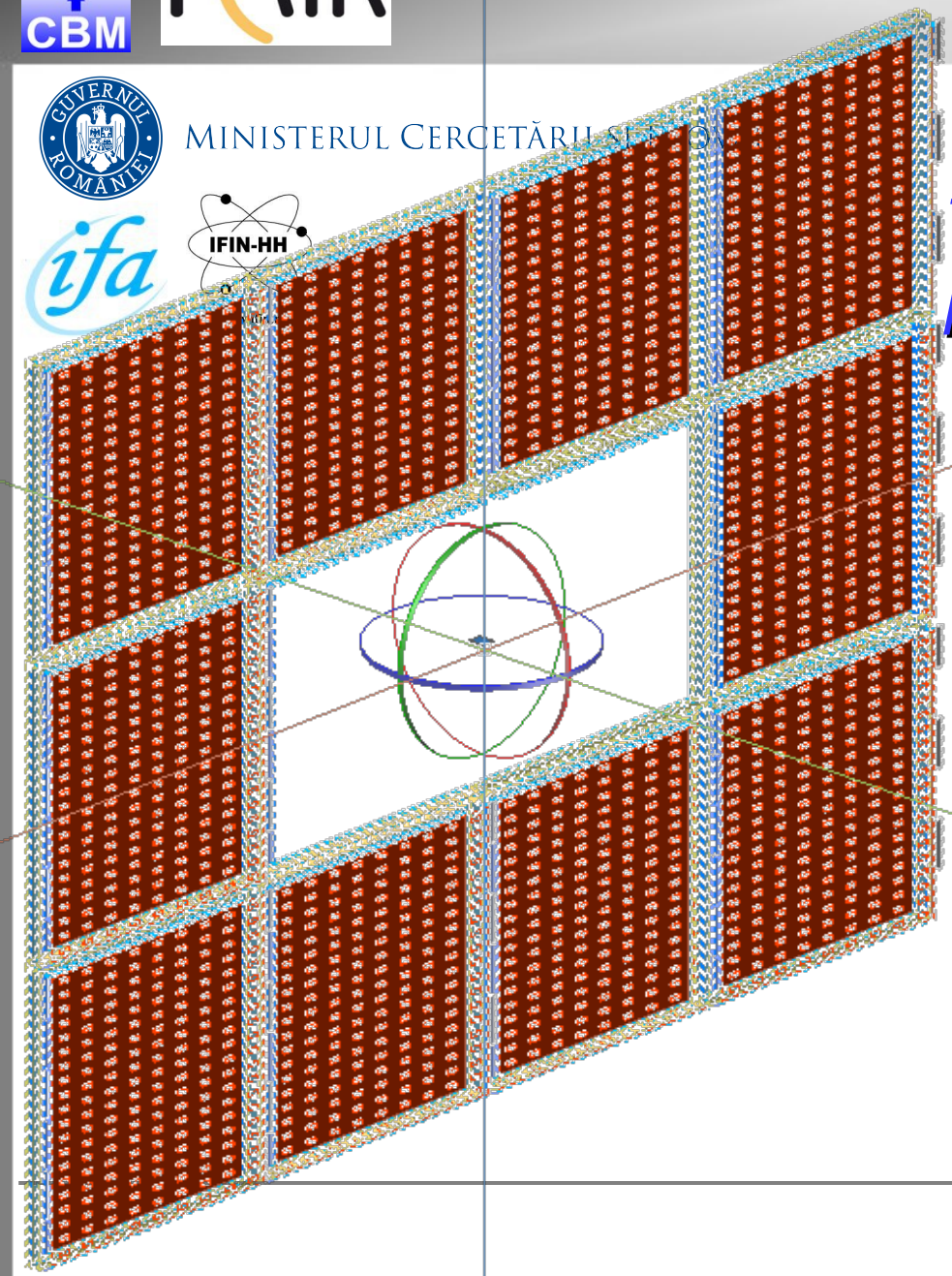
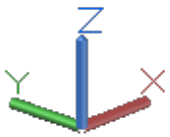


