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ABSTRACT

The emergence of frequency modulation or FM radio signals, which arose from the desire to free broadcasting of static noise common to amplitude modulation or AM, has produced the controversial development of stereo broadcasting. The resulting enhancement of sound quality helped FM pass AM in audience shares in less than two decades. The basic groundwork for FM stereo was laid in 1955 when the Federal Communications Commission (FCC) allowed FM multiplexing, where one transmitter sends out two simultaneous (and, possibly different) signals. By April 20, 1961, the FCC allowed FM stations to broadcast stereo with multiplex, creating considerable excitement in the broadcast industry. The decision to allow stereocasting for AM radio was much more problematic. The FCC, in 1982 (after years of debate) finally decided that, rather than pick a single standard to ensure rapid facilitation of stereo on AM stations, they would instead pass the decision process to the marketplace. The FCC sent the AM stereo decision to the marketplace out of confusion and desperation. The changing role of the Commission during deregulation of radio directly affected AM stereo, particularly since both proceedings were being dealt with by the FCC simultaneously. The result was that the FCC failed to set a standard. The major difference between the evolution of FM stereo and AM stereo was the changing policy of the FCC. The outcome made it clear that self-regulation of the airwaves is a difficult task. (Ninety-eight references are appended.) (MS)

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GOVERNMENT STANDARD-SETTING VS. THE MARKETPLACE

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FM STEREO AND AM STEREO: GOVERNMENT STANDARD-SETTING VS. THE MARKETPLACE

Two basic types of radio signals are used in delivering programming from the station transmitter to the consumer's receiver: (a) amplitude modulation, or AM; and (b) frequency modulation, or FM. Each of these methods appears to be quite similar, but the audio quality produced is markedly different. FM produces a consistently clear sound. AM, however, is prone to interference from any number of outside sources, natural and artificial (Head & Sterling, 1983, p. 46).

Discrepancy in sound quality has played a major role in commercial radio history. Unquestionably, FM emerged out of a desire to free broadcasting of static noise common to AM signals (Barnouw, 1968, p. 40). As the years passed, many other technological advancements improved radio's sound quality. However, several complications arose from this quest for aural perfection. One of the more interesting and controversial developments was stereo broadcasting.[1]

FM: The first mass medium to broadcast in stereo

Stereo broadcast experimentation can be traced back to 1925, the first decade of commercial radio (Graham, 1979, p. 53; Sunier, 1960, pp. 29-30). But until the 1950s, no serious Federal Communications Commission (FCC) consideration was given to using stereo for broadcasting purposes (FCC, 1958, pp. 5284-5285; Tlamsa, 1978, p. 26; Feldman, 1984, p. 37).

Of AM, FM, and TV, FM was the first to be approved for stereo broadcasting (Carrol & Kolodin, 1961, p. 38). Because of

the enhancement to its sound quality, FM stereo became quite attractive to listeners (Stereo AM: Coming soon, 1982, p. 58; NAB's agenda for AM action, 1985, p. 58). In less than two decades FM caught and passed AM in audience shares.

AM owners and operators tried several remedies; none of them appeared to stem the tide. The most popular solution was resorting to formats less dependent on sound quality than music, such as talk, news, and information. While these voice-only formats did not recapture lost AM audience shares, there was some success in retarding the attrition rate. Overall, however, the strategy failed miserably (AM: Band on the run, 1985, p. 46).

In just 12 years, FM radio completely reversed AM's historic stranglehold in the ratings. For example, 70 percent of all radio listeners tuned to AM in 1973. But by 1985, FM controlled that 70 percent share (AM: Band on the run, 1985, p. 35; FM share up to 70%, 1985, p. 1). Ten more years at the same rate of decline would leave AM radio with no listeners (AM: Band on the run, 1985, p. 35).

Obviously, the solution to AM's troubles lay in closing the sound quality gap created by FM stereo. The first step was taken when the FCC approved AM stereo broadcasting in 1982 (FCC, 1982, pp. 1-32). The AM stereo approval process, however, was not an easy task for the FCC. Even after more than five years on the air, AM stereo continued to struggle for audience and broadcast industry acceptance.

Purpose

The object of this paper is to examine the inception and development of both AM stereo and FM stereo. Then, a comparison

is made to establish any similarities or differences in the evolutions of the two.

