STATUS OF THE ESS IKC

WIRE SCANNER ACQUISITION SYSTEM

Mario Ferianis

on behalf of the Elettra-ESS IKC WS Team

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4.1.2   Partner SoW   ESS-0044053_2016.09.22

The Partner shall develop (i.e. design) and to deliver to ESS ERIC the following part of the system:

  a) The analog front end electronic (AFE) for both SEM current (13x) and scintillator readout (OFE) (12x);
  b) The OFE for the SCINT fast WS readout (6x);   *OFE is 2 channel unit:, therefore numbers dived by 2*
  c) The Back End modules for both AFE and OFE front ends (31x);
  d) The power supplies needed for wire polarization and photo detector biasing (included into the BE).

The Partner is responsible to integrate for ESS Accelerator Division, the COTS parts of the system, based on COTS products of ESS ERIC choice, indicated in the following:
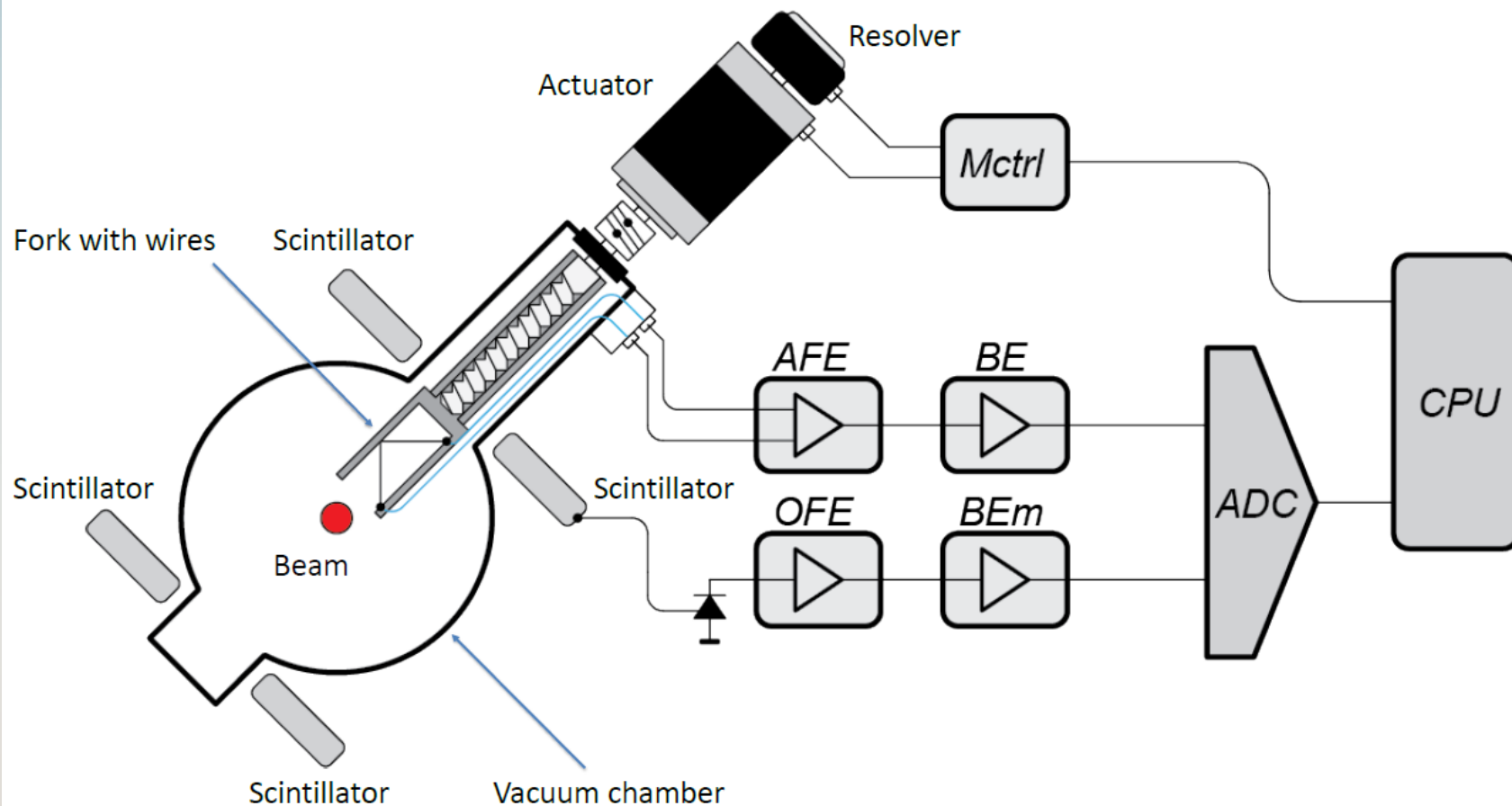
  i.   The digitizer card according to ESS ERIC specifications;
  ii.   The electronic crate;
  iii. The motion controller, according to ESS ERIC specifications;
  iv.   The EPICS integration, the control software and engineering screen.

