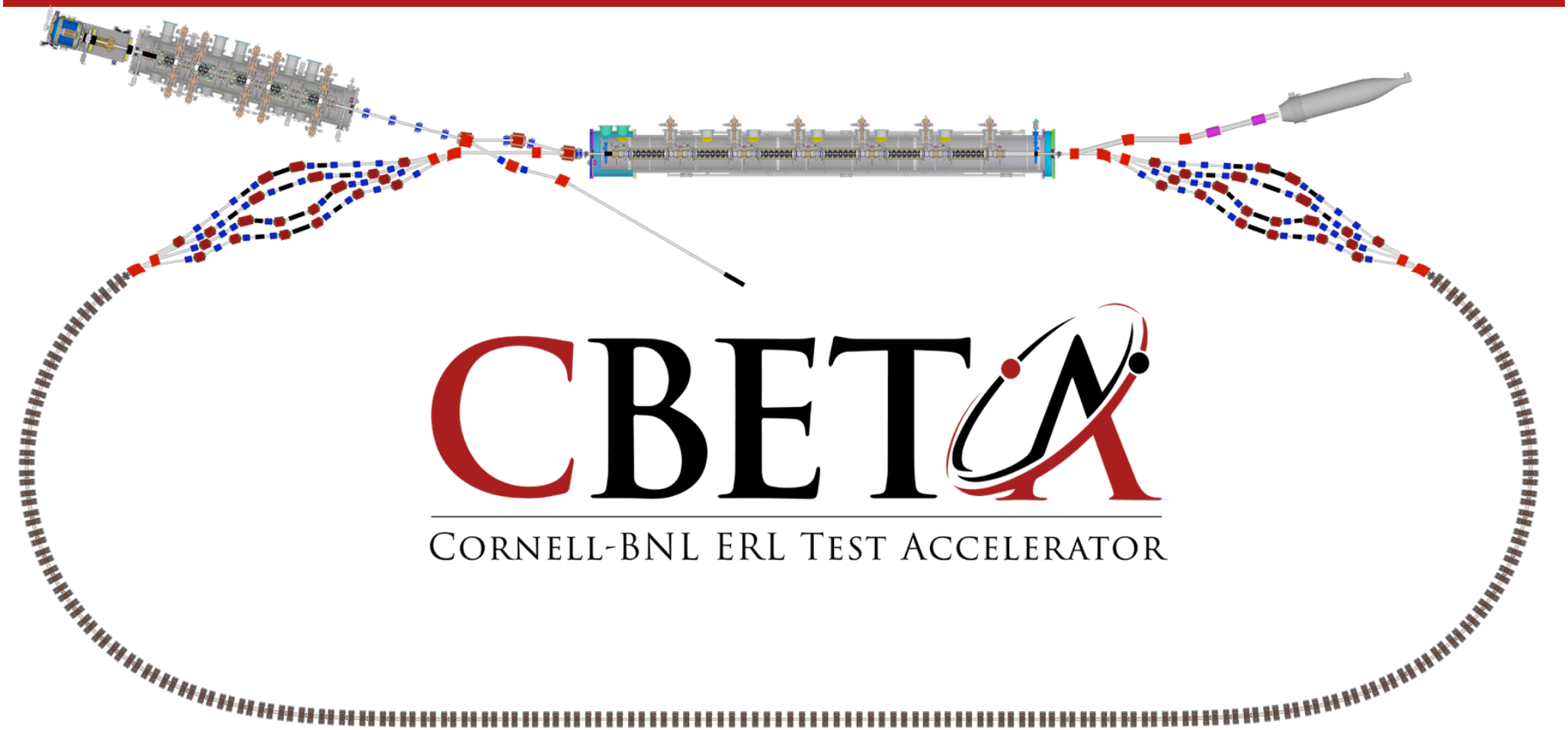
Welcome



Charge

1. Technical Design: Is the overall technical design conceptually sound and likely to meet the project's technical performance requirements? Has a technical plan at a level of detail sufficient to support construction been presented and documented?
2. Project Scope: Are the project scope and specifications sufficiently well-defined to support a detailed cost and schedule estimates? Are the scope apportionment and deliverables that are split between BNL and Cornell clearly established and well defined? Is a viable scope contingency plan in place, including decision criteria and branch points? Are the NYSERDA milestone well defined?
3. Cost and Schedule: Are the cost, schedule and contingency estimates in support of construction credible and realistic? Is a statussing and reporting plan/structure in place to allow regular tracking of project progress and cost performance upon receipt of funds?
4. Management and ES&H: Is the project being appropriately managed? Will the management model properly support the project goals? Have the anticipated roles and responsibilities of both the institutions and the project principals been adequately defined and understood by all parties? Is the project team populated with sufficiently dedicated personnel to the necessary WBS level, and in the Project Office? Is there a sufficient level of Laboratory and University support to provide the necessary oversight? Is the project's ES&H plan well-tailored to the project's technical goals and scope, and is it soundly based?
5. Risk: Are risk analysis and mitigation strategies in place? Is there a viable plan in place to track the risks as the project evolves? Does the contingency estimate properly take into account the project risks?
6. Documentation: Has the necessary documentation been developed? Does it adequately support the start of construction?

