

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
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In the Matter of)
)
Advanced Television Systems)
and Their Impact Upon the)
Existing Television Broadcast)
Service)

En Banc Hearing)

MM Docket No. 87-268

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COMMENTS OF JAMES E. CARNES

on behalf of

THE DIGITAL HDTV GRAND ALLIANCE

December 12, 1995

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SUMMARY

The Grand Alliance supports the Commission's twin goals of preserving and promoting free over-the-air television while making the most efficient use possible of television spectrum. We believe that both of these fundamental goals will be best served by the rapid introduction of ATV, including HDTV, and that this can be accomplished with modest modifications of the Commission's ATV implementation plan.

Technological innovations are bringing dramatic changes in the television industry and related fields. Already computer displays are capable of higher resolution than commercial television. Over the next ten years, a substantial fraction of the video delivered to the home by cable, satellite, fiber and tapes or discs will inevitably move to high-definition. Large-screen TV sales in the U.S. have already surpassed two million sets per year, and the Direct Satellite System ("DSS"), the fastest growing consumer electronics product in history, is already delivering digital, packetized signals to the home. Moreover, DSS is fully capable of delivering high-definition signals today.

If free over-the-air television service to the public is to survive in the years and decades to come it must remain technically competitive in this environment. The proposed ATV standard based on the Grand Alliance system is the only means for avoiding this threat of technological obsolescence. It will allow broadcasters to compete on a level playing field--provided that the system is implemented! If the Commission wants to preserve free over-the-air broadcasting, then it must do everything possible to encourage and accelerate the implementation by broadcasters of the ATV standard based on the Grand Alliance system and recommended by the Advisory Committee. This suggests the following actions and policies:

- The FCC should move quickly to approve the ATV standard recommended by the Advisory Committee so that the various industries involved can complete their designs and build the necessary equipment and infrastructure. The Grand Alliance system is already**

the most thoroughly tested system of its kind in history. The technical issues have been hashed and re-hashed for eight years. This is an outstanding, world-leading system.

Waste no time in approving it!

- **The FCC should do everything possible to encourage broadcasters to implement digital service on the transition ATV channel as rapidly as possible. The transition channels should not be auctioned, for this would slow the process, if not destroy it entirely. Rather, the FCC should hasten the switch-over away from NTSC so that the NTSC spectrum--once reclaimed and repacked for maximum utility--could be auctioned.**
- **The FCC must ensure that each broadcaster retains access to a full 6 MHz channel, so that full HDTV can be delivered. If partial channels are allocated, or if broadcasters are forced to share the 19 Mbps data stream available through a 6 MHz channel, broadcasters will not be able to compete on a level playing field with other means of delivering video.**
- **The FCC should require simulcast policies which initially encourage broadcasters and consumers to switch to digital, i.e., by initially permitting unique programming on the new channel, and which eventually ease the spectrum reclamation process, i.e., by requiring full simulcast, so that all NTSC content is also available on the digital channel.**
- **To create maximum value and promote efficient use of spectrum, the FCC should repack the ATV channels once NTSC transmissions cease, and organize the reclaimed spectrum into large contiguous nationwide blocks which would have the greatest value and which could be auctioned for a variety of purposes. Careful planning now can create a transition that will yield large blocks of contiguous nationwide spectrum, paying big dividends to the public in the future.**

In addition to these measures to ensure the survival of free over-the-air television, the Commission should give broadcasters wide latitude in exploiting the unprecedented flexibility provided by the all-digital Grand Alliance system. Besides further increasing the ability of broadcasters to compete, this flexibility can bring new, innovative services to the American public, and can help accelerate and pay for the conversion to a digital broadcast television

system. While we can identify a variety of potential innovative services that could easily be developed and provided over the channel, only when creative people are turned loose in the marketplace will we discover the full potential and value of the flexibility inherent in the Grand Alliance system.