FM Stereo

Early development of FM

FM was created out of broadcast pioneer David Sarnoff's desire to free radio of static noise. In a casual conversation with his friend and colleague Edwin H. Armstrong, Sarnoff revealed his idea. Armstrong worked from 1922 until 1933 designing a system unaffected by outside electrical interference (Barnouw, 1968, p. 40). He originated the first FM broadcast from New York's Empire State Building on June 16, 1934, some 28 years after the first successful AM broadcast. Sarnoff's employer, RCA, owned the facilities used by Armstrong, such as the antenna and station area. But, in 1935, the company told Armstrong that more emphasis would be placed on the emerging medium of television (pp. 40-41). Armstrong was forced out of his experimental station, but forged ahead with FM. In 1936, he was unsuccessful in gaining official FCC approval of FM (Armstrong, 1948, p. 115; Barnouw, 1968, p. 42; Lubell, 1940, p. 18). The FCC changed its opinion in 1940, and FM was launched, only to have its development postponed by World War II (Lubell, 1940, p. 37; Barnouw, 1968, p. 130; Montgomery, 1986b, p. 14).

FM faced another obstacle as well. By 1948, television began its challenge. By the 1950s, TV would start to dominate radio (Lichty & Topping, 1975, p. 455; Gould, 1952, p. X9).

Implementation of FM stereo

The basic groundwork for FM stereo was laid in 1955 when the FCC allowed FM multiplexing (FCC, 1955, p. 1821). Simply

put, multiplexing is the act of one transmitter sending out two simultaneous (and, possibly different) signals (Eisenberg, 1958, p. 45; What's all this, 1961, p. 422). The method is not unlike one telephone line handling several calls at one time (Sunier, 1960, p. 119).

Originally, the FCC's "Subsidiary Communications Authorization (SCA)" was intended for non-broadcast services (FCC, 1958, p. 5284). A good example is piped-in music often associated with medical waiting rooms or elevators. The 1958 notice of inquiry was issued to determine if "additional uses are feasible, appropriate, and should be permitted in the FM broadcast band" (p. 5284). The FCC listed stereo broadcasting as an SCA service, along with a host of others such as traffic light control, paging services, and others directed toward specific interests (FCC, 1958, p. 5284; FCC, 1976, p. 69).

The prospect of stereo broadcasting created both proponents and opponents. Advertising executives were confident because legitimate stereo broadcasting went beyond the gimmicks and superficial stereo attempts of the past, such as simulcasting between AM-TV or FM-TV. Pure stereo offered listeners an enjoyable sound and presented advertisers with "the opportunities of a whole new advertising medium" (Stereo broadcasting: What does, 1958, p. 22).

Others, chiefly broadcasters, believed FM had never been acceptable and never would be because the average consumer was considered incapable of distinguishing stereo and non-stereo broadcasting. One overriding concern of the day was lack of research. Many of the business people affected most by the advent

of stereo broadcasting dealt in mounds of opinion and a vacuum of hard stereo data:

> One possible explanation for this dearth of data on FM broadcasting is that, up till [sic] now anyway, FM has always been the underfed runt of the industry because it grew up cringing in the sprawling shadow of television. (p. 22)

A National Stereophonic Radio Committee (NSRC), under supervision of the FCC, was formed in 1959 by W.R.G. Baker (organizer of prior standards committees for black and white TV and color TV). The NSRC was charged with the task of setting stereo broadcasting standards for AM, FM, and TV (Stereo specs due this year, 1959, p. 39).

On March 11, 1959, the FCC adopted a Further Notice of Inquiry in the stereo matter (FCC, 1959, p. 1997). The purpose of the document was to announce the notice had been amended to separate FM stereo comments from other SCA authorizations proceedings (p. 1997).

FM Stereo Systems

Fourteen systems entered the competition to become the industry standard for FM stereo. By January 1, 1960, the NSRC had completed testing which narrowed the number to seven: Crosby, Halstead, Calbest, General Electric (two systems), Zenith, and Electrical & Musical Industries. Criteria for elimination included "technical aspects of transmission and reception" and "degree of compatibility of each system with existing receivers" (Stereocasting at crossroads, 1960, p. 37). RCA and CBS withheld their respective systems from NSRC scrutiny because the FCC refused to participate in the tests. The FCC indicated that it could not become involved because of an existing backlog of other business. Therefore, the NSRC was charged with recommending a

system to the FCC (p. 37). As a result of the FCC's reluctance, and the fact some experts believed stereo was ahead of its time technologically, many broadcasters feared stereo would "not be making the big breakthrough for some time" (Emma & Wolff, 1960, p. 161).

