

DATA TRANSMISSION -
IS IT FOR YOU?

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ABSTRACT: Data transmission is not new to the publishing and printing industry. However, due to changing market requirements and emerging technology, it is likely to explode within the next few years. This will be particularly true for newspapers and magazines, but does not exclude smaller prepress operations.

Changing market trends plus advances in both printing and communications technologies are opening the doors to data transmission for all those who have a valid need.

Once text, graphics and pictures are digitized, there is a common denominator for communicating between various types of equipment and geographic locations.

The new electronic media has put a new pressure on providers of printed materials to be more current than ever. The only way to accomplish this is to side step many time consuming previously used methods.

Whether or not you become a "transmitter" yourself, the world of digital communication will profoundly affect you in the future. If you do decide to take this step, it will involve extensive research to find the most cost effective method to suit your needs.

This paper will attempt to explain some of the major benefits, pitfalls and methods of various options available now and in the future.

Purpose And Method Of The Study

By no means do I now consider myself an expert in data transmission, but due to my past involment with digital imaging I began to see trends which led me to believe that I might have to be in the future. During the course of my graduate study I sought out local electronics classes, but found that they either did not exist or if they did, had very little relationship with the field of printing. The same held true for any available reading materials and texts. Furthermore, most published material was outmoded six months after it was published due to rapidly changing technology. Articles from various technical journals did help to put together some background information.

The only way to get a true picture of the present state-of-the-art was to ask users themselves. I arranged for a series of interviews with various publications that were currently involved in data transmission. My goal was to find out why they had started; what they were doing; what were some of the benefits and drawbacks. As my research progressed I realized that I had only begun. At each corner, a new angle that needed further investigation, turned up. I have been researching this area for over two years and could continue to do so for several years to come.

Unfortunately, the major question of costs and budgets was a taboo. Financial data was considered confidential. Another factor which makes costs difficult to discern, is the experimental nature of much of this work. Equipment manufacturers will very often share the financial burden of developmental costs for new equipment and applications. If nothing else can be said, all users appeared well satisfied with their initial decision to become involved with transmission even if the end results were not exactly as previously projected.

Market Trends

Printing can no longer be viewed as merely applying ink to paper. It has entered the age of information communication. Resulting publications may appear the same, but the ways of producing them are rapidly evolving. Due to changing market requirements, the use of transmission is quickly becoming another everyday "tool".

As consumer tastes have changed, magazines and newspapers have had to specialize content. Localized production has become a necessary means to speed delivery and reduce distribution costs. Increased competition, resulting from new entrants, has made it more difficult to maintain a formerly loyal readership. Although magazines are expected to keep pace with general economic growth, the most successful ones will have quality editorial content specifically aimed at target markets.

Another recent phenomenon is the use of color in newspapers. In the fall of 1982, the Gannett Co. began to publish USA TODAY using full color throughout its pages. It is the country's first national newspaper. Although its financial success may still be questionable for some time, it has stirred the interest of both readers and competitors. It has already had a profound effect on the increased use of color graphics and advertising in newspapers throughout the country.

In response to the need to ease information flow and cut costs, the newspaper industry revised the Standard Advertising Unit (SAU) in July 1984.(1) This new system will allow an advertiser to order insertions in multiple newspapers without customizing size to each individual publication. A natural means to disseminate such standard

formats would be satellite broadcasting to multiple sites. The struggling Ad/Sat project for nationwide satellite delivery of newspaper ad materials is attempting to "blitz newspapers in the top 100 markets, trying to sign every major paper in those markets by the end of 1986."(2)

Another trend to eliminate multiple transmissions, thereby saving both time and costs for advertisers as well as publishers, is the "superbrand" concept.(3) This approach has begun to take hold in Europe despite obvious language barriers. National advertisers in the United States are also turning in this direction. The increase of ads in USA TODAY is a good example of the national concept. However, there must be a total corporate commitment for it to be successful. How do you communicate product benefits across national and perhaps international frontiers? According to Don Arlett, exec. art director of Ogilvy & Mather in London, "You have to apply sophisticated criteria to decide whether a product is suited to this approach."(4) To date, the medium of television has proven more successful for the delivery of global messages, although we are beginning to see such an approach for print in such publications as Time, Newsweek and the Wall Street Journal. Products such as Coke, Canon, Digital, NEC, Kodak, Ford, Panasonic, Xerox and Colgate are among the international blitzers taking advantage of the global commercial.(5) If expectations are met for TV, this approach is likely to affect print on a grander scale.

