

ILC US detector R&D

Organizational status

Status & progress in the US

H. Weerts, Argonne Nat. Lab.

Outline

History/ Introduction

“Top down” \$ estimates

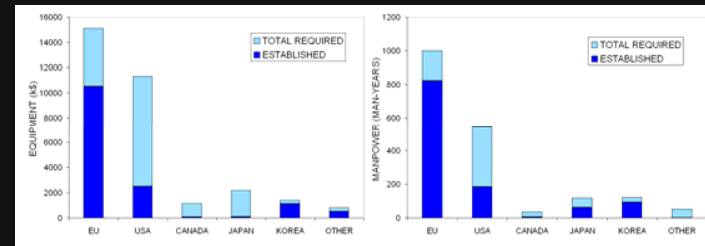
Comparison to guidance profile given

History

Historically US ILC detector R&D supported at labs plus a grant to universities (started in 2005). Scale ~\$5M/year

End 2006

WWS R&D panel comes out with report, summarizing ILC detector R&D program, needs for the future and fund needs in world regions.



Conclusion

US effort is lagging behind EU and estimates of needed R&D far exceed funding

Agreement that this should be fixed.

Produce an estimate of R&D needs in US as part of the worldwide ILC R&D program. (Similar to accelerator R&D)

Introduction

Will give a somewhat historical overview how we arrived at \$\$ numbers, where we are right now and what needs to be done

May/June 2006 Produce a “bottoms up” estimate of needs of the US ILC detector R&D program

Right after EPP2010: optimism was very high

In about 2 months, such a estimate was produced and given to DoE
Total funding estimates FY07-FY11: ~\$128M

optimism was now at modest level....

Fall 2006 Produce a “more realistic ” estimate with milestones

Asked mostly ALCPG subgroup leaders to do this
This is called the “top-down” estimate and this is what will be used in all further discussion.



Creators of initial “top-down” estimate

Mostly ALCPG subdetector leaders/co-leaders:

LEP	Eric Torrence, Oregon
VXD	Ron Lipton, FNAL
TRK-TPC	Dan Peterson, Cornell
TRK-Si	Bruce Schumm, UC St. Cruz
CAL-EM	Ray Frey, Oregon
CAL-had	Dhiman Chakraborty, NIU
Mu/PID	Paul Karchin, Wayne State
Forward	Bill Morse, BNL
Solenoid	Kurt Krempetz, FNAL
TestBeam	Jae Yu, UT Arlington
Algorithm	Norman Graf, SLAC

of course with help from many others

June 19-20, 2007: DOE/NSF review of “US ILC detector R&D program”

(first review ever)

Methods used

to produce the “top-down” estimate

- Based on program described in the subsystems talks at review
 - Assume that R&D is completed by FY11
 - Years covered: FY07-FY11 i.e. five years
 - Include ALL cost (regardless where resources will come from), SO manpower as well as M&S
 - No contingency and no inflation
 - Manpower: include FTE's required; uniform conversion to \$\$'s
 - Produce this for each subsystem in a “standard” format
 - Produce milestones
 - Roll up the numbers to get totals
- This is changing in US, not worldwide yet.

Additional work done on “top-down” estimate

- Include a management reserve (form of contingency)

- In meantime FY07 progressed.....
- Some supplemental funding was made available in FY07
- P. Grannis/DOE gave guidance funding profile for FY08 through FY13



Simply shift the existing FY07-FY11 estimate to an FY08-FY12 estimate, without any changes or revisions.


