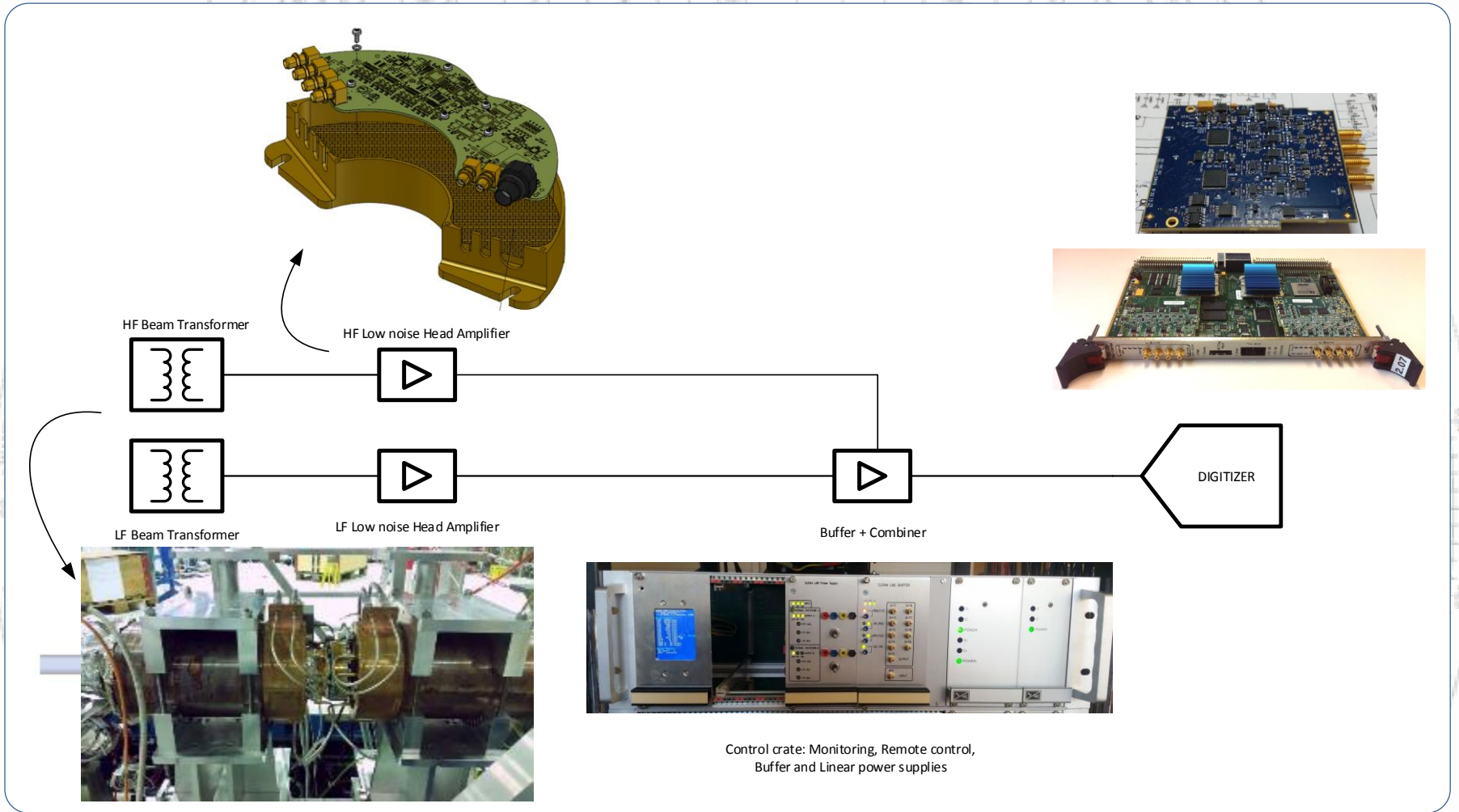


Status of the Longitudinal pickups for the ELENA ring and transfer lines
September 2017 - Status

Jorge Sánchez-Quesada

BE-RF-FB

- Electronic modules.
- Magnetic pick-up.
- Measurements.
- Required work.



GENERAL STATUS

- Analog combiner unit – EDA-03260

The analog combiner unit (EDA-03260) is being produced (version 2).

- Extraction line buffer – EDA-03263

It is ready to be installed. The produced units have been tested.

- Display and control module – EDA-03257 and EDA-03258

Both modules are ready to be installed, but their firmware differs depending on which crate they are installed in (ring control crate, under the LLRF at AY01) or (extraction line control crates, at AY02).

