OFFICIAL DOCUMENT SUMMARY SHEET

FOR PROCESSING OF PROPOSALS TO OFFICE OF SPONSORED PROJECTS

NO OF PROPOSALS TO	
TO AGENCY: Original +	1
TO O.S.P.:	2

P.I.D. NO.: 95-114 (For OSP use only)

SECTION I *(To be completed by the Principal Investigator or originating Department/Office)(SEE REVERSE SIDE).*

PROJECT DETAILS *(Check 1 box in each column)*

- [ ] Grant
- [X] Contract
- [ ] Clinical Test
- [ ] Other Agreement

- [ ] Research Federal
- [ ] Research Non-Federal
- [ ] Instruct Service Federal
- [ ] Instruct Service Non-Federal
- [X] Public Service Federal
- [ ] Public Service Non-Federal
- [ ] Other

- [X] New
- [ ] Renewal
- [ ] Continuation
- [ ] Revised
- [ ] Supplemental

NOTE: Street Address (Bldg., Name/No. &Room No. required when hand delivered):

Name of AGENCY where Proposal is to be submitted:
Utah Science Center Authority
2001 South State Street, Ste. N4200
Salt Lake City, Utah 84190

New title

(1)

ATTENTION: L. Blake & R. Millar
Telephone Number: 468-3516

Deadline Date:
- [ ] Postmark
- [ ] Due at Agency
- [ ] Special Courier

Account no. to be charged for special courier:

TITLE AND NARRATIVE DESCRIPTION *(Indicate how project will aid academic program of University–if necessary, use additional sheet):*

Center for Integrated Science Education (CISE) Prospects for Leonardo on Wheels. Provides partial staff & student support and contribution to an important local community project.

Principal Investigator
- [ ] Will
- [X] Has
- [X] Will not be on extended leave of absence during the project. J. Andrade is CEO of Protein Solutions, Inc.
- [ ] Has no potential conflict of interest with private company or investment group.

Health and/or Safety reviews required (See reverse side): [ ] Yes [X] No Committee/Board Approval

Indirect Cost Waiver requested (See reverse side): [X] Yes [ ] No Waiver Approved: VP for research or designee:

AGENCY FUNDS (fill in dates and amounts):

Dates	Immediate Period	Total Period
	From: 5/1/95 To: 12/30/95	From: To:
Direct Costs	$34,000	$
Indirect Costs	$ --	$
Total Costs	$34,000	$

UNIVERSITY FUNDS

Any box(es) check below? If yes, attach a Cost Sharing Data Sheet
- [ ] Mandatory Cost Sharing/Matching
- [ ] Other type matching or contribution
- [ ] Indirect cost subsidy
- [ ] Cost Sharing shown for proposal review only

DEPARTMENT AND COLLEGE APPPOVALS

We certify that staff, space, equipment, computer time, etc., are available and/or budgeted herein. If not, attach statement of additional requirements. PI will submit the final technical report as required. PI will insure that he/she and those that he/she supervises comply with Policy & Procedures 6.4 regarding patents and inventions.

Originating College: Engineering
Department: Bioengineering
Room Number: 2480 MEB
Building No: 64
Mail Code: 06409
Name of Department Liaison: J. Andrade
Telephone No.: 581-4379
Principal Investigator's Typed Name and Signature: J. Andrade
Telephone No.: 581-4379
Department Chairperson's Signature: R. Normann
Dean's Signature: K.L. DeVries

SECTION II *(To be completed by the Office of Sponsored Projects):*

ADDITIONAL REQUIREMENTS BY THE UNIVERSITY

Items of special or unusual significance (Remodeling, etc.)

PROPOSAL OR APPLICATION REVIEW AND ROUTING

Reviewed by Sponsored Projects	DIRECTOR:	ADMINISTRATOR:	FED FLOW-THRU? NO:	YES:	AGENCY?

Contract or Grant Number:
University Account No.:

Revised 2/1/93

Time and Date Received at OSP

A Contract Proposal

To: **The Utah Science Center Authority**
Attn: R. Millar and L. Blake
Leonardo on Wheels Projects

From: Center for Integrated Science Education (CISE)
University of Utah, 2480 MEB
Salt Lake City, Utah 84112
(801) 581-4141 phone; (801) 585-5361 FAX

J.D. Andrade, Principle Investigator

Subject: CISE Projects for Leonardo on Wheels

Background:

Planning for the Leonardo Project is now at an advanced stage. The committees have made decisions on the thematic content and on specific exhibits and activities. The budget for the Leonardo Project has been approved by the Utah Science Center Authority and a complete budget breakdown was approved as part of that process.

The Center for Integrated Science Education at the University of Utah is playing a critical role in this process by providing University space in its Leonardo Laboratory, 391 Chipeta Way, and providing an extensive number of students as volunteers for projects on specific Leonardo exhibits as part of course work requirements and by providing staff, faculty, and other student services on a volunteer basis.

