

The Integrated Circuit

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Redesign of the University Procurement Process

Anthony Aniello

When he became President of the University of Illinois two years ago, James Stukel said, "One of my top goals is to cut costs where possible, reemphasize productivity, and create a positive, businesslike administration that reassures taxpayers, tuition payers, and

private donors that their money is being used effectively. We will use technology to become virtually 'paper-less' in payrolls, procurement, accounting, and related administrative areas." We have all been working diligently toward that challenging goal. In the past year you have seen a number of new on-line

systems being rolled out to address the reduction of paper and the improvement of processes. While these new systems will help make administrative processes more efficient, their scope was not large enough to encompass the bold steps needed to accomplish the changes (see Redesign, page 2)

Redesign

(continued from page 1)

envisioned by the President's goal. As these systems were being developed to address more immediate needs, a substantial effort has been going forward to redesign entire processes on a scale intended to more fully achieve that goal.

The two most paper-intensive processes at the University of Illinois are those associated with purchasing and human resource management. In the past several years, efforts have been underway to reengineer these processes to make them more efficient and enable them to take advantage of modern information management techniques.

In this issue – the last printed edition of our newsletter (see *News Briefs* story, page 15) – we will highlight what is being done with the procurement process, and in a future issue we will focus on the human resource management area.

By now most of you have seen or heard the announcements about the University's decision to purchase a software

system from the Oracle Corporation, which will support the new procurement process. At the same time, many of you have been or soon will be involved in the roll-out of the new on-line system called the Electronic Ordering System (EOS). Others of you have been involved in pilot projects aimed at implementing a new purchasing card capability, which will allow you to make relatively small purchases with a credit card instead of a purchase order. These are not independent events, even though they are being implemented in a piecemeal fashion. Rather they are all complementary facets of the overall effort to implement the new procurement process.

The new procurement process represents a substantial change in how we relate to suppliers and how the needs of individual units and staff will be met. It gives individual units more authority and control over the process, while still assuring compliance with University policies, as well as state and

federal regulations. It will eliminate a lot of time-consuming, expensive paper handling, and do away with multipart forms and paper invoice distribution. It will take advantage of imaging technology to include management of images along with data in the on-line environment. Some other benefits include:

- Units will be able to create, process, and track orders on-line.
- Units will have on-line access to complete and current procurement information.
- Units will no longer have to maintain their own procurement records while waiting for paper to work its way through the system.
- Units will be able to match what was ordered vs. what was shipped and/or paid for through on-line information.
- All information about a purchase will be gathered in one easily accessible place.
- Units will be able to perform routine purchasing activities without involving buyers in the Purchasing offices.

When the new procurement process is fully implemented we will have, for the first time, one integrated, University-wide business system which will manage the ordering, receiving, and payment functions of the procurement process. In addition, the new process will automatically update the University's accounting and asset management systems (UFAS and PAS). This means your accounting information will always be current with your purchasing activities, which should be of particular value to those of you involved in the management of grants and contracts.

The new procurement process is a major step in accomplishing the President's goal of bringing more efficiency and effectiveness to the University's administrative procedures. The majority of the articles in this issue are intended to keep you informed of what is happening. I hope you find it useful and encourage you to begin your own preparation for the opportunities to come.

■ Anthony J. Aniello is Associate Vice President of AISS.

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Shepherding the UI Buy Project

Ron Patrick

When I was asked to be Project Director for UI Buy, my immediate response was, "This is a great opportunity!" I'd have a part in an exciting project that will improve the way we buy and pay for materials and services here at the University. My previous University jobs included almost every procurement function. In addition to being a departmental customer who had bought goods and services, I'd also been involved in invoice processing, buying, and purchasing management.

I'm sure that everyone who works for a living says at some point about their job, "I could really improve this process if I only had the opportunity." I had been no exception. Now I was being offered that opportunity. Being Project Director for UI Buy has turned out to be one of the most interesting and rewarding tasks I have ever undertaken.

I feel comfortable saying, from my own experience, that the basic steps in the University procurement process have not really changed much for a long time. There have been incremental improvements over the years, but nothing dramatic. Until just the last few years, we could say that about many other University administrative functions. However, recently the University has undertaken many new redesign and system implementation initiatives. The University is making a real effort to improve its administrative processes by making them less expensive and easier to use. The UI Buy team believes, of course, that its project is one of the most important of these initiatives –

not just because of our own involvement, but because sooner or later almost everyone will buy something.

We started the UI Buy project by carefully setting up an implementation team. The University Procurement Redesign Implementation Team (UPRIT) is composed of a cross-section of University employees who represent key stakeholders in the procurement process. UPRIT members include representatives from academic departments, as well as from purchasing and information systems offices. The project also has a core group of full-time staff who are working exclusively on the UI Buy project.

The UI Buy team is also working closely with other University employees. Many of these employees are members of campus Project Advisory Teams (PATs). The PATs have taken an active part in the early tasks of the project – primarily of selecting a vendor for the system application. In the future UPRIT will seek support and participation from the PATs for the planning and implementation of the new system. The PATs, in turn, will work closely with UPRIT, especially in the areas of testing, training, and system roll-out.

I believe the people involved in the project have been the key to our early success. Most of the UPRIT team work part-time on the project while fulfilling the full-time requirements of their regular positions. The demands on their time are tremendous. In addition, the leadership and guidance provided by both the Project Steering Team and the Management Steering Team have helped considerably with our early project success.

As with any worthwhile endeavor, there are positives and negatives. From a personal standpoint, one of the highlights has been all the University people I have met. Until UI Buy, my work has been primarily in Chicago, with infrequent visits to both UIUC and UIS. It has been a pleasure to meet, work with, and get to know so many new people from the other campuses. Almost everyone I am working with is a new acquaintance. The most surprising thing about the project is



that everyone I have encountered has been enthusiastic and willing to share some of the responsibility for helping the project vision described in the original Procurement Process Redesign Plan become a reality.

One of the most interesting and difficult parts of the project, and one that directly relates to AISS, is working through the systems selection process, namely dealing with sales people. This process was somewhat new to me, as well as to several of the team members. It is difficult and almost impossible to glean from a systems sales representative exactly what functions a system can or cannot perform, what modules are necessary to perform these functions, how difficult it is to install, and what it is actually going to cost. Many of the team members compared the process of buying a systems application to buying a used car. I have a new understanding and appreciation for those of you who work with vendors on a daily basis.

Now that we have selected Oracle as the system provider and consultant for implementation of the new purchasing and accounts payable systems, the real implementation process will begin. Initial software installation and technical work has begun. Testing will begin in early spring. The way you do business will begin to change.

In late spring these changes may begin to cause you some discomfort and concern, as changes often do. This probably indicates that UPRIT's honeymoon is over and tough issues and tasks will have to be tackled. I'm sure all of the team members – Steering, Management, UPRIT, and the PATs – are up to the challenge. It won't be easy, but we're confident we'll find and successfully implement a set of solutions that will meet the goals outlined in the Procurement Process Redesign Plan. Our target for project completion is the point at which the UI Buy system will be the only purchasing system supported at the University. Our goal for completion is December 1998.

UI Buy will have a positive effect on the way the University does business, will contribute to President Stukel's vision of a streamlined administrative structure without duplication of systems and processes, and will save a considerable amount of money. However, we cannot do any of this without the participation and support of all three of our University communities.

■ Ron Patrick is Project Director for UI Buy.