- LNE and LNR power modules – EDA-03259 and EDA-03262

The LNR modules are ready for installation. LNE modules require testing.

- Low noise amplifiers – EDA-03310 and EDA-03311

All the amplifiers in stock have been tested and are operational.

- Filter box – EDA-03309

Ready to be installed, however:

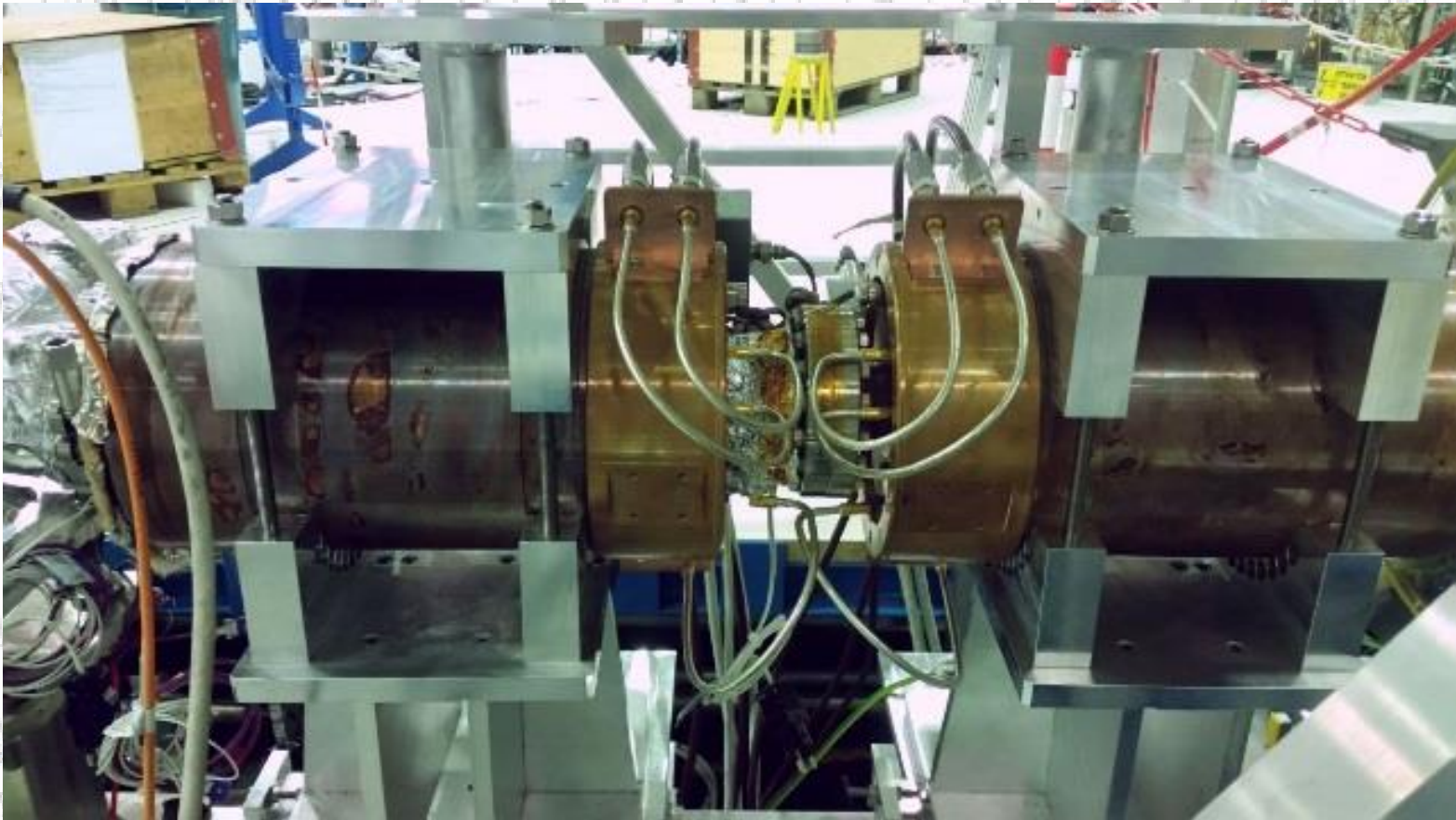
If required by the intensity measurement system, there is a modification which could improve the noise floor at low frequencies. This is a simple modification which can be performed after tests with beam.

