

***Preliminary DCH
Budget & Schedule***

Technical Board Meeting

Pisa, Sep 19 2012

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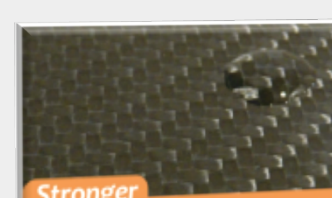
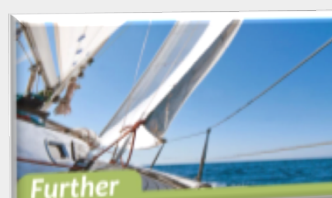
DCH Budget & Schedule

1. Construction of the mechanical structure
 - including the 35,000 holes
2. Assembly and stringing
3. Electronics
4. Gas, endplate systems
5. Commissioning & test

CAVEAT: the draft schedules shown in the following slides have **not** been fully discussed yet

Mechanical Structure

- Four companies contacted
- Discussion with Riba Composites (Faenza, Italy) and Salver (Brindisi) most advanced so far
 - Preliminary budget analysis from those companies in the next slides
 - agreement at 20% level – we'll check what is exactly included in each offer
- Schedule estimate:
 - ~13 months for Riba
 - ~8 months for Salver (Brindisi)
 - procurement of material dominates, but construction of the necessary tools can be started meanwhile
 - Plan: try to get more accurate estimates, quote more conservative schedule anyway



Analisi budgetaria

- ⇒ **Attrezzature laminato (modelli, stampi)** → **148 k€**
- ⇒ **Attrezzature staffatura lavorazione** → **50 k€**
- ⇒ **Materiale** → **57 k€ (40 k€)**
 - CFRP pre-preg M18/M46J (out-gas) → 52 k€
 - CFRP pre-preg TBD/T300 (standard) → (35 k€)
 - Qtà n. 200 boccole metallo incollate → 5 k€
- ⇒ **NR progetto** (progettazione, documenti, ...) → **13 k€**
- ⇒ **Lavorazioni esterne** (forature, flange, riprese, ...) → **120 k€ (da consolidare)**
- ⇒ **Produzione e controlli** (2 parabole + 2 shell) → **16 k€**



Esclusioni

- ➔ Progettazione del prodotto
- ➔ Assemblaggio finale, Verniciatura delle parti
- ➔ Incoming dei materiali mediante prove di accettazione
- ➔ Procurement adesivi o sigillanti, minuteria di assemblaggio
- ➔ Trasporti , casse ed assicurazioni

Mechanical structure: quote from SALVER



Sulla base di quanto sopra esposto, abbiamo formulato la presente quotazione "DRAFT" in termini di costi non ricorrenti e costi ricorrenti come di seguito riportato..

COSTI NON RICORRENTI

Detti costi sono relativi alle attività sotto riportate propedeutiche alla fase produttiva e consistono in:

➤ Studio e test concurrence	Tot. € 19.200,00
➤ Planning/sustaining	Tot. € 7.200,00
➤ Programmi a C/N	Tot. € 4.800,00
➤ Tooling	Tot. € 9.600,00
➤ Sustaning tecnico e start-up	Tot. € 4.800,00
	Tot. € 45.600,00

ATTREZZATURA

➤ Stampo per laminazione end plate (unico)	Tot. € 128.000,00
➤ " " cylindrical shell "UPR"	Tot. € 138.000,00
➤ " " Inner cylinder	Tot. € 32.000,00
➤ " " Connection plate (q.ty 2)	Tot. € 6.000,00
➤ Portapezzo per foratura/rif. a c/n	Tot. € 11.000,00
	Tot. € 315.000,00

Nota. Ipotizzando che i due end plate siano uguali abbiamo quotato, nell'ottica di contenimento dei costi, un unico attrezzo per la produzione di entrambi gli end plate.

