Volume XIII Number 9   May 1990

The history of automatic identification....

....has been dotted with "breakthroughs" in concepts and hardware which have had significant effects on opening up new markets.

> Moving beam laser scanners and an omnidirectional symbology were the keys to the success of UPC/EAN and retail automation; the hand-held laser scanner gave movement and flexibility to high-speed, accurate scanning in almost all environments; thermal printheads improved the quality and speed of on-demand, stand-alone printers; RF identification and communications made real-time applications possible where line-of-sight-scanning and hard-wired systems were unavailable; EDI allowed trading partners to exchange immediate information so as not to impede the flow of goods and the completion of financial transactions.

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*                      LATE BREAKING NEWS ITEM                                *
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*   New York, May 3.....In a decision handed down today, Judge Kimba Wood of  *
*   the Federal Court for the Southern District of New York ruled that Symbol *
*   Technologies' 3 basic patents on hand-held laser scanners were valid and  *
*   enforceable.  Symbol's official statement declared: "Opticon should       *
*   be enjoined from further sales of their laser scanner products utilizing  *
*   the patented technology and ordered to pay Symbol damages and costs       *
*   resulting from the infringement."  The 57-page opinion comes about three  *
*   years after Symbol commenced the action accusing Opticon of infringing.   *
*                                                                             *
*   Opticon's response was that they find the outcome "surprising."  The      *
*   company has indicated that "an appeal is warranted" although no final     *
*   decision has been announced.  In analyzing the impact of the court's      *
*   decision, Opticon stated:  "The decision will have little or no effect    *
*   on the business of Opticon....The specific products involved [in the      *
*   lawsuit] presently represent approximately 2 percent of our unit sales."  *
*                                                                             *
*   Symbol now has a pending action in New Jersey Federal Court against       *
*   Metrologic Instruments for infringement of two of the patents upheld in   *
*   the Opticon litigation.  Speculation has already surfaced that the        *
*   Opticon decision will have a "positive effect" for Symbol in the          *
*   Metrologic case.                                                          *
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INCLUDING THE INTERNATIONAL EDITION

On the horizon today is a possible new breakthrough that promises to move auto ID into expanded markets. We have previously referred to this phenomenon as mega-density bar codes, two-dimensional symbologies, and portable databases. The term being promoted for the 1990's is Portable Data File (PDF).

The concept of the two-dimensional bar code first gained widespread attention at SCAN-TECH 87, when David Allais (with Intermec at that time) introduced his Code 49 (*SCAN* Nov 87). The following year, Ted Williams (Laserlight Systems) unveiled Code 16K (*SCAN* Nov 88).

Last year, a theoretical paper by Swartz, Wang and Pavlides (Symbol Tech) explored the underlying theories and fundamentals for creating reliable 2-D symbologies that would encode high density information, using existing scanning and printing technologies (*SCAN* Nov 89). Last month, Symbol Tech unveiled its PDF 417 symbology which, the company states, meets those criteria. Briefly:

> PDF 417 features 1,000-2,000 characters per symbol; a density of 100-340 characters per square inch; and a multi-mode coding scheme with variable security and redundancy. It supports full autodiscrimination and scan "stitching" (reconstructing the full code from scanned bits and pieces); and it is printable by all print technologies with a .010" module width. [Not incidentally, current thinking, as presented by Symbol, is that scanning might best be done with a rastering, hand-held laser scanner -- although there is no reason why CCD arrays won't be able to do the job.]

The major difference between Symbol's PDF 417 and the earlier 2-D symbologies is not so much in the structures or features of the bar code as it is in the conceptual approach to the market. In 1987, when Allais introduced his new symbology, he stated: "Code 49 addresses the problem of encoding more information into less space. Many objects are simply too small to accommodate a bar code symbol encoding the required information."

In an interview with Rich Bravman, Symbol's VP of Marketing, he opened the door much wider. "What we are talking about doing here," he stated, "is implementing portable data applications where you are not carrying license plate information, but you are carrying meaningful data itself."

