8/19/69

Copies of
letters
sent out

August 19, 1969

Dear Mr. Gilmer:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that AT&T has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Enclosed are some of the issues we will be considering. You may wish to use these, in part, in organizing your comments. I look forward to hearing from you.

Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Identical letters sent to the people on the attached list.

Mr. Ben S. Gilmer
President
American Telephone and Telegraph Company
195 Broadway
New York, New York 10007

August 16, 1969

Benefit to the public from the economic and service potential of satellite technology

1. What specific services that are not now available would be made possible and economically feasible through satellite technology?

2. What specific services now being offered could be provided more effectively or more efficiently through satellite technology, and what economic savings would accrue?

3. What institutional, technical, and economic arrangements, taken as a whole, appear most likely to assure full benefit to the public of domestic satellite potential?

4. What specific services and systems appear to offer the most immediate economic potential and how can they best be provided?

Learning about the problems and possibilities of satellite services

1. What information about technological capabilities and performance of satellite systems is needed to resolve uncertainties about the technical and economic feasibility of potential systems?

2. What information about operational uncertainties is needed?

3. What information about economic and market characteristics is needed?

4. Specifically, what information or technological developments are needed over the next few years with respect to tradeoffs among spectrum utilization, orbit location, and cost to permit maximum utilization of communications satellite capabilities?

5. What of the above information can be obtained best by further research, experimental trials, or a pilot operational system?

Incentives for innovation by communications firms to develop new telecommunications services and markets

1. What Government policies would be most effective in promoting development of new telecommunications services and markets by the private sector?

2. What research and development can be carried out by private enterprise to speed the development of economically viable domestic communications satellite applications?

3. Is there research that can be carried out only by the Government that would resolve uncertainties or impediments to technological or market innovation by the private sector?

4. Given appropriate economic incentives and institional arrangements, what new services, markets, or technologies could the private sector likely develop in the foreseeable future?

5. What institutional arrangements with respect to ownership and operation of communications satellites will offer the best balance between the rate of innovation and nondisruptive growth of the communications industry?

Degree of regulatory control and impediments to technical and market innovation

1. What type and degree of economic regulation (such as rate-base regulation, limits on entry of new firms, authorized user limitations, or limits on services offered) is now clearly necessary during the initial phases of domestic commercial satellite communications? What technical regulation, such as spectrum utilization, interference standards, or service standards?

2. Under reasonable projections of the economic and technological potential of satellite services, what regulatory policies appear most desirable for the long run?

3. Is it desirable to have regulatory policies with respect to telecommunications via satellite that are distinct and different from policies for terrestrial systems?

4. To what extent can competition, together with general regulatory guidelines, foster a more responsive industry than is possible with very detailed regulation?

Mr. Ben S. Gilmer
President
American Telephone and Telegraph Company
195 Broadway
New York, New York 10007

Mr. Joseph Charyk
President
Communications Satellite Corporation
950 L'Enfant Plaza
Washington, D. C. 20024

Mr. Russell W. McFall, President
The Western Union Telegraph Company
60 Hudson Street
New York, New York 10013

Mr. Leslie Warner
President
General Telephone and Electronics Corporation
730 Third Avenue
New York, New York 10017

Mr. McGeorge Bundy
President
Ford Foundation
320 East 43rd Street
New York, New York 10017

Mr. John W. Macy, Jr.
President
Corporation for Public Broadcasting
1250 Connecticut Avenue, N. W.
Washington, D. C. 20036

Mr. Fred J. Borch
Chairman of the Board and Chief Executive Officer
General Electric Company
570 Lexington Avenue
New York, New York 10022

Mr. T. Vincent Learson
President
International Business Machines Corporation
Old Orchard Road
Armonk, New York 10504

Mr. Howard W. Hughes
President
Hughes Aircraft Corporation
Culver City, California

Dr. R. D. DeLauer
President
TRW Systems
1 Space Park
Redondo Beach, California 90278

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

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

Mr. Charles H. Pillard
President
International Brotherhood of Electrical Workers
1200 15th Street, N. W.
Washington, D. C. 20005

Mr. Vincent T. Wasilewski
President
National Association of Broadcasters
1771 N Street, N. W.
Washington, D. C. 20036

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

General James McNitt
President
International Telephone and Telegraph
World Communications
67 Broad Street
New York, New York 10004

Mr. Howa rd Hawkins
President
RCA Global Communications
30 Rockefeller Plaza
New York, New York 10020

Mr. Edward A. Gallagher
President
Western Union International
26 Broadway
New York, New York 10004

Mr. Charles Wyly
President
University Computing Company
1300 Frito-Lay Tower
Dallas, Texas 75234

Dr. Frank Stanton
President
Columbia Broadcasting System
51 West 52nd Street
New York, New York 10019

Mr. Julian Goodman
President
National Broadcasting Company
30 Rockefeller Plaza
New York, New York 10020

Mr. Leonard Goldenson
President
American Broadcasting Company
1330 Avenue of the Americas
New York, New York 10019

THE WHITE HOUSE

WASHINGTON

August 19, 1969

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Ben S. Gilmer
President
American Telephone and Telegraph Company
195 Broadway
New York, New York 10007

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Charyk:

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Joseph Charyk
President
Communications Satellite Corporation
950 L'Enfant Plaza
Washington, D. C. 20024

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. McFall:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that Western Union has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Russell W. McFall, President
The Western Union Telegraph Company
60 Hudson Street
New York, New York 10013

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Warner:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that the General Telephone and Electronics Corporation has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Leslie Warner
President
General Telephone and Electronics Corporation
730 Third Avenue
New York, New York 10017

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Bundy:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that the Ford Foundation has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. McGeorge Bundy
President
Ford Foundation
320 East 43rd Street
New York, New York 10017

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Macy:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that the Corporation for Public Broadcasting has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. John W. Macy, Jr.
President
Corporation for Public Broadcasting
1250 Connecticut Avenue, N. W.
Washington, D. C. 20036

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Borch:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that the General Electric Company has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Fred J. Borch
Chairman of the Board and Chief Executive Officer
General Electric Company
570 Lexington Avenue
New York, New York 10022

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Learson:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that IBM has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. T. Vincent Learson
President
International Business Machines Corporation
Old Orchard Road
Armonk, New York 10504

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Hughes:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Howard W. Hughes, President
Hughes Aircraft Corporation
Culver City, California

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Dr. DeLauer:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that TRW Systems has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Dr. R. D. DeLauer
President
TRW Systems
1 Space Park
Redondo Beach, California 90278

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Butler:

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We are aware that the Electronic Industries Association has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

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

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Beirne:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that the Communications Workers of America has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Sincerely,

Clay T. Whitehead
Staff Assistant

Enclosure

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

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Pillard:

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Sincerely,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Charles H. Pillard
President
International Brotherhood of Electrical Workers
1200 15th Street, N. W.
Washington, D. C. 20005

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Wasilewski:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that the National Association of Broadcasters has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Sincerely, yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Vincent T. Wasilewski
President
National Association of Broadcasters
1771 N Street, N. W.
Washington, D. C. 20036

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Ford:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that the National Cable Television Association has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

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Clay T. Whitehead
Staff Assistant

Enclosure

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

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear General McNitt:

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Clay T. Whitehead
Staff Assistant

Enclosure

General James McNitt, President
International Telephone and Telegraph
World Communications
67 Broad Street
New York, New York 10004

THE WHITE HOUSE

WASHINGTON

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Dear Mr. Hawkins:

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Staff Assistant

Enclosure

Mr. Howard Hawkins, President
RCA Global Communications
30 Rockefeller Plaza
New York, New York 10020

THE WHITE HOUSE

WASHINGTON

August 19, 1969

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Sincerely,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Edward A. Gallagher
President
Western Union International
26 Broadway
New York, New York 10004

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Wyly:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

We are aware that University Computing Company has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work on October 1.

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Sincerely,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Charles Wyly
President
University Computing Company
1300 Frito-Lay Tower
Dallas, Texas 75234

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Stanton:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

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Clay T. Whitehead
Staff Assistant

Enclosure

Dr. Frank Stanton
President
Columbia Broadcasting System
51 West 52nd Street
New York, New York 10019

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Goodman:

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We are aware that NBC has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and information would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work about October 1.

Since the Federal Communications Commission is responsible for authorizing specific operational systems, we will not be concerned with specific corporate proposals or the details of system designs. Rather, our focus will be on the economic and institutional structure of the industry, the relationships between competition and regulation, and how new uses and services can be encouraged for public benefit.

Enclosed are some of the issues we will be considering. You may wish to use these, in part, in organizing your comments. I look forward to hearing from you.

Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Julian Goodman
President
National Broadcasting Company
30 Rockefeller Plaza
New York, New York 10020

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Goldenson:

The Government is considering alternative policies for the timely introduction of satellites to domestic commercial communications. Our objectives are to assure timely and full benefit to the public of satellite technology potentials and to assure maximum learning about the problems and possibilities of satellite services in domestic applications.

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. Leonard Goldenson
President
American Broadcasting Company
1330 Avenue of the Americas
New York, New York 10019

AT&T Ben S. Gilmer, 195 Broadway, NYC 10007
COMSAT Joseph Charyk, 950 L'Enfant Plaza, D. C. 20024
Western Union Russell W. McFall, 60 Hudson St., NYC 10013
GT&E Leslie Warner, 730 Third Ave., NYC 10017

ABC Leonard Goldenson, 1530 Ave. of the Americas, NYC 10019
NBC Julian Goodman, 30 Rockefeller Plaza, NYC 10020
CBS Dr. Frank Stanton, 51 W. 52nd St., NYC 10019
Ford Foundation McGeorge Bundy, 320 E. 43rd St, NYC 10017
Corporation for Public Broadcasting John W. Macy, Jr., ~~555 Madison Ave. NYC 10022~~
1250 Conn Ave NW Wash 20036

Fred J. Borch, Chairman of the Board & Chief
General Electric Executive Officer, 570 Lexington Ave, NYC 10022
IBM T. Vincent Learson, Old Orchard Rd., Armonk, N. Y. 10504
Hughes Aircraft Co. Howard W. Hughes, Culver City, California
TRW Systems Dr. R. D. DeLauer, 1 Space Park, Redondo Beach, California 90278

George Butler, President, 2001 I, N. W.
Electronic Industries Association Washington, D. C., 20006
Communications Workers of America, Joseph Beirne, 1925 K, NW 20006
IBEW Charles H. Pillard, 1200 15th, N.W. Washington, D. C. 20005
Vincent Wasilewski - National Association of Broadcasters 1771 N St., N.W., D.C. 20036
National Cable Television Association, Inc. Frederick W. Ford, Gen. /1634 I Street, N. W., Washington, D. C. 20006
ITT World Com/James McNitt, 67 Broad St., NYC 10004
RCA Globcom Howard Hawkins, 30 Rockefeller Plana, NYC 10020
Western Union International Edward A. Gallagher, 26 Broadway, NYC /10004
IT&T Corp. H.S. Geneen, 320 Park Ave, NYC 10022

University Computing Corporation Charles Wyley, 1300 Frito-Lay Tower, Dallas, Texas

AT&T Ben S. Gilmer, 195 Broadway, NYC 10007
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√National Cable Television Association, Inc. Frederick W. Ford, Gen. /1634 I Street, N. W., Washington, D. C. 20006
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√Western Union International Edward A. Gallagher, 26 Broadway, NYC
IT&T Corp. H.S. Geneen, 320 Park Ave, NYC 10022 /10004

University Computing Corporation Charles Wyly, 1300 Frito-Lay Tower, Dallas, Texas (zip 75234 (201) 828-3900
(local contact for UCC - Microwave Transmission Corp- subsidiary of UCC - 6201 Leesburg Pike, Falls Church, Va. 22044, 532-1000)

AT&T Ben S. Gilmer, 195 Broadway, NYC 10007
COMSAT Joseph Charyk, 950 L'Enfant Plaza, D. C. 20024
Western Union Russell W. McFall, 60 Hudson St., NYC 10013
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IT&T Corp. H.S. Geneen, 320 Park Ave, NYC 10022 /10004

University Computing Corporation

Domestic Working Group

August 19, 1969

MEMORANDUM FOR MR. ZIEGLER

Attached is a copy of a letter sent to the organizations on the attached list. I don't think a press release is called for, but some of the press may be interested in getting copies.

Clay T. Whitehead
Staff Assistant

Attachments

cc: Mr. Flanigan
Mr. Whitehead
Central Files

CTWhitehead:ed

THE WHITE HOUSE

WASHINGTON

August 19, 1969

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

August 16, 1969

Benefit to the public from the economic and service potential of satellite technology

1. What specific services that are not now available would be made possible and economically feasible through satellite technology?

2. What specific services now being offered could be provided more effectively or more efficiently through satellite technology, and what economic savings would accrue?

3. What institutional, technical, and economic arrangements, taken as a whole, appear most likely to assure full benefit to the public of domestic satellite potential?

4. What specific services and systems appear to offer the most immediate economic potential and how can they best be provided?

Learning about the problems and possibilities of satellite services

1. What information about technological capabilities and performance of satellite systems is needed to resolve uncertainties about the technical and economic feasibility of potential systems?

2. What information about operational uncertainties is needed?

3. What information about economic and market characteristics is needed?

4. Specifically, what information or technological developments are needed over the next few years with respect to tradeoffs among spectrum utilization, orbit location, and cost to permit maximum utilization of communications satellite capabilities?

5. What of the above information can be obtained best by further research, experimental trials, or a pilot operational system?

Incentives for innovation by communications firms to develop new telecommunications services and markets

1. What Government policies would be most effective in promoting development of new telecommunications services and markets by the private sector?

2. What research and development can be carried out by private enterprise to speed the development of economically viable domestic communications satellite applications?

3. Is there research that can be carried out only by the Government that would resolve uncertainties or impediments to technological or market innovation by the private sector?

4. Given appropriate economic incentives and institional arrangements, what new services, markets, or technologies could the private sector likely develop in the foreseeable future?

5. What institutional arrangements with respect to ownership and operation of communications satellites will offer the best balance between the rate of innovation and nondisruptive growth of the communications industry?

Degree of regulatory control and impediments to technical and market innovation

1. What type and degree of economic regulation (such as rate-base regulation, limits on entry of new firms, authorized user limitations, or limits on services offered) is now clearly necessary during the initial phases of domestic commercial satellite communications? What technical regulation, such as spectrum utilization, interference standards, or service standards?

2. Under reasonable projections of the economic and technological potential of satellite services, what regulatory policies appear most desirable for the long run?

3. Is it desirable to have regulatory policies with respect to telecommunications via satellite that are distinct and different from policies for terrestrial systems?

4. To what extent can competition, together with general regulatory guidelines, foster a more responsive industry than is possible with very detailed regulation?

Mr. Ben S. Gilmer
President
American Telephone and Telegraph Company
195 Broadway
New York, New York 10007

Mr. Joseph Charyk
President
Communications Satellite Corporation
950 L'Enfant Plaza
Washington, D. C. 20024

Mr. Russell W. McFall, President
The Western Union Telegraph Company
60 Hudson Street
New York, New York 10013

Mr. Leslie Warner
President
General Telephone and Electronics Corporation
730 Third Avenue
New York, New York 10017

Mr. McGeorge Bundy
President
Ford Foundation
320 East 43rd Street
New York, New York 10017

Mr. John W. Macy, Jr.
President
Corporation for Public Broadcasting
1250 Connecticut Avenue, N. W.
Washington, D. C. 20036

Mr. Fred J. Borch
Chairman of the Board and Chief Executive Officer
General Electric Company
570 Lexington Avenue
New York, New York 10022

Mr. T. Vincent Learson
President
International Business Machines Corporation
Old Orchard Road
Armonk, New York 10504

Mr. Howard W. Hughes
President
Hughes Aircraft Corporation
Culver City, California

Dr. R. D. DeLauer
President
TRW Systems
1 Space Park
Redondo Beach, California 90278

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President
Electronic Industries Association
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Washington, D. C. 20006

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Communications Workers of America
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Washington, D. C. 20006

Mr. Charles H. Pillard
President
International Brotherhood of Electrical Workers
1200 15th Street, N. W.
Washington, D. C. 20005

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International Telephone and Telegraph
World Communications
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New York, New York 10004

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President
RCA Global Communications
30 Rockefeller Plaza
New York, New York 10020

Mr. Edward A. Gallagher
President
Western Union International
26 Broadway
New York, New York 10004

Mr. Charles Wyly
President
University Computing Company
1300 Frito-Lay Tower
Dallas, Texas 75234

Dr. Frank Stanton
President
Columbia Broadcasting System
51 West 52nd Street
New York, New York 10019

Mr. Julian Goodman
President
National Broadcasting Company
30 Rockefeller Plaza
New York, New York 10020

Mr. Leonard Goldenson
President
American Broadcasting Company
1330 Avenue of the Americas
New York, New York 10019

8/19/62

Ruth sent
cyo. of
material
to those
checked on
this list.

Bill Anderson
Frank Jones
Jim Ross
FLANIGAN

Could you
stick a
note on
here
saying
who
received
these

Memo sent to	Phone No.	Date sent	Representative	Repr.'s Phone No.	Attended Mtg. on 8/15/69
Dr. Lee A. DuBridge Director, Office of Science and Technology Room 203 - EOB	3530	8/6/69	Dr. Russell Drew XX Rm 285-EOB	3570 X	Dr. Russell Drew
Dr. Paul McCracken Chairman Council of Economic Advisers Room 312 - EOB	5036	8/6/69	Dr. Tom Moore XX Rm 327 EOB	5080	Ed Mitchell
Mr. Robert Mayo Director Bureau of the Budget Room 252 - EOB	4840	8/6/69	Bill Morrill X Rm. 10009 New EOB BOB	4684	Don Crabill
~~General James O'Connell~~ Director, Office of Telecommunications Management 1800 G Street, N. W. Washington, D. C.	5182	8/6/69	Col. Ward Olsson X Rm 750 1800 G St NW	5190	Col. Ward Olsson
Chairman Rosel Hyde Federal Communications Commission Room 814 1919 M Street, N. W. Washington, D. C. 20554	632-6336	8/6/69	Chairman Hyde X Bernard Strassburg Rm 514 Wm Watkins Rm 714 Al Priesser	Same 632-6910 632-7060	Chairman Hyde Bernard Strassburg
Mr. Richard McLaren Assistant Attorney General Dept. of Justice Room 3109 10th and Const. Ave., N. W. Washington, D. C.	(187) 2401	8/6/69	Don Baker X Chief of Evaluation Section Antitrust Div Rm 3115 Justice Dept 10th & Const ave NW Wash D C.	(187) 2411 737-8200	Richard McLaren Walker Comegys (Brock)

Dr. Thomas O. Paine
Administrator
National Aeronautics and
Space Administration
Room 7137 - FOB-6
400 Maryland Avenue, S. W.
Washington, D. C.

(13)36931 8/6/69

Dr. Willis Shapley (13) 24715 Dr. Shapley
Dr. Walter Radius (Alt) (13) 24583 Dr. Radius

Dr. Myron Tribus
Asst. Secy. of Commerce
for Science and Technology
14th and Const. Avenue, N. W.
Room 5884 Commerce Dept.
Washington, D. C.

(189) 3111 8/6/69

Mr. E. T. Klassen
Deputy Postmaster General
Room 3202 New P. O. Bldg.
12th and Pa. Ave., N. W.
Washington, D. C. 20004

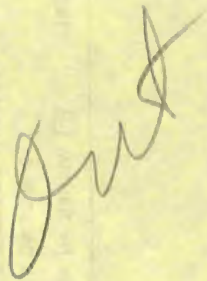
(177) 7370 8/6/69

Robert Scherr (177) 7472 Robert Scherr
G. C.'s office)

Mr. Secor Browne
Asst. Secy. for Research
and Technology
Dept. of Transportation
Room 800 West
800 Independence Avenue, S.W.
Washington, D C 20590

962-0988 8/6/69

Richard L. Beam 963-4313 Richard L. Bean
Director, Office
of Telecommunications
Rm. 834



THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. Geneen:

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We are aware that International Telephone and Telegraph Corporation has had a continuing interest in this subject. While we have reviewed the public record of the last several years, your current ideas and inf ormation would be a useful addition to our review. I would, therefore, like to invite you to submit any information or comments you feel would be helpful to our working group. We expect to complete our work on October 1.

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Sincerely,

Clay T. Whitehead
Staff Assistant

Enclosure

Mr. H. S. Geneen
President
International Telephone and Telegraph Corporation
320 Park Avenue
New York, New York 10022

THE WHITE HOUSE
WASHINGTON

8/15/69

Tom -

This is a copy of the first memo reactivating Paul I - dead for past 2 years - on Satellite Com. Appears to be primarily concerned with int'l broadcast policy. Activity is an outgrowth of the Zablocki Hearings & this may asking who is responsible for nat'l telecom policy.

Now appears to have only slight parallels to your domestic sat working group.

Dick M

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF TELECOMMUNICATIONS MANAGEMENT
WASHINGTON, D.C. 20504

OFFICE OF THE DIRECTOR

July 22, 1969

Memorandum for: Members, Panel 1
Ad Hoc IntraGovernmental Communications
Satellite Policy Coordination Committee

This Office is concerned about views, voiced recently in Congressional hearings on the gaps that are reputed to exist in U. S. policy on direct broadcasting. Consider, for example, the following quotations from Hearings of the House Subcommittee on National Security and Scientific Developments, May 13-22, 1969, Clement J. Zablocki, Chairman:

From the "Analysis & Findings," page 3R:

"Although the United States has much at stake in the international political decisions which soon may be made regarding satellite broadcasting, the subcommittee found an appalling lack of Government policy.

