

BACKGROUND

Since its introduction in 1986 **Landmark's University Partnership Program** has grown from four to 20 university partners worldwide (see attachments 1,2,3). Like Landmark, the University Partnership Program is international in scope.

The University Partnership Program contains an important and unique feature lacking in academic programs sponsored by other geoscience workstation companies. While some of these companies do offer academic discounts (not as large as Landmark's) on their software (not on hardware platforms), none of them enter into an active partner relationships with the universities to the same extent as does Landmark. No single company, to my knowledge, has a totally separate program, with a committed resource level comparable to that of Landmark's, entirely devoted to academic relations. Our programs unique quality stems from its recognition that providing active expertise (people) is as important as providing the physical technology. The program is comparable in scope of activity to programs found in much larger companies. In fact, IBM consulted with the Landmark University Partnership Program while developing their two million dollar geoscience project at Colorado School of Mines where the Landmark University Grants Program had placed a grant workstation eight months earlier (Colorado School of Mines-IBM geoscience project, 1989).

Landmark is a technically dynamic organization providing essential geoscience computing products and services to an increasingly technically oriented and constantly changing petroleum E&P industry. Close ties to the academic environment are resources that provide Landmark with a "big picture" understanding of the important large scale issues, directions and technologies that help drive the geoscience industries, petroleum E&P included.

H. Garrett De Young, in the January 21, 1991 issue of Electronic Business (page 57, see attachment 4), lists university research agreements as an important step which any company can take to keep itself more aware of and receptive to changing technology. He also notes that even though in most cases **new products** are not immediately forthcoming, academic contacts can keep the company abreast industry developments and their implications--usually at a far lower cost than if the company maintained the same full time expertise inhouse.

The most significant obstacle to effectively developing valuable university/industry resources is described by Dr. A. G. Jordan in her article on "The Future of the Factory" (see attachment 5). Dr. Jordan contends that despite the risks of university research, it has been enormously successful in bringing potentially valuable technologies to fruition. The real obstacle is the lack of understanding--in both the universities and industry--of the complex process of technology transfer.

Moves to change the University Partnership Program should act to strengthen Landmark's overall ability to recognize, seize and use academic opportunities while creatively addressing some basic university needs.

THE UNIVERSITY PARTNERSHIP PROGRAM

MISSION:

Landmark's University Partnership Program actively seeks opportunities to identify, develop and foster vital academic/industry geoscience partnerships. We provide technology and expertise resources that enable geoscientists and future geoscientists in academic environments to carry out research and gain valuable "hands-on" interactive geoscience computing experience.

GOALS:

PEOPLE

A wide spread infrastructure of technically proficient geoscientists who are creative, qualified and professionally motivated to design, use and choose computer aided geoscience tools in both academic and industry settings.

ATTITUDES

A geoscience industry atmosphere which fosters and supports opportunities for academic/industry geoscience technology partnerships to develop and flourish.

RESOURCES

Techniques for effectively identifying, transferring and utilizing important partnership resources (people, ideas, research and data).

UNIVERSITY PARTNERSHIP PROGRAM SCOPE

The University Partnership Program recognizes the following activities as being within its scope of interest.

- Lay the groundwork for developing an infrastructure of highly qualified and technologically proficient geoscientists by exposing them to state-of-the-art geoscience interactive computing technology.
- Encourage academic investigation and development of prototype geoscience software and/or new interactive interpretation methodologies addressing the existing and future needs of the Petroleum E&P industry.
- Provide commercial outlets and opportunities for new academic geoscience prototype applications.
- Identify academic facilities with resources to provide "external application development" opportunities on a contractual basis.
- Aid universities with geoscience projects that enhance future funding requests and attract highly qualified and motivated students.
- Develop partnerships with, and maintain a company presence in, high profile, high potential academic associations.
- Encourage the academic development and adoption of potential industry "standards" (data file formats, computing environments, user interfaces, etc.).
- Explore significant new technology trends and evaluate their geoscience potential.
- Introduce interactive workstation technology into academic geoscience situations outside of the sphere of petroleum exploration and production (mining, environmental, engineering).
- Provide academic "intelligence gathering" about important issues and trends in the geosciences and in geoscience industries.
- Identify and develop a company awareness of highly qualified university students and researchers expressing interest in industry employment.
- Develop methods for connecting the academic and industry sectors, and encourage an active exchange and distributing of university program results (university networking, online application library, online demos and instruction).
- Build a "network of minds" among those breaking new ground in interactive geoscience applications research.

