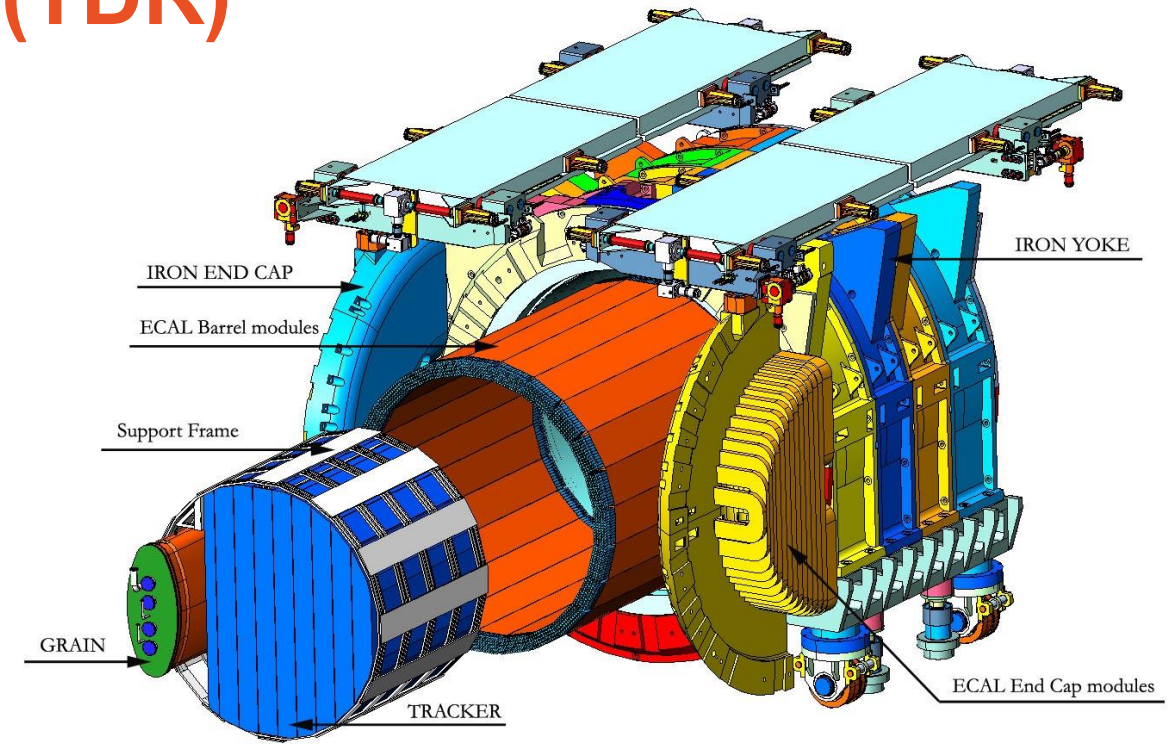
The Technical Design Report (TDR) for SAND in the ND complex



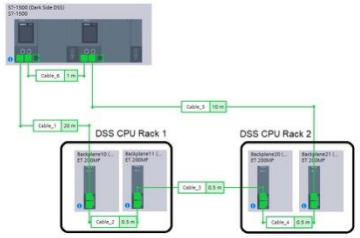
Paolo Bernardini

DUNE Italian Meeting

Frascati - November 12th, 2025

UNIVERSITÀ DEL SALENTO
L'Ateneo tra i due mari
INFN
Istituto Nazionale di Fisica Nucleare

Index of the SAND chapter



1. Foreword (only for preliminary version)
2. Overview
3. Lead/Scintillating-Fiber Calorimeter (ECAL)
4. Superconducting Magnet
5. Liquid Argon Active Target (GRAIN)
6. Straw Tubes (STT)
7. Drift Chamber

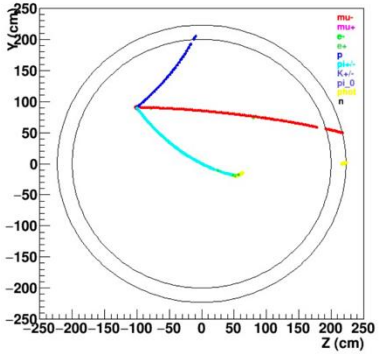
} Subdetectors / Hardware

DAQ {

8. Data Acquisition (DAQ) Architecture
9. Detector Control (DCS)
10. Detector Safety System (DSS)

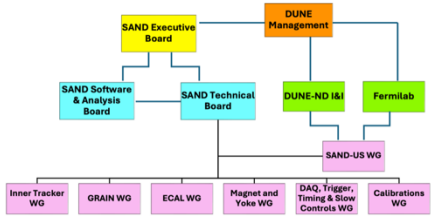
11. Software & Computing
12. Event Reconstruction
13. Analysis

