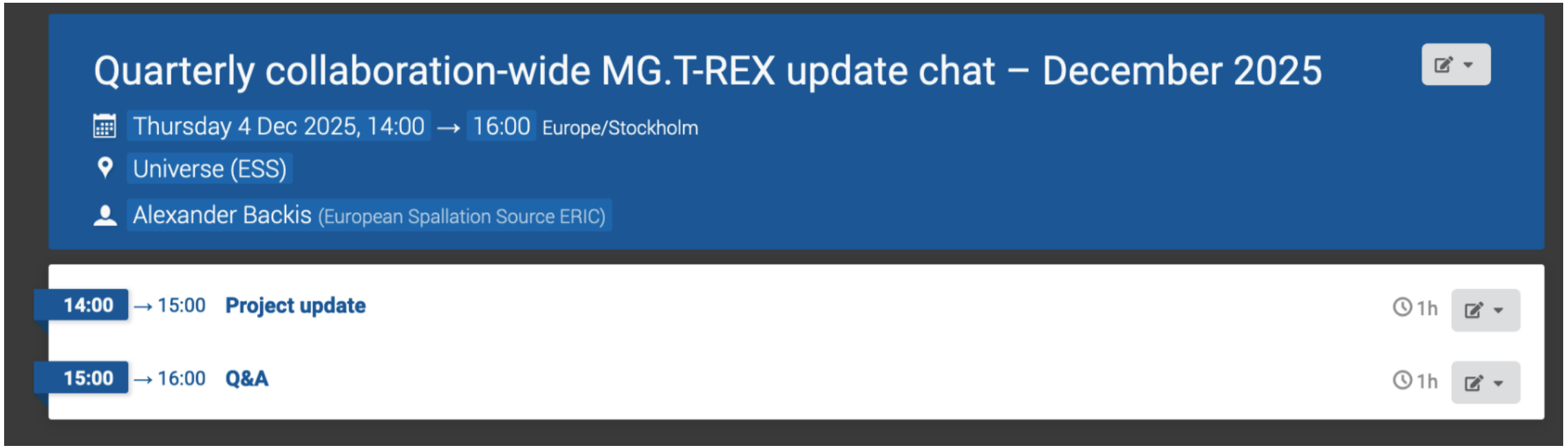

Quarterly collaboration-wide MG.T-REX update chat – December 2025
Thursday 4 Dec 2025, 14:00 → 16:00 Europe/Stockholm
Universe (ESS)
Alexander Backis (European Spallation Source ERIC)
14:00 → 15:00 Project update
1h
15:00 → 16:00 Q&A
1h

Project overview

PRESENTED BY ALEXANDER BACKIS, DAVID HANSSON, JOSEF EID AND JOHN ANNAND

2025-12-04

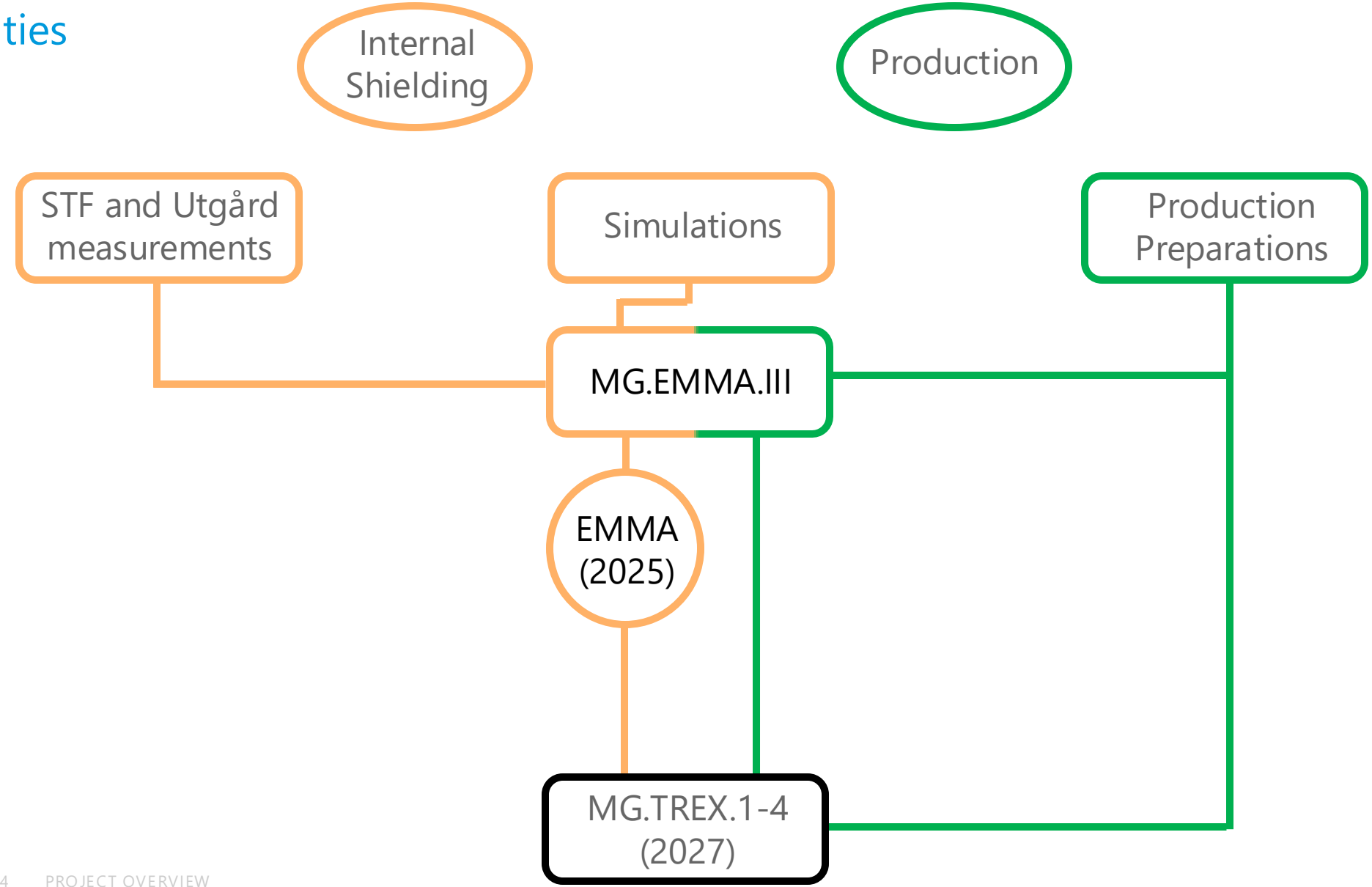
Agenda

1.

