

CFD Analysis for Regis Residence A/C Outdoor Units

Report: 16 January 2019

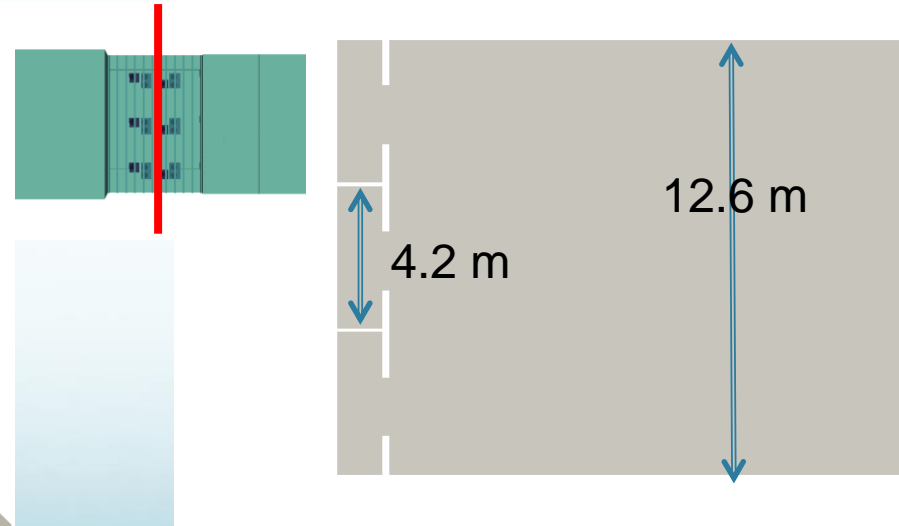
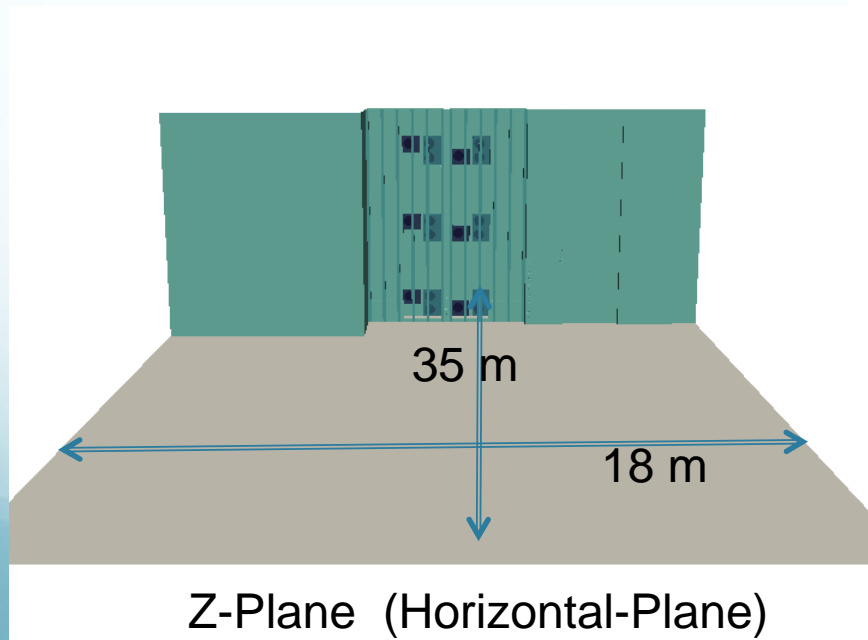
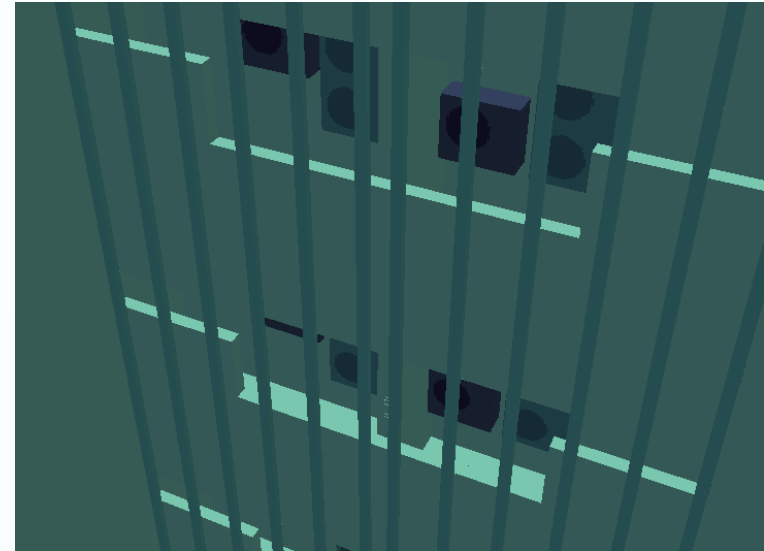
Dena Hendriana Sc.D
Center for Computational Fluid Dynamics
Swiss German University

Simulation Conditions:

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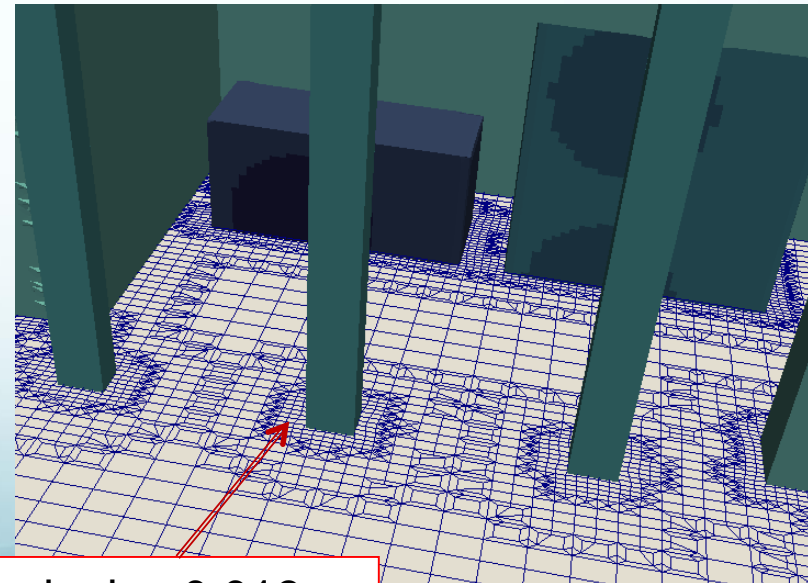
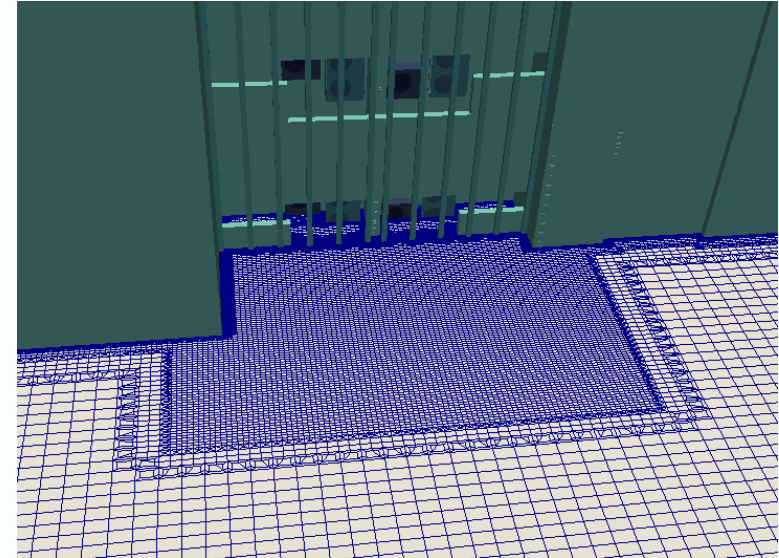
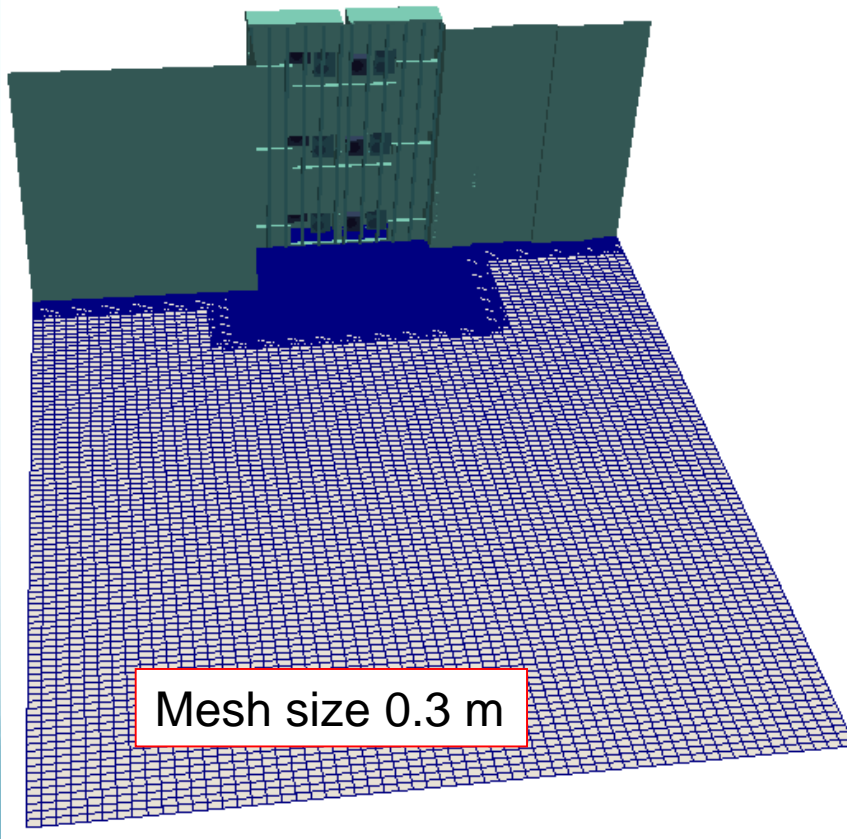
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- $k-\omega$ RANS Turbulence model
- Geometry and computational domain:



Y-Plane (Cutting engine room, Vertical-Plane)

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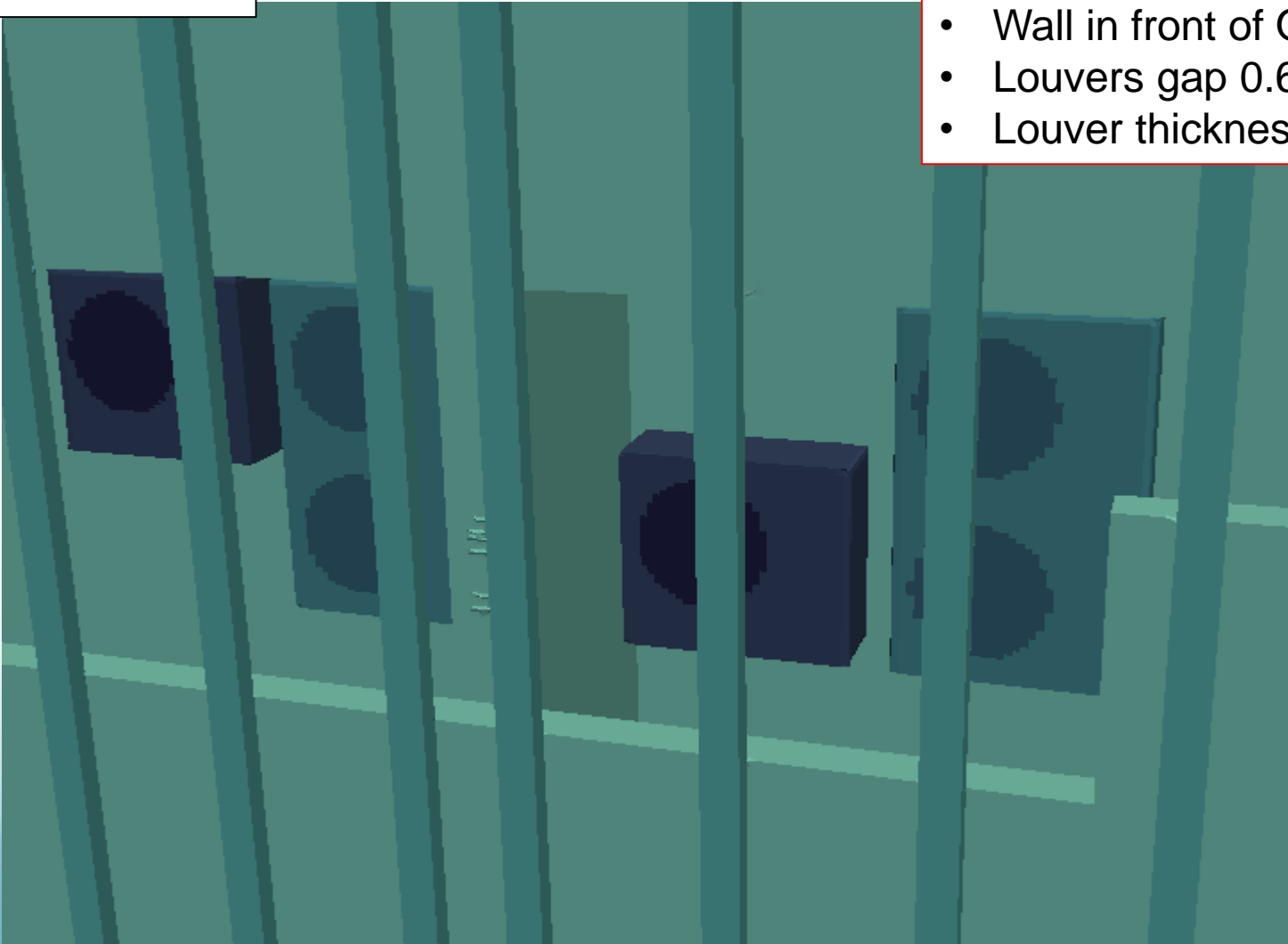


Mesh size 0.019 m

A/C Outdoor Room Information:

