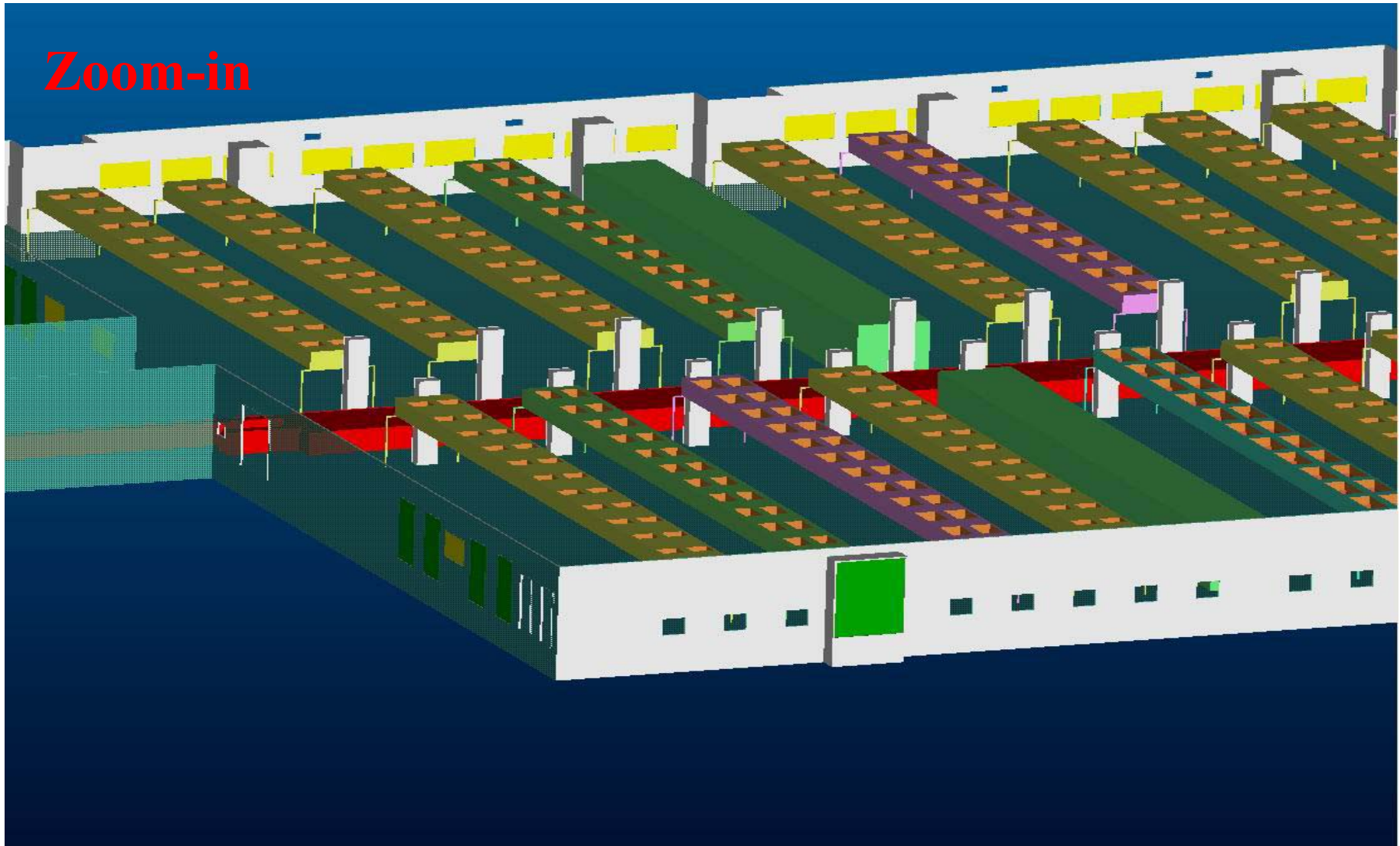
Electronics Manufacturing (1/4)

Cleanroom: 104 m x 52 m x 3 m



Electronics Manufacturing (2/4)

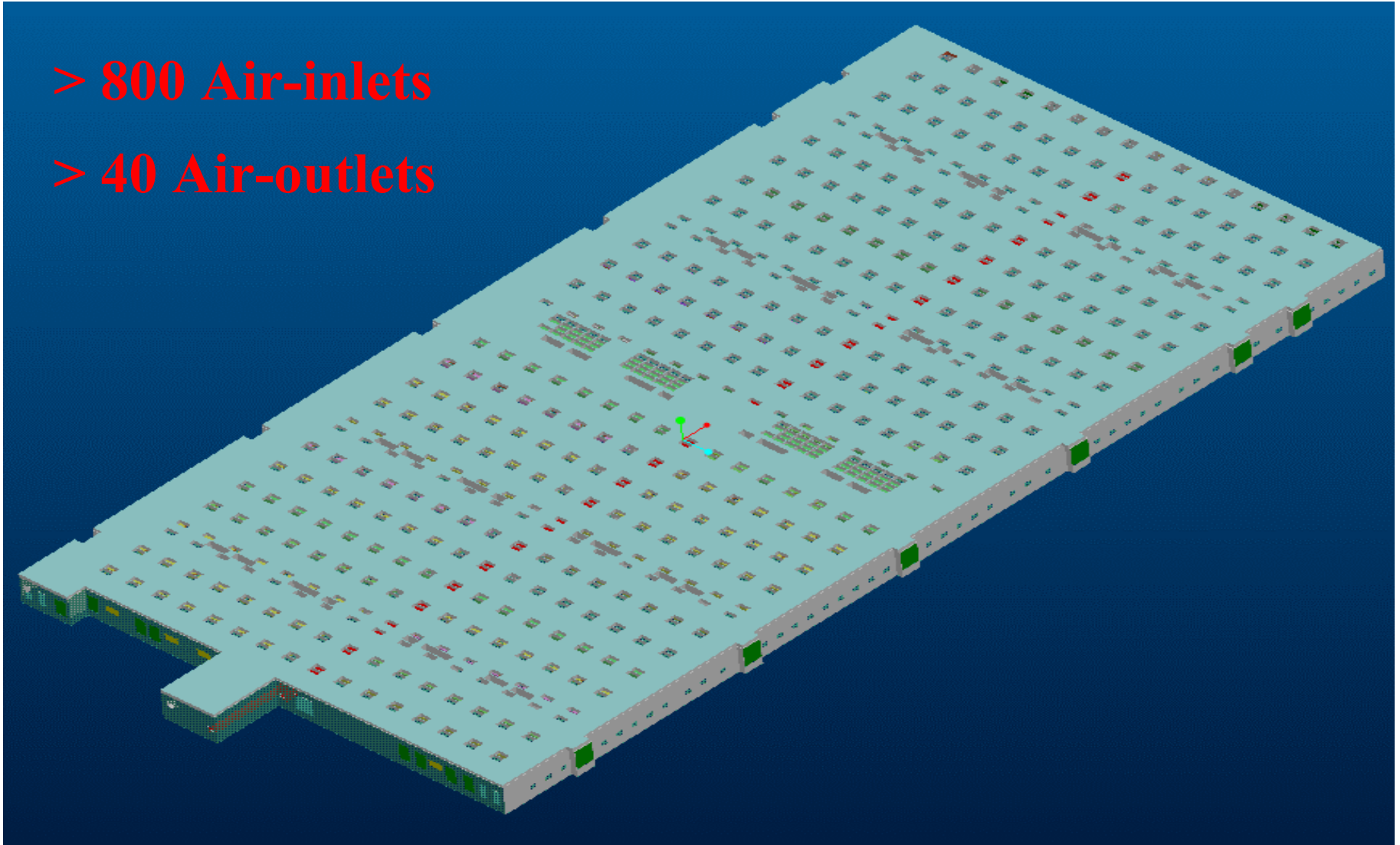
Zoom-in



Electronics Manufacturing (3/4)

