ORIGINAL
FILE

# FLY, SHUEBRUK, GAGUINE, BOROS AND BRAUN


JAMES LAWRENCE FLY (1966)
PETER SHUEBRUK (RETIRED)
BENITO GAGUINE
JEROME S. BOROS
HOWARD J. BRAUN*
HEIDI P. SANCHEZ*

JEROME S. SILBER
ADAM A. ANDERSEN*
DIANE L. MOONEY*
ANDREW J. SIEGEL**

MORTON I. HAMBURG**
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Washington, D. C.
October 22, 1987


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Re: Docket No. 87-268

Dear Mr. Tricarico

There is submitted herewith an original and five (5) copies of the comments of Isaac Blonder of Blonder Tongue Laboratories in Docket No. 87-268.

Should there be any questions concerning this submission, please communicate with the undersigned.

Very truly yours

Benito Gaguine

Mr. William J. Tricarico
Secretary
Federal Communications Commission
Washington, D. C. 20554

enc.

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Federal Communications Commission
Office of the Secretary

Comments on MM docket No. 87-268
in the matter of
Advanced Television Systems and Their Impact on the Existing Broadcast Service
Review of Technical and Operational Requirements: Part 73-E, Television Broadcast Stations
Reevaluation of the UHF Television Channel and Distance Separation Requirements of Part 73 of the Commission's Rules

What is suggested is a reassignment of the UHF TV frequencies to accomplish these desirable objectives:

1. Allow more UHF broadcast licenses.
2. Assign 12 mhz on a contiguous basis in order to provide spectrum space for the ATV systems requiring more than 6 mhz of bandwidth.
3. Preserve compatibility of the NTSC signal, so that none of the home TV's are ever rendered obsolete.
4. Provide additional spectrum space for landmobile, paging, data etc.
5. All of the above benefits with minor expense to the UHF TV broadcaster.

Isaac S. Blonder desires to comment on Docket No. 87-268 particularly from his experience as an independent UHF broadcaster since 1964,and also from his activities in the fields of engineering, manufacturing, and cable systems management as related in Exhibit 1.

Listed below are the recommended actions to be implemented by the FCC. Statements on these actions will parallel the FCC table of contents in order to serve a dual purpose for presenting Mr. Blonder's views on the specific issues discussed therein as well as to support his presentation.

1. Assign 12mhz of continuous bandwidth to each UHF station as follows:
   Set 1. 17,18; 21,22; 25,26; 29,30; 33,34; 38,39; 42,43; 46,47; 50,51; 54,55; 58,59,; 62,63; 66,67.
   Set 2 .15,16; 19,20; 23,24; 27,28; 31,32; 35,36; 40,41; 44,45; 48,49; 52,53; 56,57; 60,61; 64,65; 68,69.
   Thus a total of 27 12mhz channels would be available, sans taboos, observing only the present on channel and adjacent channel spacings, with channel 37 left open ,resulting in two sets for assignments by adjacent channels rules.

2. Authorize the station to use the additional channel of bandwidth in any fashion it may find advantageous, e.g. two independent standard NTSC programs; one NTSC advertiser-supported program, land-mobile, data, teletex, paging etc, within the adjacent 6 mhz; HDTV; 3-D TV; etc.

3. Authorize the station to use a single transmitter and antenna to deliver any of the services suggested in 2.

4. Revise the taboos to recognize that the comparatively minor reductions due to taboo artifacts are not only temporary, but that the advantage of transmitting 12mhz is a positive economic gain for the established UHF broadcaster even with some reduction in his coverage area.

5.Avoid any requirement for an increased aspect ratio. There have appeared intriguing proposals for compatible ATV within the 6 Mhz current

bandwidth that will enable the 12mhz broadcaster to deliver simultaneously two ATV signals with the usual 4:3 aspect ratio. Also, for the first time ever, two independent channels will permit the viewing of high quality 3-D TV in a satisfactory fashion for both the monocular and binocular displays.

