



Towards VXD Commissioning

- Tentative Schedule
- Work before Commissioning
- Commissioning Steps
- Skeleton Schedule and Manpower requirement
- Conclusions and Outlook

Plan "C4" (top: present baseline)



				2014					2015							2016							2017											
					_	Y201			JFY2015						_								_	6 (H28		JFY2017 (H29) 1 2 3 4 5 6 7 8 9 10 11 12								
	12	3	<u>45</u>	6	78	9	<u>10 1</u>	1 12	1	2 3	4	5	<u>6</u> 7	8	9 10	0 11	12 1	2	3	4 5	6	78	9	<u>10 11</u>	12 1	2	3	4 5	6	<u>78</u>	9	<u>10 11</u>	12	12
Driginal Schedule																																		
SuperKEKB/Belle II (overall)		Ċ	Const	tructio	'n		Start with powe cond ing	high er	No	ase 1 QCS Solen	noid							w w	hase / Q(/ So /o V	CS olenoid		Summe Shutdo		Phase Physic						nonth		add TO umed	P	
Main Ring		(Const	tructio	n																								(add	RF	statio	ns)		
IR		(Const	tructio	n				IR ·	for ph	ase	1		* QC	S ins	tall		IF	R for	phase	e 2													
Belle II		(Const	tructio	'n				_	ast ph			*	Belle	II rol	ll in (r	no VX	D) B	east	phase	e 2	VXD in	stall	Partial	TOP				add	TOP			F	- ull Be
Damping Ring		(Const	tructio	n							DR																						
(MR high power startup) (Phase 1 to Phase 2)								ndition It powe						ssembl elle II ro			B	ea	m	Te	st	@	DI	ESY			P	(D	@	KE	ΞK			
										n budı FY201				QCS in		ield me		assem	ıbly					3ell	e (-								
an C4										_	T						P	h1		Phas	e 1 (c	option)					Ph2	2						
SuperKEKB/Belle II (overall)		Ċ	Const	tructio	'n						wi po	artup th hig ower onditic g	sh Si	ummer hutdov	N	hase o QC o Sol	1 S enoid					•				v v v	v/o V	CS olenoi	d	Summ Shutd		Phase Physic		n
Main Ring		(Const	tructio	'n																					V	V/ FL		ЛР					
IR				tructio											IR	R for p	hase 1					* Q(CS ir	nstall		I	R for	phase	2					
Belle II		(Const	tructio	n										В	east p	hase	1				* Belle	e II (no VXD, I	Full T	DP) E	Beast	phase	2	VXD ii	nstall	Full Be	elle II	
Damping Ring		0	Const	tructio	n													DR																
(MR high power startup)												condit																						
(Phase 1 to Phase 2)											Ivia	gnet po	ower d					-+				sassemb Belle II r		(Full TO	P)	(<u> </u>] + £.		
Plan C4													Install full TOP					Belle II roll in (Full TOP) QCS install QCS field measuren			asurem	_{Ras} Stai			ts i	n 2(017	aut 'aut	um	۱n.				
																•	VX	(D		an	d	ΡI	a	n (24							/		

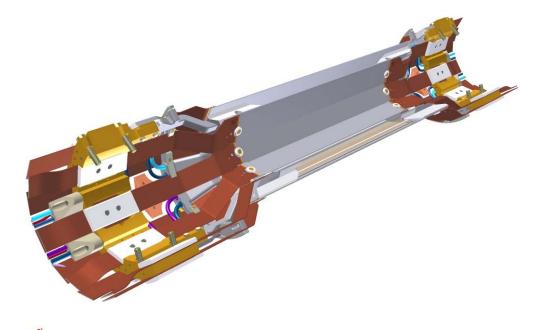




Steps before VXD commissioning

PXD: bring 2 complete and tested ("partly commissioned") half shells to KEK (B1), require a "clean room area 2" in B1