LANDMARK

• MARKETING

• "SISTER"
COMPANIES

INFORMATION
EXCHANGE

• REGIONS

• R&D

UNIVERSITY PARTNERSHIP

PROGRAM

COMMERCIAL BASED
RESOURCES & EXPERTISE

TECHNOLOGY
TRANSFER

ACADEMIC BASED
RESOURCES & EXPERTISE

PARTNERS

LANDMARK UNIVERSITY

LANDMARK UNIVERSITY PARTNERSHIP PROGRAM



GRANTS

- *"SYSTEM" GRANTS*
- *INDUSTRY DONATION PROGRAM*
(6 systems to date)

DISCOUNT PURCHASES

- *HARDWARE = 25%*
- *SOFTWARE = 50%*
- *UNIVERSITY MAINTENANCE RATES*

SCHOLARSHIPS & INTERNSHIPS

- *\$1000 / SEMESTER SCHOLARSHIPS*
- *LANDMARK INTERNSHIPS*

LANDMARK'S UNIVERSITY PARTNERSHIP PROGRAM

STIMULUS FOR CHANGE

As a company, Landmark has made significant changes over the past year. Company "decentralization" and an "off-the-shelf" hardware philosophy and the addition of technology strengths through the acquisition of "sister companies" were all designed with future directions in mind. The University Partnership Program recognizes these significant corporate strategy directions and will incorporate program changes designed to compliment these directions and goals.

The most immediate and significant change to the University Partnership Program will be in its **UNIVERSITY GRANTS**.

PAST - HARDWARE DEPENDANT

In past grants, Landmark offered "full university grants", consisting of both hardware and application software. The "hardware + software" grant structure was necessary due to the "customized" nature of Landmark's hardware platforms (386's and RT's). As expected, the majority of the costs incurred by the University Partnership Program were hardware related (capital systems expense, shipping, maintenance, etc.). At the University Program's inception, the hardware cost dictated that only three Landmark systems could be provided to universities as "full-grants". Since that time the University Program has been able to expand to six "full-grant" systems. Although this demonstrates Landmark's commitment to addressing the needs of future geoscientists through a strong academic presence, it would be difficult to make a timely and significant Landmark presence in the academic environment. The program would have to rely on discount sales of to develop a substantial academic presence, and as always, universities never seem to have adequate funds to make entire workstation scale commitments (even at a discount).

PRESENT

Landmark currently maintains six active "full-grant" IBM-RT workstation systems at:

The University of Calgary, CREWES Project
Colorado School of Mines
Cornell University
Stanford University
Rice University
Cambridge University

Summaries of projects in progress at these grant university sites maybe found in attachment 6. Attachment 7 includes pending inhouse grant requests and proposals.

EXISTING HARDWARE COMMITMENTS

The attached University Grants Inventory listing (see attachment 8) shows that without the addition of further hardware inclusive grants, all existing university grant hardware will be totally amortized by July of 1992. Attached summaries break out the details of the university grant systems, third party software development systems (supported through the University Grants Program and developing future commercial products) and university software donations (no capital costs). All six current grant systems are IBM-RT based workstations and listings of all grant system configurations are included in attachment 8.

FUTURE - HARDWARE INDEPENDENT

Landmark now offers application software on "off-the-shelf" hardware platforms (Sun and IBM RS 6000). The University Program is moving to adopt a "SOFTWARE-ONLY" grant structure. Landmark would supply its application software for installation on existing compatible hardware platforms in universities. The existing workstation hardware could be owned outright by the university or be obtained through grants from other sources. Terms for software-only grants should be kept flexible, being awarded for specified periods of time, for specified project deliverables, or left open-ended, depending upon need.

