

College of Engineering

Vision Plan for Information Technology

2007-2008

(<http://www.engr.utexas.edu/itg/vision/>)

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Summary of College of Engineering ITAC funding requests for AY 2007/2008

Project Title	Brief Description	Requested Funding
<ul style="list-style-type: none"> Software Licensing Systems 	Due to a number of factors which include eclectic corporate cultures and the desire to rapidly integrate software into our service offering portfolios, we have a hodge-podge of software licensing mechanisms which are creating undesirable overhead and may be constraining, rather than facilitating the effective use of software licenses. We propose to audit these systems around campus and the industry and implement a shorter list of coordinated and integrated software licensing solutions. New classroom software such as DyKnow and Click To Meet are of special interest since they are licensed concurrently, yet are potentially used by a broad spectrum of classes in ad hoc and scheduled fashions and no system currently exists to manage these type of licenses effectively.	\$35,000
<ul style="list-style-type: none"> Online Reading Room 	Faculty members still need assistance in getting their content online. We have some legacy “reading rooms”, which need some prodding to reinvent. We propose a small force of students over a couple semesters to cater to and assist faculty in identifying and simplifying how to get their auxiliary study materials online, rather than having reserved copies available in constrained access reading rooms.	\$50,000
<ul style="list-style-type: none"> Classroom Connectivity 	Wireless connectivity and the availability of electrical power needs to be reinforced in our classrooms. About 10% of the campus classrooms are under the stewardship of Engineering and although Engineering pursued pervasive wireless throughout the College early-on via grants, this sparse infrastructure is proving inadequate for ramping demands. We propose reinforcing and tuning the classroom wireless infrastructure and electrical power connections.	\$750,000 Or any portion thereof in \$15,000 increments.
<ul style="list-style-type: none"> 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	\$150,000 per year FTE and maturation and scaling of initiated pilots

	address security breaches and protect the productivity of our learning activities.	
▪ Distributed/ Virtualized Data Centers	A well architected, distributed and redundant data center culture needs to be prototyped and implemented across campus. Engineering, Business, Communication and likely other Colleges/Schools envision working together to identify and build a practical and replicable distributed data center model for the campus in concert with appropriate centralized data center facilities.	\$150,000 (Engineering contribution toward overarching cooperative model)
▪ Classroom 2010 pilots and propagation	Several pilots have proven successful and generated momentum that needs to be pursued in order to fulfill the aspirations for our classroom learning spaces.	\$500,000 (per year for 5 years, entering 3 rd year)
Increasingly critical operational imperatives – recurring funding in nature		
▪ Network Funding	Adequate network funding remains a priority of IT funding, and will remain so until consistent funding is identified. (please reference appendix 2)	\$450,000 per year
Total:		\$2,085,000

OVERVIEW OF CURRENT IT PROGRAMS AND INFRASTRUCTURE

Engineering continues on its diligent commitment to foster world-class learning through the innovative and appropriate integration of technology into the curriculum.



- Enhance the educational **experience** through student-centered learning
- Provide a supportive **environment** to nurture STUDENTS, faculty, and staff
- Foster a first-class learning **community** that reaches beyond the classroom

Engineering’s heritage of Learning Resource Centers, Studio Classrooms, laptop mobility carts, robust server infrastructure, Faculty Innovation Center, deployment of Multimedia Teaching Podiums (60 classrooms), pervasive wireless infrastructure (130 access points in 5 buildings) and Laptops for Learning Initiative (now entering its 11th year) depict the consistent efforts of the College to identify and address the practical roles of Information Technology to improve pedagogy.

Engineering leverages the ITAC allocations for visionary IT projects at typically greater than a 100% matching level. We have yet to commit any Vision Plan funding toward recurring expenses and we aspire to continue this commitment.

The primary sources of funding available to the College of Engineering to support the IT infrastructure and activities are through student fees. Currently we are in the midst of a transformation from a collection of fees (Instructional Resources fee, Instructional Technology fee, Information Technology fee, and Graduate LRC fee) toward a flat-rate tuition fee. Historically these sources of funding have been incrementally consumed by increases to operational obligations and rate increases have not kept pace with needed funding amounts. The impact of the flat-rate tuition upon this situation has yet to be determined.

All proposed projects are aligned with the multi-year Vision Plan theme **Classroom 2010: Unleashing Learning Spaces**. This year, more than ever, the academic departments are working together to build infrastructures and services that will serve constituents across the College, rather than each department merely being a “tub on its own bottom”.

