GEM TN-92-132

Collaboration Council Meeting - SSCL

July 2, 1992

Abstract:

Agenda, attendees, and transparencies of the GEM Collaboration Council Meeting held at the SSC Laboratory on July 2, 1992.

GEM Council Meeting
July 2, 1992

Status of SSC Laboratory - *R. Schwitters* (No transparencies)

a. Physical

1. Magnet section now at LN temperature with no problems.

b. Political

1. Good reception before Bennet Johnson's subcommittee; Senator Bumper's objections handled well; Senator Johnson thinks SSC funding is possible.

Costing - *G. Sanders*

Magnet Design and Review - *R. Stroynowski*

Surface Facilities - *M. Harris*

GEM Organization Committee - *C. Baltay*

Break

Baseline Report - *M. Marx* (See GEM PAC Report)

Magnet - *G. Deis* (See GEM PAC Report)

Participants List

7/8/92

LAST NAME	FIRST NAME	AFFILIATION
Adams	Lyn	
Baker	Howard	Draper Laboratory
Barish	Barry C.	California Inst. of Technology
Brau	James E.	University of Oregon
Bugg	William M.	University of Tennessee
Chargin	Anthony K.	Lawrence Livermore National Laboratory
Cohn	Hans O.	Oak Ridge National Laboratory
Fackler	Orrin D.	Lawrence Livermore National Laboratory
Fuchs	Ben	Lawrence Livermore National Laboratory
Gordon	Howard	Brookhaven National Laboratory
Kamyshkov	Yuri	Inst. for Theor. and Exper. Physics, (ITEP)
Korytov	Andrey	Massachusetts Institute of Technology
Lane	Kenneth D.	Boston University
Lebeau	Michel	LAPP
Marlow	Daniel	Princeton University
Miller	Robert J.	Michigan State University
Newman	Harvey B.	California Inst. of Technology
Onel	Yasar	University of Iowa
Plasil	Frank	Oak Ridge National Laboratory
Rennich	Mark	Oak Ridge National Laboratory
Ritchie	Jack L.	University of Texas at Austin
Roman	Oleg	Belarus Academy of Sciences
Sulak	Lawrence R.	Boston University
Tarlé	Gregory	University of Michigan

Participants List

7/8/92

LAST NAME	FIRST NAME	AFFILIATION
Taylor	Frank E.	Massachusetts Institute of Technology
VanBibber	Karl	Lawrence Livermore National Laboratory
Wang	Ming-Jer	Academia Sinica
Whitaker	Scott	Boston University
Willis	William	Columbia University
Wuest	Craig R.	Lawrence Livermore National Laboratory
Yanagisawa	Chiaki	State Univ. of New York at Stony Brook
Yu	X. Q.	University of Science & Technology
Zhu	Ren-yuan	California Inst. of Technology

PARTICIPANTS LISTING

LAST NAME	FIRST NAME	INSTITUTION
Heck	Jack	Martin Marietta/ORNL

PARTICIPANTS LISTING

LAST NAME	FIRST NAME	INSTITUTION
Barabash	Leonid	SSC Laboratory
Dingus	Peter	SSC Laboratory
Harris	Mike	SSC Laboratory
Johnson	Coleman	SSC Laboratory
Marx	Mike	SSC Laboratory
McFarlane	Kenneth	SSC Laboratory
Mitselmakher	Gena	SSC Laboratory
Paige	Frank	SSC Laboratory
Sanders	Gary	SSC Laboratory
Sheer	Irwin	SSC Laboratory
Yost	George P.	SSC Laboratory

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Presentation by:

Gary Sanders

GEM COST ESTIMATE REVIEW

JUNE 23, 1992

OVERVIEW, METHODOLOGY, ESTIMATE SUMMARY

Gary Sanders

SSCL GUIDELINES

Following 1990 Snowmass PAC review, and again following December 1990 review, SSCL issued design to cost guidelines to proponents of major SSC detectors.

My paraphrase:

1. SSC project includes $550 million FY90$ for possible two major detectors. Smaller detectors to be funded from $75 million FY90$ reserved for this purpose.