"To date, U. S. policymakers have chosen to temporize on the issues involved in satellite broadcasting. Emphasis has been placed on the far-off nature of the technology. When problems have arisen they have been handled on a case-by-case basis."

"The lack of policy guidelines was nowhere more clear than in the arrangement made between the United States Government and the Government of India to allow the latter to use an ATS-F satellite, scheduled for launching in 1972, as the basis of an instructional television system..."

From page 33, Mr. Zablocki:

"I am wondering why India was selected, over an area of our own country. Alaska would be more in NASA's area and would not bring the international aspect into the NASA operations."

"Let me restate the question."
"According to my knowledge, there is no well-defined U. S. Government space broadcasting policy. Nothing is very clear, even during the hearings here today, as to the policy of the United States in the area of satellite broadcasting..."

From page 118

Mr. Zablocki: "Mr. Secretary (Mr. De Palma, State Department) in what areas do you think further study in depth must be undertaken by the State Department, or as Mr. Marks has suggested, by an interdepartmental task force, before we can arrive at some U. S. policy, and have some instructions for the U. S. delegation at the U. N. meeting in July?

"After all, it is just a little over two months before the meeting will be held. If there is an absence of policy, a policy vacuum, how effective will our delegation be at the ITU? That is the question that comes to my mind."

Additional examples in the same vein could be cited from these hearings.

It is clear that there is need for development and dissemination of comprehensive U. S. policy regarding satellite broadcasting. Some of the elements of such a policy have already been established by the action of government agencies. How can the policy gaps be closed and how should these policies be promulgated?

First, it should be noted that this Office has, among other things, responsibility to "...advise and assist the President in connection with ...provisions of (the Satellite) Act" and to "...Coordinate the activities of governmental agencies...so as to insure...compliance...with policies set forth in the Act..." (E. O. 11191). Other responsibilities are set forth in E. O. 10995.

We would like to offer our good offices to develop answers to the questions cited above. Panel 1 of the Ad Hoc IntraGovernmental Communications Satellite Policy Coordination Committee appears to be a good forum in which to discuss these questions. Therefore, we

propose that this Panel be reconvened for the purpose of arriving at a consensus on what U. S. policy should be regarding broadcasting satellites.

We would welcome your agreement to a panel meeting on these questions. I would suggest initially that we address the following questions and issues:

1. What priority should be attached to the various satellite broadcasting services in comparison with the other needs of developed and developing nations?

2. How does satellite broadcasting rank in comparison with alternate means of supplying these services in other countries both in an economic sense and in terms of its effectiveness?

3. What is the priority or ranking of various regions or countries for initial broadcast satellite systems?

4. What changes in the Communications Satellite Act of 1962 might be necessary or desirable to permit or encourage these systems?

5. What changes might be necessary or desirable in the Radio Regulations regarding frequency allocations, definition of services, interference avoidance criteria and procedures, etc.

6. What should be the views of the U. S. regarding control of programming, unwanted reception of "foreign" broadcasts, and jamming? How can these concerns be resolved?

7. How should such systems be coordinated and regulated to prevent harmful interference, the proliferation of systems and harm to other space efforts such as INTELSAT?

8. Should aid be given to countries desiring such systems? How would such aid be provided?

9. What is the technological state-of-the-art for "community" and "direct" broadcast systems?

10. What additional questions should be considered by Panel 1 in the hope of arriving at elements of an agreed U. S. policy on broadcast satellites?

An early meeting appears most desirable. An initial response to question 10 above would also be welcome.

In cases where previous Panel 1 members have left their respective agencies, this memorandum is being directed to the head of those agencies with a request that it be directed to an appropriate staff member.

J. D. O'Connell

Distribution:
OST - Dr. Lee A. DuBridge
NSC - Dr. Henry A. Kissinger
USIA - Mr. Frank J. Shakespeare
NASA - Dr. Willis Shapley
NASC - Mr. Roman V. Mrozinski
State - Mr. Frank E. Loy
OASD - General Harold Grant
Justice - Mr. Don Baker
FCC - Mr. Bernard Strassburg
GSA - Mr. Marvin M. Morse
FAA - Mr. John H. Shaffer

August 19, 1969

Dear Fred:

Thank you for your kind letter of July 30th regarding our action on the domestic communications satellite issue. I have indeed met Walt Hinchman, and am finding him and his analyses very useful. I will indeed be in touch if our efforts involve any outside assistance.

Sincerely,

Clay T. Whitehead
Staff Assistant

Mr. Fred W. Morris, Jr.
President
Tele-Sciences Corporation
9315 Holly Oak Court
Washington, D. C. 20034

cc: Mr. Whitehead
Central Files

CTWhitehead:ed

TELE-SCIENCES CORPORATION
TELECOMMUNICATIONS CONSULTANTS

9315 HOLLY OAK COURT
WASHINGTON, D. C. 20034
TELEPHONE (301) 469-6034

July 30, 1969

Dear Tom:

Congratulations on the positive step forward you are taking and the leadership exhibited in your convening a study group to consider the domestic communications satellite issue and to advise the FCC concerning the Administration's policy position. I want to join many others in wishing you well in your endeavor. In my opinion it is unfortunate that such leadership has not been forthcoming from the ODTM in the past.

During the Johnson/Rostow Task Force on Communications Policy, Mr. Walter Hinchman - now with the Department of Commerce, Boulder, Colorado - contributed some fine analysis in the field of your new effort. If you have not already made contact with Walt, I suggest you do so.

Please let me know if I can be of any assistance to you or your associates.

With personal regards,

Sincerely,

Fred

Fred W. Morris, Jr.
President

Dr. Clay T. Whitehead
Staff Assistant to The President
The White House
Washington, D.C.

THE WHITE HOUSE

WASHINGTON

August 19, 1969

Dear Mr. _____:

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

8/16/69

Tom:

Attached is a xerox of a list I am working on to update the 2/25 memo Morrill sent us re persons outside Govt. concerned with Telecommunications Task Force Report. (I think I got all the add-ins under the correct category).

Also, a list of those with whom you met.

I thought you might need to look these over in connection with the letters

you will be sending out.

Also attached is a list you wanted added to the Morrill list----
G. E. I will put under Industry.

Do you want a listing of Networks to include Everett Erlich? Anyone else?

McKenna & Wilkinson? ? ? ? ?

Tom wants

list of organizations and people in the communidations industry based on the Morrell memo we have been working from ---- add to it the various names that we have now penciled in and also add the name of United Utilities, Paul Hinson, President.

THE WHITE HOUSE

WASHINGTON

August 19, 1969

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Sincerely yours,

Clay T. Whitehead
Staff Assistant

Enclosure

Add to Comm. list from Ronald.

General Electric

Bernard White
General Electric Missile and Space Division
King of Prussia, Pennsylvania 19406

(215) 962-4111

Raymond E. Baker
General Electric Communications Products Department
Lynchburg, Virginia 24503

ABC Television

Everet H. Erlick
1330 Ave. of Americas
New York, New York

McKenna and Wilkinson, Attorneys

James A. McKenna,* Kittner, & Ramey
1705 DeSales Street, N.W.
Washington, D. C. 20036

4-22-69

MEMORANDUM

Shakespeare

THE WHITE HOUSE
WASHINGTON

1 AT&T
GT&E
~~Comsat~~
Western Union

2 RCAC
WUI
IT&T Worldcomm
Comsat

6 Hughes
IBM
~~Sp~~

3 CWA
NABET
AFTRA

4 Networks
NBC
CBS
ABC

5 NAB JCET*
AITC
NET
RAB
TBA
EIA
NCTA
~~JTAC~~

FF
CC

+ Joint Council of the Educational Telecommunications
Harold Wigren 659-9740.

MEMORANDUM

Shakespeare

THE WHITE HOUSE
WASHINGTON

1 AT&T
GT&E +
~~Comsat~~
Western Union

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NABET
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5 NAB JCET *
AITC
NET
RAB
TBA
EIA
NCTA
~~&~~ JTAC

FF
CC

+ Joint Council of the Educational Telecommunications
Harold Wigren 659-9740.

I think you just
talked with this
one and did you
decide against
meeting with anyone
from Sperry?

yes

Friday 4/18/69 (212) 956-2121

4:20 In checking on W. L. Barrow, V. P. for Research, Development and Engineering at Sperry Rand Corporation, Don Gessaman has discovered that the man has retired. Herbert Harris has taken his place; however, Gessaman says that Barrow had very little to do with the Rostow Task Force and Harris knows very little about it.

Do you want to skip Sperry Rand or talk with Harris?

4/21 talked with Herbert Harris
will call
fuck

PEOPLE TO CALL

Tom:

On 5/8/69 you met with Richard Gifford, GE of Lynchburg, Va.

yes Was this one of those telecommunications meetings?

You met with Don Rodgers and Don Atkinson of GE on 4/22/69.

How about Fred W. Morris, Jr., President, Tele-Sciences Corporation? ? ? ?
Yes Telecommunications meeting to be added to Morrill's list?
(Met with him 5/27)

You said to add to the list of names -- United Utilities, Paul Hinson, President.
No Did you meet with him?

Start inviting people to come in to meet with Mr. Whitehead:

(To discuss the general area of telecommunications policy matters)

Tom wants to call
+ talk to them himself

B.B. FORM NO. 34

FEB 25 1969

UNITED STATES GOVERNMENT

Memorandum

Executive Office of the President
Bureau of the Budget

TO : Mr. Clay T. Whitehead

DATE:

Wm A. Morrill

FROM : National Security Programs Division (William A. Morrill)

SUBJECT: Persons outside Government concerned with Telecommunications Task Force Report

Below is a list of persons with industry, industrial associations, institutions, and labor who have voiced interest in or are likely to voice interest in specific chapters of the Task Force report or the report in general. In some organizations more than one high level executive is directly interested in the report; the person most concerned is identified with an asterisk.

Industry

4/9 ✓ AT&T: * Ed Crossland, VP-Federal Relations, New York City; (212) 393-1000
Ben Oliver, VP-Government Operations, Washington, D. C., 466-3000;
Ben Givens, Asst. VP-Federal Relations, Washington, D. C.

4/8 ✓ ITT: * Joseph J. Gancie, VP-ITT World Communications, Washington, D.C., (division ~~headquarters~~)
296-6200;
John Ryan, Task Force Contact, 296-6000 ext. 213. Deputy Dir, ITT Govt. Relations

~~Ted Westfall, Exec. VP (ITT Corp)~~

4/14 ✓ RCA Communications: Howard Hawkings, President, New York City. (212) 363-4200
Leonard Tuft, VP Washington Office (212) 337-8500

4/18 ✓ Western Union Telegraph Co.: * Earl Hilburn, VP and Special Assistant to the President, New York City; (212) 577-4321
Richard Callaghan, VP-Congressional Liaison.

4/14 ✓ COMSAT: * General McCormick, Chairman, Washington, D. C.; 554-6000 WC
Dr. Charyk, President, Washington, D. C.;
David Acheson, General Counsel, D. C.

4/30 ✓ Western Union International: E. A. Gallagher, President, New York City. R.E. Conn
Thomas Greenish, Exec. VP Henry Catuna VP Wash Ops (Gov't relations 638-6724)

✓ GT&E: * Theodore F. Brophy, VP and General Counsel, New York City;
Gaylord Horton ; * Jim Clerkin, V.P., Operations

5/12 ✓ Hughes Aircraft: * Dr. Fred Wheelon, VP Engineering, Culver City, PhD. will call 4/23
California; (213) 391-0711 Ext. 3770
Clell McKinney, NASA & Commercial Communications Activities, 277
Washington, D. C. 234-9300;
Mr. Paul Visher. El Segundo Calif.

5/8 GE - Richard Gifford, Lynchburg Va.

4/22 ✓ Also General Electric Ex 3-3600 ~~0230~~
* Don Rodgers, Mgr. Missile & Space Field Operations
Don Atkinson, Mgr. aerospace Market Development

IBM: Robert King;
George Hallgren;
* Jack Melick, Data Processing Division, Washington, D. C.
333-6700 ext. ~~7396~~. 7036

Sperry Rand Corporation: W. L. Barrow, VP for Research, Development, and Engineering, New York City.

Labor

Communications Workers of America: Joseph A. Beirne, President, Washington, D. C.

National Association of Broadcast Employees & Technicians: Chicago, Illinois.

American Federation of Television & Radio Artists: Vicki Viola, New York City.

Industry Associations

National Association of Broadcasters: Vincent T. Wasilewski, President, Washington, D. C.

Association of Independent Telephone Companies: Paul Porter, Counsel, Washington, D. C.

Association of Maximum Service Telecasters: Lester Lindow, Executive Director, Washington, D. C.

National Educational Television: James Karayn, Washington Bureau Chief, 483-6367.

American Advertising Federation: New York City.

Radio Advertising Bureau: Miles David, President, New York City.

Television Bureau of Advertising: Norman Cash, President, New York City.

Electronic Industries Association: Washington, D. C.

National ~~Community Television~~ Cable Television Association: Fred W. Ford, President, Washington, D. C.

Institutions

Brookings Institution: William Capron, Washington, D. C. 483-8919.

Ford Foundation: * McGeorge Bundy, President, New York City;
Paul Laskin, Task Force Contact, 212-573-5000.

Carnegie Corporation of New York: Alan Pifer, New York City.

Technical Groups

Joint Technical Advisory Committee of the Institute of Electrical and Electronic Engineers and the Electronics Industry Association: John M. Kenn, Secretary, New York City.

Networks
ABC
NBC
CBS

Add to Comm. list from Ronnie.

General Electric

Bernard White
General Electric Missile and Space Division
King of Prussia, Pennsylvania 19406

Raymond E. Baker
General Electric Communications Products Department
Lynchburg, Virginia 24503

ABC Television

Everet H. Erlick
1330 Ave. of Americas
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1705 DeSales Street, N.W.
Washington, D. C. 20036

4-22-69

September 3, 1969

3:35 Katherine Johnson of AVIATION WEEK called to ask the names of the people on the domestic satellite committee. 737-6630

Gave them to her.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

REPLY TO
ATTN OF:

September 5, 1969

Dr. Clay T. Whitehead
Staff Assistant
The White House
Washington, D. C. 20500

Dear Dr. Whitehead:

The accompanying material has been prepared as a follow-up on our discussion on August 15. It consists of a complete version of the briefing we presented on that date and a commentary on technical aspects of a U. S. domestic communications satellite system. A summary statement on factors affecting orbit and frequency utilization, now in preparation, will follow in two weeks.

We hope that this material provides answers to the questions you asked at the meeting. As we said at that time, some factors influencing frequency and orbit utilization are not yet well defined. Consequently, in our opinion, a domestic communications satellite system should evolve step by step, avoiding a firm, long-term commitment to a particular frequency band until there is more information available on the attainable "packing density" of various frequency bands and of the orbit arc serving North America.

Sincerely,

R. B. Marsten
Director, Communications Programs

Enclosure

September 3, 1969

U. S. DOMESTIC SATELLITE SYSTEM

The purpose of this paper is to highlight and make recommendations on some of the more important technical aspects concerned with configuring a U. S. domestic satellite system. We believe that some of the technical problems described in proposals before the FCC have been over-simplified, and we hope the following paragraphs which describe some of these problems will place them in better perspective.

Paragraph I summarizes the more important factors, particularly with respect to frequency allocation, orbital spacing, compatibility with other systems, and special technology requirements.

Paragraphs II through V provide background information and discussions of each factor.

I. SUMMARY

A. Because of the multitude of unanswered questions relating to frequency allocation, orbit utilization, and technology readiness, a final configuration of a domestic communications satellite system may remain undefined for several years. Therefore, a "test bed" system at 4 and 6 GHz or 7 and 8 GHz should be provided as soon as possible to obtain the necessary answers. The "test bed" configurations should provide enough flexibility to avoid constraining the design of an ultimate domestic system.

B. No attempt should be made to go ahead with a fully operational system confined to the 4 and 6 GHz bands. Sufficient bandwidth will not be available at 4 and 6 GHz if a viable system is to be provided.

It is also not certain that the frequency-sharing criteria adopted by CCIR in 1966 can be applied to the greater density of satellites and Earth terminals required for domestic communications via satellite, particularly in areas of dense deployment of surface radio relay systems.

Due to these uncertainties, the Director of Telecommunications Management has requested NASA to design and manage a program of experiments to provide additional data on the feasibility of sharing between a domestic satellite system and terrestrial radio relay systems and on the utility of frequencies above 10 GHz for some communication satellite services. NASA plans to provide preliminary data for the region 4 GHz - 8 GHz in January 1971. Initial data above 10 GHz will become available in late 1969 if NASA's ATS-5 is successful. Additional data will become available in late 1972 via ATS-F.

C. Due to spectral crowding at 4 and 6 GHz, and the fact that the bands above 11 GHz are technically practicable and uncrowded, aggressive efforts should be pursued to make these upper bands available.

D. A variety of services such as point-to-point communications, community TV, and program distribution may eventually be provided in a domestic or national system. Therefore, planning must include systems analysis of all of the technical and economic factors involved in providing a mixture of such services.

E. We consider the technology required for a satellite distribution service to be similar to that required for point-to-point communications satellite service and that it is technology which is readily available. Because, however, frequency crowding already exists in the 4 and 6 GH_Z bands, additional frequencies should be considered and allocated in other spectral regions to provide for

satellite program distribution requirements. Criteria and procedures for frequency sharing and orbit utilization will have to be developed for the specific bands selected and for the specific co-users of the channels, using many of the principles established for sharing criteria in the 4 and 6 GHz bands.

If the position is taken that the program distribution service is not a part of the communication satellite service, orbit utilization criteria appropriate to this different situation would have to be developed.

F. We recommend that frequencies be allocated for community broadcasting satellite services in the 614 to 890 MHz, selected portions of 1556 to 3400 MHz, and 11.7 to 12.7 GHz bands.

G. Equitable allocation of the desirable space available in synchronous orbit is potentially a very serious problem. There are many unanswered questions and, therefore, a pre-assignment of slots in a geostationary orbit would be undesirable at this time.

H. The question of compatibility between a U. S. domestic satellite system and a co-regional system such as a Canadian or South American system or INTELSAT communications satellite system should not be neglected. Questions relating to compatibility such as frequency allocation, interference, and the ability of an Alaskan ground station to work with a co-regional system must be studied before a final configuration is determined.

I. For point-to-point communication and program distribution up to 8 GHz, present technology is adequate. Additional services and frequencies will require more careful consideration of "spill-over" aspects, beam shaping, pointing, and narrow-beam, large spacecraft and ground antennas. Maximum allowable drift rates and interference require further work in attitude control, station keeping, and five- to ten-year lifetimes for these systems. Geographic separation of Hawaii, Puerto Rico, and other areas require some development in pointing and multiple beam technology. Multinational contiguity (e.g., U. S., Canada, and Mexico) requires beam shaping techniques to minimize "spill-over" problems.

II. FREQUENCY ALLOCATION

A. Program Distribution We consider the technology required for a satellite distribution service to be similar to that required for point-to-point communications satellite service and that it is technology which is readily available. Because, however, frequency crowding already exists in the 4 and 6 GH_z bands, additional frequencies should be considered and allocated in other spectral regions to provide for satellite program distribution requirements. Criteria and procedures for frequency sharing and orbit utilization will have to be developed for the specific bands selected and for the specific co-users of the channels, using many of the principles established for sharing criteria in the 4 and 6 GH_z bands.

If the position is taken that the program distribution service is not a part of the Communication Satellite service, then orbit utilization criteria appropriate to this different situation would have to be developed.

In any event, program distribution systems would tend toward higher-power satellites to reduce cost and complexity of receiving facilities. It is noted that if these systems share frequencies with communication satellite systems, this will tend to reduce the efficiency of utilization of the geostationary orbit especially if it results in interspersing "inhomogeneous" satellites, and by permitting Earth stations without enough antenna pattern directivity to discriminate against interference from satellites adjacent to the "wanted" satellite.

Technical criteria for sharing between satellite and terrestrial communication systems were developed in the U.S. and proposed to the International Telecommunications Union (ITU) prior to 1963. Essentially similar criteria were adopted by the ITU at its Extraordinary Administrative Radio Conference on space frequency allocations in 1963 and revisions and refinements were accepted at the XIth Plenary assembly of the International Radio Consultative Committee (CCIR) in 1966.

These criteria were developed for sharing between the communications satellite system being considered for worldwide use at that time, and terrestrial radio relay systems, and envisioned that adequate isolation would be possible for the relatively few Earth stations involved in the global system. ALTHOUGH SOME RELEVANT EXPERIMENTS HAVE BEEN PERFORMED, IT IS NOT CERTAIN THAT THE SAME SHARING CRITERIA CAN BE APPLIED TO THE GREATER DENSITY OF SATELLITES AND EARTH TERMINALS REQUIRED FOR DOMESTIC COMMUNICATIONS VIA SATELLITE, PARTICULARLY IN AREAS OF DENSE DEPLOYMENT OF SURFACE RADIO RELAY SYSTEMS.

Due to this uncertainty and the fact that adequate bandwidths will not be available if expanded service beyond point-to-point communication is offered, the Director of Telecommunications Management asked NASA to design and manage a program of controlled experiments to provide additional data on the feasibility of sharing between a domestic satellite system and terrestrial radio relay systems, and on the utility of frequencies above 10 GH_z for some communication satellite services. NASA plans to provide preliminary data for the region 4 GH_z - 8 GH_z in January 1971. Initial data above 10 GH_z will become available in late 1969 if NASA's ATS-5 is successful. Additional data will become available in late 1972 via ATS-F.