COSTI RICORRENTI

Detti costi si riferiscono alla manodopera ai materiali diretti di produzione e alla utensileria

➤ Costo manodopera	Tot. € 70.500,00
➤ Costo materiali	Tot. € 33.500,00
➤ Utensili per foratura/lamatura	Tot. € 13.100,00
	Tot. € 117.100,00

Assembly and stringing: draft schedule

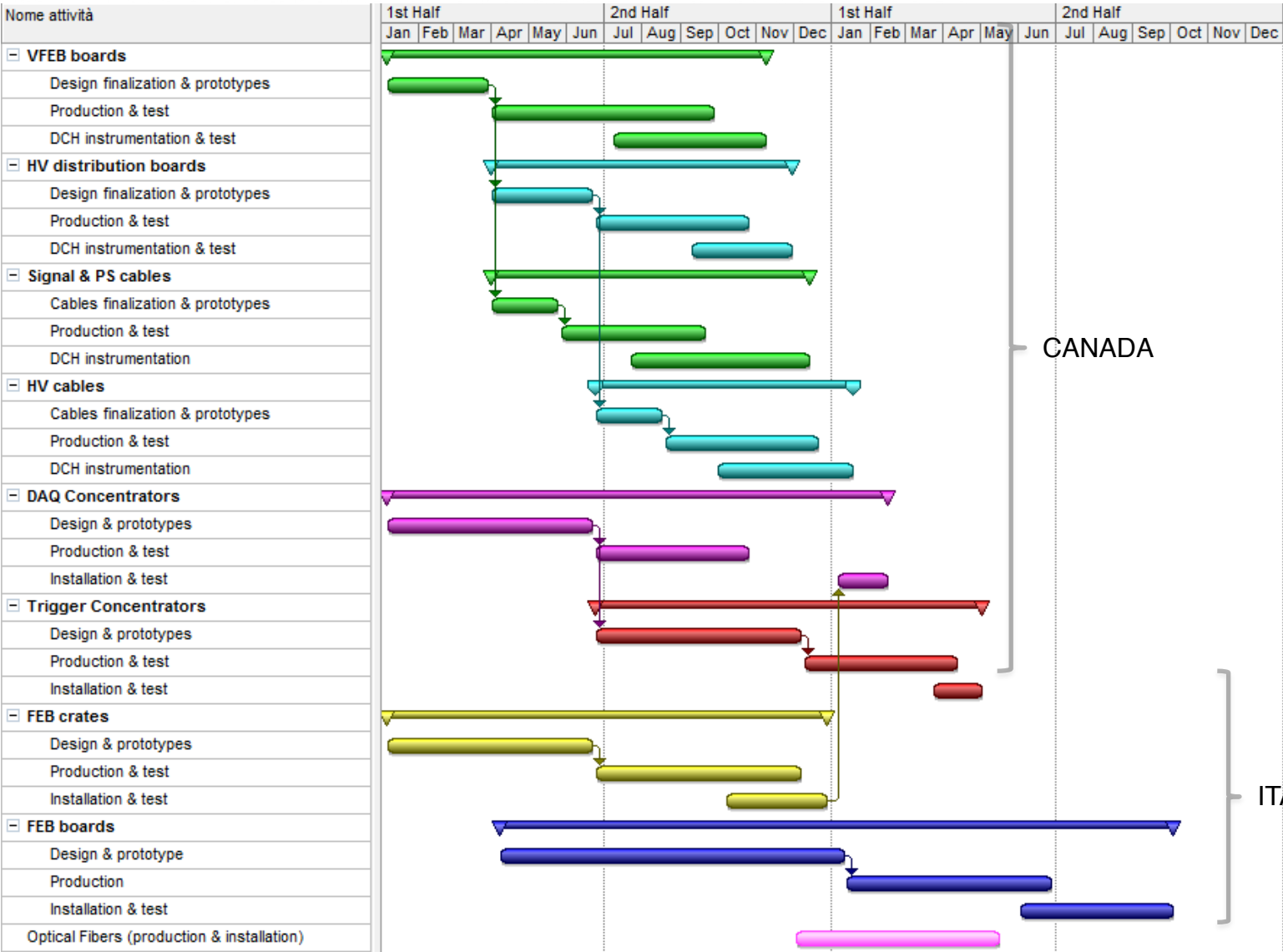
- Experience from KLOE & BaBar:
 - Wire and feed-through design, test, procurement & QA: ~18 months, to be started during mechanical construction
 - design, fabrication and preparation of stringing tools, QA system and robotics: ~24 months
 - Assembly of DCH structure, stringing, including wire and endplate deformation QA: ~7 months
 - Assembly of external cylinder, gas leak test, gas sealing: ~1month