The majority of academic research facilities in the U. S. (and probably in the world) already use Sun hardware in some capacity. As hardware costs decrease and as the number of hardware platforms compatible with Landmark application software increases, the number of potential university software-only grant sites will increase. A software-only grant enables Landmark to more easily, and quickly accommodate grant proposals from universities which have, or are willing to develop "hardware commitments" on their own.

PROGRAM OPPORTUNITY

Obviously, software-only grants represent an opportunity for Landmark to support university geosciences at a substantially lower cost. But it also represents a potential for longer term, wide spread benefits for Landmark.

In the long term, this commitment represents the development of an infrastructure of technically proficient and creative geoscientists who are motivated users and designers of computer aided geoscience tools (and who have a preference for Landmark tools). A wider spread network of university based Landmark users provides higher potential for development of ideas and prototypes with product value to Landmark.

The University Program needs to become proficient at identifying and supporting university efforts having high "value added" potential for Landmark. At the other end, we must effectively transfer that "technical value" to the part of Landmark which will utilize it.

- prototype applications development
- future application design ideas
- new application techniques
- university consulting (with Landmark)
- new testing datasets and potential test sites
- specialized teaching and demo personnel
- shortcourse training programs development
- inhouse technical education for Landmark professionals
- articles in professional publications
- presentations and presence at industry trade shows
- marketing public relations opportunities
- university/company relations
- potential future employees

...are just a few of the resource areas available to Landmark through our existing academic connections. Our call should be to effectively identify the needs within Landmark and leverage the appropriate university value-added opportunities.

REGIONAL RESOURCES

"DECENTRALIZATION" -

REGIONAL ACADEMIC/INDUSTRY CONNECTIONS AND CONSIDERATIONS

Academic/industry relationships in foreign countries (our Landmark regions) sometimes function differentially than do the academic/industry relationships here in the states. Landmark recognizes the huge foreign market potential. The academic/industry relationships in these countries may provide an important entry point and establish continuing market opportunities for Landmark.

Jacek Gawron and I have discussed the relationships between foreign universities and national petroleum entities. Many foreign countries encourage and support extremely close academic/industry ties. Universities literally serve as the "initial training grounds" that supply the national petroleum concerns with fully degreed, technically proficient and "industry ready" geoscientists. These governments and companies recognize the importance of establishing and maintaining active academic training environments, both a source of new, highly qualified professional employees and as a center for the continuing educational development of existing industry professionals. In fact, foreign university geoscience departments are generally staffed with faculty members employed by the national petroleum entity. In many cases, it is possible and probable that geoscience students and researchers work under the guidance and tutelage of their potential company managers and supervisors (example: Universidad Nal. Aut. De Mexico - Pemex relationship).

The ability to identify and evaluate these foreign "nationalized" academic/industry environments" and sponsor academic software and training grant programs in appropriate situations accomplishes some important objectives. First, it develops technically capable geoscientists at the university level, builds potentially valuable individual contacts and develops a "technology loyalty" early in the geoscientists professional career. More importantly though, it helps increase the potential that the "geoscience computing tools of choice (workstations)" for an entire country's petroleum industry will be, and remain, Landmark products.

LANDMARK "SISTER" COMPANIES

PCI already has two copies of their software at Colorado School of Mines, Petroleum Engineering Department and one copy at the University of Texas, Petroleum Engineering Department.

The University Partnership Program should work with Landmark's "sister" companies to involve their software in university grants. As evidenced by PCI, these grants gets us access to academic areas outside of geophysics (petroleum engineering).

UNIVERSITY PROGRAM ADVISORS

University Program advisors should represent the following areas:

TECHNICAL / PROGRAM ADVISORS

Roice Nelson (Chairman)
Chuck Edwards (ExploiTech Representative*)
Dennis McMullin (Administrator)
John Mouton
R&D representative(s)

MARKETING

Gaye Denley
Bob Peebler

REGIONS

Jacek Gawron

"SISTER" COMPANY REPRESENTATIVES

Zycor representative(s)
PCI representative(s)
ITA representative(s)
EAI representative(s)
ExploiTech representative(s)*
(Chuck Edwards, above)