As more major corporations become involved internally with computerization and telecommunications, they will demand the same type of services from their suppliers, including advertising agencies, prepress services and printers. According to Roger Smith, Chairman of the General Motors Corp., GM "will be a paperless workplace linked by computers and satellite communications bringing together all parts of the business."(6) With their recent acquisitions of Electronic Data Systems and Hughes Aircraft, one of the major builders of satellites, they should be able to accomplish this. It would appear likely that suppliers selected for print media will have to fit into their "master plan", sharing a similar philosophy and technical approach.

I am not saying that we will see the demise of printed material, but we will have to change our way of thinking and working. Although there have been heated discussions about the effect of videotex, teletex and other electronic media on the printed page, they are not expected to pose the major threat as once thought. The feeling is that people will still look to print for in-depth analysis, whereas electronic media will provide instant facts, figures and brief updates. Furthermore, this source of media will be limited to an electronic elite for some time to come due cost and often difficult access procedures. Recent seminar presentations have shown over and over that as computerization has increased in the office place, so has the amount of available information requiring printed documentation. The same appears to hold true for the consumer marketplace as

we see the number of specialized publications on the local newsstand. The immediacy of computerization for information delivery and production procedures should be viewed as another source of competition which will force all forms of print media to stay current and meet demanding tastes.

Technology Trends in Printing

As in other industries, there has been a trend toward computerization in publishing and printing for several years. The term ECP (electronic color publishing) has already become a reality due to the development of computerized text and graphic imaging equipment. At the present time, separate components are well established in single-user environments. As this equipment has proven itself, large pioneering organizations such as Time, Inc. and Gannett have made the move to totally integrated electronic networks. By combining this state-of-the-art equipment with transmission networks, these giants will be able to increase their market share, with more up-to-date information, lower production costs and increased use of high quality color. When I began my initial research, several publisher networks were still in the developmental stages. Within the two years, they became reality, directly linking editorial departments with final production facilities. Naturally, data transmission has played a major role.

The first component to start computerization of publishing was text processing, introduced in 1975 by Atex and Penta. Newspapers were their first users. In 1976 image scanning was introduced by Imagitex and used by US News and World Report. In 1980 black and white compositions systems were introduced and widely adopted for newspaper production. Although color scanners were introduced in 1971 by HCM, they were not directly adopted by publishers and printers, but by their smaller suppliers, usually color separators and engravers. The final link in a potential network system was the introduction of color pagination in 1978 and color editorial systems in 1982, both by Scitex.(7)

In the future, we will see further digitization of the printing industry with the adoption of CCD scanners and cameras, flat bed FAX scanners, direct-to-plate engraving systems and improved methods of data compression. As more prepress equipment is designed to convert previously hard copy materials into digital information, a common denominator for communication is provided. Input will no longer dictate output, enabling distribution of functions previously housed under one roof. If a printing job is now viewed in data terminology: as input, manipulation and output, traditional boundaries are eliminated, allowing the union of both the creative and manufacturing processes.(8) Previously established lines of demarcation will blur.

With regard to data transmission, newspapers, which are still mainly black and white, are far ahead of full-color magazines. The major difference is the amount of data required. To date, transmission of black and white text,

graphics and photography has been practical and cost effective. Although the same does not hold true for four-color magazine pages, new technology is rapidly turning this around.

In the 1920's, facsimile transmission of data for black and white news information gained wide acceptance.(9) Today, a typical New York Times page, scanned by facsimile equipment is transmitted in 1-1/2 minutes via microwave and satellite. Color transmission of a Newsweek magazine page requires 20 minutes with the use of Triple I's InfoColor system. This difference is even greater when one considers the variance in overall page size (ie; 14 x 21.5 for The New York Times vs. 8 1/2 x 11 for Newsweek). Typical newspaper pages are manually pasted up, photographed for a glossy positive proof and then scanned with FAX equipment, such as Rapicom or Ricoh.

