SATELLITE SECURITY

ALLEN DAVIS

HOME BOX OFFICE
Time & Life Building   NY, NY

I doubt very much if any of us really want to see satellite security ever become a requirement, with the possible exception of the manufacturers presently engaged in developing such a system. I have spent several months of time and travelled thousands of miles talking to various companies and individuals who are interested in providing equipment to secure satellite feeds. It is not surprising that while many people are engaged in research and development in this field that they are all following one of perhaps three or four paths. We'll discuss some of these systems a little later.

There are, of course, problems created with having to secure satellite transmissions, such as the logistics of supplying decoders fast enough, (remembering that earth stations are being installed every day), so that the network can pick a date for commencement of scrambling without someone being unable to receive the transmission due to the lack of a much needed decoder. This decoder which is placed right after the earth station receiver, places another link in the transmission and reception chain. In other words, it's something else to go wrong. Recognizing this problem we must now find a way of overcoming it. If we have to have a redundant decoder the price doubles, if we don't and a CATV system, for whatever reason, has a decoder failure, then either the affiliate will lose their pay service until the problem is rectified or the only other choice would be to unscramble the entire network. As you can see this would be more or less self-defeating.

While all the problems could be troublesome they can be overcome by careful planning and emergency procedures adopted. Unfortunately, these questions cannot be answered right now.

1. Economics:

When the costs of providing satellite security are considered it is very easy to see the reluctance to commit yourself to such a project. Costs for decoders have been estimated anywhere from $150.00 to $15,000.00, depending upon the degree of security being offered. One must consider the time frame involved even if a decision were to be made today to scramble it would be anywhere from 18 to 24 months before the equipment could be manufactured and delivered. At this date in time we could be talking about having to supply perhaps as many as four to five thousand decoders. With a little math you can see the amount of money that has to be considered.

2. Technical Requirements:

There are a few basic technical requirements that are a must in choosing a scrambling system. There must be no apparent degradation to either the sound or picture. This is important as subscribers have been used to viewing a certain standard of quality before satellite security began and I believe they would not be tolerant of any change in those standards. Another important consideration is that whatever system is selected, it must not touch the vertical interval. As you are aware, this is where the vertical interval test signals are placed and these must remain in their original form if they are to be of any use in determining the performance of a given transmission path. Also located in the vertical interval, in the future, will be teletext information and this must be left intact. The question arises if audio security is necessary. Some approaches to audio range from ignoring it to digitizing it, depending on what scheme the video scrambling has taken. Certainly if teleconferencing is to be considered, it would be absolutely necessary that both audio and video be secured as no firm would want their competition even listening to what future plans were being made.

The system must be capable of changing the decoder control codes when required. Some

approaches to this problem have been to provide thumbwheel switches on the decoder so that at a specified date and time the affiliate can change the switches to a new code. Another system is a code credit card, good for the next month, which is mailed to each affiliate to be inserted in their decoder. These systems are too prone to problems such as our U.S. Mail not getting through in time, if ever. I believe the best method of controlling codes is to place the required data on a line in the vertical interval at the encoder. In this way codes could be changed at random without bothering the affiliate at all or taking a chance of a "folded and mutilated" card arriving by mail. Lastly, it is important that the manufacturer provide circuit cards that cannot be copied, should a decoder fall into the hands of an enterprising individual. This would require that either key circuits be potted or special components be provided that would be available to only the one manufacturer. Of course, the last system is also the most expensive one.

3. Scrambling Systems:

Various companies and individuals are either developing a scrambling scheme or have modified existing equipment they already produce in order to provide satellite security hardware. I tend to place the various systems into three categories:

a. Soft security
b. Medium security
c. Hard security

Soft Security:

Soft security implies that it can be easily defeated. This is not necessarily true; it could be by certain individuals but not to the same extent that some cable scrambling systems can. Some of the STV security methods fall within this category, all of them being strictly analog designs. While suppressed sync, inverted polarity are used, some are more advanced, using the vertical interval for code control changes.

These systems are, naturally, the least expensive being offered, with costs running between $150.00 to $300.00.

Medium Security:

As in the previous category all the medium security systems are analog in design. Here they, however, begin to depart from the soft security approach in that each line is attacked instead of complete fields of video. Most of the companies

are doing line by line random polarity reversals with the control data being placed in the vertical interval or on a separate subcarrier. The approach to securing the audio is either to cut it off completely without the proper codes or to use a different form of modulation.

Costs for this type of equipment range between $1,000.00 to $2,000.00, with quantity playing an important role.

Hard Security:

Hard security is exactly what it implies, it would be nearly impossible to defeat due to the method and to the fact that, in some cases, millions of different codes are readily available. All these systems utilize analog-to-digital converters, scrambling in the digitized form and reconverting back to analog for transmission. Naturally, the reverse takes place in the decoders.

Some firms are utilizing their frame synchronizer design and interchange complete lines on a random basis. With the sequence constantly changing, it is almost impossible to break the code.

Another firm has developed a system that not only digitizes the video line by line and interchanges them on a random basis, but dissects each line at different points and reverses each line front to back. The audio is also digitized and placed on lines in the video. I think it's safe to say that it would be totally impossible to defeat this system.

Cost for hard security seems to run between $7,000.00 to $15,000.00 and up.

SUMMARY:

As you can see you get what you pay for. The question is -- how much security, if any, do we really need? Would a simple solution be enough or do we have to go to the other extreme and spend millions upon millions of dollars for hard security? There are still a lot of questions to be answered; this is why HBO will continue to work with those doing the designing work and follow the progress very carefully and with much interest.