

INTEGRATED ENVIRONMENT MODELER SIMULATION TOOL -IEMSim

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ENVIRONMENTAL PHYSICS & TOOLS (Traditional solutions)



IEM Innovation - DEFINING A NEW MODELLING FRAMEWORK

3D Urban Digital Model + Geometry Processing



Interface layers for master planner and urban designer to overlay with other planning layers



IEM Functionalities





IEM – Digital Twin for Built Environment

- IEM has been integrated to Virtual Singapore (VS) platform. With this implementation, it became the first modelling and simulation application in VS, and is available to all of Singapore's public agencies with access to VS through the efforts of GovTech.
- To incorporate IEM into JTC digital platform for Punggol Digital District planning and development

Integrating IEM application to Virtual Singapore platform

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Further development tool -

Incorporating IEM for PDD planning & development





IEMSim Software Tool



Validation With Field Data



Good agreement on solar irradiance field data (e.g. comparison of data on 4th July 2016, 12:30 hr)



Reasonable agreement on wind speed and temperature with field data from June - Aug 2016



Good agreement on traffic noise field data (e.g. comparison of data on 4th July 2016, 12:30 hr)

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IEMSim - Functional scalability and validation

• IEMSim verification testing for **3 new case studies in Singapore**



Plantation Precinct – Traffic Noise







PLANNING OF TENGAH USING IEM





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NEW FRONTIER IN MICROCLIMATE MODELLING CITY SCALE SIMULATIONS

Wind Speed (m/s)

2.0

3.0

4.0

1.0

WIND-FLOW ANALYSIS



IEMSim Model Requirement

- For IEMSim scalability testing, we estimate that township scale simulation requires:
 - Grid size: 120 million
 - RAM: 512 GB
 - Processors: 64
 - Expected completion time within ~8 hours.
- STL geometrical properties are needed for IEM simulation



IEMSim Readiness

- IEMSim has been developed, validated and user acceptance tested
- IEMSim has been verified for successful running on workstations (IHPC and HDB), clusters (IHPC and HDB) and HPC system at NSCC.
- IEMSim operates on Linux OS, and Windows virtual machine for IHPC
- IEMSim are able to integrate with other platforms, such as Virtual Singapore.
- IEMSim has been licensed to WizVision Pte Ltd for distribution, further development, technical support and maintenance.

IEM2 – Further Ongoing Research Efforts



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THANK YOU

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