



# Virtual Reality projects at Department of Building technology

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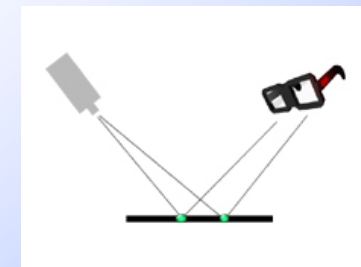
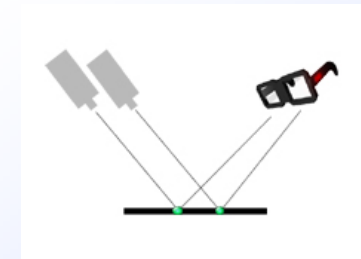
Bygningskonsulentforeningens besøg på  
Aalborg Universitet 9 oktober, 2003

# What is Virtual Reality ?

- ❑ Presentations that take place at the VR-Centre ?
- ❑ Convincing your senses that something *virtual* is *real*
- ❑ Realistic visualisation of phenomena which are difficult to see in reality (e.g. airflow)

## Virtual Reality may include the following elements:

- ❑ Stereo viewing (different pictures for right and left eye)
  - Passive (polarized or colour filter)
  - Active (shutter glasses)
  
- ❑ A certain degree of immersion
  - Wide screens, power walls
  - Large curved screens
  - CAVE
  - Head mounted displays
  
- ❑ Realtime interaction with the model/database
  - Mouse or keyboard
  - Tracking of persons or interaction devices
  - Haptic devices

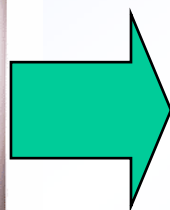


# VR facilities at Aalborg University (1)

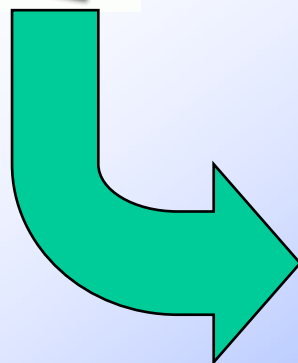
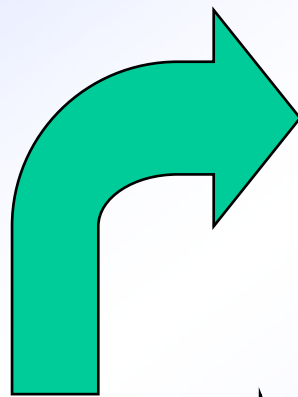
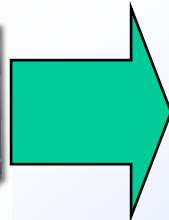
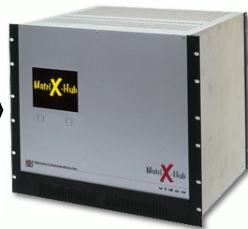


Onyx2 IR2

(to be replaced by PC cluster 2003)