In March 1960, the NSRC was disbanded, because those involved thought the FCC should participate in the selection process. Upon the committee's demise, the FCC began planning for FM stereo hearings (Stereo committee suspends activities, 1960, p. 63). A final decision on stereo broadcast standards was predicted for fall 1960 (Stereo stimulates FM broadcasters, 1960, p. 30).

On May 4, 1960, the FCC adopted two documents which opened the door for FM stereo. The first allowed for subsidiary communications on a "multiplex basis," while the other called for engineering comments on seven FM stereo systems (FCC, 1960, p. 4240-4243). These systems were numerically coded by the FCC and NSRC: (1) Crosby Laboratories; (2A) Calbest; (2B) Halstead; (3) Electric & Musical Industries; (4) Zenith; (5A and 5B) General electric (with two systems). The systems were slated for field testing in the summer of 1960 (Stereo tests on the way, 1960, pp. 48-49).

The paperwork for the tests was completed and sent to the FCC in October. Tapes of the experimental broadcasts from KDKA in Pittsburgh were included in the report (Electronics newsletter: Stereo standards group, 1960, p. 11). Speculation centered on early 1961 as a decision date, and that the FM stereo standard might even be a "hybrid" of at least two systems (Electronics newsletter: The question now, 1960, p. 10). Even foreign

authorities were waiting for the FCC's decision, hoping to base their standard on the results (Carrol, 1960, p. 32).

April 20, 1961, the FCC released its document allowing FM stations to broadcast stereo with multiplex. Furthermore, the Commission did choose a hybrid system as the FM stereo standard. The system was a composite of those proposed by Zenith and one of General Electric's two proposed systems. The FCC noted, in addition to meeting the NSRC's standards the system "impressed the Commission" with its "apparent lower cost" to implement as well as other technical characteristics (FCC, 1961, p. 3533). The FCC then considered the matter "terminated" with FM stereo broadcasting to begin on, or after, June 1 (p. 3533).

The FCC's announcement was greeted with excitement by the broadcast industry. Costs of adapting stations to stereo were estimated between $2,000 and $4,000 (Stereo decision creates new FM market, 1961, p. 32). The first receiver adaptors were introduced by H.H. Scott for $99.95, while other manufacturers were to follow quickly (Carrol & Kolodin, 1961, p. 38).

The first station to broadcast FM stereo was WGFM, Schenectady, New York, at 12:01 a.m. EST, June 1, 1961 (Carroll, 1961, p. 31). By the end of the year about 50 stations followed suit, with 185 planning to do so (Bruun, 1961, p. 22).

AM Stereo

Inception of AM stereo

AM stereophonic broadcasting can be traced to 1925 when WPAY, New Haven, Connecticut, crudely broadcast one channel of its sound on one frequency and another channel on a separate frequency, or AM-AM (Graham, 1979, p. 53; Sunier, 1960, pp. 29-

30). Several other superficial attempts at stereocasting emerged through the years. These were all similar to WPAY's method, all of which require two separate transmitters, or stations: AM-FM, FM-FM, TV-AM (FCC, 1977, p. 34910; Sunier, 1960, pp. 113-118).

In the 1950s, the FCC began to take a serious look at stereo broadcasting for AM, FM, and television (Feldman, 1984, p. 37; Stereo specs due this year, 1959, p. 26; Montgomery, 1986a, p. 12). Eventually, the FCC decided to allow stereocasting on FM but denied it for AM radio and television. The decision may have been made for several reasons. Primarily, FM needed the concept to help it compete with AM radio (Tlamsa, 1978, p. 26). Besides, AM was looked upon as technologically too inferior to properly broadcast in stereo (FCC, 1977, p. 34910; Sterling, 1970, p. 468). On the other hand, television was not permitted to use stereo because experts thought "stereo sound mated with the small-screen pictures of a typical TV set would be distracting and unsatisfying" (Feldman, 1984, p. 37).

Both these explanations may be valid. However, a third appears more likely. James E. Barr, Assistant Chief of the FCC's Broadcast Bureau, stated that AM stereo and TV stereo fell victim to circumstance. He indicated that initiating stereo broadcasting standards for AM, FM, and TV was a task too great to handle all at once (Stereo stimulates FM broadcasters, 1960, p. 30). Subsequently, stereocasting for AM and TV was "postponed indefinitely" (p. 30).