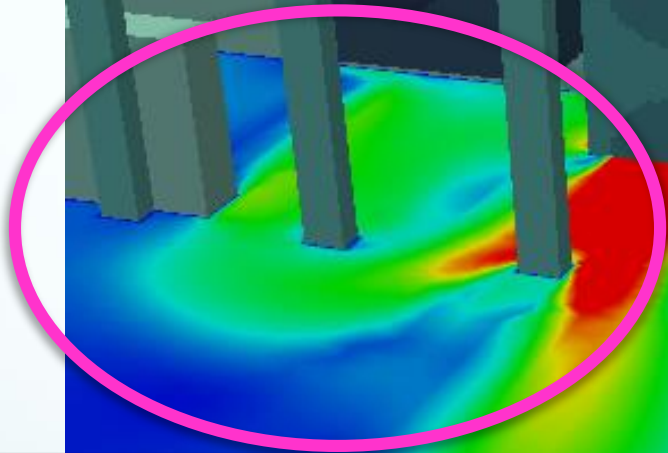
EAST SIDE

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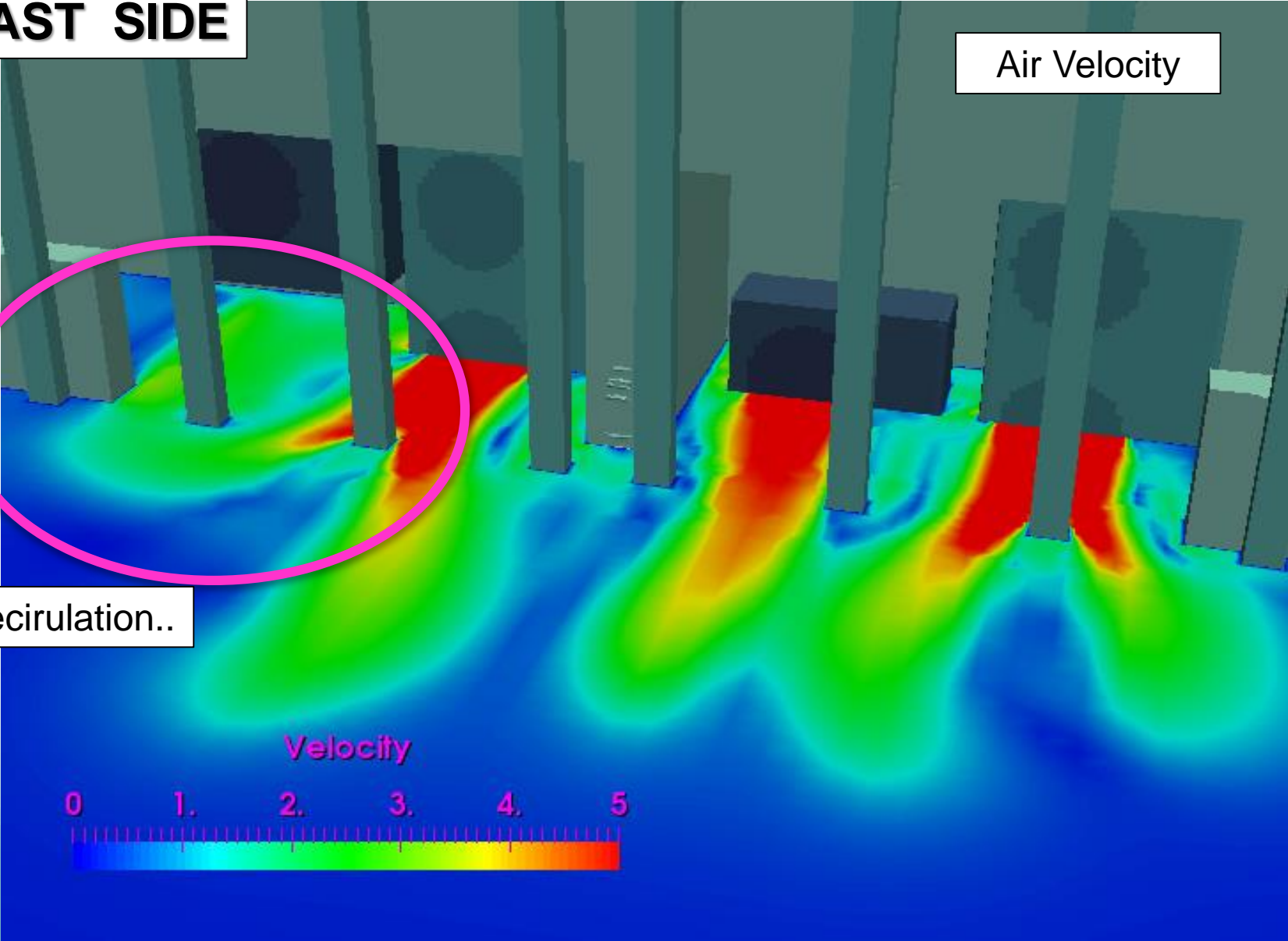


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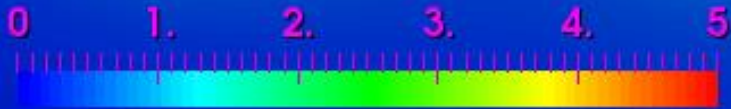
Air Velocity



Air recirculation..

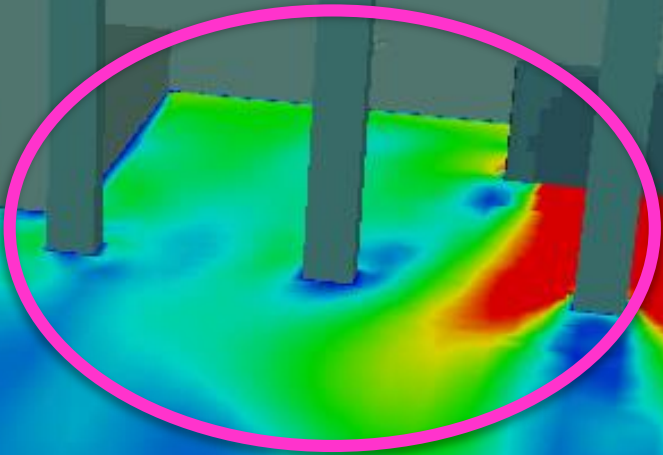


Velocity



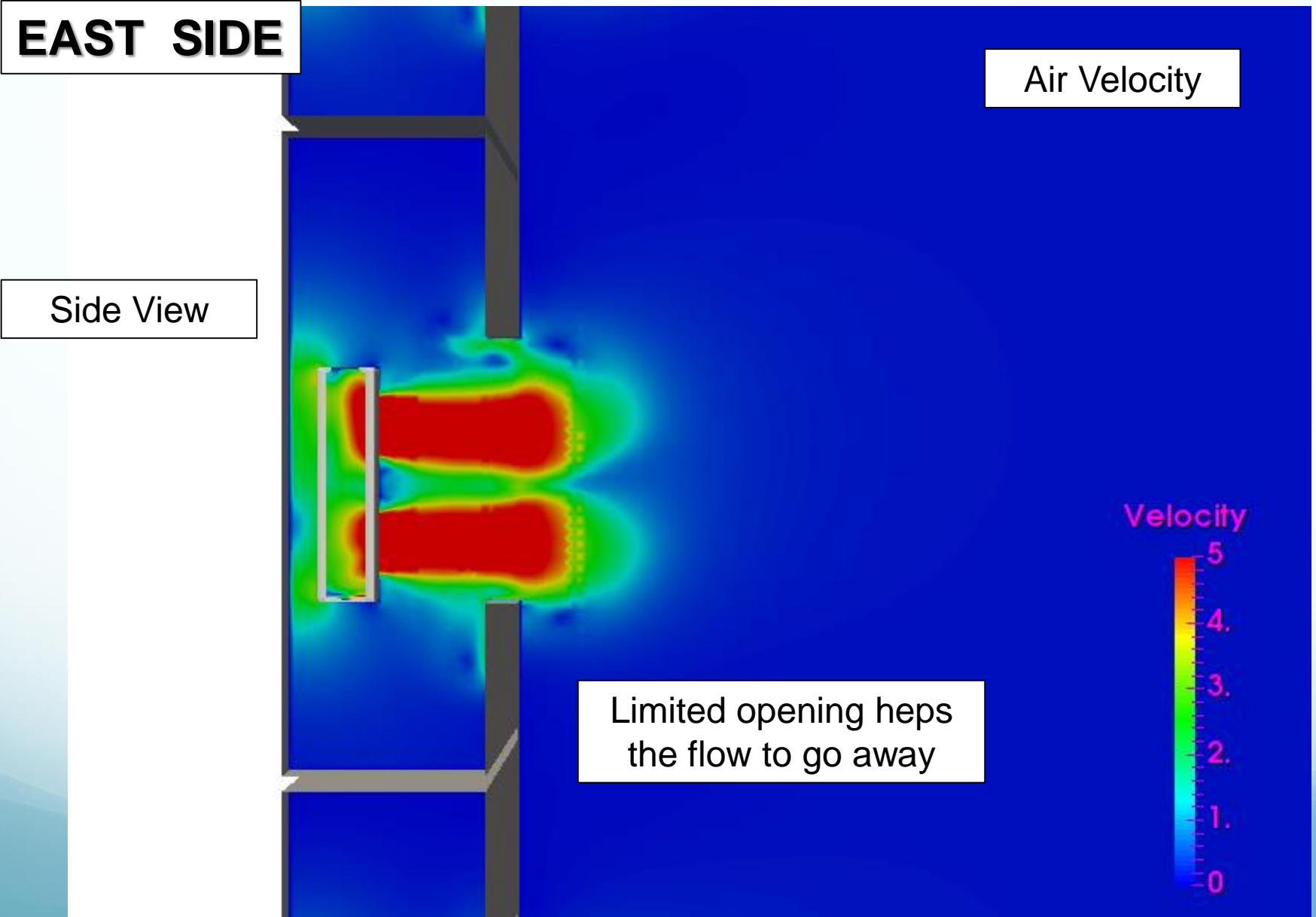
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Air Velocity



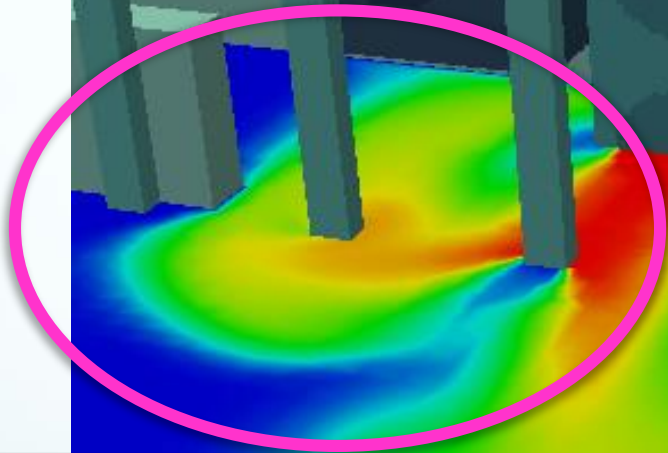
Air recirculation..



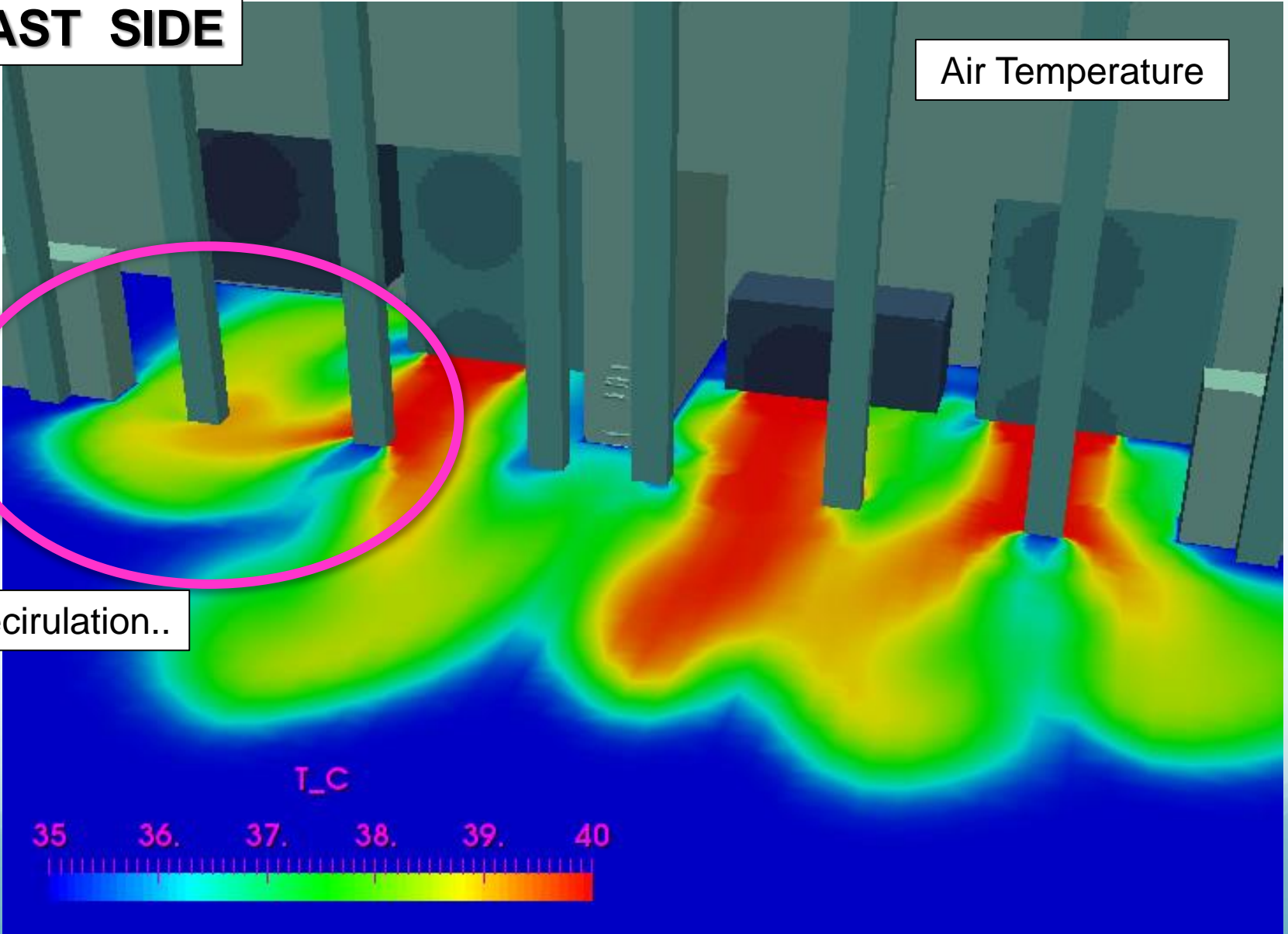


EAST SIDE

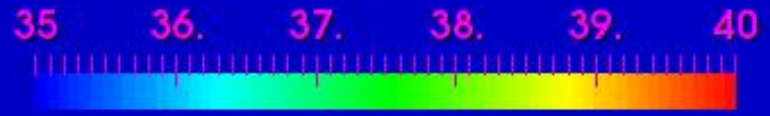
Air Temperature



Air recirculation..