One final note. The Commission has been studying the transition to a new broadcast television system for more than eight years, with its own dedicated and technically competent staff focusing on the complex issues involved, plus an army of industry volunteers that includes some of the best engineering and technology development talent in the world. The Grand Alliance strongly urges the Commission to take a leading role in formulating and advancing appropriate ATV policies, and to recommend them to the Congress, rather than simply waiting for a less informed Congress to give direction, as some seem to be suggesting.

The United States stands on the threshold of deploying a world-leading digital high-definition television system that will usher in a new era of digital broadcast communications--one that will not only bring dramatic improvements in the technical quality of television, enabling free over-the-air television to compete in the decades to come, but will also enable a host of other applications that help meet pressing needs of American citizens. To harvest these benefits for the American public, and to optimize the use of valuable television spectrum, the Commission should do everything possible to promote the rapid introduction of digital HDTV. In reiterating its clear commitment to the process it began eight years ago, and in acting promptly to adopt the ATV transmission standard recommended by the Advisory Committee, the Commission will unleash the industry to make investments that will commercialize this powerful technology, turning the vision of digital high-definition television into a reality for the American people.

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I. Introduction

On November 20, 1995, the *digital* HDTV Grand Alliance ("Grand Alliance")¹ submitted comprehensive comments on the issues outlined in the Commission's Fourth Further Notice of Proposed Rulemaking and Third Notice of Inquiry ("Notice") in this Advanced Television ("ATV") proceeding. My comments today focus more narrowly on the tremendous flexibility afforded by the all-digital Grand Alliance system, the opportunities this creates for broadcasters both to improve the quality and diversity of free over-the-air television and to provide supplementary and ancillary services, and the policy decisions that ought to govern broadcasters' use of this flexibility.

¹The *digital* HDTV Grand Alliance was formed in 1993 to combine the best elements of four previously competing all-digital high-definition television ("HDTV") systems, and consists of AT&T, General Instrument, the Massachusetts Institute of Technology, Philips Electronics, the David Sarnoff Research Center, Thomson Consumer Electronics, and Zenith Electronics. Under the direction of the Commission's Advisory Committee on Advanced Television Service ("Advisory Committee"), the Grand Alliance constructed a prototype best-of-the-best HDTV system which recently has been tested extensively by the Advisory Committee and found to exceed performance requirements and expectations. On November 28, 1995 the Advisory Committee voted unanimously to recommend the Grand Alliance system to the Commission as the basis for a new advanced television transmission standard.

The Grand Alliance members endorse the Commission's twin goals in this proceeding-- to preserve and promote universal, free, over-the-air television to the public, and to ensure the most efficient use of the spectrum, including recapturing as much spectrum as possible in contiguous blocks after the transition to ATV. We believe both of these fundamental goals will be best served by the rapid adoption of ATV, especially HDTV, and we also believe that giving broadcasters substantial flexibility in using the digital channel will allow them to compete more effectively and will accelerate the conversion to digital high-definition television.

II. The Commission should permit flexible use of the channel, consistent with its goal to preserve and promote free, over-the-air television.

The digital Grand Alliance HDTV system offers broadcasters unprecedented flexibility, principally through its use of a packetized data transport system that organizes all information carried over the channel into packets of data, each with its own header and descriptor information. Thus, each packet carries a label telling a receiver what kind of information it contains, e.g., "program 1 video," "program 2 video," "program 1 audio," "auxiliary data," etc. In essence, this makes the HDTV transport system a generalized digital data delivery vehicle, capable of carrying 19 Mbps per television channel of any kind of digital information into American homes and businesses. This same capability also ensures the *extensibility* of the system, i.e., that additional features and functions can be added in the future without degrading the performance of the earliest HDTV/ATV receivers or rendering them inoperable. This is possible because the packet headers will allow later generations of receivers to recognize data associated with new capabilities, while earlier receivers will ignore packets of a type they don't recognize.