CBM-TRD Addendum

Tentative structure as starting point for preparation of the in-kind contract based on the Bucharest-solution for the inner zone of the CBM-TRD



Alex Bercuci for the Bucharest-TRD Group

CBM-TRD Retreat
27-29 March 2019
Schloß Waldthausen

Outlook

- Tentative structure of TRD-TDR Addendum
  - Results, availability and to-be-done
- Financial situation of the Romanian contribution at CBM/TRD

"The alternative chamber design is certainly very elegant and innovative, and the level of evaluation and tests is very impressive. The performance of the alternative electronics is also demonstrated to work well, it is however not yet on a level that is integrated in the system – digitization and readout logic development are still ahead which takes significant time and effort. Unless a significant improvement in overall performance for the CBM physics program can be demonstrated for the alternative solutions, the referees recommend to base the project on a uniform system using the presented baseline."

CBM TRD review, GSI, March 14th & 15th 2017
Reviewers:
Venelin Angelov (Heidelberg University)
Thomas Kirn (RWTH Aachen)
Christoph Rembser (CERN)
Werner Riegler (CERN)
Enrico Scomparin (INFN Torino)

Addendum

Addendum-TDR TRD

1. The Transition Radiation Detector of CBM.
link to existing TDR, objectives and physics
2. Tests on prototypes (this is not appearing in the original TDR)
2.1 Energy resolution - PID : Test-beams/lab Outstanding Results listed
2.2 Position resolution - Tracking : Test-beams/lab Outstanding Results listed
2.3 High rate capabilities : lab Outstanding Results listed
3. Readout Chamber (ROC) [detailed description]
3.1 ROC design - mounting structure
3.2 Pad Plane
3.3 Front-End Boards - mounting structure
4. FEE [detailed description]
4.1 FASP ASIC
4.2 GETS
4.2.1 High rate monitoring, recovery etc.
5. Software [detailed description]
5.1 Simulation (from ROC Garfield to FASP CADENCE)
5.2 Reconstruction (free-running, 2D position reconstruction)
5.3 Estimated performances in realistic simulations (CBM SIS100 setup)
6. Production
6.1 Local ROC production : Experience, infrastructure, manpower
6.2 External FEE production : Costs, availability, time
6.3 General Costs

