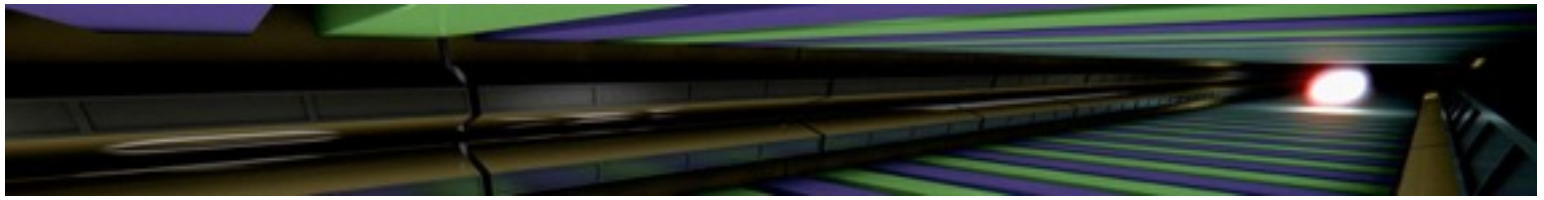


Instrument Installation Planning

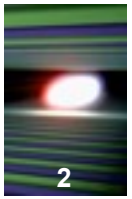
XFEL Collaboration Meeting

Tobias Haas

Photon System Coordinator

24 April 2015

Starting Point



- We need a better installation plan that accounts for critical infrastructures and resources
- The plan should go beyond the mechanical installations and include the technical commissioning
- The team coordinating the installation should be strengthened
- The plan should be reviewed well before the installation starts

What Happened

- We set up an new planning philosophy:
  - Photon System Project Office (PSPO) defines the planning standards
  - PSPO supports the planning efforts
  - PSPO provides the “Master Plan”
  - PSPO provides overall co-ordination and conflict resolution
  - The instruments are responsible to provide all necessary information for their individual installation plans and they have to buy into the plans
    - Instruments report regularly in the Technical Coordination meeting

PSPO Team

G. Wellenreuther, Section Coordinator

K. Piorecki, Project Engineer

Lead Planner

N. Saaristo, CAD Integration Engineer

Also supports planning

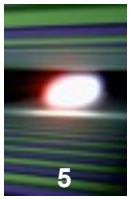
A. Violante, **Deputy Section Coordinator**

U. Conta, Documentation Assistant

S. Cunis, Project Engineer

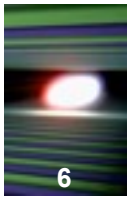
T. Haas, Group Leader

Contacts on the Instrument Side

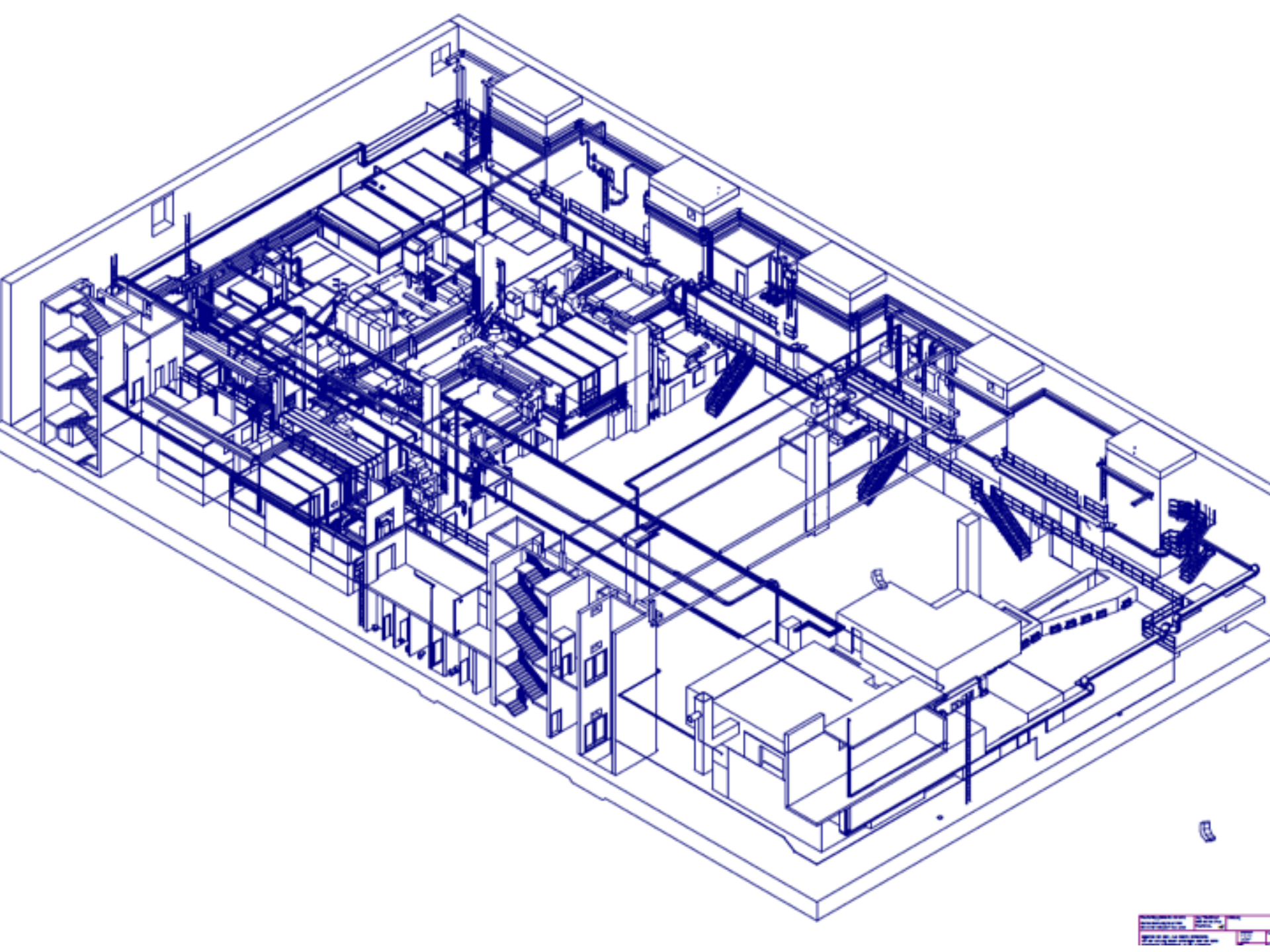


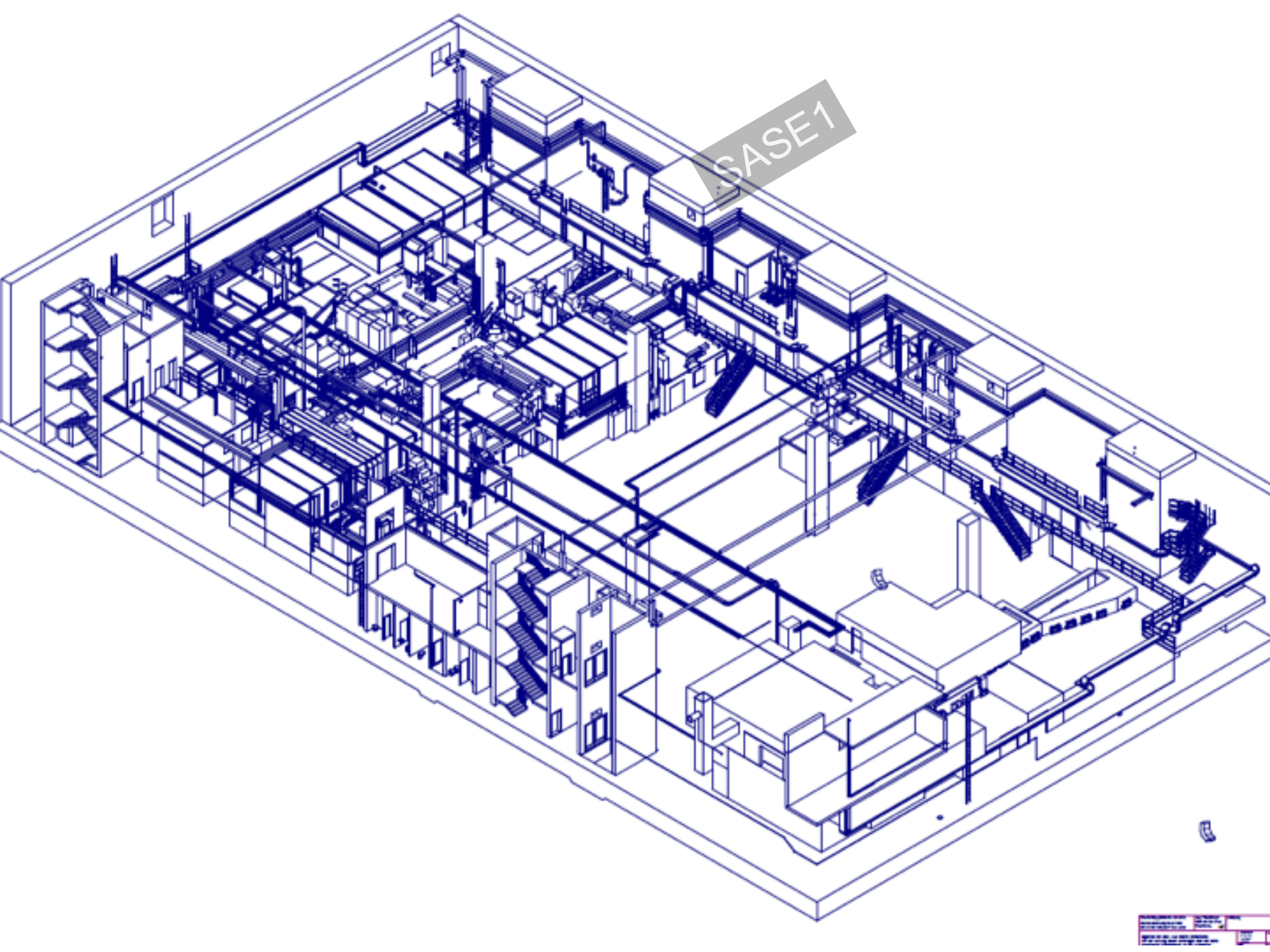
- FXE: W. Gawelda (Instrument Scientist)
- SPB/SFX: S. Readman (Engineer/Planner from Diamond)
- SQS: M. Meyer (Leading Scientist)
- SCS: A. Scherz (Leading Scientist)
- MID: A. Schmidt (Engineer)
- HED: A. Schmidt (Engineer)
- Laser: G. Palmer (Laser Scientist)

