Prototype Status

Status Update

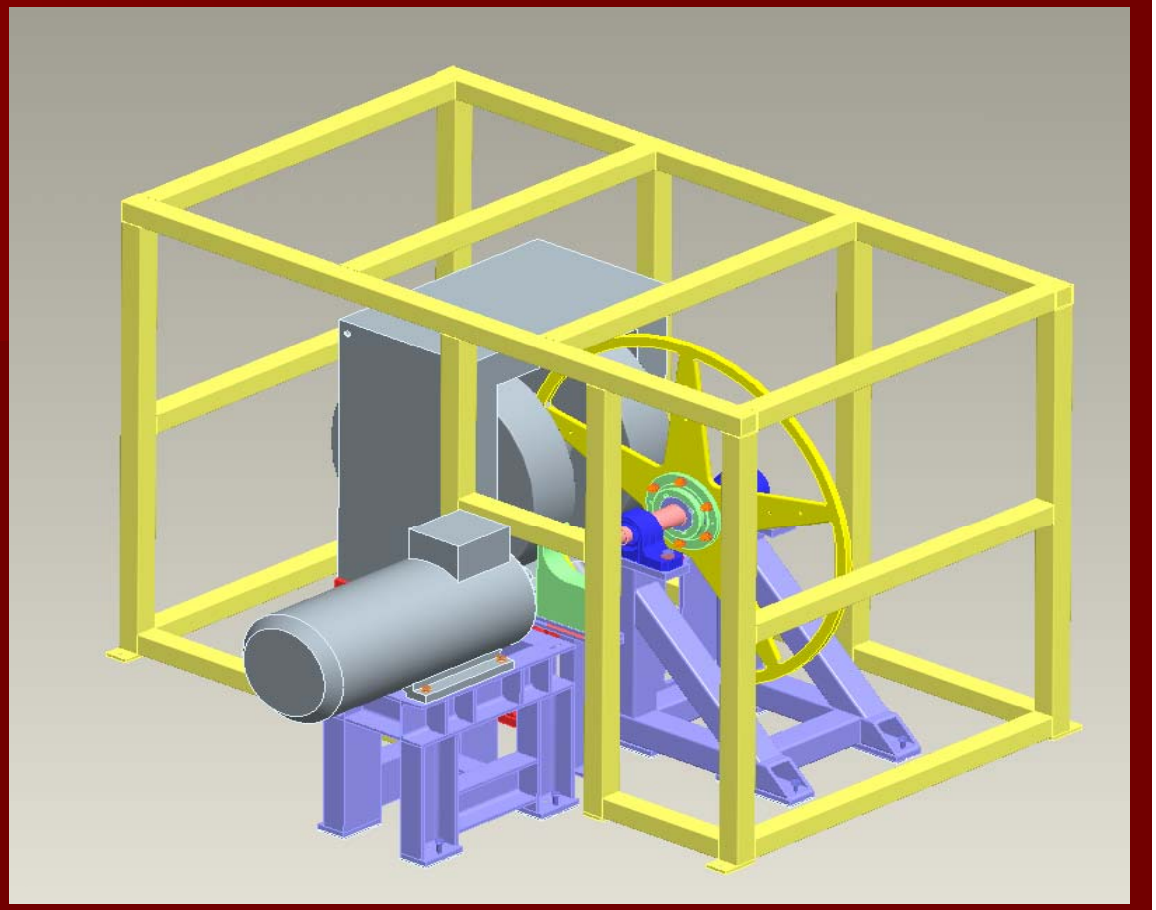
- Safety Cage arriving soon
- Torque transducer up and running
- ‘Commissioning’ data analysis underway
- Magnetic simulations
- Accelerometer safety trip delivered
- Lei (PhD student) indoctrination