All the modules that have been produced (missing: analog combiner)

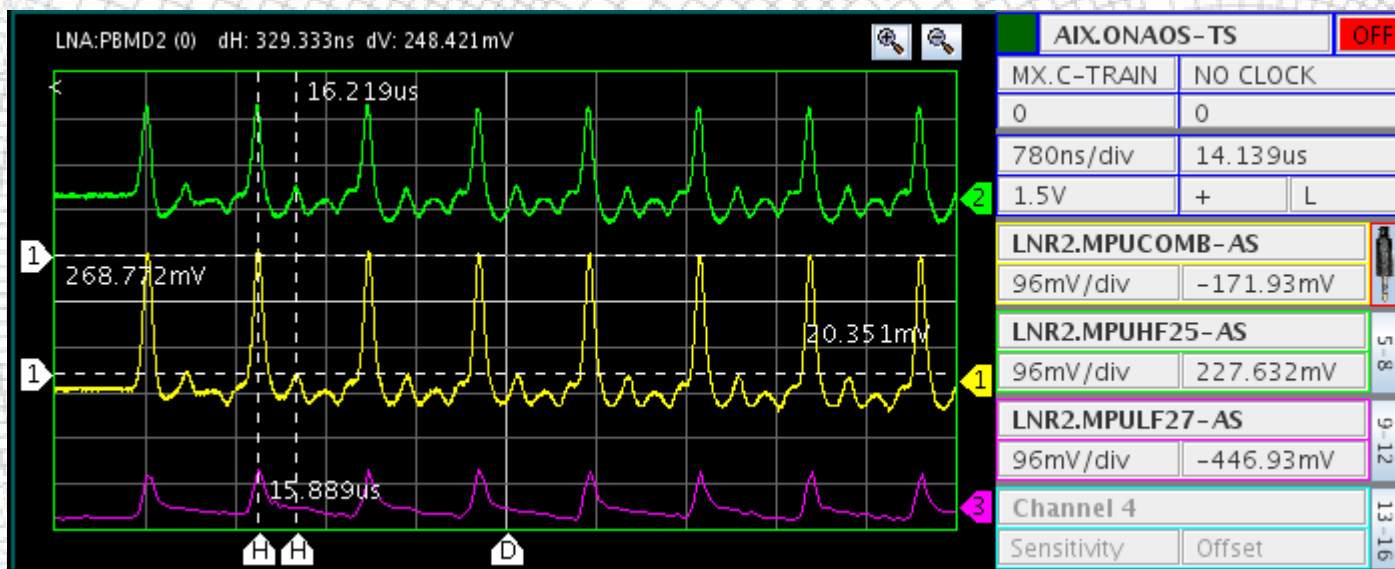


- The Low Frequency and High Frequency LPU installed in the ring, were calibrated and tested, and are within specification.
- More tests with beam have to be carried out in order to compare their performance against the electrostatic pick-up.
- The transfer line pick-ups (LF) are being assembled. They will be prepared for the vacuum tests.
 - **Problem with the reworked pieces:** the modifications made to the vacuum chamber, reduced the space for the coils to the point that they cannot be installed.
 - Also, the primary connection point has been rotated 180 deg. from the specified position.
 - We expect the corrected vacuum chambers to be available in one day, to continue with the assembly...

