Underlying Motivations in the Broadcast Flag Debate

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Abstract:

As the rollout of digital television progresses, content owners have expressed great concern for the security of their intellectual property if released unfettered across the airwaves in high definition digital form. The proposed solution, the broadcast flag, is to be attached to a digital broadcast signal, and would control to how the content could be used: to which devices it could be sent and how many times it could be copied. The content industry, led by MPAA, claims that this scheme will protect their content and, if it is implemented into the DTV infrastructure, they will freely release their content. Implementation requires the support of a variety of other actors, many of whom claims to support the flag as well. This paper posits that the probable benefits to many of these actors are distinct from their stated goals of supporting the technologically-embedded policy.

After a brief description of what the broadcast flag and its history, we assess its utility as a policy tool. Since digital rights management problems in many ways resemble traditional information security issues, we posit that the formal threat model analysis of systems security is particularly useful in testing the robustness of a given system against a range of attacks. The efficacy of the flag is thus tested with a threat model analysis in the context of several digital rights management goals. We find that, while the flag would not successfully keep content off the Internet, it might offer content providers several other concrete benefits in controlling their content, including blocking heretofore popular consumer behaviors and shifting the balance of content control towards the copyright holder.

Having established a likely set of outcomes that would benefit the content holders, we turn our attention to the full range of players involved in the drafting and implementation of the broadcast flag proposal, a group that includes consumer electronics companies, broadcasters, the major television networks, consumer groups, cable providers, the FCC, and Congress. A cost-benefit analysis helps unpack the motivations and incentives each player has for supporting or opposing the flag. Many reports help demonstrate that the flag will be expensive to fully implement across society, yet there is little evidence that this cost will be primarily borne by any of the major proponents. We then compare our analysis with the public statements by each of the players regarding the flag, to evaluate the sincerity of their claims and affirm our analysis. Ultimately, it appears that the underlying motivations of key players in the broadcast flag debate are quite different from the stated goals of the broadcast flag, and relate far more to establishment of DTV in general than digital content protection.

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Introduction[1]

Digital content protection has grown into a huge issue over the past 10 years, as the ability to make and distribute perfect copies of digital content becomes ubiquitous and cheap. Content owners fear the wide spread dissemination of their copyrighted materials over the Internet, particularly over peer-to-peer systems that have proven hard to shut down. The advent of Digital Television offers yet another benefit of the digital information age, but also threatens to open other means of digital infringement if users can freely capture and distribute broadcast TV shows and movies. One of the main drives behind Digital Television is the release of Hollywood movies, yet Hollywood companies, represented by the Motion Picture Association of America (MPAA), are reluctant to release their content without some sort of protection.

The resulting proposal, after working with various interested actors, is the broadcast flag. This simple digital signal, attached to a digital broadcast signal, would control to how the content could be used: to which devices it could be sent and how many times it could be copied. The MPAA claims that this scheme will protect their content and, if it is implemented into the DTV infrastructure, they will freely release their content. Implementation requires the support of a variety of other actors, each of whom claims to support the flag as well. Opponents feel the proposal is ineffective, overly broad and restrictive of the freedoms users are accustomed to with their media content.

This paper proposes to examine the veracity and robustness of the MPAA's claims, as well as the claims of other key actors in the debate. Each interested group has a stated motivation for supporting the broadcast flag, and has used that motivation to push for the implementation of a broadcast flag regime. We find that, while the broadcast flag does offer significant benefits to many of the key players, these benefits are seldom directly related to the stated motivation of curbing unauthorized internet content distribution, and often have little to do with the broadcast flag at all.

We begin this paper with a description of the broadcast flag, paying particular attention to the benefits purported by the MPAA itself. Since the MPAA claims that the flag will effectively stop unauthorized Internet distribution, we then evaluate the robustness of the flag with a formal threat model analysis. We also examine other possible benefits of the broadcast flag under this framework, and determine that, while not successfully keeping the content in question off the Internet, it will offer the MPAA several other concrete benefits, quite different from the one publicly stated. In the fourth section, we turn our attention to the full range of players, including consumer electronics companies, broadcasters, the major television networks, consumer groups, cable providers, the FCC, and Congress, and use a cost-benefit analysis to unpack the motivations and incentives each player has for supporting or opposing the flag. We then compare our analysis with the public statements by each of the players regarding the flag, to evaluate the sincerity of their claims and affirm our analysis. Ultimately, it appears that the underlying motivations of key players in the broadcast flag debate are quite different from the stated goals of the broadcast flag, and relate far more to DTV in general than digital content protection. We

[1] The authors gratefully acknowledge the guidance and feedback of Barbara Fox and Hal Abelson.

conclude that support for the broadcast flag is based on ulterior motives. If this costly policy is to be implemented, we feel a more accountable case should be made prior to acceptance.

Digital Television and the Broadcast Flag

The broadcast flag was suggested as a consequence of the emergence of digital television. Digital television offers many benefits over analog television, including improved picture and sound, while requiring less bandwidth for broadcast transmission. Following the FCC creation of the Advanced Television Systems Committee in 1995, which was mandated to develop standards for digital television, broadcaster began implementing the switch to digital television. While maintaining analog broadcasts, digital broadcasts began using additional spectrum granted by the FCC. By late 1998, the 26 TV station in the country's most populous cities would begin broadcasting the using the Grand Alliance DTV system. This initial broadcast would reach 30% of U.S. television households. By 1999, that number would expand to 40 stations and by 2000, that number would reach 120 stations. By 2006, every station would be expected to transmit all content digitally for fear of losing the FCC licenses.[2]

Since digital television offers an enormous amount of compression compared to what is possible in the analog domain, when the transition to DTV is complete, the FCC will regain the old spectrum and license it for different uses. Given spectrum scarcity, government hopes to regain and resell the original NTSC spectrum granted to FCC licensed broadcasters in exchange for DTV spectrum with the same bandwidth.[3]

Over the past few years, adoption has been lagging. As of the end of the middle of 2003, a little over 6 million sets have been sold[4] out of what Nielson estimates to be over 100 million households with television.[5] Networks attempted to encourage HDTV subscriptions by offering a range of programming in high definition format. However, the lackluster adoption rates gave broadcasters little reason to invest in the more costly HDTV formatted content. This, compounded with the high price gave consumers little reason to invest thousands of dollars for digital television sets.[6]

Some attributed the slow adoption of digital television to the lack of quality content on terrestrial television, and looked to the MPAA (Movie Picture Association of America) to provide that content on digital television. The MPAA, however, has stated that it would not release content without copyright protection enforcement. Unlike DVDs and cable, which are either decrypted when played or broadcast encrypted, digital broadcasting must be delivered unencrypted. In fact,

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[2] Jerry Whitaker and Blair Benson *Broadcast History: Milestones in the Evolution of Technology*. New York: McGraw-Hill Professional, 2003. Online Copy of Chapter 19: http://www.tvhandbook.com/support/pdf_files/Chapter19_7.pdf
[All links cited in this paper are valid as of August 28, 2003]

[3] Jennifer Manner, *Spectrum Wars: The Policy and Technology Debate*. Boston: Artech House, 2003

[4] Jeff Joseph and Jenny Miller, "Digital Television Sales Flourish During First Half of 2003" *CEA Press Release,* July 30, 2003. http://www.ce.org/press_room/press_release_detail.asp?id=10269

[5] Nielsen Media Research, 2001, cited by *Northwestern University's Media Management Center* in "Industry Outlets of Different Media." http://www.mediainfocenter.org/compare/penetration/

[6] Goroch, Antonette. "HD in the Clouds? DBS seek to stay ahead, despite slow growth in HDTV." *Broadband Week* January 22, 2001. http://www.broadbandweek.com/news/010122/010122_wireless_hdtv.htm.

the FCC requires that this terrestrial broadcast television be sent "in the clear" as part of its mandate. The MPAA fears delivering high-quality, unencrypted content digitally, because viewers could record shows and later make them available on the Internet for widespread, unauthorized distribution.

In an effort to address this problem, The Copy Protection Technical Working Group (CPTWG), composed of representatives from entertainment, information technology and consumer electronics industries, formed the Broadcast Protection Discussion Group (BPDG) to develop guidelines for copy protection of content provided by parties such as the MPAA over digital terrestrial television. The goals of the group include developing a technical specification for the broadcast flag and recommending the implementation of that specification.