Overview

Overview

US program

"Top Down" ILC US detector R&D program

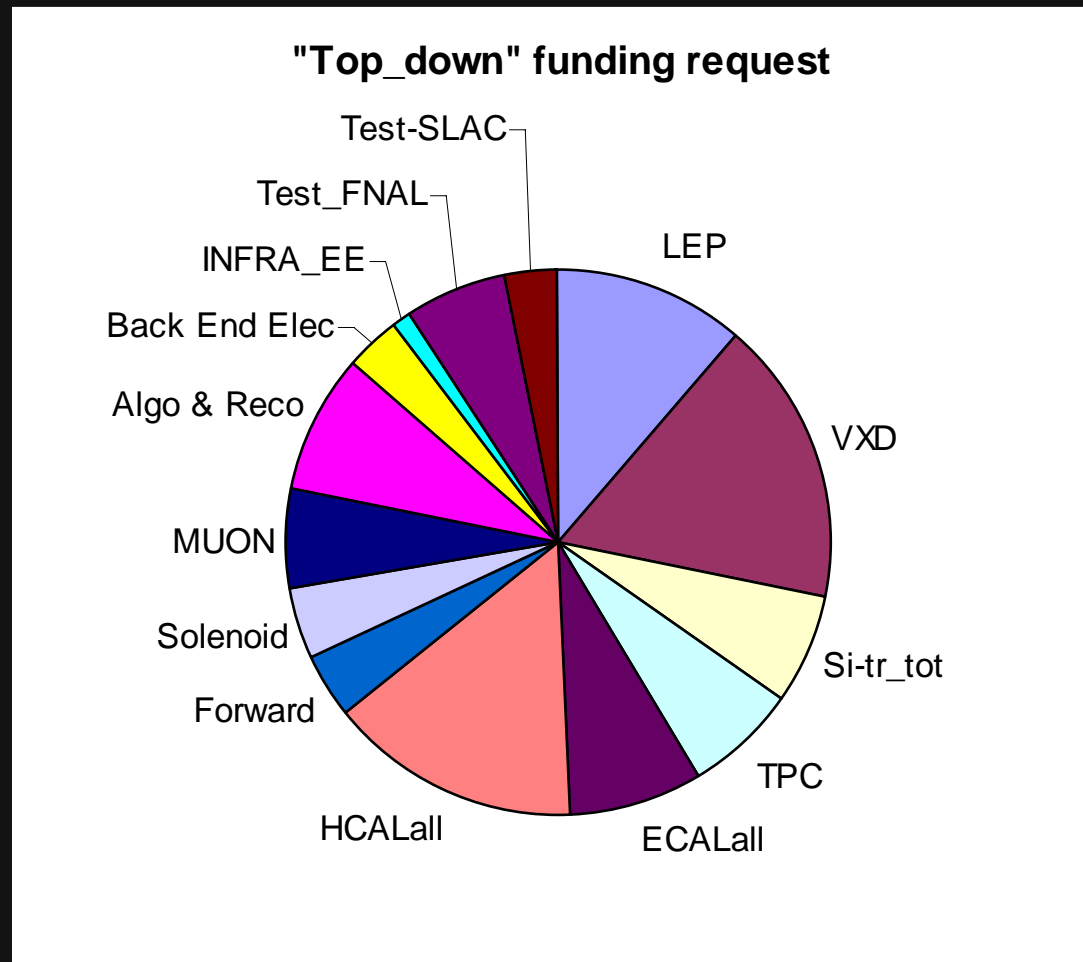
Version -

AR 0.14

TOTAL		FY08 Cost(K\$)	FY09 Cost(K\$)	FY10 Cost(K\$)	FY11 Cost(K\$)	FY12 Cost(K\$)	FY13 Cost(K\$)	Total Cost
LEP	TOTAL	\$ 1,684	\$ 1,684	\$ 1,684	\$ 2,916	\$ 2,916	\$ -	\$ 10,883
VXD	TOTAL	\$ 2,440	\$ 2,800	\$ 3,440	\$ 3,650	\$ 3,650	\$ -	\$ 15,980
Si-tr_tot	TOTAL	\$ 1,025	\$ 1,215	\$ 1,375	\$ 1,330	\$ 1,280	\$ -	\$ 6,225
TPC	TOTAL	\$ 822	\$ 1,519	\$ 1,315	\$ 1,566	\$ 943	\$ -	\$ 6,165
ECALall	TOTAL	\$ 1,175	\$ 1,490	\$ 1,825	\$ 1,630	\$ 1,485	\$ -	\$ 7,605
HCALall	TOTAL	\$ 4,084	\$ 3,631	\$ 2,404	\$ 2,110	\$ 1,850	\$ -	\$ 14,079
Forward	TOTAL	\$ 565	\$ 793	\$ 813	\$ 813	\$ 788	\$ -	\$ 3,772
Solenoid	TOTAL	\$ 452	\$ 724	\$ 1,004	\$ 1,114	\$ 702	\$ -	\$ 3,996
MUON	TOTAL	\$ 661	\$ 1,105	\$ 1,141	\$ 1,224	\$ 1,281	\$ -	\$ 5,412
								\$ -
Algo & Reco	TOTAL	\$ 1,570	\$ 1,630	\$ 1,630	\$ 1,630	\$ 1,630	\$ -	\$ 8,090
								\$ -
								\$ -
Back End Elec	TOTAL	\$ 205	\$ 375	\$ 660	\$ 920	\$ 1,020	\$ -	\$ 3,180
INFRA_EE	TOTAL	\$ 182	\$ 188	\$ 193	\$ 199	\$ 205	\$ -	\$ 968
Test_FNAL	TOTAL	\$ 970	\$ 1,270	\$ 870	\$ 1,255	\$ 1,515	\$ -	\$ 5,880
Test-SLAC	TOTAL	\$ 525	\$ 525	\$ 525	\$ 625	\$ 625	\$ -	\$ 2,825
US program		\$ 16,360	\$ 18,948	\$ 18,879	\$ 20,982	\$ 19,890	\$ -	\$ 95,060
Mngmt reserve	10%	\$ 1,000	\$ 1,500	\$ 2,000	\$ 2,500	\$ 2,000		\$ 9,000
