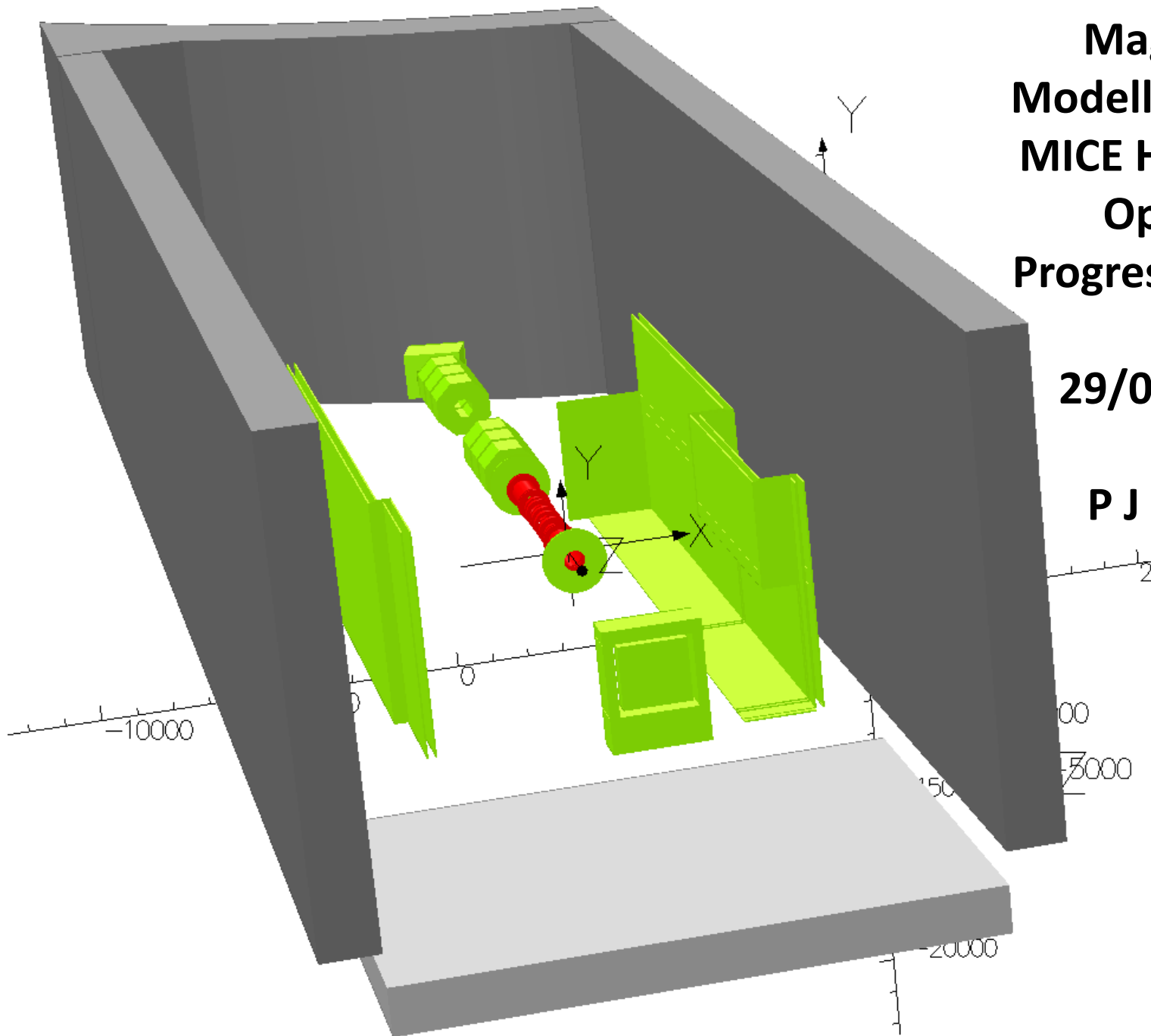


Magnetic Modelling of the MICE Hall Using Opera - Progress Update

29/08/2012

P J Smith



Overview

- Last week I reported that I was having problems meshing the existing geometry that I have. – This is the process where you take the geometry, like shown on the previous slide, and convert it into a mesh that the FEA program can do the calculations on.
- Some progress has been made – see later slides, but getting the model to mesh reliably is continuing to be a complete nightmare...
- I battled with the meshing on Thu/Fri of last week and I made significant improvements – I Left on Friday with two models to build and run automatically over the weekend. One ran to completion and the other failed.
- I tried to understand the reason for the second model falling over yesterday but have uncovered some other issues that have prevented me from understanding the meshing problem.
- I am now in contact with Klaus at Vector Fields and with his help I have made some improvements to the model so the modelling process runs much faster. The improvement in running speed is a great help in continuing to debug the model.
- I am now trying to get to the root of the meshing issues with Klaus from VF.