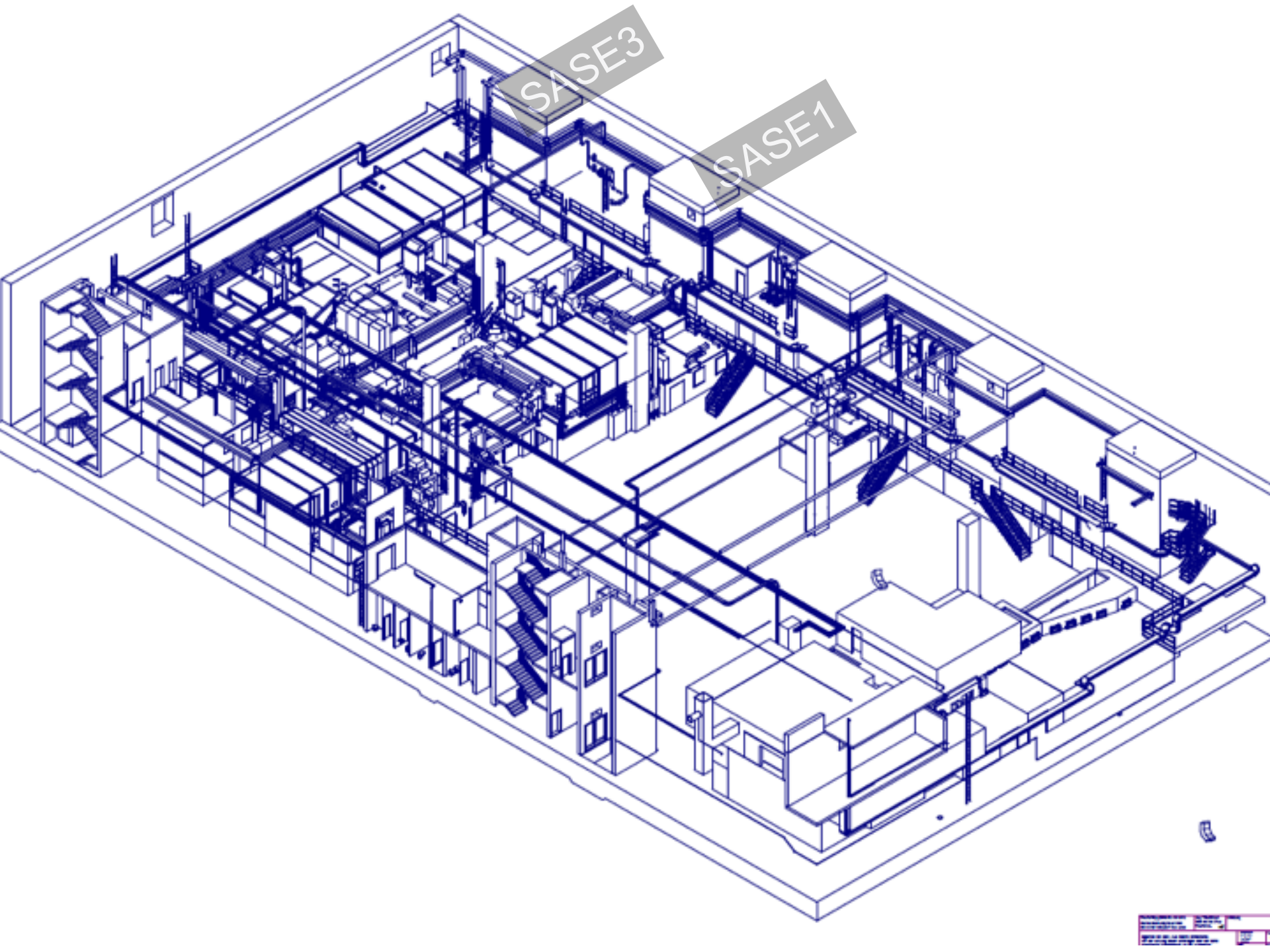
Topics

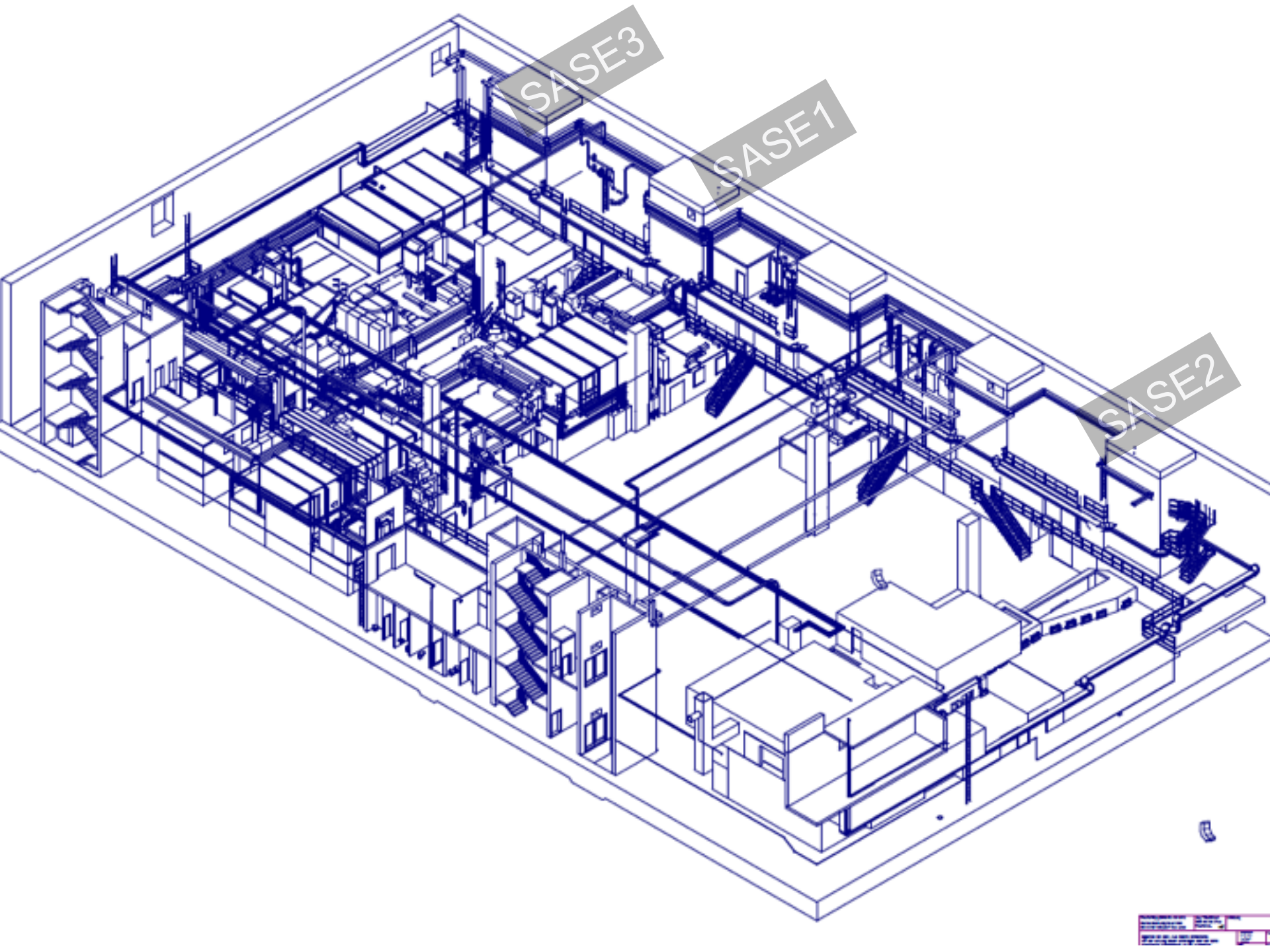


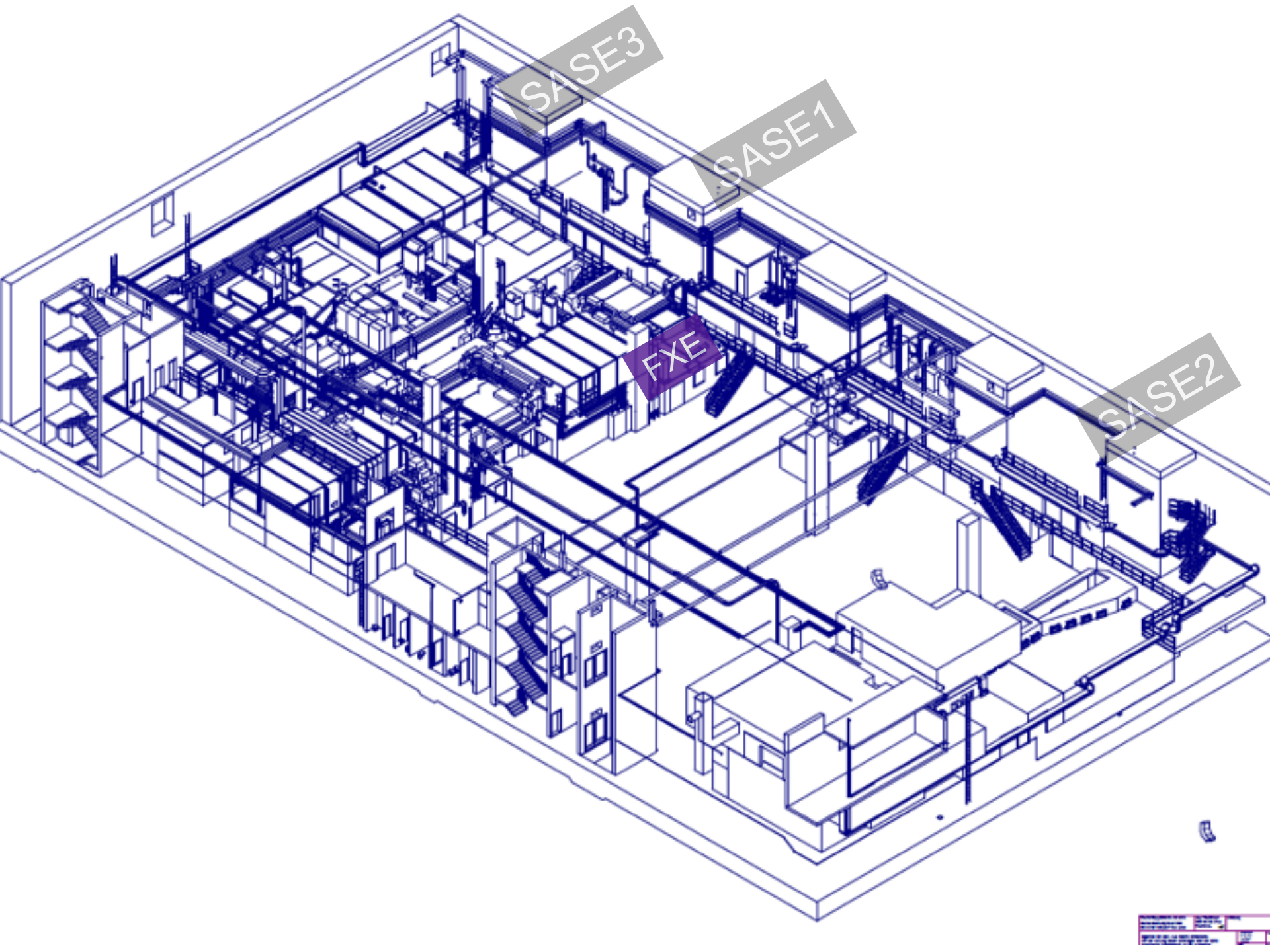
- Planning Standards
- Planning Procedure
- Master Plan
- Examples from SQS & FXE
- Overall Status