Activities

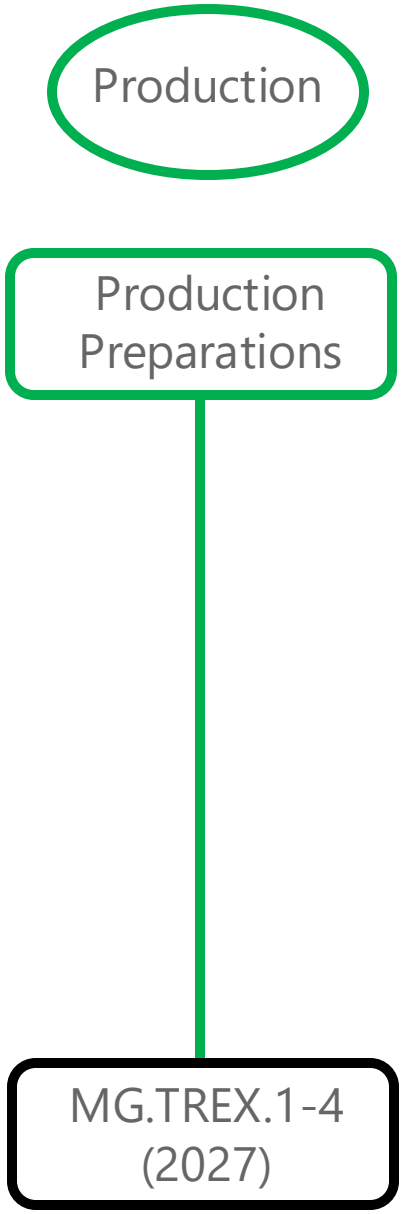
1. Overview

Activities



1. Overview

Activities

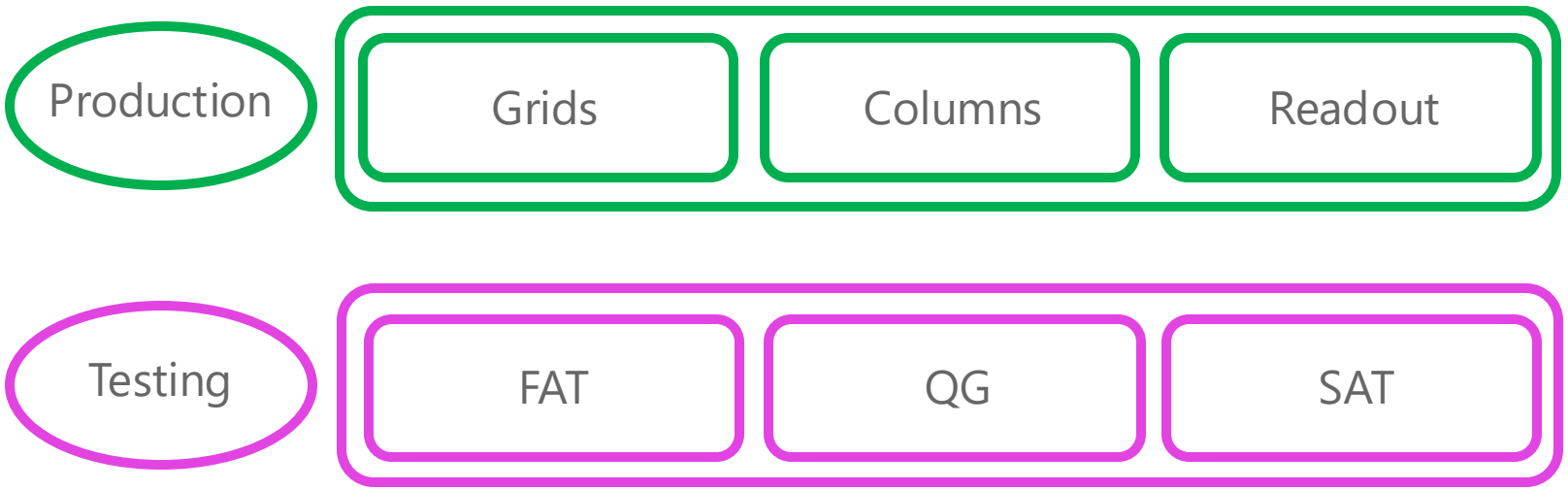


1. Overview

Activities

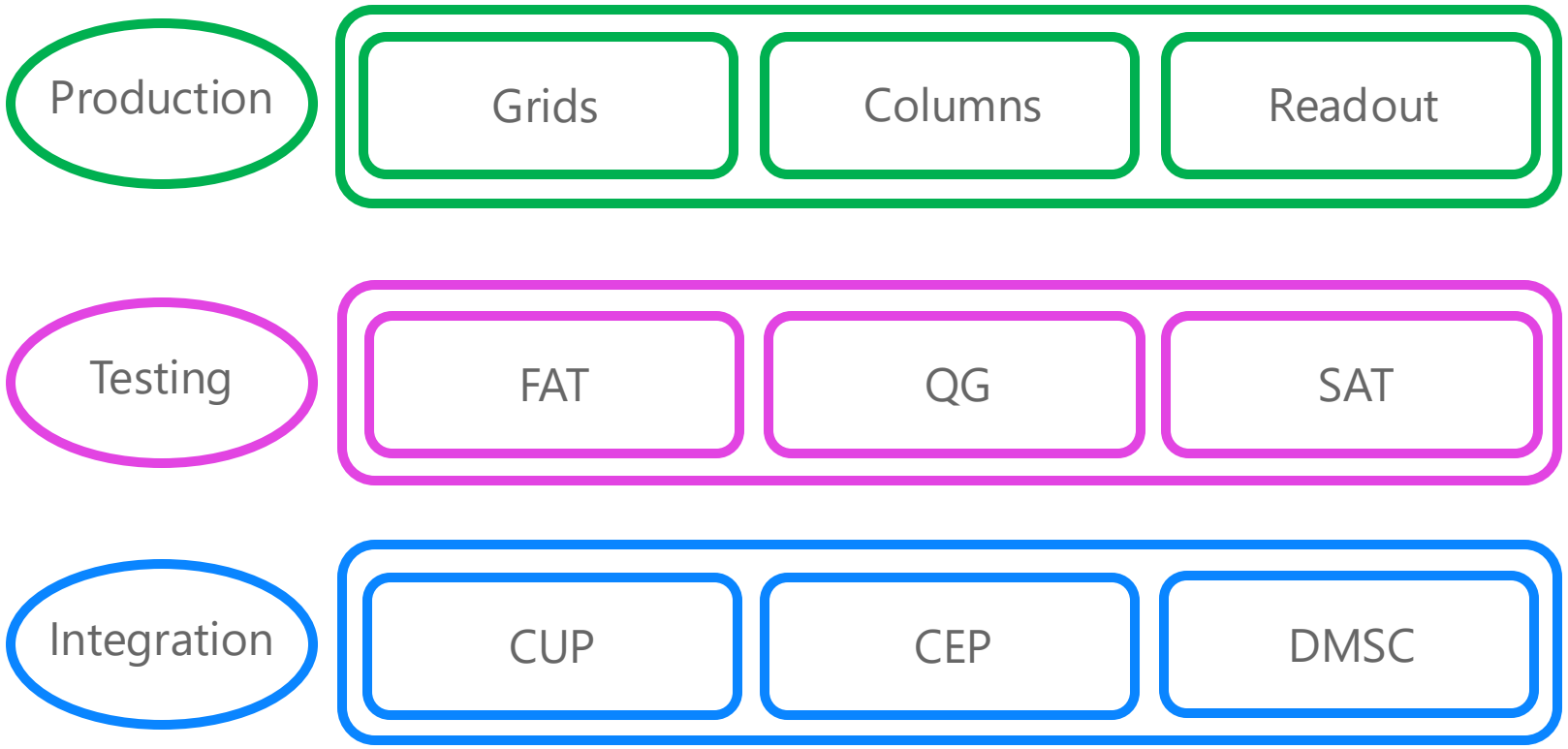
1. Overview

Activities



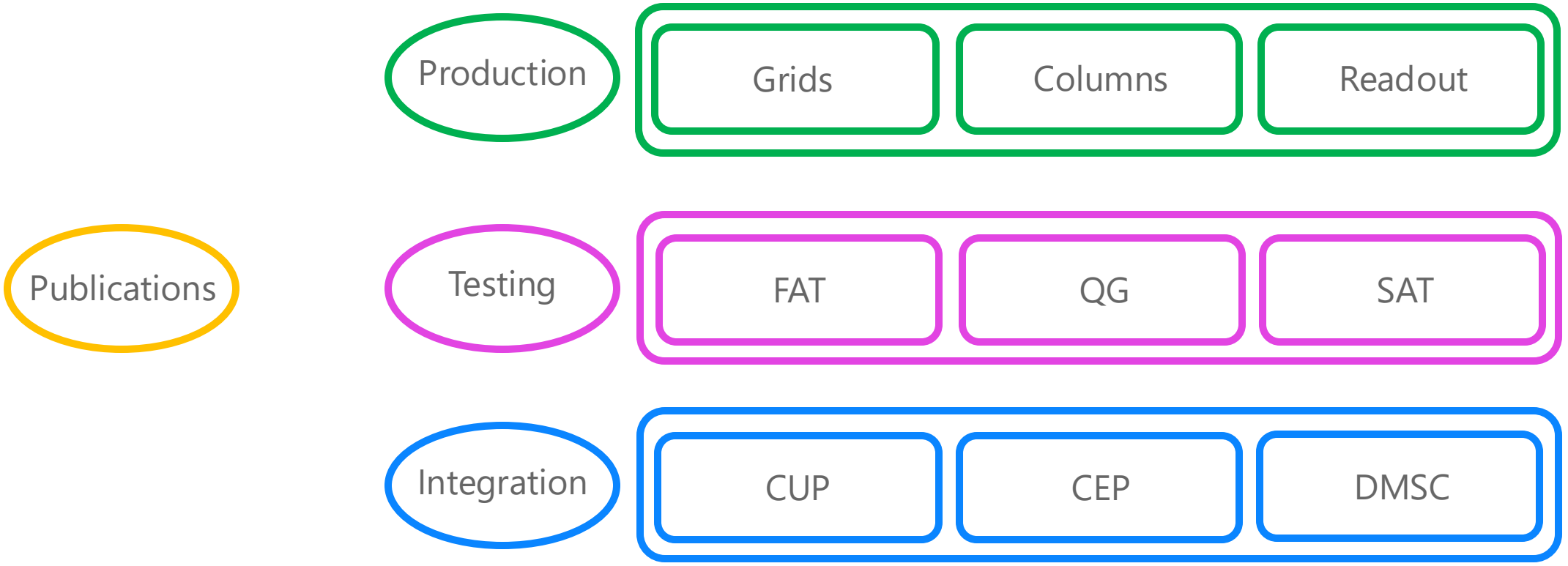
1. Overview

Activities



1. Overview

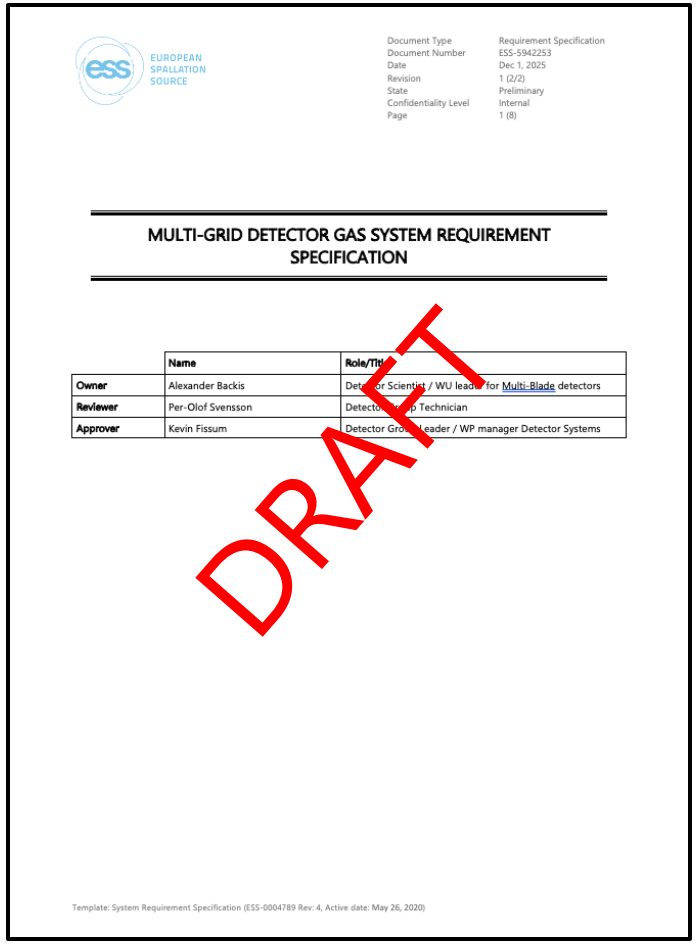
Activities



1. Overview

Activities

CUP



EUROPEAN SPALLATION SOURCE

Document Type	Requirement Specification
Document Number	ESS-5942253
Date	Dec 1, 2025
Revision	1 (2/2)
State	Preliminary
Confidentiality Level	Internal
Page	1 (8)

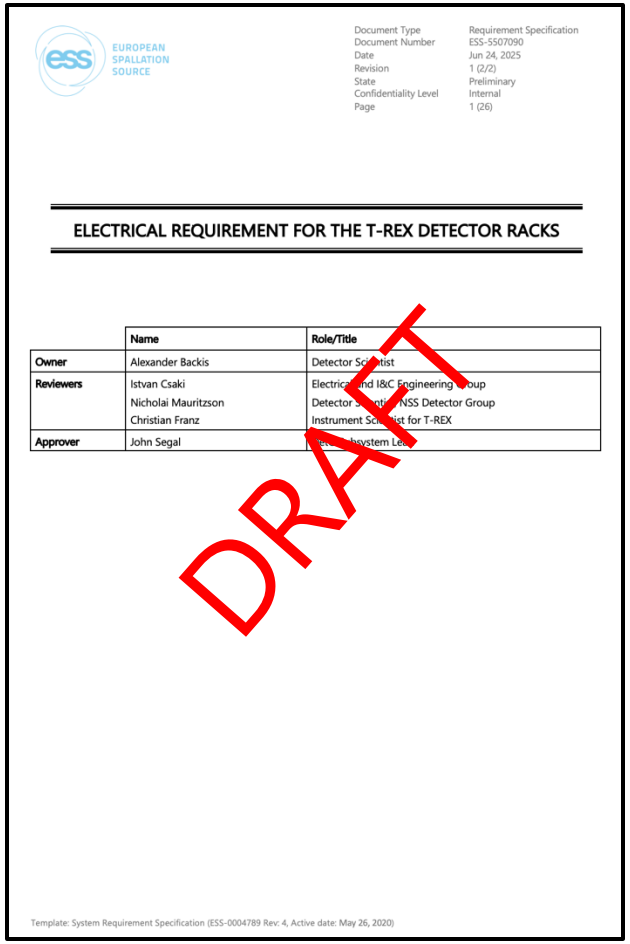
MULTI-GRID DETECTOR GAS SYSTEM REQUIREMENT SPECIFICATION

	Name	Role/Title
Owner	Alexander Backis	Detector Scientist / WU leader for Multi-Blade detectors
Reviewer	Per-Olof Svensson	Detector Group Technician
Approver	Kevin Fissum	Detector Group Leader / WP manager Detector Systems

DRAFT

Template: System Requirement Specification (ESS-0004789 Rev: 4, Active date: May 26, 2020)

CEP



EUROPEAN SPALLATION SOURCE

Document Type	Requirement Specification
Document Number	ESS-5507090
Date	Jun 24, 2025
Revision	1 (2/2)
State	Preliminary
Confidentiality Level	Internal
Page	1 (26)

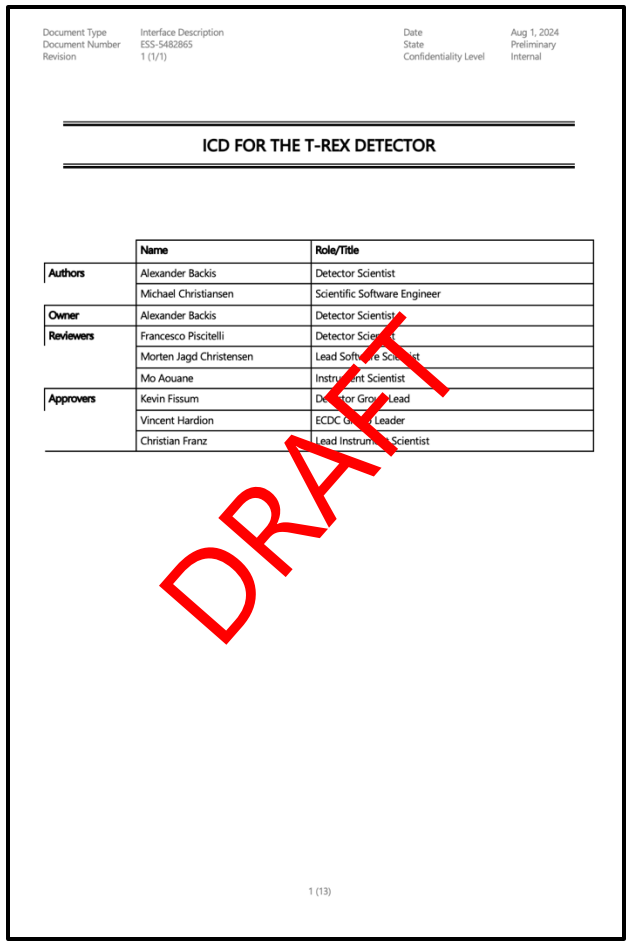
ELECTRICAL REQUIREMENT FOR THE T-REX DETECTOR RACKS

	Name	Role/Title
Owner	Alexander Backis	Detector Scientist
Reviewers	Istvan Csaki	Electrical and I&C Engineering Group
	Nicholai Mauritzson	Detector Scientist, NSS Detector Group
	Christian Franz	Instrument Scientist for T-REX
Approver	John Segal	Detector System Lead

DRAFT

Template: System Requirement Specification (ESS-0004789 Rev: 4, Active date: May 26, 2020)

DMSC



Document Type	Interface Description	Date	Aug 1, 2024
Document Number	ESS-5482865	State	Preliminary
Revision	1 (1/1)	Confidentiality Level	Internal

ICD FOR THE T-REX DETECTOR

	Name	Role/Title
Authors	Alexander Backis	Detector Scientist
	Michael Christiansen	Scientific Software Engineer
Owner	Alexander Backis	Detector Scientist
Reviewers	Francesco Piscitelli	Detector Scientist
	Morten Jagd Christensen	Lead Software Scientist
	Mo Aouane	Instrument Scientist
Approvers	Kevin Fissum	Detector Group Lead
	Vincent Hardion	ECDC Group Leader
	Christian Franz	Lead Instrument Scientist

DRAFT

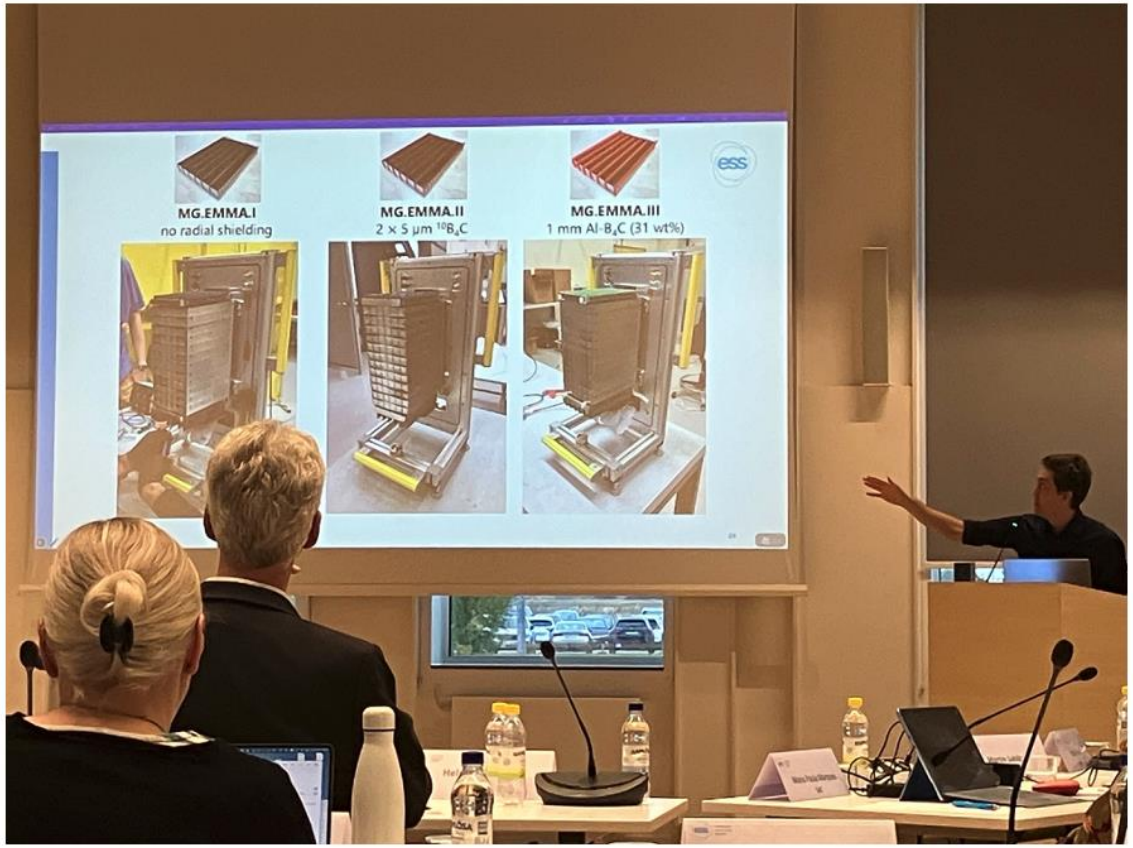
1 (13)

2.