Lightwave  
Matrix-Hub



Cave

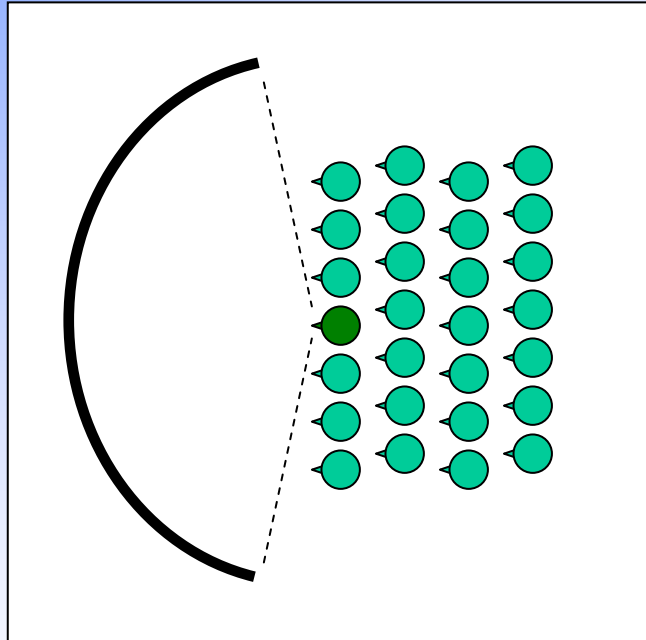


Panorama



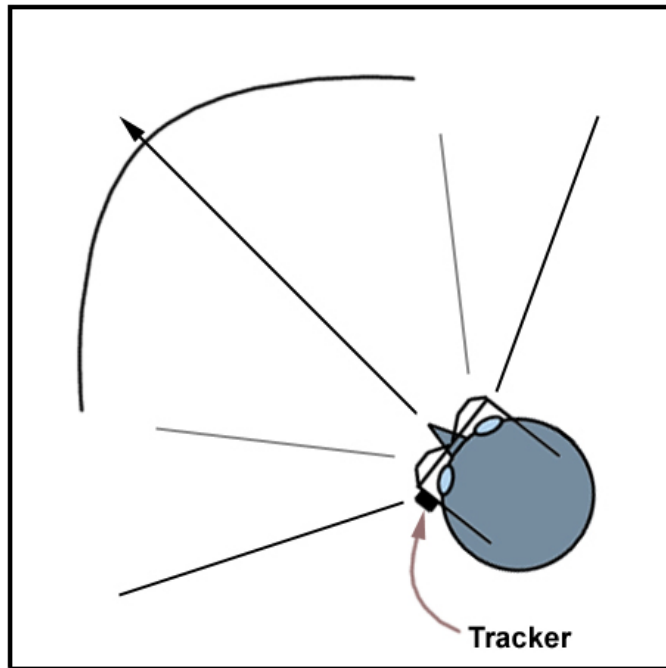
3D  
Auditorium

## VR facilities at Aalborg University (2)



- Panorama
  - Ø 7.1m, 160°, H 3.5m
  - Mono & *aktive* stereo
  - 28 persons
  - Tracking

## VR facilities at Aalborg University (3)



- 6-sided CAVE
  - 2.5m x 2.5m x 2.5m
  - Back projektion
  - *Aktive* stereo
  - 1 person ***with tracking***,  
+ a few observers ***without tracking***

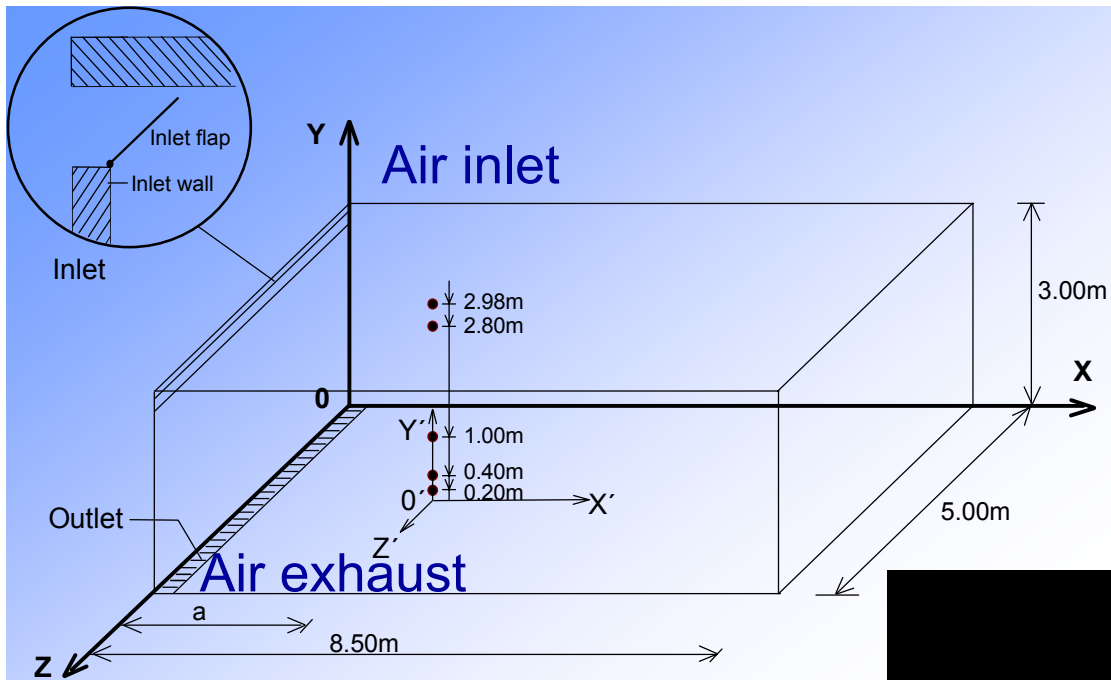
## VR facilities at Aalborg University (4)

- Portable equipment
  - 2.5m x 3.5m
  - Portable projector and PC
  - *Passive* stereo
  - 30 persons +

