THIRD IN A SERIES:

Some Sources For Information On HDTV

In the last column I promised to provide sources of information for those who were interested in obtaining more information on the topic of high definition television systems.

There are many sources for information on this topic; some discuss the aesthetics, but most are technically grounded. But by far the greatest source of HDTV information of a technical nature is to be found within the pages of the *Journal* of the Society of Motion Picture and Television Engineers.

Within the pages of the SMPTE *Journal* almost every aspect of HDTV and advanced television systems is discussed by authorities on the subject. The *Journal* features papers that have been thoroughly researched and documented and have a wealth of information both within the body of the text and within the bibliography. These bibliographies, in many instances, reveal the origins of the thesis of a particular train of thought in its germinal stages, tracing it through its early research stages into a working piece of technology.

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In any discussion of a complex topic I think that you can't really know where you are going until you discuss where you have been in the past and where you are at the present. Taking this into consideration, I have chosen to relay the following information on Advanced Television systems in a specific manner. Although there is a specific chronological order with respect to this topic, I have chosen not to follow it. My reasoning is that a building block approach to the research materials available will be more useful in the long run. In this instance the building blocks aren't necessarily composed in a linear fashion. To provide a base of information without necessity of having to read the articles in their entirety, I will provide a synopsis of each document.

The first article that I would like to bring to your attention was co-written by Joyce H.D.M. Westerink and Jacques A.J. Roufs, Phd., Institute for Perception Research, Eindhoven, The Netherlands. It is entitled *Subjective Image Quality As A Function Of View Distance, Resolution and Picture Size* and appears in the February 1989 issue of the SMPTE *Journal*, pages 113-119.

In this paper Westerink and Roufs used a control group of 20 subjects to assess subjective image quality with respect to angular resolution by using varying distances, resolution and picture size. The researchers used high quality slide projectors to perform their subjective tests.

Their experiments revealed that "subjective quality increases with resolution, but saturates at a resolution (6db cutoff frequency) of approximately 25 periods per degree. There is also a linear relationship between subjective quality and the logarithm of the picture angle."(1)

The doubling of the bandwidth-related resolution is perhaps the most widely lauded attribute of HDTV versus any of the conventional systems of today. But what Westerink and Roufs discovered was that at a viewing distance of three metres "...the best way to improve image quality is by increasing the picture width; whereas increasing the bandwidth-related resolution itself has no beneficial effect, because these resolutions are beyond saturation."(2)

As is the case with any scientific conclusions reached from an experiment there is room for interpretation and challenging of the data, especially when transferred from one medium (such as film) to another. In spite of this, the conclusions of Westerink and Roufs are sufficiently sound so that their results can be used as a comparative tool for assessing the subjective image quality differences between regular TV signals and enhanced bandwidth HDTV.

Information of this nature re-iterates the fact that, as Charlie Pantuso put it, "...there is no free lunch in HDTV, or anything else for that matter". To gain something there had to be a corresponding loss or compromise elsewhere.

The next series of articles are concerned with the desire — or the perceived necessity — of making an HDTV that is spectrum compatible with the present television systems.

NHK, the Japanese broadcaster, was the leader in the development of HDTV technology, as you may recall. Since they were so far ahead technologically, it seemed that the system that they developed would become the de facto standard for HDTV. That is, until many countries realized the financial and political implications of accepting a foreign — particularly in the case of the United States, a Japanese — standard became anathema.

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There has been a considerable amount of animosity directed towards the Japanese by the U.S. because of what the Americans consider to be restrictive trade practices. The last thing that they would want to do is to allow further penetration of their very lucrative television production markets by a foreign power. This type of scenario was what many in the broadcasting sector felt would happen if the NHK system were adopted.

In any country, but particularly in the U.S., when advancing new technologies one must be aware of powerful special interest and lobby groups that have a vested interest in maintaining the status quo in order to protect their profitability.

William Schreiber Phd. illustrates many of the considerations — technical and otherwise — that have so far impinged on the widespread acceptance in the U.S. of the NHK standard. His paper appears in the October 1988 issue of the SMPTE *Journal*, pages