The criteria for frequency sharing apply to the following four (4) modes of potential interference which are possible between communication satellite systems and radio relay systems:

At 4 GHz

1. Interference in the Earth station receiver as a result of radiation from radio relay transmitters.

2. Interference in the radio relay system receiver as a result of radiation from communication satellite transmitters.

At 6 GHz

3. Interference in the communication satellite receiver as a result of radiation from radio relay transmitters.

4. Interference in the radio relay system receiver as a result of radiation from the Earth station receiver.

In a recent study performed by the National Academy of Sciences a Panel on Satellite Broadcasting considered it improbable that any attempt would be made to go ahead with a fully operational system confined to the 4 GHz and 6 GHz bands. THEY PRESUPPOSED THE PRACTICABILITY OF DEVELOPING THE TECHNOLOGY FOR USE OF BANDS ABOVE 11 GHZ AND A WORLDWIDE AGREEMENT TO ALLOCATE ADEQUATE BANDWIDTHS IN THAT REGION FOR COMMERCIAL SATELLITE USE.

The present state-of-the-art makes such an assumption reasonable although not certain. The Academy went on to state that a pilot system in the 4 and 6 GHz bands for OPERATIONAL TRIALS AND EXPERIENCE only was desirable.

Although current proposals before the FCC do not go beyond common carrier and TV program distribution services, it is possible that a domestic satellite could be used also to provide a community broadcasting capability, perhaps by adding a transponder operating at appropriate frequencies. However, there are no frequencies now allocated to the broadcasting satellite services.

B. Community TV and Direct Broadcast We recommend that frequencies be allocated for community broadcasting satellite services at 614 to 890 MHz, selected portions of 1556 to 3400 MHz, and 11.7 to 12.7 MHz bands.

614 to 890 MHz

Footnote 324B, proposed in the U. S. Preliminary Views, is an equivocal approach to the expressed need of the lesser-developed countries for a community broadcasting service. In our opinion it is technically feasible for a community broadcasting satellite service to share the

UHF band with terrestrial broadcasting, especially in areas where terrestrial use is minimal or absent. Therefore, co-equal allocation of 614 to 890 MHz to the community broadcasting satellite service on a regional basis should be sought, studies on technical feasibility of sharing expedited, and sharing criteria developed.

Direct broadcasting satellite service in this band is not practical except on an exclusive basis. We should not consider any allocation in this part of the spectrum for the direct broadcasting satellite service at this time.

S-Band (1556 to 3400 MHz)

Additional provisions for a community broadcasting satellite service should be made in this region of the spectrum. There are several bands between 1550 and 3400 MHz where it may be technically feasible for this service to share co-equally with existing services. We are undertaking a short-term investigation of sharing potentialities which should be completed in November. Pending its completion, we recommend co-equal allocation of approximately 200 MHz to the community broadcasting satellite service in an appropriate part of the S-Band.

11.7 to 12.7 GHz

This band has been mentioned for both community and direct broadcasting satellite service.

A community grade of broadcasting satellite service is considered feasible in the near future and the typically high directivity of antennas for all services at these frequencies should enhance the possibilities for co-equal sharing. We intend to study the technical feasibility of such sharing and report on results early in 1970. Pending the outcome of these studies, we recommend adding community broadcasting satellite service to existing allocations in the 11.7 to 12.7 GHz band on a co-equal basis.

In our opinion technology for direct broadcasting in this band is at least 10 years away and will therefore not be discussed at this time.

III. ORBIT UTILIZATION

Because of the desirability of the synchronous equatorial orbit for point-to-point communications and other applications, the number of satellites in such orbits may become large in the 1970's.

Canada is proposing to use 88° and 109° West longitude with a possible third position of 95° West longitude for growth capability. Antennas would range from 30 to 60 feet. NASA's ATS-5 satellite is planned for 110° West longitude and will be used with 40 to 85 feet antennas. Comsat Corporation has proposed two satellites at 97° and 103° West longitude in their concept of a domestic system. Transmit/receiver antennas would range from 42 to 85 feet. Both Comsat and Canada state that there should be a minimum of 6° spacing between satellites. If the above satellites are placed in their proposed positions the line-up would be as follows:

88° West longitude	Canada	
95° West longitude	Canada	
97° West longitude	Comsat	(See Figure 1)
103° West longitude	Comsat	
109° West longitude	Canada	
110° West longitude	NASA	

IT SEEMS APPARENT THAT EQUITABLE ALLOCATION OF THE DESIRABLE SPACE AVAILABLE IN SYNCHRONOUS ORBIT IS POTENTIALLY A VERY SERIOUS PROBLEM. MANY FACTORS CONCERNED WITH COMMUNICATION SATELLITE SYSTEM DESIGN ARE RELATED TO ORBITAL UTILIZATION AND DETAILED SYSTEM STUDIES ARE REQUIRED TO OPTIMIZE ALL OF THESE FACTORS.

The number of longitude slots available is determined by a multitude of complex considerations such as:

(1) use of Earth station antennas which are as large as practicable in relation to system economics and which have low sidelobe radiation relative to the radiation in the main beam;

(2) use of polarization discrimination;

(3) use of narrow-beam satellite antennas;

(4) minimization of differences between characteristics of system using adjacent satellites;

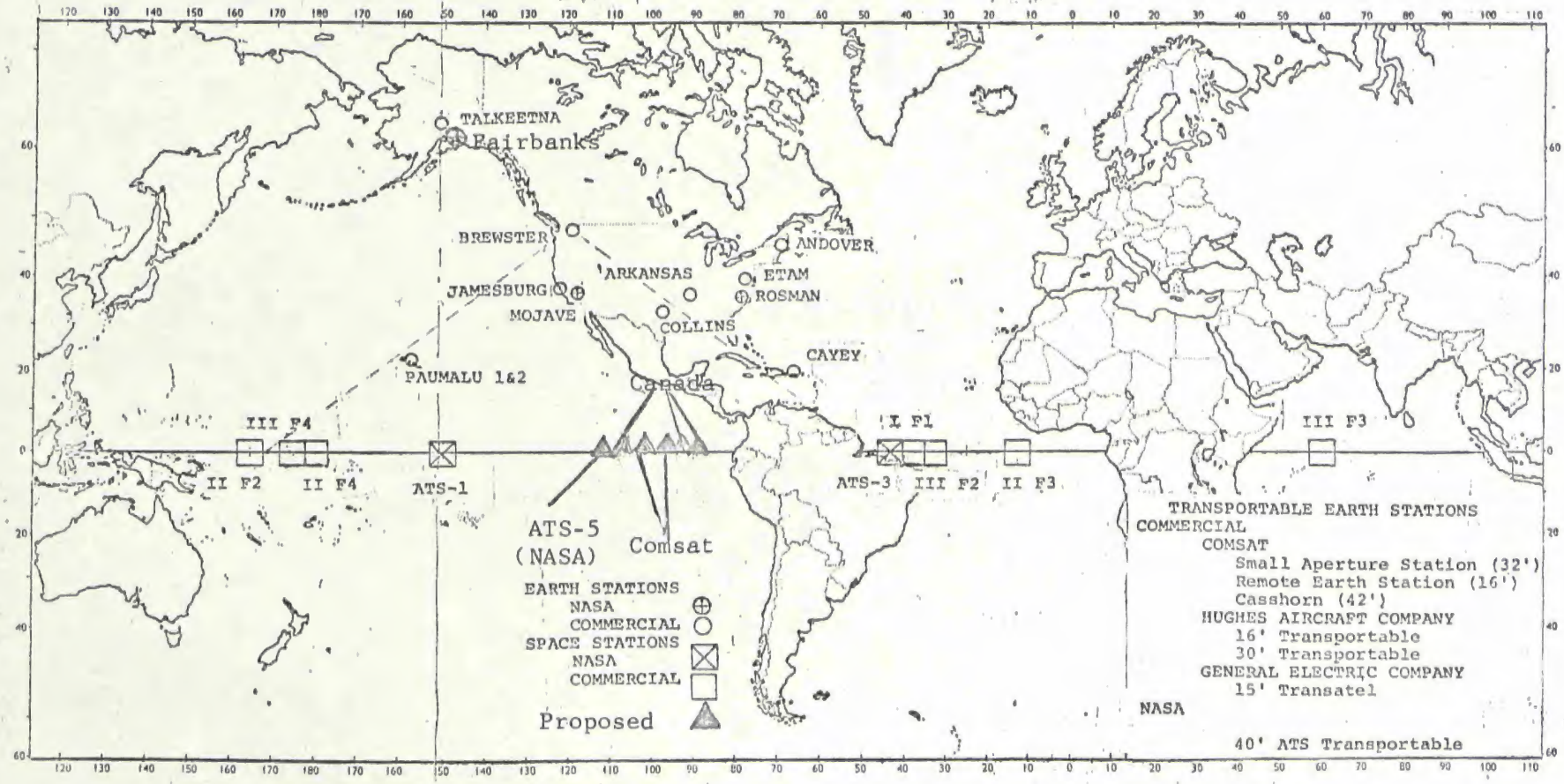
(5) choice of appropriate interference noise allowances;

(6) flexibility in satellite positioning;

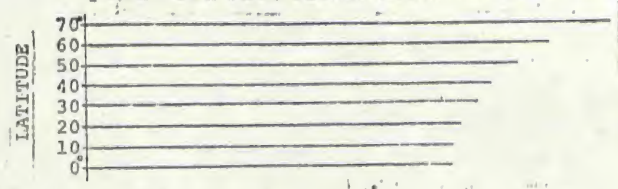
(7) interleaving of carrier frequency where appropriate.

FIGURE 1

ORBIT UTILIZATION



SCALE FOR FIVE DEGREE ELEVATION ANGLE



To determine the potentially usable satellites for a specific earth station, find the latitude of the earth station and select the appropriate scale. The scale or line segment forms a radius from the specific earth station showing those inclusive satellites potentially available. Example shown: Brewster - latitude approximately 50° - useful satellites: INTELSAT II F4, III F4, ATS 1, 5.

The CCIR has adopted a Study Program on orbit utilization and several countries, including the U. S., are contributing valuable technical information.

The question of preassignments of slots in a geostationary orbit will probably by considered at the ITU space frequency allocations conference in 1971. THE U. S. SHOULD NOT ADVOCATE PREASSIGNMENT AT THIS TIME DUE TO THE LARGE NUMBER OF UNANSWERED QUESTIONS ASSOCIATED WITH DETERMINING SLOTS.

Again this emphasizes the need for a pilot system with flexibility and the capability for government and user experimentation.

IV. COMPATIBILITY CONSIDERATIONS

THE QUESTION OF COMPATIBILITY BETWEEN A U.S. DOMESTIC SATELLITE SYSTEM AND A CO-REGIONAL SYSTEM, SUCH AS A CANADIAN OR SOUTH AMERICAN SYSTEM OR INTELSAT COMMUNICATIONS-SATELLITE SYSTEM, SHOULD NOT BE NEGLECTED. Experience in the last few years has demonstrated that it was in the U.S. national interest as well as INTELSAT's interest that NASA's Application Technology Satellites were, to some extent, compatible with the INTELSAT system. On frequent occasions NASA provided backup coverage for certain events when INTELSAT was unable to provide this coverage. Therefore, questions relating to compatibility such as frequency allocation, mutual interference and the ability of an Alaskan ground station to work with a Canadian or other regional system must be studied before a final configuration is determined.

V. SPECIAL TECHNOLOGY REQUIREMENTS

For point-to-point communication and program distribution up to 8 GHz present technology is adequate. Additional services and frequencies will require certain technology developments. For example, "spill-over" constraints require special techniques in beam shaping, pointing and narrow-beam, large spacecraft and ground antennas. Maximum allowable drift rates and interference require further work in attitude control, station keeping and five- to ten-year lifetimes for these systems. Geographic separation of Hawaii, Puerto Rico and other areas require some development in beam shaping, pointing and multiple beam technology. Multinational geographic contiguity (e.g., U. S. Canada, Mexico) requires beam shaping techniques to minimize "spill-over" problems. Further efforts are needed in millimeter waves due to the need for and probable use of higher frequencies. Additional services and user demands will require increased efforts concerned with power sources, demand assigned multiple access, optimum utilization of shared bands and interference and propagation measurements.

COMMUNICATIONS PROGRAM OBJECTIVES

- STUDY REQUIREMENTS FOR AND TECHNICALLY ASSESS APPLICABILITY TO FUTURE NEEDS
- INSURE AVAILABILITY OF NEW TECHNOLOGY AND TECHNIQUES
- CONSULT AND ADVISE OTHER AGENCIES ON TECHNICAL MATTERS
- FULFILL RESPONSIBILITIES ASSIGNED IN COMMUNICATIONS SATELLITE ACT OF 1962

FIGURE 1

NASA SA68-514
1-5-68

FIGURE 2

There are seven major areas of satellite applications, six of which are shown on this 1967 chart: the seventh, which has become visible since then, is data collection.

POINT TO POINT COMMUNICATIONS, typified by the INTELSAT system, introduces a new dimension of flexibility in establishing and altering traffic routing patterns, and traffic capacity, without the limitations previously imposed by cables and HF radio, and permits intercontinental video (TV) service for the first time.

MULTIPLE ACCESS permits simultaneous use of one satellite repeater by a number of ground stations. Multiple access is particularly advantageous in applications involving access by many stations or users, such as in air and marine navigation and traffic control, and in the planned use of satellites to collect data from thousands of fixed and/or moving platforms such as oceanographic buoys and meteorological balloons. Such "large-scale multiple access" satellites will greatly enhance environmental monitoring and control capabilities, by collecting data in real time or near real time on a continental or global scale.

NAVIGATION & TRAFFIC CONTROL by satellite will increase substantially the capacity and safety of intercontinental air traffic routes, improve efficiency and safety of maritime operations, and enhance the effectiveness of search and rescue operations. It is anticipated that these advantages can be applied also to over-land operations, by improving low altitude coverage (no line-of-sight limitations), and by increasing precision of position-fixing. This could reduce or eliminate problems of terminal area congestion, and minimize collision probabilities.

DATA RELAY is primarily a government requirement, aimed at increasing the percentage coverage of both unmanned and manned missions in low earth orbit. The minimum requirement is back-up voice communications, while the desired capability is wideband channels for tracking and for relay of video information. As indicated, there are also possibilities for applying this type of service to lunar and deep space missions.

FIGURE 1

The first three of the four major program objectives shown stem from the Space Act of 1958.

The third objective also stems from the Comsat Act of 1962, which requires that the National Aeronautics and Space Administration consult and advise the Communications Satellite Corporation, the Federal Communications Commission and the Department of State.

We feel that, to meet these legislative mandates, we must perform both studies and developments which will show when specific technology is ready for utilization -- that is, what is the current state of the art, what are its weaknesses, and what are its strong points.

The requirement to advise and consult with the FCC is particularly important. In the past, the FCC has had presented to it a wide spectrum of views on almost any matter which it was considering, thus enabling it to make a judgment among the various alternatives. In the communications satellite area the FCC is usually faced with only a Comsat. Corp. proposal. Therefore, the FCC looks to NASA for alternatives to Comsat. proposals should such alternatives be desirable.

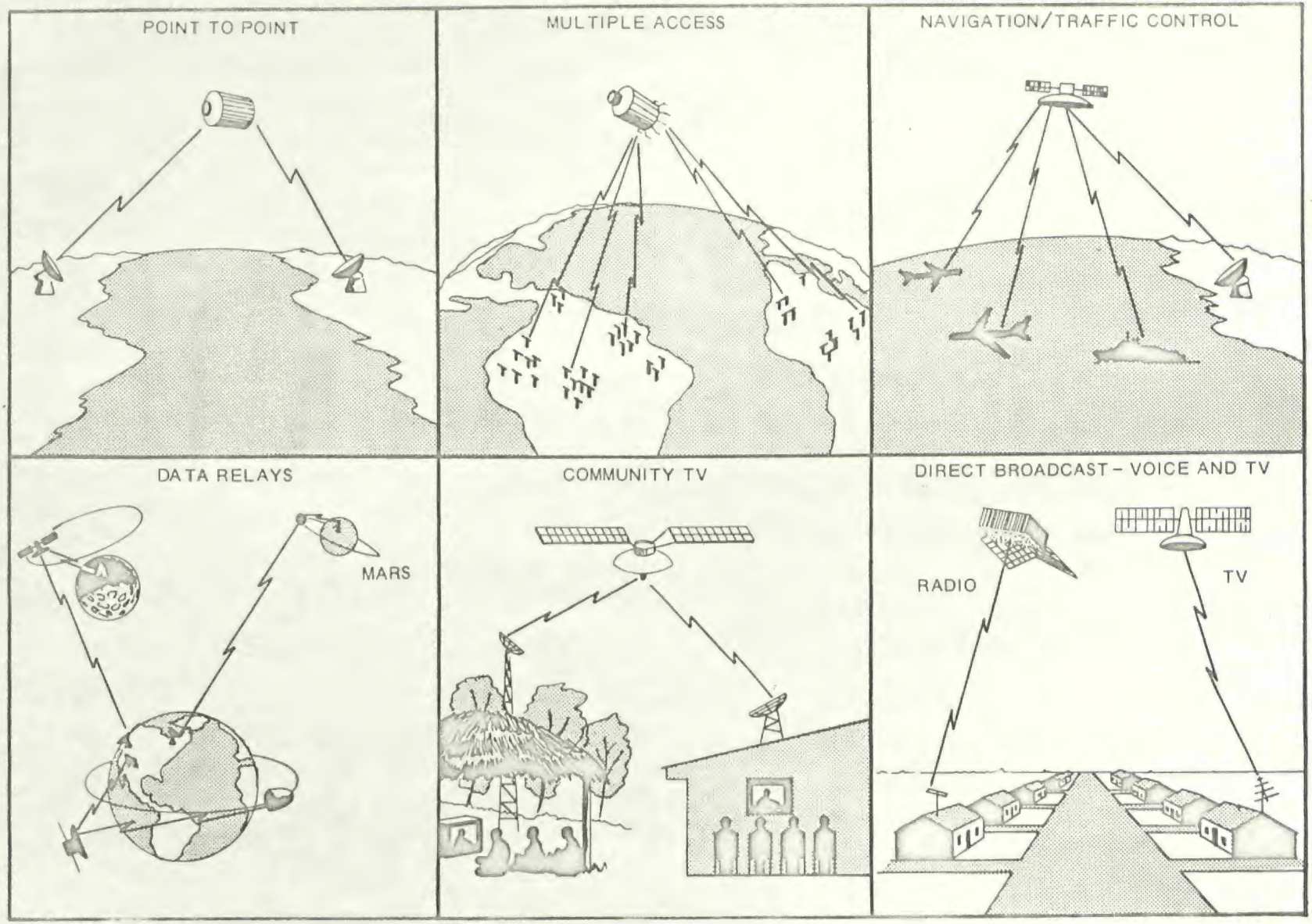
An important area of research which is implicit in these mandates is that of frequency utilization. That portion of the radio frequency spectrum considered usable for earth-space communications was already fully allocated when satellite applications became practical. Full utilization of satellites for communications and navigation requires a new approach to spectrum engineering, to facilitate sharing of frequencies between separate satellite communications systems, and between satellite and terrestrial systems, and to develop the utility of new portions of the spectrum.

FIGURE 2

COMMUNITY BROADCASTING would provide informational, educational, and entertainment services to sparsely populated areas, or areas like India which have many thousands of small communities with no large metropolitan centers. The received material could either be viewed directly on a large and specialized receiver, or fed to local redistribution facilities.

DIRECT BROADCASTING to the unaugmented living room receiver is probably not practical before 1985, if then, although "direct" broadcasting will be feasible at an earlier date to receivers augmented with special antennas and perhaps a preamplifier.

SATELLITE COMMUNICATIONS CAPABILITIES



NASA SA 67-2018
2-28-67

FIGURE 2

FIGURE 3

Any given application of communications satellites progresses from research to space experiments and then to an operational system meeting user requirements; this sequence may recycle several times.

Greatest progress has been achieved in point-to-point communications, which went through several stages of research and experimentation prior to the initial commercial communication satellite, Early Bird. Comsat is now in its third generation of global commercial satellites.

The NASA applications technology satellite program is the principal mechanism for experiments and tests of other applications of communications satellites. ATS-I, III, and V, now in orbit, and ATS-F, to be launched in 1972, will contribute to multiple access technology. Propagation experiments on ATS-V, F&G will provide new information on usability of frequencies above 10 GHz.

ATS-F will be used for community TV experiment with India, and ATS-G may have similar capabilities. This could lead to a demonstration model of a satellite built solely for community TV service.

ATS-F and G will be used to test the concept of data relay between near-earth-orbiting satellites and a geostationary relay satellite. Studies are being conducted to determine the relative advantages of data relay satellites for lunar and deep space missions.

For direct TV broadcasting, studies have so far been limited to the basic technologies required, such as high powered transmitting tubes, high primary power capabilities, dissipation of large amounts of heat, and large deployable antenna systems.