This tremendous flexibility means that in addition to the quantum improvement in the technical quality of free over-the-air television, implementing HDTV offers an immediate opportunity to improve the national information infrastructure to help address pressing needs

in health care, education and other areas. Adopting HDTV broadcasting will put huge data "pipes" and high-resolution displays into American homes, thereby helping to cover the costs and facilitate the introduction of these other applications. With an eye to these important uses, the Advisory Committee and the Grand Alliance members worked diligently over the past several years to maximize the *interoperability* of the HDTV/ATV system with computers and telecommunications, while satisfying extremely challenging objectives for improving entertainment television.

The Grand Alliance members believe that upgrading the nation's terrestrial television system to digital high-definition capability is and should remain the principal use of the transition channel. Once the Commission adopts policies that ensure this principal use, broadcasters should be allowed to take advantage of the unprecedented flexibility designed into the system. Such flexibility can increase broadcasters' ability to compete, by improving the technical quality of their services and by allowing them to provide new, innovative services which will themselves serve the public interest. Moreover, this flexibility will promote a more rapid transition to digital broadcasting by increasing the appeal to consumers and by providing the potential for additional advertising and other revenues to help offset the expenses of conversion. To facilitate the rapid adoption of ATV, the Commission should adopt several important policies.

A. The Commission should require broadcasters to provide a minimum amount of HDTV on their ATV spectrum.

In considering the future of television, it is vital that the Commission, broadcasters and all other parties interested in this proceeding focus several years into the future and take into account the technological and competitive environment that will exist at that time--the time when broadcast ATV will begin to become a significant factor in the marketplace. The spatial resolution of today's computer screens has already surpassed that of today's television, and by that time such higher resolution will have become common in entertainment applications.

Indeed, today's consumer-oriented high-power direct broadcast satellite services already offer better resolution than most of today's televisions can support.

HDTV is the defining and most constraining ATV application, and forms the basis for a digital television standard that will endure for decades to come. HDTV provides the significant increase in resolution that broadcasters will need to remain competitive in the future, while delivering quantum improvements in picture and sound quality that will motivate consumers to invest in digital television. By requiring HDTV broadcasts, the Commission will ensure early and frequent availability of HDTV programs which will encourage consumers to purchase HDTV sets, creating higher manufacturing volumes that will help drive unit costs and prices down more rapidly. The more HDTV programming that is offered, the faster the transition to digital will proceed, and the sooner the Commission will be able to recapture valuable NTSC spectrum.

Furthermore, requiring HDTV will ensure that broadcasters follow through on their commitment to offer HDTV as the primary application of the ATV channel. Only HDTV represents the kind of quantum improvement in the technical quality of entertainment television that warrants temporarily lending broadcasters a second 6 MHz channel to make the transition, and HDTV is the *only* application that requires a full 6 MHz channel. If broadcasters were not committed to offering substantial amounts of HDTV programming, they would not need the entire 19 Mbps capacity of a 6 MHz channel. For example, if broadcasters offered only standard definition digital television ("SDTV"), all the broadcasters in a single market could share the digital bit streams carried over one to three 6 MHz channels, leaving the remainder of the spectrum available for other ATV entrants or for other uses. However, the Grand Alliance companies are convinced that broadcasters *must* offer HDTV if they are to compete successfully in the decades to come. Moreover, by maintaining HDTV as the centerpiece application of ATV broadcasting, the Commission can ensure that a high ceiling is established for the future technological evolution of digital television.

B. As long as the predominant use of the ATV channel is for free over-the-air television, including a substantial commitment to HDTV, broadcasters should be given wide latitude in exploiting the flexibility of the Grand Alliance system.

Ancillary and supplementary services that are analogous to those permitted under the Commission's current regulatory scheme and that don't detract from the primary broadcast function should be permitted. As previously described, the Grand Alliance's packetized data transport makes a vast array of such services possible. For example, the Grand Alliance has demonstrated an interactive high-definition automobile commercial that makes opportunistic use of excess channel capacity. As this video advertisement is transmitted, scenes that contain complicated motion require the full bit rate of the channel to render high-quality video and audio, while other simpler scenes need only a fraction of the available data rate. During these simpler scenes, supplementary information about available options, performance and safety features, and dealer locations, is included in the data stream. Interested viewers who have ATV receivers that support these features can then use an air mouse to interact with their receivers to obtain additional information about the automobile.