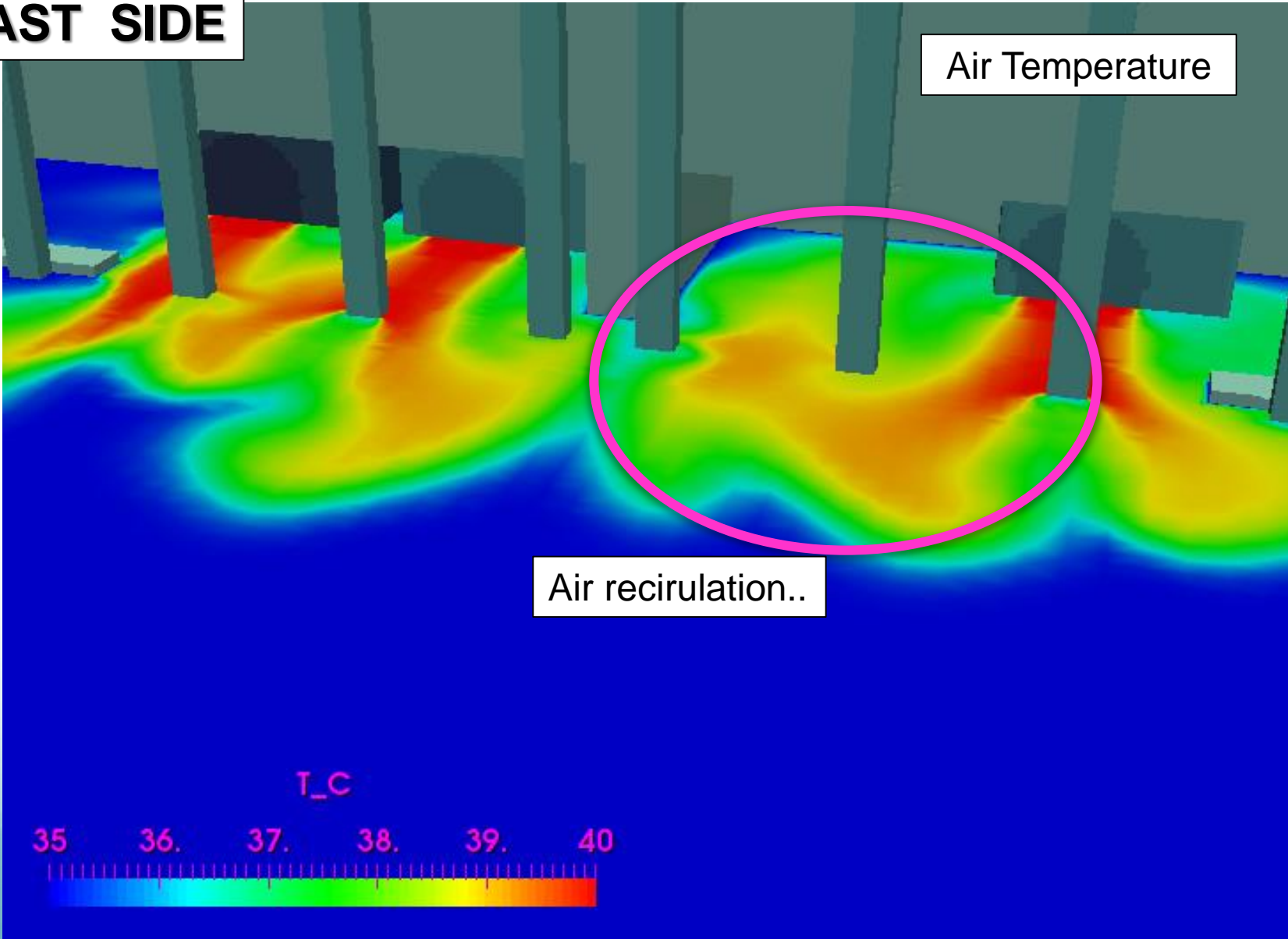
T_C



EAST SIDE

Air Temperature

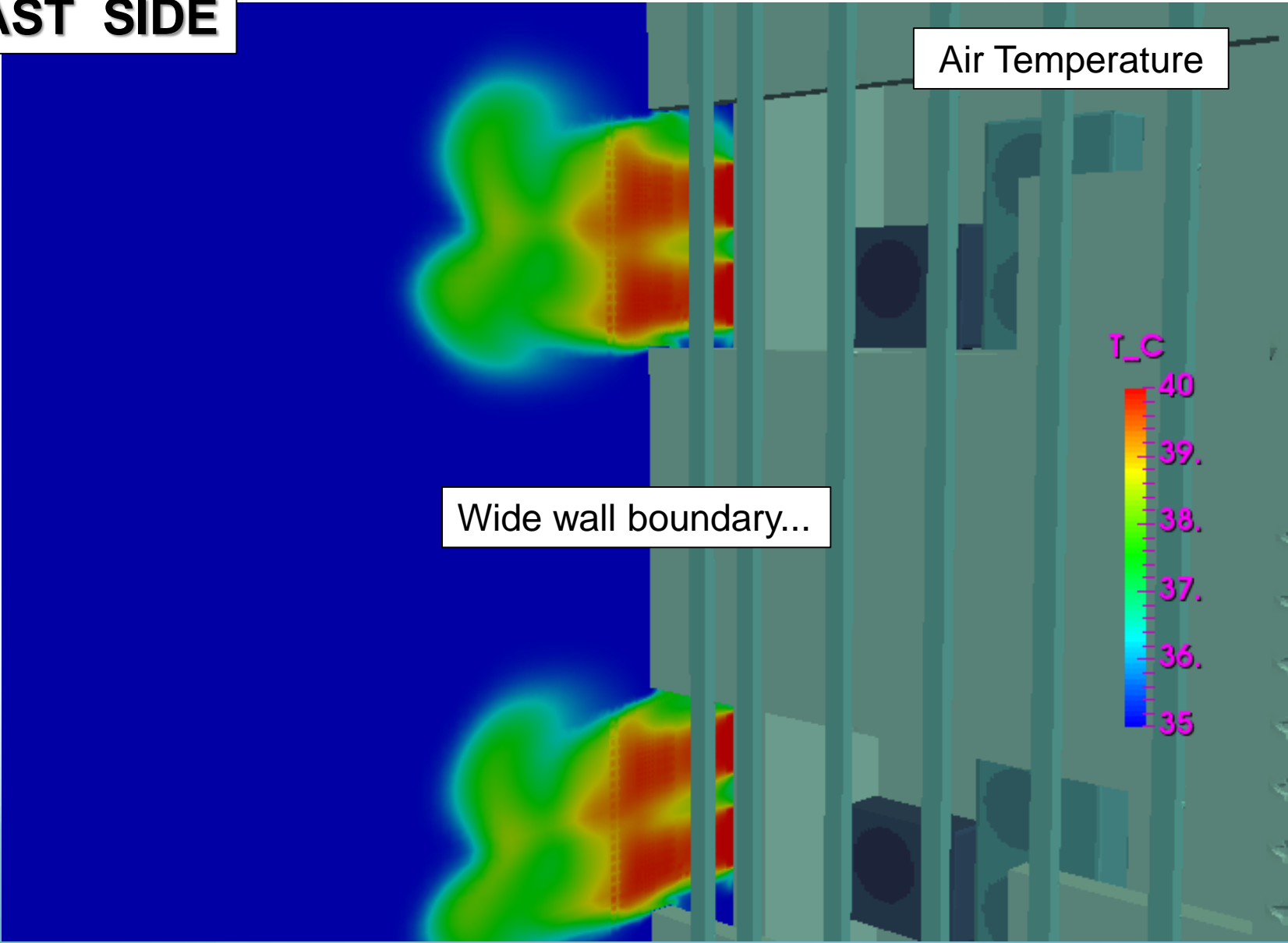
Air recirculation..



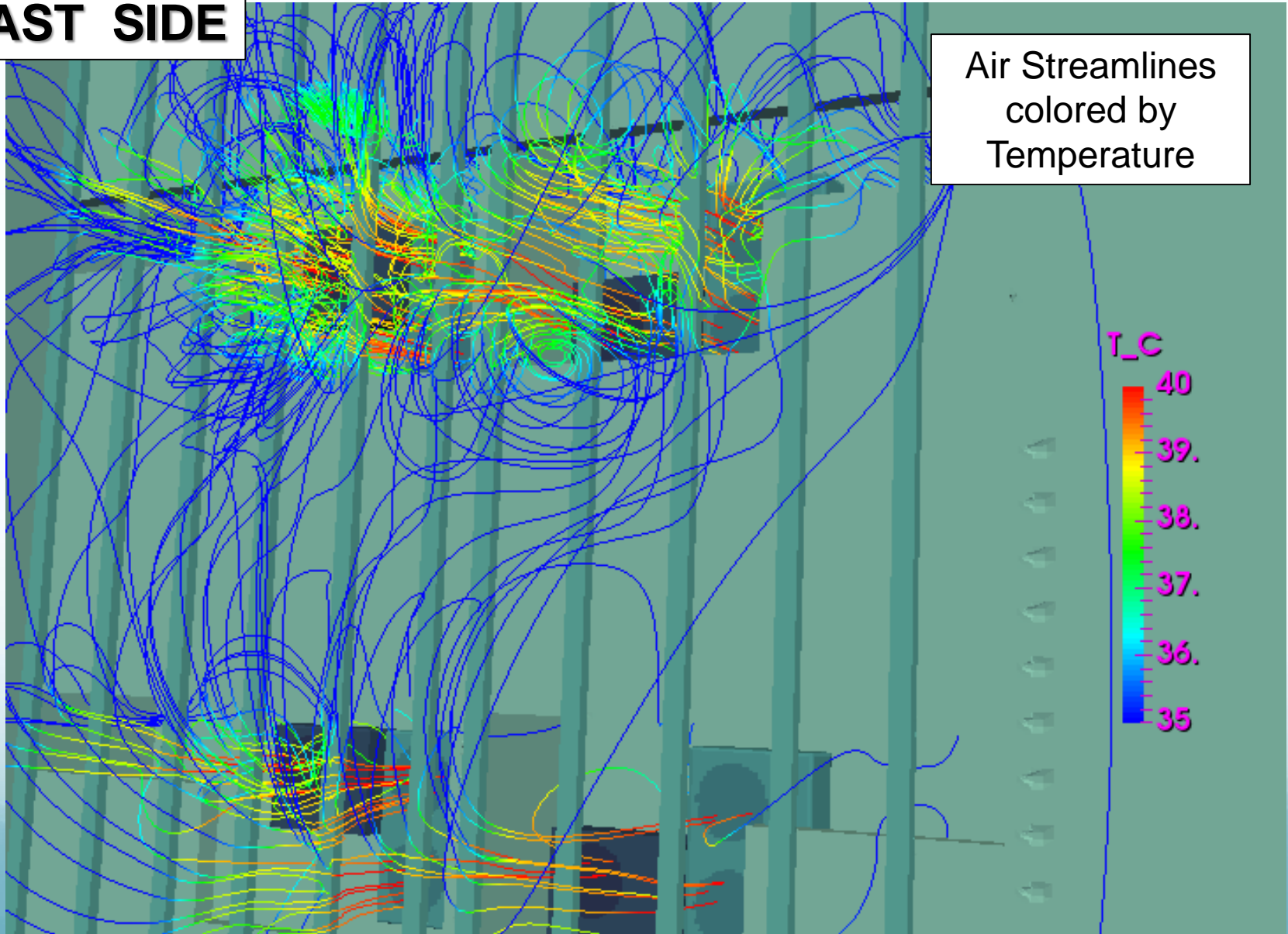
EAST SIDE

Air Temperature

Wide wall boundary...