1991 LANDMARK UNIVERSITY PARTNERSHIP PROGRAM



GRANTS

- *SOFTWARE ONLY*
- *FLEXIBLE GRANT TERMS*
- *INDUSTRY DONATION PROGRAM*
- *REGIONAL ACADEMIC RESOURCES*

DISCOUNT PURCHASES

- *HARDWARE = 25%*
- *SOFTWARE = 75%*
- *UNIVERSITY MAINTENANCE RATES*

INTERNSHIPS & UNIVERSITY CONSULTING

- *STUDENTS & PROFESSORS*
 - *AT LANDMARK*
 - *AT UNIVERSITIES*
- *RESEARCH PROJECT INTERNSHIPS*
- *ACADEMIC "CONSULTING"*

RECOMMENDATIONS

February, 1991

1. The University Partnership Program should **move immediately to a "software-only" based grant.**
2. Current standing requests for "software only" grants be approved pending training agreements with the appropriate regional general manager. These requests include:

Immediate software grant requests:
 Colorado School of Mines (multiple networked RS 6000) - no training
 University of Calgary, CREWES (standalone installation?) - no training
 University of California, Santa Cruz (standalone) - require training

Potential software grant requests (Second and Third Quarter 1991)
 University of Kansas (standalone) - training? (Dr. Ralph Knapp at the Kansas Survey is a Landmark user and could possibly provide some training)
 University of Houston (multiple networked RS 6000's) - require training
3. Existing IBM-RT based university grant systems should remain active at current university sites.
4. Requests for grant extensions into 1992 from current grant universities (University of Calgary, Colorado School of Mines, Rice University, Cambridge University, Stanford University and Cornell University) should be approved.
5. The University Partnership Program should **"decentralize" its grants program** by encouraging and assisting Landmark regions to develop university grants as strategic marketing, sales and public relations tools and to identify candidate universities where they can build academic resource centers with "region specific" objectives.
6. The University Partnership Program should coordinate with any existing academic efforts at Landmark "sister companies" (Zycor, ITA and PCI) to include their software products as part of the University Program grants, which are perceived as strategically advancing their products commercial identity and interests.

RECOMMENDATIONS

(continued)

February, 1991

7. Investigate the ramifications of lowering the university discount on Landmark software to 75% off book value.

8. The University Advisory Board should reflect company structure and interests. Proposed members and areas should include:

TECHNICAL / PROGRAM ADVISORS

Roice Nelson (Chairman)

Chuck Edwards (ExploiTech Representative*)

Dennis McMullin (Administrator)

John Mouton

R&D representative(s)

MARKETING

Gaye Denley

Bob Peebler

REGIONS

Jacek Gawron

"SISTER" COMPANY REPRESENTATIVES

Zycor representative(s)

PCI representative(s)

ITA representative(s)

EAI representative(s)

ExploiTech representative(s)*

(Chuck Edwards, above)

ATTACHMENTS

- 1.....UNIVERSITY
PARTNERS**
- 2, 3...PROCESS &
ORGANIZATION**
- 4, 5...ARTICLES**
- 6.....UNIVERSITY GRANT
SUMMARIES**
- 7.....GRANT REQUESTS**
- 8.....GRANT INVENTORIES
& CONFIGURATIONS**