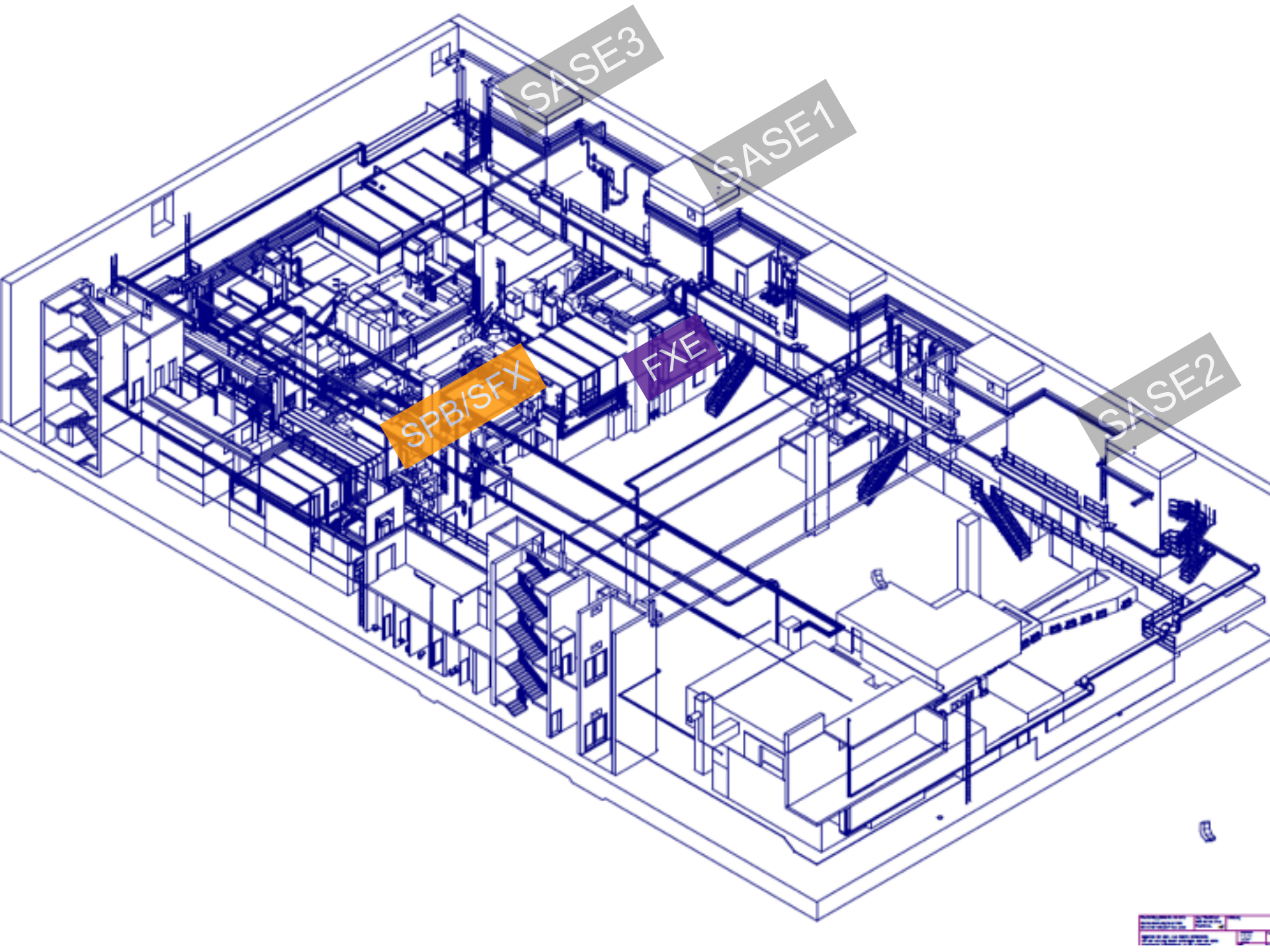


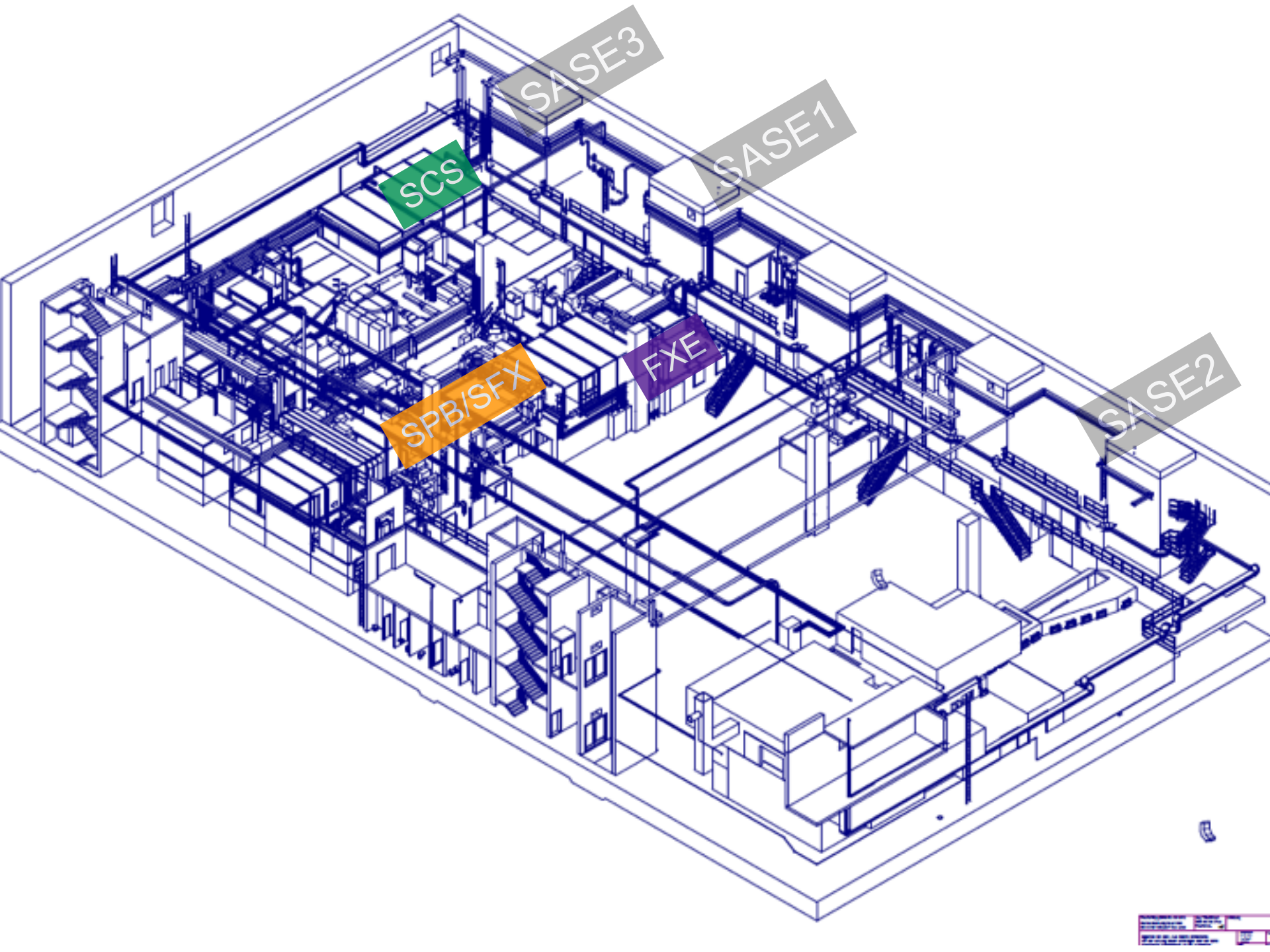

SASE1

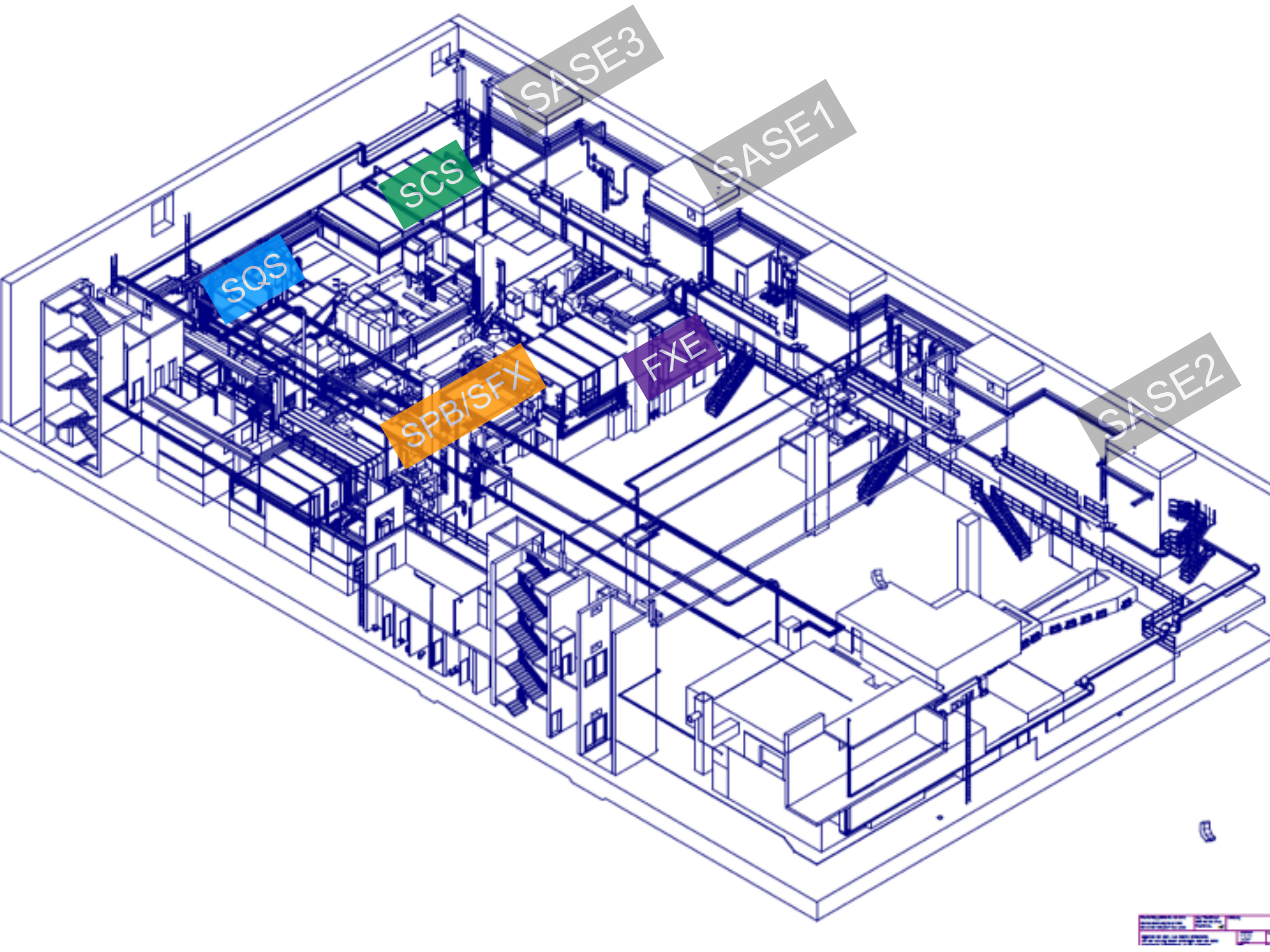

SASE3
SASE1

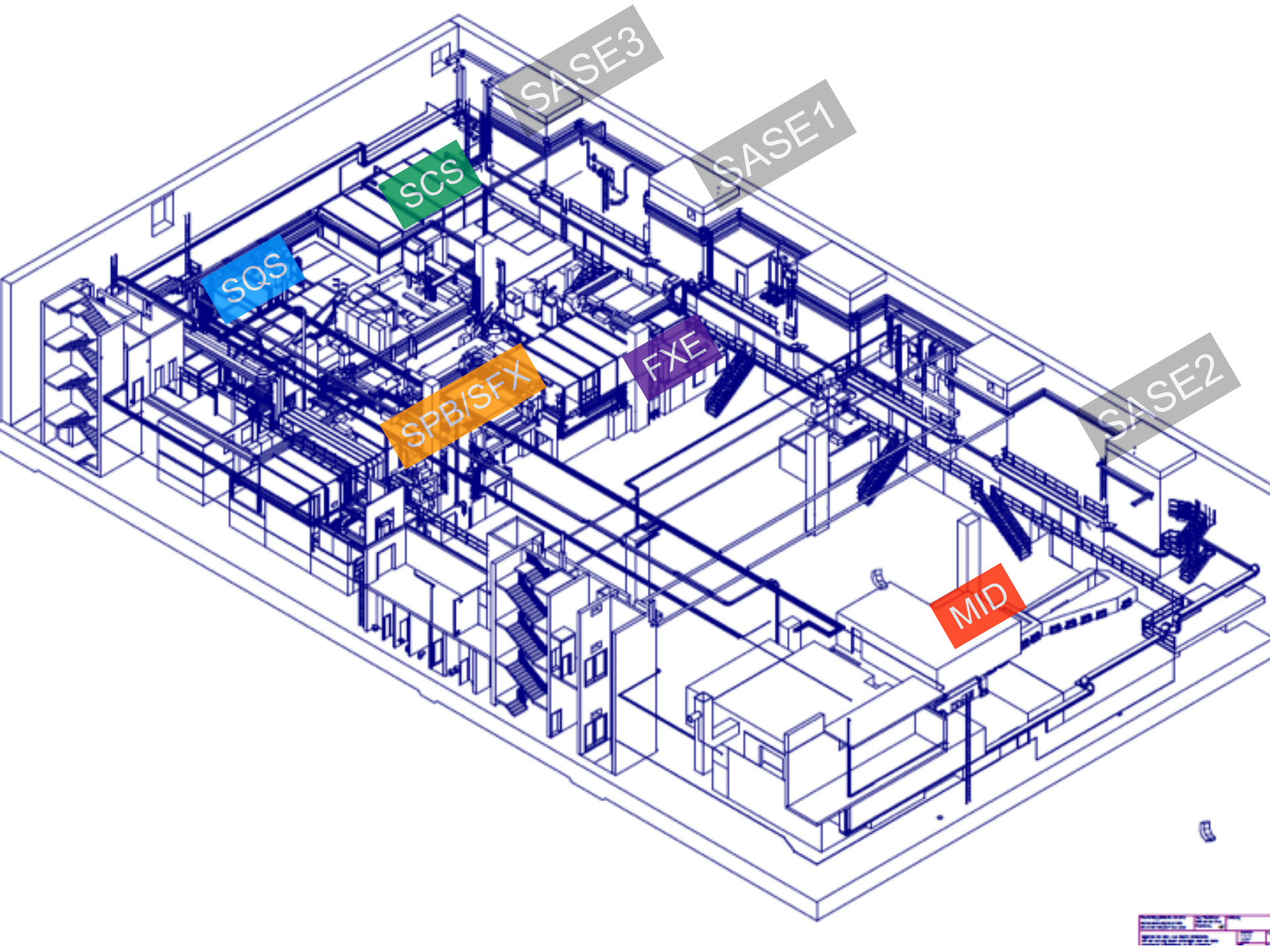

SASE3
SASE1
SASE2

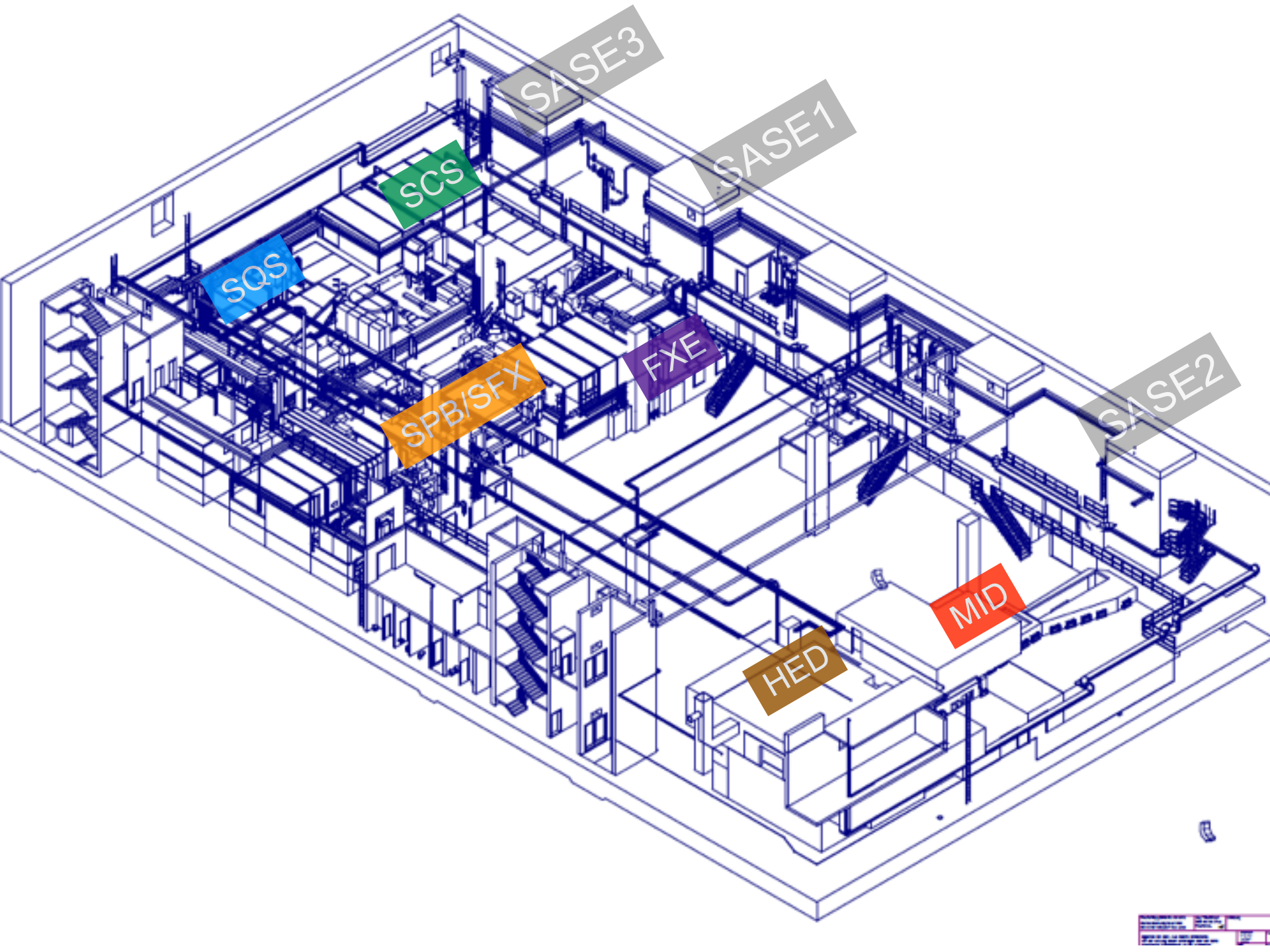

SASE3
SASE1
FXE
SASE2


SASE3
SASE1
SPB/SFX
FXE
