March 4, 2005

RANDALL LEAVES ADVANSTAR

Brian Randall has resigned from his position as GM of **Advanstar's** IT Group to take a job with another trade show company. The move comes less than three months before the **AIIM/On Demand Conference & Expo**, set for May 17-19th at the **Pennsylvania Convention Center** in Philadelphia. Last month, Randall told us how excited he was about the show, which *Tradeshow Week* has billed as "North America's largest business IT event."

"This was not something that caught us by surprise," Kerry Gumas, VP and GM of Advanstar's Technology Group, told *DIR*. "Brian and I had been discussing the situation for awhile."

From what we understand, Randall has taken a job with Portland, ME-based **Diversified Business Communications**, which produces trade shows for the food and hospitality market. "Most of the planning for this year's AIIM/On Demand show is complete," said Gumas. "This includes the marketing strategy used to attract end users. All that is left is to complete the physical details of carrying it out.

"We actually thought it was an ideal time to bring someone new on board to take those plans to completion, and really get up to speed as the show approaches. Brian will continue to work with us on some of the show committees."

When we spoke with Gumas, he was not at liberty to release the name of Randall's successor, but indicated it would be someone with a strong IT trade show resumè. Randall began working with AIIM as the VP of sales and marketing in 2001. He joined Advanstar the following year when the company purchased the AIIM Expo & Conference in 2001 [*see DIR* 2/1/02].

For more information: http://show.aiimondemand.com

Kodak Sets Its Course Downstream

Distributed capture was the talk of the town last week at **Kodak's** 7th annual Breakaway partner conference held at the **Marriott Rivercenter** in San Antonio, TX. At the event, the Rochester-based imaging giant discussed plans for further penetrating the sub-$10,000 document scanner space, which it first began seriously targeting three years ago. Other hot topics included the recent corporate combination of Kodak's Document Imaging Group with its burgeoning high-end print business, and the introduction of a new program for offering reference archive image-to-microfilm services over the Web.

No new products were introduced at Breakaway, which is understandable considering the number of new releases the company unveiled throughout the past 13 months. Rather, Kodak seems focused on adjusting its personnel and strategy to take advantage of everything it now has in its arsenal. At the event, *DIR* was introduced to Bill Gates, who has been promoted to general manager and VP of sales, Document Imaging in the U.S. & Canada. Gates has worked with the company's Latin American channel for the past three years and has now been charged with building up the company's North American channel.

Kodak is counting on this channel to help it gain additional market share with what it has labeled as its "distributed" group of products. These include Kodak's workgroup, departmental, and low-volume production document scanners. To date, Kodak has been more successful with these offerings in geographic markets outside of North America. In 2004, they made up 20% of Kodak's North American document scanner revenue. For 2005, the company has set a goal of raising that to 30-35%.

The introduction of the own-manufactured i100 departmental model earlier this year should help [*see DIR* 1/21/05]. "Our main competitive advantage lies in our ability to leverage technology we've

developed for the high-end of the market in our lower volume products," said Erwin Schwarzl, general manager of Kodak Document Imaging.

This strategy seems to have already paid off in a large sale that was discussed at the event. A large financial institution reportedly has committed to purchasing 5,000-8,000 i40 workgroup scanners this year, after buying 1,400 late last year. According to Kodak execs, this is just the first phase of a potentially larger rollout. Apparently, Kodak's PerfectPage with iThresholding image processing technology was a key element in the deal.

Robert Bijster, marketing manager for Kodak's *Capture Software* indicated the company is also looking to add more distributed capture-focused features to its image capture application.

Kodak Bundling VRS With i600

All this doesn't mean Kodak is forgetting the products it has now labeled its "production" document scanners, in the mid- and high-volume segments. At Breakaway, Kodak announced a deal to include a copy of **Kofax's** VRS software free to resellers for the next six months with purchases of i600 series scanners. Despite the fact that the successful i600 series already includes PerfectPage with iThresholding, apparently 30-40% of them are currently being installed with VRS. The VRS list price for an i600 is more than $2,000. The i600's main competition, the **Böwe Bell & Howell** Spectrum 8000 series has always included VRS. "If this arrangement with Kofax works out well, we will consider extending the time period indefinitely," said Roger Markham, marketing manager for Kodak's production-level scanners.