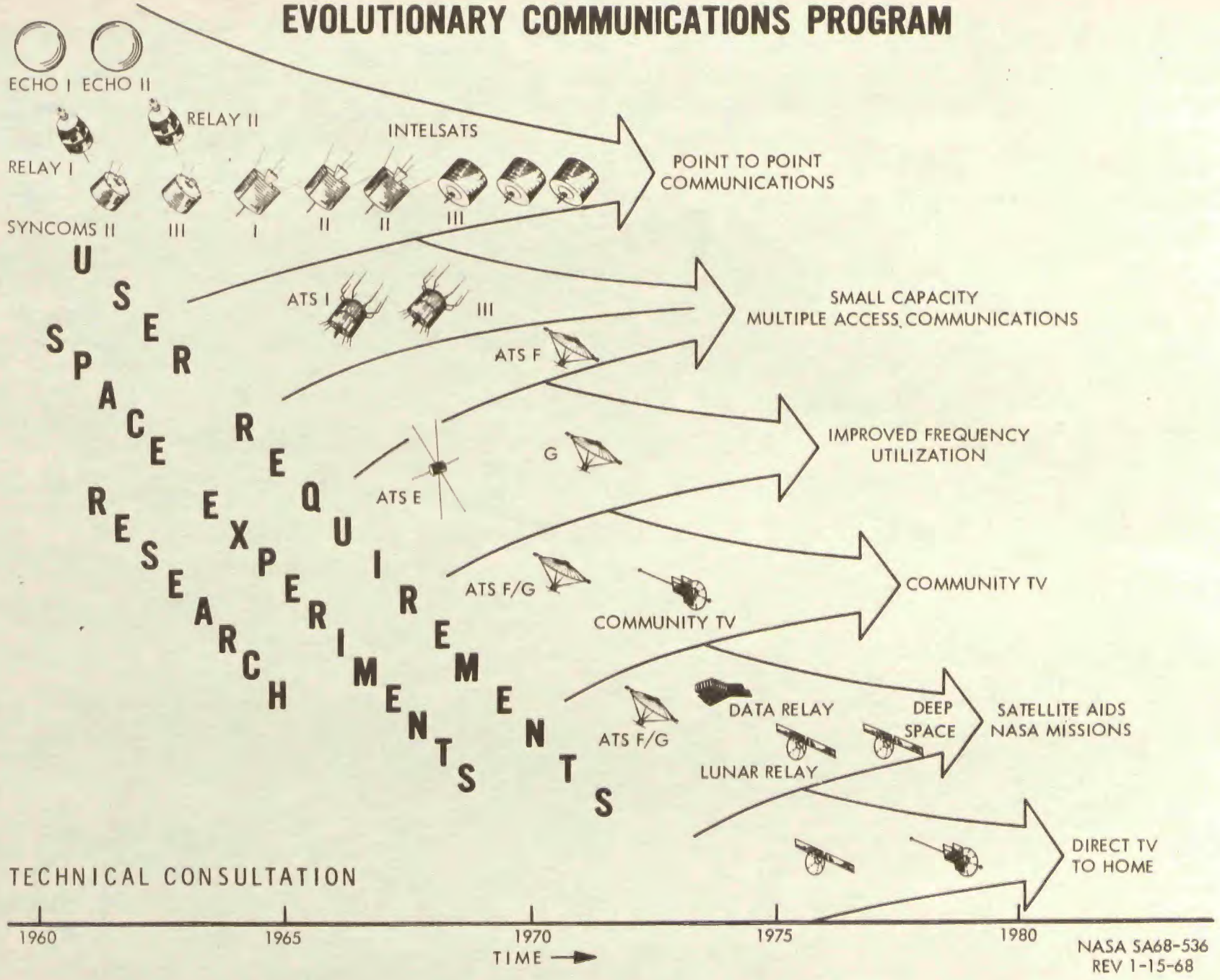

EVOLUTIONARY COMMUNICATIONS PROGRAM
ECHO I
ECHO II
RELAY I
RELAY II
SYNCOMS II
III
I
INTELSATS
II
II
III
POINT TO POINT COMMUNICATIONS
USER SPACE RESEARCH EXPERIMENTS REQUIREMENTS
ATS I
III
ATS F
SMALL CAPACITY MULTIPLE ACCESS COMMUNICATIONS
ATS E
G
IMPROVED FREQUENCY UTILIZATION
ATS F/G
COMMUNITY TV
COMMUNITY TV
ATS F/G
DATA RELAY
DEEP SPACE
LUNAR RELAY
SATELLITE AIDS NASA MISSIONS
DIRECT TV TO HOME
TECHNICAL CONSULTATION
1960
1965
1970
1975
1980
TIME
NASA SA68-536
REV 1-15-68

FIGURE 3

FIGURE 4

On the facing page we show some particular milestones for the capabilities that we have been discussing in general.

Studies are already underway, in cooperation with the FAA and international agencies, of a transoceanic navigation and traffic control system which could come into being in 1974. We expect that satellites can also improve over-land air navigation and traffic control; such a capability is anticipated by 1978.

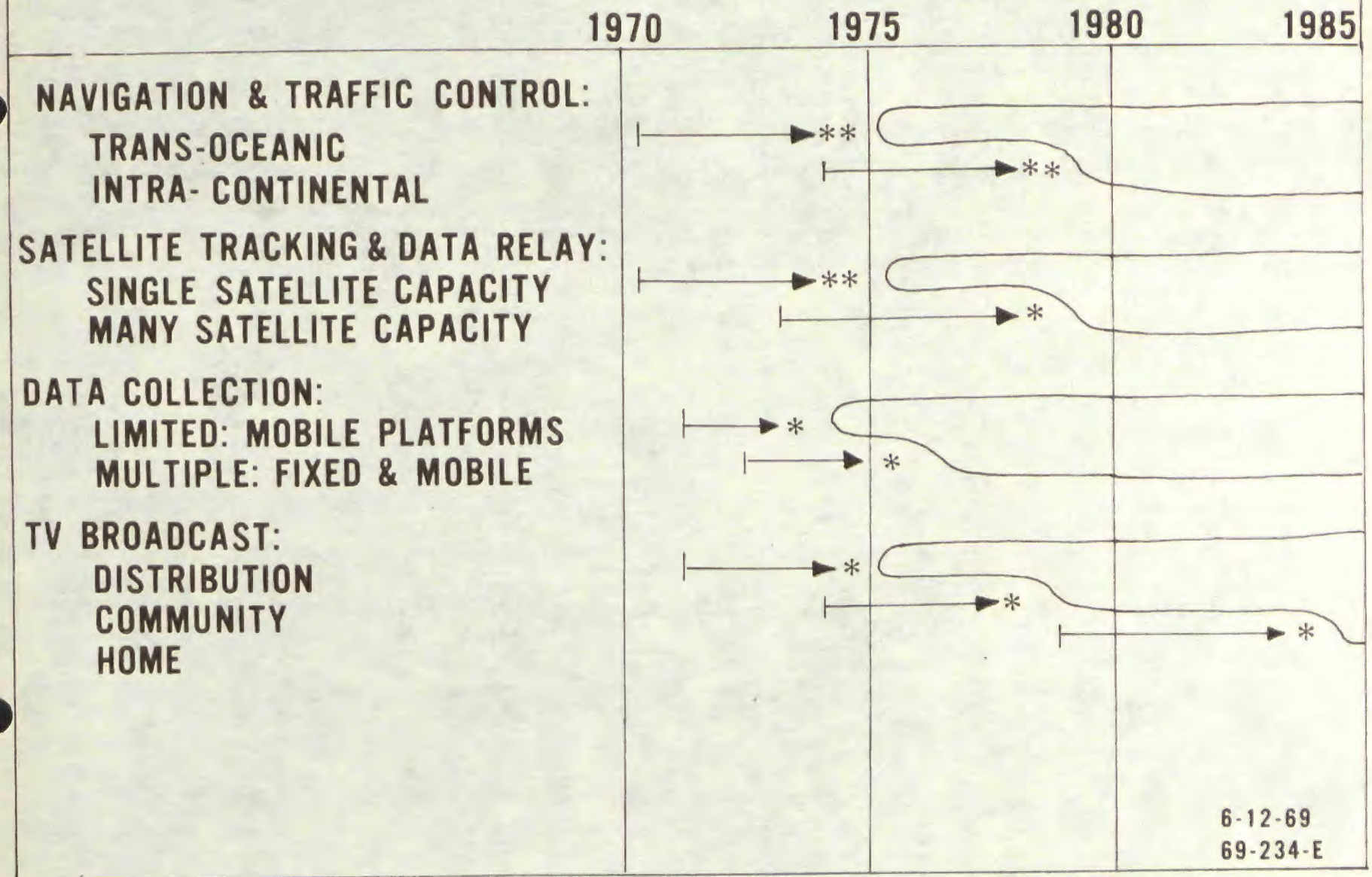
A limited capability tracking and relay satellite system could become available in 1974 serving one or a few mission satellites. A more sophisticated capability would be available by about 1978.

In data collection, we have already flown several experiments demonstrating the capability for collecting data from fixed platforms. Serving and locating mobile platforms places the system in somewhat the same category as the navigation and traffic control system, though the data rate is far less. By 1976 it will be feasible to use a single system for collecting both fixed and mobile platform data.

The dates shown for distribution and community broadcast capabilities may seem pessimistic, but they reflect nontechnical as well as technical factors, not the least of which is the possibility that frequencies other than 4 and 6 GHz may have to be used for these services.

This is the impetus for our problem to investigate interference and frequency sharing factors between separate satellite systems and between satellite and terrestrial systems, and to investigate the influence of the atmosphere on earth-space communications in the frequency range of 10 to 100 GHz, not now used for communications satellite systems.

NEW COMMUNICATIONS & NAVIGATION CAPABILITIES



NASA HQ SA69-16546 6-12-69

FIGURE 4

FIGURE 5

On the opposite page is a 1967 estimate of technology readiness dates for various types of spacecraft power sources.

Solar cells continue to be the principal capability for powers up to 25 or 50 kilowatts.

It is obvious that these dates do not reflect actual attainments, but only "could have been" dates. This is because requirements, authorizations, priorities and appropriations have not been optimum to realize these capabilities. At this point in time, late 1969, one would have to slip all of these dates down stream by two to three years; and even so, actual vs. readiness dates would depend on the same factors enumerated above -- requirements, authorizations, priorities and appropriations.

ESTIMATED TECHNOLOGY READY DATES FOR SYSTEMS OF PRINCIPAL INTEREST

	PROBABLE POWER RANGE IN KW				
SYSTEM	0.01 - 2.0	2 - 10	10 - 25	25 - 50	>50
SOLAR CELLS	1966 - 1967	1967 - 1968	1968 - 1969	1969 - 1970	
ISOTOPE THERMOELECTRIC	1966 - 1969				
ISOTOPE BRAYTON		1970 - 1972			
REACTOR THERMOELECTRIC			1969 - 1971		
REACTOR RANKINE				1972 - 1974	1976 - 1980
REACTOR THERMIONIC					1976 - 1980
BATTERIES STERILIZABLE	1971 - 1972				
5 YEAR RECHARGEABLE	1972 - 1974				
FUEL CELLS 1 YEAR LIFE	1973 - 1975				

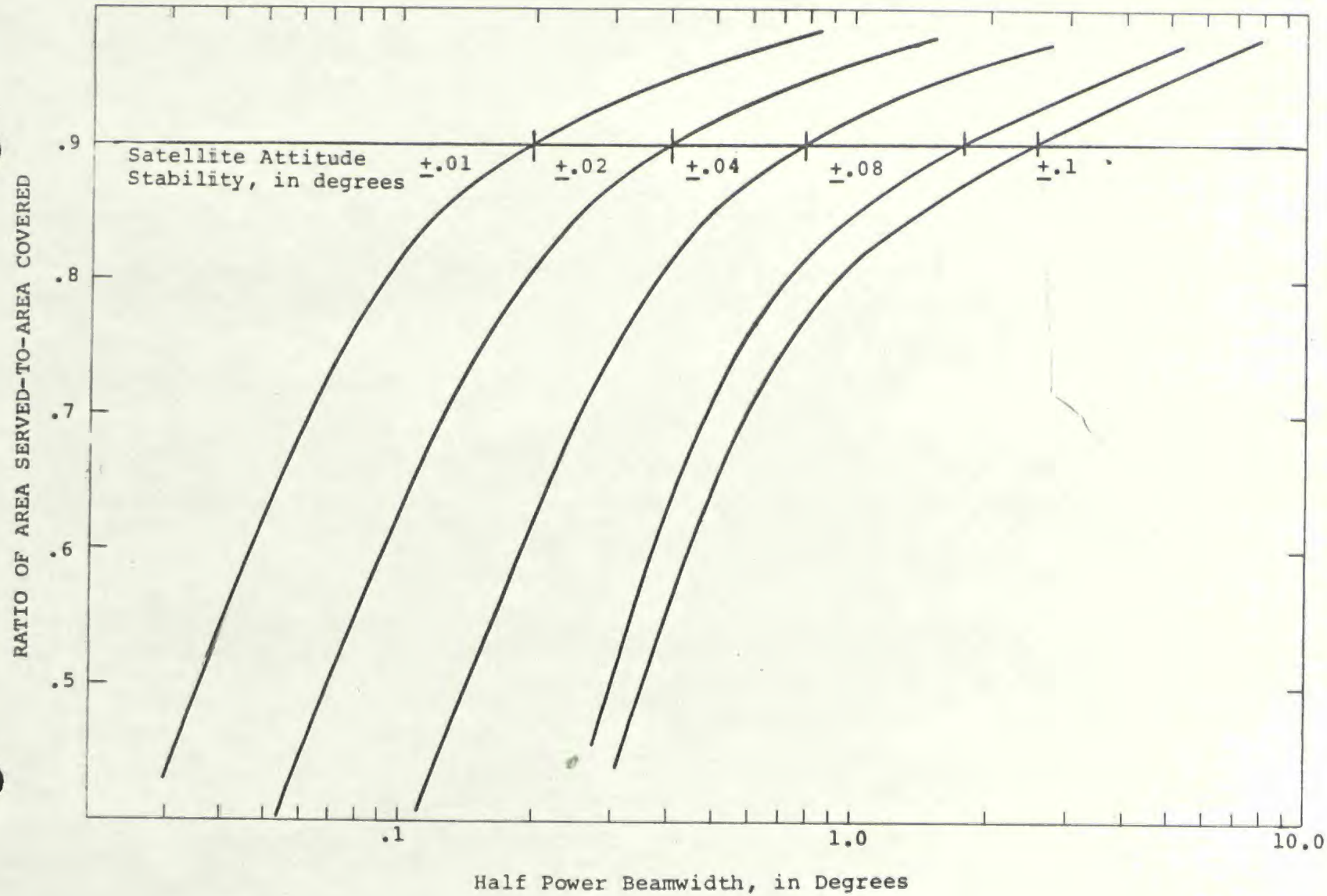
NASA RN67-1545
1-18-67

FIGURE 5

FIGURE 6

As satellite beams become more and more directive, satellite attitude stability must be increased proportionately to maintain an efficient ratio between area served and area covered.

Our present attitude stability capability is approximately 0.1 degrees, which would limit satellite antenna beamwidth to about 2.5 degrees. We foresee a number of requirements for greater directivity and, consequently, greater satellite attitude stability. For example, the limited e.i.r.p. capabilities of near earth orbiting satellites may necessitate that data relay satellites have highly directive beams. Another potential requirement is for beaming broadcast satellite programs to small geographic regions or small countries. And another potential requirement is for "spotlighting" small areas in regional or domestic systems. For instance, the second generation domestic system proposed by AT&T in connection with FCC Doc. 16,495 showed satellites capable of spotlighting areas as small as 50 miles in diameter from geostationary altitude. We would need at least an order of magnitude improvement in attitude stability capability to meet such requirements.



RATIO OF AREA SERVED-TO-AREA COVERED VERSUS SATELLITE ANTENNA BEAMWIDTH

FIGURE 6

FIGURE #7

Projected needs for communications satellite frequencies far exceed present frequency allocations, and these are shared with terrestrial fixed and mobile services, thus limiting the growth potential of both terrestrial and space systems.

ATS-E (ATS-V) includes an experiment to measure atmospheric attenuation and other propagation characteristics at frequencies of approximately 15 and 31 GHz.

Users have predicted needs of at least 3 GHz up and down to meet future requirements, and the U. S. Preliminary Views for the forthcoming space frequency allocations conference reflect them. New allocations must be developed in several bands above 10 GHz. The degree to which these new allocations can be made and exploited depends on propagation factors and on equipment technology. NASA experiments with ATS-E will be followed by experiments on ATS-F and ATS-G at approximately 20-30 and 60 GHz and possibly even 94 GHz, to measure atmospheric attenuation, assess usable bandwidth, and in the process, develop hardware technology. Use of these higher frequencies is governed by three major considerations: the service probability requirement of the user; the maximum attenuation to be expected in order that the service be within this service-probability requirement; and whether this maximum attenuation probability can be offset by system margin or whether space diversity techniques must be resorted to.

COMMUNICATIONS PROGRAM
FREQUENCY UTILIZATION
PROPAGATION EXPERIMENTS ABOVE 10 GHz

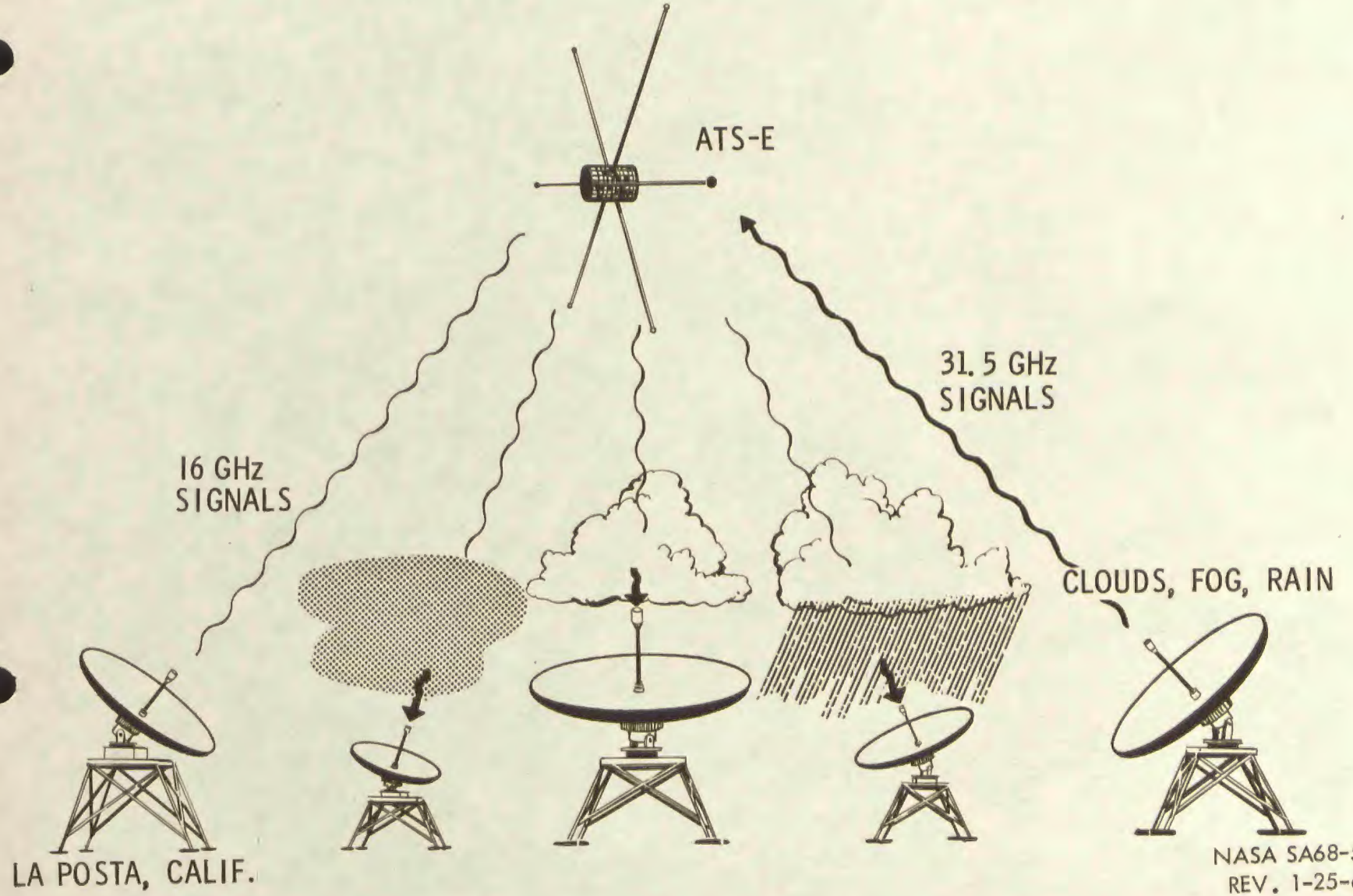


FIGURE #7

FIGURE 8

For these reasons NASA is undertaking a ground-to-ground interference measurements program at the request of the Director of Telecommunications Management, both to support decision-making for domestic communications satellite systems, and to provide additional information for the US participation in the forthcoming space frequency allocations conference.

FIGURE 8

The decision of the International Telecommunications Union in 1963 to allocate frequencies for communications satellites on a shared basis with terrestrial radio relay systems was based on a very thorough evaluation of interference considerations in the four modes shown on the opposite page:

(1) interference from a satellite transmitter to a radio relay receiver;

(2) interference from a radio relay transmitter to a satellite receiver;

(3) interference from a radio relay transmitter to an earth station receiver; and

(4) interference from an earth station transmitter to a radio relay receiver.

The resulting CCIR/ITU sharing criteria were predicated on a global communications satellite system employing relatively few earth stations, each of which could be isolated geographically from sources of interference to and from that earth station. Moreover, the original CCIR/ITU sharing criteria did not consider abnormal propagation mechanisms such as precipitation scatter.

The initial CCIR/ITU sharing criteria were labeled "provisional", thus inviting review by participating administrations.

At least four considerations argue for review of the initial criteria:

They are based on theory and prediction rather than actual experimental data;

They did not anticipate earth stations in metropolitan areas which are also hubs for terrestrial radio relay systems;

They did not take scatter propagation phenomena into account;

They are not readily extended to frequencies above 10 GHz.