Leonard Kahn, President of Kahn Communications, opposed the FCC's delay of AM stereo. In petitioning the FCC for action in 1977, Kahn said "the technology for compatible stereophonic

transmissions has been fully developed over the past 16-year period" (FCC, 1977, p. 34910).

On June 22, 1977, the FCC adopted its Notice of Inquiry into the AM stereo matter. The FCC stated that Kahn Communications, Inc. (Kahn) and the Association for AM Stereo, Inc. (AAMSI) had petitioned for a move toward AM stereo approval. AAMSI noted: "AM stereo is an idea whose time has come" (FCC, 1977, p. 34910). The organization cited the need for giving AM a chance at technical parity with FM.

The National AM Stereophonic Radio Committee (NAMSRC), created similarly to the NSRC, was instructed by the FCC to conduct a study into the necessity and feasibility of AM stereo (p. 34911). The FCC followed up the NAMSRC study with its Notice of Proposed Rulemaking for AM Stereocasting (FCC, 1978, p. 1; FCC makes it Magnavox, 1980, p. 27). In the notice, the FCC reported comments from over 90 sources. Many of the replies were from broadcast stations, networks, equipment manufacturers, and other interested parties writing in favor of AM stereo. The most notable correspondence came from the five companies vying to produce the industry AM stereo system standard: Belar Electronics, Harris Corporation, Magnavox, Motorola, and Kahn (FCC, 1978, pp. 1-2).

The Commission offered "a brief description of each of the five AM stereo systems," and stated each "is basically similar" in meeting standard broadcast standards, such as compatibility with existing mono AM equipment (p. 3). The chief advantage of each lay in the fact that stereo on AM could be accomplished, and the systems could neutralize the poor fidelity and frequency

response of AM radio -- major contributors to AM's poor sound quality which the FCC had considered improbable to overcome just two decades earlier. The basic difference in each was that stereo was transmitted differently, making receiver incompatibility the major disadvantage of all the systems (Hawkins, 1980, p. 47). Basically, the FCC was confronted with two seemingly simple options: (a) pick a single standard to ensure rapid facilitation of stereo on AM stations; or, (b) pass the decision process to the marketplace.

More than a year passed before the FCC released any further information concerning AM stereo. An FCC spokesperson explained the staff was "swamped" with other business (No go, 1979, p. 7). On April 9, 1980, the Commission voted 4-2 to make Magnavox the "tentative" single system standard (Bad vibes, .1980, p. 80; FCC makes it Magnavox, 1980, p. 27). Naturally, the other manufacturers were upset, despite previous support of a single system decision. The FCC was threatened with litigation should the "tentative" decision be made definite (There's only one happy manufacturer, 1980, p. 27). The Commission did emphasize that substantial industry response could influence any permanent action (The FCC on the firing line, 1980, p. 44).

By June 1980, the FCC confessed a "further notice of proposed rulemaking" would be issued (FCC brings AM stereo, 1980, p. 19), possibly indicating a lack of support for the Magnavox system. [illegible]phen Lukasik, FCC Chief Scientist, stated. "There is no doub[illegible] [illegible]mmission . . . wants one system. . . . What the notice [illegible] ore is the best way to choose that one system" (p. 19).

In that further notice of July 31, 1980, the FCC said the "tentative" Magnavox decision had been cancelled (FCC, 1980, p. 2). An FCC Office of Science and Technology (OST) spokesperson reported to the Commission that "the selection of Magnavox was not wholly defensible" (The final days, 1980, p. 23). The explanation was initially considered unacceptable to the FCC Commissioners, who had thoughts of forcing the OST to finish the original task of defending the Magnavox choice. Commissioner Abbott Washburn said "a step backwards had been taken" (p. 23). Added Commissioner Gilbert Lee: "I don't know why we can't stick to our guns" (p. 23).

Belar Electronics withdrew from the AM stereo battle in February 1981. President Arno Meyer explained: "We didn't want to keep pouring money down the bottomless pit" (AM stereo gets another hearing, 1981, p. 84). From September 1980 until March 1982, the FCC failed to act on the AM stereo situation. After almost two years of deliberation, the FCC announced on March 4, 1982, that no single system for AM stereo would be picked by the government. Instead, the matter would be placed in the hands of the marketplace (FCC, 1982, p. 16). The FCC explained in its docket that the industry had rejected Magnavox. Since no one system really stood out among the rest, the Commission considered a "lottery" because the selection of a single standard "would be highly tenuous" (p. 9).