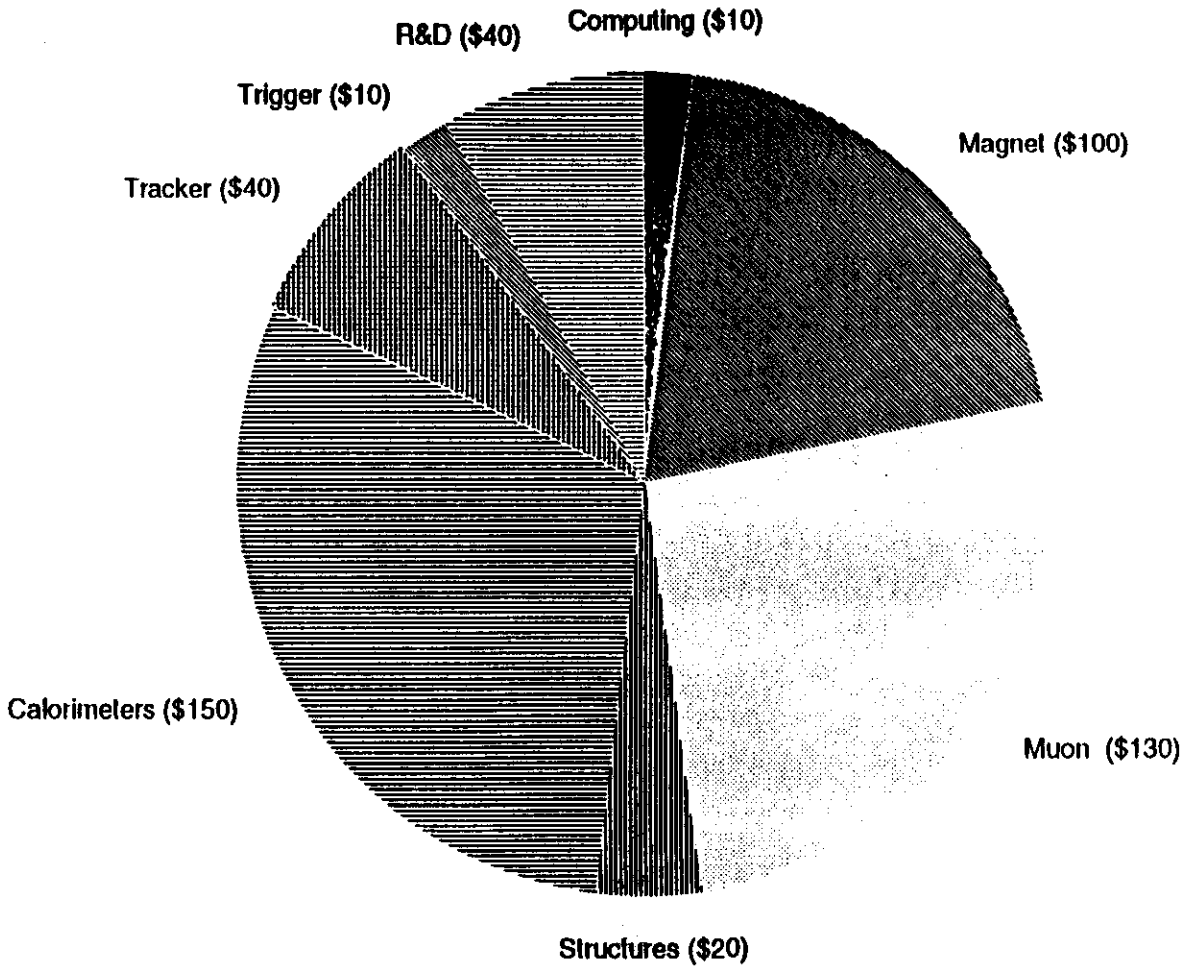
2. SSCL commits $225 million FY90$ to each of two possible major detectors. Remainder of $550 million FY90$ ($100 million) held in reserve for major detectors to be allocated based upon scientific and technical merit. Practical effect of this is that $275 million FY90$ used as planning number.

3. SSCL guidance is to design to cost using a target no more than $500 million FY90$.

4. Gap between SSC project funds and estimated cost of a major detector is to be provided by contributions from non-Federal sources.

Cost estimates prepared according to normal US DOE requirements and methods. Final funding plan to reflect responsibility matrix and actual offsets against US estimate. Recent letter from Schwitters provides renewed guidance on funding plan.

GEM COST TARGETS (29 JULY 1991)
($ MILLIONS)



COST ESTIMATING METHODOLOGY

1. GEM COST ESTIMATING PLAN, rev. E provides guidance on methodology across all subsystems.

2. WBS established. Three main categories Construction, R&D, and Conceptual/Preliminary Design. Latter two categories include all costs from beginning of GEM in mid-1991. WBS at lower levels is by subsystem.

3. WBS is used to organize estimate spreadsheet. It includes Engineering, Design, Inspection, Administration, Procurements/Fabrication, Assembly, Installation and Contingency. Materials and Labor are separated. WBS includes Project Management, and within each subsystem, Subsystem Management. These include PM, QA, systems engineering, ES&H, administration.

4. Estimate worksheet includes attached data sheets for risk analysis/contingency and also, "basis of estimate" information by item. All work is driven to be "bottom-up".

