College of Engineering

Vision Plan for Information Technology

2003-2004

(Presented to VP of IT for ITAC committee review, April 2003, http://www.engr.utexas.edu/itg/vision/)

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Executive Overview

Engineering continues on its diligent commitment to foster world-class learning through the innovative and appropriate integration of technology into the curriculum. This spring we were fortunate to receive yet another generous **HP Mobility Grant** that will permit us to address the approaching impasse for every student to have highly mobile, network connected, compute capability in their possession for virtually all educational experiences. Although our Laptops for Learning initiative and various campus programs and industry grants have helped move us in this direction, the expectation that every student and faculty member could use technology effectively in the classroom environment cries for an affordable, highly mobile and flexible set of supportable IT solutions.

Consistent with this earnest pursuit, we held a wireless lunch and learn roundtable discussion in the fall of 2002 to help promote and facilitate deployment of wireless Ethernet across campus based upon our experiences in deploying 802.11b wireless Ethernet throughout the five College of Engineering main campus buildings.

In this forthcoming seventh year of our **Laptops for Learning** initiative, which makes it easy and affordable for students to purchase laptops which are well supported by Engineering, we anticipate including both 802.11b and g wireless capabilities. Tablet PC capabilities are also under investigation with another small HP grant.

The deployment of **Multimedia Teaching Podiums** in the classrooms transcended 84 percent of the nominally 55 classrooms within the Engineering campus domain and will anticipate obtaining 98% (54 of 55) classrooms equipped with some form of multimedia capability by fall 2003. Engineering is part of the campus **Technology Classroom** coalition (Natural Science, Liberal Arts, and Fine Arts) to benefit and contribute to the success of the purchasing power and expertise exchange.

Broad-spectrum software licensing, such as programs in place with Microsoft, National Instruments and AutoDesk continue to contribute greatly to synergistic cultures which are not overburdened with individual license tracking. Maturing anti-virus and anti-SPAM solutions need to follow-suit.

College of Engineering ITAC funding requests for FY 2003/2004

Project Title	Brief Description	Requested Funding
Learning Grid Initiative The Learning Grid initiative is the umbrella theme of the majority of the funding requests and is designed to enhance collaborative learning experiences and connect engineering students with a richer set of real-world learning opportunities. The broad spectrum of activities envisioned will encompass K14 initiatives (http://www.engr.utexas.edu/k14/) in addition to activities which directly impact the curriculum for which funding is sought below.		
▪ Live Distributed Learning	There is an aspiration to replicate a richer set of the classroom experiences without significant overhead or delay. Technologies and methodologies for extending the classroom experience are consistently being investigated and the Tegrity Weblearner pilot, or the like, would offer ability to capture content from a non-digital whiteboard.	$50,000 (pilot of two systems envisioned with capability to scale implicit in pilot)
▪ Collaborative toolsets	A richer set of collaborative functionality is envisioned to enhance the collaborative learning experience both within and beyond the classroom. A rich set of collaboration tools are envisioned for increasing integration into the curriculum and several pilot projects are envisioned to further assess the benefit of these capabilities which would include virtual office hours to take advantage of learning opportunities beyond existing constraints.	$100,000
• Real-world classroom	A broad spectrum of opportunities to bring real-world engineering into the classroom learning experience are under development. Some implementations would require instrumentation of physical structures to gather live representations of engineering dynamics.	$80,000 (initial pilots)
▪ Mobile Classroom Initiatives	Expanding the access and ability to productively use technology interactively within the curriculum is the focus of this project. Tailored courseware and highly mobile computing devices will implement this next generation of classroom interactivity. Our Laptops for Learning Initiative has moved us substantially closer to needing every student to have compute capability within the classroom. Mobile carts and application servers are perceived as transitional solutions to further explore this capability while optimizing the use of the equipment. Pilots are also in place which leverage application servers to make classroom resources highly available as well.	$300,000
▪ TEAM Focus Centers	The Faculty Innovation Center (FIC) has been a remarkable implementation toward providing an intimate collaborative environment for faculty. Similar environments are desired to keenly address student needs. Although students may use the FIC, as use increases, more capacity and a richer set of spaces are anticipated.	$350,000 (multiple centers are envisioned at this cost with some remodeling expenses anticipated)
▪ Next Generation Classroom	Reevaluating and addressing the spectrum of IT services and furniture configurations in direct support of classroom activities is the intent of this project.	$200,000
Increasing critical operational imperatives – recurring funding in nature		
▪ Network Funding	Adequate network funding remains the number one priority of IT funding, and will remain so until consistent funding is identified.	$450,000 per year
▪ Security hardening & scaling system management outreach	Emphasis is on extending securely delivered services and security updates to all college constituents through a set of proactive measures which will optimize resource use and management and protect the productivity of unrecoverable classroom time. A security conscious culture needs to be further developed and equipped with proactive diagnostic tools and properly trained response teams to address security breaches and protect the productivity of our learning activities.	$150,000 per year FTE and maturation and scaling of initiated pilots
	Total:	**$1,680,000**

Please also duly note that the $222K Vision Plan funding allocated to Engineering in the

FY 02-03 was leveraged for a total investment of $721.5K for a total investment return of 325%.