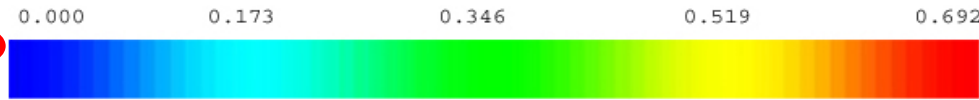
> 800 Air-inlets

> 40 Air-outlets

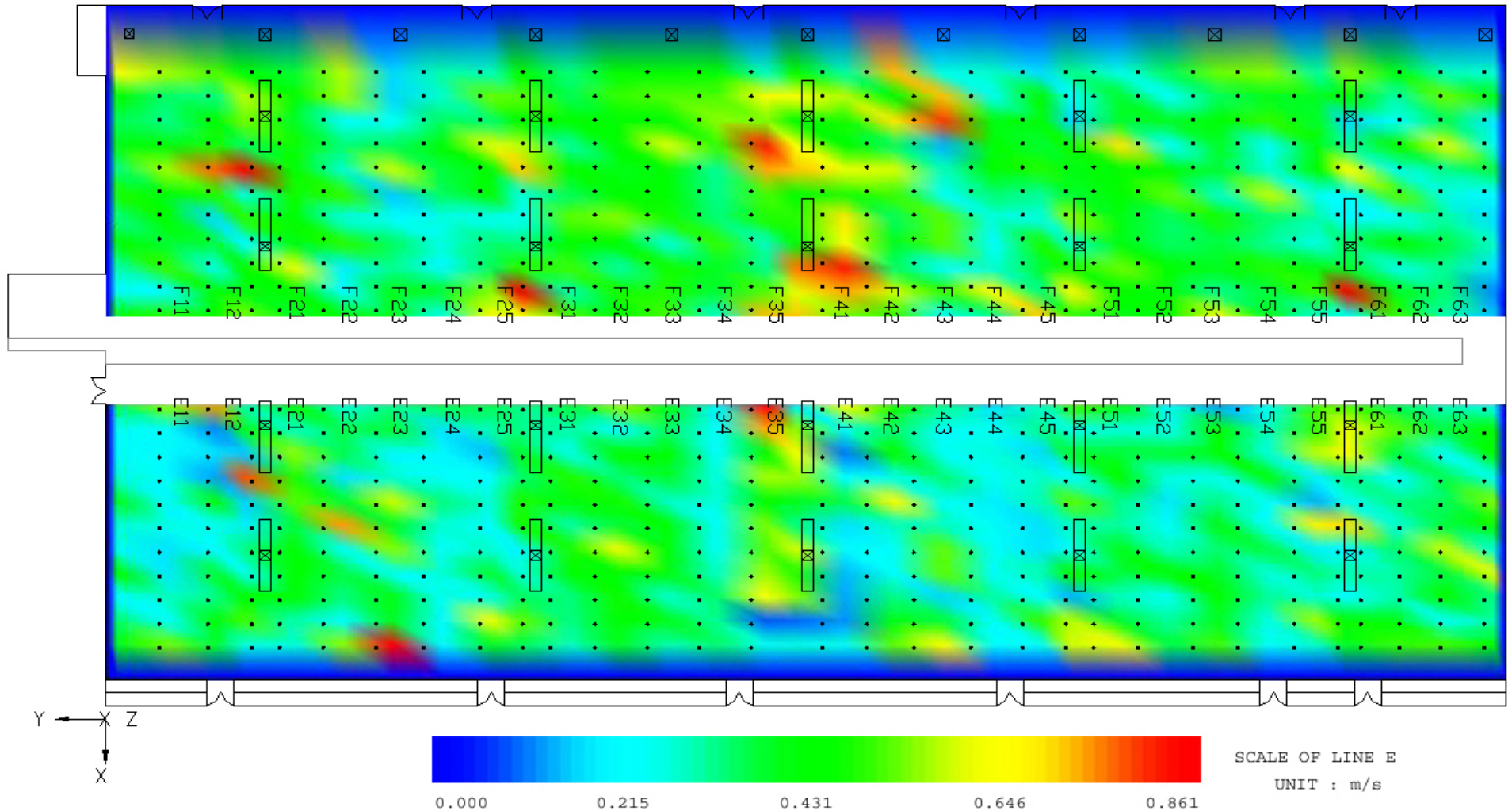


Electronics Manufacturing (4/4)

CONTOUR OF AIR VELOCITY AT 130 cm.



SCALE OF LINE F

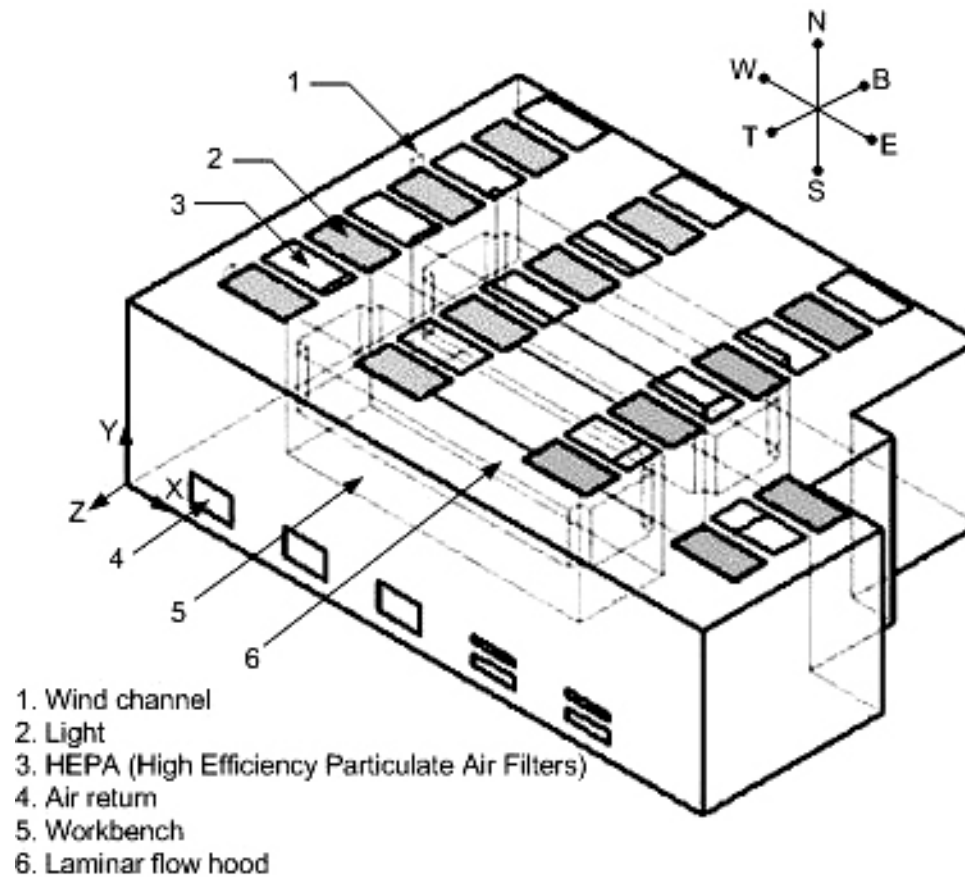


“*CAMETA*” CFD Software (1/6)

