



ITk Money Matrix

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2015: preliminary aspirations for ITK: ~ 7MCHF (info to CERN)

- Pixel: design, production and test of all modules for the innermost 2 layers (~10% of all modules) including Sensors, Bump bonding (FlipChip), Flex+WB (including Flex production), Irradiation+Beamtests;
- Mechanical supports for innermost layers and loading of them, DAQ (software, firmware), contribution to cooling system and to voltage distribution system
- Later INFN envelope was reduced to 6.5 MCHF
- New estimates in 2016, also taking into account possible requests of reduction from CERN



Version 0

Pixel Contributions Italy		Fraction	Total Full	Layer 1-2	%	Layer 3-4-5	%	Rings	%	Your
2.1.1	Sensors	0,240	7870	1570	20	3450	43	2850	37	1888,80
2.1.2	FE chip	0,100	3120	650	21	1400	44	1070	35	312,00
2.1.3.3	Bump-Bonding	0,200	8980	1500	17	4400	48	3080	35	1796,00
2.1.3.(1,2,4)	Module flex	0,170	1110	180	17	550	48	380	35	188,70
2.1.3.5	Module assembly & test	0,200	300	60	20	140	46	100	34	60,00
2.1.4.(1-6,10-13)	PP1, PP2, Cables		3620	800	23	1920	52	900	25	0,00
2.1.4.(7-9)	Optical data transmission		1170	540	47	400	33	230	20	0,00
2.1.5.(1,2,4,6)	Local supports	0,100	5270	400	8	2970	55	1900	37	527,00
2.1.5.(3,5)	Stave/ring cables + electronics + PPO	0,200	4970	1120	23	2500	49	1350	28	994,00
2.1.5.(7-8)	Local supports loading & test	0,170	1260	210	17	600	47	450	36	214,20
2.1.7	Integration and system test	0,170	1260	210	17	600	47	450	36	214,20
2.1.8	HV+LV+DCS	0,100	2100	410	20	990	46	700	34	210,00
Total cost (kCHF)			41030	7650		19920		13460		
Pixel Committed Core (kCHF)										6404,90

Common Item Contribution Italy

GRAND TOTAL = 6969,90 kCHF

	ITk Common Mechanics	Estimate	Fraction Covered	FA Contribution (kCHF)
2.3.9	CO2 cooling plant	6300	0,050	315,0
2.4	ITk Common Electronics			
2.4.3	READOUT	2500	0,100	250,0
Total		16495		565,0
Common Committed Core (kCHF)				565,0



Version 1: complaint with INFN envelope

Pixel Contributions Italy		Fraction	Total	Layer 1-2		%	Layer 3-4-5		%	Rings	%	Your
			Full									
2.1.1	Sensors	0,200	7870	1570	20		3450	43		2850	37	1574,00
2.1.2	FE chip	0,100	3120	650	21		1400	44		1070	35	312,00
2.1.3.3	Bump-Bonding	0,180	8980	1500	17		4400	48		3080	35	1616,40
2.1.3.(1,2,4)	Module flex	0,170	1110	180	17		550	48		380	35	188,70
2.1.3.5	Module assembly & test	0,200	300	60	20		140	46		100	34	60,00
2.1.4.(1-6,10-13)	PP1, PP2, Cables		3620	800	23		1920	52		900	25	0,00
2.1.4.(7-9)	Optical data transmission		1170	540	47		400	33		230	20	0,00
2.1.5.(1,2,4,6)	Local supports	0,100	5270	400	8		2970	55		1900	37	527,00
2.1.5.(3,5)	Stave/ring cables + electronics + PPO	0,170	4970	1120	23		2500	49		1350	28	844,90
2.1.5.(7-8)	Local supports loading & test	0,170	1260	210	17		600	47		450	36	214,20
2.1.7	Integration and system test	0,170	1260	210	17		600	47		450	36	214,20
2.1.8	HV+LV+DCS	0,100	2100	410	20		990	46		700	34	210,00
Total cost (kCHF)			41030	7650			19920			13460		5761,40
Committed Core												

