# DUNE UK
## Expressions of Interest for R&D Projects
## Project Planning

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13th April 2018

# Aims

- Agreement on the tasks – See Giles' talk
- Add to the list responsible people for each task, (and modify the tasks?)
  - Enough effort to do the job
- A plan to move forward in discussions and planning very rapidly
- Add detail to existing project plan and start using it to track project.
  - Following slides summarize tasks
    - Only UK institutes considered. Will involve collaboration with international partners
    - Have add groups and leadership based on current information, not definitive – the point of this discussion!

# A: DPM

- Institutes: Oxford (+SLAC)  (+ ?)
  - Leadership: Abi, Barr
  - Effort: Babak Abi (60%), Roy Wastie (50%), Peter Hastings (50%)
- 2 week deliverable: Schedule and task-list for testing.
- 6 month deliverable: DPM boards
- Sub-tasks
  - Complete DPM PCB development
  - Deliver tested modules
  - Develop firmware for RAM and NVM management
- Comments
  - Involve other group(s) in firmware and testing?
  - Hardware currently on track ( est. delivery Sept )

# B: Vertical Slice Test Hardware (DPM Carrier)

- Institutes: Birmingham, UCL, Oxford, RAL, Bristol
  - Input from SLAC
  - Leadership: Watson(Staley?), Cussans
  - Effort: UCL Engineer(50%), Kostas Manolopoulos (firmware engineer), Babak Abi, Cussans(20%) then new Bristol PostDoc
- 2 week deliverable: Investigate feasibility of team working and schedule. Specify hardware and tasks for vertical slice test.
- 3 month deliverable: Schematics and design review, initial PCB layout.
- 6 month deliverable: DPM Carrier, infrastructure firmware.
- 12 month deliverable: Demonstration of protoDUNE readout with DPM carrier(vertical slice-test of front-end hardware).
- Sub-tasks
  - Infrastructure firmware, software
  - Separate daughter-board for optics to WIB (?)
- Comments
  - Schedule is **extremely** tight

# C: Trigger Primitive Extraction and Data Compression

- Institutes: Sussex, Bristol, Oxford, Edinburgh,RAL,UCL
  - (UK) Leadership: Peeters
  - Effort: A.Booth(Sussex),+others(Sussex), Miquel Nibot(50%,Edinburgh), Bristol PostDoc(when recruited), UCL PostDoc, Kostas Manolopoulos(RAL), Phil Rodrigues(Oxford,20%), C. Shepherd-T
- 3 month deliverable: Initial studies (FPGA,GPU,CPU)
- 6 month deliverable: Trigger primitive definition, and rates from simulation studies. Compression algorithms in FPGA.
- 12 month deliverable:
  - Compare implementations in FPGA, GPU and CPU
- 18 month deliverable:
  - Implementation in vertical slice-test (either FPGA or GPU/CPU, as selected at 12 months)
- Comments
  - Overall leadership Klein (Penn)
  - Compression in collaboration with SLAC

# D: Data Flow

- Institutes: Oxford, RAL,  ?
  - (UK) Leadership: Barr
  - Effort: P.Rodrigues(50%,started), G.Barr(20%,started), Sankey, Shepherd-T, Harder, Dopke, Manolopoulos, Wilson
- Immediate Tasks: Initial network tests, plan “escalator” work, build team with Felix.
- 6 month deliverable: Design of FE dataflow architecture, first performance tests.
- 12 month deliverable: Vertical slice data-flow demonstrator operating for protoDUNE readout.
- Sub-tasks
  - Architecture
  - Low-level data-flow software
  - Test of I/O protocols and system performance
- Comments
  - UK may not be the primary group

# E: Photon Detector Trigger

- Institutes: Warwick, Edinburgh, UCL
  - Leadership: Haigh
  - Effort: J.Haigh(50%,ramp from protoDUNE), F.Muheim(20%) +Student, UCL PostDoc effort
- 6 month deliverable: Primitive definition, trigger capability from simulation
- 12 month deliverable: Demonstration of PD trigger extraction in hardware
- Comments
  - Depends on output of firmware and software from front-end data flow and trigger primitive groups
  - Needs tight integration with international groups
    - already present

# Next Steps

- Have been asked for UK DAQ plans
  - Time-scale next week (!)
    - … at very least by May collaboration meeting
- Don’t have sufficient effort currently deployed to get things done in time
  - → Increase the effort , modify planning.
- Need to demonstrate that we are spending funds wisely.
  - STFC gets ever more enthusiastic about “Project Management”
    - Make a plan that is useful to guiding the project.

# Mappings to Georgia's list

(https://docs.google.com/spreadsheets/d/1k-T8uItywyvo9oPI-mHtLKzKsyrXnTigXeIunzXe4tY/edit#gid=0)

| | Our description | Georgia's list | |
|---|---|---|---|
| A | DPM | 9 | Set up, maintain a representative vertical slice of the lower-level DAQ system: WIB to RCE+FELIX |
| B | VS DPM-carrier | 9 | Set up, maintain a representative vertical slice of the lower-level DAQ system: WIB to RCE+FELIX |
| C | Trigger primitive extraction | 32 | SP TPC simulation: Further develop trigger algorithms, including optimization for low-energy, robustness against radiologicals, noise |
| D | Data flow | 13 | Set up, maintain a representative vertical slice of the higher-level DAQ system - CPU solution (could be with fake data inputs) |
| E | PD trigger | 36 | SP PD simulation: Develop trigger primitive algorithms |