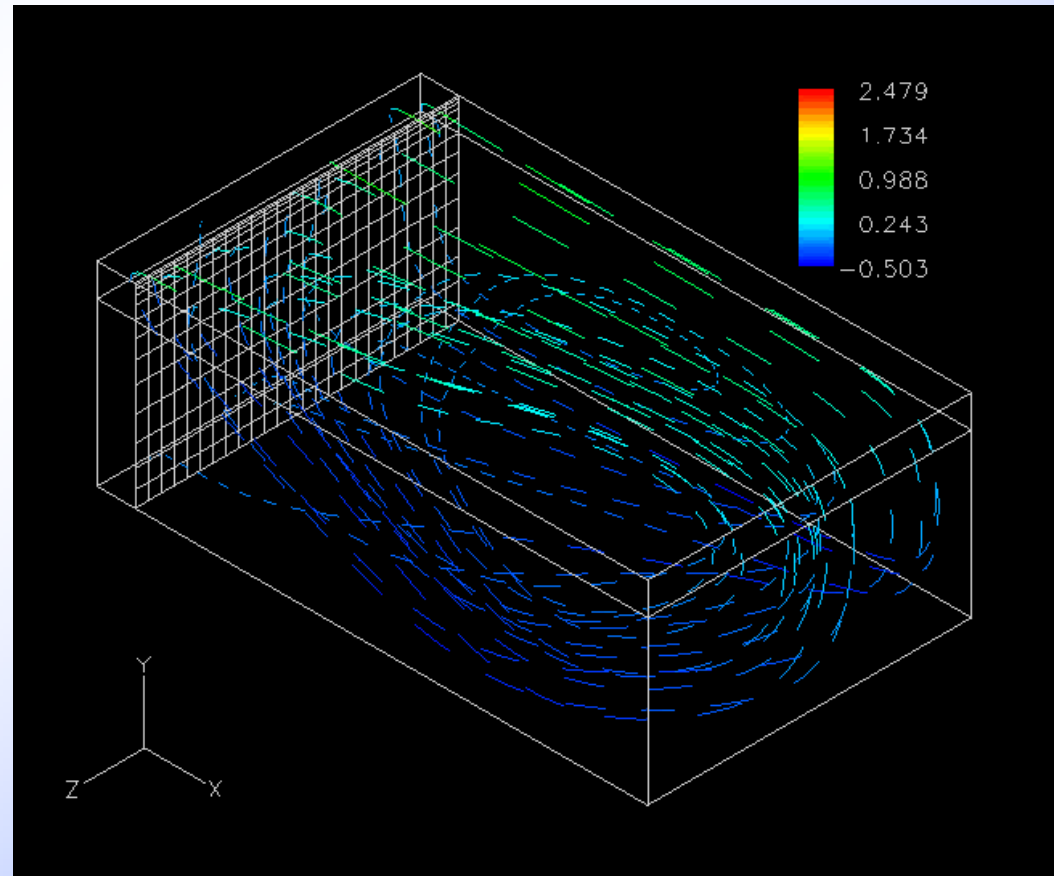
**Examples of projects  
where we used Virtual Reality**

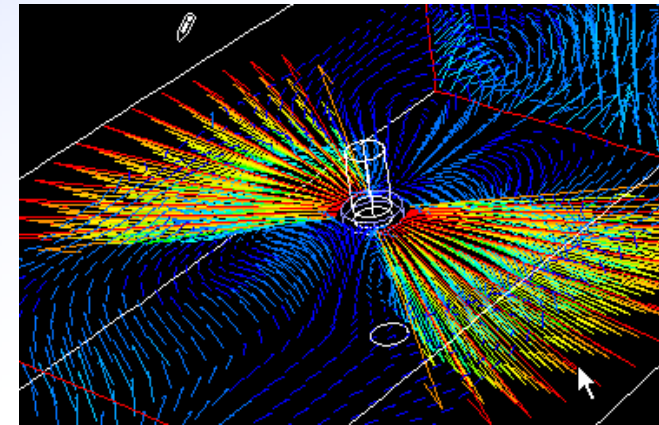
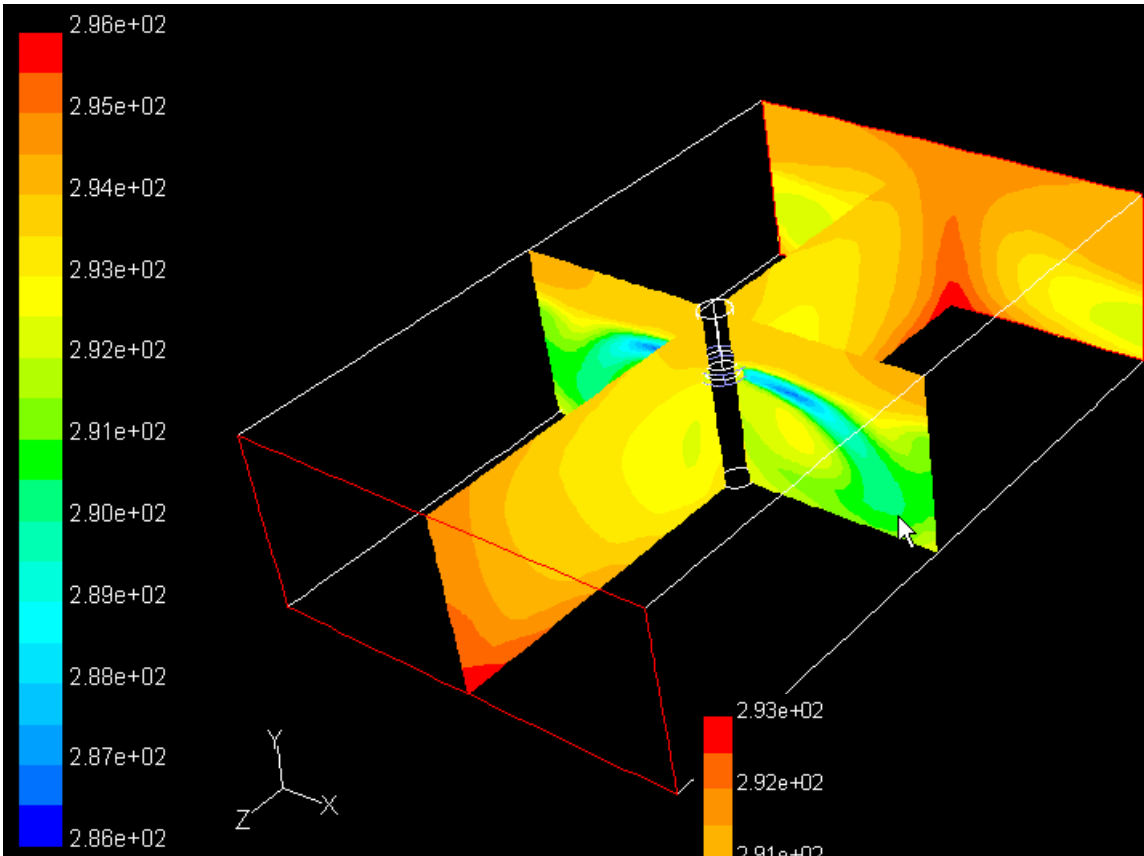