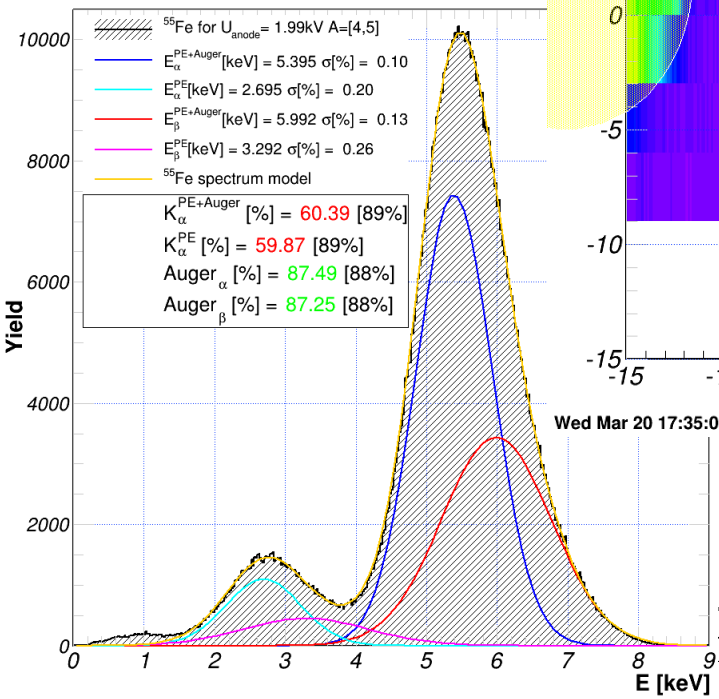
Addendum - Tests

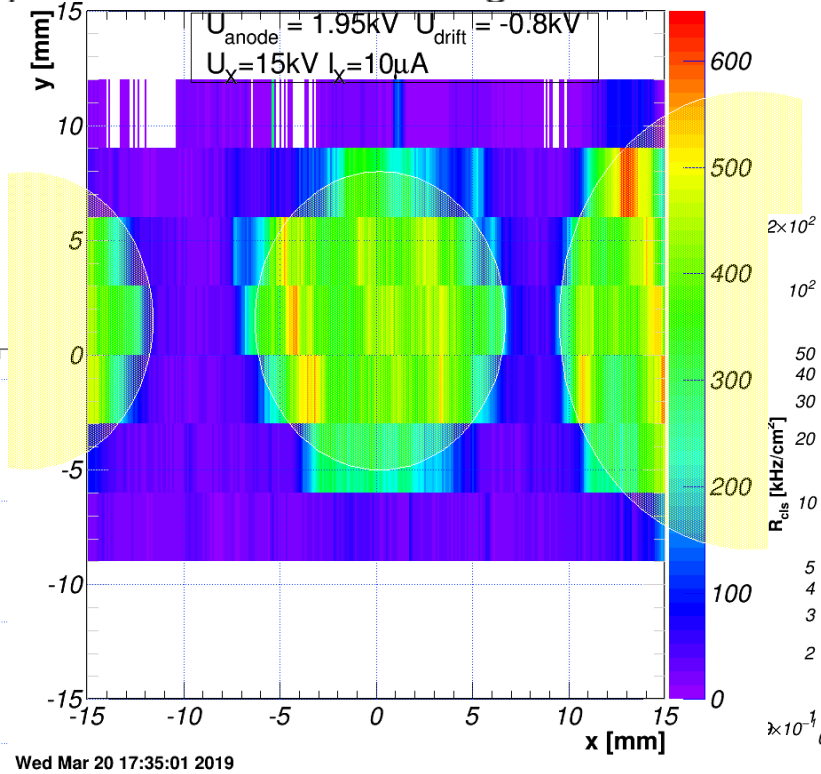
2. Tests on prototypes (this is not appearing in the original TDR) PS

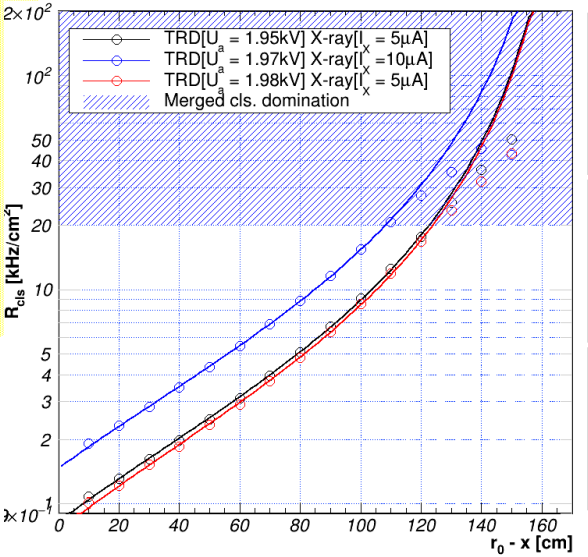
2.1 Energy resolution - PID : Test-beams/lab Outstanding Results listed SPS

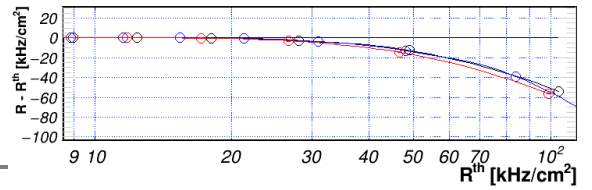
2.2 Position resolution - Tracking : Test-beams/lab Outstanding Results listed