Kodak has also increased the flexibility of the ultrasonic double-feed detection sensors on the i600 series and added automatic color document detection. In the high-volume i800 series, Kodak has introduced grayscale capabilities on the color-capable i820 and i840 models. "We received some requests, particularly from customers who wanted to use grayscale images for OMR (optical mark recognition) applications," said Markham. "We currently have no plans to introduce VRS for the i800 series, partly because it would require a hardware component to continue to run at rated speeds."

Kodak has also dropped the list price of its i660 from $52,000 to $47,000. This brings the i660 within a couple thousand dollars of the competitive Böwe Bell & Howell Spectrum 8125.

Program Eases Film-From-Imaging Creation

For service bureaus that work with microfilm, Kodak introduced a new program entitled RASN (Reference Archive Service Network). RASN is designed to make it easy for service bureaus to receive images that need to be written to archival microfilm for long-term storage. Through the program, service bureaus will receive a software application that can be distributed to their customers and used to create

"virtual rolls of film." These virtual rolls, which consist of document images and their indexing information, can then be submitted electronically to the service bureaus, which can write them to microfilm.

Nancy R. Dhurjaty, the marketing manager for RASN, estimated Kodak has sold more than 800 Archive Writer image-to-microfilm machines worldwide, mainly to service bureaus and government customers. At Breakaway, RASN was introduced to an overflow room of more than 60 service bureau representatives.

Exploring Input-To-Output Synergies

From a corporate standpoint, the integration of Document Imaging with Kodak's rapidly expanding high-end print business has created a $4 billion group known as Graphic Communications. The initial synergy between the two groups will be realized in their services components, which are being combined into a single entity run by Dolores Traxler, general manager of Documents Products and Services, and VP, Eastman Kodak Company.

The combination of the various service entities is expected to be completed before the end of the year. It will create an organization with more than 2,000 field service technicians worldwide and 1,200 in North America—approximately double the size of the organization in 2004.

On the products side, Schwarzl indicated the company is just beginning to explore some of the potential crossover. "One thing we have started looking at is aligning the settings of our color output from printers with our color scanner settings for more effective capture and color dropout," said Schwarzl. [*This is the type of functionality being tested by* **ADI**, *which makes recommendations to the* **U.S. Census Bureau** *regarding imaging and document technology; see* DIR *8/20/04. The Census Bureau is expected to award the contract for processing the 2010 census forms this summer.*]

Market Still In Need Of Education

More than 600 people from the Americas attended Breakaway, which represented a record number for the event. *DIR* editor Ralph Gammon participated in a pair of educational panels discussing trends in the industry. Both sessions had a lively audience asking questions on topics like distributed capture, the digital mailroom, and even Check 21. Kodak also hosted a dinner party/tradeshow event that featured more than 20 exhibitors.

The continued growth of events like Breakaway is just one more piece of evidence of the current health of the document imaging market. Resellers

who attend these events are hungry for education. Kodak deserves kudos for offering it to them in what was by no means a rah-rah, sell-more-Kodak environment. I think we all realize that despite the fact that Kodak has been selling document scanning products for more than 15 years, in many ways, this is still an immature market that requires some careful nurturing in the form of education.

For more information:
http://www.kodak.com/go/docimaging
http://www.kodak/go/rasn

Direct Network Connections For Workgroup Scanners

silex technology america would like to help users make their workgroup scanners act more like true workgroup devices. In other words, they'd like to help users hook them directly into their networks—minus the PC traditionally used as a scan station. To enable this, silex is currently targeting its SX-5000U2 USB-device server at the workgroup scanner space.

silex, which is headquartered in Osaka, Japan, is a leading provider of network printing technology. "We have a long history of partnerships with the leading Japanese printer and MFP manufacturers," said Keith Sugawara, VP of silex america's network division. "We see a lot of similarities in the scanning market, to what we saw in the printing market 10 years ago. At that time, most people's printers were connected to PCs. We see an opportunity to replace those PCs at a fraction of their cost, while also reducing device footprints—perhaps eventually integrating our technology into the scanners themselves."

The SX-5000U2 has a list price of $229 and is available through silex resellers, e-tailers, and retailers. In Japan, it is currently being sold by **Fujitsu** as a document scanning accessory, and **Headway** recently signed on to distribute the device in Europe. Sugawara is currently attempting to forge North American relationships with scanner vendors, distributors, and resellers.

The device is a small black box with four USB ports on one side and an Ethernet port on the other. It includes a software driver. silex is currently developing a single-port USB-device server targeted specifically at document scanners. According to Sugawara, the new device will list for less than $150. "It will also be smaller, and eventually we see it possibly being embedded in the scanning hardware," he added.

