Near Detector WBS and costing

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Paul Soler

University of Glasgow

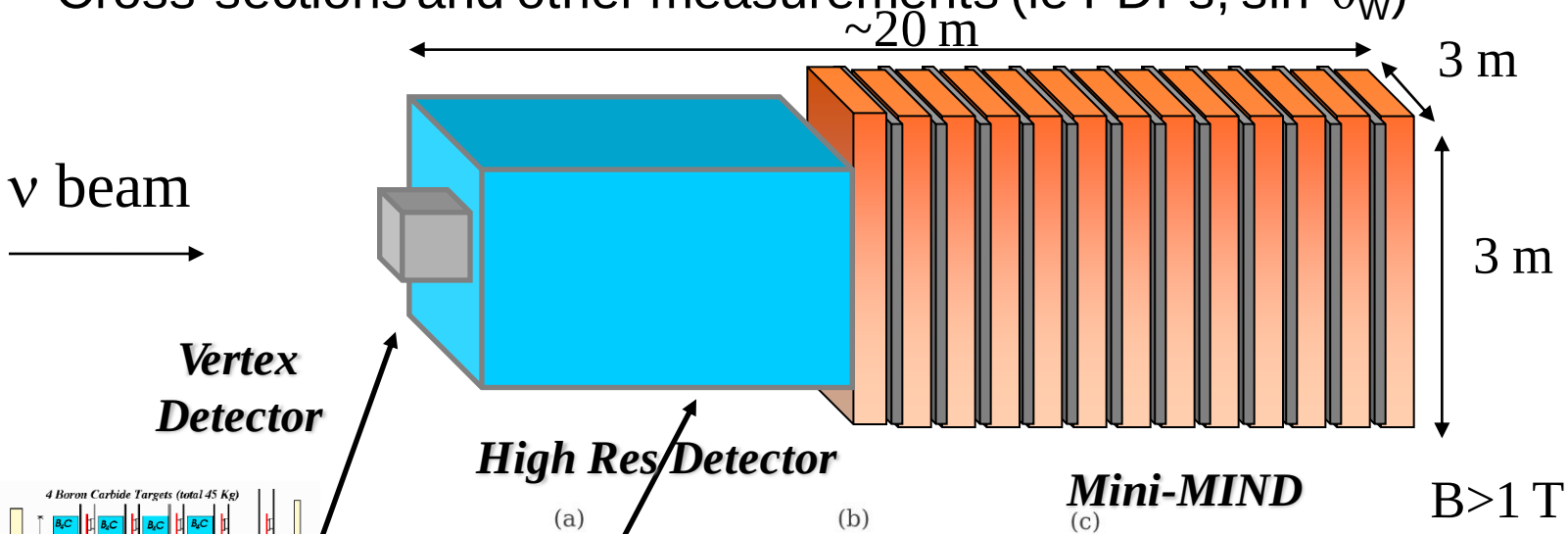
MIND WBS

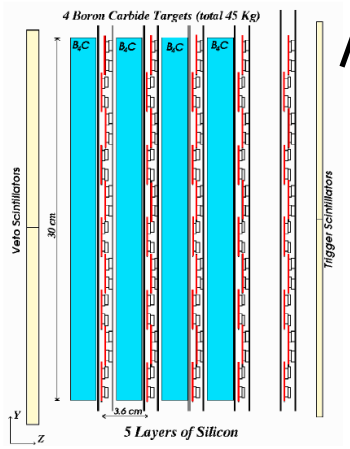
- Work Breakdown Structure
  - Work Breakdown Structure is a management tool to split work into its necessary components to aid project management and costing
  - MINOS and NOvA provide useful examples of WBS for future detectors
  - This is the first attempt at a WBS for MIND, based on MINOS
  - Need similar structure for near detectors

2.2.	Intermediate baseline detector (MIND 100 kton)	Cost (%)
2.2.1.	Detector R&D	0.3
2.2.2.	Underground cavern	22.0
2.2.3.	Steel plate fabrication	38.7
2.2.4.	Magnet coil	0.2
2.2.5.	Scintillator detector fabrication	30.9
2.2.6.	Electronics, DAQ and database	6.1
2.2.7.	Detector installation	1.5
2.2.8.	Project management	0.3

Near Detectors

- Near detector for a Neutrino Factory:
  - Neutrino flux (<1% precision) and extrapolation to far detector
  - Charm production (main background) and taus for Non Standard Interactions (NSI) searches
  - Cross-sections and other measurements (ie PDFs, $\sin^2\theta_W$)





4 near detectors at Neutrino Factory (one per straight)

Near Detector WBS

- First attempt at Work Breakdown Structure for near detector

2.1.	Near Detector	Cost (%)
2.1.1.	Mini-MIND	10.1
2.1.2.	High resolution tracker	41.9
2.1.3.	Silicon vertex	28.5
2.1.4.	Computing	5.0
2.1.5.	Installation	10.3
2.1.6.	Project management	4.3

Near Detector WBS

- Work Breakdown Structure

2.1.1.	**Mini-MIND**
2.1.1.1.	Steel plane fabrication MIND
2.1.1.2.	Scintillator MIND
2.1.1.3.	Fibre MIND
2.1.1.3.	SIPM MIND
2.1.2.1.	Electronics MIND
2.1.2.2.	Coil Mind
2.1.2.	**High resolution tracker**
2.1.2.1.	Scintillator HighRes
2.1.2.2.	Fibre HighRes
2.1.2.3.	SiPM HighRes
2.1.2.4.	Electronics HighRes
2.1.2.5.	Coil

Near Detector WBS

- Work Breakdown Structure

2.1.3.	**Silicon vertex**
2.1.3.1.	Silicon
2.1.3.2.	Silicon electronics
2.1.4.	**Computing**
2.1.4.1.	Central system and trigger farm
2.1.4.2.	Data acquisition
2.1.4.3.	Database
2.1.5.	**Installation**
2.1.5.1.	Infrastructure
2.1.5.2.	Materials receiving and handling
2.1.5.3.	Detector assembly
2.1.5.4.	Alignment and survey
2.1.6.	**Project management**

Conclusions

- First attempt at a work breakdown structure for near detector based on MINOS and MIND.
- A lot of the assumptions come from MIND engineering, which is well advanced: iron, scintillator, photon detectors (SiPM) costs come from MIND estimates
- Near detector has more components but much smaller so costs are smaller but WBS more complicated
- Of course we will need four detectors at the baseline neutrino factory