Meeting -- Tuesday, November 4, 1969

Roy Easley, Asst. Exec. Director
Lester Lindow, Exec. Director
Howard Head, Engineering Counsel
Henry Goldberg, one of their legal counsel (Covington & Burling)

* Dr. Drew, Dr. Moore and Mr. Kriegsman have been invited to join Mr. Whitehead in the initial 45-minute meeting with industry people -- prior to their meeting with Domsat Working Group

DOMESTIC SATELLITE MEETINGS
(with industry)

Friday, October 24, 1969

* 10:00 a.m. AT&T — Rm. 730, 1800 G St., N.W.

Ed Crosland, Vice President, Federal Relations
Dean Gillete
Ken McKay, Vice President for Engineering
William Stump
Charles McWhorter, Executive Assistant

10:30 a.m. All will be joined by Domsat Working Group

Tuesday, November 4, 1969

* 10:00 a.m. COMSAT — Rm. 110

Joseph Charyk, President
Gen. James McCormack, Chairman

10:45 a.m. All will be joined by Domsat Working Group and others from Comsat — Rm. 208

* 2:00 p.m. COLUMBIA BROADCASTING SYSTEM — Rm. 110

William Lodge, Vice President for Affiliate Relations and Networking
Dr. David Blank, Vice President for Economics and Research

2:45 p.m. All will be joined by Domsat Working Group — Rm. 272

* 4:00 p.m. MAXIMUM SERVICE TELECASTERS — Rm. 110

Roy Easley, Assistant Executive Director
Lester Lindow, Executive Director
Howard Head, Engineering Counsel
Henry Goldberg, one of their legal counsel (Covington & Burling)

No meeting with Domsat Working Group

Wednesday, November 5, 1969

* 10:00 a.m. COMMUNICATIONS WORKERS OF AMERICA Rm. 110

Joseph Beirne, President
John Morgan, Administrative Assistant
George Miller

10:45 a.m. All will be joined by Domsat Working Group Rm. 272

Thursday, November 6, 1969

UNIVERSITY COMPUTING COMPANY

* 2:00 p.m. Martin Hoffman, Assistant General Counsel Rm. 110
Seymour Joffee
David Foster
Ed Berg

2:45 p.m. All will be joined by Domsat Working Group Rm. 272

Friday, November 7, 1969

2:00 p.m. Windup meeting of the Domsat Working Group Rm. 272

David Acheson
Dr. James Armstrong
Donald Baker
Lucius Battle
Richard Beam
Dean Burch
Robert Button
Asher Ende
Jerome Freibaum
George Haydon
Dr. Richard Marsten
Dr. Boyd Nelson
Robert Powers
Dr. Walter Radius
Siegfried Reiger
John Richardson
Abbott Roseman
Gen. George Sampson
Robert Scherr
Wilbur Serwat
Willis Shapley
Bernard Strassburg
Dr. Myron Tribus
William Watkins

Meetings with Industry on Domestic Satellite Communications

	Date of Meeting	Representatives	Telephone Number
AT&T	10/24/69 10:00 a.m.	Ed Crosland, V.P., Federal Relations, N.Y. 195 Broadway, NYC 10007 Dean Gillete Ken McKay, V.P. for Engineering, N.Y. 195 Broadway, NYC 10007 William Stump Charles McWhorter, Executive Assistant, N.Y. Working Group representatives	(212) 393-1000 (212) 393-4459
COMSAT	11/4/69 10:00 a.m.	General James McCormack, Chairman Joseph Charyk, President 950 L'Enfant Plaza, Wash., D. C. 20024 Working Group representatives	(202) 554-6020
Columbia Broadcasting System	11/4/69 2:00 p.m.	Dr. David Blank, V.P. for Economics and Research William Lodge, V.P. for Affiliate Relations and Networking 51 West 52nd Street, NYC 10019 Working Group representatives	(212) 765-4321, x 3561 (212) 765-4321, x 3541
Maximum Service Telecasters	11/4/69 4:00 p.m.	Roy Easley, Asst. Exec. Director Lester Lindow, Exec, Director Howard Head, Engineering Counsel Henry Goldberg, one of their legal counsel (Covington and Burling) 1735 DeSales Street, N.W., Wash., D.C.	(202) DI7-5412

Meetings with Industry on Domestic Satellite Communications

	Date of Meeting	Representatives	Telephone Number
Communication Workers of America	11/5/69 10:00 a.m.	Joseph Beirne, President John Morgan, Administrative Assistant George Miller 1925 K Street, N. W., Wash., D. C. Working Group representatives	(202) FE7-7711
University Computing Co.	11/6/69 2:00 p.m.	Martin Hoffman, Asst. General Counsel 1300 Frito-Lay Tower, Dallas, Tex. 75235 Seymour Joffee Ed Berg David Foster Working Group representatives	(214) 350-1211
Windup meeting	11/7/69 2:00 p.m.	Domsat Satellite Working Group	

Mr. David Acheson

Mr. William Anders — 3300
National Aeronautics and Space Council
New Executive Office Building
Washington, D. C. 20502

Dr. James Armstrong — (177) 7442 — 961-7442
Post Office Department
Room 7119 New Post Office Bldg.
Washington, D. C.

Mr. Donald Baker — (187) 2411
Chief of Evaluation Section
Antitrust Division
Room 3115 Justice Department
10th and Constitution Avenue, N. W.
Washington, D. C.

Mr. Richard Beam — (13) 34313 — 963-4313
Director, Office of Telecommunications
Department of Transportation
Room 834 West
800 Independence Avenue, S. W.
Washington, D. C. 20590

Dr. Russell Drew — (103) 3570 — 395-3570
Office of Science and Technology
Room 285 - EOB
Washington, D. C.

Mr. Asher Ende

Mr. Peter Flanigan — 2361
Assistant to the President
White House
Washington, D. C.

Mr. Richard Gabel

Mr. Larry Gatterer
Department of Commerce

Mr. Walter Hinchman
Room 493 - EOB
Washington, D. C.

Chairman Rosel Hyde — 632-6336
Federal Communications Commission
Room 814
1919 M Street, N. W.
Washington, D. C. 20554

Mr. Will Kriegsman

Dr. Richard Marsten National Aeronautics and Space Administration Room 5081 - FOB 6 400 Maryland Avenue, S.W. Washington, D. C.	(13) 20888	962-0888
Dr. Thomas Moore Council of Economic Advisers Room 327 EOB Washington, D. C.	(103) 5080	395-5080
Mr. William Morrill Bureau of the Budget Room 10009 New EOB Washington, D. C.	(103) 4684	395-4684
Col. Ward Olsson Office of Telecommunications Management Room 750 1800 G Street, N. W. Washington, D. C.	5190	395-5190

Mr. Robert Powers

Dr. Walter A. Radius National Aeronautics and Space Administration Room 7101 - FOB 6 400 Maryland Avenue, S. W. Washington, D. C.	(13) 24583	962-4583

Mr. John Richardson

Mr. Jonathan Rose Administrative Assistant White House Washington, D. C.	2514	
Mr. Robert Scherr Room 4226 New Post Office Building 12th and Pennsylvania Avenue, N. W. Washington, D. C.	(177) 7472	961-7472
Mr. Wilbur Serwat Post Office Department Room 306 Safeway Building Washington, D. C.	(177) 8687	961-8687

Mr. Willis Shapley (13) 24715 962-4715
Associate Deputy Administrator
National Aeronautics and Space Administration
Room 7137 - FOB 6
400 Maryland Avenue, S. W.
Washington, D. C.

Mr. Bernard Strassburg 632-6910
Federal Communications Commission
Room 514
1919 M Street, N. W.
Washington, D. C.

Dr. Myron Tribus (189) 3111
Asst. Secy. of Commerce for
Science and Technology
Room 5884 Commerce Dept.
14th and Constitution Ave., N. W.
Washington, D. C.

Mr. William Watkins 632-7060
Federal Communications Commission
Room 714
1919 M Street, N. W.
Washington, D. C.

THE WHITE HOUSE

WASHINGTON

October 31, 1969

Memorandum for the Domestic Satellite
Working Group Members

The following meetings have been scheduled in Room 272, Executive Office Building. Would you please let my office know who will be attending.

Tuesday, November 4

10:45 a.m.	COMSAT
2:45 p.m.	Columbia Broadcasting System

Wednesday, November 5

10:45 a.m.	Communication Workers of America
~~2:45 p.m.~~	~~University Computing Company~~

Thursday, November 6

~~2:45 pm~~ University Computing Company
~~2:00 p.m.~~ ~~Working group meeting to wind up the report~~

Friday, Nov. 7

2:00 pm. Working Group meeting to wind up report.

Clay T. Whitehead
Staff Assistant

Attached is the list
of those who
responded to your
August 19 letter.

(International Brotherhood
(of Electrical Workers
(and
(National Assoc. of
(Broadcasters did not
(send in a reply.

Those unmarked sent in
statements without your
request.

Leonard H. Goldenson
President
American Broadcasting Companies, Inc.
1330 Avenue of the Americas
New York, N. Y. 10019

Julian Goodman
President
National Broadcasting Company, Inc.
Thirty Rockefeller Plaza
New York, N. Y. 10020

ITT World Communications, Inc.
J. R. McNitt (James)
President
67 Broad Street
New York, N. y. 10004

Charles J. Wyly, Jr.
President
University Computing Company
1300 Frito-Lay Tower
Dallas, Texas 75235

Joseph A. Beirne
President
Communications Workers of America
1925 K Street, N. W.
Washington, D. C. 20006

George D. Butler
President
Electronic Industries Association
2001 Eye Street, N. W.
Washington, D. C. 20006

Richard D. DeLauer
Vice President & General Manager
TRW Systems Group, TRW Inc.
One Space Park
Redondo Beach, California 90278

Edward B. Crosland
Vice President
American Telephone and Telegraph Company
195 Broadway
New York, New York 10007

S. G. Lutz
Chief Scientist
Hughes Research Laboratories
3011 Malibu Canyon Road
Malibu, California

T. Vincent Learson (President - ?)
International Business Machines
Corporation
Armonk, New York 10504

L. B. Davis
Vice President
General Electric Company
777 Fourteenth Street, N. W.
Washington, D. C. 20005

James J. Clerkin, Jr.
Executive Vice President-Telephon
Operations
General Telephone & Electronics
Corporation
730 Third Avenue
New York N. Y. 10017

Earl D. Hilburn
Executive Vice President
Western Union
60 Hudson Street
New York, N. Y. 10013

Communications Satellite Corporat
Joseph V. Charyk
President
950 L'Enfant Plaza South, S. W.
Washington, D. C. 20024

Frank W. Norwood
Executive Secretary
Joint Council on Educational
Telecommunications
1126 Sixteenth Street, N. W.
Washington, D. C. 20036

John W. Macy, Jr.
President
X Corporation for Public Broadcasting
Suite 630
1250 Connectivut Avenue, N. W.
Washington, D. C. 20036

J. D. O'Connell
Director
Office of Telecommunications Management
Executive Office of the President
Washington, D. C. 20504

Howard R. Hawkins
President
X RCA Global Communications, Inc.
60 Broad Street
New York. N.Y. 10004

E. A. Gallagher
X President
Western Union International, Inc.
26 Broadway
New York, N.Y. 10004

Frank Stanton
X President
Columbia Broadcasting System, Inc.
51 West 52 Street
New York, N.Y. 10019

The Ford Foundation
McGeorge Bundy
X President
320 East 43rd Street
New York, N. Y. 10017

Richard S. Mann
President
The RME Group of Communocations Companies
100 East Broad Street (Suite 1302)
Columbus, Ohio 43215

M. G. Robertson
President
Christian Broadcasting Network, Inc.
P. O. Box 111
1318 Spratley Street
Portsmouth, Va. 23705

National Cable Television Association Inc.
X Frederick W. Ford
President
1634 Eye Street, N. W.
Washington, D.C. 20006

X Indicates organizations to whom the 19 Sep letter frm Mr. Whitehead were forwarded for submission.

Note: Submissions were not received from International Brotherhood of Electrical Workers or National Association of Broadcasters.

Previous request - see attached

Will

List people who have indicated plans to come in.

association of
MAXIMUM SERVICE TELECASTERS / INC.

1735 DeSales St., N.W.
Washington, D. C. 20036
DIstrict 7-5412

Lester W. Lindow, *Executive Director*

October 10, 1969

Dr. Clay T. Whitehead
The White House
Washington, D. C.

Dear Dr. Whitehead:

The attached Comments concerning the development of communications technology and services and their regulations were filed with the Federal Communications Commission on September 5, 1969. This paper highlights some of the profound policy aspects of the "wired nation" concept. I hope that this information will be useful to your task force on domestic satellites.

Representatives of this Association would welcome the opportunity to meet with you for discussion of the issues involved in your current study.

Sincerely,

Roy W. Easley
Assistant Executive Director

kf

Enclosure

September 5, 1969

To: Mr. Roy Easley

From: Eva Daughtrey
Tom Whitehead's office

Mr. Whitehead asked me to send you a copy of the letter and attachment which you requested.

No decision has been reached yet as to whether or not meetings will be held with interested parties to discuss these matters -- but we will be in touch.

Attachment

Friday 9/5/69

9:25 Had a call from

Roy Easley
Assistant Executive Director
Maximum Service Telecasters
1735 DeSales Street, N. W.
Washington, D. C. 20036

DI. 7-5412

It is an association of approximately 160 TV stations all over the country. Indicated that in an article in this weeks Broadcasting Magazine, mention was made that the Task Force was looking into domestic satellite field and had sent letters to industry, etc., attaching a set of issues.

He said his association has been very heavily involved in all the spectrum allocation in management matters and a heavy participant with the FCC in all phases including CATV regulation, manned mobile radio, etc.

Would like very much to have a copy of the letter and issues. Also wondered if they might be able to meet with you to discuss the matters.

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

In the Matter of

Amendment of Part 74, Subpart K. of the Commission's Rules and Regulations Relative to Community Antenna Television Systems; and Inquiry into the Development of Communications Technology and Services to Formulate Regulatory Policy and Rulemaking and/or Legislative Proposals.	DOCKET NO. 18397

COMMENTS OF THE ASSOCIATION OF MAXIMUM SERVICE TELECASTERS, INC., ON PART V (GENERAL AREAS OF INQUIRY)

The following comments are submitted by the Association of Maximum Service Telecasters, Inc. (MST), in response to Part V of the Commission's December 13, 1968 Notice. As to some of the questions posed in Part V, e.g., technical standards for multi-purpose wire communications, MST takes no position at this time. As to others, e.g., nature of services to home or business, MST awaits with curiosity the responses of other parties to learn about "checkless" checks, paperless "newspapers," and at home shopping "trips." However, there is a series of interrelated questions and issues upon which MST will comment at this time -- these concern the place of the free, local television broadcast station, advertiser supported or educational, in the home communication system of future decades. Simply stated, MST opposes any substitution or phasing out of the free, local television broadcast station in favor of a multichannel, wire grid system, interconnected by terrestrial microwaves or space satellites into a "wired nation."

A. CATV Is A Detour On The Road To The Wired Nation.

Over the past two years, since proposals for a "wired city" first came to light,[1] broadcasters have watched with increasing alarm as the momentum for the wired city or wired nation concept grew among some large CATV interests and others of a more academic caste. The convergence of forces in favor of the wired nation is, perhaps, best illustrated by the Commission's own Part V inquiry, which seems to view CATV, albeit in expanded form, as a logical step in the direction of the wired nation. But is it and should it be? Technically, there is reason to believe that the coaxial cable used for CATV would not be adaptable to the two-way transmissions and switched exchanges that some see as the sine qua non of the wired nation. (See, e.g., ADA Comments on Part V, p.8, June 5, 1969). While the allegation has been made that CATV cable systems could be converted for two-way transmissions, there is no technical evidence to support this view. There is considerable doubt that even the most up to date CATV equipment demonstrated at NCTA's June 1969 convention is capable of satisfactorily providing two-way operations on as few as three or four television channels.[2] Even if there were a way to allow for CATV conversion to two-way operations there is every reason to believe that the costs would be enormous -- certainly not commensurate with the likely benefits. Moreover, given the propensities of the typical woman shopper, it is extremely doubtful that there would ever be sufficient cable bandwidth

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1/ See, e.g., Barnett & Greenberg, A Proposal For Wired City Television, 1968, Wash. U.L.Q.1 (Winter, 1968).

2/ See Switzer, "1969 Trade Show Review," TV Communications p. 75 (August 1969).

or switching capacity available in a system to make it feasible for hundreds or thousands of women to select their new Fall wardrobes by using wired television channels. Even if the technical obstacles could be surmounted, it would be fundamentally unfair to make broadcasters, like condemned men who have to supply the hanging rope, participate in their own destruction by allowing CATV operators to use free broadcast signals as the economic base for the wired nation, which would have no room for television broadcast stations once the objective was achieved.

Operating on the principle that no one ever went broke promising program diversity to the FCC, CATV interests have taken up the academics' cry of service to"minority taste" audiences. Discounting such foot in the door appeals, it is clear that creation of a multichannel technical capacity, even on present-day cable systems, does not and will not create significantly more diverse or higher quality television programming and that the probable result would be loss to the public of the free over-the-air service it now receives in abundance. Like the promises of the over-the-air pay TV proponents before them, CATV operators may promise culture and special interest programming, but they have their eyes on broad-appeal entertainment programming, where, free from the public service responsibilities of broadcast television licensees, the greatest subscriber and advertiser revenues lie. The CATV operators now moving into program originations may talk about channels devoted to city council meetings, high school drama, cameras focussed on weather instruments and news wire teletypes, but most look to films and other entertainment programming as their contribution to "diversity." This sounds like wired pay TV, because it is. Explaining the "diversity concept"

in the July 1969 issue of BM/E (Broadcast Management/Engineering), one CATV operator stated that the four channels of non-broadcast programming he expects to market to CATV systems throughout the United States "to be paid for by subscribers rather than by local advertisers." Even if direct program charges are not imposed on subscribers, the subscriber could end up paying for non-broadcast program channels on CATV either by charges per channel, or special service charges, or through increased subscription charges. As another CATV operator stated,

> "It's not always the smart thing to go to the local municipality that granted the franchise and ask for a fee hike. Such tactics always leave a bad taste. But it's quite another thing to ask for a rate increase when it's sought on the basis of increased investment and additional service." (BM/E (Broadcast Management and Engineering), July 1969, p.56)

No matter how the subscriber pays for the programming, it is pay TV for, as the Commission has recognized, "pay TV" does not necessarily mean that charges will be imposed only on a per program basis.

Until recently, the sources for such "diverse" programming have been free-film sponsors, syndicators of "baby sitting" cartoon shows and some film packagers. At present, CATV systems are moving into direct competition with television broadcasters for the most attractive feature film and sports programming packages. For example, GenCoE has made arrangements with Warner Brothers-Seven Arts for a film package which "represents 40 percent of the released films between 1950-1964 . . . the same that are now being released to commercial television."[1/] CATV for August 11, 1969 (p.16) reports that Cable Channels Inc., has an exclusive contract from NFL-AFL Films for the NFL's 1965-66, 203 film "Game of the Week" package. The report concludes by stating that

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1/ CATV, p.8, July 28, 1969.

"with professional sports becoming higher and higher priced, and television increasingly hesitant to pay the prices the pro leagues demand, cable may wind up with a share of the action at some time in the future." Manhattan Cable Television Company has the rights to carry 125 Madison Square Garden sports events (pro hockey, basketball and boxing) during the 1969-70 season.[1/]

Later, with the profits derived from subscribers and advertisers -- since program sponsorship by national and local business is another source of present and future CATV revenue -- CATV operators on the road to the wired nation would syphon programs and talent now available free of charge on broadcast television. Thus, the adverse impact of CATV's importation of distant television broadcast signals would be accelerated by direct syphoning of free television's programs and talent. Instead of specialized programs for minority taste audiences, the public would end up paying dearly for the same type of program fare to which they now have access merely for the price of a second-hand television receiver.

Beyond programming, some believe that CATV could also serve as the foundation for initiation of services to the home such as information retrieval, data processing, banking and shopping by wire, etc. However, even one of the originators of the wired city concept -- Dr. Edward Greenberg of Washington University (St. Louis, Mo.) -- assessing the future economic outlook for cable television at the June 1969 NCTA Convention expressed skepticism about

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1/ The Evening Star (Washington, D.C.) p.E-2, May 21, 1969. For other examples of CATV program originations see MST's Comments (April 3, 1969) and Reply Comments (May 12, 1969) on Part III Paragraphs 11-20, 23-25 of the Notice in Docket No. 18397.

CATV's potential for developing "non-television" services. (See NCTA Membership Bulletin, July 1, 1969, p.6).

B. The Road to the Wired Nation is Also the Road to the Destruction of Free, Local Television Broadcast Stations and Would Raise Serious Social and Economic Problems.

There are proponents of the wire concept who believe that a multichannel, wired city system, interconnected on a nationwide basis, would be economically, socially and politically more desirable than our present mixed communication system of telephone and microwave common carriers, television broadcast stations and CATV. There is, however, no reason to believe that the universal wired communications system they envision could be realistically implemented in a way to provide significantly more, more diverse or better program service than we now have, even if such a system might allow us to shop, bank, and work at home! In terms of the critical information and entertainment functions of our communication system, the evidence points to the conclusion that the wired nation would destroy the free, local television broadcast station as it has developed over the years and, with it, the immense values served by our present mode of television broadcasting.

1. Television broadcasting provides enormous benefits to the American public.

Our present television broadcast system serves enormous social and economic values. While there is some hesitation about placing a dollar figure on these values and the benefits derived from television broadcasting, one way of coming to grips with this task was developed by Robert R. Nathan Associates, Inc., in a report entitled "The Social and Economic Benefits of Television Broadcasting," which was submitted to the Commission as Exhibit No. 6 to MST's April 30, 1969, Reply Comments in Dockets Nos. 18261 and 18262.

Nathan's economic studies showed that the dollar value of the benefits provided to the American television viewing public by commercial and educational television programming amounts to over $100 billion annually and this is without regard to the additional enormous contributions that television broadcasting makes to society and the further enormous contribution that television broadcast advertising makes to national business productivity and economic activity.

2. Adverse impact upon free, local television broadcast stations.

The adverse impact upon the public interest in television broadcast stations and the values they serve is one of the most serious problems associated with the wired nation. Once a multichannel wire system is established it would destroy the local television broadcast station by a combination of a loss of network, syndicated and other nonlocal program services and extensive audience fragmentation, which would destroy financial support for local program services. Given the severe audience fragmentation and high cost per thousand caused by a multichannel wire system, it is extremely unlikely that sufficient advertising support could exist for the maximum number of "national commercial networks" contemplated in wired city proposals. There might be some increase in viewing, but there would be small audiences for each "network." Advertising revenue for each "network" would be reduced, while program costs continued to climb.

