Oklahoma Space Center

J. Soter
project

Oklahoma Space Center

client

Mac Sudduth, Director
Omniplex
2100 NE 52
Oklahoma City, OK 73111
405-424-5561

advisors

Alan Brunken Research
Alexander Erdely Design
OSU School of Architecture

Edward O. Buckbee, Director
Scott Osborne, Assistant Director
Alabama Space and Rocket Center
Tranquility Base
Huntsville, AL 35807
205-837-3400

David Crowe, Architect
David A. Crowe & Associates
P. O. Box 234
Huntsville, AL 35804
Traditionally this page is where the student thanks all the people who had an impact on the project. So here goes:

To my parents Mr. and Mrs. Joseph Soter for their moral and financial support during the crises a project such as this involved.

To my advisor Professor Erdely for letting me test my own wings and demanding quality throughout.

To my client Dr. William Mac Sudduth who took time from his busy schedule to help this student who showed up at his office one day with an unusual request.

To Messrs. Edward O. Buckbee and Scott Osborne whose generosity was fundamental to the program.

And finally to all these people whose encouragement, help, and inspiration proved to be a valuable resource through the long hours of work.

Brenda Presley
Marsha Dodson
Camille La France
Gordon Thoms
Jim and Pat Soter
Jim and Betty Schepens
The Southwest Side

David Crowe, A.I.A.
Louis Bass
Isao Tomita
Werner Von Braun
Analog Magazine
The Playmates of the Year
Mr. Mons
This report is in partial fulfillment of the requirements for the degree of Master of Architecture. It is a sequence called Professional Project. In this sequence the student simulates the role of a project architect. The student arranges to have a person act the role of client. Programming is accomplished in the fall semester and design is performed in the spring. This book is arranged in two sections text and appendix. The text is comprised of programming requirements, the appendix is comprised of graphical references and the final design solution.
1 INTRODUCTION
2 CONTENTS
3 FAMILIARIZATION
14 NEEDS AND DATA
93 GOALS AND CONCEPTS
101 PROBLEM STATEMENTS
103 BIBLIOGRAPHY
104 APPENDIX
They're going to wreck the world! They really are, and they're too big to stop, and there's too many of em!

What can one man do? What can anyone do? You can run but you can't hide!

Aha! I know! I'll build a spaceship and go to hell with 'em all. Ha ha!
familiarization

This section is the familiarization process. It is the product of a literature search and initial conversations with the client. Its purpose is to identify general areas of concern and to determine the scope of the problem.
The space center is similar in concept to a science museum. It is a hands-on facility which teaches the public through active participation. By turning dials, moving levers, riding simulators, playing games and viewing exhibits people learn what it's like to live and work and play in space. The center also supplements classroom teaching by providing programs demonstrating principles which are not within the scope of most school curricula.

The purpose of such a facility is to educate the public about the immediate benefits of space activities, to clarify misunderstandings about "outer space", to possibly inspire young people to pursue space careers, and generally to raise the collective consciousness about the fact that the age of space exploitation is upon us. This is to be done in an entertaining and informative manner.

The space center is people. The staff and the visitors make up the user group.

Initial research suggests the center may be organized along the lines of a museum. Below is a typical museum organization chart. Immediately following is a list of staff positions at the Omniplex and a departmental breakdown.

At my next client meeting I wish to determine the exact hierarchy of the Omniplex staff. My technique will be to ask Mr. Sudduth to compare the sample charts with his organization and make changes or supply me with his own chart if it is available.

Upon determining the staff functions each job will be analyzed for the following data:
Table 2. Anticipated Staff and Estimated Salary Levels

<table>
<thead>
<tr>
<th>Department andPosition</th>
<th>Estimated Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td></td>
</tr>
<tr>
<td>Executive Director</td>
<td>$27,000</td>
</tr>
<tr>
<td>Assistant Director</td>
<td>17,000</td>
</tr>
<tr>
<td>Secretary to the Director</td>
<td>10,000</td>
</tr>
<tr>
<td>Gift Shop Manager</td>
<td>10,000</td>
</tr>
<tr>
<td>Public Relations Coordinator</td>
<td>10,000</td>
</tr>
<tr>
<td>Receptionist</td>
<td>6,000</td>
</tr>
<tr>
<td>Secretary</td>
<td>7,200</td>
</tr>
<tr>
<td>Bookkeeper</td>
<td>10,000</td>
</tr>
<tr>
<td>Shop Foreman</td>
<td>9,000</td>
</tr>
<tr>
<td>Print Shop Manager</td>
<td>6,000</td>
</tr>
<tr>
<td>Building Engineer</td>
<td>7,200</td>
</tr>
<tr>
<td>Construction (½)</td>
<td>3,600</td>
</tr>
<tr>
<td>Maintenance (1½)</td>
<td>9,000</td>
</tr>
<tr>
<td>Security (2)</td>
<td>12,000</td>
</tr>
<tr>
<td>Volunteers &amp; Membership</td>
<td>10,000</td>
</tr>
<tr>
<td></td>
<td><strong>$154,000</strong></td>
</tr>
<tr>
<td>Exhibits</td>
<td></td>
</tr>
<tr>
<td>Exhibit Director</td>
<td>$15,000</td>
</tr>
<tr>
<td>Assistant Exhibit Director</td>
<td>12,000</td>
</tr>
<tr>
<td>Graphic Artist (2)</td>
<td>20,000</td>
</tr>
<tr>
<td>Electronics (half time)</td>
<td>5,000</td>
</tr>
<tr>
<td>Exhibit cleaning (half time)</td>
<td>3,000</td>
</tr>
<tr>
<td>Carpenter (half time)</td>
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<tr>
<td></td>
<td><strong>$58,600</strong></td>
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</table>
### Education