- **CFD software for cleanroom:**
 - **CAMETA version 2.0**
 - **Time-independent (steady-state) solution**
 - **Three-dimensional domain**
 - **Cartesian coordinate system**
- **Two-equation turbulence models**
 - **Low-Re k - ϵ model (Launder-Sharma)**
- **Physical quantity of interest:**
 - **Airflow velocity**

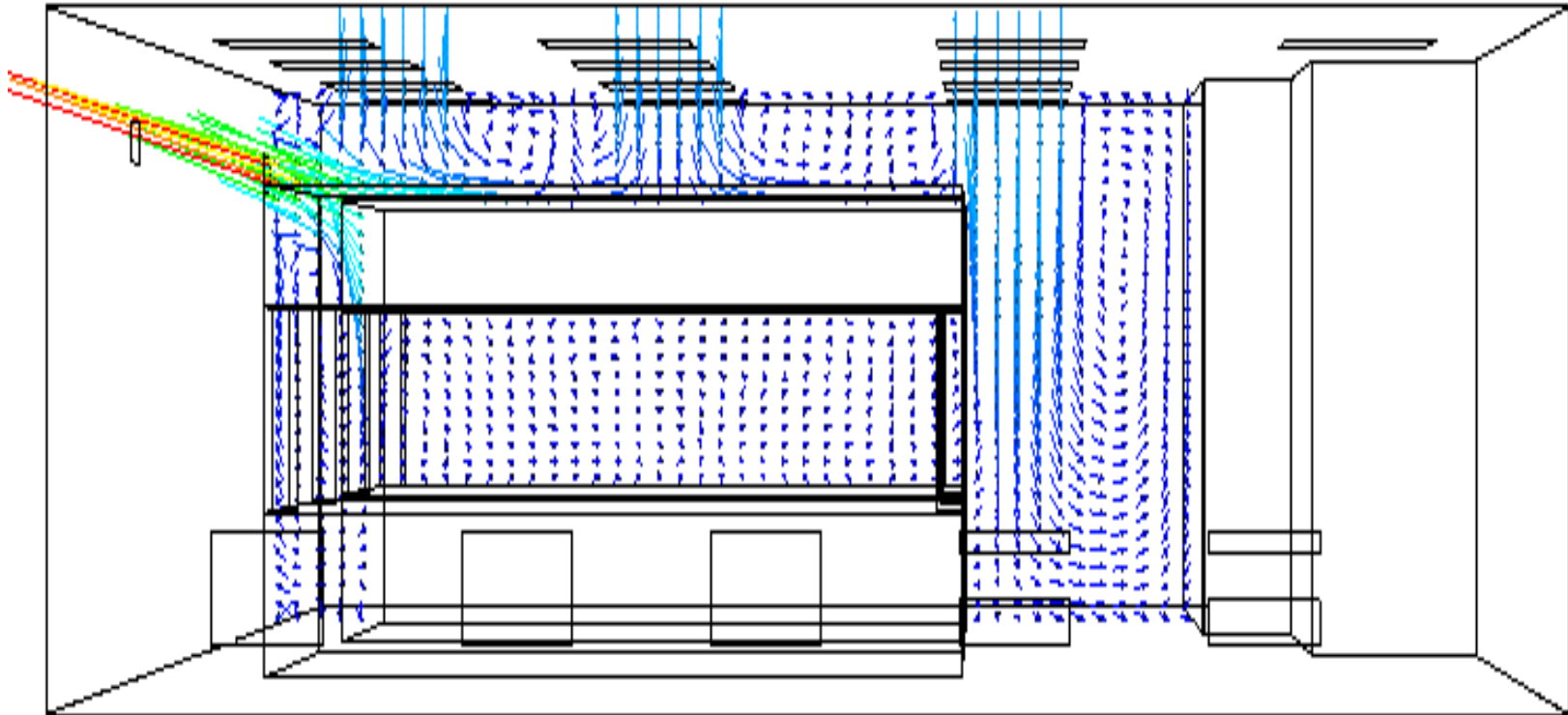
“*CAMETA*” CFD Software (2/6)

- Cleanroom test case



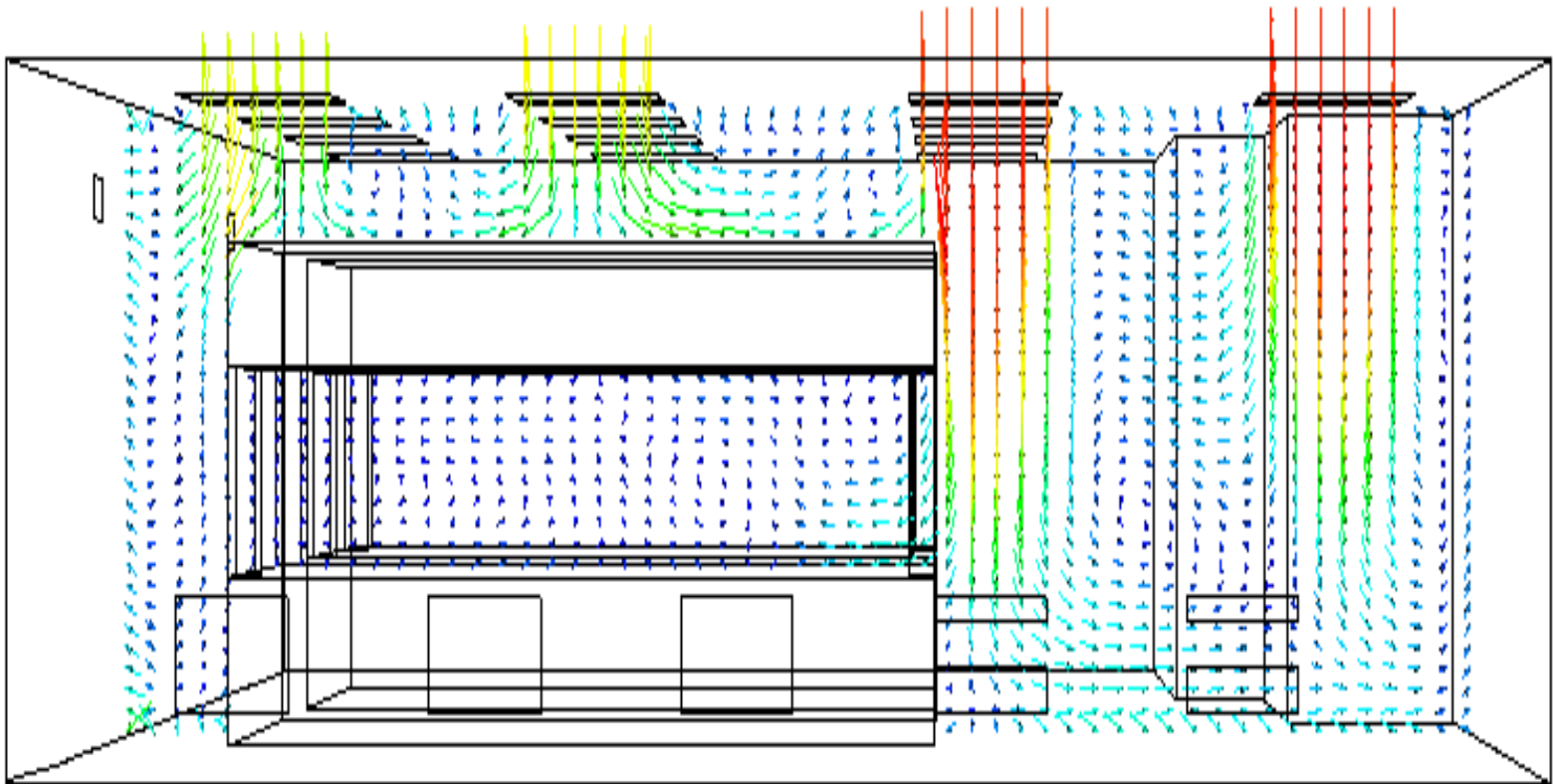
“*CAMETA*” CFD Software (3/6)