Intercontinental transmission of complete newspaper pages was not practical until the introduction of geostationary satellites in 1976. Prior to this, Muirhead Data communications, a major manufacturer of facsimile equipment tested its Pagefax system in 1967, but transmission time was greatly limited via the orbiting "Earlybird" satellite.(10) In 1976 Pagefax transmitted a high quality page from Washington to Rome via an Intelsat geostationary satellite. In the meantime, Dow Jones ran its first satellite transmission test in 1973 and was utilizing this technology on a limited national basis by 1974.(11)

Related Technology Trends

In addition to changes occurring within the printing industry itself, advances in the fields of data transmission and computing will profoundly affect computer aided publishing (CAP). With the divestiture of AT&T, competition in data communications is becoming stiffer, resulting in more service options from which to select. These include dedicated lines, buying "on-demand" and leasing of satellite capacity. The newer fiber optic networks which increase the speed, capacity and accuracy for data transmission will be one of the bright "lights" (ie; laser) of the future.

Personal computers are becoming a major link in many corporate electronic (CEP) systems. Combined with a laser-writer, they can provide a stand alone system, replacing previous higher price methods and equipment. Optical disc storage systems will supply the higher densities required for color storage. Over the past few years, the electronics industry has been producing more processing power and storage capabilities for very little additional cost.

Unfortunately, as many current users have already discovered, all of this data transmission will not happen overnight. Industry standards which will enable free flow of information between the varied types of vendor equipment does not yet exist. As a result, networking and transmitting is often difficult, if at all possible. Efforts are

currently being made by user groups, international industrial organizations and governmental bodies to force equipment manufacturers to adopt common standards for data exchange. There is no "off-the-shelf" system to solve your needs. Everyone has done "their own thing." Until such standards are in place, users will have to proceed with caution, knowledge and creativity.

Transmission Options

When I first began my research into transmission for printing, my thoughts went skyward to satellites and earth stations. I quickly learned that this was not the only option for printers. Even if satellite transmission was the main vehicle for page data, it was usually not a stand alone option. Most initial page creation was located in busy metropolitan areas where large dish installations are either physically impossible or even illegal. Some means of terrestrial transmission in the form of microwave or land-line was necessary to send data from the metropolitan office to the suburban central earth station.

Transmitting information depends on our ability to propagate and receive electromagnetic waves in patterns. These transmitted waves can take the form of electromagnetism through the air, electrical energy through metal wires or light energy (laser) through optical fibers. The information transmitted can be either voice, data or video or a combination.(12) Depending upon a user's own unique requirements, several options are possible.

An initial consideration to transmit in the printing business should be influenced by some basic determining factors. These factors are both internal and external. They include:

1. Printing Application: B/W vs. 4/C; time constraints.
2. Geographic spread; Urban vs. suburban; multisites.
3. Company size and budget.
4. Potential expansion: size; new market applications; future production facilities.
5. Equipment required: Both printing and peripheral to take advantage of telecommuting.

No matter what the application is, original transmission plans should look toward the future. Once involved, current users found new applications or expanded beyond their original plans. Narrow range thinking could be a costly mistake. As with any equipment or service, shopping the market place will provide the most cost effective results. The choice of options is wide and will continue to increase. Finding the right person at varied suppliers of transmission services can often prove to be a lengthy, as well as frustrating, experience. Both passing time, quantity discounts and distance can greatly affect pricing.

Both telephone and cable should be viewed as a point-to-point only service. As more sites are added to a network, more lines must be added to reach these locations. Depending upon the capacity and quality level required, land-lines alone can provide effective transmission service for many users. Suppliers of this option include AT&T and its newer competitors and local cable companies such as Manhattan Cable (MCTV). AT&T has become much more aware of the data user in recent years and has begun to offer some economical, high capacity options.

If "point-to-point" is viewed as the major disadvantage to wire or cable based services, then an almost unlimited "view" enabling simultaneous transmission to multisites, could be considered the major advantage of satellite transmission. The ability to simultaneously broadcast pages to multisites in a matter of minutes, would probably be the choice of the larger, far-flung user.

