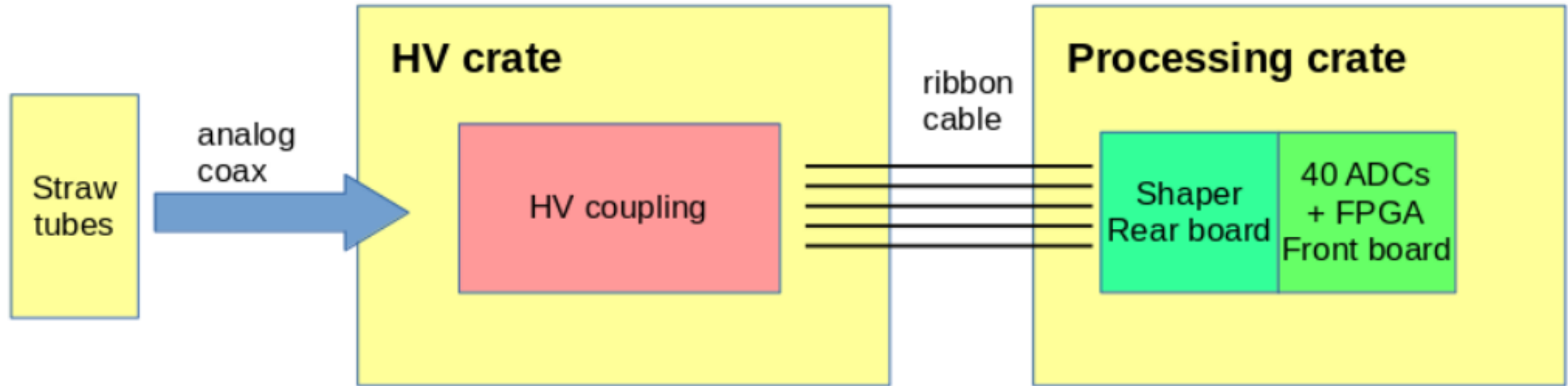


STATUS OF ADC BASED DAQ FOR PANDA STT

PANDA STT READOUT MEETING

24. MAY 2018 | A. ERVEN, L. JOKHOVETS

SYSTEM OVERVIEW

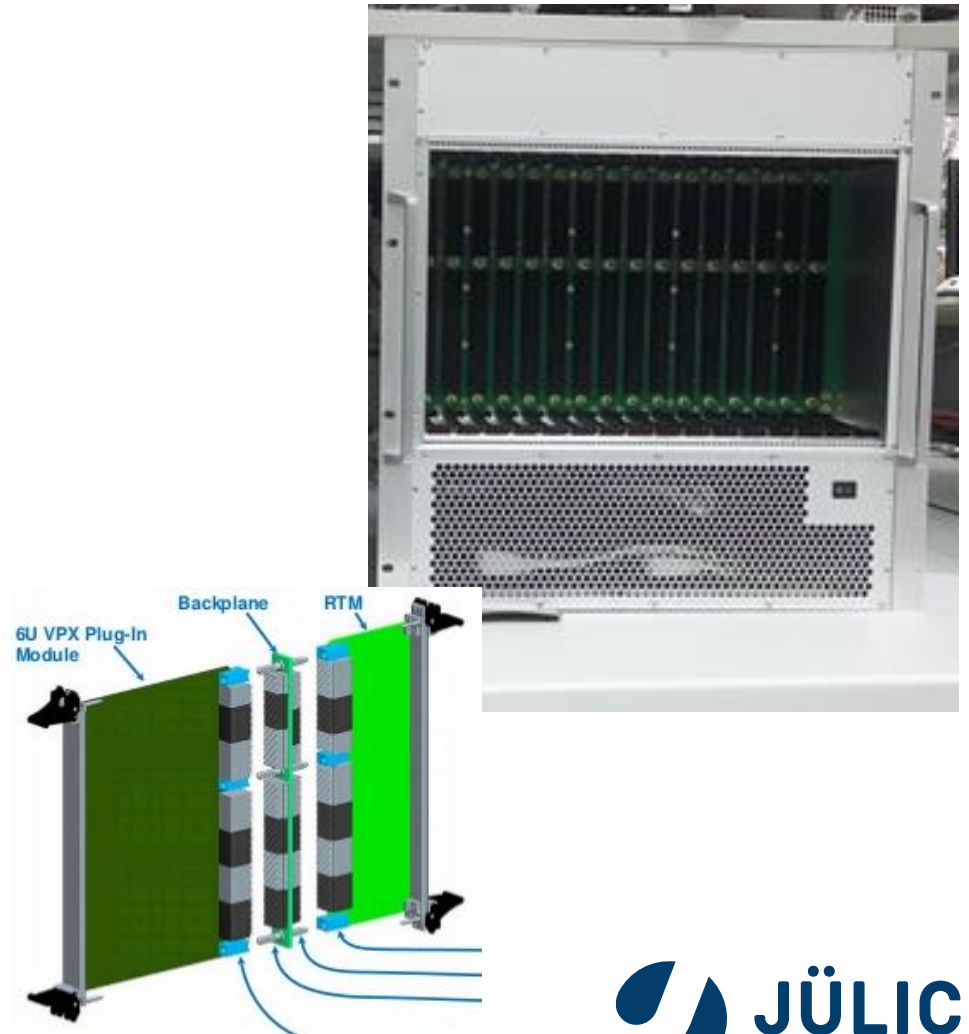


480 straw tubes

„Samtec cable“

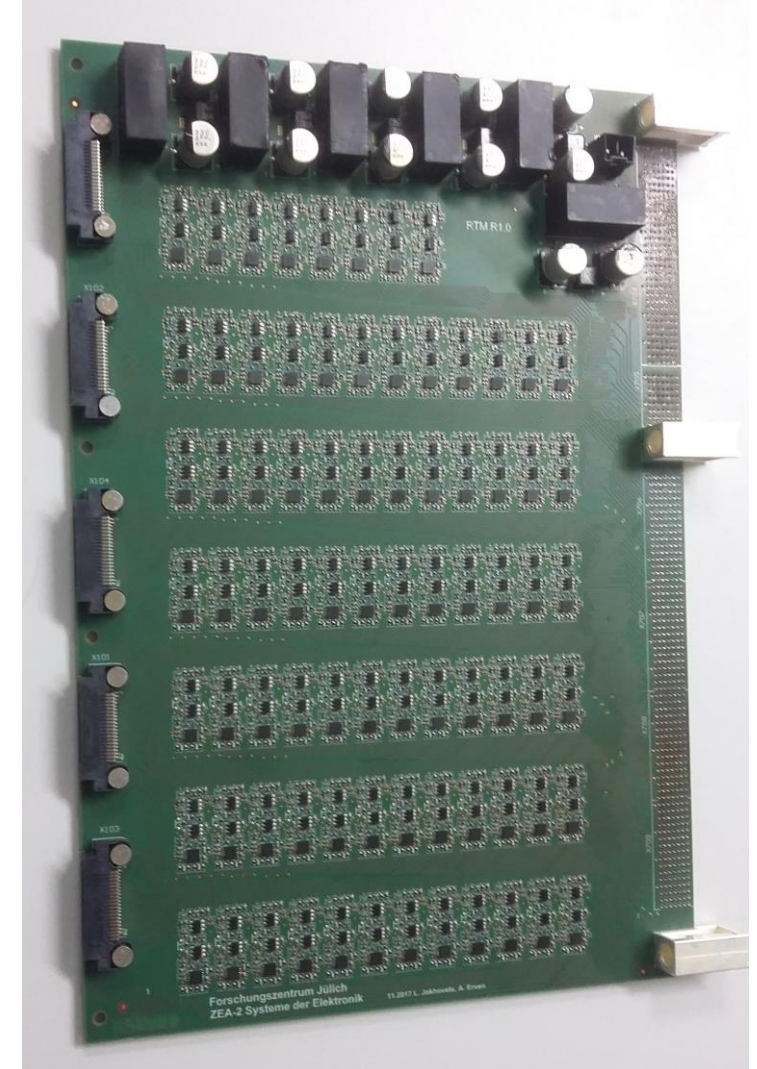
CRATE

- Initial planning was based on ATCA standard, but changed to openVPX standard
- Advantages
 - Introduction of Rear Transition Module (RTM) allows separation of analog and digital part
 - independent development
 - Highspeed Board-to-Board and Controller-to-Board communication
 - Enough connections for RTM-communication
 - Compact boards for short signal lines to backplane and ADC
 - Backplane adapted to our needs and crates produced by ELMA (very smooth development)