At last week's **Kodak** Breakaway partner conference, silex announced that the SX-5000U2 officially works with Kodak scanners. silex demonstrated a connection using a Kodak i40. "For most devices, connecting to our device should be plug-and-play," said Sugawara. "Our device emulates a direct PC connection. Once you make this connection, you can launch your capture application from the desktop and proceed to scan like you normally would. You walk over to the scanner, load the paper, push a button, and the images will show up at your workstation."

Sugawara acknowledged that there will be some speed degradation working through a device server vs. a direct PC-connection. At Breakaway, he estimated the i40 was capturing images at about half its rated speed of 25 ppm. "This is caused by network overhead and some other factors," he said. "Essentially, in most workgroup environments where we envision this being used, we don't see this loss of speed as a big deal."

For more information: **silex technology america**, Salt Lake City, UT, PH (801) 747-0656, http://www.silexamerica.com

Fujitsu Goes Lower

It's no secret that the workgroup segment (sub-$2,000) is the hottest market in document scanning. Over the past two years, we've watched the segment explode, and we've also watched a host of new vendors enter the space, hoping to get a piece of the rapidly growing pie. Meanwhile, segment leader **Fujitsu** has held its own, relying primarily on the fi-4x20 line it introduced almost three years ago.

Well, it's status quo no more for Fujitsu. After upgrading the fi-4x20s in November [*see DIR 11/19/04*], FCPA (Fujitsu Computer Products of America) has followed suit with a new sheetfed-only workgroup model that represents the lowest-priced networkable duplex scanner on our price sheets.

The fi-5110C was announced last week and is currently shipping. It is rated at 15 ppm/30 ipm at 200 dpi in bi-tonal and grayscale, and at 150 dpi in color. Its list price of $895 is $500 less than Fujitsu's 4120C and $100 less than the **Panasonic** KV-S2026, the next least expensive networkable duplex model we have listed. [*The Fujitsu ScanSnap lists for $495, but does not include TWAIN and ISIS drivers.*]

"With its lower-price point and more modest specs, we think the 5110 appeals to a segment of the market we weren't reaching that well with other products," said Scott Francis, director of product marketing for the Imaging Products Group at FCPA. "When I started at Fujitsu in 1999, I think there were 15,000 scanners sold in the whole workgroup segment. The latest projections I've seen have that number rising over 200,000 in a few years. As part of this explosive growth, we've seen an emerging sub-segment for document scanners in the $300-700 range.

Fujitsu's new fi-5110C represents the lowest-priced networkable duplex scanner on our price sheets.

"Our ScanSnap fits in there, but it doesn't enable users to connect directly to network document imaging applications," said Francis. "A lot of users looking for scanners in this price range have been purchasing them from consumer-focused vendors who have added some document imaging functionality. When these scanners don't hold up, these users often end up coming to Fujitsu. The 5110 offers an even lower barrier to entry for our products."

Like the 4x20 series, the 5110 includes infra-red, or thickness-based, double-feed detection, a unique feature in the workgroup segment. It also comes bundled with **Adobe** Acrobat. "Aside from the speed, probably the biggest difference from the 4x20 series is in the software bundle," said Francis. "The 5110 does not include **Kofax** VRS or *Capio*."

Another key difference may also be that the 5110 is not being targeted at card scanning the way the 4120C has. "We've had some success in medical environments with the 4120C because of its ability to handle plastic items like hospital admission cards, as well as paper administration forms," said Francis. "While the 5110 might scan cards better than some non-Fujitsu scanners, we have specifically positioned the 4120C as our 'paper or plastic' scanner."

Speaking of plastic, FCPA also recently introduced the fi-60F small document and card scanner. "Traditional applications for these types of devices include scanning passports and receipts," said Francis. "The fi-60F provides our VARs with another tool to be deployed in areas where a full-page scanner might not be needed, or might not fit. We see the Patriot Act as potentially driving an increase in ID scanning. Check 21 [*as it drives point-of-purchase check capture, see DIR 2/18/05*] could have a similar effect."

The fi-60F lists for $395, includes color capabilities and TWAIN and ISIS drivers, and is available through the usual Fujitsu distributors.

Finally, Francis added that FCPA will continue to market the ScanPartner 15C, a simplex document scanner that includes a flatbed and lists for $995.

For more information:
http://www.fcpa.com/products/scanners/

FormScape Successfully Blends Input & Output

There's been a lot of talk in the document management world over the past couple years about combining the worlds of input and output. The theory has been that documents coming into an organization invariably affect those going out, and vice versa. Despite this posturing, however, there has really been little tangible evidence of combined input and output solutions in the real world. That may be starting to change.

