Warsaw University of Technology (WUT)

Institute of Electronic Systems

Microwave Circuits and Instrumentation Group

1. **Phase Reference Line** (AIK 8.2)

   Work Unit Co-ordinator Krzysztof Czuba (WUT)

   In-Kind Contribution Agreement signed in November 2016

2. **tasks in LLRF System Unit** (AIK 8.7)

   Work Unit Co-ordinator Krzysztof Czuba (WUT)

   (in PEG consortium)

   In-Kind Contribution Agreement signed in November 2016

3. **New (from 2017) tasks in LLRF System Unit**

   Work Units Co-ordinator Krzysztof Czuba (WUT)

Phase Reference Line (WUT)

The design, development and installation are in progres.

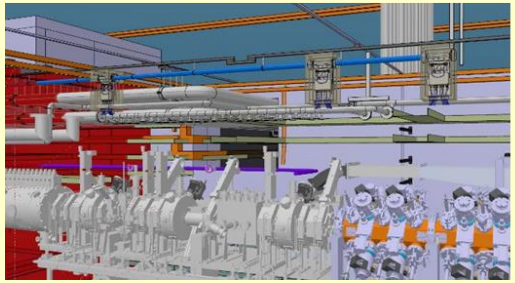
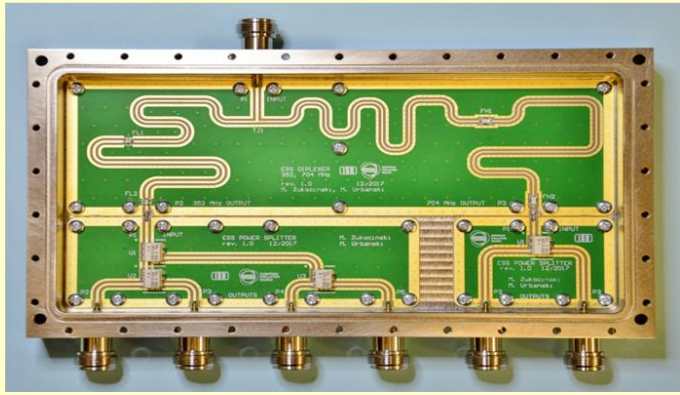
The instalation in Lund majority finished

Some of the elements of the PRL are still in design and procurement proces (power amplifiers for 352 MHz and 704 MHz).

Reports etc. - according to the procedures

- **Main line up to Dog Leg section installed (~500 m):**
  - **Rigid lines (~120) with temperature sensors, heaters and thermal insulation**
  - **Directional couplers (53)**
- **Powers Splitters produced and tested**
- **PRL in Dog Leg section and Power Splitter area integrated with ESS 3D model**
- **PRL Split Box prototype for Tap Point tested**



Tasks in LLRF System (PEG)

Design of RTM and Cavity Simulator have been finished.