A conceptualization and partial specification of the broadcast flag was issued in the Final Report of the Co-Chairs of the Broadcast Protection Discussion Subgroup. They describe a system in which the broadcast signal is marked with a flag indicating the copy permissions of that content. The demodulating device that interprets the digital signal will only pass the digitally accessible content to devices that securely and reliably indicate that they will honor these copy protections. The exact implications of how users will be affected by a full implementation are the subject of much debate, and perhaps a little propaganda.[7] An exact prediction is almost impossible given the matters yet to be decided, and is outside the scope of this paper. Instead, we examine how effective it will be at its stated goals, and speculate on how various actors see the broadcast flag in relation to their own interests.

A Threat Model Analysis of the Broadcast Flag

How effective will the broadcast flag be at doing what it is supposed to do? The MPAA claims that the broadcast flag is designed only to prevent "unauthorized redistribution of copyrighted content, not prohibit digital copying."[8] While the MPAA is clear that it means only to prevent movies from being traded on the Internet, an implementation of the broadcast flag may also accomplish other goals. In the threat analysis, we examine the effectiveness of the broadcast flag in accomplishing the stated goal of the MPAA, in addition to other speculated motives. In doing so, we examine all possible threats to the broadcast flag as a security mechanism, and the parties that may accomplish these threats. We conclude that the broadcast flag is not an effective means of preventing digital content distribution over the Internet, but will be successful in promoting other possible, although unstated, goals of the content owners.

This threat analysis uses two assumptions. The first assumption is that the Table A components, as part of digital television, are commonplace.[9] The FCC has convinced consumers to switch to digital television, and has discontinued analog broadcasts. Almost all homes have replaced their

[7] See, for example, the MPAA's FAQ (http://www.mpaa.org/Press/Broadcast_Flag_QA.htm) on the topic as compared to the advocacy group Digital Consumer's FAQ (http://www.digitalconsumer.org/faq.html)
[8] "Broadcast Flag Frequenty Asked Questions." *MPAA Broadcast Flag Press Releases.* http://www.mpaa.org/Press/Broadcast_Flag_QA.htm.
[9] Table A is a list of technologies that conform to the standards set up by the BPDG for adequate protection. It should be noted that there is not complete on these standards or exactly how a technology may qualify. See the Section 6.6 in the BPDG Final Report.

legacy televisions with digital televisions. Since the flag meaningless without compliant devices, this assumption is necessary to analyze the flag in action.

The second assumption is key and states the following: *the analog output from all digital television tuners has been restricted*. This is, in effect, plugging the so-called 'analog hole.[10]' The justification for this assumption is that if the analog hole is not blocked, then the broadcast flag will have no effect in preventing the Internet redistribution of movies, since it is trivial to redigitize an analog video stream. By trivial, this analysis does not imply that the average consumer will redigitize his own movies. However, the analysis does assume that since redigitization from the analog output is relatively prevalent under an NTSC paradigm, it will continue to be so in the future if the analog output is not restricted. We are not alone in realizing that the analog hole poses a serious problem to the success of the broadcast flag; as mentioned in the Appendix. In October 2002 Representative Billy Tauzin (R-LA) drafted legislation on the broadcast flag that included a proposal to remove all analog outputs from digital devices that interacted with broadcast DTV signals.[11]

For the purposes of the threat analysis, we identify four potential goals of the MPAA in proposing the broadcast flag:

- The elimination or near elimination of illegal distribution of movies on the Internet;
- Restriction of personal recordings of movies for time shifting or library building;
- The reversal the societal norms allowing copyright infringement;
- The shift of control of content into the hands of the copyright holder.

These four goals have not all been publicly identified as being goals that the MPAA wishes to accomplish by passing broadcast flag legislation. Rather they are goals that seem reasonable in light of what the broadcast flag makes possible.

Each of these goals and consequent threats are examined below:

Goal I: Elimination of Illegal Distribution of Movies on the Internet

The MPAA's stated goal of the broadcast flag is to prevent the illegal distribution of movies over the Internet. According to the MPAA, the broadcast flag "signals that the program must be protected from unauthorized redistribution."[12] The same public statement further clarifies the point to apply to internet distribution: "If unauthorized copies of programs are widely available on the Internet they cannot be sold in ancillary markets and the owners cannot cover the costs of production."[13] MPAA constituents may fear a loss of revenue through this unauthorized distribution chain, and may wish to prevent this problem before it escalates. Currently most

[10] The analog output of media devices forms a "hole" in digital rights management efforts, since any analog output signal can rerecorded as a digital signal through an analog input. Various factions of the digital content media have begun to work on this problem; it is hard to imagine a solution that does not involve more hardware regulation. See the Analog Reconversion Discussion Group for more information: http://www.cptwg.org/Assets/Presentations/ARDG/ARDG%20page.htm.

[11] The Electronic Frontier Foundation attributes this unsigned staff discussion draft to Tauzin's office. This wording has not been incorporated into any proposed legislation. http://www.eff.org/IP/Video/HDTV/tauzin-bf-mandate.pdf

[12] "Broadcast Flag Frequenty Asked Questions." *MPAA Broadcast Flag Press Releases.* http://www.mpaa.org/Press/Broadcast_Flag_QA.htm.

[13] Ibid

consumers do not have the bandwidth to download full-length movies in a reasonable amount of time. For example, a 2-hour movie encoded using the DivX codec takes about 10 hours to download over a cable modem, compared to 2 minutes for the average song encoded in the MP3 format. While illegal copies of movies are not as prevalent as MP3 music files on the Internet, it is possible that future advances in bandwidth will give rise to a movie trading community, perhaps over peer-to-peer networks. Future projections aside, the MPAA has made this goal clear.

For the purposes of this threat model, we assume the attack has been successful even if a very small number of people manage to release a movie on the Internet. Compared with personal control, which we discuss below, a single unauthorized copy can undermine a protection scheme using peer-to-peer systems. Decentralized networks, such as Gnutella and Limewire, have proven resistant to attempts to shut them down, either by technical means or through legal action[14]. In these peer-to-peer networks, as more users download the file and keep it available for others to download, it becomes easier to find and download by others, spreading exponentially across the network. Therefore, in a peer-to-peer network, if the original source of a file is not stopped prior to sharing of the file, it is impossible to prevent the spread of the file, provided the file is in demand. This paper does not seek to challenge the validity of monetary loss claims, but rather focuses on the internet distribution itself.

Another assumption made is that the MPAA is only concerned with the distribution of HDTV-quality movies. For the purposes of this threat analysis, we will ignore the Internet distribution of movies that are "ripped" from DVDs, rather than broadcast HDTV.[15] Since the DVD encryption system has already been broken, as long as DVDs continue to be sold, movies of SDTV quality will probably be shared through the internet.

There are many threats to the goal of preventing unauthorized distribution of movies on the Internet. We distinguish between three capable adversaries to meeting the goal of preventing Internet distribution of digital content, whom we label as follows: average consumers, nefarious infringers, and groups with resources.

Average Consumers

The average consumer may wish to distribute movies on the Internet to share them with friends, or simply to share them to anyone. Movies may be distributed in their entirety, or as short clips. Since we assume the analog output would be disabled, digitization of content is not an option. Consumers will somehow have to work around the broadcast flag to disseminate movies over the Internet since the broadcast flag is designed explicitly to prevent movies from being moved to computers. The average consumer must thus have the interest, knowledge and resources to use a circumvention device. While the broadcast flag is not currently in use, comparisons can be made to older copy protection methods, such as the CSS encryption used in DVDs. CSS encryption

[14]Seagrumn Smith, "From Napster to Kazaa: The Battle over peer-to-peer filesharing goes international" *Duke L. & Tech. Rev*. 0008 2003 http://www.law.duke.edu/journals/dltr/articles/2003dltr0008.html
[15] Andy Patrizia, "DVD Piracy: It can be done" *Wired Magazine,* November 1, 1999. http://www.wired.com/news/technology/0,1282,32249,00.html

was broken in 2000, and DVD decryption software is widely available on the Internet.[16] Usage of CSS, however, remains somewhat limited. Of traded movies, many are captured from cinemas or stolen screening tapes. An analysis of ripping versus trading of music files reveals similar conclusions, that only a few peers in a P2P network generate and share most of the files.[17] This conforms to the content industry's claim that file-swappers are primarily interested in acquiring content for free.[18] Those merely seeking to consume has will yield to a low barrier of entry in distributing content they themselves release; they will instead download and share the handiwork of others.