5. All items and terms are defined in the Plan.

6. All labor rates are standardized (SSCL, national average industrial,...) or composite national lab rates. These rates are tabulated in the Plan. Very few labor operations are based upon actual rates at intended suppliers. Thus, cost reductions afforded by using low cost suppliers have not been included in this estimate. That work will be included prior to TDR. No credit for foreign labor taken yet.

LABOR RATES

Labor rate tables in the Cost Estimating Plan:

National Laboratory average rates
National average rates
SSC employees
Job/shop in Dallas area
Contractor (Davis-Bacon) installation

Very few activities are estimated for this review using lower cost labor such as foreign, university, or student rates. No labor rate optimization has been performed to reduce costs. This is a "hidden contingency" built into estimate which should be extracted as estimate matures. No optimization of manufacturing algorithm has been performed either. This also must be brought to a mature optimization in the next year.

While rates are standardized, labor/skill mixes for teams are assigned by subsystem designers. If labor mixes are downgraded to lower rates, this is compensated in many subsystems by task duration extensions through the manufacturing algorithm.

ESCALATION FACTORS

Top level GEM Cost Estimate Summaries are expressed in FY90, FY91, and FY92 dollars for this review. FY90 is SSC project base year.

Procedures followed by GEM follow DOE order guidance. Estimate worked bottom up in current year dollars. Comparison with project base year is made using official DOE escalation factors.

Estimate presented here is not a fully escalated estimate. It is an FY92 estimate de-escalated to SSC project base year.

Our detailed study of national laboratory labor rates shows escalation far in excess of official DOE escalators. This high escalation (10% - 25%) is due to ES&H review and remedial plan overhead charges applied in FY92 following Tiger Team reviews. Since we have worked in FY92 dollars and applied DOE escalators to return to base year, <u>our labor estimate for EDIA is higher than that predicted by DOE escalation factors.</u> This will be adjusted out in future as labor is assigned to lowest cost laboratories, and moved to industrial, university and foreign institutions. This will result in a marked lowering of EDIA labor costs in our estimate.

DOE ESCALATION FACTORS:

FY90 to FY92	6.32%
FY91 to FY92	3.66%

GEM COST ESTIMATE SUMMARY

June 23, 1992
(with Liquid Argon, LSDT Option)
(Costs in millions of FY90 dollars)

Procurements/Fabrication	197	
Installation/Assembly	58	
Subtotal (Procurements and Labor)	255	
EDIA	113	(44%)*
Direct Costs	368	
Contingency	97	(26%)
Subtotal	465	
R&D	25	(10%)*
TOTAL DETECTOR FY90 $M	490	

* % of subtotal (Procurements and Labor)

GEM COST ESTIMATE SUMMARY

June 23, 1992
(with Liquid Argon, LSDT Option)
(Costs in millions of FY91 dollars)

Procurements/Fabrication	202	
Installation/Assembly	60	
Subtotal (Procurements and Labor)	262	
EDIA	117	(44%)*
Direct Costs	379	
Contingency	100	(26%)
Subtotal	479	
R&D	26	(10%)*
TOTAL DETECTOR FY91 $M	505	

* % of subtotal (Procurements and Labor)

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GEM COST ESTIMATE SUMMARY

June 23, 1992
(with Liquid Argon, LSDT Option)
(Costs in millions of FY92 dollars)

Procurements/Fabrication	210	
Installation/Assembly	62	
Subtotal (Procurements and Labor)	273	
EDIA	121	(44%)*
Direct Costs	394	
Contingency	104	(26%)
Subtotal	498	
R&D	27	(10%)*
TOTAL DETECTOR FY92 $M	524	

* % of subtotal (Procurements and Labor)

INDEPENDENT COST ANALYSIS

Earlier this year, SSCL declined to call an external (to GEM) cost review. We planned to present a preliminary cost estimate to the July PAC session and a final estimate at TDR submission.

As a management tool, we decided that we needed an independent review of GEM cost estimating as an ongoing process. This was accentuated by the lack of scheduled external reviews.

GEM has hired U.S. Cost/SAIC to perform an independent analysis of all GEM estimating methodology, all GEM subsystem estimates, and to search for uniformity in approach, and to independently review our labor, manufacturing, assembly, installation, EDIA, contingency estimates.

We got authorization to proceed with this contract at the beginning of May and began the work with the scintillating fiber calorimeter (the most conventional detector assembly problem in GEM), the magnet, our methodology, and cost/schedule controls system. The magnet report is due this week.

We will receive several reports prior to the July PAC meeting and all will be received prior to technology choices.

We have been informed that this company is being placed under contract to provide similar services for SDC.