GRAND TOTAL = 6502,40 kCHF

Common Item Contribution Italy

	ITk Common Mechanics	Estimate	Fraction Covered	FA Contribution (kCHF)
2.3.9	CO2 cooling plant	6300	0,070	441,0
02.04	ITk Common Electronics			
2.4.3	READOUT	2500	0,120	300,0
Total		16495	Common Committed Core (kCHF) 741	

Version 2: -10% cut (wrt 7 MCHF)

Pixel Contributions Italy		Fraction	Total Full	Layer 1-2	%	Layer 3-4-5	%	Rings	%	Your
2.1.1	Sensors	0,180	7870	1570	20	3450	43	2850	37	1416,60
2.1.2	FE chip	0,080	3120	650	21	1400	44	1070	35	249,60
2.1.3.3	Bump-Bonding	0,180	8980	1500	17	4400	48	3080	35	1616,40
2.1.3.(1,2,4)	Module flex	0,170	1110	180	17	550	48	380	35	188,70
2.1.3.5	Module assembly & test	0,200	300	60	20	140	46	100	34	60,00
2.1.4.(1-6,10-13)	PP1, PP2, Cables		3620	800	23	1920	52	900	25	0,00
2.1.4.(7-9)	Optical data transmission		1170	540	47	400	33	230	20	0,00
2.1.5.(1,2,4,6)	Local supports	0,100	5270	400	8	2970	55	1900	37	527,00
2.1.5.(3,5)	Stave/ring cables + electronics + PPO	0,170	4970	1120	23	2500	49	1350	28	844,90
2.1.5.(7-8)	Local supports loading & test	0,170	1260	210	17	600	47	450	36	214,20
2.1.7	Integration and system test	0,170	1260	210	17	600	47	450	36	214,20
2.1.8	HV+LV+DCS	0,100	2100	410	20	990	46	700	34	210,00
Total cost (kCHF)			41030	7650		19920		13460		5541,60
			Committed Core							

Common Item Contribution Italy

GRAND TOTAL = 6282,60 kCHF

2.3 ITk Common Mechanics Estimate

2.3.9 CO2 cooling plant 6300

02.04 ITk Common Electronics

2.4.3 READOUT 2500

Total

16495

Fraction Covered

FA Contribution (kCHF)

0,070 441,0

0,120 300,0

Common Committed Core (kCHF) 741

Version 3: -20% cut (wrt 7 MCHF)

Pixel Contributions Italy		Fraction	Total Full	Layer 1-2	%	Layer 3-4-5	%	Rings	%	Your
2.1.1	Sensors	0,160	7870	1570	20	3450	43	2850	37	1259,20
2.1.2	FE chip	0,070	3120	650	21	1400	44	1070	35	218,40
2.1.3.3	Bump-Bonding	0,160	8980	1500	17	4400	48	3080	35	1436,80
2.1.3.(1,2,4)	Module flex	0,160	1110	180	17	550	48	380	35	177,60
2.1.3.5	Module assembly & test	0,200	300	60	20	140	46	100	34	60,00
2.1.4.(1-6,10-13)	PP1, PP2, Cables		3620	800	23	1920	52	900	25	0,00
2.1.4.(7-9)	Optical data transmission		1170	540	47	400	33	230	20	0,00
2.1.5.(1,2,4,6)	Local supports	0,090	5270	400	8	2970	55	1900	37	474,30
2.1.5.(3,5)	Stave/ring cables + electronics + PPO	0,150	4970	1120	23	2500	49	1350	28	745,50
2.1.5.(7-8)	Local supports loading & test	0,160	1260	210	17	600	47	450	36	201,60
2.1.7	Integration and system test	0,160	1260	210	17	600	47	450	36	201,60
2.1.8	HV+LV+DCS	0,100	2100	410	20	990	46	700	34	210,00
Total cost (kCHF)			41030	7650		19920		13460		Committed Core
										4985,00

Common Item Contribution Italy

GRAND TOTAL = 5613,00 kCHF

2.3	ITk Common Mechanics	Estimate	Fraction Covered	FA Contribution (kCHF)
2.3.9	CO2 cooling plant	6300	0,060	378,0
02.04	ITk Common Electronics			
2.4.3	READOUT	2500	0,100	250,0
Total		16495	Common Committed Core (kCHF) 628,0	