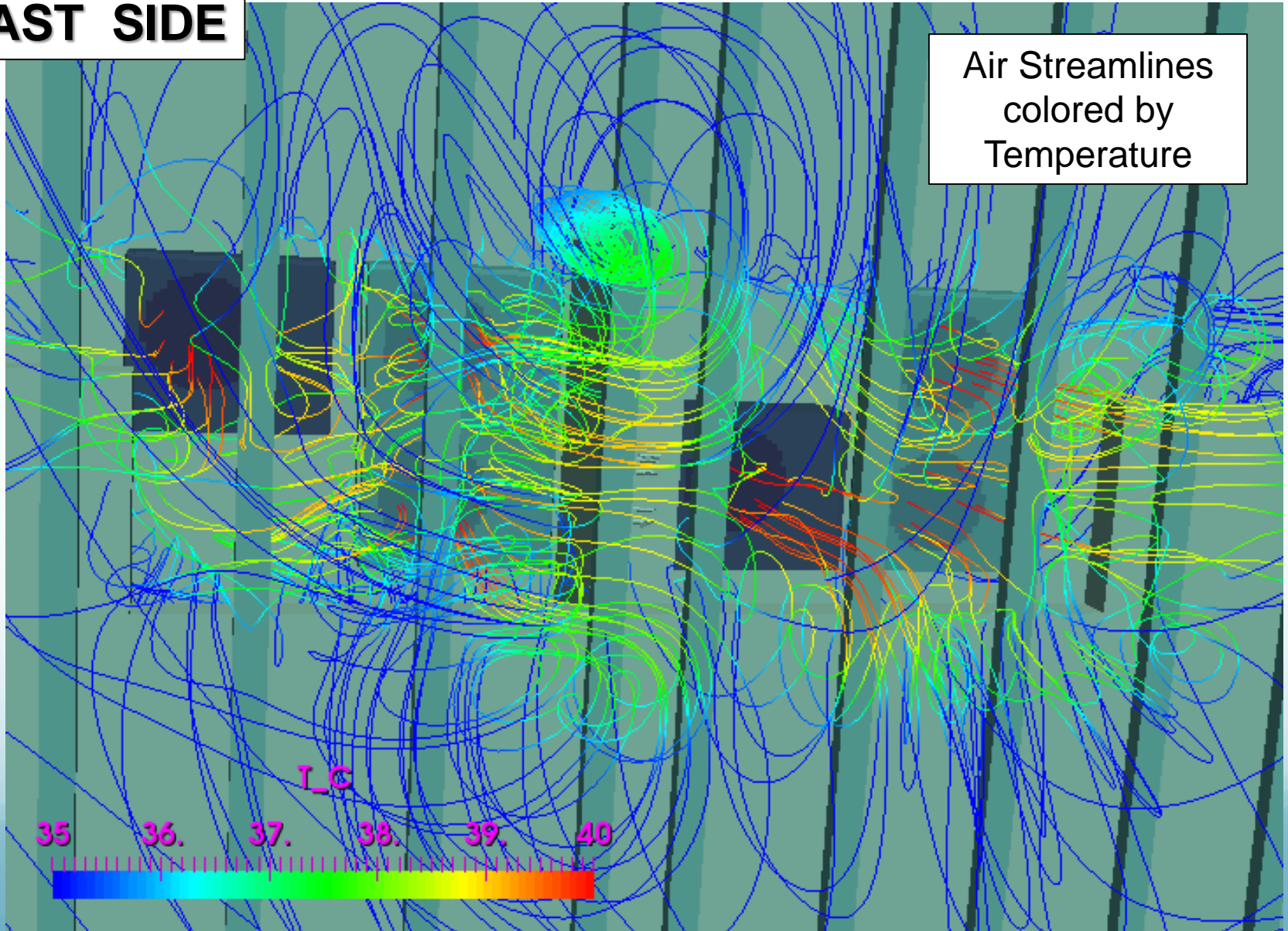


EAST SIDE



EAST SIDE

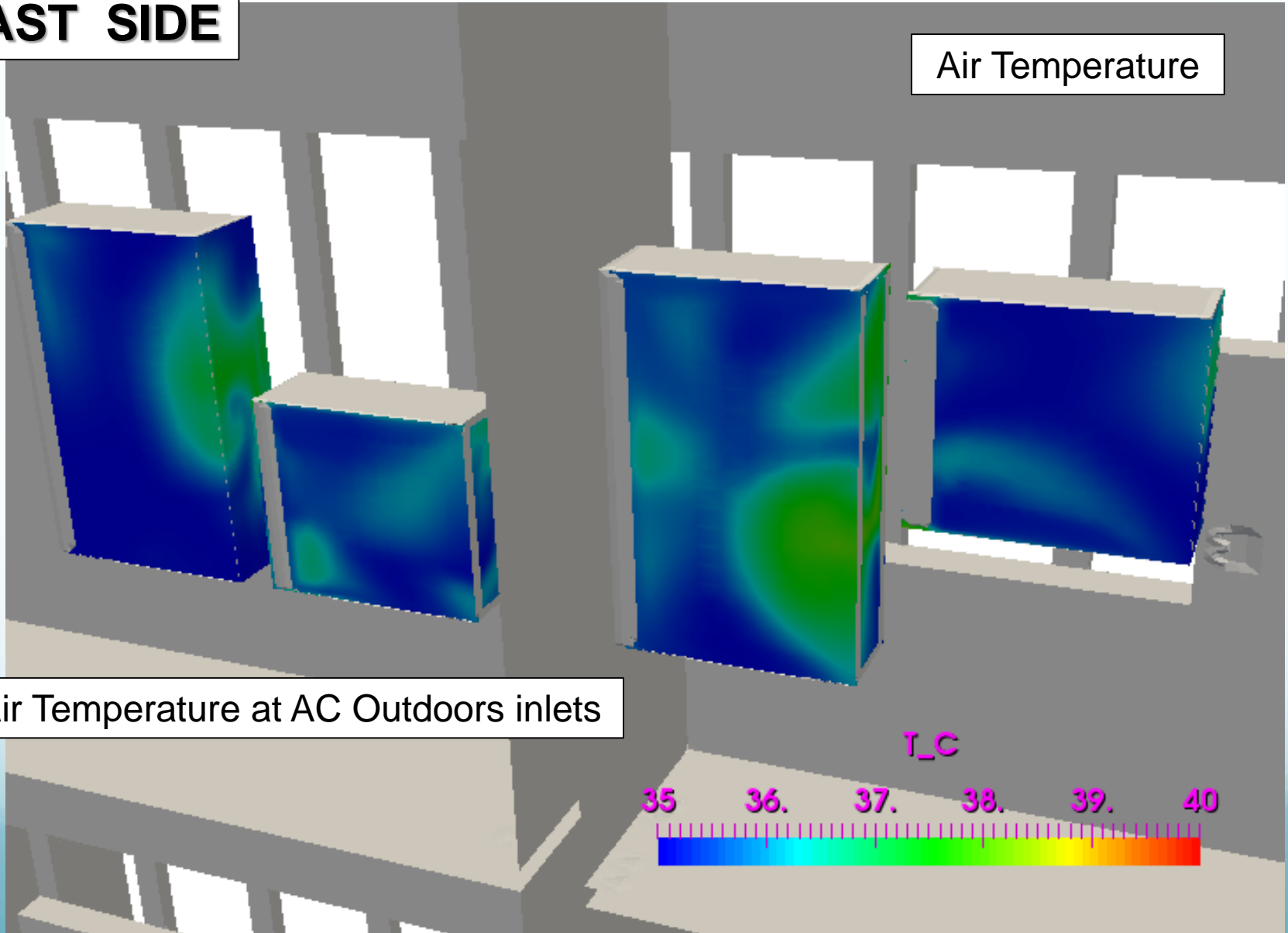
Air Streamlines
colored by
Temperature



EAST SIDE

Air Temperature

Air Temperature at AC Outdoors inlets

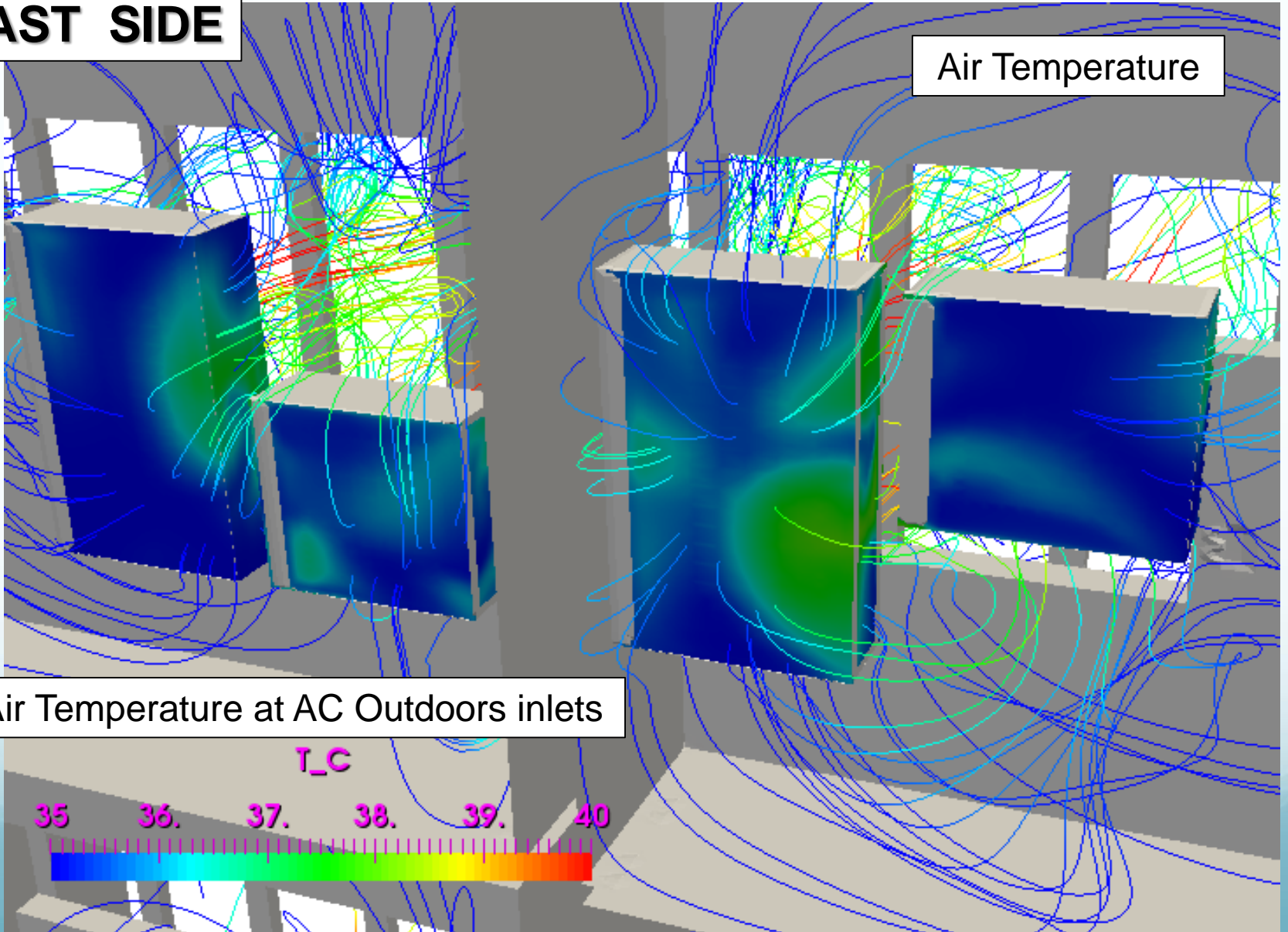


EAST SIDE

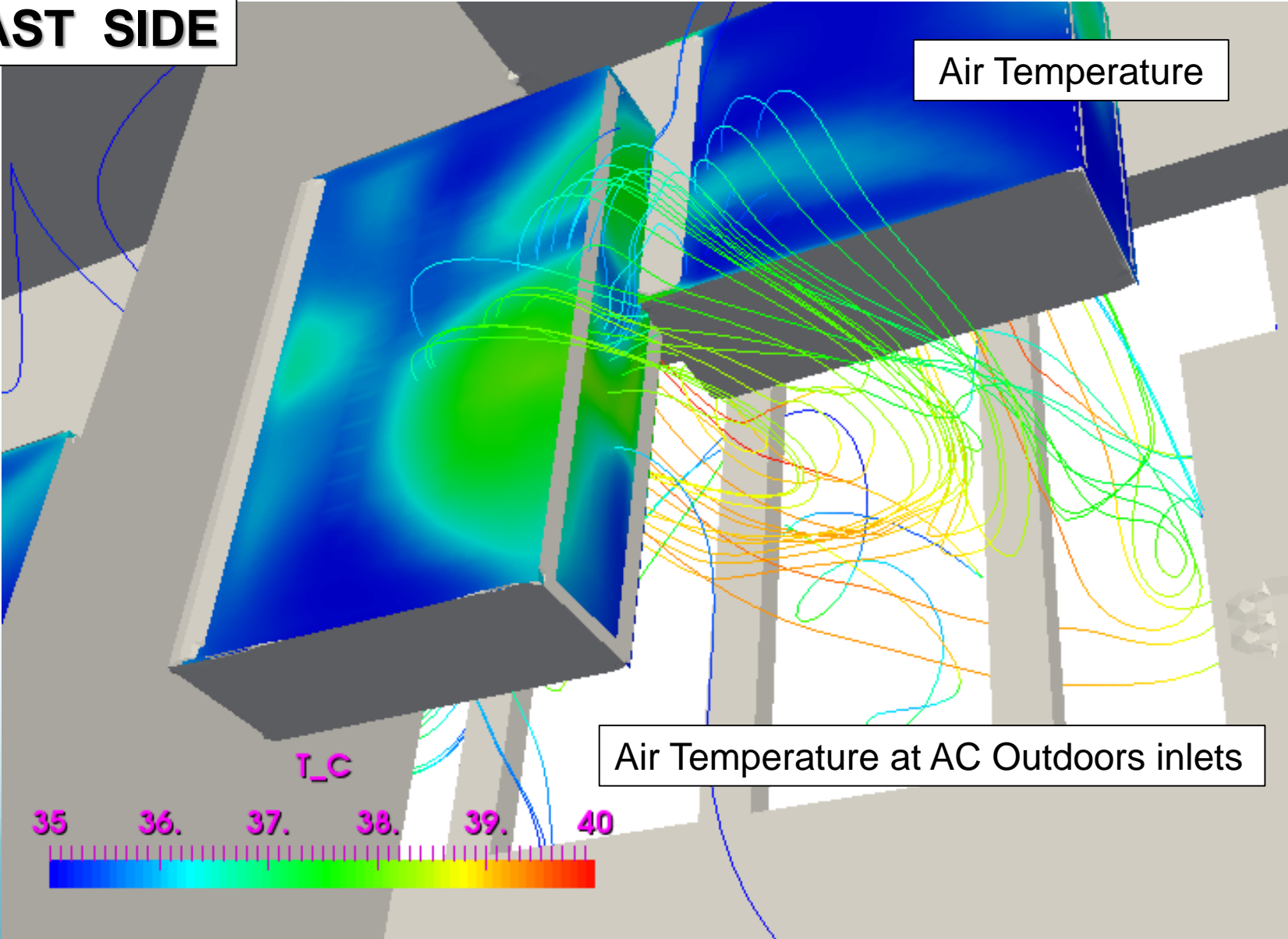
Air Temperature

Air Temperature at AC Outdoors inlets

T_C

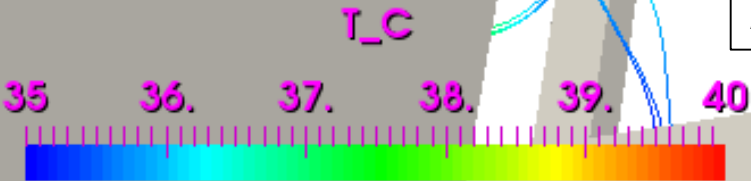


EAST SIDE



Air Temperature

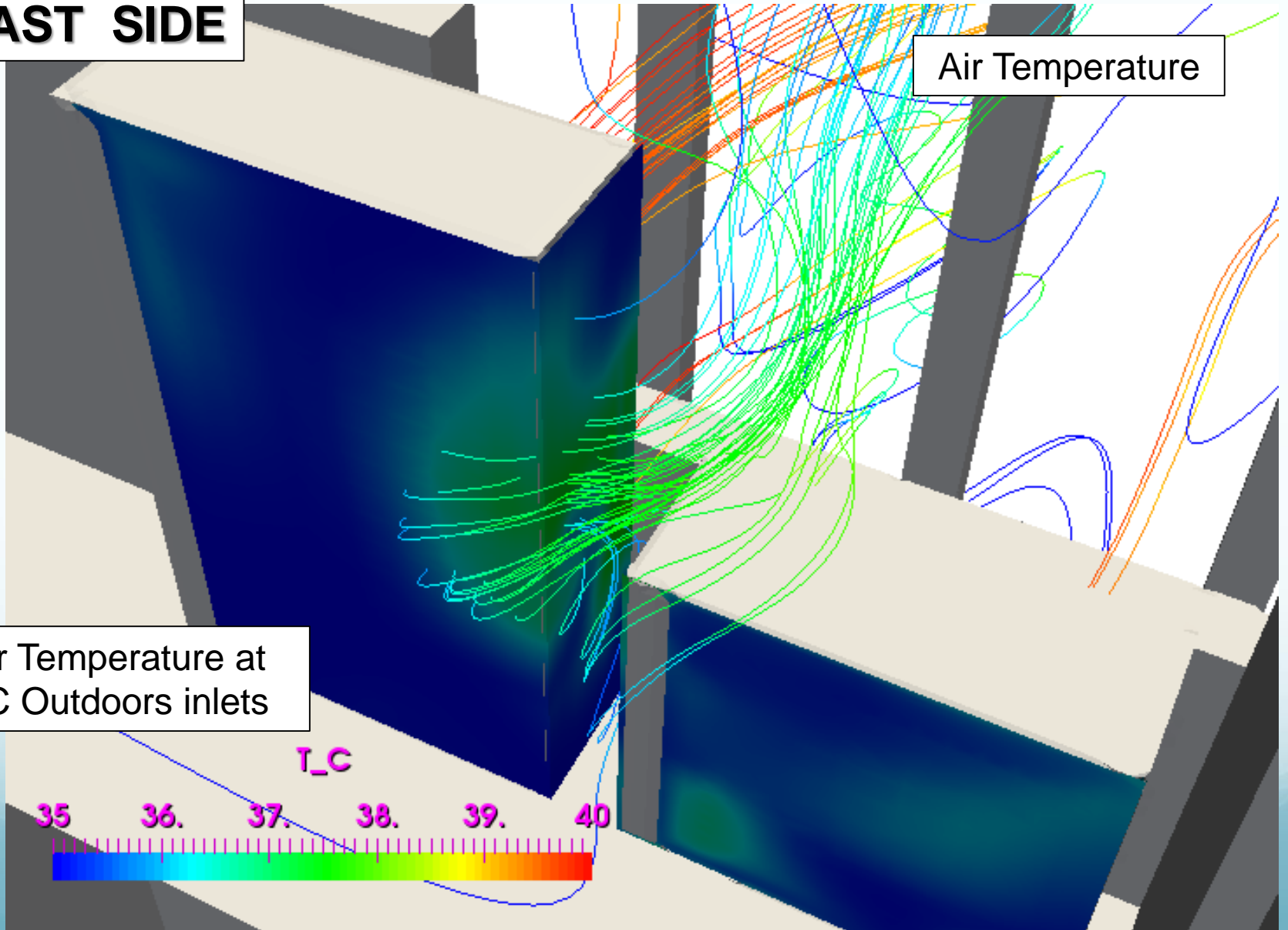
Air Temperature at AC Outdoors inlets



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Air Temperature

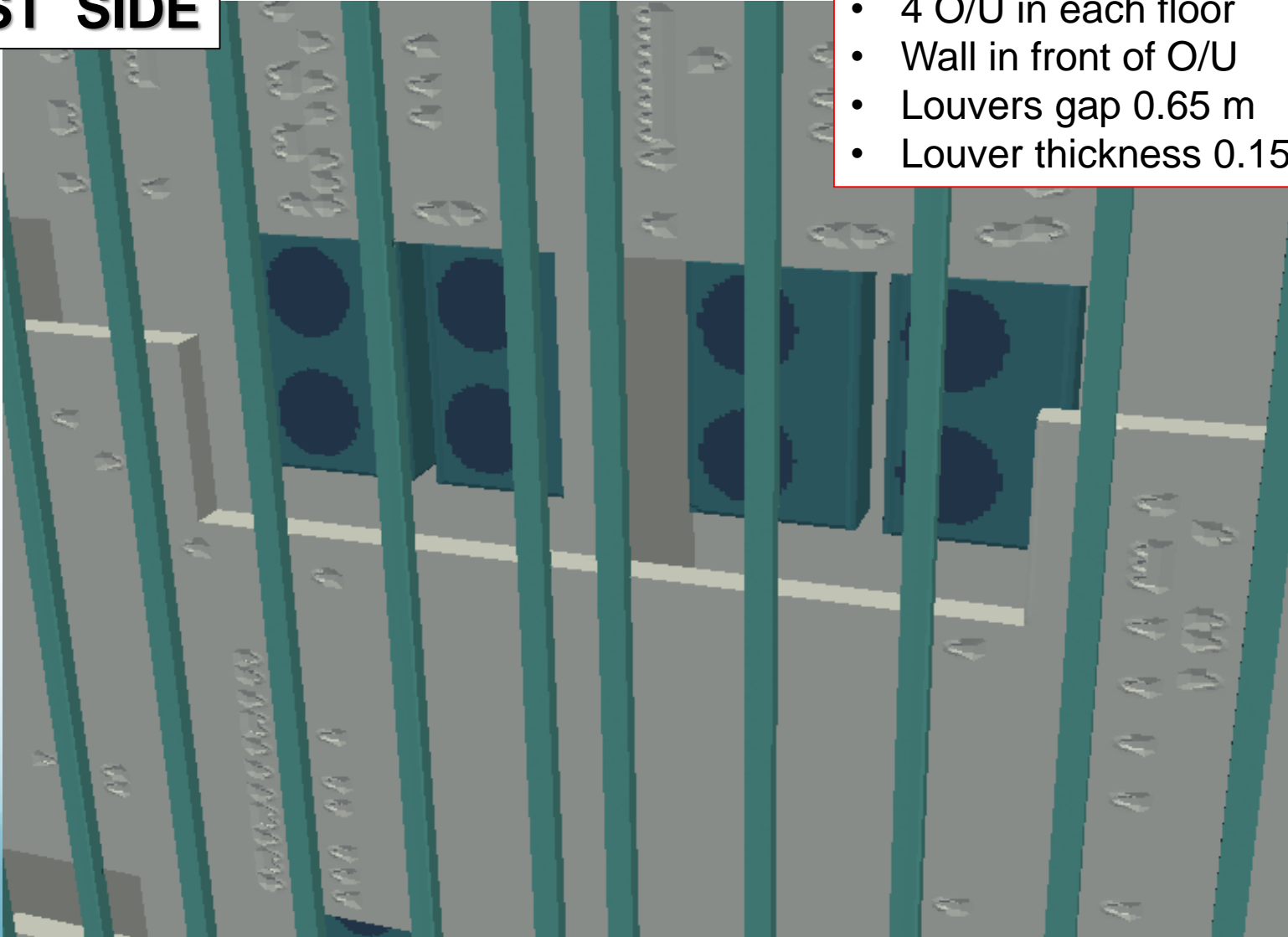
Air Temperature at
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A/C Outdoor Room Information:

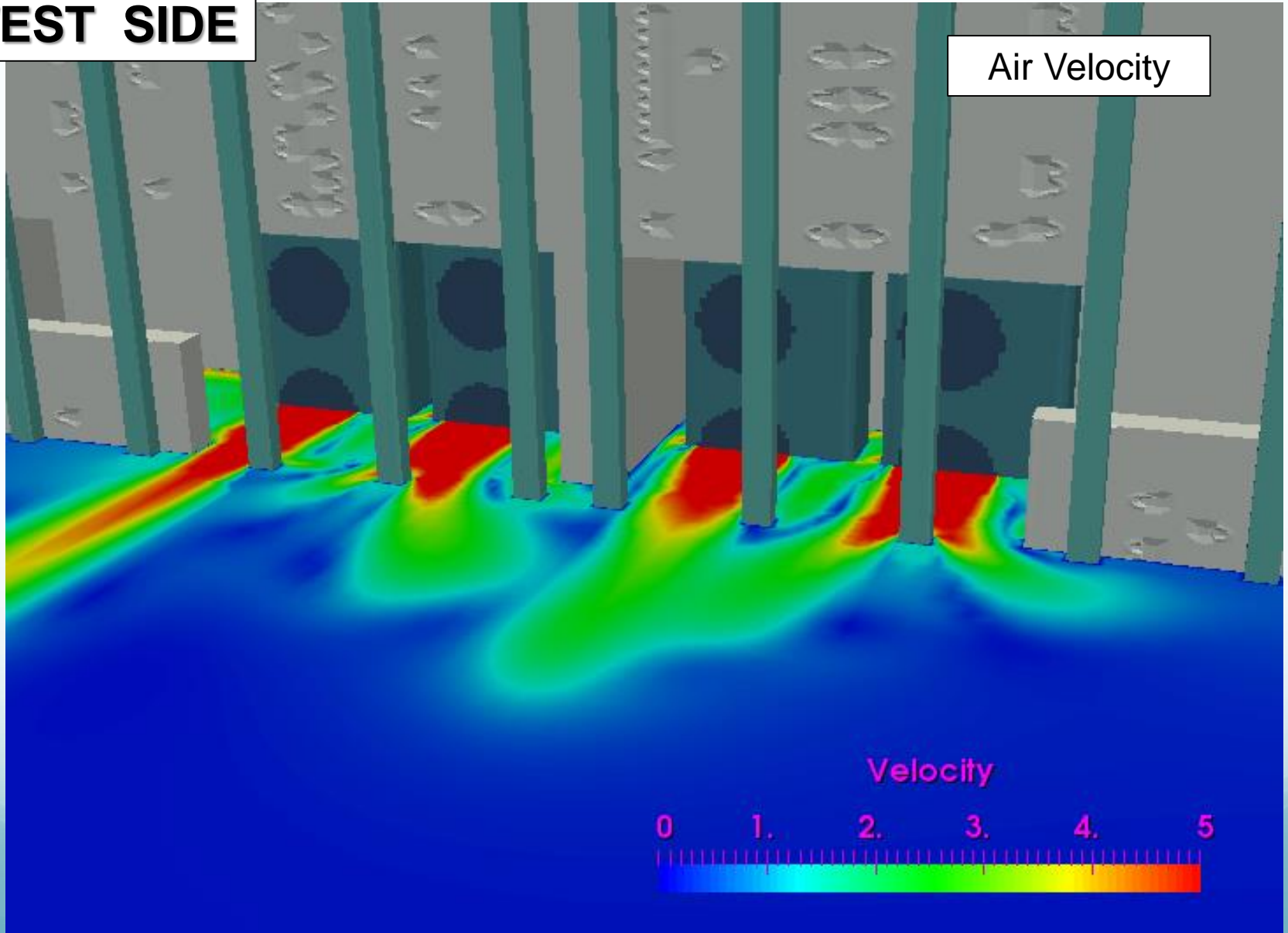
WEST SIDE

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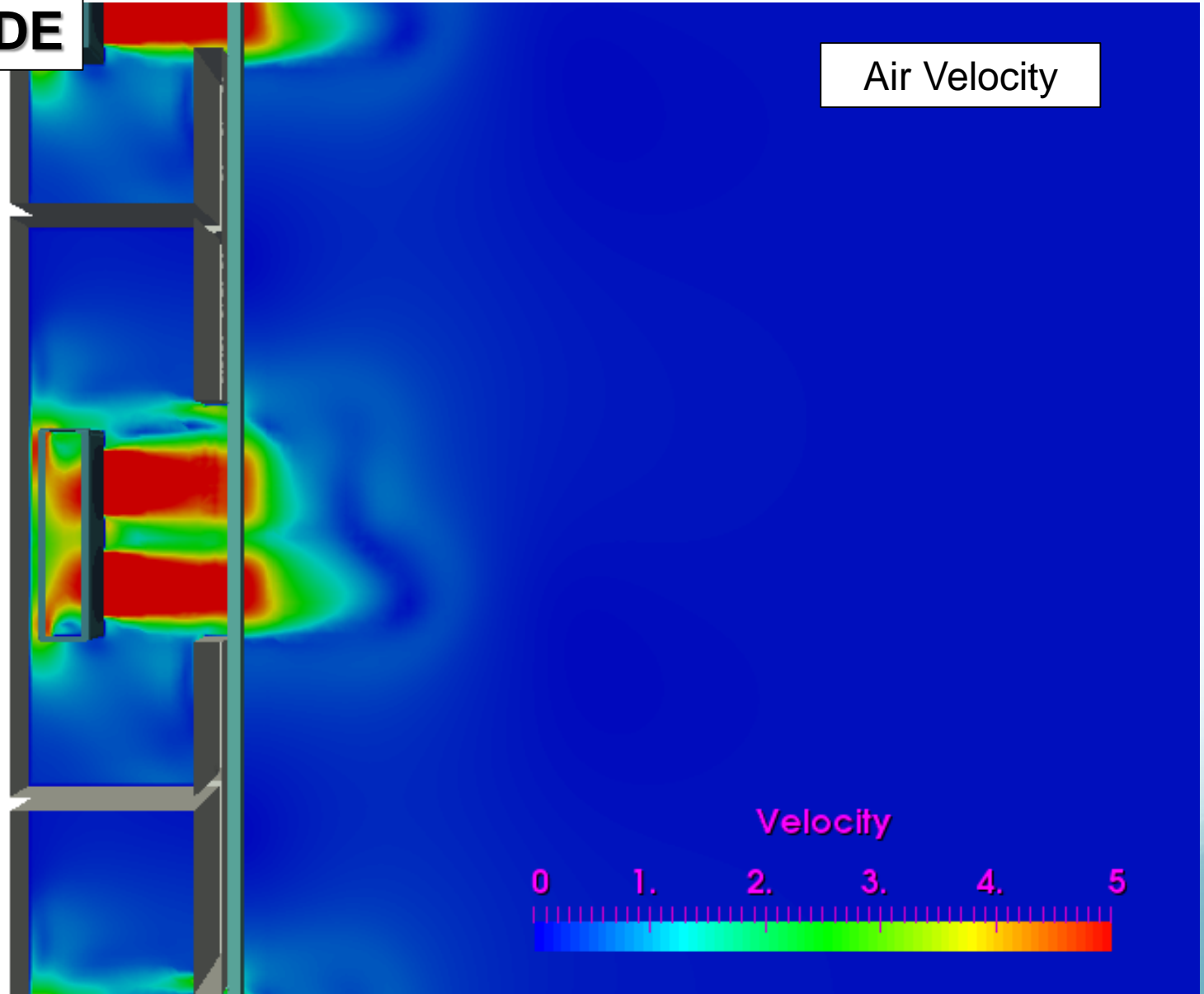
Air Velocity