Updates

2. Updates

SAC presentation



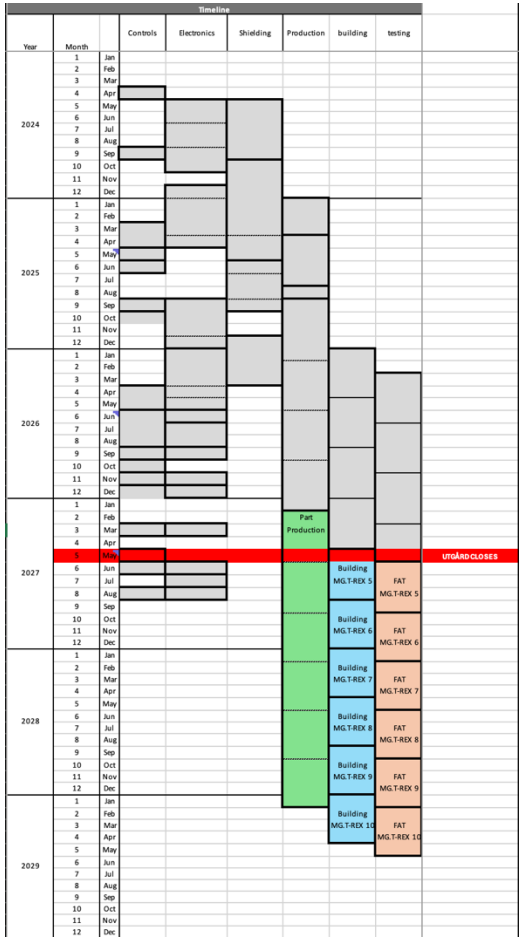
2. Updates

Funding for remaining 60% detector coverage

Non-labour

	Category			Item / Service	Minimum quantity	Spare
Detector system	Columns	Grids	Normal blades	Radiopure Al sheets	1068	107
				Etching	1068	107
				Al-B4C targets	24	3
			Radial blades	Al-B4C sheets	636	64
				Micro Waterjet	22176	2218
				Ni-plating	22176	2218
				End shielding	3168	317
			Grid blocks	Standard	3024	303
				Cut-out	144	15
				Cutting triple normal blades	22176	2218
				Assembling grids	3168	317
				Glueing grids	3168	317
				Ultra low cap head screw	12672	1268
				Hexagon socket cap head screw	6336	634
				Wire	13	2
				Backbone	36	4
				Backbone insulator	36	4
				H-spacers	6264	627
				End-grid spacers	144	15
				Carriages	144	15
				Column stopper	36	4
				End-grid bracket	36	4
				End-grid bracket bottom	36	4
		End grids		End grid Front	72	8
				End grid Back	72	8
		Wire PCBs	Signal PCB	Pad PCB	36	4
				Component PCB	36	4
				HV PCB	36	4
		Backbone PCB		Top	36	4
				Centre	36	4
				Bottom	36	4
				Aggregator PCB	36	4
	Cabling	HV		SHV cables	72	8
				HV strip	36	4
		Data		Flat cables	180	18
				Samtec cables	144	15
				HDMI cables	72	8
				Optical fibres	48	5
		Slow control		Ethernet cables	7	1
	Front-end	Assistor box		Hybrids	72	8
				Mini-assistors	18	2
				Power distributor	18	2
				Pent-house box PCB	36	4
				12U rack	6	1
				Power supply box	6	1
				Pent-house box	18	2
		Interface box		Network switch	1	1
				12U rack	6	1
				Patch panel - optical fibres	1	1
				Patch panel - HV	3	1
		E-box		Interface PCB	36	4
	Back-end			Master rack + power distribution panel	1	0
				UPS 11 kVA (main unit + 2 batteries)	1	0
				PDU+dongle	2	1
				Network switch	1	1
				Fibre patch panel	4	1
				RMM	1	0
				Server RMM	1	1
	HV			CAEN 12ch power supply	3	1
	Gas			Gas system	1	0

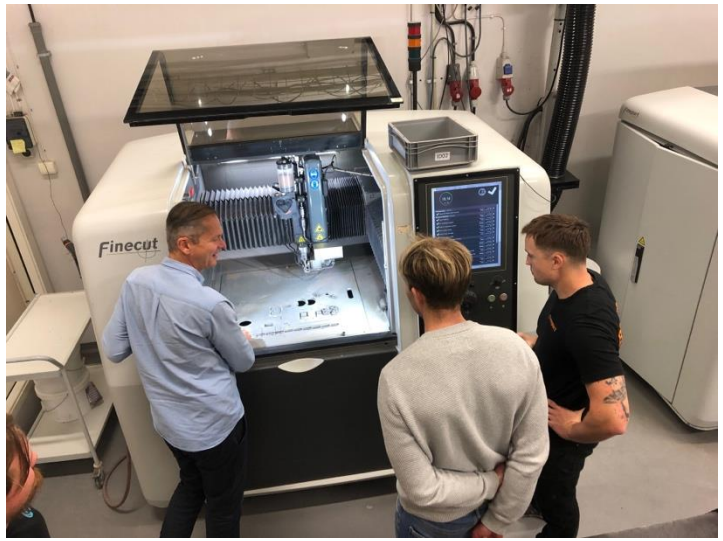
Labour



2. Updates

Contracts signed with Finepart, HP Etch and Provexa

Finepart

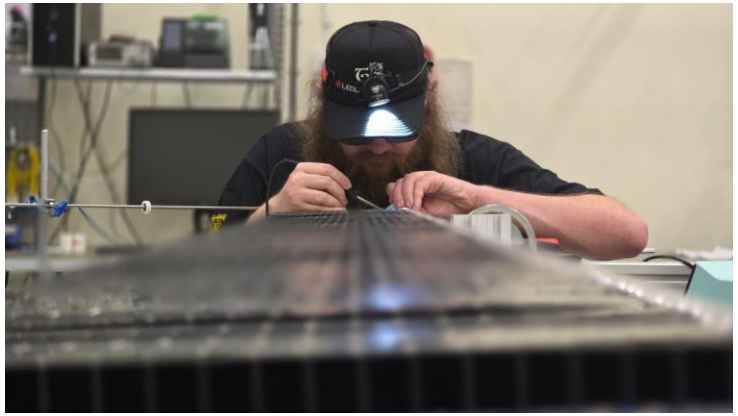


HP Etch

Provexa

2. Updates

Glasgow contract signed

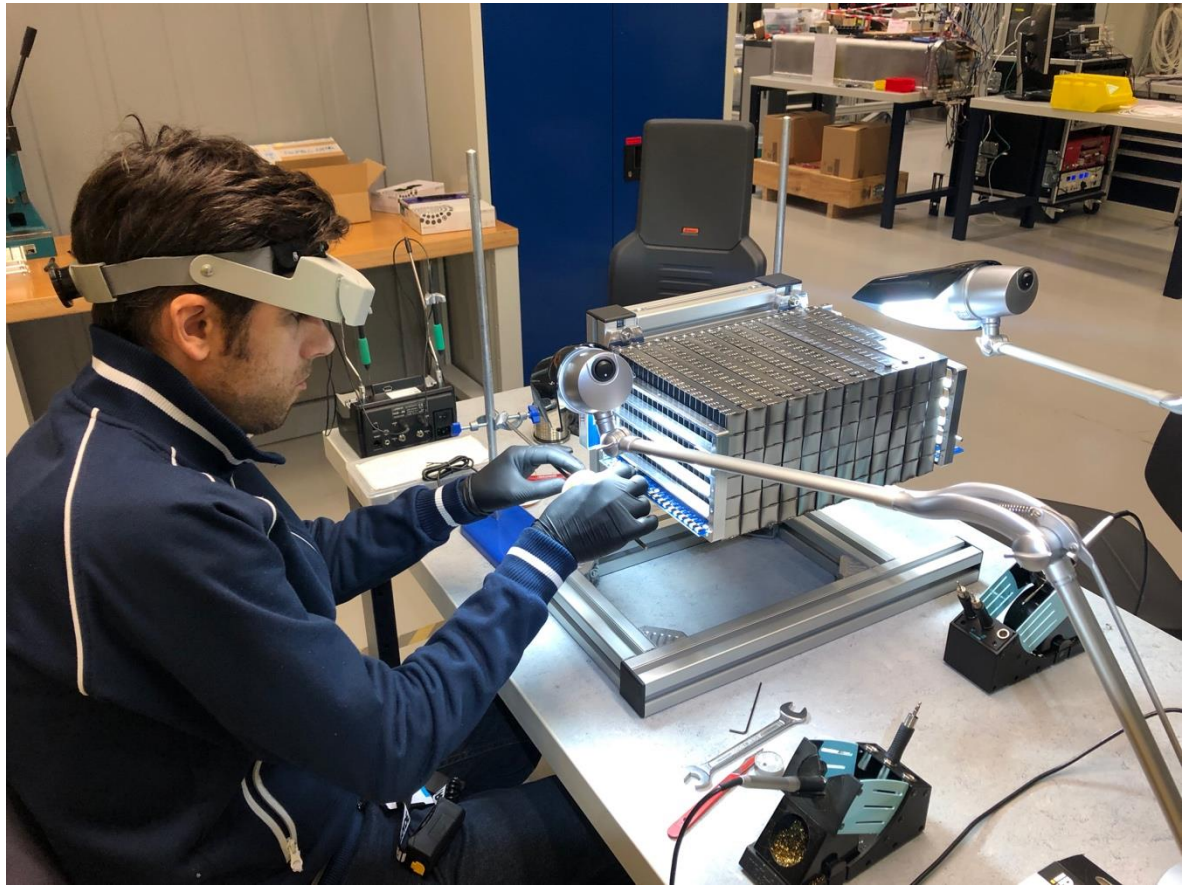


Duration
January 2026 – December 2027

Scope
- Column assembly and wiring
- FAT and QG
- Installation
- SAT
- Peer reviewed publications

2. Updates

Erlis transitions to permanent contract



2. Updates

Parental leave

Initial parental leave
January 1 -> February 9

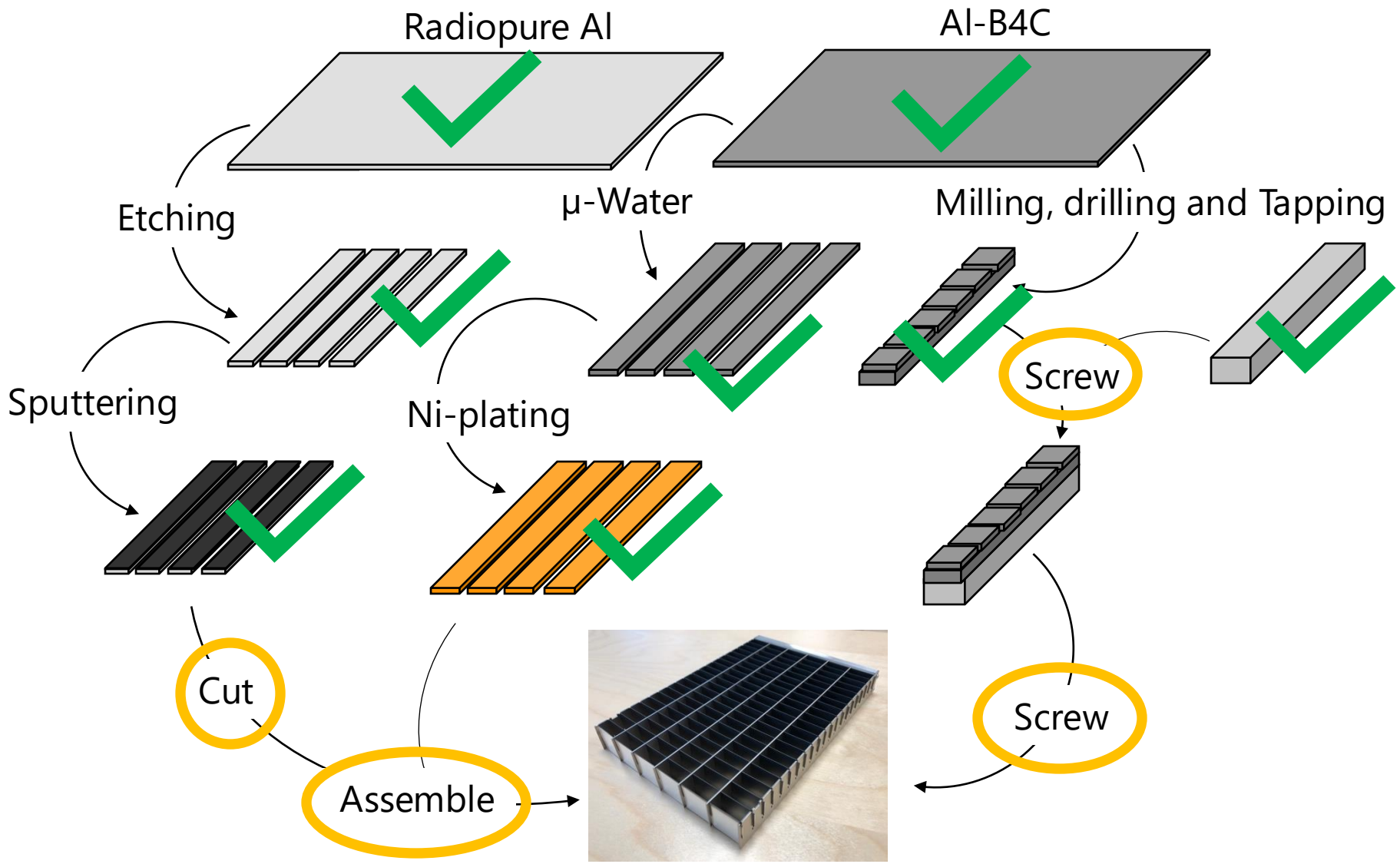
Acting MG work unit leads
- Francesco Piscitelli
- Chung-Chuan Lai

3.