<table>
<thead>
<tr>
<th>Position</th>
<th>Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Coordinator</td>
<td>$15,000</td>
</tr>
<tr>
<td>Elementary School Specialist</td>
<td>10,000</td>
</tr>
<tr>
<td>Early Childhood Specialist</td>
<td>10,000</td>
</tr>
<tr>
<td>Science Development Consultant</td>
<td>12,000</td>
</tr>
<tr>
<td>Bookings and Secretary</td>
<td>7,200</td>
</tr>
<tr>
<td>Part-time Teachers (10)</td>
<td>10,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$64,200</strong></td>
</tr>
</tbody>
</table>

### Planetarium

<table>
<thead>
<tr>
<th>Position</th>
<th>Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director</td>
<td>$15,000</td>
</tr>
<tr>
<td>Assistant Director</td>
<td>12,000</td>
</tr>
<tr>
<td>Astronomer</td>
<td>12,000</td>
</tr>
<tr>
<td>Planetarium Specialist</td>
<td>10,000</td>
</tr>
<tr>
<td>Electronics Technician (half time)</td>
<td>5,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$54,000</strong></td>
</tr>
</tbody>
</table>

**Total** $330,800
(Organization of a Museum)
Visitors comprise two typical categories, individual or family visitors and organized group visitors. Individuals visit the facility and view and partake in the exhibits. They may stop for a snack or bring a picnic lunch. They may also purchase items at the center shop. Groups do the same things but require an assembly area and are involved in activities or lectures which are arranged with the staff in advance.

The movement of people and objects through the facility are a significant aspect of programming. The following three flow diagrams show the movement of visitors, staff and objects through the space center.
visitor flow
staff flow
object flows
The kinds of spaces needed are expressed in a space diagram. The major space concept is separation of staff and public areas. See next page.

The Alabama Space and Rocket Center provides many exhibit ideas. Jon L. Allen describes the following in his book *Aviation and Space Museums of America*.

- a central area containing full size space hardware such as Mercury and Apollo spacecraft
- a moon rock display
- a satellite tracking station receives and displays weather information directly from space
- space suits and astronaut equipment
- a Future In Space section with models of the shuttle, space stations, Mars lander
- educational exhibits: solar system model, a planetarium
- hands on exhibits
  - remote control rocket engines
  - a heart monitoring system which lets visitors check their own heart rates
  - a lunar module landing simulator
  - a gyro chair in a simulated spacecraft
  - an air chair which rides on a cushion of air
  - a zero gravity simulator
NOW THAT YOU THREE HAVE HAD YOUR LITTLE JOKE, WHERE DID YOU HIDE THE ORBITING TELESCOPE???
The Needs and Data section is for organizing the facts which bear on the design. These facts were culled from interviews with the client, his staff, and other sources. The section is in four parts. The first part views the facts in terms of users' and objects' needs. The second part organizes the data of the first in terms of space considerations. The third analyzes the relationships between spaces through the use of bubble diagrams. The fourth part presents the site parameters.
1) Organized Groups. Essentially these groups are classes from schools throughout the state. They range from K through 8. The teacher has made reservations for a demonstration or lab. The students are gathered into "classrooms" for these demos. Anywhere from five to ten groups visit the center per day. This occurs from Tuesday through Friday averaging 500 students per day or 2000 for the four days. Each group is comprised from 50 to 100 students but usually number about 50 with 2 to 4 adults: the teacher and chaperones. A major characteristic of these student groups is that the teacher has used the "field trip" as a reward for some performance criteria at school. Hence the visit to the center is perceived by the pupils as a time for fun and games. This leads to problems in group control, lost children and noise. These groups usually arrive in school buses. After the demonstrations these groups move through the center and view the general displays. The staff person operating a display tries to insure that each child gets a chance to participate. At most four groups are in the center at one time.

2) Individuals and Families. Observations of these users indicate they are in small groups of 2 to 6 persons usually being couples with or without children. They arrive by auto and move through the center independently. The highest traffic for individuals occurs Thursday through Sunday. Two thirds of this traffic occurs on the weekend. About 1000 individuals visit per week. During the summer months it rises to 1500.

Both user groups require restrooms, drinking fountains, snack services and resting areas. The organized groups also require an assembly area for such things
as "counting noses" and distributing literature and tickets. A drop off and parking space for school buses is needed. Visitors to the Space Center like to take a memento of their visit with them. The Center should provide a gift shop.

1) Executive Director. The Director provides leadership and vision for the Center. He is the final decision maker in the day to day operation of the Center. He initiates projects, determines policies and coordinates activities among the various departments. He reports to the Board of Trustees and represents the Center at public affairs. He signs the checks: payroll and otherwise. The Executive Director presides over a weekly staff meeting comprised of department heads to discuss and coordinate their activities.

   The Executive Director requires an office equipped with desk, chair, credenza or lay table, book shelves, phone, 2 guest chairs. He should have a conference space with table, seating for ten, audiovisual equipment and coffee service, a coat rack or closet.

2) Secretary to the Director/Office Manager. The Secretary to the Director performs all secretarial duties for the Director: typing, filing, minutes of staff meetings and correspondence. In the role of Office Manager he maintains the membership roster, controls and distributes office supplies and acts as Personnel Director. The Secretary/Manager will soon be assigned a full-time assistant. In addition there are two high school students hired during the summer through a state jobs program.

   The Secretary/Manager needs: A minimum of 8 four-drawer file cabinets, 3 supply cabinets, a desk, typewriter, phone, chair.
- Assistant: Desk, typewriter, chair, phone
- 2 Students: One eight foot work table, 2 chairs
- Waiting space for visitors to Director: Seating for four with coat rack.

3a) Assistant Director/Education Director. The Assistant Director substitutes for the Director when he is gone. However his major duties are as Education Director. He develops along with his staff the special demonstrations and classes offered to student groups. He also coordinates the exhibits in the main area to relate with the demonstrations. His education staff consists of the Reservationist, the part-time Teachers, and his full-time Assistant. His exhibit team consists of the Exhibit Designer, Carpenter, Electronic Specialist and volunteers.