Buying in to UI Buy: Changing the System through Teamwork

Mike Schluter*

Since becoming President in August 1995, one of President Stukel's top priorities has been to streamline the University's administration and to reduce bureaucracy. His goal is to improve the way business is conducted so the core mission of the University of Illinois – teaching, research, and public service – “can gain a greater portion of our time, attention, and funding.”

An important step toward the realization of that mission has been the Procurement Reengineering Project that began in October 1995. The project scope is to examine, redesign, and implement the process by which all three campuses requisition, purchase, receive, and pay for goods and services. Through a fundamental rethinking of how the University conducts business, the project's goal is to improve service to the University community, reduce the cost associated with the purchasing process, and improve negotiating positions with suppliers.

The Procurement Reengineering Project was organized into several phases. The first phase, which ran from October to December 1995, was an analysis of the current procurement processes, procedures, technologies, and costs by the consulting firm of Coopers & Lybrand (C&L). They found that the current procurement process is:

- not satisfactory to customers
- costly

- lengthy with unnecessary process delays
 - hampered by multiple approvals and hand-offs
 - manual- and paper-intensive
- And finally, C&L found that the University lacks access to the data necessary to negotiate discounts with suppliers effectively.

From these findings, the University Procurement Redesign Steering committee recommended that a process redesign team be selected. This team would be responsible for:

- Identifying potential short-term solutions to procurement-related issues at the University.
- Creating a process vision, including a high-level map of a new and improved procurement process.
- Engineering a new procurement process, including process specifications, required system features and functions, policy changes, and ways in which to measure its performance.
- Developing a business case and implementation plan.

The next phase, which began with selection of the Redesign Team, differed significantly from the way committee assignments have been made in the past. The Redesign Team included representatives from all three campuses. It also included cross-functional expertise from academic departments, purchasing divisions, information technology groups, financial divisions, and Central Stores.

This representation not only ensured that the team would have technical expertise to carry out its assignment, but also that the needs of users would drive the process change.

In addition to the team makeup, the way the team worked also forged new ground at the University. The Redesign Team became a 12-week, full-time commitment for its 13 team members. This relieved all team members from their regular offices and most normal work. Representatives from Chicago and Springfield campuses lived temporarily in Champaign-Urbana during much of January, February, and March of 1996. Though time-intensive, this level of commitment from the team members ensured a timely and focused design effort.

The resulting reengineered process prescribed a system that would:

- be simple and user-friendly
- be highly automated
- support a single University-wide process
- interface with the University financial system
- provide management information
- accommodate preferred supplier strategies
- support faxes, electronic data interchange (EDI), and imaged invoices
- provide internal controls

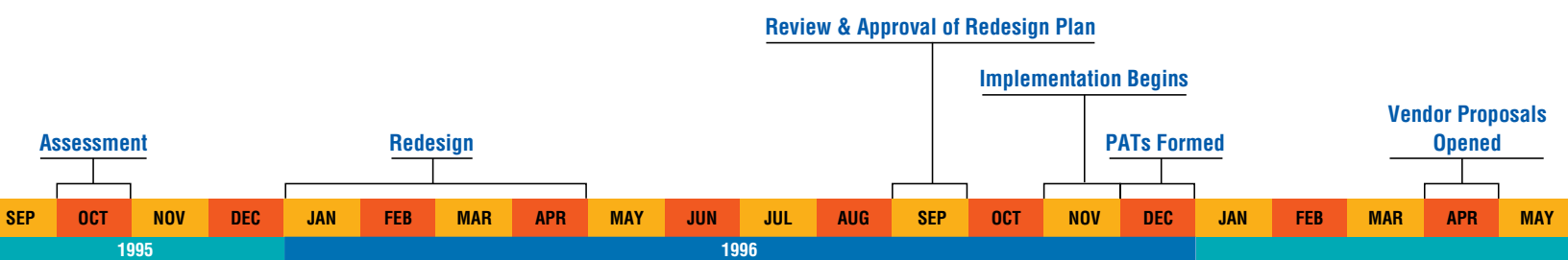
The team also determined that, with implementation of the redesigned process, more than 80 percent of all purchase transactions will go through a simple eight-step process – from ordering to receiving and payment approval. The remaining 20 percent, the exceptions, will be handled through consistent and clearly defined steps, most of which will be built into and supported by the new electronic procurement system.

The next phase of the project was to select the University Procurement Reengineering Implementation Team (UPRIT) and assign it the responsibility of constructing a Request for Proposal (RFP), performing the product search, evaluating bids, recommending a selection, negotiating a contract for purchase of the new system, and following through with implementation.

UPRIT followed a five-step process in making this product selection decision:

1. RFPs

UPRIT reviewed RFPs from other universities which had reengineered and installed new procurement systems. Team members collected information from the Web, printed materials, and organizations like CAUSE and NACUBO. The three campus Project Advisory Teams (PATs) reviewed a draft RFP and made recommendations. The finalized RFP was sent to 40 vendors in March 1997, and seven responses were opened April 7, 1997.



2. Preliminary Evaluation

UPRIT identified 84 items the new system must address. Three vendors could not meet these requirements and were rejected. The Team split into sub-teams to analyze the proposals in terms of how the systems were built and functioned, the viability of the company, and cost. One vendor was rejected, leaving three still to be considered.

3. Product Demonstrations

UPRIT prepared scenarios asking each vendor to demonstrate items such as a single purchase order for nine different items, charged to 11 different accounts, and delivered to three different locations. All UPRIT members (and several PAT members) attended these demonstrations. One vendor was eliminated because it lacked experience with educational institutions, and had priced its product significantly higher than the other vendors.

4. In-depth Analysis

UPRIT again split into sub-teams. The first sub-team, concerned with functionality, conducted telephone interviews and on-site visits with people currently using one of the competing systems. This team, along with PAT members, also reviewed day-long, detailed demonstrations by each vendor.

The second sub-team, concerned with technology, met for two days with each vendor's technology and consulting rep-

resentatives. They investigated the feasibility of implementing each system into the University's current systems.

5. Negotiations

UPRIT negotiated with the two finalists to get the best possible contract terms and conditions. Vendors made significant concessions during these negotiations.

After this in-depth analysis and investigation, the UPRIT unanimously chose to recommend Oracle as the new procurement system.

As the second largest software company in the world, Oracle sells products worth \$5 billion and spends \$500 million on research each year. Their customers include major universities and corporations. UI Buy is confident Oracle can be implemented at the U of I because:

- Oracle has a more advanced Web-based system than its competition.
- Oracle has an impressive, field-tested implementation methodology.
- Oracle is confident the system can be completely installed by December 1998.
- Oracle consultants have been trained on and work exclusively with Oracle products. Other vendors use outside consultants.
- Oracle training is superior to training offered by other vendors. In addition, using the Web capabilities of the system will require much less training for most users.
- The system is user-friendly, simple, and intuitive.
- Users will be able to initiate requisitions, tailor screens, and establish routing/approvals to meet their needs. (For example, users who work most often with requisitions will be able to tailor their screens to display requisition screens first.)
- Users will be able to track a requisition's location, what has been done to it, and who has it.
- Users will be able to forward purchase orders to vendors electronically.
- More than 200 standard management reports will be available.
- Because the system is built on a database, users can create an almost unlimited number of special reports to meet their information needs.
- Oracle employs Microsoft OLE (Object Linking and Embedding).
- Oracle also included its General Ledger (GL) because this component is necessary for full-system operation. At this time,

