Americas

FALC – GDE Meeting – Americas Region Update

Program Elements

Roles

Resources

Future Program

Mike Harrison
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Jan 2011

Americas

Americas Region Program

SRF Technology Development (~ 40%)

- Cavity gradient & yield
- Cryomodule design and fabrication
- Industrial tech transfer (US & Canada)
- Value engineering (see PAC)

RF systems (~ 20%)

- Klystron cluster RF power distribution system
- Solid State modulator development
- LLRF

Particle Sources

- Prototype high voltage electron gun/photocathode
- Positron simulations
- Positron target hardware development

Americas Region Program

Damping Rings

- E-cloud experimental program complete. Integrate results into the Damping Ring design.

Conventional Facilities

- Tunnel layout & facility design & specification

Main Linac

- Component integration
- Beam dynamics

Beam Delivery

- Machine Detector Integration
- Final focus magnet development & IP region layout
- Accelerator Test Facility program support at KEK

Miscellaneous

- GDE support, CLIC collaboration, and starting very soon the Technical Design Report
- Accelerator physics, DR design, ……

Americas Region Roles – Major players

Americas

SRF Te
-
RF Sys
-
Particl
-
Dampir
-
Conven
-
Main Li
-
Beam D
-
Miscell
-

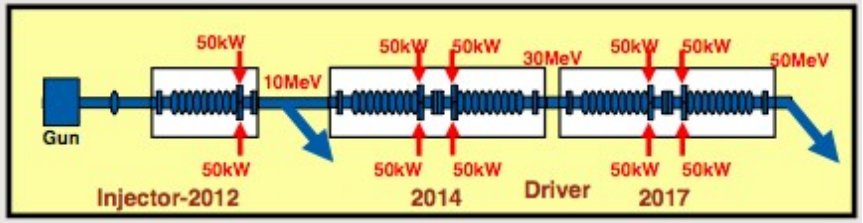
Total E

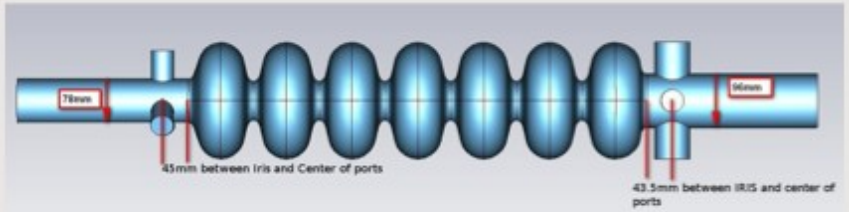
TRIUMF

SRF in Canada

- ISAC-II heavy ion superconducting linac upgraded to 40MV with twenty cavities from PAVAC
- Linac commissioned May 2010 meeting project goals for cavity gradient and Q

- TRIUMF ARIEL project is funded to design, fabricate and install the first 30MeV (100kW) of an eventual 50MeV (10mA) superconducting electron linac (1.3GHz) to produce radioactive ion beams through photofission
- Nine-cell ILC style cavity being modified for high intensity cw application – two 50kW power couplers
  - Cu model being fabricated in PAVAC





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Americas Region – Resources FY2011 (Oct 10 -> Oct 11)

Given the nature of the work flow out into the national labs there is potentially (semi) infinite resources provided we can pay for them although a major component involving synergy with existing lab programs is always highly desirable.

During FY09 & FY10 the US program was based on $35M/yr which corresponds to ~ 90 FTE's (1/3 direct salary, 1/3 materials, 1/3 lab overhead charges)

We presently do not have a federal budget for FY11. Funding so far has been provided by a mechanism called a continuing resolution which is valid until March 4th. There is no information yet on what may follow ("newly elected House members are claiming to want to cut $100B from discretionary funding which corresponds to about 20% of the existing budget")

We are currently planning an ILC budget of ~ $30M for FY11.

Some program elements have concluded and will not be replaced e.g. e-cloud R&D, cryomodule components purchase, ….

Priorities largely unchanged (SRF technology, RF systems, and Technical Design Report)

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Americas Region – Resources FY2012

Needless to say there is no FY12 budget at this point.

The FY12 budget is likely to be a highly contentious political issue given the recent change of control in the Congress and the size of the federal budget deficit. Large scale budget cuts are possible.

We will get some feeling for what could happen when the presidents budget is made public in mid-February though at this point I expect the presidents budget to mean less than in recent years.

The goal would be to maintain the budget around ~$30M to finish the TDR and the R&D program as scheduled in CY2012.

It is possible that it could be significantly less than this.

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The ILC Program Post 2012

How the Americas program will evolve after the Technical Design Report is of course significantly dependant on the "post GDE era".

We need to preserve the GDE core competencies until some form of project decision is forthcoming. We would also like to use this time period to advance the technical program in highly leveraged areas.

The CLIC-ILC general issues working group has recently produced a "best guess" timeline on which to base such tentative planning.

