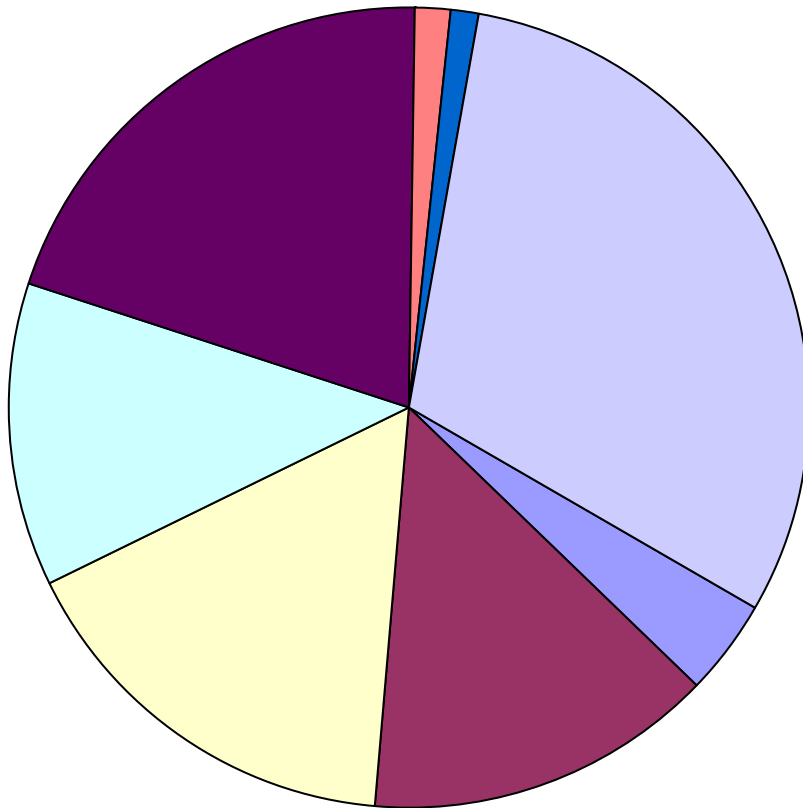


ILC Integrated Control & LLRF

Cost Discussion as of October 24,
2006

Bakul Banerjee

Integrated Controls & LLRF 10/24/06



- Control system Engineering
- Global Control System
- RF Phase Timing Distribution System
- Protection Systems equipment
- Frontend Control System equipment
- Control LLRF Rack/Relay equipment
- LLRF Engineering
- LLRF Equipment

Integrated Controls & LLRF 10/24/06	\$K	35.61%
Control system Engineering	\$10,080.00	0.00%
Global Control System	\$36,447.36	10.97%
RF Phase Timing Distribution System	\$41,774.11	13.39%
Protection Systems equipment	\$30,914.00	0.00%
Frontend Control System equipment	\$52,339.40	50.90%
Control LLRF Rack/Relay equipment	\$ 3,400.00	0.00%
LLRF Engineering	\$ 2,640.00	0.00%
LLRF Equipment	\$78,204.72	49.38%

Assumptions

- This is compatible with the general guideline provide in the International Linear Collider Global Design Effort Baseline Configuration Document (BCD) dated September 2006. Back document is Technology Options Study dated March 2004.
- It is assumed that most of the purchases will be made during 2010, the projected project start year.
- The cost is given in the 2006 dollar values, with no built-in escalations. However, since Moore's Law influences computing capabilities, the expected computing capabilities are escalated on a case by case basis for processors. For commodity computing, the pricing is for FY06 dollars, however we are expecting 2 to 4 times improvement in performance (even assuming normal dollar inflation – true?)

Assumptions

- To meet the requirements for High Availability, the cost was mostly estimated using a standard ATCA package using FY06 dollar value
- There are three damping rings. See referenced BCD
- This estimate does not include any SWF cost, but includes M&S costs for FTEs.

Justification

- No changes were made to manpower. The manpower profile looks OK for now. However, we might wish to adjust ramp up and ramp downs.
- Global Control System: Cost reduction is basically done extrapolating additional performance using Moore's law. Need information in networking.
- RF Phase distribution: Reasonable reduction by recalculation
- Frontend: some corrections. The major reduction is due to general redesign of system resulting into major saving in the cable plant. The cost may go up if the subracks have to accommodate addition slots for BLM, and others for Instrumentation.. BPM are accounted for.
- LLRF: See the justification below.

LLRF Justification

- Reduced cost of downconverters 30 K to 15K
- Moved Power Coupler & Waveguide Interlocks to HLRF

Questions

- It is not obvious to me, but did anybody made an attempt to purchase equipment in operations phase?
- LLRF:
 - "Motors and Motor Controllers
Moved to Controls as per agreement with John Carwardine - Total savings per station 35k" _ did this move to Instrumentation group? Do they know about it?
"Cable cost for these system is removed as well." Was it picked up by somebody else in the controls group or was it picked up by somebody else?
- Frontend – ATCA slot issue – what is the impact? do we have to resolve it?
- Is there any questions about RF Phase Timing