6. Consider turning back the clock somewhat and assign the 14-20 channels as follows:15,16; 17,18; 19,20. 14 would be assigned to land-mobile. The current occupants on 15-19 could make their deals with the UHF stations who now have a far greater bandwidth available for lease than the present assignments for land mobile, and ultimately these channels would be freed to become full service broadcast facilities.

7. Low power TV would also benefit from the new 12mhz bandwidth.

8. Technology exists for the delivery of four channels within 12 mhz at a quality level similar to today's standards. None of the published multiplex systems are compatible with NTSC. Unimaginable but not impossible to see an extraordinary effort on the parts of both the broadcasters and manufacturers in order to achieve a doubling of the channels in the major metropolitan areas to 38!

Responses to the Table of Contents.

paragraph 3. As a UHF broadcaster since 1964, Mr. Blonder is intimately acquainted with the red ink so often associated with the disadvantaged UHF spectrum. It is not too late to save the day for UHF, and award every UHF station 12mhz, with all the implied technical and economic benefits. The general public will be rewarded with superior picture quality, more programs, more stations and more coverage. Although cable will continue to be the preferred source of TV for the majority, our lower income and rural citizens still deserve consideration for their plight from the FCC. One estimate gives 40 million as the long term uncabled viewers who need TV service at a low price, only available by land-based broadcast TV facilities.

paragraoh 17. Mr. Blonder takes sharp issue with the subject of "compressed aspect ratio" relative to a "cinema like aspect ratio". His views are expressed in a printed editorial, exhibit 2. Besides the historical and technical arguements presented in exhibit 2, two more issues are either ignored or patronized - cost and home viewing habits. None of the published psychological studies investigating the preference for 16:9 versus 4:3 horizontal to vertical dimensions (incidentally, 16:9 is a rather feeble increase in ratio) gave the increased cost of 16:9 as one of the factors in the viewers choice of format. One company in limited production, charges $3000 for a HDTV receiver. What percentage of the US public wants to pay six times as much for 16:9? Of course the futurist will predict competitive prices in the gloaming, but even if you believe him, why do you need 16:9 in the home? The home viewing area is extremely variable and mostly small. Typically the screen size goes according to the pocketbook. Indeed, 20% are still black and white! The angle subtended by the eye, in most cases, is around 10 degrees whether in the format of 16:9 or 4:3, and is substantially below the human field of vision (140) and thus there is little psychological stimulus from the minor increase in aspect ratio. Why burden the pocketbook of Mr. Average Citzen with the added cost of 16;9 and the extra bandwidth

which may be better used for additional programming? Even in motion picture theaters where cinerama was born, the vast majority are screened with the standard 4:3 35mm film and often with masking the top and bottom of the screen to simulate a wide screen format.

Paragraph 40,5. The immediate advantage of augmenting the channel capacity of existing Television assignments from 6 mhz to a contiguous 12mhz is the economic survival of the broadcaster during the research and shake out period of the various proposed ATV schemes. The second important economic advantage of two contiguous channels is the ability to transmit two channels on a single transmitter and antenna investment. The UHF broadcaster needs the added income to survive the stormy seas of format battles. Third, and most important for quality, only a single antenna and transmission pattern will provide stable artifacts if more than 6 mhz is need tor the ATV system. In the real world of ghosts, noise sources and atmospheric anomalies, non contiguous frequencies, particularly if eminating from physically displaced antennas, may even drop the ATV picture quality below the level of a normal NTSC transmission.

Paragraph 43. There is no pressure from the general public to replace NTSC. Viewers have been polled many times, both formally and informally, and they have usually expressed their satisfaction with the present NTSC quality level. Only if new rivals such as Super VHS tape recorders and HDTV DBS appear, will there be a public outcry for change in the broadcast standards. Indeed the present VCR standards are lower than broadcast and yet have engoyed a phenomenal reception by the general public. Remember that the same public is still buying black and white TV's, so it is obvious that the programs and price are the principal concerns of our citizenry.