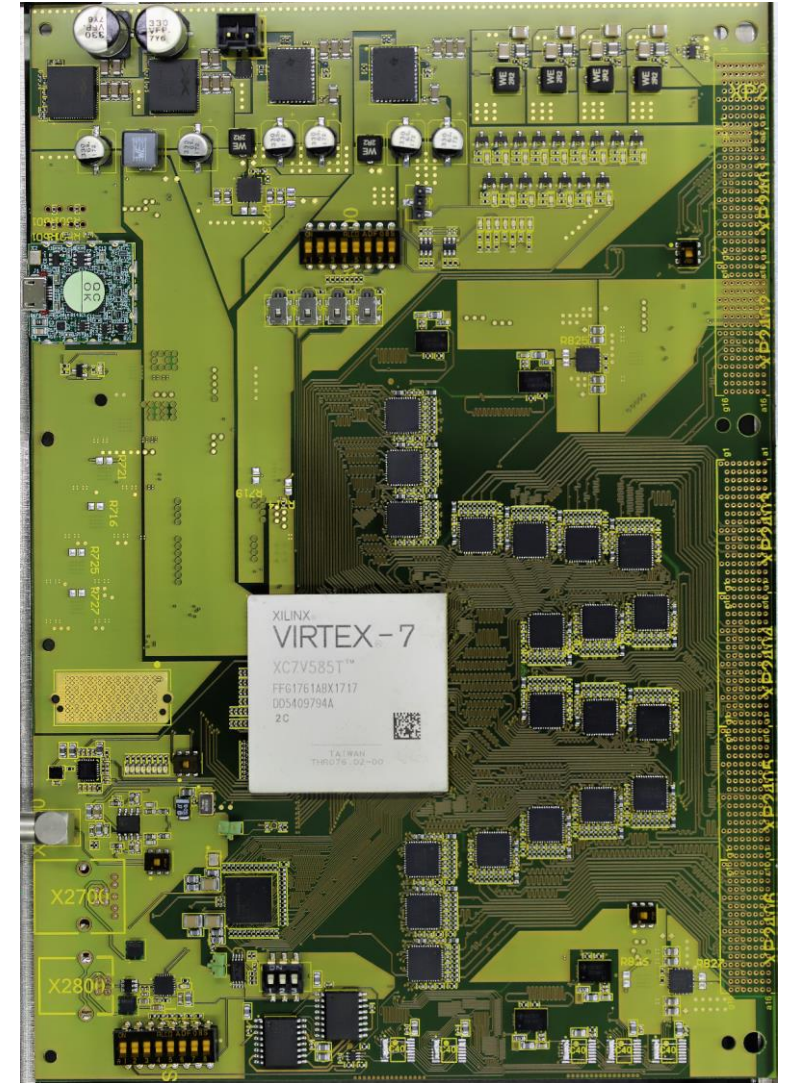
REAR TRANSITION MODULE

- Amplifier stages for 160 channels per board
- 5 input connectors for samtec cables (32 channels each)
- After receiving modules, serious error in layout was realized
- Found workaround for test, modules were usable with limitations
- Fix for further productions is done by external provider
- Slight revision of power supply needed
- Add contact area to ground plane for shielding