We therefore claim that the flag imposes too large a technical obstacle for the average consumer, who is only casually interested in distributing files him or herself. The flag is specifically designed to block casual misuse. The average user will not engage in the necessary effort to circumvent a robust implementation of the flag. This group consumer does not pose a serious threat to the broadcast flag's primary goal.

Nefarious Infringers

This "nefarious infringers" are a much smaller group than the average consumers. They will have some technical knowledge, and are willing to expend energy in learning how to circumvent copy protection mechanisms. This group may distribute movies on the Internet for monetary compensation, but the more likely reason is that they simply enjoy distributing movies. Monetary compensation is unlikely to be a driving force of nefarious users because of the difficulty in receiving payment for the sale of illegal merchandise without getting caught. To continue the prior comparisons, this is the group that converts songs to the MP3 format and compresses decrypted DVD content for internet distribution.

To distribute HDTV-quality movies on the Internet, this group must circumvent the broadcast flag. While a full discussion of the technical robustness of the broadcast flag is outside the scope of this paper, we have attempt to make a brief analysis here for the purposes of the threat model.

To prevent these users from hacking DTV tuners, the BPDG has released a set of robustness requirements for consumer electronics. These include various requirements, such as ensuring that all buses are encrypted, and that all integrated circuits are soldered, not socketed, to boards. The requirements even go as far as naming screwdrivers in a list of tools that should not be able to be used to defeat the copy protection system in DTV products.[19] These countermeasures are likely to deter many people from finding weaknesses in DTV systems. However, the cost of consumer electronics must be kept low. The BPDG realizes this, and has decided to forgo any countermeasures that would deter hackers using more sophisticated tools, such as logic

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[16] Ibid

[17] Eytan Adar and Bernardo A. Huberman, "Free Riding on Gnutella" *First Monday*, 5:10 2000 http://www.firstmonday.dk/issues/issue5_10/adar/

[18] "The term 'file sharing' is a popular euphemism for copying, which… is stealing." Fritz Attaway, "Copyright Privacy Prevention and the Broadcast Flag" *Testimony to the House Committee on the Judiciary, Subcommittee on Courts, the Internet and Intellectual Property* March 6, 2003. http://www.house.gov/judiciary/attaway030603.htm

[19] BPDG "Requirements for the Protection of Unencrypted Digital Terrestrial Broadcast Content Against Unauthorized Redistribution" April 25, 2002. http://www.cptwg.org/Assets/BPDG/Tab%20F-2.DOC

analyzers.[20] Herein lies a sticky problem pointing to the weakness in the broadcast flag implementation: the system should be secure when distributed to millions of people, but should also be cheap.

The BPDG may feel that adversaries with logic analyzers do not pose a significant risk because of the limited number of people with both access to logic analyzers and the technical knowledge with which to hack DTV systems. However, one person who defeats copy protection on a DTV device may be able to share enough information about the method for others to circumvent copy protection on identical devices. Indeed, a similar situation existed with Microsoft's X-Box game system, which was designed to execute only Microsoft-authorized (signed) code. In 2002 MIT graduate student Andrew Huang, having spent many hours in a well-equipped lab, successfully crafted a method to run unsigned code on the X-Box. While not everybody has access to logic analyzers, the directions and information Mr. Huang provided helped others to run unsigned code on their own machines.[21]

Developing a workaround for the copy protection on a broadcast flag-compliant device is not the only way to move movies to a computer. Another method, which may be much easier, is to use a DTV receiver that simply ignores the broadcast flag. Legislation will obviously make it illegal to import these devices from overseas, but US law cannot prevent their manufacture overseas. If international standards and self-regulation close off that source of new non-compliant devices, there are over six million HDTV devices sold to date, and a large portion of these contain non-compliant decoders.[22] There is no reason not to expect a flourishing black market in these devices under an enforced broadcast flag regime.

The BPDG is taking care to deter nefarious users from hacking broadcast flag-compliant devices by having robustness rules for compliant devices. However, given the availability of non-compliant technology, the determination of technically-oriented nefarious users and the low threshold of file availability necessary to spread content, this group poses a high threat to the content industry's goal of blocking internet distribution.

Organized Crime

A third adversary to MPAA's goal of stopping Internet distribution of its digital content with the broadcast flag: organized crime. While most nefarious users do not have monetary gain as motivation to distribute movies on the Internet, there are groups whose motivation is of a monetary nature. These groups are analogous to the groups that currently copy movies and sell them on VHS tapes or DVDs on city streets, often based in off-shore operations. Since these groups have more financial resources than individual consumers, and can have factory-sized operations, it stands to reason that they will be more likely to succeed in an attack on breaking the copy protection technologies. The movie industry has identified illicit international

[20] The Logic Analyzer is a test instrument used for developing, debugging, and maintaining digital systems. It can record the electronic output of a hardware device to understand how the information flows through that system. It is a critical tool for reverse-engineering.

[21] "Hackers Play with the Xbox." *BBC News* June 26, 2002. http://news.bbc.co.uk/1/hi/sci/tech/2067045.stm

[22] Jeff Joseph and Jenny Miller, "Digital Television Sales Flourish During First Half of 2003" CEA Press Release, July 30, 2003. http://www.ce.org/press_room/press_release_detail.asp?id=10269

organizations as a serious threat to its business model.[23]

Any group with resources is more likely to have the technology necessary to circumvent the copy protection mechanism on DTV devices. Further, if they decided that HDTV was their preferred source for illegal content acquisition, exemptions in professional-level equipment would allow them to bypass the flag completely.[24] However, their motivation of profit affects the likelihood that a group will actually distribute movies over the Internet. Instead, they will more likely use standard media such as VHS cassettes and DVDs, which do not offer the HDTV quality. Moreover, the focal point of this large black market on first-run films[25] makes the down-market titles to be broadcast over the public airwaves less appealing.

Goal 2: Restriction of personal recordings of movies for time shifting or library building

It is possible that content owners may be motivated by the broadcast flag's potential to limit individuals' ability to record movies for time shifting or library building[26]. These privileges go back to the Supreme Court decision *Sony v Universal Studios*, where Universal Studios sought unsuccessfully to show that time shifting was a form of illegal copyright infringement. Library building the court saw as a technical infringement, but not so severe a harm as to ban the technology since there was little commercial harm provable. However, *Sony* only dealt with illegal infringement issues—these privileges were not recognized rights but merely activities protected under the purview of fair use.[27] The advent of the broadcast flag affords the MPAA an opportunity to effectively reverse the *Sony* decision in practice, if not in principle. While this is not a states goal of the MPAA (they have, in fact, claimed the opposite[28]) it would appear to follow as a direct repercussion of the flag implemented across technology. Without an analog output on DTV tuners, the only way consumers will be able to record broadcasts is via the copy-protected digital output. By creating the standards for broadcast flag compliance, the BPDG will be able to set restrictions on recording for time shifting or library building.

Practical subversion of this goal does not depend on how the broadcast flag is used. Indeed, it is easy to imagine the consumer uproar were they denied the right to record a favorite show.[29] This

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[23] Jack Valenti, "International Copyright Piracy: Links to Organized Crime and Terrorism*" Testimony to the House Committee on the Judiciary, Subcommittee on Courts, the Internet and Intellectual Property* March 13, 2003 http://www.house.gov/judiciary/valenti031303.htm

[24] "[regulations] will be crafted so as to exempt the requirements from applying to products that are specifically intended for professional and broadcast use" *Final Report of the Co-Chairs of the Broadcast Protection Discussion Subgroup*. June 3, 2002. http://www.cptwg.org/Assets/BPDG/BPDG%20Report.DOC

[25] Jack Valenti, "International Copyright Piracy: Links to Organized Crime and Terrorism*" Testimony to the House Committee on the Judiciary, Subcommittee on Courts, the Internet and Intellectual Property* March 13, 2003 http://www.house.gov/judiciary/valenti031303.htm

[26] Time shifting is the practice of recording television shows for purposes of viewing them later at a more convenient time. Library building is the practice of recording television shows in a systematic fashion to keep it for repeated viewing over a long period.