- Cleanroom test case: $z = -1.7$ m



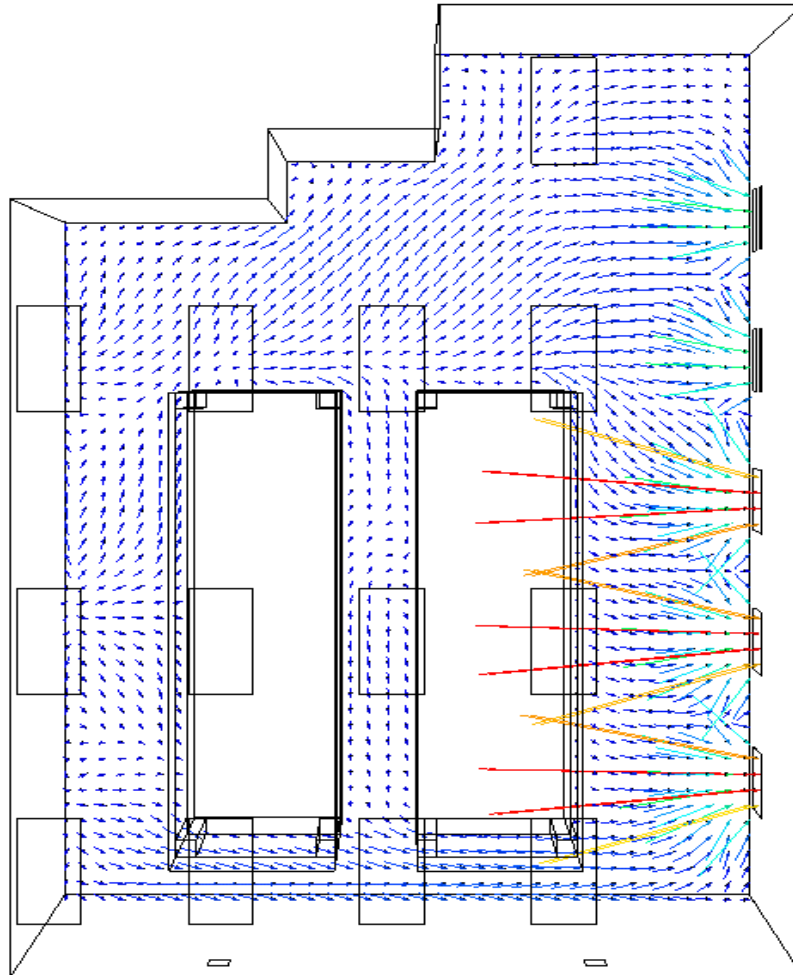
“*CAMETA*” CFD Software (4/6)

- Cleanroom test case: $z = -4.8$ m



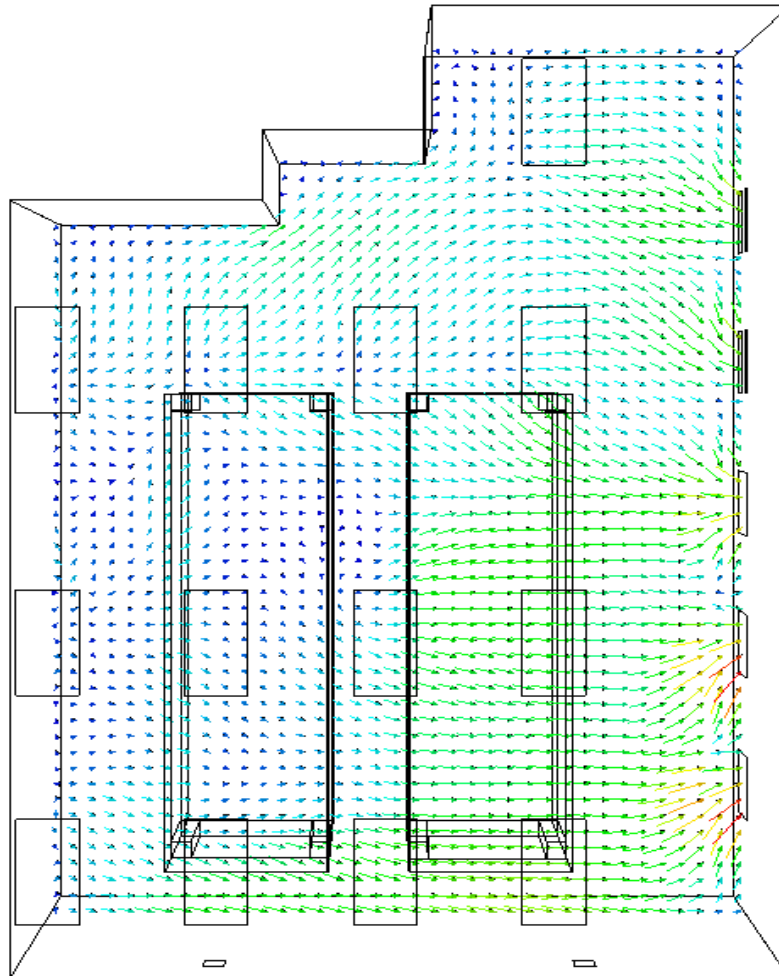
“*CAMETA*” CFD Software (5/6)

- Cleanroom test case: $y = 0.6 \text{ m}$



“*CAMETA*” CFD Software (6/6)