Assembly and stringing: budget

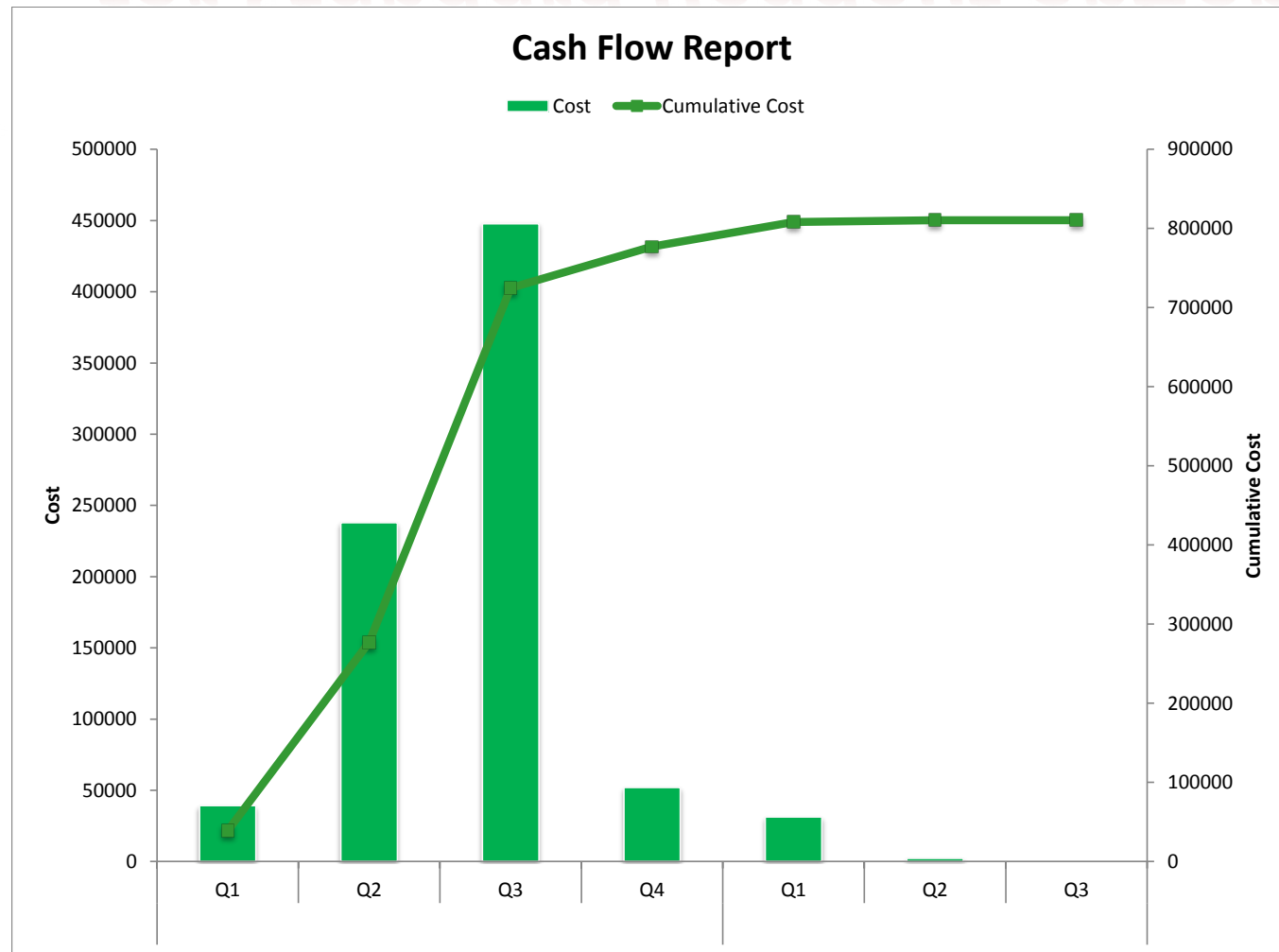
Item number	Item description	Cash (Canadian \$)	Total (Canadian \$)	Date acquired, or to be acquired (MM/YYYY)
13	Drift Chamber Wire			
14	Anode and field wires	73304	73304	2013-15
15	QC/QA instrumentation and tools	6176	6176	2013-15
16	Labour: technical	40830	40830	2013-15
17	Feedthroughs		-	
18	pins, insulators, materials, shipping	218684	218684	2013-15
19	Testing instrumentation	132557	132557	2013-15
20	Labour: engineer/designer technical	264170	264170	2013-15
21	Assembly Robots			
22	Motors and related equipment	146958	146958	2013-15
23	Control software development	150000	150000	2013-15
24	Control computers and instrumentation	9503	9503	2013-15
25	Components and supplies	15367	15367	2013-15
26	Shipping to/from assembly site	10860	10860	2013-15
27	Travel for installation and assembly	20700	20700	2015
28	Labour: engineer/designer technical	381667	381667	2013-15



