

# DAQ Consortium Status

Dave Newbold

Tech Board, 14-Sep-17



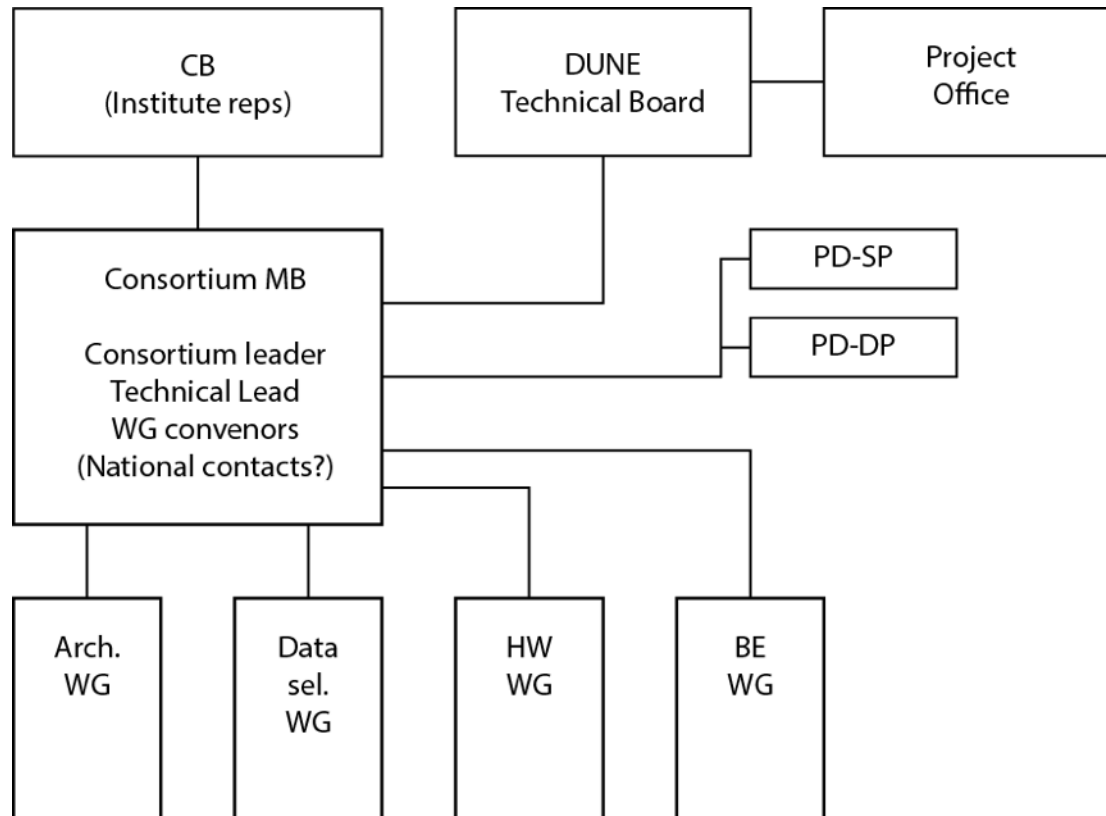
# Today's Meeting

- First of our regular whole-consortium meetings
  - ▶ Complementing the working meetings of the WGs
- Goals
  - ▶ Keep everyone up to speed with consortium activities and organisation
  - ▶ Introduce the routes for practical participation in the WGs
- Agenda
  - ▶ Introduction and Status: Dave Newbold
  - ▶ Technical overview: Georgia Karagiorgi
  - ▶ Architecture WG: Giles Barr
  - ▶ Hardware WG: David Cussans
  - ▶ Back-end WG: Kurt Biery
  - ▶ Data selection WG: Josh Klein

# Consortium Charge and Scope

- Plan and execute the construction, installation, and commissioning of the far detector subsystems
  - ▶ Provisional set of responsibilities ... among the participating institutions, accounting for realistically available resources
  - ▶ Breakdown of consortium deliverables and responsibilities ... milestone-driven schedule
  - ▶ Technical designs for the subsystem as required for moving from ProtoDUNE to the far detector
  - ▶ Scientific support for simulation / analysis activities necessary for producing the Technical Design Reports
- What does 'DAQ' mean?
  - ▶ Clearly, there are elements of 'DAQ' in some other consortia
  - ▶ Establishing the boundaries is a key early task