DIR recently caught up with **FormScape**, a well-known output vendor that has been enjoying some success in the document imaging space. According to Brian Reed, FormScape's VP of global marketing, the company has sold some 50 document imaging and storage applications since introducing its *Covus* product line in 2003. Recently, FormScape sold an invoice processing solution to Raleigh, NC-based real estate management firm **Highwoods Properties**.

Prior to introducing *Covus*, FormScape's entire revenue was generated from software for managing high-volume output for distribution environments. It specializes in forms such as checks, invoices, purchase orders, etc. "Then, about three years ago, we expanded into the document storage space by introducing COLD/ERM-type capabilities," Reed told *DIR*. "This was driven by customers asking us questions like, 'What if we have to reprint some of our invoices?' or 'How do we archive the documentation that we generated for an FDA-regulated device we manufactured?'

"Our technology already had the underpinnings of a storage system—we just added some logic in areas like free-text search and cross indexing, and we were able to go from just output-to-distribution, to output-to-storage. Since we began offering storage, the majority of our new customers have purchased it."

Storing only output documents, however, proved not to be enough for FormScape customer **Hays Personnel**. "Hays is the Manpower of the U.K." said Reed. "It provides its customer base with some 25,000 part-time and non-permanent employees. Hays brought in FormScape to improve its invoicing to these customers.

"After we solved the invoice distribution problems, however, we uncovered another issue. It turned out that more than half of Hays' customers were challenging their bills, which created a very high average DSO (days sales outstanding). To solve this problem, we used a partner and brought in some document imaging technology.

> **"We immediately recognized three to four other customers who had similar situations where the documents going out were dependent on something coming in further upstream."**
>
> **—Brian Reed, FormScape**

"We then set up a system to capture all the time sheets that were used to create the invoices. Now, when our system generates a batch of invoices, it also generates copies of the time sheets, which are sent to the clients as well. The customer challenge rate has dropped to 5%, and in the first six months, we knocked four days off Hays' average DSO."

The success with Hays got FormScape thinking about similar problems at other customers. "Accounts payable and receivable are two of our major focus areas with our output line," said Reed. "What Hays really had was a problem with its ordering cycle running through AR. We immediately recognized three to four other customers who had similar situations where the documents going out were dependent on something coming in further upstream. At that point, we realized we needed our own imaging system with a BPM layer on top of it."

To add imaging technology, FormScape signed a one-time source code license with "a well-known imaging vendor." FormScape built its BPM layer itself. "Our output technology has very rich features in areas like integration, transactions, and routing, so it wasn't hard to expand that to a full-blown BPM application."

The new document imaging, BPM, and storage application was labeled *Covus* and began shipping a year-and-a-half ago. Since then, FormScape has more than 50 installations. *Covus* was recently credited with driving 18% growth in FormScape's revenue for the second quarter of its fiscal 2005. "Out of the 50 installs, 1/3 have been to new

customers and 2/3 to existing customers," estimated Reed. "For new sales, *Covus* has helped drive our average software deal size up near $250,000."

ERP Provides The Hub

Reed noted that most of FormScape's sales involve integration with ERP systems, both for input and output documents. The Highwoods deal is no exception. "We had gone live with our JD Edwards system in 2000 and at that time, we purchased FormScape's solution for check printing," explained Kevin Penn, CIO at Highwoods.

After solving its output problems, Highwoods began looking at a way to improve the invoice processing that comes before the checks can be cut. "Because we grew through a number of acquisitions, our invoices were arriving at decentralized locations throughout the region," Penn told *DIR*. "There, they would be stamped and coded manually by site managers before being forwarded to our central AP group."

Highwoods decided to go with a centralized image-based invoice processing system for a couple reasons. "First, our property managers' job is to take care of their tenants and buildings, not to be doing paperwork," Penn said. "Second, we thought we could reduce our payment times, and as a result, take advantage of early payment discounts while reducing late fees. Based on this second aspect, we think we can achieve a hard ROI on our *Covus* installation in less than a year."

Highwoods looked at several invoice processing applications before choosing *Covus*. "Part of the attraction is the integrated repository for checks and invoices," acknowledged Penn. "Leveraging this, we can enable field personnel to look up a vendor's historical paper trail of invoices and checks through a Web interface without having to log into JD Edwards. We also really like the ability to configure the *Covus* interface in the way we want it."