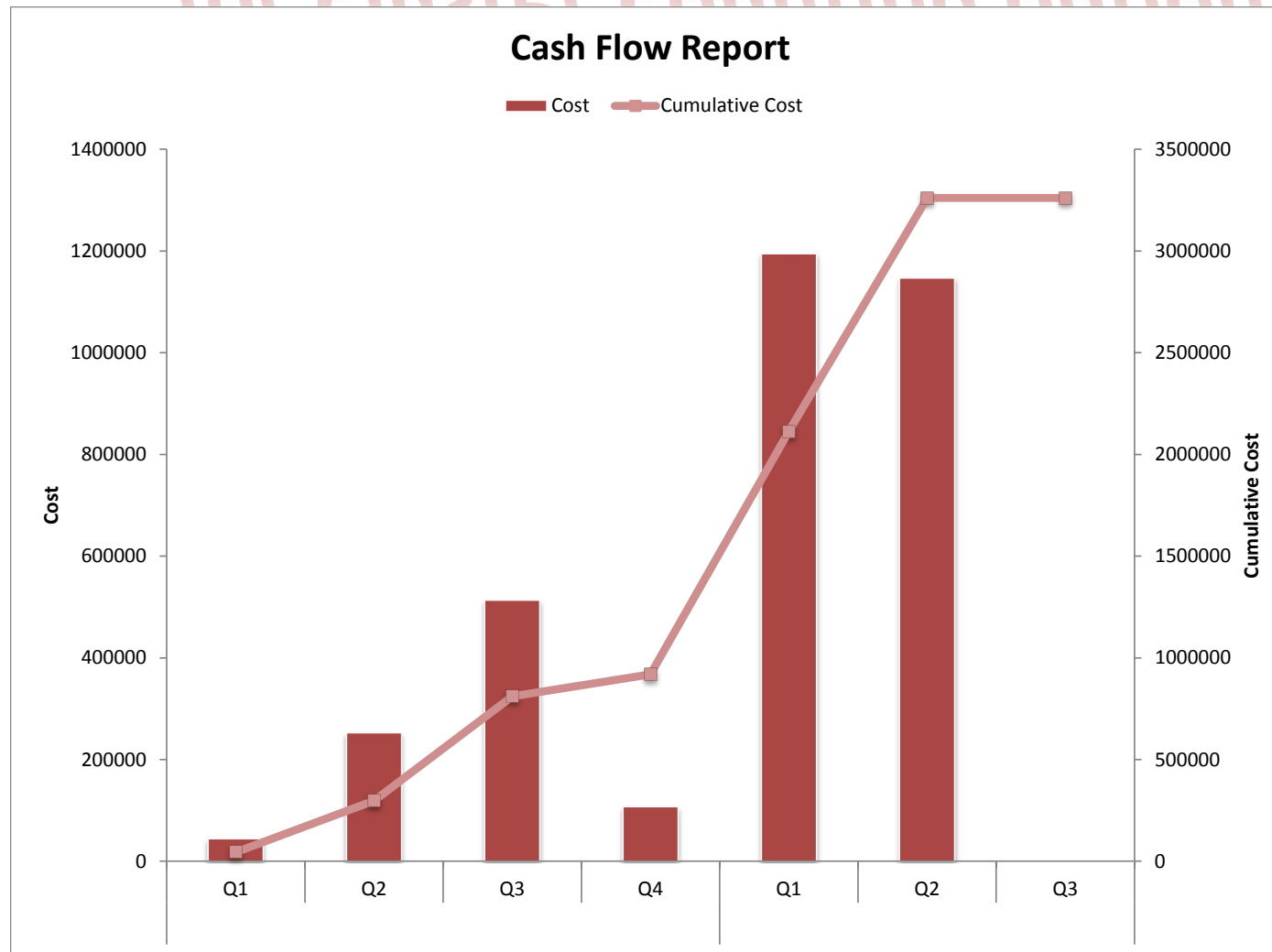
Electronics: draft schedule



Electronics: draft spending time profile for Standard Readout option



Electronics: draft spending time profile for Cluster Counting option



Electronics (Canada): budget

Item number	Item description	Cash (Canadian \$)	Total (Canadian \$)	Date acquired, or to be acquired (MM/YYYY)
1	Readout electronics			
2	Electronics components	284325	284325	2013-16
3	Travel testing, installation	16590	16590	2016
4	Labour: engineer/designer technical	205830	205830	2012-16
5	HV frontend boards			
6	Electronics, connectors, fabrication	73255	73255	2013-16
7	Labour: engineer/designer technical	20000	20000	2013-16
8	High Voltage system			
9	HV supplies, controllers, test equip.	201797	201797	2013-16
10	Cables and connectors and tools	30700	30700	2013-16
11	Travel for installation	13026	13026	2016
12	Labour: engineer/designer technical	34167	34167	2013-16
29	Analog Cables			
30	Cables and connectors	279064	279064	2013-15
31	Testing instrumentation	26216	26216	2013-15
32	Travel for installation	8600	8600	2016
33	Shipping to assembly site	6000	6000	2016
34	Labour: technical	110830	110830	2013-15
35	Digital Electronics Cards		-	
36	Components	111858	111858	2013-16
37	Labour: engineer/designer technical	205830	205830	2013-16

Gas end endplate system: budget

Item number	Item description	Cash (Canadian \$)	Total (Canadian \$)	Date acquired, or to be acquired (MM/YYYY)
