

# Strips L3 Meeting

## Feb 18, 2020

# HV Mux

- We have been moving to place this order
- Still waiting for official quote from Panasonic but we understand the cost is reduced by about \$343K
- Plan was to order through CERN but suddenly this option has vanished due to BNL legal issues.
- New approach is through RAL, we are waiting to hear from UK on this.
- US Barrel planning meeting 1/22, Bart reports that they are working with RAL procurement. There is a tendering process which is estimated to require 3 months from when it starts. We asked about “sole source”, impression that cost is too high for this in UK
- Concern also expressed about US assuming sensor costs not in MOU – PO?
- JK to meet with UK colleagues at Itk week and hopefully resolve
- Also see next slide (back burner for now)
- Meeting with UK concludes successful, STFC to pursue process, expect 2 mo?, US POC should be Dave Lynn, oversight by CH
- Still no quote?
- Report from JK who was at the meeting
- **No news**

# HV Mux continued: Vitaliy inquires about CERN market survey path

VF opinion: 1) This is possible, would take roughly 3 months.

2) This path is worth exploring/following, at least as a backup to the RAL-based purchase plan.

3) The CERN option is only viable if there is somebody in the US to push things along. The person (P) would need to interact with the CERN procurement about the survey documents, conclusion documents, etc.

Process: (Who is P? Dave Lynn or someone in the PO?)

1. P contacts CERN procurement and Thomas Koffas to let them know we want to follow the path of 1-step MS. And to get the templates for the documents to be written.
2. P drafts the Technical Questionnaire for the survey and the HV-mux specifications. This would need to be done with an angle of selecting the best company if there are multiple applicants.
3. CERN posts the MS documents for a month.
4. P summarizes the collected replies. (Bart indicated he expects only one.)
5. CERN prepares the Tendering documents. Some help/review from P may be expected.
6. CERN posts the Tendering documents for a month. (Might be a bit shorter.)
7. If there are negotiations, P helps CERN with that. Otherwise the contract gets signed.

# Coils

- New cost, similar to P6 but 15% Chinese tariff
- Ready to go, pending ATLAS Tech Rev office signoff **and approval of documentation drafted by Yale on QA/QC, by the strips modules group: APPROVED**
- Just learned that we are only down for 67%, so our cost is reduced by \$27K
- But Europeans do not want to pay tariff so Yale has determined that firm can ship direct to Europe their portion. We would not accept responsibility of QA/QC
- Europe has revised its order to a larger number of parts (~10K)
- Satish has now received quote from Wurth and they have responded positively to having 2 orders
- **Nominal 15 week lead time, we are requesting faster for 500(250) for PB's**
  - If not possible, coils may be come bottleneck for PB Prepro 1
  - Latest is that at least 200 should be on hand early
  - We still do not know whether coils will be critical path for Prepro 1
- **Have requested BNL xfer required funds to Yale: Funds are now at Yale**
- Satish has been very responsive and engaged in making this all happen
- **Module group requests presentation from Satish – completed 2/11/2020**
- **Still waiting for confirmation whether we will be able to get ~250 early for powerboard prepro – Satish verbally say it is OK**

# Power Boards Preproduction 250+750

- **For the 250:** Bottleneck are the coils (nominal is late May, want 250 by March). Ideally:
- mid Feb: finish PCB design and start PCB production (3 weeks)
- mid Mar: start SMD and ASIC loading, wire bonding (now at AMTECH) (4 weeks)
- mid Apr: receive boards at LBNL, all boards should be tested within 4 weeks
- **For the 750:** Bottleneck will be AMACs, assuming AMACs are available 1st of September, the plan would look at follows. (bPOL12V v5 was also unclear, but timing seems better than AMAC.)
- mid Jun: start PCB production (in theory now design changes needed) (4weeks)
- mid Jul: load SMDs, prepare for ASIC loading
- beg. Sep: load ASICs and wire bond (4 weeks)
- beg. Oct: start testing AT AMTECH (boards should start shipping 2 weeks after that)
- The whole production should be done by mid Nov.
- If AMAC late, so are HCC\* so the whole process slips
- These processes mesh with module/site qualification as outlined in BCP-28
- These dates and task ordering no longer correspond to what is in P6, need to update, cost neutral