US program	TOTAL	\$ 17,360	\$ 20,448	\$ 20,879	\$ 23,482	\$ 21,890	\$ -	\$ 104,060

Everything included as far as we know

Graphically



"Top-down" funding request by subsystem; total without reserve

M&S requests only

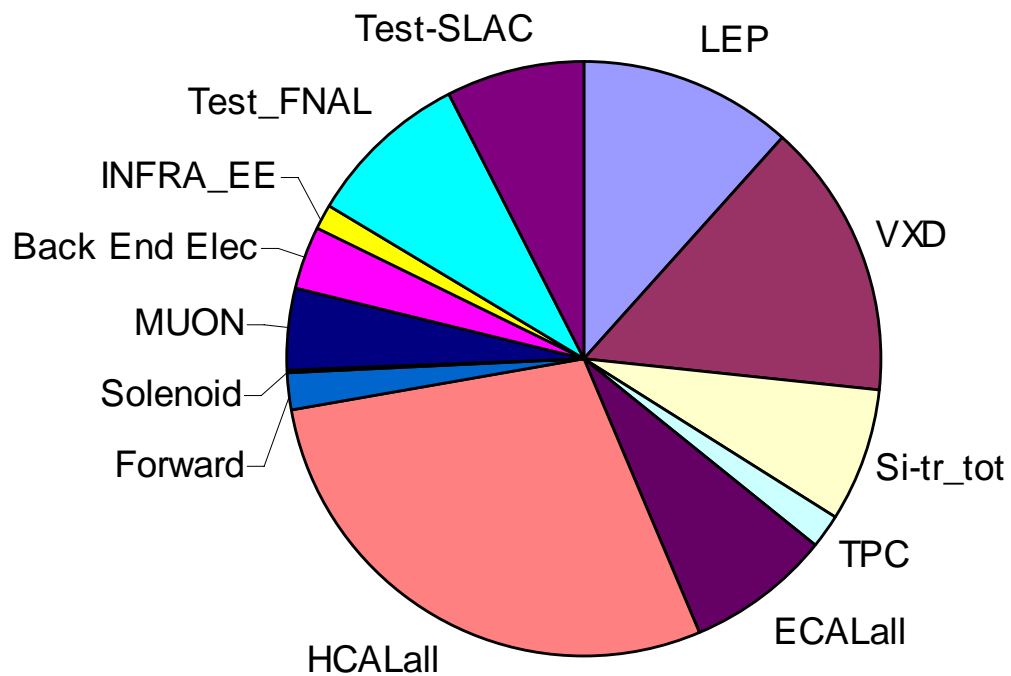
M&S part only TOTAL		FY08 Cost(K\$)	FY09 Cost(K\$)	FY10 Cost(K\$)	FY11 Cost(K\$)	FY12 Cost(K\$)	FY13 Cost(K\$)	Total Cost
LEP	M&S	\$ 313	\$ 313	\$ 313	\$ 469	\$ 469	\$ -	\$ 1,875
VXD	M&S	\$ 400	\$ 450	\$ 500	\$ 550	\$ 550	\$ -	\$ 2,450
Si-tr_tot	M&S	\$ 150	\$ 250	\$ 250	\$ 250	\$ 250	\$ -	\$ 1,150
TPC	M&S	\$ 85	\$ 84	\$ 73	\$ 56	\$ 33	\$ -	\$ 331
ECALall	M&S	\$ 305	\$ 290	\$ 395	\$ 170	\$ 85	\$ -	\$ 1,245
HCALall	M&S	\$ 1,839	\$ 1,317	\$ 500	\$ 600	\$ 400	\$ -	\$ 4,656
Forward	M&S	\$ 20	\$ 75	\$ 75	\$ 75	\$ 50	\$ -	\$ 295
Solenoid	M&S	\$ 10	\$ 20	\$ 20	\$ 10	\$ 10	\$ -	\$ 70
MUON	M&S	\$ 105	\$ 160	\$ 170	\$ 150	\$ 140	\$ -	\$ 725
								\$ -
Algo & Reco	M&S	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
								\$ -
								\$ -
Back End Elec	M&S	\$ -	\$ 100	\$ 150	\$ 150	\$ 100	\$ -	\$ 500
INFRA_EE	M&S	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ -	\$ 250
Test_FNAL	M&S	\$ 150	\$ 350	\$ 150	\$ 400	\$ 400	\$ -	\$ 1,450
Test-SLAC	M&S	\$ 200	\$ 200	\$ 200	\$ 300	\$ 300	\$ -	\$ 1,200
US program	TOTAL	\$ 3,627	\$ 3,659	\$ 2,846	\$ 3,230	\$ 2,837	\$ -	\$ 16,197

