R9 Progress
(inc. Rack and Compressors)

Melissa George

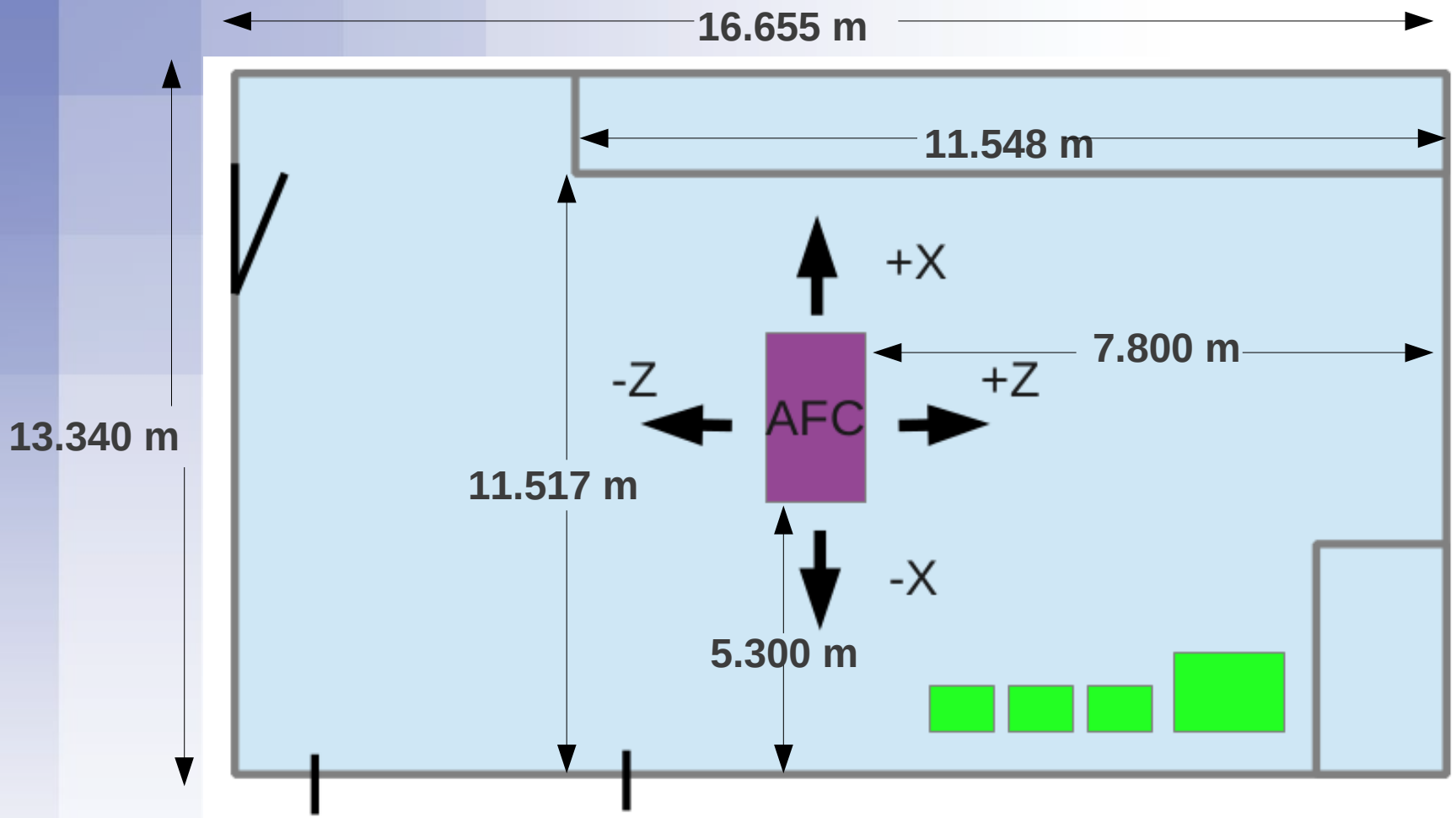
21/5/13

Summary

- R9 Model
- Rack Model
- Compressor Model
- Next Steps

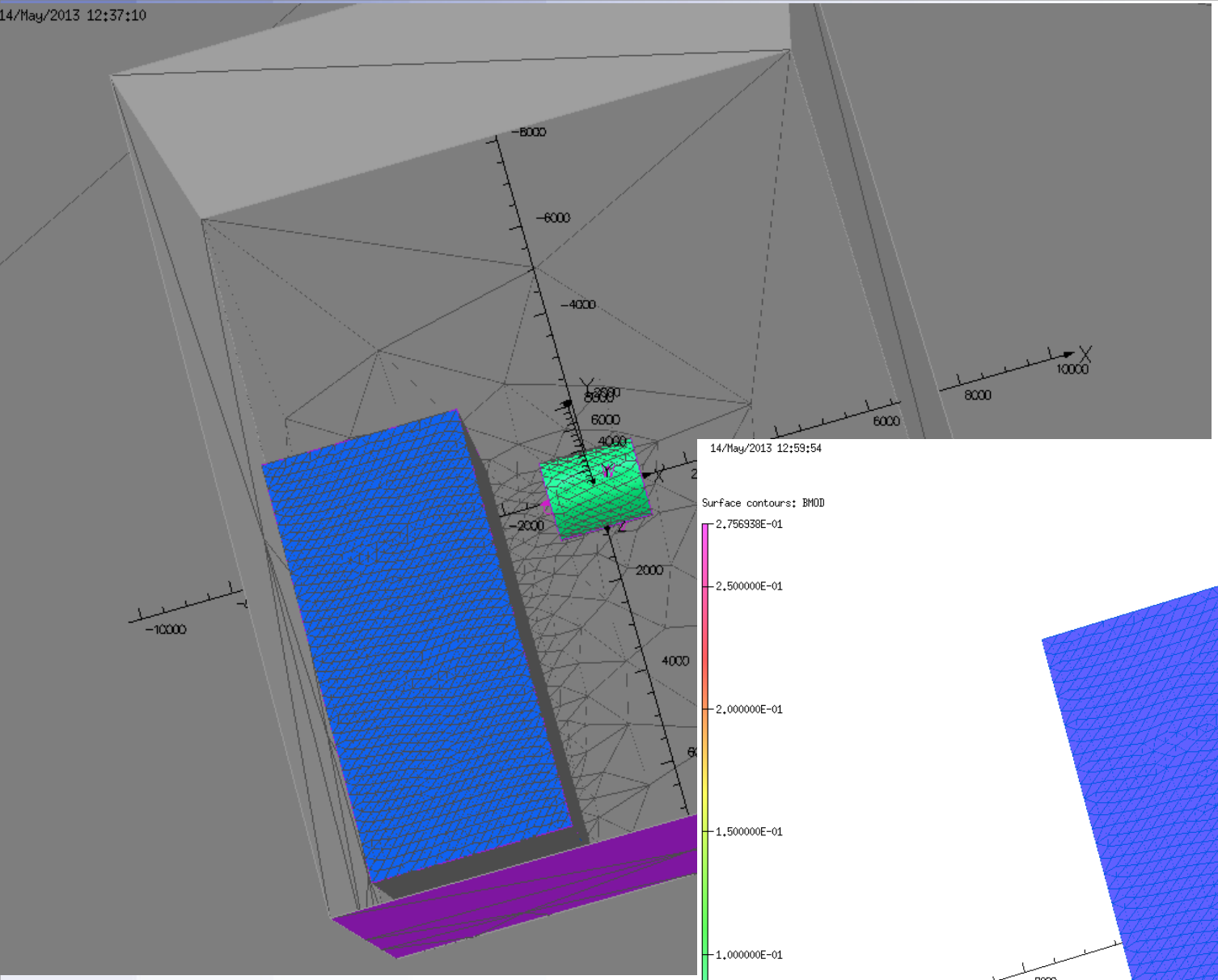