[27] Sony Corp. v. Universal City Studios, Inc., 464 U.S. 417 (1984)

[28] "Q: When the broadcast flag is implemented, can I record any TV program… and watch it later…? A: Absolutely… Q: Can I make a back-up copy of that program for my library? A: Yes."
"Broadcast Flag Frequenty Asked Questions." *MPAA Broadcast Flag Press Releases.*
http://www.mpaa.org/Press/Broadcast_Flag_QA.htm.

[29] "…the more we restrict how our customers use our products, the more likely they are to be annoyed." Edward Black, "Copyright Privacy Prevention and the Broadcast Flag." *Testimony to the House Committee on the Judiciary,*

threat is judged on its full impact, and the power such control wields. By limiting how time shifting and library building can occur, the content owners will have the ability to block previously established practices. These practices include making multiple copies, storing files on a variety of mediums and sampling video clips for alternate media uses. For example, a political speech broadcast on a new program under 'copy-once' could not be used for other purposes.

Independent Individuals

Individuals working alone pose a threat to this goal if they are successful in circumventing the copy protection system in a DTV system to make personal copies. These copies do necessarily have to be digital. This group is motivated by the desire to have the same capabilities in the new DTV world as in the analog TV world when such desires are thwarted by the limitations of Table A devices and "copy once" compliance.

To be successful these individuals would have to reverse engineer a DTV tuner and/or digital recorder which, as noted above, will be difficult without specialized equipment. Regardless, their effect will be limited if they are not able to share this knowledge with others; the overall system still restricts copying for most of its users. Thus, independent individuals will not be successful in deterring the broadcast flag from restricting personal recording of movies for time-shifting and library building purposes.

Consumer Electronic Companies

If there are fewer ways to copy broadcast programming onto media, there will be fewer media devices to be sold. We can imagine consumer electronics firms being frustrated with these restrictions and seeking some way around them to increase their market.

Many consumer electronics firms, however, were active participants of the Broadcast Protection Discussion Group, and it is unlikely they would seek to undermine their own work.[30] The encouragement of regulation and penalties for violation make this even less likely, so there is little threat of consumer electronics companies restoring the ability to make personal copies with impunity.

Malintentioned Groups

Malintentioned groups with infringement in mind have as a goal circumventing copy protection in a way that is easy for others to replicate. Additionally, groups allow more widespread sharing of information than individuals. If fans of a particular broadcast program are unable to build a library as they wish, there might be a secondary market in reselling copies. Monetary gain could also be had if the group wants to sell modifications that disable copy protection. This would be similar to chip modifications of Sony Playstation video game consoles, allowing the modified systems to play games copied to CD-R discs. However, actions that would accomplish circumventing the MPAA's second potential goal violate the DMCA, so it may be risky to run

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Subcommittee on Courts, the Internet and Intellectual Property March 13, 2003
http://www.house.gov/judiciary/black030603.htm

[30] CPTWG "Attendee List" http://www.cptwg.org/html/ATTENDEES%20home%20page.doc

such a business. It may also be difficult to create chip modifications that work across systems.[31] Unlike Playstation consoles, every model DTV tuner may be different. If we assume a heterogeneous market and variations in design and protection features, then the "break once, run anywhere" attacks will not be as useful.

Since consumers are not likely to take action by themselves to defeat copy protection, the larger threat is that someone will sell a service of modification to a DTV device to defeat copy protection. However, this threat is also not very significant because of the problem of charging for such a service. Under the DMCA this service is illegal, and the people involved in such businesses could be prosecuted.[32] (Chip modifications to Playstations occurred prior to the DMCA.) Thus, the treat of malintentioned cooperative groups in acting as a threat to MPAA's goal of restricting time-shifting and library building via the broadcast flag is low, not much higher than the threat posed by independent individuals.

Goal 3: To reverse societal norms of copyright infringement

Most people simply do not consider the subtleties of infringement when they use copyrighted material. Whether making a mix tape for a friend or loaning a disk of software: their view of personal property if more flexible than that which the laws provide.[33] Many in the content industry have observed these permissive social views perpetuate casual infringement:

> So long as the general public believes that private copying for non-commercial use is not wrong in the digital environment, it is simply a given that we will see the immediate uploading and free downloading of best-selling novels, music, and - once the bandwidth is there - theatrical motion pictures by millions of people.[34]

The music industry has begun to fight this battle, with a website containing messages from recording artists about the losses they suffer from consumer file-swapping.[35] Jessica Litman observes that, historically, copyright law has not applied to individual people. The broadcast flag could be an attempt to reverse that, by embedding control in the technology. This attempt could be opposed by either consumers or Congress.

Average Consumers

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[31] See 17 USC Sec 1201 (a)(1)(A) "No person shall circumvent a technological measure that effectively controls access to a work protected under this title."

[32] See parallel prosecutions of chip mod agents, i.e
Declan McCullagh, "US Crime-fighters seize web sites" *CNet News.com* February 26, 2003.
http://news.com.com/2100-1023-986225.html

[33] Jessica Litman. *Digital Copyright*. Amherst, NY: Prometheus Books, 2001. pp 161-162.

[34] Christopher Murray , comments made at *Intellectual Property System Major Problems Conference*. Franklin Pierce Law Center, NH. 1998. Transcribed at http://www.idea.piercelaw.edu/articles/39/39_2.1/10.Blair.pdf

[35] Musicunited.org is an industry-sponsored website that informs music listeners that file-swapping is legal with stiff penalties, it hurts artists and there are legal alternatives, with messages from popular artists themselves. It was launched with a full page New York times advertisement on September 26, 2002 (see http://www.musicunited.org/who_cares.pdf for the ad)

At the end of the day, the companies represented by the MPAA are answerable to its customers: the average consumers who actually buy Hollywood products. Without the financial support of the average consumer, the MPAA member companies cannot exist. These consumers pose a threat to the MPAA's attempt to change the social perceptions on copyright infringement. If consumers were to speak out against the MPAA, or organize a boycott of movies because they were unhappy with restrictions on copying broadcast television, then the companies represented by the MPAA would be forced to answer, much like software firms were eventually encouraged by angry consumers to stop using "dongles" as a digital rights management system.[36]

Unfortunately, such a consumer revolt is not likely in the short run. As supporters of the flag point out, the restrictions of the average user *are* minimal, unlike the annoyance of software dongles, or copy-protected CDs that won't play in standard players.[37] If initial reaction to the flag is tolerant, consumers will have a technological reminder that the content they are viewing is not their property in a standard sense: its uses are systematically limited. Just as ubiquitous information flows can make some people resigned to an absence of personal privacy,[38] so too might a shifted technical reality change perceptions of use. This embedded lesson may shape thinking of intellectual property far more effectively than New York Times advertisements.

Congress.

Congress poses a threat to attempts to reverse social perceptions with its power to codify certain rights under law. It has passed legislation condoning a more free perspective of musical content with the Audio Home Recording Act of 1992. The AHRA exempted consumers from lawsuits for copyright violation in certain cases in return for mandating copy protection mechanisms in home audio recording equipment.[39] This balance is noteworthy, since it permits active user behavior that is technically infringement, but hides the content protection in a "natural" degradation function. It makes intuitive sense that a copy of a copy of a cassette might be less than perfect, just as is the case with a photocopy of a photocopy of a paper document. The broadcast flag, on the other hand, implements its protection in a more direct fashion, so that users will come to think that content simply isn't *meant* to be copied and shared.

The AHRA was passed as a balance of competing forces, and represented the interests of industries other than those aligned with the content creators, particularly consumer electronics groups. To strike a balance against the broadcast flag, similar coalitions would have to force congress' hand. While this is always a possibility, the authors do not consider this a terribly likely outcome in the foreseeable future.

Goal 4: To Move content control to the copyright holder.

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[36] Jim Seymour "Dongles foil pirates-but drive users crazy," *PC Week,* November 21, 1994, vol. 11 no. 46, p. 44

[37] Chris Oakes "Copy-Protected CDs Taken Back" *Wired Magazine* February 3, 2000. http://www.wired.com/news/technology/0,1282,33921,00.html

[38] See Scott McNealy's infamous quote, "You have no privacy anyway… get over it." http://www.wired.com/news/politics/0,1283,17538,00.html

[39] See 17 USC Sec 1008 "No action may be brought under this title alleging infringement of copyright… based on the noncommercial use by a consumer…"

If the broadcast flag legislation is passed, it will mark the first time that a coalition including the content creators and copyright holders both dictate how the content can be used, and architect the technological framework to enforce those decisions. To date, the copyright holder has not been able to prevent infringement. Instead, the copyright holder sues after infringement has occurred. Using the broadcast flag movie studios will proactively be able to restrict the use of their content, which is obviously self-beneficial. In the case that broadcast flag legislation is passed, only regulatory action can offer a threat to this model.