M&S is \$16M out total of \$94M (no reserve added)

Manpower dominates the cost

M&S funding request

M&S request only by subsystem



Some comments

Estimates were arrived at after a long period of minimal funding

Efforts at labs, either did not exist or were funded from non-ILC sources (start thinking *very small*). SLAC is probably exception

In principle current estimate of request includes everything related to R&D (nothing else *i.e. not EDR*)

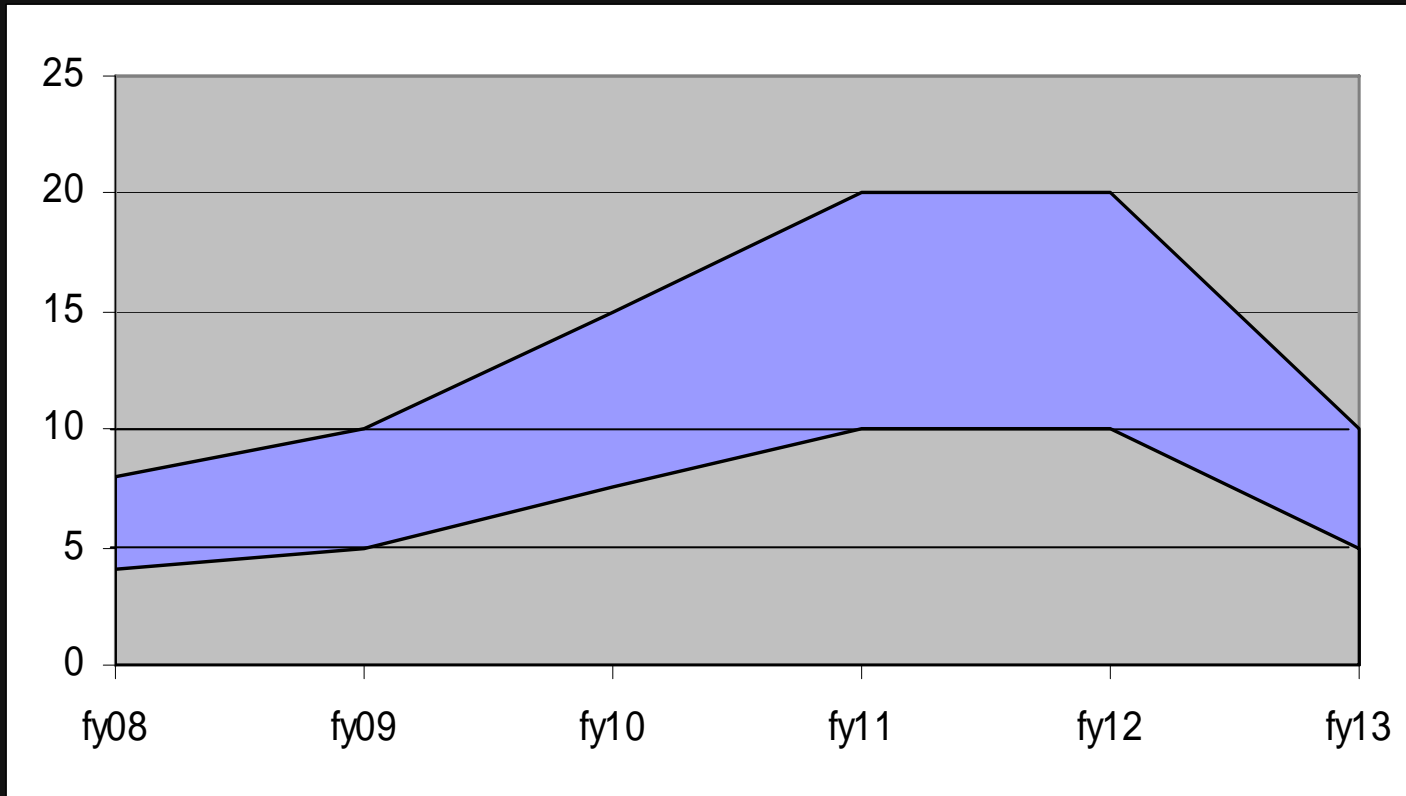
Manpower needs dominate & need to increase. Opportunity for groups