A major source of programming, audience and revenue for local television stations would be lost in a wired system, when network and other nonlocal program services could be provided directly to the home viewer.

If local, advertiser-supported television station entities continued to provide local program services on a

wired system, they would have to do so without network programming, without attractive films and syndicated program materials and without adequate advertising support, which would result from the great audience fragmentation caused by a multichannel wire system. Once the entertainment and sports nucleus of a local television broadcast station's program service is lost to the wired system or adversely impaired by it, the next block of programs that would be lost would be the commercially unattractive public service and public affairs programs, since stations presently use the funds derived from the sale of commercial time in other programming to "subsidize" the public service programs and other programming intended for specialized audiences.

The loss of news programming would be most severe, since this is often the most expensive portion of the local television broadcast station's local program service. Even though local news programs are usually attractive to sponsors, the revenues derived from the sale of time in local newscasts is usually not enough to cover the cost of producing and broadcasting the news programs, or, at best, to permit the station to break even on its news operations. In many communities the only actively competitive local news organizations are the news departments of the various local, commercial television broadcast stations. Given the dwindling number of competitive local, daily newspapers, it is reasonable to expect that many communities that now have multiple television broadcast service, and hence competitive broadcast news service, would end up with none in a wired system or would have no more than one localized television news entity. There is also a question as to whether the quality, scope and depth of television news could be maintained. There is even less likelihood that present television broadcast public service and public affairs

programming would be sustained in a wired system. In short, rather than expanded news, informational and public service programs the end result of the wired city and nation may be to diminish or preclude the full availability of such programming. Such a development would rightly be viewed with considerable alarm.

Permitting "tests of different systems or services by different entities," as suggested by the Commission in Part V, question 3(b), would not afford any basis for determining the extent of adverse impact on television broadcast stations which would result from the wired nation. The difference between the effects shown by such experiments and the impact of a fully operational wired nation is a difference of kind not of degree.

Perhaps Commissioner Kenneth Cox put the potential adverse impact of a wired nation best in a perceptive speech to the Wisconsin Broadcasters Association on January 30, 1968, when he stated:

> " . . . I must confess that one of my main concerns with this whole concept is about its impact on local broadcast programming. While I have been known to be critical of the local live offerings -- or lack thereof -- of certain stations, I believe strongly in a diversely owned, locally based broadcast system, both to insure diversity of viewpoints and to provide the base for a service emphasizing local news, local weather, local religion, local issues, local charitable organizations, and local programming tastes. . . . I don't mean to imply that our system is sacrosanct and should not be modified. But I do think there are real values in our system which should be preserved if at all possible, and that we should be sure that proposed change will really produce a better service before we embrace it. As I have suggested, I think there are serious problems in the proposal for wired television which its supporters have not thought through. And I am concerned that even if we can gain some of the promised benefits of such a system, we may lose other values in the process.

3. Implementation of the wired nation concept would lead to enormous concentration and centralization of

control over communications facilities to the detriment of the public.

The ultimate effect of a multichannel wired system would be an extensive concentration of ownership and control in the provision of television service to the public; with this concentration would come a greatly increased amount of governmental control, especially since it is likely that a common carrier would operate the wired facilities and it would be subject to strict government regulation. If such regulation were effective, it could work to stifle free expression. If it were not effective, the public would be at the mercy of the operators of the wired system. The "big brother" potentiality of a wired system must be contrasted to the real values derived from a diversely-owned, locally-based free television broadcast structure with its principal emphasis on localism.

With such a universal, nationwide wired system, the Commission may be deceiving itself by posing a question concerning the "division of regulatory functions between federal and state or local authorities. . . ." (Part V, question 10). The unprecedented concentration that would result from the fully interconnected wired nation would most likely lead to a substantial loss of state and local control.

While some see a nationwide wired television system, subject to regulation as a common carrier and involving unlimited access of program-supplying entities to the common carrier channels, as an enhancement of free speech opportunities, it would not likely work out this way. The wired nation would destroy the present locus of responsibility for programming now lodged in the licensee of the local television broadcasting station. Exercise of this responsibility operates to expand the access of varying views to the broadcast channel. The point is that a combination of

economics, technology and legal and social responsibilities has shaped the local television broadcast station as a unique entity organized to serve local and area needs and to reflect local community values by providing comprehensive, well-rounded program services to all the people free of charge. It is extremely doubtful that the unique entity that is the local television broadcast station, and the values it serves, could be preserved or recreated if a wire grid were to replace the present television broadcast system.

4. Under the wired nation concept of providing television program service, the poor and rural residents would be deprived of benefits they now receive free of charge, absent subsidization by the federal government.

NCTA frankly admits that problems such as service to the urban and rural poor and service to residents of sparsely populated areas, regardless of their ability to pay have not been solved. (NCTA Comments of May 12, 1969, pp. 14-19.) With respect to service to the poor, NCTA pointed to the welfare field for possible solutions, stating that the gain in social benefits may justify subsidies in order to allow the poor to subscribe to wired television. A subsidy is also proposed as a possible solution to the problem of service to rural areas, i.e., through a type of Rural "Wired Television" Administration. However, given present national priorities for the expenditure of public funds, it would be most unwise to invite further government subsidies to provide wired television to those who could not otherwise avoid it. Without subsidies, reliance upon the wired nation as a means of providing television programming would mean a withdrawal of service from those segments of the population who rely most heavily on free television service as their principle means of entertainment, news, information and culture.

To summarize MST's position, whatever arrangements are ultimately made for providing the non-television programming services that some look to from the wired nation, the Commission should assure that no step is taken that would jeopardize the provision of television program service to the American people by free, locally oriented television broadcast stations. Once destroyed, our present system -- which offers and provides so much to so many -- would be virtually impossible to recreate in the wired nation.

Respectfully submitted,

ASSOCIATION OF MAXIMUM
SERVICE TELECASTERS, INC.

By /s/ Ernest W. Jennes
ERNEST W. JENNES

By /s/ Henry Goldberg
HENRY GOLDBERG

Covington & Burling
888 Sixteenth Street, N.W.
Washington, D.C. 20006

Attorneys for
Association of Maximum
Service Telecasters, Inc.

September 5, 1969

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THE SOCIAL AND ECONOMIC BENEFITS of TELEVISION BROADCASTING

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Prepared for

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SUMMARY AND CONCLUSIONS

1. The proposal and counter-proposals for reallocation of the electromagnetic spectrum in FCC Dockets 18261 and 18262 from a television use to land mobile radio raise profound issues of public interest:

a. Nearly one-third of all UHF channels (14 to 20 and 70 to 83) would be reallocated to land mobile radio (LMR) (see figure 1).

b. The number of television broadcast stations in a number of large metropolitan areas of the nation would be limited to those presently in operation. VHF is completely saturated, and there are very few available unused UHF TV channels in the 25 principal market areas where spectrum congestion is alleged to be a serious problem -- no unused commercial channels in the top 10, and only 4 in the top 25 markets. This is contrary to one of the apparent underlying assumptions of the FCC.

c. In many others further expansion will be limited to the small number of channels allocated and not yet in operation.

d. A number of smaller communities with no television channels presently assigned to them will be permanently denied the possibility of such future assignments.

In short, at a time when available TV outlets in major cities are now or will soon be fully utilized, the FCC and the industry are proposing the allocation of the only remaining large block of unassigned TV spectrum to non-TV use, as well as a large share of the spectrum already assigned.

2. The seriousness of the issue is compounded by the fact that free TV as we know it is dependent on the use of the spectrum, whereas LMR is of only marginal importance to the users.

3. There is very little practical prospect that this reduction in the amount of spectrum allocated to television would be redressed in the future, either through allocation of other parts of the spectrum, or recovery of spectrum presently proposed for reallocation.

4. The transfer of a major portion of the spectrum from one class of use to another is proposed by the FCC without the benefit of studies required for the FCC to reach an informed judgment that it is "consistent with the public interest, convenience, or necessity," as required by the Communications Act. At a minimum such studies would have to be objective and independent, and include:

(a) Projections of future requirements for land mobile radio and television channels, particularly in the 25 leading market areas where spectrum congestion is said to exist.

(b) The opportunities for accommodating present and prospective LMR users within existing spectrum allocation through improvements in allocation, coordination, licensing, management, and use of spectrum.

(c) The costs and benefits to the public, both present and prospective, of the proposed transfer of spectrum from television to LMR use.

5. Those proposing the reallocation of spectrum from UHF to land mobile radio ignore the conclusions of the FCC staff that comprehensive studies necessary to fully evaluate the total cost and total benefits were beyond the resources of the Commission staff, and probably would require contractual studies.

They are also ignoring the findings and recommendations of a high-level scientific advisory panel to the Secretary of Commerce and others that a national research program on the social and economic values of competing demands for the use of the spectrum is needed, if the nation is to have the tools it will need to make intelligent decisions with regard to spectrum utilization in the future.

6. A theoretical or conceptual framework for the analysis of the social and economic values of television broadcasting has not been developed by the Federal Government, the television industry, and the academic community.

In the absence of such an established and accepted analytic framework, and of other authentic studies on the subject of the social and economic benefits of television broadcasting, it was necessary to evolve our own concepts and measurements.

7. The economic expenditures that are made for broadcast activity and equipment and for TV reception are estimated at $7.8 billion in 1967. If we view these as costs, and compare them with the amount of information and entertainment

delivered to the homes of the nation, television must be regarded as perhaps the most efficient and productive element of the economy.

8. The real benefits of television broadcasting are the value that it has for the user, and the beneficial effect it has on economic development. In these terms television broadcasting is a unique industry, and the measurement of benefits presents a unique problem.

Total consumer benefits per annum are estimated in monetary terms at $101.6 billion, or nearly four times total expenditures for all forms of recreation. The concept of consumer's surplus is the excess of consumer satisfaction above his cost. Consumer's surplus is estimated with reference to the alternative cost to the viewer if he were to obtain the same or similar information and entertainment from some source other than television (see figure 2).

9. While this kind of measurement in monetary terms is essential for purposes of economic analysis and comparison, it does not and cannot reflect the benefits to the public of the immediacy of television, and the availability of kinds of informational and entertainment programs for which there is no comparable alternative.

10. The benefits of television broadcasting to economic development are also considered to be very substantial. There are no available means of measuring these, similar to those employed in the measurement of benefits to the user. Benefits of television to GNP and economic development result from --

(a) The demand which it creates for new goods through its unique effectiveness as an advertising medium, and the functioning of the demonstration effect of programming.

(b) The increase of productivity and dynamism resulting from its educational and demonstration impact on the viewer.

The educational and demonstration impact would apply to viewers of all classes, but is of particular significance to those in the lower income groups and those with lower levels of educational achievement.

11. UHF transmission is rapidly overcoming the basic handicaps that have restricted its growth in the past. In the three years 1966-68 a total of 124 UHF stations went on the air compared with a cumulative total of 148 in the entire preceding period. The percentage of sets equipped for UHF transmission increased from 22.8 percent in 1965 to 65 percent in 1968.

12. The goal of greater diversity in programming and concomitant need for expansion in the number of available TV broadcast stations will result from future increases in per capita income, in leisure time, and in educational levels of the population. The market for a variety of informational, cultural, and public affairs programming will grow far beyond present-day levels.

(a) From 1966 to 1980 the population of the 50 largest TV market areas is expected to increase from 94 million to 114 million.

(b) Per capita income in the U.S. will rise from $2,964 to $4,654 in real terms.

(c) The number of individuals having completed four or more years of college will rise from 9.8 million to 16.8 million.

(d) Consumer expenditures on such discretionary items as recreation, private education and research, religious and welfare activities, and foreign travel are expected to increase in real terms from $42.9 billion in 1967 to $82.5 billion in 1980. The greatest growth will be in expenditures for radio, television, records, and musical instruments -- from $8 billion to $21.1 billion (see figure 3).

13. There is no evidence that the future growth of the television broadcasting industry will be limited by the availability of funds.

14. The LMAC study of the comparative economic benefits of land mobile radio and television is not worthy of serious consideration. The FCC order establishing the Committee did not authorize such a study. Professional economists or other social scientists were not engaged in it. Members or representatives of the TV industry were not included on the Committee.

15. The study also fails to meet the test of adequacy with respect to almost any of the essential features of a study of this kind, including the concepts employed, depth of analysis, thoroughness and accuracy, and sufficiency of basic data.

16. Thus it merits rejection on grounds that it was done by people without proper professional qualifications or sufficient knowledge of the TV industry, and that the exclusion of a pro-LMR and anti-television bias would have been very difficult.

17. The study uses an irrelevant and misguided concept for the measurement of intensity of the use of allocated spectrum by LMR and television, i.e., the dollar value of annual expenditures per unit of spectrum allocated. In so doing, it ignores the only meaningful measure of use, i.e., the extent to which allocated spectrum is actually used over time.

18. While the LMAC report concludes that LMR produces greater social and economic benefits than television, it in fact does not attempt to evaluate the benefits of television. Rather, it assumes without investigation that all of the social and economic benefits of television broadcasting would be equally available if it were to be transmitted by wire. The cost of wire transmission is stated to be $3.6 billion annually, without any supporting analysis or detail. This compares with an estimate of approximately $20 billion annually by Complan Associates, prepared for the U.S. Government.

19. The estimates of economic benefits from the use of LMR in the form of savings to users are based on wholly undocumented assumptions and a limited number of responses to a questionnaire survey of LMR users. The questionnaire itself was biased so as to elicit favorable responses. It called for information which users could not have had in their records, was not available from outside sources, and which therefore had to be estimated. The accuracy of these

estimates apparently was not checked with the respondents, even though the variation in the estimates was so great as to suggest that verification was required.

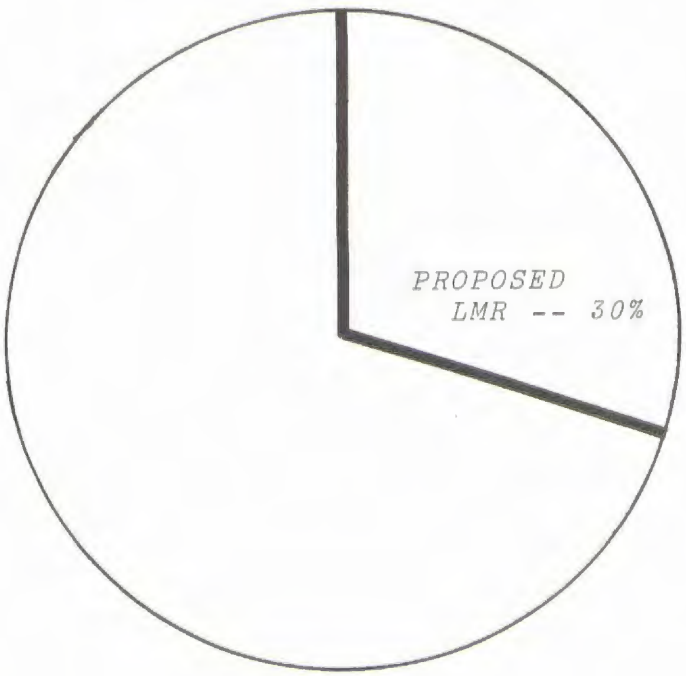
20. The LMAC makes liberal use of obsolete data and specious reasoning to arrive at a conclusion that justification for more UHF broadcast stations would be questionable unless UHF revenue growth should be significantly greater than VHF. The data are for the period ending in 1965, when only 20 percent of TV sets were equipped for UHF reception, and do not reflect the sharp growth since then in the number of UHF stations and UHF-equipped sets.

21. Substantial benefits would accrue to the economy from the implementation of recommendations of the Association of Maximum Service Telecasters for improvements in the management and efficiency of use of spectrum for land mobile radio purposes. The allocation of additional spectrum to LMR at the expense of television broadcasting would deny the economy the benefits of future operation of additional television stations. If LMR requirements could be met without television spectrum, the economy would benefit by the value of the additional TV broadcasting stations.

In addition, the substitution of common carrier services for independent systems will reduce overall investment costs for LMR.

FIGURE 1

PROPOSED REALLOCATION OF UHF SPECTRUM TO LMR

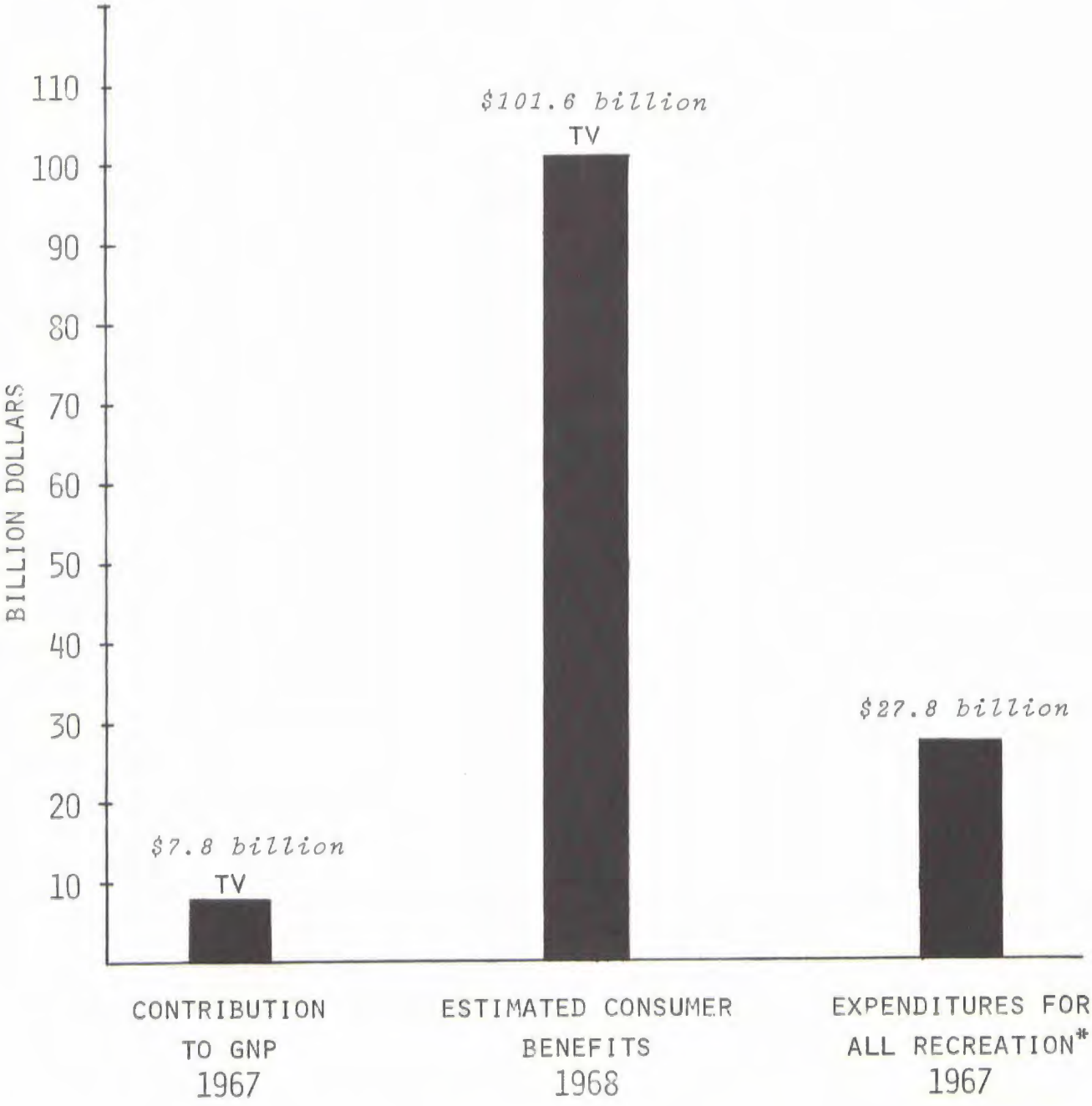


SPECTRUM ALLOCATED TO UHF-TV: 70 CHANNELS

PROPOSED REALLOCATION TO LMR: 21 CHANNELS

FIGURE 2

COMPARISON OF COST AND BENEFITS OF TELEVISION WITH CONSUMER EXPENDITURES FOR ALL RECREATION



**Includes expenditures for books and maps; magazines, newspapers, and sheet music; nondurable toys and sport supplies; durable toys and sport supplies; radio and TV, records and music instruments; radio and TV repair; flowers, seeds, and potted plants; motion picture theaters; theaters and opera, and entertainments; spectator sports; clubs and fraternal organizations; commercial participant amusements; pari-mutuel net receipts; and other recreation.*

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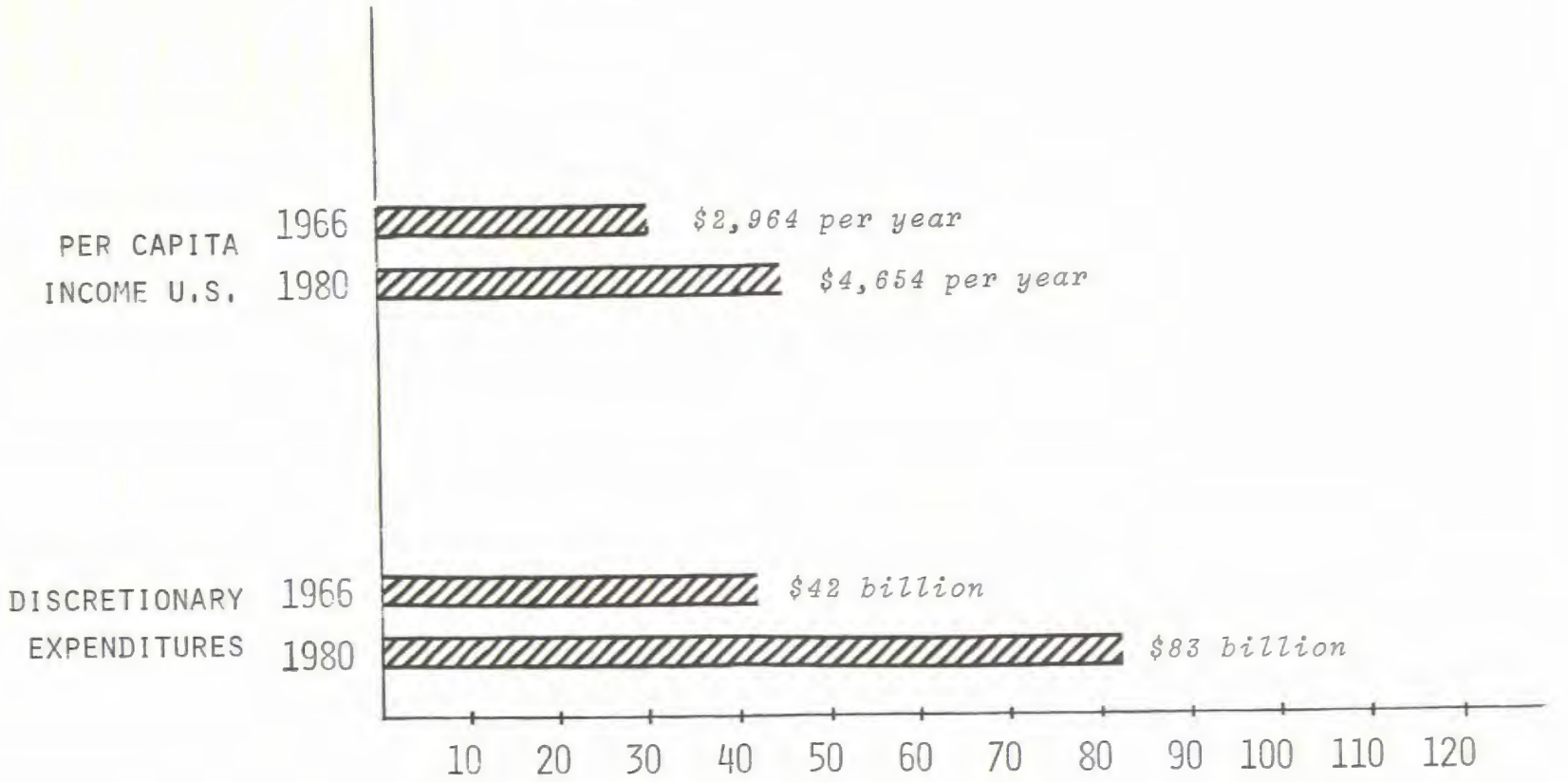

FIGURE 3

COMPARISONS OF INCREASES IN PER CAPITA INCOME AND DISCRETIONARY EXPENDITURES, 1966 AND PROJECTED 1988

I. INTRODUCTION

The Nature and Scope of the Assignment to Robert R. Nathan Associates, Inc.

