

# College of Engineering

## Vision Plan for Information Technology

### 2002-2003

(Presented to VP of IT for ITAC committee review, January 2002, <http://www.engr.utexas.edu/itg/vision/> )

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#### Executive Overview

Engineering continues on its diligent commitment to enhance teaching and learning through the innovative and appropriate integration of technology into the curriculum. This past year we were fortunate to receive a generous **HP Mobility Grant** that permitted us to deploy wireless Ethernet coverage throughout the five main campus engineering buildings and extensively explore the benefit/impact of courseware tailored to facilitate student comprehension queries during class. It should be noted that one of the intents of this project was to work closely with ITS and the support of the VP of IT, Dan Updegrave, to architect large-scale deployments of wireless Ethernet working toward a vision of pervasive wireless Ethernet across campus. We are in the process of documenting the lessons learned from this pilot and submitting for a follow-up grant from HP to mature and extend the benefits of this first grant.

Engineering also continued its **Laptops for Learning** initiative for the fifth year, making it easy and affordable for students to purchase laptops which are well supported by Engineering. It may be interesting to note that these configurations are nominally identical to the Computer Life-Cycle program configurations coordinated through the Provost's office and ITS. The deployment of **Multimedia Teaching Podiums** in the classrooms transcended 60 percent of the nominally 60 classrooms within the Engineering campus domain. 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 contribute greatly to synergistic cultures which are not overburdened with individual license tracking.

The approaching impasse is the need/desire 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.

### Summary of ITAC funding requests for 2002/2003

<b>Project Title</b>	<b>Brief Description</b>	<b>Proposed Budget/ Funding Source</b>
<ul style="list-style-type: none"> <li>▪ Network Funding</li> </ul>	Adequate network funding remains the number one priority of IT funding, and will remain so until consistent funding is identified. The requirements of this funding are detailed in the appendix addressing the network status.	\$450,000 per year
<ul style="list-style-type: none"> <li>▪ Collaboration</li> </ul>	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.	\$100,000
<ul style="list-style-type: none"> <li>▪ High Performance Computing (HPC)</li> </ul>	Creating a culture whereby the capabilities of HPC can be more easily harvested. Engineering will work closely with TACC to assess need and create the infrastructure (GRID) to meet demand.	Existing equipment, industry and campus partnerships
<ul style="list-style-type: none"> <li>▪ Mobility Initiatives</li> </ul>	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.	\$300,000
<ul style="list-style-type: none"> <li>▪ Next Generation Classroom</li> </ul>	Reevaluating and addressing the spectrum of IT services in direct support of classroom activities is the intent of this project. The aggressive deployment of Multimedia Teaching Podiums into virtually all classrooms will continue.	\$200,000 Largely realigning existing funding, some thrust funding has been identified and fee adjustments have been requested.
<ul style="list-style-type: none"> <li>▪ Security Model (&amp; practices)</li> </ul>	A security conscious culture needs to be developed and equipped with proactive diagnostic tools and properly trained response teams to address security breaches.	\$50,000 for campus license for Internet Security Systems tools
<ul style="list-style-type: none"> <li>▪ Resources for Researchers</li> </ul>	Leveraging existing resources, services and knowledge and tailoring them to meet the needs researchers is the focus of this project.	Existing resources, grants, industry partnerships
<ul style="list-style-type: none"> <li>▪ UTDIRECT services</li> </ul>	This project item exists to emphasize the importance of integrating IT services into the UTDIRECT infrastructure to increase awareness and impact.	Largely an awareness and availability issue.
<b>Total:</b>		\$1,100,000

## Status report on ITAC expenditures for 2000/2001

(Please review this status report while referencing the full listing of the projects available in the Vision Plan - <http://www.engr.utexas.edu/itg/vision/vision-00-01.pdf> )