COMMUNICATIONS PROGRAM

FREQUENCY UTILIZATION

FOUR POSSIBLE MODES OF INTERFERENCE

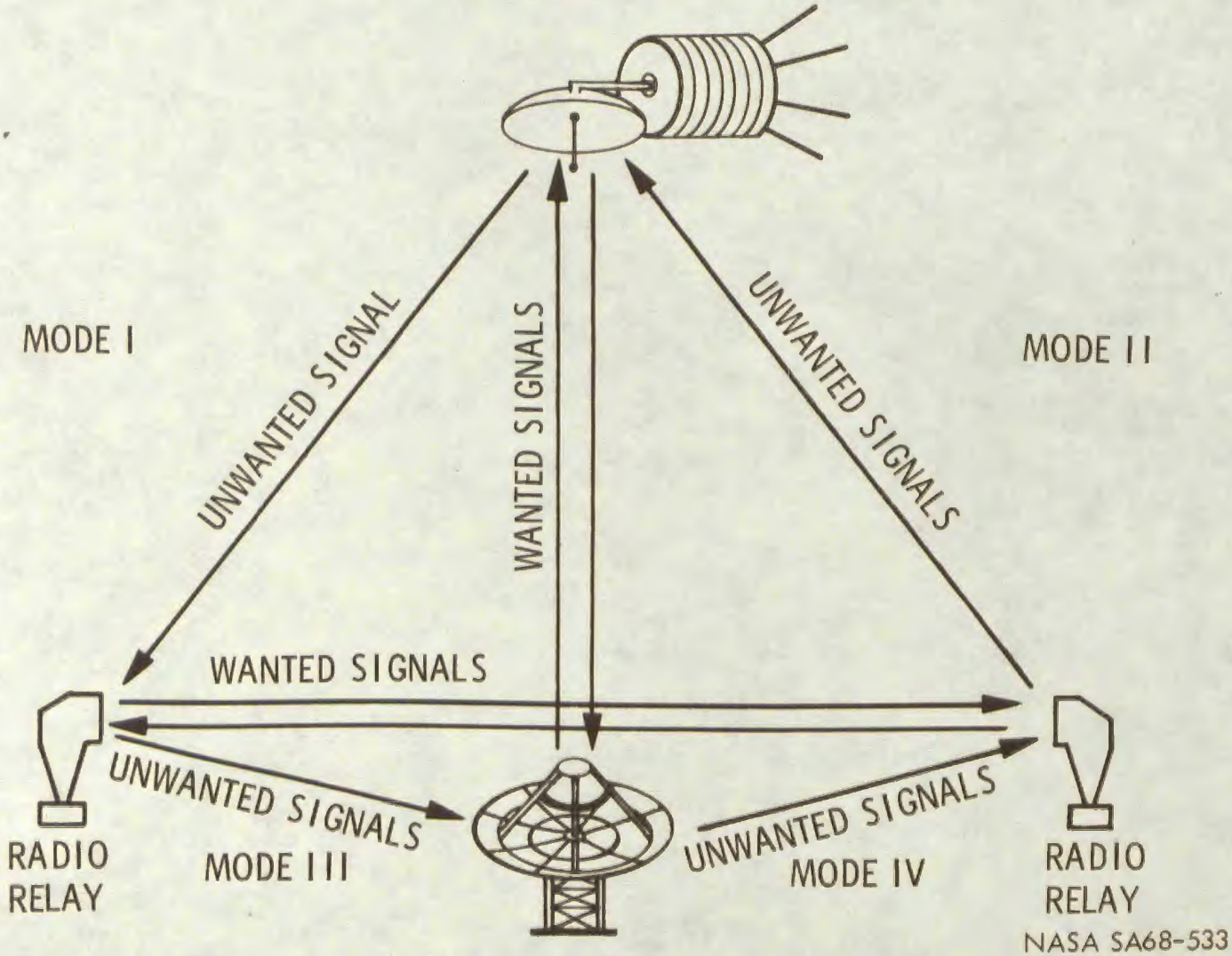


FIGURE 8

FIGURE 9

The facing illustration indicates the typical coverage one might get from symmetrical antenna beams having the indicated beamwidths. It can be seen from the shape of these diagrams that the satellite is not on the same meridian as the area covered.

These patterns are unrealistic to the extent that they show the ability to cover the area of primary interest without showing that antenna beams do not terminate abruptly at their 3 dB points but go on to cover other areas which may or may not wish to be covered. The implication of this fundamental property of antenna coverage is that we must either learn to generate "country-shaped" antenna beams, or reach political compromises concerning control and content of programs which inevitably spill over into other territory. Since the problems of pattern shaping are formidable, the latter course may sometimes be preferable. In this connection, one should note that community and distribution systems do not serve the listener directly, and that therefore the recipient can control program distribution within reasonable limits.

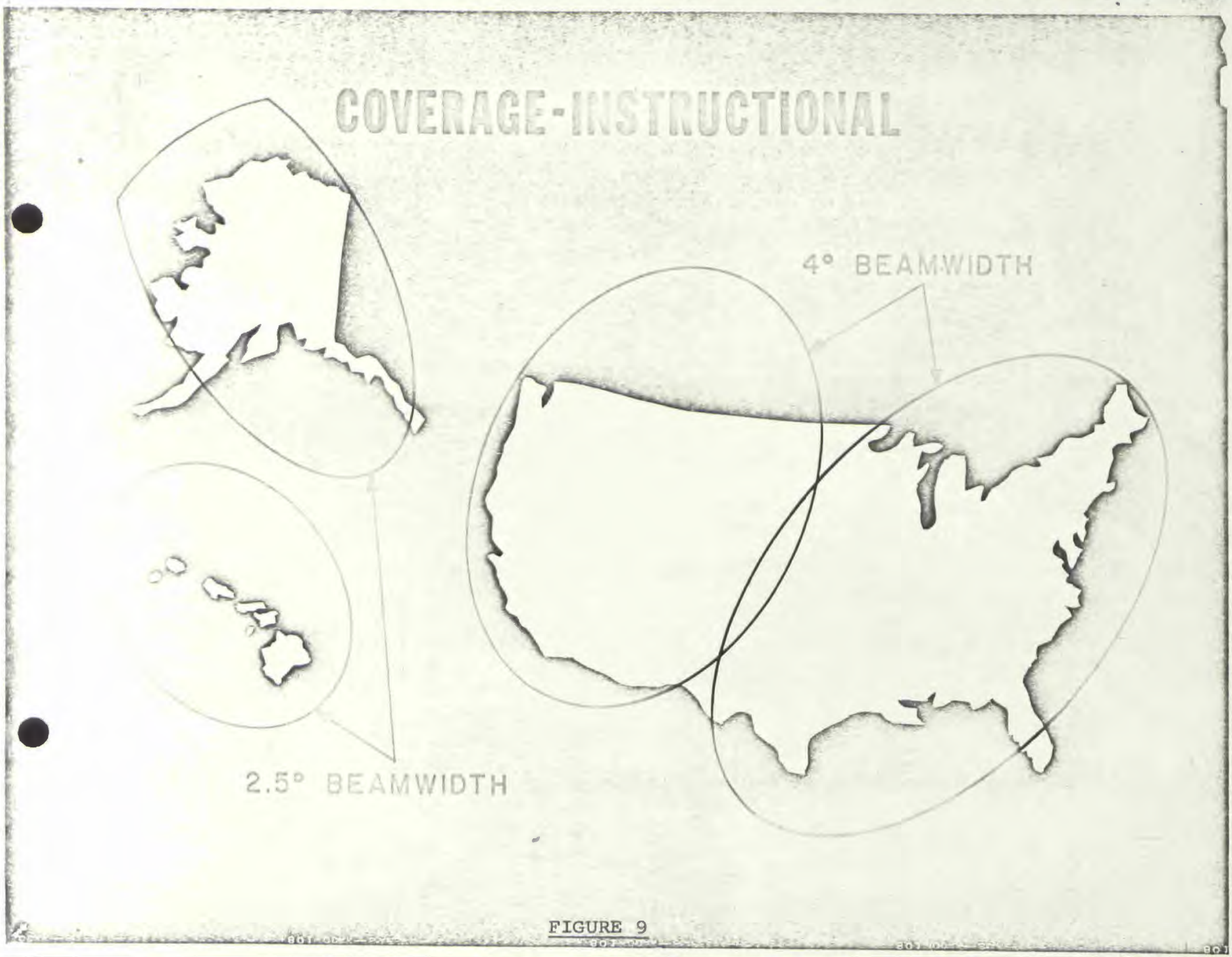


FIGURE 9

FIGURE 10

The sketch on the facing page illustrates the spill-over problem, showing the planned antenna pattern coverage of the Canadian domestic satellite system for a satellite located at 88° W. longitude. One can see that the -3 dB or half power contour passes through Chicago and Detroit, and that the -4 dB contour passes approximately through New York and Seattle. If this is the case for a large land mass such as North America, one can readily understand the concern expressed by the participants in the recent U. N. Subcommittee on direct broadcasting from satellites concerning spill-over, and the consequent need for controlling program content and other aspects. As noted in connection with the preceding illustration, pattern shaping is difficult but by no means impossible. The eventual solution to this problem may be a combination of technology in beam-shaping and political compromise concerning spill-over.

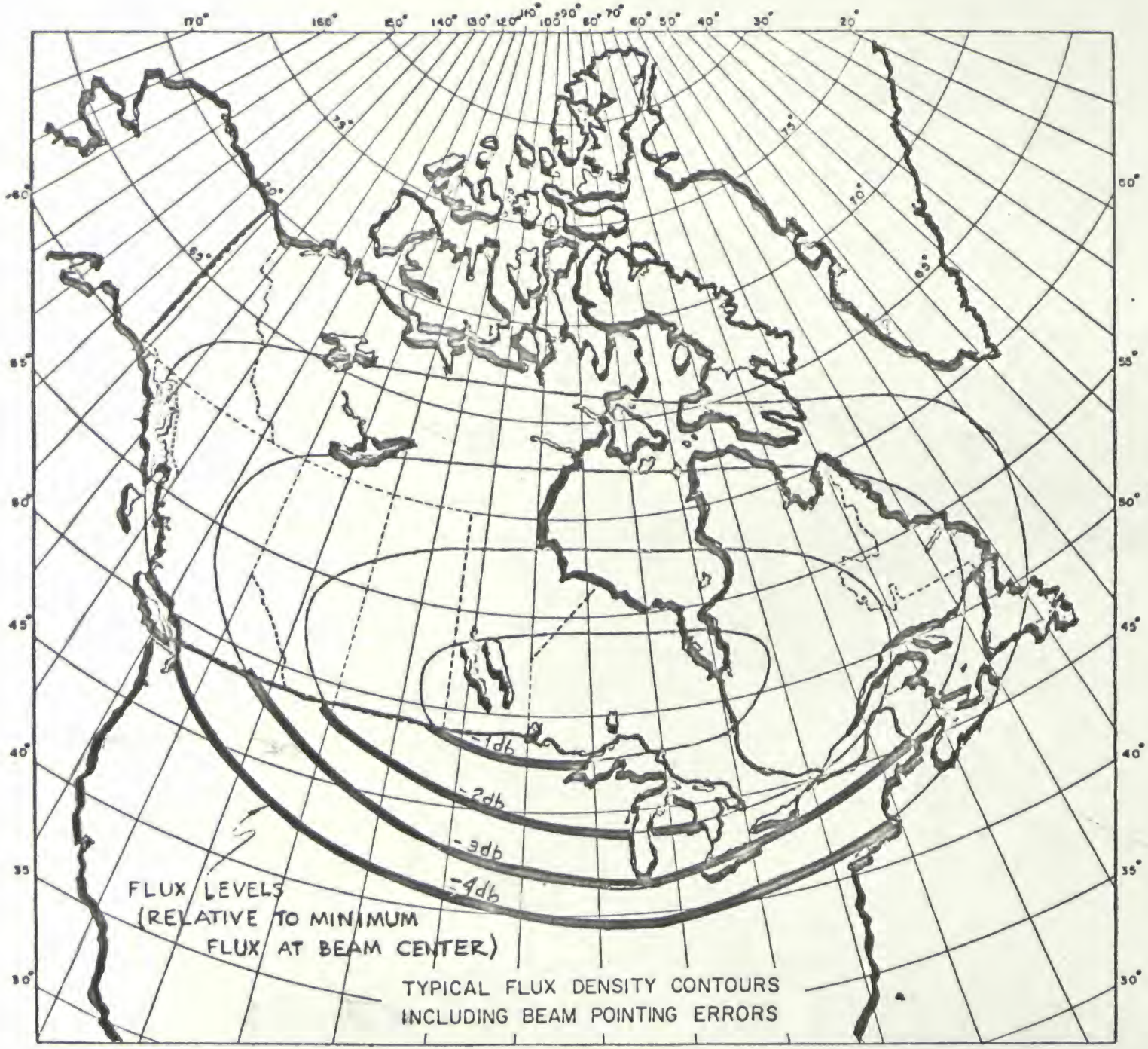

-1db
-2db
-3db
-4db
FLUX LEVELS
(RELATIVE TO MINIMUM
FLUX AT BEAM CENTER)
TYPICAL FLUX DENSITY CONTOURS
INCLUDING BEAM POINTING ERRORS

FIGURE 10

FIGURE #11

The next few illustrations attempt to relate technological capabilities to the ITU sharing criteria limitations and show how these considerations influence trade-offs between the space segment and the ground segment of proposed systems.

The technology exemplified by the projected Canadian system contemplates 12 Down-Link channels at 4 GHz, each about 37 MHz wide and each having +37 dBW per channel. The total available e.i.r.p. is about +49 dBW, divided between the transmitter of 20 watts (+13 dBW) and an antenna with a 3^{o} beamwidth having a gain of 36 dB.

The near-future capability, exemplified by ATS-F, to be launched in 1972, is +62 dBW in a 40 MHz channel, consisting of a 20 watt transmitter and, in the case of ATS-F, a 30 ft. antenna with a 0.6 degree beamwidth having 49 dB gain at 4 GHz. We will show that +37 dBW per 40 MHz is well below the ITU flux-density limit, and that +62 dBW is well above it.

COMMUNICATIONS SATELLITE SYSTEM CONSIDERATIONS

PRINCIPAL MEASURE IS E.I.R.P.

PRESENT CAPABILITY, EXEMPLIFIED BY PROJECTED CANADIAN SYSTEM, AT 4 GHz. ---

+ 37 dBW PER TV CHANNEL

12 CHANNELS, EACH 40 MHz WIDE

+ 49 dBW TOTAL E.I.R.P., CONSISTING OF

+ 13 dBW (20W) TRANSMITTER POWER

36 dB ANTENNA GAIN 3° BEAMWIDTH

5' ANTENNA

NEAR FUTURE CAPABILITY, EXEMPLIFIED BY ATS-F (1972)

+ 62 dBW IN 40 MHz CHANNEL, CONSISTING OF

+ 13 dBW (20W) TRANSMITTER POWER

49 dB ANTENNA GAIN 0.6° BEAMWIDTH

30' ANTENNA

FIGURE #11

FIGURE #12

In Figure #11, we indicated that the proposed Canadian system will have an e.i.r.p. of about +37dBW per 37 MHz channel. The CCIR/ITU flux-density limit is -152dBW per square meter per 4 kHz. Let us look first at how this influences the minimum capability of a cooperating ground station.

-152dBW per 4 kHz adds up to -112dBW in 40 MHz, since 40 MHz is 40 dB greater in bandwidth than 4 kHz. To convert this to e.i.r.p. from the satellite, one can use the convenient rule-of-thumb that one watt of e.i.r.p. from a satellite produces a flux-density of -162dBW per square meter at the earth's surface. Therefore, -112dBW is equivalent to +50dBW e.i.r.p. from a satellite. Using typical figures for earth station system temperature of 150° Kelvin, and a carrier-to-noise ratio of 20dB, one finds that the minimum required carrier power at the input to the receiver is -105.6dBW. The arithmetic in Figure #12 indicates that for a system temperature of 150° Kelvin, the minimum size of the antenna is 10 feet, to raise -112dBW/m^2 to -105.6dBW.

INFLUENCE OF FLUX DENSITY LIMIT ON TRADEOFFS BETWEEN SPACE AND GROUND SEGMENTS.

LIMIT OF -152 dBW PER SQUARE METER PER 4 kHz. ADDS UP TO -112 dBW TOTAL, EQUIVALENT TO +50 dBW E.I.R.P., IN 40 MHz.

TYPICAL "CHEAP" RECEIVING SYSTEM HAS NOISE TEMPERATURE OF 150° KELVIN.

NOISE POWER IN 150° SYSTEM WITH BANDWIDTH OF 40 MHz.

BOLTZMANNS CONSTANT	-228.6 dBW
BANDWIDTH IN CYCLES	+ 76.0 dB
TEMP. IN DEGREES KELVIN	+ 27.0 dB
	-125.6 dBW

IF MINIMUM CARRIER-TO-NOISE RATIO IS ASSUMED TO BE 20 dB, MINIMUM REQUIRED CARRIER POWER AT RECEIVER INPUT IS -105.6 dBW.

EFFECTIVE AREA OF ANTENNA MUST BE +6.4 dB RELATIVE TO 1 SQUARE METER, TO PRODUCE -105.6 dBW FROM -112 dBW/m^2.

EFFECTIVE AREA IS 4.4 m^2. ASSUMING 55% EFFICIENCY, ACTUAL AREA IS 8.2 m^2, AND DIAMETER IS 3.2 m, OR 10'.

GAIN OF 10' ANTENNA AT 4 GHz. IS 40 dB, OR 10,000 TIMES.

SYSTEM G/T IS 10,000/150, OR 66 (18.2 dB).

FIGURE #12

FIGURE #13

In Figure #13, we relate the flux-density-limited characteristics shown in Figure #12 to the space segment and ground segment characteristics of the near-future proposed domestic communications satellite systems.

As noted earlier, the proposed Canadian Domestic Communications Satellite System contemplates +37dBW per 37 MHz TV channel. Therefore, the ratio between the flux-density-limited antenna diameter and the diameter of antennas proposed for the Canadian system should be in the ratio of the square root of 20, or 4.5. Therefore, the earth station antenna diameter for the proposed Canadian Domestic system should be 45 feet. However, this assumes a minimum carrier to noise ratio of 20dB (Figure #12). If one reduces the carrier to noise ratio from 20 to 16dB, a factor of 2.5, the required antenna diameter is reduced by a factor of the square root of 2.5, from 45 to 28 feet. Actually, the proposed minimum size of ground station antennas in the Canadian Domestic system is 25 to 30 feet.

PLANNED DOMESTIC SYSTEMS NOT YET FLUX DENSITY LIMITED

THE FLUX-DENSITY-LIMITED POWER OF +50 dBW IN 40 MHz. IS 13 dB (20x) GREATER THAN THAT PLANNED FOR DOMESTIC SYSTEM (37 dBW PER TV CHANNEL).

THEREFORE

RATIO OF MINIMUM AND DOMESTIC SYSTEM ANTENNA DIAMETERS SHOULD BE $\sqrt{20}$ OR 4.5. 10' x 4.5 = 45'.

PROPOSED DOMESTIC SYSTEMS WILL UTILIZE ANTENNAS OF 25 OR 30 FEET DIAMETER

BUT

IF ONE REDUCED CARRIER-TO-NOISE RATIO FROM 20 dB TO 16 dB (2 1/2 TIMES), ANTENNA DIAMETER IS REDUCED BY $\sqrt{2.5}$, OR FROM 45' TO 28'.

FIGURE #13

FIGURE #14

In Figure #11, it was noted that ATS-F will radiate +62dBW in 40 MHz. We have illustrated that +50dBW equals the CCIR/ITU flux-density-limit in this bandwidth. The arithmetic in the facing table indicates that the ATS-F, if operated at full power at 4 GHz (which is not currently contemplated) could exceed the CCIR/ITU flux-density-limit by 12dB.

1972 SATELLITE (ATS-F) CAN EXCEED FLUX DENSITY LIMIT

CONVENIENT RULE OF THUMB IS THAT 1 WATT E.I.R.P. (ZERO dB) PRODUCES -162 dBW PER SQUARE METER AT EARTH'S SURFACE FROM SYNCHRONOUS ALTITUDE.

SO +62 dBW PRODUCES -100 dBW PER SQUARE METER.

SPREADING -100 dBW OVER 40 MHz. (40 dB GREATER BANDWIDTH THAN 4 kHz.) REDUCES FLUX DENSITY TO -140 dBW PER SQUARE METER IN <u>EACH</u> 4 kHz. SLOT.

THIS EXCEEDS CCIR LIMIT (-152 dBW/m^2/4 kHz.) BY 12 dB.

<u>FIGURE #14</u>

FIGURE #15

The import of the statements on the facing page is that, lacking any flux-density-limits, one can trade-off indefinitely between the space segment and the ground segment, but not without an overall loss in efficiency of orbit/frequency utilization. As satellite e.i.r.p. increases, and ground station antenna directivity decreases, the necessary angular spacing between ajacent satellites increases with a consequent decrease in the criterion for orbit utilization measured by channels per degree per MHz of frequency allocation. This assumes that there is no offsetting increase in orbit/frequency utilization due to satellite antenna directivity. In any event, the measure of orbit/frequency utilization depends on the service being rendered: some services will willingly opt for lower utilization ratios in terms of channels per degree per MHz, in the interest of optimizing their particular service requirements.

TRADEOFFS CANNOT BE EXTENDED INDEFINITELY

ASSUMING NO FLUX DENSITY LIMIT -- THAT IS, EXCLUSIVE FREQUENCY ASSIGNMENT, CAN THIS OVER-CEILING E.I.R.P. BE USED EFFICIENTLY?

THE GREATER THE E.I.R.P., THE SMALLER THE SIZE OF THE EARTH STATION ANTENNA.

BUT SMALLER ANTENNAS HAVE LESS DISCRINIMIANTION AGAINST INTERFERENCE AT A GIVEN ANGLE FROM THE POINT AXIS.