> AFE 11 + 2 spares=13 AFE;
> OFE: 5 + 1 spare= 6 OFE;
> 3 OFE for fast WS
> 13 BE and 9 BEmod

System general outline

DELIVERIES - 3

4

✓	**Analog Front End (AFE)**	**13x**	delivered and tested at ESS
✓	**Back-End (BE)**	**13x**	delivered and tested at ESS
✓	**Optical Front End (OFE),**	**9x**	running, done by end of 2019
80% Done	**Modified Back End (BE$_{mod}$)**	**6x**	running, done by end of 2019
✓	**EPICS IOC & ENG PANEL**		delivered and tested at ESS

Still due:

- 80% Done • Certification documents (Certificate *of Conformity*)   ….
- 80% Done • **TRR, SAR-1** and **SAR-2**   >>>   next week, *IKC DIAG FORUM*…

There are *extra BONUS* deliveries, as well *(free of charge)*:

- ✓ • *Software-assisted* **Factory Acceptance Test procedure** delivered and tested at ESS
- ✓ • Wire current emulator
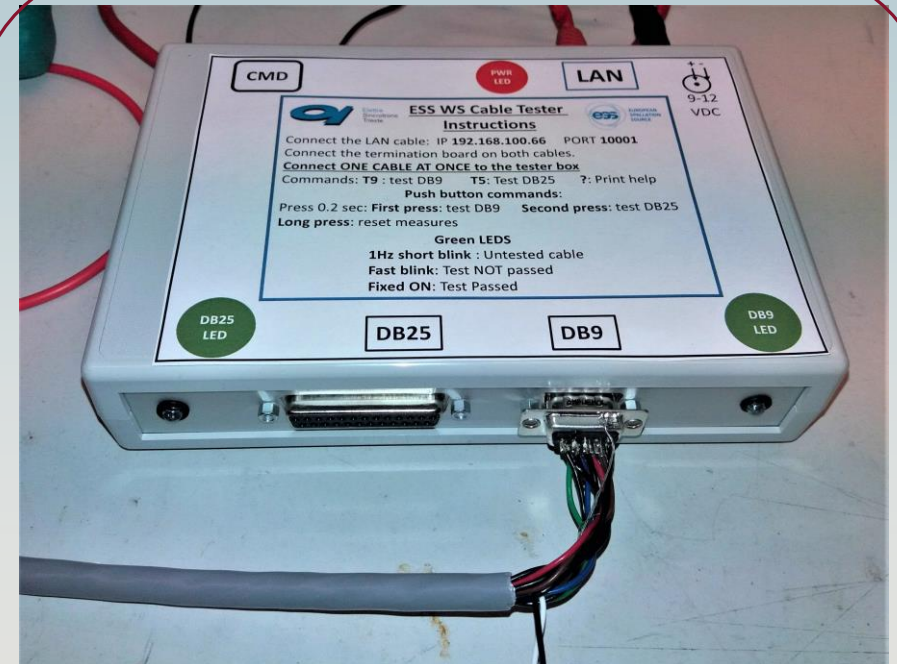- ✓ • Cable tester
- ✓ • OFE optical tester

Equalized OFE optical tester

AFE balanced wire current generator

Automatic long run cable tester

From ESS:, we had visiting
- M. Skafar
- C. Darve
- M. Zambelli

ST approach to quality presented

Hazard evaluation table received
Need now to work on it together
to identify any potential risk

Meeting Elettra-ESS

Dates: 14-15 October, 2019

Location: Elettra, Trieste, Italy - Room 82

Participants:

ESS	M. Zambelli
	C. Darve
	M. Skafar
INFN	P. Mereu
Elettra	A. Fabris
	D. Castronovo
	M. Ferianis
	R. Fabris
	R. Laghi
	C. Pasotti
	R. Visintini