SASE2


SASE3
SASE1
SCS
FXE
SPB/SFX
SASE2

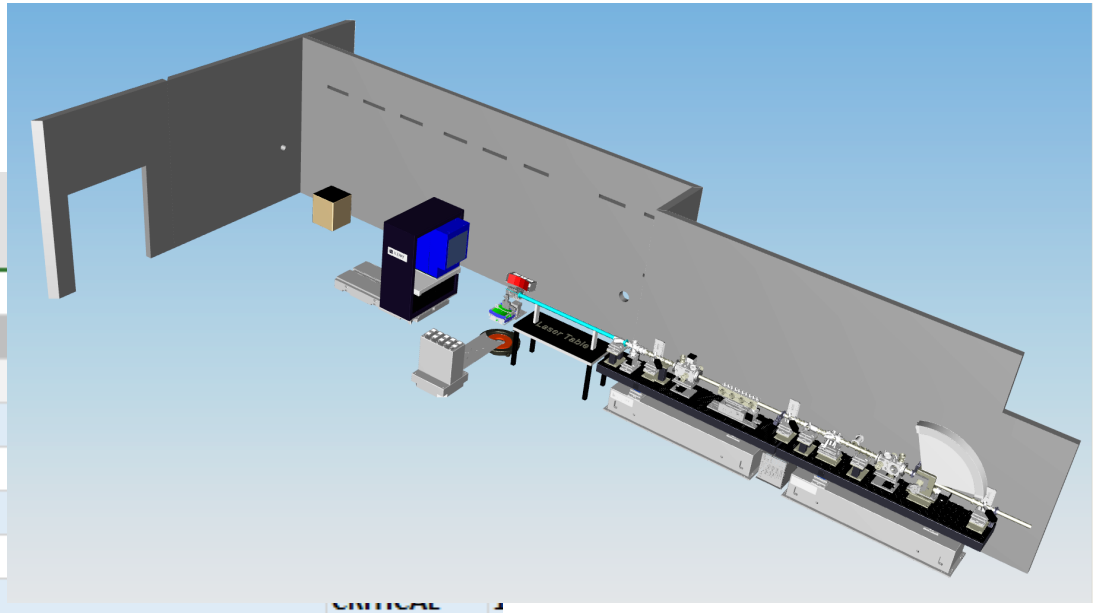

SASE3
SASE1
SCS
SQS
SPB/SFX
FXE
SASE2


SASE3
SASE1
SCS
SQS
SPB/SFX
FXE
SASE2
MID


SASE3
SASE1
SCS
SQS
SPB/SFX
FXE
SASE2
MID
HED

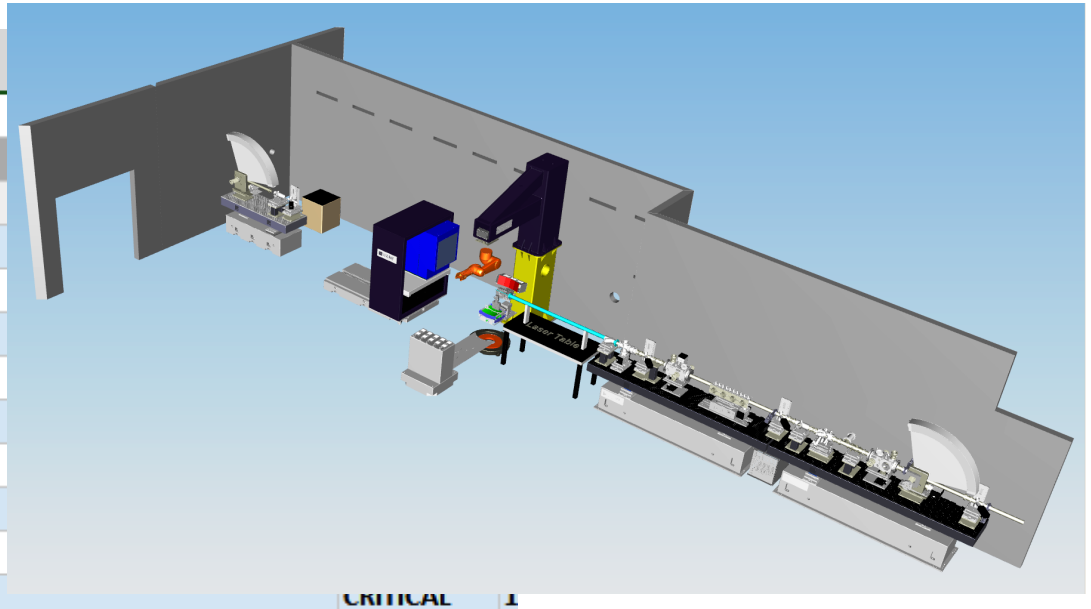
Product Breakdown Structure (Day 1)

- FXE:



	Task Name		
14	WP81_PLAN_FXE		
68	XHEXP1		
69	EXP_HUTCH		
178	OPTICAL TABLE		
828	OPTICAL TABLE DONE		
829	REMOVABLE TRANSPORT TUBE		
846	REMOVABLE TRANSPORT TUBE DONE		
847	MOVABLE LASER TABLE		
867	MOVABLE LASER TABLE DONE	CRITICAL	0
868	SAMPLE STACK	CRITICAL	1
891	SAMPLE STACK DONE	CRITICAL	0
892	DETECTOR	CRITICAL	1
916	DETECTOR DONE	CRITICAL	0
948	BEAMDUMP	CRITICAL	5
962	BEAMDUMP DONE	CRITICAL	0
963	SPB TUBE	CRITICAL	3
982	SPB TUBE DONE	CRITICAL	0
983	EXP_HUTCH_DONE	CRITICAL	0
1126	XHEXP1 DONE		0

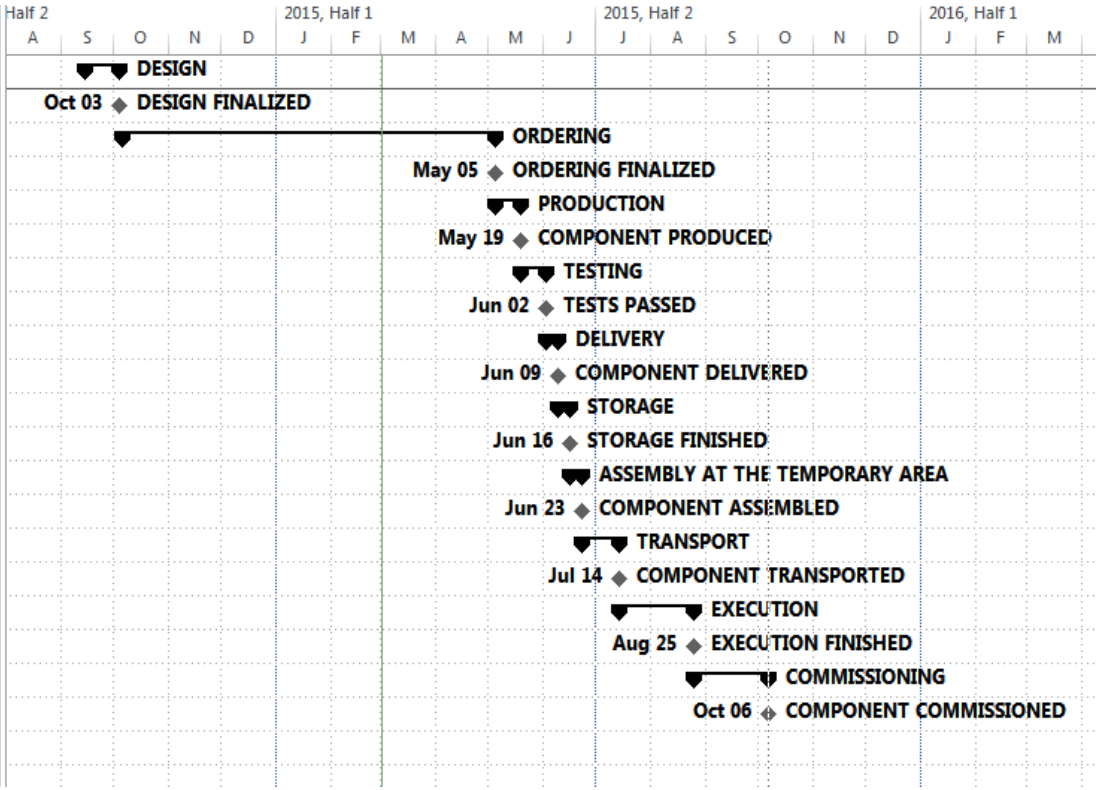
Product Breakdown Structure (Complete)



		Task Name		
14		WP81_PLAN_FXE		
68		XHEXP1		
69		EXP_HUTCH		
70		ROBOT		
177		ROBOT DONE		
178		OPTICAL TABLE		
828		OPTICAL TABLE DONE		
829		REMOVABLE TRANSPORT TUBE		
846		REMOVABLE TRANSPORT TUBE DONE		
847		MOVABLE LASER TABLE		
867		MOVABLE LASER TABLE DONE		
868		SAMPLE STACK	CRITICAL	1
891		SAMPLE STACK DONE	CRITICAL	0
892		DETECTOR	CRITICAL	1
916		DETECTOR DONE	CRITICAL	0
917		POST-DIAGNOSTICS	NON CRITICA	5
947		POST_DIAGNOSTICS DONE	NON CRITICA	0
948		BEAMDUMP	CRITICAL	5
962		BEAMDUMP DONE	CRITICAL	0
963		SPB TUBE	CRITICAL	3
982		SPB TUBE DONE	CRITICAL	0
983		EXP_HUTCH_DONE	CRITICAL	0
1126		XHEXP1 DONE		0

HW Template and Life Cycle

	Task Name	Duration	Predece
1	DESIGN	15 days	
5	DESIGN FINALIZED	0 days	4
6	ORDERING	151,38 day	
42	ORDERING FINALIZED	0 days	41;37
43	PRODUCTION	10 days	
46	COMPONENT PRODUCED	0 days	45
47	TESTING	10 days	
50	TESTS PASSED	0 days	49
51	DELIVERY	5 days	
53	COMPONENT DELIVERED	0 wks	52
54	STORAGE	5 days	
56	STORAGE FINISHED	0 days	55
57	ASSEMBLY AT THE TEMPORARY AREA	5 days	
59	COMPONENT ASSEMBLED	0 days	58
60	TRANSPORT	15 days	
64	COMPONENT TRANSPORTED	0 days	63
65	EXECUTION	30 days	
77	EXECUTION FINISHED	0 days	76
78	COMMISSIONING	30 days	
83	COMPONENT COMMISSIONED	0 days	82



- agreed with the instruments and the laser

Control Electronics Life Cycle

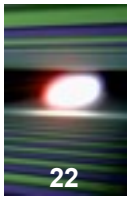
	Task Name	CATEGORY	CONTROL_
14	WP81_PLAN_FXE		
68	XHEXP1		
1027	RCK_HUTCH	CRITICAL	BECKHOFF
1028	OPTICAL TABLE	CRITICAL	BECKHOFF
1029	SUPPORT	CRITICAL	BECKHOFF
1030	GRANITE & STEEL TABLE	CRITICAL	BECKHOFF
1031	REQUIREMENTS COLLECTING	CRITICAL	BECKHOFF
1038	REQUIREMENTS COLLECTED	CRITICAL	BECKHOFF
1039	DEVELOPMENT	CRITICAL	BECKHOFF
1041	DEVELOPMENT DONE	CRITICAL	BECKHOFF
1042	DESIGN	CRITICAL	BECKHOFF
1050	DESIGN DONE	CRITICAL	BECKHOFF
1051	DEVELOPMENT	CRITICAL	BECKHOFF
1053	DEVELOPMENT DONE	CRITICAL	BECKHOFF
1054	ORDERING	CRITICAL	BECKHOFF
1062	ORDERING DONE	CRITICAL	BECKHOFF
1063	PRODUCTION	CRITICAL	BECKHOFF
1066	PRODUCTION DONE	CRITICAL	BECKHOFF
1067	DELIVERY	CRITICAL	BECKHOFF
1074	DELIVERY DONE	CRITICAL	BECKHOFF
1075	STORAGE	CRITICAL	BECKHOFF
1077	STORAGE FINISHED	CRITICAL	BECKHOFF
1078	TRANSPORT	CRITICAL	BECKHOFF
1082	TRANSPORT DONE	CRITICAL	BECKHOFF
1083	EXECUTION	CRITICAL	BECKHOFF
1092	EXECUTION FINISHED	CRITICAL	BECKHOFF
1093	COMMISSIONING	CRITICAL	BECKHOFF
1097	COMMISSIONING DONE	CRITICAL	BECKHOFF
1098	GRANITE & STEEL TABLE DONE	CRITICAL	BECKHOFF
1099	SUPPORT DONE	CRITICAL	BECKHOFF

- agreed with AE, CAS and IT groups

Resource Groups

No	Name	description
1	BAU	DESY'S GENERAL CONTRACTOR OF THE CIVIL CONSTRUCTION WORKS
2	CIE	PERSONNEL OF THE CENTRAL INSTRUMENT ENGINEERING
3	CONTRACTOR	PLACEHOLDER FOR FUTURE NAME OF ELECTED CONTRACTING COMPANY
4	DERU	DESIGNER
5	JJ	JJ X-RAY
6	MEA2	DESY SURVEYING SERVICE
7	MEA5	DESY TRANSPORT GROUP
8	MKK	DESY'S GENERAL CONTRACTOR OF THE INFRASTRUCTURE (ELECTRICISTY, WATER, AC, IT, FIRE SAFETY, ETC…)
9	PI	DESIGNER
10	WP71	PERSONNEL OF THE UNDULATOR SYSTEMS
11	WP73	PERSONNEL OF THE X-RAY OPTICS AND TRANSPORT
12	WP74	PERSONNEL OF THE X-RAY PHOTON DIAGNOSTICS X-RAY PHOTON DIAGNOSTICS
13	WP75	PERSONNEL OF THE DETECTOR DEVELOPMENT
14	WP78	PERSONNEL OF THE OPTICAL LASERS
15	WP79	PERSONNEL OF THE SAMPLE ENVIRONMENT
16	WP81	PERSONNEL OF THE SCIENTIFIC INSTRUMENT FXE
17	WP82	PERSONNEL OF THE SCIENTIFIC INSTRUMENT HED
18	WP83	PERSONNEL OF THE SCIENTIFIC INSTRUMENT MID
19	WP84	PERSONNEL OF THE SCIENTIFIC INSTRUMENT SPB/SFX
20	WP85	PERSONNEL OF THE SCIENTIFIC INSTRUMENT SQS
21	WP86	PERSONNEL OF THE SCIENTIFIC INSTRUMENT SCS
22	WP90	PERSONNEL OF THE CONTROL AND ANALYSIS SOFTWARE
23	WP91	PERSONNEL OF THE ADVANCED ELECTRONICS
24	WP92	PERSONNEL OF THE IT AND DATA MANAGEMENT
25	WTM	CIVIL CONSTRUCTION PLANNING AND SUPERVISION
26	PROC.	XFEL PROCUREMENT DPT.
27	VACUUM GROUP	PERSONNEL OF THE VACUUM GROUP
28	TS	TECHNICAL SERVICE
29	ELECTRICITY GROUP	ELECTRICIANS / ELECTRICAL/WIRING TECHNICIANS
30	BEAMLINE MECHANICS	BEAMLINE / MECHANICAL TECHNICIANS:
31	PONTAX	LEAD HUTCHES' CONTRACTOR

Planning Process: PSPO side



- PSPO (Photon System Project Office)
  - Defines the driving mile stones in the Infrastructure Master Plan
  - Hosts regular (mostly weekly) meetings with the Instruments
  - Maintains individual instrument plans in a central repository
  - Combines individual instrument plans into the Instrument Installation Master Plan
  - Coordinates and resolves conflicts
  - Escalates critical topics to the management
    - ➔ Head of PSPO regularly reports to the MB

Planning Process: Instrument side

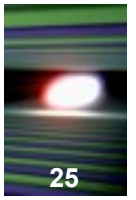
- Instruments
  - Are responsible to provide all necessary information for their individual installation plans and they have to buy into the plans
  - Provide one person responsible for the planning
    - ➔ ideally an engineer
  - Report regularly in the Technical Coordination/ XHEXP1 meetings
  - Provide key outgoing mile stones to the overall project plan