In one of the most important applications, Bravman sees these mega-density symbols as "paper EDI." "EDI is proving to be difficult to implement across the thousands of trading partner relationships in retailing," he explained. "A given retailer will tell you that they have 4,000 manufacturing sources and that setting up EDI relationships with the top 50 or 100 is no big deal. As for the other smaller 3,900 companies, they don't know when they'll ever get to them because of the resource requirements and the lack of sophistication on the part of those trading partners."

"It turns out," Bravman concludes, "that PDF is a solution to that problem. You are sending information in paper form, either on a label or a shipping manifest itself, which can be comparable to what others are sending via EDI."

Which of the symbologies introduced so far will become the standard if the PDF concept catches on? There are many factors that will come into play:

> o The optimum symbol has probably not yet seen the light of day.
>   There are basically two approaches to mega-density, 2-D symbologies;

i.e., bar codes and dot codes. Generally speaking, bar codes are "dimensional," and the previously mentioned Codes 49, 16K and 417 (plus Codablock by ICS in Germany) fit that description. Dot codes (also referred to as matrix codes) can be thought of as "positional" and are represented by DataCode (*SCAN* Nov 89), Vericode (by Veritec) and the Cauzin Softstrip. [Note: These seven symbologies are fully described in two articles by Bert Moore -- AIM's Director of Technical Communications -- in the April and May, 1990 issues of *P&IM Review*. We highly recommend these articles for those interested in the subject.]

- User acceptability is still an open question. Although it has been over 2 1/2 years since Code 49 was introduced -- and a year-and-a-half since the so-called improvements by 16K -- we do not know of any important usage of 2-D symbols. Symbol Technologies has embarked on a very well-financed and organized plan to involve the market in the development and introduction of their PDF 417. They have staked out this technology as an important part of their future. Beta tests, currently under way at Haggar Apparel and Wal-mart stores, attest to the attention Symbol attracts when it gets behind its new products. Even so, widespread market acceptance is still a long way off.

- Although no particulars have been released on PDF 417 as yet, the issue of the amount and complexity of the software necessary to print and decode PDF-type symbologies may become a factor in determining the availability of cost-efficient systems. Scan stitching, redundancy, autodiscrimination and multi-thousand character sets cannot be developed and installed readily or inexpensively.

Interestingly, we do not believe that the question of read-reliability will be one of the factors that will be important to the advancement of the 2-D symbology concept or in the symbol selection process. The users of the world, and their systems engineers, do not normally question the error rates of the various bar codes, since one error per million scans vs. one error per 5 million scans has never really been a significant issue. It is certainly worthwhile for the industry to continue to establish standard testing procedures -- such as the program now taking place at Ohio University on Codes 49 and 16K -- but the controversial Stony Brook University tests conducted in 1985-87 have sunk beneath the surface with hardly a ripple.

FACT will sponsor a Two-Dimensional Code Symposium on July 11, 1990 at the Stouffer Concord Hotel in Arlington, VA. FACT: 412/963-8588; FAX 412/963-8753.

Our worldwide coverage....

....of news about automatic identification outside the US has mostly concentrated on Europe -- *SCAN* maintains an editorial office in the UK -- with reports also appearing sporadically from the Far East, Australia/New Zealand and other Asian and African sources. Admittedly, we have sorely neglected South America -- up to now.

Our newest "stringer" is Ernesto Castagnet, an industrial engineer and currently a professor at the Universidad Nacional del Sur in Bahia Blanca, Argentina. The following report is based on a special survey of auto ID activities in South America that Castagnet has written, exclusively for *SCAN*.

[Our newest correspondent lends a little poetry to his material. About his native country, he writes: "Argentina (30 million inhabitants), that far-distant country, the most European country in South America, where, due to its geographical situation, all climates are possible; where the Iguazu Falls stand, and the Perito Moreno Glacier, the biggest moving glacier in the world, can be seen; a country of the extended 'Pampas,' with its 'Gauchos,' Argentina has experienced a great deal of growth in auto ID systems."]

Argentina is currently in the throes of a severe economic recession. Moises Ikonicoff, Argentina's economic planning secretary, told *The Wall Street Journal* on April 26, 1990: "We're a country on the way to underdevelopment. Our whole infrastructure is collapsing; half the railroad tracks are unusable, and there are no trains or locomotives for the usable half. Schools are falling apart, the medical system is too, and the only reason we don't have electricity shortages is because the crisis has made consumption fall."