SATELLITES MUST BE FURTHER APART, AND ORBIT UTILIZATION IS REDUCED.

THIS ASSUMES, OF COURSE, THAT THERE IS NO SIGNIFICANT REDUCTION IN POWER RADIATED FROM THE "UNWANTED" SATELLITE TOWARD THE INTERFERED-WITH STATION.

FIGURE #15

FIGURE #16

FREQUENCIES, ORBIT UTILIZATION as will be developed in detail in the next three charts, current and proposed frequency allocations will not satisfy all of the potential requirements for communications and broadcasting satellite systems; or for NASA's experiment programs.

A related problem is that of sharing criteria, discussed in connection with Figure #8. Introduction of domestic and/or regional systems creates the need for criteria for frequency and orbit sharing between and among separate space systems. In October 1968 the U.S. introduced into the CCIR a new Study Program on efficient utilization of the geostationary orbit, and several countries (including the U.S.) are studying this subject. A Rand study under NASA auspices has been an important input to this work, as has work done by General Electric (GE) under a joint OTM/NASA contract.

Two major conclusions of these studies are (1) the factors influencing spacing between satellites are numerous and complex, making it difficult to pre-assign orbit "slots" - orbit assignments should be based on evaluation of specific characteristics of the systems involved, and (2) the principal factor influencing spacing is antenna pattern discrimination.

POLICIES: These technical problems point to the need for policy decisions in certain areas:

- Since antenna beams cannot be shaped arbitrarily, coverage of an "undesired" area - spillover - will occur occasionally.

- The U.S. should consider whether it should seek broadcasting-satellite allocations based on foreseeable U.S. needs or should also anticipate needs elsewhere in the world.

- There may be attempts, at the W.A.R.C. in 1971, to pre-assign "slots" in the geostationary orbit on a permanent basis. This is considered impractical and a potentially severe limitation on efficient and flexible use of orbit space.

PROBLEM AREAS INFLUENCING DOMESTIC

SATELLITE UTILIZATION

- -- AVAILABILITY OF FREQUENCIES FOR
  - COMMUNICATION SATELLITE SERVICE (GOOD)
  - BROADCASTING SATELLITE SERVICE (POOR)
- -- ORBIT UTILIZATION
  - PREFERRED SEGMENTS
  - PATTERN DISCRIMINATION & CONTROL
- -- POLICIES
  - "SPILLOVER" VERSUS SOVEREIGNTY, PROPAGANDA
  - U.S. NEEDS VERSUS U.S. POSITION ON SPACE BROADCASTING
  - ORBIT UTILIZATION

FIGURE #16

FIGURE #17

The situation with regard to communications satellite frequencies is good at least for the near-term, primarily because this requirement arose at the earliest time, and was given precedence at the 1963 Space Frequency Allocations Conference (EARC).

2,800 MHz were allocated at the EARC to Communications-Satellite service; 1,500 MHz in the up direction and 1,300 MHz in the down direction.

In actual fact, 800 of this 2,800 MHz was sought by the USSR and, because of conflicting service allocations, is not readily usable for U. S. or INTELSAT purposes. Of the remaining 2,000 MHz, 1,000 is, in the U. S., allocated for non-Government users and the other 1,000 MHz for Government users.

It was noted earlier that the projected requirements for communications satellite frequencies aggregate 3 GHz up and 3 GHz down. The lower part of Figure #17 indicates the extent to which these new requirements are sought in the U. S. Preliminary Views for the World Administrative Radio Conference scheduled for 1971. The pace of exploiting frequencies above 10 GHz will depend upon the results of propagation experiments being conducted by NASA and other agencies in the U. S. and elsewhere.

AVAILABILITY OF FREQUENCIES

COMMUNICATION SATELLITE FREQUENCIES

-- CURRENT ALLOCATIONS

UP	5725 - 6425 MHz	N.G.	(5725-5925 USSR)
	7900 - 8400 MHz	G.	
	4400 - 4700 MHz		(USSR)
DN	3400 - 4200 MHz	N.G.	(3400-3700 USSR)
	7200 - 7700 MHz	G.	

-- PROPOSED ALLOCATIONS (WARC)

DN	2150 - 2200 MHz	
UP	2500 - 2550 MHz	
UP	11.7 - 12.2 GHz	
UP	27.8 - 29.8 GHz	
	29.8 - 31.3 GHz	EXCLUSIVE
DN	17.7 - 19.7 GHz	
	19.7 - 21.2 GHz	EXCLUSIVE

FIGURE #17

FIGURE #18

We have indicated earlier that three different types of "broadcast" services have been identified: program distribution, community broadcasting, and direct broadcasting.

We have excluded the program distribution service from this discussion because the consensus is that it is not a broadcasting-satellite service, and is technically similar to the communication-satellite service. Hence, the program distribution service is not considered a competitor for broadcasting-satellite frequencies.

There are no current allocations for broadcasting satellite service, either for community or direct service.

The U. S. Preliminary Views for the World Administrative Radio Conference include requests for footnotes authorizing broadcasting satellite service in the bands 88-100 MHz for aural broadcasting, and 614-890 MHz for TV broadcasting.

This position is considered equivocal in terms of indicated needs of LDC's for a community satellite broadcasting capability.

We would like to see a stronger U. S. position along these lines:

--Delete Footnote 268A; no real need foreseen for aural broadcasting from satellites.

--Propose co-equal allocation of 614-890 MHz for community broadcasting satellite service on a regional basis.

--Propose co-equal allocation of a 200 MHz band, somewhere between 1550 and 3400 MHz, for community broadcasting satellite service.

--Propose co-equal allocation of 11.7 - 12.7 GHz for community broadcasting satellite service.

FIGURE #18 (continued)

Appropriate sharing criteria would have to be developed to support the feasibility of these proposed allocations.

A direct broadcasting satellite service to unaugmented home receivers requires exclusive frequency allocations. Since technology for this service is at least 10 years away, and in view of the political sensitivity of this subject, we would not recommend that any allocations be sought at this time.

AVAILABILITY OF FREQUENCIES

BROADCASTING SATELLITE FREQUENCIES

-- CURRENT ALLOCATIONS

NONE

-- PROPOSED ALLOCATIONS ("ARC)

88 - 100 MHz. Footnote

610 - 890 MHz. Footnote

-- NEEDED ALLOCATIONS

2500 - 2690 MHz. SHARED

11.7 - 12.7 GHz. PART SHARED

PART EXCLUSIVE

FIGURE #18

FIGURE #19

Until now, NASA experimentation in communications has taken place in the bands allocated in 1963 for the Communication-Satellite service - 4 and 6 GHz.

The increasing exploitation of these bands for operational purposes, and diversification of NASA's experimental program, indicate the need for frequencies available exclusively to NASA on a long-term basis for experimental purposes. Certain bands are already allocated for space research, and other bands are proposed for this service in the U. S. Preliminary Views for the WARC. However, these bands are neither wide enough nor appropriately situated in the spectrum for NASA's applications needs.

For our on-going, multiple purpose experiments, we foresee the need for the following frequency allocations on an exclusive basis:

1. Two 1-MHz bands in the UHF region (near 400 MHz) for narrow-band data collection experiments and for information dissemination experiments;

2. Two bands, each approximately 250 MHz wide, in the vicinity of 15 and 17 GHz, for wideband experiments in the areas of data relay, earth resources down links, and other communications experiments.

AVAILABILITY OF FREQUENCIES

-- -- -- -- --

EXPERIMENTAL FREQUENCIES

-- NEEDED FOR GENERAL COMMUNICATIONS EXPERIMENTATION, IN ADDITION TO ACTUAL AND PROPOSED ALLOCATIONS FOR SPACE RESEARCH

-- SOME EXPERIMENTS, AIMED AT SPECIFIC APPLICATIONS, HAVE BEEN CONDUCTED IN APPLICATIONS BANDS, e.g., ATS IN 4 & 6 GHz. COM SAT BANDS

-- FOR MORE GENERAL, MULTIPURPOSE EXPERIMENTS, NEED

- UHF BANDS ($\approx$ 400 MHz) FOR NARROW-BAND DATA COLLECTION, INFORMATION DISSEMINATION EXPERIMENTS
- SHF BANDS ($\approx$15 & 17 GHz) FOR WIDE-BAND EXPERIMENTS
  - DATA RELAY
  - EARTH RESOURCES DOWN-LINKS
  - OTHER COMMUNICATIONS EXPERIMENTS

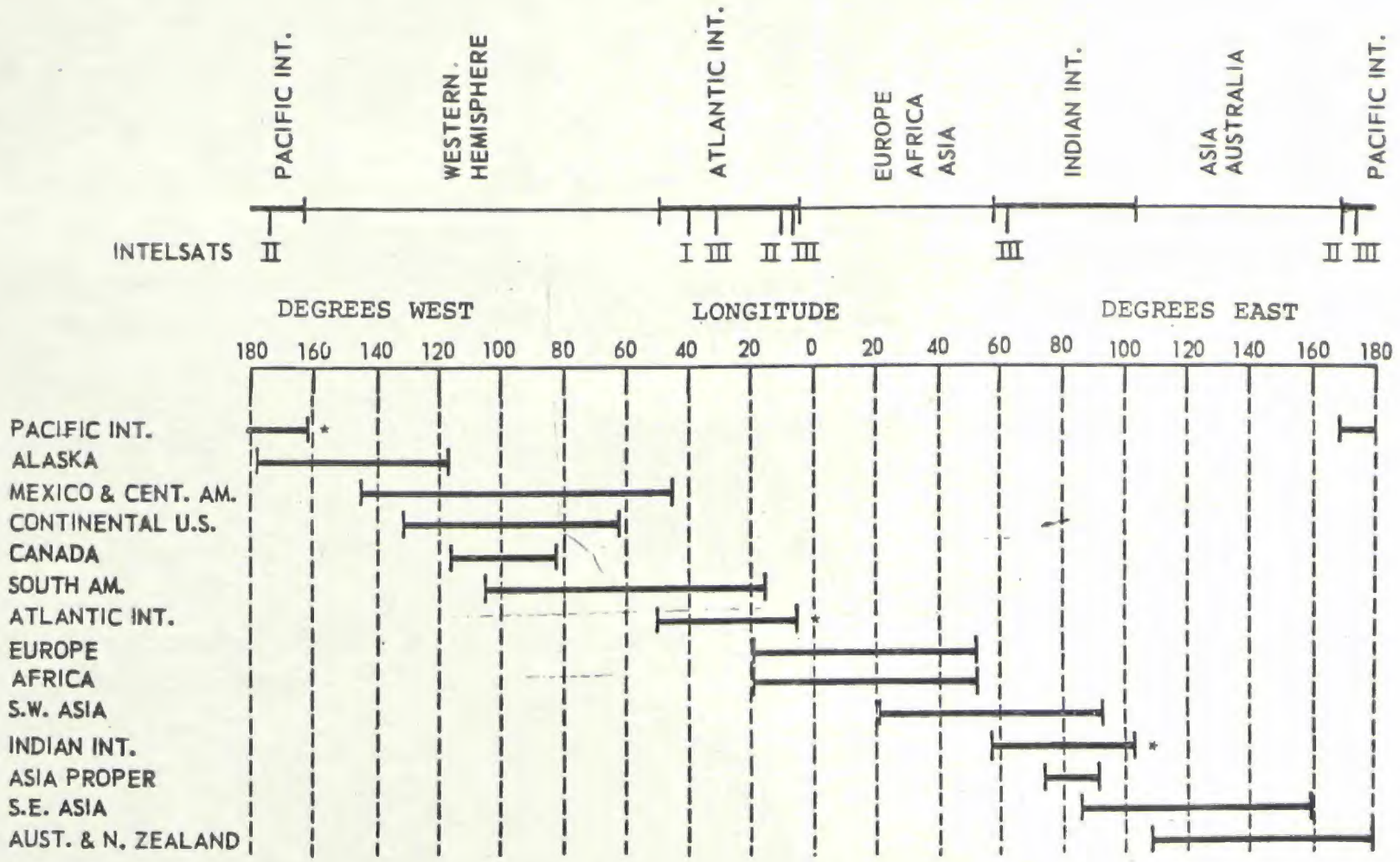
FIGURE #19

FIGURE #20

The geostationary orbit is the preferred orbit for most of the operational services now contemplated. While different frequency bands will be used for different services, utilization of the band for a particular service will be complicated by the fact that certain arcs of the orbit are optimum for service between particular land masses.

The preferred arcs of the geostationary orbit for particular communications needs are as shown on the right. Those with a dot to the right of the bar are for a minimum elevation angle of 5°; all others are for a minimum elevation angle of 10°. This implies that competition for certain orbital arcs will be more intense than for others.

This situation was recognized in 1968 by the CCIR, when it adopted a Study Program concerning efficient use of the geostationary orbit for communications satellites. It also established an International Working Party to consider and interpret the submissions of the various administration on this study program. This subject will be considered in depth at the forthcoming World-wide Meeting of CCIR Study Group IV in Geneva in September 1969, and will be considered further at the special meeting of CCIR Study Group IV immediately preceding the WARC in 1971.



*COVERAGE IS FOR 5° ELEVATION ANGLE FROM THE EARTH. FOR OTHER LAND MASSES SHOWN, ELEVATION ANGLE IS 10°.

PREFERRED STATIONARY ARC REGIONS FOR INTERNATIONAL AND DOMESTIC COVERAGE

FIGURE #20

FIGURE #21

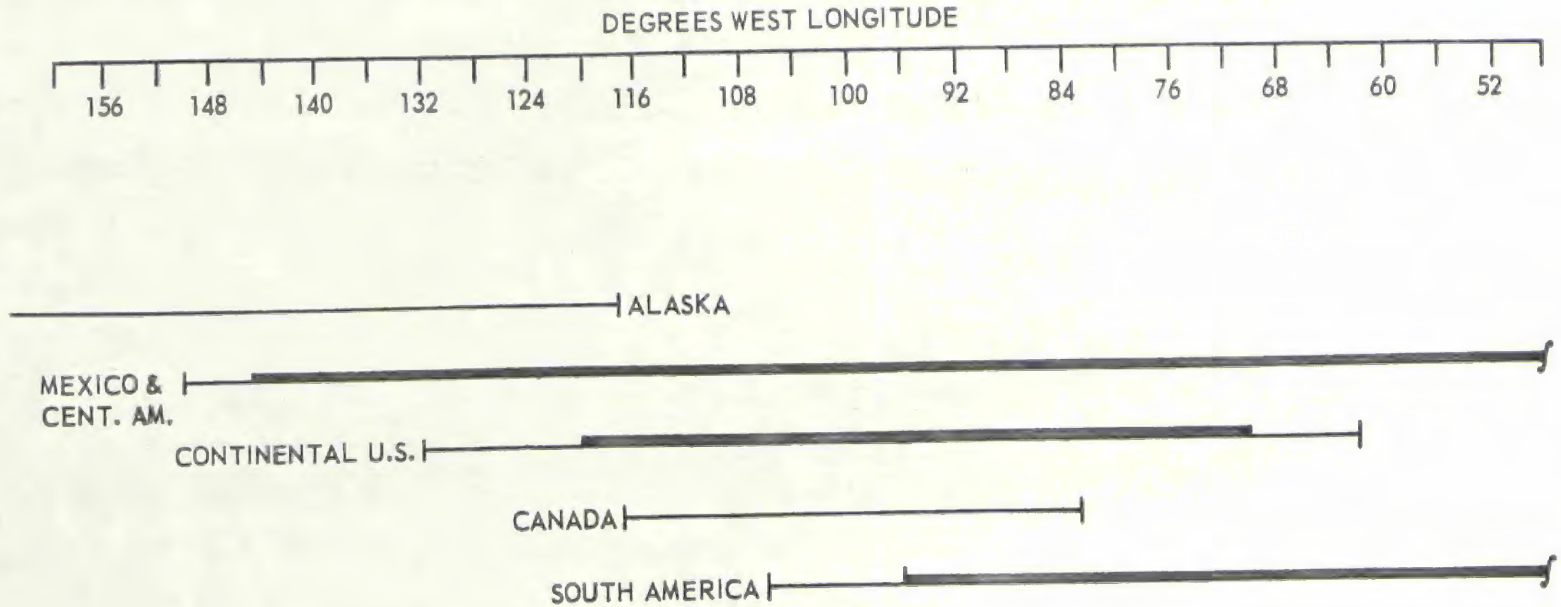
A more detailed view of arc visibility and utility for the Western Hemisphere is shown opposite.

The thin lines indicate orbit utilization for minimum elevation angle of 10°; the thick lines indicate orbit utilization for a minimum elevation angle of 15°. It is noteworthy that the optimum arc for the whole of the hemisphere extends from about 84 to 108°.

Intensive study of this subject has been underway in the U. S. for the past year or more by the Communications Satellite Corporation and by NASA.

Factors influencing minimum angular separation between satellites in different systems include antenna directivity of both the earth station and the satellite; antenna polarization; protection ratio in dB required by the services involved; relative bandwidth occupied by the shared services; methods of modulation employed by the sharing services; relative powers of the "wanted" and "unwanted" satellites; and other factors.

The interrelationships among these several factors are quite complex, and they do notlend themselves to pre-assignment of orbit slots on a long-term basis.



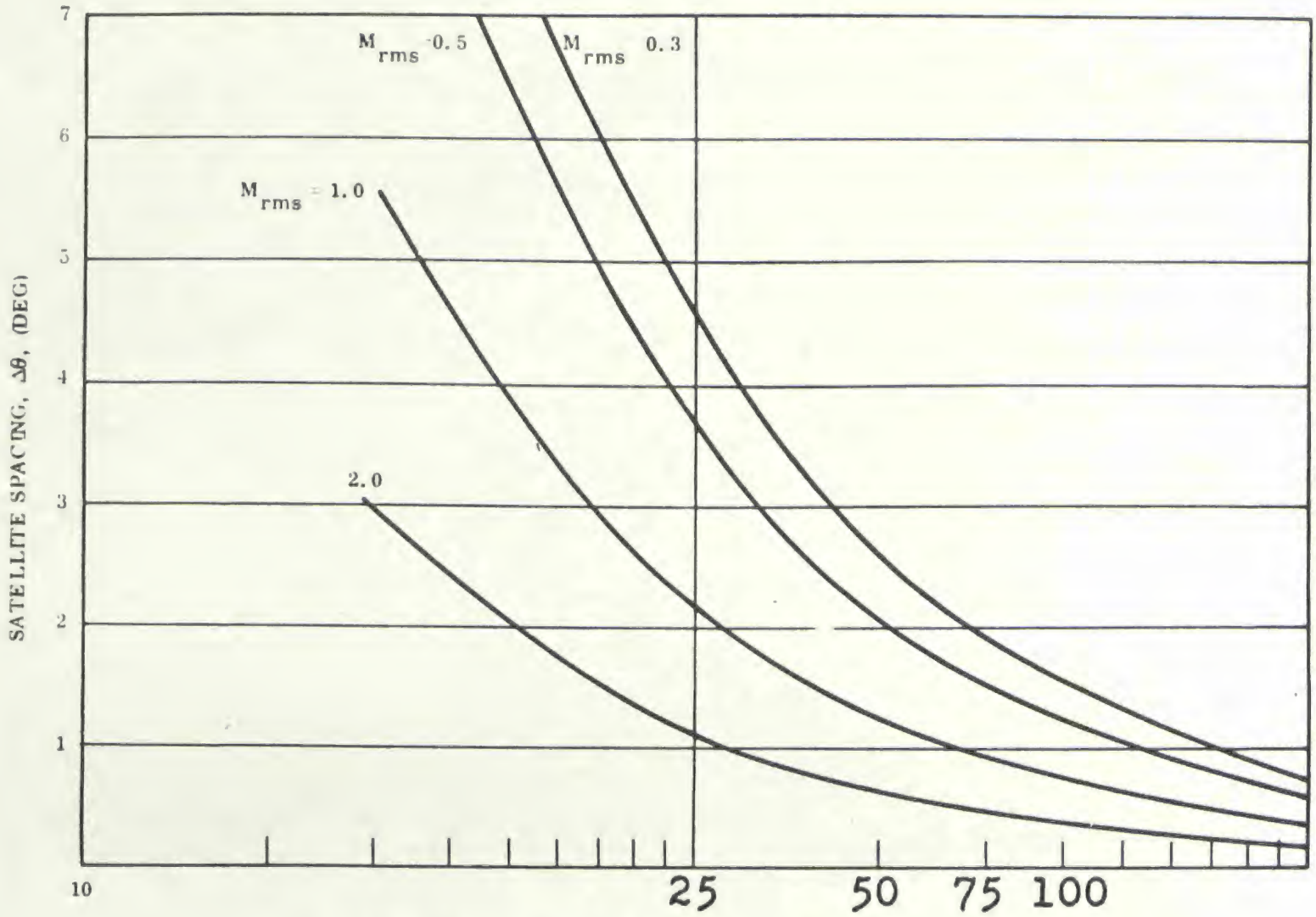
ARC VISIBILITY FOR WESTERN HEMISPHERE

FIGURE #21

FIGURE #22

Two of the principal factors influencing minimum angular spacing between adjacent satellites are illustrated here.

These four curves indicate the minimum angular spacing as a function of the modulation index employed, and of the antenna diameter in feet and the consequent antenna directivity. It is readily apparent that larger earth station antennas with high directivity, and larger modulation indices having lesser protection ratio requirements, lead to smaller angular separation in degrees.



