



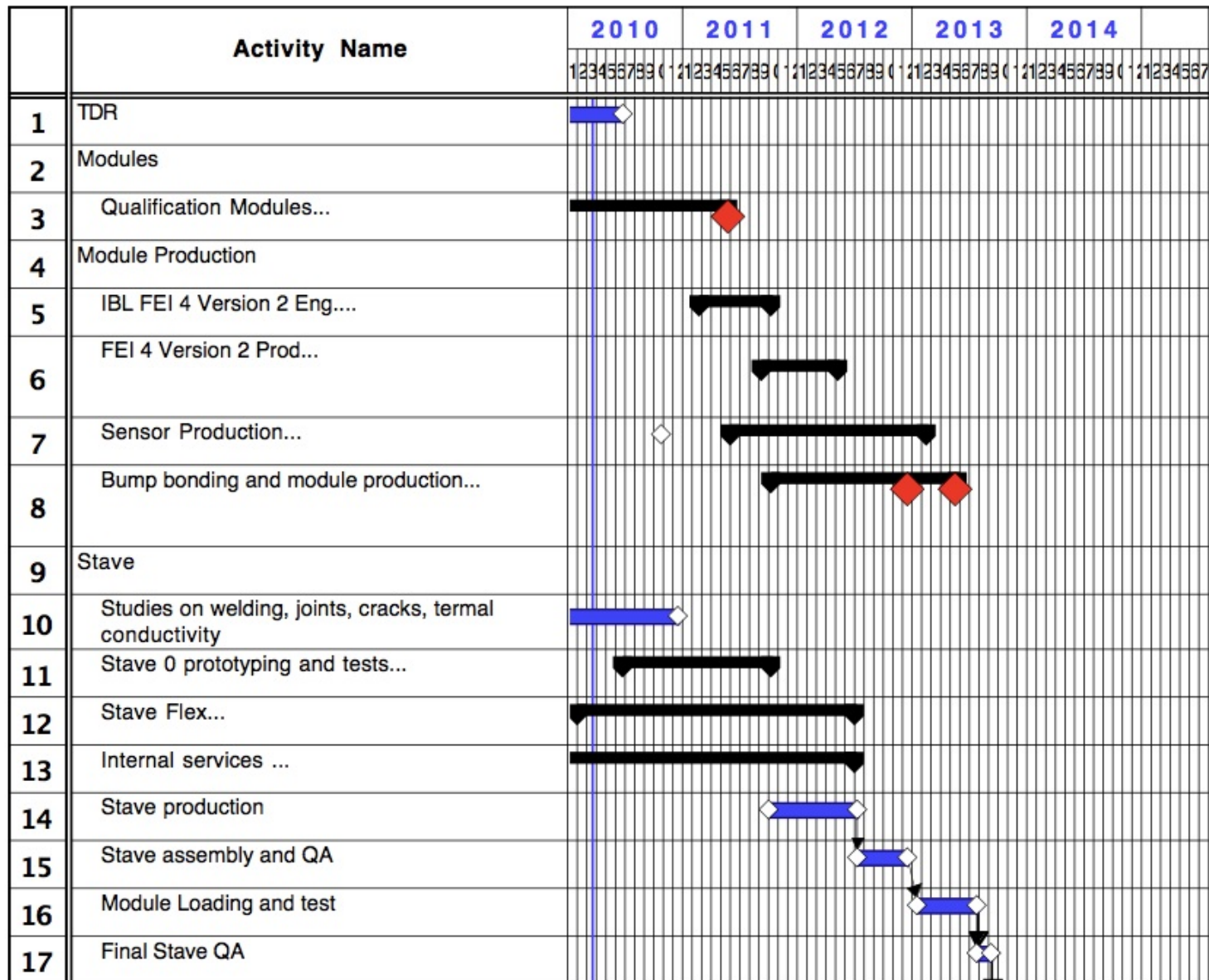
*Materiale per discussione richieste finanziarie
dell'IBL nel 2011*

[G. Darbo](#) - INFN / Genova





IBL Schedule (March 2010)





Project Status – FE-I4

FE-I4 Submission

- FE-I4 submission has been delayed twice (since the former page IBL schedule)
- Submission date was moved from March 31st to May 17th and is now June 30th (this is the date communicated to IBM after 17th of May became impossible)
- We will know better at the end of the week if date is realistic or not. Design effort was more than initially estimated (usual optimism). There are no major show stoppers, but mix of design complexity (x20 number of transistor of FE-I3) and risk/cost of failure (513kCH).