WEST SIDE

Air Velocity

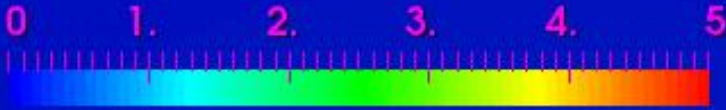
Side View



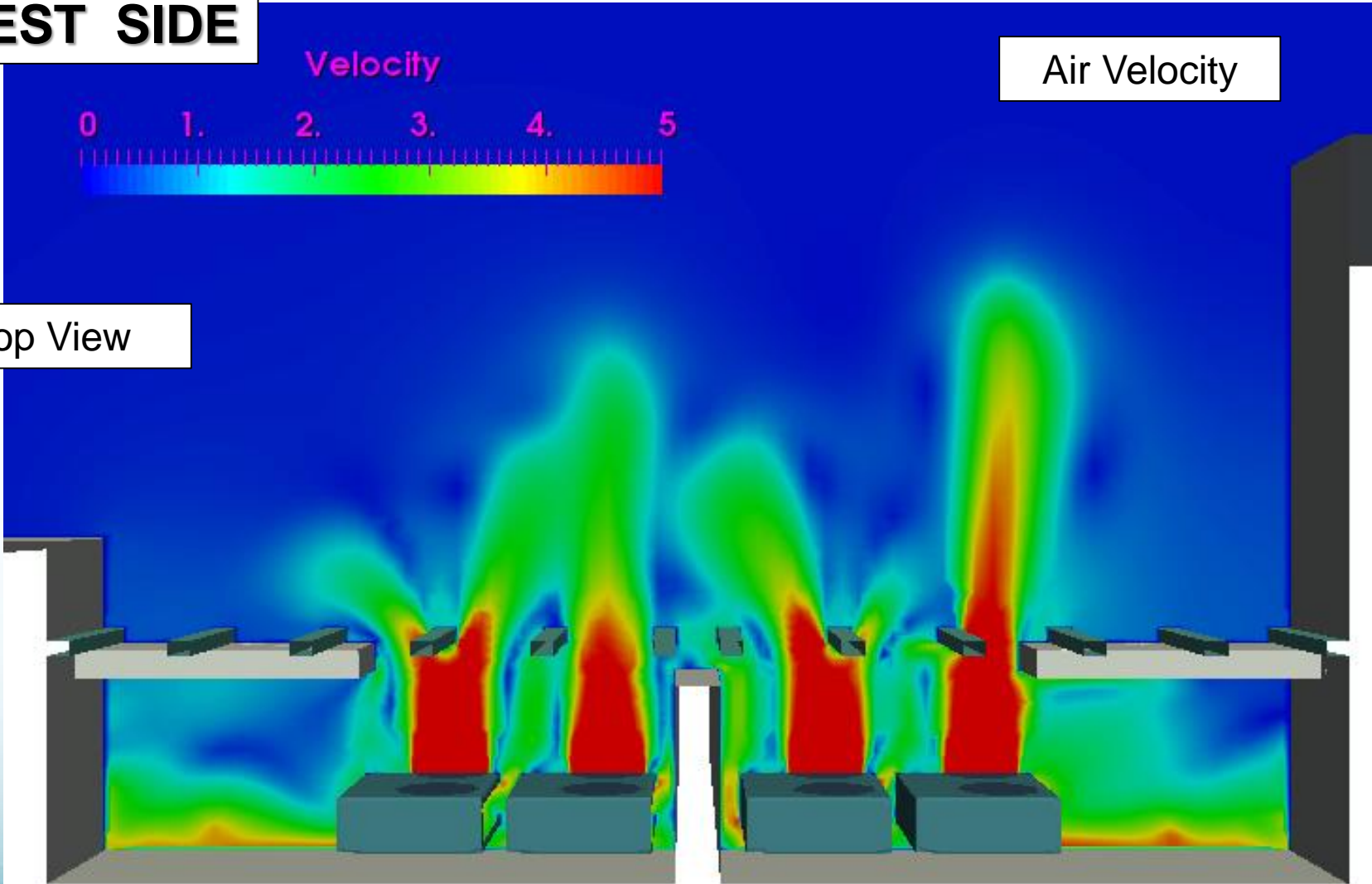
WEST SIDE

Velocity

Air Velocity

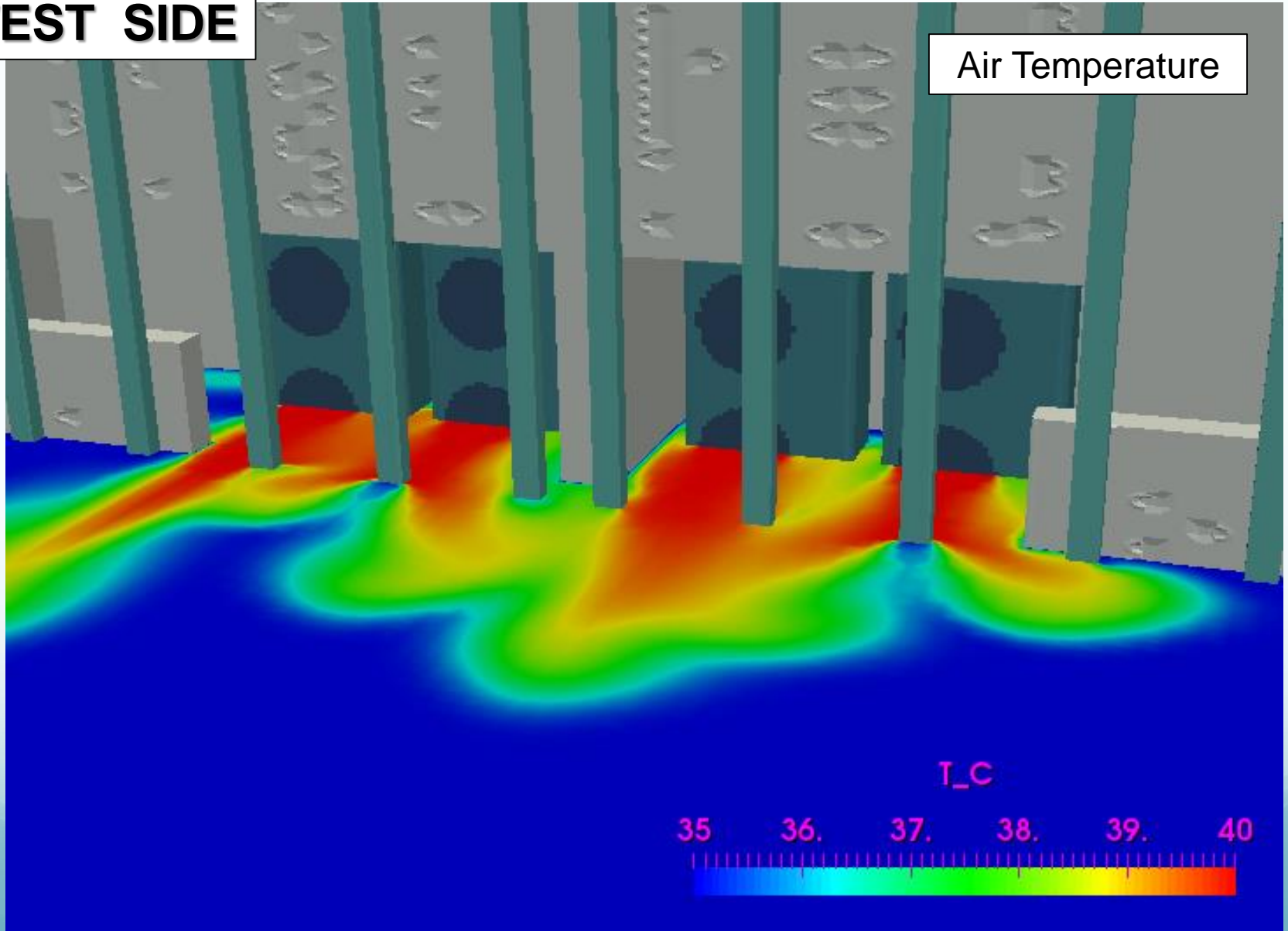


Top View



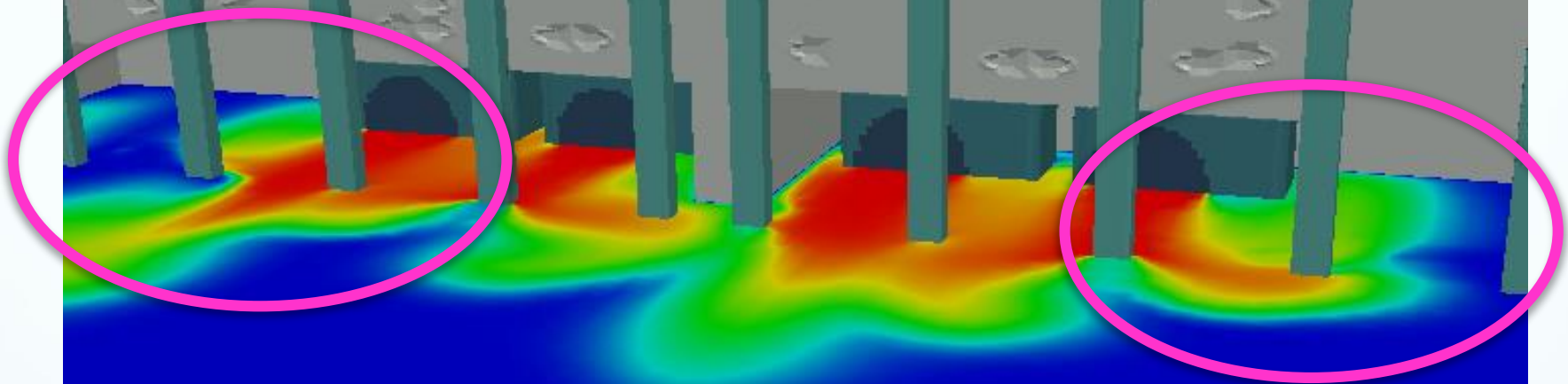
WEST SIDE

Air Temperature



WEST SIDE

Air Temperature



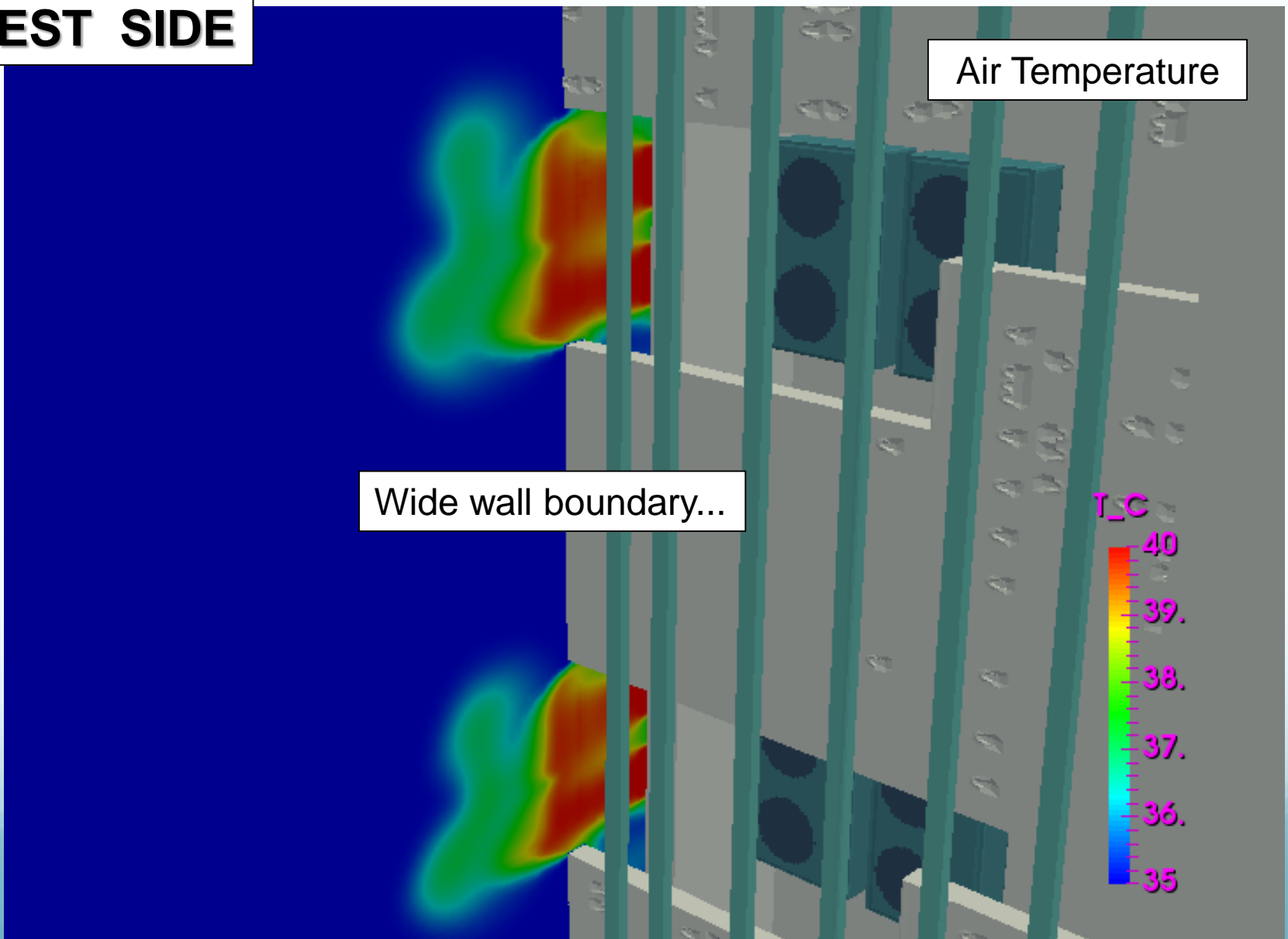
Air recirculation..



WEST SIDE

Air Temperature

Wide wall boundary...