SVD: assemble SVD half shells in "clean room area 1" of B1

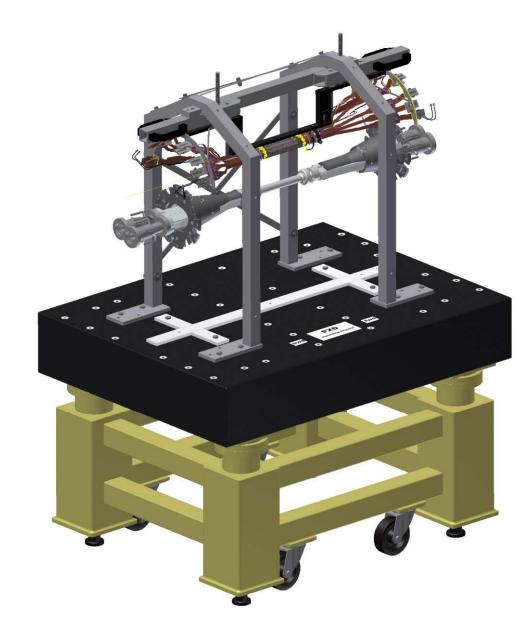


PXD needs to be married with the beam pipe top - bottom

SVD half shells wait to be married to PXD/BP right-left







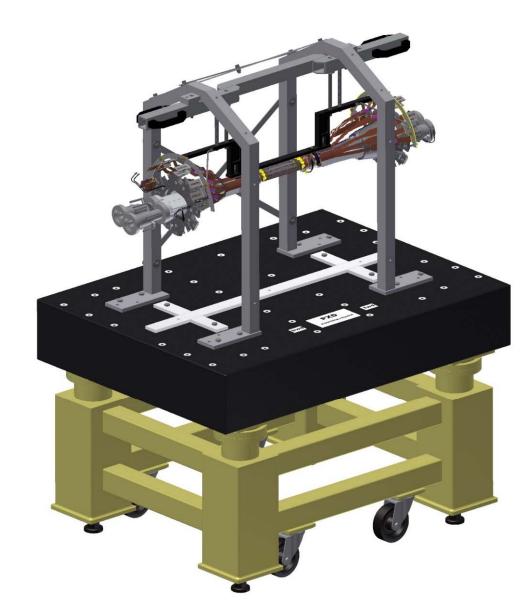
VXD assembly table in B1

(where is the assembly table located?)

Y X





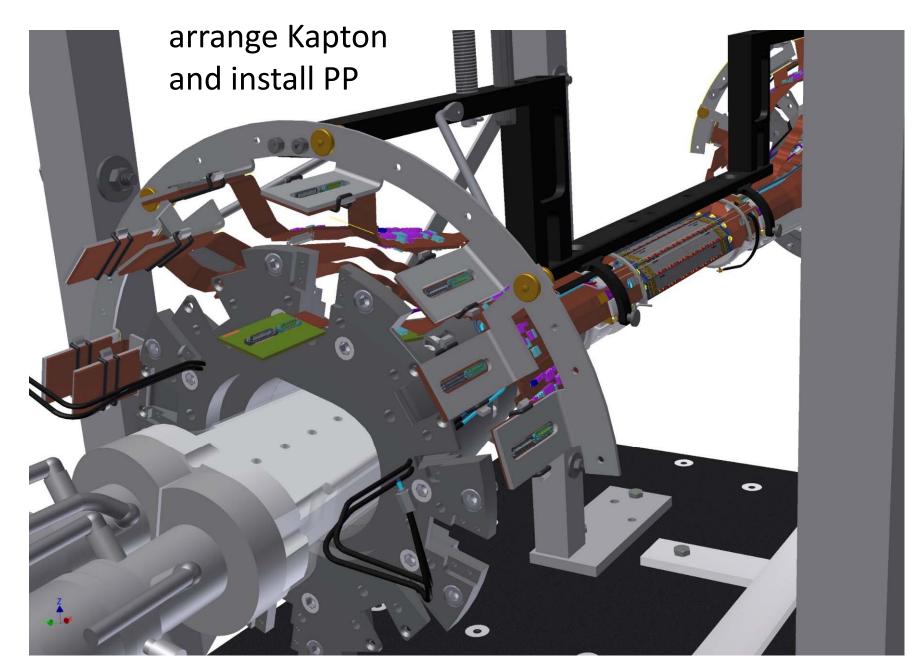


VXD assembly table in B1

(where is the assembly table located?)

Assembly Work for VXD (IV)