**{Direct allocations of the \$100K Vision Plan funding are in bold in items 1, 2 & 8}**

Priority	Project Title	Status Description
1	<b>Network connectivity</b>	<ul style="list-style-type: none"> <li>Contributions toward essential network infrastructure improvements were made to PGE from <b>Vision Plan funding allocation (\$25K)</b>, these funds contributed to additional funds within Dept.</li> <li>Identifying a perpetual source of funding remains a high priority for the Deans and opportunities are consistently taken to identify this need to the new VP of IT and other funding opportunities such as Compact 2000.</li> </ul>
2	<b>Wireless Pilot</b>	<ul style="list-style-type: none"> <li>The pilot was accomplished with existing funds and an opportunity presented itself and was successfully pursued to acquire an HP grant to comprehensively deploy wireless networking throughout the college. The infrastructure will be deployed throughout the fall 2001 semester, but approximately \$90K total funding will be needed to fully implement the wireless infrastructure (the remaining allocation of the <b>Vision Plan funding ~\$45K</b>, was applied to this project)</li> </ul>
3	<b>TEAM Focus Center</b>	<ul style="list-style-type: none"> <li>The Faculty Innovation Center (FIC) has been a remarkable implementation toward providing a environment for faculty.</li> <li>A similar environment is desired to keenly address student needs, although students may use the FIC.</li> </ul>
4	<b>Active Directory Services</b>	<ul style="list-style-type: none"> <li>An active directory infrastructure is in place for the COE and is being deployed throughout the college upon invitation.</li> </ul>
5	<b>@home connectivity</b>	<ul style="list-style-type: none"> <li>Pilot projects have identified affordable options. Documentation needs to be developed and published on the web to convey this knowledge.</li> </ul>
6	<b>Universal File &amp; Web Services</b>	<ul style="list-style-type: none"> <li>The foundation for this service has been laid by implementing Active Directory.</li> <li>Incremental implementation of this service will be made by extending existing capabilities as service requests demand.</li> </ul>
7	<b>Desktop tele-conferencing</b>	<ul style="list-style-type: none"> <li>A NetMeeting server was established and a virtual office hours pilot was pursued with Phil Schmidt.</li> <li>Resources have been identified to allow this service to scale.</li> <li>Documentation of best-practices needs to be published.</li> </ul>
8	<b>Live Distributed Learning</b>	<ul style="list-style-type: none"> <li>A component of the FORD PROCEED grant, for developing two distance learning classrooms, could certainly be perceived as contributing toward this objective. The "live" component will be appropriately addressed via the FIC in coordination with the faculty member.</li> <li><b>\$30K Vision Plan funding</b> was contributed to enhance the FIC's distance learning classroom</li> </ul>
9	<b>Unrestricted Access to Learning Resource Centers (LRCs)</b>	<ul style="list-style-type: none"> <li>A mechanism has been identified to accomplish this goal within the next academic year utilizing UT IDs at possibly no cost to facilities with existing card readers.</li> <li>Scaling of this capability to additional facilities is anticipated being affordable beginning in late spring 2002.</li> </ul>
10	<b>Multimedia Teaching Podiums (continuing)</b>	<ul style="list-style-type: none"> <li>Funding was identified and approved, via student fees, to permit the establishment and ongoing operation of multimedia capabilities for all engineering classrooms.</li> <li>Approval was received from the provost for the college to accept responsibility for technology in the general purpose classrooms and an FTE was granted to us to help fulfill this mission.</li> </ul>
11	<b>Handheld wireless</b>	<ul style="list-style-type: none"> <li>Pilot investigations are determining the optimal feature sets and configurations of next generation devices. Some existing funds are being used and the HP mobility grant, which also provides the wireless networking infrastructure, will permit in depth investigation of options to include active use in the classroom.</li> </ul>
12	<b>Studio Classroom</b>	<ul style="list-style-type: none"> <li>No new facility was aggressively pursued. Investigations have begun into determining the optimal next generation configuration for HP Studio TEAM Centers. (The CPUs in HP Studio Classroom TEAM Center #1 were refreshed in September 2001.)</li> </ul>
13	<b>Real-world classroom</b>	<ul style="list-style-type: none"> <li>No opportunities were identified to accomplish this goal.</li> </ul>

Addendum: An opportunity presented itself, through the Engineering foundation, to explore the impact of a **distributed computing** model utilizing unused compute cycles in our existing PC infrastructure to create a substantial compute engine. These investigations are proceeding with United Devices as a corporate partner.

**Categorical IT spending:** This detail is provided to help engender a better understanding of IT expenditures as we strive to comprehend the total investment in IT infrastructures and align investments toward optimal benefit.

**College of Engineering LRC, Information Technology and Instructional Technology Fee expenditures for 2000-2001**

	LRC Fees	ITAC Fee	Inst. Tech Fee	TOTAL
<b>BALANCE FORWARD</b>	\$315,372	\$361,942	\$567,101	\$1,244,415
<b>AMOUNTS RECEIVED:</b>				
Fee Income	\$1,755,536		\$1,761,722	\$3,517,258
IML Income			\$69,820	69,820
Continuing Annual Amount		\$369,022		369,022
Vision Plan		100,000		100,000
<b>TOTAL AMOUNT AVAILABLE</b>	<b>\$2,070,908</b>	<b>\$830,964</b>	<b>\$2,398,643</b>	<b>\$5,300,515</b>
<b>SALARIES AND FRINGE:</b>				
Salaries	(\$1,166,371)		(\$733,895)	(\$1,900,266)
Fringe Benefits	(169,035)		(146,608)	(315,643)
	(\$1,335,406)	\$0	(\$880,503)	(\$2,215,909)
<b>HARDWARE:</b>				
Computer Purchases (Capitalized)	(\$50,654)	(\$164,142)	(\$495,573)	(\$710,369)
Computer Purchases (Not Capitalized)	(30,014)	(4,540)	(65,725)	(100,279)
	(\$80,668)	(\$168,682)	(\$561,298)	(\$810,648)
<b>SOFTWARE:</b>				
Computer Software	(\$34,324)	(\$92,641)	(\$55,401)	(\$182,366)
<b>SUPPORT:</b>				
Telecommunication Expenses	(41,295)	(7,204)	(22,983)	(\$71,482)
Telecommunication Equip. Not Capt.		(131)	(4,799)	(4,930)
	(\$41,295)	(\$7,335)	(\$27,782)	(\$76,412)
<b>MAINTENANCE:</b>				
Computer Maintenance	(7,644)	(1,789)	(10,773)	(\$20,206)
Maintenance & Repair	(10,785)	(3,870)	(26,194)	(40,849)
	(\$18,429)	(\$5,659)	(\$36,967)	(\$61,055)
<b>OTHER:</b>				
Books and Subscriptions	(\$2,563)	(444)	(1,012)	(\$4,019)
Consumable Supplies	(53,210)	(33,377)	(41,439)	(128,026)
Equipment & Furniture	(35,186)	(23,595)	(336,123)	(394,904)
Freight & Postage	(138)	0	(1,863)	(2,001)
Insurance	(2,116)	(678)	(719)	(3,513)
Other Operating Expenses	(81,820)	(16,341)	(55,267)	(153,428)
Other Services	(163,118)	0	(44,829)	(207,947)
Printing and Reproduction	(1,916)	0	(5,291)	(7,207)
Travel	(12,824)	0	(9,334)	(22,158)
	(\$352,891)	(\$74,435)	(\$495,877)	(\$923,203)