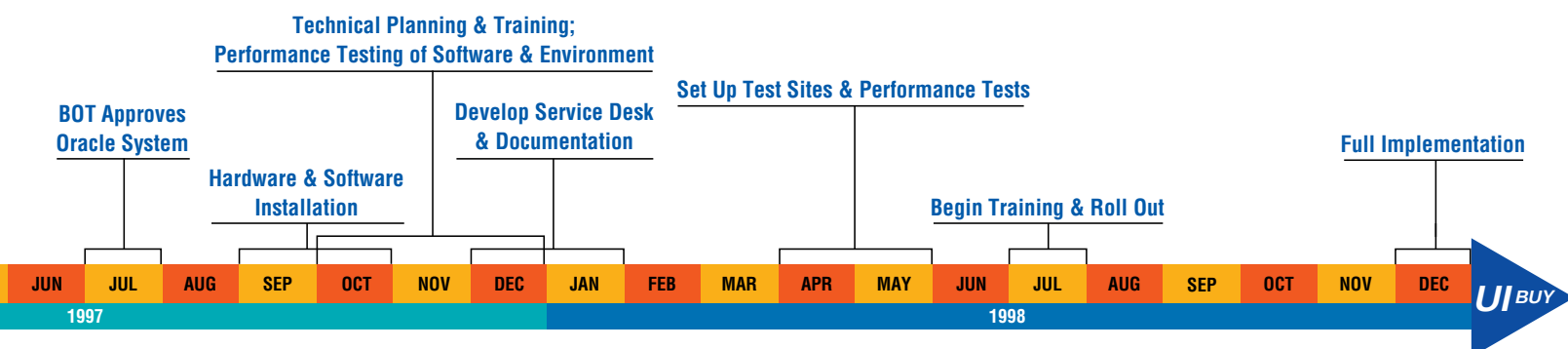
there is no plan to replace our current general ledger, as that decision is outside the scope of the procurement reengineering project. The Oracle GL will interface with UFAS.

UI Buy and Oracle have begun planning the implementation of the various system components. The UI Buy team will evaluate and select an imaging system, plan campus-wide training, set up a service desk, assess the operational impact of these changes and – with the assistance of the Office of Business Affairs – formulate a transition plan to ensure service is not disrupted.

Members of the University Procurement Reengineering Implementation Team are ready to speak to your unit about the new procurement system. Call (217) 333-9567 to make arrangements, or visit www.oba.uillinois.edu/uibuy/ on the Web.

■ Mike Schlueter is Assistant Vice President of AISS Central Office Business Systems.

* The "constructor" of this article would like to thank Ron Patrick, UI Buy Project Director, and Ken Van Der Griend, UI Buy Technical Project Manager, for their assistance in the "cutting and pasting" task.



UI Buy: Frequently Asked Questions

UI Buy project teams have met with many future purchasing system users at all three campuses. The teams found that a number of similar questions were asked everywhere they went. These questions, along with their answers, have been incorporated into a FAQ page on the UI Buy Web site. We've included a few of the most representative questions here.

Will UI Buy process payments to vendors more quickly than today's methods?

Payments should flow much more quickly because the current process calls for the manual assembly of an invoice and purchase order, and in some cases, the receiving report. With UI Buy the order, invoice, and receiving report will be delivered electronically to the payment approver's desk for review and approval. The system will also be capable of a systematic two-way match which will pay some invoices automatically. After approval, an electronic transfer of funds may be made to the vendor.

What kind of reports will UI Buy provide?

Oracle provides more than 200 standard, real-time reports that can be created quickly and easily. As an alternative, you can select information from the huge databases in the system, and download them into a spreadsheet program (such as Microsoft Excel) for further detailed analysis.

How will the approval process work?

The approval process will be electronic. Workflow and approver profiles will be defined within the system for each person who needs to approve each requisition, based on such things as the person submitting the request, the dollar amount, the type of material ordered, and the account to be charged.

Contacts

UI Buy

www.oba.uillinois.edu/uibuy/

E-mail: UIBuy@uillinois.edu

Purchasing Card (P-Card)

www.oba.uillinois.edu/uibuy/pcard/

Marsha Hardman, (217) 333-0095

E-mail: mhardman@uiuc.edu

Will we be able to get electronic catalog information directly from vendors?

The Oracle system can access vendor catalogs via the Web. One method for ordering from a vendor will be to cut and paste the catalog number, description, and price into an order form. If, for example, vendor information is loaded and maintained within the new procurement system, a second method for ordering will be to click on an item in the vendor's catalog and direct the information to the electronic requisition, eliminating the cut-and-paste step.

What hardware will be required?

Identifying the hardware you need is not dependent upon just your use of the new procurement system. The size and capability of your workstation depends on what (in total) you use your workstation for. You should work with your network administrator to size your workstation appropriately. Those using the system on a full-time basis might require a large monitor in order to view invoice images optimally. Additionally, most casual users may require only a desktop computer that is capable of supporting a Web browser.

To find out more about current standard workstation hardware recommendations, refer to the AISS document at www.aiiss.uillinois.edu/CDBS/recommen.html.



Computerese for Beginners

Madelle Becker

Many who are new to computers frequently hear the terms *word processing*, *spreadsheet*, and *database*, but complain that these terms are not clearly defined. Because UI Buy is committed to user-friendly computing, I want to explain these terms and talk about why they're important to our new procurement system.

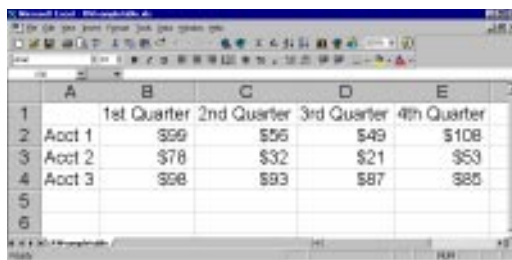
Word processing, spreadsheet, and database are three types of computer programs. Although they were each designed for a specific purpose, they can be used in other ways. For example, you could create and print a letter in a spreadsheet program, but you'd work a little harder because the program wasn't originally designed for that purpose.

Word Processing

A word processing program, such as WordPerfect or Microsoft Word, is designed to create letters, articles (like this one), manuscripts, and simple publications. You can type text, number the pages, and change font size and style. You can even insert charts, tables of financial information, or pictures to give your document some pizzazz.

Spreadsheet

A spreadsheet program, such as QuattroPro or Microsoft Excel, is designed to create financial documents. The screen is usually laid out like a table, with vertical columns and horizontal rows (see figure 1).



	A	B	C	D	E
1		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
2	Acct 1	\$99	\$55	\$49	\$108
3	Acct 2	\$78	\$32	\$21	\$53
4	Acct 3	\$98	\$93	\$87	\$85
5					
6					

Figure 1.

You can enter numbers into row and column cells, and then create formulas to add, subtract, multiply, or divide the numbers. You can also make a graph or chart from the numbers (see figure 2).

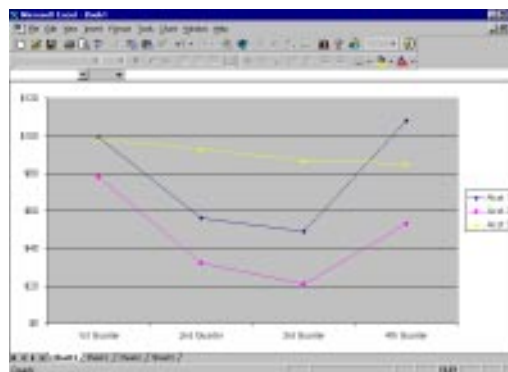


Figure 2.

