MCTF

MC-DFS and NF-RDR

High-level Objectives and Deliverables

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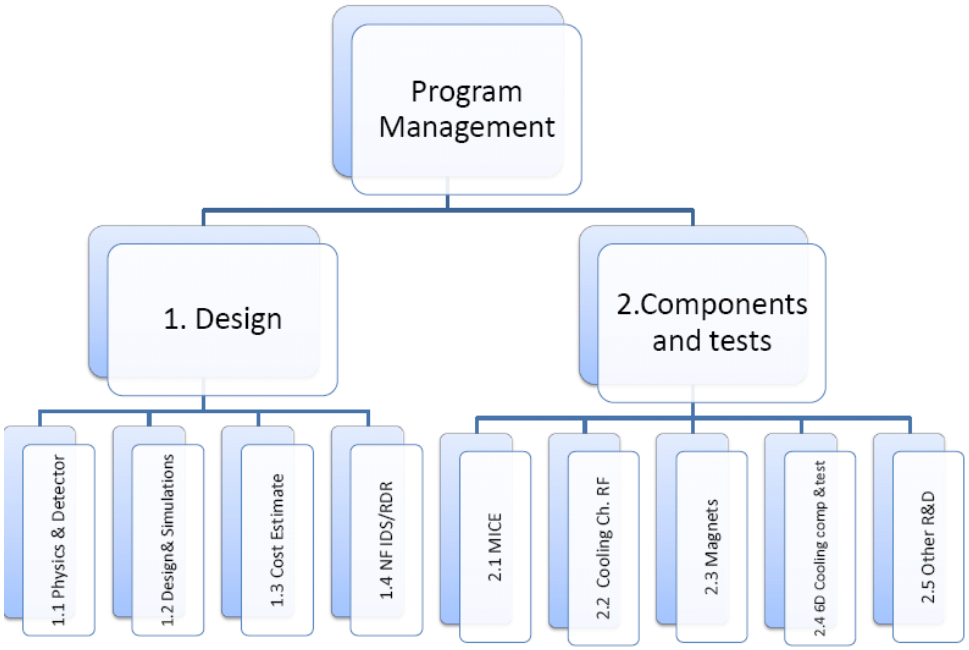
BERKELEY LAB

ELEMENTS OF THE PLAN (1)

- Plan has two main components
  - Design (incl. simulations and costing)
  - Component development and tests

Muon Accelerator R&D Program



ELEMENTS OF THE PLAN (2)

- Main elements of MC and NF design activity
  - for the MC DFS
    - Physics and Detector Study (Demarteau and Eichten)
    - Accelerator Design and Simulation Study (Ankenbrandt and Fernow)
    - Cost Estimation Study (Zisman)
  - for the NF RDR (Bross) (under IDS-NF auspices)
    - overall system design and staging scenarios
    - siting issues
    - participation in cost estimation activity

ELEMENTS OF THE PLAN (3)

- MC DFS
  - intended to be a "high-end" feasibility study
    - component engineering and costing not fully detailed
      - component level, not bottom-up
        - » want to understand cost in units of, say, LHC or ILC costs
  - defines R&D program (extends beyond this plan)
- NF RDR
  - IDS-NF management will set standards for work
    - we contribute to engineering and costing (select areas)
    - will participate in, and in some cases lead, accelerator design of various subsystems

KEY QUESTIONS

- To prove feasibility of MC we need to show
  - complete facility design showing acceptable transmission and beam properties
  - detector design capable of operating productively in expected background conditions
  - physics reach meeting or exceeding other technical approaches
  - realistic and affordable cost
- NF feasibility has already been shown but costs need refining

PHYSICS AND DETECTOR STUDY

- Objectives
  - establish physics case for MC
    - establish physics reach as *f(E, L)*
    - develop realistic detector simulation tool
      - including all known background sources
  - develop and simulate baseline detector design
      - LHC upgrade detector will serve as model

MC DESIGN AND SIMULATIONS

- Objectives
  - develop end-to-end simulation of multi-TeV MC
    - based on demonstrated or "almost" demonstrated technologies
      - identify and document required R&D tasks
  - demonstrate (via end-to-end simulations) a baseline design that meets performance requirements

MC COST ESTIMATION

- Objectives
  - develop WBS for facility
  - describe components in sufficient detail to develop cost estimate
    - develop cost estimate system-by-system, including transition areas
      - prepare contingency assessment (component level where possible)

NF RDR PLAN

- Objectives (from IDS-NF)
  - deliver RDR for accelerator and detector
  - develop cost estimate at 50-75% uncertainty level
  - identify possible staging scenarios
  - consider possible sites for accelerator + detector
    - educated guess: we'll pick Fermilab as site to study

Substantial overlap with MC design effort; more detailed for costing purposes

TIME LINE

- Desire plan that gives results by end of 2013
  - implies only 5 (4?) years to complete
  - very aggressive schedule
    - even in the absence of funding limitations!
  - we believe we should aspire to deliver information in this time frame
    - "publish or perish" (?)
  - this is one the most challenging parts of the present plan

COMMUNITY INVOLVEMENT

- Design and simulation effort will come from Labs, universities, and SBIR companies
  - present effort is dominated by Labs
  - expect much of new effort, especially post-docs, to come from universities
    - good way to "introduce" more accelerator physics into academic setting
  - SBIR participation will come in selected areas, e.g.,
    - 6D cooling
    - Li lenses

SUMMARY

- Design and simulation effort will permit us to develop a scenario for both MC and NF
- Requires substantial ramp-up in staff and funding to accomplish objectives in the proposed 2013 time frame
- We believe this time frame is significant for worldwide HEP planning