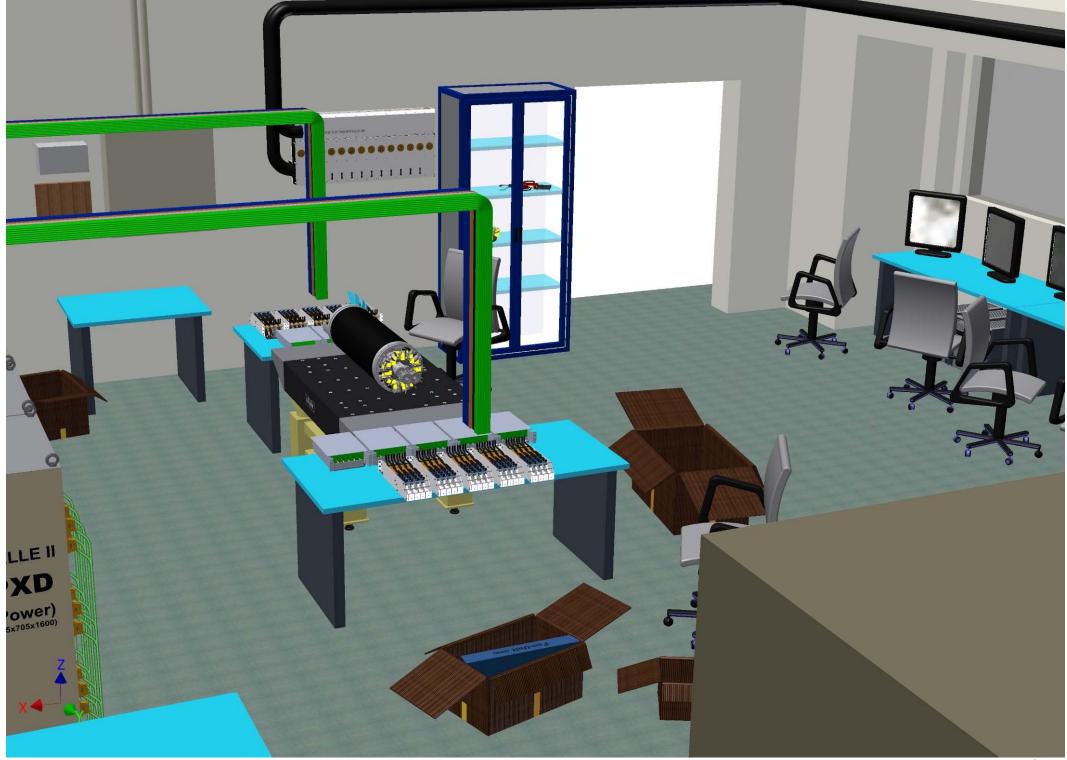


Location of the VXD Assembly Table









Heat Load for B1: 7 kW PXD, 10 kW SVD = 17 kW



C. Kiesling, 6th VXD Workshop, Pisa, Oct. 1-3, 2014



Preparation for Commissioning





Skeleton for VXD Commissioning (I)



Slides following are subject to discussion

Installation and Com	imis	ioni	ig (L	SEAS	1+1	(XU)		<u> </u>																										-			\square		⊢
			-																																				
							2015												2016												2017							3	20
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
Belle II on beam line							-												Dete	ctor o	n bea	m lin	e																
Access to Belle II																	J.																						
Data Taking Modes										Phas	e I (B	east l)											Phase	e II (Be	east II	1)							Phas	e III (I	Physic	s)		
Services																			Insta	II CO2	pipe	5																	
CO2 System					build	and	comn	nissio	n CO2	syst	em (@	MPI)					instal	I IBB	elle sy	st. (Kl	EK)	Cm. (002																
PXD Installatons												asse	mble	and c	ommis	sion	PXD (@MP	기)				prep.	Beas	tll	PXD t	o B1				VXD	Inst.(+cabl	es)					
SVD Installations														Ladd	er mo	unt (E	31)		cosm	. com	m.																		
Air Cooling (KEK ?)																																							
TOP / CDC Installation														TOP	/ CDC	Insta	lation	1									VXD I	Integr	./con	nm (E	31)								
MP (FTE's PXD) P																2	3	3	3	3	3	4	4	4	5	6	6	6	6	6	6	8	8	8	8	8	6	4	ł
MP (FTE's PXD) E																1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	1	0	0	0	0	
MP (FTE's PXD) T																2	4	4	4	4	4	4	2	2	2	2	2	2	1	1	3	3	3	1	0	0	0	0	
MP SVD													4	4	4	4	4	4	3	3	3	1	5	5	5	3	5	5	4	4	10	10	10	8	8	8	8	6	1
total MP VXD at KEK																9	13	13	12	12	12	11	13	13	14	12	14	14	12	12	21	23	23	18	16	16	14	10	

Key Commissioning Phases:

start

Phase I:	Bake-out (+Beast I)	Oct. 2015
	(no Belle, no QCS)	
Phase II:	BG optimization, target lumi = 1 x 10 ³⁴ cm ⁻² s ⁻¹	Dec. 2016
	(with Belle and QCS and BEAST 2 detector)	
Phase III:	"Physics"	Oct. 2017
	(with Belle and QCS and VXD)	