WORK IN PROGRESS
AREAS OF POTENTIAL ESTIMATE GROWTH

1. Audit of all conventional equipment in Interface Systems and in all subsystems to properly identify missing and duplicated items.

2. Management of foreign activities.

3. Costs traded off for schedule to be included, if necessary, when mature schedule is completed. This work has to be coordinated with conventional facilities design now in Title I.

WORK IN PROGRESS
AREAS OF POTENTIAL ESTIMATE DECREASE

1. Assembly estimates now based upon manufacturing engineering approach for major subsystems. No manufacturing optimization has been performed. This optimization expected to decrease estimate by at least **$6 million FY92$** (10% of approx. $60 million in current estimate).

2. Optimization of Engineering and Design labor rates by selecting lower cost suppliers without downgrading skill mix can be expected to save at least **$7.5 million FY92$** (10% of approx. $75 million in current estimate).

3. Eliminate stainless steel from magnet FFS, central support and undercarriage, and substitute low carbon steel. Magnetic field impact under study. Novosibirsk requests this change. Estimate cost would be reduced by **$5.6 million FY92$**.

4. Eliminate mobility from magnet design. Estimate reduction **$1.5 million FY92$**.

5. Reduce total calorimeter thickness from 12 interaction lengths to 11. Impact upon muon system under study. Estimate reduction at **$5 million FY92$**.

These items could represent a **$25 million FY92$** reduction if all were achieved. These are reductions to the US cost estimate.

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Presentation by:

R. Stroynowski

Cost review June 23 SSCL

- Magnet cost credible
- Impressed by 29% of cost estimate backed by quotes
- No major problems
- Two potential areas of additional cost
  - Cryogenics – we have 1 refrigerator out and ask for 99% reliability
  - Alignment

Magnet technical review June 30-July 1, SSC

No show Stoppers. Magnet big but simple.

Pointed out places for improvements

Cryogenics - need pumps for LN system since thermosyphon may not work adequately

- may need a 2nd refrigerator or good plan for trucking helium

Winding - do not like split coil form

- do not like insulating breaks in the bobbin

- conductor acquisition is a pacing item

Others - do not like titanium rods for cold mass support, use other material

- concern with dump resistors placem

- will need machining for FFS plate

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Presentation by:

C. Baltay

C. BALTAY
July 2, 1992

PRELIMINARY REPORT OF THE GEM ORGANIZATION COMMITTEE

Members of the Committee:

C. Baltay (Chairman)

J. Branson

A. Chargin

J. Friedman

G. Mitselmakher

I. Pless

J. Reidy

J. Rutherfoord

N. Samios

R. Stroynowski

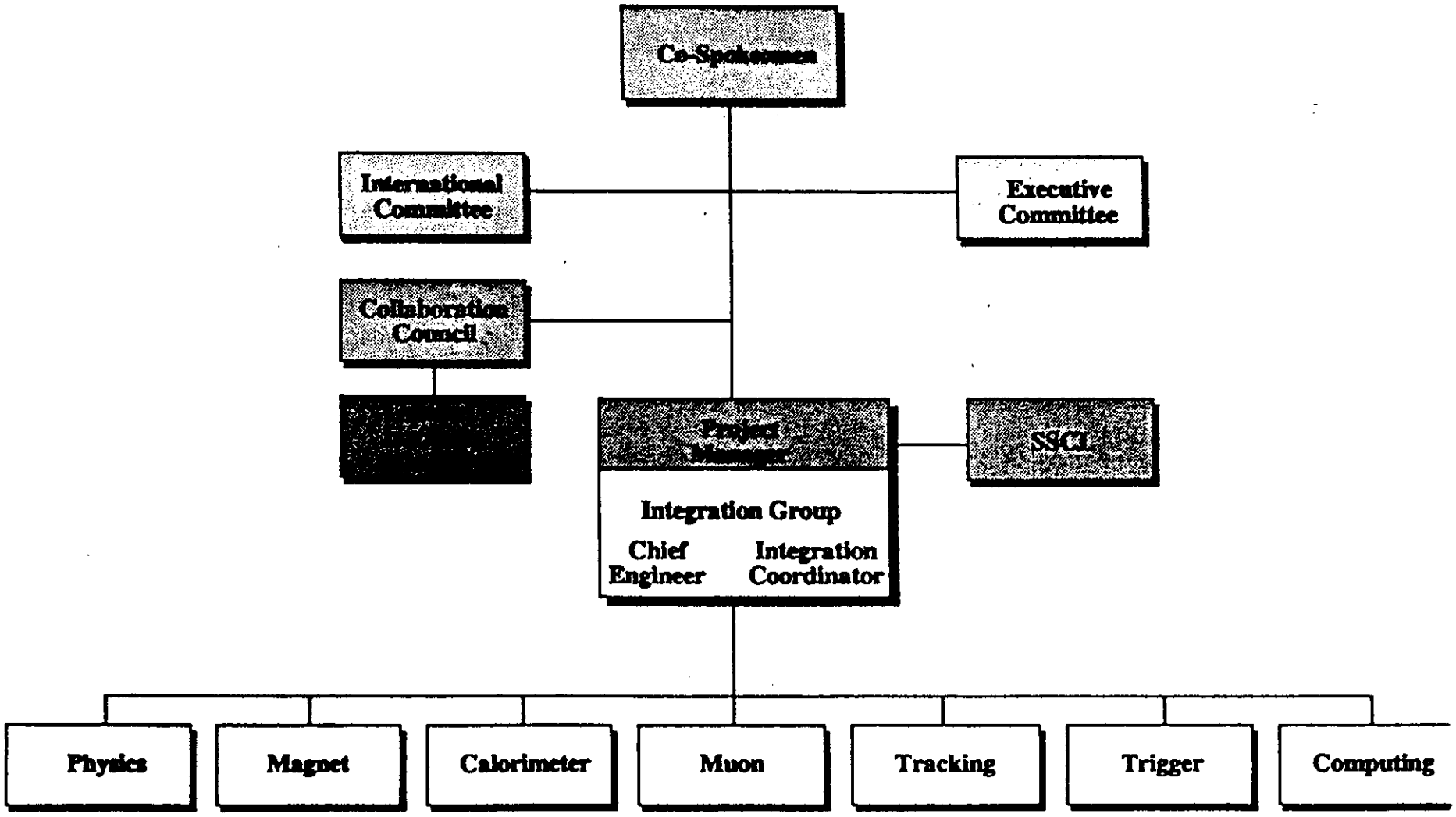
X. Q. Yu

GEM ORGANIZATION & MANAGEMENT

1. Main Components of GEM Organization
   - Cospokesmen
   - Collaboration Council
   - Executive Committee
   - International Committee
   - Project Managers Office
     - Chief Engineer
     - Integration Coordinator
     - Budget Control
       etc etc
   - Subsystem Organizations

2. Organization chart will be similar to the present interim GEM Organization chart.

3. The detailed functions of the various Components of the GEM Organization are still to be defined, as are the fine points of the Organization Chart.


Co-Spokesmen
International Committee
Executive Committee
Collaboration Council
Project Manager
SSCL
Integration Group
Chief Engineer
Integration Coordinator
Physics
Magnet
Calorimeter
Muon
Tracking
Trigger
Computing

THE COLLABORATION COUNCIL

1. Will consist of one representative from each collaborating institution
   - Representative chosen by each institution
   - Terms up to pleasure of each institution
   - Chairman (or present secretary) to keep track of institutional representatives
2. The collaboration, through the Collaboration Council, should legitimize and approve the GEM Organization and select or approve the selection of the

   Spokesmen
   Project Manager
   Executive Committee
   International Committee
   Subsystem Leaders
   etc, etc

3. The Collaboration Council should elect its own chairman (and secretary)

a) One year term, renewable once

b) Nominations
- From floor of Collab Council Mtg
- By letter to Secretary

c) Secretary will
- Check if nominees are willing to run
- Makes up ballot and sends it to all Coll. Councilors by mail for vote by mail, due in ~2 weeks

d) If no candidate gets majority, top ~~three~~ 2 candidates will stand for a run off vote.

THE GEM SPOKESMEN

1. To be selected soon after TDR is approved
   - One Spokesman or Co spokesmen
   - Fixed terms of 3 years
   - No prejudice or limit about number of consequtive terms served
2. Selection Process
   a) Nominating Committee consisting of GEM Collaborators
      - 4 elected by Collaboration Council
      - 2 picked by SSC Lab
      - 3 chosen by Organization Committee to balance group geographically etc.
      - Nominating Committee to elect its own chairman
   b) The Nominating Committee will consult extensively with Collaboration, present leadership, SSC Lab, etc. etc. and will nominate a single slate
   c) The slate thus nominated will be put up for approval or rejection by the Collaboration Council
      - All Councilors vote by mail
      - ~ 2 week thinkink period allowed between presentation of slate & ballot

3. This selection process will be repeated every 3 years.
A new Nominating Committee will be constituted each time.

4. The Executive Committee by a 2/3 vote, followed by a majority vote of the Collaboration Council, can trigger this selection process at any time in unusual circumstances.