# Organisation



- WGs are of finite duration (up to TP), will be reworked when we have full picture of schedule and interests

# What's Happened so Far?

- Our action list from August
  - ▶ Agree consortium scope – DONE
  - ▶ Identify and appoint tech lead – DONE
  - ▶ Identify and appoint WG leaders (MB) – DONE (next slide)
  - ▶ Mailing lists, etc – DONE
  - ▶ Initial discussion with institutes – nearly done, apologies if we didn't see you yet
  - ▶ Begin monthly consortium meetings – DONE (next in October, see Georgia's talk)
  - ▶ First-pass project schedule – DONE, in early draft
  - ▶ First-pass responsibility matrix / WBS – not yet
  - ▶ Begin concrete working group activities – TODAY
- Upfront observations
  - ▶ We have no baseline DAQ design or schedule; this is our first task
  - ▶ Many participants are flexible in their long-term plans; good, but need to firm up

# Participation

- Almost 30 institutes in consortium – expect (require) number to grow
- Detailed discussions in progress over last weeks – thanks to all
  - ▶ Short-term plans
  - ▶ Longer-term (post-TDR) plans
  - ▶ Resources (capital, effort)
- We are asked to make initial breakdown of responsibilities
  - ▶ Yes, this is early and aspirational
  - ▶ Need to identify any major gaps in expertise / experience
  - ▶ Try to have this by end of October
  - ▶ National / group discussions are encouraged

	Institution	Contact
France	Institut de Physique Nucleaire de Lyon (IPNL)	Dario Autiero
Japan	National Institute of Technology Kure College	Seiji Kasai
Japan	Iwate University	Shinya Narita
Japan	KEK	Takuya Hasegawa
Netherlands	Nikhef	Paul de Jong
CERN	CERN	Iovanna Lehmann Miotto
United Kingdom	University of Birmingham	Alan Watson
United Kingdom	STFC Rutherford Appleton Laboratory	Alfons Weber
United Kingdom	Univ. of Warwick	Gary Barker
United Kingdom	University of Liverpool	Karol Hennessey
United Kingdom	University of Oxford	Giles Barr
United Kingdom	University of Sussex	Simon Peeters
United Kingdom	University of Bristol	David Newbold
United Kingdom	University College London	Ryan Nichol
United Kingdom	Edinburgh University	Franz Muhem
USA	Brookhaven National Lab	Brett Viren
USA	Columbia University	Georgia Karagiorgi
USA	Duke University	Kate Scholberg
USA	Fermi National Accelerator Lab	Kurt Biery
USA	Iowa State University	Amanda Weinstein
USA	University of California (Davis)	Bob Svoboda
USA	University of California (Irvine)	Micheal Smy
USA	University of Minnesota (Duluth)	Alec Habig
USA	Notre Dame University	John LoSecco
USA	Pacific Northwest National Lab	Eric Church
USA	University of Pennsylvania	Josh Klein
USA	SLAC National Acceleratory Laboratory	Mark Convery
USA	South Dakota School of Mines and Technology	Juergen Reichenbacher

Welcome to SAU-Colombia!

# TP and TDR

- Following a ‘European style’ approval process
  - RRB review -> Technical Proposal -> Technical Design Report -> EDRs
  - Assumptions about these documents can be made from (e.g.) LHC
- RRB review, incl. draft WBS / responsibilities matrix (due late October)
  - Plausibility assessment of consortium mission, organisation, schedule
- Technical Proposal (due ~18Q2)
  - Outline description of system design and possible options
  - Statement of outline system cost and schedule – plausibility proof
  - Description of remaining R&D / test programme (... protoDUNE)
- Technical Design Report (due ~19Q2)
  - Detailed technical description of system components
  - Concrete construction schedule and plan
  - Detailed appraisal of system cost, profiled, and with risk assessment
  - Institutional responsibilities and cost contributions
- We have some serious work to do in the coming 18 months