R9 Dimensions

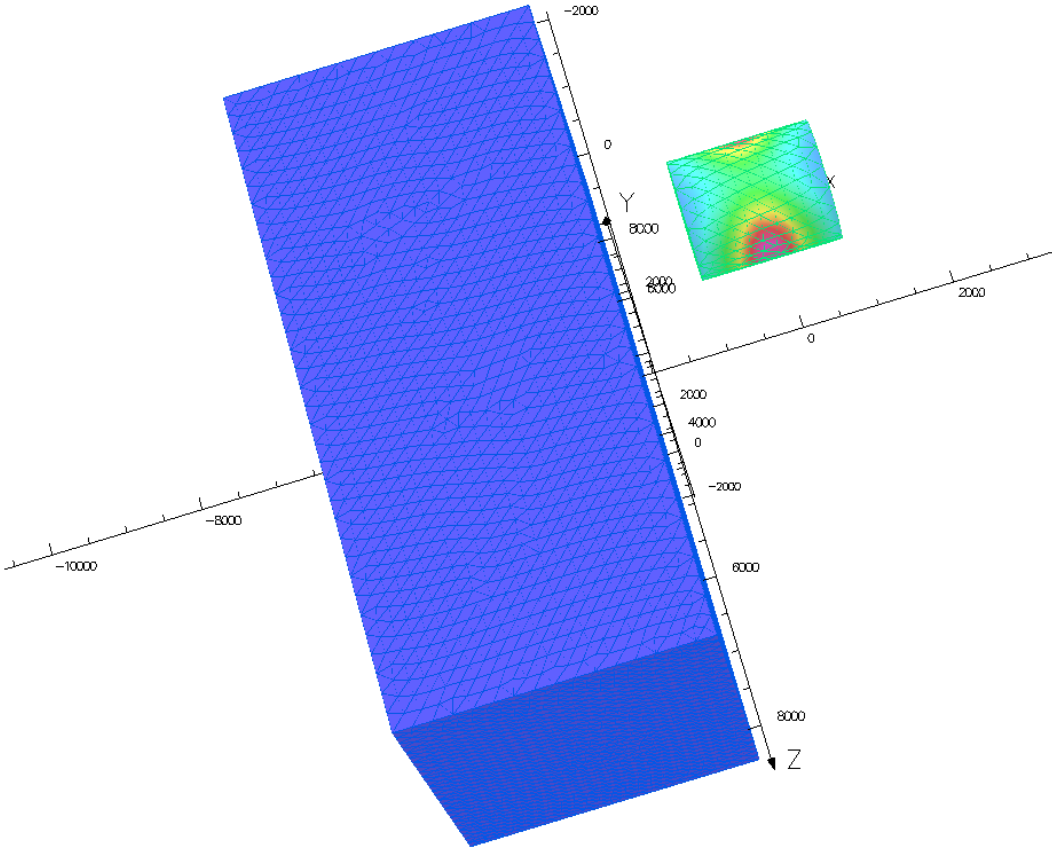
~ +/- 5cm error



R9 Height = 9.000 m

R9 Model





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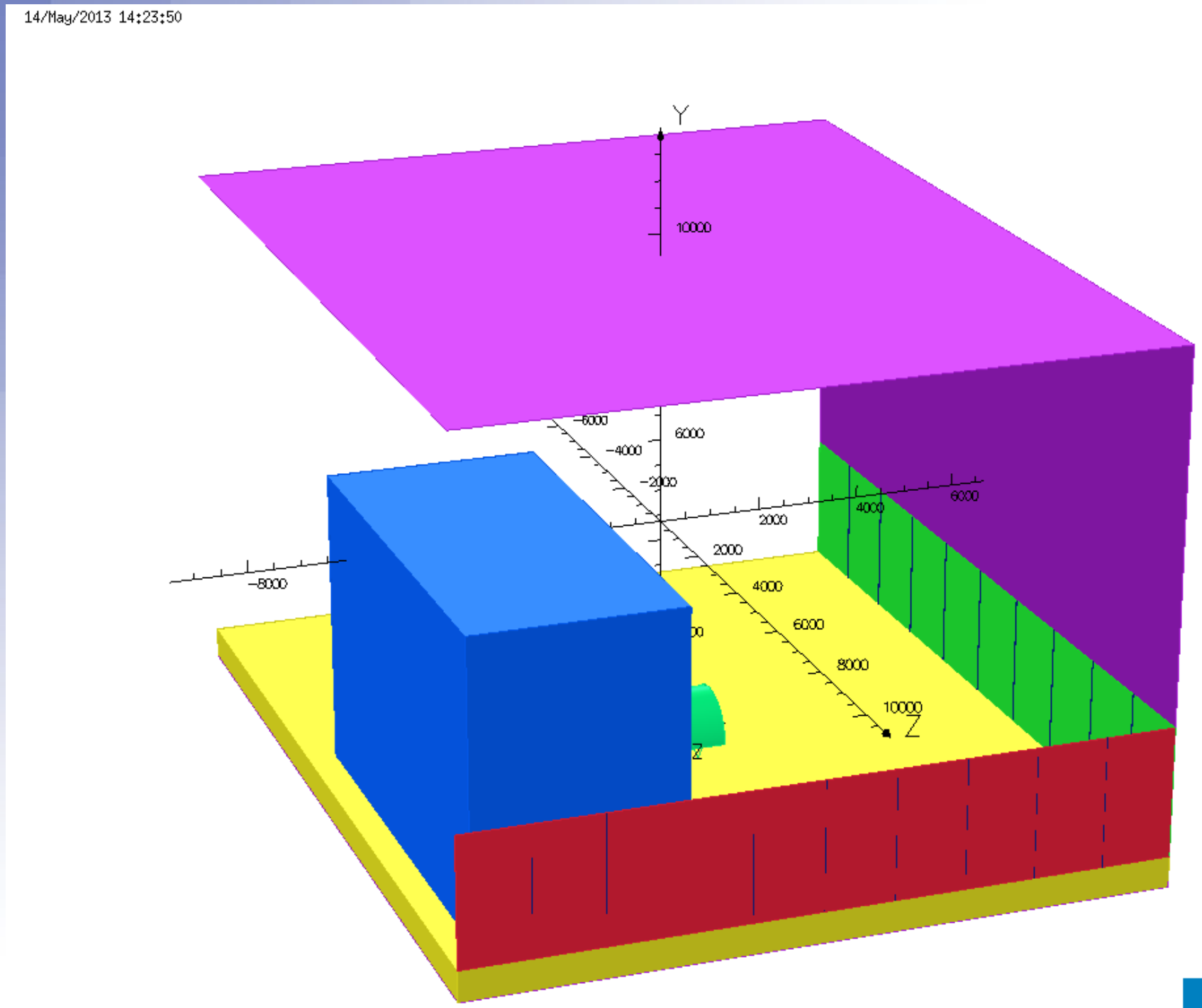
R9 Model

- V2 Model of room complete
  - No Walls
  - AFC is chosen by the user to be in flip or normal mode
  - Metal in floor and storeroom not included
- Meshing now works well and quickly.
- Solved using non-linear Newton-Raphson with adaptive conductor line integrals.
- OPERA analysis has been performed and output at the points measured by Celeste have been sent for comparison.
- It should be remembered that this model is an extremely simplified version.