CLIC & ILC roadmaps (not official)

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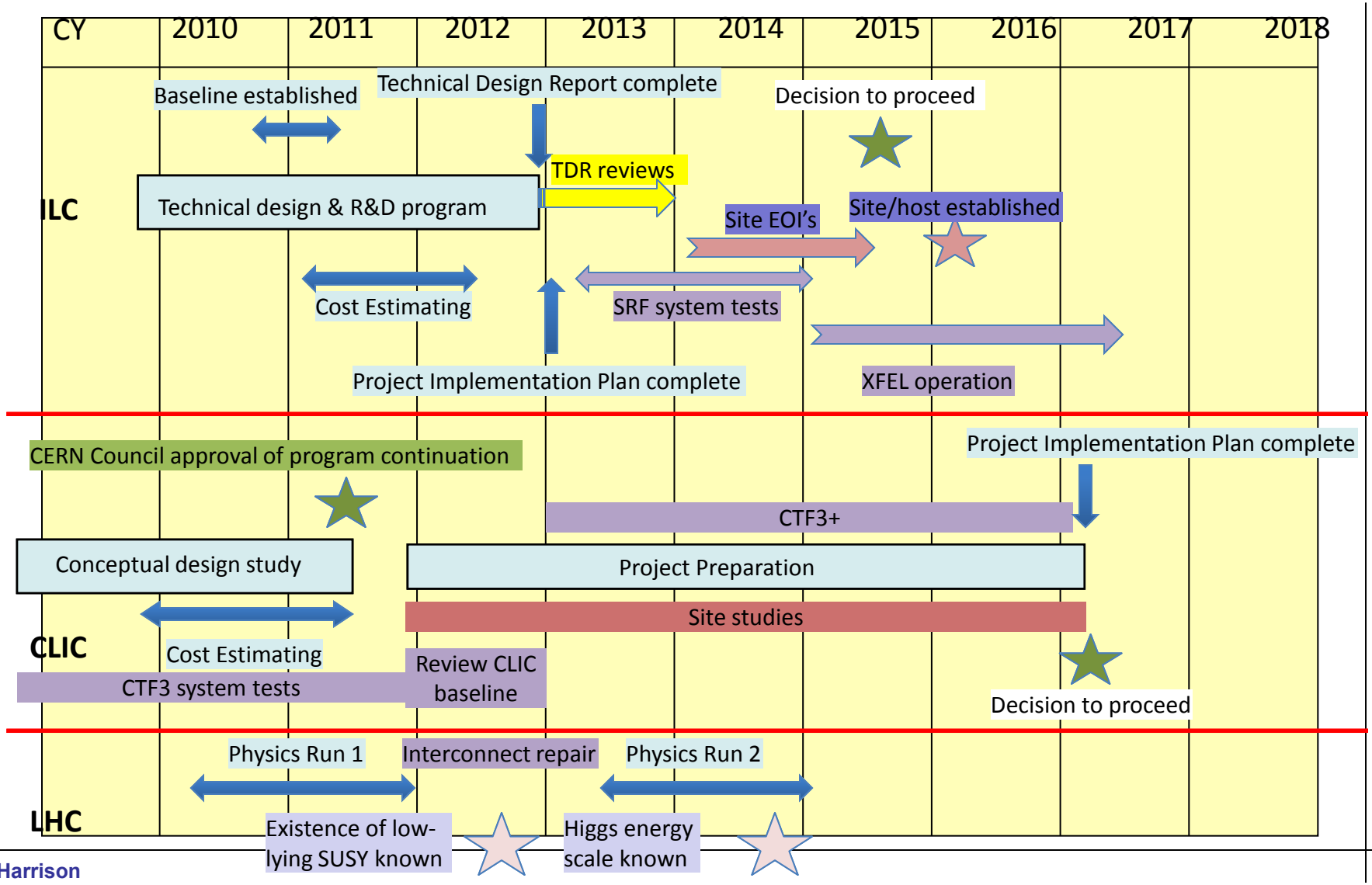

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SRF Thin Films

Bulk-like performance Nb film

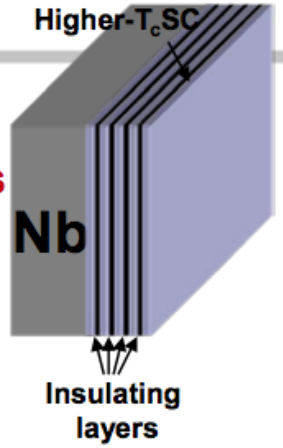
Single Layer
Nb, high κ

Substrate
Cu, Al …

Multi-Layers
S-I-S-I-S

Substrate
Bulk Nb Nb film
(>1μm thick)

high κ SC films
NbN, Nb_3Sn, MgB_2,
S-I-S-I-S…



- Major system simplifications.
- Highest level of quality assurance and reliable performance.
- Use of substrates with higher thermal conductivity

- Taking advantage of the high –Tc superconductors with much higher Hc without being penalized by their lower Hc1…
- Suppression of vortex entry in multilayer structures for cavity operation at **4.2K or higher**

Alex Gurevich, Appl. Phys. Lett. 88, 012511 (2006)

Accessible only via deposited or synthesized films.
Significant challenges to define and achieve the optimum film characteristics and SRF performance:

Other

The concept is to leave the cavity stationary and bring the sequential processes to the cavity.