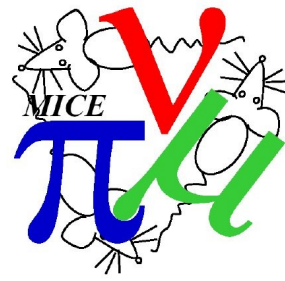


Radiation Monitor: A Quick Review

Melissa Uchida

14/1/14

Progress

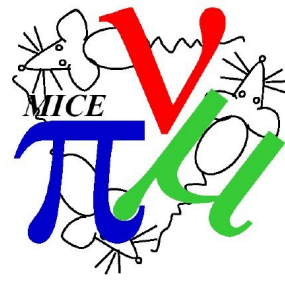


- System design
- Placement design
- Simulation
- Costings
- Timeline
- Electronics
- Software
- Documentation
- Commissioning

- Yet to begin
- Work has begun
- In hand

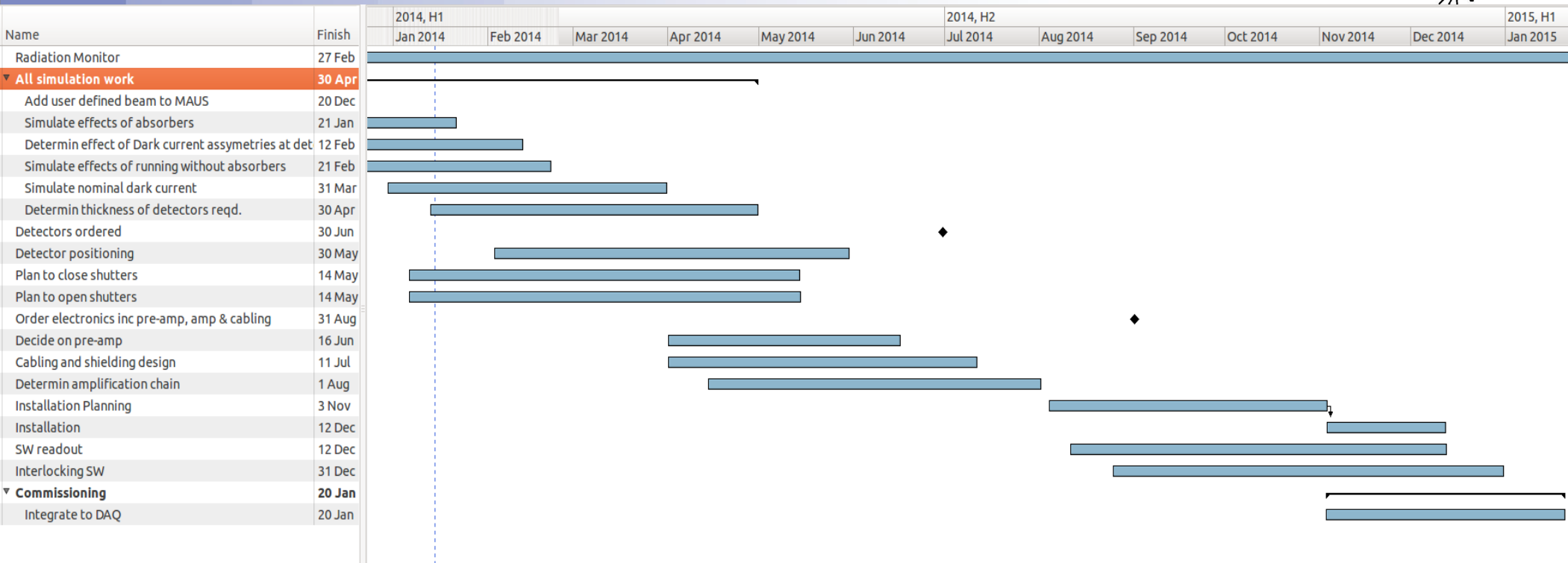
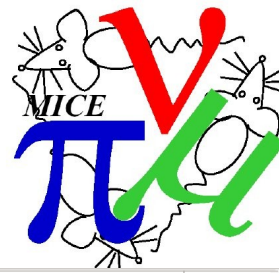
Document/Paper in Waiting

