

Senator Specter
Questions for Chris Cookson
President
Warner Bros. Technical Operations Inc.
Chief Technology Officer
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1. Mr. Cookson, many opponents of the MPAA-supported legislative solution have centered on the choice of VEIL technology as a means of closing the so called “analog hole.” Can you explain to me why VEIL was chosen and whether alternative technologies exist?

Answer: VEIL was proposed by the motion picture industry as a technology for use in closing the analog hole for several reasons. First, the VEIL technology is embedded into the actual picture of the filmed content. This means that it is difficult to separate from the content in analog form without seriously degrading the content. In contrast, CGMS-A is not embedded in the actual image part of the filmed content and can be readily, sometimes even inadvertently, removed or stripped out. In some instances, such as with VGA connections to computer monitors, there is no way to put CGMS-A into the signal. Therefore, VEIL is useful for acting as a back-stop to the removal or other lack of CGMS-A.

Second, VEIL is the best alternative to using a video watermark. When solutions to the analog hole were first being discussed, many studios preferred to use a full-fledged video watermark for purposes of closing the analog hole. However, many consumer electronic and computer companies objected to the use of a full-fledged video watermark solution because of the implementation burdens and other implications associated with detecting and responding to such watermarks. VEIL was proposed by the motion picture industry as a compromise solution because its implementation burden on consumer electronics and computer manufactures is roughly 1/10th of the implementation burden required for a typical full video watermark.

Third, a number of different companies hold patents in the video watermarking area. Because Veil is an older technology, it minimizes the potential patent minefield problems of other technologies.

Fourth, the owners of the VEIL technology have agreed to license it on reasonable terms. No royalties or ongoing fees are charged to product manufacturers (i.e., the manufacturers of analog-to-digital converters covered by the proposed legislation). Instead, a one time of administrative fee of \$10,000 is charged for a long term license to embed VEIL detectors in an unlimited number of products and devices.

Fifth, the VEIL technology was selected by the motion picture industry only after multiple rounds of vigorous and extensive testing conducted by the well-respected consulting firm National TeleConsultants. The VEIL technology was tested for its

robustness against analog attacks, reliability across one generation of analog transmission, and visibility by the human eye. In all three categories it met the testing standards that had been established jointly by the consumer electronics, computer and motion picture industries in prior rounds of watermark testing.

2. Mr. Cookson, can you estimate how much will it cost the consumer electronics and computer software industries to incorporate the legislatively mandated technologies into covered products?

Answer: Our estimates are that there will be a cost of \$0.01 to \$0.015 per device to implement the VEIL technology into hardware and less for implementation in software.

In 2004, a variant of the VEIL technology was developed for use as a content protection technology. A system was designed using the VEIL technology to create the VRAM (VEIL Rights Assertion Mark) as a point solution addressing the analog hole. The VRAM, in conjunction with CGMS-A, gives content owners the ability to mark their content with usage rights in a robust manner that is, at the same time, simple to detect.

Detection of the VRAM is a much less burdensome operation than detection of a typical video watermark. During VRAM detection, a VEIL decoding algorithm extracts the VEIL energy from selected frames. The VEIL energy measurements are then applied to a statistical calculation algorithm that determines the probability of the VRAM being present within the frames. Over time, the statistical analysis will determine to sufficient certainty whether or not the VRAM is present within the analyzed video content. The low number of per-pixel operations and simple statistical methods used result in a low complexity decoder that carries a very small burden of implementation.

The typical level of resource on a computer chip to detect a standard video watermark is expressed as approximately 100,000 to 250,000 gates whereas the typical gate count to detect the VRAM is approximately 15,000 gates. We are advised by independent authorities that VRAM detection in silicon chips would cost approximately \$0.01 - \$0.015 per chip. Assuming that a device does its detection in a single analog to digital video detector, as opposed to doing so in software, the result would be a cost per device of \$0.01 - \$0.015.