AM stereo development: The marketplace

The FCC apparently opted for the marketplace because of an internal uncertainty over the proper role of the Commission. Sterling (1982) observed:

> On the surface, the decision appeared to be a collective throwing up of hands, as the Commission staff admitted its inability to make a clear-cut choice among the systems, all of which were compatible with existing AM technology. Throughout the four-and-a-half years of the complex AM proceeding, a constantly recurring issue has been the proper role of the FCC in a time of dramatic technical, economic, and political change. (p. 137)

Was the FCC's role "to be one of limiting, allowing, or actually promoting" new technologies" (p. 141)? Upon examining the Deregulation of Radio dockets (FCC, 1979, pp. 57635-57723; FCC, 1981, pp. 13888-13955), it appeared the Commission might be open to new technologies as long as certain technical requirements were met. As for promotion, the FCC stated it was not responsible for the success of AM stereo or any other technology. The FCC declared: ". . . we do not believe that the Commission should undertake the obligation of warranting the success of one or more systems" (FCC, 1982, p. 16).

The FCC was confident the best system would ultimately win, and explained: "Our society generally has not seen fit to supplant the free decisions of consumers with those imposed by government, and there is no convincing reason why AM radio" should be treated any differently (FCC issues 'tenuous,' 1982, p. 73). The FCC stated, the major responsibility for the Commission lay in making sure all systems in use complied with federal technical regulations. AM stations were told they could begin broadcasting in stereo 60 days after March 5, the release date for the marketplace docket (FCC gives up, 1982, p. 36).

Industry reaction to the FCC's marketplace decision was varied. Some analysts thought that even with AM stereo, a long time might pass before any progress could be made against FM (Hedegaard, 1982, p. 49). Others adopted the attitude that AM

stereo was a reality for better or worse (Stereo AM: Coming soon, 1982, p. 58; Week one of AM stereo, 1982, p. 58; Lineback, 1982, p. 48), and accused the FCC of "copping out" (Salsberg, 1982, p. 6).

On July 23, 1982, both KDKA in Pittsburgh and KTSA in San Antonio became the first AM stations to broadcast in stereo. Several others followed shortly, but the vast majority of AM broadcasters elected to wait (Petras, 1982, p. 22). Many broadcasters who delayed stereo implementation continued altering or changing formats, stalling to see which AM stereo system would become the standard (Josephson, 1982, pp. 45, 119). One broadcaster explained: "We were content to have AM radio be the news/talk . . . multipurpose or nostalgia radio program product. After all, the FCC in its infinite wisdom chose not to select any one AM stereo system" (Walker, 1983, p. 31).

AM Stereo vs. FM stereo: A Comparison of Development

When comparing the development of stereo broadcasting for AM and FM, three major differences become clearly evident. Though initially facing many of the same regulatory obstacles as FM stereo, AM was hindered greatly by a perceived technological inferiority to FM. When those doubts were erased, the next step was for the FCC to initiate the approval process, consisting of tests to select a standard AM stereo transmission system and authority for stations to begin stereo broadcasting. The same ordeal was applied to FM stereo years earlier. Unfortunately for AM stereo, the Commission's proceedings were influenced greatly by the move to deregulate radio. Both tasks were underway simultaneously. Finally, the FCC's uncertain regulatory role of

the late 1970s and early 1980s prompted the Commission to leave the standards decision to the marketplace. Each of these three discrepancies is examined.

Broadcast technology

FM stereo broadcasting is much easier to accomplish than AM stereo because of the size of the audio channels. FM is much wider than AM, therefore more room exists for the two signals (Shepler, 1985, p. 8). FM stereo is achieved by multiplexing, in which two or more signals can be sent from one source (What's all this about multiplex, 1961, p. 422).

Originally, there were at least five AM stereo methods, however, it is now sent via two basic ways: (a) Kahn -- independent sideband modulation (ISM); and, (b) Motorola -- compatible-quadrature amplitude modulation (C-QUAM) (Shepler, 1985, p. 8; Montgomery, 1986a, pp. 12, 14). Each uses two audio channels, but differently. ISM transmits one channel above the frequency and another below it. C-QUAM is similar to FM multiplexing in that both channels are merged and then split by the receiver (Shepler, 1985, p. 8). Because of this difference in AM stereo technology, the FCC was forced to take great care in testing each individual system. With FM, the FCC was free to choose the best multiplex system, and to take good attributes from others to produce an even stronger system. Overall, however, technology did not seem to delay the selection process as much as FCC policy and procedure.