The FCC and Congress

Since the FCC has authority over the public airwaves, it may pass a mandate specifying the encoding rules for broadcast DTV. This could force the MPAA to allow a certain number of copies, or allow some other fair use copying. The FCC would be interested in doing this to placate consumers unhappy about the DTV transition. Yet their interest appears at the moment to be primarily with expediting rollout. In a statement to congress, the commission stressed that they had "no desire to duplicate the work of the US Copyright Office."[40]

Similarly, Congress could be moved by public opinion to act, particularly if the administrators of the flag attempt to expand. An opponent of the broadcast flag has suggested that they might next demand prohibitions on fast-forwarding though commercials on taped TV shows.[41] Whether congress would act is, of course, an open question. Certainly recent bills such as the DMCA and the Copyright Term Extension Act have tended to weigh in favor of copyright interests. On the other hand, the proposed legislation of Zoe Lofgren affirming media choice shows that congress is made of divergent interests.[42] Given the indeterminate nature, congress could be seen as a moderate threat to the goal of a shift in copyright control.

Threat analysis conclusion

As shown through the above threat analysis, the broadcast flag does not provide a robust technical solution to the problem of Internet redistribution of movies. The nature of existing online distribution chains such as peer to peer networks allow a "break once, run anywhere" model, permitting a few advanced users to crack the broadcast flag protection and then allowing others to share with impunity. However, the threat model does show that the broadcast flag will have a strong impact on average consumers of broadcast content, shaping how they experience and use it. It has the potential to prevent consumers from enjoying uses of content previously considered as "fair uses" in the analog realm, and to give content providers control over the use of its content. Though its states goals are not met, the MPAA and its constituents would derive considerable benefits from the broadcast flag regime.

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[40] W. Kenneth Ferree "Copyright Privacy Prevention and the Broadcast Flag." *Testimony to the House Committee on the Judiciary, Subcommittee on Courts, the Internet and Intellectual Property* March 13, 2003 http://www.house.gov/judiciary/ferree030603.pdf

[41] Edward Black, "Copyright Privacy Prevention and the Broadcast Flag." *Testimony to the House Committee on the Judiciary, Subcommittee on Courts, the Internet and Intellectual Property* March 13, 2003 http://www.house.gov/judiciary/black030603.htm

[42] "Electronic Frontier Foundation Supports Digital Media Bills*" Electronic Frontier Foundation.* Retrieved December 7, 2002, from http://www.eff.org/IP/DMCA/20021003_eff_pr.html

A Cost-Benefit Analysis of the Flag

Embroiled in the question of the broadcast flag are several key groups representing specific interests. Each group will be affected in different ways by an implementation of the flag, incurring some costs and deriving some benefits; a cost-benefit analysis allows us to isolate predicted motivations for each actor. We look at costs and benefits incurred throughout the process, both in the development and deployment of the flag, seeking to isolate out as much as possible the effects the of BPDG proposal. Potential benefits or risked costs count towards the real benefits or costs, since their expected value can be computed as the product of their probability times their expected harm or benefit. We find that, in cases, where the benefits exceed the costs, many of the benefits are derived from exogenous factors of DTV, rather than directly relating to the question of the broadcast flag itself.

MPAA

The motion picture association, as largest representative of premium content generators, has played a major role in the BPDG and the drafting and support of the broadcast flag proposal. Furthermore, the trade association has spent considerable effort lobbying various actors in Washington for the general promotion of the flag, appearing before congress several times. Still, this is within the operating parameters of an industry representative, and the costs do not appear to have been considerable.

The alleged primary benefit of the flag is that MPAA members will release their massive libraries of premium content once the broadcast channels are protected against the threat of unauthorized distribution. The threat of unauthorized distribution is discussed above; what about the idea of newer, better content on the airwaves? It is not altogether clear where in the current distribution chain the free (advertiser-sponsored) distribution of premium HDTV content will occur. Hollywood movies are currently broadcast over NTSC television standards, but these occur at the very end of the distribution chain. Movies are released to different media to extract the maximum value from them, going from the theaters to VHS/DVD sale and rental to pay-per-view, through the premium movie channels before finally being made available on network TV.[43] Until this last stage, the consumer is willing to pay a premium to access the movie; in order for the market to shift, content-owners must believe they can extract greater rents from the advertising-sponsored broadcasts than they can from other sources. While this may be possible due to the fantastic image quality of HDTV, it is not assured. Moreover, that quality will be present at the end of distribution chain regardless of prior distribution, so we see it unlikely that studios will forgo the earnings from fee-for-service revenue channels by broadcasting films in DTV before DVD and video release.[44] This also means that films will be vulnerable to unauthorized distribution earlier. The studios will thus not benefit substantially from any new market. Moreover, given the late stage in the distribution chain that movies may be broadcast, it

[43] Alan Smithee "The anatomy of a monster" *Frontline*: *The Monster that Ate Hollywood.* 2001. http://www.pbs.org/wgbh/pages/frontline/shows/hollywood/business/windows.html.
[44] 46% of current profits derive from video/DVD. "Filmspace: Behind the Scenes," ABN Amro, studios 2000, cited here: http://mba.vanderbilt.edu/Mike.Shor/courses/NetEcon/Lectures/Grp2.ppt

is unlikely that illegal distribution derived from unprotected broadcast will drastically impact VHS or DVD income, much of which comes in the early weeks of availability.

The MPAA will also derive the considerable benefits discussed above, most of which revolve around framing the debate over intellectual property. By establishing the precedent of privileging their own interests, and framing the debate around those interests as being common interests, the MPAA can have a lasting impact on the long-run policy development process. By defining fair-use technically, rather than legally, the content owners can edge around sticky issues of fair use, for example, by simply asserting that their own rights should be protected in the system. The MPAA gains a huge benefit, simply by defining the debate. Given the relatively small part studio content currently plays in the broadcast television market, the MPAA plays a large role in the shaping of the current agenda.

Comparing costs and benefits, we see that the Motion Picture Association of America bears relatively few of the costs in securing its distribution channel. Furthermore, the marginal benefit they derive is not from secure digital television transmission, nor significantly fewer unauthorized internet distribution opportunities, but the long term solvency of the content industry. The MPAA is using the flag as a tool to assert its role as a primary actor in defining digital copyright issues.

Major Networks

The major television networks can be seen as content providers as well, since they primarily create and distribute broadcasting content to their affiliates. The primary output for their content is advertiser-sponsored open broadcast, and the value of that is the first release as a primetime broadcast, as well as resale for syndication. Those broadcasts differentiate their network from others, and allow them to control the costs. Under a broadcast flag regime, much more content would be available for networks to purchase, claims the MPAA, and the market may well demand its broadcast. Yet these benefits come with drawbacks. The networks would have to pay for these movies, but would not retain the rights for syndication and resale. Furthermore, the occasional hit TV show offers opportunities for external marketing and licensing, such as *The Simpson's* Happy Meals, or the *Touched by an Angel* Christmas Album. By spending resources on Hollywood's movies, rather than their own productions, networks may miss these synergistic marketing opportunities. Finally, networks derive a fair amount of prestige for creating their own programming, and competing for awards like the Emmys; this too would diminish with a rise in Hollywood movies on network TV. The matter is further complicated by the nebulous distinction between studios and networks, as most networks are also affiliated with a major studio.[45]

The networks, like major studios, risk their content being distributed over the internet. On one hand, they may have more to lose: a 21 minute television show is much easier to disseminate across the net with reliable quality than a 120 minute feature-length movie. Cult followings of many television shows may cause more file-swapping among these groups. On the other hand, Television shows do not have as long a distribution chain, and thus can not extract as much value

[45] Viacom owns CBS and Paramount Studios, Disney owns CBS, News Corporation owns the Fox Network and 20th Century Fox studios.

from an episode of a hit TV show as a studio can from a hit movie. It is harder to quantify the opportunity cost of one less viewer during afternoon syndication of *The Real World* than one less DVD purchase. However, recent success of packaging television shows for the rental/sale market may alter this market configuration, and more networks are backing the flag.