The Assistant Director requires a desk, chair, lay table, book shelf, phone, 2 file cabinets, 2 chairs. The Education Assistant needs a desk, chair, typewriter, phone.

3b) Reservationist. The Reservationist is in charge of booking classes and school groups, reports to the Education Director, determines weekly schedule of events and maintains the inter-office mail drop.

The Reservationist requires a desk, chair, typewriter, phone, 2 file cabinets, pigeon hole mail drop (36 boxes), 3'x5' bulletin/calendar where all can see.

3c) Part-Time Teachers perform the demonstrations.

The part-time Teachers require 2 "classrooms" each with 16'x3' table surface area, seating for 75, 1 sink, a raised stage area, audiovisual equipment and storage, projectors and sound system and materials storage space.
3d) **Exhibit Designer.** The Exhibit Designer plans and directs construction of exhibits for the main areas. He works with the Education Director determining the type and level of complexity of each exhibit. Any items received for display are set up under his direction. He works with (and a lot of times against) the Art Director deciding the proper graphics and signage for the various exhibits. His staff is comprised of a carpenter, a technician, and two helpers.

The Exhibit Designer requires a drawing table, a stool, phone, a lay table, a flat file, some tack space 5'x5' minimum, and a shelf for reference books.

The carpenter requires three drill presses, a 4'x30' timber storage area, two band saws, two table saws, a minimum of four hundred square foot spray paint area and fifty lineal feet of work bench.

The electronics technician requires one 3'x3' work bench, a stool, one "in" file shelf, one "out" file shelf, a shelf over the workbench for test equipment: meters, scopes, etc., and parts storage bins under the bench.

The volunteer helpers requirements are listed under "volunteer coordinator."

Also required above is storage for brooms, brushes, pails, vacuums, scaffolds and ladders, slop sinks at various needed locations and exhibit storage space.

4) **Planetarium Director.** The Planetarium Director orchestrates the planetarium shows. He composes shows with lights, music, voice, and photographic techniques. His two assistants aid in all these areas and provide ushering and crowd control in the dome. He operates the observatory and holds night programs for small groups at the telescope.
The Planetarium Director needs a desk, a chair, a book shelf, an 'omnimay' space theater system, a small observatory capable of supporting a 24" telescope, a small canopy dome for classes about 20' in diameter and storage for a portable star projector.

The Assistants require a 3'x5' slide sorter/light table, storage for slides, a small photo lab including a sink, chemical storage, an enlarger, a cutter and paper storage, and a film dryer, a recording studio comprised of a soundproof enclosure for voice recordings capable of seating 2 people and an electronics room with 2 turntables, hardware rack, an equalizer board, record and tape storage and seating for two people. A record and tape long term storage space, a work area for maintenance and construction of projectors, special effects, lenses etc. One hundred lineal feet of shelf storage, 40 lineal feet of work-bench.

5a) Business Manager. The Business Manager oversees the day to day business operations of the Center. He reports to the Director and handles admission fees, shipping and receiving, gift shop sales and orders supplies and materials. He's also in charge of maintenance and security.

The Business Manager requires a desk, a chair, a phone, a credenza or lay table and two guest chairs.

5b) Two Full-Time Sales People operate the gift shop. They maintain the shop, keep inventory, sell materials and memberships. Sales average 300-400 items/day. Including post cards, books, trinkets, posters, t-shirts, etc.
The sales people require a desk, a work table, a phone, six display cases about 3'x6', a cash register, some bag storage, 2 sets 4' inventory storage shelves and a receiving area.

5c) Security. Two security people work the Center one at the front entry screens and directs visitors. The other walks through the building checking all exits and monitoring the visitors.

Security requires walkie talkies, a phone, and a security station with ticket box and shelves for checklists.

5d) Maintenance. Two maintenance persons wash floors, supply toilet rooms, clean offices, maintain the grounds and do spot repairs on mechanical devices.

The maintenance personnel require a desk and phone, shelf storage for supplies, vacuums, scrubbers, tools, a storage space for a 4 level scaffold shared with the exhibit department. At critical points throughout the facility should be janitors closets with slop sink and a shelf.

6a) Bookkeeper. The Bookkeeper provides a service to all other departments. He ideally works along with the Business Manager. He handles all requisitions, invoices, statements, the payroll and all bills. The Bookkeeper is responsible for all cash on hand distributing petty cash as needed. He maintains all records and reports of interest to insurance companies, the Internal Revenue and other agencies. Future plans call for computerization of many aspects of the Bookkeepers functions.
The Bookkeeper needs a secure area which can be locked since he handles cash. He needs a small safe, a desk, a chair, eight 4-drawer file cabinets, a calculator, two adding machines and a phone.

6b) Bookkeeping Assistant/Programmer. This person assists the Bookkeeper and operates all computing devices.

The Assistant/Programmer requires a desk, a chair, a phone, a blackboard, a work table, four file cabinets (4-drawer), and most importantly, a computer terminal or a microcomputer.

7) Art Director. The Art Director and staff provide "Art" services for the entire Center. These include design, advice on art purchases and supplies. Their work is mainly museum and exhibit graphics, publications, handouts and the monthly newsletter. The art work on exhibits are graphical explanations and informational diagrams. The art department's staff is comprised of the Director and 3 full time plus one part time artists. Art services also include coordination with the exhibit designer, painting signage, printing, photography, silkscreening and publications layout.

Equipment required by the art department staff includes eight drawing tables, which is two for each full time artist since work is done on several projects simultaneously, four lay tables, two large sinks for silkscreening, a desk with a phone, a large cutting surface, storage for work and paper, drying racks for silkscreens, a photo lab, a press type storage file, a camera processor such as
the "Visua Graphics Co. CPS316" which occupies a 4'x6' space, a photo file, lockers, and a small print shop with an A. B. Dick type mineo and a collator.