- Safety cage constructed
- But not in position

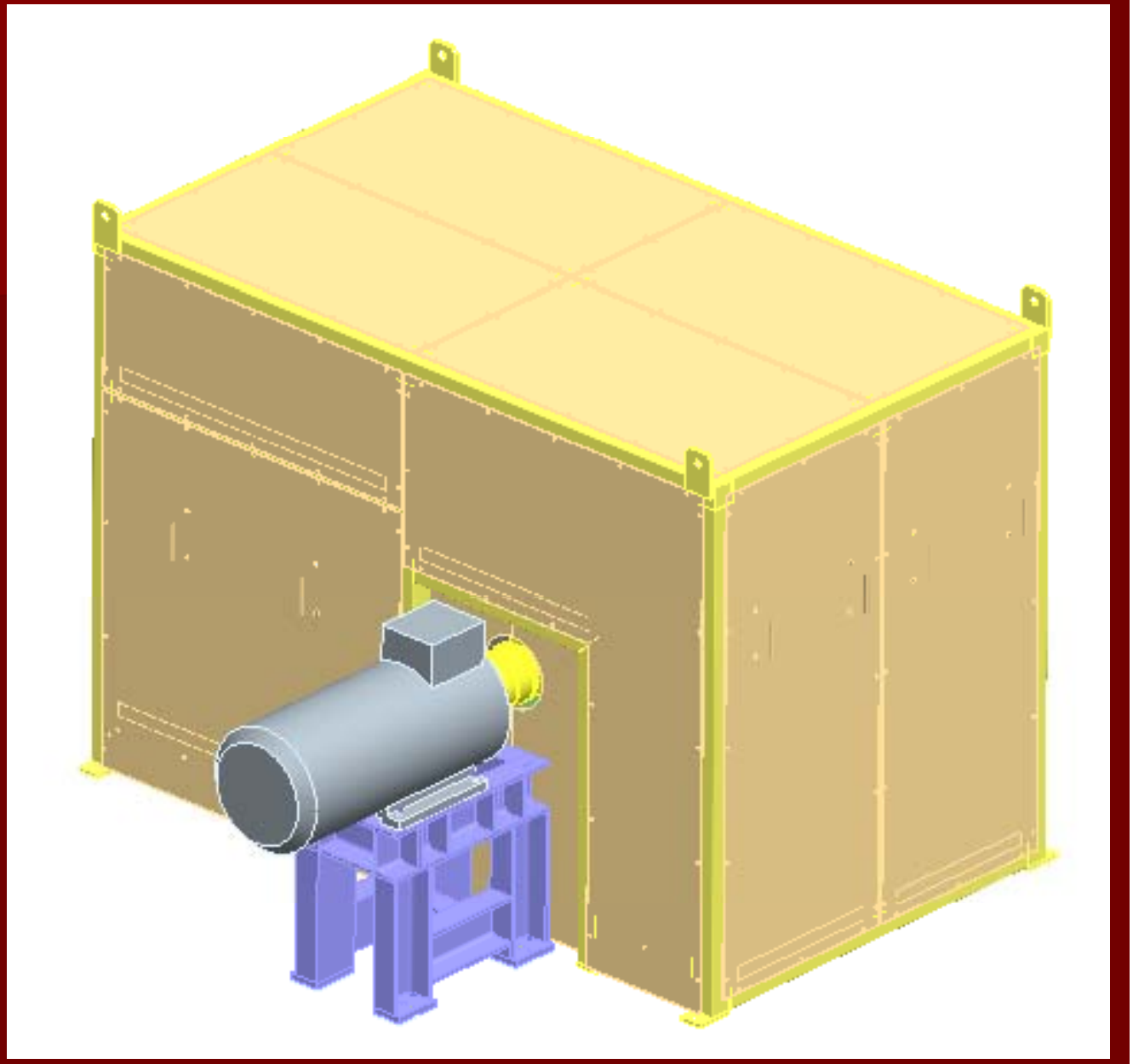
- LLNL finite-element analysis + the Alekseevski-Tate model (Ian Bailey) results are in

- 5mm stainless steel panelling is adequate to contain wheel fracture
- (plus sandbags)