Production

3. Production

Grids



3. Production

Grids

Al-B4C sheets delivery

Al-B4C sheets quality assurance

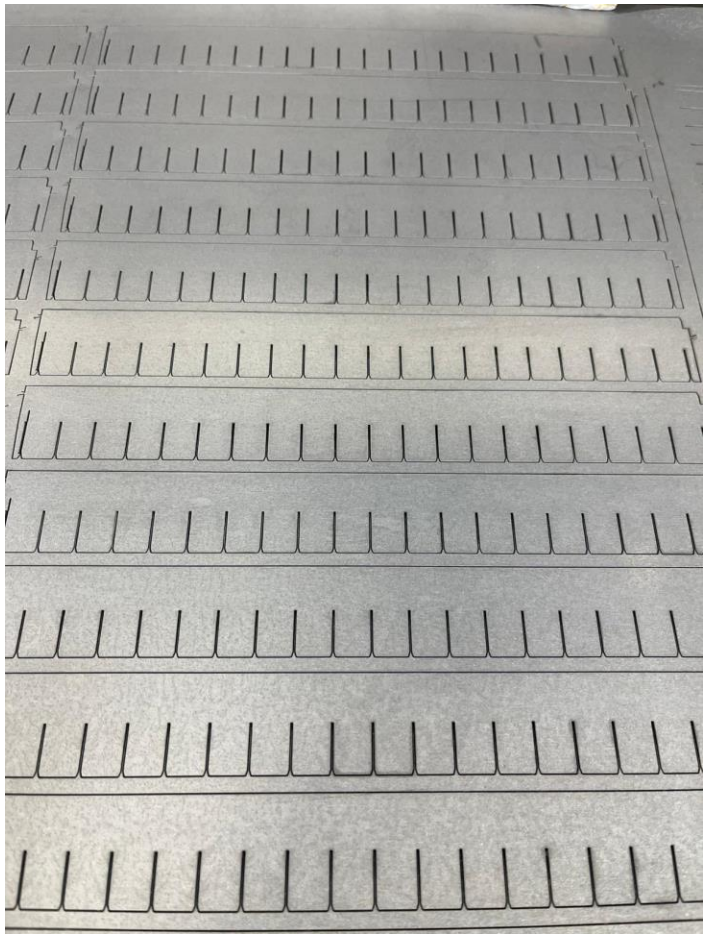
3. Production

Grids

3. Production

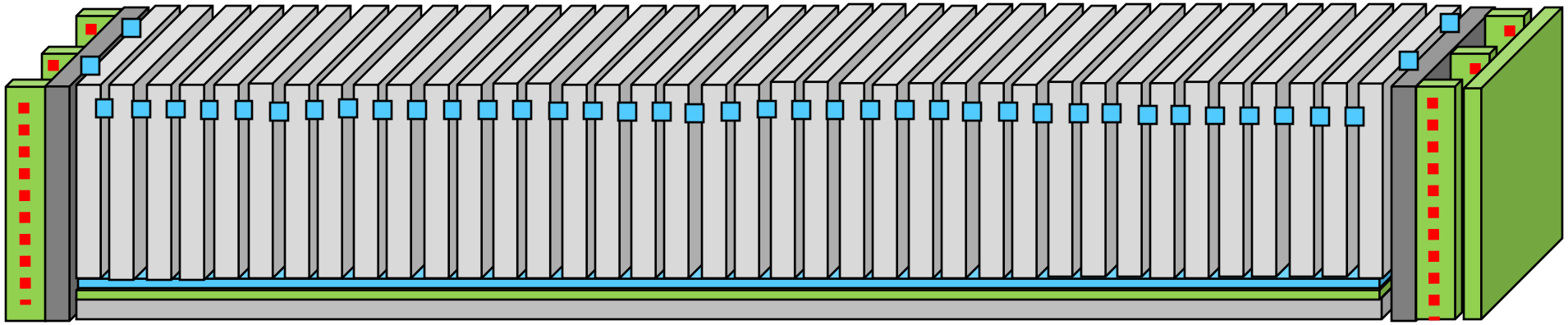
Grids

Micro water jet



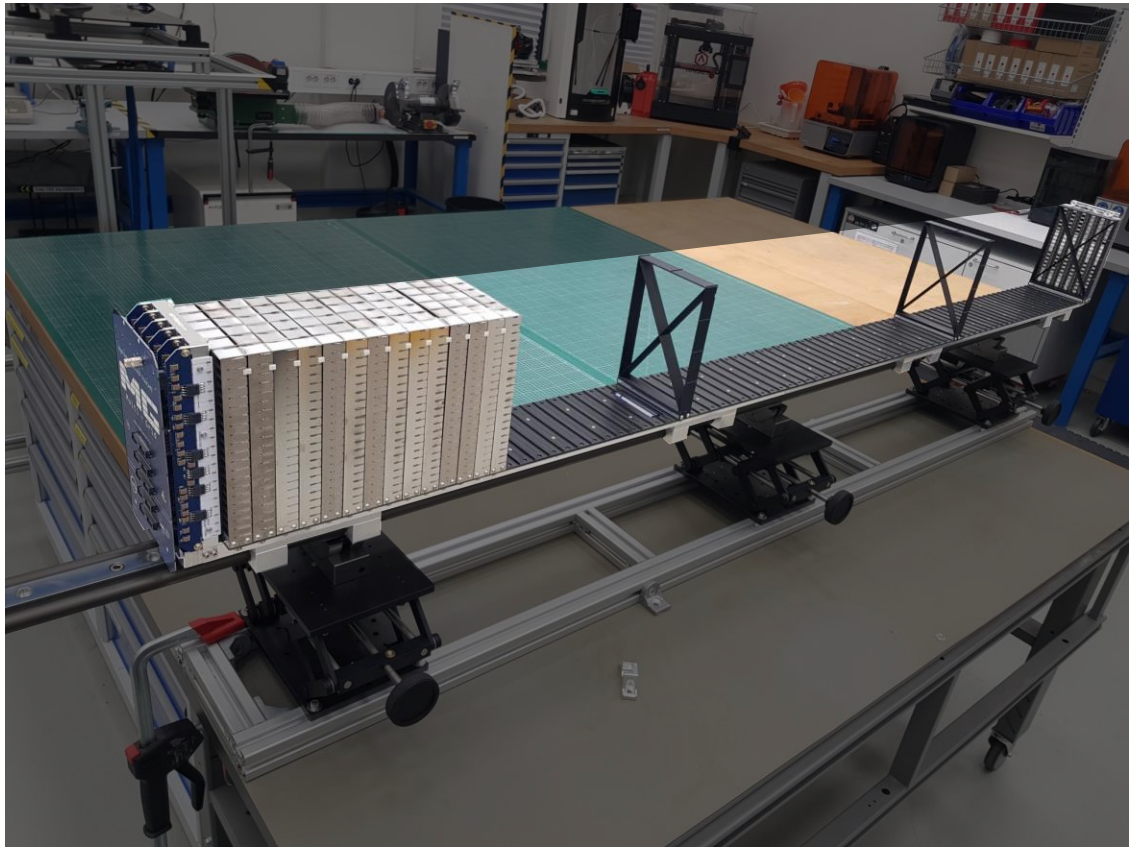
3. Production

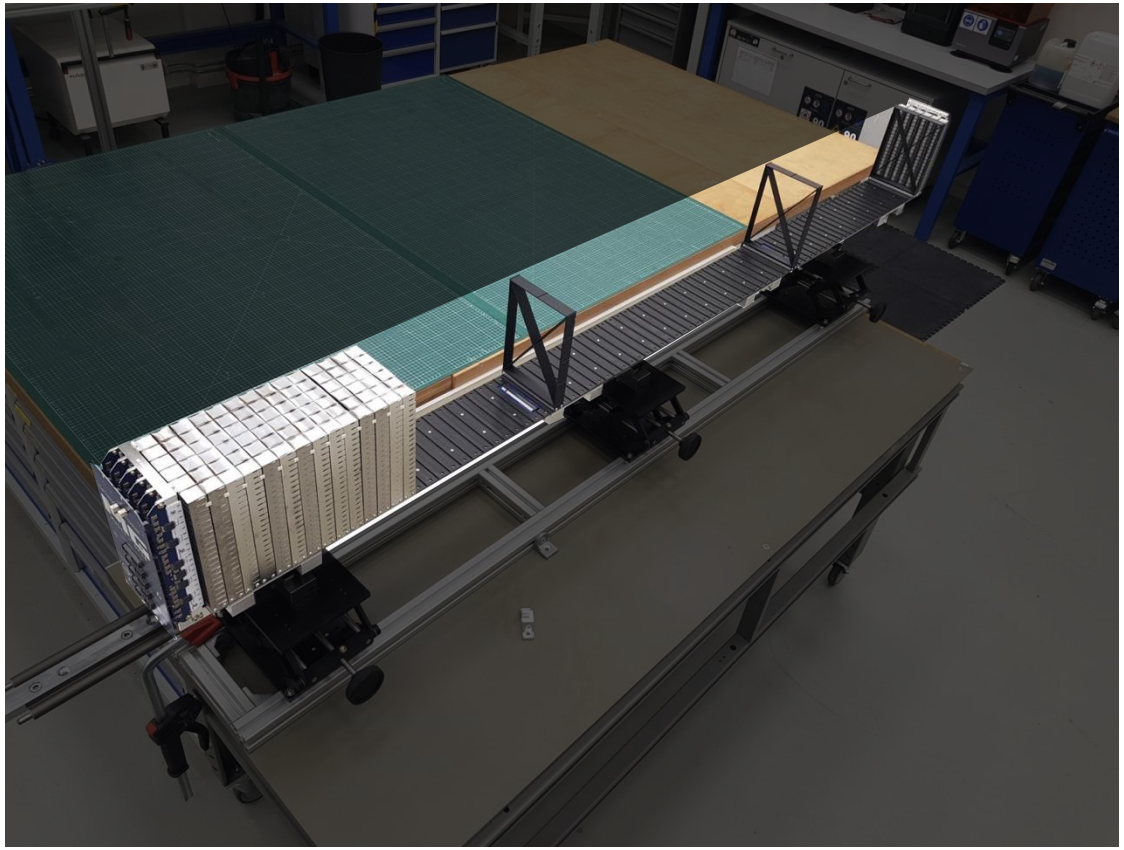
Columns



3. Production

Columns





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Columns

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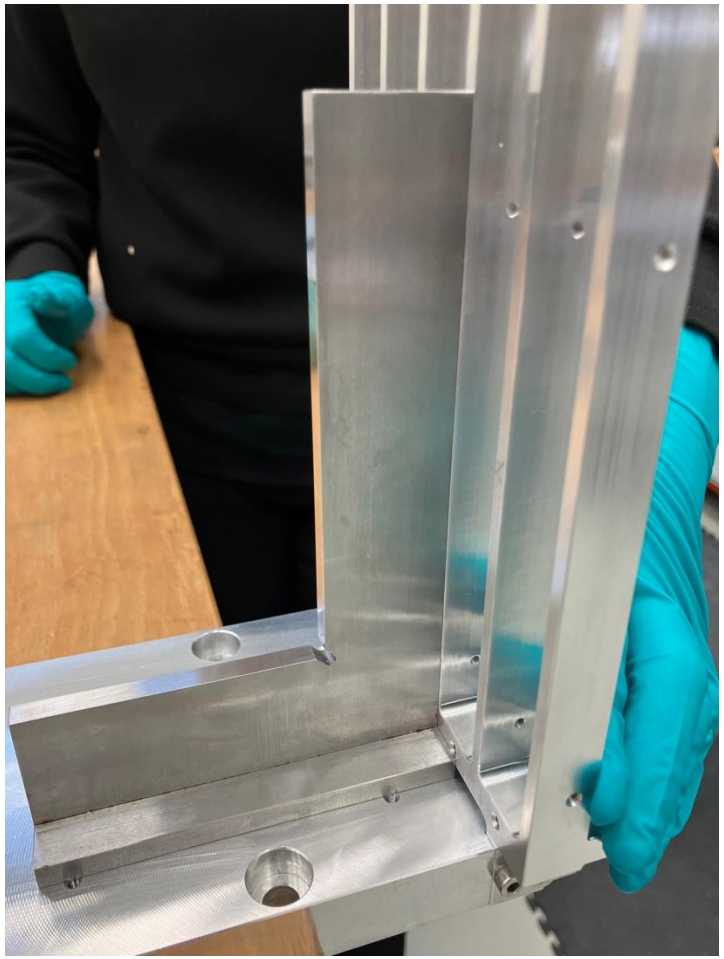
Columns



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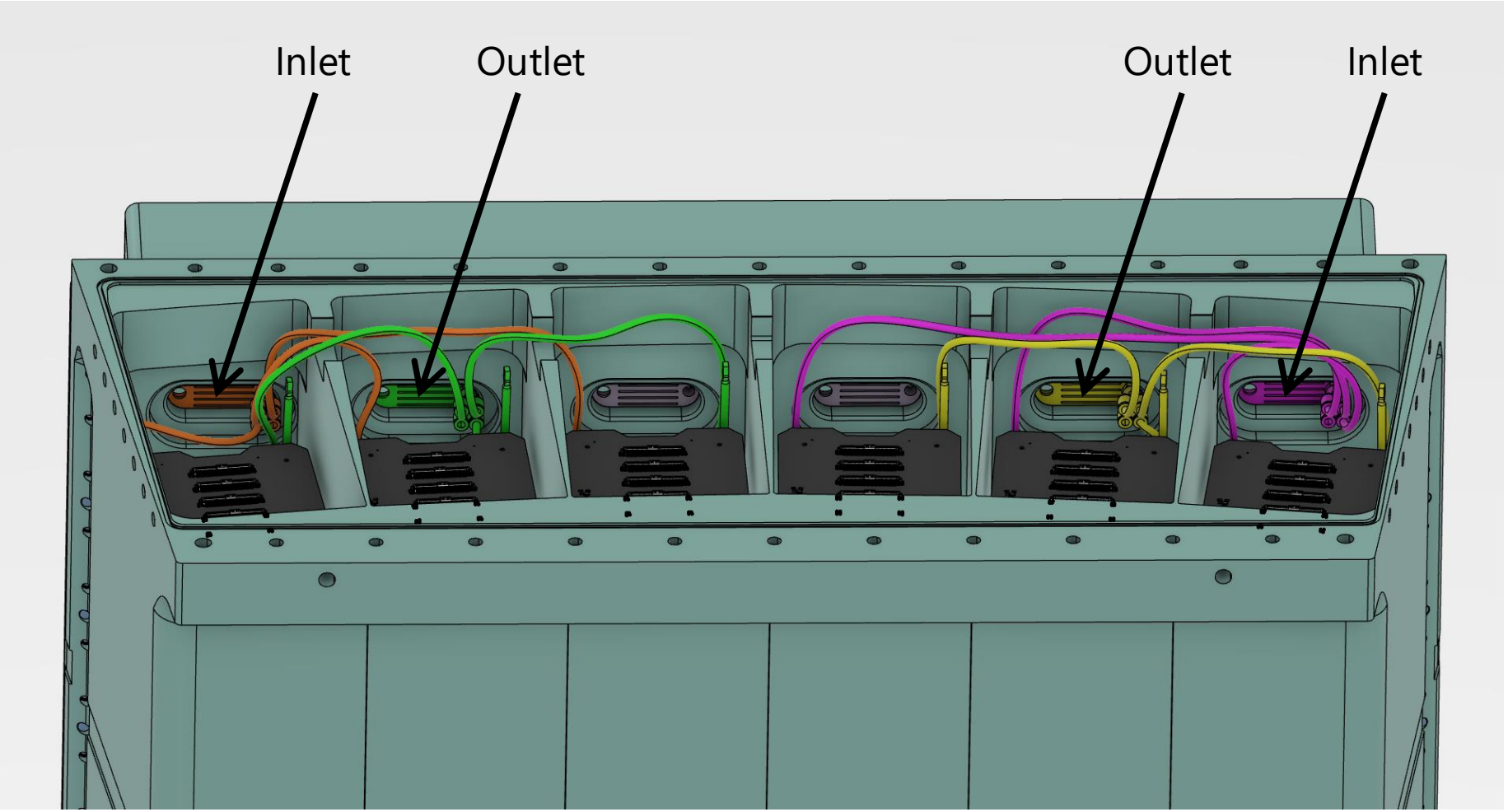
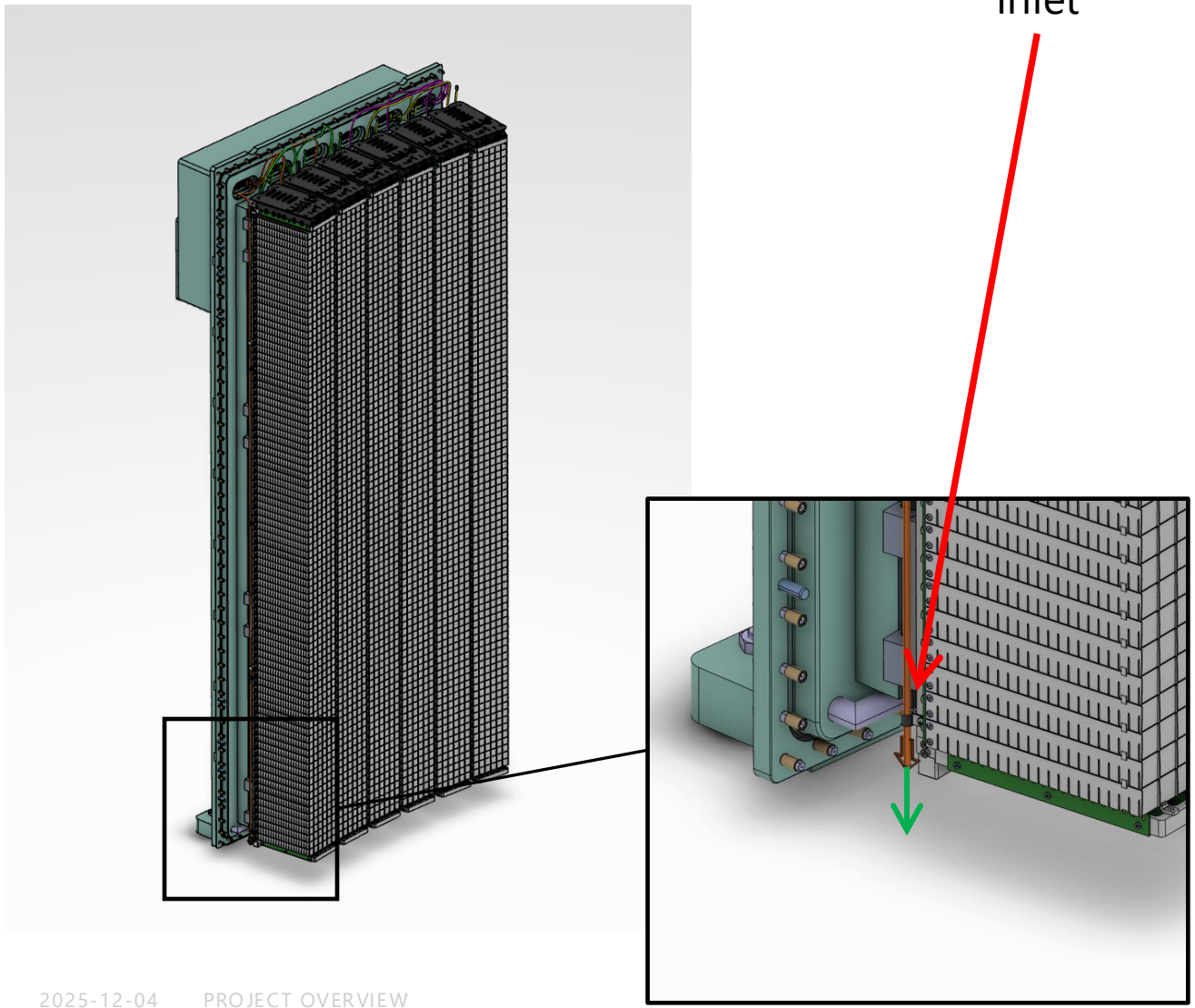