2.3 High rate capabilities : lab Outstanding Results listed

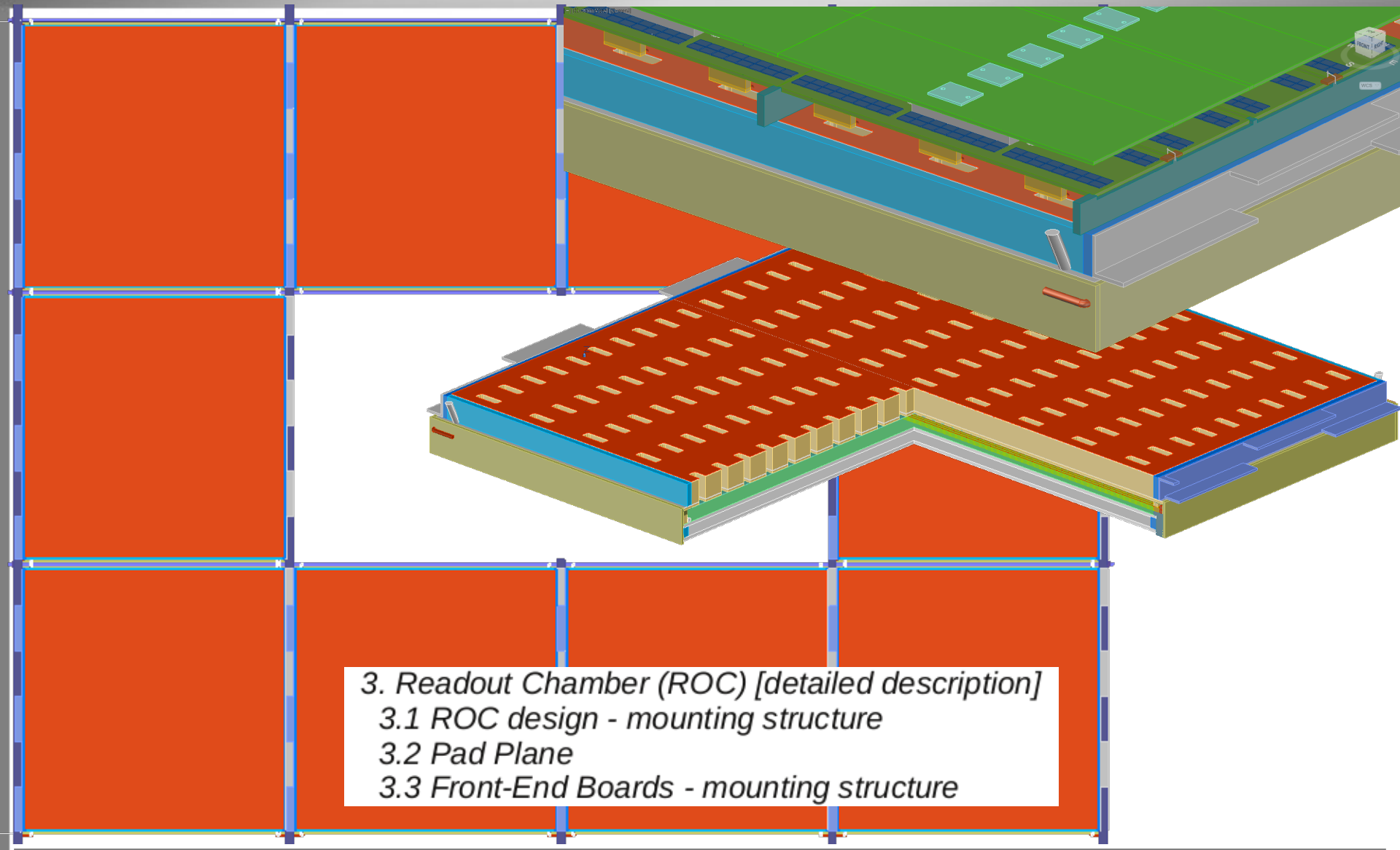








Addendum - Construction



3. Readout Chamber (ROC) [detailed description]
3.1 ROC design - mounting structure
3.2 Pad Plane
3.3 Front-End Boards - mounting structure