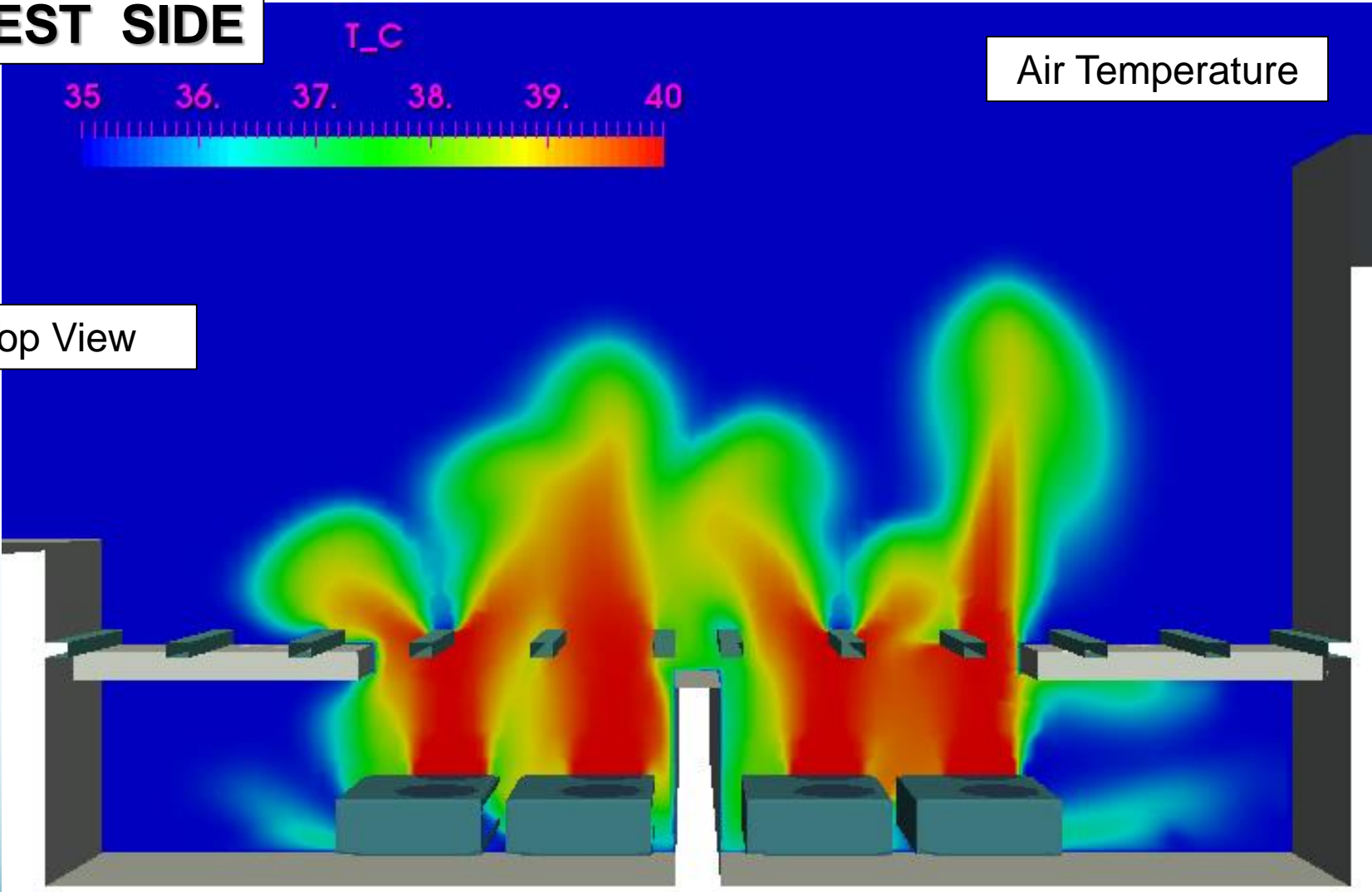
WEST SIDE

T_C

Air Temperature

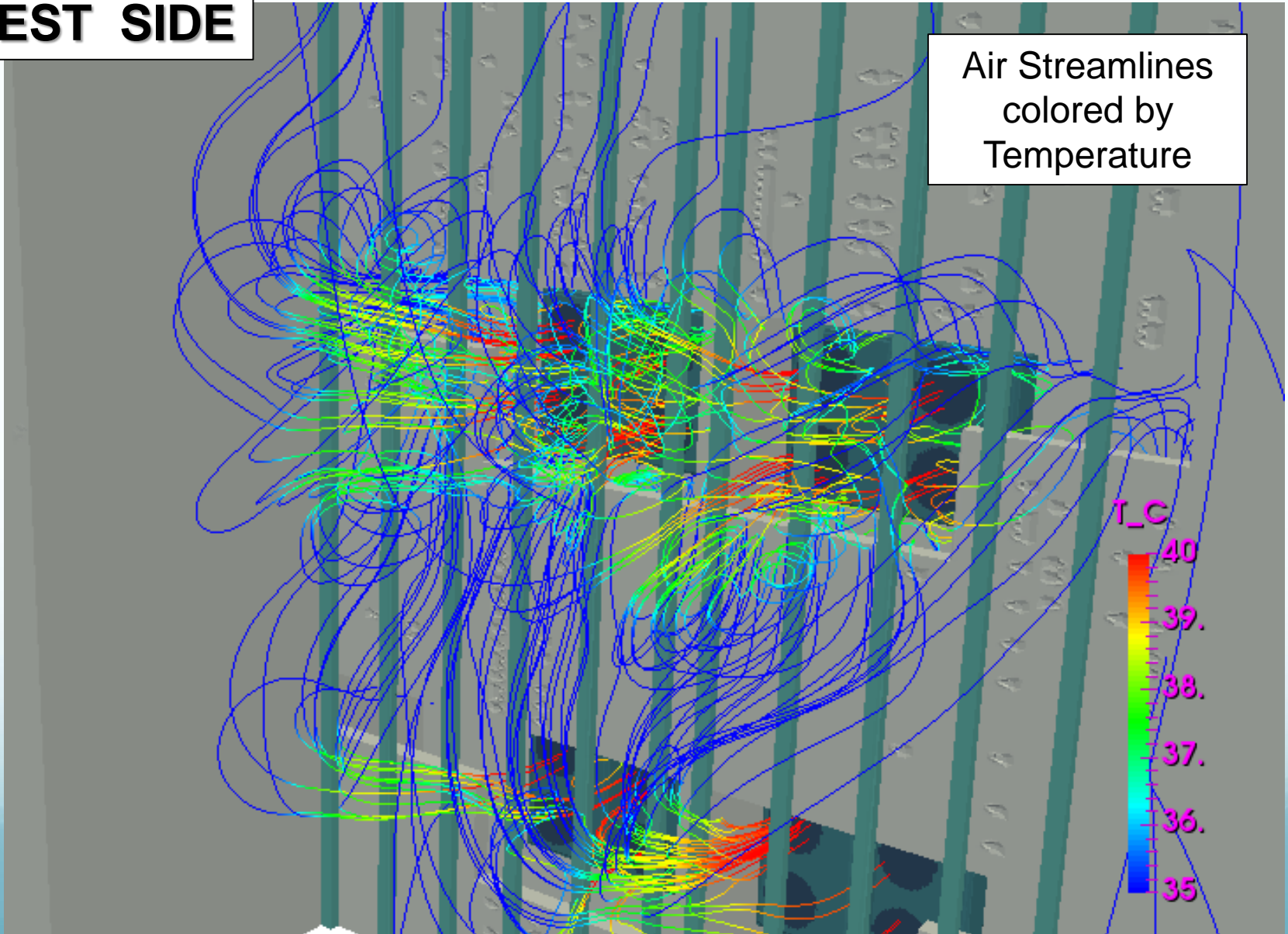


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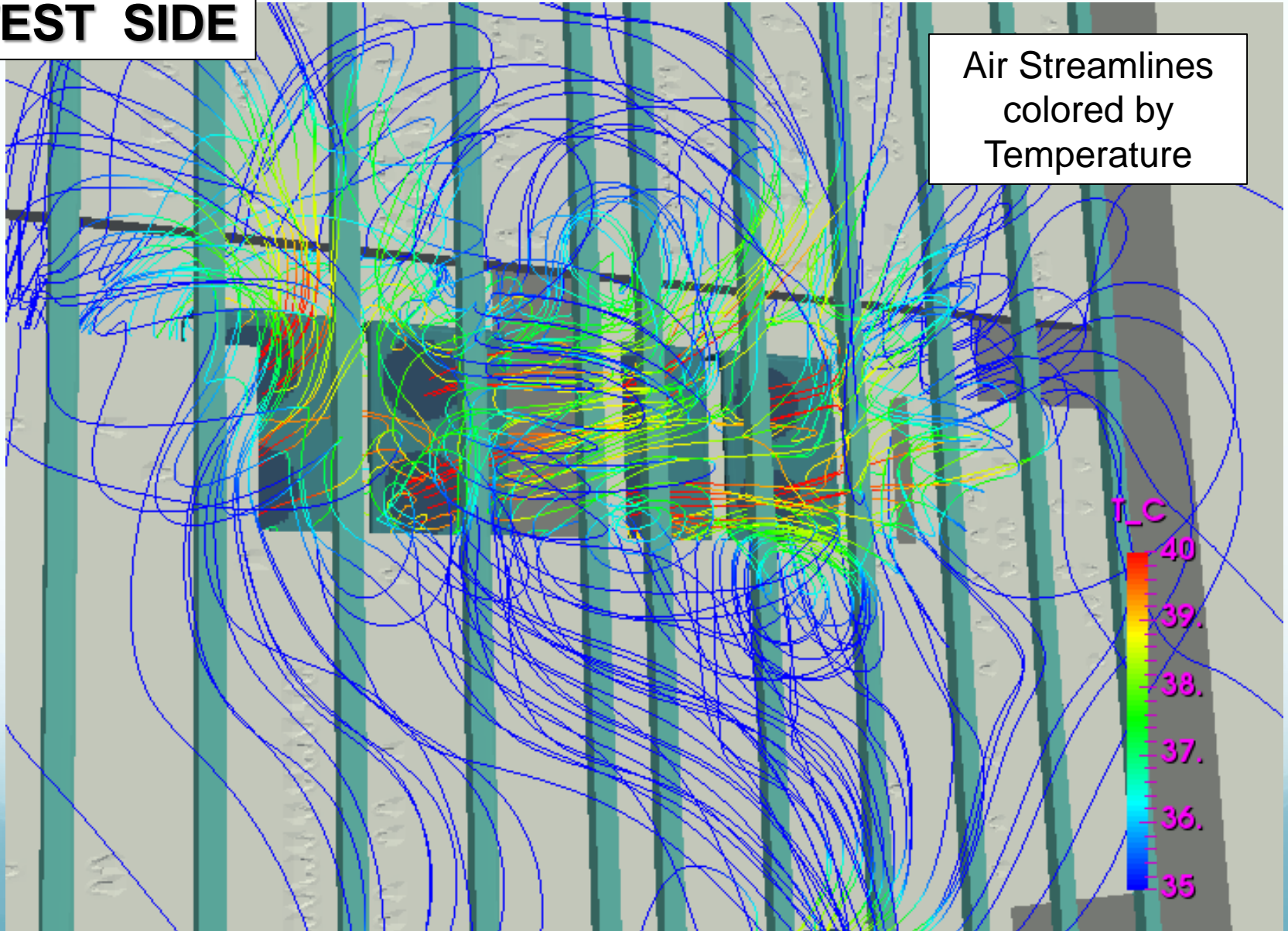
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Air Streamlines
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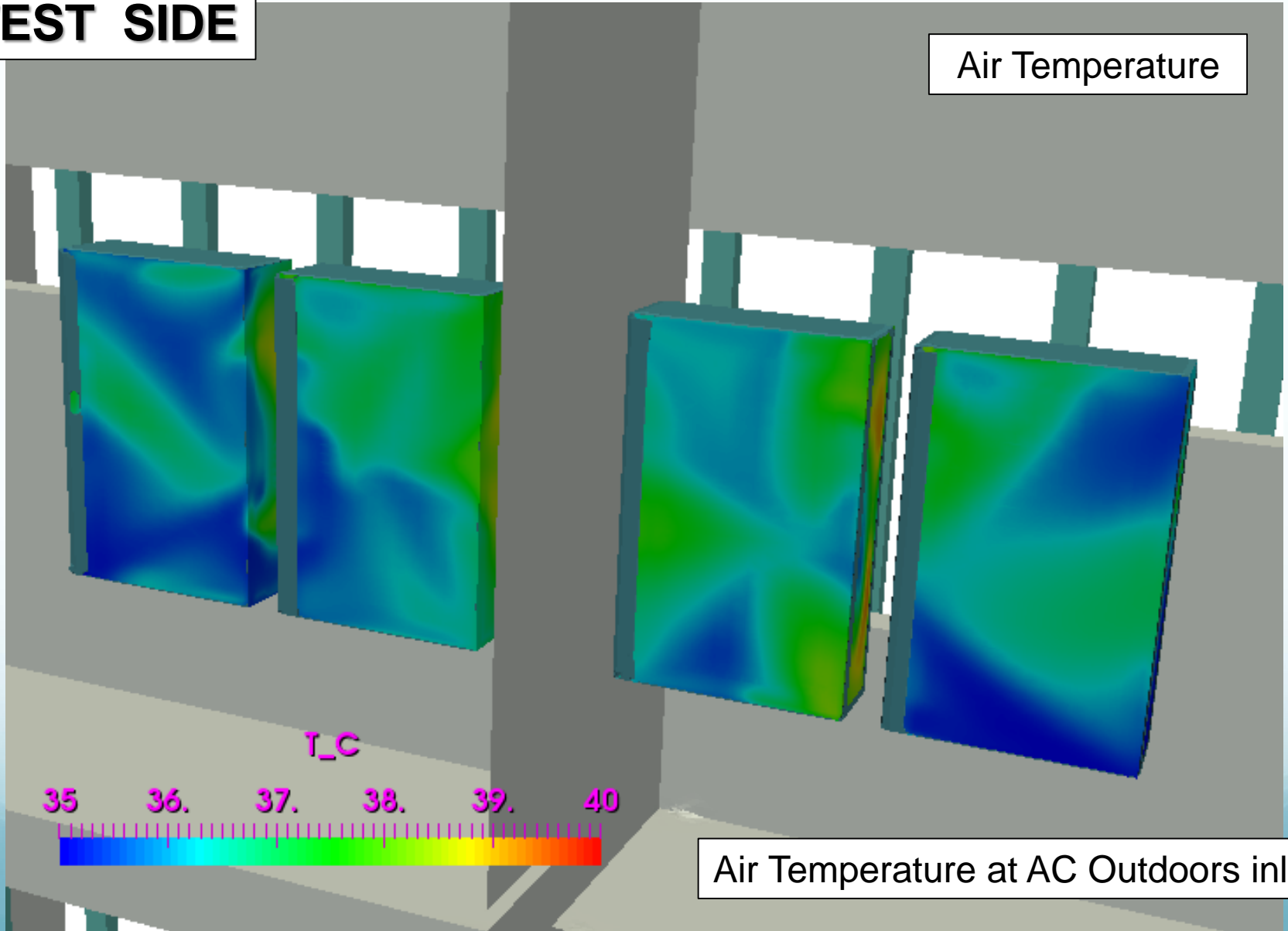
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Air Streamlines colored by Temperature



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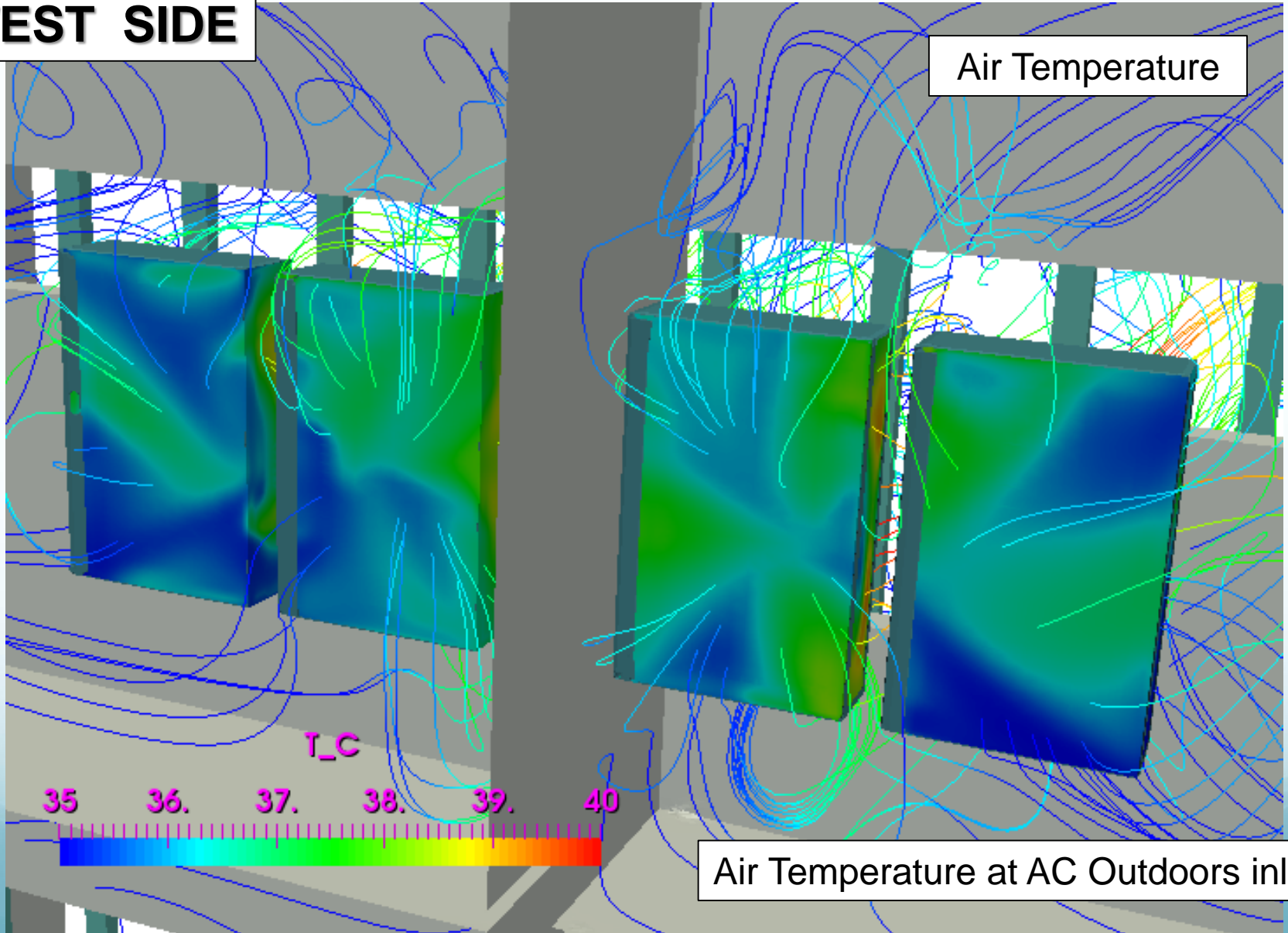
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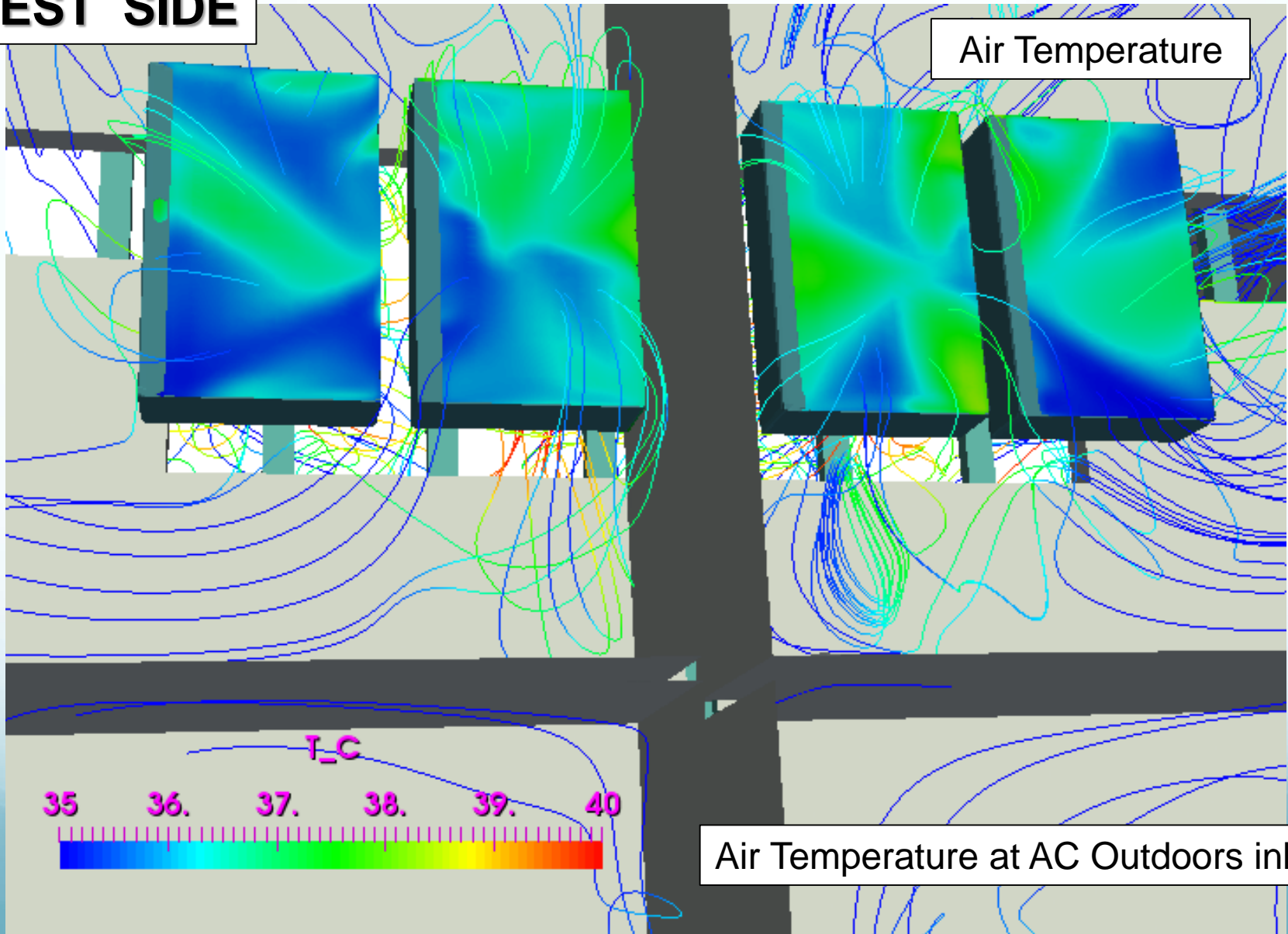
WEST SIDE

Air Temperature



Air Temperature at AC Outdoors inlets

WEST SIDE



Air Temperature

Air Temperature at AC Outdoors inlets

Conclusions:

- AC Outdoor air outlet some are recirculating to Outdoor inlets and West side configuration has more recirculations (indicated by higher air temperature).
- Wide wall between floors makes a good boundary between outdoor in one level to the others.

Suggestions:

- Move all AC Outdoors to be closer to the edge of floors to reduce recirculations.
- Arranged the AC Outdoors outlets to be not blocked by louvers/grilles.

Assignment Letter / *Surat Tugas*

No. AL/ARCS/1857/VIII/2018
Date August 1st, 2018
Page 1 of 1
Doc. Type Main Document / *Dokumen Utama*

Dena Hendriana, BSc., S.M., Sc.D,

Activity Assignment

Penugasan Kegiatan

Director of Academic Research and Community Services

Direktur Lembaga Penelitian Akademik dan Pengabdian kepada Masyarakat

In consideration of:

His appointment as Director of Academic Research and Community Services of Swiss German University under Decree nr. SK/020/HR/XI/19, dated November 18th, 2019

Mengingat:

Pengangkatannya sebagai Direktur Lembaga Penelitian Akademik dan Pengabdian kepada Masyarakat dengan SK pengangkatan no. SK/020/HR/XI/19, tertanggal 18 November 2019

Herewith gives the task to:

Name : **Dena Hendriana, BSc., S.M., Sc.D,**
Position : **Head of Master of Mechanical Engineering Study Program**
Employee ID : **11211528**

Dengan ini menugaskan kepada:

Name : **Dena Hendriana, BSc., S.M., Sc.D,**
Position : **Kepala Program Studi Master Teknik Mesin**
NIK : **11211528**

To follow the activity below:

Untuk berpartisipasi pada kegiatan berikut ini:

Nr.	Activity/ <i>Kegiatan</i>	Organizer/ <i>Penyelenggara</i>	Day & Date/ <i>Hari & Tanggal</i>	Venue/ <i>Tempat</i>
1.	Penelitian simulasi sirkulasi udara untuk pendinginan AC outdoor di gedung bertingkat bekerja sama dengan PT. BSA	Swiss German University	Agustus 2018 – Februari 2019	Swiss German University The Prominence Office Tower

The appointed shall accomplish the task in responsible ways in line with the related guidelines and other regulations given by SGU.

Pihak yang bersangkutan harus melaksanakan tugas dan tanggung jawab sebaik-baiknya, sesuai dengan petunjuk dan peraturan dari SGU.