R9 Model With Walls

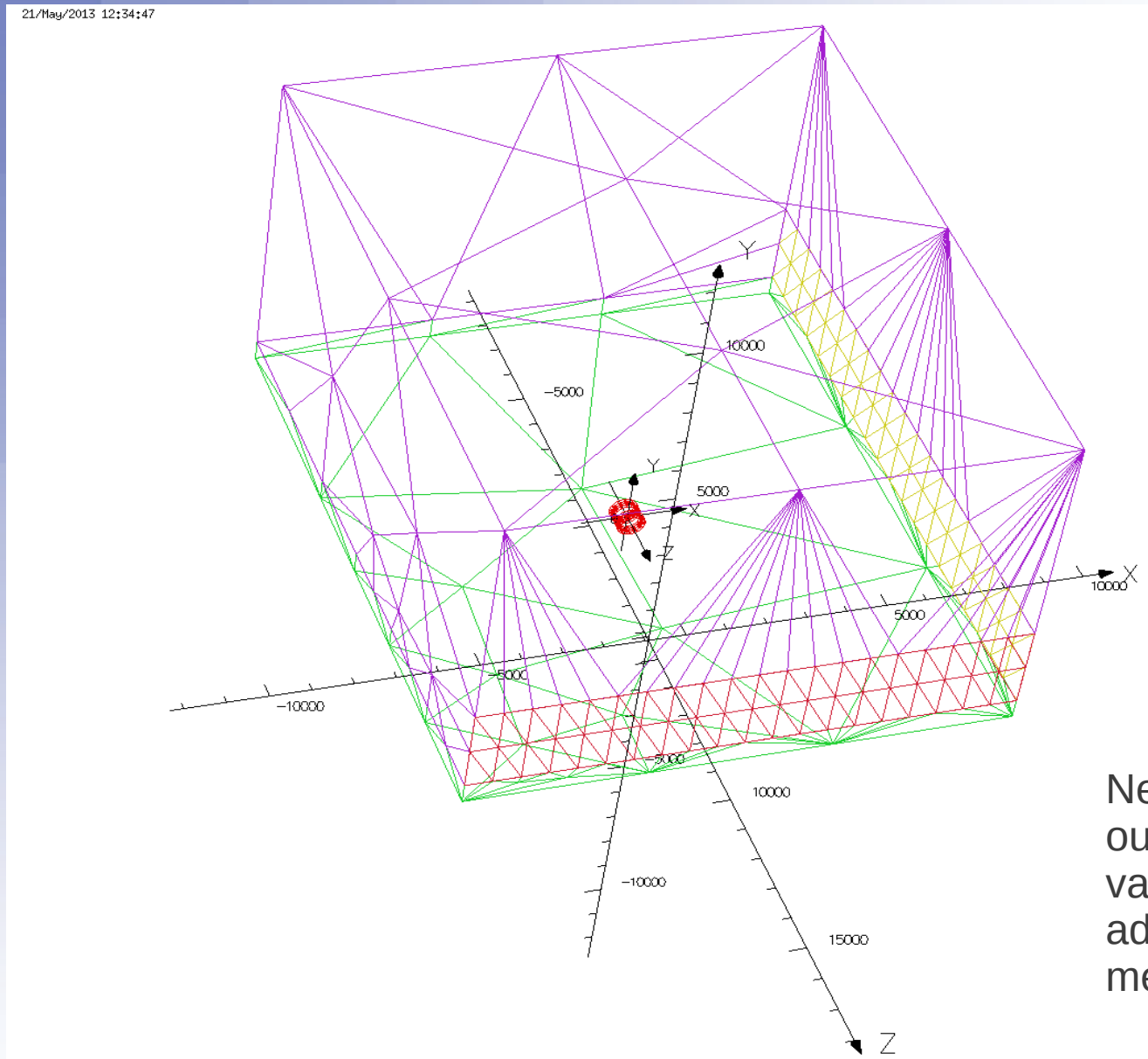
- V3 of Model of room now complete
  - Walls
  - AFC is chosen by the user to be in flip or normal mode
  - Metal in floor and storeroom not included
- Meshing now works and quickly, but still has some warnings.
- Mesh quality is just inside the not to worry range but could still end up taking a very long time when the model becomes very complicated
  - for this reason it is a priority, but not a disaster.