The **Classroom Video conferencing** systems are particularly indicative of this partnering. Three different pursuits have been endorsed; ECE will actually host the online service on behalf of the entire College, the ITG will deploy capabilities into a number of classrooms and ChE will build a portable unit to continue to explore the benefits of videoconferencing in different venues.

The **DyKnow** project will bring interactive annotation into the classroom between faculty and students, leveraging the increasing popularity of Tablet PCs. The Vision Plan allocation of \$170,000 was enhanced by a small additional allocation by ITAC of \$9,000 in order to enhance classroom interactions; this was integrated into the DyKnow line item.

The **Virtual LRC initiative** is especially exciting because it aspires to deliver significant LRC functionality to students around the clock, especially when LRC’s are closed. This project leverages the significant success of virtual servers and takes this capability to new levels by making institutionally licensed software available to students on-demand via client-centric virtual machines and permits streaming of applications to personally owned laptops instantaneously.

The **VisLab** project will make three-dimensional real-time immersive technology accessible and collaborative for exploratory investigations in advanced engineering courses

Unfortunately our efforts to effectively use Vision Plan funding are being hindered by other campus funding dynamics, because next year’s Vision Plan allocated is expected to only be about \$120K, a 33% drop in the allocation. This is especially unfortunate since the College of Engineering strives to make such innovative use of this funding and leverages it with matching funds. In addition, this reduction in funding comes at a time when funding should be greatly increased. We think the campus administration and the College of Engineering Dean’s office should make external fundraising for computing resources a high priority in the next several years.

The benefits of a **Virtual infrastructure** cannot be overemphasized and are still emerging as a transformative force across campus in both the data center and now the client desktop. The implementation of virtual infrastructures should be considered a key **best practice** which enables access, flexibility and resiliency which heretofore have been unattainable with conventional implementations. It also has implications for significant cost savings in campus-level data centers.

USE OF PREVIOUS ACADEMIC YEAR ALLOCATIONS

We were able to leverage an ITAC allocation of **\$179,000** with **\$268,000** from various sources for a total of **\$447,000** to implement a spectrum of IT projects as depicted below. As is typical, when we receive the ITAC funding we brainstorm on IT projects that are contemporarily appropriate and immediately fund these activities, thus ensuring a high correlation to funding and implementation. We also do some closing activities at the end of the fiscal year to ensure projects have been brought to a close or clearly understand delays, typically when physical plant scheduling has been involved.

All of our allocations were tightly coupled to **direct classroom and learning environment improvements**.

Engineering IT Committee Vision Plan allocations for fiscal 05/06

Project Title	ITC		Match%	Totals	
	100% Proj%	Allocated Funding			Matching
DyKnow, Tablets	5%	\$9,000	\$9,000	100%	\$18,000
Classroom Video conferencing system(s)					
> Click to Meet licensing	16%	\$28,219	\$40,000	142%	\$68,219
> Optimal implementations					
>> Permanent	3%	\$6,000	\$6,000	100%	\$12,000
>> Portable	3%	\$6,000	\$6,000	100%	\$12,000
Virtual LRC initiative and components					
Virtual LRC for ECE	20%	\$35,000	\$35,000	100%	\$70,000
Virtual LRC for BME	14%	\$25,000	\$25,000	100%	\$50,000
Virtual LRC for ME	3%	\$5,500	\$5,500	100%	\$11,000
Synchron-VM brokering (~130)					
> BME (~Qty 30)	2%	\$3,750	\$3,750	100%	\$7,500
> ME (~Qty 30)	2%	\$3,750	\$3,750	100%	\$7,500
> ITG (~Qty 70)	5%	\$8,750	\$8,750	100%	\$17,500
Softtricity-Client App Streaming (~150)					
> BME (~Qty 50)	4%	\$6,750	\$6,750	100%	\$13,500
> ME (~Qty 50)	3%	\$6,250	\$6,250	100%	\$12,500
> ITG (~Qty 50)	3%	\$6,250	\$6,250	100%	\$12,500
ASE-COE VisLab	16%	\$28,781	\$106,000	368%	\$134,781
	TotReq>	\$179,000	\$268,000	<Match	\$447,000 <Total

Highlights of these implementations include continued enthusiasm for the **Tablet PC** for interactive use in the classroom – complemented by other initiatives as well.

NEEDS AND PROPOSED USE OF FUNDS

Although we would primarily like to continue to emphasize our multi-year **Classroom 2010 vision** (ref appendix 1), several other projects must be articulated as well, especially since they could contribute or detract from the implementation of the Classroom 2010 vision.

- **A distributed and virtualized data center culture needs to be nurtured across campus.**
 - o It needs to be acknowledged that course critical content is already highly distributed and although linkages to content will likely emanate from the campus courseware solution, the

content will be housed at increasingly dispersed locations. A wholly centralized solution is insufficient to address the inherently distributed nature of content creation and curation.