# Foam Order

- Jeff has been in touch with Allcomp and they promised a quote by Jan 10. I have not heard from Jeff yet.
- Portion which is shipped to Europe may have import costs, these have not been included as far as I know. Will confirm.
- Latest communication is news the beginning of February
- No news as of this week
- Have activated a back channel to Allcomp, “quote is imminent”
- **Quote received, consistent with cost in P6, 2 year delivery**
- **Next step will be CD-3a spend approval and we place the order**
- **Need to understand export aspect for the part which goes to UK, EU, ask vendor what their experience/policy/cost are**
- **Export costs us? BCP?**

# Carbon Fiber

- Recently Jeff received a new price from Toray, much higher than what is in P6 (\$303 vs \$581 per sqm). We do not understand this. Jessica Aguilar (LBNL ME in Eric's team) is negotiating with Toray.
- Also, amount needed was too low in P6. UK portion was not properly accounted. (590 sqm vs 861 sqm)
- Unless Toray costs come down, differential is \$320K
- News is that quote was for 12" wide sheets but we actually need 6" which should be closer to \$303/sqm -> differential would be \$167K
- **Any news since last PO from Toray? NO (learned that we have also not received a new quote for Honeycomb from Ultracor. They are waiting for Toray...)**
- **Have modified P6 to reschedule the CF orders appropriately. Will nominally enter costs based upon the \$303 number until we learn otherwise in preparation for next BCP. Updated scrubbing report.**
- **Entire tape-facing-core chain should now be correctly updated or close**

# Bus tape

- Now have samples from 4 US sources and 1 CERN source
- **We think at least 3 sources look viable**
- ~~Plan would be to have a decision by Feb 14 FDR~~
- Plan would be to place preprod orders from at least 2 source
- Do not yet know cost impacts
- First co-cure test completed – After further checks and measurement on optical scanner, co-cured facing actually looks very good, distortion is 100 microns (over 1.4 m) (spec is 300 microns).
- An error was found in one of the tools which when corrected could only improve result.
- Plan to complete ~5 co-cure tests before FDR follow-up to demonstrate consistency
- UK has a new scheme to co-cure tapes in pairs, before singulation – yield issue? Test completed but distortion is still there.
- **FDR follow up now on Feb 26-27,**
- **Hope to have co-cure and tape selection results by then but additional cocure test slow**



# Bus tape continued

- **New tapes scanned from Pioneer (last vendor), length distortions look normal**
- **Sent Pioneer sample to UK for TDR evaluation, arrived, to measure this week, DC OK, some question about surface contamination on a few pads, investigate**
- **Wirebonding test completed on Pioneer, nominally OK**
- **Second constrained co-cure is being prepared, should happen this week, 2 more on deck, aimed at the next requested core**
- **Have shipped older 14 module free and co-cured tapes to BNL and UCSC for HV tap bonding test, any results??**
- **Across barrel, encap, EOS, hybrids, a large variety of Kapton materials and adhesives are in use**
- **Survey initiated of all these materials with radiation test data**
- **Nominally it appears that all candidate materials have been tested by someone – needs official confirmation**
- **In any case, batch testing during production has always been considered a part of the process**

# ASICs

- It has been about a month since Penn meeting
- Last week we asked Evelyn about rate of progress and was told that April submissions are still the plan.
  - However, she admitted that the error bar on the predicted submission date hasn't shrunk
  - Paul: "not ready to say that we won't make the April submission at this time"
- ASIC follow-up discussion now scheduled for Feb 7, 1700 CERN.
- Received new costs from GF and new dicing estimates (from CERN)
- Total effect on prepro+pro is \$492K for a 28% increase, need to plan BCP
- Similar to earlier estimate but now firm
- Itk week ASIC presentation - Paul says he is pleased with HCC progress, AMAC OK – seems submission schedule has now slipped 1 month to May, or end of May at 90% CL
- Faster GF turnaround means that ~1 month delay can be absorbed
- Plan for weekly updates and follow up meeting at time of March 10-11 scrub