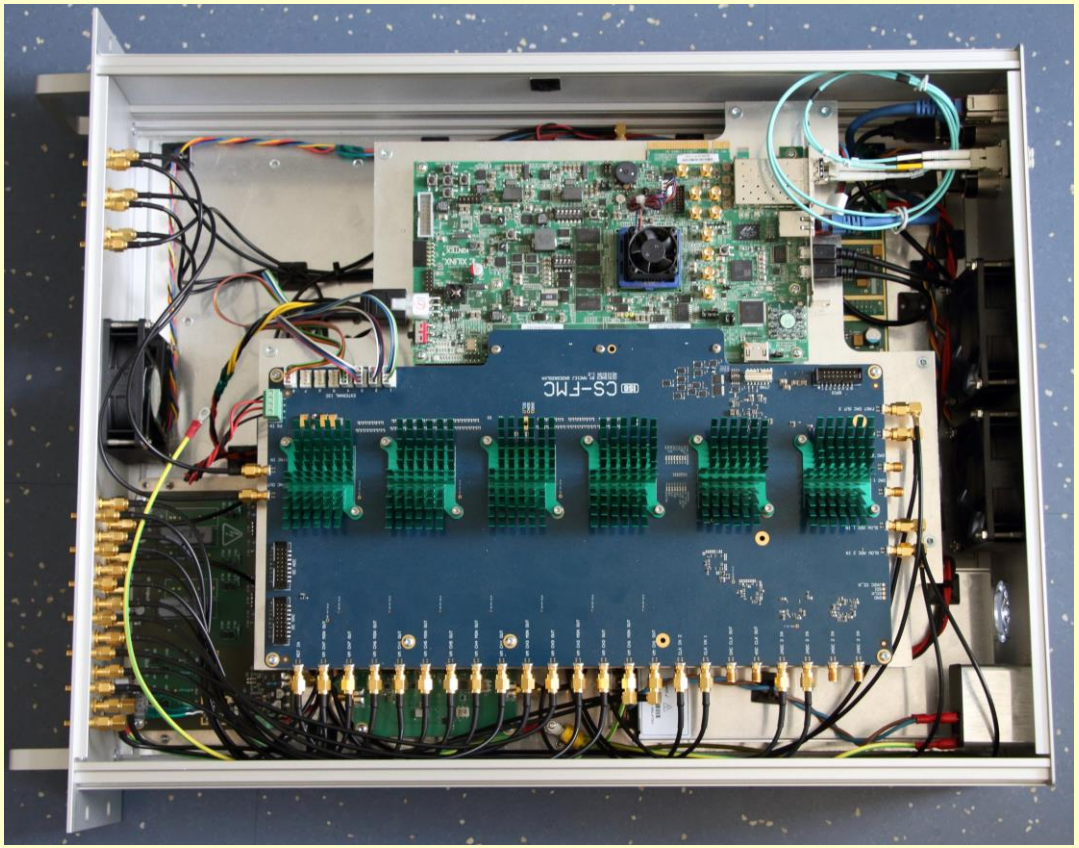
The Cavity Symulator was realized (4 pcs.) the software is still in progress now.

The RTM has been ordered.

Housings have been designed and their commissioning is in progress.

PEG-ESS-LLRF meeting 15-17 January 2018 (Warsaw) and next meeting is planned in November 2018 (Lódź)

The Cavity Symulator was realized (4 pcs.), the software is still in progress now.



BCM system components

- **ACCT-FE module – housing containing Bergoz ACCT modules, power supplies and power supply control board,**
- **AIU crate and its internal components. It is a box used to calibrate current measuring windings and to convert windings' output signal to a level and impedance accepted by further components.**
- **FAST BCM crate. It is a box used to measure the rise/fall times (~10 ns) of the MEBT BPM chopper.**

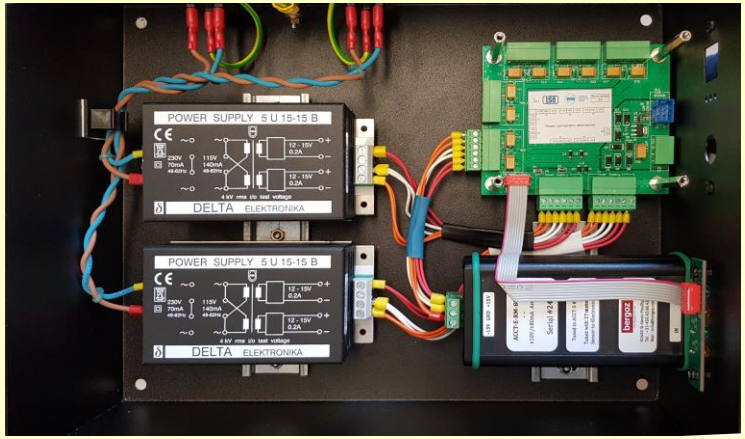
Tasks in Beam Diagnostics (WUT)

- PSS Switch units production and assembly – in mass production
- Split box units production and assembly – measurements of drifts

BCM - ACCT-FE module

Project status:

- **22 boxes produced**
- **3 completed and installed**
- **19 boxes are ready to assembly. They will be completed as soon as we get components provided by in kind partners.**



