TELIDON AND 525 LINES

John Syrett
Project Manager, Telidon and Education Project,
Ontario Educational Communications Authority,
Toronto, Ontario

ABSTRACT

What happens when alpha-geometric concept finds material expression in video hardware? Or, to state the case another way, what medium of communication emerges when the "picture description instructions" of Telidon are translated on the North American television screen?

The Telidon code that describes geometric figures should in theory produce perfect circles, perfect rectangles, perfect polygons, perfect lines,--Platonic images of infinitely refined colour, form and detail. But if Telidon is to enter the home or office by way of the typical televison set, it must come to terms with the display characteristics of the hardware. Instead of images of unlimited refinement, it must offer graphics of great strength and simplicity, vivid patterns that declare themselves in spite of pebbly edges and uniform planes.

A laconic medium of communication emerges. The artist who designs for the medium starts as all artists do, with the limitations and resistances of the medium, and finds a characteristic form of expression that is the product of goal, imagination, and the limiting characteristics of the medium.

Out of these characteristics arise questions about the applications best suited to the medium. Given its mode of communication, what are the meanings that it can best convey? The paper takes a prospective look at applications in education, narrowly functional information, and broadcasting.

RÉSUMÉ

Qu'arrive-t-il lorsqu'un concept alpha-géométrique trouve une expression matérielle dans le matériel vidéo? Ou, en d'autres mots, quel nouveau médium de communication apparaît lorsque les "instructions de traçage d'image" de Télidon sont traduites sur un écran de télévision nord-américain?

Le code Télidon qui permet de tracer des figures géométriques devrait en théorie produire des cercles parfaits, des rectangles parfaits, des polygones parfaits, des droites parfaites, c'est-à-dire des images d'une perfection transcendante dont la couleur, la forme et les détails peuvent être infiniment affinés. Mais pour que Télidon puisse entrer au foyer ou au bureau au moyen d'un poste de télévision classique, il faut qu'il s'adapte aux caractéristiques d'affichage des téléviseurs. Au lieu d'images infiniment affinées, il doit permettre d'obtenir des représentations visuelles de grande qualité et simplicité, des figures vives qui s'affirment en dépit des contours irréguliers et des plans uniformes.

Un médium de communication concis apparaît. L'artiste qui utilise ce médium commence comme tous les autres artistes, avec les limitations et résistances du médium, et découvre une forme d'expression caractéristique qui est le produit de son objectif et de son imagination et des caractéristiques limitatives du médium.

Étant donné ces caractéristiques, on peut s'interroger sur les applications les mieux adaptées au médium. Compte tenu du mode de communication utilisé, quels sont les messages qui peuvent être le mieux communiqués? L'auteur jette un regard prospectif sur les applications dans les domaines de l'éducation, de l'information strictement fonctionnelle et de la télédiffusion.

By now, it is widely known that Telidon is the Canadian videotex technology. Because the computer/communications field is rife with new vocabulary, some clarification of the terms videotex and Telidon may be appropriate before proceeding with the theme of this paper.

The term videotex has recently come to be used as a generic term for communications systems that make use of television receivers to display text and graphics that have been stored as instructions in a distant computer and are retrievable via a decoder that is linked to the television receiver. An integral part of such systems are the means of carrying the coded information from the host computer to the user terminal. One can group these as wire or wireless,-- that is, telephone lines, cable, or optical fibre on the one hand, and various broadcast frequencies on the other. When the information is carried by broadcast means, the term teletext is used. Several other terms are used when some sort of wire carrier is the means of transmission. It is perhaps simplest to refer to the two modes as broadcast videotex or on-line videotex.

The use of a screen to display computerized text and graphics is not new. What is distinctive about videotex systems is the use of the television set and all that goes with it. One can readily imagine the original developers of videotex in Europe seizing upon the idea of millions of homes with television sets being able to call up information that would otherwise be available only to the few who might have access to computer technology in business offices or college settings. But in the process of moving the information in to the home, some significant design implications emerged. If the home viewer was to be able to read text and see graphic illustrations from the same point in the room from which television was viewed, then the visuals must be of a certain size. Instead of text displaying on a 21-inch screen in, say, 80-character lines, fewer characters per line -- say 40, or even 32 -- were perceived to be appropriate, for the sake of readability. Immediately that decision was reached, the number of sentences that could be displayed on the screen at one time was sharply reduced. The resulting dialogue between the user and the computer tended to be laconic, made up of more requests for information, and fewer sentences per response than would be the case if the viewer were seated close to the screen and receiving information on 80-character lines.

This limitation in display, characteristic of videotex systems, is not necessarily bad. Rather, it changes the process of communication, and it pre-disposes the use of videotex systems for some purposes rather than others. Videotex immediately becomes less like the print medium.

That does not mean that it necessarily becomes more like the television medium. Characteristic of television is that it presents images and processes, both visual and aural. By contrast, videotex can present graphic images, but of a more incremental and less flowing character. In the case of the European videotex systems, these images are constructed like a mosaic. A matrix 80 by 60, providing 4800 mosaic pieces, can be taken as representative of the resolution that this approach to graphic display allows. The resulting images are clearly restricted as to detail and pictorial effect. These limitations make the mosaic approach an unlikely candidate for any form of communication where sophisticated graphics are necessary in order to convey intended meanings.