In spite of all this gloomy outlook, Castagnet reports that auto ID seems to be doing reasonably well in his country. Intermec, which is represented in Argentina by Ecadat, S.A. (Capital Federal -- the federal district near Buenos Aires, with many commercial offices), appears to be the most active company in this industry. Ecadat reports that the bar code systems it has sold to Renault control the assembly of its new Sedan 21, including scheduling employee attendance and spare parts; and sales have been made to VCC and Cablevision, which use bar codes to check their cable TV invoices.

Other companies that have installed Intermec systems include Ticket Restaurant, Pierre Cardin, Firestone, AGFA, Ducillo, Kellogg's, Royal and Clarin Newspaper. Insis SRL (Bahia Blanca), a systems integrator, introduced Intermec in the province of Neuquen last September; that distributor also showed Intermec products at the FISA '89 International Fair, November 11-26, 1989.

Other US-based auto ID companies active in Argentina include: Welch-Allyn, which is represented by Datco, S.A. (Capital Federal) and has provided the Argentine Central Bank with a bar code system; Burr Brown, whose new distributor, Conorpe S.A. (Capital Federal), is hoping to begin doing business during 1990; and Spectra Physics, represented by Autorede, S.A. (Capital Federal), a sister company of Ecadat (Intermec's rep). During 1989, Autorede installed a complete Spectra Physics retail system at the "beautiful Spinetto Hipermarket." Autorede has also sold retail systems to El Hogar Obrero, the largest workers' cooperative in Argentina.

Although NCR Argentina (Capital Federal) is active, they admit they are suffering from the current Argentine economic problems. They recently demonstrated their equipment at La Cooperativa Obrera Limitada (Bahia Blanca), the second largest workers' cooperative in Argentina, but no purchasing decision has been reported, as yet.

Nixdorf Computer, S.A. (Capital Federal) only recently began operations in Argentina in March, 1989. According to Vice President Silvio Fernandez Sequeiros: "We have suffered these past freezing months due to the Argentine economic situation, but we expect to recover if the economy gets stable."   (He had no news to report on how his operation would be affected by the recent Siemens acquisition of Nixdorf AG in Germany.)

European Article Numbering (EAN) is represented in Argentina by CODIGO (Paraguay 577, 1053 Capital Federal, Argentina). President Lorenzo Canas reports that there were 50 stores with bar code systems in the country as of June, 1989. The breakdown of the equipment suppliers to those scanning stores is:

Omron	21 stores	42%
NCR	16 stores	32%
Autorede (Spectra Physics)	12 stores	24%
Hugin/Sweda	1 store	2%

The news from Brazil ["with 130 million inhabitants, the extremely exciting country of the Carnival and the beautiful white sand beaches"] is dominated, unfortunately, by their unbelievable rate of inflation (1,765% last year). In an effort to reform the economy, newly elected President Fernando Collor de Mello has instituted a series of sweeping measures -- which even include tight restrictions on people's access to their own money held in bank accounts. In this climate, it is not surprising that the implementation of the EAN system in Brazil is lagging. Another reason for this slow development has been the government's restriction on the import of scanning equipment. These import constraints encouraged two Brazilian companies to develop and market their own auto ID systems. PSI Projetos e Servicos and Midia Informatica are both located in Sao Paulo, and they report increasing activity.

At this time, we have only limited information about the rest of South America. In Chile, the European Article Numbering organization is represented by CNC-DEPCO. In Uruguay, the EAN organization, CUNA, was created as a result of the efforts of the Supermarket Association of Uruguay and its President L. Cordozo. Columbia and Peru joined the EAN organization in 1989. Venezuela is also a recent addition to the EAN group, as is Bolivia, where a few stores have been established using scanning equipment. Paraguay and Ecuador have indicated increasing interest in auto ID and retail scanning and are expected to join the EAN organization during the coming years.

> *COMMENT*
>
> *South America represents a significant potential market for auto ID. For the immediate future, retail seems to be the major application area. In view of the economic and political problems in evidence in both South and Central America, however, the rule of the day would seem to be "cautious aggressiveness" for entry into any of the markets south of the border -- for the next few years, in any case.*

We return once more....