3. Production

Columns



3. Production

Columns

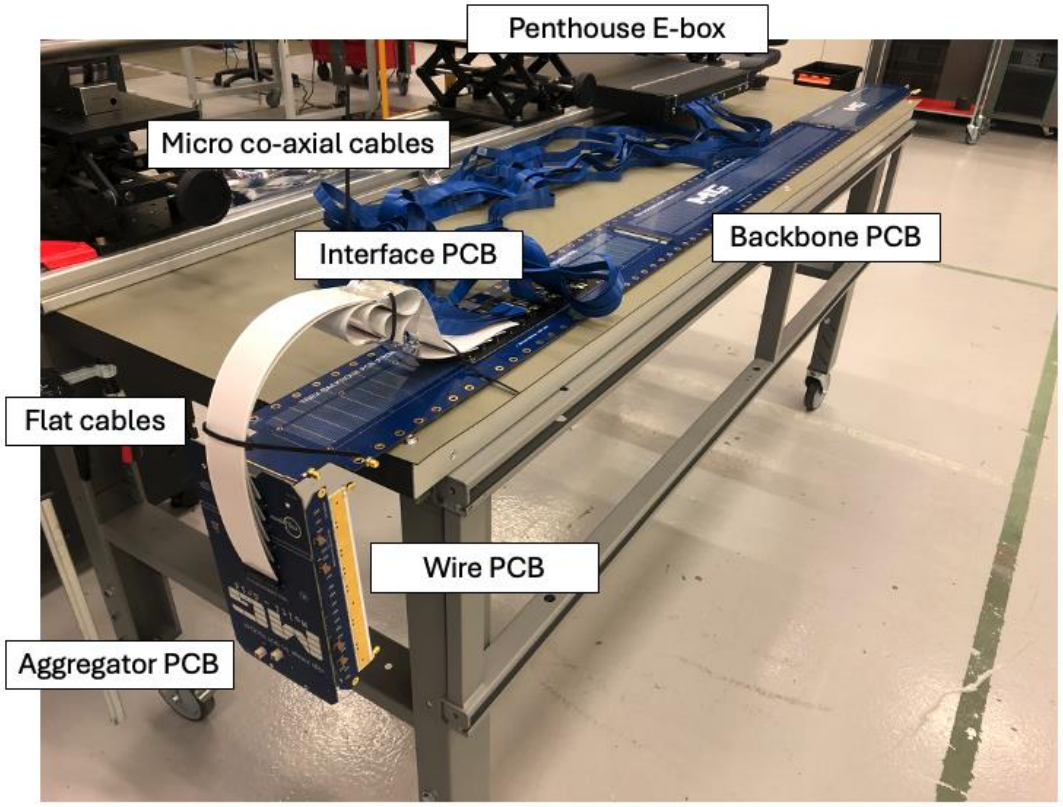
3. Production

Columns

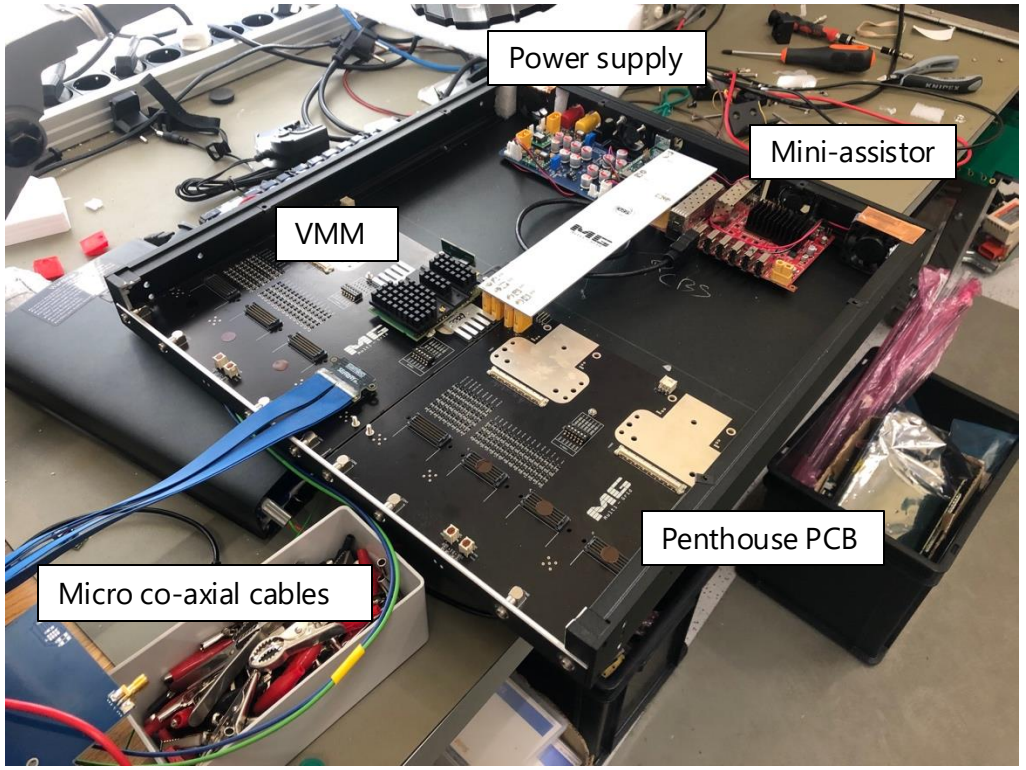
3. Production

Readout

PCBs

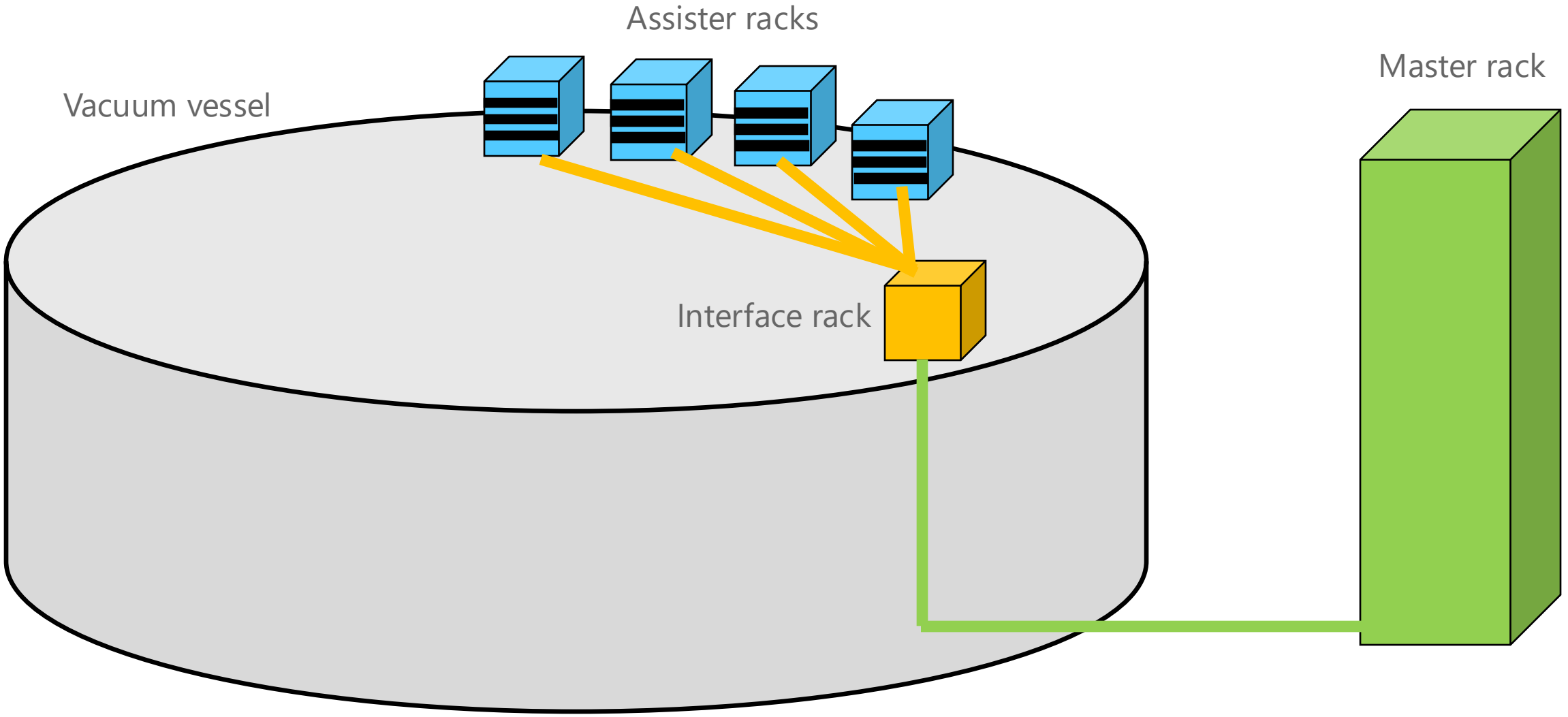


Penthouse box



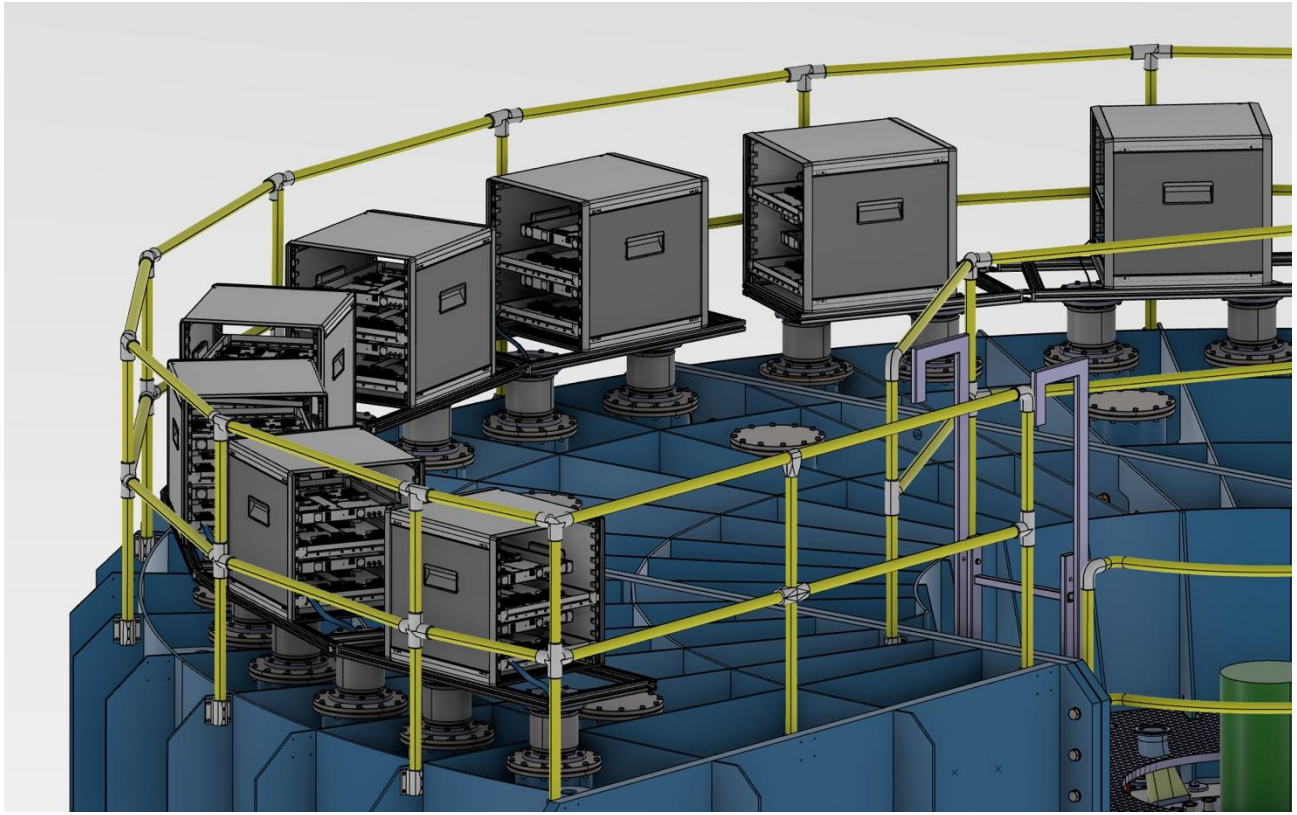
3. Production

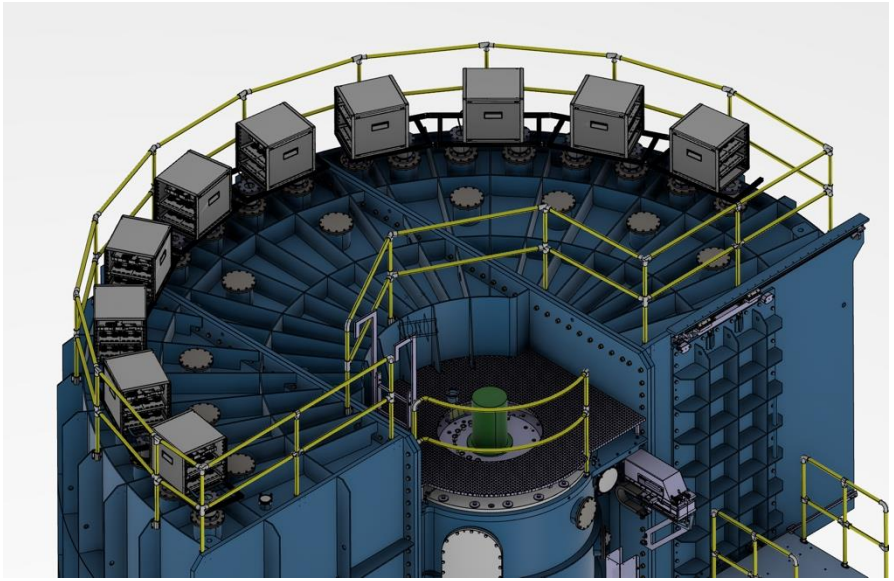
Readout

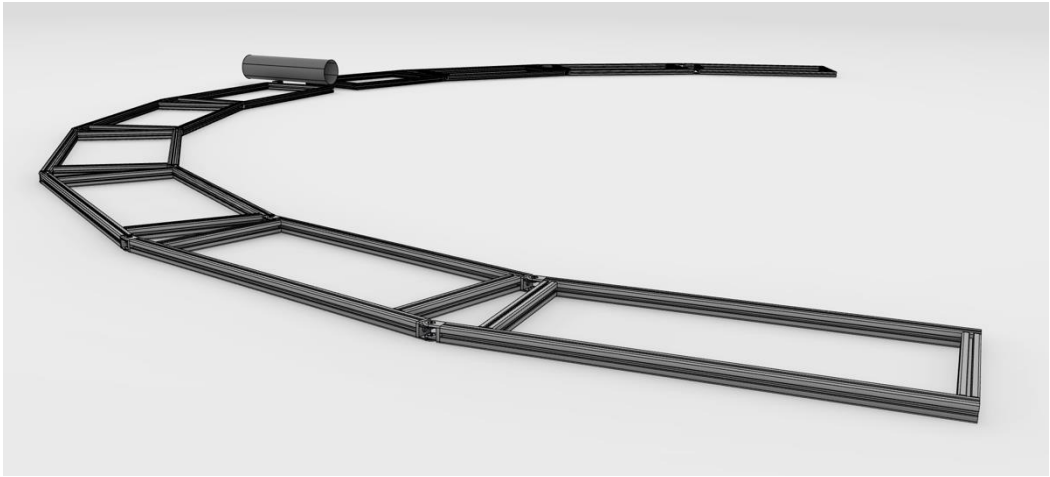


3. Production

Readout







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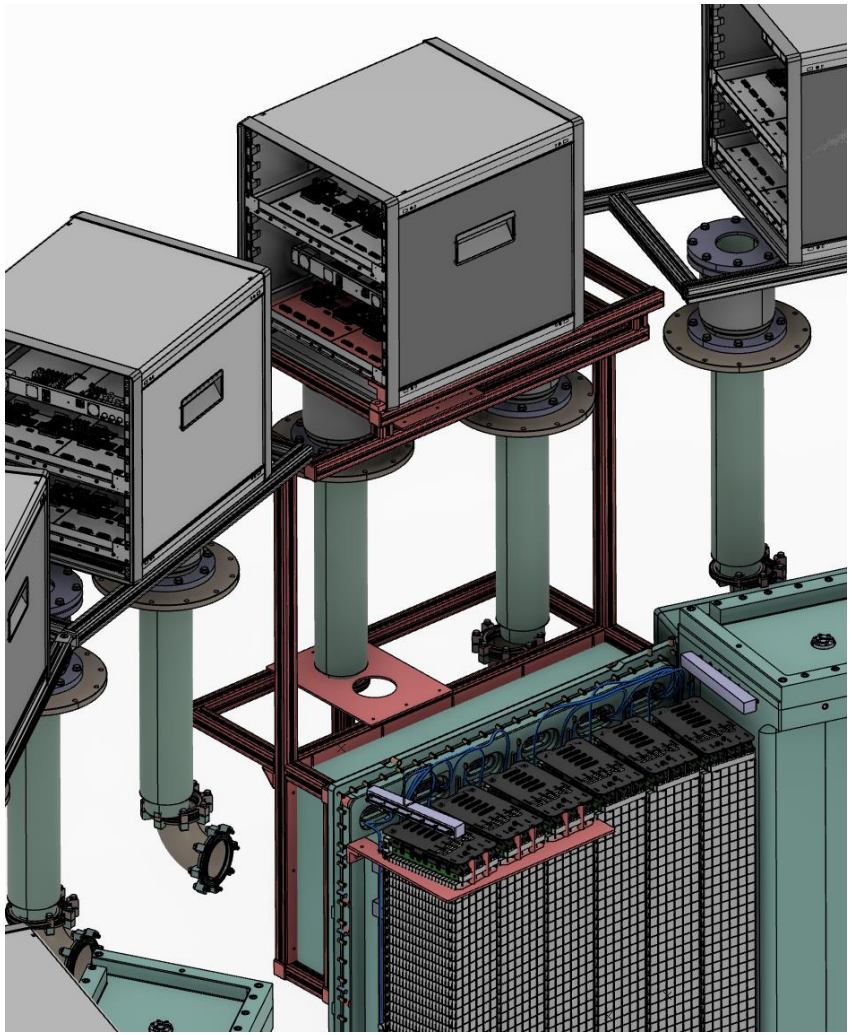
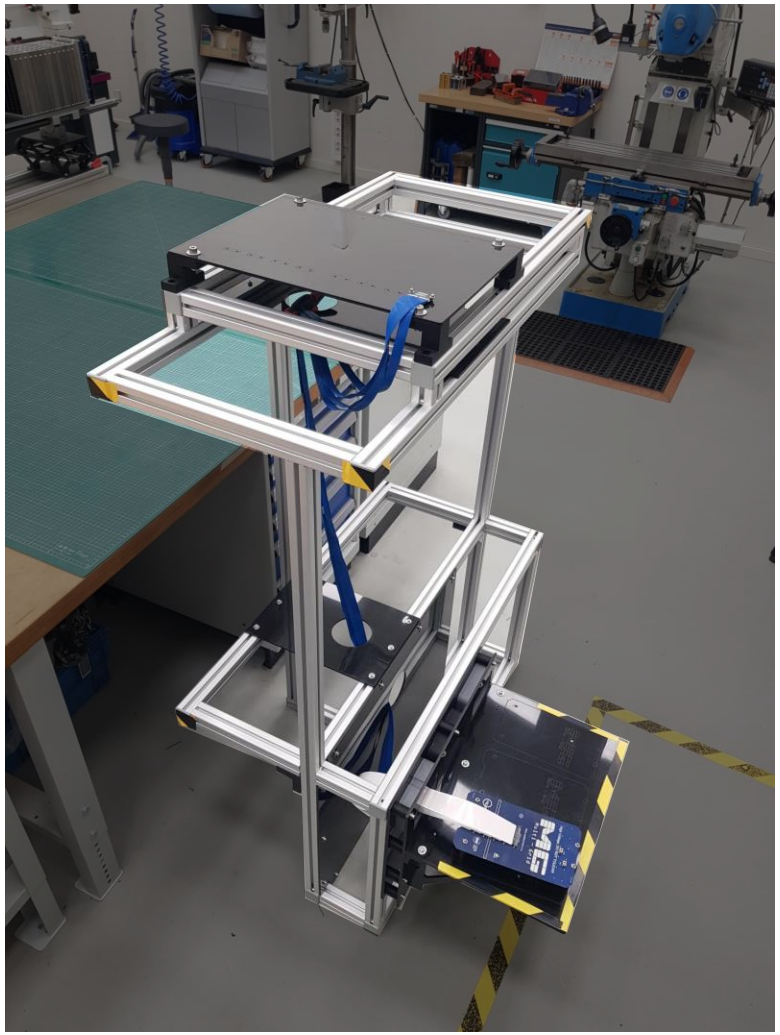