# Airflow in livestock buildings

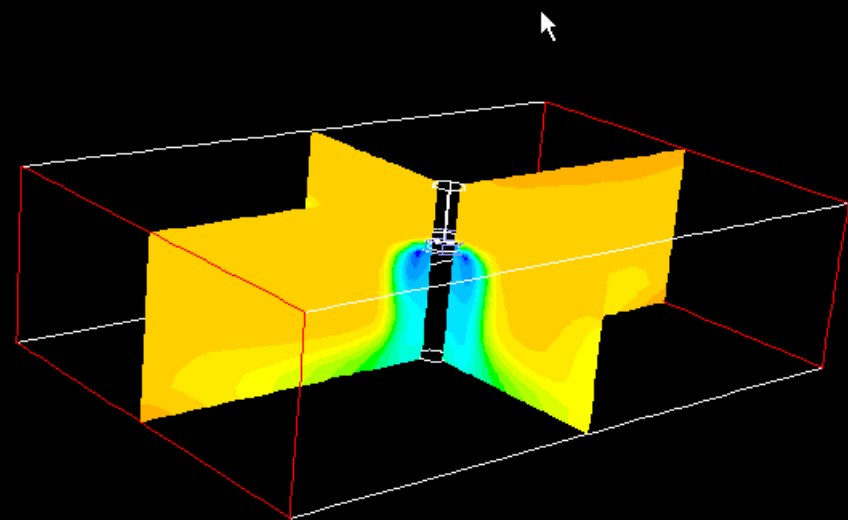
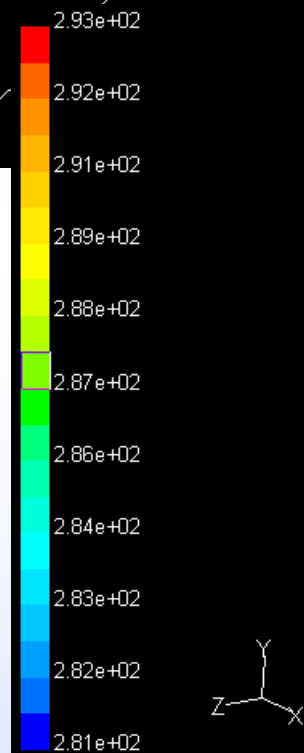