Energy Recovery Linacs at Cornell

Concept invented at Cornell: Tigner 1965

A Possible Apparatus for Electron Clashing-Beam Experiments (*).

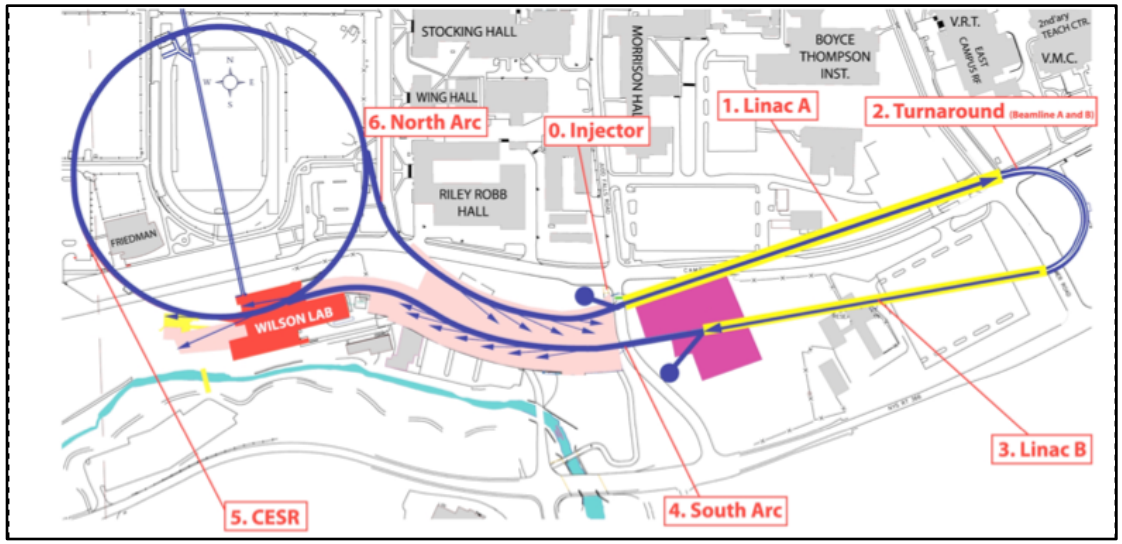
M. TIGNER

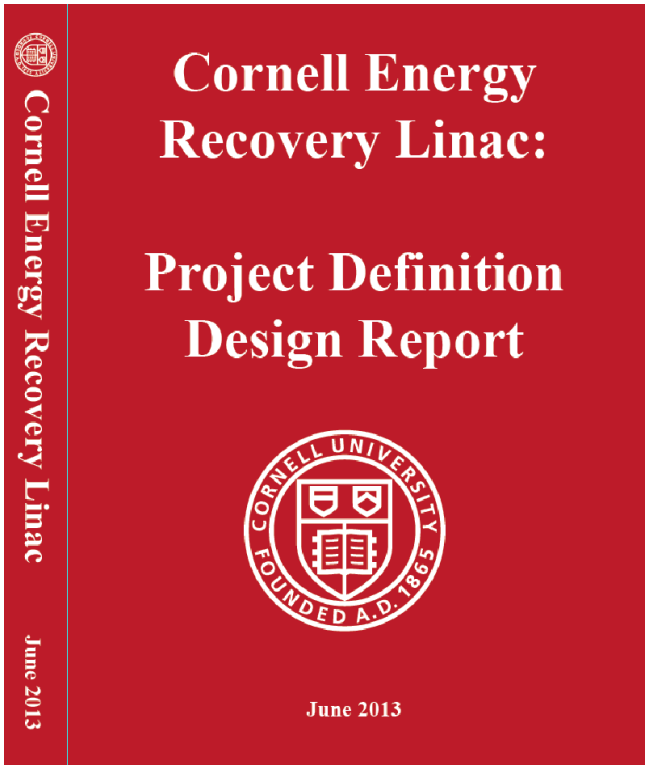
Laboratory of Nuclear Studies, Cornell University - Ithaca, N. Y.