ATTACHMENT 1

UNIVERSITY PARTNERS

**LANDMARK UNIVERSITY PARTNERS
UNIVERSITY GRANTS**

UNIVERSITY OF CALGARY -ELASTIC WAVE EXPLORATION SEISMOLOGY
CREWES PROJECT
Dr. Rob Stewart

CAMBRIDGE UNIVERSITY -DEEP REFLECTION GEOPHYSICS
BIRPS, BALLARD LABS INTERPRETATION AND PROCESSING
Prof. Richard Hobbs

BRITISH ANTARTIC SURVEY -3D INTERPRETATION, POLAR ICE
CAMBRIDGE UNIVERSITY STUDIES
Prof. Bob Larter

COLORADO SCHOOL OF MINES -GEOLOGIC DATABASE AND OPTICAL
TECHNOLOGY RESEARCH

Dr. Phil Romig

RICE UNIVERSITY -ODP SITE EVALUATION,
SEQUENCE STRATIGRAPHY

Dr. Andre Droxler, Dr. Peter Vail

CORNELL UNIVERSITY -FLUID FLOW MODELING,
DEPT OF GEOPHYSICS GLOBAL BASINS RESEARCH NETWORK,
DEEP REFLECTION GEOPHYSICS

Dr. Larry Cathles

CORNELL UNIVERSITY
DEPT OF AGRICULTURE AND -SHALLOW PENETRATING RADAR,
BIOTECHNICAL ENGINEERING ENVIRONMENTAL IMPACT STUDIES
Prof. T.S. Steenhuis

STANFORD UNIVERSITY -ROCK PHYSICS, DATABASE RESEARCH

Pierre Samec

UNIVERSITY OF SOUTHWESTERN LOUISIANA -
CENTER FOR ADVANCED COMPUTER STUDIES
EXECUTIVE SYSTEMS INC. - HYPERMEDIA SYSTEMS
DENNIS MOREAU, WAYNE DOMINICK, GEOLOGIC ATLAS PROJECT
LAYAFETTE, LOUISIANA

**LANDMARK UNIVERSITY PARTNERS
DISCOUNT PURCHASES**

CURTIN UNIVERSITY -SEISMIC ATTRIBUTES
OF TECHNOLOGY
PERTH, AUSTRALIA
Dr. Brian Evans

IMPERIAL COLLEGE -CROSS HOLE TOMOGRAPHY
LONDON, ENGLAND
Prof. Michael Worthington

UNIVERSITY OF CALGARY -DEEP REFLECTION GEOPHYSICS
LITHOPROBE PROJECT INTERPRETATION AND PROCESSING
Kris Vasudevan

TEXAS A&M UNIVERSITY -2D/3D INTERPRETATION,
 GULF OF MEXICO PROJECT
Prof. Joel Watkins

LAMONT DOHERTY GEOLOGICAL -GLOBAL BASINS RESEARCH NETWORK
OBSERVATORY,
COLUMBIA UNIVERSITY
Dr. Roger N. Anderson

LOUISIANA STATE UNIVERSITY - GLOBAL BASINS RESEARCH NETWORK
BATON ROUGE, LOUISIANA
Dr. Jeff Nunn

UNIVERSITY OF NEW ORLEANS - INTERPRETATION, PROCESSING AND
NEW ORLEANS, LOUISIANA TEACHING LAB
George Ioup

UNIVERSIDADE FEDERAL DA - SEISMIC EVALUATION OF RESERVOIR
BAHIA PROPERTIES
BRAZIL, SA
Prof. Sampaio

LANDMARK UNIVERSITY PARTNERS
DISCOUNT PURCHASES

UNIVERSITY OF LIVERPOOL - MODELING & INTERPRETATION
LIVERPOOL, ENGLAND

Prof. N.J. Kuszfir

UNIVERSITY OF LEEDS - MODELING & INTERPRETATION
LEEDS, ENGLAND

Prof. J.D. Fairhead

ALFRED WEGNER INSTITUTE FOR -INTERPRETATION & MODELING
POLAR AND MARINE RESEARCH
BREMERHAVEN, W. GERMANY

Dr. Wilfried Jokat

UNIVERSITY OF MELBOURNE
MELBOURNE, AUSTRALIA

-INTERPRETATION, TEACHING

Dr. Greg Beresford

KEY CENTRE FOR PETROLEUM
ADELAIDE UNIVERSITY
ADELAIDE, AUSTRALIA

-INTERPRETATION, MAPPING,
TEACHING

Dr. Bill Stewart

****BRITISH GEOLOGICAL SURVEY**
HYDROCARBONS UNIT
EDINBURGH, SCOTLAND

Dr. J. McInnes

****Pending University sale**

ATTACHMENT 2, 3

PROCESS & ORGANIZATION

LANDMARK

- MARKETING
- "SISTER" COMPANIES
- REGIONS
- R&D

INFORMATION
EXCHANGE

UNIVERSITY PARTNERSHIP

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