} Computing / Data Analysis



Organization {

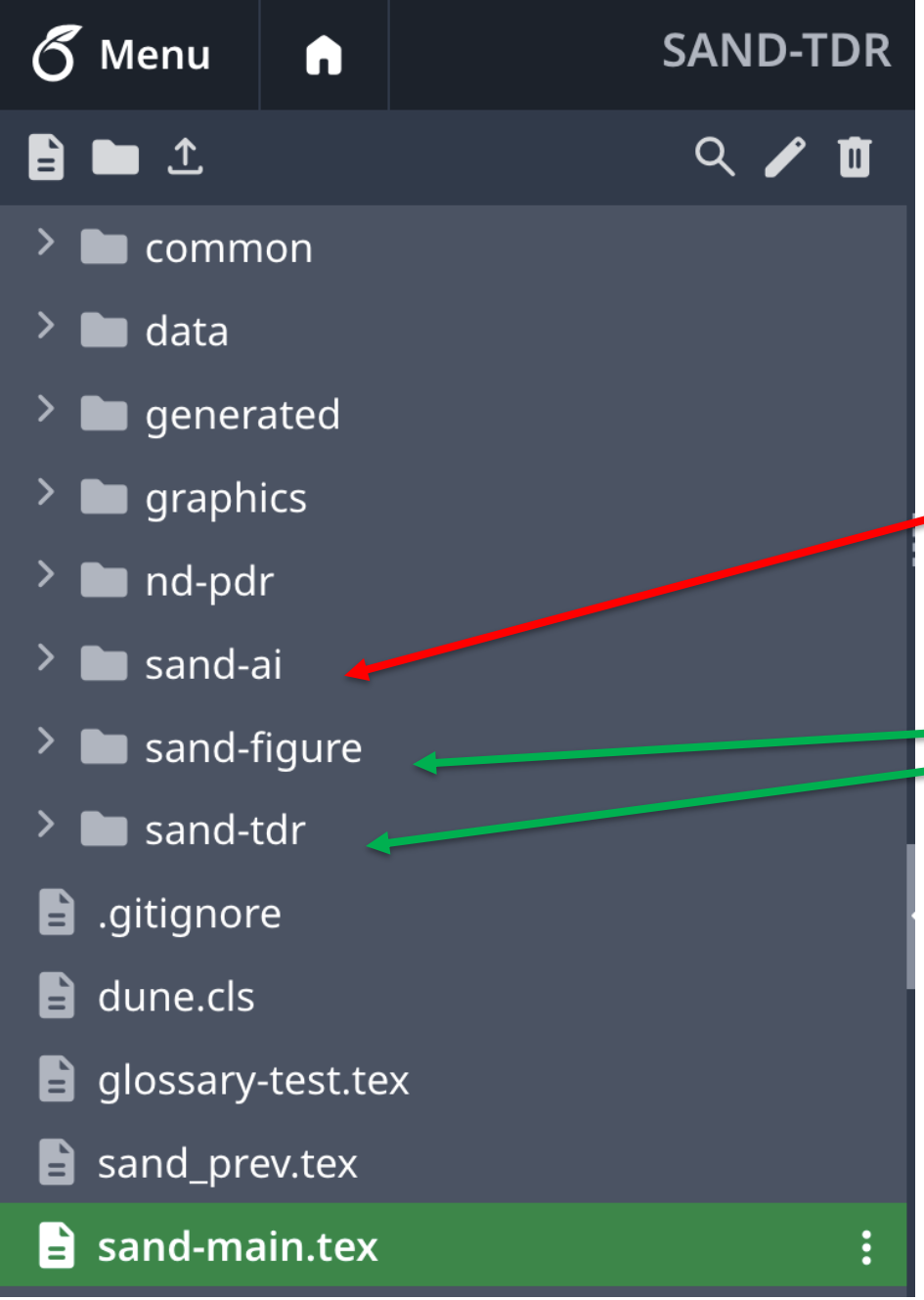
14. Installation & Integration
15. Organization & Management
16. Time Schedule



Appendix A (Engineering Codes and Standards)