- Cleanroom test case: $y = 1.0$ m

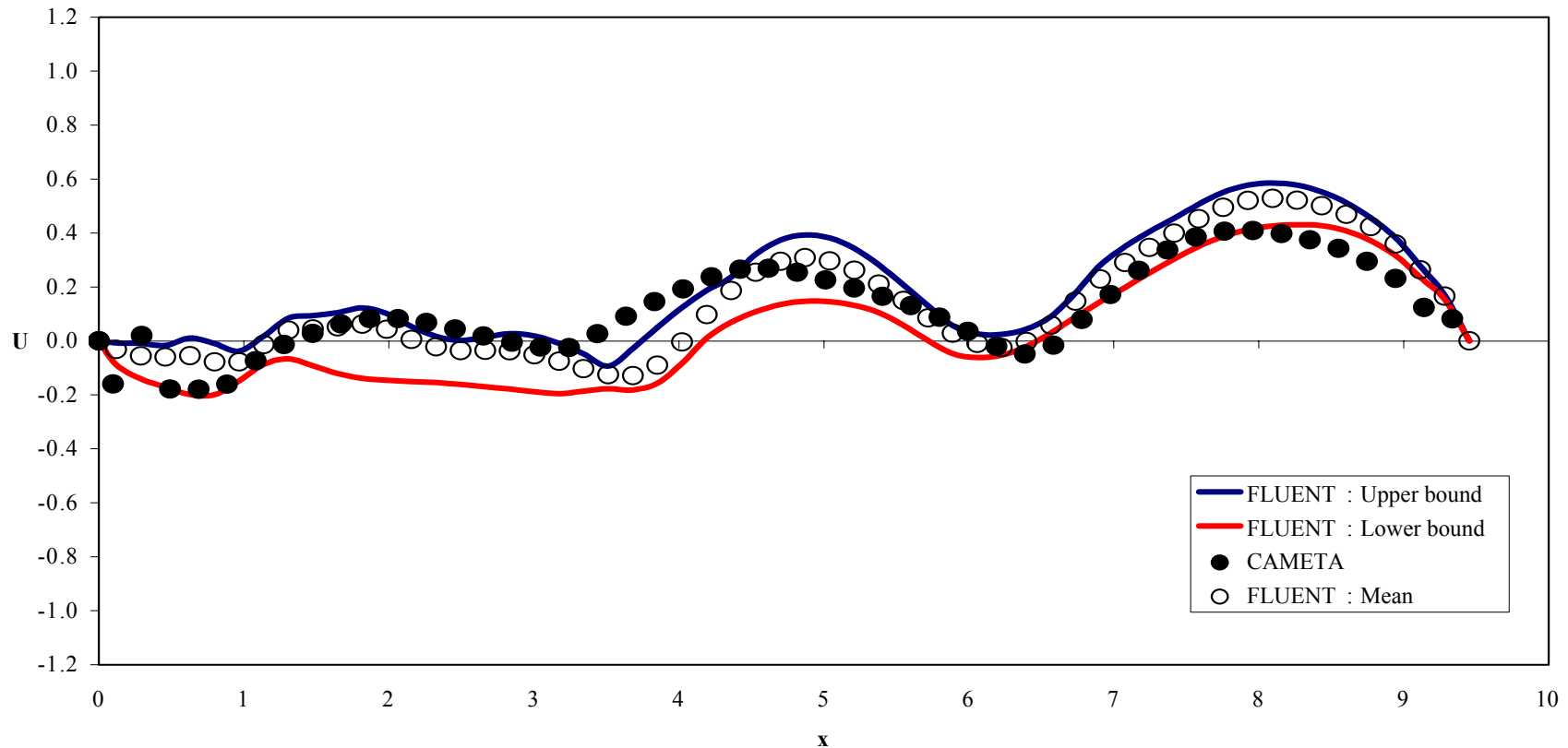


How is *CAMETA* validated? (1/9)

- **Commercial CFD software:**
 - **FLUENT version 6.1.22**
 - **Structured & uniform grid**
 - **Unstructured & non-uniform grid**
- **Two-equation turbulence models**
 - **High-Re k - ε models (Standard, RNG, Realizable)**
 - **High-Re k - ω models (Standard, SST)**
 - **Wall functions (Standard, Non-equilibrium, Enhanced)**

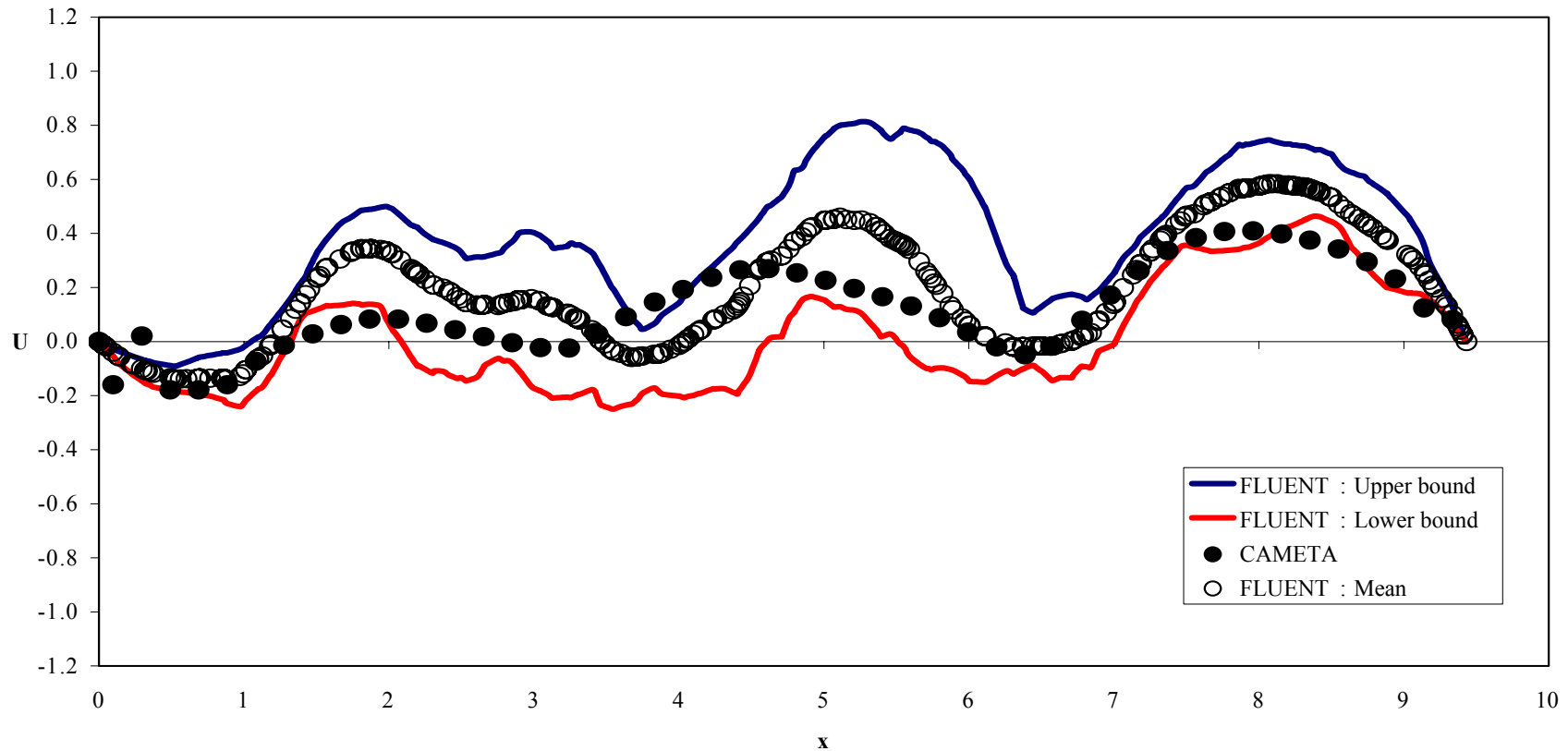
How is *CAMETA* validated? (2/9)