HAZARD EVALUATION TABLE

Hazard evaluation table, by C. Darve ... need now to filled in

Document Type: Document Template
Document Number: ESS-0060909

HazId No.	Hazard	Yes	No	Hazard No.	Hazard description	Existing Controls/Routines	Further action
1	**Electrical safety**						
1.1	Is there any electrical equipment?						
1.2	Is there any voltage ≤ 6 Vac?						
1.3	Is there any voltage > 6 Vac but ≤ 25 Vac?						
1.4	Is there any voltage > 25 Vac but < 50 Vac?						
1.5	Is there any voltage ≥ 50 but ≤ 1000 Vac?						
1.6	Is there any voltage > 1000 Vac?						
1.7	Is there any voltage ≤ 15 Vdc?						
1.8	Is there any voltage > 15 Vdc but ≤ 60 Vdc?						
1.9	Is there any voltage > 60 Vdc but < 75 Vdc?						
1.10	Is there any voltage ≥ 75 but ≤ 1500 Vdc?						

Global Quality of the supply to ESS

3 main areas involved:
- **Technical:** Design, Manufacturing, Communication and Documentation
- **Administrative:** Contract, Procedures, Meetings and Control
- **Human:** good relationship, to get used to work together

our "JOB" at ESS will be completed with the in-situ test phase
- Not only "*Design for delivery*", but rather "*Design to Install*"
- To participate to the Installation and Commissioning

But, overall, our IKC to ESS WS system has been heavily driven by:
- **Experience**

Technical: Design, Communication, Manufacturing and Documentation (!!!)

- **Agreement on the specifications** documents
  - at first with B. Chemyol
  - then, with C. Derrez and T. Shea
- Establishing **efficient technical communication channels**, while keeping paperwork overhead moderate…
  - regular skype tel-cos (on a 2-week basis) with minutes, from March '16 to August '18
  - regular participation to the IKC DIAG FORUMs
- Always "fight for" **test with beam,** before releasing production phase:
  - CERN (2017, AFE+BE)
  - Julich (2019, OFE)
- Applying **ST internal good design rules**, tested in several successful and reliable implemented designs (over 25+ years)
- Manufacturing: either with **pre-qualified suppliers** or **internal senior staff, 100% daily control**

Administrative: Contract, Procedures, Meetings and Control

- Implementing the ESS IKC framework:
  PDRs, CDRs, SARs, TRRs, FATs , SATs , TACs etc etc
- To run all foreseen Meetings
- To prepare all foreseen documentation

Human: Relationship and work together

- Establishing good personal relationship with ESS Colleagues and other IKCs (ESS Bilbao)
- Strengthen the "distributed" Team by regular teamwork
- Get used to work together to solve issues… to get the work done
- **Vertical Integration** sessions (2 held: in Lund and Bilbao)
- To implement a "positive criticism": point out any, at least curious, situation or solution

The **Optical Front End** represents one of the outstanding results of this IKC

(by Sandi Grulja)