Now at Version 11



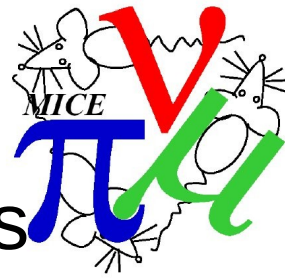
- Purpose and Requirements
- Radiation Shield
- Design
 - Detectors
 - Hardware
- Electronics chain
 - Pre-amplifiers
 - Amplifiers
 - Cabling
 - Signals and Readout
- Positioning of system
 - Magnetic field considerations
 - Cabling
 - Racks and Control room
- Time-line
- Outstanding Questions
- Conclusions

Timeline



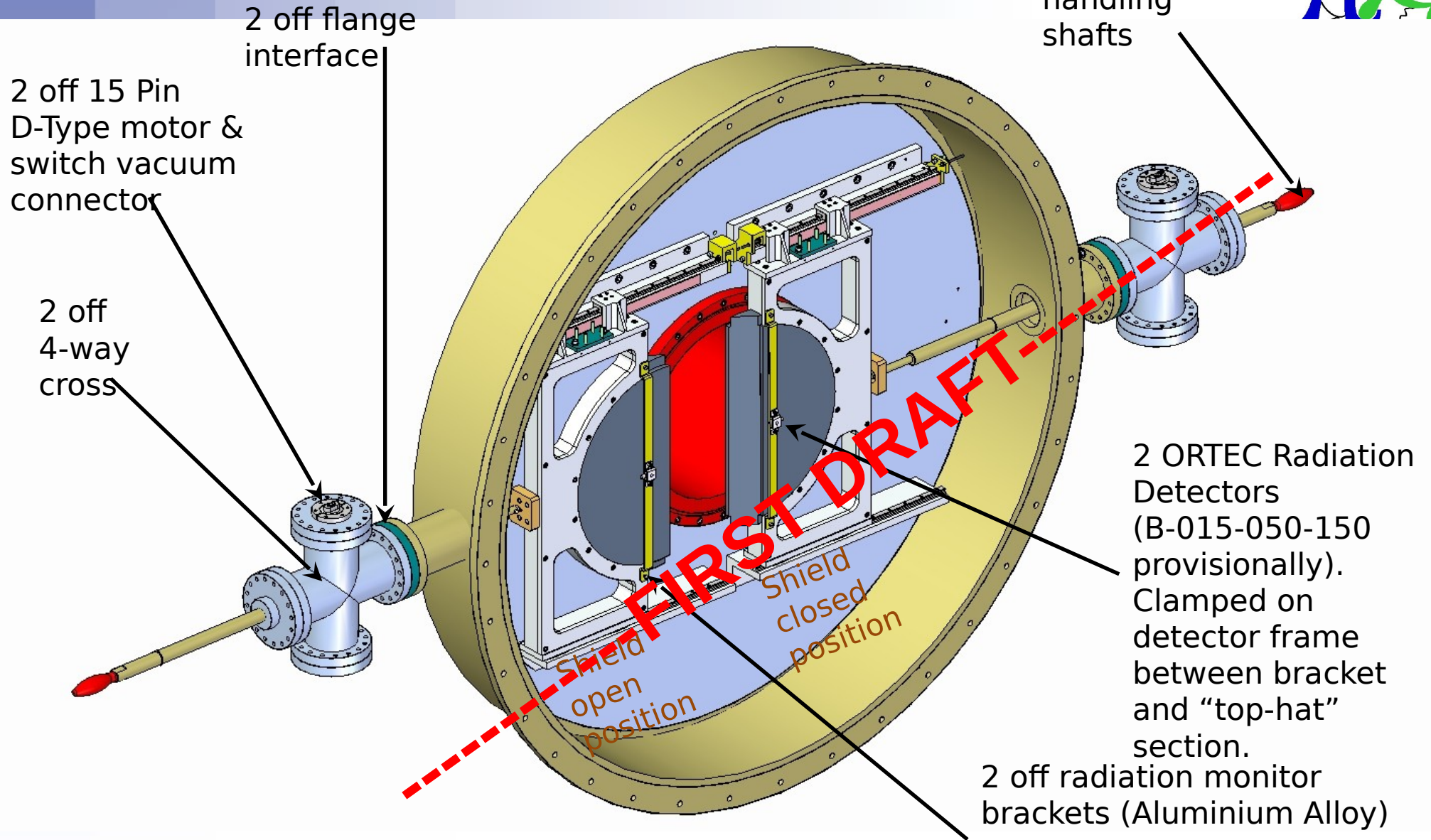
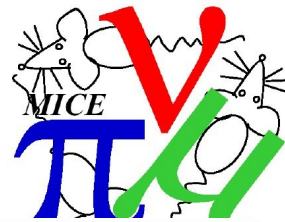
On target so far
 Schedule has enough contingency
 Work to be completed far before appearing on the critical path