The model that did run

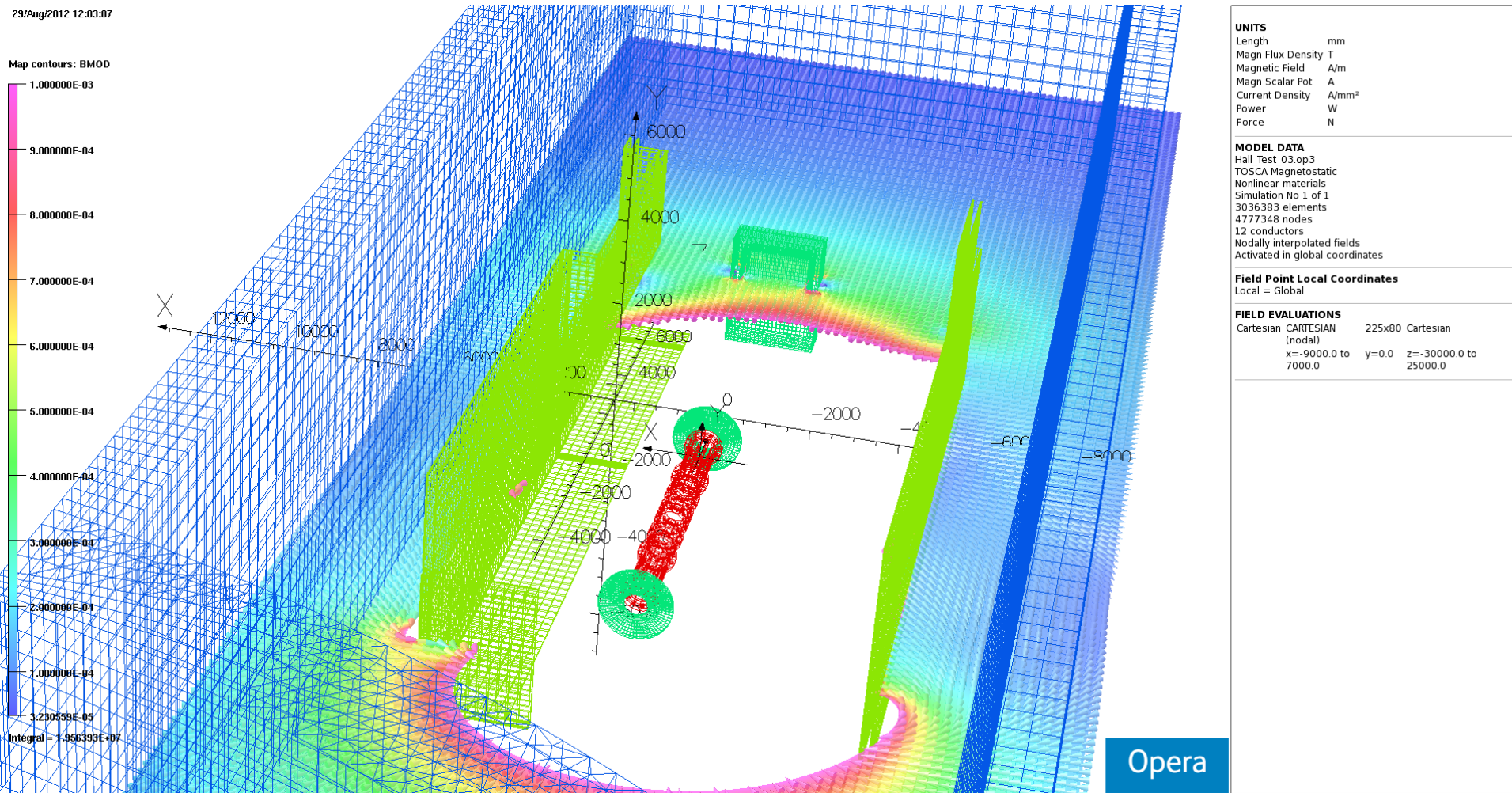
This model contained:

- South Shield Wall
- North Shield Wall
- Virostek Plates
- Solenoids (Step IV – solenoid mode)
- Beam Dump
- Hall Walls

All meshed and ran ok!