(ricevuto il 2 Febbraio 1965)

A decade of work on Energy Recovery Linac technology aimed at an ERL x-ray source

Supported by NSF, New York State and industry.



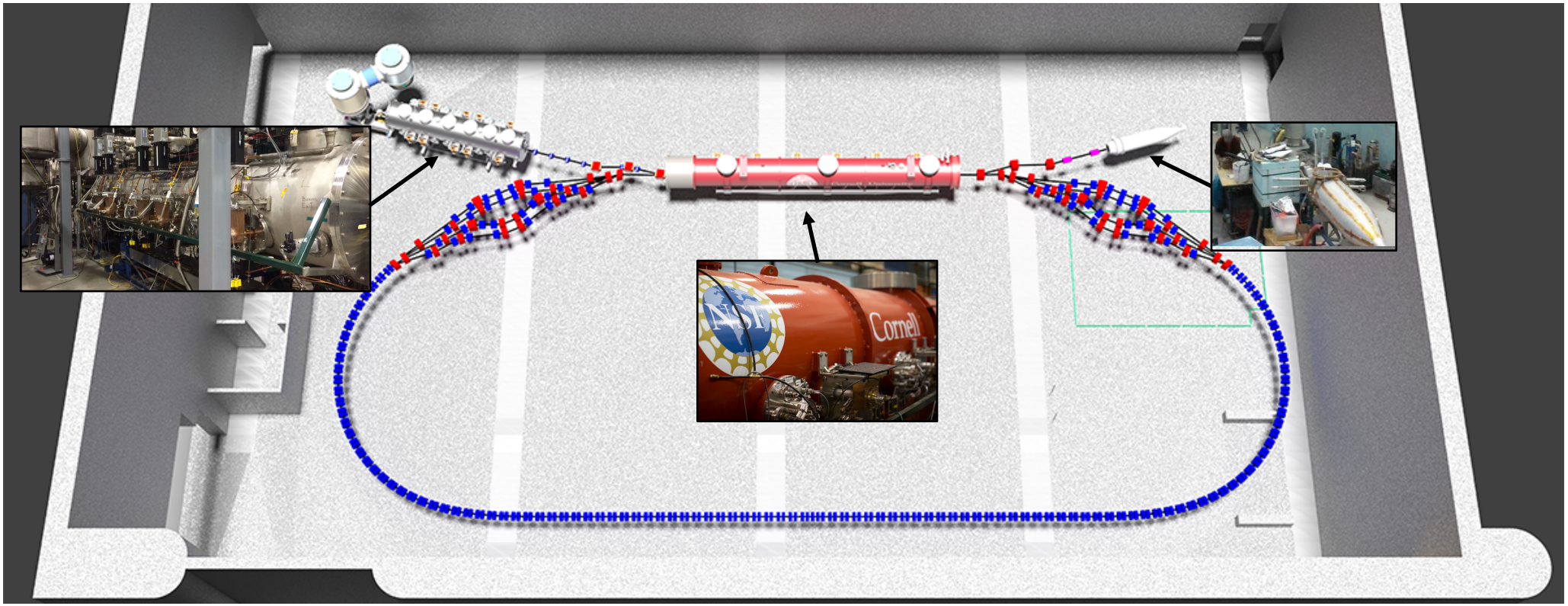


Design report
530 pages of conceptual and engineering design
www.classe.cornell.edu/ERL/PDDR

Cornell-BNL ERL Test Accelerator

CBETA: 4- turn ERL with FFAG arcs

- Takes our highly successful ERL development program to the next stage
  We have submitted an NSF proposal to use it for beam studies, eg BBU
- Basis for a potential future program, eg hard x-rays via Compton Backscattering
- Builds partnership with BNL



Cornell contributions to CBETA

Cornell provides:

- Invention of ERL concept (Tigner)
- Installed and operational photoinjector with DC gun and SRF accelerating section
  World record brightness
- High Q superconducting RF linac
  Operational and tested
- Beam dump
  Operational and tested

All have met CBETA specs

ERL technology is thanks to NSF support

Cornell contributions:

- $32M in existing equipment and infrastructure
- $8M in waived overhead on equipment acquisition and associated labor
- Expert team