The project has been taken as far as is practical in the planning process. The Leonardo Time Table (attached) requires that we move forward to the prototyping stage. This requires the commitment of personnel, equipment, supplies, and fabrication expenses. Since most of the people involved in the Center for Integrated Science Education's Leonardo activities are University-based personnel and the work will be done in University-based laboratories, it is efficient and convenient to expend and utilize the funds through University mechanisms.

This proposal accomplishes that goal. It proposes Leonardo Budget categories in which CISE faculty, staff, students, and facilities are involved. Table 1 clearly shows each of these projects, taken directly from the approved Leonardo budget, shows the total funds budgeted and available from that budget, shows those funds and categories which CISE requires to complete the prototyping and exhibit construction activities, and shows the funds remaining in the Leonardo budget in that category for additional activities (see Table).

Rather than submit a proposal in each of the separate eight areas, we have chosen to do it with one generic proposal, but with each of the categories, topics, and deliverables itemized (see Table 1.

Table 2 includes several other components of the approved Leonardo budget, which are also scheduled to be accomplished at the University of Utah. Since the key investigators involved in each of these projects (Herb Clemens, Mathematics and Tracy Petersen, Music) have some concerns, reservations and inexperience with the contract mechanism, and the deliverables concept, it has been suggested that these two areas also be included in the CISE contract. The funds would be maintained in a separate category for the exclusive use of the Sound and Music and Mathematics components, but would be under the fiduciary responsibility of J. Andrade as Co-Director of CISE. Joe would also assume responsibility for seeing to it that the funds were dispersed in accordance with the needs of the Leonardo Project (deliverables listed later in this proposal). If the Authority wished to use this mechanism for the mathematics and music components, then the total budget allocated would be the sum of Tables 1 and 2, for a total of $42,000.

Proposal:

1) **Weather**. The $1,500 requested would be used primarily to acquire a small, used deep freezer system with which to perform the cloud nucleation component of the weather project. Supplies and fabrications costs are for the purpose of completing the remainder of the exhibit. This project is being conducted by Mr. Jason Bagley, a senior in Chemical Engineering who will

graduate in June. Mr. Bagley expects to have the project finished in June. He will work closely with James Biggs and others to complete final assembly, signage, instructions, and assembly prior to June.

This will allow $1,500 remaining in the $3,000 budgeted for the Weather category. It is expected that some of these funds would be used by an East High School group of students and faculty who have volunteered through their science club to work on the weather project under Jason Bagley and Rod Millar's supervision. Those funds are, however, not requested at this time, and a separate proposal would be made for those at a later date.

Deliverable: Freezer, accessories, and signage for a complete cloud nucleation interactive (Earth and Biosphere theme area).

Completion: July 1, 1995.

2) **Health and Performance**. $6,000 was originally budgeted. $6,000 is requested. We have made considerable progress with the help of six Mechanical Engineering students who have taken this project on as their senior design project for Mechanical Engineering. A comprehensive exhibit plan and pre-prototype components are now complete. To complete this exhibit will require two of these students working over part of the summer and will require additional consultant and advisory input. It will require signage and simple, preliminary, teaching exhibits, and some equipment. All of that is budgeted in this proposal, including the fabrication costs required to complete the exhibit. This will include the educational principles of pressure, flow, heart rate, cardiac output, physiologic monitoring, exercise, work, and other topics related to health and human performance.

Deliverable: Health & Performance interactive exhibit (You! - The Visitor theme area).

Completion: September 1, 1995.

3) **Sound and Music.** $6,000 was originally budgeted. $3,000 is requested. The $3,000 remaining will presumably be for faculty in the Department of Music or for local musicians in the

arts community (see Table II). The funds are for and exhibit which will allow the visitor to interact musically with a computer, including a map of sound intensity and frequency. It will include a number of simple, hand made and operated musical instruments, a model of the structure of the ear, and some development of sense of hearing related activities. Some of this will be modeled on the highly successful exhibits available through the Exploratorium in San Francisco, but coupled with modern computer/audio technologies which will lead to an enhanced array of exhibits.

Deliverable: Complete Sound and Music interactive exhibit (You! - The Visitor theme area).

Completion:

Phase I	June 15, 1995
Phase II	July 15, 1995
Phase III	September 15, 1995.

4) Vision, Light, and Art. $6,000 was originally budgeted. $6,000 is requested, of which one third is for equipment. Basically, this is to acquire and use the same computer system as used in Sound and Music. This computer will be time-shared between the two exhibit project areas. Clearly when we go to implementing this in Leonardo we will need to have multiple copies of these computer systems to facilitate the expected visitor through put. Vision, Light, and Art will be coordinated very closely with the Arts component of the exhibits through Kenvin Lyman and Robert Olpin.

Some of these projects will involved copies of the Exploratorium-like standard projects which already exist, such as primary colors, color mixing mechanisms and sense of vision, visual perception, 2-D/3-D perception, connections to Leonardo's painting style and technique, and related areas. There will also be some activities on the sense of vision and optical correction in related areas.