8a) Volunteer Coordinator. The Volunteer Coordinator recruits, trains and supervises volunteers for the Center. He also chairs fund raisers such as the Used Book Fair, the Science Fair and parties for the volunteer organization: "Omnipeople." The coordinator has one assistant.

The Volunteer Coordinator requires a desk, a chair, a typewriter, a work table and a scheduling board. The assistant needs a desk, a chair, a phone, typewriter and a work table.

8b) Volunteers. The volunteers are typical (perhaps better than typical?) citizens who offer their time and skills to the Center. They matriculate an orientation class and then receive on the job training working in the planetarium, the education program, assisting the lab demonstrations and operating some exhibits. Other volunteers come to the Center and work in groups to make items for the gift shop or help in mailing the newsletter. They are a motley group ranging from little old ladies quilting blankets to about forty teenagers who act as guides for special events. During the summer a special program has twelve teenagers working each day. Attendance at regular meetings is 15 to 20. Periodically a general meeting is held with about 100 "Omnipeople."

The volunteers set their own hours and therefore are arriving and leaving throughout the day. The volunteers are a precious asset and should be provided with some amenities for comfort.
The volunteers should have locker facilities for changing into uniform, a lounge area seating 30 people, a workroom with tables and seating for 20 which can double as a meeting room, a storage cabinet for glassware and equipment used for teas and parties, a small lending library for background information when operating a lab or exhibit. A general information bulletin board and a place for large functions of about one hundred people and a public phone. The volunteers should have easy access to the coordinator.

9) Exhibit spaces recommended by the staff at the Alabama Space and Rocket Center.

9a) General Space. A general exhibit space is required to display acquisitions such as capsules, aircraft, satellite and mock ups.

The general space should be about twelve thousand square feet in area with an industrial rated floor, special access for moving in exhibits, an open plan, a grid system of electrical outlets in the floor and portable lighting systems.

9b) Controlled Space. This area is used for displays and models which simulate space environments and activities such as a solar system model, space stations and walks on the moon.

The controlled space should be about six thousand square feet in area, have easy access for equipment and construction, should be windowless or light tight and have a system of partitions for maximum background control.
10) The permanent exhibits are a "Zero Gravity Simulator" and a "Lunar Oddysey." Again, these items were recommended by the staff at the Alabama Space and Rocket Center.

The Zero Gravity Simulator requires sufficient clearance for the counter balances electrical power to work the weights control and sufficient footings for anchorage.

The Lunar Oddysey is a small planetarium which simulates a trip to the moon. The entire planetarium spins, simulating 2G acceleration through centrifugal force. It requires electrical power and an industrial rated floor slab.
"Yeah, boss, our cable stringing is way ahead of schedule since Pete brought his kid's bow and arrow up on the Shuttle."

Drawn especially for NSI by David Hills, Winston-Salem, North Carolina, © 1978
space: SNACK BAR
quantity: 1
area: 720 SQ. FT.
requirements: FIXED SEATING FOR 50, TRASH RECEPTORS, SALAD BAR, SERVING COUNTER
space

Food Preparation

quantity

1

area

500 SQ. FT.

requirements

PLUMBING, VENTILATED, ACCESS TO SHIPPING AND RECEIVING, DUMPSTER, COLD STORAGE
<table>
<thead>
<tr>
<th>space</th>
<th>FOOD STAFF LOCKER ROOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>quantity</td>
<td>2</td>
</tr>
<tr>
<td>area</td>
<td>150 SQ. FT</td>
</tr>
<tr>
<td>requirements</td>
<td>STORAGE FOR CLOTHING, LAVATORIES AND TOILETS, A BENCH</td>
</tr>
</tbody>
</table>
space

quantity

area

requirements

ASSEMBLY AREA

4

625 SQ. FT.

A DESIGNATED AREA NEAR THE ENTRANCE, SEATING FOR 25 PEOPLE
space: DIRECTOR'S OFFICE

quantity: 1

area: 150 SQ. FT.

requirements: DESK, CHAIR, CREDENZA, BOOK SHELF, 2 GUEST CHAIRS, PHONE
space  
CONFERENCE SPACE

quantity  
1

area  
150 SQ. FT.

requirements  
TABLE, SEATING FOR 10, AUDIOVISUAL CABINET, COAT RACK
SECRETARY TO DIRECTOR

1

200 SQ. FT.

DESK, TYPEWRITER, 8 FOUR DRAWER FILE CABINETS, 3 SUPPLY CABINETS, PHONE, COAT RACK, SEATING FOR FOUR
space

quantity

area

requirements

ASSISTANT'S WORK AREA

1

150 SQ. FT.

DESK, CHAIR, TYPEWRITER, PHONE, WORK TABLE, 2 SIDE CHAIRS
space
quantity
area
requirements

ASSISTANT DIRECTOR'S OFFICE

1

150 SQ. FT.

DESK, CHAIR, LAY TABLE, BOOKSHELF, PHONE, 2 FILE CABINETS, 2 CHAIRS
space
quantity
area
requirements

EDUCATION ASSISTANT
1
100 SQ. FT.