Received guidance about funding from DoE.



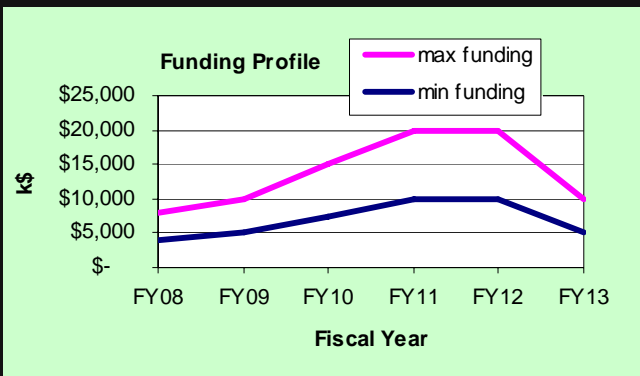
Funding profile given by DOE

Guidance from P.Grannis, ~May 2007; funding envelope



■ No numbers from NSF yet

Some notes



Funding profile is for 6 years (not 5)
Extends into FY13

Not consistent with GDE plans

Laboratories
(at least FNAL & SLAC):

Physicist manpower (staff & postdocs)
& Travel is not part of this funding

For us this means we need estimate of manpower that
labs will contribute to this from “other”/non-ILC sources

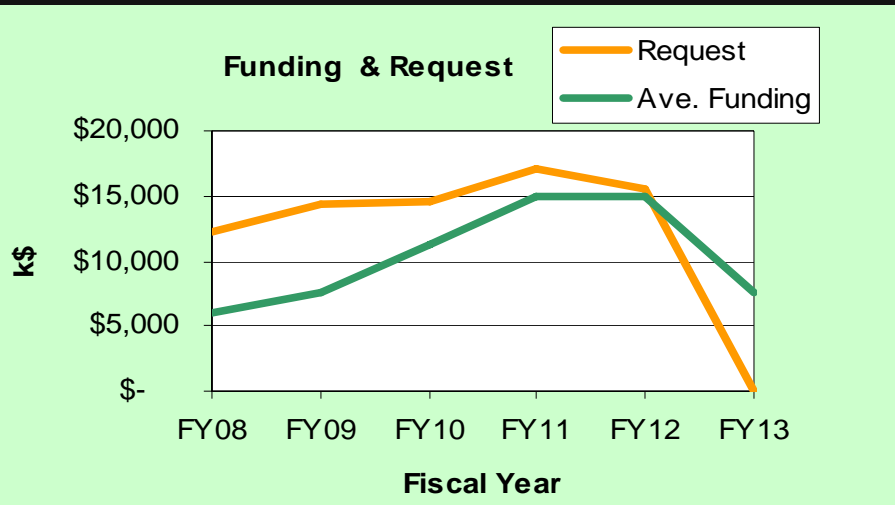
Request this information from labs i.e. what do labs estimate is
contribution to ILC manpower in terms of physicists (staff &
postdocs) by subsystem and NOT funded by ILC funds.