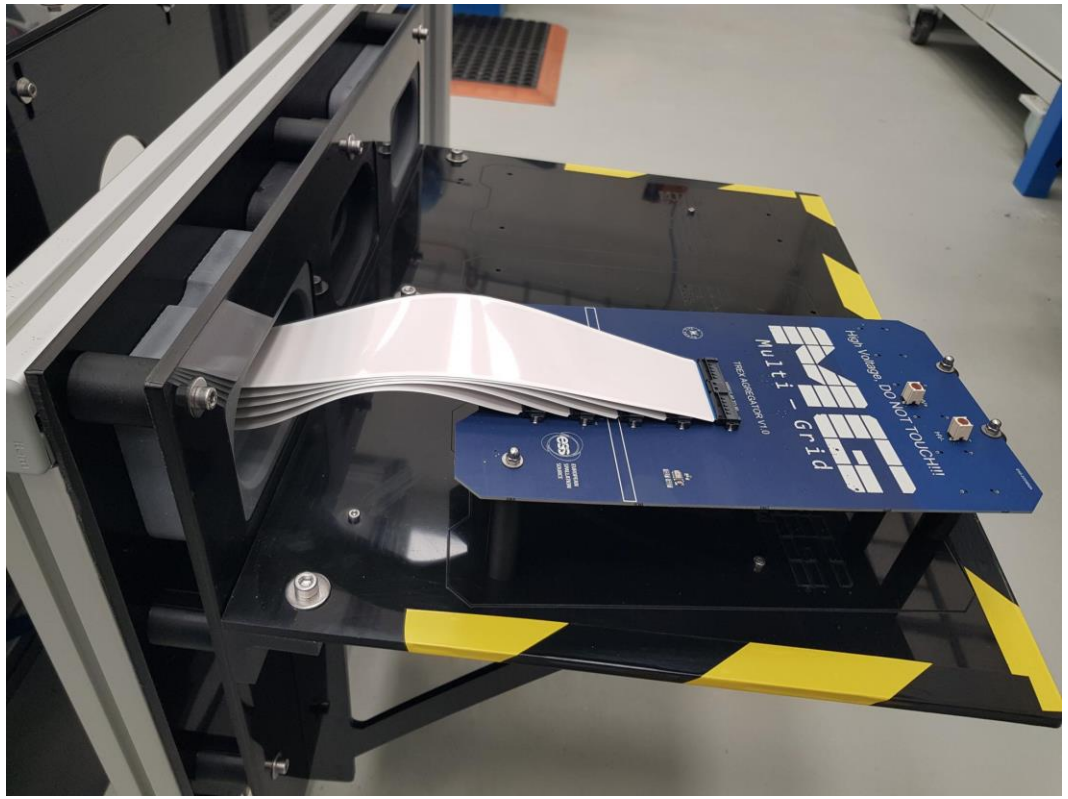


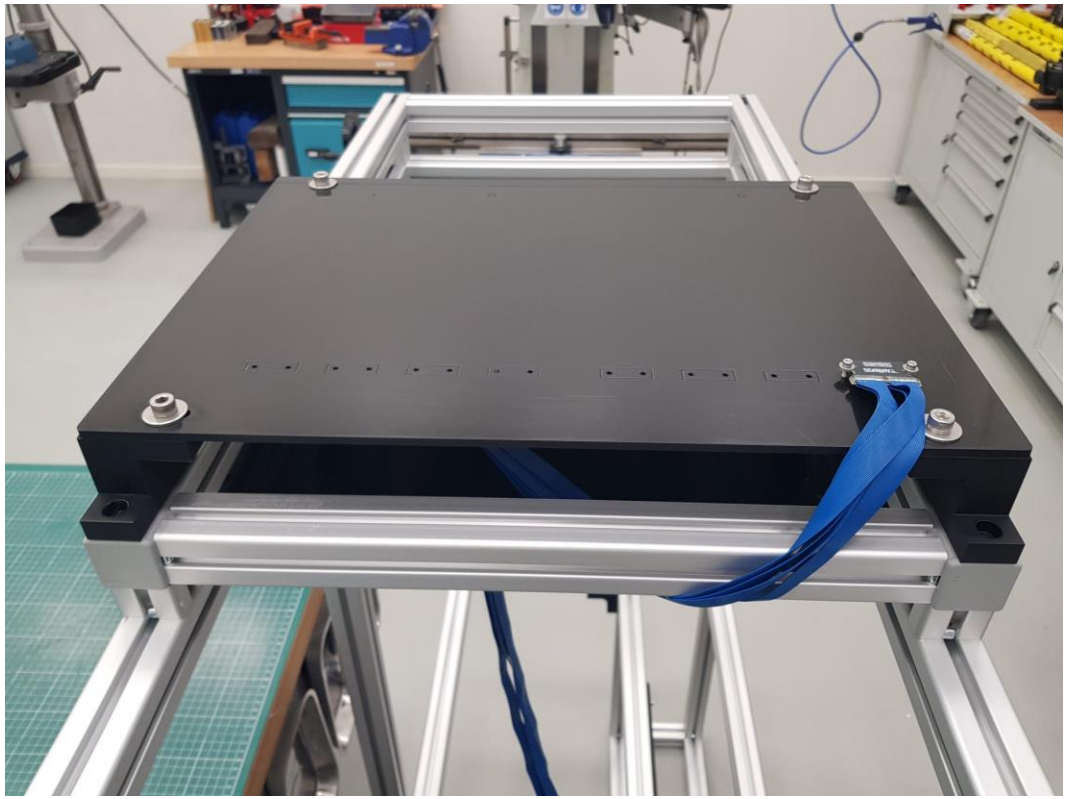
3. Production

Readout

3. Production

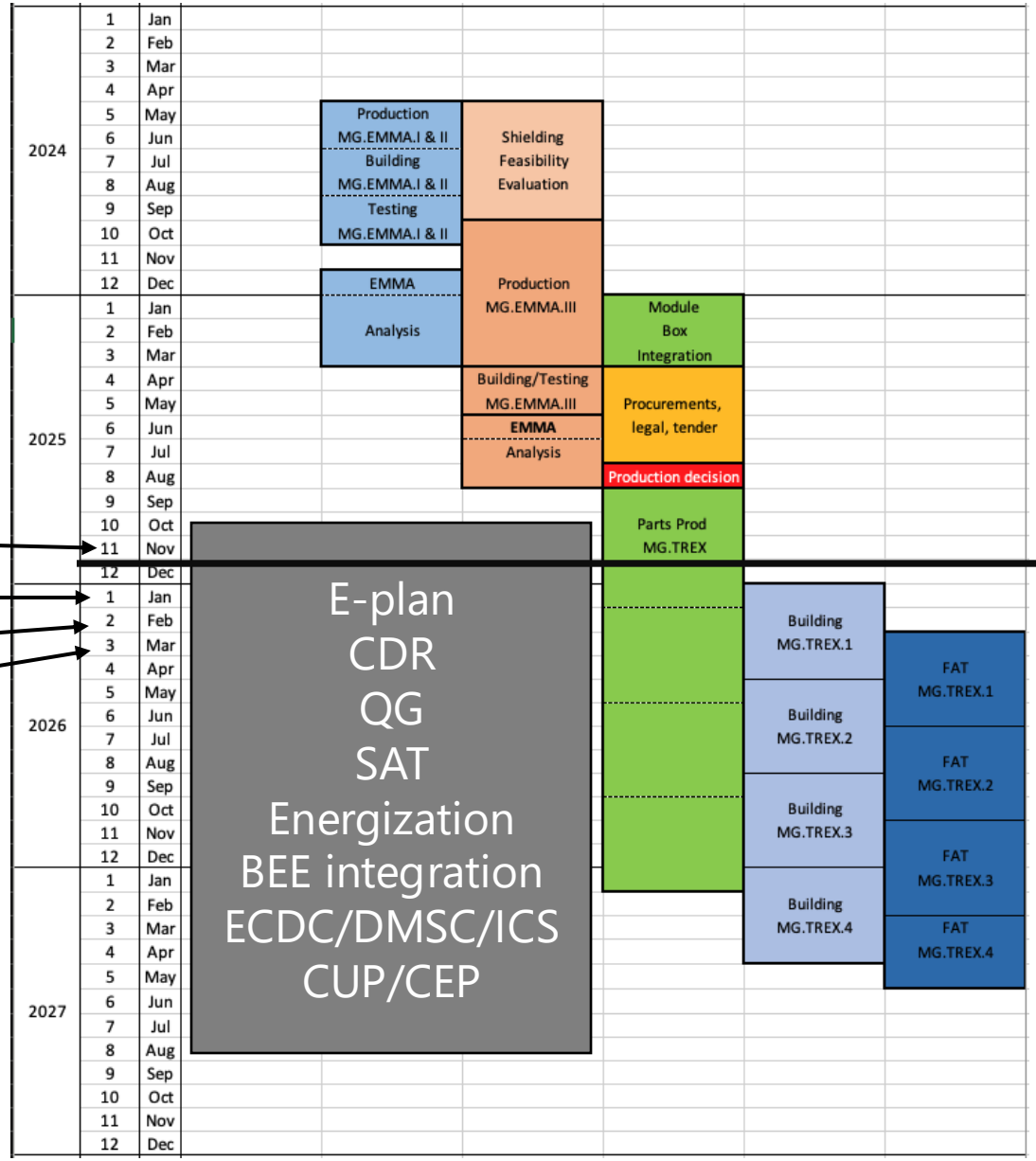
Readout





3. Production

Simplified timeline



Micro water-jet and etching

Coating and Ni-plating

Grid building

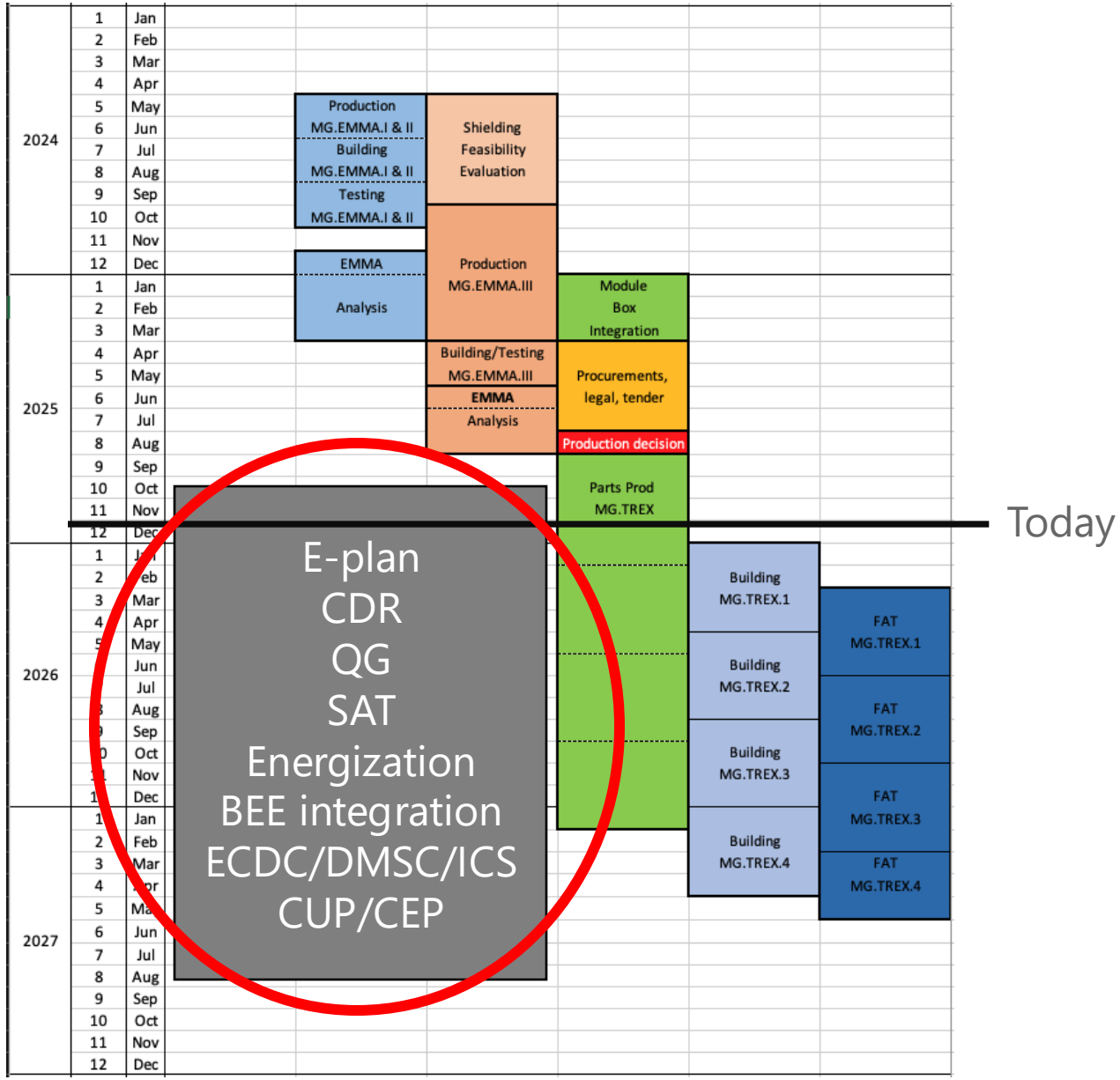
Column assembly and wiring

4.

Planning

4. Planning

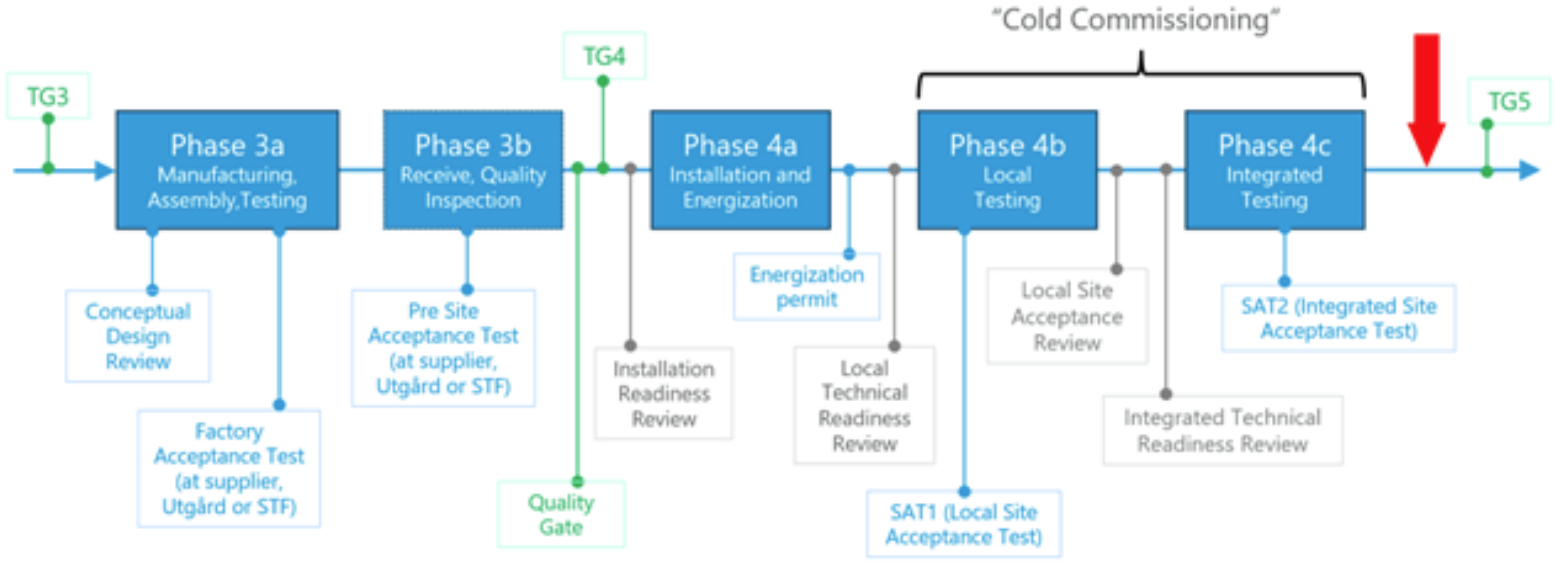
Detailed timeline of BEE/integration



4. Planning

Detailed plans updated and linked

- DetG EICC planning template implemented
- Linkes to Instrument, CEP, CUP etc updated



- ESS-0060987 HIGH LEVEL STRATEGY FOR THE COLD COMMISSIONING OF DETECTORS
- ESS-5620506 DETECTOR **ENERGIZATION, INTEGRATION, AND COLD COMMISSIONG**

4. Planning

T-REX EICC with deliveries and links in P6

13-NSS-Live.1.6.15	**MultiGrid TREX (T3) Detector (WUL Alex)**		**03-Jun-24 A**	**13-Sep-27**	**724.00**	**449.00**	
13-NSS-Live.1.6.15.1	**Prototypes MG.EMMA & MG.MAPS**		**03-Jun-24 A**	**02-Mar-26**	**385.00**	**788.00**	
NSS-A2147353720	Duration	Shielding feasaibility evaluation	03-Jun-24 A	01-Nov-24 A	87.00		
NSS-A2147351660	Duration	Production, building, testing Prototype EMMA	03-Jun-24 A	29-Nov-24 A	201.00		
NSS-A2147382900	Duration	Analysis Prototype EMMA	02-Dec-24 A	30-Apr-25 A	95.00		S
NSS-A2147351680	Duration	PDR EMMA 1 (obsolete)	02-May-25 A		0.00		S
NSS-A2147351670	Duration	Production, building, testing Prototype EMMA 3 (MAPS)	04-Nov-24 A	28-May-25 A	134.00		
NSS-A2147357940	Duration	Module Box integration design	03-Feb-25 A	18-Aug-25 A	114.00		S
NSS-A2147382910	Duration	Evaluation methods/tendering - final design decision	18-Aug-25 A	01-Oct-25 A	33.00		S
NSS-A2147382890	Duration	Analysis Prototype EMMA 3	18-Aug-25 A	27-Nov-25 A	74.00		
NSS-A2147351690	Duration	PDR EMMA 3	28-Nov-25 A		0.00		
NSS-A2147351800	Duration	Submission/preparation of documentation for CDR 2	28-Nov-25 A	02-Feb-26	20.00	702.00	
NSS-A2147351730	Duration	CDR 2/Sub TG3	03-Feb-26	02-Mar-26	20.00	702.00	
13-NSS-Live.1.6.15.2	**Production MG.TREX.1-4**		**02-Oct-25 A**	**30-Aug-27**	**427.00**	**449.00**	
NSS-A2147351740	Duration	Building training	27-Nov-25 A	06-Feb-26	42.00	174.00	
NSS-A2147358010	Physical	FEE (DAQ)	27-Feb-26	02-Jun-26	63.00	186.00	
NSS-A2147351700	Duration	Parts production for MG.TREX1-4	02-Oct-25 A	01-Feb-27	302.00	174.00	
13-NSS-Live.1.6.15.2.1	**Building MG.TREX.1**		**09-Feb-26**	**17-Jul-26**	**109.00**	**649.00**	
NSS-A2147351750	Duration	Building MG.TREX.1	09-Feb-26	17-Apr-26	48.00	174.00	
NSS-A2147358070	Duration	Qgate preparation		21-May-26	39.00	649.00	
NSS-A2147358020	Duration	TREX Detector FAT Module 1 MG.TREX.1		01-Jul-26	77.00	174.00	
NSS-A2147407590	Duration	Site Arrival Inspection (SAI) of box 1 and Integration of 6 columns int box 1 at Utgår			20.00	187.00	
NSS-A2147407580	Duration	Shipping of box 1 with 6 columns to site (MG.TREX.1) (from Utgård)		03-Jul-26	2.00	174.00	
NSS-A2147351780	Duration	Quality gate review and approval MG.TREX.1	22-May-26	17-Jul-26	40.00	649.00	
NSS-A2147419320	Duration	Installation of detector vessel + MG.TREX.1 at site (Installation 1 with columns	06-Jul-26	17-Jul-26	10.00	174.00	
13-NSS-Live.1.6.15.3	**Rack installation & Energisation Phase**		**08-Dec-25**	**26-Feb-27**	**274.00**	**44.00**	

Links to Instrument

4. Planning

T-REX EICC with deliveries and links in P6

13-NSS-Live.1.6.15.3	**Rack installation & Energisation Phase**		**08-Dec-25**	**26-Feb-27**	**274.00**	**44.00**
NSS-A2147418750	Duration	Requirements document to CUP	Dec-25*	12-Dec-25	5.00	151.00
NSS-A2147357960	Duration	Electrical pre-requirements for CEP released incl EPL	27-Feb-26*	27-Feb-26	0.00	77.00
