



Minutes of PLUME Phone meeting - 2010, February 26 -

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Participants

- **University of Bristol:** Joel Goldstein,
- **Desy, Hamburg:** Lena Bachynska, Ingrid Gregor, Ulrich Koetz,
- **University of Oxford:** Andrei Nomerotski,
- **IPHC, Strasbourg:** Jerome Baudot, Nathalie Chon-Sen, Mathieu Goffe.

Agenda

The agenda contained 5 presentations for which the slides are available at <http://indico.cern.ch/conferenceDisplay.py?confId=85363>.

The general project status is that the flex has been produced in its PCB version and tested in Oxford while other labs are preparing the following steps: mounting thinned sensors on kapton, testing modules, mounting modules on foam.

1 Dicing and thinning MIMOSA 26, Mathieu

Mathieu informed us that 20 sensors, MIMOSA 26 with standard epitaxial layer, are to be diced and thinned down to 50 μm in California. Their delivery at IPHC is expected mid-March. Obviously more sensors will be diced later on.

For this year, conservative dicing dimensions have been chosen which results in a $\sim 200 \mu\text{m}$ distance pixel to pixel from one chip to the other. Decreasing this distance will require, next year, one or both of the following actions:

- ask AMS to reduce and rearrange the so-called “scribe structure”,
- require a higher dicing precision.

2 Tests of flex PCB-version, Andrei

4 PCB samples of the flex cable were delivered in February. Oxford kept 3 for testing and sent one to IPHC for the design of the mounting tools. Electrical tests are positive so far, see slides for details. They are going on, Pete Hastings is still affected partially to the project in Oxford.

Some decisions were taken:

- Oxford orders 12 pieces in kapton to Graphic right away (10 days for production),
- The manufacturer should drill a hole in each ear,
- Oxford will mount components on flex and repeat the electrical test prior to send them to IPHC for mounting.

Mathieu gave some news on the auxiliary board. The design is done. Accounting for the order, fabrication and assembly, it should be ready by end of March or beginning of April.

3 Mounting of sensors on flex, Nathalie

Nathalie exposed the concept of the sensor mounting on flex which will be done by hand, for this year, with the help of specific jigs. These tools are already designed (see slides) and will be fabricated now at IPHC. The whole system should be ready by the end of March.

The flatness of the sensors (which are slightly curved by the internal stress) and of the flex are insured by vacuum sucking on the jigs. The glue (roughly 10 μm thick) extends more or less uniformly under the sensors to maintain the flatness and position once the jigs are removed. The operation does not require real pressure.

4 Status on the mechanical design, Joel

A quick discussion leads to choose for this year a 8% foam as provided by the vendor, i.e. without additional tooling in lab. The expected flatness tolerance is 50 μm . Joel orders

the foam now in prevision of the few weeks lead time.

Joel presented the CAD drawing of the box holding the ladder. To cope with the thermal dilatation one of the ladder end will not be fixed by glue but allowed to slide slightly ($\ll 1$ mm). The holding structure allowing this movement is still to be chosen among two options. The proposed air flow is transverse to the ladder length with a manifold inlets. Holes for longitudinal air flow possibility was also required.

We discussed how this box will stand in the beam telescope. A system to hold the cables going out of the box appears necessary, to be designed (ongoing discussion Bristol-Strasbourg).

We decided that as many boxes as produced ladders will be needed. Bristol will tool these boxes.

5 Results of beam tests for PLUME 2009, Nathalie

Nathalie presented the results of the test beam from last November with the small ladder (2 analog sensors MIMOSA 20 on each side) of 2009. The single resolution obtained for one sensor with 30 μm pitch amounts to 7 μm which is much larger than the expected 2 μm . This is due to a combination of two factors. First, the flex used in 2009 did not allow enough decoupling capacitors which resulted in an large noise increase. Then, the DAS was operating zero suppression online, based on the CDS pixel value (Correlated Double Sampling) without pedestal or common mode shift correction.

Nevertheless when the two points from the ladder are combined, the resolution gain reaches the expected $1/\sqrt{2}$ factors with respect to a single measurement point. This indicates that the mechanical structure is stable for one side relative to the other.

The pointing angle resolution obtained by comparing the vector made of the two ladder points and the track parameters displays discrete structures. This is understood by the low number of pixels constituting clusters (see slides for details).

Overall, the current results are satisfactory with respect to the stability of the ladder. More studies can be undertaken with the variable incident angle data which are left untouched so far.

6 Current planning and action items

Currently, the planning is as follow:

- March: The kapton-flex version is received and tested in Oxford; the mounting and test setups are finalized at IPHC, the thinned sensors arrived at IPHC.
- April: First sensor mounting on flex and operational test of MIMOSA 26 on the flex at IPHC; Oxford get quotes for the flex from other vendors.
- April-June: ongoing test/validation of the potentially different flex; preparation of the tools for the assembly of ladder in Bristol.
- Beginning of July: start to produce ladders with the “best” flex.

The planning for the mounting of modules (flex+sensors) on foam to make ladder will be discussed during the next phone meeting.

Several action items were raised during the meeting:

- check how much money left for other vendors,
- which diameter for the hole on the ears ? URGENT (done since then)
- provide a sketch to Joel for a support in the connector area,
- expect drawing of box in beam by Bristol (to check 5 cm distance and air flow path). (done since then)

7 AOB

- Preparation of power pulsing in DESY is ongoing and follows expectation. First tests may start by April with MIMOSA 26 analog part.
- It appears that a certain amount of objects (sensors, flex, modules, ladders, boards, ...) will be “flying” between our different labs and that tests will be performed on them. It is clear we need a bookkeeping system which could range technically from simple paper sheets to a database with a web interface...to be defined during our next meeting.

⇒ Next phone call, planed for Tuesday 6 April at 2:00 PM (Paris time).