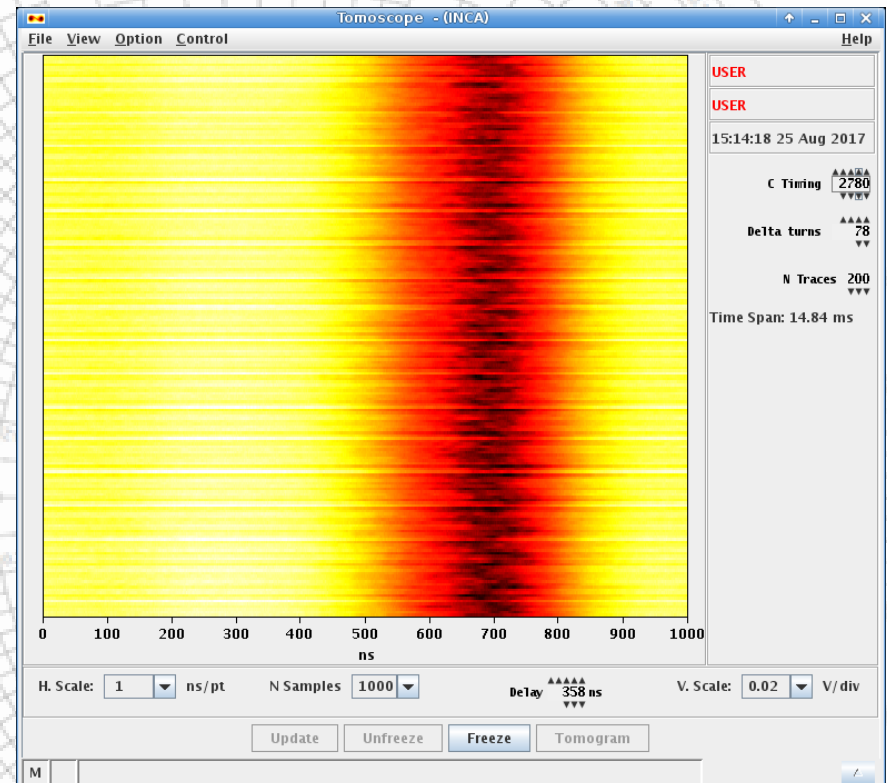
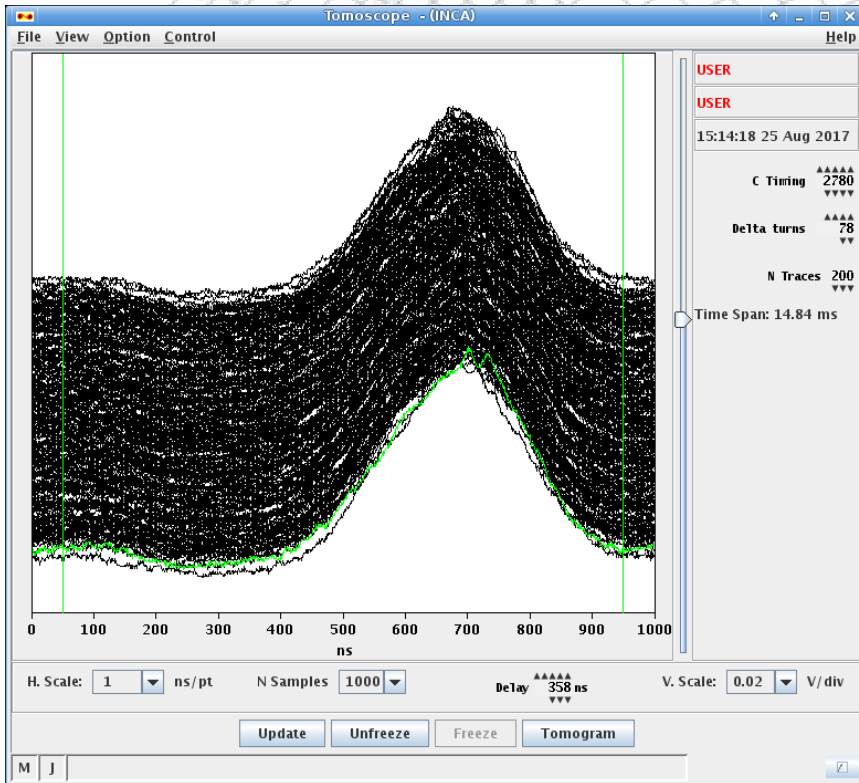
Longitudinal pickups installed in the ring:



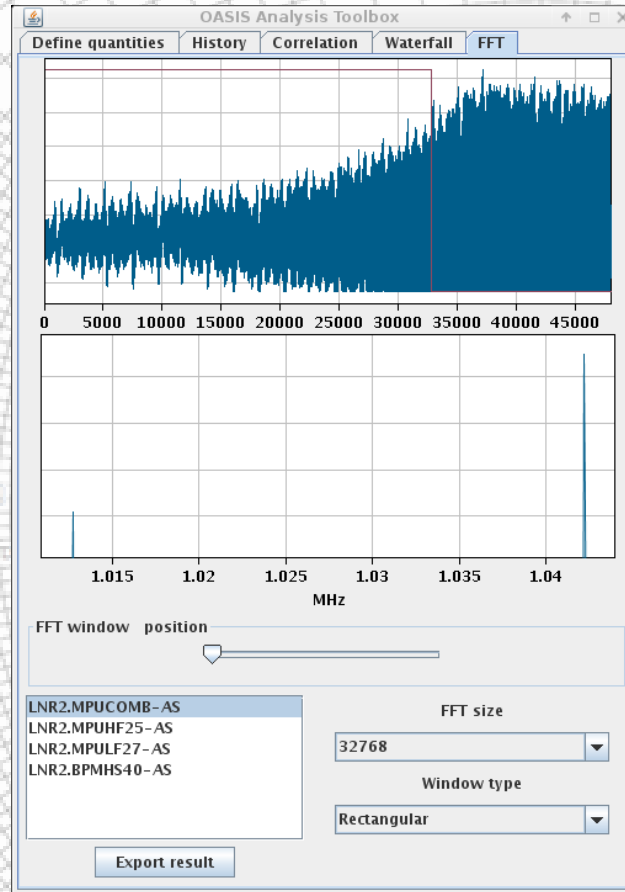
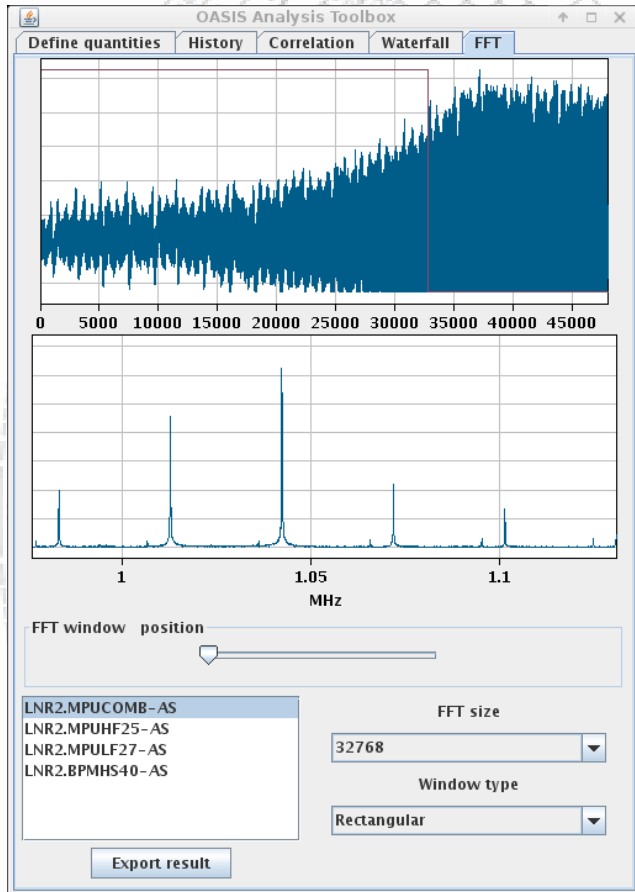
- Measured beam from AD
- Using the combiner prototype (LF + HF), but **without** dynamic time of flight compensation, but static using a coaxial cable. (measurement taken at injection, fast fRev)
- Ringing observed due to a matching problem in the HF line (solved in the new combiner version, being produced).



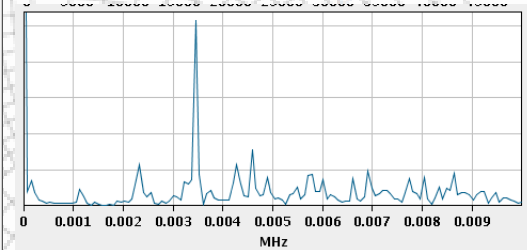
- Tomoscope (MD from 25/08/2017, pBars from AD)



- Observed spurious content around the fRev carrier: $\sim 30\text{KHz}$ spectral lines. To be studied...



- Baseband content: $\sim 3.5\text{KHz}$ noise (most likely, power supply ripple)



- **Electronics:**

- Test the combiner modules from production, including the programmable time-of-flight compensation.
- Fill the transfer line control crates in AY02 rack.

- **Beam transformers:**

- Continue with the assembly.
- Test the transformers before and after the electron beam welding.
- Remaining work in the main workshop:
 - Welding of the vacuum flanges.
 - Preparation of the chambers for the vacuum tests.
- Remaining work to be done by the vacuum experts:
 - Conformity tests (includes bake-out)
 - (after installing the transformers in the transfer lines): connecting the vacuum chambers, and proceed with the bake-out.
- RF expert:
 - Installation of the low noise amplifiers, and calibration.
 - Filter box and cables.
 - Final test.

- **Firmware:**

- A firmware for the control module is required, in order to gain remote control over the head amplifier gain, calibration switch, input switch, power switch and voltage/current/temperature readouts.
- Firmware for the display module is also required, but not a show-stopper.

- **Software:**

- The tomoscope should have the possibility to **invert** the combined signal coming from the ring pick-ups. This can be done in software, if the option is not available at the digitizer.
- FESA classes required for the remote control.



Thank you!