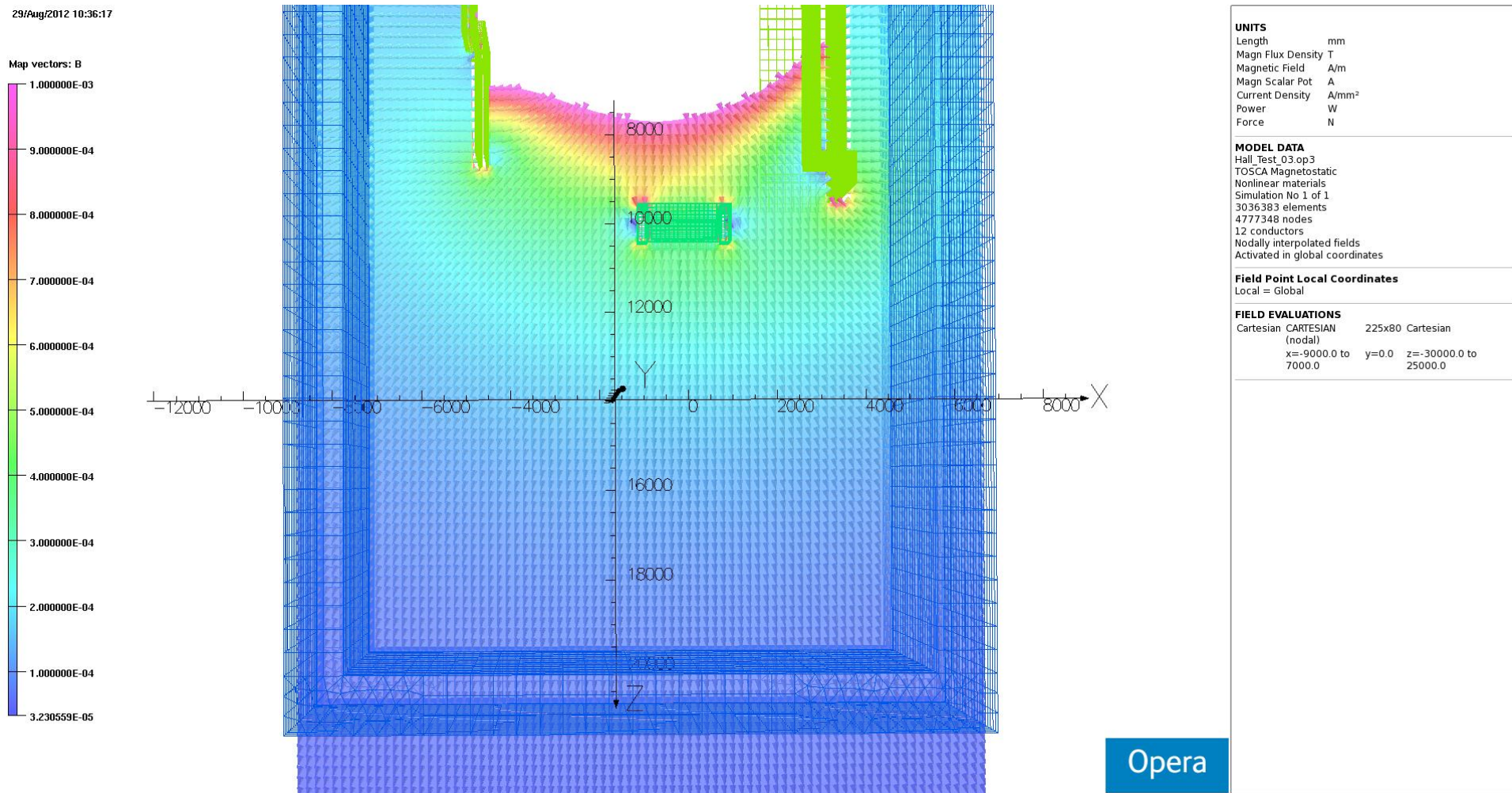
I quickly pulled some plots off this morning to show you how it looks – but I haven't spent much time on this!

Illustration only – Not for interpretation!



Overview of model - 10 gauss scale

Illustration only – Not for interpretation!