					P6 Task		
<b>ABCStar Production</b>	Per item	Qty	Total	US Total	<b>RE310390M</b>	NEW US Total -P6	
Mask	\$396,970	1	\$396,970	\$133,779			
Wafers - Prod	\$2,623	696	\$1,825,608	\$691,905			
Total			\$2,222,578	\$825,684	\$833,800	-\$8,116	
Dicing	\$1,000	680	\$680,000	\$257,720			
Total with dicing				\$1,083,404	\$833,800	\$249,604	
<b>ABCStar PreProduction</b>					<b>RE310335M</b>		
Mask	\$396,970	1	\$396,970	\$133,779			
Wafers - Eng	\$3,932	16	\$62,912	\$23,844			
Wafers - Prod	\$2,623	24	\$62,952	\$23,859			
Total			\$522,834	\$181,481	\$152,876	\$28,605	
Dicing	\$1,000	24	\$24,000	\$9,096			
Total with dicing				\$190,577	\$152,876	\$37,701	
<b>HCCStar/AMAC Production</b>					<b>RE321030M</b>		
Mask	\$396,970	1		\$396,970			
Wafers - Prod	\$2,623	48		\$125,904			
Total				\$522,874	\$462,176	\$60,698	
Dicing	\$1,000	48		\$48,000			
Total with dicing				\$570,874	\$462,176	\$108,698	
<b>HCCStar/AMAC PreProduction</b>					<b>RE320650M</b>		
Mask	\$396,970	1		\$396,970			
Wafers - Eng	\$3,932	5		\$19,660			
Total				\$416,630	\$325,200	\$91,430	
Dicing	\$1,000	5		\$5,000			
Total with dicing				\$421,630	\$325,200	\$96,430	
Grand Total				\$1,946,670	\$1,774,052	\$172,618	
Grand Total with dicing				\$2,266,486	\$1,774,052	\$492,434	

Item	P6 task	P6 (Old+dicing)	New no dice	New+dicing	Change
ABCStar production	RE310390M	\$833,800	\$825,684	\$1,083,404	\$249,604
ABCStar preproduction	RE310335M	\$152,876	\$181,481	\$190,577	\$37,701
HCCStar production	RE321030M	\$462,176	\$522,874	\$570,874	\$108,698
HCCStar preproduction	RE320650M	\$325,200	\$416,630	\$421,630	\$96,430

\$492,434

28%

# Mechanical Sensors

- We have a bill for \$18K for mechanical sensors which were part of a larger group procurement of active sensors in 2017
  - We received and used the mechanical sensors
- Tracking down a chain of responsibility here is at the limit of my capabilities. Vitaliy says he is aware of this.
- Proposal is to consider it as part of the fixed modules consumables cost per at \$6K per site, so no additional cost.
  - Should this be an administrative change that can be included in a future BCP?
- BNL is in the process of setting up the funds for CERN
- **Have signed CERN document**

# End of Stave (EOS) project

- This is a German deliverable
- It is required as part of stave assembly
- It is known to be late due to its ASICs
- Proposal last year was to mount a temporary passive EOS on first N staves and then refit with real EOS when they arrived.
- Estimate was \$25-50K for boards, plus \$100K labor in the USA
- We were told Germans would not take financial responsibility
- Now that FEE ASICs are also late, stave production is further delayed so question was whether this EOS delay has changed in any way
- Asked Tony last week, he think yes, at least partially, will have better understanding after some schedule revisions are complete - March
- We propose to continue to treat this as a risk instead of including it in P6 until its characteristics are better known, but this would become a BCP
- Tony offers to brief PO on this, pending