Money for submission are all collected and PO should be out.

Institute	Fraction	Due	Paid
Bonn	22%	sFr. 113 045	sFr. 113 045
Geneva	8%	sFr. 41 107	sFr. 41 108
Genova	12%	sFr. 61 661	sFr. 61 661
LBNL	22%	sFr. 113 045	sFr. 78 135
			sFr. 41 000
Marseille	20%	sFr. 102 769	sFr. 102 769
Nikhef	16%	sFr. 82 215	sFr. 82 215
Total	100%	sFr. 513 843	sFr. 519 933

Version 2 of FE-I4 should be submitted (end of) next year



IBL TDR

- *IBL after Chamonix needs to document better the Physics and Performance case*
 - Some funding agencies might require demonstration of improved performance with IBL (this is an issue in US)
 - Difficult to base it on ageing given slow LHC rump up
 - Really needs some physics argument
- *In last week ATLAS EB the "IBL physics and performance taskforce" has been put in place.*
 - The TF will reinforce the efforts to ensure the completion of the IBL performance studies for the IBL TDR by end of August.
 - Markus Elsing chairs the task force
 - First meeting last Friday (04/06/2010)
 - <http://indico.cern.ch/conferenceDisplay.py?confId=97135>
- *Method of Work*
 - Planned weekly meetings on Friday afternoon.
 - Wiki and Share Point in place:
 - Share Point: <https://espace.cern.ch/atlas-project-pixel-offlinesw/IBL/default.aspx> (link from top banner in the IBL Share Point)
 - Wiki: <https://twiki.cern.ch/twiki/bin/view/Atlas/IBLPerformanceTaskForce>



IBL P&P Task Force

Members of the Task Force

- Pixels sw : Attilio Andreazza
- Vertexing: Vadim Kostyukhin
- B-tagging: Laurent Vacanant
- Tracking Perf: Christian Schmitt
- tracking studies: Dmitry Tsybychev, Johanna Fleckner
+ existing IBL software people
- Fast Sim: Andreas Salzburger
- sim+pileup: John Chapman
- Physics (gen): Ian Hinchliffe
- Higgs: Bill Murray / Ketevi Assamagan
- WH study: Giacinto Piacquadio
- IBL-PL: Giovanni Darbo
- TDR editor: Kevin Einsweiler
- Chair: Markus Elsing



Markus Elsing

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Next Year Plans

- *Delay in the FE-I4 will impact the plans of next year (not yet updated in the schedule)*
 - We want still to maintain readiness of the IBL for end of 2014
 - Next week will be known the plans of the LHC machine (CERN Council)
- *As from today, next year we will see most of module/stave prototype work*
 - FE-I4 modules, bump-bonding qualification, sensor qualification/selection
 - In the schedule is planned to have initial (pre)-production for sensors (more realistically in 2012).
- *ROD*
 - ROD/BOC prototype in 2011. Plan to use for 2011 test beam.
 - Pre-production from 2012 on.
- *Stave*
 - Final prototype and design
 - Flex Hybrid and services: final prototype (needs FE-I4 v2 for production - available in 2012)
- *Early installation of External Services*
 - Need to understand if cables, fibers, opto-boxes, Will be installed in the next shutdown (in discussion with Mauro et al,...)



Prototype: Sensor – BB – Module

This and next year module prototypes

- Planned a common sharing of bump-bonding with the sensor partners
- IZM selected for this program: aim to qualify sensors and FE-I4 in test-beam and irradiation
- In parallel plan to qualify IZM for thin module bump-bonding and Selex as second technology option in case IZM show serious technical issues.