Glossary

References



Overleaf Professional

SAND-TDR

A new folder for the text files after the rewriting by AI

The figures in sand-figure and the text in sand-tdr are input for sand-main.tex

Present version in docdb (updated Nov 10, 2025)

DUNE-doc-32829-v3

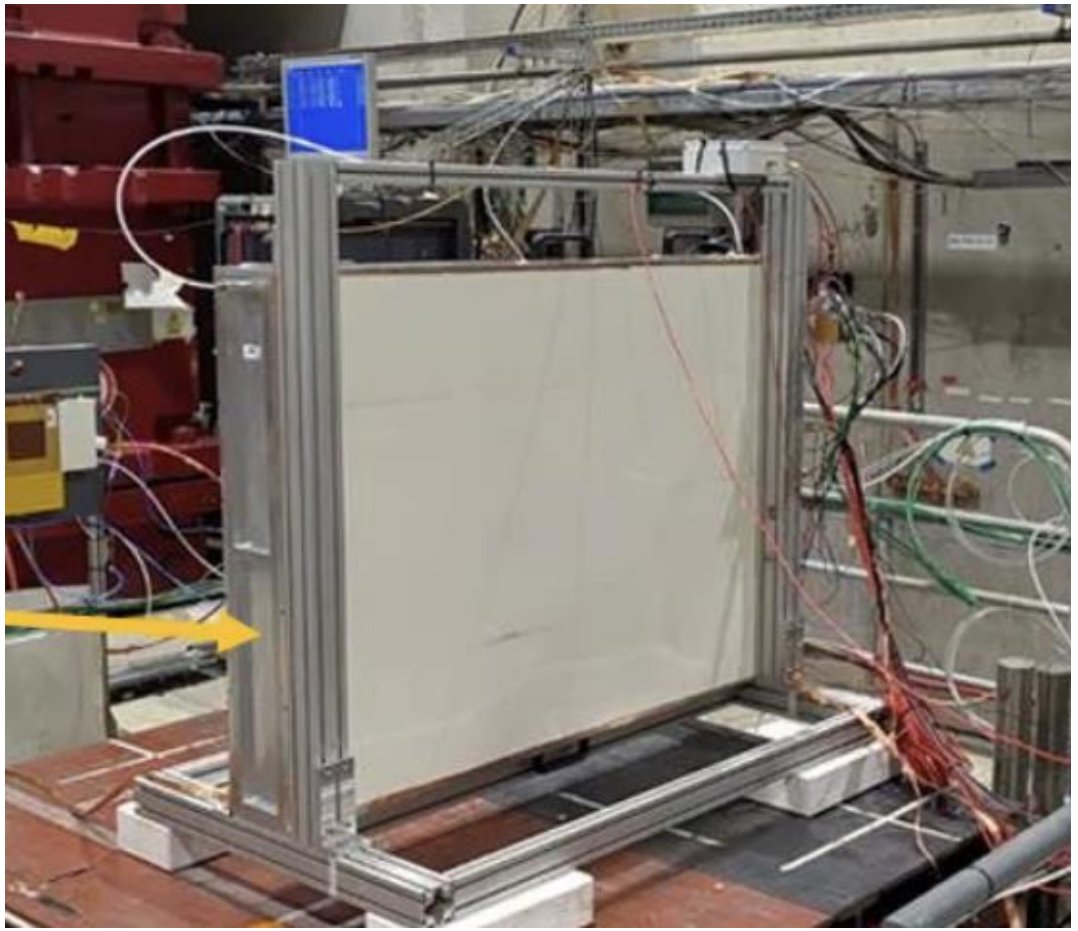
Present: 572 pages 486 figures 119 tables 4 \todo

Slight reduction in the number of pages,
due to greater conciseness and editing corrections

1 - Writeup status	Howmany sections	What sections
Complete text	10	Overview ECAL Magnet GRAIN STT Software Analysis Management DCS+DSS
Minor additions and corrections	2	DAQ Time Schedule
Few subsections to be written	2	Reconstruction I&I
Preliminar draft	1	Drift Chamber (11 pages)

few improvements w.r.t. last meetings (Valencia, SAND zoom)

Drift Chamber – What to do ?