THE GEM PROJECT MANAGER

1. GEM will set up a Search Committee at the earliest practical time, consisting of

   - GEM Spokesmen
   - Chairman of Collaboration Council
   - Two SSCL representatives chosen by the SSC Lab
   - 2 or 3 others selected by Spokesmen

   the Search Committee will be chaired by the Spokesmen

2. The Search Committee will conduct a search, with extensive consultation with Collaboration, SSC Lab, DOE, etc. Will select a single candidate to be approved or rejected by Collaboration Council (same election procedure as above)

3. The Project Manager will serve with indefinite term to the completion of the construction of GEM. However the spokesmen can trigger the formation of a new Search Committee at any time in case of a problem.

SUBSYSTEM LEADERS

1. The subsystem leaders will be nominated by the Spokesmen after wide consultation with the Collaboration, the Project Manager, and the subsystem key players.

2. Nominated slate to be approved or rejected by Collaboration Council (same election rules)

3.

EXECUTIVE COMMITTEE

1. Membership will be nominated by Co spokesmen after wide consultation with Collaboration

2. Nominated slate to be approved or rejected by Collaboration Council

3. Same term of office as spokesmen

4. Will have large overlap with subsystem leaders.

3. the membership of this committee can be re-evaluated as appropriate by the spokesmen, with the approval of the collaboration Council

THE INTERNATIONAL COMMITTEE

1. Areas of Concern of this Committee
   - Fiscal Policy
   - Coordination of work resposibilities
   - International issues & agreements
   - Recommendation of New Collaborators, with approval by Collab. Council
2. Consists of ≤ 2 representatives of each Country collaborating on GEM
3. Chaired by one of the Spokesmen (Maybe rotating chairman later)
4. Same terms of office and selection process as Executive Committee

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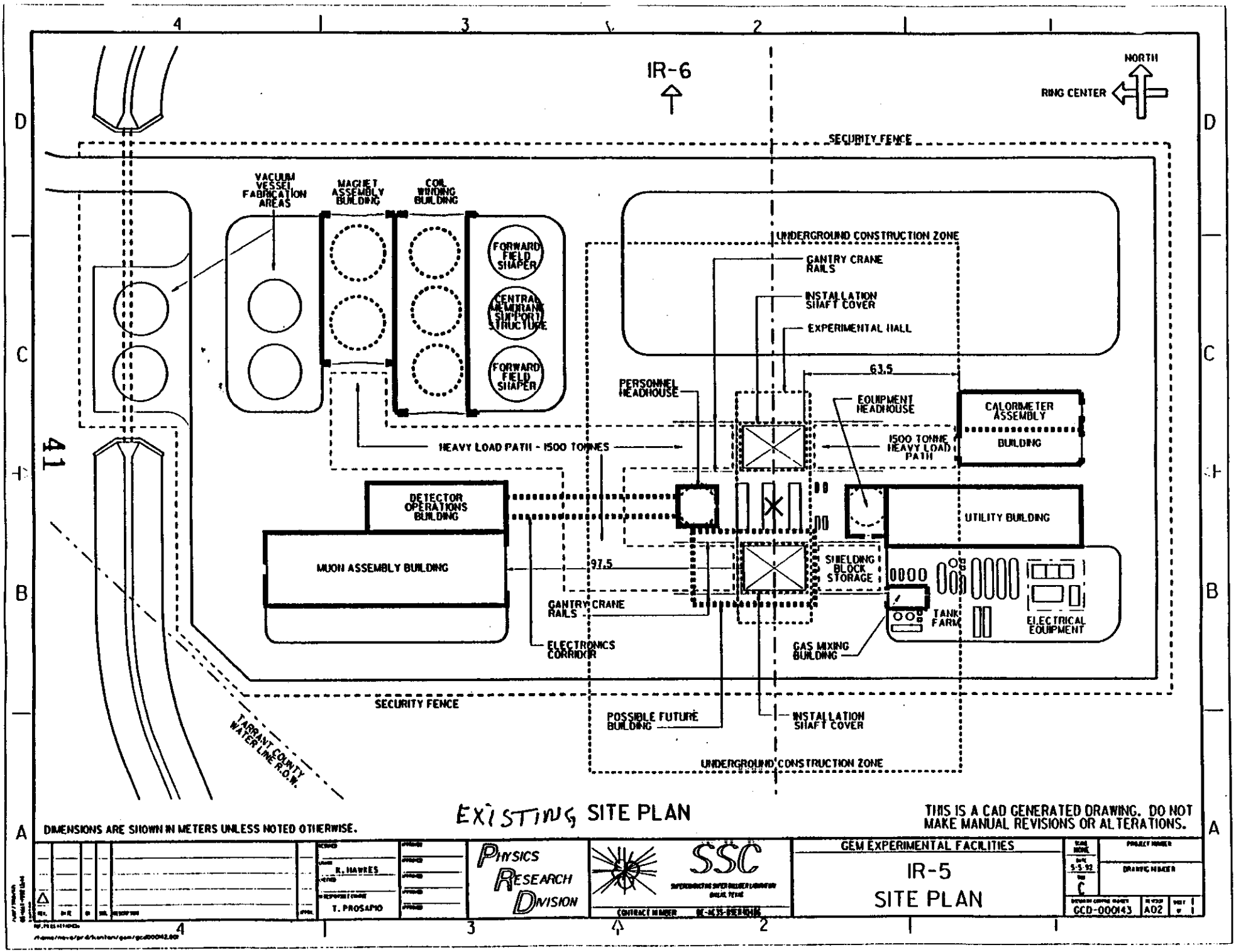
Presentation by:

