GEN BOX
TOSCA SIMULATION

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Outline of Talk

- The GEN Magnetic BOX : Why ?
- TOSCA
  - . What is it ?
  - . Finite element analysis
- The Model
  - . Description
  - . Steps of conception
  - . Results / Conclusion

The GEN Magnetic BOX

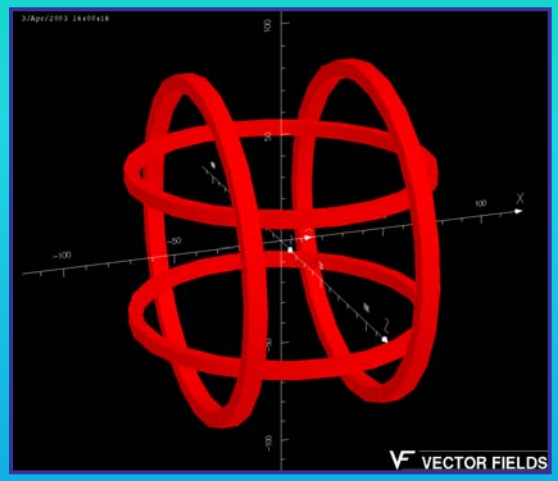
GEN uses BigBite →

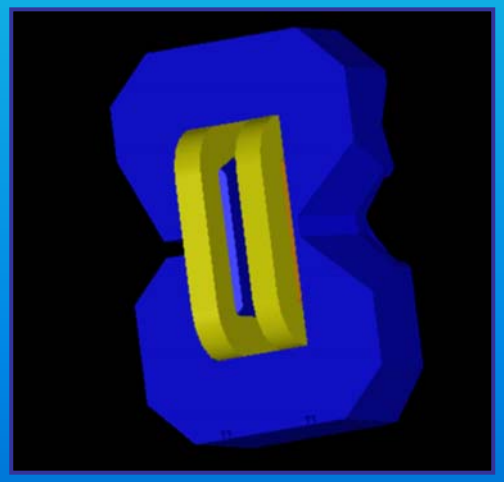
Need magnetic **shielding**

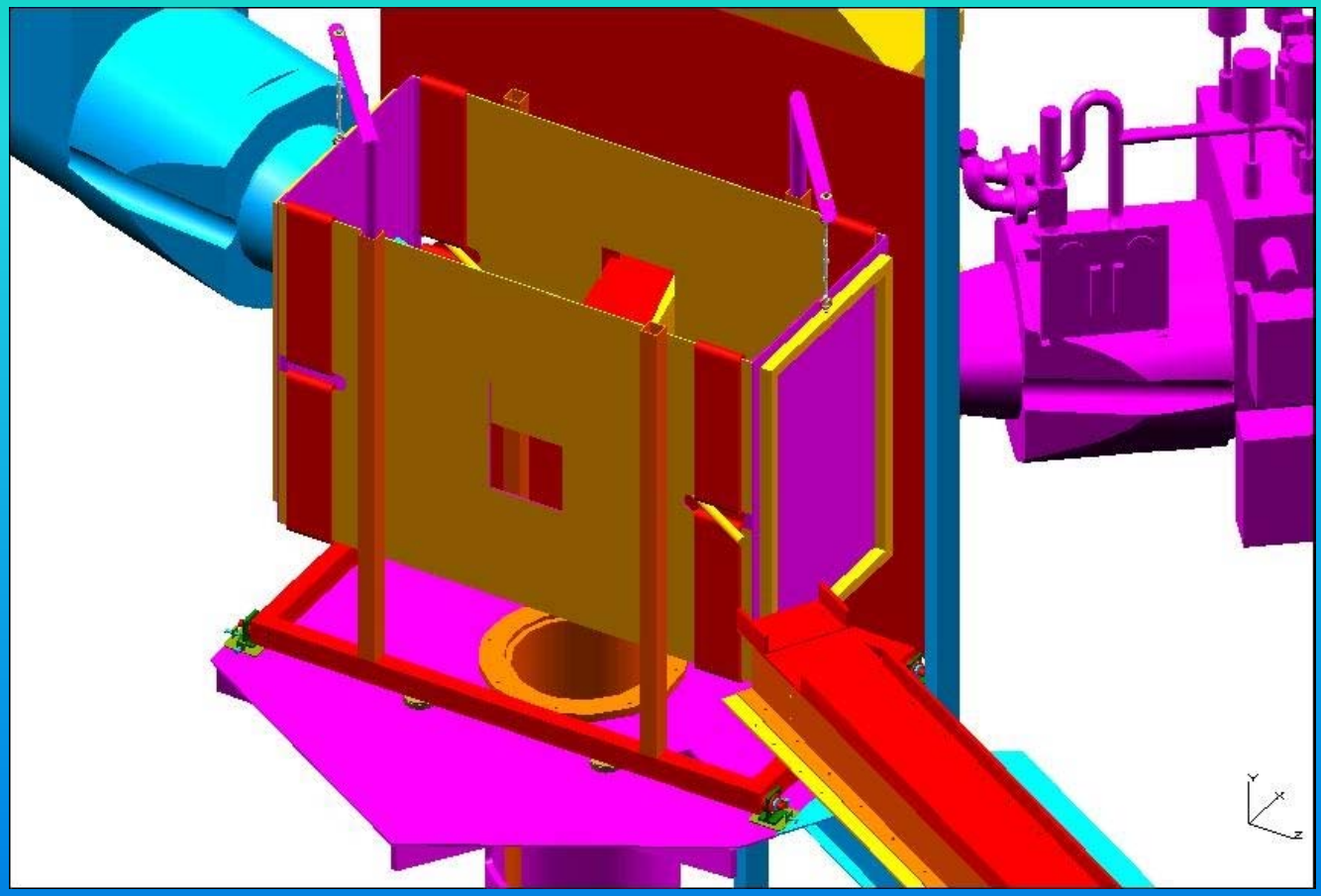
→