If you use a spreadsheet program designed to work with a suite of programs (such as Microsoft Office), then you can do even more exciting things. For example, if I create a financial report in Microsoft Word, I can copy and paste a spreadsheet from Excel into the Word document. I don't have to re-type the information and risk making a mistake. I can even link or "relate" the spreadsheet and the Word document so that if I make changes in the spreadsheet, the copy in my report is updated automatically.

Database

A database program, such as Microsoft Access or Oracle, is designed to organize information for easy retrieval. Think of it as keeping your friends' addresses on 4 x 6-inch cards. Each card is a "record." Each piece of information on the card – name, address, birthdate, marital status, number of children, allergies to housepets – is a "field." I can sort the cards according to any of the fields – by arranging them in alphabetical order according to the last name, or chronologically by birthday.

A database can be so simple that all it does is create address labels or store a graduate student's bibliographical information; or, a database can be as powerful and complex as Oracle, the true world-class relational database management system (RDBMS) used in UI Buy. What makes a database more complex is its ability to ensure the accuracy of your information (data integrity) and its ability to accommodate increasing amounts of data (scalability).

Databases store information in a table format. Most databases have the ability to connect, or "relate" parts of one table to parts of another table. Hence the term, "relational database." It means you have to enter information only once, and it's easier to retrieve your information for a report. For example, the database might have vendor, product, or buyer tables. A relationship between the tables could identify which vendors sell specific products, or which buyers purchase a particular product. By relating the three tables, you could determine which vendors buyers used when purchasing products.

Choosing a procurement system built around one of the world's finest databases gives us tremendous reporting ability. We will be able to retrieve department purchase records by any number of fields – date, item purchased, vendor, cost, who approved it, account charged, etc. This data can be retrieved and printed as a report or pasted into word processing documents or spreadsheets.

Welcome to the twenty-first century!

■ Madelle Becker is the Communications Coordinator for UI Buy.

Here's AISS: Quality Assurance

The Quality Assurance (QA) mission is to help AISS deliver high quality, error-free applications on time.

We are a dedicated crew of support professionals who work behind the scenes testing and retesting every component of many AISS applications. Our ultimate goal is to eliminate all problems before an application is delivered to a client.

We acquired SQA's TeamTest suite, an automated testing tool, in the summer of 1996 and have used it to test Electronic Change of Status (ECOS) Phase I, and Budget Creation. TeamTest allows rapid regression testing every time a new version of an application is released. Having now been through the learning curve of this new and very powerful tool, we are ready to use it on many more client/server applications in the coming year.

Not often visible outside of AISS, we want to tell everyone whose job involves using an AISS client/server application that we are working hard to make your life easier!

Eric Sidoti

As manager of AISS QA, I oversee staff at UIC and UIUC. Despite the distance, this group functions as one team, kept together by a common mission and by frequent use of our new video-conferencing capabilities.

I began my computing career as a sales clerk at Boston University, eventually managing all departmental computer sales. My move to Illinois saw a shift to the commercial sector, where I worked for seven years as the leading Macintosh Systems Engineer in the Chicago Northwest area. I joined AISS as a client services representative in 1994. In 1996, I moved to the QA group, and was named manager in May 1997. I earned Microsoft Certified Systems Engineer status in 1995, and SQA Certified Tester certification this year.

Outside of the University, I spend time with my wife Jill and two-year-old son Orion, or create music for my church. As Director of Music Ministry at First Congregational Church in Des Plaines, I direct four choirs and supervise the scheduling of three additional groups plus special soloists. When I can find free time, I enjoy backpacking, camping, science fiction, and role-playing and strategy games of all types.



Kevin Washington

I joined the QA group at UIC in August 1996, and began testing new and enhanced versions of client/server applications before they went into the I am working with the first application QA tested using SQA TeamTest software (ECOS Phase I), and am also the Production Support Engineer for that application. I've also worked on Budget Create in a support role, and currently I'm the Lead Engineer on SHOTS, a medical immunization tracking system at UIC.

Away from work I'm an avid roller skater. I also enjoy bicycling, basketball, traveling, local and world politics, watching football, and dining at all kinds of ethnic restaurants.

Spending quality time with my four kids, Nicole, Kimberly, Savannah, and Onniere is also very important to me.



Mike Wilson

I am an AISS QA Engineer at the UIC campus. I joined the University (and AISS) in July 1997. Before coming to UIC, I worked for a technology solutions consultant as a Team Leader on the Data Analysis and Reporting team for a major managed health care provider. Previously, I worked for a number of years for a European automobile manufacturer as a Regional Parts & Service Manager. Needless to say, the QA position is quite a change and will be an exciting challenge.

Outside of work I enjoy the outdoors – camping, walking, bicycling, etc. I also enjoy playing golf and tennis. My wife Betsy and our two teenagers, Emily and Bill, keep me very busy with various school, church, and other activities. In addition, I am an *X-Files* fanatic.



Scott Strohmeier

In July of this year I came on board as an AISS QA Engineer at UIUC. Prior to this, I worked for Spyglass Inc., as a QA Engineer for their Web browser and Web server products. My last project at Spyglass was a Web browser designed for embedded hardware devices like TV set-top boxes, cellular phones, pagers, and hand-held personal computers. Prior to Spyglass, I worked in technical support for Datastorm Technologies, the maker of Procomm Plus communication software. I did a short stint in the QA department at Datastorm, and have been doing QA ever since.

In my copious spare time, I enjoy reading, watching *Babylon 5*, playing poker, cycling, snow skiing, and stuffing my head full of trivial facts. My wife, Ann, and I have been married since 1991, and have two dogs (a Norwegian Elkhound named Gonzo, and a Beagle mix named Captain) and two cats (Murphy and Lady).



Matt Wolfersberger

June 1991, I joined AISS as a student employee working on the new inventory system – in other words, sticking on barcode tags. Yes, I am to blame for those black stripes on the upper right corner of your monitor. Afterwards, I worked in AISS Client/Server Development testing our client/server applications – a sign of things to come. After graduating from UIUC in May 1996, I began testing the new library system, and assisting QA in testing ECOS, Phase I. I earned the SQA Certified Tester certification this year. Today I am Lead QA Engineer on ECOS Phase II and the library system, as well as Production Support QA Engineer on the Budget Creation '97 project.

In my spare time, I enjoy outdoor activities. I water ski, snow ski, camp, fish, hunt, ride horses – anything that lets me get fresh air. When I can't be outside, I enjoy country music or a good movie. I was married in the summer of 1996 and we have one son. He has a little more hair than most other children and we don't know his exact age, but since he is a cat, nobody seems to find that strange. I refer to him as our son because Sara, my wife, insists on calling me his dad.



Debby Borg-Nolan

It's taken me almost 20 years to travel south to Champaign from Wisconsin (considering I started in Kankakee, Illinois). I have been in the health care field for more than 11 years, since obtaining my BS in Applied Computer Science from the University of Wisconsin-Parkside. I've held positions ranging from computer operator (3rd shift) to operations supervisor to systems analyst. Now I'm a QA Engineer, testing client/server applications. My first project is testing ECOS.

On the personal side: I have an identical twin sister living in Champaign, a seven-year-old son (Evan) who's an upper-level belt in Tae Kwon-do, and a husband (Stewart) who is pursuing his masters degree at the U of I. My extracurricular activity will be searching for Scully, Sassy, Pookie, and Stewie (cats) to join our new home in Savoy (of course, *not* all at once!) We already have Fox (Fox and Scully from *X-Files*).