R9 Model With Walls



Opera

R9 Model With Walls – Mesh



UNITS

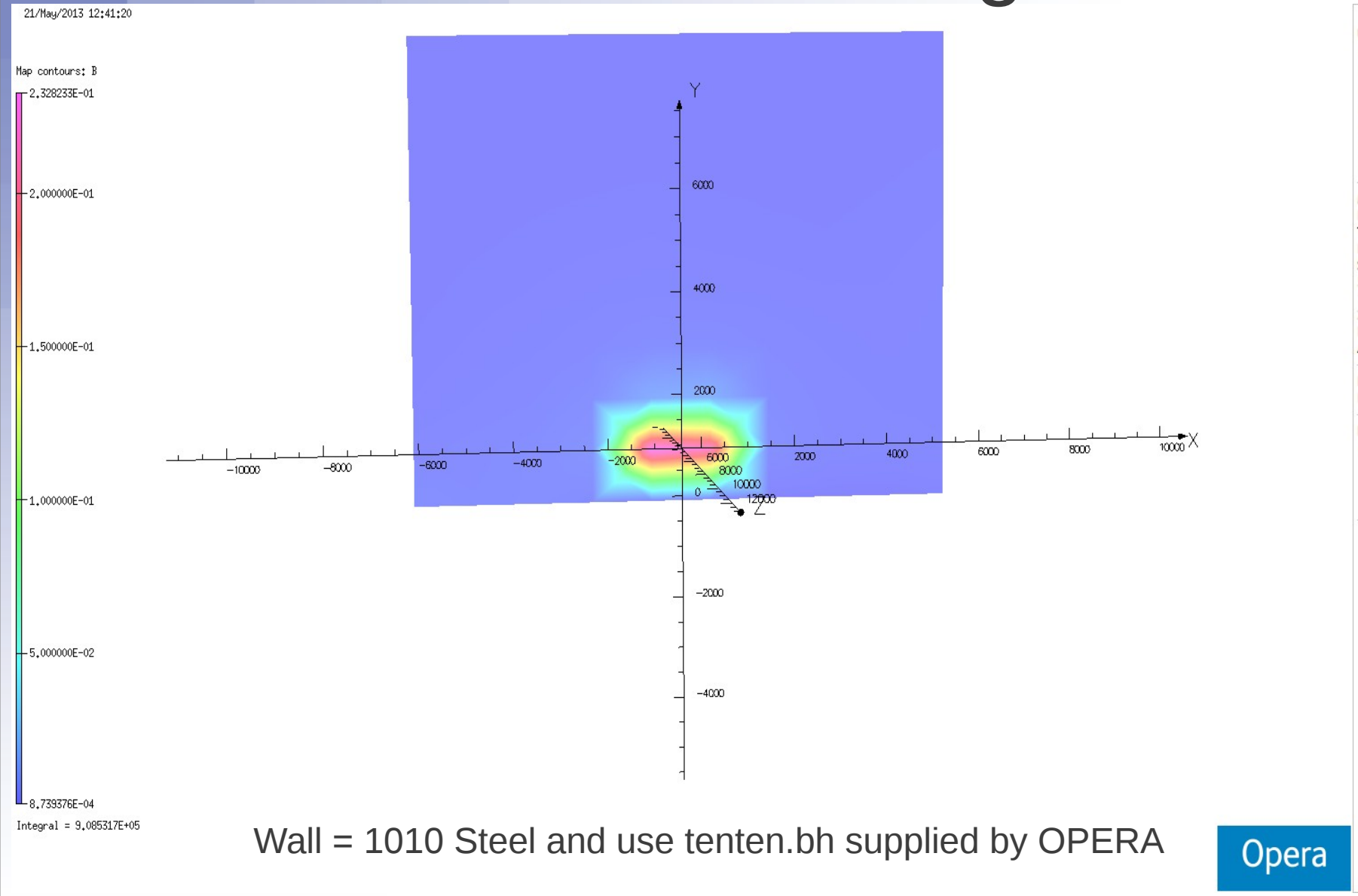
Length	mm
Magn Flux Density	T
Magnetic Field	A/m
Magn Scalar Pot	A
Current Density	A/mm²
Power	W
Force	N

MODEL DATA
R9ModelInc1010WallsV1.op3
TOSCA Magnetostatic
Linear materials
Simulation No 1 of 1
571092 elements
126778 nodes
2 conductors
Nodally interpolated fields
Activated in global coordinates

Field Point Local Coordinates
Local = Global

Need to make mesh of room outline more square. Trying various methods including adding layering, reducing mesh size and adding bodies.