Replacement of the current Hall A target Helmholtz Coils because of **space** and **cost.**

Possibility to use **higher current** for the future



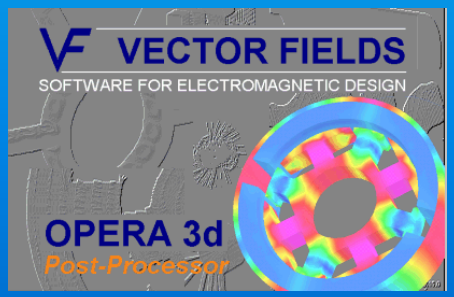




Original design : David Waldman

TOSCA

From VectorFields



How to do it ?

TOSCA is part of OPERA-3d : electromagnetic analysis software suite

Draw 2D geometry

Extrude it into volumes

TOSCA : **Finite element** analysis

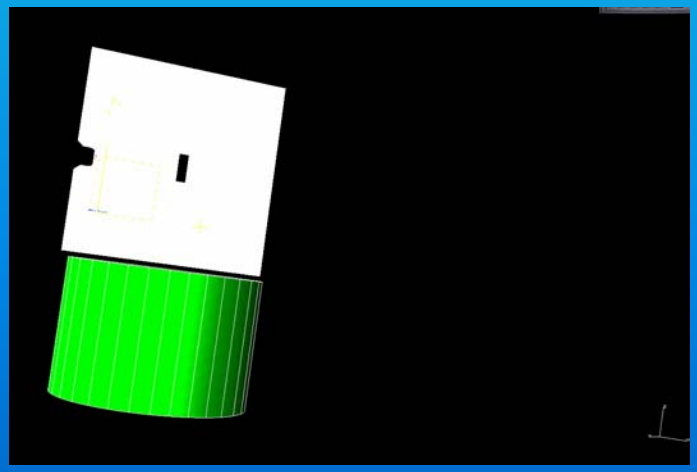
→

Mesh it: Create Nodes & Elements

How ?