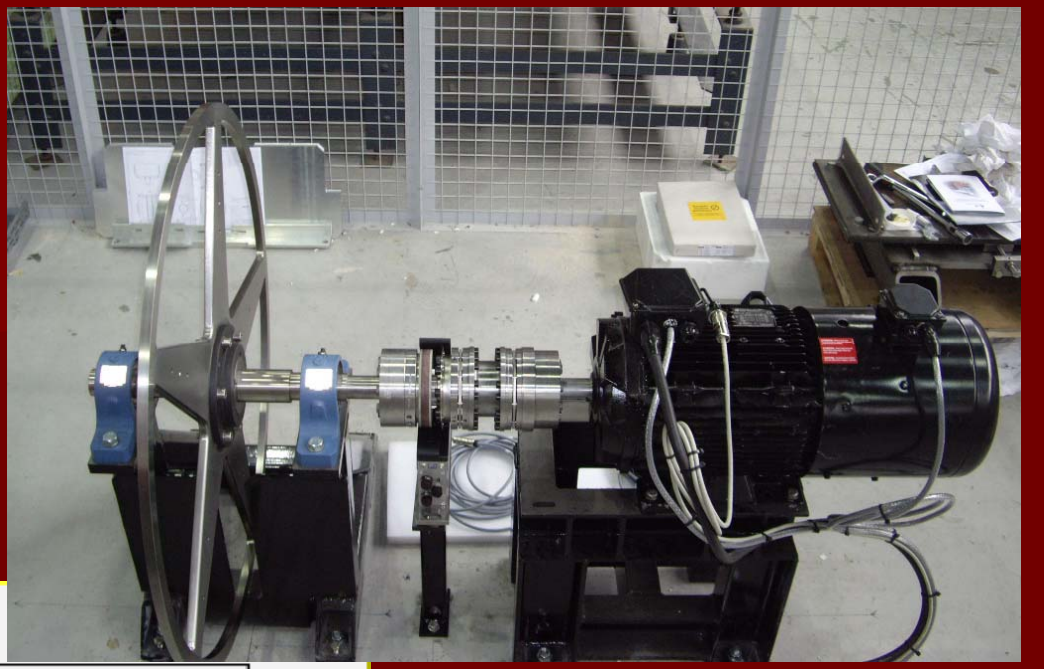
- Panelling due in 2 weeks

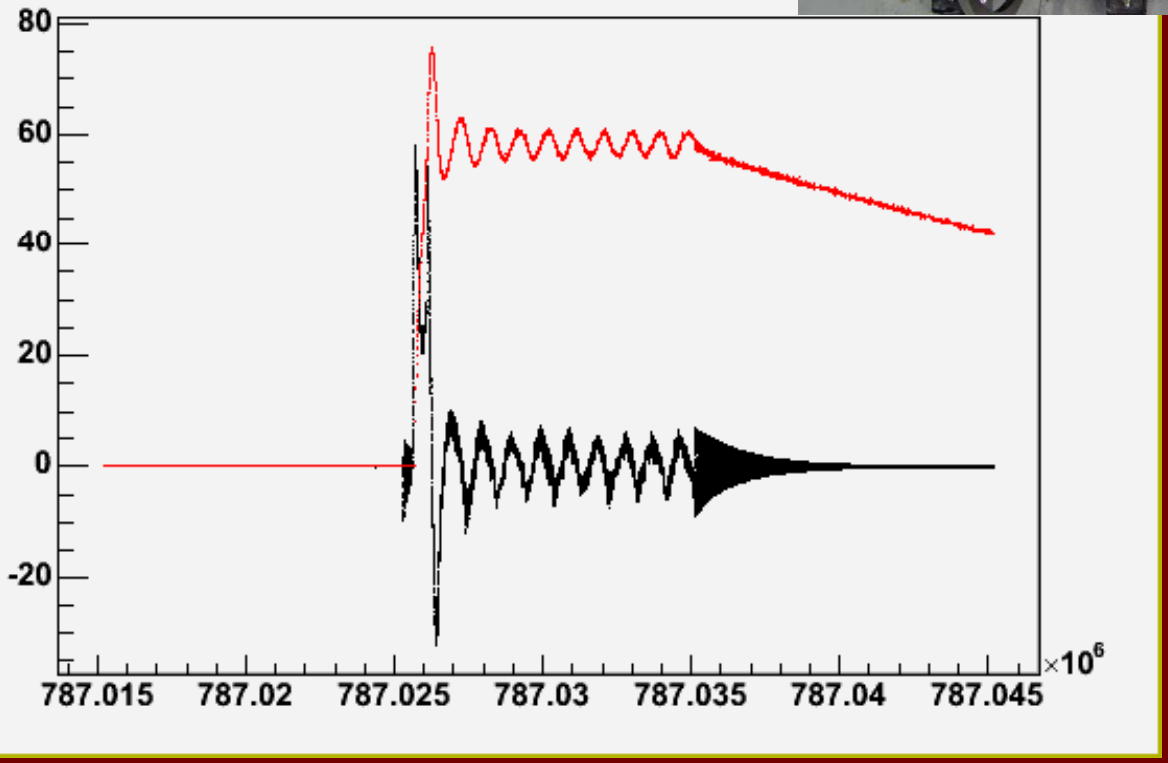


- Removable panels allow for access
- Cameras, power, lighting inside cage
- Design requires slight modification to accommodate cooling fan (Ken Davies)

