

# VentraFlow

## AI-Driven CFD Automation & Engineering Intelligence

*VentraFlow blends **domain knowledge, agentic AI automation, and robust simulation pipelines** to deliver accurate, decision-ready results — repeatable, traceable, and production-ready.*

At **Sukra Infotek**, we are redefining how organizations use Computational Fluid Dynamics by transforming a traditionally expert-driven, time-intensive process into an automated, AI-assisted engineering workflow.

VentraFlow enables architects, MEP consultants, data center designers, safety engineers, and facility operators to obtain fast, reliable, physics-accurate insights at scale — without long manual cycles or dependence on rare CFD specialists.

Using automated meshing, OpenFOAM-based solvers, and multi-agent AI validation, VentraFlow delivers engineering-grade airflow and thermal simulations for buildings, data centers, cleanrooms, and large infrastructure systems.

# AI-Enabled Flow Efficiency

*VentraFlow unifies flow simulation, real-time monitoring, and AI-driven insights into a single platform—delivering consistent, validated, operations-grade efficiency.*

## Our Core Competence



### Automated Geometry & Meshing

IFC/STEP/Revit model ingestion, domain extraction, automated snappyHexMesh pipelines, y+ targeting, refinement zones, and mesh-quality iteration loops.



### OpenFOAM-Based Simulation Engine

HVAC-style incompressible RANS models, pressure zoning, ACH analysis, thermal comfort mapping, rack inlet temperature prediction, and scenario sweeps.



### AI-Orchestrated Multi-Agent Workflow

LLM-driven agents performing input generation, error detection, correction loops, solver restarts, and boundary condition validation using RAG-supported engineering knowledge.



### Scenario Campaigns & KPI Dashboard

DOE-based multi-scenario analysis with KPIs such as airflow uniformity, temperature distribution, pressure differences, thermal hotspots, containment efficiency, and energy indicators.



### Visualization, Validation & Reporting

Interactive 3D vtk.js visualizers, mesh QC reports, simulation logs, audit trails, and downloadable engineering-ready summary reports.

## VentraFlow Application Areas

### Building Airflow & Comfort

Supply airflow patterns, ventilation efficiency, pressurization, occupancy comfort mapping, and retrofitting options.

### Hospitals & Cleanrooms

Isolation strategies, differential pressure studies, sterility airflow simulations, and contaminant migration tracking.

### Data Center Thermal Optimization

Rack-level inlet temperatures, aisle containment strategies, CRAC performance, hotspot mitigation, and energy optimization.

### Large Public Spaces

Airports, stations, malls, and assembly areas — airflow safety, crowd ventilation, emergency response airflow studies.

### Industrial Ventilation

Factory ventilation, local exhaust systems, thermal load analysis, stack dispersion using CFD automation.