Fox was an original sponsor of the broadcast flag effort.[46] Despite broadcasting without protection at the moment, several networks commented to the FCC on the urgency of resolving conflicts with the flag, including CBS, who threatened to halt HDTV programming absent a forthcoming standard.[47]

CPTWG-approved CE Corporations

The consumer electronics industry has a large role in the broadcast flag debate since all consumption of broadcast content will involve manufactured electronics. The corporations that have developed CPTWG-approved standards, including the member firms of 5C and 4C consortiums,[48] bear considerable costs in the actual development of the flag-compliant devices. The rather complex standard discussed above requires the cooperation and coordination of disparate firms, and the legal costs alone of securing an equitable intellectual property mechanism must have been quite substantial. While the full costs of the standard creation are not published, going from protocol design to baked silicone entails an extensive procedure. The BPDG, at the urging of these firms as well as the MPAA, set the required level of robustness rather high; in order to be compliant a device must "effectively frustrate" attempts to circumvent it. This efficacy requirement is a high barrier that represents a high cost of compliance. The added expense of broadcast flag compatibility will raise the price of the product, and result in a corresponding decrease in the amount purchased. Moreover, the increased cost of manufacturing could affect the revenue streams of an industry where cheap electronics have already dramatically shrunk profit margins to razor-thin levels. These corporations face the costs of development, together with threats to their current profitability. Finally, if home recording is going to be substantially more difficult, we can envision a similar substantial reduction in the number of VCRs bought.

Despite the costs, these corporations stand to gain two large benefits. First, as commented on above, consumers will have to update their entire home-theatre system, which gives the CE manufacturers a vast new market. The leading edge is already under way, and current digital televisions, although not necessarily flag-compliant, sell at large mark-ups for gadget-hungry early-adopters. Soon, every household that wishes to watch broadcast television will be forced to upgrade its television, as well as any peripherals that go with it. This portends millions of dollars in sales in consumer electronics. Yet with the advent of digital and high-definition television, many consumers would voluntarily upgrade, at least purchasing a set-top box tuner when the standard analog channels go dark. Much of the added benefit does not require the

[46] Andrew Setos of Fox Group was a co-chair of the BPDG. See the final report: http://www.cptwg.org/Assets/BPDG/BPDG%20Report.DOC

[47] Jack Meyers, "Viacom Draws Line in the HDTV Sand at FCC" *Jack Meyers Report* December 17, 2002. http://www.jackmyers.com/pdf/12-17-02.pdf

[48] 5C corporations comprise Sony, Hitachi, Intel, Matsushita and Toshibi, who developed the HDCP standard. 4C firms comprise IBM, Intel, Matsushita and Toshibi, who developed DVI.

implementation of the broadcast flag *per se*. Rather, the flag affords a second, less obvious benefit to corporations working with the CPTWG. The consortia collectively own the standard necessary for compliance with Table A, and thus all other consumer manufacturers will be forced to license this standard to compete in the television market. This offers these firms a chance to extract rents from their intellectual property. Already, Intel has over 50 licensees for its HDCP technology.[49] Potentially, it could erect a barrier of entry into the market of DTV sets and peripherals, and creates the potential for a cartel to maintain artificially high prices.

Companies working closely with CPTWG stand to make a significant profit from their investment in early standards, a profit that comes at the expense of their competitors and the consumers. Again, we see that this net benefit comes with the broadcast flag but in no way relates to the initial idea driving the public policy. This analysis is affirmed by the general support of the industry in furthering the broadcast flag, as evidenced by their support for Table A technologies and their criteria for compliant devices.

Independent CE Firms

By independent firms, we mean those that do not have the express endorsement of the BPDG's major players and are subject to conflict regarding their technologies' place on Table A. Philips Electronics, for example, has developed an independent Open Copy Protection System (OCPS) that has been "rejected for inclusion on Table A at this time" by MPAA companies.[50] Any firm that does not wish to or cannot develop a compliant standard would have to pay to license flag compliance technology from a competitor should they wish to continue selling televisions. If independent firms expect to lose market share due to the added expenses they would face, we would expect them to be speaking out against the strict flag regime and its barrier of entry. In fact, they are doing just that, which helps lend credence to our theories about discriminatory licensing of 5C technology. While supporting Digital Television in general, independent consumer electronic manufacturers have no incentive to support the broadcast flag itself. The consumer electronics manufacturers can be represented by the Consumer Electronics Association (CEA), a group that represents companies involved in the design and manufacture of electronics for consumers. The CEA has a close relationship with the Home Recording Rights Coalition (HRRC) and consequently shares many views with that organization that seeks to protect the ability of consumers to make recordings in their homes for noncommercial uses. The more than 1000 members of the CEA account for more than $80 billion in sales of consumer electronics each year.[51] Since consumers will have to buy some form of electronics in order to watch television in the future, these consumer electronics companies, which hold a large share of the market, represent a potent force in the broadcast flag debate.

As predicted in the analysis, the CEA has taken a firm stance in favor of the consumer's right to record in their home. They say, "Copyright owners must resist the temptation to restrict technology. If successful, restrictions will deprive the public of equal and fair access to

[49] "List of HDCP Licensees" *Digital Content Protection LLC.* http://www.digital-cp.com/list.html
[50] BPDG "Table A" List of discussed and approved technologies. http://www.cptwg.org/Assets/BPDG/Tab%20C-2.doc
[51] Jeff Joseph and Jenny Miller. "CEA Reports Record-Setting October DTV Sales." *CEA Press release,* November 18, 2002 http://www.ce.org/press_room/press_release_detail.asp?id=10106.

information, entertainment and education".[52] This opinion places them firmly in opposition to the implementation of the broadcast flag. However, as also predicted by the analysis, the CEA does support digital television in general, as evidenced by the creation of "Digital Television Zones" throughout the United States. These DTV Zones are designed to educate the American public about digital television and expose them to its better picture and sound quality, in the hopes that this will motivate them to transition to a digital television set.[53] We see that the quotes of non-5C CEs support the above cost-benefit analysis in predicting that non-5C CE firms will not support the broadcast flag, but will be interested in DTV rollout in hopes of increased sales.

Consumers

It is the consumers, in theory, for whom the broadcast flag is being set up. They are, by definition, the ones who will consume the content broadcast under the digital television regime. Yet they bear considerable costs. As part of the DTV transition, consumers will have to upgrade their broadcast television receivers. This does not necessarily include the high definition displays, which are an rather high expense, with or without a broadcast flag. Nonetheless, every set receiving DTV signals off the air must have a corresponding receiver. The broadcast flag regime regulates this receiver: it can only connect to other digital devices in the secure prescribed fashion. Moreover, in order to have any hope of closing the analog hole, external receivers must be discouraged. This precludes the option of a convenient set top box, that could be cheaply manufactured with demodulators and a standard output. Instead, consumers will have to purchase a new television, that either contains an embedded demodulator or has a compliant digital input. The expected marginal cost of the broadcast flag to consumers is in the difference of a cheap conversion with a set top box and the more expensive integrated solution. Furthermore, all peripheral devices that touch the content, including home recorders and projectors, must be upgraded. In total, this would pose a considerable expense, some of which would not be necessary absent the flag.

A closer look at how Americans get their content moderates this cost, however. The Television Bureau of Advertising, the broadcast TV's trade organization, estimates that almost 70% of households with televisions subscribe to cable, and over 15% subscribe to an alternate data source such as satellite service DirctTV.[54] Assuming that very few households have both, 85% of households receive their digital content pre-encrypted by cable or satellite firms. They do not need new equipment to handle the broadcast flag, since the digital signals are handled by proprietary decoders in the incoming signal demodulators; there is no need for the cable to "keep honest people honest." Those without cable or other alternatives who will be forced to upgrade their equipment. Without exact figures on the demographics of non-cable subscribers, we can posit that two reasons for non-subscription are either financial issues or lack of interest. From a social perspective, these are not the people who should bear the cost of the broadcast flag.

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[52] CEA Policy Position: Home Recording Rights January 2003.
http://www.ce.org/shared_files/initiatives_attachments/218Homerecord0103.pdf

[53] "…a joint initiative by the National Association of Broadcasters (NAB) and Consumer Electronics Association" "All About Digital TV Zone" http://www.digitaltvzone.com/info/about_dtvzone.html

[54] Cable and satellite facts: http://www.mediainfocenter.org/television/size/alt_del_sys.asp, http://www.mediainfocenter.org/television/size/cable_vcr.asp, from Television Bureau of Advertising

All consumers will have to bear the costs of compliance, however. Even if cable subscribers do not need to immediately rush out to replace their equipment, legislated compliance will raise the price of all TV-related components. Thus, for minimal benefits, consumers across the board will face considerable costs, both real and potential. The15% who do rely on broadcast television will face considerable upgrade costs when they could be quite minimal for a STB (Set Top Box).