ENCUMBRANCES	(\$43,669)	(\$120,561)	(\$201,122)	(\$365,352)
ASSET/LIABILITY - ACCOUNTS PAYABLE	(\$4,111)	\$0		(\$4,111)
TRANSFERS OUT FOR RENOVATIONS	\$720	(\$24,219)	(\$13,000)	(\$36,499)
TOTAL EXP, ENC & TRANSFERS OUT	(\$1,910,073)	(\$493,532)	(\$2,271,950)	(\$4,675,555)
ENDING BALANCE	\$160,835	\$337,432	\$126,693	\$624,960

## Targeted ITAC expenditures for 2001/2002 (and a special funding request)

Expenditures in the current fiscal year are closely aligned with the vision for 2002/2003 funding requests. Allocations are nominally considered seed money to inspire leveraging with respect to other sources of funding since the total amount of funding needed to accomplish individual objectives has yet to be identified.

Project Title	Brief Description	Allocation
▪ Network (& IT) Funding	To address desperate networking infrastructure needs and leveraged with local funds.	~\$30,000
▪ Collaboration	Hopefully highly leveraging or supplementing grant funding.	~\$30,000
▪ Mobility Initiatives	Hopefully highly leveraging or supplementing grant funding.	~\$30,000
▪ Next Generation Classroom	Applied toward curriculum innovation to enhance the classroom experience.	~\$30,000
	<b>Held in reserve</b>	~\$10,000
	<b>Total:</b>	\$130,000

**Special Note:** Engineering would like to submit a request for a special one-time allocation within this current fiscal year for \$100,000 toward the aggressive deployment of Multimedia Teaching Podiums. We have a full, formal proposal to ITAC ready for presentation should this request be permissible.

## 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
<b>Total</b>	<b>155,000</b>	<b>\$198,400</b>

**Total per year, nominally \$450,000**

Within the past year, Engineering was fortunate to receive a generous grant from HP, permitting the pervasive deployment of 802.11b (11 Mbps) wireless Ethernet throughout all 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 would find it extremely useful for ITS to carry-through with its commitment to purchase the Internet Security Systems tools for campus and create a network security culture to substantially reduce the risk of downtime from attack or equipment failure.

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.

The IT vision for this year includes a comprehensive reassessment of how computer labs can best serve the needs of the curriculum in the light of a pervasive wireless infrastructure and the impact of courseware.

**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 60 classrooms (both departmental and general purpose, equating to approximately 10 percent of the campus classrooms).

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

This past year, 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 60 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.

Faculty increasingly have the expectation that their classrooms will be equipped with multimedia capability and 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 envisioned with a generous multi-year grant from Ford Motor Company.

Engineering actively participates in the campus **Technology Classroom Committee** which helps to architect and facilitate inter-college cooperation. A notable project for this year is a web-based, campus-wide database of technology classrooms, which is intended to greatly facilitate the use technology enabled classrooms across campus, to be generated in partnership with the registrar's office.

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 is beginning curriculum redesign to incorporate project-based instruction in over 40 undergraduate courses. Recently, 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.

For perspective, last year over 2200 students used Engineering's courseware tool of choice, UTwired-Prometheus, to participate in online classes.

## 5 – IT staffing status for 2001/02

This initial report of IT staffing levels was acquired by generating a report on the 9300-9399 job codes. Throughout this next year a more comprehensive assessment method will be envisioned and implemented. Within this current year the table provided in the “Status report on ITAC expenditures for 2000/2001” section earlier in this document may provide additional insight.

FTE staff funded with ITAC funds (This includes Informational Technology Fee, Instructional Technology Fee and Learning Resource Center Fee)	33.7
FTE staff funded from unit ongoing	13.5
FTE staff funded from one-time	0
Total FTE tech staff (with IT related duties)	unable to report at this time
Total compensation expense for tech staff (with IT related duties)	unable to report at this time
Total IT FTEs:	47.2