FCC procedure

Granted, the FCC had a more perplexing technological problem with AM stereo than it had 20 years earlier with FM

stereo. The FM stereo process from inception to implementation lasted only three years (1958-1961). During that span, the FCC did all its preliminary research on stereo feasibility for FM, and delegated technical study to the NSRC. The origiral number of systems was narrowed from 14 to a final choice of the two-system hybrid. The FCC made a decision, stood by it, and experienced no controversy.

Legitimate AM stereo, as opposed to the superficial two-transmitter attempts, was considered in the 1950s along with FM stereo and TV stereo. But, the FCC delayed any further action until 1977. From 1977 until 1980, the FCC and NAMSRC conducted testing of the five AM stereo systems and finally selected one system. That tentative decision was later withdrawn by the Commission. Up to that particular point in history, AM stereo was roughly on the same timetable as FM stereo.

Between 1979 and 1981, the philosophy of the FCC seemed to change with the deregulation movement. In addition, the appointment of FCC Chairperson Mark Fowler further influenced the Commission's regulatory stance. Fowler, an opponent of governmental regulation, was described as "virtually a classic free marketeer" (From public interest to marketplace, 1985, p. 38). As a result of this new direction in FCC policy, AM stereo became entraped somewhere in the middle -- between old and new. In 1982, the FCC chose to leave any AM stereo system decision to the public, and stations were allowed to transmit in stereo via any of the five approved systems.

From conception to implementation, the AM stereo approval process took more than five years -- almost twice the time as FM

stereo. The overall process has yet to end. After five years of FCC procedure and five years in the marketplace, there was still no AM stereo system standard. Conversely, all loose ends were tied together when FM stereo went on the air, because standard technology was implemented in the industry. Station owners could promote a new uncomplicated, standardized service. Not so for AM owners. By going with the marketplace, the FCC caused effective AM stereo to be delayed indefinitely.

Clearly, governmental philosophy and policy dictated the greatest difference between the developments of FM stereo and AM stereo. Stereo was necessitated for both AM and FM for purposes of parity in audience numbers, and expanding technology allowed for successful transmission of stereo on AM or FM. However, while the government helped FM stereo through swift action and stern decisiveness, AM stereo was victimized by changing FCC policy in the deregulation era.

Five years in the AM stereo marketplace

Throughout the first five years of the AM stereo marketplace, the FCC intervened only to police technical violations and complaints. The Commission envisioned the marketplace as the quickest way to get AM stereo to the consumer. To a point, the strategy worked (Huff, 1988, pp. 20).

The first positive marketplace action came when Delco chose Motorola as the standard for its receivers (Hall, 1982c, p. 11). Soon afterward, nearly 40 other manufacturers followed the Delco lead by selecting Motorola. No receiver manufacturers aligned themselves with any other company.

Eventually, Sony and Sansui introduced receivers capable

of decoding the stereo signals of all five systems (Norberg, 1984, p. 30). Surprisingly, the marketplace rejected the notion of multidecoders. The price of the units was higher than that of Motorola-only receivers, but the difference was rather insignificant considering the product capabilities (Multisystem AM stereo receivers, 1983, p. 95; Technological cornucopia at NAB '83, 1983, p. 86). Perhaps the head start by Motorola had more to do with the failure of multisystem receivers than any other factor (Huff, 1988, p. 21).

Within the first two years of the marketplace, three of the five systems dropped out of the competition. That left only Motorola and Kahn. As Motorola slowly gained favor in the marketplace, Kahn's system remained status quo at best. In fact, several stations in major markets deserted Kahn for Motorola, citing listener discontent for the switch (p. 25). Still, the total number of AM stereo-equipped stations remained relatively small. At its peak, the number of AM stereo stations reached only about 600 by the end of 1987 -- or, about 10 percent of all AM stations.

Often, apparent AM stereo progress was hindered by an opposite reaction, generally by Kahn. For instance, when Harris removed its system from the market, the choice for the industry was narrowed to two systems. Harris eventually joined Magnavox in producing the C-QUAM system. Harris officials explained the move as being in the best interest for AM stereo (Harris Corporation, 1984, p. 1). Kahn, however, took objection to the alliance, and soon filed an antitrust suit with the FTC (Kahn, 1984, p. 26; FTC said to be, 1985, p. 42; Harris throws its weight, 1984, p. 109).