In Dockets No. 18261 and 18262 adopted July 17, 1968, the Federal Communications Commission proposes the reallocation to, or sharing with, land mobile radio (LMR) of substantial portions of the spectrum presently allocated to UHF television use. The LMR industry has presented counter-proposals that go beyond the FCC proposal. The total amount of spectrum involved in the proposed allocation for land mobile use, including common carriers, is 157 megahertz. Of this, 126 are presently allocated to UHF television use, or nearly one-third of the total UHF allocation of 420 MHz.

Among the studies which guided the FCC and the industry in the preparation of these proposals and counter-proposals is the report of the Commission's Land Mobile Advisory Committee (LMAC). Its membership was composed of representatives of various classes of LMR users, including radio equipment manufacturers and other interested groups. This report included what purported to be a study of the economic benefits of the use of the spectrum for land mobile uses and for television broadcasting. The study alleged that LMR produced greater economic benefits than television per unit of spectrum allocated to each.

The extent to which the FCC was influenced by the economic findings of the LMAC report in the development of its proposals for reallocation of the spectrum in the two Dockets cited is not clear. However, since it is in the public record and since industry comments and counter-proposals rely on it to show the economic value of LMR, the report requires objective examination and comment for the public record. Robert R. Nathan Associates, Inc., was retained by the Association of Maximum Service Telecasters, Inc. (MST) to perform such a critical evaluation, to study the positive social and economic benefits of television broadcasting, and to examine the future growth of broadcasting.

The Issues Raised

The various proposals for reallocation of such a substantial portion of the spectrum from one class of use to another class raises issues as profound and as important as those in any previous allocation decision by the FCC. Spectrum now allocated to television use, in accordance with an FCC plan for the provision of minimum levels of service to the nation, would be reallocated to land mobile radio uses. UHF channels 14 to 20 would be assigned to LMR use on a geographic basis, while channels 70 to 83 would be reallocated on a national basis, except for service in outlying areas as "translators" of signals from existing stations.

In its counter-proposals to the FCC, the LMR industry has gone considerably beyond the FCC proposals. It has asked for reallocation of the lower 42 MHz (Channels 14-20) on a national basis, rather than sharing. It also asks for the higher 84 MHz (Channels 70-83) to be reserved on a national basis [34, 36, 37].[1/]

1/ Numbers in brackets refer to the references in the Bibliography, page 115.

The seriousness of the issue arises from the amount of spectrum involved, the radically different character of TV broadcast and LMR use of the spectrum, and their respective social and economic contributions.

Broadcasting is an open system with the benefits of the transmission from any one station freely available to all owners of television sets within the effective range of that station. LMR is essentially a closed system, whether for private or public use, with very limited communications impact.

Television could not exist without the use of the spectrum, except at substantial social and economic costs. The character and cost structure of the industry would have to be revolutionized. Free television would cease to exist.

LMR, on the other hand, is a tool for either increasing the efficiency of use of users' physical and manpower resources, or improving service, or both. The economic value of LMR to the user is marginal, and the social contribution is a marginal increment to the basic service being provided by the private business and industrial user. For public safety users this increment has unique social values, of course, which may be compared with those of television.

In considering the reallocation proposal, one must assume that once FCC makes a decision of this nature and it is implemented by assignments of frequencies to users, it tends to persist under even the most compelling circumstances.

One cannot roll back the decision or unscramble the millions of users without destruction of economic values in the form of investment and income or savings. This

consideration becomes a major issue under counter-proposals by the LMR industry for allocation of channels 14 to 20 on a national basis to LMR use.

The Inadequacy of the Data Base

A decision to carry out any of the proposed reallocations must, under the terms of its organic statute, be supported by an FCC finding that such action is "consistent with the public interest, convenience, or necessity."[1/] From the available record it would appear that there is no FCC precedent quite comparable to the subject proceedings, and not even the rudiments of a body of knowledge on which to base the decision in terms of the statutory mandate.

Until the present time, major classes of users have been reasonably well accommodated within a spectrum that has been expanding both intensively and extensively as the result of technological progress. If a need existed for comparative evaluation of broad classes of users in terms of the requirements of the Communications Act, the FCC did not respond with basic studies of the subject. The apparent necessity to consider seriously the reallocation of such substantial portions of the spectrum between essentially different classes of use is itself a reflection of the fact that the FCC had not addressed itself previously in a systematic fashion to the prospective growth of demand for such uses. There is a relative poverty of information relevant to rational decisions on the issue. The almost total absence of information from sources other than those having a partisan interest in the issues involved, makes national decisions even more difficult.

1/ The Communications Act of 1934, as amended [25, 26, 27].

A thorough and objective study of the social and economic benefits of television broadcasting on the one hand, and of land mobile radio use on the other, is highly relevant to rational decisions pertaining to the proposed reallocations of TV broadcast spectrum to non-broadcast uses.

The need for long-range planning and independent study on the part of the FCC is forcefully demonstrated by the conflicting information submitted for the record by the principally interested groups. The Commission is proposing the reallocation of substantial portions of the spectrum from UHF television use to land mobile use without a solid basis in fact or theory that this is either desirable or necessary. Toward this end, answers are needed to the following key questions:

1. The prospective demand for UHF television channels and for LMR uses in the congested areas and in the nation as a whole.

2. The extent to which existing demand for LMR and prospective future demand can be accommodated within existing allocations in the heavily populated urbanized areas through improvements in the allocation, coordination, management, and use of this portion of the spectrum.

The LMAC examined this subject in only a piecemeal and inadequate way, and more factual data are needed. MST has presented an extensive set of proposals for improved LMR spectrum management.

3. The underlying social and user costs of alternatives, such as the substitution of common carrier service for present private LMR communication systems.

4. The means by which present and future demand for LMR use by business, industry, and Government is to be channeled through shared use, common carriers, and communication service companies.

5. The total costs and benefits of the various proposals for reallocation of spectrum.

6. The way in which the future demand for more television channels will be accommodated, and how future conflicts in demand between TV and LMR will be reconciled.

Widely divergent conclusions are reached by the LMAC and MST on the future growth of LMR. In neither case do the studies attempt to analyze and project LMR demand in the 25 urbanized areas in which FCC finds that serious problems of congestion exist.

Particularly revealing is a statement on pages 9 and 10 of FCC Docket 18262 that--

> Although the Commission is of the view that spectrum space should be reserved now for future use by the private land mobile services, it is not prepared to suggest what the subdivision should be between various categories of users. The Commission has recently awarded a study contract to determine the optimum allocation and assignment structure in the land mobile service, both within bands already allocated and assigned to land mobile users, and in bands which might be cleared of other users. Further, the Commission is gathering data in an attempt to determine if there is a correlation generally applicable between population growth and demand for service within the several land mobile services, either within a given geographical area or on a nationwide basis.

> Lacking this information at present, it would be premature to attempt to decide now how the band should be suballocated.

Thus the Commission acknowledges that in proposing the allocation of a large portion of the spectrum to land mobile use, it did not have before it even such elementary information as the optimum land mobile allocation and assignment structure, or the relationship between the demand for LMR and population trends, not to mention population densities, income levels, and patterns of economic development. Furthermore, it considers such information relevant only to the suballocation of the spectrum, and not to the fundamental decision of the amount of the spectrum to be allocated to LMR use. One is moved to ask how the amount of spectrum to be reallocated was determined, if no attempt was made to evaluate the needs of user classes.

What more eloquent testimony could there be of the lack of adequate preparation and knowledge for the momentous proposals under consideration?

Equally revealing is the following remark in the report to the Commission of its Land Mobile Frequency Relief Committee, composed of FCC staff members: "Again, there is essential agreement that the comprehensive studies necessary to fully evaluate the total cost and total benefits of allocating either the lower 4 to 7 channels or the upper 14 or so to the land mobile services are beyond the resources of the Commission staff and probably will require contractual studies."[1/] Under the circumstances, it is impossible to envisage a responsible reallocation of the spectrum at this time.

1/ Report of Working Group 3 [41, p.4].

Economic Research Recommendations of the Telecommunication Science Panel

The nature of the problem and the needs for research were articulated clearly and forcefully in the October 1966 report by the Telecommunication Science Panel, entitled Electromagnetic Spectrum Utilization -- The Silent Crisis [105].

The Panel was asked to answer the question, "What research and technical service programs directed toward more efficient utilization of the electromagnetic frequency spectrum for telecommunications are needed?" It struggled unsuccessfully with the question of what criteria were to be adopted for distinguishing more efficient uses of the spectrum from less efficient ones.

It rejected suggestions that the need for research and more stringent technical measures could be partly alleviated by providing certain services more spectrum space at the expense of others, and posed the following as a rhetorical question, "How does one decide whether it is more 'efficient' to allocate fewer frequencies to broadcast TV and more to land mobile service, or vice versa?"

Having identified as one of the very basic shortcomings in the present situation the completely inadequate quantitative measures of the relative value to the nation of existing and future telecommunication services, the Panel recommended the development of a research organization in the Federal Government whose objective would be the improvement of the overall effectiveness of utilization of the electromagnetic spectrum. It would service the needs of Government policy-making in regulatory agencies, the telecommunications industry and users, and the research and development community.

An extensive survey of professional economic literature on the subject of broadcasting and magnetic spectrum management reveals a growing concern on the part of the profession over the undesirable consequences of the present system of spectrum management by the FCC. But it also confirms what is implicit in the findings of the Telecommunication Science Panel, that the professional economists and other social scientists have not evolved and articulated a theoretical or conceptual framework for the future allocations and assignment of spectrum in a manner that would optimize both social benefits and efficiency of the use of the spectrum.

However, the increasing concern of the research community with the problem of spectrum management and regulation is evidenced in such events as the panel on the economics of broadcasting and advertising at the annual meeting of the American Economic Association in 1965, and the Conference convened in 1967 by the Brookings Institution and Resources for the Future on the "Use and Regulation of the Radio Spectrum." Economists played a prominent role in this Conference and presented several of the papers. These papers included proposals for the substitution of a market mechanism for the distribution of spectrum rights as well as some more modest suggestions for possible revisions in arrangements governing frequency allocations.

It is neither germane nor necessary to the purposes of the present study to arrive at any judgments of the relevance of free market concepts to spectrum allocation and management. It does seem quite clear from the fundamental principles established by Congress in the Communications Act that the optimization of social rather than private gain was a major objective. It seems equally clear that the allocation of such a scarce and finite resource at the margin on

the basis of profitability rates would not in itself insure the optimization of social gains from the use of the spectrum.

It was the conclusion of the Interdepartment Radio Advisory Committee "that displacing of spectrum space to the highest bidder would place the emphasis on a user's ability to pay for the commodity, rather than on the degree of need therefore, or the public interest involved....it saw no practical basis for pricing the radio spectrum competitively" [121].

In terms of the objectives of regulation, benefits must be evaluated from a socio-economic point of view, and they may be defined in whatever economic or noneconomic terms are relevant. In the absence of any existing accepted theoretical framework for such analysis, we found it necessary to examine various relevant concepts and to evolve a framework from these which, in our judgment, provided the most nearly accurate and comprehensive measurement of benefits from television broadcasting. These are discussed in Chapter II following.

II. THE MEASUREMENT OF TELEVISION BROADCASTING BENEFITS

The purpose of the discussion in this section is to estimate the current benefits of television broadcasting under the present system. A cost-benefit analysis of a formal nature is not attempted because the data are not sufficiently precise to yield meaningful results. Moreover, there are inherent limitations in comparing television broadcasting with other forms of communication or other uses of the spectrum because broadcasting is a unique activity not substitutable by any other in our social system. What is attempted is a general order-of-magnitude comparison that will highlight the value of television to the viewer, and which can be compared and contrasted with other uses of electromagnetic spectrum.

Costs of Television

The cost of bringing television to the public is divided into three main sectors: (1) the cost of producing and broadcasting programs, (2) the cost of acquiring and operating receiving equipment, and (3) the alternative uses to which the time spent viewing television could be put. There is no way to measure (3) quantitatively; it must be assumed that time spent watching television represents the viewer's evaluation of the best use of his time. The other two elements of cost have been estimated.

Commercial television broadcasting costs are almost wholly covered by payments for advertising by sponsors. There are modest additions to station revenue from publicly financed television and private support, including institutional support, of public and educational TV. The cost of providing programs is about 15 cents daily per home.[1/] It is a moot question how much of this cost is borne by the TV viewer. Certainly the total revenue which is paid out for broadcasting expense is a cost to the economy because resources are devoted to it. How the incidence of that cost is spread among the public would be difficult to trace. Clearly it is not a necessary cost to the individual viewer since he can receive the program without buying any of the sponsor's product.

Someone must assume the burden, however, if broadcasting is to continue. Since the TV audience includes 95 percent of the public from week to week, and since the sponsor's product is sold to the public, it is a justifiable generalization that the cost of broadcasting is passed to the public. That is not to say that television advertising is a net cost to the public nor that the public would save the difference if there were no television. Marketing costs must be met in order to distribute products. Those which utilize television find it to be the most efficient medium for them. The cost to consumers could be higher if other media had to be substituted.

The value of television measured by the producing and broadcasting costs plus the owning and operating of receivers

1/ Advertiser's daily cost per television household for TV sponsorship is estimated at 14 cents [94]. One cent additional is estimated to cover the cost of noncommercial programs.

is equivalent to the television sector of the gross national product.

Gross national product (GNP) and associated national accounts such as national income, disposable income, savings, employment, and the like, are a measurement of economic activity. The national accounts are important tools for analysis and public policy, but they should not be confused with benefits. An increasing GNP is taken as a sign of prosperity, and this is generally true. It means that people are employed, earning income, and therefore have purchasing power, or claims on the output of economic systems. Economic activity, or work, is necessary to produce most benefits. But it should not be overlooked that the objective of economic activity is to maximize benefits and to minimize the resources necessary to produce them. An example can illustrate the conceptual problem. The production of heating services -- coal, oil, gas, electricity, furnaces, radiators, and associated activity for heating homes and buildings in the temperate zone -- is incorporated into the national accounts as part of the GNP. In the tropics this industry is not necessary (and in many of the tropical highlands neither is air conditioning necessary). The benefits of agreeable climate are enjoyed by the people, but no credit is reflected in the GNP for this fact.

To a considerable degree television in the United States is a parallel situation. The public enjoys a widespread benefit at a very low price to the consumer. Of course, the economic activity generated by the manufacture and sale of television sets and the preparation and broadcasting of television programs runs to respectable figures. It is estimated that the direct contribution of television to the GNP was about $7.8 billion in 1967 and probably about $8 billion in 1968.

Economic Activity in the Television Industry, 1967

	Million dollars
Advertising billings	2,765[a/]
Educational TV expenditures	62
Shipments of broadcast equipment	353
Retail sales of TV receivers	3,711
Repair of TV sets	400
Power consumption of home sets	500
	7,791

a/ Billings of sponsors by advertising agencies covers all program and station costs of sponsored programs, including advertising agency fee. Does not include losses paid for by borrowing or equity contributions. Does not include current capital expenditures explicitly, but does cover depreciation of existing capital, which is probably higher than new capital expenditures.

Source: See Appendix B.

Television accounts for about 1 percent of the GNP, which is a big figure considering the great number of sectors that currently contribute to our affluent standard of living. It is almost as large as the receipts of all other amusements and recreation services combined. However, it is less than the alcoholic beverage sector and runs behind the sales of cosmetics. And, of course, it is dwarfed by the massive automobile sector.

The large number of jobs and income created by the television broadcasting sector is impressive; but even more outstanding is the fact that the sector input is small compared with the benefits that are created by it. If we take the $8 billion of activity in the television sector as a cost and compare it with the more than $100 billion of consumer benefits that flow from it, the conclusion is that television broadcasting and associated activity is a highly efficient use of our human and natural resources.

The marginal cost of additional television viewing is nearly zero. The average cost has been estimated at 21 cents per day for a home with television. Since the average usage is in excess of 5 hours per day, the average cost is about 4 cents an hour [94]. The marginal cost per home is probably less than half that for an hour's program and is even less per viewer.

Benefits of Television

In short, the cost of broadcast television to the public is very cheap considering the pervasiveness of the industry in contemporary life. The question arises, "Are the benefits comparable to this input or are they much greater?" Benefits can be measured in different ways. In the conventional cost-benefit analysis the flow of benefits is valued at some historical or projected market price in dollars. A direct measurement of the benefits to the public of television viewing in market prices is not possible because no market transaction is involved. Even if there were a market price it would not reflect the social and individual satisfactions not represented by prices, but which are encompassed in the concept of benefit. Yet, it is useful to express values in an abstract unit such as dollars for purposes of comparison. For example, national wealth is often expressed in $ trillion, although it includes a valuation of public assets, such as national parks, that are not subject to market price testing.

Over the decades since the advent of television, a vested interest on the part of the viewing public has been built up in easy access to television programming. Ninety-five percent of American homes have television sets. In most communities the use of welfare funds to pay for a

family television set is not frowned upon as a luxury. Both for the urban and rural poor, or even the family of modest means, the value of television broadcasting should not be measured by their ability to pay. The benefits of television to the low-income individual are no lower than those to members of high-income categories. The poor may even receive greater benefit because they have fewer alternatives for their attention. Loss of television would be felt more keenly by them. On this basis the benefit to the poor should be estimated as higher than that of the rich. There are other special classes of viewers to whom the value of broadcasting may be especially high, such as rural families, shut-ins, and the elderly, both rich and poor.

Consumer's Surplus

One way to appreciate the value of television broadcasting to viewers is to use the concept of consumer's surplus, i.e., the excess of consumer satisfaction above his cost. In every free transaction the buyer receives more in benefit (or avoids more dissatisfaction) as he sees it, than the cost to him or he would not have made the deal. This consumer's surplus is subjective and is not revealed by market price. It is the value of his purchase that he would have paid if he had had to do so rather than go without, but which he did not have to pay because the going price was less than his private valuation.[1/] The maximization of consumer's surplus is the object of economic activity, that is, to achieve the greatest consumer satisfaction at the least cost.

1/ There is also a seller's surplus because he received more than he deemed necessary to make the transaction. That is, the selling price was the seller's purchase and it was worth more to him than what he sold.

Since this consumer value is subjective, it can only be inferred or imputed if it is to be expressed quantitatively. We cannot probe the minds of television viewers or even circulate a questionnaire for their valuation of the program, but several lines of reasoning indicate that viewers are receiving in consumer's surplus many times the value of what is spent collectively to bring the programs to them.

One of the lines of reasoning is based on the proposals for subscription TV. Entrepreneurs are sure that if they could, in effect, charge admission to television programs the total revenue would surpass that which advertising sponsors could pay. The number of viewing hours would surely go down if the family had to pay 10 cents, 25 cents, or one dollar for programs. The budgets of many families would not stand charges of this size for the average number of hours per day that the television set is now used.[1/] Others may value television viewing only slightly above the present marginal cost and might reject it if there were a price attached. However, the prices per set that pay TV expects to be able to charge is so many times greater than the payments per home that sponsors can afford to pay, that the entrepreneurs would reap a high profit.

At present a program like Bonanza costs about $600,000 for an hour program. It reaches about 17 million homes at a cost of 3.5 cents per home to the advertiser, which constitute the receipts of the industry. If the program could be restricted to those who could pay 50 cents, the audience might be cut to 2 million homes but the revenue would be

1/ Average hours per household with one or more sets turned on is estimated at 5.46 daily. From [94], based on A.C. Nielsen, National Television Index.

raised to $1 million. Moreover, the 15 million homes that would have to forego the program would have had varying values under 50 cents but above 3.5 cents that they would have paid. The sum of all these would be indicative of a total value greater than $600,000 that now derives from the program.

The foregoing argues for high value for television shows based on ability to pay. It could be argued that those without the ability to pay receive as high benefits from television as those who do, if not higher. Some of the Bonanza audience of 17 million homes have only a marginal interest in the program, but perhaps half to three-fourths of the audience would enjoy the program as much as those who could and would pay. In terms of benefit the program could be worth $4 to $6 million instead of the $1.3 million or so it cost the producers to present it and the audience to receive it.[1/]

Shadow Pricing

When a market price value cannot be assigned directly to a product or a flow of benefits, it is often useful to resort to shadow pricing. In its simplest form this technique utilizes prices for the same flow of benefits in a situation as nearly similar as possible; or for as nearly similar flow of benefits as can be identified in a like market. Sometimes no parallel markets exist so other analogous prices are used to suggest the real value of the benefits in question. Shadow prices have generally been used in feasibility studies in which it is believed that the actual or prospective prices do not represent the true economic value. They have been especially useful in public works projects in which

1/ $600,000 to produce and broadcast it, plus $680,000 for operation of home receivers in 17 million homes at 4 cents per hour.

government intervention has distorted the going price, or in which no price is going to be charged for services. The economist may "adjust" the price to take account of an unreal interest rate or exchange rate. Or he may utilize a hypothetical import from the world market adjusted for tariffs and charges as a means of comparison with domestic prices. Because they are artificial, shadow prices are used sparingly and with care. They should serve to illustrate order-of-magnitude differences and not nice distinctions between prices.