Beyond the immediate fiscal cost, all consumers face an encroachment on fair use, as is briefly mentioned above. The authors of this paper do not wish to wade into that debate, often filled with hyperbole, but do wish to note that a regime designed to protect fair use would not include a 'copy-never' flag at the broadcast level.[55] We would further note the fair-use concerns of the Consumer Group Copyright Project, specifically the question of who will determine what acceptable fair use is.[56] Consumers face considerable real fiscal costs and a threat of diminished rights over what they can do with publicly broadcast content; what benefits do they derive?

The motivation of the broadcast flag is to create incentives to broadcast movies over DTV. Yet digital cable services can offer movies for consumers as well; many of them pay a premium to see them even earlier. As noted above, it is not completely clear that studios would refuse the revenue from selling films for digital broadcast without the flag, since the content will be exposed other places. If the flag proposal were rejected, a cost-benefit analysis by the studios would show that movies would be traded online in any case, and there would be little marginal harm from the sale.

Consumers do not appear to have much to gain from the broadcast flag proposal, and will bear both real costs of technical upgrades and social costs in the way of diminished rights. Correspondingly, consumers groups have stated strong concerns with the broadcast flag proposal.[57]

Broadcasters

The broadcasters are a key player, understandably, since they will broadcast the signal carrying the flag itself. Since they have invested considerable expense in upgrading their traditional NTSC broadcast arrays to handle the new DTV standards, any compliance costs of the flag will be fairly small in comparison. Since broadcasters are required by FCC mandate to upgrade their facilities to be capable of digital broadcast, the stations are primarily interested in having consumers ready as soon as possible. In the event that the broadcast flag regime slows consumers in their adoption of DTV-capable hardware, the DTV market grows more slowly and thus any added advertising revenue would grow more slowly as well. Broadcasters need this revenue to recompense their DTV expenses. Thus the principle cost borne by broadcasters from the

[55] Richard Lewis, CTO of Zenith Electronics noted in a congressional hearing the "As recently as last week, a large cable operator in an urban market had marked all digital content as "Copy Never," preventing digital recording of any kind" He cited this source in his written testimony: "Cablevision in New York City," *San Jose Mercury News*, September 18, 2002. http://energycommerce.house.gov/107/hearings/09252002Hearing719/Lewis1171.htm

[56] "Consumer Policy Questions and Issues Regarding the BPDG Proposal for Protecting DTV Content" by Center for Democracy & Technology, Consumers Union and Public Knowledge. http://www.cdt.org/copyright/020719bpdg.pdf.

[57] See CDT's complaints joined by the Consumers Union (http://www.cdt.org/press/020807press.shtml) and the consumer federation's criticisms (http://www.consumerfed.org/flagcomments12.5.02.pdf)

broadcast flag would be a delay in DTV diffusion. To minimize their costs, the broadcasters have no interest in blocking the flag itself, merely in preventing the flag from becoming a stumbling block for DTV rollout. As NAB president Edward O. Fritts said, regarding the digital transition, for the broadcasters, "there is no turning back."[58]

The National Association of Broadcasters has, in fact, supported the broadcast flag, joining the MPAA in their comment to the FCC, so the broadcasters believe that they will benefit from it. If the MPAA members do indeed release more content for broadcast television, this will increase the desirability of the broadcasters' content, helping them gain back some of the market share lost to cable over the past 25 years. This market share translates, of course, into advertising revenue. The NAB's testimony before congress emphasizing cable must-carry rules requiring local cable to carry the broadcasters' signals supports this analysis. Discussion above takes some wind out of the argument that Hollywood content will flood the airwaves under a flag regime.

The broadcasters want DTV implemented quickly to recoup costs and, just as important, they need to appear as cooperative players to the FCC and other regulators. Why are appearances important? The broadcasters currently control two large chunks of electromagnetic spectrum used for broadcasting: the old analog bands and the newly licensed bandwidth for DTV. They were given the DTV spectrum as a loan, under an arrangement that would involve them handing over the old spectrum once the full digital transition is completed. Yet recent developments show that the broadcasters have more to gain as spectrum controllers. The FCC recently agreed to allow 21 broadcasting companies to sell off their old UHF spectrum to wireless electronics interests, and keep much of the considerable proceeds to expedite the process.[59] It is very likely that NAB members feel they will be in a good position to reap similar rewards. Hence, there is a general reluctance in the broadcasting community to in any way obfuscate the DTV transition, including attacking the flag.

The broadcasters seek a fast diffusion of digital television, and thus will support the broadcast flag if it can advance that goal. Although a cost-benefit analysis of the broadcasters' stake shows little to do with the merits of the broadcast flag itself, they support it for other reasons.

Cable

The cable industry bears little actual cost in the implementation of the broadcast flag, but it is the delivery system of choice for over a majority of Americans. The flag primarily addresses broadcast television, which obviously aims at reclaiming market share (see discussion above). The cable system might be expected to oppose the flag, since it would be the sole provider of HDTV Hollywood content were the studios to make good on their promise to deny feature movies to unprotected broadcasters. On the other hand, individuals making the investment to watch high definition content will probably seek out as many sources of HDTV to maximize return on their investment. Cable companies offer several sources of HDTV, many at

[58] Fritts, Edward. "Broadcasters Moving Forward on DTV." *National Association of Broadcasters Press Release,* May 15, 2002. http://www.nab.org/Newsroom/PressRel/speeches/051502.htm.
[59] Michael Calabrese, "The Great Airwaves Robbery." *New America Foundation Spectrum Series* #2 November 2001. http://www.newamerica.net/Download_Docs/pdfs/Pub_File_639_1.pdf

the premium level. It appears this is the primary motivation for the cable industry with regards to DTV deployment.

Cable companies worked with electronics companies to develop standards between digital television products and digital cable. This agreement

> … will ensure that the next generation of digital television sets will receive one-way cable services without the need for set-top converter boxes; enable consumers to receive HDTV signals with full image quality and easily record digital content; allow for an array of new devices easily to be connected to the new HDTV sets; permit access to cable's two-way services through digital connectors on high-definition digital TV sets.[60]

The emphasis here is on maximizing usability of DTV is such a fashion that allows consumers to capitalize on everything the cable companies can provide. Interoperability is critical for this range of functions, which is why the cable industry has been involved in the broadcast flag standard. Their place at the table and support for the mechanism gives them ground to oppose undue expansion into their own domain. In their comments to the FCC, NCTA stated that it "supports Commission implementation of a broadcast flag for the limited purpose of protecting against the unauthorized redistribution of high value digital broadcast content over the Internet."[61] This idea of a limited purpose is emphasized throughout the document, claiming that, for example, the cable company should be allowed to implement its own signal protections outside the purview of FCC regulation.

Again, there is little cost born by this interest group, so support costs little, given the moderate benefits. Cable is not interested in a strong, over-arching broadcast flag, but has little to lose from a basic implementation if the DTV transition will lead to an expanded market for their services.

FCC

The FCC will be responsible for overseeing the multiple regulatory issues under the broadcast flag regime. They have pressed strongly for the entire DTV rollout. In the event that consumer reluctance to purchase new technology slows DTV adoption, the FCC would fail to achieve its stated goals. Given the rapid transition schedule, the FCC would suffer an image failure as a regulatory agency if it failed to produce a successful and timely transition. The flag could expose the Commission to risk here, if consumers are reluctant to quickly upgrade their home entertainment systems because of the specific increased expenses of the flag. Moreover, as the oversight body for the broadcast flag regime, it would be the focal point for both internal and external conflicts. Resources would have to be stretched to evaluate competing claims, such as complaints about compliance or improper usage. Both the public and Congress would look to the FCC to solve these issues and hold the body responsible for failures. Members of Congress often

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[60] Rob Stoddard "Cable and Consumer Electronics Companies Reach Key Agreement on Digital TV Transition Issues" *NCTA Press Release, December 19, 2002.*
http://www.ncta.com/press/press.cfm?PRid=325&showArticles=ok

[61] NCTA, "Reply Comments of the National Cable and Telecommunications Association" *MB Docket No. 02-230.*
http://www.ncta.com/pdf_files/Feb20MB02-230BcastFlagReply.pdf

have favored industries, and would pressure the Commission to rule in their favor, threatening funding or legislative delay should the ruling be averse to their interests. In sum, the broadcast has a potential to embroil the FCC in a mess that it might not want.