And to avoid any more Star Trek jokes (my maiden name is Borg), I became a newlywed on August 21, 1997 – because *resistance is futile!*

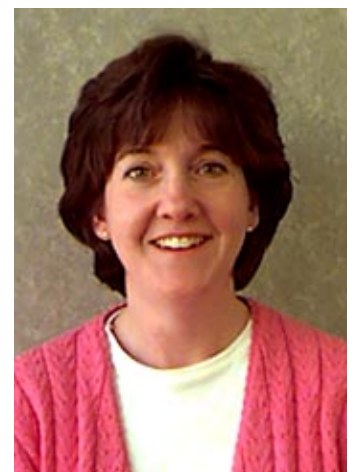


Lori Kelso

I have been with AISS since January of 1988. I was initially in Production Control, where I was responsible for various systems, including Student Accounts Receivables, Cashiering, and General Accounts Receivables. In the ensuing years, I was an administrator of the Report Management System (RMS). I assisted the maintenance of RMS, and taught RMS training classes.

I am now an Associate QA Engineer. I play various roles in QA projects, and am the Workgroup Administrator and Unit Security Contact for the QA group.

Outside of AISS, I am busy enjoying our new daughter, Lindsey Irene, born April 20, 1997. Summers are spent watching my husband John play ASA major-level slow-pitch (state champs and ranked 31st in the country, I might add!). Fall and winter will be spent finishing my bachelors degree in Management Information Systems at the U of I; being a devoted Illinois sports fan; and developing scoreboard graphics for Illinois sports – women's basketball being my favorite.



Planning for 2000

Margaret Krol



A couple of years ago, a friend of mine accompanied her grandmother to an appointment with a new physician. A few minutes after they had checked in with the receptionist, a nurse called my friend to the desk, and told her that the doctor could not see this patient, because she was an infant. My friend, surprised to hear that her grandmother was an infant, checked with reception. The flustered receptionist intervened and explained that no matter how hard she tried, she simply could not find a way to enter the patient's correct birthdate into the computer. There was not sufficient room in the birthdate field to enter the birth year as 1895. She entered 95, the system "assumed" 1995, and calculated her age as less than one year old. This is one example of "the year 2000 problem."

Actually, the year 2000 problem is a collection of several related problems, the most common occurring because many systems allow only two digits to identify a year (such as 95 for birth year), and assume a century of 19. This approach – used in many older computer systems – was taken because early on, computer storage was very expensive. Saving two digits in every date field has been a widely accepted technique that works fine when all dates fall within the same century. For example, a student system that records a student birthdate as 3/16/80 can calculate that student's age easily by subtracting the birth year (80) from the current year (97). But when the current year becomes 00, the student's age

becomes negative, and the calculation will fail. Similarly, sorting according to a 2-digit year fails when dates reach 2000 because records containing 00 will be placed before the 70s, 80s, and 90s, even though the year 2000 is later than 1980.

Problems may also occur even though the underlying data contains the full 4-digit year, if the system allows input of only a 2-digit year. In most of these cases, the input field was programmed to assume a value for the century, i.e., 19. This technique was used when space on a screen was limited, or when keying a 4-digit year was considered too time consuming. This problem, however, is not limited to computer systems. Take a look at your checkbook. Is there a 19 pre-printed in the date field?

**"January 1,
2000,
falls on
Saturday,
so we'll have
all weekend to
fix things!"**

However, you should not assume that you have a problem simply because you see only two digits. Some systems display only two digits to indicate the year, due to space limitations. Often there's no problem because the century is correctly stored in the file, and the correct date can be inferred from the system's output. Unlike computers, humans have very little difficulty interpreting a date displayed as 10/15/97 in a report header – obviously the correct year is 1997 rather than 1897 or 2097.

The third most common year 2000 date problem relates to errors that may occur with specific algorithms used to handle dates – for example, the logic for dealing with leap years.

Years evenly divisible by four are leap years unless they are even centuries. Century years are leap years only if they are evenly divisible by 400. Most programmers never thought their programs would still be running at the end of the century so they didn't worry about it. As a result, some programs that contain perpetual calendars or calculate numbers of days between dates will fail. Likewise, dates stored as the number of days before or after a fixed date may overflow at some point (and not necessarily in 2000). There are also cases in which you may use programs that treat certain dates as having special purposes. For example, some programs set an unexpired ending date for a time range to 12/31/99 – the furthest date in the future that the system could accommodate.

Because these problems have been around for a while, you may have heard some year 2000 jokes being made by computing staff, such as: "Don't worry about getting systems ready for the year 2000. January 1, 2000, falls on Saturday, so we'll have all weekend to fix things!" As with most jokes, there is a kernel of truth in this one, because correcting year 2000 problems is, in most cases, quite straightforward. It is the pinpointing of year 2000 problems before they become catastrophes that is difficult.

Recent newspaper and magazine articles have discussed the year 2000 problem, its potential impact on businesses, and the enormous costs associated with finding and correcting programs that will remain in use past the year 2000. This sort of publicity is important because the problem has the potential to make a significant impact on more than just the Information Systems (IS) community. For example, programs

you run to analyze data, or spreadsheet applications that allow you to set and change dates – all these tasks may be affected. And think about University business conducted online with other institutions or companies – if they aren't prepared for the year 2000, University operations may be disrupted despite our best efforts. However, this recent publicity does give people the impression that the problem has sprung up overnight and taken the computing world by surprise.

IS professionals have been aware of the year 2000 problem for some time, as have any of you who use computers on a daily basis. Some of you may have already encountered problems in programs that incorporate future dates. AISS has gone through a planning process to assess the impact the problem may have on University systems (see Year 2000 Strategy for AISS-maintained Systems, page 12).

To assess the impact this problem may have on you and your department, you may want to draw up a similar plan.

The first step in our plan was to identify the scope of the problem. We did this by classifying computer systems into one of four categories:

1. systems that already handle 4-digit dates correctly
2. systems supported by vendors that are addressing the year 2000 problems in those systems
3. systems that will be replaced or obsolete before dates used in them can reach the year 2000
4. systems in which we must identify and correct year 2000 problems



The second step is to develop a plan for dealing with each type of system. Systems falling into category 1 require no special action. However, we believe that a test of all systems – including those in category 1 – is a good idea to be sure a problem hasn't been overlooked. One approach is to develop a test plan and go through it using future dates, such as 1999, 2000, and 2001. A few words of caution, however: When testing, use a copy of your data. And if you reset a system date on your hardware, be sure you have insulated all other production functions, programs, or files running on that hardware from your date change. You may want to make a complete backup of your personal computer system, run your tests, and then restore from your backup. Alternatively, you could set up a separate, independent test machine.

Systems falling into category 2 require planning for the coming vendor upgrade. You may, for example, be using an older release of a personal computer software package. If so, it will very likely require a purchased upgrade. Begin now to budget for such upgrades, and to plan for all installation, testing, and conversion or cut-over activity that may be necessary.

Also realize that some older personal computers, such as those running old versions of DOS, may never handle dates beyond 1999 correctly. These machines will require hardware and operating system upgrades (in addition to the application software upgrades already mentioned), which could, in turn, require more application software upgrades.

Systems falling into category 3 should be covered within any plans for their replacement before the year 2000. When planning for a system replacement, don't forget to identify an alternative solution which you can implement in the event the new system cannot be put in place on schedule. One alternative, for example, might be to convert all, or a critical subset, of an existing system, for the year 2000. Make sure your checkpoint for making this determination allows sufficient time to implement your alternate plan if necessary.