We are not aware of previous attempts to apply shadow pricing to the valuation of television broadcasting. A thorough calculation would require breaking down the programs into homogeneous categories and finding appropriate pseudo-prices for each. The data and facilities are not at hand for a study in depth, so this analysis can only make a rough estimate based on statistics collected for purposes other than those of this report. However, the results are not an unreasonable approximation of the magnitudes involved. Further refinements could be made if it would serve the purposes of spectrum allocation.

The simplest way to shadow price television broadcasting would be to assign an arbitrary value to an hour of viewing and multiply that by the total estimated person/hours of viewing. This process can be modified by setting different values for different categories of programs and time of day, and multiplying by the appropriate estimated audience. By setting the hourly values at figures that would be generally accepted as low and others that would be obviously high, a range could be arrived at which would identify the order of magnitude of the total.

A quick and rough calculation utilizes the following data:

1. Total viewing hours, 1968	191 billion[a/]
2. Average hours per viewer per week	20
3. U.S. homes with television, 1968	57 million

a/ Estimated by Television Bureau of Advertising [94].

If it is assumed that each hour is worth 10 cents to the viewer, the total value would be $19.1 billion.

It is not assumed that the average household would pay 10 cents per person per hour to view television. Such an expense would constitute a considerable drain on the average family. The average TV household had a set or sets turned on 5.46 hours per day in 1968 and there was an average of 1.7 viewers per household.[1/] The present rate of television watching at 10 cents per hour per person would reach 94 cents per day, or $333 per year.

Comparison with pay TV is not a fair test. The benefits of TV have been available for a generation. Customary dependence has been built up on them. The question of value is not what the public would be willing to pay if it were forced to do so, but rather what would the public be deprived of if it had to give up television broadcasting. If one looks to alternative sources for television services that have come to be taken for granted, the cost would run high indeed.

1/ From [94], based on Nielsen, op. cit. These estimates are more conservative than others in common use.

It is reasonable to say that the benefit to the television viewer is that he received at a very low cost that which would cost him "X" amount through the next cheapest medium. It does not matter that he could not or would not have recourse to the alternative source of entertainment or information in the absence of television. Broadcasting is a unique activity that cannot be substituted by any other means in our social system. We do not know what the impact would be on the recreation sector if television broadcasting were to become impossible. It is sufficient to say that the television viewer is now receiving a benefit which from the next alternative source of supply is valued at a recognizable market price. A family receiving supplemental food assistance under the surplus food disposal program is said to receive a benefit valued at the market price of the commodities, even though they could not be sold at the market, nor would the family buy those commodities if it were given the money equivalent.

Specifically, if the viewer can see a feature film at home for next to no cost, he is receiving a benefit which the market valued at the admission price, even though he would not leave the house to go to the theater and pay the price asked. The conditions are not entirely equal between the entertainment at the theater and that at home on the television, so direct substitution of price values is not justifiable. Films on television have normally been exhibited in both first- and second-run theaters. They include breaks for commericals and often cuts to fit them into the station schedule. Other types of television programs also do not have exact alternative parallels outside the medium. The prices for the alternatives that can be identified can serve as bases for shadow prices, but they should be adjusted.

Prime time in the evening hours from 7:30 to 11:00 p.m. is chiefly filled with entertainment programs. Special broadcasts, news, and informational programs are inserted to the extent of about 10 percent of the total time. Educational TV accounts for a substantial number of broadcast hours in this period, but far less than 1 percent of the viewer hours. Presently many of the programs are feature films. The rest of the entertainment shows may be shadow priced in the same way as feature films for present purposes. They are programmed in hour and half-hour segments for marketing convenience, but to the viewer they offer the same show-type entertainment as the feature film or variety theater. There is even a trend toward longer shows that parallels the reduction in short subjects in the movie theater.

The only alternative for this type of family entertainment is the movie theater, and the cheapest alternative is the neighborhood theater. The few live shows available, chiefly for teenagers, are all more expensive. These and night clubs are about the only alternative for variety shows which largely disappeared from the American scene over a generation ago and were brought back by television. To duplicate them outside of television would necessitate prices higher than first run theater and similar to concert halls.

Families would not go to movie houses on the same scale as they watch evening entertainment at home. In addition to the strain on the budget, there are other costs and inconveniences attached to movie-going, such as travel and parking, struggling with crowds, and the time spent coming and going with attendant weather and often public safety problems. While there are synergistic effects from watching and hearing entertainment as part of a crowd, there are distractions in live audiences from people moving around,

coughing, conversation, etc. Commercial breaks are generally resented on television, but the convenience of viewing in the home is worth a great deal.

Neither would many families pay out-of-pocket at the movie rate for the entertainment they receive over television. The admission price at neighborhood second-run film theaters varies from 75 cents to $2 depending on the section of the nation, the attractiveness of the theater, and the character of the neighborhood. A representative admission price seems to be about $1.50 for adults and 75 cents for children, although it is not known if this is near the average. For shadow-pricing purposes it is not necessary to be exact. Theater programs run between 1 1/2 and 2 hours, which would place their price per hour at $.75 to $1 for adults and $.375 to $.50 for children in the example cited. To take into account the differences between television and theater, and to be sufficiently conservative, the benefit which home viewers of television are receiving in prime time hours was assumed to be worth $.50 per viewer. Other costs such as transportation or baby sitters were not considered, so that any adjustment in the figure would be upward.

Evening audiences are close to 80 percent adults and teenagers who would have to pay full price at the theater.[1/] The weighted average movie theater admission price for the television audience would be between $.67 and $.90 per hour, or on the average of $.78. The average cost or price for alternative entertainment that could not be supplied through neighborhood movies would run substantially higher; so that the figure of $.50 chosen is considered sufficiently conservative.

1/ From [94], based on Nielsen, op. cit.

Most films shown on television are older than those being shown at second-run theaters in the neighborhoods, but some are film classics, and the variety shows are not only current but unique. Some of the programming is made up of repeats of earlier television shows which would seem to call for a double discount. However, since the audience has a choice most of the time between a film, a repeat, and a new show, it must be assumed that the audience distribution represents its best estimate of the relative benefits. This is especially true in the metropolitan areas which have three stations or more. In 1968, 90 percent of TV homes could receive four or more stations, which probably includes all of the 50 largest TV-market areas in the United States [96]. All things considered, it is assumed that the evening audience would feel that it had lost something worth no less than $.50 per hour to each of them if they were deprived of television.

Prime time television viewing is estimated at 76 billion person/hours in 1968.[1/] At the rates indicated, the benefit to the public should be shadow-priced at $38 billion. This is a minimum estimate and would be rounded off at $40 billion.

Early evening fringe time is that between 5:00 p.m. and 7:30 p.m. This time is a combination of network and local station news reports, cartoons and childrens programs, repeats, talk/variety shows (such as Steve Allen, Mike Douglas, and Merv Griffith), and some films.

From the data available it is difficult to separate these audiences. It is probable that children and teenagers

1/ From [94], based on Nielsen ratings.

predominate until the 6:30-7:30 period. The evidence indicates that the major news broadcasts at this time attract only a small part of the total estimated audience of 40 billion person/hours of viewing. The major half-hour information programs account for about 9 billion of the total, or 22.5 percent. It is not known what the audience is for other information programs broadcast locally. Moreover, in large cities where the LMR congestion is claimed to exist, there are a number of stations broadcasting repeats such as "My Favorite Martian," "Dennis the Menace," and "Batman," which may attract adults as well as children. Recently there has been an increase in adult oriented programs -- talk/variety syndicated and local shows -- especially near the end of the fringe and beginning of prime time. This mixture of viewing person/ hours could be sorted out with more time and resources, but for now a rough division is being made, assigning 15 billion person/hours to information programs and 25 billion to non-information programs in the early evening fringe.

The audience for news reports is 87 percent adult. No demographic estimate is available for the non-information programs, but we have divided it between adults on the one hand, and children and teenagers on the other. This probably is not completely accurate, but no great violence is done to the general order of magnitude of estimated benefits by the assumption. The character of the non-information programming indicates that a lower price could be justified whether for adults or children, except for the information programs.

There is no close alternative to news reports over television. For timeliness, radio may be the fastest source of news, but radio lacks a picture to go with it and, in any case, the benefit evaluation of radio is just as subjective as that for television. Newspapers are the traditional

source of current information. Editions are not as easily at hand as newscasts and the illustrations are limited and don't move. The newspaper really serves a different purpose. It can be more analytical, convey details not possible to broadcast over the television or radio (if the whole newspaper were broadcast it would take a half day at least), and it supplies a written record to the home.

The complementary nature of television, radio, and newspapers is shown by the fact that most homes have all three. Although they are not alternatives for one another, it might be conceded that television news broadcasts and newspapers are roughly equal in benefits. Newspapers are sold at prices that are cognizably lower than their fair value. While the benefit to the reader is subjective, the same as that of television to the viewer, the total receipts from subscriptions and advertising in newspapers average about 30 cents per copy in the United States. While the reader would not pay 30 cents out-of-pocket for a newspaper (except for some Sunday editions which cost much more than that to print) there is a reason to believe he has received that much benefit. The viewer of a television half-hour newscast has received something of value from his own point of view, but society believes he should receive news via the broadcast medium. Such public service is, by implication or directly, asked of station operators when they are licensed. Therefore, for this analysis, information broadcasts in the evening fringe are shadow-priced at 30 cents for the half-hour, or 60 cents per hour. The 15 billion viewing hours at this period of the day is considered to contribute $9.0 billion in benefits.

Programs in the early evening fringe, such as the children's cartoons, adventure stories, and re-runs, are

often looked down upon by critics and other commentators. Nevertheless harried parents welcome TV as a baby-sitter at this busy hour. Certainly the children would miss them keenly if they were forbidden. Critics may not value the children's choice highly, but we are not measuring benefits to critics. At 25 cents for an hour of entertainment to youth, the time is not overvalued. Many a parent might pay 25 cents for an hour of quiet when he would not pay it for a program for himself. To take account of a number of adult-oriented shows in the early evening fringe which could not be separately accounted for, an extra 10 cents per hour of value was allowed. At 35 cents per hour, the early evening non-information programs would yield benefits of $8.8 billion.

Weekday daytime viewing between 6:00 a.m. and 6:00 p.m. differs from evening audiences in the demographic makeup and the numbers. The reduced audience is heavily weighted toward housewives. This influences the type of program broadcast, but it does not reduce the interest of the individual viewer. There is plenty of evidence of the loyalty of daytime viewers to their favorite shows. Many are more adamant about not missing an episode in the afternoon serial than they are about an evening show. Thus although the audience is smaller and differently composed, there is no reason to believe the benefit per person/hour is any lower than in the evening.

The daytime programs are more varied, including news and information, serial dramas, children's programs, audience participation, syndicated guest-artist shows, etc. It would be possible to make computations based on hourly estimates of audiences and types of programs if a detailed breakdown were called for. It is enough for present purposes to lump them together. The variation in the size of the audience is the chief variable. It was assumed that consumer satisfaction with the daytime program he or she chose to watch was

equivalent to that for evening fare. No allowance was made for differences in audience with regard to sex, but children are a bigger percentage of daytime audiences so a correction was made for this factor.

Using the values for evening viewing hour of $.75 to $1 for adult moving picture admissions, and $.375 to $.50 for children, the weighted average was $.78 for the whole audience. For daytime audiences the weighted average would be $.68. A benefit value of $.40 per viewer hour was adopted for weekday daytime television, compared with $.50 for evening prime time.

The audience rises steadily from hour to hour in daytime viewing. It rises a little more rapidly after 4:00 p.m. when school children join the audience. However, a simple average of hourly estimated audiences from 6:00 a.m. to 5:00 p.m. is a sufficient representation of daily weekday daytime audience. Total viewing person/hours for this daytime period Monday through Friday was estimated at 36 billion.[1/] At the rate of $.40 per person/hour the total benefit is calculated at $14.4 billion.

Weekend daytime television benefits are the most difficult to estimate. The audience is divided between children's programs and movies on the one hand, and sports programs on the other, with a number of intellectual information programs on Sunday. The sports programs are highly seasonal, with football attracting the biggest audiences in the fall and winter. Other seasons of the year when golf, racing, baseball, and basketball are the chief attractions, the audience

1/ From [94], based on A. C. Nielsen, National Television Index.

falls to normal size compared with other adult programs.[1/] The best evidence available indicates that nonsports audiences are 60 percent of weekend daytime viewing, and that sports audiences are 40 percent.[2/] Applying these percentages to the estimated 20 billion weekend daytime viewers gives 8 billion for sports and 12 billion for nonsports programs.

Live sports events carry high admission prices. For football, $6 to $10; golf, $5; professional basketball, $4 to $5. Athletic contests are usually about 2 1/2 hours in length -- basketball and hockey 1 1/2 to 2 hours. The admission to live events would be between $1.50 to $3 per hour, except for boxing which would be higher. The sports viewer on television is more likely to be emotionally involved with the contestants than the average viewer with drama or variety entertainment. The jokes about the involvement of the head of the house with his favorite team reveal a recognized condition in many homes. Sports broadcasts presented probably the highest benefit to their audiences of any programs. A shadow benefit of $1.50 per hour is adopted here as representative of the importance of the weekend sports to the fans. Total benefits in this category are assigned a magnitude of $12 billion.

The nonsports weekend daytime programs are largely for children and teenagers, with a number of serious programs. The latter have relatively small audiences. Because of their serious nature they should be valued highly per viewer, but they do not add significantly to the overall figure. The

1/ Sports events are attractive to advertisers, not so much because the audience is large, but because the demographic makeup is favorable for certain products.
2/ From [94], based on Nielsen, op. cit.

weekend children's programs would seem to have the same general value as early evening time programs. As in the case of the early evening fringe, an upward bias is justified for the serious adult programs. The mixed programs were assigned a value of $.30 per viewer hour. At that rate, the benefit from 12 billion hours of such programs would be $3.6 billion.

The final category would be late fringe, which is 11:00 p.m. to sign-off, usually 1:00 a.m. During this period the 1968 audience was estimated at 18 billion viewer/hours. The late variety shows or feature films take up most of this time. The audiences are smaller, but the attraction and benefit should be measured by a shadow price based on movies. The audiences are taken to be almost wholly adult so there is no need to weight the shadow price for children's admissions. Instead of the $.50 per hour adopted for prime time, the shadow price is chosen as $.60 to take account of the absence of children. It might be noted that the first half-hour of the late fringe is normally a newscast and that it carries the largest audience. Since we valued newscasts at the same $.60 price, there was no need to treat them separately. At that rate the late fringe would supply benefits quantified at $10.8 billion.

The following table recapitulates the shadow price calculations: -

Time sector	Audience (billion viewer/ hours)	Rate ($/hr.)	Total benefit ($ billion)
6:00 a.m. - 5:00 p.m. Mon.-Fri.	36	.40	14.4
5:00 - 7:30 p.m. Mon.-Sun. information	15	.60	9.0

continued--

Time sector	Audience (billion viewer/ hours)	Rate ($/hr.)	Total benefit ($ billion)
5:00 - 7:30 p.m. Mon.-Sun. non-information	25	.35	8.8
7:30 - 11:00 p.m. Mon.-Sun.	76	.50	38.0
11:00 p.m. - 1:00 a.m. Mon.-Sun.	18	.60	10.8
6:00 a.m. - 5:00 p.m. Sat.-Sun. sports	8	1.50	12.0
6:00 a.m. - 5:00 p.m. Sat.-Sun. nonsports	12	.30	3.6
			96.6

Shadow Pricing Educational TV

The foregoing does not include the present or prospective value of educational television broadcasting. In 1967 the educational TV stations spent $62 million to originate and broadcast programs. There was an unknown additional amount spent on programming that was transmitted over educational television and an equally unknown amount spent to receive the broadcasts. Some universities and other institutions provided space and personnel without charging the stations. Films donated for broadcasting and local school sports were not priced.

Similarly, it was not possible to determine the audience ratings for educational TV broadcasting, as was the case for commercial TV, because the incentive of advertising was not present. Educational television stations broadcast a total of about 254,000 hours in 1967. This was lower than

the corresponding figure for 1966, but it can be assumed that the total is again rising. For illustrative purposes, if an average audience of 10,000 people viewed 300,000 hours of educational television broadcasting, and if each hour were reckoned to be worth $1 per viewer, then a sum of $3 billion would be added to the total valuation of broadcasting.

Using the percentages quoted in The People Look at Educational Television [91], and assuming that these proportions still hold, 17 percent of the total television audience could be expected to view one program per week on educational television. Another 33 percent would view less than one program per week. If we could say that 50 percent of the audience saw one hour per week of educational television, then, on the basis of 184 million regular viewers in the United States, educational television would have an audience of 4.78 billion viewer hours annually. These hours should be worth at least $1 each, which would add almost $5 billion to the value of broadcasting to the public, or $101.6 billion total.

The Contribution of Television to Economic Development

The economy of the United States experiences a greater volume of growth and change than that of any other nation. Although the rate of growth is not the highest in the world, the base is so vast that the impact of development each year far outstrips any competitor. For example, the per capita income growth in the U.S. in one year is greater than the whole per capita income of dozens of less developed countries. Television is a major contributor to growth and change in the United States. Not only the expansion of the industry as revealed in the national income accounts, but in other more important ways, television broadcasting has a major influence on the direction and degree of national development.

This influence on national life not only reflects great credit on the industry but also imposes a serious responsibility. Television broadcasting is a strong force that can serve both good and evil.

Advertising

For a comparatively small sector of the national economy, advertising has an explosive effect on development. In 1967 about $16.9 billion was expended in all media for this purpose, which was less than 2.5 percent of the GNP. Over the past 30 years, there has been no apparent trend in the relationship of advertising to GNP, personal income, consumption expenditures, or corporate sales. It is a permanent and rather steady part of the economic mechanism of the nation. Because the nature of the art is to get attention, advertising appears to be more pervasive than it actually is. This characteristic also accounts for the strong reactions of critics and defenders. Advertising would lose much of its function if it did not provoke and stimulate.

Television is only one division of the major media, and not the largest. In 1967 it accounted for $2.9 billion in billings, which was about 17 percent of the total and less than the dollar volume in newspapers by 30 percent. Each of the major media has advantages over the others for particular aspects of advertising. That of television lies in the visual motion combined with sound which is peculiar to the media. The combination makes for easier retention and recall of experiences. This is associated largely with awakening interest by demonstration. It is not an inventory, pricelist type of promotion which is better served by the printed word. Television advertising is largely concentrated on consumer products which are manufactured in volume, but sold by the

package (from toothpaste to automobiles). There is a certain amount of institutional advertising for image improvement, but consumer advertising dominates the industry.

A good case could be made that television advertising, and therefore the whole broadcasting side of the industry, costs the consumer nothing in the sense that the efficiencies of mass marketing and production had reduced the price below what it otherwise would have to have been by more than the cost of broadcasting.

Thus television is a force for creating demand for new goods. The economist says that the variety of man's wants is infinite. We can never have general overproduction because as soon as currently felt wants are filled, new ones will rise to occupy our productive efforts. This has been true historically, but those new wants often have to be awakened and stimulated before the public knows that it has them. This has been a function of advertising -- to keep the flow of demand running ahead of the production lines so that industry will not have to stop.

Television is the fastest growing medium for advertising, and especially for nationally marketed branded merchandise. It contributes to mass production and marketing where economies of scale are important. One of the fastest growing branches of TV advertising is in local department store ads. The big users are distributors of national merchandized, mass-produced, brand name goods. While there are limits to the educational efficiency of TV advertising, its value lies in combining a moving picture with sound.[1/] This cannot be done

1/ TV cannot educate the other senses beyond sight and sound. It is a fleeting impression that will not stand still for study, but is easily retained for reflection.

by any other media save personal demonstration. Moreover, its value to development is only in its infancy (like its value to politics) because we are only beginning to learn how to use it.

Television as Education

Defined generally, education is the broadening of experience by whatever means achieved, be it by travel, conversation, print, manipulation, etc. Education, or experience, is the foundation of development. The two are so closely tied as to be different names for the same things. This was dramatically illustrated by the success of the Marshall Plan, which was built on the institutions and know-how of educated Europe, contrasted with the difficulty of achieving development in uneducated less-developed countries. Education is not necessarily formal, but consists of all the experiences to which people are exposed, especially in the formative years when habits of thought and action are being fixed. Television may not be more important than other influences, but it is a major item.

This pervasive effect of broadening experience by advanced means of communication has been called the "demonstration effect." Before television one of the chief media of the demonstration effect was American-made films which penetrated all levels of society both in the United States and abroad. Later radio added to the dissemination of ideas. The two were credited with a key role in the rising tide of expectations, not only in the less developed countries of the world but also in the underprivileged in this country. Now television has outstripped older media in the efficiency of transmitting new experience. Its penetration of rural and ghetto areas of the United States is almost complete. In

foreign countries the number of receivers is startling considering the income levels, and utilization per set is even higher because neighbors, relatives and friends join together.

The influence of television should not be exaggerated. People on the move, as much of our population is, still use radio, and the printed word has uses which television will never replace. Nevertheless, no means has surpassed the efficiency of television in broadening the experience of people generally by letting them participate by sight and sound in events which heretofore they could only recreate by imagination.

No one would question the public interest in the use of broadcasting for formal educational purposes. Both in-school and extension teaching can use television techniques. Television broadcasts for use by local schools and universities in the classroom constitute a substantial part of the time of educational broadcasting. Quantitative data were not available, or could not be segregated from other school accounts, with which to estimate benefits from this activity. The benefit per student should be valued at a high figure, perhaps more than other categories mentioned.

Formal educational instruction by television concentrates on audiences that are small by commercial or entertainment standards, though they may be large by classroom comparison. Audiences are small because they are specialized by subject matter, and also because formal education requires some personal effort and concentration, which entertainment may not. For the very reason of specialization, great diversity is called for to meet the demand as this field of education grows. A relatively large number of broadcast channels are needed, or will be in the future, a factor which must be

kept in mind in allocating the remaining broadcasting spectrum. This will be an acute problem in the congested areas which also contain the slums that are a special target for educational TV.

Public Broadcasting

Both commercial and noncommercial broadcasting provide programs which are supported by public funds, foundation grants, and private donations, but which are not formally educational. As public funds become available through the Public Broadcasting Act of 1967, this area of programming will grow. Realistically such public broadcasting may not attract the mass audiences of commercial TV, but the content of the programs intentionally will be selected for social, economic, and cultural values beyond pure entertainment. It can be assumed that the educational benefit for those who do watch is high.

The public interest in providing discriminating public broadcasts is greater than the size of the audience indicates. Many people who cannot appreciate the intellectual qualities associated with them are prepared to subsidize the broadcasts through taxation. After all, not all the public expects or wants to go to college, but almost all approve of state universities. The citizens of San Francisco, who voted to subsidize the San Francisco Symphony, stay away from the concerts in droves, but they approve of the orchestra. There is a consensus that excellence is a good thing and that making it generally available will stimulate improvement and development in the coming generation.