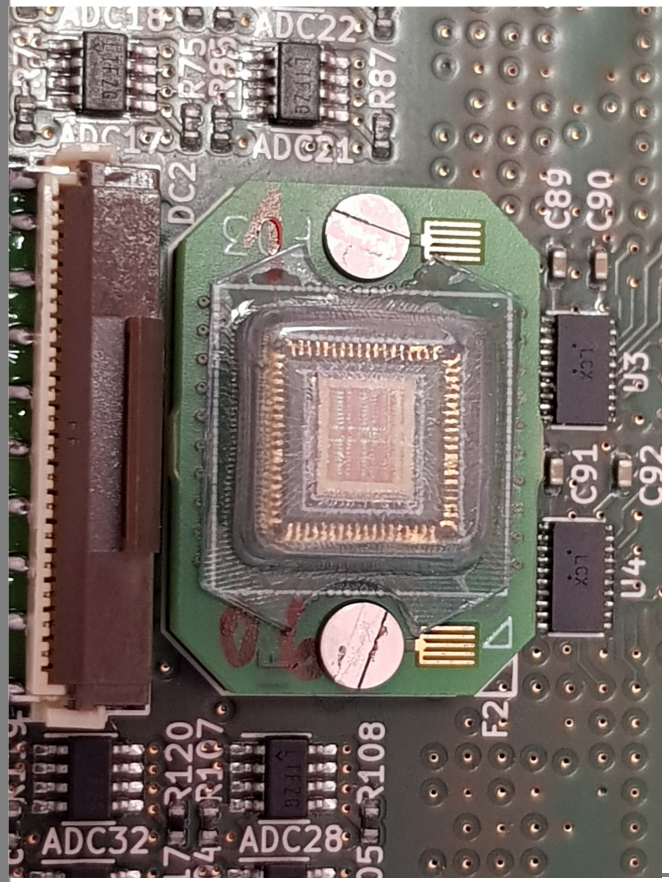
Addendum - FEE

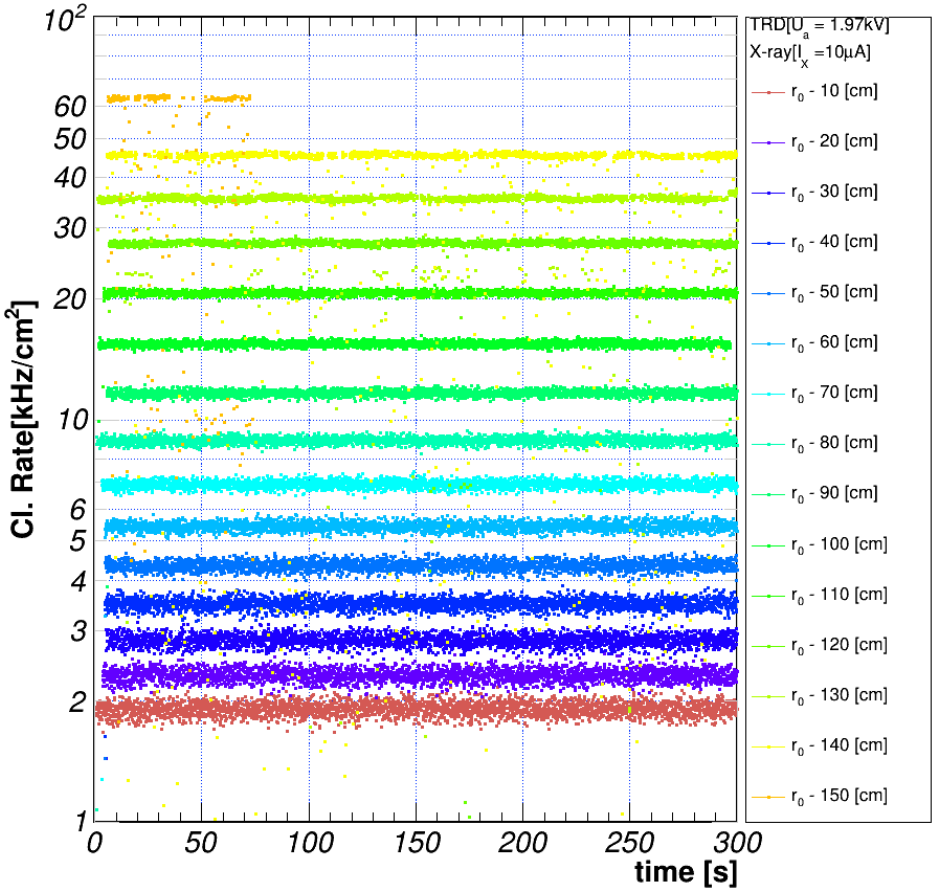
4. FEE [detailed description]