Somewhat
sensitive

Received estimates FY08-FY13: all labs

Request & Funding ; graphically

Now assume funding is: $(\text{high} + \text{low}) / 2 = \text{average}$

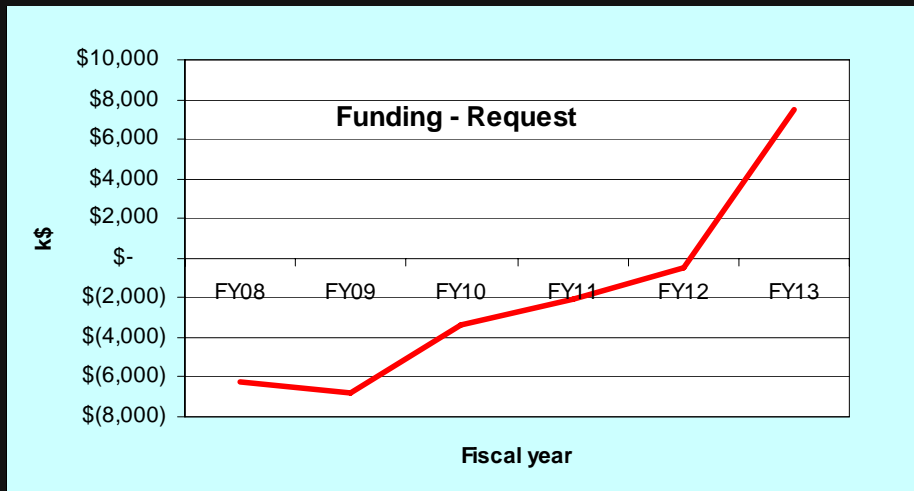


Note:

Amazingly not totally out of whack

FY08 request (not far away) is probably on high side

Lab contrib. through non-ILC sources important



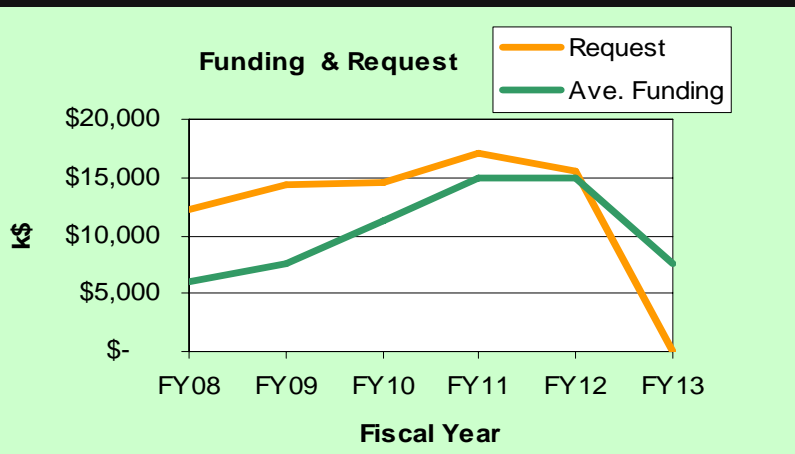
Status

Do one
exercise:
(Exercise 1)