Item	Qty	Cost	Description	CERN-Pix	CAN	D-BMBF	E	F	I	N	SLO	UK	US	Total
Planar			MoU A1.1	10%	-	40%	-	30%	-	-	-	-	20%	100%
4-inch: mask + design	1													
4-inch: UBM and dicing (n-in-n) - 2 batches	12	€ 12 800												
6-inch: mask + design	1													
6-inch: UBM and dicing (thin n-in-n) - 1 batch	5	€ 8 050												
FE-I4 single chip flip-chip	60	€ 9 600												
FE-I4 2-chip module flip-chip	30	€ 8 700												
Planar Total		€ 39 150	Contribution	€ 3 915	€ -	€ 15 660	€ -	€ 11 745	€ -	€ -	€ -	€ -	€ 7 830	€ 39 150
3D			MoU A1.1	-	-	-	25%	-	25%	25%	-	25%	-	100%
4-inch: mask + design	1													
4-inch: UBM and dicing - 3 batches	12	€ 14 800												
FE-I4 single chip flip chip	60	€ 9 600												
Option: handling wafer removal of the 3D wafer	--													
3D Total		€ 24 400	Contribution	€ -	€ -	€ -	€ 6 100	€ -	€ 6 100	€ 6 100	€ -	€ 6 100	€ -	€ 24 400
Diamond (FE-I4 size)			MoU A1.1	10%	50%	-	-	-	-	-	40%	-	-	100%
Mask+design	1													
Run with 20 tiles	1	€ 26 000												
FE-I4 single-chip flip-chip	20	€ 6 700												
Diamond Total		€ 32 700	Contribution	€ 3 270	€ 16 350	€ -	€ -	€ -	€ -	€ -	€ 13 080	€ -	€ -	€ 32 700
FE-I4			MoU A1.1	3%	8%	7%	4%	5%	4%	4%	7%	4%	3%	50%
bump mask for 8" wafer	1	€ 2 000	MoU A1.3			50%								50%
- First 2 wafer unthinned														
- Thinning to 400-450 µm - 6 wafers														
- UBM, bump desposition and dicing	8 (5)	€ 17 000												
Option: 3 wafers (out of 8) thinned to <200µm, on support wafer, removal of support wafer after flip chip	0 (3)	€ 10 350												
FE-I4 Total		€ 29 350	Contribution	€ 978	€ 2 446	€ 16 632	€ 1 223	€ 1 468	€ 1 223	€ 1 223	€ 1 957	€ 1 223	€ 978	€ 29 350
Contingency			MoU A1.1	7%	17%	13%	8%	10%	8%	8%	13%	8%	7%	100%
- Contingency for extra wafers		€ 20 000	Contribution	€ 1 333	€ 3 333	€ 2 667	€ 1 667	€ 2 000	€ 1 667	€ 1 667	€ 2 667	€ 1 667	€ 1 333	€ 20 000
Total			Total	€ 9 497	€ 22 129	€ 34 958	€ 8 990	€ 15 213	€ 8 990	€ 8 990	€ 17 703	€ 8 990	€ 10 142	€ 145 600
			Fraction	7%	15%	24%	6%	10%	6%	6%	12%	6%	7%	
Fraction of FE-I4 wafer processing on MoU A1.1				50%										
MoU A1.1 Proto				5%	17%	8%	12%	6%	12%	12%	13%	12%	4%	100%

Summary (Quotation IZM no. 059/274/10)

1. Bumping of FE-I4 (wafer thickness 400÷450µm)	€ 19 000
Option 3: bumping of FE-I4 (wafer thickness <200µm)	€ 10 350
2. UBM on planar 4-inch wafers (thin n-in-n)	€ 12 800
3. UBM on planar 6-inch wafers (thin n-in-p)	€ 8 050
4. UBM desposition on 3D 4-inch wafers	€ 14 800
5. Metalisation on diamond sensors	€ 26 000
6. Flip-chip	€ 34 600
Total	€ 125 600