DESK, CHAIR, TYPEWRITER, PHONE
RESERVATIONIST

1

150 SQ. FT.

DESK, CHAIR, TYPEWRITER, PHONE, 2 FILE CABINETS, MAIL DROP - 36 BOXES, BULLETIN
space
quantity
area
requirements

CLASSROOM
2
1200 SQ. FT.
2 8 FOOT TABLES, 75 CHAIRS FOR AUDIENCE, AUDIOVISUAL EQUIPMENT
space

quantity

area

requirements

EQUIPMENT STORAGE

1

150 SQ. FT.

SHELVES, 2 LOCKING CABINETS, ROOM MUST BE LOCABLE, HAVE ACCESS TO BOTH CLASSROOMS
space
quantity
area
requirements

EXHIBIT DESIGNER'S STUDIO
1
200 SQ. FT.
DRAWING TABLE, STOOL, PHONE, LAY TABLE, FLAT FILE, TACK SPACE, REFERENCE SHELF
space
quantity
area
requirements

WORKSHOP

1

1000 SQ. FT.

3 DRILL PRESSES 2'x3' USER SPACE
4'x30' TIMBER STORAGE RACK
2 BAND SAWS 2'x3' USER SPACE
2 TABLE SAWS 4'x8'
VENTILATION, ACCESS TO SHIPPING AND RECEIVING, ELECTRICAL,
25 FOOT MINIMUM CLEARANCE, PLUMBED
SPRAY AREA

1

400 SQ. FT.

VENTILATION, PLUMBED AND DRAINED, SAME AS WORKSHOP
space  ELECTRONICS SHOP
quantity  1
area  150 SQ. FT.
requirements  WORK BENCH, IN-OUT SHELVES, PARTS STORAGE, TEST EQUIPMENT SHELVES
space: EXHIBIT STORAGE
quantity: 1
area: 1000 SQ. FT.
requirements: MINIMUM 30' CLEARANCE, ACCESS TO SHIPPING AND RECEIVING AND MAIN EXHIBIT SPACES
space
quantity
area
requirements

EXHIBIT MAINTENANCE

1

150 SQ. FT.

STORE ROOM FOR BROOMS, BUCKETS, BRUSHES, SUPPLIES, SCAFFOLDING, SLOPSINK
<table>
<thead>
<tr>
<th>Space</th>
<th>PLANETARIUM DIRECTOR'S OFFICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>1</td>
</tr>
<tr>
<td>Area</td>
<td>150 SQ. FT.</td>
</tr>
<tr>
<td>Requirements</td>
<td>DESK, CHAIR, BOOKSHELF, PHONE, WORK TABLE</td>
</tr>
</tbody>
</table>
SPACE THEATER

1

8100 SQ. FT.

SEE DIAGRAM NEXT PAGE, OMNIMAX PROJECTION SYSTEM, SEATING FOR 300, VENTILATION
OMNIMAX THEATRE

1. Rolling Loop Projector
2. 180° Fish-Eye Lens
3. Film Reel Unit
4. Control Console
5. Air Compressor
6. Lamp Power Supply (Rectifier)
7. Electrical Control Cabinet
8. Lamphouse Coolant Unit
9. Projector Elevator
10. Umbilical Connections to Projector: power, coolant, air & exhaust
11. Sound Reproducer: 35mm, tape player
12. Loudspeaker Units
13. Dome Projection Screen
14. Projector Enclosure
15. Entry
16. Exit
<table>
<thead>
<tr>
<th>space</th>
<th>SLIDE ROOM</th>
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<tr>
<td>area</td>
<td>100 SQ. FT.</td>
</tr>
<tr>
<td>requirements</td>
<td>3'x5' SLIDE SORTER, CHAIR, SLIDE FILES</td>
</tr>
<tr>
<td>space</td>
<td>DARK ROOM</td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
</tr>
<tr>
<td>quantity</td>
<td>1</td>
</tr>
<tr>
<td>area</td>
<td>100 SQ. FT.</td>
</tr>
<tr>
<td>requirements</td>
<td>TYPICAL LAB WITH WET AND DRY SIDES, ENLARGER, PAPER STORAGE, LIGHTS, ROOM MUST BE LIGHT TIGHT, CONTROLLED ENTRY, SINK, CHEMICAL STORAGE, VENTILATION</td>
</tr>
<tr>
<td>space</td>
<td>SOUND STUDIO</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>quantity</td>
<td>1</td>
</tr>
<tr>
<td>area</td>
<td>100 SQ. FT.</td>
</tr>
<tr>
<td>requirements</td>
<td>SOUNDPROOF, SEATING FOR 2</td>
</tr>
<tr>
<td>space</td>
<td>ENGINEER'S BOOTH</td>
</tr>
<tr>
<td>------------</td>
<td>------------------</td>
</tr>
<tr>
<td>quantity</td>
<td>1</td>
</tr>
<tr>
<td>area</td>
<td>100 SQ. FT.</td>
</tr>
<tr>
<td>requirements</td>
<td>WINDOW TO SOUND STUDIO, 2 TURNTABLES, RACK FOR HI FI GEAR, EQUALIZER BOARD, SEATING FOR 2</td>
</tr>
<tr>
<td>space</td>
<td>STORAGE ROOM</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>quantity</td>
<td>1</td>
</tr>
<tr>
<td>area</td>
<td>100 SQ. FT.</td>
</tr>
<tr>
<td>requirements</td>
<td>RECORD RACKS, TAPE RACKS</td>
</tr>
<tr>
<td>space</td>
<td>WORK AREA</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>quantity</td>
<td>1</td>
</tr>
<tr>
<td>area</td>
<td>500 SQ. FT.</td>
</tr>
<tr>
<td>requirements</td>
<td>100 LINEAL FEET OF 2 1/2' SHELF SPACE 40' WORK COUNTERS WITH STORAGE BENEATH</td>
</tr>
</tbody>
</table>
space  BUSINESS MANAGER'S OFFICE

quantity  1

area  150 SQ. FT.

requirements  DESK, CHAIR, PHONE, LAY TABLE, 2 GUEST CHAIRS
space: GIFT SHOP

quantity: 1

area: 400 SQ. FT.