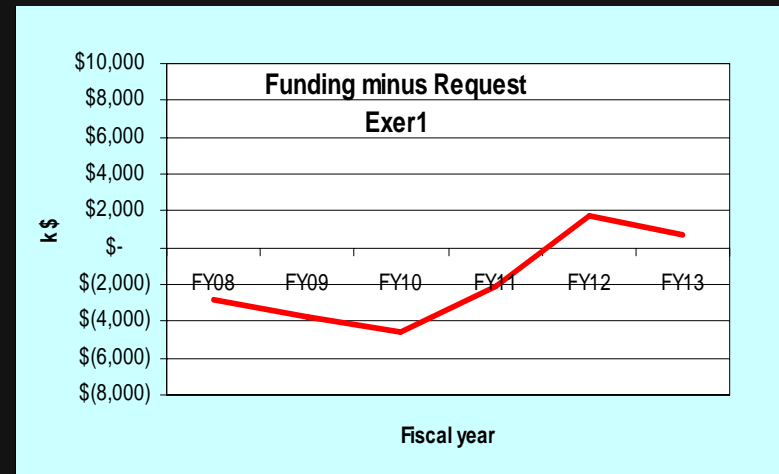
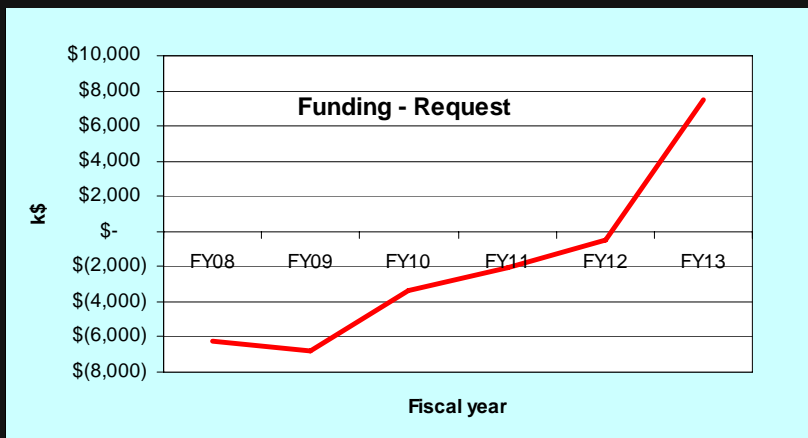
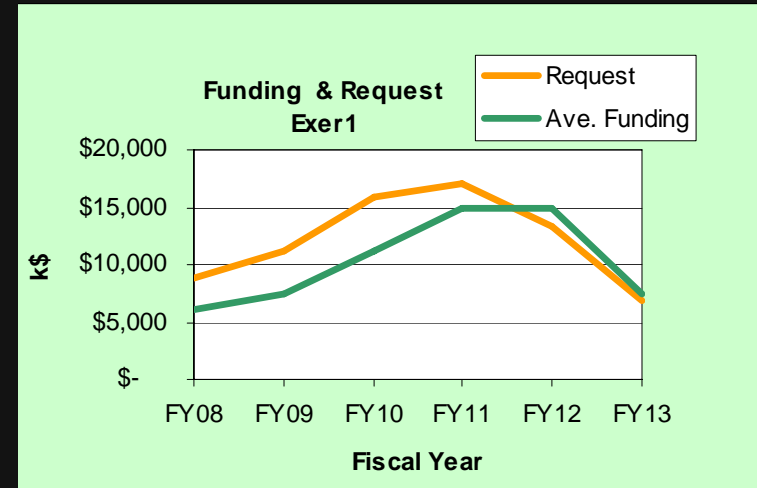
- Assume average funding profile (high+low)/2
- Assume lab contributions in FY13
- Reweigh “top-down” request profile, lowering 08,09 and stretching into FY13, keep total fixed
- Add manpower in FY13 (can not do without)

Exercise 1(4)

Previous version



Reweigh + FY13 manpower



Observations

A first estimate/scope of US ILC detector R&D has been formulated

Program defined as part of worldwide effort:
complimentary & part of it

Lab contributions are obviously critical and vital

Estimate is for 5 year program, extend to 6 ?

No contingency
No inflation
No project

Everything compared to DoE guidance only; no NSF
guidance yet

Current top down estimate, with assumptions made, fits
within higher end of existing guidance

No recipe on how to proceed (No ILC lab or entity)

Need clear structure/responsibilities for R&D areas

ALCPG is US coordinating mechanism for “ILC physics & detectors”

Conclusions

“Top down” funding estimates still needs work

The scale of the R&D has been defined

Did we miss anything ?

This is R&D only; does not include EDR phase for detectors