Satellite Spacing as a Function of Earth-Station Antenna Size, Co-Channel Case (N_I = 7500, f_D = 0)

FIGURE #22

FIGURE #23

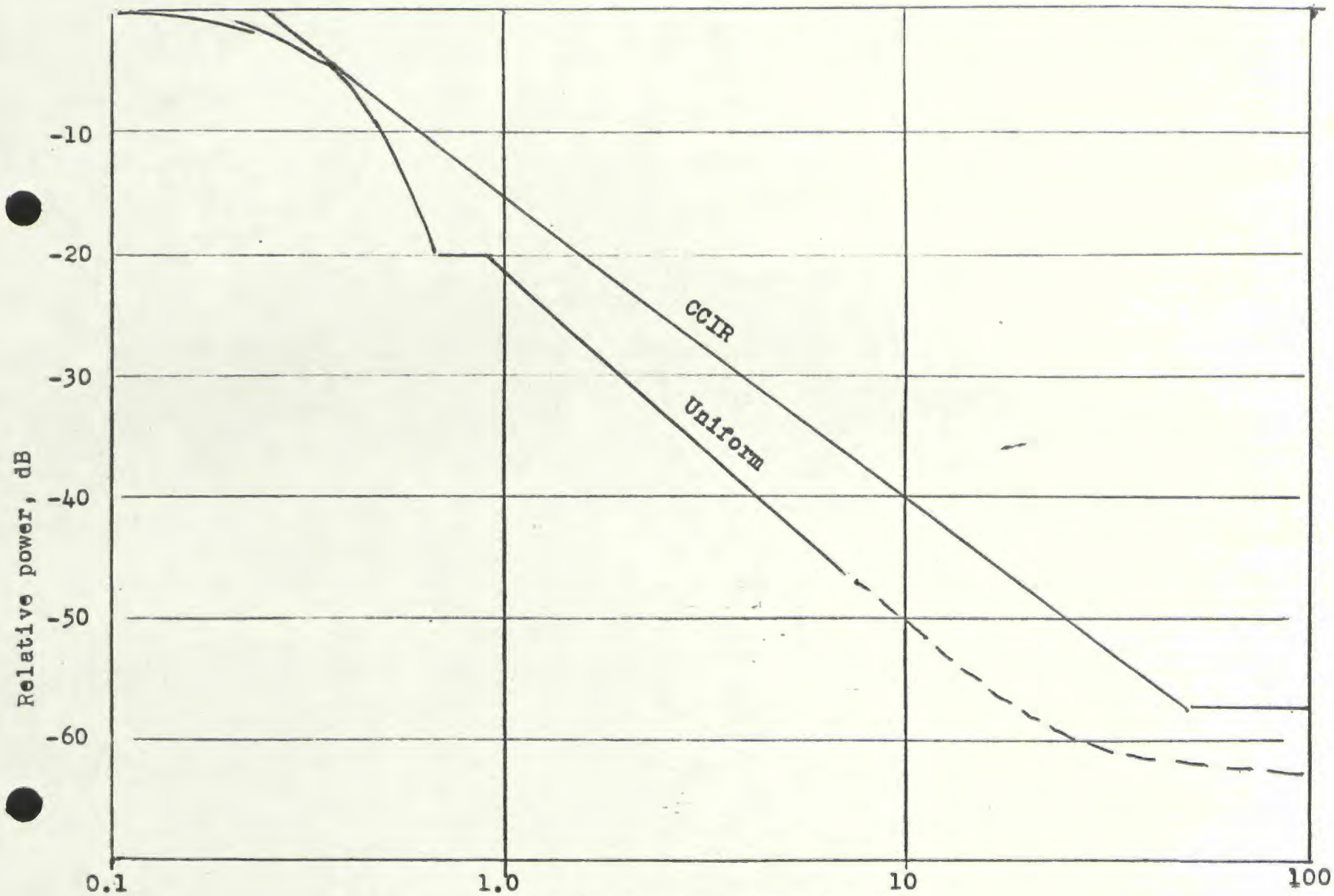
Here we show the relative discrimination in antenna directivity as a function of antenna pattern for a given antenna size. The curve labeled CCIR shows the discrimination defined by the CCIR provisional pattern standard of $32 - 25 \log_{10} \phi$,* as compared with an equivalent circular aperture with uniform illumination. Here we see that from five to ten dB of additional intersystem isolation can be achieved with optimum antenna design. Whether or not such an improvement can be achieved depends on the economic viability of improved antenna designs.

*See CCIR Report L.2.w (IV), Geneva, 1968, which says,

"..... a radiation diagram following the characteristic given below would be a conservative fit to most of the available data (on radiation diagrams of existing antennas), at least for antennae with gains between 45 and 60 dB down to a side-lobe level of - 10 dB relative to isotropic:

"Gain (relative to isotropic antenna) = $32 - 25 \log_{10} \phi$ (dB)

"where ϕ is the angle (in degrees) between the axis of the main beam and the direction in question."



Antenna model patterns for D/λ - 100 (25' @ 4 GHz)

FIGURE #23

FIGURE #24

In concluding this presentation, we call attention again to the policy problems, as we see them, which are "begotten" by technical factors.

Antenna beams cannot be shaped to fit a geographic or political entity precisely. Therefore, so-called domestic space services may require international coordination and compromise.

There appear to be bona fide requirements for community broadcasting from satellites, in some parts of the world if not in the United States. The frequency requirements for such a service should be studied to indicate preferred bands and to establish practical sharing criteria, and a U. S. position supporting appropriate allocations is required.

Technical factors influencing spacing of satellites in the geostationary orbit are numerous, and complex, and therefore the U. S. should oppose any attempts to pre-assign "parking spaces" in this orbit on a geographic or political basis, and support a flexible assignment and adjustment procedure based on actual system requirements.

POLICY PROBLEMS

- SPILLOVER CAN NEVER BE COMPLETELY ELIMINATED

  - HENCE -

  POLITICAL COMPROMISE INDICATED.

- IF -- AS WE ANTICIPATE -- SPACE BROADCASTING IS "INEVITABLE" --

  U. S. SHOULD RECOGNIZE AND SUPPORT FREQUENCY REQUIREMENTS.

- DIFFICULT TO PRE-ASSIGN ORBIT "SLOTS" PERMANENTLY

  THEREFORE

  U. S. SHOULD OPPOSE ANY SUCH PROPOSALS.

FIGURE #24

Dorsett

September 12, 1969

MEMORANDUM FOR TOM WHITEHEAD

Subject: Domestic Satellite Issues

Please forgive my resort to the formality of a memo, but I find it generally easier to marshall my thoughts on a subject on paper rather than around the conference table.

Briefly, I am as concerned as yourself as to how we approach this issue. Perhaps I am overly pessimistic, but the past few years have convinced me that progress in bringing some life and action into the communications industry is likely to be in modest increments based on solid, irrefutable analyses rather than revolutionary leaps based on broad generalizations and analogies with other industries. In short, I suspect we shall have to eventually fall back from the open-skies philosophy (much as I might support it) and seek much more modest advances. What troubles me is that, should we go all out for a major change and fail in that, the fallback position could well be the status quo if adequate attention is not given during the preparatory work to various intermediate alternatives. This incidentally was one of the grave miscalculations of the recent Task Force staff during its early, heady days.

To be more specific, I will try to restate some of my comments at yesterday's meeting. First, there is a natural tendency -- fostered by the common carriers whenever possible -- to lump "communications" or "telecommunications" into one large pot dominated by the basic telephone (or "public message switched") service. Thus, when one speaks in general terms of "competition" in the industry, it raises the immediate spectre in many minds of two or more bandsets in every home and office, and all the wasteful duplication that implies. One of the first steps of the Economics Committee, I would think, should be to clearly distinguish between the public message switched service, private line services, data services, video services, etc. By examining each of these as distinct services, the committee should be able to evaluate the merit of providing each under either (a) a single integrated system;

(b) competitive systems serving the same customers; (c) competitive but complementary systems (e.g., area or service monopolies with competition at the fringes); (d) common-user systems; or (e) private, dedicated systems. I suspect that even purely economic considerations may opt for different treatment of different services; but more importantly, the process should clearly indicate tenable fallback positions once the political hue and cry becomes unbearable.

Secondly, there is a further tendency to opt for either common-carrier operations (to promote systemic integrity, achieve maximum economies of scale, etc.), or fully competitive operations (to secure maximum innovation, etc.) or private, dedicated systems (to secure freedom of choice and maximum cost-savings to the user, etc.). This unfortunately ignores an intermediate solution which, though requiring considerably more coordination and cooperation, seems to me to have several advantages (e.g., both exploitation of economies of scale and user freedom of choice and direct realization of cost savings, etc.). This is the common-user approach, in which several interests jointly design, install, operate, and use a common set of facilities and share appropriately in their cost. Unlike common-carrier operations, each user has a positive voice in system operation and pricing which provides some leverage for innovation, even where direct competition is infeasible. The satellite seems a natural for the common-user approach, since it is a single, costly facility which inherently can serve so many diverse needs. It is less clear that earth stations offer such common-user benefits, particularly as their costs decrease and as specialization (e.g., receive-only) appears to offer further cost savings. However, for some services, common-user earth stations (serving either competitive or complementary systems) may be very attractive.

To sum it all up, I feel we should very carefully delineate the potential communication satellite service (including such as mobile radio services, for example); carefully evaluate the potential role of competition, complementarily, and monopoly for each service as well as for aggreations of service; and finally give serious consideration to common-user opportunities to meet those situations where monopoly is not basically "natural" nor essential

but where fully independent private systems might not be cost competitive with the established monopolists, given their built-in advantages. For the latter to be effective, however, a clear demarcation would have to be made between common-user and common-carrier participants, since the planning, design, and operation of the facilities would otherwise be dominated by the large-scale, public-service-oriented needs of the common-carriers, to the probable detriment of common-users each having relatively small and specialized needs.

Walter Hinchman

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 week's 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.

Meetings

8/15/69 - Mtg. of working group

9/11/69 - Mtg. --

Don Baker
Tom Moore
Bill Morrill
Dick Gabel
Walter Hinchman
Will Kriegsman

IFAC
INTERFACE
FOR APPLIED
COMMUNICATION
680 Park Avenue
NEW YORK, N.Y. 10021 (212) 879-1322
110 ETON ROAD • MORRISVILLE, PENNA. 19067 (215) 295-9027

September 11, 1969

Dr. Clay T. Whithead, Chairman
White House Task Force on
Domestic Satellites
The White House
Washington, D. C.

Dear Doctor Whithead:

As a broadcast veteran of 30 years and a consultant and writer on broadcasting and satellites, I would appreciate it if you would put me on a mailing list to receive any copies of releases and findings concerning your task group.

I wish you the best in this important service to the nation.

Sincerely,

Ralf Brent
President

RB/jm
cc: Hon. Rosel Hyde

Monday 9/15/69

4:00 Meeting of the Domestic Satellite Working Group has been scheduled for Thursday (9/18) at 3 p.m.

Economic Committee

Dr. Tom Moore, Chairman	(103) 5080	395-5080
Mr. William Morrill	(103) 4684	395-4684
Mr. Don Baker	(187) 2411	737-8200
Mr. Bernard Strassburg		632-6910
Dr. Walter Radius	(13) 24583	962-4583
Dr. James Armstrong	(177) 7442	961-7442

Technical Committee

Dr. Russell Drew, Chairman	(103) 3570	395-3570
Col. Ward Olsson	(103) 5190	395-5190
Mr. Richard Beam	(13) 34313	963-4313
Mr. William Watkins		632-7060
Dr. Richard Marsten	(13) 20888	962-0888
Mr. Wilbur Serwat	(177) 8687	961-8687
Mr. Walter Hinchman	(145) 2179	456-2179

9/16/69
for
9/18 mtg

THE WHITE HOUSE
WASHINGTON

To: Domestic Satellite
Working Group

From: Tom Whitehead

Attached is an agenda and draft of issues to be considered in the Technical and Economic Committees which we will discuss at our 3 o'clock meeting on Thursday, September 18, in Room 415 of the Executive Office Building.

Attachments

AGENDA

DOMESTIC SATELLITE WORKING GROUP MEETING

SEPTEMBER 18 , 1969 (3:00 pm)

1. Announce appointments of William E. Kriegsman as Executive Secretary to the Group; and Jon Rose as legal advisor to the Working Group.

2. Announce establishment of two subsidiary committees:

(1) Economic Committee
(2) Technical Committee

Membership of Committees:

Economic Committee	Technical Committee
Dr. Moore, Chairman	Dr. Drew, Chairman
Mr. Morrill	Col. Olsson
Mr. Baker	Dr. Radius
Mr. Strassburg	Mr. Beam
Mr. Scherr	

3. Discuss the responsibilities of the working group:

The working group has been established to assist the White House in the development of guidelines to achieve the following objectives:

- assure full benefit to the public of the economic and service potential of satellite technology.

- insure maximum learning about the problems and possibilities of satellite services.

- Minimize unnecessary regulatory impediments to technological and market development by the private sector.

- encourage more vigorous innovation generally among communications entitles to develop new telecommunications services and markets.

4. Discuss responsibilities of the two committees.

   a. The Economic Committee will focus on the implications and alternative institutional arrangements for:

      -- the objectives cited above

      -- entry, operation and regulation

      -- terrestrial common carriers

   b. The Technical Committee will evaluate the major technical constraints governing the provisions of domestic satellite service; particularly, the availability and communications capacity of radio spectrum resources, the question of orbital slots and the technical operating criteria required to ensure effective and efficient use of these resources and compatibility among systems.

5. Discuss, consider any proposed revisions of the five alternatives contained in the August 15 handout.

6. Establish a reporting schedule for the two committees and plan for meetings of the entire working group.

Attachments:

Outlines of Economic and Technical Studies

9/15/69

DOMESTIC SATELLITE
ECONOMIC COMMITTEE OUTLINE

I. Alternative uses of satellites: potential applications and prospective users

   A. Benefits to users and to the economy (early use and in the long run)

   B. Costs and rates

   B. Economies of scale

II. An evaluation of three basic alternatives -- open entry, limited entry, or single system -- on the basis of:

   A. Flexibility to provide the public with alternative services

   B. Insure efficient use of satellites and serving the public

   C. Encourage innovations in communications

   D. Increased learning about possibilities for use, costs, and service

III. Policy on potential entrants

   A. Who are potential entrants?

   B. Should terrestrial common carriers be carred?

   C. Should major networks be barred?

   D. What if number of entrants is few (one or two)?

      1. Possibility and results if few entrants

      2. Government policy to encourage other entrants

3. Restrictions on bandwidth?

IV. Policy on operation of system

A. How should satellites (common carrier and others) be regulated?

1. Ownership

2. Rates (maximum or minimum?)

3. Spectrum use

4. Access

B. Should ownership of ground stations be specified, e.g. commonly owned with satellite, different ownership than satellite, left up to marketplace? (two way and receive only)

C. If system is to be a pilot --

1. How long should it run?

2. Who should run it?

V. Effect of alternatives on terrestrial common carriers

A. Cream skimming

B. Rates and rate basis

C. Regulation

D. Interference and compensation

Technical Committee

The primary objective of the Technical Committee is to identify -- and evaluate the importance of -- those technical and operational factors which could significantly limit the development, number, operation, and economics of domestic satellite communication systems. A secondary objective is to describe technical/operational criteria which should guide interim development of such systems so as to avoid harmful radio interference between different satellite systems as well as between satellite and terrestrial systems.

The Committee is not required to resolve outstanding technical differences or uncertainties, nor to develop design, operational or experimental criteria aimed at achieving an optimum system configuration for domestic satellites. Rather, the focus should be on the following specific questions which are important to the basic policy issues.

1) Is it technically feasible to accommodate planned INTELSAT and Canadian domestic satellites plus one or more satellites for U. S. domestic services, using the 4 and 6 GHz spectrum bands presently allocated for commercial communication satellite services? If so, approximately how many U. S. satellites could be accommodated, assuming present and near-future technology and design possibilities? (Inasmuch as the results of this analysis will contribute to the shaping of basic domestic satellite communications policy, it will consider not only present technology, operations, spectrum usage criteria, etc., but also technically feasible alternatives and/or extensions of these factors.)

2) Is it technically feasible to accommodate one or more domestic earth stations within or near typical major metropolitan areas, again assuming use of 4 and 6 GHz spectrum allocations, under various combinations of the following alternative deployments:

(a) all stations operate in send/receive mode

(b) most stations are receive only

(c) each station uses entire spectrum allocation

(d) most stations use only small fraction of spectrum allocations

(e) minimum earth station antenna size is 15, 30, 60, or 90 feet

(f) only highest grades of telephone and video service is acceptable

(g) lower grades of service are acceptable.

How many earth stations are feasible per city, under various combinations of the above parameters?

3) To what extent is it technically feasible to use other spectrum bands not now available to commercial communications satellite services (e.g., 7 and 8 GHz communication satellite allocations now reserved for Government use) on a shared basis, or to achieve greater use of any of these spectrum bands through multiple antenna beam technology, reversal of up-and-down link frequency assignments, etc.? What multiplication of the basic communications capacity indicated in (1) above appears likely through such techniques, assuming there were no policy or other impediments to their exploitation?

4) Is it technically feasible to provide communications service to Alaska and/or Hawaii and/or Puerto Rico through separate antenna beams on a satellite designed for service to the contiguous 48 states? Would this materially alter the reliability and total cost (combined earth and space segment) of (a) service to the contiguous states and (b) service to and within Alaska, Hawaii, or Puerto Rico (as compared with provision of the same services through INTELSAT or Canadian satellites, for example)?

5) Which design and/or operating characteristics of domestic satellite systems require standardization and/or coordination to insure compatibility among systems and adequate growth potential? To what extent are these standards and coordination likely to be worked out among the parties concerned, under present FCC rules and regulations, and to what extent will it be essential that the Government exercise regulatory control of such proceedings? What alternative steps could be taken to encourage resolution of these issues directly by the parties concerned? Specifically, would it be technically feasible for one party or another to either operate with reduced quality of service or adopt appropriate design changes to accommodate a potentially interfering service, if there were effective rules for and means of compensation?

6) What significant developments in either technology or technical information are foreseen during the next 10 years which might result in major improvements in the cost and capacity of satellite communications, greater and more efficient utilization of the radio spectrum resource, or the operational scope and effectiveness of satellite communications?

Dan Sat file

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Wednesday 9/17/69

2:00 Robert Lowe left these papers for you --

7/11 memo is criticism of the Task Force Pilot Program proposal for the domestic satellite. The other memo is a criticism generally of the Task Force Report and it includes some recommendations for long-range institutional arrangements for the domestic satellite, as well as a common carrier regulation. Green book is a copy of a report he did for the Senate Commerce Cmte. The heart lies in the conclusions and recommendations that are appended by a paper clip.

He said there was another paper that he can't find; assume the BOB still has copies of that. It was DOT's recommendations for reorganization of Telecommunications Management. In terms of his biases and ideas in the field, he feels this is probably the most comprehensive thing he has done.

???????

Meeting -- September 18, 1969 -- 3:00 p.m.

OST	Dr. Russell Drew
CEA	Dr. Tom Moore
BOB	Bill Morrill
DTM	Col Ward Olsson
FCC	Chairman Rosel Hyde Bernard Strassburg William Watkins
Justice	Donald Baker
NASA	Mr. Willis Shapley Dr. Walter Radius
Commerce	Walt Hinchman Larry Gatterer
P. O.	Robert Scherr Dr. James Armstrong Wilbur A. Serwat
DOT	Richard Beam Richard Gabel Will Kriegsman Clay T. Whitehead

Don Salt
file

Meeting -- September 18, 1969 -- 3:00 p.m.

OST	Dr. Russell Drew -
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BOB	Bill Morrill -
DTM	Col. Ward Olsson -
FCC	→ Chairman Rosel Hyde - Bernard Strassburg - ECON - William Watkins - TECH. -
Justice	Donald Baker -
NASA	→ Mr. Willis Shapley - DR RICHARD MARSTEN TECH - : Dr. Walter Radius - ECON
Commerce	Walt Hinchman - Larry Gatterer
P. O.	→ Robert Scherr - Dr. James Armstrong - ECON. - Wilbur A. Serwat - TECH -
	Richard Gabel - Will Kriegsman - Clay T. Whitehead -

MEMORANDUM

THE WHITE HOUSE

WASHINGTON

MEMORANDUM FOR

Working Group Members

1. As a result of the meeting on September 18, 1969, membership of the Economic and Technical Committees was revised as follows:

Economic Committee	IDS Code	Outside No.
Dr. Tom Moore, Chairman	(103) 5080	395-5080
Mr. William Morrill	(103) 4684	395-4684
Mr. Don Baker	(187) 2411	737-8200
Mr. Bernard Strassburg		632-6910
Dr. Walter Radius	(13) 24583	962-4583
Dr. James Armstrong	(177) 7442	961-7442
Technical Committee		
Dr. Russell Drew, Chairman	(103) 3570	395-3570
Col. Ward Olsson	(103) 5190	395-5190
Mr. Richard Beam	(13) 34313	963-4313
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Dr. Richard Marsten	(13) 20888	962-0888
Mr. Wilbur Serwat	(177) 8687	961-8687
Mr. Walter Hinchman	(145) 2179	456-2179

2. Attached for the information of the Working Group is a discussion prepared by OTM of the objectives set forth in the Agenda for the September 18, 1969 meeting.

W. E. Kriegsman

1 Atch
OTM Talking Paper

WEK/nck

TALKING PAPER

ALTERNATIVES FOR INTERIM POLICY ON DOMESTIC SATELLITE COMMUNICATIONS

OBJECTIVES

To determine if, how and when satellite communications can be utilized in domestic telecommunications and, when ready and wherever advantageous, to realize the early and orderly introduction and integration of satellite communications technology into the domestic telecommunications environment, through an evolutionary process, to contribute to attaining national telecommunications goals (ends) listed by priority as follows:

-- Enhancement of the availability, quality, versatility and dependability of services provided by telecommunication systems to make available increased benefit to the users, both private and Governmental, and contribute to the achievement of social, economic and security objectives of our nation.