Engineering, Business and Communication are certainly interested in helping to mature and deploy this much needed model across campus and will likely enlist other campus partners.

- Engineering and Business have substantially completed core proof of concept work in the cooperative data center arena.
- Engineering, Business and Communication have significant virtual server implementations and are biased toward virtual servers as the preferred server-infrastructure platform.
- These cooperative partners are proposing to build contemporary data center nodes that will host appropriately synchronized/duplicated/replicated data and services. The data center nodes will have both active and passive components and will be architected around virtual servers running on space efficient blade server or multi-processor hardware using affordable Storage Area Networks. Sophisticated switching and networking accommodations will permit rapid switch-over should failsafe services be needed.
- Please consider the joint College proposal for architecting this infrastructure as a key component for cost savings and offering new levels of capability in the classroom and transforming how data centers are envisioned and implemented.

- **A College-cooperative approach toward developing and providing a full-spectrum of classroom-capture, stream hosting and conferencing services appears optimal and needs to be nurtured.**
 - Some Colleges or Schools have developed skills, capabilities and capacities that could easily be scaled and distributed to other Colleges. An umbrella service-bureau needs to be formalized to facilitate the delivery of these services in a cost-effective and customer-friendly fashion.
 - Engineering is proposing to help facilitate the transformation of these existing campus services in partnership with Colleges/Schools willing to host the services as a service to the campus.
 - Additionally, needed services will be identified and candidate Colleges will be identified to prototype and potentially host the service as a service to the campus.
- Adequate and sustainable **networking infrastructure and security hardening** funding remains crucial and jeopardizes all other service offerings if not sufficiently addressed. Specific amounts are identified in appendix 2.

- **Cross-College collaborative software licensing efforts that should be acknowledged**

Description	Partners	Costs
AutoDesk AutoCAD	Engineering and the School of Architecture cooperatively fund a broad-spectrum use license	~\$30K/year currently
National Instruments LabVIEW	Engineering, Natural Science and the VP of Research partner to provide an unlimited license for academics and research	\$24,995/year
Microsoft Premier Support	Engineering, Business, ITS, Facilities	~\$97K/year

Appendices:

1 – Classroom 2010: Unleashing Learning Spaces

Leveraging experience, success, vision and opportunity
to create the learning environments of tomorrow...

Building upon systemic transformational efforts to fundamentally evolve learning dynamics through project-centric learning experiences, Classroom 2010 plans to harvest practical best practices and build prototype classrooms in each of the **classroom categories**:

- Lecture Audiences (large and medium)
- Distance/Distributed
- Seminar
- Project
- Computer
- Laboratory

And then **propagate the enhanced classroom models to all 60 classrooms** within the main campus Engineering buildings by 2010. Additionally, classroom models will be shared with the campus community and promoted, especially in learning spaces where Engineering faculty teach across campus.

Faculty will engage with undergraduate and graduate students to explore and articulate enhanced learning dynamics supported robustly by our **Faculty Innovation Center**, catering to the course content needs of faculty, and our **Information Technology Group**, ensuring IT infrastructures are robust and responsive to class needs.

Tablets PCs will be used as the computing conduit for this transformation to weave **courseware** (Blackboard et al), live-sync **annotation** (facilitated by DyKnow), **guest-lecturers** (brought into the classroom with Click To Meet), **assessment** (via response systems) and **learning portfolios** (Polaris) in **morphable classrooms** that can adapt to student-centered project-biased learning needs. (Grants will be sought from Microsoft, HP and other industry partners in these pursuits.)

The focus will be on enhancing and unleashing learning opportunities throughout the College, leveraging existing resources in new ways and building future classrooms in ways that are conducive and available for unfettered learning.

- Next generation Multimedia Teaching Podiums are already being deployed with Voice Over IP
- Performance and Learning infrastructures will be actively pursued and enhanced
 - Classroom Performance System (CPS)
 - Courseware: adaptive testing and mobilizing
- Furniture, lighting and acoustical enhancements to address and transcend challenges

"The best way to predict the future is to invent it."
-- Alan Kay

2 – Critical Network Infrastructure Lifecycle Funding needs

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.

Network Infrastructure Lifecycle Funding Budget Overview

Equipment (cost per year on 5 Year Lifecycle)	\$250,000
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Year	Areas Covered (proposed cycle)
Year 1	WRW, CPE-East
Year 2	ECJ, ETC
Year 3	ENS
Year 4	BME, futures/new technology
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

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.