- To draw the geometry :
  - o Pre processor : uses extrusion from a 2D cross-section.
  - o Modeller or I-DEAS : uses geometric primitive volumes
- To create the finite element mesh, conductors and material properties : Pre processor
- Display the electromagnetic fields : Post processor

The Model



Description

Physical volumes (Steel) :

-BOX

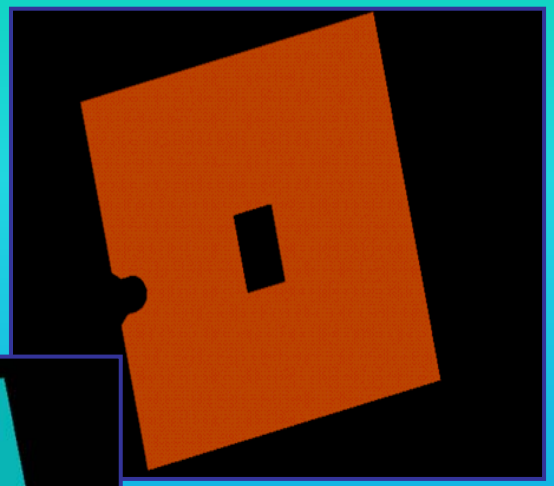
-Field clamp plate

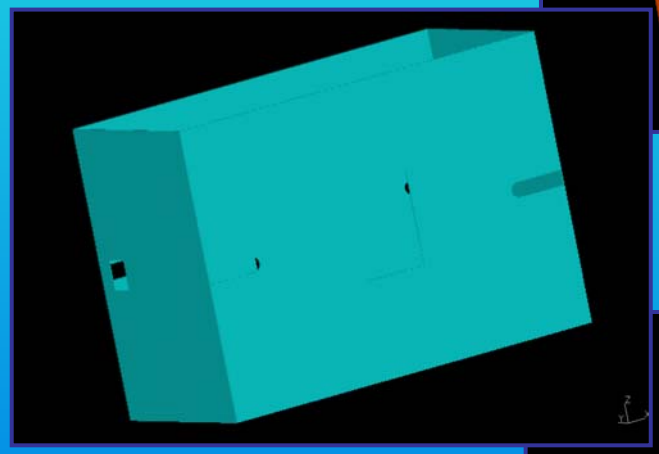
-Support

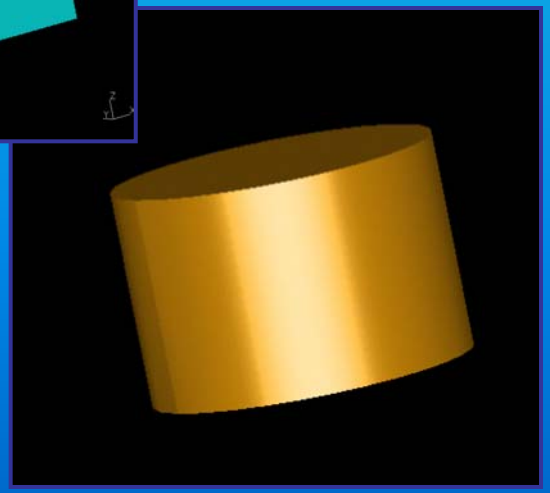
Mathematical volumes (needed by TOSCA) :