By installing and testing the **Analog Front End** and **Back End,** connected to a CERN wire scanner on LINAC 4 at CERN, we were able to double check the HW prototype operation in a **real ion accelerator environment** (**credits to Raffaele De Monte**)
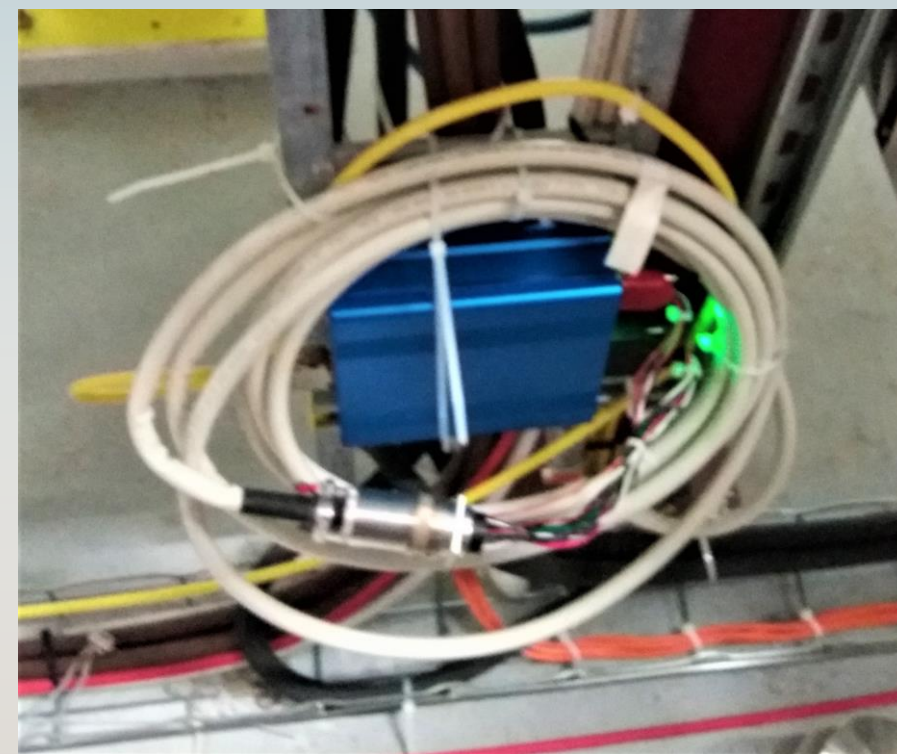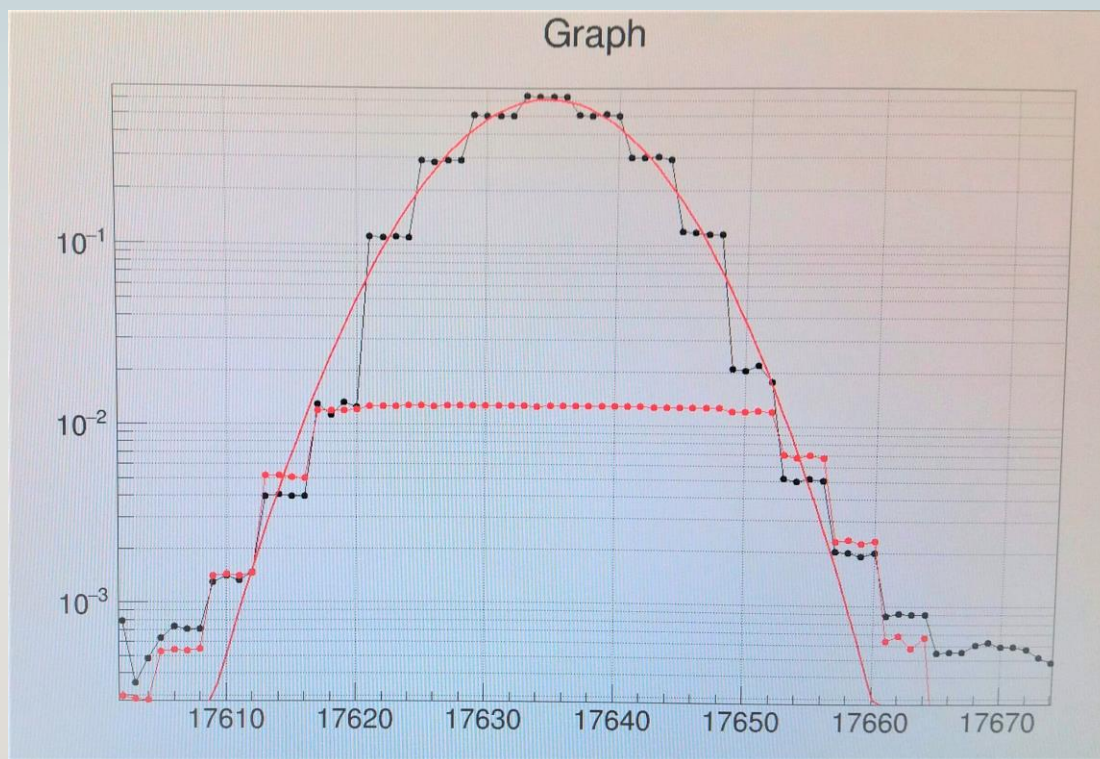
In order to rapidly and reliably test all (100% quality assurance) delivered HW modules, an EPICS procedure has been written such that it both excites the AFE inputs and read back the Back End outputs. Obviously, it generates a written report   (**credits to Stefano Cleva**)