....to one of our least favorite subjects: Mandatory item-pricing in scanning supermarkets. Even after 15 years of strife, this is an issue that just does not seem to want to go away.

Last year we compared the experiences and responses of the protagonists in this dispute, which ranged from Albany, New York to Bonn, West Germany to Melbourne, Australia. In New York, the retailers lost to the consumers (*SCAN* Aug 89); in Germany and Australia, the supermarkets seem to have won out (*SCAN* July 89, Oct 89). The latest from New York State is that Governor Mario Cuomo, up for

reelection in November, views item-pricing as a hot consumer issue, and is planning to propose a stricter version of the law passed just last year.

> [And just in from Sweden is the news that "The Consumer Ombudsman" -- a government authority appointed to oversee consumer interests -- is prosecuting a major food retailer for "improper price information." The issue, of course, is item-price-removal. In a country with 1,500 scanning supermarkets, which are checking out 40% of the nation's food purchases, this case has assumed major proportions. The defense has been joined by the Food Retailers Association and the Swedish EAN group, and the case is scheduled to be heard this Fall.]

In the US, the controversy surfaced again on February 28 when the City Council of Philadelphia, PA passed a bill (by the overwhelming vote of 15-to-1) requiring item-pricing of all supermarket merchandise -- and then sent the measure to Mayor Wilson Goode for signature.

The heat and emotionalism that can be generated by item-pricing was highlighted by the front page, over-the-fold article that appeared on March 1 in the city's leading newspaper, the *Philadelphia Inquirer*, which reported: "The legislation...is an effort to redress...widespread problems with electronic scanners that read prices." According to the staff reporter (whose personal antipathy to scanning seemed apparent throughout the article): "The bill comes amid growing nationwide dissatisfaction with the electronic scanners, and an increased nostalgia (sic) for individual price tags."

The Philadelphia scenario then took a different twist. In a March 16 article, the same *Inquirer* reporter put her own slant on the latest development, when she wrote: "Mayor Goode yesterday dealt a blow to senior citizens' groups by vetoing the so-called item-pricing bill, a measure that would require supermarkets to put prices on all items they sell." Surprisingly, although the initial lopsided vote by the Council seemed to portend an easy override of the Mayor's action, enough Council members eventually switched sides to sustain the veto and the law was killed.

The major reason for the victory by the retailers was attributed to the aggressive proposal from the Pennsylvania Food Merchants Association to institute an industry program to help guarantee accuracy at the register. The new plan depends on significant employee involvement and it includes expanded consumer education programs plus a guarantee that if the retail price recorded by the scanner is higher than the price marked on either the shelf or the product, then the customer receives one unit of that item free of charge.

It is important to note that no responsible groups or individuals are suggesting the elimination of scanning with its faster checkout and detailed register receipts. It's just that some consumer groups do not want to lose the added security of visible price labels on each item. It is almost like wearing a belt <u>with</u> your suspenders to make sure your pants don't fall down.

Part of the blame, of course, does lie with some of the supermarket operators. They have not sold the advantages of scanning to their customers; they have not installed shelf price markers that are accurate and properly situated; and they have not gone the last step to be certain that shelf prices and consumer prices always agree.

[Thanks to Bruce Wray (Regional Sales Manager for Computype), our unofficial corespondent from the City of Brotherly Love, for keeping us posted on the Philadelphia story.]

Unique formats and contents....

....are notable in some of the most recent contributions to the literature of the auto ID industry. Here is just a sampling we've selected for review:

- From the Bushnell Consulting Group comes the *Getting Started Kit*. It includes a basic primer on bar coding, an instruction manual, a Psion handheld computer, a fully programmed portable bar code scanner and an integrated software package (to run the purchaser's PC). According to Rick Bushnell: "The purpose of the GSK is to meet an ever-growing need for people to experiment and learn before they buy a larger system."

  The $1,500 GSK will track inventory items, print inventory reports, print bar codes, and communicate between the scanner and the PC. The accompanying book tells the user how to define and implement a bar code system, and the Quick-Start manual steps the users through four exercises and familiarizes them with the kit's hardware and software. Although we haven't had any hands-on experience with this particular package, we believe the concept of educating potential users with a simple and relatively inexpensive system is a good one. Bushnell Consulting Group, 24 Far View Road, Chalfont, PA 18914; 215/822-6880.