Infrastructure Master Plan

- Covers XHEXP1 and adjacent activities Infrastructure and (some) Civil Construction
- Takes into account planning and execution phases
- Produces key outgoing mile stones for the instruments:

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
907	SASE1 Hutch construction start	0 days	Tue 17.02.15	Tue 17.02.15	315	
908	FXE BIG ITEMS	0 days	Tue 07.07.15	Tue 07.07.15	347	
909	SPB/SFX BIG ITEMS	0 days	Tue 07.07.15	Tue 07.07.15	348	
910	HUTCH CONSTRUCTION COMPLETE (INSTRUMENT INSTALLATION POSSIBLE)	0 days	Mon 28.09.15	Mon 28.09.15	409	
911	ALL HUTCHES & BASIC INFRASTRUCTURE DONE (INSTALLATIO OF SENSITIVE COMPONENTS POSSIBLE)	0 days	Mon 09.05.16	Mon 09.05.16	411	
912	COMPLETE HUTCHES AND INFRASTRUCTURE DONE	0 days	Fri 08.07.16	Fri 08.07.16	413	
913	COMPLETE DAY 1 INSTRUMENT INSTALLED AND COMMISSIONED (DAY 1 INSTRUMENT READY)	0 days	Mon 03.07.17	Mon 03.07.17	406FS+12 emons	914FS+1 emon
914	ALL SAFETY TESTS DONE (BEAM IN INSTRUMENT POSSIBLE)	0 days	Wed 02.08.17	Wed 02.08.17	913FS+1 emon	915FS+3 emons
915	DAY 1 INSTRUMENTS WAS COMMISSIONED WITH BEAM (FRIENDLY USER OPERATION POSSIBLE)	0 days	Tue 31.10.17	Tue 31.10.17	914FS+3 emons	916FS+3 emons
916	ROUTINE INSTRUMENT OPERATION ESTABLISHED (USER OPERATION POSSIBLE)	0 days	Mon 29.01.18	Mon 29.01.18	915FS+3 emons	917FS+6 emons
917	ENTIRE INSTRUMENT INSTALLED AND COMMISSIONED FOR ROUTINE OPERATION (FULL SCOPE ISNTRUMENT READY)	0 days	Sat 28.07.18	Sat 28.07.18	916FS+6 emons	

Infrastructure Plan: SASE1



327	STEEL Constructions	55 days	Thu 19.02.15	Wed 06.05.15		
328	ALIGNMENT, SURVEYING	1 day	Thu 26.03.15	Thu 26.03.15	318	333
329	ALIGNMENT, MARKING ON THE...	1 day	Thu 26.03.15	Thu 26.03.15	194;330	
330	Execution planning	25 days	Thu 19.02.15	Wed 25.03.15	319SS;248	333;329;332
331	EXECUTION WORKS	30 days	Thu 26.03.15	Wed 06.05.15		
332	MODIFICATIN OF THE GALERY STAIRS	5 days	Thu 26.03.15	Wed 01.04.15	330	333
333	Execution works	20 days	Thu 09.04.15	Wed 06.05.15	330;328;323FS-2 wks;3	334
334	EXECUTION WORKS FINISHED	0 days	Wed 06.05.15	Wed 06.05.15	333	335
335	STEEL CONSTRUCTIONS DONE	0 days	Wed 06.05.15	Wed 06.05.15	334	365
336	EXP_HUTCHES (LEAD)	145 days	Tue 03.02.15	Mon 24.08.15		
337	ALIGNMENT	2 days	Fri 29.05.15	Mon 01.06.15		
338	ALIGNMENT, surveying	1 day	Fri 29.05.15	Fri 29.05.15	194;341	339
339	MARKING ON THE ...	1 day	Mon 01.06.15	Mon 01.06.15	338	340
340	ALIGNMENT FINISHED	0 days	Mon 01.06.15	Mon 01.06.15	339	
341	Execution planning	83 days	Tue 03.02.15	Thu 28.05.15	273FS+13 days	343FS-14 edays;3
342	PETRA3 work	16 days	Fri 29.05.15	Fri 19.06.15	341	346
343	detailed plan from Subcontractor	14 edays	Thu 14.05.15	Thu 28.05.15	341FS-14 edays	344
344	info send to Diamond (roof of the EXP_hutch)	0 days	Thu 28.05.15	Thu 28.05.15	343	
345	EXECUTION WORKS	46 days	Mon 22.06.15	Mon 24.08.15		
346	hutch construction	46 days	Mon 22.06.15	Mon 24.08.15	341;324;342	347SS+12 days;34
347	FXE BIG ITEMS	0 days	Tue 07.07.15	Tue 07.07.15	346SS+12 days	908
348	SPB BIG ITEMS	0 days	Tue 07.07.15	Tue 07.07.15	346SS+12 days	909
349	EXECUTION WORKS FINISHED	0 days	Mon 24.08.15	Mon 24.08.15	346	350;358
350	EXP_HUTCHES (LEAD) DONE	0 days	Mon 24.08.15	Mon 24.08.15	349	365
351	CTR and RCK_HUTCHES	151 days	Fri 27.02.15	Mon 28.09.15		
352	ALIGNMENT	2 days	Mon 30.03.15	Tue 31.03.15		
355	ALIGNMENT FINISHED	0 days	Tue 31.03.15	Tue 31.03.15	354	
356	EXECUTION PLANNING	30 edays	Fri 27.02.15	Sun 29.03.15	235	353
357	EXECUTION WORKS	25 days	Tue 25.08.15	Mon 28.09.15		
358	walls construction	15 days	Tue 25.08.15	Mon 14.09.15	349	361;360;359SS
359	FLOOR (DOUBLE) construction	15 days	Tue 25.08.15	Mon 14.09.15	358SS	
360	CTRL_RCK_walls DONE	0 days	Mon 14.09.15	Mon 14.09.15	358	
361	roofs construction	10 days	Tue 15.09.15	Mon 28.09.15	358	362
362	CTRL AND RCK ROOF DONE	0 days	Mon 28.09.15	Mon 28.09.15	361	364;363
363	EXECUTION WORKS DONE	0 days	Mon 28.09.15	Mon 28.09.15	362	
364	CTR and RCK_HUTCHES DONE	0 days	Mon 28.09.15	Mon 28.09.15	362	365
365	HUTCHES DONE	0 days	Mon 28.09.15	Mon 28.09.15	364;350;326;335	406;409;367;478

Hutch Construction and Infrastructure Dates

- SASE1
  - Hutch Construction: Apr - Sep ’15
  - Infrastructure: Oct ‘15 - Mar ’16
    - → All Hutches and Infrastructure done (Instrument Installation possible): March 2016
      - 9 months for Instrument Installation
- SASE3
  - Hutch Construction: Jul - Oct ’15
  - Infrastructure: Nov ’15 - Apr ’16
    - → All Hutches and Infrastructure done (Instrument Installation possible): April 2016
      - 9 months for Instrument Installation
- SASE2
  - Hutch Construction: Oct ‘15 - Jan ’16
  - Infrastructure: Feb - Jun ’16
    - → All Hutches and Infrastructure done (Instrument Installation possible): Jun 2016
      - 10 months for Instrument Installation

SQS Plan: General Structure

	Task Name	Duration	Start	Finish	Predecess	CATEGORY_1
1	In-Coming Milestones	1598 days	2011-01-01	2017-02-15		
3	Large, heavy items installation possible	0 days	2015-07-06	2015-07-06	\\win.desy	CRITICAL
5	Instrument's installation possible	0 days	2016-06-28	2016-06-28	\\win.desy	CRITICAL
7	Sensitive components installation possible	0 days	2016-08-29	2016-08-29	1389;\\win.	CRITICAL
8	DESIGN START	0 days	2011-01-01	2011-01-01		CRITICAL
9	CDR	0 wks	2011-06-17	2011-06-17	1391	CRITICAL
10	TDR	0 days	2012-08-01	2012-08-01	1392	CRITICAL
11	EXP_HUTCH FINISHED	0 days	2016-06-28	2016-06-28	5	NON CRITICAL
12	LAS_HUTCH FINISHED	0 days	2011-01-01	2011-01-01		NON CRITICAL
13	RCK_HUTCH FINISHED	0 days	2011-01-01	2011-01-01		NON CRITICAL
14	CTRL_HUTCH FINISHED	0 days	2011-01-01	2011-01-01		NON CRITICAL
15	TUNNEL INSTALLATION POSSIBLE	0 days	2011-01-01	2011-01-01		CRITICAL
16	GENERAL COMMISSIONING POSSIBLE	0 days	2011-01-01	2011-01-01		
17	FIRST BEAM POSSIBLE	0 days	2017-02-15	2017-02-15		CRITICAL
18	WP85_PLAN_SQS	1645 days	2011-01-01	2017-04-19		CRITICAL
19	TUNNEL	1 day	2011-01-03	2011-01-03		
22	TUNNEL STUFF DONE	0 days	2011-01-03	2011-01-03	19	
23	XHEXP1	1645 days	2011-01-01	2017-04-19		CRITICAL
24	EXP_HUTCH	1645 days	2011-01-01	2017-04-19		CRITICAL
1295	EXP_HUTCH DONE	0 days	2017-04-19	2017-04-19	24	CRITICAL
1296	LAS_HUTCH	36 days	2011-01-03	2011-02-21		NON CRITICAL
1310	LAS_HUTCH DONE	0 days	2011-02-21	2011-02-21	1296	NON CRITICAL
1311	CTR_HUTCH	6 days	2011-01-03	2011-01-10		CRITICAL
1348	CTR_HUTCH DONE	0 days	2011-01-10	2011-01-10	1311	CRITICAL
1349	RCK_HUTCH	6 days	2011-01-03	2011-01-10		CRITICAL
1383	RACK_HUTCH DONE	0 days	2011-01-10	2011-01-10	1349	CRITICAL
1384	XHEXP1 DONE	0 days	2017-04-19	2017-04-19	23	CRITICAL
1385	SQS INSTRUMENT DONE	0 days	2017-04-19	2017-04-19	18	CRITICAL
1386	RESEARCH	10 days	2011-03-27	2011-04-07		
1387	ACTIVITY	10 days	2011-03-27	2011-04-07		
1388	MISSING OR LOST ISSUES	5 days	2011-01-03	2011-01-07		
1389	General handover of the infrastructure	1 wk	2011-01-03	2011-01-07		
1390	Out-going Milestones	1645 days	2011-01-01	2017-04-19		
1391	CDR PUBLISHED (PLAN)	0 wks	2011-06-17	2011-06-17	1	
1392	TDR PUBLISHED (PLAN)	0 days	2012-08-01	2012-08-01	1	
1393	installation complete	0 days	2011-01-01	2011-01-01		
1394	DONE for friendly users	0 days	2011-01-01	2011-01-01		
1395	DONE for operation	0 days	2017-04-19	2017-04-19	1385	

External Milestones

CDR

TDR

First beam possible
15-02-2017

Critical
Non-Critical

today

SQS Plan: VMI Spectrometer

Q3/15

Sensitive Equip.