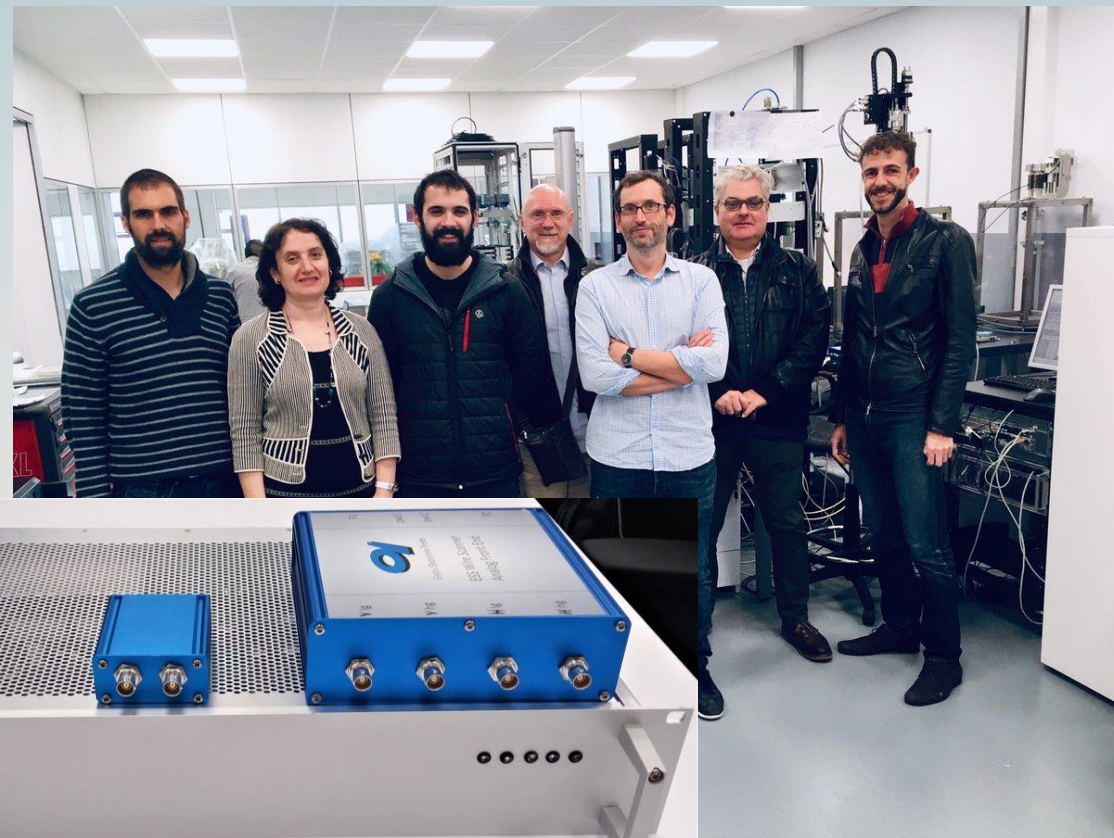file:///C:/Users/mario
TINGS/2019%2010%
08%2015_43_32.htm..