- The *Source Book of Automatic Identification and Data Collection* by Russ Adams is a potpourri of information collected from various sources. The first 160 pages provide a basic explanation of the principles and applications of the auto ID technologies: Bar Coding, OCR, MICR, Voice Recognition, RF and Smart Cards.

  The second half of the book is a series of appendices which contain lists of information, such as publications, trade shows and seminars, consultants, VARs and integrators, and available industry surveys. Our impression is that this type of dated information, not normally found in a book, may have limited usefulness after a short period of time. Van Nostrand Reinhold, Mail Order Department, Box 668, Florence, KY 41022-0668; 606/525-6600.

- *The EDI Forum*: *The Journal of Electronic Data Interchange* (Winter, 1989/1990), is the type and caliber of technical publication that we wish someone would undertake to publish for the auto ID industry. This is only the second edition of *EDI Forum* (*SCAN* Oct 89) and we were impressed with the scope and quality of the articles, which were written by many industry leaders. This latest issue contains about 40 articles (or "Thought Pieces") covering technical issues, standards and specifications, state-of-the-art reports and special insights -- from both the vendor and user viewpoints.

  Publisher Daniel Ferguson further envisions that his publication will serve as an educational source of information and as a catalyst "looking to the future of EDI." EDI Forum, Box 710, Oak Park, IL 60303-0710; 708/848-0135; FAX 708/848-0270.

- The new *Retail Technology Review 89/90* developed by Datapro Research and distributed by the National Retail Merchants Association, purports to be "the latest in what's new and hot in retail technology." RTR turns out to be a compilation of previous Datapro reports selected by the NRMA as most pertinent to the general merchandise retail industry, and enhanced with additional sections provided by NRMA.

  The three sections on point-of-sale systems include overviews of the technology coupled with comparative listings of vendors in each category. Other sections on Industry Trends, Credit and Payment Systems, and Voice and Data Communications provide additional information to vendors of retail systems. NRMA, Book Order Division, 100 West 31st Street, New York, NY 10001; 212/244-8780; FAX 212/594-0487.

- Volume 2 of Harry Burke's two-volume set, *Automating Management Information Systems*, is now available. Volume 1 -- published a few months ago (*SCAN* Feb 90) -- was oriented toward defined applications in the manufacturing environment, including specific management information systems involving the latest methods for transaction processing.

  In Volume 2, subtitled *Barcode Engineering and Implementation*, Burke gets into the real nuts and bolts of how bar coding works. A sampling of the 11 chapters includes such titles as Pixillated Information, Printing, Electro-magnetic Radiation, Reading Barcode Symbols, Labels, Work Station Terminals. At the end of the book, there is one of the best 30 page glossaries that we have seen anywhere. Burke spent 4 years writing these two books, and his painstaking research and passion for bar coding are evident throughout his work.

  Incidentally, these books would provide excellent texts for a college course on auto ID in manufacturing. Copies of both volumes can be obtained from Van Nostrand Reinhold, Mail Order Department, Box 668, Florence, KY 41022-0668; 606/525-6600.

When we reported in March....

....that <u>Graphic Technologies</u> acquired <u>Data Documents Systems</u> from Pitney-Bowes (*SCAN* Mar 90), we did not accurately represent the facts about similarly-named Data Documents. We will herewith attempt to correct any misstatement by directly quoting from a letter received from Anita Meints, Director of Corporate Communications, for the <u>other</u> Data Documents, located in Omaha, Nebraska. "Please be advised," Meints wrote, "that Data Documents Systems, which was recently acquired by GTI/Nitto Denko, is in no way affiliated with Data Documents. Also, Data Documents has not been a subsidiary of Pitney-Bowes for over two years."

According to its catalogue, <u>this</u> Data Documents is a producer of business forms, pressure-sensitive labels, data processing supplies, computerized business mailings and direct mail marketing packages. Many of their products are bar coded. Data Documents, 4205 South 96th St., Omaha, NE 68127-1290; 402/339-0900; FAX 402/339-0485.