**3D airflow in a laboratory set-up with an isothermal slot inlet**

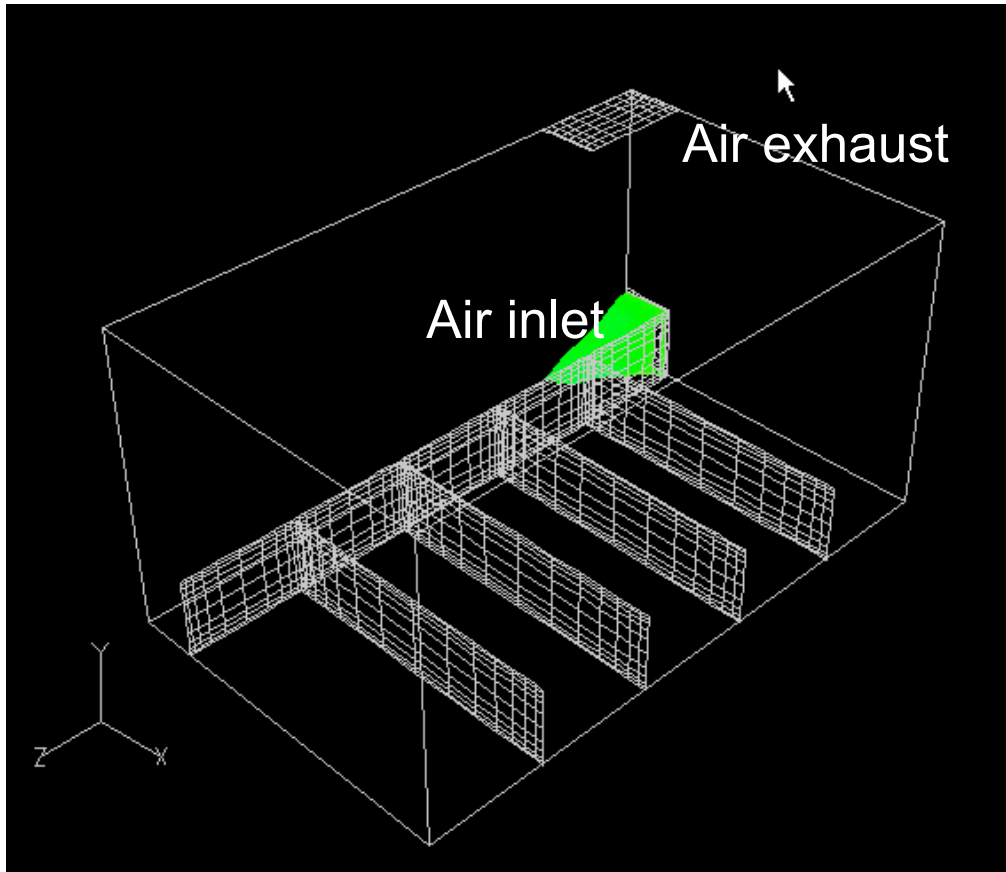




**Airflow in a room with a radial inlet device**

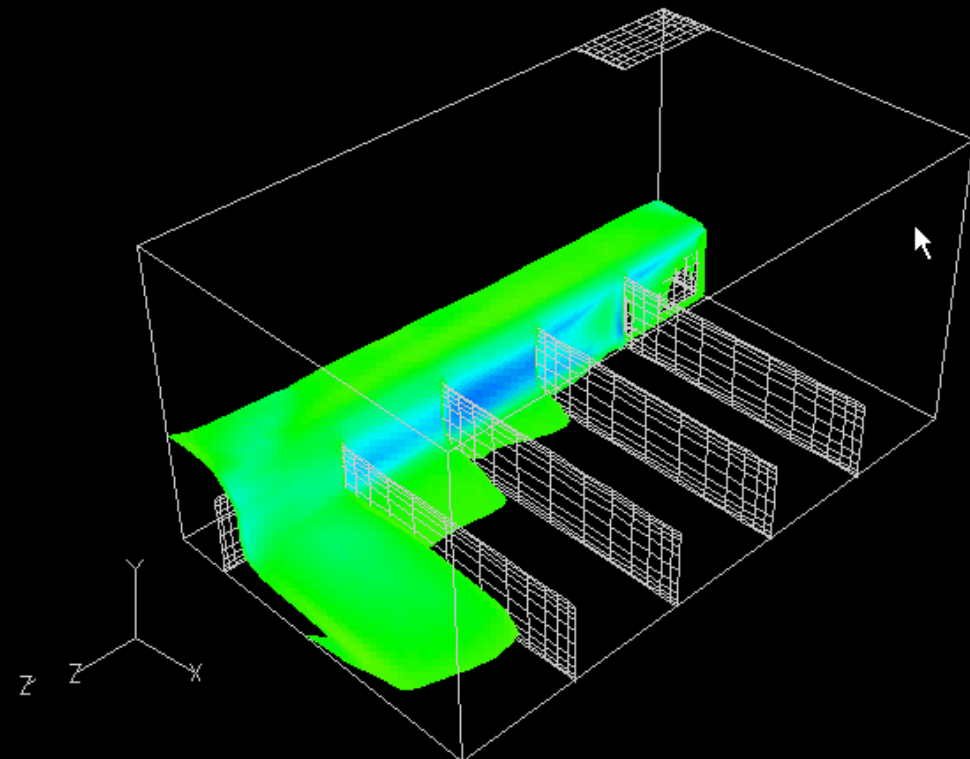


# Airflow in livestock buildings



**Airflow in a room with closed pen