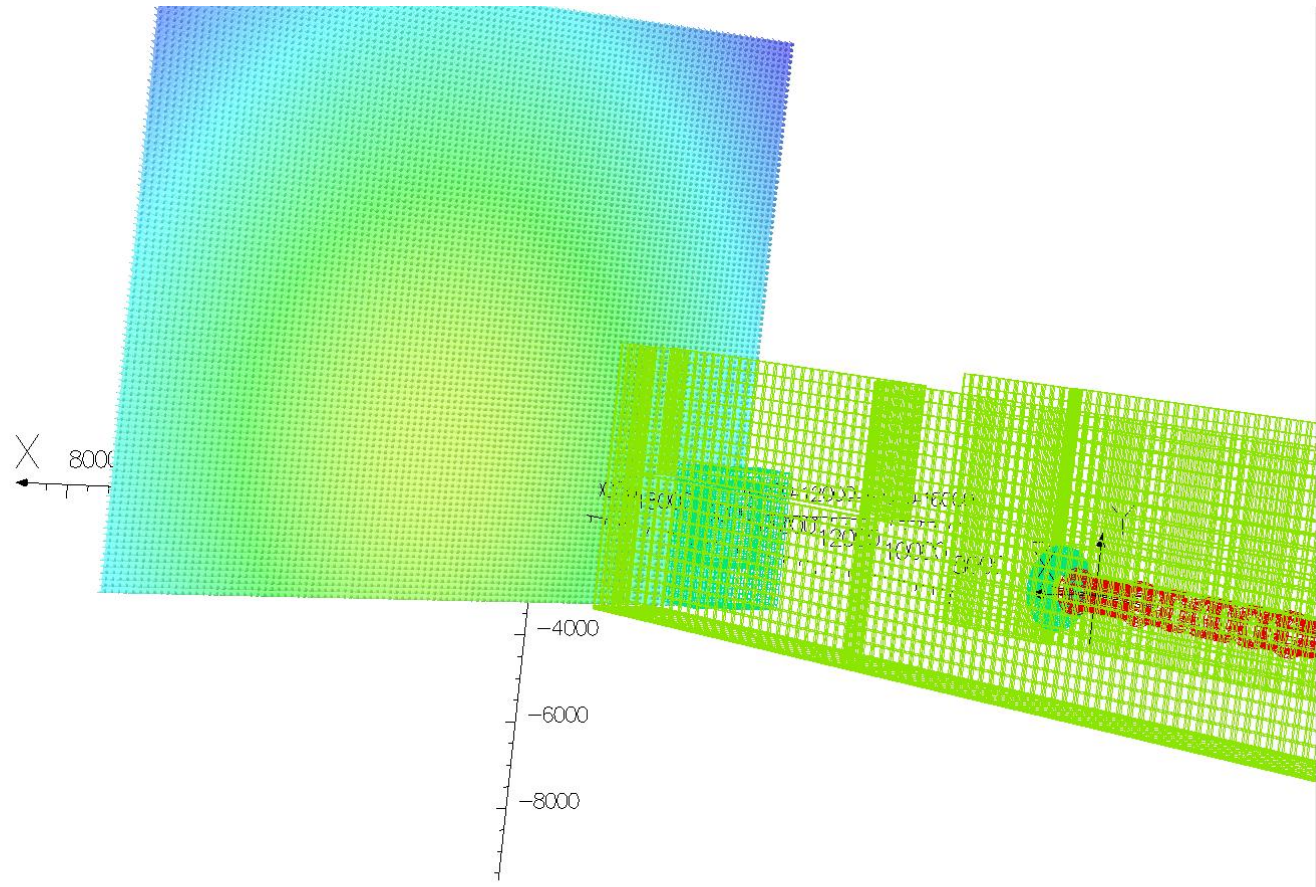
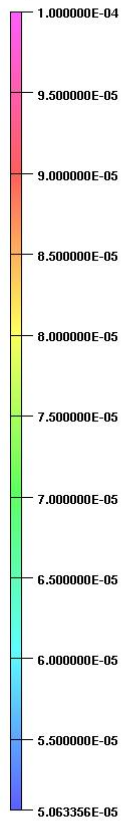


Towards west Wall - 10 gauss scale

Illustration only – Not for interpretation!

29/Aug/2012 12:07:52

Map vectors: B



UNITS			
Length	mm		
Magn Flux Density T	T		
Magnetic Field	A/m		
Magn Scalar Pot	A		
Current Density	A/mm ²		
Power	W		
Force	N		
MODEL DATA			
Hall_Test_03.op3			
TOSCA Magnetostatic			
Nonlinear materials			
Simulation No 1 of 1			
3036383 elements			
4777348 nodes			
12 conductors			
Nodally interpolated fields			
Activated in global coordinates			
Field Point Local Coordinates			
Local = Global			
FIELD EVALUATIONS			
Cartesian	CARTESIAN	100x100	Cartesian
	(nodal)		
	x=-9000.0 to 8000.0	y=-3000.0 to 10000.0	z=19735.0



Towards west Wall - 1 gauss scale

Summary

- Progress has been made – the existing model is in much better shape than it was a few days ago – I can get some models to run - but it is hit and miss as to whether they will run. Meshing errors and program crashes are still tripping the model up.
- To reiterate...
- Getting to the root of these meshing issues is important and must be understood before any more geometry is added to the model, but I'm at the stage where I need expert input to resolve the current issues.
- Understanding the meshing issues should make it much easier to add further geometry - i.e. the process 'should' get easier when these problems are resolved and understood.
- We are now in contact with VF and help has been forthcoming – perhaps a visit with Mike in the near future will help speed the rate of progress up.