Status report on ITAC expenditures for FY 2001/2002

- **$180,000** - diverse distribution among departments and Faculty Innovation Center with matching funds generally applied.
  - $130,000 annual allocation was supplemented by savings from previous years to permit total allocation.

Dept	Project Title	Proposal	Matching	% Match	Totals	Comment
Aerospace	Network essentials	$ 25,000	$ 7,000	28%	$ 32,000	Compensating for mission critica network deficiencies
BioMed	ELVIS	$ 15,000	$ 15,000	100%	$ 30,000	Pilot flexible electronic prototyping stations
Chemical	Molecular modeling	$ 20,000	$ 5,000	25%	$ 25,000	Accelerys licensing for use in undergraduate curriculum
Civil	Mobile classroom & AppServer	$ 39,000	$ 30,000	77%	$ 69,000	Mobile classroom pilot leveragin application server
Electrical	LRC access	$ 20,000	$ 10,500	53%	$ 30,500	Permitting 7/24 LRC access
Mechanical	Networking for collaboration	$ 15,000	$ 5,000	33%	$ 20,000	Leveraging FORD Proceed investments to establish collaborative student spaces
Petroleum	LRC equipment infusion	$ 28,000	$ 28,000	100%	$ 56,000	Significant enhancements to waning LRC infrastructure
Faculty Innovation Center	Interactive Teaching	$ 2,500		0%	$ 2,500	Infrared instantaneous classroom response tools
	Video-Conferencing	$ 11,000	$ 11,000	100%	$ 22,000	Linking industry to classroom (leveraging FORD Proceed)
	Flat screen monitors	$ 2,000	$ 1,500	75%	$ 3,500	Outfitting FIC with flat screens to enhance collaborative nature of room
	Online testing	$ 2,500		0%	$ 2,500	Extending courseware functionality
		$ 180,000	$ 113,000		$ 293,000	

Targeted ITAC expenditures for FY 2002/2003

- **Please note that the $222K Vision Plan funding allocation to Engineering in the FY 02-03 was leveraged for a total investment of $721.5K for a total investment return of 325%.**
- The umbrella theme is a Learning Grid designed to enhance collaborative learning experiences and connect engineering students with a richer set of real-world learning opportunities.

Priority	Theme	Brief Description
1	TEAM Focus Center	The Faculty Innovation Center (FIC) has been a remarkable implementation toward providing a collaborative environment for faculty. Similar environments are desired to keenly address student needs. Although students may use the FIC, as use increases, more capacity and a richer set of spaces are anticipated.
2	Mobile classroom(s)	Our Laptops for Learning Initiative has moved us substantially closer to needing every student to have compute capability within the classroom. Mobile carts and application servers are perceived as transitional solutions to further explore this capability while optimizing the use of the equipment. Pilots are in place which

		leverage application servers to make classroom resources highly available.
3	Live Distributed Learning	There is an aspiration to replicate a richer set of the classroom experiences without significant overhead or delay. Technologies and methodologies for extending the classroom experience are consistently being investigated.
4	Real-world classroom	A broad spectrum of opportunities to bring real-world engineering into the learning experience is under development. Look for these opportunities to be formalized and presented under a "Learning Grid" campaign.
5	Security hardening & scaling system management outreach	Emphasis is on extending securely delivered services and security updates to all college constituents through a set of proactive measures which will optimize resource use and management.

Appendices:

1 - Building network status

Adequate funding for the mission critical network infrastructure remains a crucial concern with the College of Engineering. Historically, we found allocating a portion of the ITAC Vision funds leveraged with College funds necessary to maintain essential networking capability. To transcend this undesirable situation, the College has proposed a Network Lifecycle Model, integrated into our fee structure, to provide for sustained maintenance and necessary expansion of the network. The following table shows the proposed schedule. More detailed information is available on our web site: http://www.engr.utexas.edu/itg/network/nlcf.cfm .

Network Infrastructure Lifecycle Funding
Budget Overview

Equipment (cost per year on 5 Year Lifecycle) **$250,000**

Year	Areas Covered (proposed cycle)
2002-2003 - Year 1	WRW, CPE-East
2003-2004 - Year 2	ECJ, ETC
2004-2005 - Year 3	ENS
2005-2006 - Year 4	BME, futures/new technology
2006-2007 - Year 5	CPE-West, wireless, all building upgrades

All years contain an amount that is non-building specific to cover software, training, tools and additional areas.