Paragraph 50. As has already been stated in the introduction, compatibility with the current NTSC receivers is of paramount importance, therefore the present 6 mhz bandwidth and technical standards should be retained. If finally a scheme is devised that will allow a single 6 mhz bandwidth to deliver the old NTSC picture and simultaneously ATV, with an appropriate Tv receiver display, then VHF will be able to compete on equal picture quality terms with UHF. UHF will of course have two channels, but this advantage will still not overcome the frequency superiority of VHF. And if it develops that UHF has a superior picture and a higher earning power than VHF, c'est la querre!

No changes need be made in the cochannel and adjacent channel spacings. All other taboos would be dropped. The small reductions in sevice area are a minor tradeoff penalty to existing UHF stations who would now be blessed with two individual programs and superior technology. There should be no problem technically in either transmitting the two channels or receiving them, since the Television receivers have proven their ability to separate satisfactorily adjacent channels on a cable system.

Paragraph 51,52,53. Coverage of the service area by microwave has been proven to be so inferior to UHF that the commission would be well advised to drop this item from the agenda.

Paragraph 60. The UHF taboos may be reasonably grouped into two catagories - 1. radiation from the tuner local oscillator, tending to interfere with

neighboring TV receivers and, 2. internal receiver problems arising from unequal strength received signals.

On March 22, 1978, Blonder Tongue Labs submitted an unsolicited proposal for the purpose of developing, building and demonstrating a TV receiver with improved performance in response to RFD 76-22 April 19, 1976, suggesting the elimination of all taboos except on channel. See Exhibit 3.

Our proposal was not approved, nevertheless we sent a prototype preamplifier, designed to suppress the local oscillator radiation, to Lawrence Middlekamp for evaluation by the FCC laboratory. On March 7, 1979, we received a phone call from Alex Felker that the booster would perform as claimed.

As for the internal receiver problems, we suggested that the manufacturer install a temporary single low cost trap in the tuner, manually tuned by the viewer to suppress the rare cases of interference as may arise due to one of the other taboos. CATV has undeniably proven that a spectrum as wide as UHF can be viewed if there exists an equal level of adjacent TV signals. In due course, the TV designer will be readily able to eliminate the tuneable trap, and substantially satisfy the requirements posed by RFD 76-22.

Section IV. The proposal to allow 12mhz bandwidth for each UHF station with 6 mhz always programmed to the current NTSC standard, answers practically all of the concerns expressed by the FCC in section IV. ATV will arise by two methods, both cost effective and responsive to new technology and the public purse, 1. New TV display technologies will markedly improve the reception of the 6mhz standard NTSC signal, 2. the additional 6 mhz awarded to UHF broadcasting can be utilized in any way the marketplace swings i.e. digital sound, extended resolution, increased width-height ratio, 3-D format and a myriad of non-TV clients who can be accomendated without having to beg the FCC for yet more spectrum space.

Paragraph 110,111,112,113. In place of the present interference level standards as expressed by the taboos on a mileage basis, the commission might find it desirable to adopt the non interference protection procedure as outlined for low power TV. First, set a standard loss of service area due to interference of between 10-20% and arbitrate the remaining potential disputes within the FCC administrative Law Judge procedures. As has been previously mentioned, the UHF station should willing accept a minor reduction in service area for the major potential income potential afforded by a 12 mhz bandwidth.

s

Exhibit 1

Declaration of Isaac S. Blonder

I am the Chairman of the Board of Blonder Tongue Laboratories, ("BTL"), which over the past thirty-seven years has been manufacturing electronic equipment for the television industry. BTL is one of the pioneers of the subscription industry. In this regard, BTL's BTVision STV encoding/decoding system (No. 4745) became the first STV system to become operational in the United States in March 1977.