requirements: DESK, CHAIR, WORK TABLE, PHONE, SIX 3'x6' DISPLAY CASES, CASH REGISTER/CHECKOUT 3'x6', BAG STORAGE, SMALL STOCK AREA FOR OPENING PACKAGES
space

quantity

area

requirements

SECURITY STATION

1

150 SQ. FT.

COUNTER OVERLOOKING ENTRY, PHONE, SHELVES, TICKET STORAGE, TABLE, 4 CHAIRS
<table>
<thead>
<tr>
<th>space</th>
<th>MAINTENANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>quantity</td>
<td>1</td>
</tr>
<tr>
<td>area</td>
<td>300 SQ. FT.</td>
</tr>
<tr>
<td>requirements</td>
<td>DESK, PHONE, 2 CHAIRS, TOOL AND SUPPLY SHELVES, PROVIDE JANITORS CLOSETS 3'x5' AS NEEDED</td>
</tr>
</tbody>
</table>
space  

quantity  

area  

requirements

BOOKKEEPER'S OFFICE

1

150 SQ. FT.

DESK, TABLE, CHAIR, 8 FOUR DRAWER FILE CABINETS, CALCULATOR, ADDING MACHINES, PHONE, SMALL SAFE - MUST BE SECURE AND LOCKABLE
space

quantity 1

area 150 SQ. FT.

requirements TERMINAL OR MICRO-COMPUTER, ELECTRICAL, 4 FILE CABINETS, WORK TABLE, PHONE, 2 CHAIRS, CHALKBOARD
space

ART STUDIO

quantity

1

area

1000 SQ. FT.

requirements

8 FIVE FOOT DRAWING TABLES, 4 SIX FOOT LAY TABLES, 2 LARGE SINKS 2' x 3' BASINS
space
quantity
area
requirements

PHOTO LAB
1
200 SQ. FT.

DARKROOM 100 SQ. FT. (SEE PLANETARIUM DARKROOM) WORKROOM WITH CAMERA PROCESSOR, 5 LOCKERS, TABLE
space

quantity

area

requirements

PRINT SHOP

1

150 SQ. FT.

A. B. DICK PRINTER, COLLATOR, SHELVES FOR JOBS
space

quantity

area

requirements

DRYING AREA

1

150 SQ. FT.

DUST FREE, VENTILATED, SILKSCREEN DRYING RACK
Volunteer Coordinator's Office

Quantity: 1

Area: 150 sq. ft.

Requirements: Desk, chair, phone, typewriter, work table, scheduling board
<table>
<thead>
<tr>
<th>space</th>
<th>ASSISTANT'S OFFICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>quantity</td>
<td>1</td>
</tr>
<tr>
<td>area</td>
<td>150 SQ. FT.</td>
</tr>
<tr>
<td>requirements</td>
<td>DESK, CHAIR, PHONE, TYPEWRITER, 4 FILE CABINETS</td>
</tr>
</tbody>
</table>
VOLUNTEER'S LOCKER ROOM

quantity
2

area
150 SQ. FT.

requirements
20 LOCKERS, BENCH
space | VOLUNTEER'S LOUNGE
---|---
quantity | 1
area | 300 SQ. FT.
requirements | SEATING FOR 30, TABLES, COFFEE SERVICE, TACK SPACE
<table>
<thead>
<tr>
<th>space</th>
<th>VOLUNTEER WORKROOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>quantity</td>
<td>1</td>
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<tr>
<td>area</td>
<td>350 SQ. FT.</td>
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<tr>
<td>requirements</td>
<td>SEATING FOR 20, LARGE WORK TABLES 3'x8', STORAGE</td>
</tr>
</tbody>
</table>
space

quantity 1

area 1600 SQ. FT.

requirements SEATING FOR 100, CHAIR STORAGE, PODIUM, AUDIOVISUALS

SPECIAL FUNCTION ROOM
<table>
<thead>
<tr>
<th>Space</th>
<th>Quantity</th>
<th>Area</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library</td>
<td>1</td>
<td>150 SQ. FT.</td>
<td>DESK, CHAIR, TABLE, 4 CHAIRS, BOOK SHELVES</td>
</tr>
</tbody>
</table>
space

quantity  1

area  12,000 SQ. FT.

requirements  INDUSTRIAL RATED FLOOR, 30'x30' ACCESS DOOR, ELECTRICAL FLOOR GRID, PROVISIONS FOR LIGHTING
space

quantity

area

requirements

CONTROLLED SPACE

1

6,000 SQ. FT.

LIGHT TIGHT, PARTITION SYSTEM, EASE OF ACCESS
space

quantity

area

requirements

ZERO-G

1

2400 SQ. FT.

FIVE DOUBLE TEETER UNITS 70' x 30' MINIMUM
30' x 10' LOADING ZONE, 45' MINIMUM CLEARANCE
<table>
<thead>
<tr>
<th>space</th>
<th>LUNAR ODDYSEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>quantity</td>
<td>1</td>
</tr>
<tr>
<td>area</td>
<td>950 SQ. FT.</td>
</tr>
<tr>
<td>requirements</td>
<td>30' DIAMETER 25' MINIMUM CLEARANCE</td>
</tr>
<tr>
<td></td>
<td>200 SQ. FT. LOADING ZONE, LIGHT TIGHT</td>
</tr>
</tbody>
</table>
space

quantity

area

requirements

PUBLIC RESTROOM

2

500 SQ. FT.
space

quantity

area

requirements

OFFICE RESTROOM

2

250 SQ. FT.
<table>
<thead>
<tr>
<th>Space</th>
<th>Mechanical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
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</tr>
<tr>
<td>Area</td>
<td>1000 SQ. FT.</td>
</tr>
<tr>
<td>Requirements</td>
<td>SYSTEM TO BE DETERMINED</td>
</tr>
</tbody>
</table>
space

quantity

area

requirements

ELECTRICAL

1

200 SQ. FT.
SHIPPING AND RECEIVING (INDOOR)

Quantity: 1

Area: 600 SQ. FT.