M. Harris


IR-6
NORTH
RING CENTER
SECURITY FENCE
VACUUM VESSEL FABRICATION AREAS
MAGNET ASSEMBLY BUILDING
COIL WINDING BUILDING
FORWARD FIELD SHAPER
CENTRAL MEMBRANE SUPPORT STRUCTURE
FORWARD FIELD SHAPER
UNDERGROUND CONSTRUCTION ZONE
GANTRY CRANE RAILS
INSTALLATION SHAFT COVER
EXPERIMENTAL HALL
63.5
PERSONNEL HEADHOUSE
EQUIPMENT HEADHOUSE
CALORIMETER ASSEMBLY
BUILDING
HEAVY LOAD PATH - 1500 TONNES
1500 TONNE HEAVY LOAD PATH
DETECTOR OPERATIONS BUILDING
UTILITY BUILDING
MUON ASSEMBLY BUILDING
97.5
SHIELDING BLOCK STORAGE
GANTRY CRANE RAILS
TANK FARM
ELECTRICAL EQUIPMENT
ELECTRONICS CORRIDOR
GAS MIXING BUILDING
SECURITY FENCE
POSSIBLE FUTURE BUILDING
INSTALLATION SHAFT COVER
UNDERGROUND CONSTRUCTION ZONE
TARRANT COUNTY WATER LINE R.O.W.
41
EXISTING SITE PLAN
THIS IS A CAD GENERATED DRAWING. DO NOT MAKE MANUAL REVISIONS OR ALTERATIONS.
DIMENSIONS ARE SHOWN IN METERS UNLESS NOTED OTHERWISE.
R. HAWKES
T. PROSAPIO
PHYSICS RESEARCH DIVISION
SSC
CONTRACT NUMBER
GEM EXPERIMENTAL FACILITIES
IR-5
SITE PLAN
5-5-92
C
GCD-000143
A02
M. Harris

Superconducting Super Collider Laboratory
2550 Beckleymeade Avenue, Mail Stop 2005
Dallas TX 75237-3946
(214) 708-6325
Fax: (214) 708-6088

Physics Research Division
GEM Project Office

Memorandum

To: John Ives and Tom Prosapio
From: Mike Harris and Gary Sanders
Subject: IR5 Surface Facilities
Date: July 2, 1992

In the continuing evolution of the GEM requirements for surface buildings at IR5, we recognize that the tracker and beamline facilities are not identified and the headhouse(s) is still not in the plan.

In an effort to free up some money to compensate for the lack of these facilities, GEM has studied the amalgamation of the Coil Winding Building with the Calorimeter Building. During this exercise, we took the opportunity to study the implications upon the facilities if the GEM muon system consisted of large monolithic structures instead of modular segments.

The results show that with a combined coil and calorimeter building and the magnet assembly building, the assembly process of the large structures could be carried out. If GEM selects this solution, the present muon assembly building may be considerably reduced or eliminated. The conclusion for the muon facilities will be reached before September in time for the Title 1 process for the magnet assembly and muon buildings.

The present conclusion is that the GEM Coil Winding Building should be combined with the Calorimeter Building giving a single building 30 x 110m with a crane hook height of 14m. The requirements are shown on the attached sheet and it should be pointed out that there is also an additional requirement for auxiliary laboratory and office space which may be part of a central facility at IR5.

We request that this information concerning the new requirement is transmitted to PB/MK within a week to avoid delaying the scheduled delivery of the building in February, 1994. Studies should continue to accommodate the missing facilities and the cost savings should be redistributed for this purpose.

MH/lhb

July 1, 1992

GEM Coil Winding/Calorimeter Assembly Building Requirements

1. Interior dimensions 30 meter wide X 110 meter long.

2. Crane hook height 14 meters.

3. Crane extension of 22 meters at north entrance to the building
   -extension rails must free span from building to end of rail.