## Innovation & R&D – VentraFlow AI Lab

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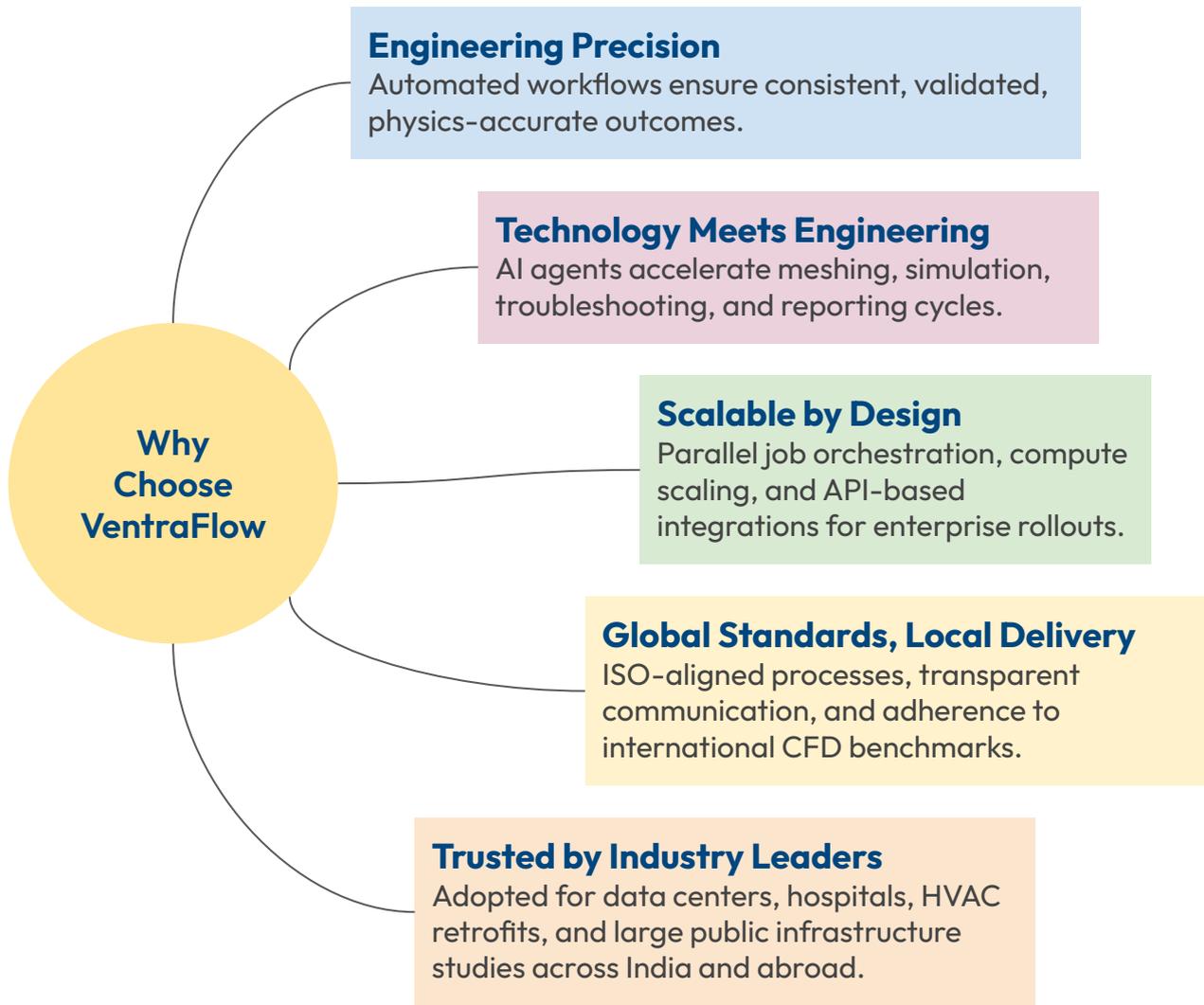
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### Our innovation roadmap includes:

- AI-driven CFD pipeline automation
- AI-guided error correction of OpenFOAM pipelines
- Surrogate modeling to accelerate simulation cycles
- Digital twin integration with BMS/SCADA
- Predictive analytics for energy & thermal faults
- Multi-physics workflow extensions

Our long-term roadmap includes high-speed auto-meshing, parametric study automation, and domain-tuned CFD AI models for industry-grade reliability.

**From AI-driven CFD automation to digital twins and predictive analytics, we transform simulation workflows into faster, smarter, multi-physics intelligence.**



## Our Engagement Models

1

### Platform Subscription (VentraFlow Access)

*Ideal for repeated studies, portfolio-wide assessments, and in-house MEP/CFD teams.*

2

### Project-Based Consulting

*Scoped engagements with defined deliverables – automated CFD, KPI reports, and engineering insights.*

3

### Resource Augmentation / C&M

*Dedicated CFD + AI engineers supporting continuous simulation, validation, or automation programs.*

# The Sukra Advantage

<b>Engineering-Grade AI</b>	AI systems built with domain physics, validated logic, and high-accuracy, real-world performance.
<b>Full-Stack Technical Backbone</b>	Expertise across data, cloud, DevOps, multi-agent systems, security, and scalable product engineering.
<b>Innovation + Delivery Stability</b>	Agility of a startup with mature processes, ISO-aligned quality, and dependable long-term execution.
<b>Trusted Global Partnerships</b>	Collaboration with <b>Atlas IntelliTek (USA)</b> and domain specialists strengthens our delivery depth and speed.

**Let's modernize and accelerate your CFD workflows with AI, automation, and engineering excellence.**



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