This year, in JUNE, we have completed the **Site Acceptance Test** (SAT) for the **Analog Front End**s and associated **Back Ends**, teaming and training **ESS Staff (C. Derrez)**.
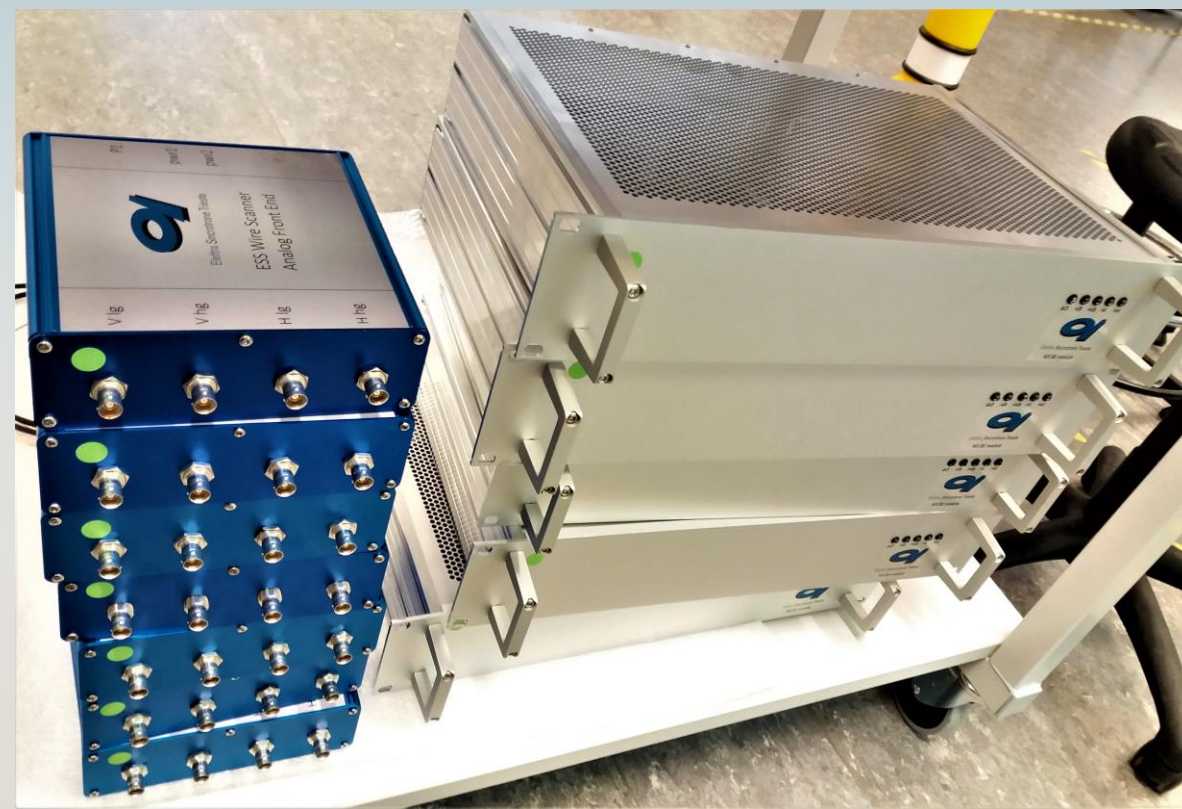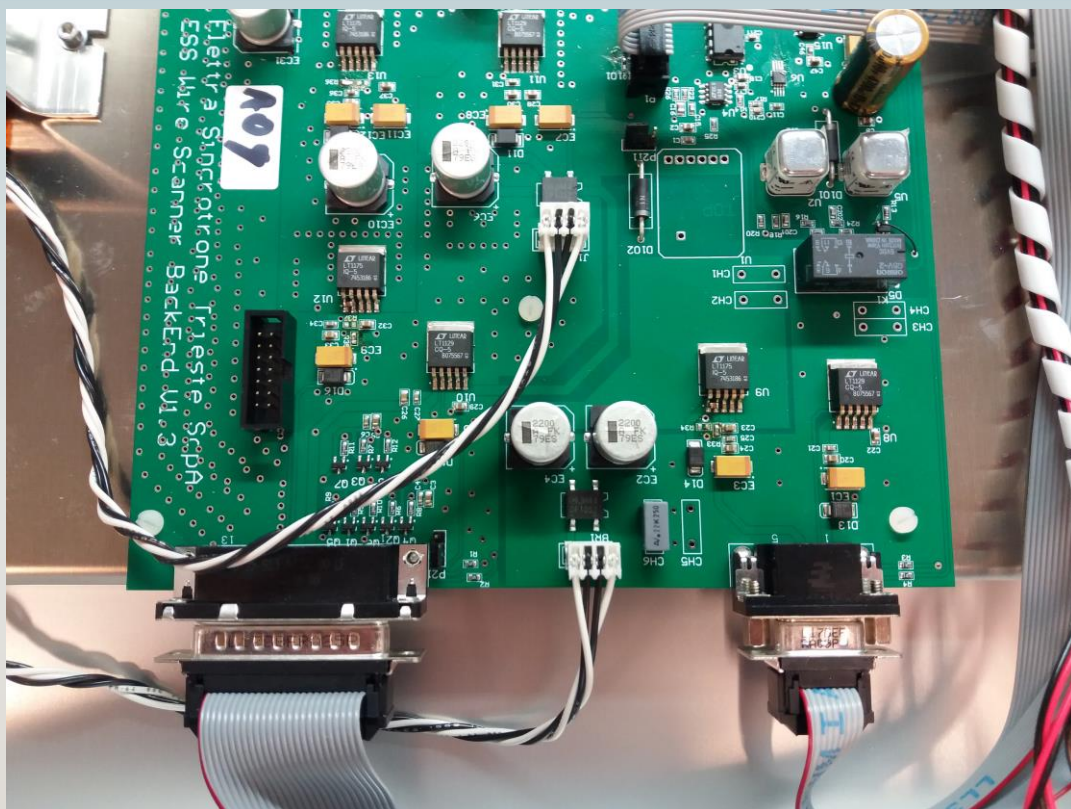
TETRA-LAB TEAM…
WORKING TOGETHER

TEST @ PARTNER LAB, CERN, OCT-NOV 2017   **VERTICAL INTEGRATION TEST @ ESS-Bilbao,** NOV 2018

THE QUALITY of THE ELETTRA IKC for the

ESS WIRE SCANNER ACQUISITION SYSTEM

Thank you for your attention