NSS-A2147357970	Duration	Proc/manufacturing of racks incl PDU	27-Feb-26	26-Mar-26	20.00	199.00
NSS-A2147357980	Duration	Proc/manufacturing of cables L3 (pred to CEP)	27-Feb-26	26-Mar-26	20.00	204.00
NSS-A2147351790	Duration	Preparation of installation binder (LoE)	31-Mar-26	29-Apr-26	20.00	102.00
NSS-A2147416810	Duration	Installation of master rack	01-Jul-26	07-Jul-26	5.00	137.00
NSS-A2147419340	Physical	Installation of assister racks	01-Jul-26	07-Jul-26	5.00	137.00
NSS-A2147419300	Physical	Electrical design requirement documents incl Eplan and CDB	25-Aug-26*	31-Aug-26	5.00	56.00
NSS-A2147358060	Duration	Population of racks	24-Aug-26	18-Sep-26	20.00	124.00
NSS-A2147419310	Physical	E-Plan electrical design work incl CDB	01-Sep-26	07-Sep-26	5.00	138.00
NSS-A2147357990	Duration	Termination of L3 cables	18-Jan-27	22-Jan-27	5.00	49.00
NSS-A2147358040	Duration	Energisation permit application process & approval	01-Feb-27	26-Feb-27	20.00	44.00
13-NSS-Live.1.6.15.9	**Detector Local/Integrated Testing - Cold Commissioning Phase**		**24-Aug-26**	**06-Apr-27**	**150.00**	**44.00**
13-NSS-Live.1.6.15.9.3	**Development Phase (Staging Phase)**		**24-Aug-26**	**24-Aug-26**	**0.00**	**156.00**
NSS-A2147418590	Duration	TREX Detector: (ECDC): EFU development complete (incl ICD and NICOS)		24-Aug-26*	0.00	156.00
NSS-A2147418600	Duration	TREX Detector: (ICS): EPICS RMM development complete		24-Aug-26*	0.00	146.00
NSS-A2147418720	Duration	TREX Detector: Firmware delivery and documentation by In Kind partner or inhouse or third party		24-Aug-26*	0.00	124.00
NSS-A2147418730	Duration	TREX Detector: (ECDC/DetG): Readout chain (RMM+FEN) ready (HW and FW)		24-Aug-26*	0.00	124.00
13-NSS-Live.1.6.15.9.4	**Integration Phase (Staging Phase)**		**24-Aug-26**	**20-Oct-26**	**42.00**	**127.00**
NSS-A2147418630	Duration	TREX Detector: (DetG:ICS): R/O CHAIN + EPICS testing	24-Aug-26	04-Sep-26	10.00	146.00
NSS-A2147418620	Duration	TREX Detector: (DetG:ICS:ECDC): Integrated testing-EFU+EPICS+R/O CHAIN (RMM+	07-Sep-26	23-Sep-26	13.00	146.00
NSS-A2147418710	Duration	TREX Detector: (DetG) Acceptance testing of detector gas system	14-Oct-26	20-Oct-26	5.00	127.00
13-NSS-Live.1.6.15.9.5	**Installation Phase (Set-to-work/pre-SAT)**		**24-Aug-26**	**25-Sep-26**	**25.00**	**144.00**
NSS-A2147418610	Duration	TREX Detector: (ICS): Slow controls IPC module, Network Switch, Fiber Patch Panel ready for racks		24-Aug-26*	0.00	124.00
NSS-A2147418640	Duration	TREX Detector: (DetG): Installation of R/O chain completion	21-Sep-26	25-Sep-26	5.00	144.00
NSS-A2147418650	Duration	TREX Detector: (ICS) RMM to EFU physical connection complete		25-Sep-26	0.00	144.00
NSS-A2147418660	Duration	TREX Detector: (ECDC) RMM to EFU logical connection (DST) complete		25-Sep-26	0.00	144.00
13-NSS-Live.1.6.15.9.6	**Deployment Phase at Site (Set-to-work/pre-SAT)**		**26-Feb-27**	**26-Feb-27**	**0.00**	**44.00**
NSS-A2147418670	Duration	TREX Detector: (ECDC): EFU software and firmware deployed		26-Feb-27	0.00	44.00
NSS-A2147418680	Duration	TREX Detector: (ICS): EPICS and GUI deployed		26-Feb-27	0.00	44.00
13-NSS-Live.1.6.15.9.1	**DetG Local Testing Phase - SAT1**		**01-Mar-27**	**12-Mar-27**	**10.00**	**44.00**
NSS-A2147418690	Duration	TREX Detector: (DetG:ICS): R/O electronics and detector local testing and EPICS sl	Mar-27	12-Mar-27	10.00	44.00
13-NSS-Live.1.6.15.9.2	**DetG Integrated Testing Phase - SAT2**		**15-Mar-27**	**06-Apr-27**	**15.00**	**44.00**
NSS-A2147418700	Duration	TREX Detector: (DetG): Integrated testing of detectors complete & SAT2		06-Apr-27	0.00	44.00
NSS-A2147418740	Duration	TREX Detector: DetG + EFU + EPICS testing End to End at site	15-Mar-27	06-Apr-27	15.00	44.00

Links to CEP, CUP…

T-REX .1 Integrated test (CC) done 6 apr-27

44 days float

5.

