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TITLE: CONSIDERATIONS IN MULTI-BIT RATE CODING OF VIDEO CONFERENCING SIGNALS

Part 3 of recommendations H.120 and H.130 calls for the completion of specifications of coding algorithm, frame structure, and other matters related to video conferencing codecs operating at 1.5 Mbits/s for the 525/60 system. While we agree with this objective and stress the need to arrive at a suitable standard in this area, we have serious concerns regarding the potential impact of separating the 1.5 Mbits/s coding issue from the lower bit rate issues. It is our view that the question of coding of video conferencing signals at 1.5 Mbits/s should be addressed in the context of multi-bit rate coding. These bit rates could be in the range of 384 kbits/s – 1.5 Mbits/s. The main objective is to arrive at a coding algorithm and frame strucutre that can operate at different bit rates and provide adequate performance for any given bit rate in the selected range (e.g., 384 kbits/s – 1.5 Mbits/s).

Some of the issues and trends that should be taken into consideration when addressing multi-bit rate coding of video conferencing signals could be summarized as follows:

a. Integration of regular voice and data traffic with video conferencing traffic: for most customer premises installations, the 1.5 Mbits/s (T1) facilities are likely to be used for both video conferencing and regular voice and data services. This implies that the video conferencing service will likely operate at lower bit rates than 1.5 Mbits/s. In order to utilize the available channel capacity effectively, it may be necessary to allocate the bit-rate in a variable or dynamic manner. Therefore, video coding and processing equipment used to support this type of service should be able to operate at different bit rates.

b. Multipoint video conferencing: the total bit rate required to support this type of service increases as the number of nodes (sites) increases. In order to reduce the total bit rate, the per-link bit rate will have to be reduced well below 1.5 Mbits/s. In this environment the per-link bit rate may vary. This will depend on bandwidth (bit rate) availability, picture quality requirement for each link, number of participants in each site, etc. Therefore, the same coding and processing equipment should be able to handle these situations, i.e., fixed bit rate and multi-bit rate coding situations.

c. Transcoding between different bit rates may be required. Unless the question of compatibility at different bit rates is properly addressed, serious problems will arise and we might be faced with the situation where converting to the analog domain (tandeming of codecs) is the only alternative.

d. Inter-regional video conferencing will constitute an important segment of future video conferencing services. Therefore, when addressing the lower bit rate codecs, it is essential to take into consideration the issue of compatibility between different TV systems (PAL, NTSC, SECAM 525/60, 625/50).

e. In multi-bit rate coding environment, bit rate allocation for auxiliary signals (e.g., 64 kbits/s high quality voice, graphics, data) should be considered. However, a certain degree of flexibility should be left in the specifications. This will allow service designers to adapt and optimize the service to customer requirements to some extent.

f. There is a strong interaction between the service definition, the video conferencing system, and the digital signal processing and coding requirements. Video conferencing systems such as single person-camera, split-screen, and voice-switched systems are presently in use. More advanced and more effective systems such as the continuous presence and the virtual space systems are emerging. In addressing the coding and processing requirements, it is essential to address the issue of their interaction with the conferencing system.

In conclusion, the above points should be taken into consideration when dealing with both the 1.5 Mbits/s and lower bit rate issues. In addition, we believe that part 3 of recommendations H.120 and H.130 should not be finalized until these issues have been adequately addressed.