Task Name	Duration	Start	Finish	Predecess	CATEGORY_1
WPBS_PLAN_SQS	1645 days	2011-01-01	2017-04-19		CRITICAL
XHEXP1	1645 days	2011-01-01	2017-04-19		CRITICAL
EXP_HUTCH	1645 days	2011-01-01	2017-04-19		CRITICAL
AQS MAIN	1626 days	2011-01-28	2017-04-19		CRITICAL
COMPONENTS	1625 days	2011-01-31	2017-04-19		CRITICAL
VMI SPECTROMETER	1613 days	2011-02-09	2017-04-13		CRITICAL
DESIGN	1193 days	2011-02-09	2015-09-03		CRITICAL
CONCEPTUAL DESIGN	3 days	2011-02-09	2011-02-11	635	CRITICAL
TECHNICAL DESIGN	3 days	2011-12-14	2011-12-16	715;636	CRITICAL
EXECUTION DESIGN	22 days	2015-08-05	2015-09-03	657	CRITICAL
DESIGN FINALIZED	0 days	2015-09-03	2015-09-03	717	CRITICAL
ORDERING	11 days	2015-09-04	2015-09-18		CRITICAL
DIRECT ORDERR	11 days	2015-09-04	2015-09-18		CRITICAL
PREPARATION OF DOCUMENTS	1 day	2015-09-04	2015-09-04	718	CRITICAL
PURCHASE REQUEST	10 days	2015-09-07	2015-09-18	721	CRITICAL
PURCHASE REQUEST SENT	0 days	2015-09-18	2015-09-18	722	CRITICAL
ORDERING FINALIZED	0 days	2015-09-18	2015-09-18	721	CRITICAL
PRODUCTION	120 days	2015-09-21	2016-03-04		CRITICAL
ACTIVITY	120 days	2015-09-21	2016-03-04	724	CRITICAL
COMPONENT PRODUCED	0 days	2016-03-04	2016-03-04	726	CRITICAL
DELIVERY	1 day	2016-03-07	2016-03-07		CRITICAL
DELIVERY OF THE CHAMBER	1 day	2016-03-07	2016-03-07	727	CRITICAL
COMPONENT DELIVERED	0 wks	2016-03-07	2016-03-07	729	CRITICAL
STORAGE	10 days	2016-03-08	2016-03-21		CRITICAL
CONTRACTED TIME DURATION	10 days	2016-03-08	2016-03-21	730	CRITICAL
STORAGE FINISHED	0 days	2016-03-21	2016-03-21	732	CRITICAL
TRANSPORT	3 days	2016-03-22	2016-03-24		CRITICAL
TRANSPORT TO THE FRONT OF THE XHEXI	1 day	2016-03-22	2016-03-22	733	CRITICAL
TRANSPORT1 (VERTICAL)	1 day	2016-03-23	2016-03-23	735	CRITICAL
TRANSPORT2 HORIZONTAL	1 day	2016-03-24	2016-03-24	736	CRITICAL
COMPONENT TRANSPORTED	0 days	2016-03-24	2016-03-24	737	CRITICAL
EXECUTION	10 days	2016-09-06	2016-09-20		CRITICAL
EXECUTION WORKS	10 days	2016-09-06	2016-09-20		CRITICAL
ACTIVITY	10 days	2016-09-06	2016-09-20	738;627	CRITICAL
EXECUTION FINISHED	0 days	2016-09-20	2016-09-20	741	CRITICAL
EXECUTION FINISHED	0 days	2016-09-20	2016-09-20	742	CRITICAL
COMMISSIONING	147,75 day	2016-09-20	2017-04-13		CRITICAL
LOCAL	5 days	2016-09-20	2016-09-27	743	CRITICAL
GENERAL	1 day	2016-09-27	2016-09-28	745	CRITICAL
COMMISSIONING WITH BEAM	5 days	2017-04-07	2017-04-13	746;667	CRITICAL
READY FOR OPERATION	0 days	2017-04-13	2017-04-13	747	CRITICAL
COMMISSIONING DONE	0 days	2017-04-13	2017-04-13	748	CRITICAL
VMI SPECTROMETER DONE	0 wks	2017-04-13	2017-04-13	749	CRITICAL

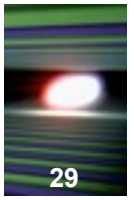
Final design & Ordering
7 weeks

Production
6 months

Installation
4 weeks

Comm.
1week

SQS Plan: Design Work

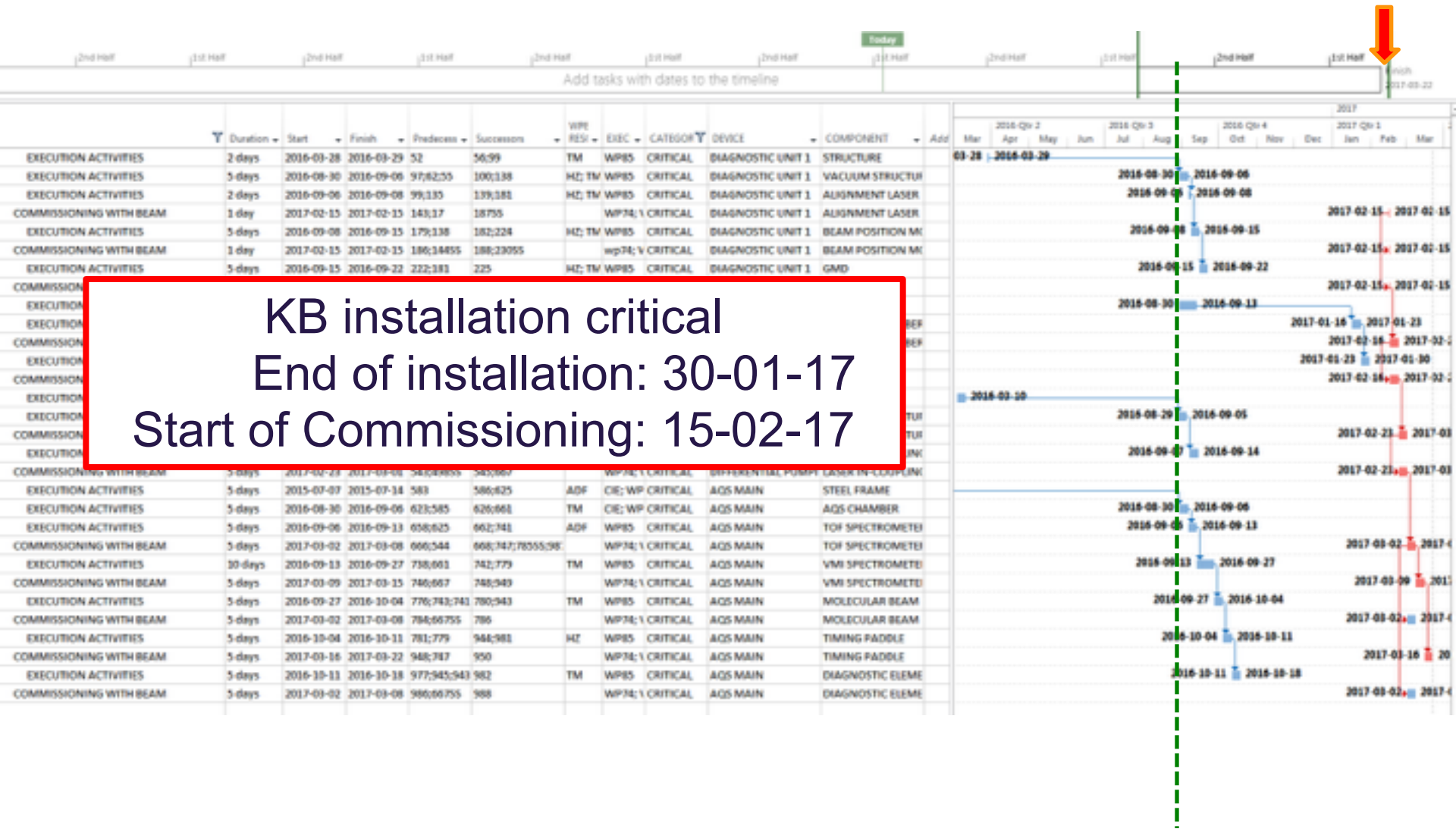


Q1/15 Q1/16

	Task Name	Duration	Start	Finish	Predecessors	CATEGORY_3	WPE RESI	EXECUTION	DEVICE
25	⊿ DIAGNOSTIC UNIT 1	1599 days	2011-01-01	2017-02-15		CRITICAL			DIAGNOSTIC UNIT 1
26	⊿ SUPPORT	1368 days	2011-01-01	2016-01-29		CRITICAL			DIAGNOSTIC UNIT 1
27	⊿ STRUCTURE	1368 days	2011-01-01	2016-01-29		CRITICAL			DIAGNOSTIC UNIT 1
28	⊿ DESIGN	1265 days	2011-01-01	2015-11-05		CRITICAL			DIAGNOSTIC UNIT 1
31	EXECUTION DESIGN	10 days	2015-10-23	2015-11-05	30;30;622	CRITICAL	HZ	WP85	DIAGNOSTIC UNIT 1
63	⊿ COMPONENTS	1599 days	2011-01-01	2017-02-15		CRITICAL			DIAGNOSTIC UNIT 1
64	⊿ VACUUM STRUCTURE	1487,25 da	2011-01-04	2016-09-14		CRITICAL			DIAGNOSTIC UNIT 1
65	⊿ DESIGN	1274 days	2011-01-04	2015-11-19		CRITICAL			DIAGNOSTIC UNIT 1
68	EXECUTION DESIGN	10 days	2015-11-06	2015-11-19	67;31	CRITICAL	HZ	WP85	DIAGNOSTIC UNIT 1
147	⊿ BEAM POSITION MONITOR	1595 days	2011-01-07	2017-02-15		CRITICAL			DIAGNOSTIC UNIT 1
148	⊿ DESIGN	1291 days	2011-01-07	2015-12-17		CRITICAL			DIAGNOSTIC UNIT 1
151	EXECUTION DESIGN	10 days	2015-12-04	2015-12-17	150;111	CRITICAL	HZ	CIE; WP85	DIAGNOSTIC UNIT 1
190	⊿ GMD	1593 days	2011-01-11	2017-02-15		CRITICAL			DIAGNOSTIC UNIT 1
191	⊿ DESIGN	1299 days	2011-01-11	2015-12-31		CRITICAL			DIAGNOSTIC UNIT 1
194	EXECUTION DESIGN	10 days	2015-12-18	2015-12-31	193;151	CRITICAL	HZ	WP85	DIAGNOSTIC UNIT 1
416	⊿ DIFFERENTIAL PUMPING UNITS	1617 days	2011-01-20	2017-03-30		CRITICAL			DIFFERENTIAL PUMPI
417	⊿ SUPPORT	1342 days	2011-01-20	2016-01-10		CRITICAL			DIFFERENTIAL PUMPI
418	⊿ STEEL FRAME	1342 days	2011-01-20	2016-01-10		CRITICAL			DIFFERENTIAL PUMPI
419	⊿ DESIGN								DIFFERENTIAL PUMPI
422	EXECUTION DESIGN								DIFFERENTIAL PUMPI
457	⊿ COMPONENTS								DIFFERENTIAL PUMPI
458	⊿ VACUUM STRUCTURE								DIFFERENTIAL PUMPI
459	⊿ DESIGN								DIFFERENTIAL PUMPI
462	EXECUTION DESIGN								DIFFERENTIAL PUMPI
502	⊿ LASER IN-COUPLING								DIFFERENTIAL PUMPI
503	⊿ DESIGN								DIFFERENTIAL PUMPI
508	EXECUTION DESIGN	5 days	2015-11-16	2015-11-20	507;462	CRITICAL	HZ	WP85	DIFFERENTIAL PUMPI
550	⊿ AQS MAIN	1626 days	2011-01-28	2017-04-19		CRITICAL			AQS MAIN
551	⊿ SUPPORT	1163,25 da	2011-01-28	2015-07-14		CRITICAL			AQS MAIN
552	⊿ STEEL FRAME	1163,25 da	2011-01-28	2015-07-14		CRITICAL			AQS MAIN
553	⊿ DESIGN	1067 days	2011-01-28	2015-02-27		CRITICAL			AQS MAIN
556	EXECUTION DESIGN	22 days	2015-01-29	2015-02-27	555;1093+1	CRITICAL	HZ	WP85	AQS MAIN
583	⊿ COMPONENTS	1625 days	2011-01-31	2017-04-19		CRITICAL			AQS MAIN
584	⊿ AQS CHAMBER	1468,25 da	2011-01-31	2016-09-14		CRITICAL			AQS MAIN
585	⊿ DESIGN	1156 days	2011-01-31	2015-07-03		CRITICAL			AQS MAIN
598	EXECUTION DESIGN	90 days	2015-03-02	2015-07-03	597;596	CRITICAL	HZ	WP85	AQS MAIN
603	⊿ TOF SPECTROMETER	1610 days	2011-02-07	2017-04-06		CRITICAL			AQS MAIN
604	⊿ DESIGN	1173 days	2011-02-07	2015-08-04		CRITICAL			AQS MAIN
607	EXECUTION DESIGN	22 days	2015-07-06	2015-08-04	606;598	CRITICAL	ADF	WP85	AQS MAIN
915	⊿ TIMING PADDLE	1612 days	2011-02-17	2017-04-19		CRITICAL			AQS MAIN
916	⊿ DESIGN	1202 days	2011-02-17	2015-09-24		CRITICAL			AQS MAIN
919	EXECUTION DESIGN	5 days	2015-09-18	2015-09-24	926;755	CRITICAL	HZ	WP85	AQS MAIN
953	⊿ DIAGNOSTIC ELEMENTS	1600 days	2011-02-21	2017-04-06		CRITICAL			AQS MAIN
954	⊿ DESIGN	1210 days	2011-02-21	2015-10-08		CRITICAL			AQS MAIN
957	EXECUTION DESIGN	10 days	2015-09-25	2015-10-08	904;919	CRITICAL	HZ	WP85	AQS MAIN