Salary (3 Full Time Employees - proposed)

Position	Salary	Annual Salary with Fringe Benefit
Senior LAN Administrator	57,500	73,600
Network and Security Administrator	57,500	73,600
Tech staff	40,000	51,200
Total	**155,000**	**$198,400**

Total per year, nominally $450,000

Engineering was previously fortunate to receive a generous grant from HP, permitting the pervasive deployment of 802.11b (11 Mbps) wireless Ethernet throughout all five main-campus engineering buildings. This wireless network significantly contributes to a campus-wide wireless infrastructure and Engineering will leverage this grant to the benefit of the campus at-large in as many ways as possible as

a model for further deployments and share in-depth knowledge gained in operating the wireless infrastructure.

Network security has become an increasing concern and Engineering has found it necessary to engage numerous resources to help mature and harden security structures to help protect the productivity of our activities and limit liability exposure.

Adequate network bandwidth, connectivity and redundancy remain chronic networking issues. While some buildings cannot currently add a single additional connection to their existing infrastructure and struggle to identify funding for expansion, other buildings have a growing concern for single points of failure that could be disastrous for mission critical network infrastructures. All of these concerns converge to the necessity of having a consistent source of network funding as proposed in our lifecycle funding model.

2 - Computer Lab Status

Departmental **Learning Resource Centers** (LRCs) were established within Engineering in the early 1980s. Currently, six departments have computer labs which support curriculum largely within their own departments and nominally attempt to provide a 10:1 student to computer ratio within each of the academic departments.

Two college-wide **"Studio Classroom TEAM Center"** computer labs have been established, with generous grants from HP, and serve a broad constituency including outreach efforts. The newly established Biomedical Engineering department will initially make use of these facilities.

A mobile lab pilot has generated significant interest in mobile classroom capabilities and a number of additional projects are being pursued in order to ensure each student in the classroom has the appropriate technology in order to engage in interactive and modular teaching investigations.

3 - Classroom technology status

Engineering continues to implement a master plan to equip all classrooms with **Multimedia Teaching Podia** (MTP) within the five Engineering buildings on main campus, housing nominally 55 classrooms (both departmental and general purpose, equating to approaching 10 percent of the campus classrooms).

Two years ago, a student fee was approved and service organization established to formalize and validate the ad hoc efforts that had been moving forward since the fall of 1996. Currently over 84 percent of the classrooms are equipped with some form of multimedia capability and Engineering actively participates in the campus coalition (Natural Science, Liberal Arts, Fine Arts) to leverage procurement, installation and support of the podia.

Engineering actively participates in the campus **Technology Classroom Committee** which helps to architect and facilitate inter-college cooperation. Improvements continue to the comprehensive campus listing of technology classrooms which was compiled by this coalition in partnership with the registrar's office.

A comprehensive listing is located on the web at: http://www.engr.utexas.edu/itg/classrooms/

Faculty increasingly have the expectation that their classrooms will be equipped with multimedia capability and identify the MTPs "… as the single most important innovation in the classroom …". Engineering has an **Equipment Loan Program** in place to support faculty whose rooms have not yet been equipped with MTPs. Several laptops and projectors are available for check-out and use where podia are not yet installed.

It should also be noted that Engineering currently has one fully equipped **distance learning classroom**, but two others are planned for fall 2003 with a generous multi-year grant from Ford Motor Company.

The challenge is to ensure that all campus classrooms are appropriately equipped with multimedia capabilities as proposed by an increasing campus coalition.

4 - Curriculum innovation status

A key strategic goal of the College of Engineering is to enhance and improve the quality of instruction provided to engineering students including K-14, on campus and lifelong learners. The College provides the **Faculty Innovation Center** (FIC, http://fic.engr.utexas.edu/), established with a generous grant from HP, whose primary objective is to assist faculty in becoming innovative instructors; facilitating their move away from faculty-centered approaches toward student-centered instruction.

Notably, the Mechanical Engineering (ME) department has begun a curriculum redesign to incorporate project-based instruction in over 40 undergraduate courses. As a result of ME/FIC partnering, ME 205, Computers and Programming, was completely redesigned from a traditionally taught, lectured-based format to a self-paced, Web-based course and was recognized in the Spring of 2001 at the University level with a first place award in the Innovation Instructional Technology Awards program.

Additionally, the College provides funding to faculty through Academic Development Funds. The faculty who are awarded these proposals spend the money developing instructional technology assets for their classes.