

Contents

1	Introduction	6	
1.1	Motivation	6	
1.2	Performance requirements	6	
1.3	Operational environment	6	Laura, Ernst
1.4	Detector description and specification	6	
1.5	Detector realization	6	
2	Sensors	7	
2.1	MOSAIX	7	
2.1.1	SVT design contributions	7	
2.2	EIC-LAS	7	Laura, Iain, Joao, Lukas, Gian Michele
2.3	Characterization	7	
2.3.1	Results from prototypes	7	
2.4	Production testing (QC)	8	
3	AncASIC	9	
3.1	Overview	9	
3.2	SLDO	9	
3.2.1	Device concept and specifications	9	
3.2.2	Design status and simulation results	9	
3.3	NVG	9	Laura, Iain, Joao, Lukas, Gian Michele
3.3.1	Device concept and specifications	9	
3.3.2	Design status and simulation results	9	
3.4	Slow control	9	
3.4.1	Device concept and specifications	9	
3.4.2	Design status and simulation results	9	
3.5	Characterization and production testing (QC)	9	

4	Modules	10
4.1	Overview	10
4.2	OB module concept	10
4.2.1	Tooling and assembly	10
4.3	Disks module concept	10
4.3.1	Tooling and assembly	10
4.4	Characterization and production testing (QC)	10
4.5	Prototype studies	10
5	Electrical interfaces	11
5.1	Overview and specifications	11
5.2	FPC design	11
5.3	Technology selection	11
5.4	FPC production and QC	11
5.5	Prototype studies	11
6	Inner Barrel, Outer Barrel, and Disks	12
6.1	IB	12
6.1.1	Overview and Specifications	12
6.1.2	IB design	12
6.1.3	Material	12
6.1.4	Production sequence	12
6.1.5	QC during IB production	12
6.1.6	FEA and prototype studies	12
6.2	OB	12
6.2.1	Overview and Specifications	12
6.2.2	Stave design	12
6.2.3	Material	13
6.2.4	Production sequence	13
6.2.5	QC during OB stave production	13
6.2.6	FEA and prototype studies	13
6.3	Disks	13
6.3.1	Overview and Specifications	13
6.3.2	Disk design	13
6.3.3	Material	13
6.3.4	Production sequence	13
6.3.5	QC during disk production	13
6.3.6	FEA and prototype studies	13

Georg, Marcello, Nikki

Laura, Marcello, Zhenyu

Domenico, Georg, Nikki

7	Readout	14	
7.1	IB readout scheme	14	
7.2	OB and disk readout scheme	14	Jo, James, Ernst
7.3	Fiber aggregator	14	
7.4	RDO boards production and testing	14	
7.5	Prototype testing	14	
8	Powering	15	
8.1	Power consumption estimates	15	
8.2	IB powering	15	
8.3	Serial powering of OB and disks	15	James, Laura, Jo, Domenico
8.3.1	Current distribution and voltage regulation	15	
8.3.2	Data and slow control communication	15	
8.3.3	Grounding scheme	15	
8.4	Power supplies	15	
9	Cooling	16	
9.1	Cooling strategy	16	
9.2	Cooling requirements	16	Georg, Nikki, Eric
9.3	Air flow distribution	16	
9.4	Safety aspects	16	
10	Global mechanics and integration	17	
10.1	Envelope model	18	
10.2	Support hierarchy	18	
10.3	Inner Support Tube	18	
10.3.1	Interfaces between Disks and IST	18	
10.3.2	Production and QC	18	
10.4	Support cones	18	
10.4.1	Interfaces between IB and support cone	18	
10.4.2	Interfaces between OB staves and support cone	18	
10.4.3	Production and QC	18	Andy, Eric, Georg
10.5	Service routing	18	
10.5.1	SVT patch panels	18	
10.5.2	Power distribution	18	
10.5.3	Cooling distribution	18	
10.6	Integration	18	
10.6.1	Integration sequence	18	
10.6.2	Integration area	18	
10.6.3	QC during integration	18	

11 Detector operation	19	
11.1 Interlocks and safety	19	
11.2 Configuration	19	Jo, Shujie, Ernst
11.3 Calibration	19	
11.4 Monitoring	19	
11.5 Alignment	19	
12 Performance	20	
12.1 Simulation and reconstruction	20	
12.1.1 Simulation	20	
12.1.2 Reconstruction	20	
12.2 Hit environment and occupancy	20	
12.3 Performance of track and vertex reconstruction	20	
12.3.1 Track reconstruction efficiency and purity	20	Shujie, Ernst
12.3.2 Momentum resolution	20	
12.3.3 Pointing resolution	20	
12.3.4 Dependence on intrinsic resolution, material, and configuration	20	
12.4 Effects of residual misalignments and distortions	20	
12.5 Impacts of dead areas	20	
12.6 Selected QCD science benchmarks	20	
13 Organization	21	
13.1 Work breakdown structure and schedule	21	
13.2 Institutions and roles	21	Ernst, Laura, Georg
13.3 Milestones and risks	21	
13.4 Cost	21	