partitions and displacement ventilation**

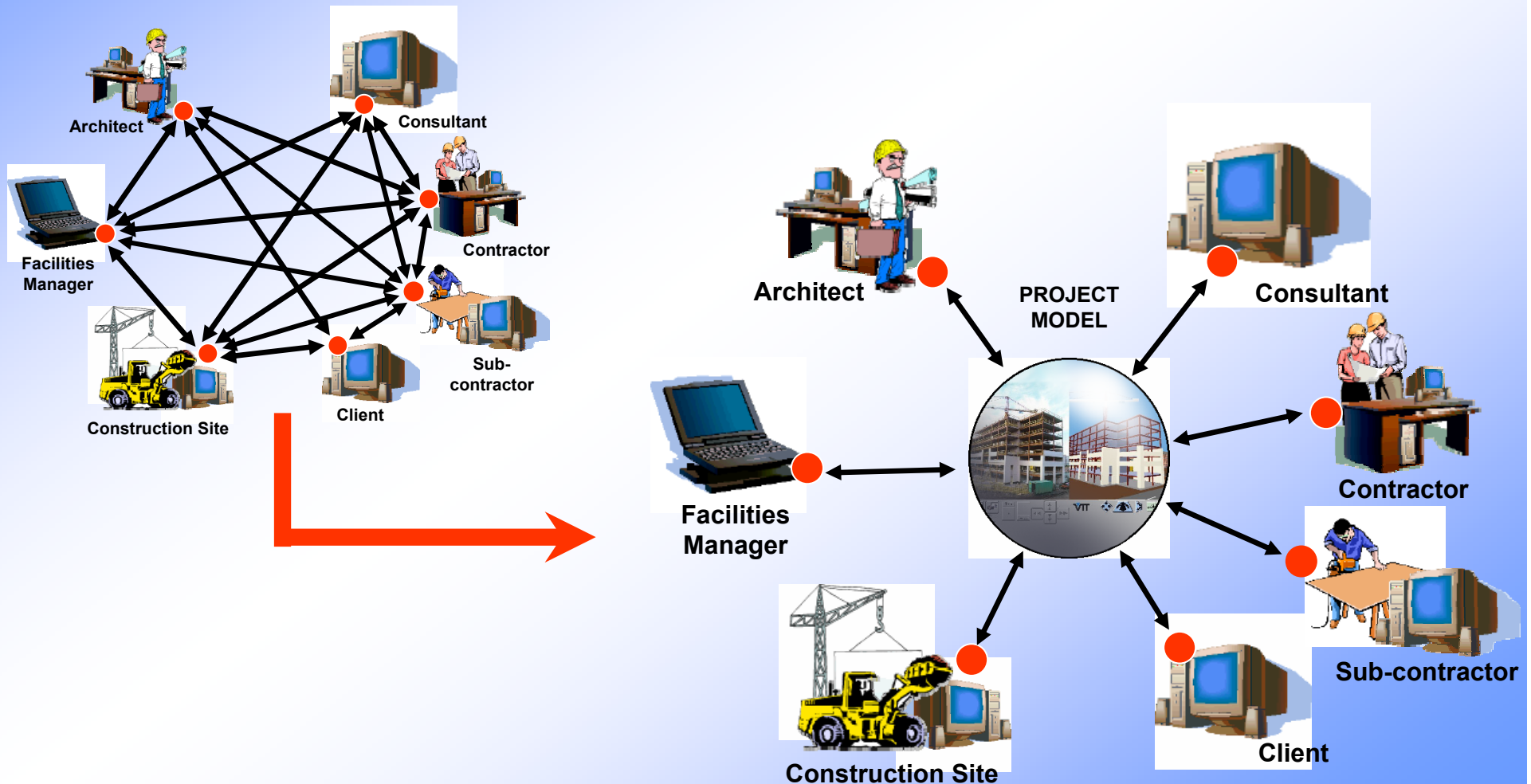
CFD simulation by Bjarne Bjerg, KVL



# VR for the AEC Sector



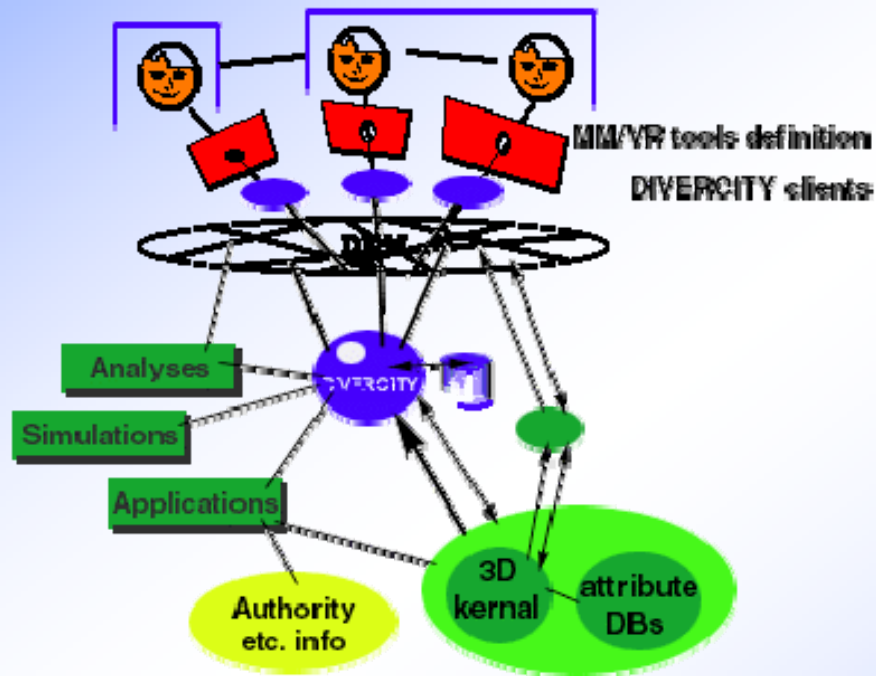
- Integrated Virtual Prototyping tools can improve communication between stakeholders



