

DESIGN CRITERIA REPORT
FOR THE
CONTROL BUILDING

REPORT TO STANFORD LINEAR ACCELERATOR CENTER - NO. ABA-59
STANFORD UNIVERSITY-ABA SUBCONTRACT S-128
UNDER AEC CONTRACT AT(04-3)-400

SLAC AHO 1991-012B14

Submitted by George Liik Approved by R. L. Sharpe
G. Liik R. L. Sharpe

AETRON-BLUME-ATKINSON
A Joint Venture
ARCHITECT-ENGINEER-MANAGER
Palo Alto, California

CHARLES LUCKMAN ASSOCIATES
Architectural Associates

October 26, 1962

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I. INTRODUCTION

This report presents the design criteria for performing the Title I design of the Control Building and associated facilities and equipment. Included are criteria for the following items of work:

- A. The Control Building structure.
- B. Conventional mechanical and electrical utilities.
- C. Access roads, parking, and landscaping.

The building location, space requirements, and mechanical and electrical services requirements were defined by SLAC Control Building Design Criteria of October 2, 1962, and supplemental memoranda.

II. DESIGN CRITERIA

A. GENERAL"

The Control Building will be a single story structure with a partial basement. Its basic function will be to contain the controls and instrumentation for the accelerator and the communications center linking the accelerator and the experimental areas, and to accommodate the operating personnel.

The laboratory Safety Office and First Aid Station will also be housed in this building.

Normal full-time population of the building will be eighteen (18), including three women. The transient population may exceed this number by several multiples.

All design work will conform to U. S. Atomic Energy Commission Manual, Chapter 6000 and the codes and standards listed therein. In addition, SLAC standards developed for this project will be used wherever appropriate.

General location of the building is shown on Sketch SKA 12062-A.

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B. ARCHITECTURAL - STRUCTURAL

1. Design. The architectural design will incorporate the normal elements of the approved architectural vocabulary for the project.

2. Structure. The structure will be conventional steel frame and metal siding type. Interior division of the building into administrative, operations, equipment and support areas will be by standard partitions. Shielding requirements, to eliminate external electromagnetic interference, will be considered during design and provision made for future installation of shielding if found to be necessary.

3. Roof and Floor. The roof will consist of built-up roofing over insulated steel deck. To accommodate possible mechanical equipment on roof, the roof will be designed for loads of approximately 30 psf. Office area floors will be reinforced concrete covered with resilient tile (asphalt tile). The Control and Rack areas will be provided with a double floor system; the upper (rack support) floor will have 6" holes at approximately 2' centers throughout the floor area for access of instrument cables and for ventilation of the racks. Adequate working space (6' -6" clear) between the floors will be provided. The floors will be designed for 500 psf uniform load or 5000 lbs concentrated load.

4. Special features. Due to nature of work in the console and rack areas, this space will be windowless. Lighting will be incandescent with controllable intensity. Considering the heat load from the racks special emphasis will be given to air conditioning of this space. A special tunnel to accommodate control cables from Klystron Gallery will terminate in the building.

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5. Building Data.

Length (exterior)	117 ft.
Width (office area)	90 ft.
Width (rack area)	54 ft.
Height (office area, ext.)	12 ft.
Height (rack area, incl. cable gallery, ext.)	25 ft.
Area (floor)	7040 sq. ft.

Area (basement, Substa. & electr. eq. area 500 sq. ft., mechanical eq. 740 sq. ft., battery, PAX, etc. area 720 sq. ft.)	<u>1960 sq. ft.</u>
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Total Area	9,000 sq. ft.
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Area (basement, as above and adding fan room 1000 sq. ft. if required)	<u>2960 sq. ft.</u>
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Total Area	10,000 sq. ft.
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C. MECHANICAL

1. Air Conditioning. Offices, PAX room, and Observation Room will receive normal office type air conditioning. In the console and rack area constant temperature air will be supplied to the racks from beneath. Humidity of the air supplied to the racks will be limited to 60% RH maximum. Air will discharge into the room from the top of the racks in the rack area. Discharge air from the top of the racks in the console area will be connected to a suspended ceiling by flexible ducts so as to decrease the space cooling load. This area will be occupied by sedentary personnel and moderate air velocities should be maintained.

All air handling equipment will be ~~located on the roof~~ of the building concealed behind the sight screen or in the mechanical equipment room. Refrigeration equipment and pumps will be located in the mechanical equipment room in the basement. Condenser water for the refrigeration may be supplied from the cooling tower lines at the Fabrication Building. Toilets and all rooms in the basement will be mechanically ventilated. It is believed that the most economical heating system for the building will be by reverse cycle refrigeration or by duct mounted electric resistance heaters.

2. Plumbing. Domestic water and sanitary sewer connections will be to existing mains north of the building near the Construction Office Building. Plumbing is of a type suitable for office structures.

3. Fire Protection. The fire protection systems will be designed to meet SLAC requirements and standards. A wet type sprinkler system will be provided in office areas and mechanical equipment room. An automatic smoke detection system will be provided in the rack area, cable access area, PAX rooms and battery room. Fire alarm boxes and horns will be provided for adequate coverage.

D. ELECTRICAL

1. The electrical power will be supplied from the same feeders which supply the Klystron Gallery at 12kv, 3 phase, 60 cycle.