-- Expansion of the range of available telecommunications services offered to all users of telecommunications through the application of technological and management innovations, where advantageous.

-- Attain coordinated and efficient use of the electromagnetic spectrum -- a limited international resource -- and the technical compatibility of the communications satellite system with existing terrestrial facilities both in the United States and abroad.

-- Continue to assure that cost benefits attained will accrue to users of enhanced and expanded range of telecommunications services.

-- Apportion responsibilities for various segments of new satellite communications elements in the domestic telecommunications environment and the concommitant structuring of institutional arrangements so as to optimize achievement of the above listed goals.

-- Assure that implementation of programs to realize the above goals are consistent with national policy including necessary Regulation to protect the public interest.

IMPORTANT AREAS OF CONSIDERATION

1. Radio Frequency Spectrum availability
2. International ramifications
3. Geostationary Orbital Space availability
4. Sound technical-operational planning
5. Demonstration (Pilot) project specific in scope and timing.

Thursday 9/18/69

9:15 Yesterday Robert Scherr called to say he was bringing Dr. James Armstrong with him to the 3 o'clock meeting today.

Now he called to say he wants to bring Wilbur A. Serwat also. I mentioned that the meeting was getting quite large. He indicated that Mr. Blount had gotten interested in it and had gotten the various departments vitally interested in it -- so he asked that Mr. Serwat also come. Scherr said he may eventually drop out of the meetings since he would only be interested in the regulation end of it.

Also, we had originally sent to Washburn, Scranton and Loy copies for <u>information.</u> Was anyone to be invited from State?

Thursday 9/18/69

5:10 Tom Malia of Telecommunication Reports called to talk with you -- wants to know if any meetings are being set with the Domestic Satellite Working Group and what's cooking.

He has a deadline tomorrow.

91ST CONGRESS
1ST SESSION

S. 2928

IN THE SENATE OF THE UNITED STATES

SEPTEMBER 18, 1969

Mr. GRAVEL introduced the following bill; which was read twice and referred to the Committee on Commerce

A BILL

To amend the Communications Satellite Act of 1962 to permit State ownership of satellite terminal stations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) section 103 of the Communications Satellite Act of 1962 (47 U.S.C. 702) is amended by—

(1) striking out the word "and" where it appears at the end of paragraph (9) thereof and inserting in lieu thereof a period; and

(2) adding at the end thereof the following new paragraph:

"(11) the term 'State' means the government of a State of the United States, the government of a political

subdivision of any such State, or an instrumentality of the government of any such State or political subdivision.".

(b) Section (c) (2) of that Act (47 U.S.C. 721 (c) (2)) is amended by inserting therein, immediately after the words "authorized carriers", the words "and States". And that the word "system" in both places of this subparagraph will be changed to "systems".

(c) Section 305 (a) (2) of that Act (47 U.S.C. 735 (a) (2)) is amended by inserting therein, immediately after the words "communications common carriers", a comma and the words "to States,".

COMSAT DISAGREES '100%' WITH GRAVEL'S CHARGES ON SATELLITE SERVICE PROPOSALS FOR ALASKA; SENATE BILL WOULD ALLOW STATES TO OWN STATIONS

A charge by Sen. Mike Gravel (R., Alaska) that the Communications Satellite Corp. "appears to be engaged in a deliberate campaign to undermine the immediate application of satellite communications" services in Alaska was rejected by Comsat Friday, Sept. 19.

Comsat Chairman James McCormack, replying to a letter from Senator Gravel, expressed "100 per cent disagreement" with the charges made by the Alaska Senator two days earlier. Mr. McCormack said that Comsat is making every attempt to work with "all interested parties. . .in an effort to bring satellite communications to your state by way of a system which is both operationally suitable and economically attainable."

Meanwhile, Senator Gravel introduced a bill in the Senate to amend the Communications Satellite Act of 1962 to permit state ownership of satellite terminal stations." In a message read to the Senate when he introduced the legislation, Senator Gravel said it would produce cost savings and other benefits.

He declared that the "era of satellite communications has been stymied, let me qualify this to say, has been perverted by traditional use of formulas predicated on the amortization of terrestrial or submarine methods of transmission and distribution."

In his letter to Comsat, the Alaska Senator complained about cost figures that have been quoted regarding the furnishing of satellite services to Alaska. He said he has been furnished cost figures which indicate that "Alaska could have a comprehensive communications system within a price range that would make economic sense. . .Comsat's regressive position is seriously impairing the developments of an adequate communications system for Alaska."

Mr. McCormack pointed out that the figures referred to by Senator Gravel were included in a presentation intended to describe "several of the many alternative system configurations which appear. . .to provide suitable communications services for Alaska from an operational standpoint."

The Comsat Chairman pointed out that William Miller, of Comsat--the target of Senator Gravel's complaint--used the term "optimum solution" in reference to several configurations ranging in cost from $10,000,000 to $20,000,000 per year. Mr. McCormack said that Mr. Miller was presenting examples of more comprehensive satellite systems which "would provide a more favorable solution to Alaska's present and future communications requirements," but that lower costs have also been stated in discussing possible system configurations.

-End-

COMMUNICATIONS SATELLITE CORPORATION

LUCIUS D. BATTLE
Vice President for
Corporate Relations

September 19, 1969

Dr. Clay T. Whitehead
The White House
Washington, D.C. 20500

Dear Tom:

I attach a copy of Jim McCormack's response to Senator Gravel. You will note that we ended up referring to the position Comsat had taken with respect to the White House study. We did not, however, mention a letter, and I hope that this reference, which we considered necessary, will not stir up interest in our full position.

If you have any questions, please call me.

Best regards.

Sincerely,

Lucius D. Battle

Attachment

COMMUNICATIONS SATELLITE CORPORATION

JAMES McCORMACK
Chairman

September 18, 1969

The Honorable Mike Gravel
United States Senate
Washington, D.C.

Dear Senator Gravel:

This is in reply to your letter of September 16 strongly attacking Comsat for appearing "to be engaged in a deliberate campaign to undermine" satellite communications for Alaska and for a "regressive position (which) is seriously impairing the development of an adequate communications system for Alaska." As painful as I find it to have to express one hundred percent disagreement with these statements, it would be even more painful to let them stand unchallenged on the record.

As the one U.S. communications entity solely devoted to progress in satellite communications, we can assure you that we have, from the beginning, actively pursued every visible opportunity for promoting satellite communications for Alaska.

Until the award of the sale of the Alaska Communications System to RCA, our efforts of necessity were confined to the area of our authorized activities, that is, interstate and international communications via an INTELSAT satellite. Even so, our enthusiastic efforts were unavoidably somewhat retarded by the concern of the Air Force managers of ACS that our application for an Alaska earth station might adversely affect the sale of ACS as directed by the Congress.

950 L'ENFANT PLAZA SOUTH, SW • WASHINGTON, D.C. 20024 • TELEPHONE 202-554-6020

The approval of the Talkeetna earth station by the Federal Communications Commission therefore came a good many months later than we had hoped for, but at least it was approved, and construction is now well along. In this connection, we should acknowledge the extensive help and support we received in this matter from two successive governors of Alaska and the many good citizens who have served on their communications task force.

We also want to emphasize again, as we have done many times in the past, that we have always regarded the Talkeetna station not just as a facility to improve interstate and international communications but even more importantly as the potential hub of an intra-state system for the happy day when U.S. domestic satellite communications may be authorized.

Accepting the disadvantage of adding even more bulk to this letter, I add two enclosures. The first is a copy of my letter to Mr. Robert W. Sarnoff, President of RCA, on the event of the announcement of the ACS award to RCA. As you will see, I urged with all of the persuasion at my command the immediate commencement of joint planning for "satellites for communications within Alaska."

The second enclosure presents an excerpt from the position taken by Comsat with respect to the White House domestic satellite communications study presently under way. As you will see, we put primary emphasis on the importance of an early decision in this matter because of its very great bearing on the future of Alaska communications.

Let me now turn to the specifics of your letter which are the apparent basis for your charges, to which my preceding comments relate. You refer to a press report of statements made by a Comsat official, Mr. William Miller, during his and my recent visit to Anchorage to participate in a public forum on the potential of satellite communications in Alaska.

Comsat began discussions on this subject with the late Senator Bob Bartlett in the fall of 1967. We have been involved in various discussions since that time with members of the Alaskan Congressional delegation and with various state and federal officials.

Our purpose has been to develop various satellite system configurations which -- operating in conjunction with existing and possible future terrestrial facilities -- could assist in resolving the communications needs of Alaska. Mr. Miller's comments in Anchorage were made in accordance with this purpose.

His speech in Anchorage was a continuation of Comsat's desire to present as accurate a portrayal as possible of the variety of satellite systems which can be established in Alaska as well as an estimate in each case of the costs which would be involved.

In short, his presentation was intended to describe several of the many alternative system configurations which appear, in Comsat's judgment, to provide suitable communications services for Alaska from an operational standpoint.

Mr. Miller used the term "optimum solution" in reference to several configurations ranging in cost from $10 million to $20 million per year.

The configuration estimated to cost $10 million per year would provide approximately 300 voice channels and one dedicated television channel through a 124-station network.

The system estimated at $20 million per year would provide about 1,500 voice channels and one dedicated television channel through a 163-station network, including six of the very large, high-capacity antennae.

Quite obviously, there are other ways in which satellite communications could be introduced in Alaska which would entail less annual costs. We do not deny this fact. Any less expensive proposals, however, would provide a satellite system of less capacity (either in space or on the ground or both) and thus fewer communications services for Alaska.

In your letter you refer to lesser cost figures confirmed by the highest authorities in the field. I am unfamiliar with the specific figures to which you refer and would be grateful if you would make them available to us with an indication of what services they would encompass and in what time frame, both factors being important to any accurate determination of cost for a satellite system for Alaska.

You may recall that -- as the result of a specific request from your office -- Comsat made a presentation to the Alaskan Congressional delegation on July 31 at the Capitol in which we described a system costing less than $10 million a year, designed to meet your estimates with respect to what Alaska could afford.

Mr. Miller's recent presentation in Anchorage was consistent with the July 31 presentation. His more recent cost estimates simply reflected examples of more comprehensive satellite systems which, in our judgment, would provide a more favorable solution to Alaska's present and future communications requirements.

With respect to your request for a cost effectiveness study on the subject of satellite communications in Alaska, it has been my opinion that the various alternative systems which Comsat has presented publicly on many occasions had fulfilled your request. If such is not the case or if we have failed to provide you with sufficient material, including cost estimates, on these various systems, I do hope you will accept our apology. We will be happy to review any of these presentations with you. Moreover, we are open to any suggestions you might have on any other more effective

ways in which Comsat can promote the solution of Alaska's communications deficiencies by way of satellite communications.

I can assure you in all sincerity, Senator, of our most earnest intentions on this subject, and that we shall continue to make every attempt to work with all interested parties -- including state and federal agencies -- in an effort to bring satellite communications to your state by way of a system which is both operationally suitable and economically attainable.

Sincerely,

James McCormack

COMSAT

COMMUNICATIONS SATELLITE CORPORATION

26 June 1969

Mr. Robert W. Sarnoff
President
Radio Corporation of America
30 Rockefeller Plaza
New York, New York 10020

Dear Mr. Sarnoff:

The announcement in this morning's press of RCA's successful offering for the Alaska Communications System gives me the reason for writing to you to emphasize the aspect of communications in our 49th state which seems to me to be of greatest interest. That is satellites for communications within Alaska.

As you may be generally informed, Comsat has made a major effort over the past two years to initiate satellite communications for Alaska. Handicapped by the absence of a commercial partner with which to work while the Air Force system was up for sale, we have nevertheless succeeded at least in securing approval by the Federal Communications Commission of an interstate/international earth station at Talkeetna.

To our way of thinking, however, this is only the beginning. This station can serve equally well as the keystone in a network of ground facilities for Alaskan state-wide services, and that is the point I want to emphasize.

We in Comsat are convinced that with forward-looking joint planning RCA and Comsat can in one giant stride help move Alaska communications from the poorest in our nation to a place along with the best. Educational broadcasting can be provided for, as can all of the other tools of economic and sociological development which depend in a substantial way on good communications.

Mr. Robert W. Sarnoff
26 June 1969

We believe moreover that the necessary cooperation will be forthcoming from federal and state authorities as a comprehensive and feasible joint satellite-terrestrial plan is produced.

I want to give all the weight I can to the idea of a major joint endeavor by RCA and Comsat toward the wide-scale introduction of satellite communications in Alaska. We should definitely include the possibility of a satellite designed specifically for Alaska, as well as the prospects for adding Alaska to the proposed overall U.S. domestic satellite system. A specially tailored Alaskan satellite system could well be the pilot for the larger system, an idea with very interesting potentials.

Sincerely,

S/ James McCormack

Excerpt from position taken by Comsat with respect to domestic satellite communications in connection with study by White House:

"In the case of Alaska, a critical time is at hand to determine the most effective and economical configuration for Alaska's internal and external requirements. The Alaska Communications System has recently been awarded to RCA, with a commitment by RCA for expansion, improvement of service and reduced rates. A major satellite earth station is under construction at Talkeetna, situated between Anchorage and Fairbanks. Proposals for an early capability for satellite communications in Alaska are under study by Comsat, NASA, RCA, and the responsible officials and representatives of Alaska. Any proposal that looks toward the maximum use of satellite links for Alaska's internal and external requirements, and toward an early connection of both with a domestic system, will work toward much improved and lower cost communications for the 49th state. Failure to provide timely access to satellites will chain the chief Alaska traffic streams to conventional facilities and will in the end make all communications more expensive for users in Alaska. The communications requirements of Alaska should be considered as an urgent, integral part of the domestic inquiry."

MIKE GRAVEL
ALASKA

United States Senate

WASHINGTON, D.C. 20510

September 16, 1969

Mr. James McCormack, Chairman
Communications Satellite Corporation
950 L'Enfant Plaza, S.W.
Washington, D.C.

Dear Mr. McCormack:

The Anchorage Daily Times of August 30th quoted William Miller of your organization as advising Alaska that an "optimum solution" for satellite communications would cost between $10 and $20 million" annually just for the satellite and the earth stations.

This is an outrageous statement, and I am surprised that you permit such statements by a purported expert. Certainly there is no limit to the amount of money that can be spent on communications. But the "optimum solution" is far below the $10-20 million annual range. Considering the number of meetings we have had on this point I cannot excuse Comsat's public insistence on an inflated figure as a case of simple misunderstanding. Comsat appears to be engaged in a deliberate campaign to undermine the immediate application of satellite communications in Alaska for the full range of intra-Alaska communications services.

The cost figures that I have, confirmed by the highest authorities in the field, indicate that Alaska could have a comprehensive communications system within a price range that would make immediate economic sense. In meetings with your representatives, these cost figures have never been denied.

Since February I have been attempting to secure from your organization a cost effectiveness study that

has been repeatedly promised as forthcoming. I trust that its eventual appearance will withstand the light of public examination.

Comsat's regressive position is seriously impairing the development of an adequate communications system for Alaska. I challenge Comsat to publicly justify the $10-$20 million annual program Mr. Miller so blithely talks about in print.

Sincerely,

Mike Gravel

cc:

Members of the Board of Directors
of the Communications Satellite Corporation

Members of the Federal Communications Commission

Dr. Clay T. Whitehead, Office of the President
General James D. O'Connell, Director, Office of Telecommunications Management, Executive Office of the President

Satellite Communication System For The State Still Is In Doubt

A vast amount of expert information on satellite communications for Alaska was aired in the past two days, but at the close of the first Alaska conference on satellite telecommunications, it was still doubtful when the state could expect such things as live television and educational television.

The proposed satellite communication network for the state was described as the "optimum solution," by William Miller, project manager for the Communications Satellite Corp.

However, he said the network would cost some where between $10 to $20 million annually for just the satellite and earth stations.

The smaller price he quoted would provided limited service to a limited area, while the higher cost would bring greater service to a larger area.

At the close of the conference Friday afternoon, Chairman George Sharrock, also chairman of the Alaska Federal Field Committee, said the meeting provided a "better perspective of our problems" in communication and "better ideas on how to solve them."

He said committees organized during the course of the conference would continue to look into such aspects as the realistic requirments of the state, the amount of revenues needed and sources for these revenues, possible use of a commercial system by the conventional and satellite systems and a realistic timetable for full satellite communication.

Committee reports were the last item on the agenda Friday.

The committees had been formed primarily to investigate aspects of the satellite demonstration program. Sharrock said, however, that until "we know where the money for this is coming from," he could not state definitely that the demonstration, using television as an educational medium, would go ahead.

The cost of this demonstration, according to Dr. Charles Northrip of the educational broadcast commission, who headed the requirements committee, would be in excess of $2 million. Although the state would obviously participate in the funding of this program to some extent, he said, "it is premature at this time" to outline full funding. More exploration, said Northrip, was needed in this area.

Anchorage, Alaska, Saturday Evening, August 30, 1969

ANCHORAGE DAILY TIMES

THE WHITE HOUSE

WASHINGTON

September 26, 1969

Dear Mr. Bazzy:

I am attaching a copy of the letter from Rosel Hyde (as dictated over the telephone to me), as well as a copy of our letter to him.

The following are the representatives on the White House Working Group:

OST	Dr. Russell Drew
CEA	Dr. Tom Moore
BOB	William Morrill
OTM	Col. Ward Olsson
FCC	Bernard Strassburg
Justice	Don Baker
NASA	Willis Shapley
Commerce	Walter Hinchman
P. O.	Robert Scherr
DOT	Richard Beam

However, some of these names could change; others have also been attending the meetings.

Sorry I have been delayed in getting this to you -- but I've sure been busy.

Sincerely,

Eve Daughtrey

Secretary to
Clay T. Whitehead

Attachments

Mr. William Bazzy
President and Publisher
The Microwave Journal
Horizon House
610 Washington Street
Dedham, Massachusetts 02026

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON

OFFICE OF
THE CHAIRMAN

July 24, 1969

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

Dear Dr. Whitehead:

This is in reply to your memorandum dated July 22, 1969, noting the importance of the domestic satellite field and the establishment of a small working group to assist the Administration in reviewing the area with the objective of formulating within about sixty days whatever Administration suggestions or comments may be appropriate.

We fully agree on the importance of the domestic satellite issue. As you are aware, this field has been the subject of a lengthy Commission proceeding (F.C.C. Docket No. 16495) and has also been studied extensively by the Executive (e.g., Report of the President's Task Force on Telecommunications). We believe that for a number of significant reasons, it is vital to proceed without further undue delay in the formulation of national policy in this area. At the same time we would, of course, welcome any further exchange of views or comments which the Executive might wish to make in this new field.

Your memorandum of July 22, 1969 indicates that we are in full agreement on both these objectives--a decision without further undue delay, and, at the same time, a full exchange of views so as to assure

a result most benefitting the public interest--and that the objectives are not inconsistent, but rather can and must be achieved. We look forward to the continuation of our important and useful liaison to achieve the foregoing objectives.

Sincerely yours,

Rosel H. Hyde
Chairman

July 22, 1969

MEMORANDUM FOR

Mr. Rosel Hyde
Chairman
Federal Communications Commission

In our review of the telecommunications problems facing the Nation and their implications for Government policy, we have found the provisions for introducing communications satellites into U. S. domestic communications to be especially important.

To assist the Administration in further reviewing this area, we are establishing a small working group and invite the FCC to participate in any way you deem appropriate. Our objective will be to formulate within about sixty days whatever Administration suggestions or comments may be appropriate. We will be concerned, of course, with the general structure and direction of the industry and not with specific applications pending before the Commission.

Clay T. Whitehead
Staff Assistant

cc: Mr. Flanigan
Mr. Kriegsman
Mr. Whitehead
Central Files

CTWhitehead:ed

Dr. Myron Tribus (189)3111
Commerce Larry Gatterer

Economic Committee

Dr. Tom Moore, Chairman	(103) 5080	395-5080
Mr. William Morrill	(103) 4684	395-4684
Mr. Don Baker	(187) 2411	737-8200
Mr. Bernard Strassburg		632-6910
and Chairman Hyde	~~632~~	632-6336
Dr. Walter Radius and	(13) 24583	962-4583
Mr Willis Shapley	(13) 24715	962-4715
Dr. James Armstrong	(177) 7442	961-7442
Mr. Robert Scheer	(177) 7472	961-7472

Technical Committee

Dr. Russell Drew, Chairman	(103) 3570	395-3570
Col. Ward Olsson	(103) 5190	395-5190
Mr. Richard Beam	(13) 34313	963-4313
Mr. William Watkins		632-7060
Dr. Richard Marsten	(13) 20888	962-0888
Mr. Wilbur Serwat	(177) 8687	961-8687
Mr. Walter Hinchman	(145) 2179	456-2179

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Chief of Evaluation Section
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Mr. Willis Shapley (13) 24715 962-4715
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Washington, D. C.

lunch at 12 — would not be free by

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Mr. Jonathan Rose Administrative Assistant White House Washington, D. C.	2514	
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Linda

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Mr. Jonathan Rose Administrative Assistant White House Washington, D. C.	2514	
Mr. William Anders National Aeronautics and Space Council New Executive Office Building Washington, D. C. 20502	3300	

domsat

September 23, 1969

MEMORANDUM FOR MR. FLANIGAN

Here for your information is a collection of the latest papers on the domestic satellite study.

The first is a discussion of alternative policies. It has been tabled pending the work of the Economic and Technical Subcommittees. The second item is the agenda of our last meeting and the agreed-upon outlines of the charters of the two subcommittees.

Clay T. Whitehead
Staff Assistant

Attachments

cc: Mr. Whitehead
Central Files

CTWhitehead:ed