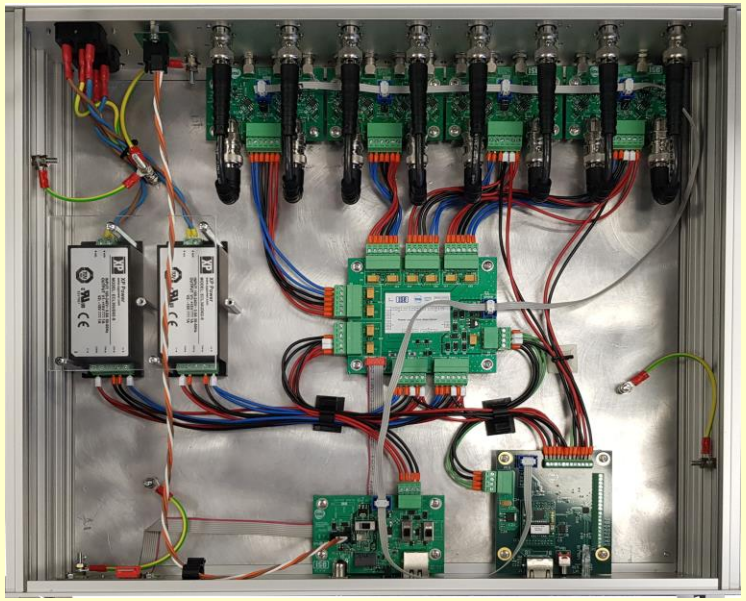
Produced modules

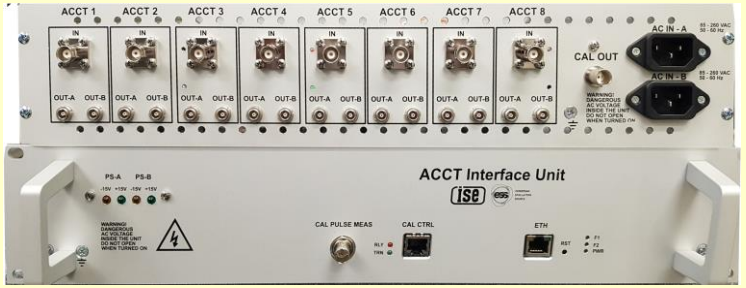
BCM - AIU - module

Project status:

- **12 boxes produced, assembled and tested.**
- **1 box will be installed soon.**
- **11 boxes waiting for installation in the tunnel.**

- **Estimated installation date is Feb. 2019**





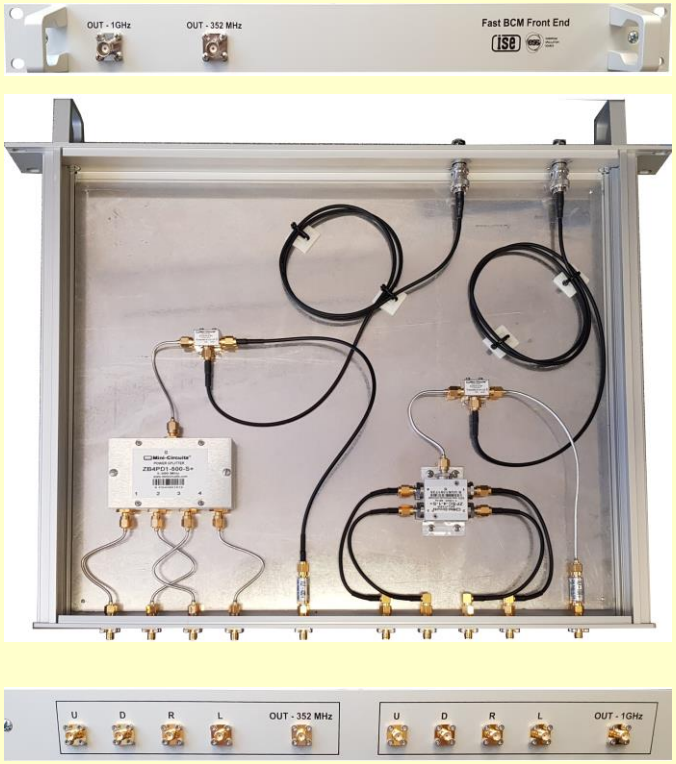
Produced modules

Fast BCM module

Project status:

- **1 box produced, assembled and tested**
- **1 box sent to Lund and will be installed soon.**

Produced modules:



Tasks in Beam Diagnostics (WUT)

Design, delivery and installation of interconnects for ESS beam diagnostics

-a scheme of electronics connections in racks,

-a list of cables used in racks,

-patch panel design,

-rack installation work.\

A mechanical patch panel design for the BCM, BPM, EMU&DPL systems has been prepared (BCM patch panel is shown).

Support for the Beam Diagnostics team in the installation of racks in the FEB building.