Discussed with M. Pozzato & S. Bertolucci

- A concise, self-contained presentation of the prototyping work up to the mid-scale chamber (**120x80 cm²**)
- **Topics**
  - **Timing resolution**
  - **Simulation results**
  - **Plan of next steps**
- **Writeup deadline: End of November**

2 - Scientific Review	Howmany sections	What sections	
Analysed and modified in accordance with the reviewers' comments	7	Overview Magnet DAQ+DCS+DSS	ECAL STT
Detailed review is not necessary	3	I&I Time Schedule	Management
Minor reviewers' suggestions must be taken into account	2	GRAIN	Analysis
Review in progress	2	Software	Reconstruction
Waiting for the complete text	1	Drift Chamber	

NO significant change w.r.t. last meetings (Valencia, SAND zoom)

3 – Editing Review (DUNE-style & English)

NO professional help was available

Artificial Intelligence used for English review

We/us/our removed

First review -> Completed on the available text !!!

The review must be repeated on the complete text

(long and boring task)

Some warnings

JPEG use for photographs

PDF use of any line drawings, plots, illustrations

PNG use due to some inability to produce proper JPEG or PDF

The DUNE rules for the figure format have not been followed

Much time has passed since the first writeup, some updates may be needed

Also the glossary must be checked

The scientific review activity is too slow

Help is needed

A reading group has been created to examine the TDR as a whole (S. Bertolucci, S. De Falco, G. Sirri, A. Surdo, L. Di Noto)

A deputy for TDR coordination is expected

Volunteers are welcome for editing/English !!!

FINAL REMARKS

Already said in Valencia

The status of the SAND-TDR is not so bad, but …

the last mile is the hardest !!!

In the last two months, few progresses

ND-TDR ready by the end of the year ?

Possible … the responsibility falls on the WG convenors, reviewers, reading group, and myself

Backup slides

Referees: L. Tomassetti (FE), A. Surdo (LE),

P. Gauzzi (Roma1), A. Campani (GE),

P. Sala (MI), R. Petti (SC), J.D. Lewis (FNAL),

M. Diwan (BNL), Seog Oh (Duke), ~~G. Sirri (BO)~~,

S. Di Falco (PI), M. Pozzato (BO), S. Di Domizio (GE),

C. Mariani (Virginia Tech)

	norm weight (%)	pages	text (0-1)	norm text (%)	referee (0-1)	norm check (%)
Foreword	0,0	1	1,0	0,0	1	0,0
Overview	4,2	7	1,0	4,2	1	4,2
Lead/Scintillating-Fiber Calorimeter (ecal)	8,3	66	1,0	8,3	1	8,3
Superconducting Magnet	8,3	25	1,0	8,3	1	8,3
Lar Active Target (grain)	8,3	33	1,0	8,3	0,8	6,7
Straw Tube Tracker (stt)	8,3	142	1,0	8,3	1	8,3
Drift Chamber (dch)	4,2	10	0,2	0,6	0	0,0
DAQ / DCS / DSS	16,7	12	1,0	15,8	1	16,7
Software and Computing	8,3	32	0,9	7,1	0	0,0
Event Reconstruction and SAND Performance	8,3	107	0,8	6,7	0,5	4,2
Analysis	8,3	82	1,0	8,3	0,7	5,8
Installation & Integration	12,5	25	0,8	10,0	0,8	10,0
Organization & Management	2,1	3	1,0	2,1	0	0,0
Time Schedule	2,1	2	0,4	0,8	0	0,0
Appendix A		4				
Glossary		9				
References		11				
	100	571		89,0		72,5

Today: 571 pages 476 figures 117 tables September 9, 2025

	norm weight (%)	pages	text (0-1)	norm text (%)	referee (0-1)	norm check (%)
Foreword	0,0	1	1,0	0,0	1,0	0,0
Overview	4,2	7	1,0	4,2	1,0	4,2
Lead/Scintillating-Fiber Calorimeter (ecal)	8,3	66	1,0	8,3	1,0	8,3
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Straw Tube Tracker (stt)	8,3	142	1,0	8,3	1,0	8,3
Drift Chamber (dch)	4,2	10	0,2	0,6	0,0	0,0
DAQ / DCS / DSS	16,7	12	1,0	15,8	1,0	16,7
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Event Reconstruction and SAND Performance	8,3	107	0,8	6,7	0,5	4,2
Analysis	8,3	82	1,0	8,3	0,7	5,8
Installation & Integration	12,5	25	0,8	10,0	0,8	10,0
Organization & Management	2,1	3	1,0	2,1	0,0	0,0
Time Schedule	2,1	2	0,4	0,8	0,0	0,0
Appendix A		4				
Glossary		8				
References		10				
	100	570		89,0		72,5

Today: 570 pages 475 figures 117 tables July 28, 2025