Dual Phase Photon Detection System Consortium Status

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Technical Board Meeting

14 September 2017

Activities of the DPPD Consortium

- Technical Lead in place ✓
  - Dominique Duchesneau (LAPP)
- Discussion with each institution representative about interests and possible contributions ✓
- Mailing lists activated ✓
- Weekly consortium meetings (Thursday 9:00 CDT) ✓
  - 3 Consortium Meetings so far (open to all members) (https://indico.fnal.gov/categoryDisplay.py?categId=699)
  - Technical presentations are foreseen about the current protoDUNE-DP system including 3x1x1 light data and expertise/infrastructures available in consortium institutions

Activities ongoing

- List of deliverables updated ✓
  - Overlap of deliverables between consortia to be addressed ✘
- Draft of WBS ready ✓
- Working groups structure decided ✓
- Starting discussions about WG convenors and members ~
- Organization of activities by each WG for TDR ✘
- Definition of institutional responsibilities (understood as “aspirational” responsibilities) ~
  - Small Consortium
  - Important to identify quickly the uncover items needed for the TDR

DPPD Deliverables

Excel file in DPPD Consortium Indico Webpage

task	Description	Responsioble Institute
1	***Dual Phase Photon Detection System***	
1.1	Photo-Sensor	
1.1.1	PMT Procurement	
1.1.1.1	Selection	
1.1.1.2	Procurement	
1.1.2	Voltage dividers	
1.1.2.1	Design	
1.1.2.2	Fabrication	
1.1.2.3	Testing	
1.1.3	PMT Characterization and Documentation	
1.1.3.1	PMT characterization	
1.1.3.2	Database	
1.1.4	Wavelength shifter (Baseline: TPC coating)	
1.1.5	R&D on alternatives to PMTs (SiPM array)	
1.1.6	Light collection optimisation (reflector, winston cones...)	
1.2	Mechanics	
1.2.1	PMT holders	
1.2.1.1	Design	
1.2.1.2	Fabrication	
1.2.1.3	Testing	
1.2.2	Assembly of the system	
1.2.2.1	Design	
1.2.2.2	Fabrication	
1.2.2.3	Assembly	
1.2.3	Mechanical interfaces with the cryostat	
1.2.4	Cable supporting structures	
1.2.4.1	Design Cable Support Structures	
1.2.4.2	Procure/Fabricate Cable Support Structures	

DPPD Deliverables

1.3	Electronics
1.3.1	Readout electronics
1.3.1.1	Design
1.3.1.2	Production
1.3.1.3	Testing
1.3.1.4	Firmware development and programming
1.3.1.5	Integration with DAQ
1.3.2	Trigger strategy
1.3.2.1	Design
1.3.2.2	Fabrication
1.3.3	Cold/warm cables
1.3.3.1	Cold cables
1.3.3.1.1	Selection/validation
1.3.3.3.1.2	Fabrication/procurement
1.3.3.3.1.3	Testing
1.3.3.2	Warm HV cables
1.3.3.2.1	Selection/validation
1.3.3.2.2	Fabrication/procurement
1.3.3.2.3	Testing
1.3.3.3	Warm signal cables
1.3.3.3.1	Selection/validation
1.3.3.3.2	Fabrication/procurement
1.3.3.3.3	Testing
1.3.4	HV power supplies
1.3.4.1	Selection/validation
1.3.4.2	Procurement
1.3.4.3	Testing
1.3.5	HV/signal splitters
1.3.5.1	Design
1.3.5.2	Fabrication
1.3.5.3	Testing