- **FLUENT: Structured & uniform grid**



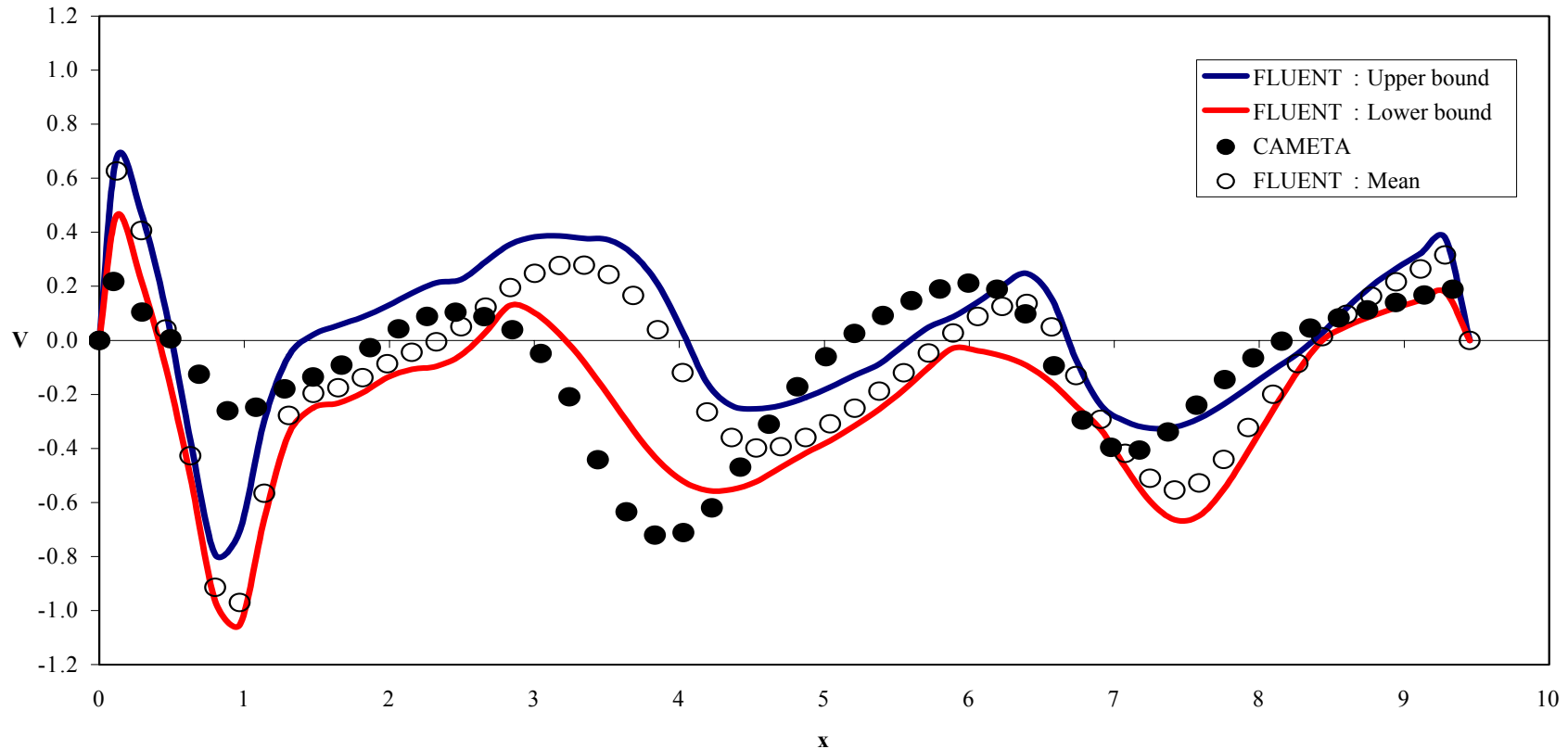
How is *CAMETA* validated? (3/9)

- **FLUENT: Unstructured & non-uniform grid**



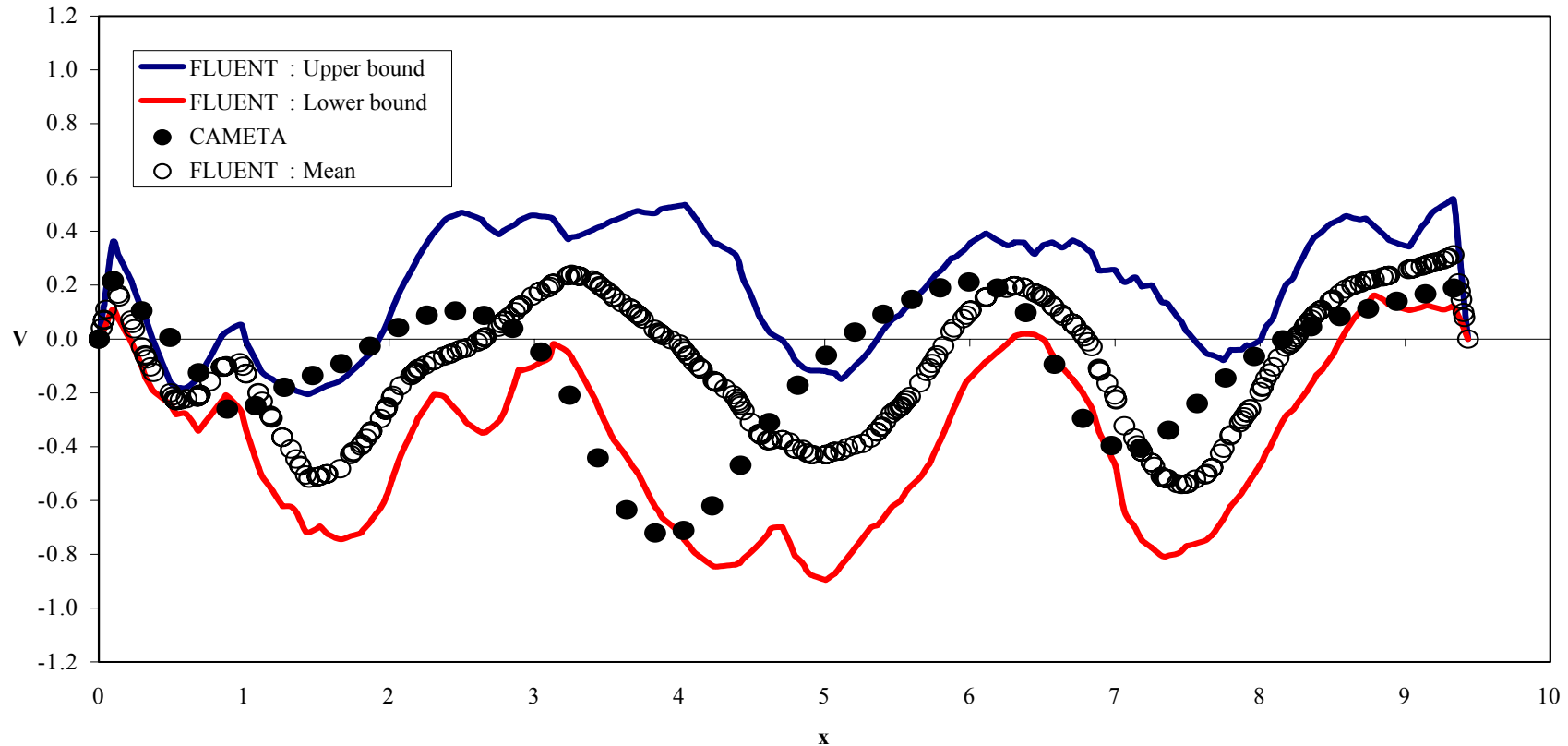
How is *CAMETA* validated? (4/9)