System Design

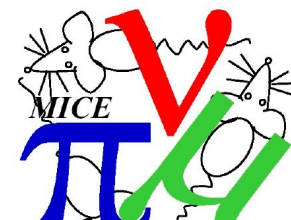


- It will monitor x-rays, gamma-rays and electrons of a few MeV.
 - The maximum energy that an electron/photon can get is 8 MeV (all 8 RF cavities (1 MeV per RF cavity) when no middle absorber is there), therefore, it is likely that the spectrum will peak at very low energies.
- Timing resolution in the order of 50ns it turns out with our chosen thin detectors, so they will give us the rise time depending on our subsequent electronics chain.
- I think we should go back to the original thick and thin double layer design as thickness of the detector is related to particle energy and efficiency, and we will need both.

Positioning - Norbert



Positioning - Norbert



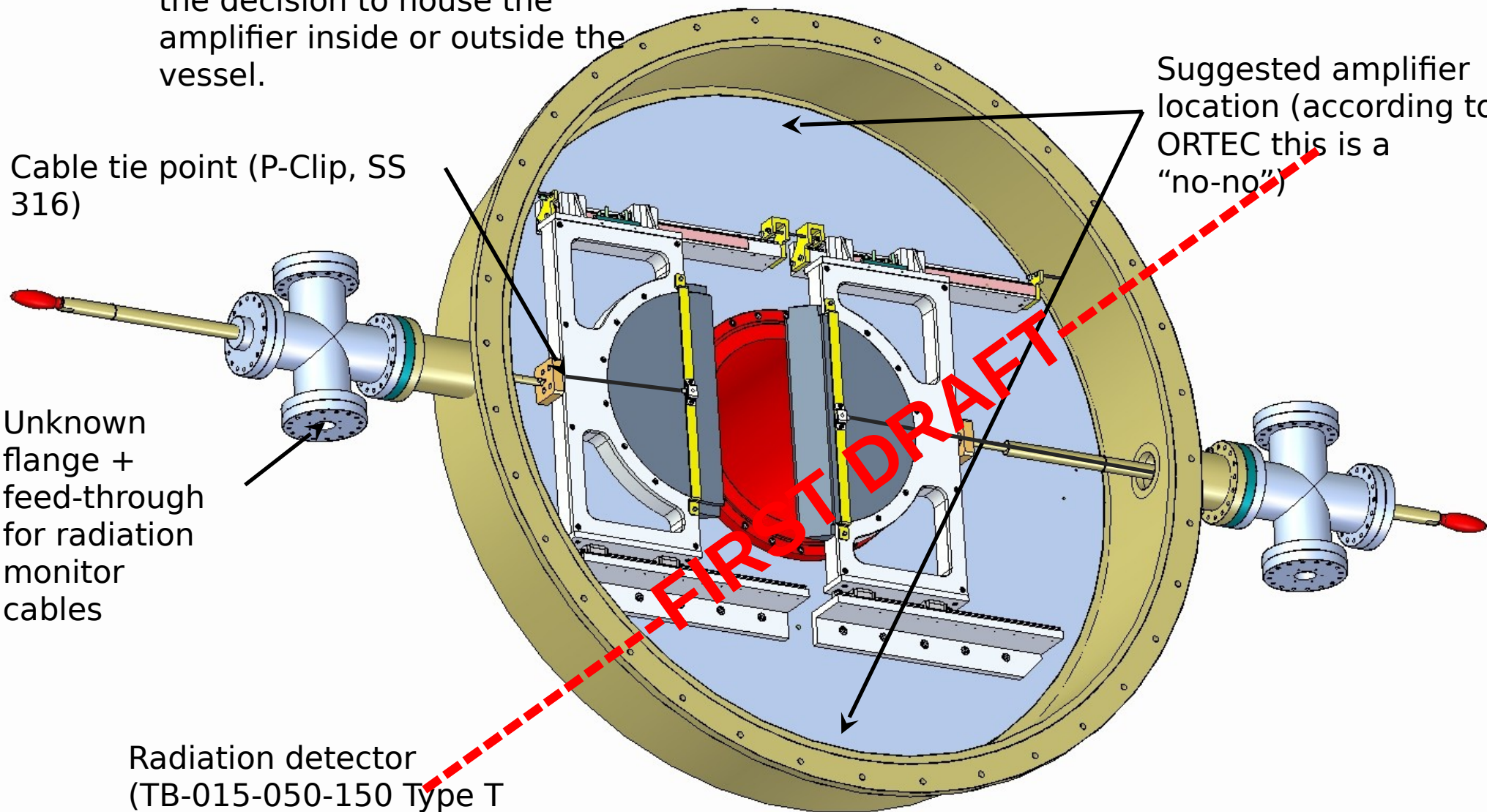
Some components depend on the decision to house the amplifier inside or outside the vessel.

Cable tie point (P-Clip, SS 316)

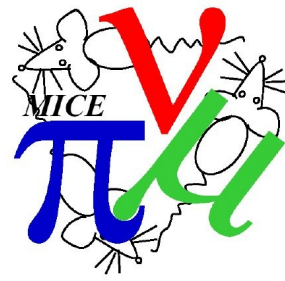