# Shipping Costs/Import/Export

- This is a complicated and far ranging topic
- If this could be centrally coordinated from the PO that would benefit everyone and lead to less redundancy and lost time. We are not experts
- Vitality has looked at sensors from Japan. Long story, but apparently the tax is not an issue but there are a variety of fees (slides exist to explain this) and the total cost to the project is about \$50K spread over multiple shipments.
- Paul has experience with wafers from CERN and claims to not have paid tax in the past due to “research use only”
  - This is what I use to send small stuff to UK regularly
- Issue of vendor made stuff to UK – foam, CF etc.
- Issue of staves to CERN, how does that work?
- Need unified approach here!
- **Action – what is the PO response? They say we should pursue ourselves**
- **After distraction of Itk expect this will proceed on multiple fronts**
- **VF has detailed discussion at Itk with Japanese colleagues, it appears they will cover sensor costs to US**
- **But each US institute has to account for the materials they will source or receive internationally**  
**FOAM**

# Risk Register

- Some updates have been done
- We really need a stable RLS to calculate downstream costs, can do this with post BCP-28 P6 report
- To be continued



# Modules and Stave Assembly

- BCP-28 was approved 1/21
- Proceeding on module and stave activities and prep for SQ as outlined in that presentation
- FDR upcoming on module loading in late Feb, preparation is a major focus of effort at module sites and BNL stave loading
- Detailed plan presented for cores, modules, stave through pre-pro A and B, as described
- **New module tasks, schedule, costs, have been loaded in P6**
- **Scrubbing report issued, in analysis**
- **LBNL modules budget in crisis mode now, guidance this month has < 0\$ and is inconsistent with past spending/received up to now! Work halted**

# Future BCPs

- As described, there is  $\sim >1.5M$  in upcoming cost changes, not mainly schedule driven – costs, rates, quantities etc
- **Need to work with PO to plan how to stage these**
- **Information still coming in**
- Carrie asked Jeff about when for cores BCPs.
- Currently checking P6 report to understand all the effects on cost and schedule
- **BCP-31 now planned for next week**

# BCP-31

- After BCP-28 (1/20) PO has been working on BCP-31
- Scrubbing report - Cobra(BCP-28) = 39,645 - 39,483k\$ = **\$122K ????**
- Elements: 97 +26 +4=122k\$
  - **Cores: +97k\$**
    - **Bus tape schedule slipped by 5 months = increase of 50k\$ of escalation (not reliable since we are still waiting for vendor selection and new quote)**
      - One big material shift (\$450k@3%=13k + many small ones for about 38k\$ total)
      - Added 5 months of Eng/Mgt due to bus tapes schedule delays - increase of 46k\$
    - **Readout -4k\$**
      - Small changes in PB schedule
    - **Modules: 0**
      - Hoped to see updated and corrected LBNL plan included, but is not
    - **Stave Assembly: +26k\$**
      - Many cost neutral changes moving tasks around (escalation +10k\$), some changes of task names to true up the schedule
      - Increased cost of shipping staves at CERN (accelerometers, desiccators, etc were not included) \_ Task ID SA190005M + 14k
      - Moved Penn tasks from FY19 to FY22 (~20k\$)
- **Not clear what these numbers are since a number of changes since last BCP-31 scrubbing report**

# BCP-31 or XX other elements to consider

- All procurements, guidance is to keep BCP-31 as labor/schedule and have procurements in a later BCP-XX
- HV mux
- Coils
- Foam – new quote OK, but export cost?
- CF
- Bus tapes
- Shipping
- EOS
- Timescale 1-2 months