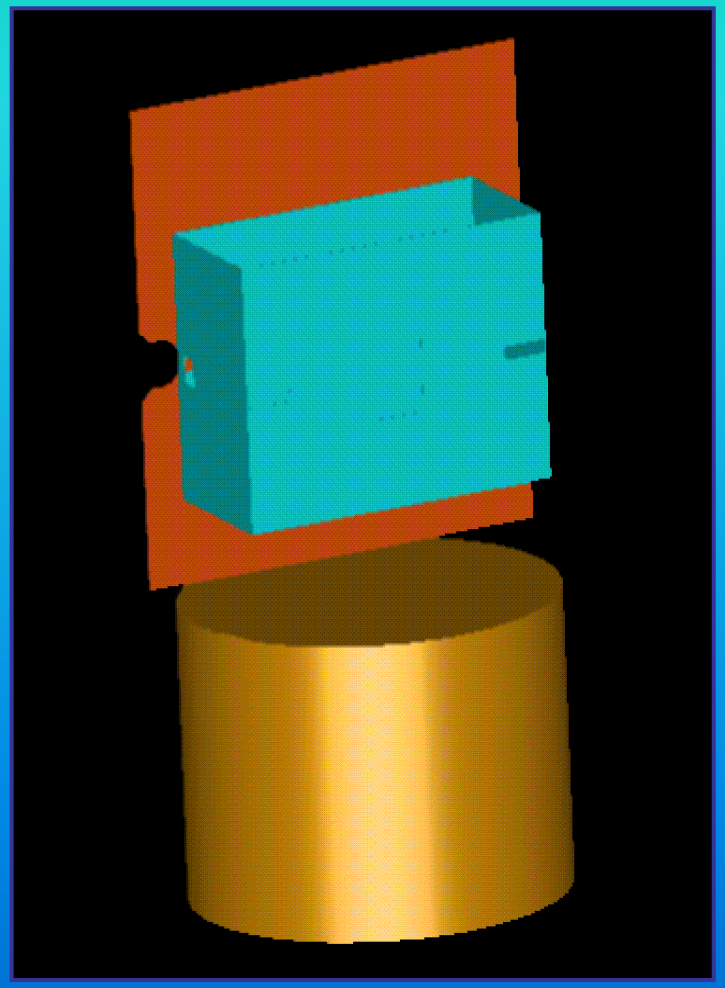
-**Reduced** and **Total** air volumes

The Geometry

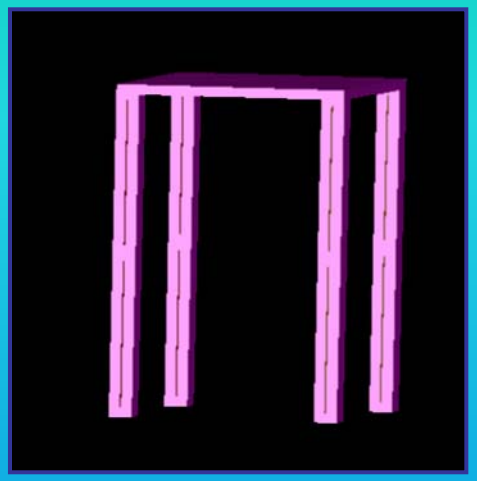


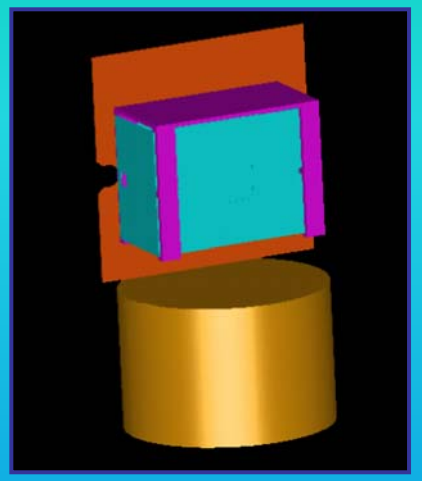


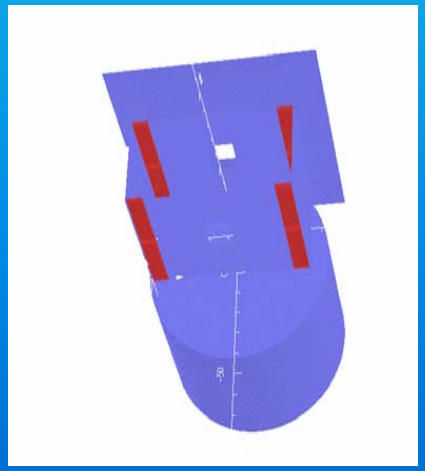


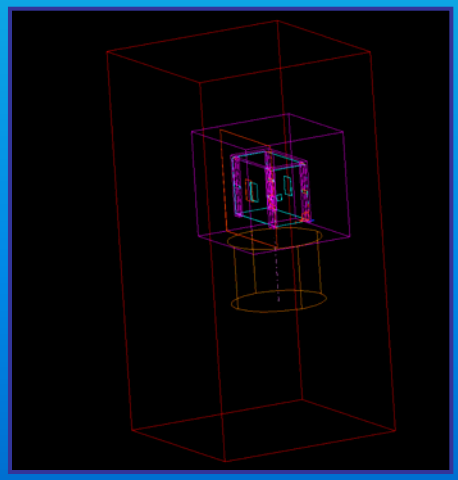


AIR VOLUMES









Steps of conception

Geometry created in I-DEAS

Pre processor :

- Materials
- Conductors
- Boundary conditions
- Simulation database

TOSCA : Calculation

Post Processor : Results

Results / Conclusion

Code very sensitive

Results pending…