Telidon addresses these graphic limitations through the concept of Picture Description Instructions. The idea is to construct images from a set of geometric drawing ''primitives'' such as print, line, arc, rectangle and polygon. These geometric primitives, in the form of coded instructions, exist independently of the display hardware.

The degree of resolution achieved by Telidon technology is related to what a particular screen and the decoder hardware which feeds it can handle. The North American home colour television receiver can typically resolve 240 by 320 picture elements, far less than what could be employed using other display hardware, but far more than is achieved on systems that take the mosaic approach.

Thus Telidon, a concept that permits of near-perfection in the depiction of geometric forms, must come to terms with the limitations of the 525-line television receiver. What emerges is a language of

communication that is not photographic, but that can convey a wide range of meanings through the use of colour graphics of considerable resolution.

The challenge facing the creative artist who wishes to communicate with the people interrogating their television receivers, so to speak, is how to work with the finite characteristics of the new medium. At the present time, for example, Telidon is confined to 6 colours and 8 shades of grey. (The range can be extended by resort to textural variants in combination.)

Another limitation that the artist must work with is the relatively static quality of the images. In due course, it should be possible to program ''transformations'' of the basic primitives into the system, but for now, a considerably more limited form of animation is available. One must start with the fact that all parts of an image appear on the screen in the order in which they are programmed as the ''page'' is being built up at the page creation terminal. By planning the sequence, a form of animation can be achieved. Until recently, it was difficult to govern the rate at which different parts of the image appeared, but with the addition of a wait command, this constraint will be reduced. The result will be a large measure of control over the rate at which images and words unfold.

The graphic limitations of the 525-line screen can be taken as a metaphor for the cluster of limitations that give characteristic expression to the medium of Telidon at its present stage of evolution: a certain degree of resolution, a certain range of colours and textures, a certain number of lines and textual characters per line, a certain potential for animation. The question: what can the communicator best do with these attributes?

There is no definitive answer to the question, certainly not yet. Experience with the medium has, however, produced some insights. One is that Telidon can achieve pattern recognition without the gradations afforded by photographic detail, and indeed, may do so more powerfully than a photograph would. Very early in the process of experimentation conducted by the Telidon and Education team at TVOntario, the question was posed whether the medium could present recognizable and persuasive portraits of well-known people, using polygons and very few colours. A portrait of Einstein created by Linda Prosh, using only 2 colours, told us emphatically that it could. The absence of detail not only means that the image appears more quickly than a comparable photographic image would, it means that a simple power of communication can be attained. The artist is led to a process of selecting only the essentials required to convey the meaning. While this means that there are some images that cannot be depicted, it also means that clarity of exposition is an inherent tendency of the medium. The vibrant colours and uniform planes may preclude nuance and subtlety, but can offer statements of great strength and simplicity, vivid patterns that declare themselves in spite of pebbly edges.

These characteristics will doubtless favour some applications of Telidon over others. Using Telidon images, there would presumably be constraints on the range of products that could be advertised. Weather maps can be carried, and road maps, and regional maps, feeding services such as tourist information and travel information. Charts are easily presented, and therefore statistical information in comprehensible form. Diagrams fit comfortably on the Telidon screen, forming a logical link to a good many technical applications. The educational field, requiring as it does frequent resort to visual illustration, presents other opportunities for the use of Telidon graphics.

The 525-line screen, then, helps define the scope of Telidon imagery and applications. The 525 lines themselves, in their capacity as carriers, influence Telidon in other ways. In the broadcast mode, Telidon data can be inserted on to one line or any number of lines up to 525. Since fewer than 525 lines are required for the transmission of a television picture, some otherwise idle lines can be used to transmit Telidon pages at the same time as the television picture is being transmitted. The simultaneous transmission of Telidon information and video information potentially presents several options to the consumer, including the ability to switch between one medium and the other, and the ability to superimpose Telidon information upon the video image. In the latter case, closed captioning for the hearing-impaired, and second-language sub-titling, are obvious potential applications. In the former, various ways of interrelating television programming and textual or illustrative material come to mind.

If all 525 lines are used for Telidon transmission, one foregoes the inter-relationships of video and Telidon information but opens up another prospect, namely, a dramatic increase in the number of Telidon pages that can be transmitted within any interval of, say, 10 or 20 seconds. Instead of a choice of perhaps 100-plus pages, the user has access to several thousand.

If all 525 lines are reserved for video only, Telidon can enter by the back door, so to speak. With an appropriate encoder, it is possible to convert Telidon images to video images. Something is lost in the process, but another option surfaces. On the negative side, the crisp definition characteristic of Telidon images gives way to somewhat misty lines and outlines, and colour values are considerably changed. On the positive side, given that the originator of the graphics is highly selective in the choice of colour combinations, it is possible to display very presentable video images. How far this may take the broadcaster remains to be seen. Some experimental work that has been done suggests that broadcasters equipped with a Telidon decoder could receive weather information in the form of maps, and translate to video for the purpose of bringing the latest weather information to a vast audience that is at present not in possession of Telidon decoders.

It can be seen that the title Telidon and 525 lines takes us down various avenues. Tying these avenues together is their common convergence on the television set. The probability is that as the years go by, the various expressions of Telidon and perhaps of all videotex systems, will continue to converge upon the television screen. Granted that better display hardware will be available for specialized graphic applications, the magnetic attraction of Telidon and video, each to each, points to a permanent if variable association.