Since public broadcasting is intended to contribute to the economic, social, and cultural development of the

public, it is a powerful tool limited only by the skill with which the programs are presented. The potential for far-reaching effect on the public can hardly be underestimated. Publicly financed television can provide an additional forum for political discussion that will be within reach of all serious candidates, impartially administered, and freely available to the public. The contribution to political development could be enormous.

Public Service Broadcasting

Commercial broadcasting stations have increasingly felt the need to supply informational programs to the public in spite of the fact that they may not have the same breadth of audience appeal as entertainment shows. The stations do this at some sacrifice of current revenue. In part they do it in compliance with their undertakings when they were licensed, in part because their public image is an important part of their sales appeal, and in part because of sense of responsibility. The public approves of special information and cultural programs as being consonant with the cultural image that should be projected, even if a majority would rather watch a lighter program.

The appreciation of these "nonfiction" programs grows gradually. Since they are more or less concentrated doses of information and culture, the educational effect, and therefore the developmental effect, is significant beyond the quantity of time devoted to them. In addition to the "special" broadcasts, the industry lends its services to the community through religious and civic programs, especially at the local station level.

Public service television is usually identified with news and information broadcasts, which have been greatly expanded and attract substantial audiences. Although it is claimed that most of them lose money because of the expense of the program, they are still evolving. News broadcasts add a new dimension of action photography to news coverage which transmits a whole new impact on the audience. This impact was illustrated by the coverage of the political conventions and the nationwide reaction to the street disturbances accompanying them during the 1968 campaign. The broadcast of current events could be more effective than formal TV educational broadcasting in molding the national attitude. The importance of the medium is illustrated in the attached release with respect to the Roper survey of public attitude toward the information media.

As in the case of freedom of the press, the safeguard of the public lies in access to all sides of the question. The public cannot rely wholly on the impartiality of reporters, nor of public regulation. Its only recourse is to a variety of reports. This is a major reason for optimizing the number of local broadcasting stations through which the public can be reached.

APPENDIX A

ROPER SURVEY OF PUBLIC ATTITUDES TOWARD MEDIA FIND CREDIBILITY OF TELEVISION NEWS AT RECORD HIGH[1/]

WASHINGTON, D.C., March 26 - Television's credibility as a news medium stands at an all-time high, according to "A Ten-Year View of Public Attitudes Toward Television and Other Mass Media," a report to the Television Information Office from Roper Research Associates. The data was announced in a presentation by TIO Director Roy Danish to the National Association of Broadcasters convention today.

The national study, sixth of a series begun in 1959, was based on personal interviews with 1995 adults, 21 years of age and over, during November 14-23, 1968. Among its major findings were these:

...Television is the most believable news medium, leading newspapers 2 to 1.

...Television's margin over the second medium as people's primary source of news was the biggest ever.

...Television coverage of riots and violence in television entertainment programs ranked far down the list in the public's view of possible causes of increased crime and violence.

...The public indicated that it gained the clearest understanding of candidates and issues in the national elections from television, leading newspapers by over 2 to 1.

1/ Press release, Washington, D.C. (March 26, 1969).

...Viewing hours per day set new highs for the total sample, the college educated and upper income groups.

...The public favors the present balance between news-public affairs and entertainment programming.

...Again, as in 1964 and 1967, the public agreed, 8 to 1, that having commercials on television is a "fair price to pay for being able to view."

In answer to a question regarding their most believable source of news, 44 percent of respondents named television; 21 percent, newspapers; 11 percent magazines; 8 percent radio.

Asked where they got most of their news about what's going on in the world, viewers put television in first place, as they have done since 1963. Television received 59 percent; newspapers 49 percent; radio 25 percent; magazines 7 percent. (Total exceeds 100 percent because multiple answers were accepted.)

Roper also reported that television led in exclusive mentions as the primary news source. While 19 percent of the sample mentioned only newspapers, 29 percent mentioned only television. The percentage mentioning both television and newspapers was 25. Newspapers and other media but not television were mentioned by 5 percent, and television and other media but not newspapers were also mentioned by 5 percent.

To determine beliefs about major causes of crime and violence in the nation, respondents were asked to rate 12 possible causes including television news coverage of riots and crime, violence in television entertainment and ten other possible causes. Television news ranks ninth and television entertainment eleventh out of the twelve possibilities offered.

Heading the list of factors by percentage of respondents considering them very important causes of crime and violence were: A general breakdown in respect for authority, law and order, 74 percent; use of drugs, 68 percent; laws that are too lenient or not letting police do their job, 64 percent; bad examples set by parents, 60 percent; conflict between whites and blacks, 50 percent; poverty and poor housing, 43 percent. The second half comprised: Youthful rebellion, 42 percent; theatres showing movies with violence and sex, 39 percent; coverage of riots and crime on TV news, 35 percent;

coverage of riots and crime in newspapers, 30 percent; violence in TV entertainment, 27 percent; and the War in Vietnam, 26 percent.

A question on possible government involvement with news programs on television drew a strong anti-control vote. Seventy-six percent said government should not have control of TV news, while only 11 percent favored it. In the college-educated group the vote was 92 percent opposed to government control, vs. 5 percent favoring it.

Use of the medium continues its slow but steady increase, Burns W. Roper, president of the research company, reported. Median hours of viewing per day reported by the typical adult was up from 2:41 in 1967 to 2:47 in 1968. Among the college-educated the increase was from 2:10 to 2:17 and in the upper income group from 2:21 to 2:24.

The public has a higher regard for programming this year, Roper observed. Twenty-three percent said programs were better today than a year ago and 44 percent said they were about the same. In the January 1967 study the figures were 20 and 39, respectively. "For a medium that must serve all groups and cater to all interests, the public gives television generally good marks for programs balance," Roper said. Six out of ten -- 59 percent -- like the present balance, 23 percent want more news and public affairs and 11 percent want more entertainment.

The public reported greater awareness of editorializing by stations. The 35 percent which reported seeing editorials in 1964 increased to 49 percent in 1967 and 52 percent in 1968. The vote in favor of editorializing was 53 percent in 1964 and increased to 62 percent in 1967 and 63 percent in 1968. Among those who were familiar with broadcast editorials, the percent in favor of editorials increased to 79 percent. Editorial endorsement of candidates by stations received less support, the vote being split evenly pro and con.

In the political sphere, 65 percent said that television was the major source of news about national candidates, compared with 25 percent for newspapers, 4 percent for radio and 5 percent for magazines. For state offices, television again led with 42 percent, compared to 37 percent for newspapers, 6 percent for radio, 9 percent for other people and

1 percent magazines. For local offices, newspapers led with 40 percent, followed by television with 26 percent, 6 percent for radio, 23 percent for people and 1 percent for magazines.

On the negative side, Roper found a generalized decrease in public satisfaction with local institutions per se -- with television and also with newspaper, schools and government. Referring to their own communities, people voted as follows:

	Percent considering performance of the institution "excellent" or "good"	
	1/67	11/68
Local television stations	64	57
Local schools	61	58
Local newspapers	59	51
Local government	45	41

Television stations dropped seven points to the same percentage they received in 1961, their previous low mark. However, the ratings of local schools, newspapers and government as excellent or good were all lower than ever before in any of the previous studies.

An overall question on media -- which one would you most want to keep? -- again puts television in the lead. The 1968 figures are: television, 50 percent; newspaper, 24 percent; radio, 17 percent; and magazines, 5. Comparable figures for the college-educated and upper income groups are:

Most want to keep	College educated	Upper income
Television	37%	44%
Newspapers	36%	30%
Radio	13%	15%
Magazines	12%	6%

In the commercial area, there was little change in attitude. By 3 to 2 they like rather than dislike most commercials. Regarding the concept of commercials being a fair price to pay, 80 percent agreed with it while only 10 percent disagreed.

The new report will be published in booklet form about May 1. The Roper surveys, commissioned by TIO, have been using identical questions to establish trends in the public's attitudes since 1959. The field staff uses a multi-staged, stratified, area probability sample representing a nationwide cross sample of adults 21 and over. The results of past Roper surveys for ITO have been confirmed by several independent studies. The Roper organization was founded by Elmo Roper, who came to national notice when he predicted the Presidential election of 1936 within one percent of the popular vote. It now serves many corporations and organizations.

The Television Information Office was established in 1959 by the National Association of Broadcasters to serve as a two-way bridge between the television industry and its many publics. The office, at 745 Fifth Avenue, New York City, provides reference and information services; publicizes programs of special interest; conducts research on public attitudes toward television; and issues publications and audio-visual materials on the structure and operation of the industry.

APPENDIX B

REVENUES AND SALES OF TV-RELATED INDUSTRIES IN THE UNITED STATES, 1967

		Millions of dollars
I.	**Broadcasting**	
	1. TV broadcast revenues	
	3 networks	953
	15 network-owned	263
	All other stations	1,059
	Total	2,275
	2. Advertising billings - television	2,765
	3. Educational television[1/]	62
	4. TV-production of films, shows, advertising representatives[2/]	800
II.	**Equipment**	
	1. Factory sales of television receivers (domestic label)	2,515
	2. Value of shipments of broadcast equipment[3/]	353
	3. Retail sales of TV sets	3,711
	4. Repair of TV sets[4/]	400
III.	**Selected Items**[5/]	7,291

1/ Funds received during fiscal year June 1966-June 1967.

2/ Includes estimates for receipts from TV film and tape production, film and tape distribution for TV, production of live shows for TV, and TV advertising representatives. The estimate for 1967 was obtained by extrapolating sales in 1963 to 1967. Growth rates were estimated from trends indicated by employment and payroll growth during the period.
3/ 1966 data.
4/ 1967 estimate obtained by extrapolating 1963 sales of TV-radio repair stores. Growth rate based on trends in employment and payrolls 1963-67. TV share of business assumed to be half.
5/ Total of advertising billings, educational TV receipts, retail sales of TV sets, value of shipments of broadcast equipment, and repair of TV sets; other items excluded to avoid duplication.

Sources: [20, 22, 49, 78, 98, 99].

APPENDIX C

INVESTMENT IN TANGIBLE PROPERTY IN TV-RELATED INDUSTRIES AND EQUIPMENT, 1967

	Original Investment	Depreciated
	(in million dollars)	
I. Broadcast Industry		
Commercial TV..... (3 networks and owned and operated stations)	238	147
Other stations.....	947	514
Total.....	1,185	661
Educational TV.....	106	
II. Equipment		
Television sets (bought 1959-67).....	19,236	10,863[1/]
Manufacturing plant - TV sets.....	150[2/]	
TV broadcast equipment.	65[3/]	

1/ From 1959-67, 77 million TV sets were sold in the United States. By year end 1967, there were approximately 76 million television sets in use, indicating an approximate life of 9 years for each set. The total depreciated value was obtained by depreciating the retail value by one-ninth each year.

2/ Estimated from 1964 data; 50 percent of book value of depreciable assets in SIC 3651 (Radio and TV Receiving Sets) assumed to be in plant manufacturing TV sets.

3/ Estimated from 1964 data; 5 percent of gross book value of depreciable assets in SIC 3662 (Radio and TV Communications Equipment) assumed to be in plant manufacturing TV broadcast equipment.

Sources: [49, 78 (January 1960-68), 83, 98]

APPENDIX D

ESTIMATED EMPLOYMENT IN THE UNITED STATES IN TV-RELATED INDUSTRIES, 1967

	Number
TV Broadcasting:	
3 networks	11,538
Network stations	3,890
All other stations	36,290
Total	51,718
Educational TV stations[1/]	4,362
TV-production, etc[2/]	23,000
Manufacture of TV receiving sets[3/]	63,000
TV wholesale dealers[4/]	10,000
TV retail stores[5/]	50,000
TV repair service[6/]	15,000
Total[7/]	217,080

1/ Part-time and full-time employees.

2/ Includes estimates for film and tape production for TV, film and tape distribution of TV, production of live shows for TV, TV advertising representatives. Estimates were made by extrapolating data on number of employees in 1963 in these sectors to 1967. Growth rates were estimated from recent employment trends in the major industrial sectors into which they fell (4-digit industries such as "Motion Picture Production").

3/ Assumed to be half the total employment in the manufacture of radios and television sets (half the value of

shipments in 1966 was accounted for by household TV sets in this sector.
4/ Television wholesale dealers are included with radio and electric appliance wholesale dealers in the employment data. There were 56,000 employed in this sector in 1967 and it was assumed that TV would provide 10,000 of these jobs.
5/ No data show separately the number employed selling TV sets. TV-radio stores employed 37,000 in 1967, but handled one-third or less of the TV retail business; 50,000 jobs were assumed to be generated selling TV in retail outlets.
6/ TV-radio repair stores employed 25,000 in 1967. Repairs are done by other types of business. It was assumed that 15,000 jobs were generated by TV repair services.
7/ Does not include advertising agencies handling TV accounts, production of TV commercials, manufacture, construction, or servicing of any equipment related to TV-broadcasting (studio, transmitting, antenna), CATV stations.

Sources: [49, 83, 98, 99].

III. THE PROSPECTIVE SHORTAGE OF TELEVISION BROADCASTING STATIONS

The Reallocation Proposals Are in Conflict with FCC-Acknowledged Broadcast Requirements

Implicit in the proposed reallocation of the spectrum by the FCC is its willingness to restrict the future availability of TV broadcast stations to levels below those previously considered necessary, and to impose on the public the risk of either interference with reception on remaining channels, or additional costs in order to eliminate such interference, or both. The Land Mobile Frequency Relief Committee referred to earlier warned of the hazard of interference to TV reception always present if land mobile channels are "shared" with TV broadcasting, stating that experience had shown that the vagaries of radio wave propagation will often result in unpredictable interference, even where there is reasonable separation.[1/]

The restrictive effects on future expansion of television were described by the Committee as follows: "The greatest impact of deleting upper UHF channels would be to curtail any future expansion of TV broadcasting in the smaller cities in heavily populated areas of the country. To some extent, this would happen if the lower UHF channels

1/ Report of Working Group 1 [41].

are deleted because the upper UHF channels must be used to replace lost lower channels. Furthermore, the present UHF assignment plan was deliberately left unsaturated so that the Commission would have maximum flexibility in meeting unforeseen future needs. The deletion of channels will impair that ability."[1/] Thus saturation already exists in the major market areas except for the smaller cities.

In its Fourth Report and Order in 1949, the Commission rejected a proposal for the allocation of the band 470-500 megacycles to multi-channel broadband common carrier mobile radio operation in lieu of television broadcasting, and made the following observation: "Thus, it appears that the entire space between 470 and 890 megacycles is urgently needed to obtain full development of television broadcasting and that the loss of any of this space to other services would severely handicap the attainment of an adequate nationwide and competitive television system." This basic policy position of the Commission was confirmed and restated on a number of occasions in later years.[2/]

In Docket No. 18262 the Commission rationalizes the proposed reallocation of the upper UHF channels to land mobile use on grounds that the spectrum now allocated to UHF TV is not fully utilized. It is silent on the question of whether the reallocation reflects a finding of superior social or economic merit for LMR over TV.[3/]

1/ Ibid.

2/ See Exhibit F, comments of Association of Maximum Service Telecasters [33].

3/ "...UHF TV has not been fully utilized and little or no relief has been found for the common carrier land mobile problem. We must recognize the fact that spectrum can be used more effectively than is presently the case in the frequency range 806-960 MHz. and reexamine the matter in that light." FCC Docket 18262 [31, p.6].

The reallocation of channels 70 to 83 is proposed despite the fact that the Commission still has before it under Docket No. 14229 its own proposal for reserving these channels for operation by "community" low-power stations. Under the same Docket, in Further Notice of Proposed Rule-Making adopted February 9, 1966, it recognized that the need for additional education stations in most of the densely populated areas of the United States could only be met by assignment of channels in that range.

In observing that the UHF spectrum was not being fully utilized, the Commission provided no evidence that it was aware of the extent to which channel assignments in the major cities were already taken up; of the progress in overcoming some of the fundamental difficulties that were hampering the economic viability of UHF stations in less densely populated areas; and of the probable future demand and need for a much greater number of television broadcast stations than are presently available.

TV Channels Assigned to Large Cities are Not Un-Utilized

One of the most striking and disturbing characteristics of the action proposed in FCC Docket Nos. 18261 and 18262 is the failure of the Commission to relate its general observations about the underutilization of spectrum to the specific situation in the 25 congested areas where it alleges that relief is needed by the land mobile users. Only four of the cities in that group have available commercial channels, i.e., Miami, Milwaukee, New Orleans and Phoenix (see table 1). In the ten largest market areas in the nation, as defined by the American Research Bureau, there is available one noncommercial channel in Philadelphia.[1/]

1/ Since the issuance of the data in table 1, the available commercial channel in Pittsburg has been applied for.

These market areas are very broad. New York includes Linden, New Brunswick, Newark, and Paterson, New Jersey; Los Angeles includes Corona, San Bernardino, Riverside, Fontana, and Guasti; Chicago includes Aurora, Elgin, Joliet, Gary, and Hammond, Indiana; Philadelphia includes Burlington, New Jersey, and Wilmington, Delaware; and San Francisco includes Oakland.

In the 50 largest markets there are a total of 27 available commercial channels and 32 noncommercial, or 14 percent of total channel assignments. In the next 50 largest cities which include areas with populations of less than 100,000, there are 57 commercial channels available, and 37 noncommercial channels.

From these data several fundamental observations may be made:

1. That underutilization of UHF channels is a function, among other things, of the number of channels allocated to a city in relationship to the size of the city and its market area; and

2. There is no evidence of underutilization in the largest cities of the country, since virtually all available channels are taken up.

Given these facts, it is indeed difficult to understand or accept a rationalization for the allocation of presently unassigned spectrum to non-TV uses, on the grounds that spectrum is underutilized. Thus the real import of the proposed reallocation of the spectrum is the restriction or denial of further broadcast television expansion in many American cities, so that the increasing demands of LMR users in the 25 largest cities may be accommodated.

Restraints on UHF Growth Being Overcome

It should be observed that what the Commission regards as an unacceptably slow rate of growth in the utilization of available UHF channels has been due to fundamental disadvantages suffered by UHF. These can only be overcome slowly, but are definitely being overcome, as evidenced by the growth in number of operating stations in recent years. The problem may also be due in part to the unwillingness of the FCC to allocate additional UHF channels to the large market areas where demand and the opportunities for economic viability are the greatest.

The greatest disadvantage has been the fact that until recently most television sets have not been equipped to receive UHF signals. With the passage of the All Channel Receivers Act, this problem is being overcome. As recently as August 1965 only 22.8 percent of United States households had TV sets equipped to receive UHF. By June 1967 this figure had risen to 42.1 percent [101]. According to data from the American Research Bureau, 65 percent of the sets in the ten largest market areas were equipped for UHF in November 1968 [122]. The sharp increase, under the impetus of color set sales, is an indication of the speed with which this problem is being overcome. But the large portion still not equipped in November 1968 is a measure of the very real handicap under which UHF stations are operating in terms of potential listeners.

Another major handicap has been the difficulty of competing with VHF stations, both independent and network-owned and affiliated, for the TV market and the advertiser dollar. This can be attributed to technical factors limiting the potential audience of UHF stations, such as the smaller

number of sets equipped for UHF reception and the fact that sets do not come equipped for "snap" tuning of UHF as for VHF. Structural characteristics of the broadcast industry, however, are also an important factor, i.e., the wide acceptance of network programming and the fact that the only three major networks are able to saturate most of the nation through ownership of or affiliation with VHF stations.

Despite these difficulties, and perhaps because they are being overcome, the UHF industry has demonstrated in recent years a remarkable growth. The total number of commercial UHF stations increased from 188 on January 1, 1965, the effective date of the All-Channels Receiver Act, to 172 by January 1, 1969 (see table 2). In the same period educational UHF stations increased from 41 to 100. Thus in the three years 1966-68, a total of 124 UHF stations went on the air, compared with a net cumulative total of 148 in the entire preceding period.

Social and Economic Factors Affecting Future TV Growth

The future potential growth in demand for television channels and stations serving given sectors of the population must be viewed in terms of social and economic needs on the one hand, and economic feasibility on the other. The question of economic feasibility raises quite different questions or considerations for the commercial and noncommercial classes of stations. While it is not possible to do a definitive study of the probable future demand for television stations, and of the economic resources potentially available to support them, it is possible to identify and measure relevant influences and trends and to arrive at general conclusions having a direct bearing on the issues before the FCC in the present proceedings.

With respect to sources of economic support for the commercial broadcast industry, we consider absolute trends in the growth of television station revenues and revenues per station, on the one hand, and in the growth in expenditures on television advertising in relationship to similar expenditures in all other major advertising media. In table 3 we see that expenditures for television advertising more than doubled in the 10-year period 1958-67, and increased at an average rate of over $200 million per year from 1963.

Of more significance, however, is the constant increase of television expenditures as a percent of total advertising expenditures in all media. In the 1958-67 period the increase was from 13.2 percent to 17.4 percent, and in the last five years has averaged approximately 1/2 percent per year. During the same period there has been a decline in all of the other major media as a percentage of the total, with the exception of radio. These figures reflect the superior effectiveness of television as an advertising medium and imply a strong and expanding foundation of economic support for the future growth and expansion of the television industry. They also imply the need for an ever-expanding number of television broadcast stations.

Of some significance in connection with the distribution of TV advertising expenditures is the relative proportion expended on network programs, by national and regional advertisers on so-called "spot" advertising, and by local advertisers. The competitive health and vigor of our economy require that there be sufficient TV broadcast stations to accommodate the present and prospective demand for spot and local advertising. The growth of these relative to network advertising is therefore important.

Table 4 shows that during the ten-year period 1959-68, expenditures on spot advertising increased 2.3 times, and on network advertising approximately doubled. The trend in local advertising expenditures is particularly important as a measure of both the need for television outlets for such advertising, and the ability of local advertisers to support such channels. In absolute values the expenditures for local advertising increased 2.0 times from 1950 to 1968, the same as network advertising. Since 1960, local as a percentage of total advertising has varied between 16 and 17 percent.

Further evidence of the growth of local advertising was an increase of 79 percent in department store TV commercials in 75 markets during January-September 1968 over the same period of 1967.[1/]

There are three basic and irreversible forces at work in American society which are going to result in public need for a greater overall diversity and variety in television broadcast programming in the future. These are the growth of per capita income, the increase in available leisure time, and the higher levels of education among the people. The need will affect all basic types of programming, whether for entertainment or for informational and instructional purposes.