2. I was one of the founders of BTL in 1950. My background is that of an engineer and physicist.

Residence - 9 Beaverhill Road, Morganville, N.J. 07751
Born - NYC, June 24,1916
1938 - U. of Conn., B.S. Physics, High Honors
1940 - U. of Cornell, M.S. Physics
1941-46 - U.S. Signal Corps, Radar Officer
1946-47 - Panoramic Radio Corp., Engineer
1947-48 - City College, NYC, Engineering Physics Instructor
1948-50 Teleking Corp., NYC, TV manufacturer, engineer and Q.C. supervisor
1950 - present, Chairman of the Board, Blonder Tongue Laboratories, Inc., manufacturer of antennas, STV, MATV, CATV, satellite equipment; U.S. designed and manufactured.
1964-1970 - Director, WNJU-TV Channel 47, Newark,N.Y.
1967-72 - President, Com-Cable TV Inc., Multiple CATV operator
1972-76 - President and principal stockholder, WBTB-TV, Channel 68, Newark-NYC
1982-present, Director, WNUV-TV Channel 54 Baltimore, Md.
1979-82, Stockholder, WQTV-TV, Channel 68, Boston,Ma.
L972-present, Director, United Jersey Bank/Mid-State.
35 patents
Member CAB Committee, 1962-66, chaired by Commissioner Bob Lee, to encourage UHF Broadcasting
Member, Cable Technical Advisory Committee, 1970-75,sponsored by the FCC to recommend technical standards for CATV
USNC Technical Advisor to the International Electrotechnical Commission sub committee 12G Cabled Distribution Systems
Member/Observer NCTA engineering committee since 1952
Member/Observer - EIA Broadband Communications study, EIA TV tuner committee, EIA land mobile committee, EIA Satellite Committee, EIA Engineering Policy Committee, EIA Engineering Education Committee,BTSC Committee, Atsc Committee,SMPTE Working group on Steroscopic TV.
Lewis Wolfson Memorial Award for services to the STV Industry, 1980.

Isaac S. Blonder

Isaac S. Blonder

Exhibit 2

# Aspect ratio: Cost vs. art

**By Isaac Blonder**
Chairman, Blonder-Tongue Laboratories Inc

Aspect ratio is a term commonly associated with the linear rectangular scan in a television system, describing the fixed relationship of the width to the height. Throughout recorded history, mankind has exhibited preferences for various ratios in all fields, particularly the graphic arts.

Human vision capabilities are the foundations for the many-faceted ratios adopted in the past. The subject of human vision has been investigated in depth and electronic designers have ample literature on the subject to guide their electronic systems to fit the vagaries and preferences of the human psyche. Briefly, some of the human visual characteristics that impact the aspect ratio decision are as follows:

- *Isotopers of the retina*: Isotopers are irregular egg-shaped concentric lines of equal threshholds of discernability. The ratio is roughly 1.2:1 of the horizontal to the vertical.
- *Color fields*: The color fields for equal subjective intensities are about 1.3:1.
- *Visual acuity*: Horizontal to vertical ratio is about 1.5:1. The muscular structure of the eye favors horizontal motion over vertical.

Viewers of both movies and television tend to position themselves from the picture at a distance where the graininess of the film or the scanning lines are just invisible. Thus, the viewer is usually seated away about eight times the height of the picture tube for the NTSC 525 line presentation, three times the height of the motion picture screen and also three times the height of the proposed high definition television (HDTV) systems.

Pythagoras was credited with creating the earliest recorded pleasing ratio of the horizontal to the vertical with the dimensions of rectangles, 2:1.

Later came the "divine proportion" of 5:3, then the "dynamic symmetry" of 5:1 and finally the "golden section," 1.618:1. Experiments on observers showed some variation of the golden rule, but the average followed the mathematical formula $a/b = b/(a+b)$ where *a* and *b* are the shorter and longer sides of the rectangle.

Visually pleasing furniture dimensions also were investigated and one early study by A. Van Dyck detailed 27 "powerful" ratios in the range of 1:1 to 3.618:1. Sixteen were called "most powerful" ratios. The lesson to be learned from the Van Dyck article, as well as from the earlier ratios, is that there is no one universal absolute that must be incorporated into the television scanning presentations.