The suit was dismissed (Scratch one, 1986, p. 7; Wytkind, 1986, p. 3).

Later, Kahn accused Motorola of FCC technical violations (The AM stereo fight continues, 1986, p. 68; C-QUAM violations alleged, 1986, p. 1). After investigating and clearing Motorola (FCC acquits C-QUAM, 1986, p. 1), the FCC, too, was attacked by Kahn. The result, a Freedom of Information Act filing for the release of test results which exonerated Motorola (Hughes, 1986a, p. 3). The results were eventually made public. Surprisingly, both Kahn's system and Motorola's were found to be operating barely within the law (Hughes, 1986b, p. 3).

In addition to formal complaints against Motorola, Kahn persistently attacked the firm through industry-wide mail and media campaigns. While Kahn may have slowed Motorola's progress immeasurably, he did nothing to improve the standing of his own system.

The AM stereo marketplace degenerated into a mud-slinging Kahn vs. Motorola war of words (AM stereo support eroding, 1986, p. 5). Tired of the lack of marketplace success, several companies and a federal agency leaped into the process in attempts to expedite the solution. Texar delivered a petition to the FCC asking for a standards decision[2] (Hughes, 1986c, p. 1; FCC asked to choose AM stereo standard, 1986, p. 35). The company acknowledged the limited success of the marketplace in eliminating three of five systems. However, Texar officials emphasized the detrimental effects the Kahn-Motorola battle had on retarding the growth of AM stereo (Baraff & Peltzman, 1986, p. 71).

Press Broadcasting also petitioned the FCC, not for a

system standard, but for requiring all receivers to be multidecoders. The Commission could act on selecting a standard transmission system, but only Congress could act on receiver requirements.

Meanwhile, the National Telecommunications and Information Agency (NTIA) became involved (Hughes, 1987, p. 8). After conducting two different studies, the agency determined Motorola a de facto AM stereo standard -- not the de facto standard. The NTIA conclusion all but ended the hopes for the Kahn system ever being the standard (NTIA wants C-QUAM protected, 1987, p. 70).

Nevertheless, the FCC was obligated to at least comment on the Texar and Press petitions, as well as the NTIA study (Zavistovich, 1987a, pp. 1, 3). The FCC delayed any comment or action until 1988 (Zavistovich, 1987b, p. 1).

Conclusion

The FCC sent the AM stereo decision to the marketplace out of confusion and desperation. The changing role of the Commission during deregulation directly affected AM stereo, particularly since both proceedings were being dealt with by the FCC simultaneously. Never before had the Commission failed to set a standard.

If the Commission believed the marketplace was better than governmental standard-setting, surely it became obvious that the marketplace had stagnated. Texar recognized the stalemate, as did Press, the National Black Media Coalition, and the NTIA. Why, then, did the FCC not see the problem? If litigation scared the Commission (as may have been the case originally), then let Kahn file his suit. Kahn's lack of market acceptance and dismal legal

track record, combined with the FCC's six decades of staunch control would surely stand the test of any legal action.

If lost credibility were a problem, the Commission should take steps to rectify its mistake by admitting the failure of the marketplace and by resuming its sound, historical traditions of strict regulatory control demanded by the broadcast industry since the 1920s.

Despite the turmoil surrounding AM stereo in the marketplace, and despite the negativity associated with it all, AM operators should not have been discouraged completely. AM stereo broadcasting only became a reality in 1982. Five years was not enough time to pronounce the medium dead.

In 1961, FM languished far behind AM in audience shares. Even stereo could not close the gap for nearly 18 more years. At least ten percent of all AM stations at the end of 1987 had installed stereo transmission systems. In spite of the FCC's blessings, FM stereo began just as humbly. Glynn Walden, Group W AM managing engineer, explained:

> Although there weren't two competing systems, it was still hard to convince broadcasters to put in FM stereo generators in the late 1960's. FM technology just sat there for 10 years, then FM receivers got better, especially in cars. With AM stereo sitting there, receiver manufacturers will have good reason to eventually build quality receivers. Once there are at least 1,000 stations with AM stereo, receiver manufacturers will have no choice but to build better AM radio receivers, in general. (Likely candidates for AM stereo, 1987, p. 76).