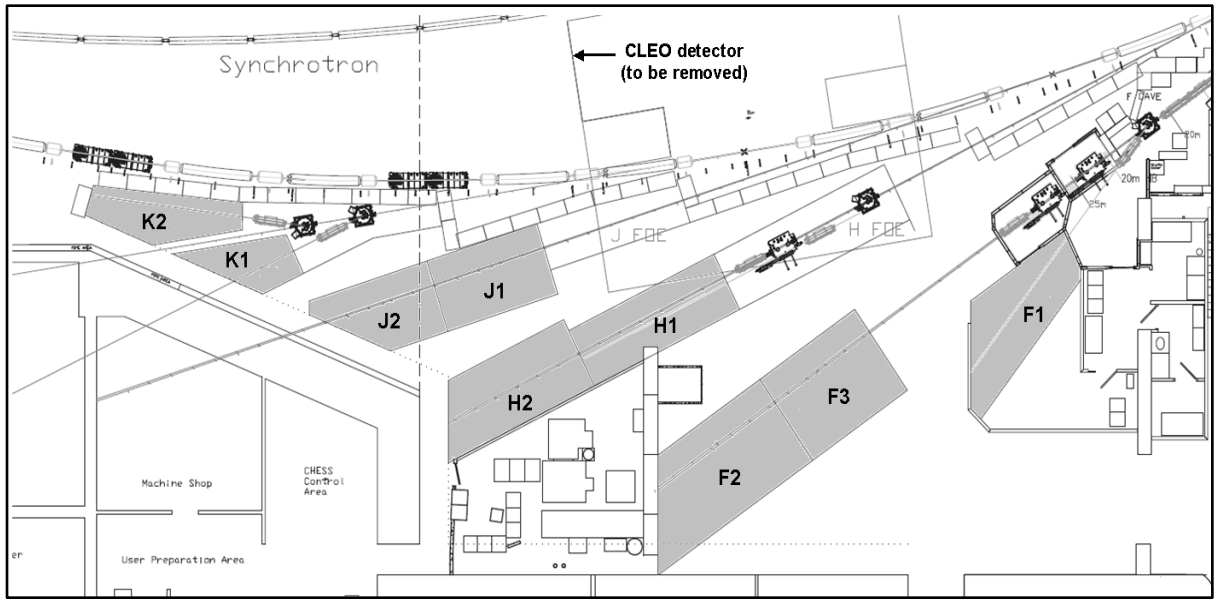
CBETA team at Cornell is experienced, with an outstanding track record.

CHESS upgrade

1. CLEO removal –
   2M pounds of equipment disassembled under contract with JLAB
   Solenoid to be used in JLAB experimental program
   Completed: Oct 2017

2. CESR rebuild through CLEO region
   Completion date:
   Nov 2019

3. New undulator-fed beamlines



Cornell project management and coordination

Cornell Project Management

- Resource-loaded schedules for all projects (MS Project)
- **Typically:** Prepared by Project Managers; Vetted by full team.
  CBETA: Prepared by L2 leaders; Vetted by full team.
- Daily project meetings to track progress, report problems.
- Monthly labor and expenditure reports
  Labor tracking by individual and by WBS.

Project Coordination

- Combine the MS Project files of **all** projects to identify labor pinch points
- Common resource list, with many individuals listed by name.
- Regular coordination meetings
  - Impact: schedule adjustments for CBETA and the CHESS Upgrade (CHESS-U), procurement of a new building for fabrication and staging, and significant term appointment hiring.

This system differs in several ways from the BNL approach, but for us, it has consistently delivered projects on time and on budget.

Observations I

- CBETA spreadsheets have withstood internal reviews by both Cornell and BNL, as well as the recent technical review. **GOOD**

- Coordination with CHESS-U project for space, labor and schedule is complete at a conceptual level. **GOOD**

- A combined CHESS-U/CBETA infrastructure schedule is mature. **GOOD**

- CBETA Project files are hot off the presses.

  Resource leveling has yet to be done.

  Could result in schedule adjustments or identification of labor shortfalls.

Observations II

- **Cornell and BNL project management take slightly different approaches**
  The Cornell approach relies more heavily on tight communication within the team for the early discovery of problems. This approach is well-matched to the size and cohesion of our staff.

  The Cornell system is well-suited to the size of CBETA and to transparency with BNL, and it has strong buy-in from the staff. **GOOD.**

- Likewise, BNL's project reporting system is well-established at BNL and should allow Cornell to stay informed of status of BNL components. **GOOD.**

CBETA is technically challenging. We can succeed if

- We are mutually transparent and accountable
- We capitalize on the strengths and procedures familiar to each team
- We carry out the project in partnership.

- Look carefully
- Ask questions
- We welcome your feedback