The dominant format for motion pictures is 35mm, which has an aspect ratio of 1.375:1. Since the picture quality of 35mm (over 900 lines) is considerably in excess of the 525 line television system capabilities, 16mm film became the standard size for transferring the silver screen to the electronic screen. 16mm has an aspect ratio of 4:3 or 1.333:1. The majority of the TV pioneers of the 30s, both in the United States and abroad, employed the 4:3 ratio with the following exceptions: BBC and Scophony 405 lines (5:4), Baird 3-color (3:4), French 440 lines (5:4), German 441 lines (5:4), Italian 441 lines (5:4) and Russian 441 lines (11:8).

### Cost realities

With this abundance of information, the one subject overlooked by the researchers of today is economics. How much will one display format cost vis-a-vis another? Once a new art is established, the subsequent practioners of the art tend to reach towards perfection, forgetting to take into account the cost/benefit curve. Occasionally, the author of such a study may drop a casual remark that "in five years other scientists will reduce the production costs of his concepts to acceptable consumer price levels." There is also a well-known bias by the psychological scientist to use intelligent, pliable subjects (usually fellow researchers) whose reactions to the experiment often follow suspiciously Pavlovian paths to a predictable answer. The commerical designer, on the other hand, subjects his brainchildren to the uncaring hands of a randomly chosen panel of jurors who can usually break the unbreakable with surprising ease.

Now to return to the aspect ratio and the price one has to pay for increasing the numbers. At eight times the picture height, the visual angle subtended by the eye is only 10°. Yes, it is true that the visual angle must be increased to 20° or more to experience the sensation of oneness with the program. Cinerama and surround screens exploit the full human vision viewing areas of 80° vertical and 140° horizontal. We have all experienced the daredevil roller-coaster ride with those presentations. It's also important to remember, however, that the primary variable cost in the TV receiver is the diagonal dimension of the picture tube. For the round tube screen, 1:1 is the most efficient use of the phosphor. The reduction in screen area for a 4:3 aspect ratio is only about 5 percent.

Before we tackle the price differential between the different aspect ratios, one subterfuge in the television industry must be included. The TV manufacturer had to build in a horizontal overscan of 10-15 percent to protect against underscan caused by variability in electronic components and line voltage. The modern TV has low-cost voltage regulation, but to produce a television receiver capable of exact registration between the picture and the screen will measurably increase the price.

***'To create an image of the same physical size... the cost to the average viewer is almost doubled'***

The television station is well aware of the TV overscan and accordingly, the "made for TV" programs keep all graphics and significant activities within the area limited to 90 percent of the vertical and 80 percent of the horizontal scene as framed by the camera lens. You can observe for yourself that many producers favor talking heads scanned from the forehead to the chin, probably in an attempt to create life size images on the small TV screen.

Thus, to create an image of the same physical size vertically as occurs with our present 4:3 aspect ratio, the new 5:3 ratio without overscan, when compared to the 19" set, requires a picture tube with a 26" diagonal. The average list price of the 19" table model today is about $300, a comparably featured 25" set is about $550, thus the cost to the average viewer is almost doubled for what I believe to be unimportant artistic values in the horizontally extended viewing areas created by the 5:3 format.

Movie sized and HDTV formats are not considered here because they consume excessive chunks of cable bandwidth.

Before ATSC mandates the 5:3 ratio, I hope it will conduct some consumer surveys to see if their lauditory comments on 5:3 are shared by the common man, once he is solicited to express his preference after viewing in his home environment the old and new formats, and the assault on his pocketbook.

I predict 4:3 will be the winner!

Exhibit 3

BLONDER TONGUE LABORATORIES, INC.
One Jake Brown Road, Old Bridge, New Jersey 08857 Marketing Dept. (201) 679-4010/Other depts. (201) 679-4000 TWX-710-998-0695

March 22, 1978

OFFICE OF THE CHIEF ENGINEER
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D. C.

SUBJECT

Unsolicited proposal for the purpose of developing, building and demonstrating a Television Receiver with improved performance, in response to RFD 76-22, April 19, 1976, suggesting the elimination of all taboos except on channel.