Systems falling into category 4 require an analysis of the problem, selection of a solution to the problem, correction of the problem, and test of the correction. For example, if you have a file or spreadsheet containing 2-digit years, you may choose to convert them to 4-digit years, and you might schedule completion of this work prior to adding any dates beyond 1999. This approach would avoid your having to convert the century portion of some years to 19 and others to 20, on an individual basis, as you would if you waited until you have a mix of centuries.

Alternatively, you may choose to leave the file unchanged, and modify only those programs impacted by the abbreviated year. A common technique in this situation is to assume that all years less than some number (e.g., 20) have a century of 20, and all years greater than or equal to that number have a century of 19. This is a reasonable alternative if a large number of your programs will be affected by a change in the numerical size of (see Planning, page 12)

Planning

(continued from page 11)

the field containing the year. By leaving the year as a 2-digit field and using program logic to handle the implied century, you can correct and test each program individually. This is unlike a file change, which would require a large conversion of the file and all programs at a single point in time.

Anticipated system lifetime is another factor in selecting a conversion approach. If a system will be phased out just beyond the year 2000, you may want to choose the lower cost alternative, even if it does not give you the best long-term results.

Some of your systems may use files containing dates with 2-digit years, but those files are maintained by another department, such as AISS, or by a vendor. When this is the case, you will want to work with the file owner to determine the disposition of the file. Will the file continue to have 2-digit years, will it be converted to 4-digit years, or will it be eliminated? Identify your options and select the one that is best for your office and the business you conduct. For example, if the file will continue to have a 2-digit year, you may choose to revise your system to use a newer, alternate data source containing 4-digit years, such as the Information Warehouse. Or

you might continue to use the existing file and change your program logic to handle the century portion of the date by inference, as discussed earlier.

The third step in planning for the year 2000 is to watch for possible problems beyond your system's and your direct control. Do you use forms that include a preprinted century number? Are other units and/or vendors that are critical to your work also preparing for the year 2000?

The final step in your plan should be to monitor progress and stay on target with your preparations for January 1, 2000. The up-front cost to prepare for the year 2000 may be high. But the cost of not being

prepared may be significantly higher, both in terms of the resulting errors and in terms of having to correct the underlying problems that are the cause of those errors.

The year 2000 problem is big and has been a worry for quite some time. However, it is better to take steps to fix the problem in the next two years, than to miss the bowl games when you're called in to work on New Year's day, 2000.

■ Margaret Krol is Director of Server Development in AISS Enterprise Server Technologies.

Year 2000 Strategy for AISS-maintained Systems

When we look at a system to determine whether it contains year 2000 problems, we:

A. Use a combination of automated tools and code inspection to find programs that require changes.

We use several tools that scan programs to find items stored as dates, and locate the lines of code in which these data items are used.

We look for calculations or compares that use dates, sorting that uses dates, and cosmetics that need to be changed.

B. Use standard subroutines to effect the changes.

We run a set of subroutines that perform the standard functions on dates, such as compares, subtraction, and addition.

C. Test using a revised date.

We have software that can change the system date for a particular execution to facilitate testing.

But knowing how to approach a system isn't enough. First we must gather some basic information about all our systems, including:

1. Inventory all the systems in our production libraries.
2. Ensure that systems we buy or build have no year 2000 problems.

AISS has been doing this for several years.

The following systems are free of year 2000 problems:

- U of I Direct
- PRMS
- Code Book
- The core systems: EOS, COS, ESTR, Budget Create
- InPower
- Oracle Procurement
- P-Card
- AISS Billing
- System 25 (space reservation)
- Payroll History Database
- Ovid (new Illinois Bibliographic Information System support)

We will install vendor-supplied year 2000 support for the following systems:

- Financial Aid Systems at all three campuses
- MailCode software
- Telecommunications support (Monies)
- Mantext
- DARS

3. Identify systems for which replacement systems are already committed or underway.

Included are:

- Procurement systems
- Payroll-related systems
- On-line catalog library systems
- Graduate admissions at UIUC
- Check writing
- Proposal tracking
- Parking at UIUC
- Portions of O&M at UIC

4. Identify systems that are unlikely to require modification.

5. Among the remaining systems, concentrate first on those that support University core activities.

Included are:

- UFAS
- GAR
- ISIS
- SAR at UIUC
- Undergraduate admissions at UIUC

6. Identify and remove year 2000 problems from all remaining systems

Included are:

- O&M at UIC (started)
- DFMS at UIUC (started)
- RDB (student research database)
- Activity Reporting System at UIUC
- General Labor Distribution System at UIUC
- Correspondence Courses at UIUC
- ICR Direct Cost Accounting
- Grants and Contracts Billing System at UIUC

During the next fiscal year AISS will complete steps 5 and 6.

What You Can Do To Prepare For 2000

Tom Cervenka

Personal computers are less affected by the year 2000 problem than legacy (mainframe) systems, due to their relative youth. There are, however, still a few issues that will affect a small number of personal computer users.

Some DOS- and Windows-compatible PCs have a BIOS problem with the rollover to 2000. Microsoft claims that most of these machines are located in Asia but, nevertheless, you might have one. It is not a big problem. If you have one of these errant BIOSes in your PC and you are not running Win95 or NT (they contain a built-in fix), you might walk into the office on Jan. 3, 2000 to find that your system clock reads Jan. 3, 1980. All you have to do is reset the clock with the utilities provided by Windows 3.x or DOS.

A program called Test2000.exe at www.righttime.com will help you test your machine's BIOS. But why bother? Do you expect to have the same machine come 1/1/2000? Is resetting the date and time that big of a deal? Shouldn't you be more concerned with the fact that you haven't upgraded your operating system in eight years or more?

Microsoft has addressed issues of concern to its DOS, Windows 3.x, Win95 and NT customers in the FAQ file, www.microsoft.com/CIO/Articles/YEAR2000FAQ.htm.

Most Microsoft application products don't actually deal with dates, they rely on the

operating system and a database to store or manipulate them. Those products that do directly store or manipulate dates are good until at least 2099. You'll find a table in the FAQ that lists the year limit for each application.

IBM has a nice "Year 2000 FAQ" article at www.ibm.com/IBM/year2000/y2kfaq.html, and a Technical Support Center at www.software.ibm.com/year2000/index.html.

Macs have, from the beginning of the 128K model in 1984, been able to correctly represent time from 1/1/1904 to 2/6/2040 (at least until 6:28:16 AM). All the Mac OS date and time utilities use 64-bit signed values, allowing dates from 30,081 B.C to 29,940 A.D.

Clarix products will handle dates correctly until at least 2019 (most of them go well beyond).

You'd think that Rhapsody would be immune to Year 2000 problems and you'd be right (although you might be surprised to find out that 2038 turns out to be the limit to its foresight).

Apple has a great Year 2000 FAQ at macos.apple.com.

The major task for the personal computer user is identifying potential problems and checking them out. Start with the programs that are important to you. I use Quicken 6 to handle my personal finances, so I want to be sure that it will survive past 2000. Referring to Margaret Krol's article, I must find out under which of the four system categories Quicken falls.

A look at www.intuit.com (Intuit is the company that publishes Quicken) reveals a link called "How do Intuit's products address the year 2000?" Following that link I find that Quicken 6 will handle dates until 2027. This might be a problem if I want to use Quicken to track a 30-year mortgage starting in 1999, but I don't care about that. It looks like Quicken 6 is a category 1 system.

