OAK RIDGE National Laboratory

05/07/2025

LFHCAL 2025 TBeam Preparation

The LFHCAL DSC

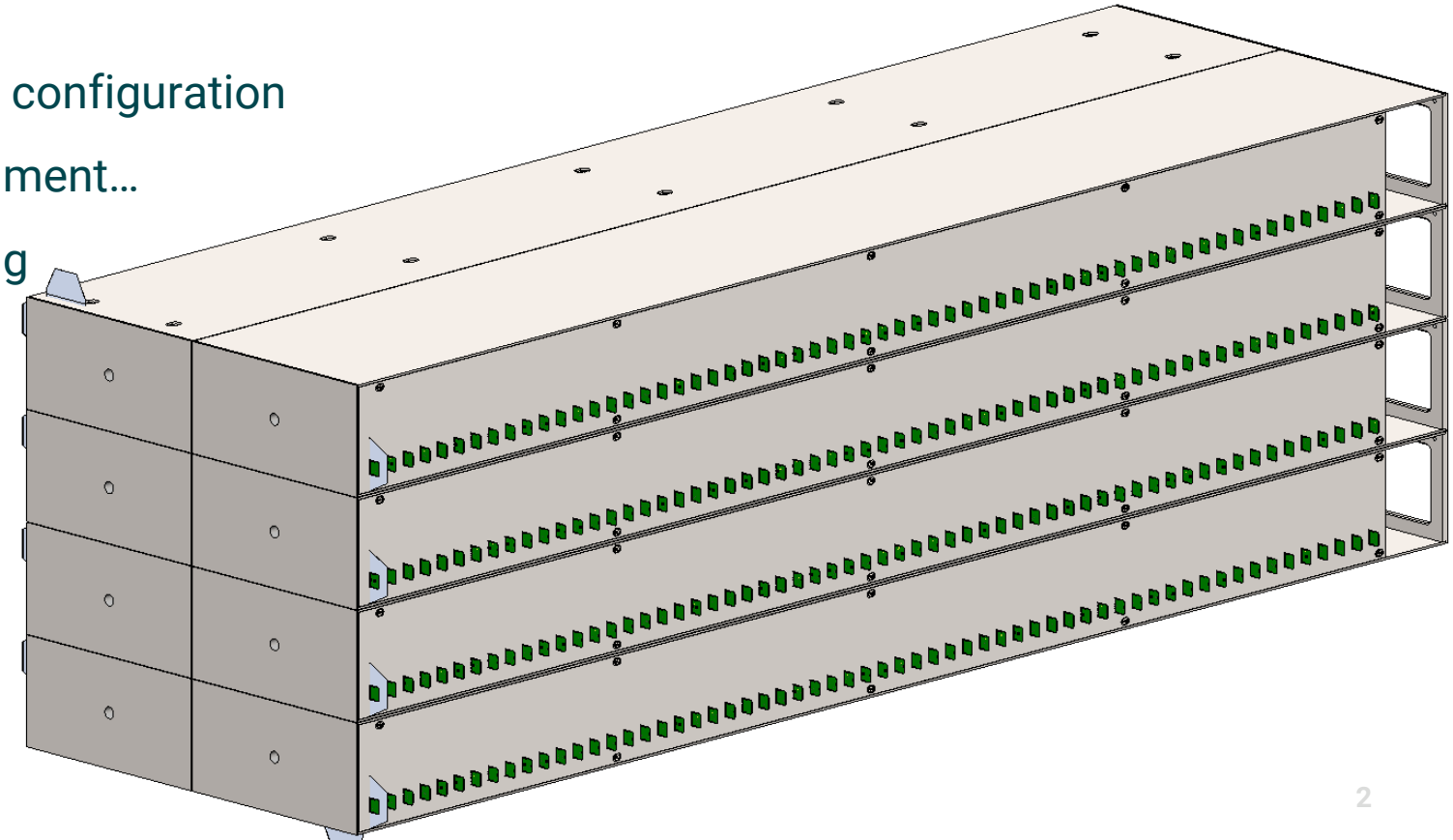
ORNL

U.S. DEPARTMENT OF ENERGY

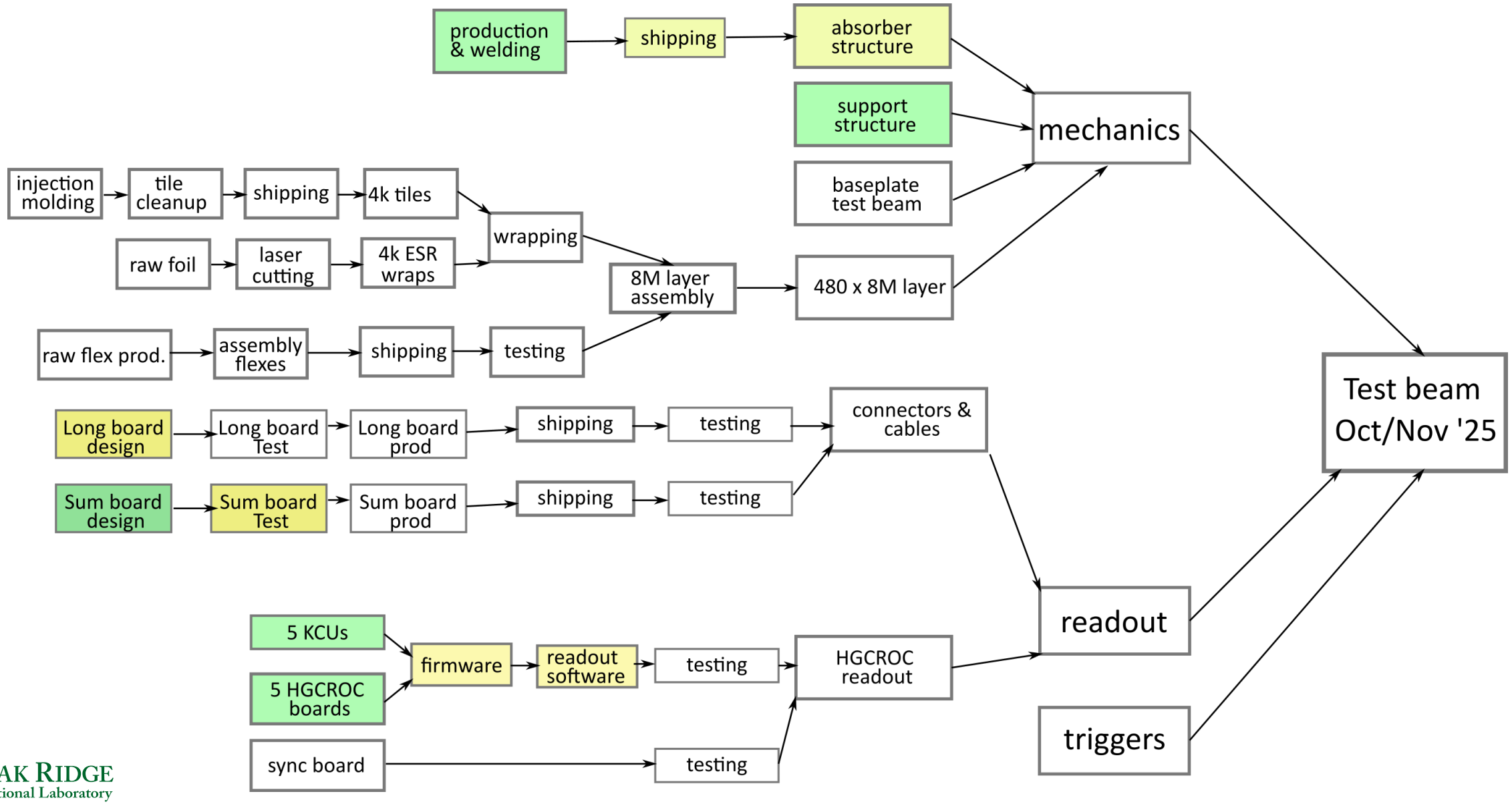
ORNL IS MANAGED BY UT-BATTELLE LLC
FOR THE US DEPARTMENT OF ENERGY

LFHCAL Testbeams 2025

- One week of CERN SPS: Oct 29th-Nov 5th
- One week of CERN PS: Nov 19th-26th
- 40cm x 40cm x 132cm prototype
    - 8x “8M” module stacked into square configuration
    - Approaching hadron shower containment…
- HGCROC readout with longitudinal summing
    - Very close to ePIC baseline