In comparison, then, historical precedent remained on the side of AM. FM radio, with or without stereo, was rarely taken seriously by much of the broadcast industry until the medium finally overtook AM in 1979. But with strategic promotion and formatting, FM sneaked up on its elder competitor. By the time AM

owners and operators responded, the damage was done. The success of FM, however, should prove to AM executives the situation is far from hopeless.

Many executives maintain AM has a more serious problem than sound quality, pointing to a need for more effective programming as listener bait (Likely candidates for AM stereo, 1987, p. 76). Regardless of the type of programming or sound quality, however, AM stereo promotion appeared to be the key to success. Several success stories supported the supposition (Obergoenner, 1984, p. 4; AM stereo arrives, 1984, p. 3; Gaines, 1983, p. 77; Wood, 1982, p. 19; Hall, 1982a, pp. 1, 70; Hall, 1982d, p. 1; Persons, 1987, p. 20).

Obviously, both AM stereo and FM stereo experienced many similarities and differences. Stereo was deemed necessary for each to compete effectively with the dominant radio medium of the day. The FCC agreed in each case, and initiated formal regulatory proceedings. After three years of study, a standard stereo system was chosen. However, the FM stereo system was supported wholeheartedly by the Commission. With AM stereo, the FCC rescinded its decision and spent two more years in deliberation. The Commission attempted to justify the selection of a particular system. When it could not, the matter was reconsidered. The FCC determined one of the five systems must be selected. That, too, was eventually ruled out in favor of allowing the marketplace to weed out its own standard. Thus, for the first time in the Commission's history, no standard would be set for a broadcast transmission system.

Before the two-year delay, FM stereo and AM stereo were on

the same track. The AM stereo marketplace has, according to the NTIA, determined a de facto standard in Motorola. The focus has returned to the overwhelming audience numbers amassed by FM stations. The marketplace aside, AM faces great odds against a recovery. But FM proved the critics wrong and, given the time, AM could do the same.

The major difference in the developments of FM stereo and AM stereo was the changing policy of the FCC. With FM stereo, the Commission carried out its responsibilities in a traditional manner. The process was smooth and uncontested. AM stereo, and AM radio in general, seemed to become some sort of sacrificial lamb to prove a point. Because of the FCC's role as a regulator, much criticism has historically been thrown its way -- particularly by those interests who somehow felt victimized by FCC decision-making, such as companies whose systems have not been chosen as standards.

In an era of deregulation, the Commission was suddenly given an ideal opportunity to prove its worth. Indeed, the FCC had deliberated for some time over both the merits of the five individual systems and the benefits and pitfalls of the marketplace vs. governmental standard-setting. An embarrassed Commission had to somehow save face with the industry. The only escape was to say to broadcasters, "If it is so easy, here's your chance to make a decision." By so doing, the industry was faced with a chaotic situation not experienced since the pre-regulation days of the 1920s. Most importantly, the FCC could demonstrate how it had come to be taken for granted over the years. The government had not asked to regulate broadcasting. Rather, the

broadcast industry begged for regulation. Frequently during the five years of the AM stereo marketplace, the industry asked again and again for FCC intervention. The Commission refused, perhaps as a reminder of the past. Few broadcasters remain who experienced the early days of unregulated radio. The Commission was able to clearly demonstrate to broadcasters the lesson learned by the early pioneers. That being, self-regulation of the airwaves is a difficult task. AM radio just happened to be in the wrong place at the wrong time.

ENDNOTES

[1] Monophonic broadcasting involves transmitting a solitary audio signal to a receiving unit consisting of one speaker. With stereo, two signals are sent as one to a receiver which splits them apart "to afford the listener a sense of the spatial distribution of the original sound sources" (FCC, 1976, p. 69).

[2] During December 1985, the National Black Media Coalition (NBMC) announced it had "asked the FCC to re-examine the AM stereo standard issue," primarily because of marketplace failure. NBMC counsel David Honig explained: "Too much time has been wasted waiting on a marketplace that won't budge, and the audience and AM broadcasters are hurting as a result" (Hughes, 1985, p. 6). Honig contended "no economic incentives" existed to prompt broadcasters to unite behind one system (p. 6). As a result, he said, none of the stations already using AM stereo would be willing "to give up the ship and go with the other system" (p. 6). The FCC never responded to the petition.

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