# DIVERCITY - Distributed Virtual Workspace for enhancing Communication within the Construction Industry

EU IST-1999-13365

<http://www.e-divercity.com/>



## DIVERCITY supports

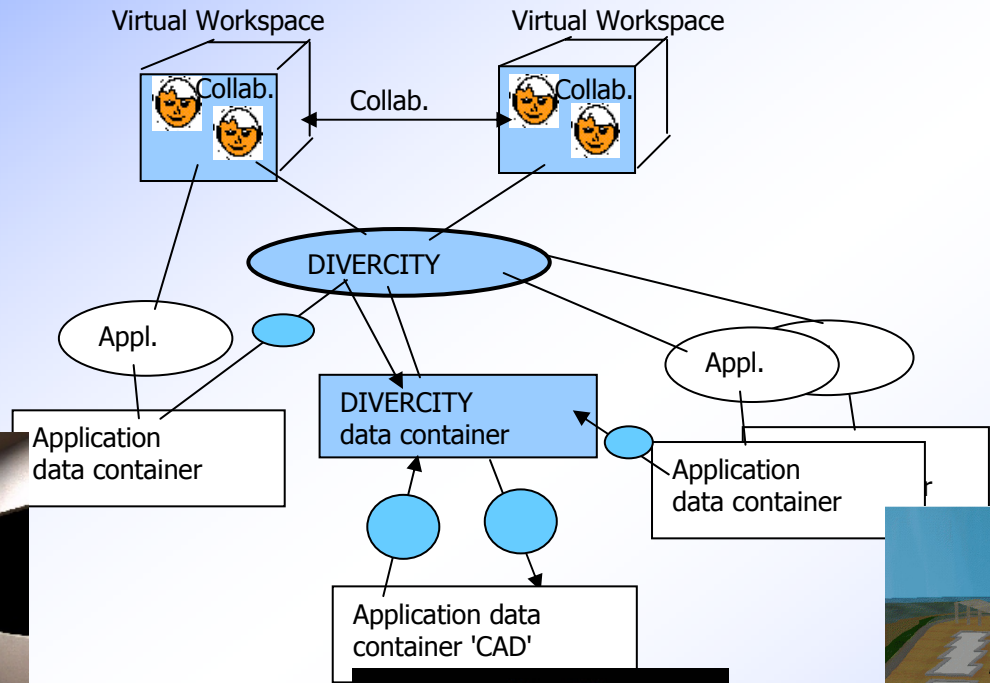
- communication between persons
- multiple building product/process information access
- building process activities

The objective of the project is to produce a prototype virtual workspace that will enable the three key phases (client briefing, design review, construction) to be visualized and manipulated, and to *produce a set of VR tools that aid the construction design and planning process.*

The Divercity project has 10 partners in 5 EU Countries



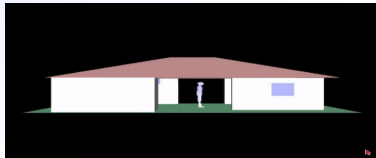
# DIVERCITY function, form, content, behaviour