- **FLUENT: Structured & uniform grid**



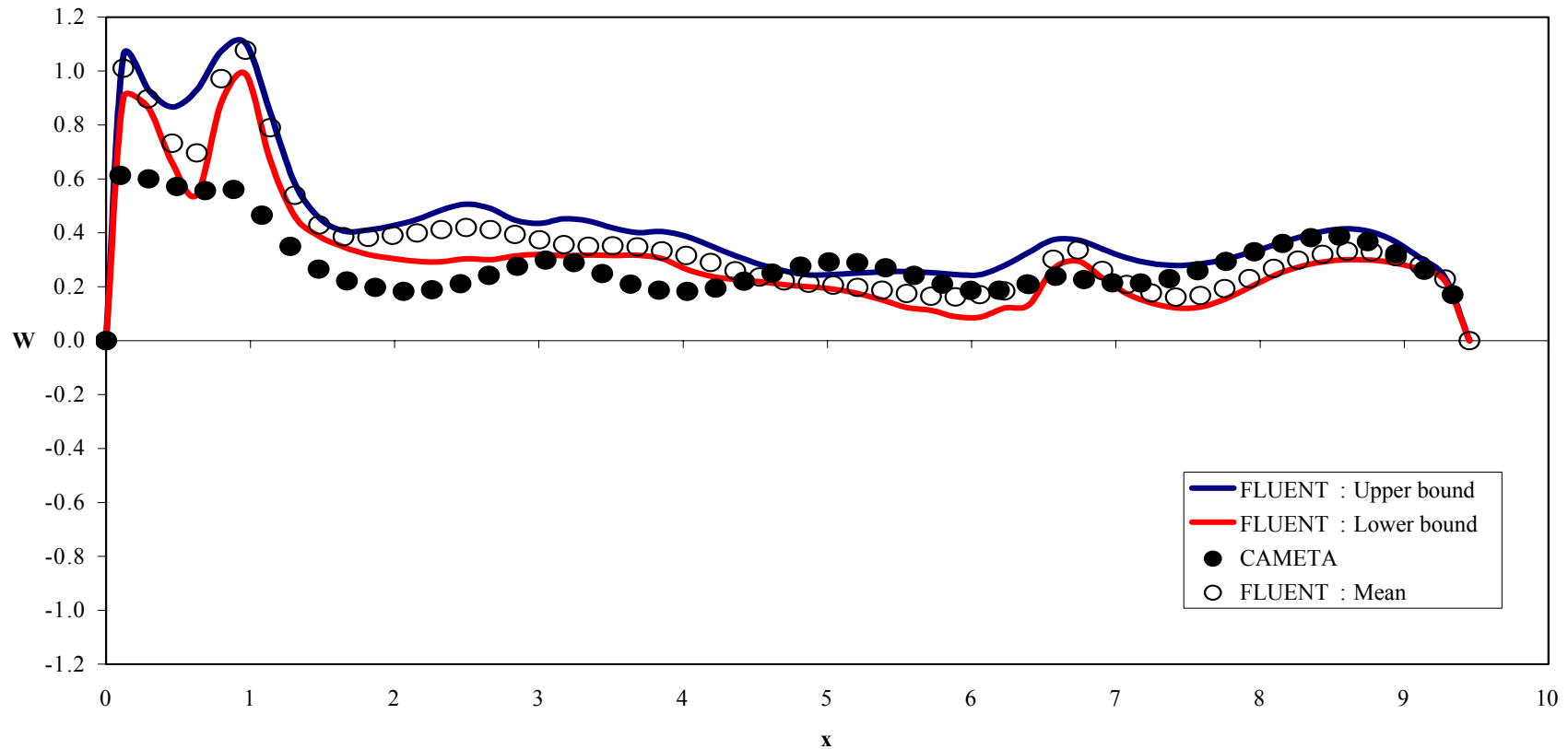
How is *CAMETA* validated? (5/9)

- **FLUENT: Unstructured & non-uniform grid**



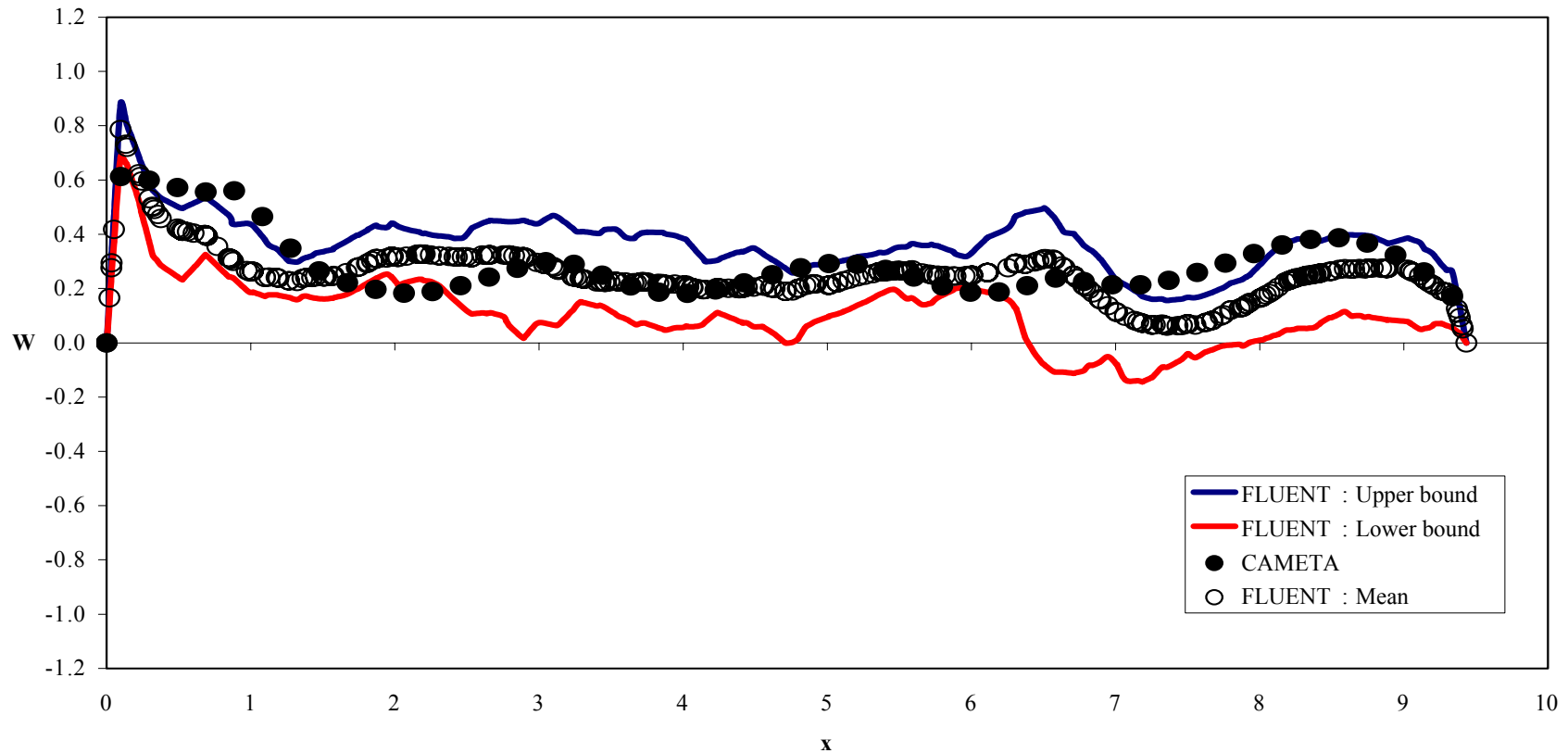
How is *CAMETA* validated? (6/9)