VXD commissioning steps:

- PXD under cooling and power -> cosmics & DAQ (PXD ClRm)
- mount PXD onto beam pipe -> align & cosmics & DAQ
- SVD under cooling and power -> cosmics?
- bring SVD halves to VXD assembly table, join with PXD, check alignment
- cosmics & DAQ & analysis
- Iower VXD onto B4 level and prepare for AIM

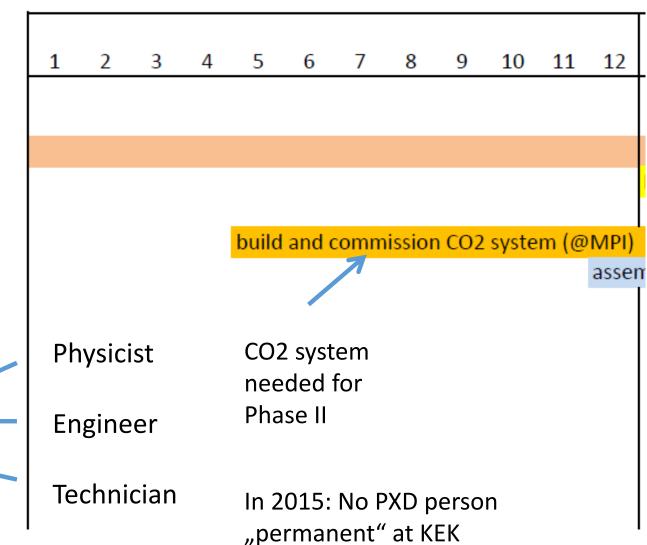
Skeleton for VXD Commissioning (III)



Installation and Commissioning (BEAST + VXD)

Belle II on beam line Access to Belle II Data Taking Modes Services CO2 System Detector Installatons Air Cooling (KEK ?) TOP / CDC Installation MP (FTE's PXD) P MP (FTE's PXD) E MP (FTE's PXD) T

total MP PXD at KEK







		T															
	┛																
											2016						
	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1
Belle II on beam line											Dete	ctor o	on bea	am lin	е		
Access to Belle II																	
Data Taking Modes		Phas	e I (Be	east I)												Phase	e II (E
Services											Insta	II CO2	2 pipe	s			
CO2 System	<mark>i CO2</mark>	syste	m (@	MPI)				insta	II IBBe	elle syst. (KEK)			Cm. (CO2			
PXD Installatons				asser	nble	and co	ommi	ssion	PXD (@MP	1)				prep	. Beas	t II
SVD Installations						Ladd	er mo	ount (B1)		cosm	. com	nm.				
Air Cooling (KEK ?)																	
TOP / CDC Installation						TOP	/ CDC	Insta	llatio	n							
MP (FTE's PXD) P								2	3	3	3	3	3	4	4	4	5
MP (FTE's PXD) E								1	2	2	2	2	2	2	2	2	2
MP (FTE's PXD) T								2	4	4	4	4	4	4	2	2	2
MP SVD					4	4	4	4	4	4	3	3	3	1	5	5	5
total MP VXD at KEK								9	13	13	12	12	12	11	13	13	14



Skeleton for VXD Commissioning (V)



															2010
							2017								2018
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
Belle II on beam line															
Access to Belle II															
Data Taking Modes	e II (B	east I	I)							Phase	e III (F	hysic	s)		
Services															
CO2 System															
PXD Installatons	tll	PXD 1	to B1				VXD	Inst.(+	⊦cable	es)					
SVD Installations															
Air Cooling (KEK ?)									-						
TOP / CDC Installation			VXD	Integr	./con	nm (B	1)								
MP (FTE's PXD) P	5	6	6	6	6	6	6	8	8	8	8	8	6	4	
MP (FTE's PXD) E	2	1	1	1	1	1	2	2	2	1	0	0	0	0	
MP (FTE's PXD) T	2	2	2	2	1	1	3	3	3	1	0	0	0	0	
MP SVD	5	3	5	5	4	4	10	10	10	8	8	8	8	6	
total MP VXD at KEK	14	12	14	14	12	12	21	23	23	18	16	16	14	10	





- First very tentative sequence of commissioning steps shown, including man power estimates required at KEK
- Schedule is based on a slightly modified "C4", shown by the machine group during Nov. 13 B2GM
- Coming discussions among the VXD crews should lead to a more elaborate sequence
- Already now visible: quite a few people will be at KEK from the VXD (partly supported by "JENNIFER")
- Clearing B1 area, offices at KEK, and housing should be addressed in the near future.