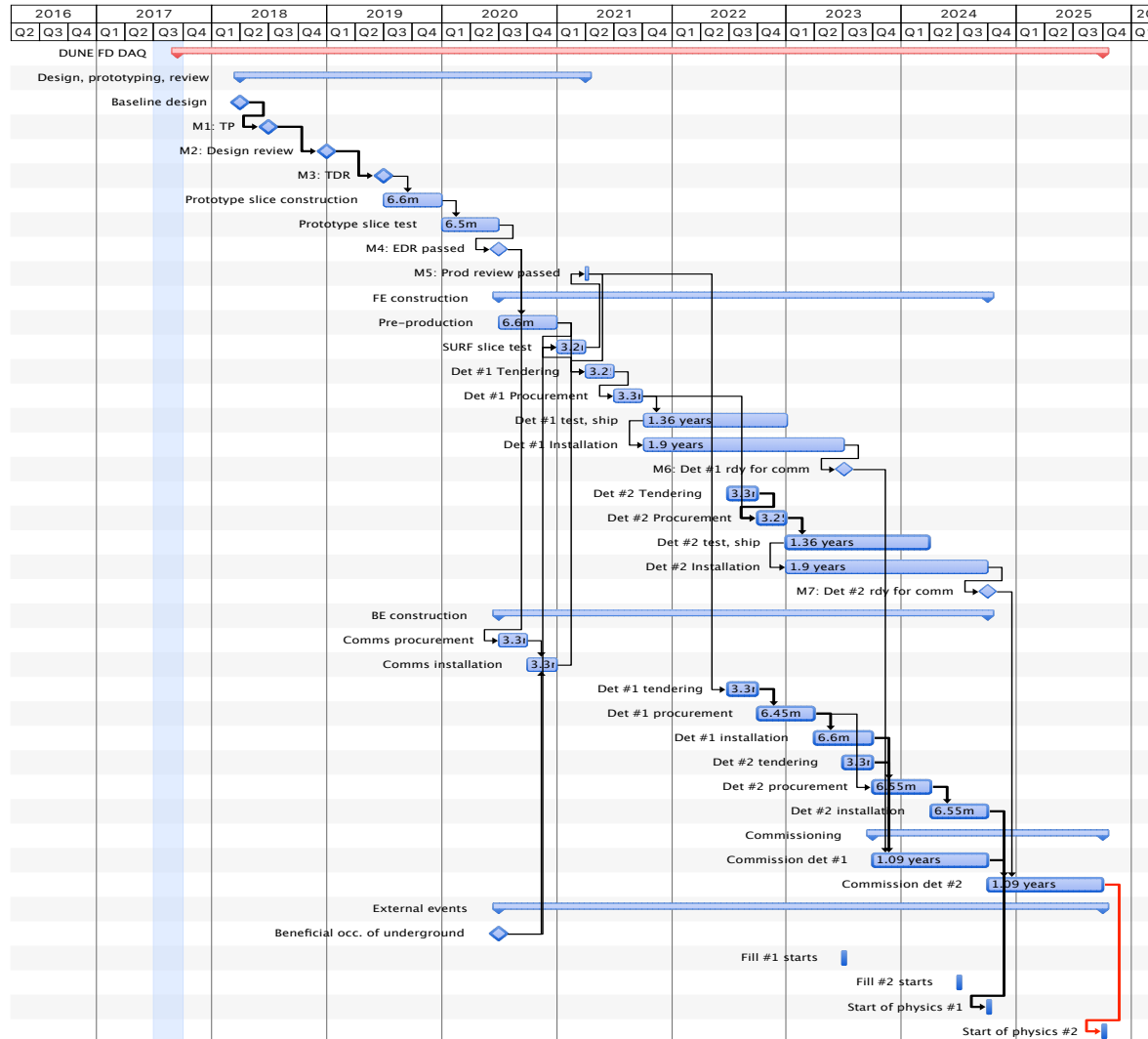
# Schedule up to TDR

- Top-level schedule (subject to further discussion)
  - ▶ 17Q4: First WBS and responsibilities matrix
  - ▶ 18Q1: Baseline design + options; system cost estimate
    - Ideally, generate a resource-loaded WBS at this point and challenge it
  - ▶ 18Q2: Technical Proposal, R&D plan
  - ▶ 18Q4: Internal review of DAQ design, begin TDR writing
    - Assignment of longer-term responsibilities at this time
  - ▶ 19Q2: TDR complete
- Will need a number of workshops as waypoints
  - ▶ 17Q4: DAQ design workshop, US
  - ▶ 18Q1: TP worktop, Europe
  - ▶ 18Q4: TDR workshop, TBD