FormScape's invoice capture application includes templating and OCR/ICR capabilities, as well as the ability to match results against existing information in a customer's database.

Reed concluded by saying the ability to offer both input and output technology has proven to be a real competitive edge for FormScape. "In JD Edwards environments, a lot of our customers have historically used Optika (now owned by **Stellent**) for their input," he said. "Since we've introduced *Covus*, I don't think we've lost a single deal to Stellent."

For more information: **FormScape**, Morrisville, NC, PH (919) 657-1100; http://www.formscape.com

eMortgage Alliance Seeks Members

Vendor organization embraces imaging as necessary part of e-mortgage solutions.

The recent wave of mortgage re-financing brought on by lower interest rates has made scanning mortgages a hotter application than ever for document imaging vendors. There is no question, it's much more efficient for a lender to push around a 300-page image file than a 300-page paper file [*for details, see story on next page*]. However, taking this approach to the next level, wouldn't it be even more efficient if the loan documentation never became paper? And if e-mortgages become a reality, what does that mean for document imaging's future?

We posed these questions to Jason King of **Hyland Software** and Tom Litke of **WellFound Decade Corporation**. Litke is the Vice Chair of the **eMortgage Alliance**, a vendor organization which Hyland recently joined. We asked King, Hyland's lending industry manager, why a document imaging vendor would become a part of an organization that sounds like it's designed to eliminate the need for imaging.

"We have always stood for going paperless," King told *DIR*. "We incorporate all sorts of features in our software so users never have to print their documents. If paper goes away tomorrow, Hyland is still going to be here, because there is a need to manage electronic documents."

That said, neither King nor Litke sees paper as disappearing anytime soon from the mortgage industry. "Many of the leading mortgage lenders have had systems in place for three to four years that involve scanning and electronically routing their documents [*and paper hasn't gone away yet*]," said King. "Yes, there are applications available that can create electronic mortgage forms, but I saw some results from a recent survey by the **Mortgage Bankers Association** (**MBA**) that said even 10 years from now, only 60% of mortgage vendors will be e-mortgage-ready."

So, what is holding up e-mortgage adoption? "The industry is used to paper," said King. "A lot of mortgage lenders look to the top 10 lenders to kind of set the standard, and they are just starting to move to e-mortgages. That said, I think within the next year-and-a-half, all of them will implement some sort of e-mortgage initiative."

The goal of the eMortgage Alliance is to ensure those initiatives will be based on the SMART

(Securable, Manageable, Archivable, Retrievable, Transferable) docs standard developed by **MISMO** (the **Mortgage Industry Standards Maintenance Organization**). SMART docs is an XML-based standard that incorporates more than 5,000 data elements associated with a mortgage loan. SMART docs can encompass electronically generated documents as well as document images. "One level of SMART docs incorporates XML-based data with an XHTML view that shows what an electronic document looked like when a user saw it," said Litke. "On another level, XML data can be wrapped around PDF or even TIFF images of documents."

MISMO was founded in 1999 and is currently working on version 3 of its standard. According to Litke, adoption of e-mortgage technology has only recently become a focus for lenders. "Most of them have just been too busy managing their increased volumes of mortgages," he told *DIR*. "Now that the re-financing boom has subsided, and they've made some money, they're looking at investing in technology that will help them handle the next big wave of business."

Litke added that the acceptance of MERS (http://www.mersinc.org) by the mortgage banking industry is a key for the growth of e-mortgages. "It's more challenging to keep track of who owns an electronic promissory note than a paper one," he said. "MERS provides a place to register electronic loan submissions and transfers online."

Even with these hurdles cleared, Litke acknowledged that social inertia, if nothing else, will keep e-mortgages from becoming widespread overnight. "Closings are probably the biggest bottlenecks I foresee to adoption. The whole process may be electronic from the beginning, but when it comes to the closing, there are cultural expectations about signing 13 pieces of paper. Yes, the national E-SIGN law has been passed, and there are plenty of applications and services available for digital signatures. However, until we get the closing agents to adopt this type of technology, true e-mortgages are not going to be a reality."