COMPANY

Blonder-Tongue Laboratories, Inc., since 1950 has engaged in the research, manufacture and sale of products to improve and distribute TV signals. We have been awarded close to 80 patents in the fields of antennas, broadband TV amplifiers, TV cameras, modulators and STV systems.

The TV Receiver manufacturing industry and, in part, the FCC, has primarily concerned themselves with the TV Receiver and indoor style attached antennas, leaving the outdoor antenna installation to the viewer.

Blonder-Tongue has devoted 28 years to the design and sale of devices to receive the TV signals at a remote point and to deliver them in good order to the Receiver terminal.

OBSERVATION

Besides the technical characteristics of the TV receiver which influence the grade of signal received, there are previously unaddressed problem areas to which we propose tentative solutions.

- Ghost causing signals from sources other than the antenna. i.e. tuner input mismatch, unbalanced input, direct pickup in the 300 ohm transmission line between the TV input terminals and the tuner, unshielded tuners, and unshielded chassis.

- Transmission line loss between the antenna and the receiver.

- 300 ohm transmission line mismatch due to faulty installation which enables the line to act as an antenna at points physically displaced from the antenna, causing ghosts.

- Low quality matching transformers, splitters, amplifiers, etc., between the antenna and the TV set, degrading the performance.

PROPOSAL

The Blonder-Tongue proposal for the improvement of TV reception and receiver:-

1. The RF stages for both the UHF and VHF bands be placed in a weatherproof case which is either plugged into a receptacle on the TV receiver or mounted at the antenna.

   Power for the broadband boosters will be supplied through the coaxial cable connection..

   An electrical interlock will insure that the receiver will not function without the RF amplifier.

2. All transmission lines confined to coaxial cable.

3. Receivers and coaxial cable specified for immunity to pickup from local fields.

4. The present UHF tuner will be modified to trade noise figure for improved selectivity.

5. The present IF will be upgraded to permit adjacent channel reception.

6. No major modifications of existing receivers or new semiconductors contemplated.

7. Target maximum price increase at the consumer level - $25.00.

8. Target noise figure, both U and V, including 100 ft. coaxial transmission line, 5 db.

Our proposal divides into several segments which may be assigned as independent projects. Tentative objectives and prices are included. Two TV sets provided by the FCC will be modified as agreed.

1. Oscillator Taboo.

   Broadband U &V detachable weatherproof RF stages, with TV Receiver mounting bracket and conversion of the U & V tuners to coax. We expect that the isolation provided by the broadband RF stage will remove oscillator taboo. $20,000.

2. Intermodulation and IF beat taboos.

   Reduced to acceptable levels by the use of currently available higher quality semiconductors in the tuner. $10,000.

3. Sound and Picture Image Taboos.

   Tradeoff of the current tuner noise figure with RF selectivity to eliminate sound and picture image taboos. The RF broadband stage will preserve the projected overall 5 db N.F.

   If the present state of the art varactor diodes do not permit the desired results, we propose a user-operated voltage or manually tuneable trap in the RF stage, mounted on the front panel, as a temporary solution until the tuner selectivity is achieved. $20,000.

4. Adjacent channel Taboo.

   If the FCC specifies equal powered adjacent channel transmitters, sharing a broadband transmitting antenna, with reduced sound picture ratio, and all receivers equipped with available ceramic intermediate frequency stages, the adjacent channel taboo could be dropped.

   For the installation of a suitable IF in the test receiver, and the study of the optimum picture-sound ratio for the transmitter, to eliminate the adjacent channel taboo. $10,000.

RECOMMENDATION

We see no need to delay the assignment of new TV stations if they are initially authorized to operate at translator powers with appropriate directional antennas. Ten years after the improved TV receiver is marketed the stations could operate at full power.

Yours truly,

BLONDER-TONGUE LABORATORIES, INC.

Isaac S. Blonder

ISAAC S. BLONDER
Chairman of the Board

ISB/jg