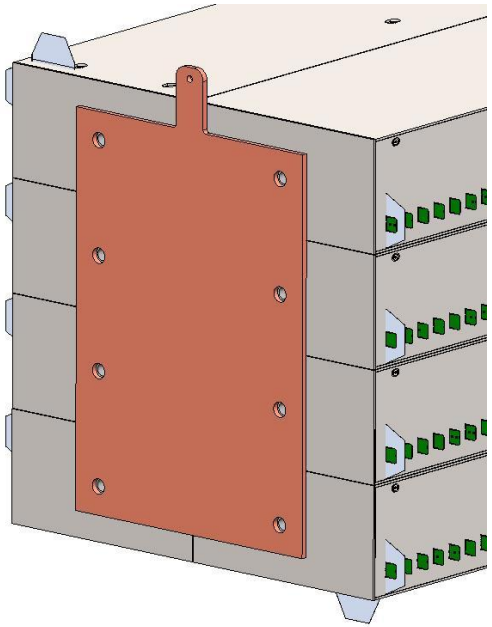


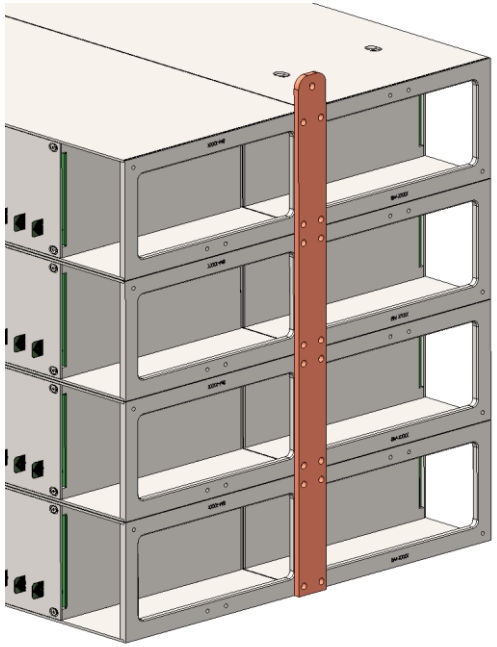
LFHCAL Testbeams 2025



Mechanics

- 5 absorber modules at ORNL
- 3 sent to Nickel plating
    - 1 plated
    - 1 damaged in transit (and fixed)
- Braces for mechanics/grounding available at ORNL



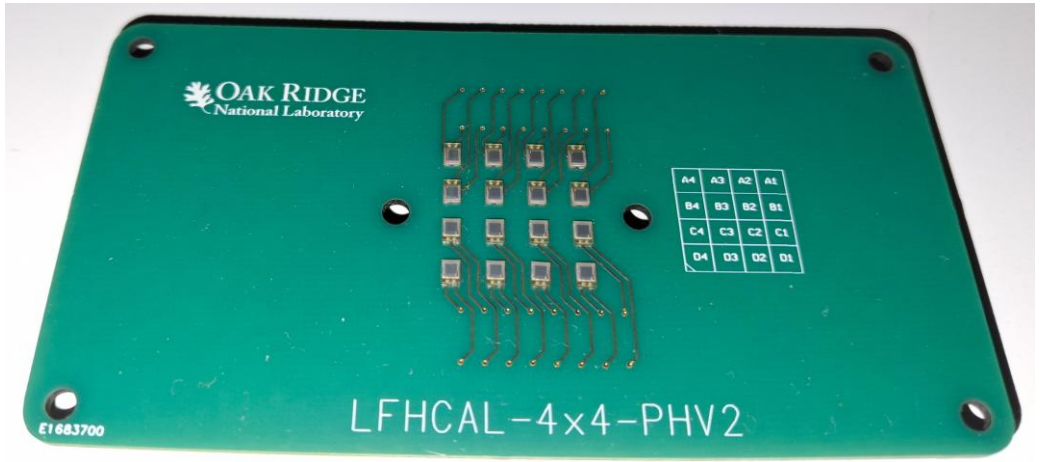


Scintillators + Flex PCBs

- FNAL will produce ~4000 new scintillator tiles
    - Will required new mold (for 4x production speed) - ~4wks
    - ~1wk production time
    - Waiting on PED money
- Need to order more ESR foil (have foil for 2000 tiles available)
- Sensors will arrive at BNL in June (according to Hamamatsu)
- New flex PCB layout is ready for production but not yet submitted
- Assembly of flex PCBs tbd:
    - Previously assembled in Hungary
    - tariffs? Assembly in US?

Electronics: Long Board + Summing Board

- First Long board design prepared for production
  - Not yet submitted, still discussing crosstalk measurements with previous boards
  - Specs close to ePIC: simplification of board end connectors
- Summing board
  - Sums 5/10 longitudinal segment sensors into single readout channel
  - Passive summing test board available (with switchable configuration)
  - SiPM test boards produced and available at ORNL – under test
  - Pre-produce 3 boards in June, retest
  - Full production of 10 summing boards in August



Electronics: HGCROC + triggers

- HGCROC boards exist, FPGA boards exist
- Same overall scale as 2024 beam time due to summing
- Active work on firmware, software, calibration routines
    - lots of experience from EEEMC + BIC beam times with HGCROC

- ORNL building our own set of plastic scintillator trigger fingers with SiPM readout
    - Thanks to

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