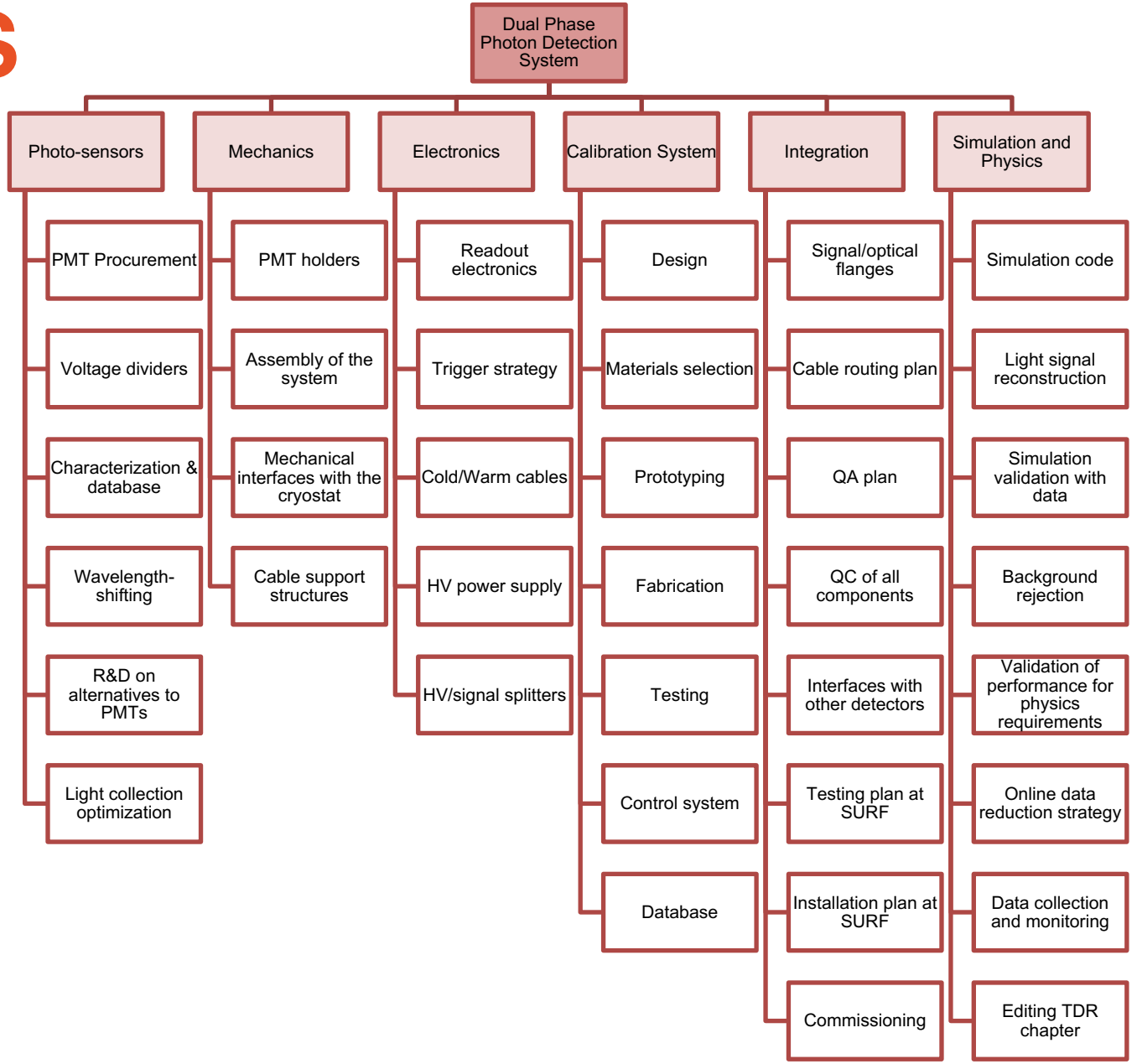
DPPD Deliverables

1.4	Calibration system
1.4.1	Design
1.4.2	Material selection
1.4.3	Prototyping
1.4.4	Fabrication
1.4.5	Testing
1.4.6	Control system
1.4.7	Database
1.5	Integration
1.5.1	Signal/optical flanges
1.5.1.1	Design Flanges
1.5.1.2	Procure/Fabricate Flange
1.5.2	Cable routing plan
1.5.2.1	Develop the routing
1.5.2.4	Develop Plan for connecting cables to feed-throughs
1.5.2.5	Install cables to feed-throughs (SURF)
1.5.3	QA plan
1.5.3.1	Material Selection/Characterization
1.5.3.2	Aging tests for material coatings
1.5.4	QA/QC of all components
	Database
1.5.5	Interfaces with other detectors
1.5.6	Testing plan at SURF
1.5.7	Installation at SURF
1.5.8	Commissioning

1.6	Simulation and Physics
1.6.1	Simulation code
1.6.1.1	Implementation of Geometry
1.6.1.2	Validate Material Optical Properties
1.6.1.3	Simulation of light formation in liquid and gas argon
1.6.1.5	Light propagation ad Detector Response
1.6.2	Light signal reconstruction
1.6.3	Validate light simulation with experimental data
1.6.4	Background rejection
1.6.5	Validation of performance for physics requirements
1.6.6	Online data reduction strategy
1.6.7	Data collection and monitoring
1.6.8	Editing of TDR chapter

WBS

14/09/17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Working groups proposal

- 6 Working Groups identified:

  WG1: Photo-sensors → link with SP Photon Detection Consortium

  WG2: Mechanics

  WG3: Electronics → link with DAQ and DP TPC Electronics Consortia

  WG4: Calibration → link with Calibration Task Force

  WG5: Integration

  WG6: Simulation & Physics → link with SNB/LE & Nucleon Decay & Radiopurity & DUNE Reco & SP-Photon WGs

- Need to identify WG convenors (and people interested in joining each WG)

Links with other consortia

- We would like to work in close collaboration with the **Single Phase Photon Detection Consortia** because:
  - We need to perform the same simulation and physics studies for the TDR to understand the performance of the system
    - Both consortia need to answer essentially the same questions
    - Most of the simulation code should be common
  - We need to explore other possible technical solutions beyond our baseline
    - R&D collaboration and expertise exchange between institutions in both consortia
  - Many issues (not all of them) are common and we need to maximize the efficiency considering the tight schedule
- Need to interact with **DP TPC Electronics** and **DAQ** Consortia to identify overlaps and interfaces (also with Slow Control and others)
  - Dave Newbold already contacted us (thanks!)