Unknown flange + feed-through for radiation monitor cables

Suggested amplifier location (according to ORTEC this is a "no-no")

Radiation detector (TB-015-050-150 Type T shown)



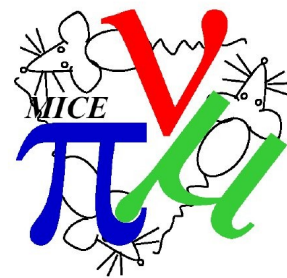
Costings



Thin Detector	Availability (days)	Cost (£)
B-015-050-150	21	863
Thick Detector		
A-026-450-2000	120	9257
B-026-450-2000	120	9765
A-022-300-2000	21	6512
B-023-300-2000	80	7224

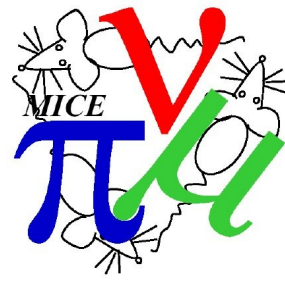
Table 1: Cost and availability of the different detectors.

Need to add costs of other components when available



Simulations

- Chris will be showing more.
- Lots of work understanding our RF has already been done by MuCOOL
- Some results can be found via http://www.fnal.gov/projects/muon_collider/cool/rf_results.html
- Another great paper: J. Norem et al, Dark Current, Breakdown and magnetic field effects in a multicell, 805Hz cavity



I think we are in good shape if we continue at this rate...