Cost sharing for bump-bonding at IZM

- Proposed sharing follows MoU Annex 1.1 (sensors) and Annex 1.3 (Bump-bonding)
- BMBF has larger fraction since partially covers BB qualification
- Money pledges proposed by 15/05/2010 – proposed program will be circulated this week and discussed to next week IB



INFN Contribution to IBL

Insertable B-Layer Cost & Deliverables - Version.1.14 (16/7/2009) (WBS 1.8)							
COSTS				Deliverables Share		&O-B / N	
WBS	MoU item	Name	Cost (kCHF)	MO-A	MO-B/ New proj.	I	kCH
1		Sensors	kCH 752.0	0.0	752.0	106.3	
1.2.1	1	3D	kCH 100.0		100.0	25%	kCH 25.0
1.3.1	1	Sensor Production	kCH 512.0		512.0	15%	kCH 76.8
1.3.2	1	Sensor QC	kCH 30.0		30.0	15%	kCH 4.5
2		Electronics	kCH 2 175.3	0.0	2 175.3	581.4	
2.1	2	FE-I4					kCH -
2.1.1	2	FE-I4 v1 engineering	kCH 504.0		504.0	12%	kCH 60.5
2.1.2	2	FE-I4 v2 engineering	kCH 584.6		584.6	12%	kCH 70.2
2.1.3	2	FE-I4 Production & QC	kCH 241.2		241.2	12%	kCH 28.9
2.5	6	ROD	kCH 380.8		380.8	100%	kCH 380.8
2.6.2	7	PP2 power regulation	kCH 36.0		36.0	100%	kCH 36.0
2.7.1	2	New Hardware	kCH 42.0		42.0	12%	kCH 5.0
3		Hybridisation	kCH 845.8	0.0	845.8	189.3	
3.1.1	3	Bump-bonding vendor qualification	kCH 72.5		72.5	40%	kCH 29.0
3.1.2	3	Bump-bonding production	kCH 653.3		653.3	10%	kCH 65.3
3.2.1	5	HDI design and prototype	kCH 20.0		20.0	100%	kCH 20.0
3.2.2	5	HDI production and QC/QA	kCH 50.0		50.0	100%	kCH 50.0
3.3.2	5	Bare module production & QC/QA	kCH 50.0		50.0	50%	kCH 25.0
4		Local Support (stave)	kCH 487.0	0.0	487.0	102.6	
4.1.1	4	Bare Stave Design & Prototype	kCH 242.0		242.0	30%	kCH 72.6
4.1.2	4	Bare Stave Production & QC	kCH 100.0		100.0	30%	kCH 30.0
5		Internal Services	kCH 245.0	0.0	245.0	28.5	
5.2	4	Internal Cooling Pipes	kCH 95.0		95.0	30%	kCH 28.5
6		Beam Pipe & Interfaces	kCH 1 990.0	1 570.0	420.0	0.0	kCH -
7		Surface Intergration (Package preparation)	kCH 382.0	0.0	382.0	0.0	
8		External Services - Routing and installation Procedures	kCH 415.9	293.6	122.3	30.0	
8.3	7	PP2 Modifications	kCH 30.0		30.0	100%	kCH 30.0
9		External Cooling and Gas	kCH 361.0	331.0	30.0	9.0	
9.1.1	4	Cooling design qualification	kCH 30.0		30.0	30%	kCH 9.0
10		Installation in the Pit	kCH 1 495.0	1 495.0	0.0	0.0	
11		DAQ, DCS and Interlock integration	kCH 592.0	375.7	216.2	0.0	
11.1.1	6	TIM (in the ROD crate)	kCH 10.0	10.0		100%	kCH 10.0
11.1.2	6	SBC (in the ROD crate)	kCH 25.0	25.0		100%	kCH 25.0
11.1.3	6	DAQ - Crates (ROD)	kCH 40.0	40.0		100%	kCH 40.0
11.1.5	6	ROS	kCH 30.0	30.0		100%	kCH 30.0
11.1.6	6	S-link destination card	kCH 81.6	81.6		100%	kCH 81.6
11.4.1	7	LV-PS (HV-PP4 included here)	kCH 66.0	66.0		85%	kCH 56.1
11.4.2	7	HV-PS	kCH 123.2	123.2		90%	kCH 110.9
12		Irradiation and Test Beam	kCH -	0.0	0.0	0.0	1 400.7