Increases in real income and leisure time will make it possible for the American consumer to allocate a larger number of his discretionary dollars and time to television, if television will provide him with the kinds of programming that will attract his interests and fill his needs. Increased real income, increased leisure, and higher educational levels

1/ Broadcasting (April 14, 1969), p.21.

will enlarge the market for informational, cultural, and public affairs programming far beyond present day levels. Tastes and interests will be much more highly diversified among a much larger number of people than they are today. With its unique ability to satisfy these needs and tastes at a much lower cost than any other means of communication or entertainment, the television industry will be able to use, and to support, particularly in the more densly populated areas of the country, a number of stations far beyond those presently available.

In table 5 we show data on population and income growth in the United States, and in the 50 largest TV market areas, projected to 1980. Projections of the numbers and proportion of the U.S. population by levels of academic achievement and education are shown in tables 6, 7, and 8. From 1966 to 1980 the U.S. population is estimated to increase from 196 to 234 million, and the population in the 50 market areas from 94 to 119 million. Per capita income in the United States is expected to increase from $2,964 in 1966 to $4,654 in 1980 in real terms.

The number of individuals having completed four or more years of college is expected to increase from 9,763,000 in 1964-66 to 16,764,000 by 1980. The number having completed four years of high school will increase from 31.6 million to 52.1 million (table 6).

By 1976-77 it is estimated that colleges will be awarding 39,000 Ph.D.'s, compared with 19,000 in 1966-67; 240,000 Masters degrees, compared with 133,000; and 961,000 Bachelors degrees, compared with 570,000. By 1980 it is estimated that there will be between 9.7 million and 11.2 million persons enrolled in colleges in the United States, compared with 6.1 million in 1966 (tables 7 and 8).

Table 9 shows the past and projected growth of consumer expenditures on the principal items for which discretionary income is spent and for which data are available, i.e., recreation, private education and research, religious and welfare activities, and foreign travel. Expressed in terms of constant dollars, which means that the data are not inflated by price increases, the total rose from $17.6 billion in 1948 to $42.9 billion in 1967, and are estimated at $82.5 billion in 1980. The category with the highest growth rate and the greatest increase in absolute terms is radio, television, records, and musical instruments, which is estimated at $21.1 billion in 1980, compared with $8.0 billion in 1967. It rises from less than 19 percent of the total items listed in 1967 to over 25 percent in 1980.

In Chapter I the contribution of television to the dynamism of our society and economy were discussed. The changes we are discussing here in population, income, leisure, and education will have an equally dynamic effect on the public demand for television services. To attempt to express this in quantitative terms as numbers of channels per city, or kinds of programs per viewing period, would be both impossible and unnecessary for the issue at hand. That issue is that, at a time when available television outlets in major cities of the country are now or will shortly be fully utilized, the FCC and the LMR industry are proposing the allocation of the only remaining large block of unassigned television spectrum (channels 70-83) to a non-television use, as well as a large share of spectrum already assigned (channels 14-20).

The various proposals for allocation of spectrum to other uses seems more an act of desperation than of reasoned judgment. It would make future expansion in many cities

dependent on the only technical alternative, i.e., wired transmission. The emphasis is on the term technical, because the political and economic feasibility of a wired system of TV on a nationwide basis has not been studied on a comprehensive basis.

Many questions arise, for which reliable answers are not available, and others arise for which the answers are known and wholly unacceptable from social and political standpoints.

As pointed out in Chapter I, this is one of the subjects which the FCC has not studied. The private studies that have been made differ radically in approach and conclusions. Estimates of the capital investment required range from a few billion dollars to over $80 billion for the entire country [17]. Estimates of annual charges range up to nearly $20 billion. Unless these charges were subsidized from public funds, they would be passed on to the TV user.

The imposition of a user charge for wired television as an alternative to over-the-air broadcasting would have very serious social and political repercussions. It would hit the poor, the old, the sick, the shut-ins, and the disadvantaged, wherever they may live. And it would hit particularly the rural areas where average wiring costs per household are very much higher than in the city because of the lesser density of population and greater distances. Contrary to the popularly held view, the poor of the nation are about equally divided between large cities and rural areas. Of a total of 29.7 million persons classified as poor in the United States in 1966, 15.2 million were in metropolitan areas, and 14.5 in rural areas [16].

The classes of society for which television has the greatest social and educational value would be deprived of free TV, and many would be priced out of the TV market. Surely this is a consequence which must be taken most seriously, and which must be clearly foreseen when considering the substitution of wired for over-the-air television.

Table 1. TV Channel Allocation and Usage by Top 100 Markets as of August 31, 1968

ARB Rank (NWC)	Market	COMMERCIAL										NON-COMMERCIAL									
		Channels Allocated		Stations on The Air		Auth.Stns. Not on The Air		Channels Applied or		Available Channels		Channels Reserved		Stations on The Air		Auth.Stns. Not on The Air		Channels Applied For		Available Channels	
		V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U
1	New York (Linden, New Brunswick, Newark & Paterson, N.J.	[a] 6	[a] 3	6	2	-	-	-	1	-	-	[a] 1	[a] 3	[a] 1	[a] 2	-	1	-	-	-	-
2	Los Angeles (Corona, San Bernardino, Riverside, Fontana and Guasti)	7	7	7	4	-	3	-	-	-	-	1	3	-	2	-	-	-	1	-	-
3	Chicago (Aurora, Elgin, Joliet, Gary & Hammond, Ind.)	4	9	4	2	-	7	-	-	-	-	1	2	1	2	-	-	-	-	-	-
4	Philadelphia (Burlington, N.J. & Wilmington, Del.)	[b] 3	5	3	3	-	1	-	1	-	-	[b] 1	2	[b] 1	1	-	-	-	-	-	1
5	Boston	3	4	3	2	-	1	-	1	-	-	1	1	1	1	-	-	-	-	-	-
6	Detroit	3	3	3	1	-	2	-	-	-	-	-	1	-	1	-	-	-	-	-	-
7	San Francisco-Oakland	4	5	4	2	-	3	-	-	-	-	1	1	1	1	-	-	-	-	-	-
8	Cleveland (Lorain)	3	3	3	1	-	2	-	-	-	-	-	1	-	1	-	-	-	-	-	-
9	Washington	4	3	4	2	-	1	-	-	-	-	-	2	-	1	-	1	-	-	-	-
10	Pittsburgh (Greensburg)	3	3	3	-	-	2	-	-	-	1	1	1	1	1	-	-	-	-	-	-
11	Baltimore	3	3	3	1	-	1	-	1	-	-	-	1	-	-	-	1	-	-	-	-
12	St. Louis	4	2	4	-	-	2	-	-	-	-	1	1	1	-	-	-	-	-	-	1
13	Hartford-New Haven-New Britain (Waterbury)	2	5	2	3	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
14	Providence (New Bedford, Mass.)	3	3	3	-	-	1	-	-	-	2	-	2	-	1	-	-	-	-	-	1
15	Dallas-Fort Worth (Richardson)	4	[c] 4	4	3	-	1	-	-	-	-	1	[c] 2	1	[c] 1	-	-	-	-	-	1
16	Cincinnati	3	2	3	1	-	-	-	1	-	-	-	1	-	1	-	-	-	-	-	-
17	Minneapolis-St. Paul	4	2	4	-	-	1	-	1	-	-	1	1	1	1	-	-	-	-	-	-
18	Indianapolis (Bloomington)	4	3	4	-	-	1	-	1	-	1	-	3	-	-	-	1	-	1	-	1
19	Atlanta	3	3	3	1	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
20	Miami	4	[d] 4	4	1	-	1	-	1	-	1	1	1	1	1	-	-	-	-	-	-
21	Buffalo	3	2	3	-	-	2	-	-	-	-	-	[d] 2	1	[d] 1	-	1	-	-	-	-
22	Seattle-Tacoma	5	2	5	-	-	2	-	-	-	-	1	3	1	2	-	-	-	-	-	1
23	Kansas City, Mo.	3	3	3	-	-	3	-	-	-	-	-	2	-	1	-	-	-	-	-	1
24	Milwaukee	3	3	3	1	-	1	-	-	-	1	1	1	1	1	-	-	-	-	-	-
25	Sacramento-Stockton	3	4	3	-	-	3	-	1	-	-	1	-	1	-	-	-	-	-	-	-
26	Houston (Galveston-Rosenberg)	3	5	3	2	-	3	-	-	-	-	1	2	1	-	-	-	-	-	-	2
27	Dayton	2	3	2	3	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2
28	Columbus, Ohio	3	1	3	-	-	1	-	-	-	-	-	2	-	1	-	-	-	-	-	1
29	Johnstown-Altoona	2	3	2	1	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
30	Harrisburg-Lancaster, Lebanon-York	1	6	1	4	-	-	-	1	-	1	-	1	-	1	-	-	-	-	-	-
31	Tampa-St. Petersburg (Clearwater)	3	4	3	1	-	3	-	-	-	-	1	1	1	1	-	-	-	-	-	-
32	Memphis	3	2	3	-	-	2	-	-	-	-	1	1	1	-	-	-	-	-	-	1
33	Charlotte, N.C. (Rock Hill, S.C.)	2	3	2	2	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	2
34	Syracuse, N.Y.	3	2	3	-	-	1	-	1	-	-	-	1	-	1	-	-	-	-	-	-

Footnotes on last page of table.

(Continued)

Table 1. TV Channel Allocation and Usage by Top 100 Markets as of August 31, 1968 (Continued)

ARB Rank (NWC)	Market	COMMERCIAL										NON-COMMERCIAL									
		Channels Allocated		Stations on The Air		Auth.Stns. Not on The Air		Channels Applied For		Available Channels		Channels Reserved		Stations on The Air		Auth.Stns. Not on The Air		Channels Applied For		Available Channels	
		V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U
35	Toledo	2	3	2	1	-	1	-	1	-	-	-	1	-	1	-	-	-	-	-	-
36	Portland, Ore.	4	1	4	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
37	Wheeling-Steubenville	2	2	2	-	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-	1
38	Grand Rapids-Kalamazoo (Battle Creek)	3	2	3	-	-	1	-	-	-	1	-	2	-	-	-	-	-	-	-	2
39	Denver (Boulder)	4	3	4	-	-	2	-	1	-	-	2	1	1	-	-	-	-	-	1	1
40	Birmingham	2	3	2	1	-	1	-	1	-	-	1	1	1	-	-	-	-	-	-	1
41	Nashville	3	2	3	1	-	1	-	-	-	-	1	1	1	-	-	-	-	-	-	1
42	Albany-Schenectady-Troy (Amsterdam)	3	3	3	-	-	2	-	-	-	1	-	3	-	1	-	-	-	-	-	2
43	New Orleans	3	3	3	1	-	1	-	-	-	1	1	1	1	-	-	-	-	-	-	1
44	Greenville-Spartanburg, S.C.-Asheville, N.C.	3	4	3	1	-	-	-	-	-	3	-	2	-	2	-	-	-	-	-	-
45	Greensboro-Winston Salem-High Point	3	3	3	1	-	-	-	-	-	2	-	2	-	-	-	-	-	-	-	2
46	Flint-Saginaw-Bay City	2	4	2	1	-	-	-	1	-	2	-	2	-	1	-	-	-	-	-	1
47	Louisville	2	3	2	1	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
48	Charleston-Huntington (Berkley, W.Va.,Ashland,Ky.)	4	3	4	-	-	1	-	-	-	2	-	3	-	-	-	2	-	-	-	1
49	Lansing (East Lansing, Parma)	e/ 2	3	2	-	-	-	-	-	-	3	e/ -	1	e/ -	-	-	-	-	-	-	1
50	San Diego	2	2	2	1	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-
51	Oklahoma City	3	f/ 3	3	-	-	1	-	-	-	2	1	f/ 1	1	f/ 1	-	-	-	-	-	-
52	Raleigh-Durham	2	2	2	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	1
53	Norfolk-Portsmouth-Newport News-Hampton	3	3	3	1	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
54	Manchester (Concord) N.H.	1	2	1	-	-	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-
55	Omaha	3	2	3	-	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
56	Wichita-Hutchinson	3	3	3	-	-	1	-	-	-	2	1	2	-	-	-	-	1	-	-	2
57	San Antonio	3	2	3	1	-	1	-	-	-	-	1	1	1	-	-	-	-	-	-	1
58	Tulsa	3	3	3	-	-	3	-	-	-	-	1	1	1	-	-	-	-	-	-	1
59	Salt Lake City-Ogden-Provo	3	5	3	-	-	-	-	1	-	4	3	2	3	1	-	-	-	-	-	1
60	Salinas-Monterey	1	2	1	-	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-	1
61	Phoenix (Mesa)	4	3	4	1	-	1	-	-	-	1	1	1	1	-	-	-	-	-	-	1
62	Davenport-Rock Island-Moline	3	2	3	-	-	1	-	-	-	1	-		-	-	-	-	-	-	-	2
63	Portland-Poland, Me.	3	2	3	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
64	Rochester	3	2	3	-	-	1	-	-	-	1	-	1	-	1	-	-	-	-	-	-
65	Orlando-Daytona Beach	3	2	3	-	-	1	-	-	-	1	-	2	-	2	-	-	-	-	-	-
66	Richmond (Petersburg)	3	2	3	-	-	1	-	-	-	1	-	2	-	2	-	-	-	-	-	-
67	Roanoke-Lynchburg	3	2	3	1	-	-	-	-	-	1	-	2	-	1	-	-	-	-	-	1
68	Shrevesport, La. (Texarkana,Tex)	3	2	3	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-	-	2
69	Wilkes Barre-Scranton	-	5	-	3	-	-	-	-	-	2	-	1	-	1	-	-	-	-	-	-
70	Green Bay	3	1	3	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1

Footnotes on last page of table.

(Continued)

Table 1. TV Channel Allocation and Usage by Top 100 Markets as of August 31, 1968 (Continued)

ARB Rank NWC)	Market	COMMERCIAL										NON-COMMERCIAL									
		Channels Allocated		Stations on The Air		Auth.Stns. Not on The Air		Channels Applied For		Avail-able Channels		Channels Reserved		Stations on The Air		Auth.Stns. Not on The Air		Channels Applied For		Avail-able Channels	
		V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U
71	Little Rock	3	1	3	-	-	1	-	-	-	-	1	1	1	-	-	-	-	-	-	1
72	Champaign-Decatur-Springfield (Danville, Urbana)	1	8	1	3	-	1	-	-	-	4	1	1	1	-	-	-	-	-	-	1
73	Mobile, Ala.-Pensacola,Fla.	3	4	3	-	-	-	-	-	-	4	-	3	-	2	-	-	-	-	-	1
74	Cedar Rapids-Waterloo	3	2	3	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
75	Jacksonville	2	3	2	1	-	1	-	-	-	1	1	1	1	-	-	-	-	-	-	1
76	Spokane	3	2	3	-	-	-	-	-	-	2	1	-	1	-	-	-	-	-	-	-
77	Knoxville	2	2	2	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
78	Des Moines (Ames)	3	4	3	-	-	2	-	-	-	2	1	2	1	-	-	-	-	-	-	2
79	Jackson, Miss.	2	2	2	-	-	2	-	-	-	-	-	1	-	-	-	1	-	-	-	-
80	Cape Girardeau, Mo.-Paducah, Ky.- Harrisburg, Ill.	3	2	3	-	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-	1
81	Columbus, Ga.	2	2	2	-	-	1	-	-	-	1	-	1	-	1	-	-	-	-	-	-
82	Youngstown	-	4	-	3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
83	Columbia, S.C.	1	3	1	2	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-
84	Baton Rouge	2	1	2	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	1
85	Springfield-Holyoke	-	2	-	2	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-
86	Greenville-Washington-New Bern, N.C.	3	1	3	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
87	Binghamton	1	2	1	2	-		-	-	-	-	-	1	-	1	-	-	-	-	-	-
88	Madison	1	3	1	2	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-
89	Lincoln-Hastings-Kearney (Albion, Grand Island, Superior)	6	3	6	-	-	-	-	-	-	3	1	2	1	-	-	1	-	-	-	1
90	Fresno (Hanford, Visalia)	-	6	-	5	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
91	Chattanooga	3	1	3	-	-	1	-	-	-	-	-	1	-	-	-	1	-	-	-	-
92	Evansville	1	3	1	2	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-
93	Sioux Falls	2	2	2	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
94	South Bend-Elkhart	-	4	-	3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
95	West Palm Beach	2	2	2	-	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-	1
96	Fort Wayne	-	4	-	3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
97	Rockford, Ill.(Freeport)	1	3	1	3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
98	Peoria, Ill.	-	4	-	3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
99	Augusta	2	2	2	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-
100	Terre Haute	2	1	2	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	1
	Sub-total - Top 25 markets	91	90	91	30	-	45	-	9	-	6	14	41	14	25	-	5	-	2	-	9
	Sub-total - Top 50 markets	157	163	157	53	-	68	-	15	-	27	21	79	20	36	-	7	-	4	1	32
	Sub-total - 51 through 100	107	134	107	41	-	34	-	2	-	57	14	59	13	16	-	3	1	3	-	37
	Total 100 markets	264	297	264	94	-	102	-	17	-	84	35	138	33	52	-	10	1	7	-	69

a/ Channels 13 and 31 - Commercial channels used by ETV.
b/ Channel 12 - Commercial Channel used by ETV.
c/ Channel 23 - Commercial Channel used by ETV.
d/ Channel 17 - Commercial Channel used by ETV.
e/ WILX - Channel 10 Shares time with WMSB-ETV Stn.
f/ Channel 25 - Commercial Channel used by ETV

Source: FCC Press Release, September 11, 1968.

Prepared by
Research & Educ. Div.
Broadcast Bur.-FCC.

Table 2. Television Stations on the Air in the United States, 1946-69 (as of January 1)

Year	Total	Commercial			Educational		
		Total	VHF	UHF	Total	VHF	UHF
1946	6	n.a.	n.a.	-	n.a.	n.a.	-
1947	12	n.a.	n.a.	-	n.a.	n.a.	-
1948	16	n.a.	n.a.	-	n.a.	n.a.	-
1949	51	n.a.	n.a.	-	n.a.	n.a.	-
1950	98	n.a.	n.a.	-	n.a.	n.a.	-
1951	107	n.a.	n.a.	-	n.a.	n.a.	-
1952	108	n.a.	n.a.	-	n.a.	n.a.	-
1953	126	n.a.	120	n.a.	n.a.	n.a.	n.a.
1954	356	354	233	121	2	1	1
1955	422	411	297	114	11	8	8
1956	459	441	344	97	18	13	5
1957	494	471	381	90	23	17	6
1958	523	495	411	84	28	22	6
1959	545	510	433	77	35	28	7
1960	559	515	440	75	44	34	10
1961	579	527	451	76	52	37	15
1962	603	541	458	83	62	43	19
1963	625	557	466	91	68	46	22
1964	649	564	476	88	85	53	32
1965	668	569	481	88	99	58	41
1966	699	585	486	99	114	65	49
1967	737	610	492	118	127	71	56
1968	785	635	499	136	150	75	75
1969	854	678	506	172	176	76	100

Source: [95].

Table 3. Estimated Advertising Expenditures in the United States, by Medium, 1952-67

(millions of dollars)

Year	Total Advertising	Newspapers		Radio		Television		Magazines		Direct Mail		Business Papers	
		Total Expenditures	Percent of Total	Total Expenditures	Percent of Total	Total Expenditures	Percent of Total	Total Expenditures	Percent of Total	Total Expenditures	Percent of Total	Total Expenditures	Percent of Total
1952	7,156	2,473	34.6	624	8.7	454	6.3	616	8.6	1,024	14.3	365	5.1
1953	7,755	2,645	34.1	611	7.9	606	7.8	667	8.6	1,099	14.2	395	5.1
1954	8,164	2,695	33.0	559	6.8	809	9.9	668	8.2	1,202	14.7	408	5.0
1955	9,194	3,088	33.6	545	5.9	1,025	11.1	729	7.9	1,299	14.1	446	4.9
1956	9,905	3,236	32.7	567	5.7	1,207	12.2	795	8.0	1,419	14.3	496	5.0
1957	10,311	3,283	31.8	618	6.0	1,265	12.3	814	7.9	1,471	14.3	568	5.5
1958	10,302	3,193	31.0	619	6.0	1,354	13.2	767	7.4	1,589	15.4	525	5.1
1959	11,255	3,546	31.5	656	5.8	1,494	13.3	866	7.7	1,688	15.0	569	5.1
1960	11,932	3,703	31.0	692	5.8	1,590	13.3	941	7.9	1,830	15.3	609	5.1
1961	11,845	3,623	30.6	683	5.8	1,691	14.3	924	7.8	1,850	15.6	578	4.9
1962	12,381	3,681	29.7	736	5.9	1,897	15.3	973	7.9	1,933	15.6	597	4.8
1963	13,107	3,804	29.0	789	6.0	2,032	15.5	1,034	7.9	2,088	15.9	615	4.7
1964	14,155	4,148	29.3	846	6.0	2,289	16.2	1,107	7.8	2,184	15.4	623	4.4
1965	15,255	4,457	29.2	917	6.0	2,515	16.5	1,199	7.9	2,324	15.2	671	4.4
1966	16,670	4,895	29.4	1,010	6.1	2,824	16.9	1,291	7.7	2,461	14.8	712	4.3
1967	16,866	4,942	29.3	1,032	6.1	2,909	17.2	1,280	7.6	2,488	14.8	707	4.2
1968 (prel)	17,930	5,237	29.2	1,145	6.4	3,142	17.5	1,318	7.3	2,612	14.6	718	4.0

Year	Outdoor		Miscellaneous*	
	Total Expenditures	Percent of Total	Total Expenditures	Percent of Total
1952	162	2.3	1,438	20.1
1953	176	2.3	1,556	20.1
1954	187	2.3	1,634	20.0
1955	192	2.1	1,870	20.4
1956	201	2.0	1,984	20.1
1957	199	1.9	2,093	20.3
1958	192	1.9	2,064	20.0
1959	193	1.7	2,242	19.9
1960	203	1.7	2,363	19.9
1961	180	1.5	2,316	19.5
1962	171	1.4	2,393	19.4
1963	171	1.3	2,575	19.7
1964	175	1.2	2,753	19.5
1965	180	1.2	2,960	19.4
1966	178	1.1	3,267	19.5
1967	191	1.1	3,317	19.6
1968 (prel.)	210	1.2	3,548	19.8

*Includes data for farm papers.
Source: [104].

Table 4. Estimated Expenditures for Advertising on Television in the United States, 1952-68

(millions of dollars)

Year	Total TV	Network	Spot	Local
1952	454	256	94	104
1953	606	320	146	141
1954	809	422	207	180
1955	1,025	540	260	225
1956	1,207	625	329	253
1957	1,265	670	352	244
1958	1,354	709	397	248
1959	1,494	741	486	267
1960	1,590	783	527	281
1961	1,691	887	543	256
1962	1,897	976	629	292
1963	2,032	1,025	679	328
1964	2,289	1,132	806	351
1965	2,515	1,237	892	386
1966	2,824	1,393	988	442
1967	2,909	1,455	988	466
1968 (prel.)	3,142	1,506	1,112	524

Source: [104].