Krol also suggests testing a category 1 system, just in case. So I do. I first create a new file. Then, I notice that dates show up as mm/dd/yy. What will happen if I enter 2001 as the year of a new transaction? Hey, it displays the date as 10/23/2001 until I record it. Then it reappears as 10/23/01. Uh oh, looks like I'm dealing with shortcuts. I go back to the Intuit site and find out that all years of 27 or less are year 2000. OK...makes sense since I will never need to enter a date of 1927 or less. But I will have to upgrade before 2028.

Figuring out the maximum date that a product can handle is only part of the task. If an application uses shortcuts (most do), it's important that you figure out how they work. There is no standard algorithm for handling them, yet.

One last check: does Quicken know that 2000 is a leap year? Some systems think that if a year is divisible by 100 it is not a leap year. Actually, this is only true for

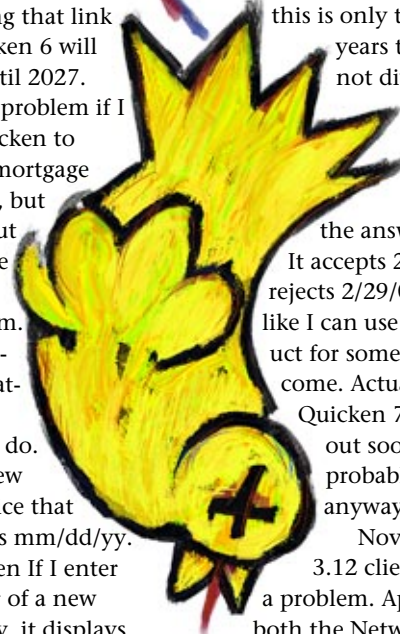
years that are also not divisible by 400. It's best to check...

And the answer is Yes! It accepts 2/29/00 but rejects 2/29/01. It looks like I can use this product for some time to come. Actually

Quicken 7 is coming out soon so I'll probably upgrade anyway.

Novell Netware 3.12 clients do have a problem. Apparently, both the Netware 4.1 and 3.12 clients and servers refuse to recognize dates past 1999. Check out the 10/20/97 issue of *Infoworld* for the full story. Novell has a fix for the problem but a bigger problem is how to get the fix to the 3.12 clients. Netware 4.1 can automatically update its clients via the Novell Application Launcher, but that option isn't available in 3.12. There are a lot of 3.12 clients out there, so if you are one of them, expect to see a tired network manager running around with a diskette in the near future. The fix can be found at www.support.novell.com.

■ Tom Cervenka is a consultant in AISS Advanced Technologies.



News Briefs

AISS Help Desk Consolidation

Suzi McLain

"...please contact the AISS Help Desk at (217) 333-3102." Many of you have encountered this message when using applications supported by AISS. The Help Desk receives approximately 35,000 calls per year, and support has evolved from being strictly related to main-frame services to including support/triage for AISS-developed client/server applications, information warehouse applications, library network and system services, and desktop support.

The Help Desk's mission is to increase the productivity of clients using information technology. To this end, we work toward providing efficient and effective means of answering client questions and solving their problems. We evaluated the existing Help Desk service model and took into account the distributed model of the University (workstations, LAN, campus backbone, application/server, etc.) and feedback from our clients. Our challenge was to determine how we could best provide support for the ever changing computing needs of our clients, the University of Illinois, and the state-wide libraries.

Part of our reengineering effort was to consolidate our Help Desk operation at UIUC as of July 1, 1997. This allows the Help Desk to handle more efficiently the increased call volume that has resulted from the introduction of client/server applications and the additional responsibility of providing service for the Springfield campus. The key to this consolidated model is that clients

continue to have a single point of contact (the Help Desk) for all aspects of AISS support. Managing the calls in such a manner provides the benefit of tracking all calls reported – from initiation to resolution – in a single repository of information. As our University business partners explore setting up their own "service centers" to provide subject matter expert support, we will work together with them to ensure that we are coordinating calls effectively so that client problems will be resolved as quickly as possible. We're now providing a better level of service to our clients by being able to answer a greater percentage of calls through one call queue, and our costs have been reduced by eliminating duplicate call center technology.

We are currently working to further improve our services. If you have suggestions or comments, please contact Help Desk Manager Terry Wilson, at (217) 333-5455 or ftwilso@uillinois.edu.

"...Thank you for calling!"

■ *Suzi McLain, former AISS Help Desk Manager, recently joined AISS Administration and Planning. (Terry Wilson, formerly a consultant in AISS Client Support Services at UIUC, has assumed command of the Help Desk.)*

AISS Client/Server Application Nominated for Smithsonian Award

Earlier this year Class Manager, a client/server application developed by AISS and used at UIC, was nominated for a Computerworld Smithsonian Award. The application's developer, Beth Walsten, attended the gala awards presentation evening in Washington, DC.

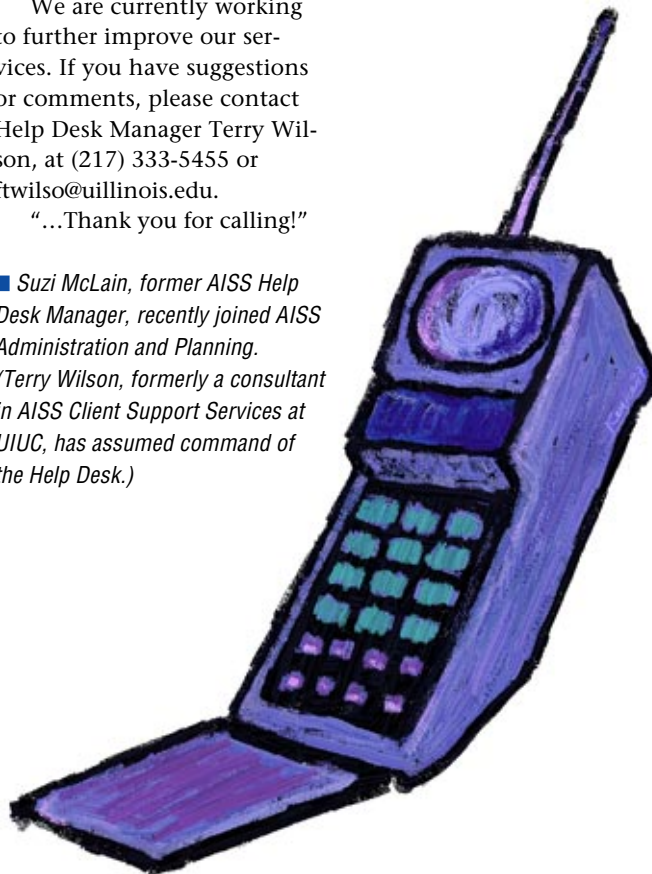
As part of the nomination process, Class Manager became part of the Smithsonian Institution's Permanent Research Collection of Information Technology Innovation at the National Museum of American History on June 10. The collection serves a historical purpose by helping the National Museum of American History record the information technology revo-

lution and the effect it has on our lives. As part of the Smithsonian Institution's Permanent Collection, Class Manager becomes part of a national treasure which documents the way information technology is being used to shape society and improve our world.

Founded in 1989, the Computerworld Smithsonian Program searches for and recognizes those who have demonstrated vision and leadership as they strive to use information technology in innovative ways.

When the 1997 Collection was formally presented to the Smithsonian Institution in June, the Class Manager case study joined more than 2,000 other examples of innovative uses of information technology, available to citizens, scholars, and researchers worldwide.

Class Manager is used by faculty and teaching assistants at UIC to organize, coordinate, and manage class and student information electronically – formerly a process exclusive to paper. Classes, sections, student rosters, and grades can be entered, tracked, and maintained electronically, and because any changes to the on-line information are reflected immediately, instructors and assistants can find anything they need to know about a class or its students, at any time.