The flag does offer several benefits, however. The risk of delayed rollout is offset by the hope of faster adoption due to more premium content. Moreover, the above "headache" could be seen in a positive light as an expanded mission. Commissioners can increase their power and influence by touching on this very *au courante* subject of digital copyright, lending their expertise to the debate and acquiring a larger role. By vocally supporting the claims of the MPAA and the content industry, the FCC gains an ally in future fights and the support of a key player that might help reign in many of its regulatees, the broadcasters. On the other hand, given the vociferous claims of the MPAA, and its threat to withhold content, opposing the broadcast flag could only serve to extend the digital broadcast debate.

The FCC appears to have followed this latter line of reasoning. In a status report, they note, "…programming content providers assert that they will not permit the digital broadcast of high quality programming. Without such programming, consumers may be reluctant to buy DTV receivers and equipment, thereby delaying the DTV transition." The FCC promotes DTV as a clear goal, and views the possibility of the MPAA making good on their threat as a clear enough risk to overwhelm administrative risks.

Congress

Congress faces similar costs and benefits as the FCC. If we put aside speculation about whether Congress will ultimately get spectrum auction revenue, a delay in DTV adoption will result in a delay in congress getting the auction proceeds. Congress must also handle the ultimate legislative assignments, and must avoid offending any industry, and the representatives that defend those industries. Finally, as the closest and most direct link to consumers, individual members are the lightening-rods for constituent discontent about unpopular policies. Congressmen thus risk being assigned responsibility for a bungled transition, and being punished at the ballot box. Television may just be important enough in daily lives to be a voting issue.

Like the FCC, Congress as a whole might be interested in the support of the MPAA, particularly in the realm of funding. Apart from the $3.4 million in MPAA PAC money,[62] is the idea of avoiding future copyright battles. While political conflict often produces the best policies, major players can benefit from producing policy outside the limelight of active congressional debate and in the shadows of precedent and natural expansion.[63] By establishing a firm grounding on how IT and copyright interface in the realm of digital TV, Congress has a precedent to refer to when addressing other questions of digital rights management. This allows the legislature to address key issues and yet not be forced to line up against the same interest groups that can seek to alter the issues for the next round of debate.

[62] Anne Ju. "Who's buying into copy controls?" *PC World*, June 18, 2002. http://www.pcworld.com/resource/printable/article/0,aid,101988,00.asp.
[63] See, e.g. C. Howard, *The Hidden Welfare State*. Princeton: Princeton University Press, 1999

As predicted by the analysis, members of Congress are currently entertaining legislative language that support both sides of the issue. Some proposed bills, such as those by Representatives Hollings[64] and Tauzin[65], align themselves with what the broadcast flag supporters are currently saying. Others, such as those of Boucher and Doolittle,[66] or Lofgren,[67] echo the concerns of those opposed to use of the broadcast flag. These bills are not being actively debated in Congress now, and it is unclear which ones will actually reach Congress and which ones will be passed. These efforts affirm the analysis that members of Congress both support and oppose the broadcast flag, although the motivation does not clearly revolve around copy protection.

Cost-Benefit Analysis Summary

By isolating each actor, and then further isolating specific costs and benefits the broadcast flag would impose on that actor, we can get a better picture of who is shaping this policy and why. By then comparing the projected actions of each actor with the actual actions and statements of that actor regarding the broadcast flag, we can reaffirm the correctness of our analysis. The costs to consumers overwhelm the projected benefits, and they thus stand against it. The remaining actors have all pegged their support of the flag onto the MPAA's claims that the flag will enable Hollywood content to be broadcast without fear of unauthorized content distribution. Earlier analysis shows this to be an unrealistic claim yet each of the remaining actors continues to support the broadcast flag.

Probing further into the benefits show that each actor may extract considerable gain from issues not directly related the flag or DTV content protection. Content owners gain the intangible benefits of being able to control the digital copyright debate overwhelm their costs. The 5C manufacturers can leverage their market position as owners of compliance technology. Broadcasters get a stronger claim over controlling how their current spectrum holdings are sold. The FCC gets a larger mission statement and more power, while congress can dispose of a sticky political question. The debate over the broadcast flag, then, is shaped by actors all party to the question of content protection over the airwaves, but few of them are acting based on concerns directly related to this matter. Since the flag is nominally aimed at DTV, the deciding factors of policy questions are not inspired by the policy problem it is designed to solve.

Conclusions

The broadcast flag is a mechanism designed to prevent the illegal redistribution of copyrighted content over the Internet. The MPAA has stated that this is its major reason for supporting the broadcast flag. There are also other possible goals of the MPAA, outlined in section three, that are further reasons for their support. However, the threat analysis of that section shows that the

[64] A draft of Hollings' Consumer Broadband and Digital Television Promotion Act is posted by bill opponent and journalist Declan McCullagh on his website: http://www.politechbot.com/docs/cbdtpa/hollings.s2048.032102.html
[65] A draft of Tauzin's proposed bill "Regarding Transition to Digital Television is available from the Enegery and Commerce committee's webite: http://energycommerce.house.gov/107/drafts/dtvstaff.htm
[66] A draft of the Digital Media Consumer Rights Act is posted on Rick Boucher's website: http://www.house.gov/boucher/docs/dmcrasec.htm
[67] A draft of Lofgren's proposed bill "The Digital Choice and Freedom Act of 2002" is posted on Zoe Lofgren's website: http://www.house.gov/lofgren/news/2002/021002_detail.htm

broadcast flag will not be successful in protecting content from Internet redistribution. On the other hand, it may help to achieve the other smaller, more incidental, goals of the MPAA, including expanding a content owners control of content.

Many of the influential actors in the situation explicitly support the broadcast flag, saying that it will properly protect copyrighted content, even though section three showed this is not the case. We then take a closer look at each of these key players, including the MPAA, consumer electronics companies, broadcasters, the major television networks, consumer groups, cable providers, the FCC, and Congress. We examine each in turn and explore the answer to four issues: what they say about the flag, what they have done with respect to the flag, what they would gain and what they would lose under a broadcast flag regime.

This cost-benefit analysis shows that the motivations of each of the broadcast flag proponents may not be entirely pure. In other words, their reasons for supporting the broadcast flag do not center on concerns for digital copyright or content protection. Instead, their support of the broadcast flag often rests on some ancillary benefit, often gleaned from another party's reaction to the deployment and diffusion of digital television.

When deciding about mandating adoption of the broadcast flag, one must be careful to separate these issues. Decisions must be made in light of the fact that, according to the analysis presented in this paper, the broadcast flag does not achieve its major stated goal of protecting copyrighted content from redistribution on the Internet. At the same time, it results in great costs to consumers, by both forcing them to buy much new equipment and threatening to eliminate the 'fair uses' to which they have grown accustomed. Therefore, the broadcast flag, if implemented, will not serve its intended purpose, while at the same time costing consumers and some consumer electronics companies greatly. The decision on whether or not to mandate the broadcast flag must be based on reasons directly related to the flag. The question of policy should be decided on its merits. In other words, the active players should seek direct methods of achieving their goals rather than realizing them indirectly through the broadcast flag. Digital content protection is a large problem, and requires innovative solutions. It should not come at an inordinate and inescapable expense to consumers, however, and should not be used as a vehicle for content owners to accrue side benefits completely tangential to the policy at hand.

It is reasonable to expect that, prior to the widespread adoption of a policy, some motivation should be offered to the public. We show in this paper that the stated motivations by many of the players involved in pushing the broadcast flag are of doubtable veracity at best, and outright insincerity at worst. Before moving forward and threatening greater expense to both themselves and consumers, the key players should reevaluate their goals in the broadcast flag. Since it is usually difficult to hide underlying motivations, especially in a market like this, let them come clean and make their case. The problems of unauthorized distribution can be very real, and if those at risk want the cooperation of other players and the general public, let them be honest and make their case directly. Public policy based on subterfuge and misdirection is poor policy.