Table 5. Total Population, Total Personal Income, and Per Capita Income
In 50 Major Television Market Areas, 1966 and Projected 1975 and 1980

(Values in 1966 dollars)

SMSA	Total resident population			Total personal income			Per Capita personal income		
	1966	1975	1980	1966	1975	1980	1966	1975	1980
	----------Thousands----------			----------Million dollars----------			----------Dollars----------		
UNITED STATES	195,857.0	218,616.0	234,462.0	580,483.1	859,440.1	1,091,300.2	2,963.8	3,931.2	4,654.4
1. New York	16,039.3	18,158.2	19,652.4	62,104.1	88,566.7	110,159.4	3,871.9	4,877.4	5,605.3
2. Los Angeles	7,859.0	9,518.7	10,602.3	28,423.3	45,055.7	57,781.6	3,616.7	4,733.4	5,449.9
3. Chicago	7,429.5	8,439.3	9,120.2	29,079.0	40,789.9	50,310.0	3,913.9	4,833.3	5,516.3
4. Philadelphia-Wilmington	5,188.1	5,791.6	6,220.6	17,140.2	24,827.5	31,506.2	3,303.8	4,286.8	5,064.8
5. Detroit	4,123.9	4,490.4	4,764.5	15,237.8	20,921.9	25,727.9	3,694.9	4,659.1	5,399.9
6. San Francisco-Oakland	2,967.1	3,465.6	3,780.9	11,797.1	18,383.5	23,461.5	3,975.9	5,304.4	6,205.2
7. Boston	2,693.4	2,924.9	3,069.5	9,219.5	13,381.3	16,671.0	3,422.9	4,574.9	5,431.1
8. Washington	2,612.0	3,217.6	3,598.8	9,204.6	14,595.4	19,140.3	3,523.9	4,536.0	5,318.4
9. Pittsburgh	2,375.1	2,571.7	2,715.9	7,422.1	10,561.4	13,281.3	3,124.9	4,106.7	4,890.0
10. Cleveland-Lorain	2,315.2	2,609.7	2,814.9	8,064.8	11,522.4	14,488.9	3,483.4	4,415.2	5,147.2
11. St. Louis	2,303.0	2,672.4	2,931.1	7,544.6	11,352.9	14,666.3	3,275.9	4,248.0	5,003.6
12. Dallas-Fort Worth	2,031.9	2,618.4	3,024.7	6,299.7	10,134.4	13,487.1	3,100.4	3,870.5	4,459.0
13. Baltimore	1,963.9	2,235.0	2,401.7	6,245.2	9,213.0	11,676.2	3,179.9	4,122.1	4,861.5
14. Houston-Galveston	1,900.2	2,427.3	2,817.0	5,514.9	8,879.4	11,927.6	2,902.3	3,658.1	4,234.1
15. Minneapolis-St. Paul	1,615.4	1,898.7	2,115.5	5,849.3	8,863.7	11,521.3	3,620.9	4,668.1	5,446.1
16. Seattle-Tacoma	1,579.1	1,877.0	2,081.8	5,519.3	8,503.7	11,149.6	3,495.2	4,530.5	5,355.7
17. Cincinnati	1,346.2	1,495.0	1,592.5	4,198.7	5,968.7	7,465.5	3,118.9	3,992.3	4,687.9
18. Milwaukee	1,343.6	1,536.8	1,646.7	4,824.8	7,148.5	8,984.3	3,590.9	4,651.3	5,455.6
19. Buffalo	1,323.5	1,498.4	1,602.0	4,175.6	6,195.9	7,885.8	3,154.9	4,134.8	4,922.4
20. Hartford-New Haven- New Britain-Waterbury	1,311.3	1,530.0	1,677.9	4,800.4	7,341.9	9,497.4	3,660.8	4,798.6	5,660.3
21. Atlanta	1,252.0	1,616.3	1,858.1	4,065.2	6,729.9	9,093.6	3,246.9	4,163.7	4,893.8
22. San Diego	1,188.0	1,448.2	1,621.3	3,741.0	5,916.1	7,802.8	3,148.9	4,085.1	4,812.7
23. Kansas City	1,181.8	1,420.8	1,569.5	3,870.3	5,981.8	7,705.3	3,274.9	4,209.9	4,909.4
24. Indianapolis-Bloomington	1,097.7	1,294.8	1,416.0	3,798.8	5,754.0	7,386.5	3,460.7	4,443.9	5,216.5
25. Miami	1,080.6	1,405.9	1,613.4	3,266.6	5,616.8	7,665.9	3,022.9	3,995.0	4,751.2
26. Denver-Boulder	1,073.0	1,346.9	1,510.0	3,469.0	5,548.3	7,216.4	3,232.9	4,119.2	4,779.0
27. Sacramento-Stockton	1,041.4	1,334.3	1,545.4	3,466.3	5,609.0	7,509.1	3,328.5	4,203.7	4,859.0
28. New Orleans	1,040.9	1,292.4	1,462.6	2,992.5	4,822.1	6,438.7	2,874.9	3,731.0	4,402.2
29. Providence-New Bedford	997.4	1,054.9	1,094.9	3,003.4	4,207.9	5,187.0	3,011.2	3,988.9	4,737.4
30. Harrisburg-Lancaster-Lebanon-York	992.2	1,105.0	1,177.3	2,931.7	4,306.3	5,467.4	2,954.7	3,897.1	4,644.0
31. Portland	915.9	1,067.5	1,165.8	3,027.0	4,578.8	5,850.7	3,304.9	4,289.3	5,018.6
32. Tampa-St. Petersburg	877.8	1,109.9	1,277.8	2,269.1	3,690.0	4,985.5	2,584.9	3,324.4	3,901.6
33. Columbus	840.1	982.8	1,068.9	2,511.8	3,783.8	4,830.7	2,989.8	3,849.9	4,518.9
34. Flint-Saginaw-Bay City	811.0	901.1	967.7	2,609.5	3,851.9	4,850.4	3,217.6	4,274.7	5,012.3
35. Dayton	804.7	964.1	1,059.8	2,663.5	4,095.5	5,243.3	3,309.8	4,247.7	4,947.0
36. Louisville	783.6	895.0	964.5	2,456.5	3,645.3	4,661.2	3,134.8	4,072.8	4,832.6
37. Memphis	748.2	852.5	915.7	1,910.9	2,874.2	3,687.1	2,553.9	3,371.1	4,026.2

(Continued)

Table 5. Total Population, Total Personal Income, and Per Capita Income In 50 Major Television Market Areas, 1966 and Projected 1975 and 1980 (Continued)

(Values in 1966 dollars)

SMSA	Total resident population			Total personal income			Per Capita personal income		
	1966	1975	1980	1966	1975	1980	1966	1975	1980
	-------Thousands----------			-------Million dollars----------			----------Dollars----------		
38. Birmingham	734.0	834.2	906.8	1,934.8	2,949.7	3,857.1	2,635.9	3,535.8	4,253.5
39. Albany-Schenectady-Troy	702.0	811.8	878.0	2,153.7	3,246.2	4,135.0	3,067.9	3,998.4	4,709.4
40. Grand Rapids-Kalamazoo	688.6	753.0	801.6	2,194.2	3,116.4	3,893.6	3,186.5	4,138.6	4,857.3
41. Toledo	668.7	735.7	778.8	2,053.5	2,920.6	3,634.7	3,070.8	3,969.6	4,666.9
42. Syracuse	611.9	712.1	777.2	1,819.1	2,782.8	3,616.5	2,972.8	3,907.6	4,652.8
43. Greensboro-Winston Salem-High Point	574.9	674.9	736.3	1,710.3	2,618.9	3,385.7	2,974.9	3,880.2	4,598.1
44. Nashville	519.8	613.6	673.0	1,459.0	2,316.3	3,061.2	2,806.8	3,774.5	4,548.6
45. Charleston-Huntington-Ashland	497.4	544.9	575.1	1,345.7	1,962.3	2,478.0	2,705.5	3,601.2	4,308.8
46. Greenville-Asheville	415.2	499.9	554.0	1,110.7	1,741.0	2,334.5	2,675.1	3,482.7	4,213.9
47. Johnstown-Altoona	405.1	421.0	434.4	996.0	1,375.3	1,693.6	2,458.7	3,266.7	3,898.7
48. Charlotte	370.3	469.9	540.9	1,169.4	1,947.6	2,657.1	3,157.9	4,144.1	4,912.4
49. Wheeling-Steubenville	351.5	380.4	399.9	921.8	1,292.8	1,615.0	2,622.5	3,398.5	4,038.5
50. Lansing	345.5	412.2	453.5	1,046.8	1,634.9	2,134.3	3,029.8	3,965.6	4,705.5
Total 50 TV-market areas	93,931.9	108,932.7	119,029.1	324,633.1	483,124.3	614,867.1	--	--	--

Source: [87].

Table 6. Educational Levels in the United States, 1957-59 and 1964-66, and Projected 1970, 1975, and 1980

(in thousands)

Years of school completed	Average		Projected[a/]		
	1957-59	1964-66	1970	1975	1980
None	2,292	1,805	1,457	1,169	971
Elementary School 1-8 years	36,116	32,231	29,029	25,789	23,177
High School 1-3 years	17,582	18,627	19,790	21,209	23,062
4 years	25,929	31,607	36,629	43,448	52,125
College 1-3 years	7,578	9,148	10,397	12,048	14,267
4 years or more	7,606	9,763	11,465	13,627	16,764
Population 25 years or over	97,103	103,182	108,766	117,291	130,366

a/ Series B projection would assume slightly higher rates of termination of education than 1964-1966 trends.

Source: [104].

Table 7. Number of High School Graduates in the United States and College Degrees Earned, 1956-57 and 1966-67, and Projected 1970-71 and 1976-77

(in thousands)

Degrees earned	1956-1957	1966-1967	1970-1971	1976-1977
High School Graduates	1,446	2,673	3,087	3,552
Bachelor's and 1st Professional Degrees	338	570	750	961
Master's (excl. 1st Professional)	62	133	193	248
Doctor's (excl. 1st Professional)	9	19	25	39

Note: These projections assume that the proportion of the population aged 18 graduating from high school will continue at the 1956-57 to 1966-67 rate, and that the proportion earning degrees will continue at the 1956-57 to 1964-65 rate. These projections might be considered conservative in that they do not assume any acceleration in the trend of the proportion of the population graduating from high school or college.

Source: [106].

Table 8. Total School Enrollment in the United States and Percentage of Total Population 5 to 34 Years Old Enrolled, 1966 and Projected 1975 and 1980

Item	Actual 1966	Projected 1975	Projected 1980
School Enrollment			
Series B-1			
1. Elementary School or Kindergarten	35,624	36,088	40,684
2. High School	13,364	16,310	15,706
3. College	6,085	9,459	11,181
4. Total enrolled	55,070	61,858	67,572
Series D-2			
1. Elementary School or Kindergarten	35,624	33,573	32,233
2. High School	13,364	15,903	15,099
3. College	6,085	8,564	9,718
4. Total enrolled	55,070	58,041	57,051
Percentage of Population Enrolled in School			
Series B-1			
1. Elementary School or Kindergarten	37.6	32.1	32.9
2. High School	14.1	14.5	12.7
3. College	6.4	8.4	9.0
4. Total enrolled	58.1	55.0	54.6
Series D-2			
1. Elementary School or Kindergarten	37.6	30.5	28.0
2. High School	14.1	14.4	13.1
3. College	6.4	7.8	8.4
4. Total enrolled	58.1	52.7	49.5

Source: [102, 103].

Table 9. Major Discretionary Consumer Expenditures, by Item, 1948, 1955, and 1967, and Projected 1975 and 1980

(in million 1958 dollars)

Item	1948	1955	1967	1975	1980
Recreation, total.....	12,019	15,361	27,815	42,417	55,925
Books and maps.....	854	1,001	2,015	2,982	3,790
Magazines, newspapers, and sheet music.....	1,997	2,158	2,583	3,124	3,627
Nondurable toys and sport supplies.....	1,227	1,924	3,934	5,613	7,126
Durable toys and sport equipment.....	1,052	1,486	3,319	5,296	7,009
Radio & TV, records & music instruments.....	1,276	3,039	8,036	44,593	21,067
Radio & TV repair.....	308	598	1,252	1,918	2,541
Flowers, seeds, and potted plants.....	373	492	981	1,573	2,076
Motion picture theaters.	2,052	1,477	572	192	167
Theaters & opera, and entertainments.....	247	270	363	526	642
Spectator sports.....	261	234	292	362	410
Clubs and fraternal organizations.....	589	623	794	941	1,053
Commercial participant amusements.....	671	671	1,218	1,705	1,985
Pari-mutuel net receipts	306	419	627	938	1,168
Other recreation.....	806	969	1,829	2,653	3,266
Private education and research, total.....	1,832	2,639	5,473	7,996	10,262
Higher education.....	784	1,023	2,603	4,120	5,526
Elementary and secondary schools.....	536	826	1,604	1,981	2,236
Other private education and research.....	512	790	1,266	1,895	2,500
Religious and welfare activities, total.....	2,836	3,607	5,920	7,769	9,272
Foreign travel by U.S. residents, total.....	813	1,510	3,675	5,397	7,067
GRAND TOTAL.....	17,590	23,117	42,883	63,579	82,526

Source: [86].

IV. CRITIQUE OF THE ECONOMIC SECTIONS OF THE LAND MOBILE RADIO ADVISORY COMMITTEE REPORT

Introduction

In attempting to evaluate the relative economic benefits of land mobile radio and television [40], the Land Mobile Radio Services Advisory Committee exceeded its terms of reference. The FCC Order establishing the Committee and its terms of reference made no mention of the benefits, economic or otherwise, of land mobile radio use of the spectrum.[1/] Neither was any reference made to the television industry.

Certainly a study of the television industry could not have been contemplated in an official advisory committee whose membership did not include television industry representatives. Requests by the latter to be included on the Executive Committee were denied on the grounds that the Committee would not deal with broadcasting.

Since economic analysis was not included in its terms of reference, the failure to establish competence in the field as a criterion for membership is understandable.[2/] It is not

1/ Public Notice-G, March 27, 1964, "FCC Establishes Advisory Committee for the Land Mobile Service."
2/ The two-man Task Force which prepared the economic studies were employees of General Electric and Standard Oil of California [40].

understandable, however, why the Committee would venture into as difficult and untried a field as the comparative evaluation of social and economic benefits of television and land mobile radio, without professional economists, and without having been charged with such responsibility. Thus the study merits rejection on grounds that it was done by people without proper professional qualifications or sufficient knowledge of the television industry, and that the exclusion of a pro-LMR and anti-television bias from the study would have been very difficult, given the composition and interests of the committee.

However, the study also fails to meet the test of adequacy with respect to almost any of the essential features of a study of this kind, including the concepts employed, depth of analysis, thoroughness and accuracy, and sufficiency of basic data. These qualities of the study are discussed in fuller detail in the balance of this chapter. But it is important to observe at this point that the study of the economic benefits of LMR and TV use of the spectrum appearing in the LMAC Report is not worthy of serious consideration by the FCC or any other body in connection with the proposed reallocation of spectrum.

The major defects and deficiencies of the report may be summarized as follows:

1. It uses an irrelevant and misguided concept for the measurement of intensity of use of allocated spectrum by LMR and television, i.e., the dollar value of annual expenditures by these two classes of use per unit of spectrum allocated. In so doing it confuses the concept of cost with the concept of benefits, and ignores the only meaningful measure of use, i.e, the extent to which allocated spectrum is actually used over time.

2. It does not include any evaluation of the social and economic benefits of TV broadcasting. Its concept of the value of television is the difference between present costs and alternative cost of television transmission, using an ill-defined mixture of CATV and broadcasting stations. No consideration is given to the socio-economic implications of that alternative. Furthermore, its estimated costs of transmission by wire are not documented, and are radically lower than responsible estimates from other sources.

3. The estimates of economic benefits from the use of LMR in the form of savings to users are based largely on wholly undocumented assumptions and a limited number of unanalyzed responses to a questionnaire survey of LMR users, calling for information which users could not have had in their records.

4. The report fails to deal with the opportunity cost of allocating spectrum to LMR use presently allocated to television.

Summary of Findings of the LMAC Report

The major findings of the economic section of the LMAC report may be summarized as follows:

1. Land mobile radio users spend annually for radio communications approximately $37 million per megahertz ($1.6 billion total) of spectrum allocated to LMR. This compares with approximately $8.6 million per megahertz ($4.2 billion total) for broadcast TV. It is concluded, therefore, that LMR users utilize allocated spectrum four times more intensively than broadcast TV users.

2. Probable savings to LMR users and "benefits to the public-at-large" are estimated to be between $8 and $13 billion annually. These savings are asserted to result from the ability of LMR to provide:

(a) ...improved profitability of business enterprises with no increase in prices to customers;

(b) ...improved level of service with no increase in prices;

(c) ...same level of service with lower prices;

(d) ...combinations of the above.

These savings from LMR are contrasted to an "approximation of the annual savings to the economy provided by the present broadcast service," amounting to $3.6 billion. This is based on estimates of the cost of CATV as an alternative to the use of the spectrum by TV broadcasters.

3. If rents were charged for use of the spectrum, LMR users would outbid broadcasters for the right to use the spectrum, because of their greater returns per unit of spectrum utilized.

4. "There is no alternative to the use of the radiated electromagnetic energy spectrum for communications with mobile units, while the broadcast service could well be provided without use of the spectrum."

Unsubstantiated Conclusions are Characteristic

The Summary Report contains many assertions which the Advisory Committee studies do not substantiate. For example,

the statement that the LMR "contribution to the national economy is large enough to constitute a significant element in American industry's competition with foreign firms and in maintaining the American standard of living" is not substantiated by any analysis.

The Report includes quotations from various publications to show the nature of the spectrum allocation problem; namely, that there is frequency congestion. It concludes that "for businesses, the severe channel congestion in such areas as Los Angeles, Chicago and New York, virtually prohibits many classes of business and industry from using radio to achieve lower overall operating costs and thus lower cost of service to the Public." There is no evidence that there had been an investigation into the number and types of enterprises that would have used LMR but for frequency congestion. Elsewhere in the Report, emphasis is placed on the receipt by FCC of thousands of LMR applications. Also, its reference to lower cost service is not supported by any factual survey that revealed the public was obtaining products or services from LMR users at lower costs.

The Report observes that "...if these services are not given spectrum relief, the public will suffer losses in safety, protection, and in increased costs for goods and services." Since there was no analysis of the relationship of LMR to prices of goods and services provided the public, there is no substantiation of the claim that if additional spectrum is not made available, there will be "increased costs for goods and services."

1/ The major LMR private enterprise users primarily operate in the trade, service, and construction sectors, unrelated to foreign trade and, in fact, involve selling and servicing of both foreign and U.S. products. Land transport users fall in the same category.

Another unsubstantiated conclusion is that "forecasts of Land Mobile Service growth both by EIA and this Advisory Committee's Working Group A-9 indicate that heavy congestion will turn into a major catastrophe in the metropolitan areas if spectrum relief is not provided soon." The forecasts of the Working Group are "statistical projections" for the entire country, and therefore are no measure of conditions in the metropolitan areas.

Conceptual and Analytic Deficiencies of the LMAC Report

Costs as Benefits

Perhaps the most serious conceptual defect of the LMAC is its assumption that the aggregated expenditures of individual LMR operators, and expenses of TV broadcasters and viewers, are measures of economic benefits to be taken into account in spectrum allocation. While acknowledging that there are benefits to the general public from public safety and similar users of LMR, the Report ignores them because they are not easily measurable. More important, it completely ignores the benefits to the public-at-large of television broadcasting and advertising.

Since the spectrum is a natural resource belonging to the general public and administered by FCC, the criteria for allocating the spectrum must explicitly reflect measures of public benefits, as well as the monetary benefits received directly by operators and broadcasters. The magnitudes of public benefits are so great for some spectrum uses that they make irrelevant the consideration of other uses of the spectrum regardless of the direct benefits to those who use it. The public benefits derived from police and fire LMR use could be of such magnitude that the use of the spectrum

could not be denied to them simply because retail businesses had greater relative financial returns from LMR.

National Data for Urban Problems

A second serious defect is the national scope of the LMAC analysis. The fact that the LMR spectrum frequency problems may be largely limited to only the 25 largest U.S. market areas is completely ignored. National aggregates do not provide measures of conditions in the urban areas.

Public and Private LMR not Distinguished

The LMAC evaluation basically emphasizes only two classes of spectrum users, LMR and broadcasting. No distinction is made between different kinds of LMR spectrum users. Thus, when the estimated "savings" generated by LMR are presented, there is no way of knowing whether most or all of the savings are generated by business, transportation, or public safety LMR users, or by which subcategories within these. Actually, at one point in the Report, estimates of police savings from LMR could be interpreted to constitute the greater part of all LMR-generated savings.

Intensity of Spectrum Use

The Report concludes that LMR users are utilizing the spectrum four times more intensively than broadcast television. This conclusion is based on the estimated expenditures per megahertz of spectrum allocated to LMR users and broadcasters.

User expenditures are not a measure of the intensity of spectrum utilization.[1/] Measures of the physical use of channels and frequencies are relevant, such as the 18 to 20 hours per day of continuous transmissions made by many television broadcasters. Spectrum is less fully used by LMR users, particularly in the private LMR sectors. This has been confirmed in the recent interim report to the FCC by the Stanford Research Institute on Land Mobile Spectrum Utilization [43]. Meaningful measures of intensity of spectrum utilization must also reflect benefits received by both individual users and the general public relative to the economic costs of utilization.

Contribution to the National Economy

The LMAC Report argues that "savings" to the national economy resulting from LMR operations "probably exceed $8 billion annually and may well be as much as $13 billion annually."

In arriving at these estimates, the LMAC used the following procedure: First, based on estimates of LMR investment, operating costs, and increases in the productivity of users, estimates are made of the reduced costs and increased revenues of hypothetical LMR users having 100 mobile units. Second, a survey of LMR users was conducted to confirm the estimates made for hypothetical users.

In the hypothetical examples, the gross returns to LMR users exceeded costs by ratios of 8:1 (hypothetical

1/ An excellent illustration of the conceptual and factual dificiencies of the Report is the failure of the LMAC to include the money costs of capital in its LMR cost analysis. Thus costs are understated, and applying their concept, so is the efficiency of LMR spectrum use.

example 1) and 5:1 (hypothetical example 2). Total savings were then estimated by applying these ratios to an estimated $1.6 billion total national cost of LMR ownership to arrive at estimates of total savings to the economy of $8 to $13 billion.