4.1 FASP ASIC CADENCE & SILICON

4.2 GETS PolarFire implementation

4.2.1 High rate monitoring, recovery etc.





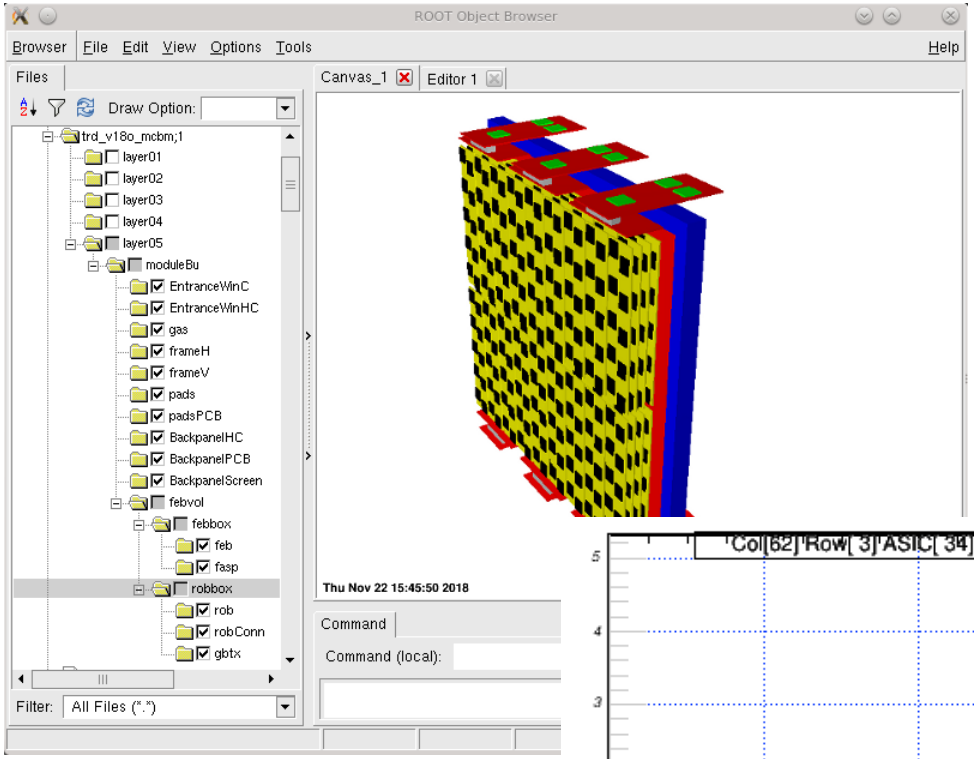
Addendum - Software

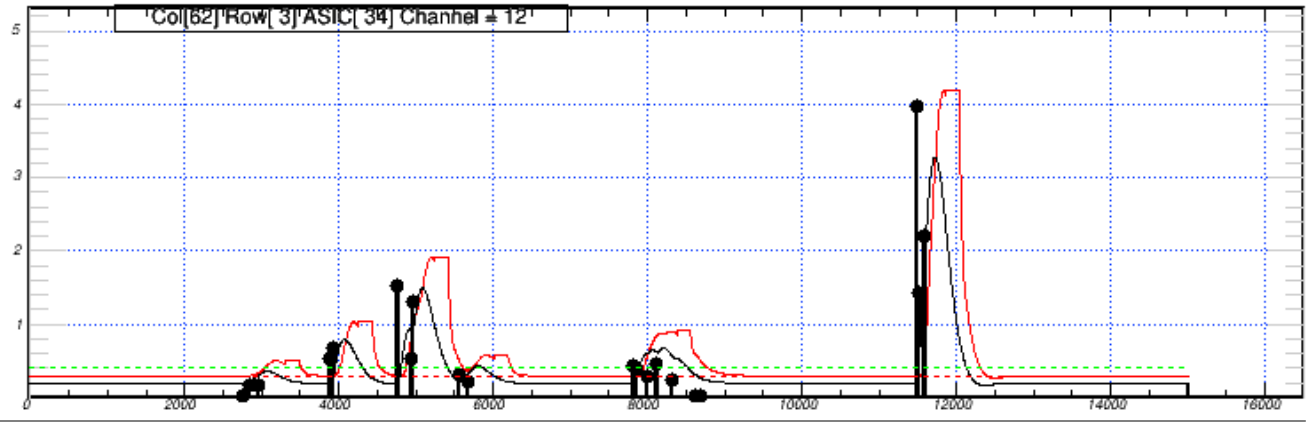
5. Software [detailed description]