Deliverable: A set of interactive exhibits on vision, light, and art, including a computer-based art and design exhibit.

Completion: October 1, 1995.

5) Leonardo Himself. $5,000 was originally budgeted. $4,000 is requested here. Leonardo Himself refers to the thematic coherence of the entire Leonardo Project, including signage, icons, color schemes, the finishing of all the exhibits and constructions, outer banners, entrance and foyer areas, the so-called Leonardo Plaza, and so on. Obviously this cannot all be done with the $4,000 budget. Most of the funds requested are to be used to establish the style and coherence for the entire project. Each of the exhibit categories under development and construction will be expected to abide by that style and coherence.

In this project, and in several of the other projects, some funds are requested for consultants. These are experts derived from other science centers in the country who will be brought to the area. The expenses will be split with other groups, possibly the Hansen Planetarium, certainly the Center for Integrated Science Education, and possibly others to minimize the cost.

Deliverable: The guidelines, font, script, icons, drawings, sketches for the Leonardo theme and connection.

Completion: Phase I July 15, 1995

Phase II September 15, 1995.

6) Leonardo Lab. Originally budgeted at $7,700, $1,200 has already been expended in establishing the lab and in providing equipment and supplies. The remaining $6,500 is budgeted as shown in Table 1. The majority of this is for personnel and most of that for Mr. James Biggs who is directing the Leonardo Lab and providing the infrastructure for exhibit prototype development and construction. Some equipment and supplies are also requested.

Deliverable: Leonardo lab space and facilities.

Completion: Through September 30, 1995 -- at which activities *may* have to be moved to a more permanent location.

7) Energy, Minerals, and Atoms. $18,000 was originally budgeted -- most of that derived from the Office of Energy Services contract. $3,000 of those funds are requested to develop the atoms and periodic table component of that exhibit. The remaining $15,000 remains to be allocated. The $3,000 used would be dispersed as indicated in Table 1.

Deliverable: A Periodic Table-based element/atom exhibit and activities completion.

Completion: October 1, 1995.

8) The Contest Category. $15,000 was originally budgeted. $750 have been expended for the Layton and Northridge High School winners of the Physics Contest. $4,000 of the remaining funds are requested, as indicated in the footnote to Table 1.

Deliverable:

1) High School force and energy exhibits is not delivered, 2nd payment will not be made.
2) Mechanical Engineering student angular momentum exhibits -- hardware completed -- signage to be made.
3) Mechanical Engineering student health and physical performance -- cardiac/blood exhibit.
4) Science Projects class exhibits, which may include: art restoration, disability experience, and forensics.

Completion:

1) June 10, 1995 for prototype -- September 1, 1995 for final.
2) September 1, 1995 for final.
3) September 1, 1995 for final.
4) October 1, 1995 for final.

Budget:

Table 1. Budget by Project Category

PROJECTS

	Weather	Health & Performance	Sound and Music +	Vision, Light, & Art	Leonardo Himself	Leonardo Lab **	Energy Minerals, Atoms	Contests
Total Funds:	$3,000	$6,000	$6,000	$6,000	$5,000	($7,700) $6,500	$18,000	($15,000) $14,250*
Personnel:	–	$2,500	$1,000	$1,000	$2,000	$4,000	$1,000	–
Consultants:	–	–	$500	$500	$1,000	–	$500	$2,000*
Equipment:	$500	$500	–	$2,000	–	$1,500	$500	–
Supplies:	$500	$1,600	$500	$500	$1,000	$1,000	$500	$2,000*
Travel:	–	$400	–	–	–	–	–	–
Fabrication:	$500	$1,000	$1,000	$2,000	–	–	$500	–
Total:	$1,500	$6,000	$3,000	$6,000	$4,000	$6,500	$3,000	$4,000
Funds Remaining:	$1,500	0	$3,000 +	0	$1,000	0	$15,000	$10,250

Table 1 Total Request: $34,000.

* $750 Awarded to Layton and North Ridge High,
$1,000 For ME Senior Design -- Angular Momentum,
$1,000 For High School Contest -- Physics,
$1,000 Supplies for Science Projects Group,
$1,000 For Mechanical Engineering Senior Design - Health & Performance.

** $1,200 Already Expended for set up.

\+ See Table 2.

Table 2. Additional Budget Components.

Category	Mathematics (H. Clemens)	Music (T. Petersen)
Total Funds:	$5,000	$6,000 +
Personnel:	$ 0	$1,000
Consultants:	$250	$ --
Equipment:	$500	$1,000
Supplies:	$3,750	$1,000
Travel:	$ --	$ --
Fabrication:	$500	$ --
Total:	$5,000	$3,000
Funds Remaining:	$ --	$3,000 +

Table 1 Total Request: $8,000.

\+ See Table 1.