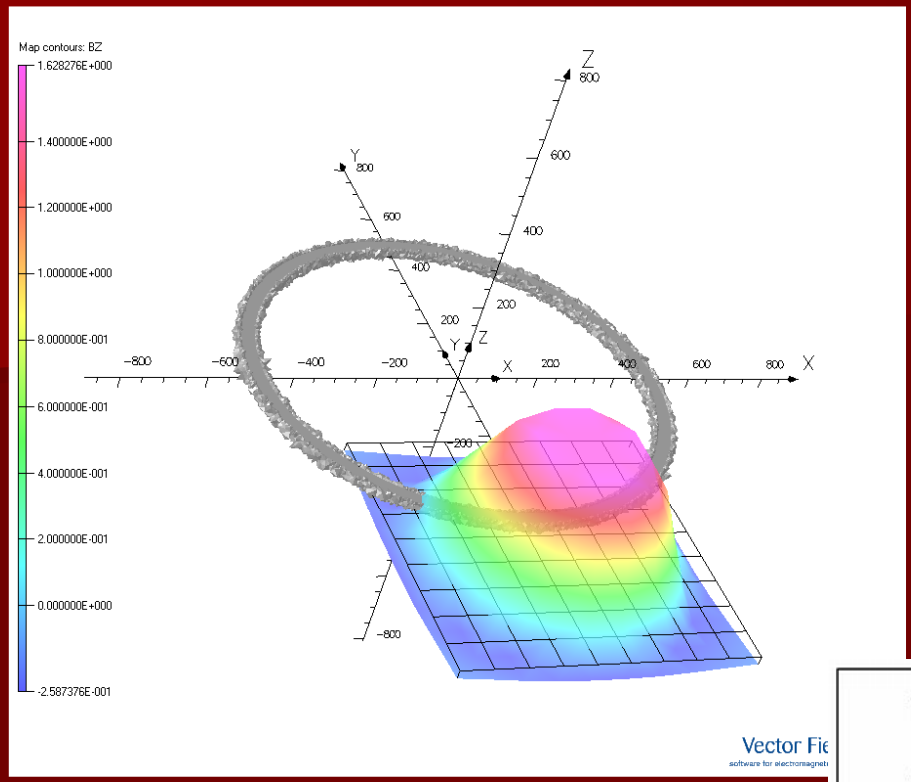


- Torque transducer operational at 2.4kHz
- Many measurements per revolution to observe kicks in B-field



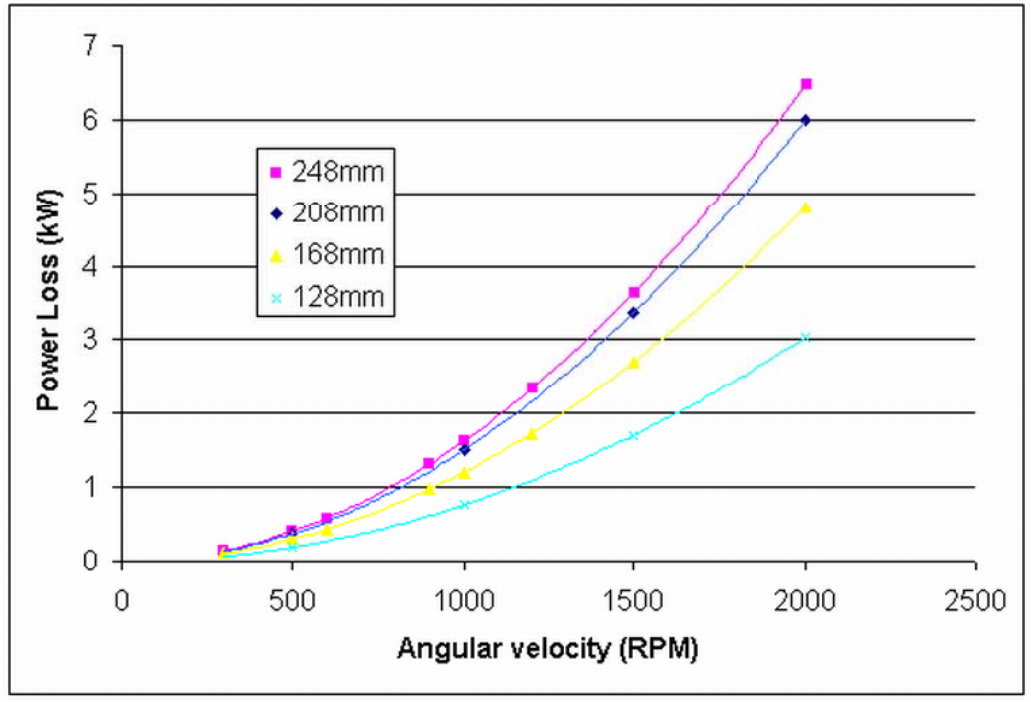


- Limited to 60 rpm (safety)
- Taking data and preparing analysis tools
- Red: rpm (not constant!)
- Black: torque (driving rpm)



- Eddy current simulations performed in Vector Fields Opera using Elektra rotational solver (J.Rochford)
- Simplified no spoke model
- Could feed into temperature measurement calculations

- Eddy current power loss for various immersion depths



Experimental Programme

- Operation of wheel in magnetic field
  - Running a bit behind schedule…
  - Systematic scan of field strength (0T to 1T in 0.2T steps)
  - Systematic scan of ang. vel. (0 rpm to 2000 rpm in ~50 rpm steps) avoiding critical speeds.
  - Torque and temperature readings to be compared with the predictions of computer simulations.
  - Immersion depths?
- Long-term operation of wheel to monitor stability…?
- Experiment complete by Nov/Dec 08.

Remaining work

- Further eddy current simulations
- Temp calibration / Thermal analysis (Lei)
- Waiting for cage to run up to speed
- Waiting for water for magnet
- Data taking!