5.1 Simulation (from ROC Garfield to FASP CADENCE)

5.2 Reconstruction (free-running, 2D position reconstruction) MOSTLY DONE

5.3 Estimated performances in realistic simulations (CBM SIS100 setup) TO BE DONE





Addendum - Production

6. Production
   6.1 Local ROC production : Experience, infrastructure, manpower
   6.2 External FEE production : Costs, availability, time **TO BE DONE**
   6.3 General Costs **TO BE DONE**

Financing the Buch-TRD project

Select zooming area. Right-click to zoom out.

All numbers refer to MSV

DEFINITIONS:

FAIR Budget = Amounts of money approved or expected from the FAIR Budget of 78 M Euro

Other sources = Amounts of money considered secured outside the FAIR Budget

EoI = Existing expression of interest by an institution

To be assigned = Amounts of money to be yet assigned to potentially interested funding agencies

Comments = All amounts mentioned herein are indicated in 2005 prices

		Information					2005 prices						2018 prices		
PSP code	System & description	TDR year of approval	Country	funding agency	institution	component belongs to CBM day 1 setup	Total Cost (2005 prices)	Secured amount (2005 price) FAIR Budget	Secured amount (2005 price) Other sources	EoI (2005 price)	To be assigned (2005 price)	Total Cost (2018 prices)	Secured amount (2018 price) FAIR Budget	Secured amount (2018 price) Other sources
	Select zooming area. Right-click to zoom out.													
			Russia	ROSATOM	NRC Kurchatov Institute (PNPI)	1	0			0		0	0	0
1.1.1.3.2.4	Muon Detector (MUCH)		Russia	ROSATOM	to be determined	1	490			490		704	0	0
1.1.1.4	Transition Radiation Detector (TRD)	approved in 2018				1	2544					3654		
1.1.1.4.1	Transition Radiation Detector (TRD)		Germany	BMBF-VF	Institut für Kernphysik, Universität Frankfurt	1	478		321	156		686	0	462
1.1.1.4.3	Transition Radiation Detector (TRD)		Germany	BMBF-VF	Frankfurt	1	166		71	94		238	0	103
1.1.1.4.4	Transition Radiation Detector (TRD)		Germany	BMBF-VF	Institut für Kernphysik, Universität Münster	1	488		321	167		701	0	461
1.1.1.4.2.1	Transition Radiation Detector (TRD)	X	Romania	MEN	IFIN-HH	1	752	752				1080	1080	0
1.1.1.4.2.2	Transition Radiation Detector (TRD)		Romania	MEN	IFIN-HH	1	482		482			693	0	693
1.1.1.4.5	Transition Radiation Detector (TRD)		to be assigned		to be assigned	1	0				0	0	0	0
1.1.1.4..6	Transition Radiation Detector (TRD)		Hungary	Hungarian Academy of Sciences	Wigner Research Center	1	179		36	143		256	0	51
1.1.1.5	Time of Flight System (TOF)	approved in 2015				1	5857					8411		
1.1.1.5.1	Time of Flight System (TOF)		Germany	BMBF / HMWK	GSI	1	740	740				1063	1063	0

CBM financial coordinator
FAIR RRB, November 2018