Requirements: MINIMUM 25' CLEARANCE
<table>
<thead>
<tr>
<th>Space</th>
<th>1uantity</th>
<th>3900 SQ. FT.</th>
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</thead>
<tbody>
<tr>
<td>area requirements</td>
<td></td>
<td>APRON FOR TWO TRUCKS 55'x24' BAY 50' TURNING RADIUS AREA</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
<td></td>
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<td>-----------------------</td>
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<tr>
<td>Quantity</td>
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<tr>
<td>Area</td>
<td>13,000 SQ. FT.</td>
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<tr>
<td>Parking, Staff</td>
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<tr>
<td>space</td>
<td>PARKING, BUS</td>
<td></td>
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<td>------------------------</td>
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<td></td>
</tr>
<tr>
<td>quantity</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>area</td>
<td>9500 SQ. FT.</td>
<td></td>
</tr>
<tr>
<td>requirements</td>
<td>5 BUSES AT 1900 SQ. FT.  FREE ACCESS SYSTEM</td>
<td></td>
</tr>
</tbody>
</table>
space

TOTAL NET AREA

quantity

area

50,070 SQ. FT.

requirements
space

quantity

area

requirements

TOTAL GROSS AREA

60,084 SQ. FT.

ALLOWING 20% CIRCULATION AND MATERIALS
bubble diagrams

ASSEMBLY
- assembly
- gift
- snack
- m
- f
- public
- to exhibit

EDUCATION
- class 1
- class 2
- to shop
- to exhibit
- education assistant
- education director
- storage
- reservationist

ADMINISTRATION
- business manager
- director
- bookkeeper
- conference
- computer
- assistant
- secretary

ART
- art studio
- photo lab
- print shop
- drying room
The site is located at 50th Street and Eastern Avenue in Oklahoma City. The following information about the site is graphically presented in the appendix.

Ownership: Public

Land Use: Currently a public part

Zoning: Currently zoned "R-1 Type A" OKC Zoning Office requires a rezoning to "R-1 Type D" Section 25-92(d) of code allows "institution of religious, education, or philanthropic nature." A visit to the OKC zoning office revealed that rezoning is "no problem" due to precedent of Omniplex to the north and the zoo to the east.

Surrounding Environmental Quality:
Unsightly development along Eastern Avenue to the west. Eastward is a semi-natural or wild condition with vegetation and rolling hills: the zoo.

Utilities: Water, electric, gas and hydrants along 50th and Eastern.

Traffic Circulation:
Primary source: Eastern Avenue, secondary source: Grand Blvd.

Soil Survey: Soil type is Noble Fine Sand Loam IVe-5. Excellent for institutional service.

Future Planned Uses:
Paragraph e page 50 northeast development study: rezone to "R-1 Type D" for cultural, educational and recreational use. The proposed Space Center is compatible with this plan.
Proposed Public Construction Directly Affecting the Site:

From Northeast Development Study: "An automated transportation system should be developed to loop around the expansion area of the zoo and connect all major public facilities in the area." "50th should be upgraded to Boulevard standards from I-35 to Grand Boulevard." From Client: City has informed by client that 50th from Eastern to Grand Boulevard shall be closed to through traffic.

A site plan and climatological data follow immediately.
### Sun Position (Degrees)

<table>
<thead>
<tr>
<th>21st</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tbody>
<tr>
<td>Sun-</td>
<td>64.5</td>
<td>76</td>
<td>90</td>
<td>104</td>
<td>115</td>
<td>119</td>
<td>115</td>
<td>104</td>
<td>90</td>
<td>76</td>
<td>64.5</td>
<td>60</td>
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<tr>
<td>Rise</td>
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<td>80</td>
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</tbody>
</table>

### Relative to South Wall

- **Plan**: Orientation and position of the structure relative to the south wall.
- **South**: Indication of the south direction.
- **Elevation**: Measurement of the angle or elevation of the sun's position relative to the south wall.
This section is arranged in a two column system. The left column indicates desired goals. A few of these are "Motherhood" goals to stimulate design concepts.

The others are programmatic goals which have corresponding concepts in the right column. The concepts suggest methods of achieving their respective goals.
The goal of the project is to raise the public's consciousness of the immediacy of space activities and to stimulate the pursuit of space-related careers.

The facility should allow for organized activities for groups which do not interfere with others' individual activities.

The facility should provide for administrative privacy.

Separate group activities from the general visitor activities.

Separate administrative from public areas.
- The facility should be a fun place to visit.
- The facility should sustain employee interaction, a goal of the matrix style organization.
- The facility should invite "hands on" participation of the visitors.
- The facility should be secure against theft and vandalism without infringing the "hands on" function of visitors.

- Integrate Administrative Areas
- Provide limited access and barriers and observation provide disposable exhibits.
The facility should protect all cash on hand.

The facility should provide for a multiple of experimental sequences according to visitor tastes.

The Bookkeeper's Area and the Gift Shop are limited access zones and closeable.

Exhibit areas have open plans, multiple routes, short cuts.
The facility should ease the flows of visitors and incoming or outgoing exhibits, materials and supplies.

The facility should permit easy change of exhibits.

The facility should minimize staff travel and waiting time due to distance and bottlenecks.

Separate the flows with temporary enclosures and separate entries.

Provide "elbow" room, easy access, adjacency to storage and work areas.

Provide direct communication and travel provide adjacencies where required.
The facility shall meet transportation requirements:

- The Center should be a "part" of the cultural complex area.
- The facility should not overpower the residential area across Eastern Avenue.
- The facility should indicate the Western edge of the cultural complex without being a barrier.

Shared parking with omniplex separate staff parking potential station for people mover when and if it is built. Separate pedestrian for vehicle traffic.

- The facility shall be a transition node to the cultural complex.
- The facility is a terminus of the cultural complex.
The facility should be striking without intimidating or alienating the visitor.

The facility should provide for the personal and "perceptive" safety of the visitor.

The facility should aid visitor orientation.

