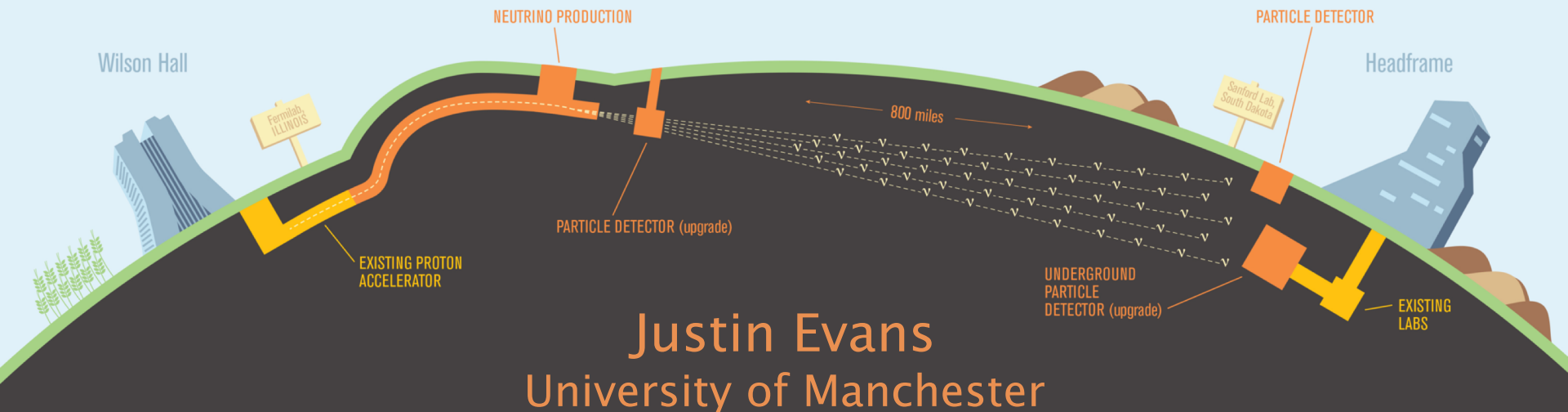


Work-package 3 APA production



Scope

SBND APA and HV feedthrough (also CPA, but that's delivered)

- SBN commissioning is not part of our scope

Building a 7th protoDUNE APA at the moment

Possibly 1 or 2 APAs for integration tests at CERN

- Ash River integration tests will likely be with bare frames, so probably easiest to make those in the US

Then 150 APAs

The WBS structure

- 3.0: Management
- 3.1: APA mechanics
- 3.2: Electrical components
- 3.3: Factory setup
- 3.4: Factory operations
- 3.5: APA shipping
- 3.6: Integration

Schedule

Proposed UK schedule

- APA production begins in June 2020

Consortium schedule

- Integration tests happen in 2020
- APA production begins in 2021

Things we're waiting on

Cold-Electronics Consortium

- At what point can we define all the interfaces between cold electronics and APAs in order to go ahead with frame procurement

Photon-Detector Consortium

- This is primarily a question of finalizing the cabling requirements

Integration tests

- Some number of APAs (2?) will be tested in the cold box at CERN
- We may then put three new APAs into the protoDUNE cryostat
- There will also be full-height integration tests at Ash River, probably involving uninstrumented frames

To what extent do we have to wait for all this to be completed before we can start production?

The next year

Complete SBND wiring and decommission winder

Factory

- Complete factory setup
- Commission new winding head
- Begin construction of additional winders

Frames

- Finalize design
- Find suppliers
- Design shipping box

PCBs

- Finalise electronic tension testing system
- Finalize PCB design
- Find PCBs suppliers
- Define PCB testing procedures and begin test-stand setup

Factory setup

Progressing well

- Alan Grant is overseeing this
- What estates work is remaining?

Winding machines

New winding head is now being commissioned and is looking good

- What still needs to be done?

New winding head will probably not be ready for APA 7

- But could be used for an integration-test APA

Timescale for starting procurement on the three new machines?

Automation code

- What improvements can be made? Can we make it more robust and easier to roll out to new winding sites?

Frames

Schedule – when can we finalise the frame design?

Begin the procurement process

- What is the procedure for obtaining lists of vendors?
- We need well-documented QC procedures and requirements before going to vendors

Would like to obtain three(?) vendor-qualification frames over the next year

Mesh panels

- Design work remaining?
- When to start procurement?

Jigs

What jigs need design work?

- e.g. comb application, board epoxy jigs, etc

Shipping

- What work needs to be done on the design of the shipping box?

Boards

Tension measurement

- Can we finalise the electrical tension-measurement system?
- Note that the new winding head allows measurement of the tension as the wire is laid – this needs to be coded into the winder software

PCB design

- This is mainly being done by PSL and requires the frame design to be finalized

PCB testing

- We should begin by locating the space at each institute where this testing work can happen
- The exact testing procedure is waiting for the final board designs, but we can likely go ahead and start purchasing equipment
- There is design work to be done for the metrology, particularly making the mechanical tolerance measurement methods less time-consuming

QA

Defining the QA requirements and processes will be ongoing over the next couple of years

The immediate priority is for the frames

- We need to have a set of QA procedures and requirements written down before we place procurement contracts

I would like to see an electronic system of travelers, QA documentation, etc, that can be rolled out to other sites

- iPads and QR codes are the modern way of doing this

Meetings

Bi-weekly phone meeting

- Focused management meetings in which each WBS element reports progress, problems and plans

Meet in person every three months

There is likely to be an APA 60% design review in January; likely at Daresbury

We will have to report to the STFC Oversight Committee every six months

Oversight Committee Actions

The Collaboration should re-baseline the schedule and submit as soon as possible (before the Construction PPRP proposal). This should include links to the construction phase and the international timeline and commentary on the changes to the current schedule.

- This is referring primarily to the pre-production project, including the SBND APA wiring

The Collaboration should include a Lessons Learnt section from the APA construction and what changes have been made to the QA/QC procedures in the Progress Report for the next OsC meeting. This should also be included in the Pre-construction Close-Out Report at the end of the Pre-construction project.

- This is primarily referring to the construction of the SBND APA frames

The Collaboration should provide a report for the next OsC meeting on the specification of wire tensions and how they will be measured and monitored through production and installation.

The Collaboration should provide a note at the next OsC meeting on WA required for the production of the 3rd APA