Project / M&O-A

MoU grouping - Costs sharing: M&O-A									
									contribut
MoU Item			Name	Total	MO-A	MO-B/ New Proj			I
		1	Sensor - prototype (including bumping to FE-I4), production,	752	-	752			
		2	FE-I4 prototype (v1), production (v2), test	1 372	-	1 372			
		3	Bump-bonding, thinning, bare module - prototype, production	726	-	726			
		4	Local support (stave): CF structure, TM, pipe - prototype, pr	467	-	467			
		5	Module assembly, stave loading, flex-hybrid, internal electric	436	-	436			
		6	R/O chain: opto-board, opto-fiber, TX/RX, BOC, ROD, TDAQ	1 025	187	839			187
		7	Power chain: HV/LV PS, PP2 regulators, type2, 3 & 4 cables,	505	333	172			167
		8	Integration in SR1 & System test	492	-	492			
		9	Cooling plant & cooling services to PP1	461	461	-			-
		10	Beampipe & mechanical interfaces (to staves, to type 1 service	1 990	1 570	420			-
		11	Installation in the pit: beampipe extraction, IBL+beampipe in	1 515	1 515	-			-
				9 741	4 065	5 676			354
MoU grouping - Costs sharing: M&O-B, New-project									
									contribut
MoU Item			Name	Total	MO-A	MO-B/ New Proj			I
		1	Sensor - prototype (including bumping to FE-I4), production,	752	-	752			106
		2	FE-I4 prototype (v1), production (v2), test	1 372	-	1 372			165
		3	Bump-bonding, thinning, bare module - prototype, production	726	-	726			94
		4	Local support (stave): CF structure, TM, pipe - prototype, pr	467	-	467			140
		5	Module assembly, stave loading, flex-hybrid, internal electric	436	-	436			95
		6	R/O chain: opto-board, opto-fiber, TX/RX, BOC, ROD, TDAQ	1 025	187	839			381
		7	Power chain: HV/LV PS, PP2 regulators, type2, 3 & 4 cables,	505	333	172			66
		8	Integration in SR1 & System test	492	-	492			-
		9	Cooling plant & cooling services to PP1	461	461	-			
		10	Beampipe & mechanical interfaces (to staves, to type 1 service	1 990	1 570	420			-
		11	Installation in the pit: beampipe extraction, IBL+beampipe in	1 515	1 515	-			
				9 741	4 065	5 676			1 047



Richieste 2011

Genova

- 4Flex (sviluppo e prototipi) 15 k€ cons
- FEI4 (contributo al nuovo run) 55k€ cons fine anno
- Test HV chain (Iseg PS + crate) 10 k€ CA
- BOC elettrico (sviluppo e fabbricazione) 7 k€ cons
- USB Pix 1k€ +BB CA

Bologna

- Crate VME completo 9U 64x 15k€ (CA)
- Secondo prototipo ROD (scheda completa) 20k€ (cons.)
- Single Board Computer 4K€ (CA)

€ME per missioni a wuppertal e cern circa 15k



Richieste 2011

Milano

- 10 Stave preproduction 15 k€ cons
- Bump bonding Selex 15k€ cons
- Power Analyzer (N6705A DC frame+moduli) 14K€ CA
- Microohmetro (hioki 3541 HiTester) 5kE CA
- FPGA+tool (ACTEL ProAsics3 Plus demo kit) 2.5ke Consumo
- irraggiamenti 15 k€ cons
- USB Pix 1k€ CA

Udine

- Sensori - run preprpoduzione 40k€ (CA) s.j.
- Preproduzione moduli 9K€ (CA)