

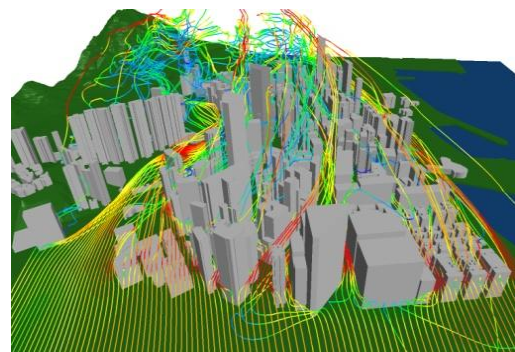


F

CFD Software for HVAC, Thermal Comfort, Internal & External Air Flow Modelling, plus Fire, Smoke and Hazard Simulation

L

PHOENICS/FLAIR is a CFD software package specializing in the simulation of scenarios involving fluid flow, heat transfer, combustion and chemical reaction processes occurring in the built and natural environment. FLAIR is utilized worldwide by architects, design engineers and safety officers concerned with the performance of air-flow systems for both the internal and external environment.



Hilly urban terrain (streamlines expanded view)

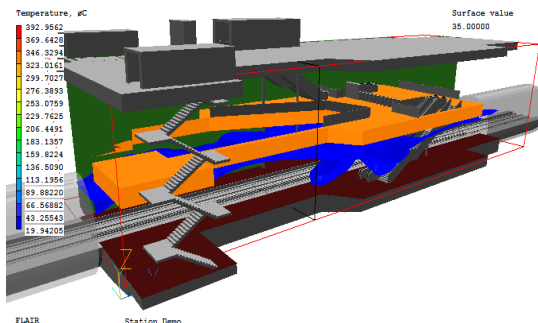
A

FLAIR enables users to visualise, understand, evaluate and refine the air-flow patterns in steady state or time dependant scenarios, in micro- as well as macro-scale. FLAIR permits the safe investigation of "what-if" scenarios involving ventilation system failures, fires, explosions, gas and chemical releases, and the subsequent effect of remedial action.

FLAIR shows results for:

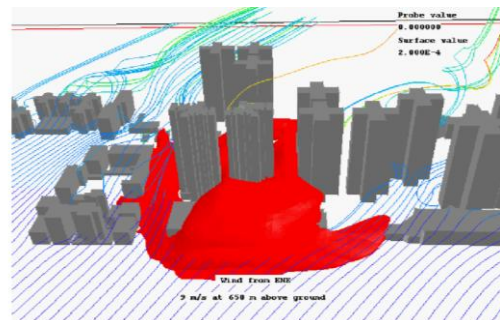
- Air-flow patterns
 - Velocity
 - Pressure
 - Temperature
 - Turbulence
- Temperature distribution / stratification
- Radiation
- Humidity
- Thermal comfort (PPM, PPD, etc)
- Age of air / residence time
- Air change effectiveness
- Smoke layering and concentration
- Visibility / line of sight
- Pollutant spread and concentration
- Transport of contaminants
- Effect of sprinkler and fan fire control methods

I

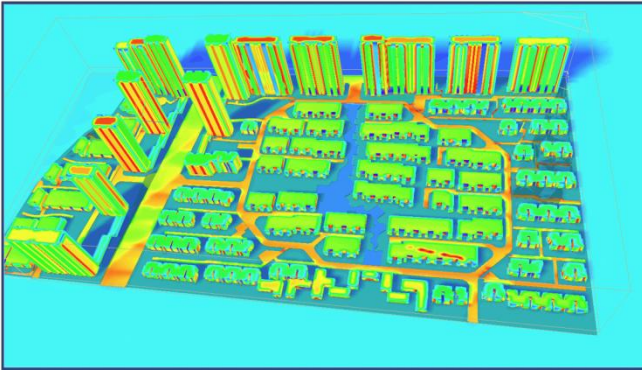


R

Smoke progression in an underground railway station



Pollution spread around buildings



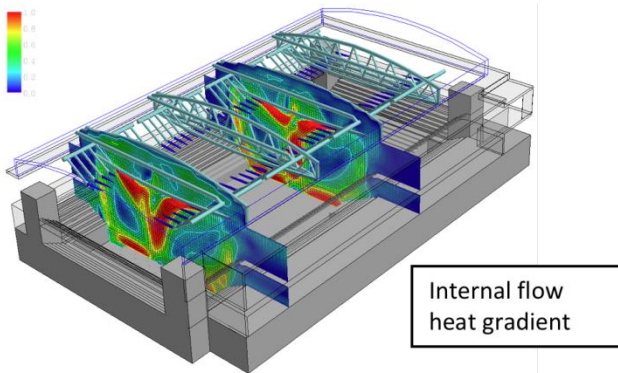
Surface temperature – urban heat island application

FLAIR contains:

- CAD import and repair features
- Standard objects for diffusers, fans, sprinklers and other equipment types
- Heat sources, inlet, outlet and other boundary conditions
- Wind and wind proofing
- Solar gain
- ISO, Green Star and ASHRAE standards
- Library of materials
- Property database
- Interface to weather database

FLAIR permits addition of user defined:

- Functions
- Materials
- Properties

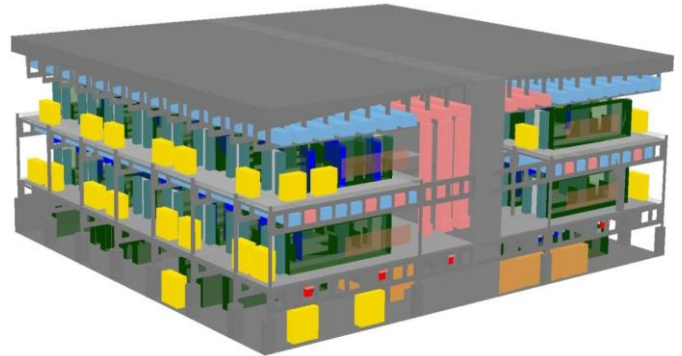


FLAIR applications include:

- Heating, ventilation and air conditioning
- Thermal comfort
- Fire and smoke hazards
- Chemical release and pollution spread
- Wind loading on structures

FLAIR displays:

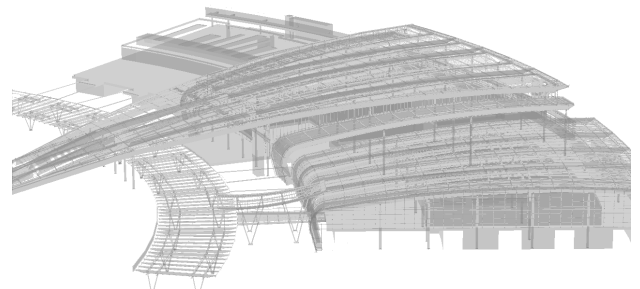
- Building geometry and terrain data
- Velocity vectors
- Streamlines
- Iso surfaces
- Contours of pressure, temperature, relative humidity, concentration and thermal comfort



Data centre analysis

FLAIR cases include:

- Air ventilation assessment (AVA)
- Atria and building complexes
- Car parks
- Clean rooms and data centres
- Furnaces and incinerators
- Railway stations
- Sports stadia
- Cityscape street canyons
- Urban heat islands (UHI)
- Road and rail tunnels



Airport terminal imported from CAD & smoke progression cross-sections