# (Straw man) Schedule after TDR

CAVEAT EMPTOR: the details are definitely wrong in many respects



# Project Planning

- Four main project phases (as traditional)
  - ▶ Design and prototyping
  - ▶ Pre-production
    - Essential to stress-test {procurement, QA, installation} procedures in a large project
  - ▶ Production (overlapping for successive detectors)
  - ▶ Commissioning
- Milestones
  - ▶ M1: Technical proposal (i.e. baseline design + options) 18Q3
  - ▶ M2: Pre-TDR design review (confirm baseline based on PD data) 19Q1
  - ▶ M3: TDR 19Q3
  - ▶ M4: Engineering design review passed (20Q3)
  - ▶ M5: Production readiness review passed (21Q2)
  - ▶ M6, M7: detector #1, #2 ready for physics commissioning (23Q3, 24Q4)

# Draft WBS

1 Coordination	1.1 Cost, schedule, logistics, procurement 1.2 Change control, QA, QC, documentation 1.3 Integration and installation 1.4 Tests, commissioning and operations		
2 Physics and simulation	2.1 Parameters and requirements tracking 2.2 Data flow simulation and performance estimation 2.3 DAQ emulation 2.4 DQM tools and visualisation	6 Online software	5.5 Det #2 spec, procurement and testing 5.6 Det #2 installation and commissioning 5.7 Storage spec, procurement and testing 5.8 Storage installation and commissioning 5.9 Wide area network links
3 Readout hardware (det #1)	3.1 Hardware spec, design and prototyping 3.2 Hardware procurement / fabrication 3.3 Hardware test stands and testing 3.4 Underground data links and interfaces 3.5 Firmware tools and validation 3.6 Infrastructure firmware 3.7 Data handling firmware 3.8 Control software and monitoring 3.9 Installation and commissioning	7 RC and data management	6.1 Code and release management 6.2 Event builder and DAQ framework 6.3 Det #1 data format, decoding, emulation 6.4 Det #2 data format, decoding, emulation 6.5 DAQ monitoring and control 6.6 Emulation and test framework 6.7 Data selection framework 6.8 Data selection algorithms 6.9 Storage / transfer management and interface
4 Data transport	4.1 Protocol definition and implementation 4.2 Control software and monitoring 4.3 Det #1 spec, procurement and testing 4.4 Det #1 Installation and commissioning 4.5 Det #2 spec, procurement and testing 4.6 Det #2 Installation and commissioning	8 Trigger and timing	7.1 Run control, user interfaces 7.2 Bookkeeping, configuration control 7.3 Data management and WAN transfer 7.4 DQM / spy framework 8.1 Trigger algorithm development 8.2 GNSS / accelerator interface 8.3 Det #1 timing and trigger interface 8.4 Det #2 timing and trigger interface 8.5 Hardware design and prototyping 8.6 Hardware procurement and testing 8.7 Firmware design and implementation 8.8 Control software and monitoring
5 Computing system	5.1 System design and prototyping 5.2 System management and tools 5.3 Det #1 spec, procurement and testing 5.4 Det #1 installation and commissioning		

- Subject to review within working groups

- ▶ Part of WG charge is to populate the details of the task list
- ▶ We will soon need to estimate effort, link to schedule, assign some responsibilities

# Next Steps

- Top-down organisation
  - ▶ Continue discussions on responsibilities and contributions
  - ▶ Continue work towards resource loaded schedule and task list
- Working groups
  - ▶ Define detailed deliverables for coming weeks, begin work
  - ▶ Continue discussion of interfaces and boundaries
  - ▶ Populate the groups, begin discussions, start documentation!
- Institutes
  - ▶ Keep in touch! Georgia and I are always available for discussion
    - Please make sure everyone is signed up to the mailing lists(s)
  - ▶ Please try to attend first workshop (October 30th – 31st, details coming up)
  - ▶ Refine thoughts and plans on longer-term responsibilities
    - Where there are 'national' or 'group' interests, it would be good to have a clear picture early on