With this particular 51-second ad, a total of 60 megabytes of supplemental information (enough to fill more than 40 floppy diskettes!) can be transmitted without degrading the high-definition images. Besides demonstrating the tremendous capabilities of the Grand Alliance system for conveying supplemental information concurrently with high-definition images, this example belies the erroneous but oft-repeated notion that HDTV will represent greater expenses with no greater revenue opportunities for broadcasters. Advertisers will certainly be willing to pay more for commercials that target interested purchasers more closely and give them more useful and relevant information. By delivering supplementary and ancillary services with greater value and appeal to both consumers and advertisers, broadcasters and consumers alike can take advantage of the flexibility of HDTV/ATV to help finance and accelerate the conversion to digital television.

First, in the early part of the transition, HDTV viewers will form a self-selected market segment that will be of particular interest and value to certain advertisers. Second, advertisers will pay more for programs that move audiences. Third, digital television and especially HDTV will permit advertisers to do things that haven't been possible in the past. And finally, increased advertising and other revenues are possible, e.g., from interactive, more closely targeted messages such as the automobile commercial described earlier, and from other supplementary and ancillary services that can be provided over the digital channel.

For public broadcasters, the flexibility of the Grand Alliance system presents opportunities to offer additional valuable services that can help pay for their conversion to digital television, even without modifying the definition of noncommercial service. For instance, if public television stations offer to transmit multiple SDTV educational programs to schools and homes during non-prime time hours, government and private entities may be more willing to provide funds necessary to finance their conversion to digital television.

A wide variety of potential services could be provided using the flexibility inherent in the Grand Alliance system. For example, program-related data such as pictures, sound clips, interactive software games or quizzes, informational brochures, sports statistics, etc., could be delivered, as could general data such as traffic reports, news, weather reports, sports scores, Internet website pages, etc. Instructional and educational videos could be transmitted, perhaps with multiple audio streams for different languages or skill levels, even employing a certain degree of interactivity by displaying to viewers only those portions of the data stream that they select. But only when creative people are turned loose in the competitive marketplace will we discover the full potential of the flexibility inherent in the system. Some creative ideas will fail in the marketplace. Others not yet conceived will make important contributions. Digital HDTV has the potential to evolve into a substantially different and richer medium than analog television, but only flexible rules governing the use of the channel will give this a chance to happen.

Even for services that go beyond broadcast television or traditional ancillary or supplementary services, including nonbroadcast services, broadcasters should be given substantial flexibility, provided that the predominant use of the channel continues to be for free over-the-air television and that a minimum number of hours of HDTV are broadcast. Generally, if such services are offered to the public for a charge, licensees should be required to pay spectrum fees as contemplated in proposed legislation pending before Congress.

III. Initial eligibility for ATV licenses should be limited to existing broadcasters, provided that the channel is used predominantly for free over-the-air television with HDTV as the primary application.

Because the temporary assignment of an additional 6 MHz channel to each existing broadcaster will bring about the smoothest and most expeditious transition to digital HDTV, the Grand Alliance wholeheartedly endorses the Commission's current plan to limit the initial eligibility for ATV licenses to existing broadcasters. However, in the unlikely event that existing broadcasters are uninterested or unable to make the transition to ATV, including HDTV, within a reasonable transition period determined by the Commission, the ATV spectrum should be made available to new entrants who make a commitment to broadcast HDTV and other digital television services.

IV. In considering public interest obligations, the Commission should not detract from broadcasters' ability to upgrade to HDTV.

The conversion to digital affects the *ability* of the Commission to impose public interest obligations more than the *merits* of doing so. In considering what, if any, obligations to impose on broadcasters' offerings of digital television programming, the Commission should take care not to detract from broadcasters' ability to upgrade their service to HDTV. For example, requiring simultaneous children's television programming during prime time would force adoption of multicast SDTV and effectively prohibit HDTV.

V. The Commission should modify its simulcast requirement in order to promote the rapid transition to HDTV/ATV and the recovery of NTSC spectrum.