TIC Going On-line; New URL for AISS Web Site

We are happy to announce that this issue of *TIC* is to be the final issue published by traditional means – that is to say, on paper. Yes, future issues of *TIC* will be “published” to our Web site at: www.aiiss.uillinois.edu. Please note that this is a new URL.

AISS Publication Services is one small part in a unit whose mission includes promoting new technology to improve cost effectiveness and efficiency. In moving to an electronic-only newsletter, we not only contribute to the fulfillment of

the AISS mission, we also show our support of President Stukel’s direction for streamlining business processes and reducing paper consumption.

It seems significant, too, that our last paper issue focuses on the new University procurement system, UI Buy. UI Buy is the premier example of this University’s effort to integrate technology, streamline business processes, improve efficiency, and reduce dependency on paper. UI Buy is exemplary in that it is a multicampus effort – staff from all three U of I campuses are working together to give us a procurement system that works for everyone.

UI Buy is also about change. Change in the way goods and services are purchased, change in the way they are paid for. Change in the way the University does business with vendors. Change to things that may be familiar to you – forms, processes, applications. Change in the way you do things. But you aren’t alone – we’re all in this together.

We are not the first to do these things. We are not at the cliff’s edge, about to jump into the blue, with no idea what we might land in or on. Some of the electronic processes that will soon be implemented here have been in place for a num-

ber of years in many major corporations and financial institutions. Imaging, electronic data interchange (EDI), electronic forms processing – none are new to today’s business world. In some ways we are facing the twenty-first century without being fully up to speed in the twentieth. We must keep pace with our business affiliates if we wish to continue to do business with them and keep their respect as a valued client.

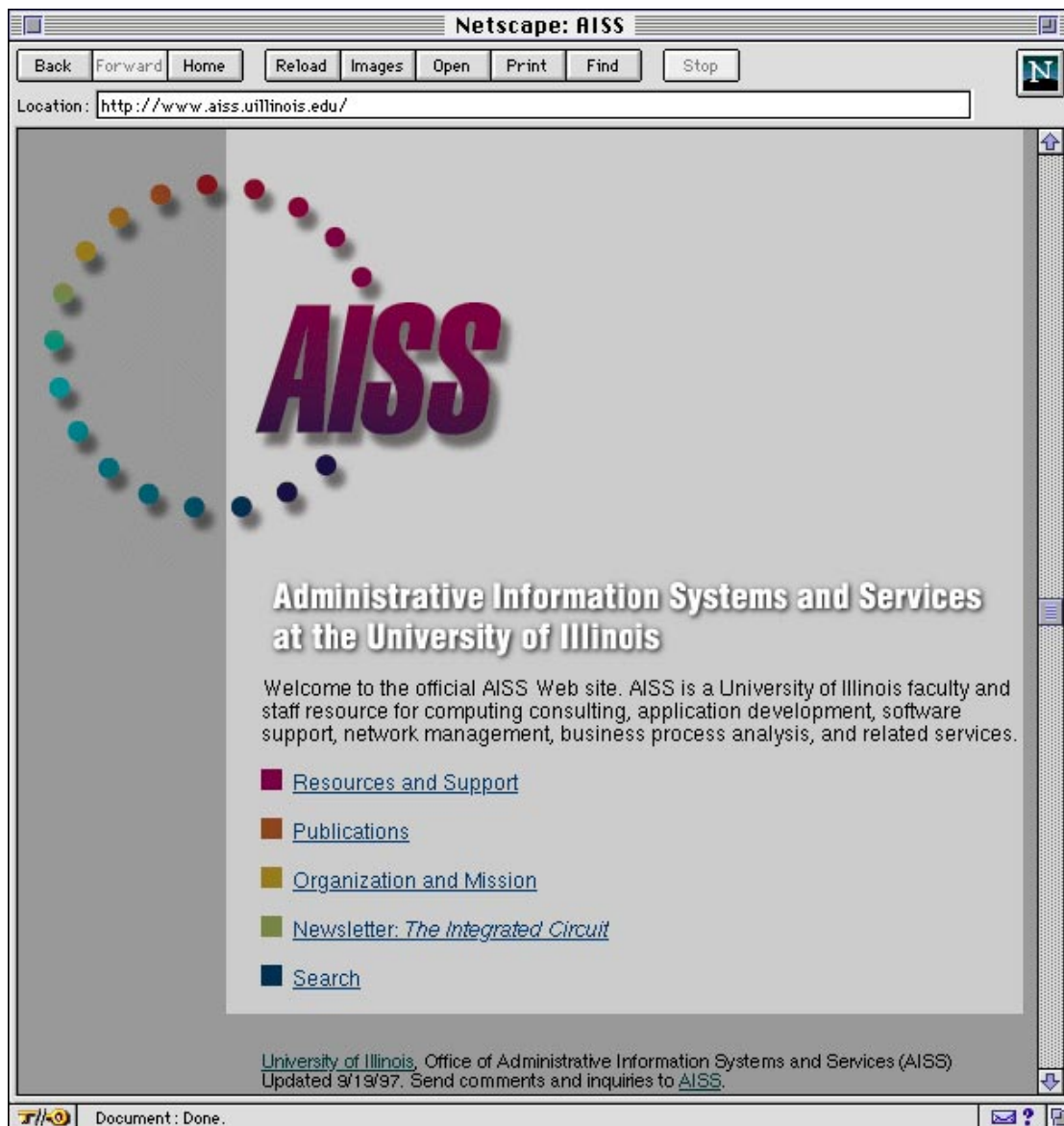
If you are a *TIC* subscriber, you should soon receive an e-mail notification about *TIC* going on-line, and asking whether you wish to continue to be notified when new issues are published. If you receive the e-mail notification, you need do nothing to continue as a subscriber.

If you currently subscribe but do not receive that e-mail announcement, then we need your e-mail address. If you wish to be notified about future issues of *TIC*, send e-mail to: tic@uillinois.edu, and on one line in the message area type: *subscribe tic*.

If you do not wish to receive announcements about future issues of *TIC*, simply respond to the e-mail notification by replying to tic@uillinois.edu, and in the subject line, type: *unsubscribe*.

I thank all of you who have subscribed over the years, and who have occasionally written or sent e-mail. We appreciate hearing from you – after all, we describe *TIC* as a newsletter for the U of I computing community. I hope each of you will continue with us as we move forward into the world of electronic publishing.

– Terry Heimbaugh,
Associate Publications Editor



AISS Quick Reference Directory

AISS Help Desk: (217) 333-3102
Visit the AISS Web site at *www.uillinois.edu*

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Facility Management Director: Mary Ellen Gaughan 996-5506
Network Management Director: Brian Mack 996-5075

Administration and Planning
Assistant Vice President: Thom Brown 244-4110
Business Operations: Connie Walsh 333-4802
Billing: Lisa Ferris 333-6395

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Client Support Services Director UIUC: Steve Stuart-Doig 244-1608
Client Support Services Director UIC: Mark Askren 413-7741
Client/Server Development Director: Scott McCartney 333-5459

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Public “Dial-up” Access
Administrative Computer Services Via Phone Line
UIC: 996-8812
UIUC: 333-4372

Library Computer System Via Phone Line
UIC: 996-8844
UIUC: 333-2494

UIC = U of I Chicago UIUC = U of I Urbana-Champaign

The Integrated Circuit

50 Gerty Drive; MC-673 Champaign, Illinois 61820