Publications

5. Publications

Overview

3 Publications in the pipeline
- Test of VMM3A readout of MG
- Neutron interactions in MG structural materials
- Alpha background from grid materials

2 further publications planned
- Description of the Geant4 and Garfield++ simulations
- Report of the 2025 Runs at EMMA...effect of Al/B_4C composite radial blades on internal scattering.

5. Publications

The Application of VMM3A Readout to Multi-Grid Neutron Detectors

The Application of VMM3A Readout for Multi-Grid Neutron Detectors

A. Backis[a], F. Piscitelli[a], D. Pfeiffer[a], J.R.M. Annand[b], M. Aouane[a], K. G. Fissum[a], K. Livingston[b], G. Mauri[c], D. Raspino[c]

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[b]School of Physics and Astronomy, University of Glasgow G12 8QQ, Scotland, UK
[c]ISIS Facility, Rutherford Appleton Laboratory, Harwell Campus, Oxfordshire OX11 0QX, UK

Abstract

The T-REX neutron spectrometer at the European Spallation Source will use Multi-Grid Technology, which is a voxelised proportional counter relying on $^{10}B_4C$ coatings to detect the scattered neutrons. Measurements of the position dependence of pulse-height and relative detection efficiency of a Multi-Grid prototype of the T-REX spectrometer are presented for two different schemes of signal-processing electronics based on the VMM3A ASIC and CREMAT technology. These measurements, intended to test the suitability of VMM3A for readout of the T-REX Multi-Grid, are compared with Monte Carlo simulations based on the Garfield++ and Geant4 tool kits.

1. Introduction

Multi-Grid (MG) technology for detection of thermal or cold neutrons, originally developed at ILL [1], will be used for the T-REX bispectral chopper spectrometer to be installed at the European Spallation Source (ESS) [2]. MG is a vertical stack of grids, each a rectangular lattice of normal and radial Al blades (Fig.1). The grids form the cathodes of a voxelised proportional counter (VPC), with wires strung vertically through the centres of each voxel providing the anodes. The normal blades are coated at ESS with ^{10}B-enriched (97%) B_4C [3], and neutron capture in this film of B_4C produces ^{4}He and ^{7}Li residual nuclei, one of which escapes the film into the VPC gas (Ar-CO_2 in the present case) generating a signal.

This work describes a comparison of signal properties for two alternative schemes to read out the charge collected from the MG electrodes. This was performed using the EMMA thermal neutron beam [4] at the ISIS neutron spallation source in the UK.

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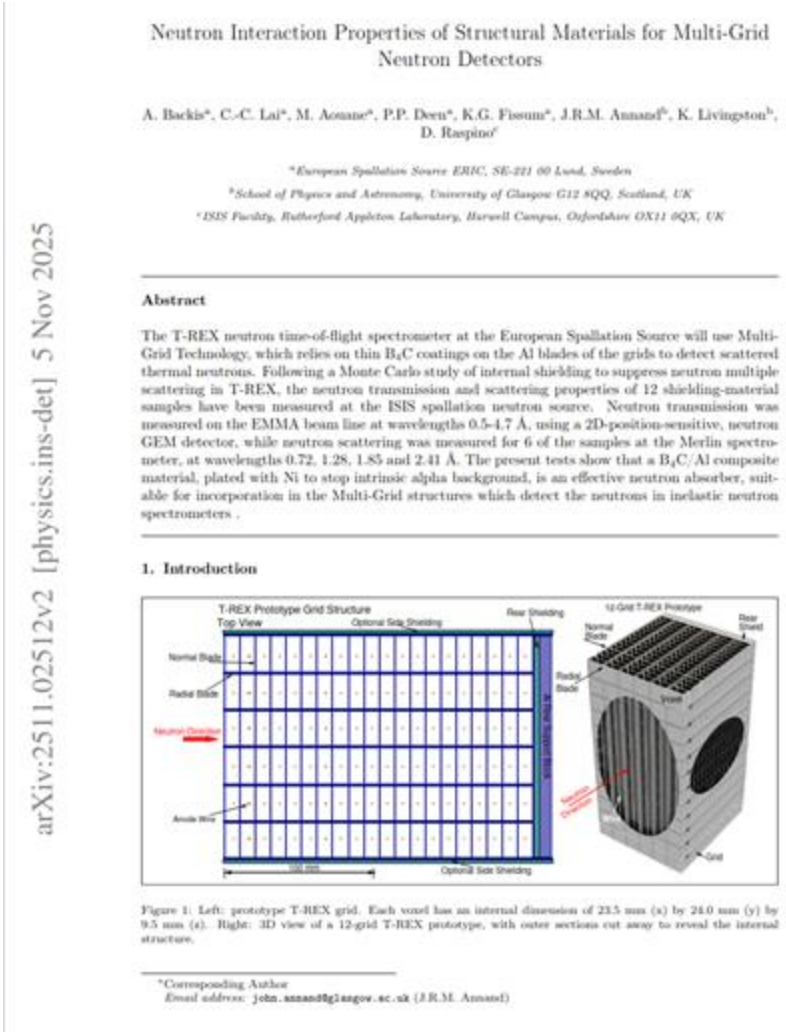
- Comparison of VMM3A and CREMAT readout of T-REX Multi-Grid prototype.
- Fine-beam scans across MG voxels at EMMA
- Submitted to arXiv 2nd Oct 2025
- Submitted to NIM-A
- Referee's report largely positive

In summary, this paper presents a very precise and objective characterization of the MG prototype complemented by an in-depth simulation of the processes taking place in the detector. This is a high-quality paper but the conclusion should focus only on the results presented in the paper.

- Reply and amended manuscript sent to authors for comment/correction 27th Nov. 2025.

5. Publications

Neutron Interaction Properties of Structural Materials for Multi-Grid Neutron Detectors



Neutron Interaction Properties of Structural Materials for Multi-Grid Neutron Detectors

A. Backis[a], C.-C. Lai[a], M. Aouane[a], P.P. Deen[a], K.G. Fissum[a], J.R.M. Annand[b], K. Livingston[b], D. Raspino[c]

[a]European Spallation Source ERIC, SE-221 00 Lund, Sweden
[b]School of Physics and Astronomy, University of Glasgow G12 8QQ, Scotland, UK
[c]ISIS Facility, Rutherford Appleton Laboratory, Harwell Campus, Oxfordshire OX11 0QX, UK

Abstract

The T-REX neutron time-of-flight spectrometer at the European Spallation Source will use Multi-Grid Technology, which relies on thin B_4C coatings on the Al blades of the grids to detect scattered thermal neutrons. Following a Monte Carlo study of internal shielding to suppress neutron multiple scattering in T-REX, the neutron transmission and scattering properties of 12 shielding-material samples have been measured at the ISIS spallation neutron source. Neutron transmission was measured on the EMMA beam line at wavelengths 0.5-4.7 Å, using a 2D-position-sensitive, neutron GEM detector, while neutron scattering was measured for 6 of the samples at the Merlin spectrometer, at wavelengths 0.72, 1.28, 1.85 and 2.41 Å. The present tests show that a B_4C/Al composite material, plated with Ni to stop intrinsic alpha background, is an effective neutron absorber, suitable for incorporation in the Multi-Grid structures which detect the neutrons in inelastic neutron spectrometers .

1. Introduction

Figure 1: Left: prototype T-REX grid. Each voxel has an internal dimension of 23.5 mm (x) by 24.0 mm (y) by 9.5 mm (z). Right: 3D view of a 12-grid T-REX prototype, with outer sections cut away to reveal the internal structure.

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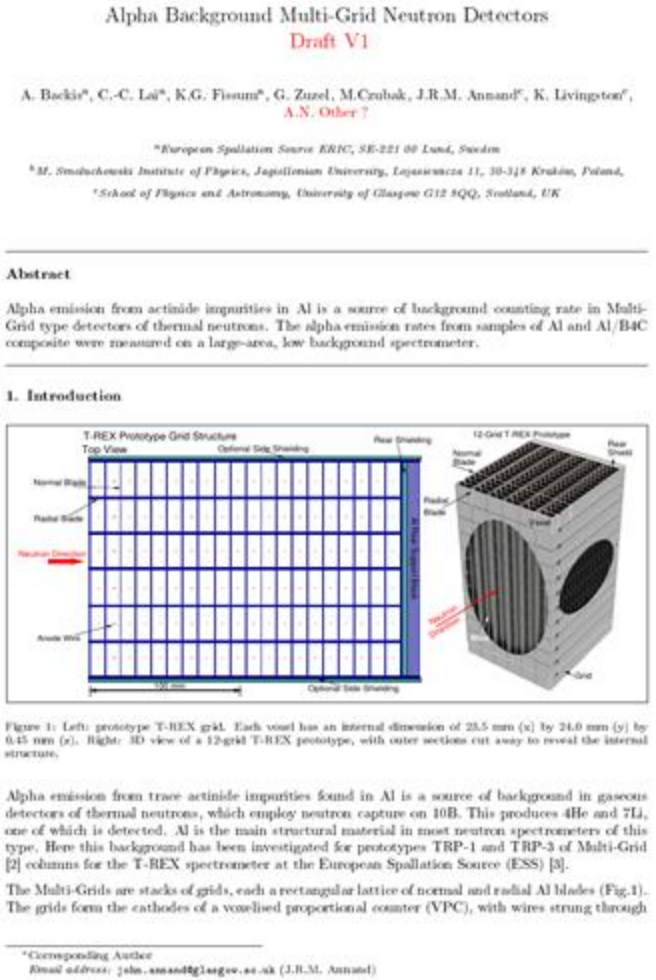
- Comparison of various possible radial-blade materials
- Neutron transmission measurements at EMMA
- Neutron scattering measurements at Merlin
- Comparison to Geant4 simulations

- Submitted to arXiv, 5th Nov. 2025
- Likely target journal NIM-A

5. Publications

Alpha Background in Multi-Grid Neutron Detectors



Alpha Background Multi-Grid Neutron Detectors

Draft V1

A. Backis[a], C.-C. Lai[a], K.G. Fissum[a], G. Zuzel, M.Czubak, J.R.M. Annand[c], K. Livingston[c], A.N. Other ?

[a]European Spallation Source ERIC, SE-221 00 Lund, Sweden

[b]M. Smoluchowski Institute of Physics, Jagiellonian University, Łojasiewicza 11, 30-348 Kraków, Poland,

[c]School of Physics and Astronomy, University of Glasgow G12 8QQ, Scotland, UK

Abstract

Alpha emission from actinide impurities in Al is a source of background counting rate in Multi-Grid type detectors of thermal neutrons. The alpha emission rates from samples of Al and Al/B4C composite were measured on a large-area, low background spectrometer.

1. Introduction

Figure 1: Left: prototype T-REX grid. Each voxel has an internal dimension of 23.5 mm (x) by 24.0 mm (y) by 0.45 mm (z). Right: 3D view of a 12-grid T-REX prototype, with outer sections cut away to reveal the internal structure.

Alpha emission from trace actinide impurities found in Al is a source of background in gaseous detectors of thermal neutrons, which employ neutron capture on 10B. This produces 4He and 7Li, one of which is detected. Al is the main structural material in most neutron spectrometers of this type. Here this background has been investigated for prototypes TRP-1 and TRP-3 of Multi-Grid [2] columns for the T-REX spectrometer at the European Spallation Source (ESS) [3].

The Multi-Grids are stacks of grids, each a rectangular lattice of normal and radial Al blades (Fig.1). The grids form the cathodes of a voxelised proportional counter (VPC), with wires strung through

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- Comparison alpha emission from radio-pure Al, Al/B_4C composite and Ni-plated Al/B_4C
- Measurements at large-area ionisation drift chamber in Krakow.
- Geant4 simulation of effect of Ni-plating thickness
- Background measurements T-REX prototypes. Al or Ni-Al/B_4C radial blades

- Await information and plots from Krakow

5. Publications

Simulation update

- Include more materials from Ncrystal data base which models thermal neutron interactions in crystaline and other substances: e.g. Al, B4C, Al/B4C composite, Ni, Al_2O_3, PPMA, V, Steel.
- More realistic model of alpha emission from ^{238}U and ^{232}Th for assessment of Ni-plating effectiveness (for alpha background article).
- Option to include Al_2O_3 spacers which set the gap between grids.
- **In progress...**
- More realistic model of T-REX boxes which contain the Multi-Grid columns
- More realistic model of support structures which hold the MG columns in place
- Inclusion of structures around the T-REX sample
- To be derived from T-REX CAD drawings
- **Wish list…**
- Calculations of the neutron-beam time structure at the T-REX sample
- Specification of the beam monitors to be used at T-REX

6.

Summary

6. Summary

- Parental leave in January, FraPi and Lai are substitutes
- Almost all essential contracts are in place, only IPAB left
- Production has started
- Detailed plan of EICC done and linked
- Publications are underway

6. Summary

- **Scientists:** Francesco, John, Ken, Kevin, Lai and Me
- **Mechanical Engineers:** David
- **Electronics Engineers:** Aleksandr and Angel
- **Technicians:** Kyle, Ross, Erlis, Alexander and Marina
- **Project Management:** Susanna
- **Procurement:** Charlotte and Mirko
- **Legal:** Johan
- **Coordinator:** Josef
- **Planner:** Lena
- **Administrative support:** Zsuzsa
- **Technical support:** Roy, Lisa, Fabio S, Jack and Doro
- **Documentation Engineers:** Fabio F


ESSDetector
Group
MG
Multi – Grid