38	Gas system			
39	System control and Instrumentation	191136	191136	2013-15
40	Travel for installation	10000	10000	2015
41	Valves,tubing,fittings,hardware,tools	89052	89052	2013-15
42	Labour: engineer/designer technical	170000	170000	2013-15
43	Endplate cooling			
44	cooling system incl. instrumentation	114030	114030	2013-15
45	four cooling loops	3258	3258	2013-15
46	Travel for installation and assembly	5700	5700	2015
47	Labour: engineer/designer technical	83300	83300	2013-15
48	N₂ electronics enclosures			
49	Components	47993	47993	2013-15
50	Travel for installation	5000	5000	2015
51	Labour: engineer/designer technical	81667	81667	2013-15

DCH Budget & Schedule: Summary

- A lot of information is there, albeit with different levels of detail
- Next step is to bring everything to the appropriate level of detail (input from the TB), and consistently use the same tool (Smartsheet) for the whole project
- We'll use this meeting to start a detailed definition of the schedule for the different items shown in the previous slides
 - the actual schedule will depend on the exact t_0 when the construction starts and necessarily depends on negotiated sharing of the available resources in the various Labs to accommodate other demands on the resources (e.g. LHC upgrades)
 - can we have an agreed nominal date for the beneficial occupancy of the SuperB experimental hall (e.g. July 2016?)