*Economy

The facility should sustain with minimum expense a variety of exhibits, gizmos and displays.

The facility is provided with image-ability indicating nodes, edges, zones, landmarks and paths.

Exhibit areas provided with variable volumes, light and power natural and artificial.
The exhibit space should keep pace with the technological changes and resulting social changes occurring within and because of space activities.

- Provide disposable and recyclable exhibits and displays.

- Provide for expansion and modification.
Above: Veteran Collier's illustrator Fred Freeman produced this exciting cut-away of von Braun's space station. The 250-foot diameter space station was designed for a crew of 80 in orbit 250 miles above the Earth. (Illustration appeared March 22, 1952.)
The final step of programming is to state the problem. The problem statements express the essence, the obvious, and the uniqueness of the project. It is the first step in design.
Since visitors to the Space Center are anticipated to be visiting the omniplex as well, the Center should provide an activity connection to the omniplex.

Since the Space Center will be used by groups and individuals simultaneously it should service both without conflict.

Since both buses and cars will be used by the visitors the Center should accommodate them without conflict and disruption of offsite traffic flow.

Since some exhibits will be actual spacecraft the Center should accommodate delivery and set-up of heavy and large pieces without disrupting visitor use and offsite traffic flows.

Since space activities are exciting the Center should be dynamic in form.

Since the Center's purpose is to educate the public about the immediacy of space activities its form should emphasize the man in spaceman.

Since the site is at the west edge of the nearly "invisible" cultural center along a busy traffic route the Center's form should indicate the cultural center's existence to passersby.

Since space activities are developing and growing at an accelerating pace the Space Center should adapt to that change through time.

Since the zoo study proposes a people mover system connecting all cultural facilities the center should potentially accommodate a connection.
bibliography

Basic Museum Management edited by George Macbeath and S. James Gooding
Canadian Museums Association, Ottawa Ontario, 1969
A primer for museum operation, it gives a good discussion of the principles involved. Chapters on staff, building, purpose, etc.

Museums and Monuments: No. 9 "Organization of Museums Practical Advise"
UNESCO, 1960
A step by step cookbook to museum administration, design, and operation.

Your Future in Museums by William A. Burns MA. Ed.D., Richard Rosen Press,
A detailed account of jobs and careers in museums, source of typical organization chart.

American Association of Museums Publications New Series 1-10
Robinson: "The Behavior of the Museum Visitor" 1928
A landmark study referred to in all the other sources.

Aviation and Space Museums of America by Jon L. Allen, Arco Publishing Co.,
A bibliography with photos and short descriptions.

Recommendations of the Science Center Planning Committee
Science Center Planning Committee, Oklahoma Science and Arts Foundation, August 1976.
A preliminary program for the Omniplex.
Al Bean urinating in Skylab II. Just in front of his knee is the air-flushed fecal containment system, which you back up to. There's no particular "up" in this picture. The surface nearest Al's head was the floor when the spacecraft was launched. Note toilet floating by sink.
The appendix is comprised of photocopies of articles related to the project, Oklahoma City zoning law, excerpts from the 1968 Northeast Oklahoma City Development Study and Zoo Plan, and the preliminary studies for the Alabama Space and Rocket Center.

THE APPENDIX IS UNDER SEPARATE COVER.

THE FOLLOWING IS ESSENTIAL SITE DATA FROM THE APPENDIX.
Figure 1
Figure 2

NORTHEAST DEVELOPMENT STUDY

OWNERSHIP

LEGEND

PUBLIC

NON-SUBDIVISIONAL PARCELS OF LESS THAN TEN ACRES

SITE

SCALE

PREPARED BY THE OKLAHOMA CITY DEPARTMENT OF PLANNING
Figure 4
Figure 5

EXISTING ZONING

LEGEND

SINCE 1966 PRIOR 1966

- SINGLE FAMILY
- MULTI DWELLING
- LOCAL COMMERCIAL
- RESTRICTED COMMERCIAL
- COMMERCIAL
- RESTRICTED LIGHT INDUSTRY
- LIGHT INDUSTRY
- AGRICULTURAL
- PARK LAND
- NONCONFORMING ZONING

AREA BOUNDARIES

STUDY AREA 1966
AREA OF INFLUENCE 1966
NORTHEAST DEVELOPMENT STUDY

SCALE

PREPARED BY THE OKLAHOMA CITY DEPARTMENT OF PLANNING
Figure 8
Figure 9

NORHEAST DEVELOPMENT STUDY

TRAFFIC CIRCULATION

LEGEND

INTERSTATE

LOCAL

SHRINKAGE

VOLUME

1965

1985

0,000

1,000

SCALE

PREPARED BY THE OKLAHOMA CITY DEPARTMENT OF PLANNING
Figure 10

NORTH DEVELOPMENT STUDY
SOIL STUDY

LEGEND
BROKEN ALLUVIAL, W. - I
POST, OAK W. - I
MOUSE FINE SAND, LOAM V. - I
DARK W. - STEPHENSVILLE, V. - I
STEPHENSVILLE COMPLEX, V. - I
ZANE'S LOAM, 4-9% SLOPE, V. - I
ZANE'S LOAM, 9-14% SLOPE, V. - I
ZANE'S LOAM, 14-20% SLOPE, V. - I
VERNON, ZANE'S COMPLEX, 14-20% SLOPE, V. - I

SCALE

PREPARED BY THE OKLAHOMA CITY DEPARTMENT OF PLANNING
a design solution
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1.</td>
<td>Site</td>
</tr>
<tr>
<td>2.</td>
<td>Lower Level Plan</td>
</tr>
<tr>
<td>3.</td>
<td>Upper Level Plan</td>
</tr>
<tr>
<td>4.</td>
<td>Mechanical Diagram/Structural Grid</td>
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<td>5.</td>
<td>Roof Plan</td>
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<tr>
<td>6.</td>
<td>Elevations</td>
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