One year
of design work

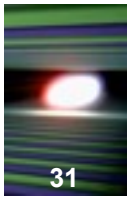
SQS Plan: Installation and Commissioning



	Duration	Start	Finish	Predecess	Successors	WPE RESI	EXEC	CATEGOR	DEVICE	COMPONENT
EXECUTION ACTIVITIES	2 days	2016-03-28	2016-03-29	52	56;99	TM	WP85	CRITICAL	DIAGNOSTIC UNIT 1	STRUCTURE
EXECUTION ACTIVITIES	5 days	2016-08-30	2016-09-06	97;82;55	100;138	HZ; TM	WP85	CRITICAL	DIAGNOSTIC UNIT 1	VACUUM STRUCTUI
EXECUTION ACTIVITIES	2 days	2016-09-06	2016-09-08	99;135	139;181	HZ; TM	WP85	CRITICAL	DIAGNOSTIC UNIT 1	ALIGNMENT LASER
COMMISSIONING WITH BEAM	1 day	2017-02-15	2017-02-15	143;17	18755		WP74; \	CRITICAL	DIAGNOSTIC UNIT 1	ALIGNMENT LASER
EXECUTION ACTIVITIES	5 days	2016-09-08	2016-09-15	179;138	182;224	HZ; TM	WP85	CRITICAL	DIAGNOSTIC UNIT 1	BEAM POSITION MC
COMMISSIONING WITH BEAM	1 day	2017-02-15	2017-02-15	186;14455	188;23055		wp74; \	CRITICAL	DIAGNOSTIC UNIT 1	BEAM POSITION MC
EXECUTION ACTIVITIES	5 days	2016-09-15	2016-09-22	222;181	225	HZ; TM	WP85	CRITICAL	DIAGNOSTIC UNIT 1	GMD
EXECUTION ACTIVITIES	5 days	2015-07-07	2015-07-14	583	586;625	ADF	CIE; WP	CRITICAL	AQS MAIN	STEEL FRAME
EXECUTION ACTIVITIES	5 days	2016-08-30	2016-09-06	623;585	626;661	TM	CIE; WP	CRITICAL	AQS MAIN	AQS CHAMBER
EXECUTION ACTIVITIES	5 days	2016-09-06	2016-09-13	658;625	662;741	ADF	WP85	CRITICAL	AQS MAIN	TOF SPECTROMETEI
COMMISSIONING WITH BEAM	5 days	2017-03-02	2017-03-08	666;544	668;747;78555;98		WP74; \	CRITICAL	AQS MAIN	TOF SPECTROMETEI
EXECUTION ACTIVITIES	10 days	2016-09-13	2016-09-27	738;661	742;779	TM	WP85	CRITICAL	AQS MAIN	VMI SPECTROMETEI
COMMISSIONING WITH BEAM	5 days	2017-03-09	2017-03-15	746;667	748;949		WP74; \	CRITICAL	AQS MAIN	VMI SPECTROMETEI
EXECUTION ACTIVITIES	5 days	2016-09-27	2016-10-04	776;743;741	780;943	TM	WP85	CRITICAL	AQS MAIN	MOLECULAR BEAM
COMMISSIONING WITH BEAM	5 days	2017-03-02	2017-03-08	784;66755	786		WP74; \	CRITICAL	AQS MAIN	MOLECULAR BEAM
EXECUTION ACTIVITIES	5 days	2016-10-04	2016-10-11	781;779	944;981	HZ	WP85	CRITICAL	AQS MAIN	TIMING PADDLE
COMMISSIONING WITH BEAM	5 days	2017-03-16	2017-03-22	948;787	950		WP74; \	CRITICAL	AQS MAIN	TIMING PADDLE
EXECUTION ACTIVITIES	5 days	2016-10-11	2016-10-18	977;945;943	982	TM	WP85	CRITICAL	AQS MAIN	DIAGNOSTIC ELEME
COMMISSIONING WITH BEAM	5 days	2017-03-02	2017-03-08	986;66755	988		WP74; \	CRITICAL	AQS MAIN	DIAGNOSTIC ELEME

KB installation critical
End of installation: 30-01-17
Start of Commissioning: 15-02-17

FXE: Instrument and Electronics connected



- Combined two plans:

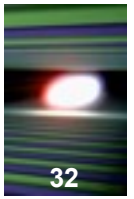
1. Plan:

- LOCATION: EXP_HUTCH
  - DEVICE: OPTICAL TABLE
    - COMPONENT: GRANITE & STEEL TABLE
      - List of activities / by JJ and WP81

2. Plan

- LOCATION: RCK_HUTCH
  - DEVICE: OPTICAL TABLE
    - COMPONENT: GRANITE & STEEL TABLE
      - List of activities / by WP90, WP91, WP92, CIE and WP81

FXE: Instrument and Electronics connected



	Task Name
14	WP81_PLAN_FXE
68	XHEXP1
1027	RCK_HUTCH
1028	OPTICAL TABLE
1029	SUPPORT
1030	GRANITE & STEEL TABLE
1031	REQUIREMENTS COLLECTING
1038	REQUIREMENTS COLLECTED
1039	DEVELOPMENT
1041	DEVELOPMENT DONE
1042	DESIGN
1050	DESIGN DONE
1051	DEVELOPMENT
1053	DEVELOPMENT DONE
1054	ORDERING
1062	ORDERING DONE
1063	PRODUCTION
1066	PRODUCTION DONE
1067	DELIVERY
1074	DELIVERY DONE
1075	STORAGE
1077	STORAGE FINISHED
1078	TRANSPORT
1082	TRANSPORT DONE
1083	EXECUTION
1092	EXECUTION FINISHED
1093	COMMISSIONING
1097	COMMISSIONING DONE
1098	GRANITE & STEEL TABLE DONE
1099	SUPPORT DONE

	Task Name	CATEGORY	CONTROL	EXECUT
14	WP81_PLAN_FXE			
68	XHEXP1			
1027	RCK_HUTCH	CRITICAL	BECKHOFF	
1028	OPTICAL TABLE	CRITICAL	BECKHOFF	
1029	SUPPORT	CRITICAL	BECKHOFF	
1030	GRANITE & STEEL TABLE	CRITICAL	BECKHOFF	
1031	REQUIREMENTS COLLECTING	CRITICAL	BECKHOFF	
1032	DEFINITION OF EQUIPMENT AND INTERFACES	CRITICAL	BECKHOFF	WP81
1033	IDENTIFICATION OF FINAL EQUIPMENT	CRITICAL	BECKHOFF	CAS; W
1034	PREPARATION OF THE DESCRIPTION	CRITICAL	BECKHOFF	CAS; AE
1035	DESCRIPTION DONE	CRITICAL	BECKHOFF	
1036	VALIDATION OF SOLUTIONS	CRITICAL	BECKHOFF	CAS; AE
1037	REQUIREMENTS APPROVED	CRITICAL	BECKHOFF	
1038	REQUIREMENTS COLLECTED	CRITICAL	BECKHOFF	
1039	DEVELOPMENT	CRITICAL	BECKHOFF	
1040	DEVELOPMENT (FIRMWARE, SOFTWARE)	CRITICAL	BECKHOFF	WP91;
1041	DEVELOPMENT DONE	CRITICAL	BECKHOFF	
1042	DESIGN	CRITICAL	BECKHOFF	
1043	IDENTIFICATION OF REQUIRED COMPONENTS	CRITICAL	BECKHOFF	CIE; WP
1044	RACK PLANNING	CRITICAL	BECKHOFF	CIE
1045	CTR ROOM PLANNING	CRITICAL	BECKHOFF	WP92;
1046	DESIGN PREPARATION	CRITICAL	BECKHOFF	CIE
1047	DESIGN FINALIZED	CRITICAL	BECKHOFF	
1048	CROSS-CHECK DOCUMENTATION	CRITICAL	BECKHOFF	WP91;
1049	DOCUMENTATION APPROVED	CRITICAL	BECKHOFF	
1050	DESIGN DONE	CRITICAL	BECKHOFF	
1051	DEVELOPMENT	CRITICAL	BECKHOFF	
1053	DEVELOPMENT DONE	CRITICAL	BECKHOFF	
1054	ORDERING	CRITICAL	BECKHOFF	
1062	ORDERING DONE	CRITICAL	BECKHOFF	

Status

- Infrastructure Master plan:
  - Implemented, maintained and regularly updated
- Individual Instrument plans

FXE	Regular Progress, almost done
SPB/SFX	Help by engineer seconded by RAL
SQS	Regular progress, almost done
SCS	Making good progress
MID	Starting, but good progress due to new engineer
HED	Starting, but good progress due to new engineer
Laser	Solid planning experience within the group

IMP: Instrument Installation Master Plan

- All Individual Instrument Plans have the same structure
- Individual instrument plans are integrated into the master plan as “sub-projects”
- Custom-columns allow to identify resources, locations, types of work
- Linking via milestones is used only for a very small number of key driving milestones:
  - Instrument Installation Possible,
  - Installation of sensitive components possible
  - Start of instrument commissioning

Next Steps

- Finish SPB/SFX and FXE instrument plans
  - More work required to integrate plan into overall plan
- Connect SASE1 plans including the laser
- Finish SQS and SCS
- Look at SASE2 in more detail
  - First presentation from HED today
- More resources are coming:
  - PSPO has hired another person
  - Instruments have hired and still are hiring up to 2 more staff in 2015

PSPO Team

G. Wellenreuther, Section Coordinator

K. Piorecki, Project Engineer

Lead Planner

N. Saaristo, CAD Integration Engineer

Also supports planning

A. Violante, **Deputy Section Coordinator**

U. Conta, Documentation Assistant

S. Cunis, Project Engineer

T. Haas, Group Leader