4. Bridge cranes:
   1-45.5 MT with 10 MT auxiliary hook
   2-30 MT with 4.5 MT auxiliary hook
   * two 30 MT Cranes must have tandem lift capability.
   one of the 30 Metric Ton cranes to be shared between calorimeter assembly and coil winding area with provision of moving in and out of clean area.

5. South bay 30m X 30m clean area available by 6/95

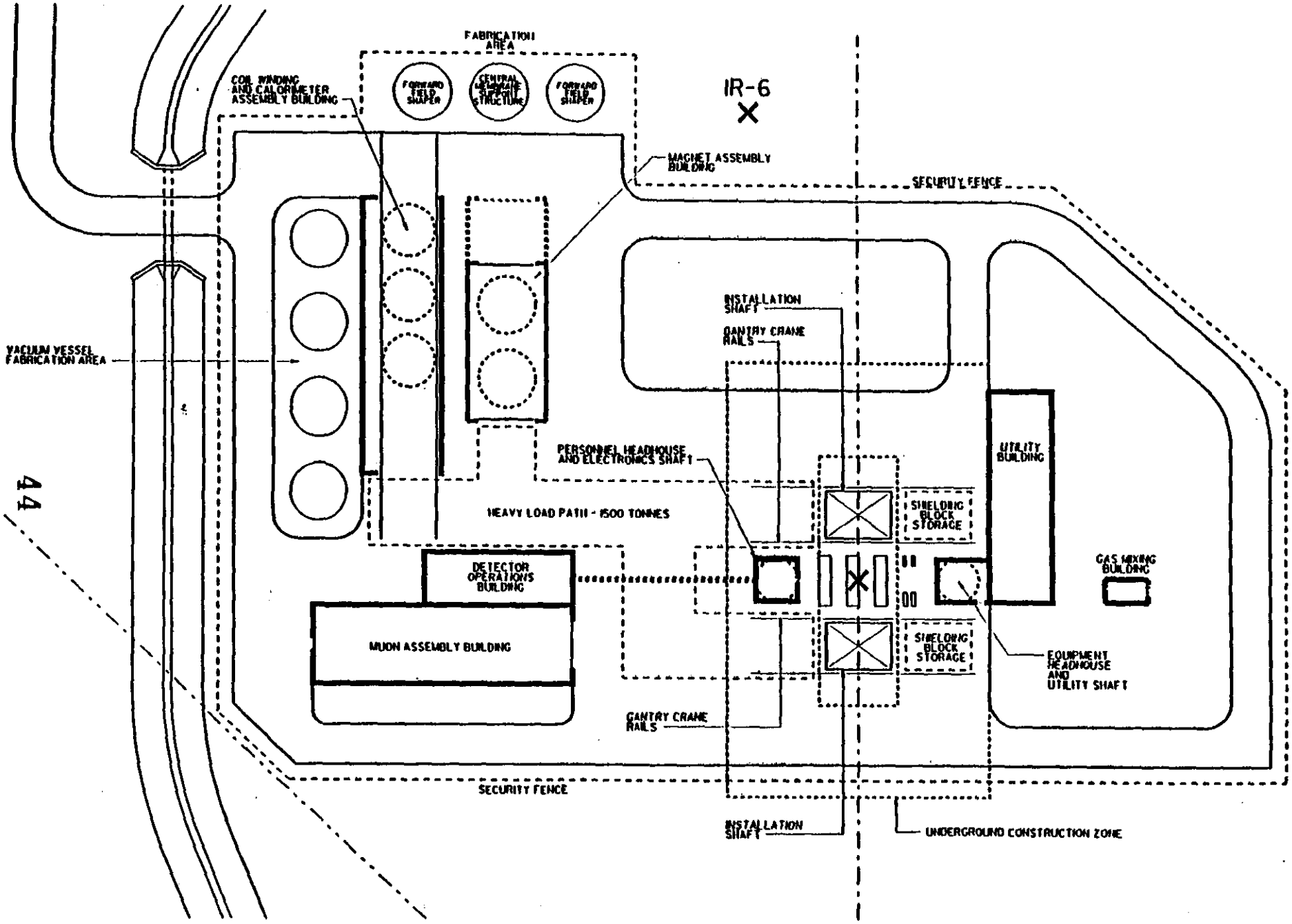
6. Doors:
   North 22m wide X 14m high
   South 22m wide X 14m high
   East 10m wide X 10m high
   Clean partition 10m wide X 10m high

7. Auxiliary cleanroom floor space for labs and offices 400 square meters with cryogenic services available 6/95.

8. 25 meter wide road space on north, south and east sides.

9. Heavy loadpath access from south end.

Greg Velasquez
Jacques Pier Amory
Nicolai Martovetski
Cliff Eberle CE



FUTURE IR-5 SITE PLAN

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