Modest rules governing the relationship between a broadcaster's NTSC and ATV programs can facilitate both the transition to ATV and the rapid recovery of spectrum at the end of the transition period. In fashioning such rules, the Commission must strike a careful balance. On one hand, broadcasters should be allowed to optimize ATV and especially HDTV, taking full advantage of the capabilities of the new technology and recognizing that production concepts, techniques and values may differ relative to NTSC. On the other hand, requiring ATV programming identical to that provided on the NTSC channel can help facilitate the transition to HDTV/ATV. In the early days of HDTV/ATV, simulcasting will allow direct comparisons of NTSC and HDTV/ATV, helping consumers to evaluate the performance improvements. And near the end of the transition, simulcasting can ensure that unique NTSC programming is not perpetuated which would cause customers to balk at the cessation of NTSC broadcasts.

VI. At the end of the transition period the Commission should repack the ATV spectrum in order to free up large, contiguous, nationwide blocks of spectrum.

The best plan for the efficient utilization of television spectrum is to do everything possible to hasten the transition to HDTV/ATV and to repack the spectrum at the end of the transition period by relocating some broadcasters. (TV broadcast spectrum cannot be repacked now, because in today's NTSC broadcast system the taboo channels must remain vacant to prevent interference.) In making initial ATV channel assignments, it is vital that the Commission look ahead to the recovery of one of each broadcaster's 6 MHz channels at the end of the transition period. With careful planning now, the Commission will be able to recover more spectrum and to organize the recovered spectrum into large, contiguous,

nationwide blocks that will be far more valuable than a patchwork quilt of locally available spectrum.²

To create these large blocks of recovered spectrum, it will be necessary for some ATV broadcasters to be relocated at the end of the transition period. The cessation of NTSC broadcasts will create vacant channels that can then be occupied by ATV stations. In addition, because digital ATV signals require much less interference protection than NTSC signals, the resulting ATV channels can be packed more tightly once NTSC transmissions cease.

Planning now for the end of the transition will yield a more spectrum-efficient result, will encourage planning and investment in new services that can take advantage of the freed-up spectrum, and will reinforce the basis upon which a second channel is being temporarily assigned to each broadcaster. Careful planning now can maximize the value of recovered spectrum while keeping the number of relocations to a reasonable level.

VII. Conclusion

As a result of the Commission's eight-year effort to upgrade the nation's television infrastructure, the United States stands on the threshold of deploying a world-leading digital high-definition television system that will usher in a new era of digital broadcast communications--one that will not only bring a quantum improvement in the technical quality of television, but will also enable a host of other applications to entertain, educate and inform American citizens. To harvest these benefits for the American public, and to optimize the use of valuable television spectrum, the Commission should make the minor modifications to its ATV policies proposed herein and in the Grand Alliance's November 20, 1995 Comments,

²Proposals have recently been made in Congress that aim to reduce the federal budget deficit by requiring the Commission to auction the television spectrum currently planned for the conversion to ATV. Such proposals would not only render broadcast ATV stillborn and undermine the ability of free over-the-air television to compete technically in the decades to come, but would lock in an inefficient usage of scarce spectrum and grossly reduce the funds that ultimately could flow to the U.S. Treasury by auctioning recaptured, repacked television spectrum at the conclusion of the transition to ATV.

should proceed as expeditiously as possible to adopt the ATV broadcast transmission standard based on the Grand Alliance system and recommended by the Advisory Committee, should assign ATV transition channels to broadcasters, and to do all else possible to promote the rapid introduction of HDTV. By reiterating its clear commitment to the process it began eight years ago, and by acting promptly to adopt the recommended ATV transmission standard, the Commission will unleash the industry to make investments commercializing this powerful technology, turning the vision of digital high-definition television into a reality for the American people.

Respectfully submitted,

A handwritten signature in cursive script that reads "James E. Carnes". The signature is written in dark ink and includes a stylized flourish at the end.

James E. Carnes

on behalf of

The Digital HDTV Grand Alliance

December 12, 1995