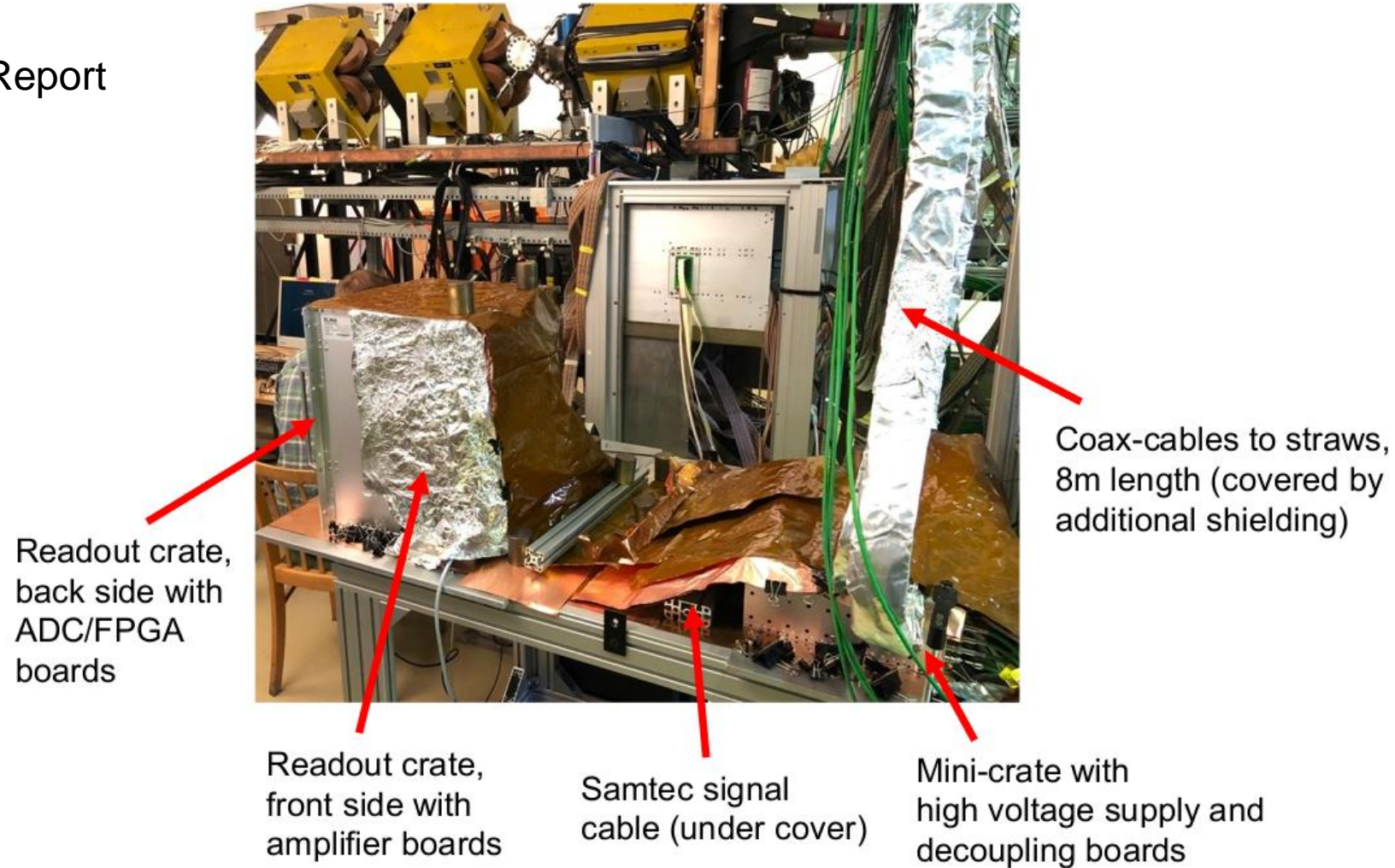
PROCESSING BOARD

- Sampling for 160 channels, 40 4-channel ADC
- Signal processing in single FPGA
- Layout was done with high attention on length compensation of signal lines
- Modules were produced with high delay, but
- **Modules run very well**
(high complexity, first revision)
- All 3 Modules produced run reliable during startup and beam time
- For further production, no extensive redesign is needed, just small modifications



MEASUREMENT SETUP

Beamtest Report
from Peter:

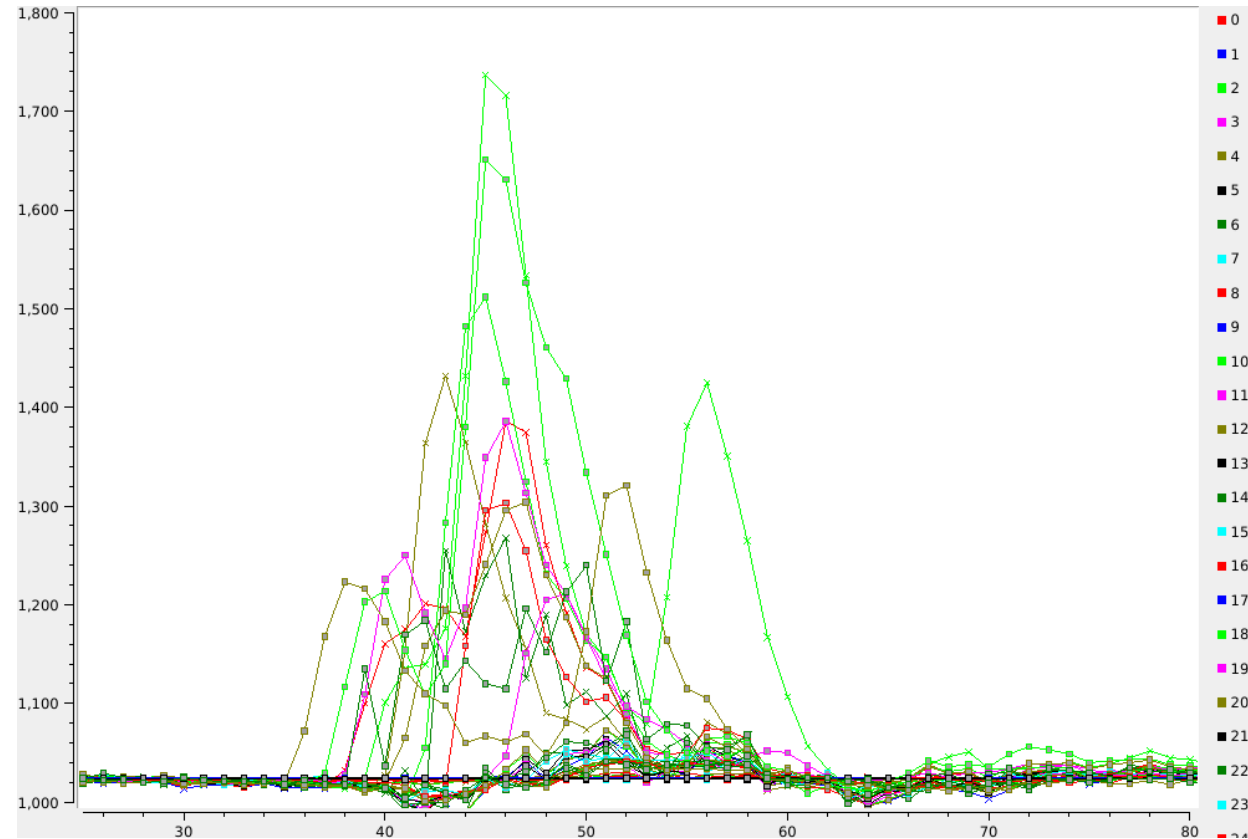


BEAMTEST

Due to delays, setup with limited number of channels was used

- One RTM / One Processing Board
- Layout error on RTM: 20 channels were not connected to Processing Board
- Generation of firmware for all channels very time consuming → used firmware with readout of 64 channels
- Shielding of cables HV <-> Processing Crate mandatory

BEAMTEST



- Sampling of Straw Pulses @ 100MHz

SUMMARY

- Successful development of electronics for ADC based DAQ system:
 - Crate, Amplifier Board, Processing Board
- Functionality of system could be shown
- Modules are ready for production with minor changes

OUTLOOK

General tasks to do

- Firmware development
 - Processing (almost done), communication, integration of SODA
- Development of System Controller
- Development of addon-Board of Processing Board, GTX-Transceiver
- Second revision of both boards (minor changes), will be done by us, no risks and additional costs

Estimation for needed time \approx 2 years