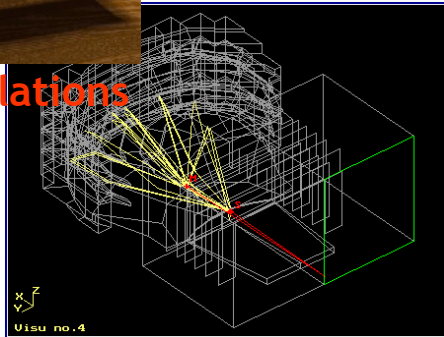
Client briefing



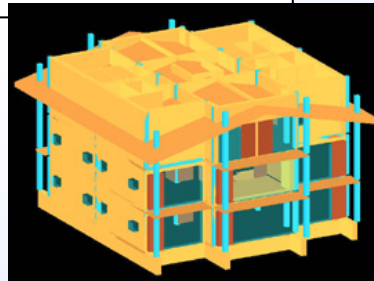
Lighting Simulations



Thermal Analysis



Acoustics

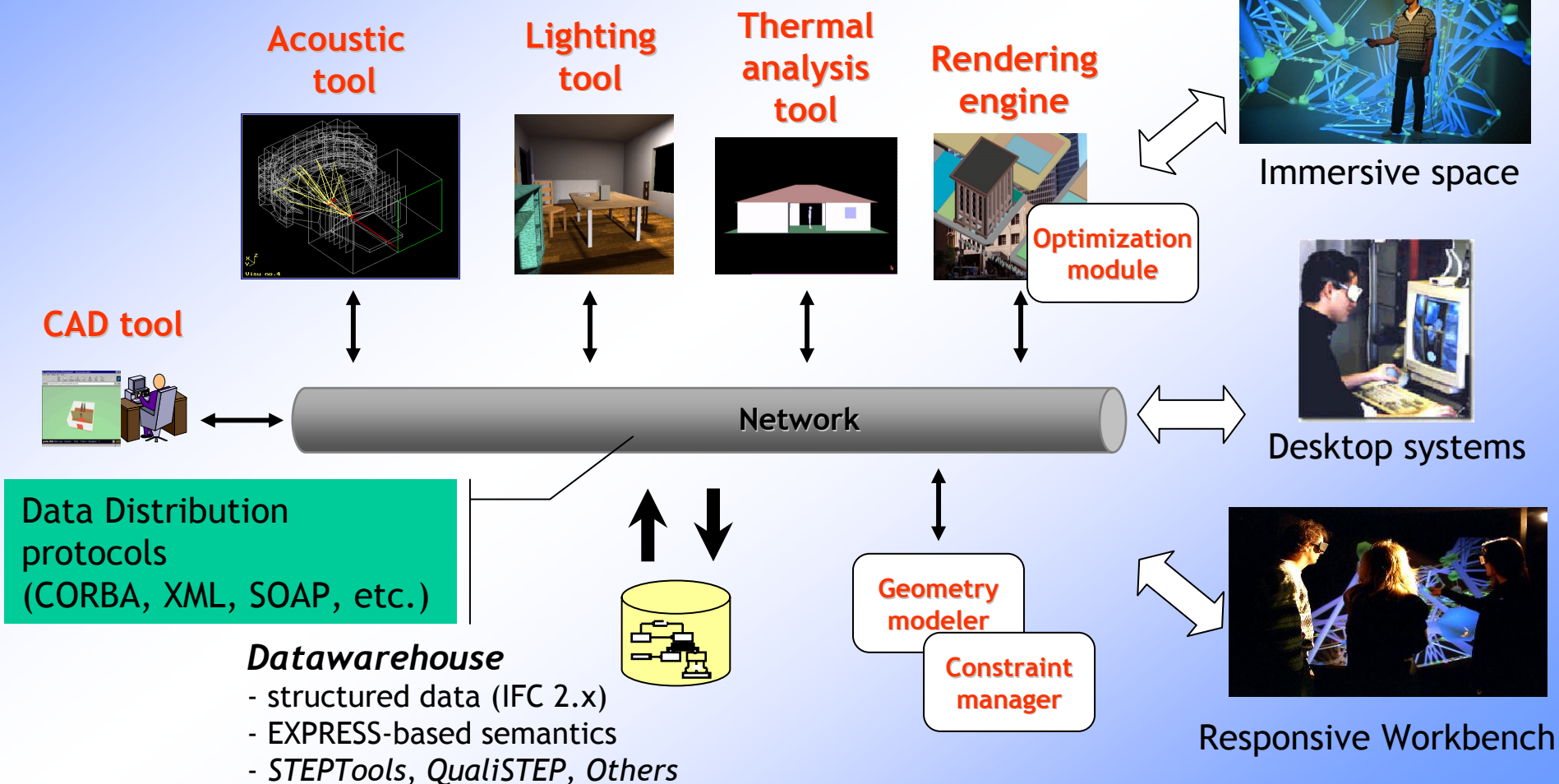


Building Model (IFC,...)



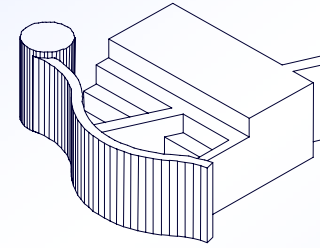
4D building site

# Integrate Components



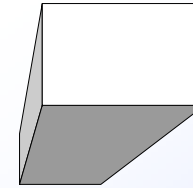
# What can IFC do?

## Shape (explicit)



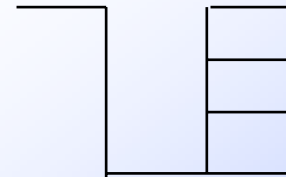
## Shape (extrusions)

beams, columns, pipes, ducts, conduit, walls, etc.



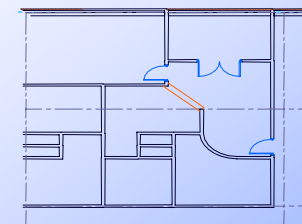
## Shape (topology)

line representations for pipe, duct, structural, etc.



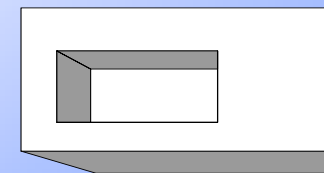
## Building Elements

wall, door, window, roof, stairs, etc.



## Relations Between Elements

holes, chases, voids, zones





# What can IFC do?

## Space and Space Structure

space, building storey, building part, building, site

## Compartmentation

fire, workstation

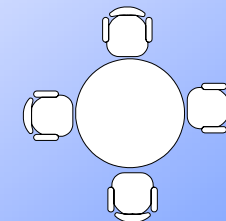
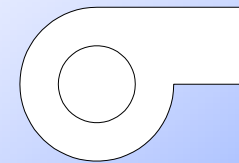
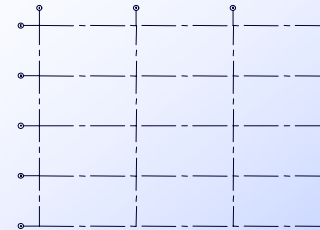
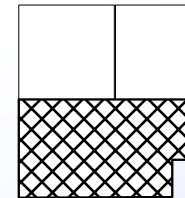
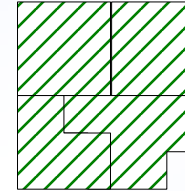
## Grids

## Equipment

chillers, fans, pumps, loose equipment, etc.

## Furniture

inc. system furniture





Tak for  
opmærksomheden

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