- **FLUENT: Structured & uniform grid**



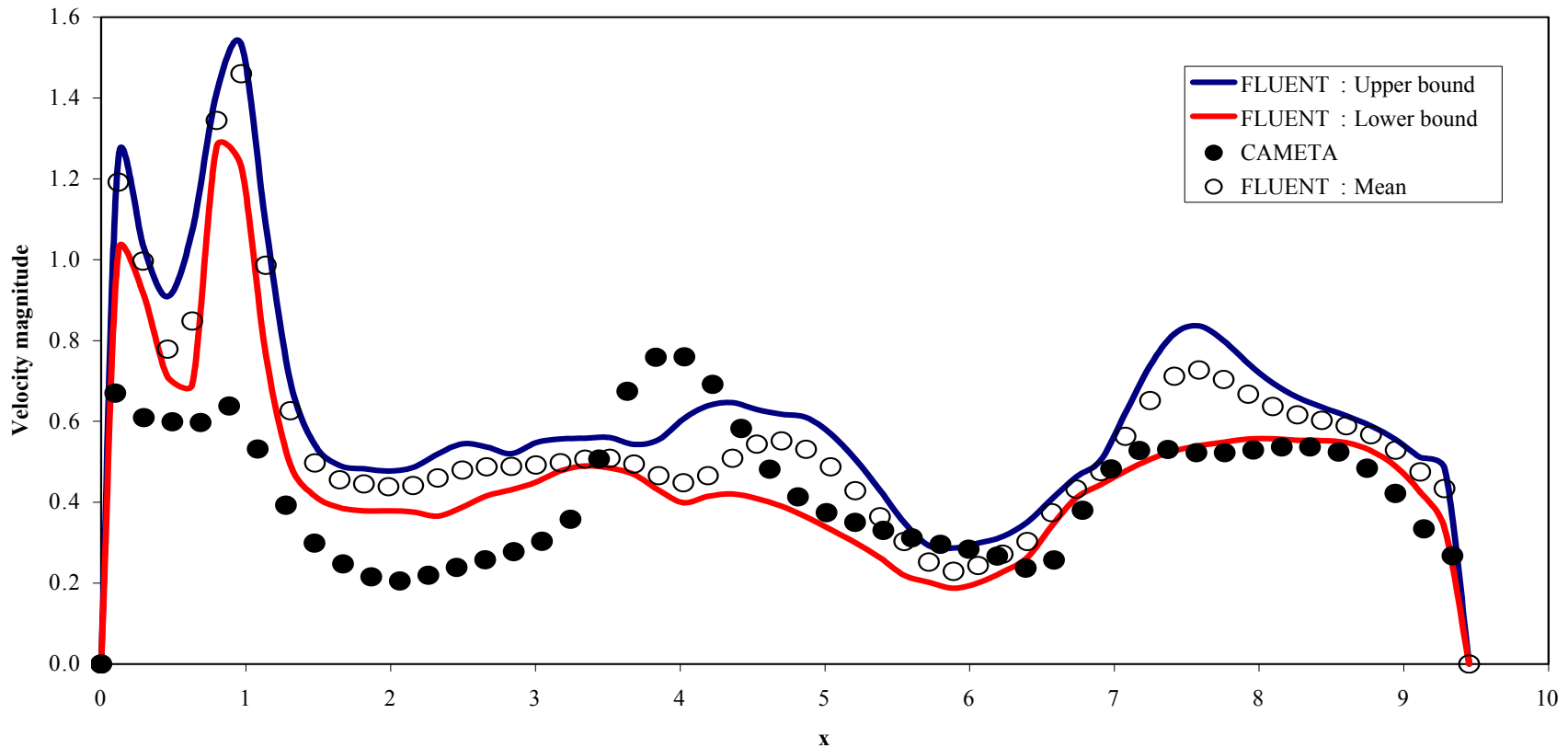
How is *CAMETA* validated? (7/9)

- **FLUENT: Unstructured & non-uniform grid**



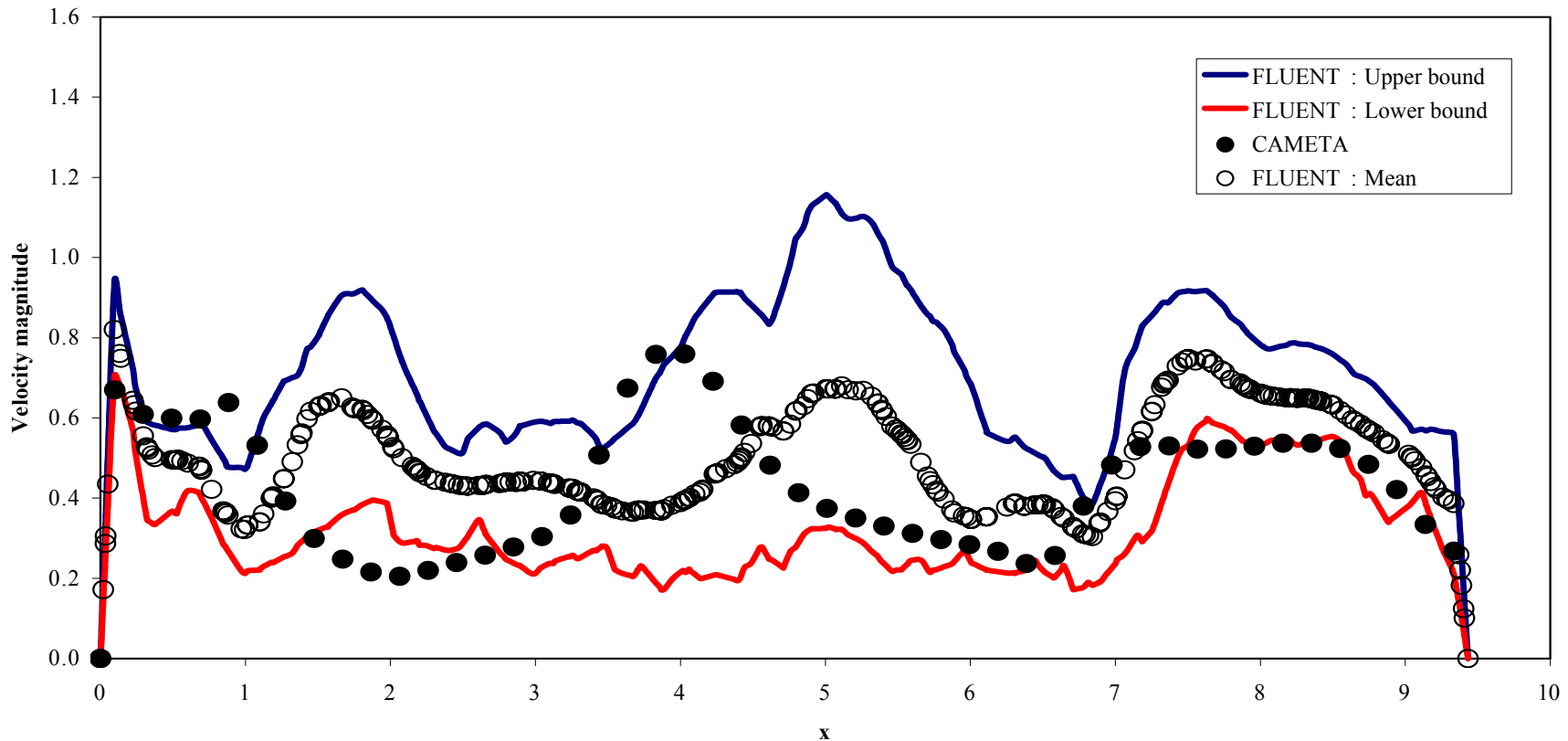
How is *CAMETA* validated? (8/9)

- **FLUENT: Structured & uniform grid**



How is *CAMETA* validated? (9/9)

- **FLUENT: Unstructured & non-uniform grid**



Acknowledgements

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คุณเอกรงค์ สุขจิต

คุณอัครพล มีสิทธิ

Thank you for your interest