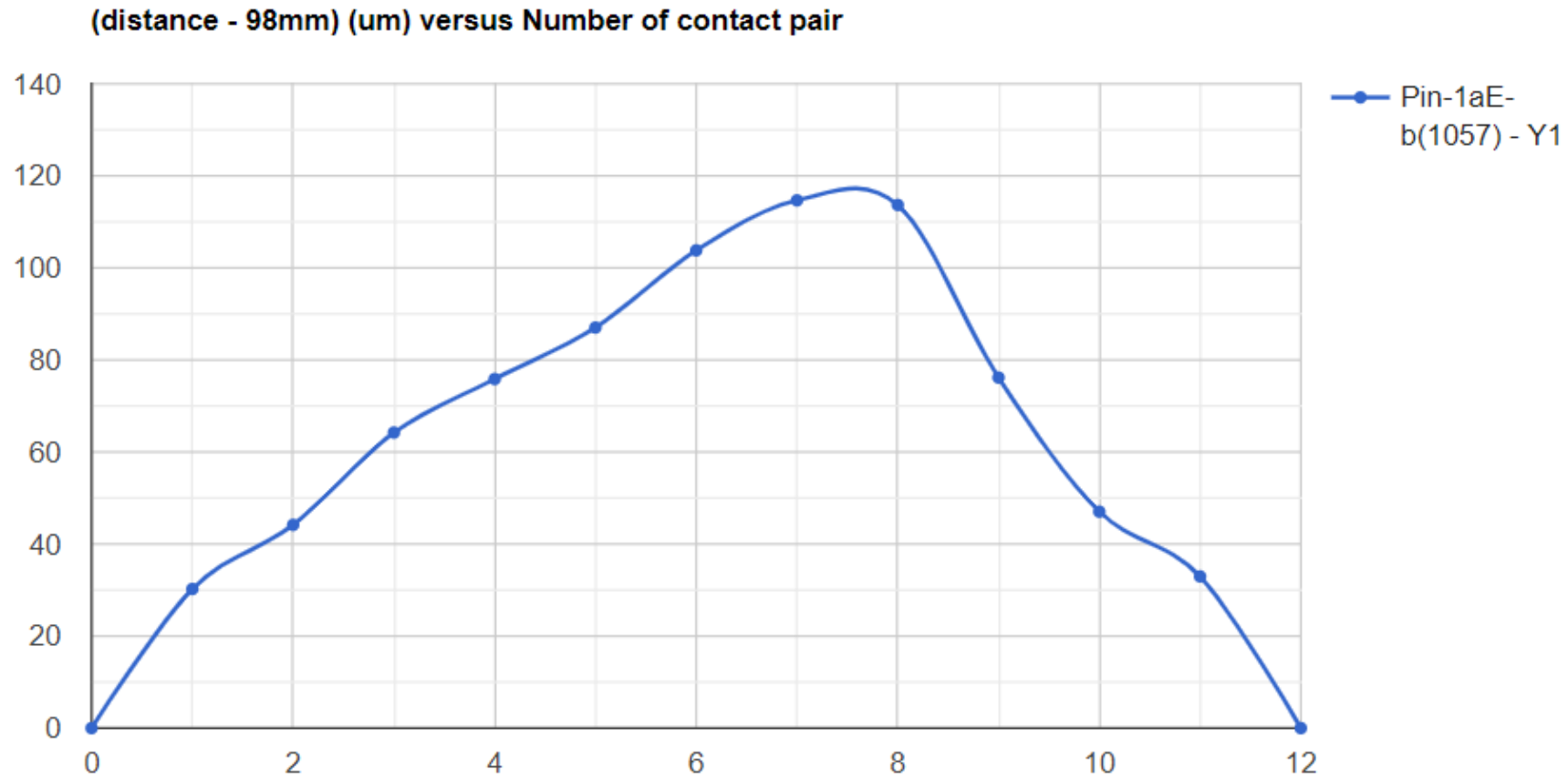
# Scrubbing Meeting

- March 10-11
- Only L2 and L3 need to attend
- Have an indico but no agenda
- <https://indico.bnl.gov/event/7677/>
- Would like rehearsals next Tuesday but not possible for all due to stave FDR, no deadline
- We will send a template
- Need stable reports, charts, and tables
- Contingency analysis?

# Back up

- A

[Back to Run List](#)



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# Event Schedule

- Scrubbing March 10-11. Appears all L3 are available
- Some number of BCPs will need to be scheduled, how many, when, etc, awaits PO guidance. There remains considerable uncertainty on the total BCP price tag, as discussed, but it is ~\$1M, today.