Example 1 assumed that three LMR vehicles could do the work of four not so equipped; example 2 assumed that one LMR vehicle could do eight service calls per day, compared with seven for one not so equipped. These assumptions were based on information "generally available" but not documented anywhere in the report.

First, even assuming that the average savings ratios would apply to operators of fleets of 100 vehicles, the majority of LMR operators, who are licensed for five or less transmitters, would not realize such savings.[1/] The economies of scale which apply to large fleet operators would not apply to the average LMR user.

In example 2, the Report uses an average billing per call of $10, with $4 for parts and $6 for labor for a typical service industry user to determine the returns from LMR use. It then treats all receipts against labor costs as profit.

The Report assumes 30,000 miles-per-vehicle per year without citing any source. According to Highway Statistics, 1967 [109], for all cargo vehicles in the United States, the average miles traveled per vehicle was only 11,204.

1/ According to the 1963 Census of Transportation [100, p.39], only 2.3 percent of all trucks used for all commercial purposes in the entire country were in fleets of 100 or more. For wholesale and retail business and for service categories, the corresponding percentages were 3.5 percent and only 1.3 percent, respectively.

Similarly, no source is indicated to substantiate the validity of the assumption that costs of operations (including amortization) would be 7 cents per mile.

Defects of the LMR User Survey

Important doubts arise because of the methods used in conducting the user survey, and the lack of disclosure of the returns. Questionnaires were mailed to a "statistically selected sample of 5,600 LMR licensees in the Business Radio Service." No mention is made of how the sample was selected or of the number or location of the respondents. Whether the returns are representative of the various types of businesses and the varying mobile fleet sizes is unknown.

A perusal of the questionnaire reveals it to be "an opinion" survey and not a factual investigation. Answers are sought to complicated questions on which the typical trading or service businessman has no records or information. A cost accounting approach as called for by the survey is something that he cannot cope with. It would be almost impossible to give a reliable answer to the question: "My records show that after I have paid the cost of my radio system, including amortization of my original investment, that my system saves me about $_____ per vehicle equipped per year."

Other examples of questions on which LMR operators would not have data and which fail to meet required standards of objectivity are: "If I were not using radio for control, I would be forced to add _____ vehicles, _____ operators, and _____ supervisors, at a total annual expense of $_____ to conduct the same amount of business," and "My Radio System Paid for Itself in the Following Ways." The respondent is encouraged to show savings even though such savings may not

exist. The survey further requests "income per call," without any definition of income, so that the answers could range from gross revenues to net profit.

Savings per vehicle shown in 60 responses ranged from $5 to $13,850, the latter by a respondent with 49 vehicles, or 13 percent of the total for which data were collected. This wide range of responses is not unexpected in view of the question and results in average savings per vehicle of $2,547, while the median is only $500.

Actually the median was not derived properly, from a statistical standpoint. The median should be the reply of the respondent who occupies the midpoint of all respondents, ranked by the savings or costs shown. The study uses "median" as the vehicle which occupies the midpoint.

The responses tabulated appear so meager that the entire "survey" results are of dubious value. For example:

Table	Returns	Percent of 5,600 Questionnaires mailed
9-3	60	1.07
9-4	138	2.46
9-5	40	.72
9-6	33	.59

The difference in the number of responses or returns for each of the tables is also very great, ranging from 33 to 138. This destroys the statistical comparability of the tables, since the average and medians are derived from different respondents and from different size universes. For example, two tables have returns with 10 units -- the others do not. Two of the largest respondents, one with 31 and the other with 49, appear in only two tables. The one with 49

vehicles shows savings of $13,850 per vehicle in one table and $694 in another.

The marginal cost of additional mobile units is estimated by the LMAC at $250 annually. However, 12 out of 60 returns, accounting for 20 percent of the vehicles covered, showed average savings of less than $250, or less than cost. The Report also concluded that the large difference between marginal savings and the statistical mean of the savings reported would "strongly infer a large-pent-up demand for additional Land Mobile Service." "Marginal savings" are not given in the report, and even if they were, the logic would be incomprehensible. It resembles wishful thinking more than analysis.

The range of "savings" reported raises doubts as to their validity, i.e., from $13,850 per vehicle down to $5. In fact, the third highest savings of $7,800 per vehicle was for a 3-unit fleet -- the lowest savings for a 3-unit response was $100. It is difficult to comprehend how a 3-unit fleet could show a total savings of $23,400 annually, or a 49 unit fleet savings of $678,650. Since the Report estimates total annual average vehicle and labor costs at $7,100, a savings of $13,850 per vehicle would mean that one LMR vehicle is as productive as three vehicles not so equipped. This is a productivity nine times greater than that assumed in their Example 1 discussed earlier, and is patently unrealistic.

We do not believe the survey results can be accepted as factual, reliable, or representative. Furthermore, they do not distinguish different types of LMR users. Do these savings apply to the seven land transport subgroups, and other industrial subgroups, such as power, forest products, telephone maintenance, and manufacturers?

The Report discusses alternative costs for LMR operators, using the police sector for illustration. It assumes that it would be necessary to increase the number of manned police vehicles by 118,000 vehicles[1/] to maintain police services without LMR, at an estimated additional cost of approximately $6 billion. Thus, police alone would account for 50 to 75 percent of the estimated $8 to $13 billion in total LMR savings.

Television Benefits

The public benefits of television broadcasting are conceived as the savings from using over-the-air rather than cable transmission. On the basis of the LMAC estimate of $3.6 billion in annual costs, including amortization, for establishing a nationwide cable system, it is concluded that the most efficient use of the spectrum would be LMR, in view of the estimated $8 to $13 billion annual savings from LMR use.

Apart from institutional and social factors which should play a prominent role in any discussion of the cable TV alternative, serious questions arise as to the estimates of annual costs and the economic implications of cable TV.

First, the estimates of the cost of establishing a nationwide cable system are based on estimated present connecting and monthly charges for cable systems which perform a limited and generally specialized function. These costs cannot be extrapolated to a nationwide basis, as they are in this study, because of the wide variations of residential density, and therefore in length of wire needed per household.[2/]

1/ Available data indicate only 174,000 police vehicles of all types [4, p.67]. The basis for the 118,000 is not stated.
2/ Martin Seiden [9] reports an investment of $4,000 per mile.

It is assumed that a $20 connecting fee will recoup the total investment. There is no basis for this allegation. Seiden's report [92] shows CATV investment for 16 small Connecticut communities (not rural areas), assuming 100 percent penetration, of from $31 to $147 per home. The total population of these 16 communities was 103,180 and the average cost per home was $55.

The foregoing is based on wiring 1,415 miles of street, serving 72 homes per mile. Extension into less populated areas increases the investment. At 36 homes per mile of wire, investment would go up to $110. If we take more sparsely settled areas of say 10 homes per lineal mile, investment per home would be $400.

Let us examine the full significance of these cost differences. First, 30.1 percent of the 1960 total population of this country lives in 54,054 rural places or areas of less than 2,500 population [104, p.16]. There are 45,469 urban places or communities of less than 25,000 people with 19.9 percent of the entire population. Thus, 50 percent of the populace lives in areas where investment in wiring would be far above $20.

There are approximately 3.7 million miles of road in the United States [109, p.165]. At $4,000 per mile, this would total $14.8 billion, compared with connection charges of $1.34 billion in the Advisory Committee Report. The above cost-per-mile undoubtedly is an underestimate because it represents towns and small communities, and does not include areas where access is difficult and terrain a problem. They are also based on CATV use of poles and not underground costs, which would be substantially higher.

Service charges of $60 annually used in the Report may reflect the situation in smaller communities where CATV is now operating. But what would be the charge in rural areas? Assuming that the capital cost could not be paid off through the connecting charge (a very safe assumption), what would the annual charge have to be -- $100, $200, $300? Or does the Report contemplate some procedure where those in more urbanized areas could subsidize rural users. Some estimates of the initial investment required for nationwide cable coverage have been as high as $80 billion. Thus, the $1.34 billion estimated by LMAC may be regarded as utterly unrealistic.

Second, a serious question arises as to who would pay the charges for wire. If the charges are levied against TV receiver owners, a portion of the economically depressed segments of the population would undoubtedly be deprived of TV, and others would receive the benefits of TV only by sacrificing the essentials of modern life. Over 8 million white families and 2 million black families receive less than $4,000 annual income. A $60 annual charge, which is unrealistically low, would equal 6 percent of $1,000 income, and 1.7 percent of $4,000. At $300 it would be 30 percent and 10 percent, respectively. It should be emphasized that people in the $2,000/2,999 income bracket have only 28.4 percent of their take-home pay available for all living expenses after taking care of food and shelter (see tables 10 and 11). Attention is directed to table 12, which lists types of expenditures which would be less than the $60 service charge assumed by LMAC.

Both in the case where charges would be levied against TV receiver owners and the case where cable charges would be passed to the consumers of products advertised on TV, the cost of allowing LMR to use the entire spectrum would be borne by

TV users, rather than the beneficiaries of LMR use. As stated earlier, this has been reliably estimated at $20 billion annually.

Hypothetical Rental of the Spectrum

As an argument that LMR is the more efficient user of the spectrum, the LMAC considers the theoretical implications of charging "rent" for spectrum use. Because of the multi-dimensional characteristics of the spectrum, a common unit spectrum measurement, a PODAF (Power Density over an Area Frequency band), is developed. It is then argued that at an established rate of rental, $1 per PODAF, the rental for a mobile system of "standard base configuration" with 10 "standard mobiles" would be $2 per month, as compared with $11,500 for broadcast stations (computed by LMAC).

The LMAC provides only a superficial analysis of the implications, and contributes little to the assessment of the contributions to the national economy by either LMR or Broadcast. Certainly LMAC does not show that land mobile users would be able to "outbid" broadcasters if the spectrum was "a free market commodity."

The LMAC Report provides estimates of the annual costs and revenues of Broadcast TV. In commenting on UHF revenues, LMAC notes that UHF revenues should increase at an accelerated rate and that UHF revenue growth should be significantly greater than VHF if a case is to be made in favor of more UHF stations. Without these conditions, LMAC argues that the justification for more UHF stations is questionable. No rationale for setting such a standard is advanced. Also, the report ignores the fact that the revenue position of the UHF industry as a whole is abnormally low because of the large

percentage of new stations. Stations that have been on the air for some years are profitable. This is another example of the undocumented and unsupported broad generalizations in the Report reflecting anti-TV bias more than objective analysis and study.

It is also obvious that LMAC places little value on the benefits of noncommercial TV, which account for 47 percent of total UHF allocation. Furthermore, the UHF growth analysis is for the period ending in 1965 when only 20 percent of TV sets were equipped for UHF. The analysis in Chapter III of this report is more current and reaches quite different conclusions about future UHF growth prospects.

An important component of broadcaster costs is hidden in the estimated aggregates, and certainly was not mentioned by LMAC. This cost component reflects a major distinction between use of the spectrum by broadcast TV and LMR. Television broadcasters are required to perform costly public services as a condition of using the spectrum. In other words, broadcasting must provide specific benefits to the public. Thus, in a real sense, an important cost element for broadcasting is a form of "rental" for spectrum use.

Projections of LMR Demand

The LMAC made projections of the number of LMR transmitters in service in 1975 if present trends continue. Individual projections are made for only transmitters in manufacturing and business, and for transmitters of all services combined. These projections were made by logarithmic plotting of the number of LMR transmitters licensed against time for the years 1955 through 1966. Comparisons were made of transmitter growth with gross national income.

Apparently the charts were drawn freehand. While the freehand curves appear reasonable for the sample period (1955-66), the extrapolations are arbitrary. Other extrapolations which would fit the data equally well might produce projections which were 25 to 50 percent lower than the LMAC projections. Such disparities often occur with logarithmic scales.

The major flaw in the projections, however, is not the crude method of analysis, or even the use of questionable data. Rather, the analysis is superficial because it does not take into explicit account the basic economic and other factors which will influence the growth of transmitters in the future.

While the Report does make reference to factors which might tend to increase or decrease growth, it does not list the most important factors, nor does it incorporate them into the projections. To adequately account for the factors which will influence future growth is a sizable and complex task.

Each of the major categories of total transmitter use should be determined. Within these categories, an analysis should be made of transmitter growth by important users to determine the causes for growth. In the industrial category, for instance, the use of transmitters by taxicabs should be analyzed to determine the proportion of taxi fleets which are already equipped with LMR, the anticipated growth in the number of taxicabs, the technical innovations in prospect, and a large number of other factors. If it were discovered, for instance, that 98 percent of taxicabs were already equipped with LMR, the projections of growth in LMR use would undoubtedly be different than if only 10 percent of the taxicabs were equipped.

But what about the future of taxis? One must visualize the city of the future in quite different terms from the contemporary city. Plans for rebuilding will radically change internal transport and communication in ways that may make the taxi obsolete.

A number of other areas of study are indicated, such as the effect of changes in LMR equipment costs or demand for LMR; trends in the number of vehicles of various kinds and uses; growth trends in economic sectors using LMR; and relative population growth trends in urban and rural areas.

An interesting illustration is the change in the ratio of LMR equipped vehicles implied by forecasts. The FCC refers to a forecast of 7.3 million mobile transmitters in 1980. This compares with 2.7 million in 1967, when there were 17.7 million commercial and private trucks, public and private buses, state and local government trucks and autos -- a ratio of about one to seven. By 1980 this would be about one to three, if we take the American Trucking Association forecast of 24.7 million trucks in 1980. Is it reasonable to expect such an increase in the saturation level? If so, why?

The projections for total LMR growth should basically be an aggregation of the growth projections of the various categories of LMR users in specific locales or areas.

Table 10. Distribution of Family Income
By Income Level and Color - 1966

Family Income	All Families	White	Non-White
	- - -(Percent of Total)- - -		
Under $1,000	2.3	2.0	5.2
$1,000-1,999	5.4	4.6	12.5
$2,000-2,999	6.6	5.8	12.7
$3,000-3,999	6.8	6.2	12.6
(Sub-Total under $4,000)	(21.1)	(18.6)	(43.0)
$4,000-4,999	7.1	6.6	11.3
$5,000-5,999	8.4	8.3	9.1
$6,000-6,999	9.4	9.5	7.9
$7,000-7,999	24.4	25.3	16.6
$10,000-14,999	20.4	21.7	9.6
$15,000 and Over	9.2	9.9	2.6
	100.0	100.0	100.0
Number of Families	48,922,000	44,017,000	4,510,000
Number with Under $4,000 Family Income	10,322,542	8,187,162	1,939,300

Source: [103].

Table 11. Impact of CATV Service Charge of $60 Annually On Low Income Families

Family Income (Midpoint of Class)	Number of Families 1/	Percent of Gross Income (Before Income Taxes)
	(Thous.)	
1,000	880	6.0
1,500	2,642	4.0
2,500	3,229	2.4
3,500	3,327	1.7

Selected Expenditures, Percent of Money Income After Taxes, Income Class $2,000-2,999 2/

Expenditures for Current Consumption	1960-61 Percent
Food, tobacco and beverages	31.7
Housing	34.1
Fuel, Light, Refrigeration, Water	5.8
Total Food and Shelter	71.6

1/ Includes number of families receiving income indicated or less, down to next bracket.
2/ [108].

Table 12. Expenditures By Low Income Families By Income Level for Selected Categories

Group	Income Level		
	Under $1,000	$1,000-1,999	$2,000-2,999
	Expenditures ($)		
House furnishings and equipment	40	64	103
Personal Care	33	52	88
Recreation	29	37	72
Reading	13	18	26
Education	22	6	12
Automobile	29	60	175
Other travel and transportation	33	35	55
Tobacco	21	32	56

Source: [108].

V. THE ECONOMIC BENEFITS OF COMMON CARRIERS FOR LAND MOBILE USE OF SPECTRUM

Among the range of proposals for achieving more efficient use of the spectrum included in the MST Comments of February 3, 1969, the one having the greatest economic significance is the increased use of common carrier services or communication service companies in lieu of the present independent LMR systems.

Economic benefits from the substitution of common carrier services for the many small independent LMR systems will flow from two sources; namely, the increased productivity of the spectrum resource itself, and the economic savings in the use of capital for communications equipment. If one assumes, for example, that the economic value of the present level of LMR uses is $5 billion annually, and that it would be possible to accommodate double that volume of use within the presently allocated spectrum, then the value flowing from the increased efficiency of use of the spectrum is $5 billion annually.

If, on the other hand, one assumes that the allocation of spectrum to LMR use needs to be tripled, there would be a cost equal to the value of the television stations that would not be able to go on the air in the future because of the reallocation of TV spectrum. If a total of 200 stations would be kept off the air throughout the nation, each of

which would have an average of 100,000 viewers for an average of 300 hours per year, and shadow-priced each viewing hour at $1, the monetary value of consumer's surplus would be $6 billion annually.[1/] But the society would also be denied all of the other values to the user, which do not lend themselves to estimation in monetary terms, that would flow from the existence of these stations.

The capital savings in communications equipment realized from common carriers apply chiefly to the base station transmitter. From an operating and cost point of view the fundamental distinction between the common carrier and the independent system is the substitution of one base station transmitter for the individual transmitters operated by the independent users. Of course, there are other user benefits from the use of the services provided by common carriers which are not otherwise available.

But to the individual LMR user, costs are pretty much the same under either method of operation, except for the elimination of the investment and maintenance costs for his base transmitter, and the addition of a service charge by the common carrier. The relative economic advantages of these two alternatives to the user will depend mainly on the number of mobile units he is operating. The larger the number of mobile units and the more intensively he uses his own base station, the greater the likelihood that its operation will be more economic than the common carrier alternative. The lower his intensity of use and the smaller the number of his vehicles, the greater will be the capital costs per unit

1/ This is conservative, when compared with total viewing hours in 1968 -- 191 billion.

of communication used in a private system, and the likelihood that the common carrier will be the more economic alternative.

In this connection it must be borne in mind that the overwhelming majority of LMR systems are very small. From a variety of sources before the Commission in the present proceedings, including the LMAC Report and the Stanford Research Institute Study of Land Mobile Spectrum Utilization, it would appear that the average size is approximately 5 mobile units per system, and that about 85 percent of users have less than 10 mobile units.

A common carrier operation will result in a more efficient overall use of capital, for at least the transmitter portion of the system, than the maintenance of independent systems. The potential saving in investment cost is best illustrated by the common carrier servicing 200 customers with 1,000 vehicles (based on the estimated average of 5 vehicles per user), whose individual transmitter investments would have averaged $1,500, with his own high-powered transmitters costing $10,000. The net savings in investment cost in this illustration would be of the order of $300,000.

Under existing FCC policy, the radio common carrier (RCC) is not as efficient and low cost a vehicle for the use of the spectrum as it might be. Similarly, the rates which RCC's charge have not been effectively regulated, even though tariffs must be filed with the FCC. The absence of effective regulation undoubtedly reflects a lack of need, since there are comparatively few RCC's serving only a very small share of the total LMR market. The limited number of RCC's is itself the result of FCC policies under which only a few channels have been made available for their use, and an individual RCC is rarely assigned more than one or two channels.

For optimum efficiency in the use of both spectrum and related equipment resources, an RCC must have control over more than one or two channels. Studies made by the Kelly Scientific Corporation for the Association of Maximum Service Telecasters conclude that from six to eight channels, with a customer base on the order of 1,000 mobile radio units, would provide the necessary economies in the use of spectrum and economic resources. This assumes the mobile radio units will have transceivers equipped with four or more channels so that the RCC can even loads among the different channels and attain higher load factors. The cost of such transceivers is higher than the cost of a single-channel transceiver. However, the scale economies of the RCC with a sufficiently large customer base are such that the cost to the user may actually be less. The Kelly estimates show, for example, that an RCC servicing 500 four-channel equipped transceivers would have an average equipment cost of 98 percent of the equipment costs for a single-channel system serving 10 mobiles. In other words, the equipment cost that presumably would be passed along to the customer by a common carrier would be no more than 98 percent of such costs for a single-channel 10 mobile service.

These comparisons are based on equipment costs only, rather than total user costs including service charges by the RCC. However, it is reasonable to assume that reductions in investment costs associated with the use of an RCC will be passed on to the customer, and that there will be further reductions in terms of the unit costs of communication because of the higher load factor on the RCC equipment.

Furthermore, one would expect that with more effective regulation of RCC tariffs by both the FCC and by state and local public utility commissions, and with the

development of competition among RCC's, the charges to LMR users would be kept at reasonable levels, and could even be lower than the cost of independent systems, particularly for those with fewer than 10 mobile vehicles. Capital costs should normally be allocated among users according to the amount of use which they make of the resource. The small user with relatively few mobile vehicles and a low volume of communication requirement should pay proportionately less than the larger user with more vehicles and more communications needs.

This principle would undoubtedly be taken into account by RCC's in establishing tariffs, and by the FCC and other regulatory bodies in establishing rate regulation principles and criteria to be applied to the RCC's. Thus, if economies can be achieved through the use of RCC's serving 1,000 or more vehicles, over the operation of a number of independent LMR systems, it is reasonable to expect that such economies would be realized by the LMR customer of the RCC.

With respect to the forces of competition, the number of private LMR vehicles in any of the large metropolitan areas will run in the many thousands. If a thousand vehicles is an economic vehicle base, it should not be necessary for the FCC to contemplate the creation of a common carrier monopoly within the metropolitan area on the model of such public utilities as telephone, electricity, and gas. It should be possible to rationalize the allocation of channels among a number of RCC's in such a fashion as to insure optimum use of the spectrum and the maintenance of competition in this service to the public.

LMR users will use RCC's for a variety of reasons other than relative cost, such as convenience, efficiency, availability of a wider range of services, lack of appropriate facilities for the installation of a private antenna, and greater overall economies. It is believed that the range of services available through common carriers is particularly important to the consumer, but also represents significant progress in mobile communication flexibility and efficiency. Among the services that are being provided are the following:

1. Calls between mobile units and any telephones anywhere, compared with the necessity for the independent communicator to call from his transmitter control point.

2. Twenty-four hour and seven-day service in lieu of the individual communicator being restricted to his own personal availability.

3. Coordination of all calls on a time priority sequence basis.

4. Instant channel access in an emergency.

5. Message holding and message relay service, eliminating the need to keep trying until contact has been established, or for the mobile unit to call back repeatedly to ascertain if a call has been made.

6. A high-powered, well-maintained, and advantageously located antenna providing better area coverage than the typical individual communicator system.

7. Simultaneous two-way communication, compared with the typical one-way communication in the private systems.

Finally, whether or not the LMR user incurs greater expense for a common carrier service than through the ownership of his own transmitter, he has the advantage of a more efficient, more desirable, and more versatile range of services, some of which result in operating savings that are not available from an independent system, as well as a more conservative and efficient use of the spectrum.

On balance, it is concluded that increased efficiency of use of the spectrum, and the use of common carriers in particular, will produce significant economic benefits.

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