2. Substation. A 750 kva 480 volt unit substation, located in the basement equipment room of the building, supplies all building power requirements.

3. Power will be supplied to various systems as defined by SLAC "Design Criteria".

4. Grounding. The grounding system is integrated with the special

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grounding provided in the Klystron Gallery. A $3/16$ by 14 inch copper bus is extended from the Gallery into the Control Building. In addition, a normal equipment grounding system will be provided.

E. COMMUNICATIONS

The communications lines will be connected to mains (manhole) north of the building, near the Construction Office Building.

F. ACCESS ROADS AND PARKING

An access road and sufficient parking will be provided, north of the building (see SKA 12062-A).

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III. COST ESTIMATE, PRE-PRELIMINARY

<u>ACCOUNT NO.</u>	<u>DESCRIPTION</u>	<u>COST</u>	<u>TOTAL COST</u>
503	Control Building - (incl. retaining walls)	\$115,000	
503	Mechanical	45,000	
503	Electrical	47,000	
503	Fire Alarm	<u>11,000</u>	
	Total, Account #503		\$ 218,000
600-X	Communications, Distr.	7,800	
410	Concrete Walks & Steps	3,000	
440	Parking, Paving, etc.	4,700	
520	Storm Drainage	2,500	
651	Sanitary Sewer	800	
671	Water Service	200	
613	Substation	25,000	
675	CTW Distribution	<u>8,000</u>	
	Total		<u>52,000</u>
			\$270,000

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IV. DESIGN AND CONSTRUCTION SCHEDULE

	<u>Y</u> <u>Time</u>	<u>Completion Date</u>
Criteria		Dec. 17, 1962
Criteria Approval		Dec. 28, 1962
Title I Preliminary Draft	7 weeks	Feb. 20, 1963
Title I Review by SLAC and AEC of Draft	4 weeks	Mar. 20, 1963
Title I Report Submittal	1 week	Mar. 27, 1963
Title I Review and Approval by SLAC & AEC	3 weeks	Apr. 17, 1963
Title II 50% Submittal	11 weeks	July 31, 1963
Title II 90% Submittal	7 weeks	Aug. 21, 1963
Title II Review and Approval	3 weeks	Sept. 11, 1963
Title II Revised and Ready for Bid	3 weeks	Oct. 4, 1963
Bidding Period	4 weeks	Nov. 1, 1963
Notice to Proceed	5 weeks	Dec. 9, 1963
Construction Complete	8 months	Aug. 6, 1964

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V. LIST, SKETCHES

<u>TITLE</u>	<u>NUMBER</u>
1. Site Plan	SKA-12062-A
2. Ground Floor Plan	SKA-12032-A
3. Cable Gallery Plan	SKA-12032-B
4. Lower Level Plan	SKA-12032-C
5. Elevations	SKA-12032-D
6. Elevations & Section	SKA-12032-E

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4. Special Features. Due to nature of work in the console and rack areas, this space will be windowless. Lighting will be incandescent with controllable intensity. Considering the heat load from the racks special emphasis will be given to air conditioning of this space. A special tunnel to accommodate control cables from Klystron Gallery will terminate in the building.

5. Building Data.

Length (exterior)	128 ft.
Width (office area)	100 ft.
Width (rack area)	60 ft.
Height (office area, ext.)	12 ft.
Height (rack area, ext.)	17 ft.
Area (floor)	8480 sq. ft.
Area (basement, Substa. & electr. eq. area 500 sq. ft., mechanical eq. 800 sq. ft., battery, PAX, etc. area 720 sq. ft.)	<u>2020 sq. ft.</u>
Total Area	10,500 sq. ft.
Area (basement, as above and adding fan room 1000 sq. ft.)	<u>3020 sq. ft.</u>
Total Area	11,500 sq. ft.

C. MECHANICAL

1. Air Conditioning. Offices, PAX room, and Observation room will receive normal office type air conditioning. In the console and rack area constant temperature air will be supplied to the racks through the false floor supporting the racks. Humidity of the air will be limited to 60% RH maximum. Discharge air from the top of the racks in the rack area will be drawn from the space through ceiling air grilles. Discharge air from the top of the racks in the console area will be connected to a suspended ceiling by flexible ducts. This space will be occupied by sedentary personnel and suitable room temperatures should be maintained.

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III COST ESTIMATE, PRE-PRELIMINARY

<u>ACCOUNT NO.</u>	<u>DESCRIPTION</u>	<u>COST</u>	<u>TOTAL COST</u>
503	(1) Control Building, Structure 10,500 SF (Incl. retaining walls & floor (2) shielding 10 Ga. steel)	\$ 173,000	
503	Mechanical	53,400	
503	Electrical	58,000	
503	Communications, Fire Alarm	12,000	
503	Water Chiller & Pumps	<u>20,000</u>	
	Total, Account #503		\$ 316,400
600-X	Communications, Distr.	1,500	
410	Concrete Walks & Steps	3,000	
440	Parking, Paving, etc.	4,750	
420	Storm Drainage	2,500	
651	Sanitary Sewer	750	
671	Water Service	200	
613	Substation	23,000	
675	CTW Distribution	<u>4,000</u>	
	Total		\$ 356,100

Note:

- (1) Control Building Structure 190,000
11,500 SF
- (2) 10 Ga steel shielding installed on
floor of 6600sq. ft. is estimated
to cost approximately \$10,000.

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