Assignor/ *Pemberi Tugas:*



Dr.-Ing Evita H Legowo

Director of Academic Research and Community Services
Direktur Lembaga Penelitian dan Pengabdian kepada Masyarakat



SWISS GERMAN UNIVERSITY

LAPORAN

**PENELITIAN SIMULASI SIRKULASI UDARA UNTUK AC
OUTDOOR DI GEDUNG BERTINGKAT
BEKERJA SAMA DENGAN PT. BSA**

Dena Hendriana, B.Sc., S.M., Sc.D – Team Leader
Fujisaki (PT. BSA) – Team Member

MASTER OF MECHANICAL ENGINEERING

2019

Swiss German University
The Prominence Tower Alam Sutera
Jalan Jalur Sutera Barat No 15, Tangerang 15143
INDONESIA

Tel. +62 21 2977 9596/9597
Fax. +62 21 2977 9598
info@sgu.ac.id
www.sgu.ac.id

Judul Penelitian	: Penelitian Simulasi Sirkulasi Udara untuk AC Outdoor di Gedung Bertingkat Bekerja Sama dengan PT. BSA
Nama Team Leader	: Dena Hendriana, B.Sc., S.M., Sc.D
Research Center/Dept.	: Master of Mechanical Engineering
E-mail	: dena.hendriana@sgu.ac.id
Mobile phone	: 081213715844
Masa program	: Agustus 2018 – Februari 2019 (6 bulan)
Keterangan Aktifitas	: PT. BSA sedang melakukan tender untuk pengadaan sistem AC di apartemen tower yang akan dibangun. Salah satu persyaratan dari tender adalah adanya analisa sirkulasi udara untuk AC Outdoor sehingga pendinginan AC dapat dioptimalkan. Beberapa konfigurasi AC Outdoor telah disimulasikan dengan menggunakan software CFD OpenFOAM yang merupakan software OpenSource. Simulasi dilakukan untuk memprediksi suhu udara yang masuk ke AC Outdoor dan untuk memprediksi resirkulasi udara yang berputar kembali ke unit AC Outdoor. Resirkulasi udara ini perlu untuk di minimumkan supaya performansi AC menjadi baik. Kegiatan ini merupakan kegiatan pengabdian masyarakat dari Swiss German University yang memanfaatkan keilmuan akademik dari Komputasi Fluida untuk kebutuhan masyarakat yang disini adalah dari pihak Industri yaitu PT. BSA. Hasil dari penelitian ini tidak dipublikasikan dikarenakan kerahasiaan dari produk PT. BSA.

Alam Sutera, Tangerang

Date: Februari 2019



Dena Hendriana, B.Sc., S.M., Sc.D

NIK: 11211528

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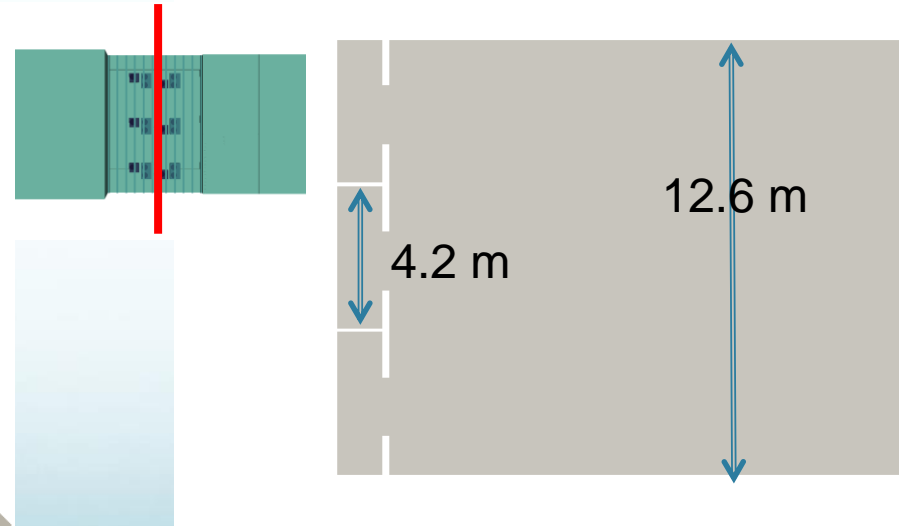
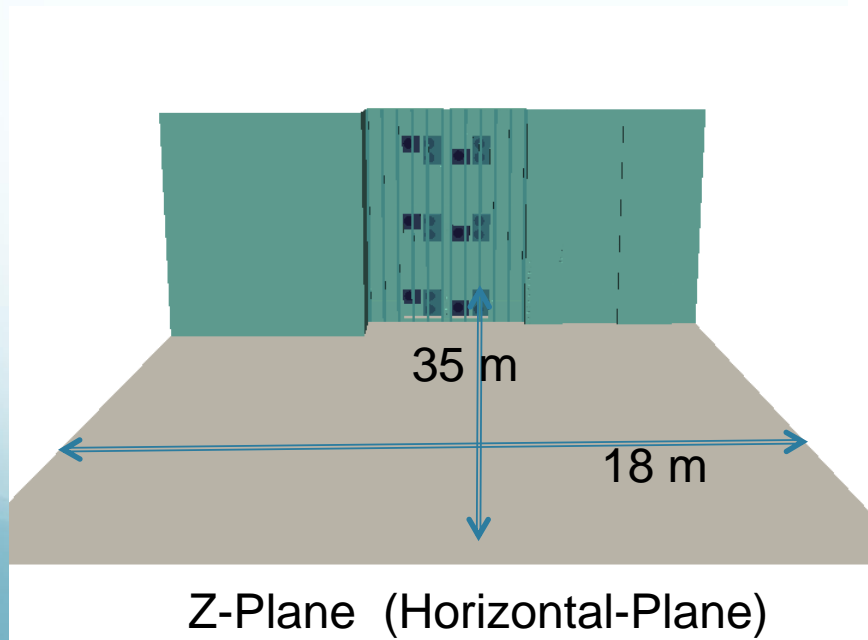
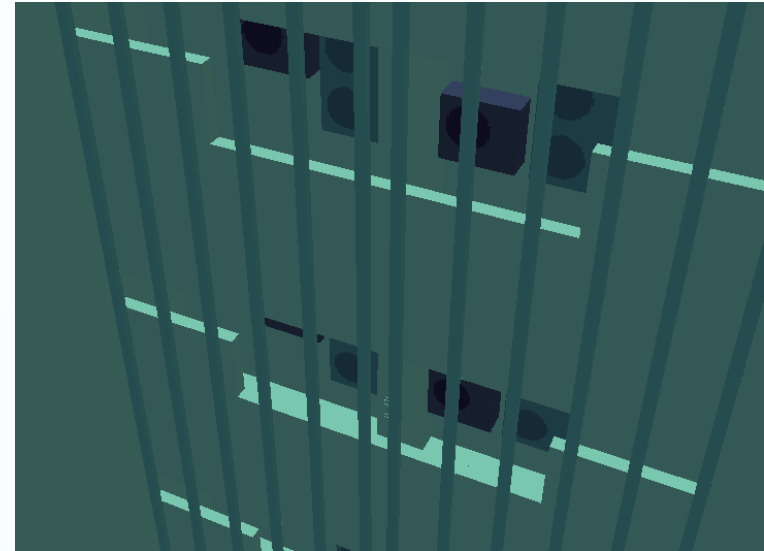
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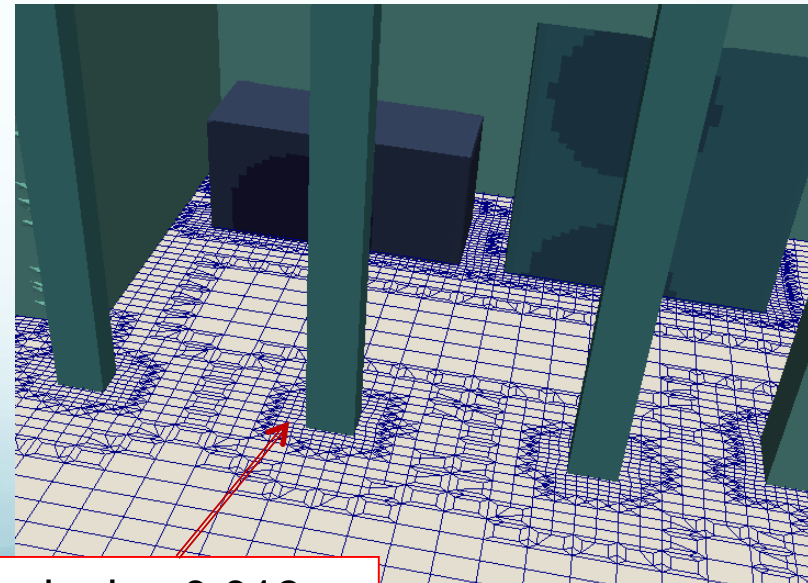
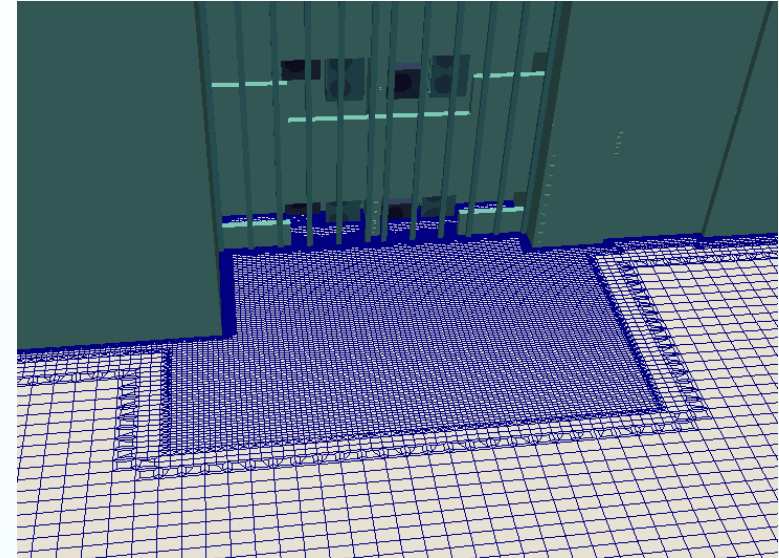
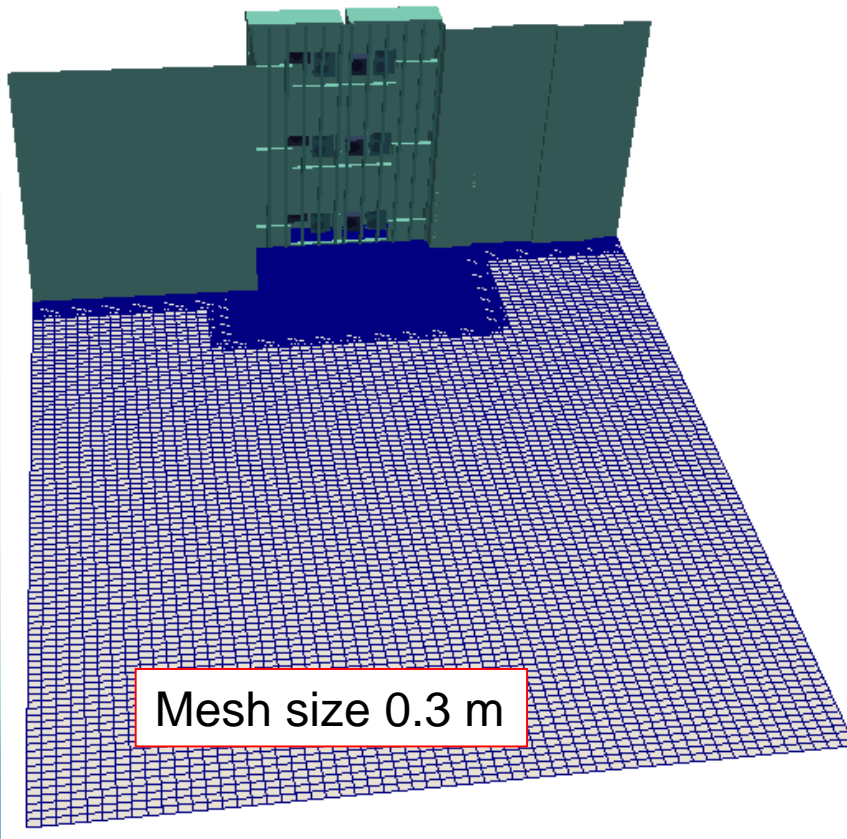
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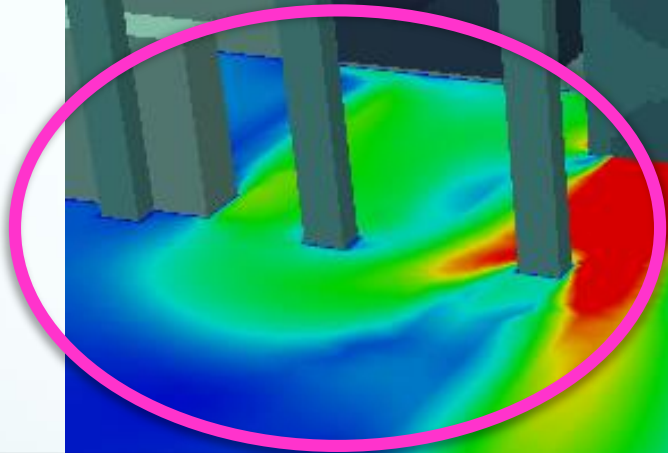
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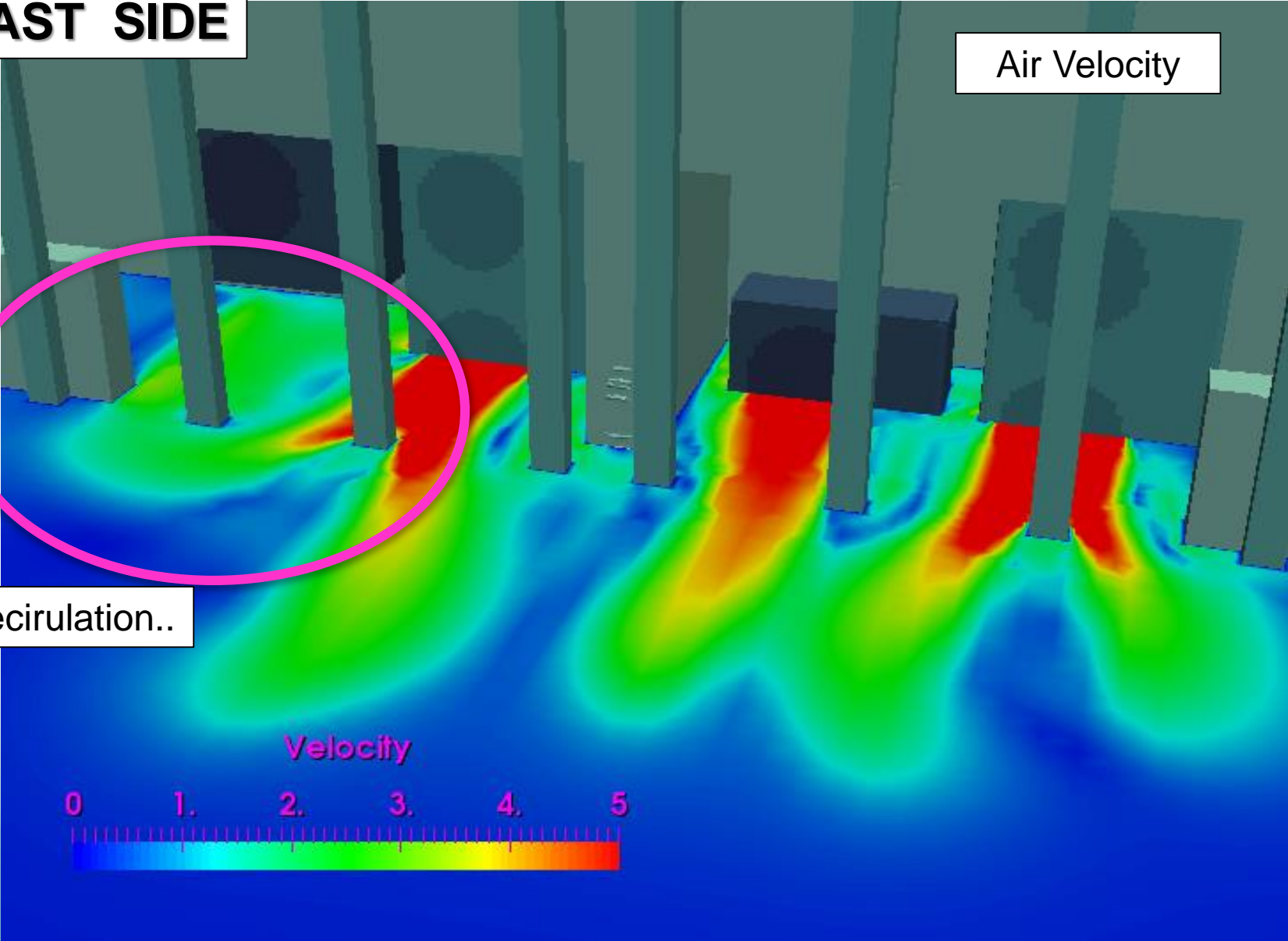


EAST SIDE

Air Velocity



Air recirculation..



Velocity