Detection of the VRAM can be accomplished in either hardware or software. The VRAM decoder algorithm has a very low memory footprint. Assuming there is sufficient overhead in the processor performing the decoding, no additional cost should be necessary to implement the VRAM detector in software. The technology licensor provides a reference hardware decoder in the form of Verilog hardware description language and a software implementation of the VRAM decoder to all VRAM adopters.

3. Mr. Cookson, does the movie industry currently incorporate the cost of piracy into its prices for consumer offerings?

Answer: I cannot answer the question on behalf of the movie industry and can only refer to the pricing practices of Warner Bros. At Warner Bros., we take into account a variety of factors in pricing our consumer offerings. These factors include market research and elasticity of consumer demand, competing channels and formats of distribution (e.g., DVD versus Pay-Per-View), and competing forms of entertainment (e.g., video games) among others. In this complex process, we also take account of losses anticipated due to piracy. Prices to consumers may or may not be able to be raised to cover these losses and many times the price is even further eroded when consumers see the same content as being widely available for free. Moreover, as we test new channels and methods for distributing our content, we constantly take into account whether or not the distinctions and bounds of the various offers we are attempting to put before the consumer can be maintained. This includes constructing a realistic economic model that takes into account losses due to piracy.

4. Can you explain the effects of analog hole legislation on a company like TiVO?

Answer: For the majority of the digital video recorders (DVRs) that TiVO and its competitors provide, the proposed analog hole legislation will have no impact because these recorders are typically integrated into satellite or cable set-top-boxes and have no analog-to-digital video converters. They instead rely on direct digital video connections. The only TiVO devices that would be affected would be stand-alone TiVOs, with an analog video input and a video analog-to-digital converter. The proposed legislation would not outlaw such devices. Rather, on a strictly prospective basis and within a time frame adequate to allow implementation, TiVO would need to equip these devices so that they detect CGMS-A and VEIL on the analog-to-digital converters and respond to the usage rules. Under the proposed legislation, these stand-alone TiVOs would be permitted to record and play all television programming as they do today with the limited exception of pay-per-view and video-on-demand.

5. Can you explain why you need a tech mandate to fix the analog hole? Why can't this be done in the marketplace?

Answer: We believe that technology mandates should be sought only as a last resort and are appropriate only in circumstances where there is no available marketplace solution, such as in the case of the analog hole problem. Marketplace solutions are based on commercial relationships where each party receives value from the other. Content protection structures that are created in the marketplace depend upon the first step of encrypting/scrambling the content.

When content is encrypted, a license is required to obtain the key to legally de-crypt the content. This license then imposes obligations to ensure that the content is

adequately protected once it is decrypted. The negotiations over such licenses are market-driven: device manufacturers want access to the encrypted content and content providers want the device manufacturers to protect the content against unauthorized copying and redistribution.

However, once the encrypted digital content is converted into analog, it appears “in the clear” and the device manufacturer has unrestricted and complete access to use it in any way desired. Thus, there is no longer a market-driven contractual basis on which to build a voluntary agreement that would attach conditions to the access and use of that content. The market-driven approach to the roll-out of new digital content offerings that involve technical protections against widespread illegal copying and redistribution of the content simply doesn’t work when it comes to analog signals and particularly to the problem of analog signals that have been redigitized.

All three industry groups (motion picture, consumer electronic and computer) that participate in the Copy Protection Technical Working Group recognized this dilemma as a precursor to the formation of the Analog Reconversion Discussion Group, which examined potential technologies to address the problem. Even the Consumer Electronics Association (CEA), in testimony before the House Judiciary Committee last year, recognized that the analog hole is a legitimate problem worthy of a legislative solution. At the hearing, Michael Petricone, Vice-President of Government Affairs for CEA, stated, “We have no objection to addressing the analog hole issue and in fact have worked extensively with the content industry in the past to do that.”

For these reasons, the analog hole problem cannot be adequately addressed by privately negotiated agreements in the marketplace.