The satellite service option can be selected as a lease or buy situation, the former being more common. The cost to install on-site dishes is high. The decision to actually purchase your own transponder can be risky due to satellite "life-span" which is approximately ten years. However, this does not mean that satellite transmission is unattainable for smaller users. Several "middleman" type of carriers, such as the American Satellite Co. (ASC), can provide the answer. Via their own network of earth stations, they will send and receive your pages linking directly to your own facilities through the installation of local-loops (AT&T). The selection decision of these various satellite options depends on how much self-control you require or want to take. Dow Jones has gone the complete route of purchasing their own transponders and building and maintaining all of their own earth stations.

If you decide that becoming directly involved with the transmission process itself is not for you, there are still options. Various service houses can provide either transmission only or a combination of prepress capabilities with final transmission. Publishers Phototype International (PPI) located in Carlstadt, N.J. and the Digital Prepress Center (DPC) in Yonkers, N.Y. are among the providers of such services. Due to the cost and technical know-how required to become a transmitter, it is likely that we will be seeing more of these operations in the future. By spreading their investments over several subscribing users, their own expansion involves less risk.

Another unique project is AD/SAT. It started out as a joint development between the Robert Wold Co. and MITSUI. Their concept was an outgrowth of the original SAT-FAX project considered by ANPA. The marketplace was to be national advertisers, their ad agencies and national retailers. Initially, transmission services were aimed at American newspaper publishers who joined the network. Both the newspapers and the advertisers would share the costs. Wold already had an established communication network including AT&T lines, cable

and satellite transponders. Although the project received much publicity and interest, start-up tests scheduled for the fall of 1985 never got off the ground due to lack of money. In March 1986, the British Printing & Communication Corp. announced their buyout of AD/SAT. Headquarters will be established in New York City, with a goal to be operating in the top 100 markets in a year. Their aim is to make multi-paper buys easier for agencies.

Common Transmission Rates

Bandwidth requirements will vary according to the type of page data to be transmitted and the time span within which it must be sent and received. As already discussed, strictly black and white pages can travel at great speed over narrower bandwidths than full four-color pages. An average B/W newspaper page (14" x 21.5") ranges between 200-300 million bits of information (uncompressed). Once color is introduced to this page, the number increases to 540 million bits or more. An average full four-color magazine cover (8" 1/2 x 11") averages around 200-240 million bits. In all cases, some form of data compression will be used to speed delivery and cut transmission costs.

Bandwidths used in the newspaper field may range from 150 kilobits to as high as 30 megabits per second. Once high quality color is required, as in the case of a newsweekly such as Time, rates may range from 56-112 kbps for international pages sent via FAX to 1.544 Mbps (T1) for color pages sent directly from their total digital system. Depending on your own requirements, a range of 9600 baud (bps) for black and white magazine-size pages to 56kbps for four-color magazine-size pages. Both of these rates can be provided by telephone lines.

Current "Transmitters"

The following list is by no means complete, but indicate some major publishers currently involved in the use of transmission to remote printing sites.

- Dow Jones & Co., Inc. (The Wall Street Journal)
- The New York Times
- The Gannett Co., Inc. (USA TODAY)
- Time, Inc. (Time, Sports Illustrated, People and Fortune)
- Newsweek Magazine

(All of the above publications were part of the original research and in many instances, the basis for many of my statements and conclusions.)

Other current users include R.R. Donnelley (The Economist), The Washington Times, The Chicago Tribune, The International Herald Tribune, The Christian Science Monitor and Investor's Daily.

Conclusions

Selecting both a service option and transmission rate should be viewed as a series of trade-offs. As a final word for consideration, or warning: These trade-offs may make an older technology a better investment for some users. One of the most applicable quotes which I found, came from Glen Parfumi, at the time V.P. of the securities research division of Merrill Lynch, who posed the following questions: Do you want to be on the leading edge of technology or the bleeding edge?"(14) Consider, wisely and slowly, keeping in mind that transmission networks can be expanded in building blocks, as technology advances and your own needs dictate.

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