R9 Model With Walls – XY Plane through AFC



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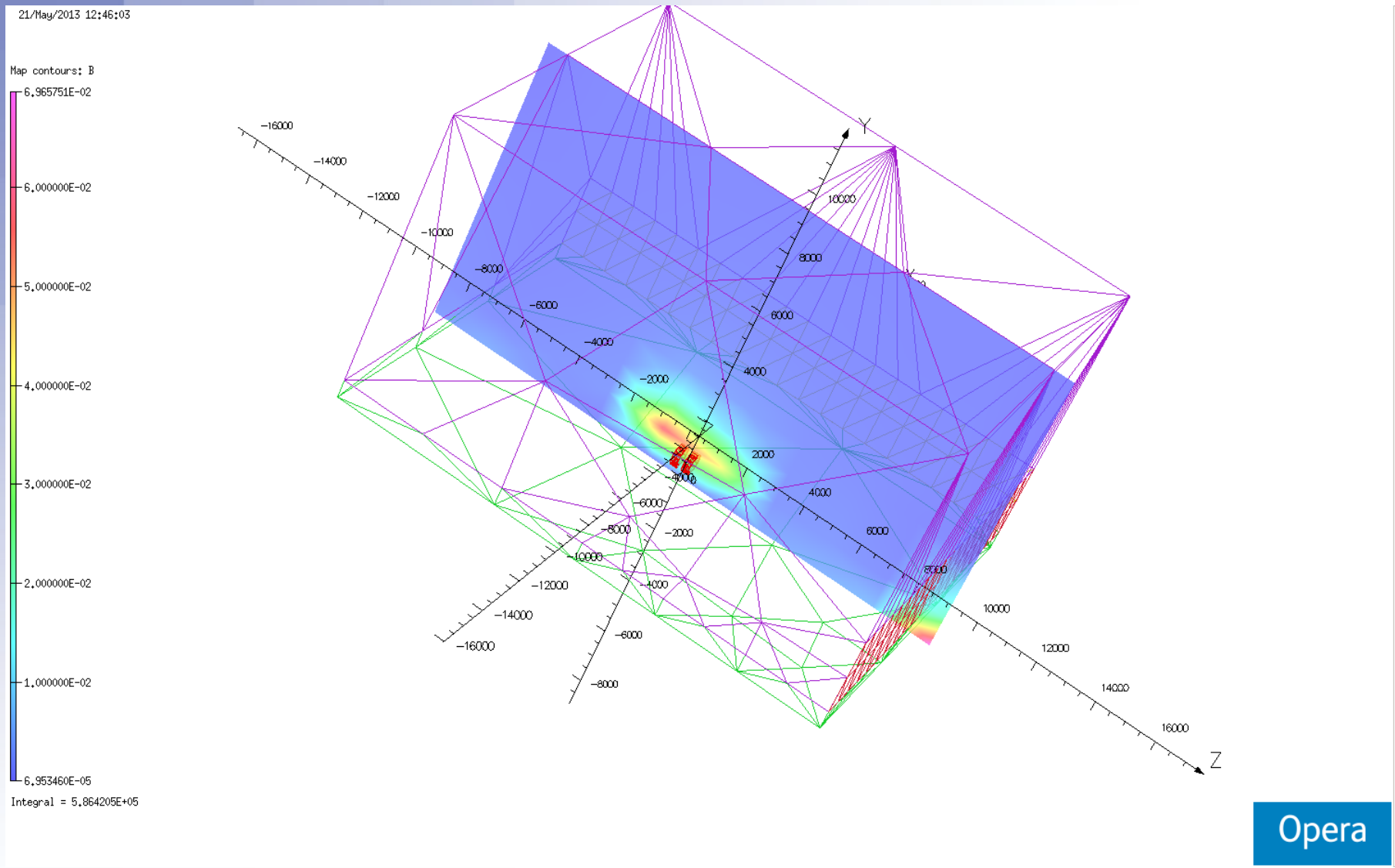
FIELD EVALUATIONS

Cartesian	CARTESIAN (nodal)	10x10
	x=-6000.0 to 6000.0	y=-600.0 to 9000.0

Wall = 1010 Steel and use tenten.bh supplied by OPERA

Opera

R9 Model With Walls – ZY Plane through AFC



Wall = 1010 Steel and use tenten.bh supplied by OPERA

Analysis

- Models produce fields in Bx, By, Bz and Bmod at coordinates that match the measured positions.
- Sent to Celeste for comparisons:
  - Simple model without walls, floor joists or electronics.
  - R9 Model including walls, but without electronics or floor.
- From now on an iterative improvement of model process will begin, based on the output of analysis.

Next Steps

- Improve model meshing.
- Test model with analysis in OPERA.
- Include walls in R9 model.
- Cileste can begin comparisons with data.
- Improve R9 with wall model ready for data comparisons.
- Rack and Compressor model input.
- Further comparisons with data.
  - Inc Walls
  - Rack
  - Compressors
- Implement joists (and workshop) in model.
- More comparisons.
- Develop Rack and Compressor models as sub-models to hall model.