Even after that, both King and Litke expect the mortgage process to be a hybrid of both electronic and paper documents. "Even if a bank creates an electronic application form, what about items like appraisals and W2 forms that don't come from within their system?" asked King. "Even if documents are coming in electronically, who's to say they will be in a SMART doc format? Our software provides important functionality for the workflow, storage, and retrieval of SMART docs, as well as an important infrastructure piece for managing the

---

MORTGAGE IMAGES 30% MORE EFFECTIVE

Just how much more efficient is it for mortgage bankers to work with electronic documents than paper ones? According to leading mortgage institution and **Hyland** customer **Countrywide Financial**, the figure is somewhere around 30%. "Countrywide recently sent out an e-mail correspondence to its partners telling them they prefer to receive multi-page TIFF images with ASCII file information," Jason King of Hyland, told *DIR*. "The correspondence provided specifications as to what document images should be included, what they should be named, and what information should be attached in the ASCII file. As an incentive, they told their partners, it could improve their turnaround time for funding by 30%."

To us, Countrywide's communication sounds like an effort to set up a proprietary SMART docs system. The fact they felt the need to implement such a system shows adoption of the standardized SMART docs format may be a ways off. It also would seem to indicate some opportunity for imaging sales to Countrywide mortgage partners.

---

creation of SMART docs."

For SMART docs to be adopted, however, King and Litke realize the whole industry must get behind them. That is why they are encouraging potential allies and competitors alike to join the eMortgage Alliance. "We realize no one vendor can offer all the elements of a SMART docs solution," said Litke. "And if mortgage lenders can't figure out how to implement solutions, the standard is not going to go anywhere. Through the eMortgage Alliance, we want to provide as many options as possible. We have about 12 members now, but we'd like to grow that to 30-50 by the end of the year."

For more information:
http://www.emortgagealliance.com

Michigan Library To Receive Archive-Quality Images

Late last year, when **Google** announced its plan to digitize 15 million books, the project was hailed as a boon for researchers. People seeking information online will no longer be restricted to only electronically published materials. What was not discussed much, however, were the potential archiving benefits of the massive book scanning project. We weren't even sure if the images were going to be captured at a high enough resolution to be considered archival [*see DIR 1/7/05*].

It turns out that the **University of Michigan** at least will receive archival-quality copies of all the

books being scanned by Google. *DIR* caught up with John Wilkin, associate librarian at the university, who told us Michigan will receive 600 dpi copies of all the images Google is scanning. Michigan will make these high-resolution copies available through its own Web site. Google, it appears from early samples, is set to display lower-resolution JPEGs.

"We have been doing production-level scanning at the library for the last decade," Wilkin told *DIR*. "This has included projects such as the Making of America Collection [http://www.hti.umich.edu/m/moagrp/], which we started in 1996. About four to five years ago, we also concluded that for any brittle books we wanted to take out of circulation, digital images would be used instead of microfilm. We have been scanning up to 5,000 books per year."

Michigan's current digital collection of more than 20,000 volumes represents one of the largest in the country. Each volume is stored primarily as a series of 600 dpi, bi-tonal TIFF, Group 4 images. The university has written its own application, called *tif2web*, that enables the images to be displayed in a Web friendly file format. OCR technology from **Prime Recognition** (http://www.primerecognition.com) has also been applied to all the university's book images. Finally, any color images are typically stored as uncompressed files. "There is very little color we have to deal with," said Wilkin. "Some people ask about the yellow tint on the pages of older books. That's actually decay, which we're not worried about preserving."

Google has been pretty secretive about the techniques it's using to capture the book pages.

"Once they sign out the books, it's pretty much a black box for us," said Wilkin. "However, even though we are still in the preliminary, testing stages, it's not uncommon for us to receive images from 1,000 books per week. That equals one-fifth of our historical annual output."

Google's goal is to complete the capture of all Michigan's seven million volumes in eight years. Michigan receives from Google both the images and the OCR results. Michigan already has an electronic card catalogue. As books become available digitally, a link is included with the record. Full-text search can be applied once a book is selected.

Michigan is currently in the process of exploring storage options for its digital collection, which could eventually require at least a half petabyte of disk space. According to Wilkin's numbers, an average-size, 340-page book requires approximately 37 MB.

"We've had some past discussions with other research libraries about a coordinated effort to create a comprehensive digital library for preservation purposes," said Wilkin. "If we had divided the work among 150 libraries in each the U.S. and the U.K., I think we could have pulled it off. It may have taken us a few years.… Then again, at Michigan, we've already been at it for 10 years, and we were still pretty much going at it alone. At a rate of 5,000 books per year, it would have taken 1,600 years to capture our whole library. The Google project is going to ensure a lot of fragile books get to stay in storage."

For more information: **University of Michigan**, Ann Arbor, MI, PH (734) 764-9356.